1 Locality Plan
1 : 1000

CONSTRUCTED TO LEVEL 1 (AS3959-2009)
NOTABLY:
- CONCRETE SLAB ON GROUND
- EXTERIOR WALLS, ROOF, VERANDAH MATERIALS ALL NON-COMBUSTABLE
- SEALED WALL AND ROOF JOINTS (EMBER ATTACK)
- COMBINATION OF ALUM SHUTTERS AND TOUGHENED GLASS WINDOWS AND DOORS
- FIRE-RESISTANT DOOR FRAMES AND WEATHER STRIPS WHERE APPLICABLE
- ALL METAL EXTERNAL TRIMMINGS (GUTTERS, DOWNPIPES ETC)

ROCKHAMPTON REGIONAL COUNCIL

These plans are approved subject to the current conditions of approval associated with

Development Permit No. 084/2016

Dated: 10/11/16

Ariel Photograph

- Current BLE
- Proposed Dwelling and Shed positions

REVISIONS			
	02	TREE SURVEY ADDED	17.05.16
	01	PLANNING APPLICATION	07.02.16
	No.	DESCRIPTION	DATE

PROPOSED RELOCATION OF B.L.E.
FOR D. & K. BELL
AT LOT 4 EUCALYPTUS CRES, NORTH ROCKHAMPTON

PLAN SIZE:	WIND SPEED:	DRAWN:	CHECKED:	PROJECT No.
A2	C2	J.P.		T15-1202 -01

Builder....
Telephone....
Address....

Licenced under the QBSA Act Lic No.
Designer

SHEET 01 OF 05
REV. 01 02

ROCKHAMPTON REGIONAL COUNCIL

AMENDED PLANS APPROVED

4 August 2020

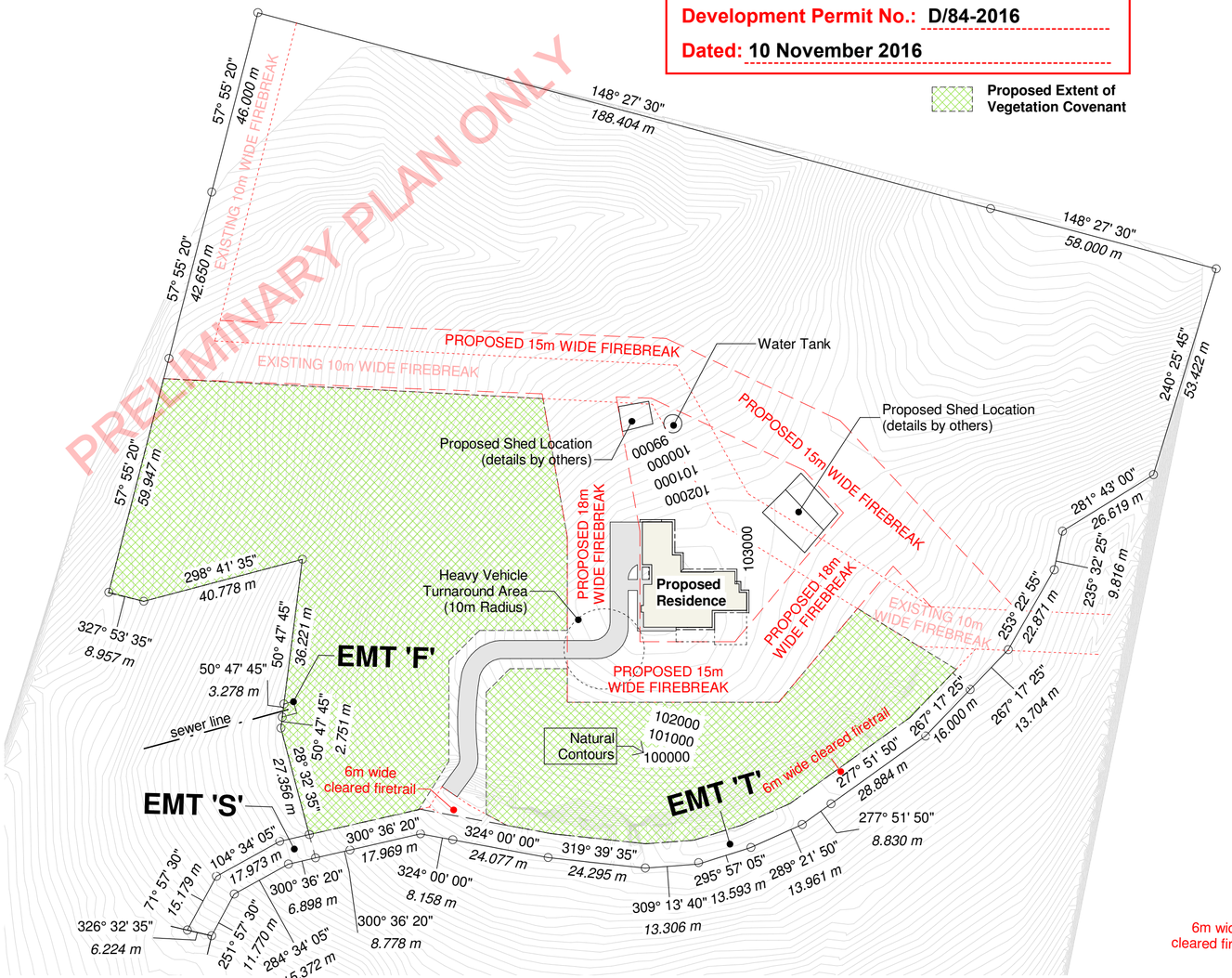
DATE

These plans are approved subject to the current conditions of approval associated with

Development Permit No.: D/84-2016

Dated: 10 November 2016

PRELIMINARY PLAN ONLY



Eucalyptus Crescent

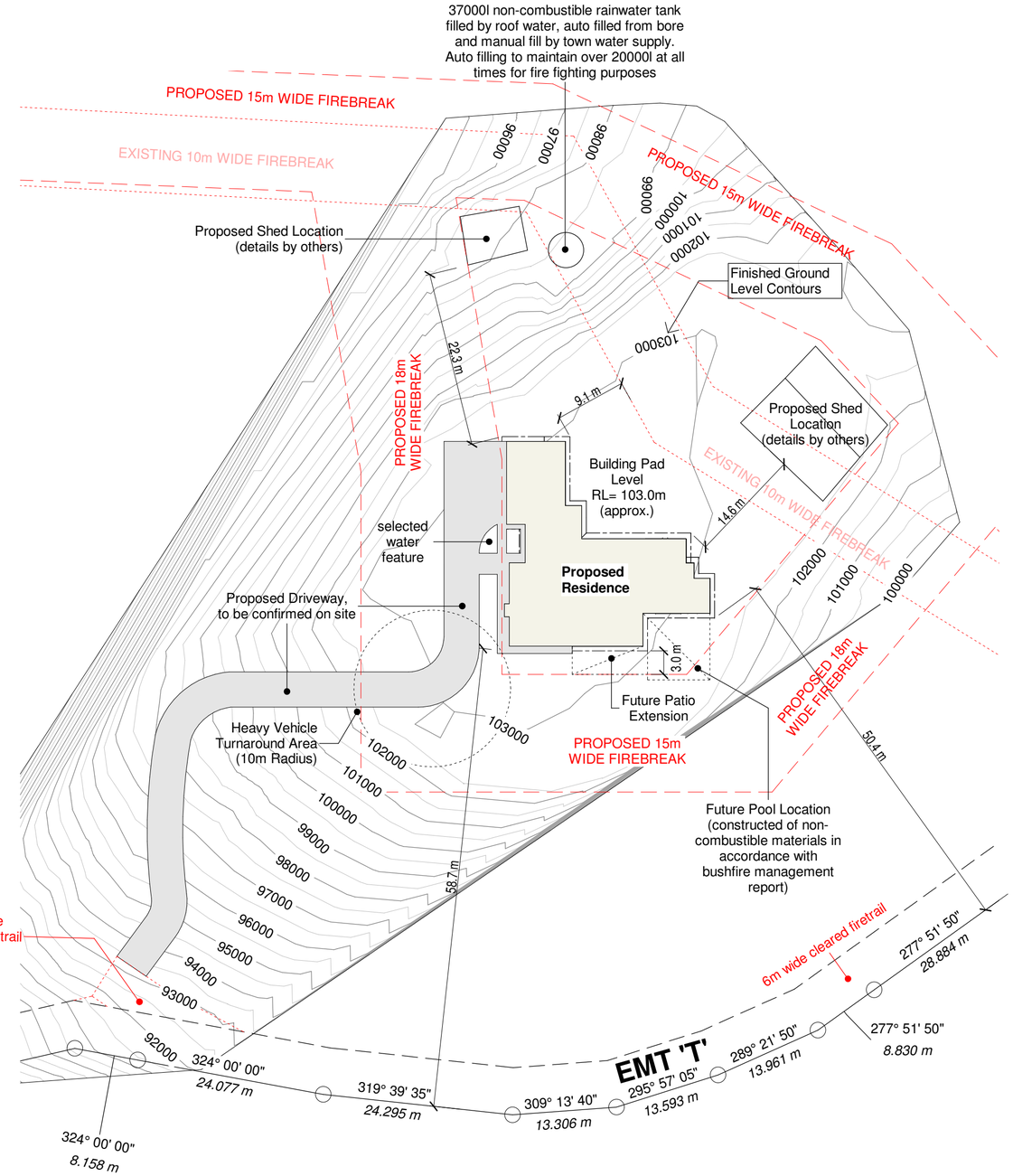
1 Site Plan

1 : 1000

Bushfire Hazard Site
Refer to bushfire hazard assessment and management plan for details

R.P.D.

Lot Number :	4
Reg./Survey Plan Number :	SP163932
Parish :	Murchison
County :	Livingstone
Area:	3.823ha
Datum :	AHD (Assumed)



2 Detailed Site Plan

1 : 500

No.	REVISION Description	Date
03	Preliminary Plan	26.06.2020
04	Preliminary Plan	14.07.2020
05	Preliminary Plan	15.07.2020
06	Preliminary Plan	21.07.2020
07	Preliminary Plan	24.07.2020

VAUGHAN building design
Phone: 0407 132 964
Email: admin@vaughanbuildingdesign.com.au
www.vaughanbuildingdesign.com.au
QBCC Licence No. (Ian Vaughan) 15007590

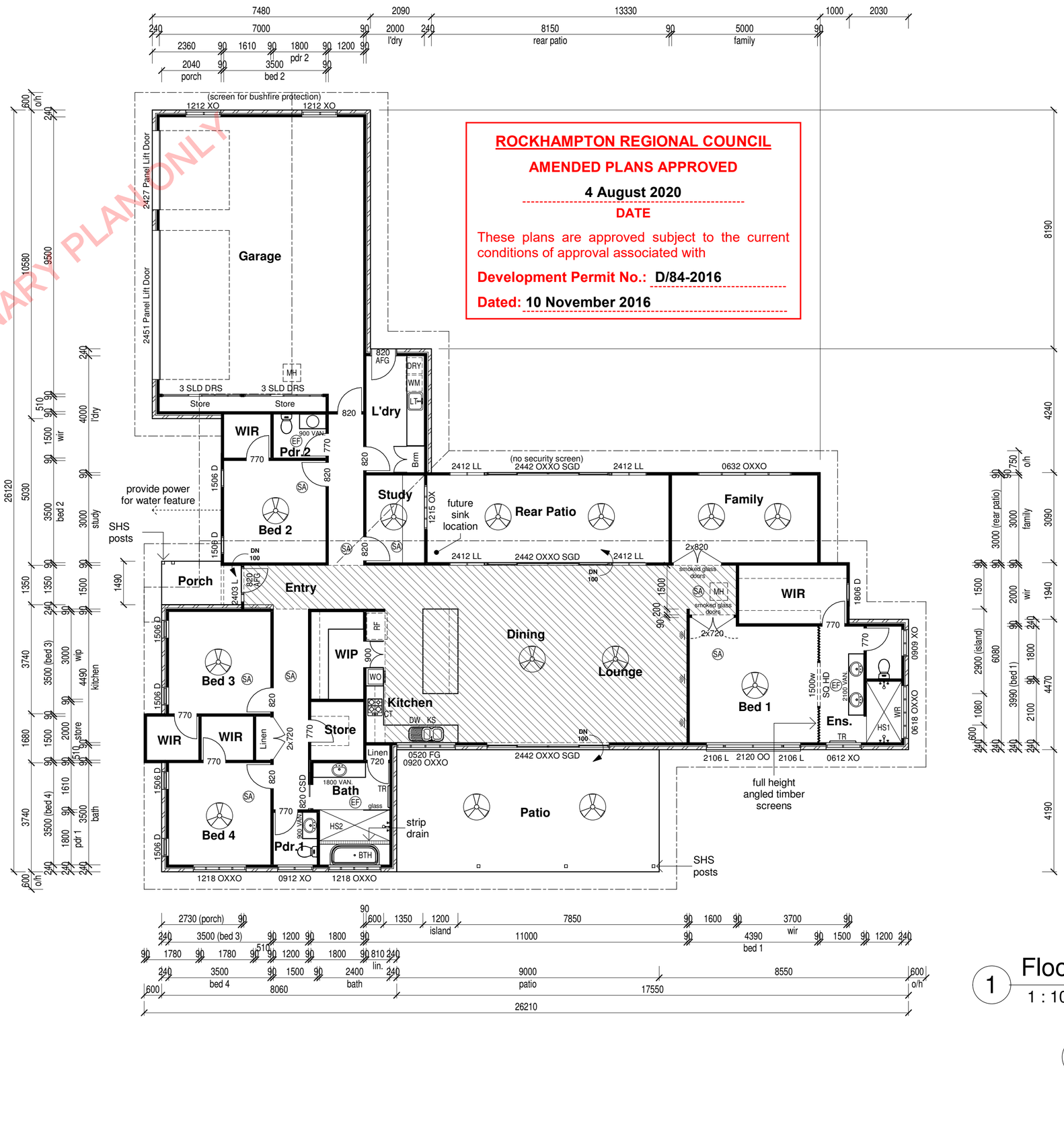
Proposed Residence
For B. & L. Hill
At 19 Eucalyptus Crescent, Norman Gardens

Drawn By: ILV
Checked By: ---
A2
Wind Speed

Project Number 19028

SHEET 01 OF 03 SHEETS

PRINT DATE: 24/07/2020 9:21:39 PM



Plan Legend

AFG	Aluminium Framed Glass Door
BTH	Bath
CT	Cooktop (gas)
DP	Down Pipe
DRY	Dryer
DW	Dishwasher
EF	Mechanical exhaust fan discharging to outside air in accord. with AS 1668.2
HC	Hose Cock
HS1	Hobless Shower (2100 x 1200)
HS2	Hobless Shower (1180 x 2400)
KS	Kitchen Sink
LT	Laundry Tub
MH	Man Hole
RF	Refrigerator
SA	Interconnected Photoelectric Smoke Alarm
TR	Towel Rail
WM	Washing Machine
WO	Wall Oven
WR	Wall Recess to owners detail
	Extent of raked ceiling
	- Soundproofing to wall

Window Legend

D	- Double Hung	*SLIDING WINDOWS*
A	- Awning	example: 1218 XO
CMT	- Casement	first 2 digits (12) = height (1200mm)
L	- Louvre	second 2 digits (18) = width (1800mm)
FG	- Fixed Glass	X - sliding panel
OBS	- Obscure glazing	O - fixed panel

Note: sliding panel always to be read as viewed from exterior

Floor Areas

Porch	4.0 m²
Rear Patio	25.6 m²
Patio	37.7 m²
Garage	77.4 m²
Habitable	249.0 m²
Grand total	393.8 m²

No.	REVISION Description	Date
03	Preliminary Plan	26.06.2020
04	Preliminary Plan	14.07.2020
05	Preliminary Plan	15.07.2020
06	Preliminary Plan	21.07.2020
07	Preliminary Plan	24.07.2020

1 Floor Plan

1 : 100

ELEVATIONS

Proposed Residence

For B. & L. Hill

At 19 Eucalyptus Crescent, Norman Gardens

VAUGHAN building design

Phone: 0407 132 964

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QBCC Licence No. (Ian Vaughan): 15007590

Drawn By: ILV	Wind Speed	Project Number	
Checked By: ---	Sheet Size A2	19028	
		SHEET 02 OF 03 SHEETS	

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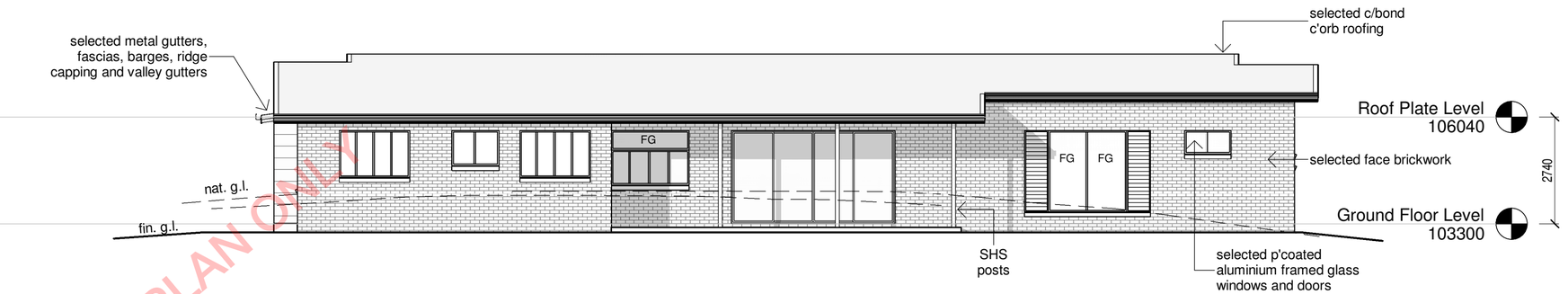

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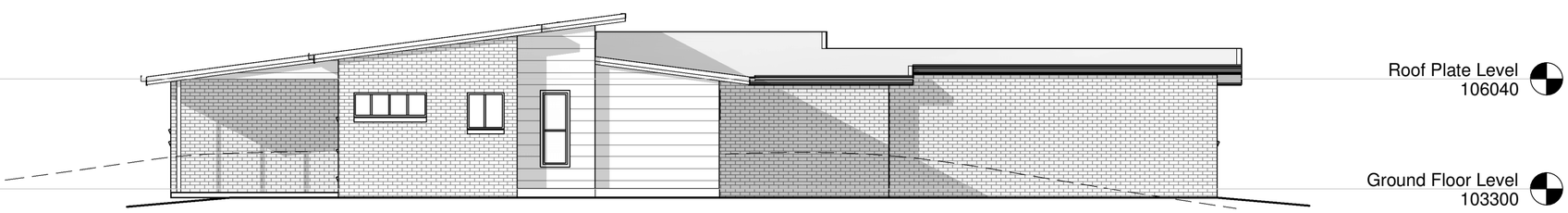
1 : 100



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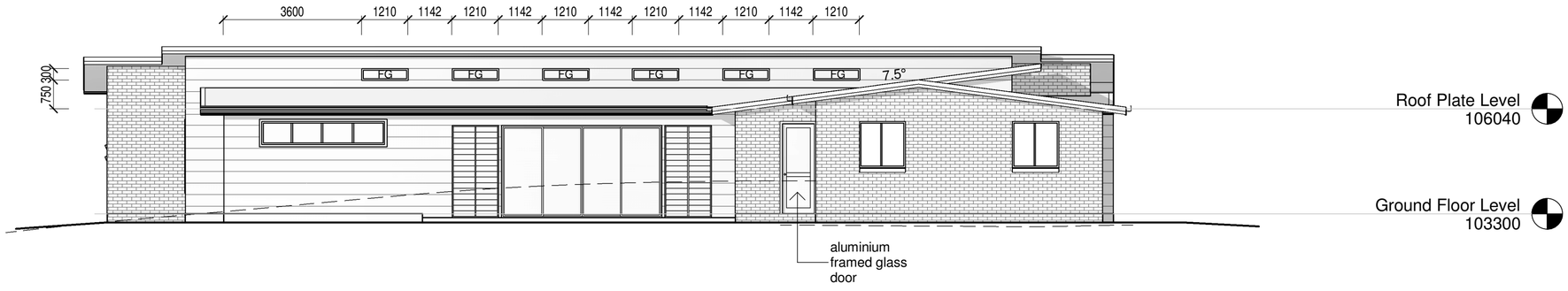
1 : 100



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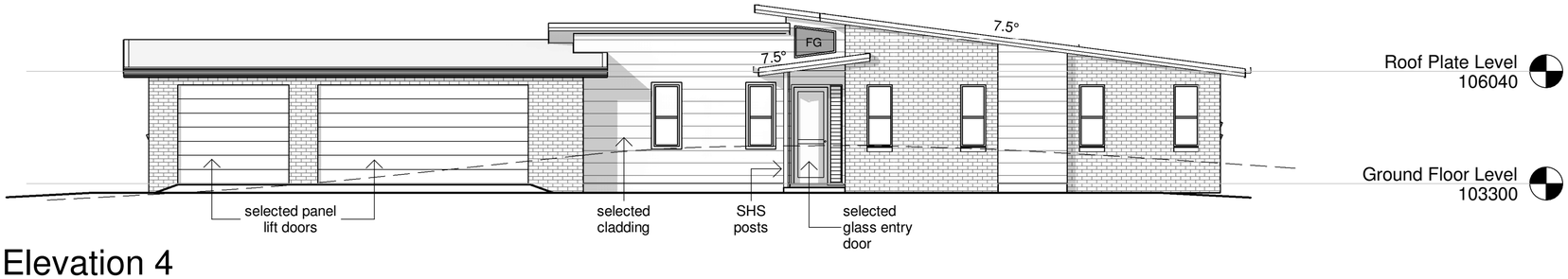

4 Elevation 4
1 : 100

No.	REVISION Description	Date
03	Preliminary Plan	26.06.2020
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Proposed Residence
For B. & L. Hill
At 19 Eucalyptus Crescent,
Norman Gardens

VAUGHAN building design
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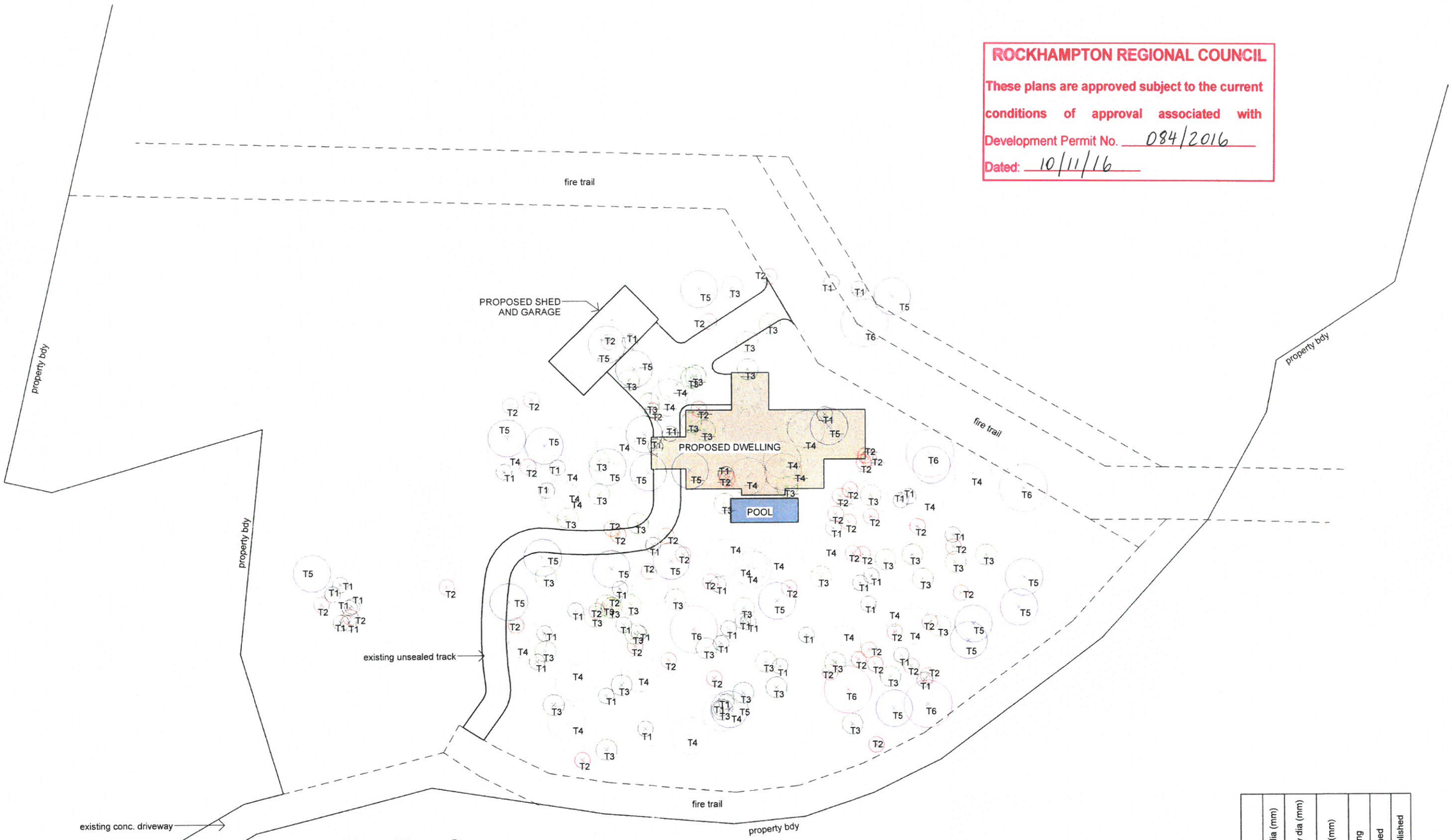
Drawn By: ILV	Wind Speed	Project Number	
		19028	
Checked By: ---	Sheet Size A2	SHEET 03 OF 03 SHEETS	

PRINT DATE: 24/07/2020 9:21:44 PM

ROCKHAMPTON REGIONAL COUNCIL
These plans are approved subject to the current conditions of approval associated with Development Permit No. 084/2016
Dated: 10/11/16



1 Site - Tree Survey
1 : 500

Label	Trunk dia (mm)	Canopy dia (mm)	Height (mm)	# existing	# retained	# demolished
T1	50	3000	8000	44	38	6
T2	100	3000	8000	48	39	9
T3	150	4000	10000	44	35	9
T4	200	7000	12000	31	25	6
T5	250	7000	15000	25	19	6
T6	300	9000	18000	6	5	1
			TOTAL	198	161	37

REVISIONS			
02	TREE SURVEY ADDED	17.05.16
01	PLANNING APPLICATION	07.02.16
No.	DESCRIPTION	DATE

PROPOSED RELOCATION OF B.L.E.
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PLAN SIZE:	WIND SPEED:	DRAWN:	CHECKED:
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Telephone....
Address....
Licenced under the QBSA Act Lic No.
Designer

PROJECT No. T15-1202 -05
SHEET 05 OF 05
REV. 01 02

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Bushfire Hazard Assessment & Management Plan

Lot 4 on SP 163932

19 Eucalyptus Crescent, Norman Gardens, 4701

Publication Details

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Date of Publication: 9/08/2016

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Project Number: 40807

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Version	Author	Recipients	Distribution type
V1	Ian Denley		Electronic

Acronyms and Abbreviations

AS 3959 – Australian Standard 3959 Building in Bushfire Prone Areas.

BAL: Bushfire Attack Level indicated in AS3959 for site specific factors.

BHA: Bushfire Hazard Assessment

BMP: Bushfire Management Plan

RRC: Rockhampton Regional Council

SPP Guideline: Draft State Planning Policy Guideline. State interest-natural hazards. Guidance on flood, bushfire and landslide hazards, December 2013.

SPP Mandatory Requirements: State Planning Policy mandatory requirements: bushfire hazard. Supports the State Planning Policy state interest—natural hazards. Draft: April 2013

Table of Contents

List of Figures

1 Background

The purpose of the Bushfire Hazard Assessment is to determine the level of bushfire hazard with reference to the SPP 1/03 Guideline and provide a Bushfire Management Plan consistent with the Rockhampton Regional Council Bushfire Management Strategies, the Australian Standard AS3959 *Construction of buildings in bushfire-prone areas* (AS3959) and advice from local fire authorities.

Lot 4 on SP163932 is the subject of a development application to relocate the existing building envelope. The subject of this Bushfire Hazard Assessment and Management Plan is the proposed relocation of the building envelope and proposed ancillary buildings on Lot 4 on SP163932.

A plan of the proposed relocation of the building envelope and ancillary buildings with the construction design and construction standards, and surrounding roads, access tracks and fire trails is provided in the appendix (Capricorn Survey Group drawing T15-1202).

1.1 Site Location

The site is described as Lot 4 on SP163932 located at 19 Eucalyptus Crescent, Norman Gardens, QLD, 4701. See Figure 21 for the site location.

Figure 1. Site location of Lot 4 on SP163932, 19 Eucalyptus Crescent, Norman Gardens, QLD, 4701

1.2 Dwelling Location

The lot configuration is provided in Figure 32. The proposed relocation of the building envelope, ancillary buildings and access is provided in Figure 3 and in the appendix (Capricorn Survey Group drawing T15-1202).

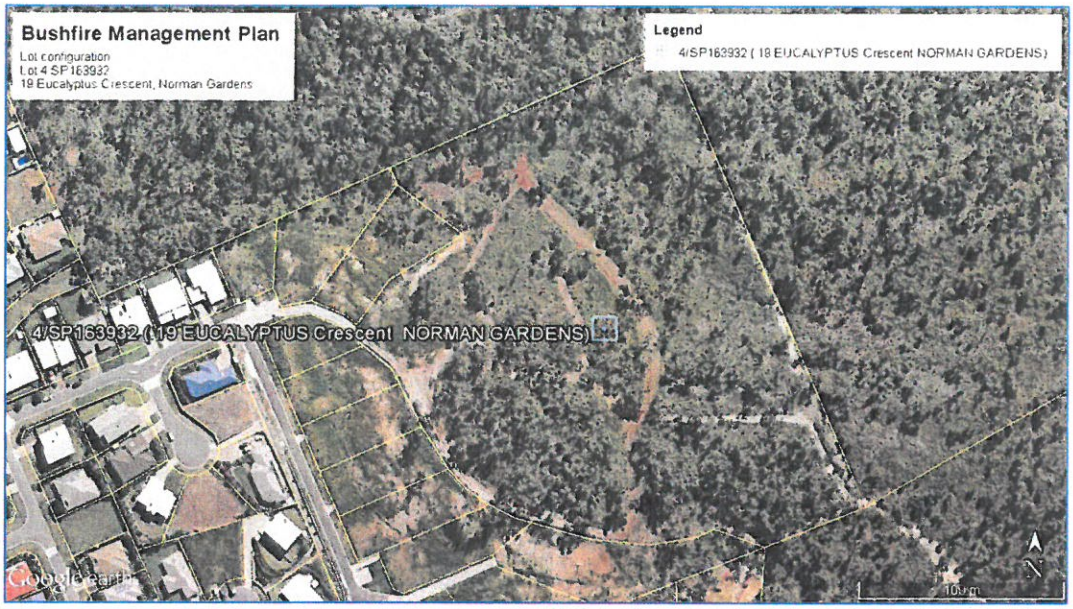

Figure 2. Configuration of Lot 4 on SP163932, located at 19 Eucalyptus Crescent, Norman Gardens, QLD, 4701.

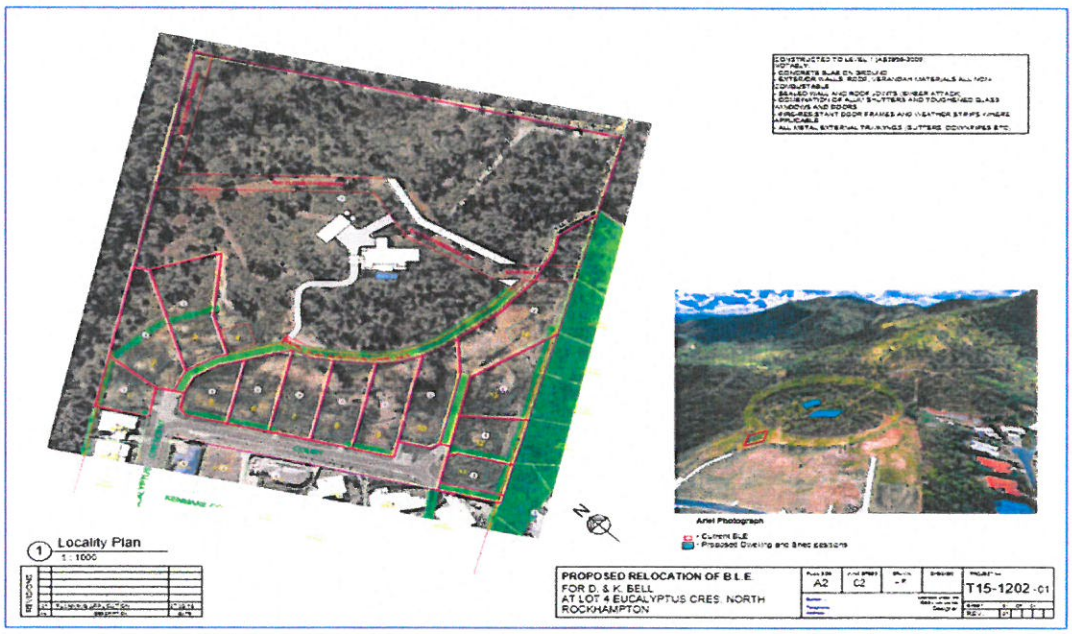

Figure 3. Surveyors drawing of the proposed relocation of building envelope and ancillary buildings.

1.3 Surrounding Landscape

The subject lot is located within hilly terrain of moderate to steep slopes. Surrounding vegetation is primarily ironbark / bloodwood open woodland (RE 11.12.3/11.12.6) with native grassland groundcover on granite. Surrounding land use is residential and undeveloped Berserker Conservation Area.

1.4 Weather

The following data was obtained from the Bureau of Meteorology (http://www.bom.gov.au/climate/averages/tables/cw_039083.shtml) for Rockhampton Weather Station.

Mean annual rainfall is 812.9 millimetres. Highest rainfall periods are between December to March. Temperatures above 29 degrees Celsius are October to March. The prevailing winds are predominately southeast but during spring and summer late afternoon northeast winds are recorded. An easterly wind frequency of 10 - <20% occurrence is recorded in the location (http://www.bom.gov.au/cgi-bin/climate/cgi_bin_scripts/windrose_selector.cgi). During winter and early spring the high pressure systems of the sub-tropical ridge can be far enough north to replace the southeast trades with south westerly winds (http://www.bom.gov.au/qld/rockhampton/climate.shtml).

The risk of fire in the area is related to regular seasonal conditions. Dry warm south-east winds coinciding with low rainfall and low humidity represent the highest risk of bushfire in the area. Overall weather conditions between September and December represent the highest risk of bushfire in the area.

1.5 RRC Bushfire Hazard Mapping

The RRC Planning Scheme *Bushfire Hazard Overlay Map OM4—38 Norman Gardens* indicates a Very High Hazard area for the entire area over Lot 4/SP163932 (see Figure 4).

The RRC Bushfire Hazard methodology uses vegetation, slope and aspect scores weighted with the FFDI and factors in climate change for 2050. Hazard ranges from low to high are: buffer area, medium, high and very high.

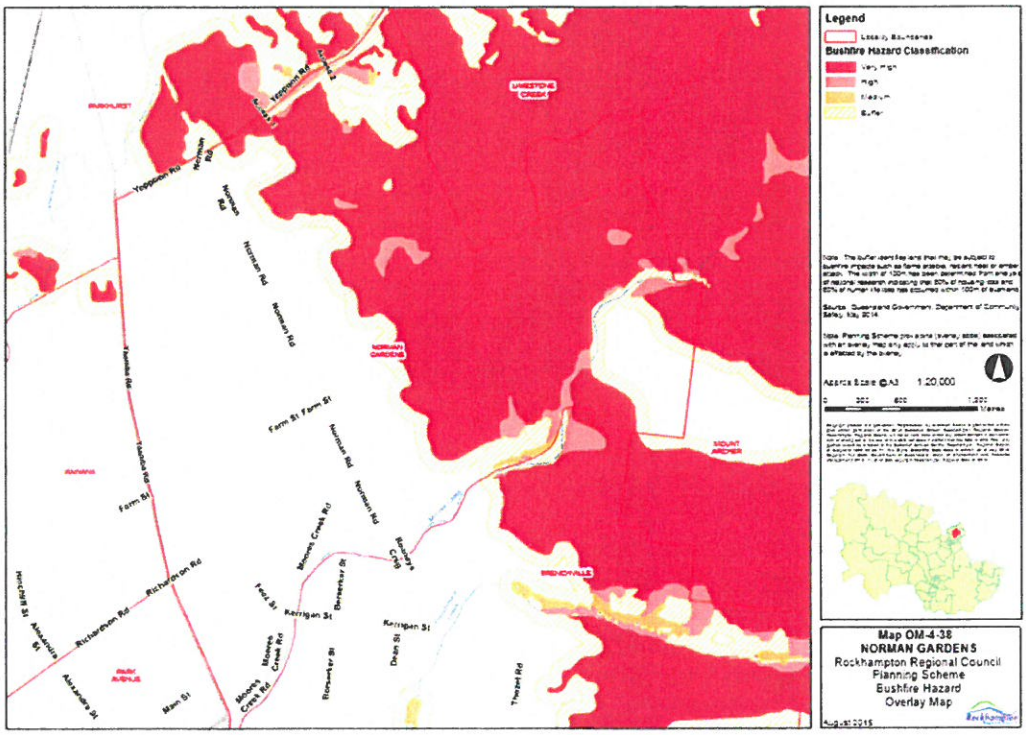

Figure 4. The RRC Bushfire Hazard Overlay map showing the location of the proposed dwelling in relation to RRC bushfire hazard categories.

2 Materials & Methods

Bushfire hazard is assessed with reference to the RRC SC6.5 Bushfire Management Planning Scheme Policy and the SPP 1/03 guideline.

Construction requirements and minimum dwelling setback distances are given with reference to the AS3959, RRC Bushfire Policy, site specific conditions and advice received from rural fire authorities.

Vegetation structural description is taken from the Australian Standard 3959. Vegetation density scales (very sparse, sparse, medium, dense etc.) are from Melzer (2011). Vegetation heights and degree of slope are calculated using a Suunto clinometer. A Suunto compass is used to determine aspect. Field data is recorded with Android software 'Open Data Kit' using an electronic version of the *fuel assessment field work form v3* (Hines et. *al.*, 2010).

3 Results

The following site specific hazard assessment includes vegetation, slope, aspect and any other natural or manmade features of relevance located within 100 metres of the dwelling site. The site specific hazard assessment is considered with respect to vegetation density, species and extent and how natural or manmade features interact with the hazard to modify risk. This provides a measure on the level of risk presented to the dwelling from wildfires at a more detailed local scale.

3.1 Site Vegetation

Vegetation around the proposed dwelling site consisted of cleared areas, grassy ironbark woodland to open woodland and grasslands.

Ironbark was the dominant canopy tree with bloodwood and bluegum occurring occasionally Canopy density varied from isolated trees to medium (crowns slightly separated). Canopy heights were 12 to 18 metres

Lower layer shrubs included brush box, Medicine Bush, cocky apple, and wattle. Density varied between isolated shrubs to a sparse even cover.

The ground layer was predominantly spear grass with kangaroo grass associated. Red natal was present near disturbed areas. Other small shrubs in this layer included lantana, *Grewia* and coffee bush. Stylo was sparse but relatively even over the site. Cover was mid-dense and median grass height was 0.5m

3.2 Hazard in Relation to Dwelling Site

3.2.1 Surrounding Hazards

The proposed dwelling is located at the crest of a hill east of Eucalyptus Drive. The adjacent vegetation hazard is largely located to the east and north of the site (see Figure 5).

Figure 5. An overview of the proposed dwelling location, subject lot (white line) in relation to the vegetation hazard.

3.2.2 *Surrounding hazards*

Surrounding vegetation is ironbark woodland to open woodland the east, north and southeast and cleared urban areas on relatively flat land to the east and south. There are regular burns in vegetation to the east of the subject lot with most fires sub canopy fires.

Western slope vegetation & slope

Ironbark woodland with sparse shrubs and mid-dense grassland is located on the hill crest immediately west of the dwelling location (Figure 7) with mown lawn on steep downhill slopes toward Eucalyptus Crescent (). Slopes to the west of the dwelling were flat then gradually increased to 20 degrees to Eucalyptus Crescent.

Hazard is considered medium to low due to the limited extent of woodland in this direction (70 m), the sparse shrubs layer and low native grass ground cover.

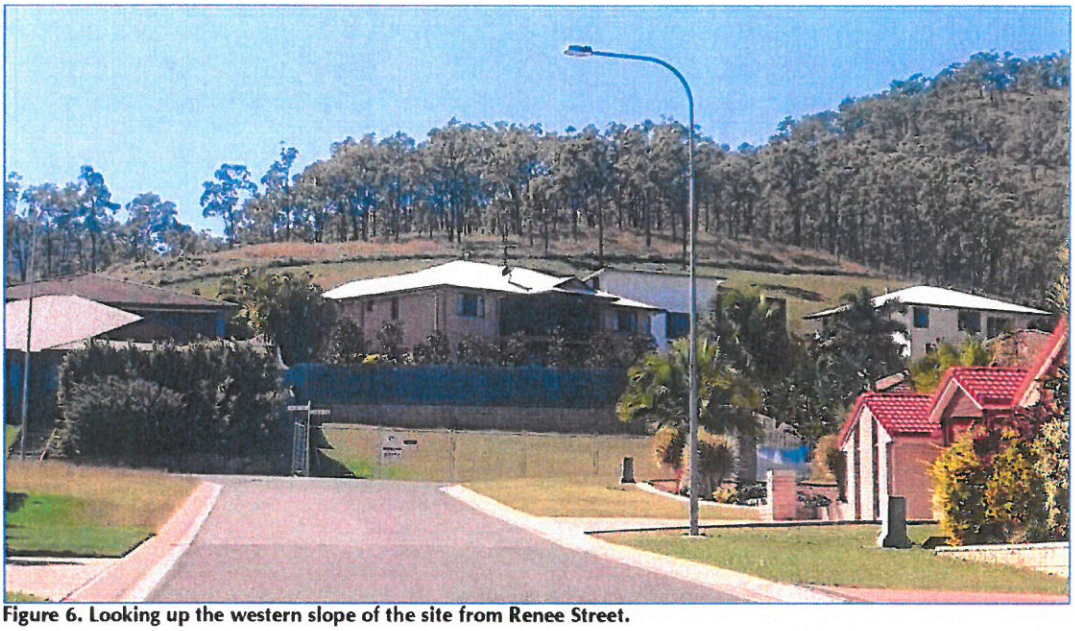

Figure 6. Looking up the western slope of the site from Renee Street.

Figure 7. West slope looking from the north to south. Mid dense Ironbark within native grass groundcover.

Northern slope vegetation

The northern slope vegetation was primarily native grassland of spear grass with kangaroo grass to 0.5 m. Ironbark and bloodwood trees were very scattered providing less than 10% canopy cover (Figure 8). Slope varied between 15 and 20 degrees.

Overall hazard was considered low towards the western extent and medium towards the eastern extent of the northern slope. The primary hazard was grassland. There is very little chance of canopy fire on this slope due to the limited extent of tree cover.

Figure 8. North slope looking from west to east. Very sparse Ironbark with bloodwood within native grass groundcover.

Southern slope vegetation

Southern slope vegetation was patchy, consisting of several vegetation types: Ironbark woodland with sparse shrubs and mid-dense grassland (Figure 9); grassland with isolated trees; and cleared areas represented by internal access roads (Figure 10) and development along Riverwood Grove. Slope was 10 to 15 degrees.

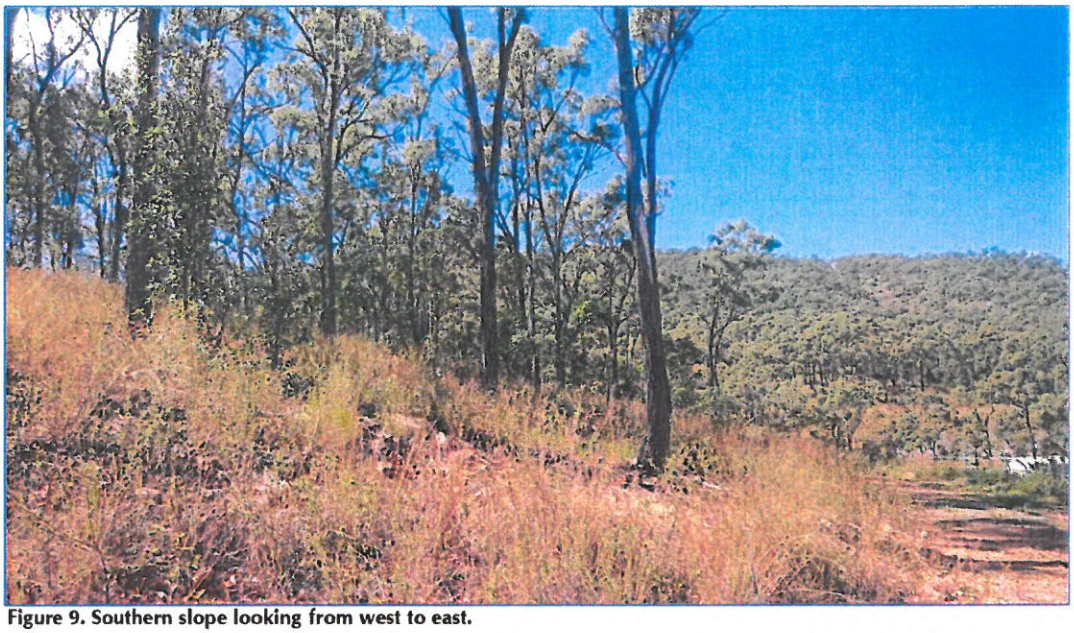

Figure 9. Southern slope looking from west to east.

Eastern slope vegetation

Vegetation on the eastern slope was patchy ironbark open woodland around the proposed dwelling with woodland located to the west and east. Slope is upslope to the east and flat to the west before a 15 degree slope of mown grass.

Figure 10. Eastern slope looking from the west to east. Mid dense to open woodland of Ironbark within native grass groundcover and sparse shrub understorey. The dwelling will be located at the crest to the left of the image.

3.3 Fuel Hazard Rating

Fuel hazard ratings are based on Hines et. *al.*, (2010). Hines et. *al.* provides an assessment of fuel hazard on a 5 step scale from low, moderate, high, very high to extreme.

The overall fuel hazard rating for the site was assessed as low (low native grassland) to medium (ironbark bloodwood open woodlands).

Bark types included ironbark and bloodwood (moderate). Elevated fuels consisted of isolated to sparse dry shrubs with a low overall fuel potential. Mid dense dry grasses of less than 0.5 meters were assessed as moderate to high.

3.4 Aspect

The proposed building envelope will be located central within the lot on a broad ridgeline.

Downhill aspects are north, west and south. The easterly aspect is uphill. It is generally accepted that northerly aspects represent the greater danger due to seasonal warm northerly winds. This direction is primarily native grasses with scattered trees.

3.5 Slope

The site of the proposed building envelope is level in elevation, with level slope towards Eastern aspects. As fires travel slower down a hill, all classified vegetation that is upslope will assume a value of 0° (i.e., flat land). The slope of the land under the classified vegetation has a direct influence on the rate of fire spread, the severity of the fire and the ultimate level of radiant heat flux. Downslopes present a higher risk as the fire front is fuelled upwards through the canopy vegetation. The downslopes below the building envelope were North and South of <15 degrees, with the most hazardous on the North-west slope >15-20 degrees.

Downhill slopes in the Northerly aspects contained a very sparse to mid dense canopy of Ironbark woodland within native grass groundcover. Effective downslopes in the West and

Southerly aspects faced the urban residential development. Site vegetation with widths less than 100m (SPP 1/03) are considered to present less risk.

3.6 *Evidence of Fire*

There was evidence at the time of the study of a low grass fire to 2 metres high in recent years. See Figure 11.

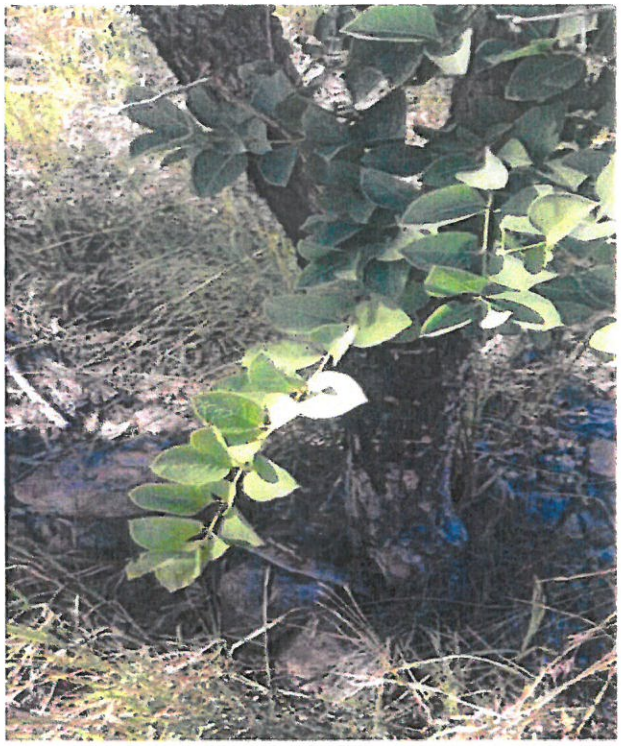

Figure 11. Evidence of recent low grass fire to 2 meters.

3.7 *Assessed Hazard*

The hazard for the proposed building envelope location is assessed as a Medium level bushfire hazard. Hazard levels are abated by extensive clearing and existing trails and fire breaks.

Vegetation in the area consisted of open woodlands of Ironbark with native grass groundcover. Most notably the pre-existing clearing on the site will lower the risk of fire hazard from the North and Westerly aspects. Residential development on the lower West and Southerly aspects will reduce the risk and direction of a bushfire attack in this direction. The western slope is the preferred escape route with the driveway exiting on to Eucalyptus Crescent. Where the risk of fire attack from Eastern and South eastern aspects is greater from uncleared and undeveloped land (Berserker Conservation Area) adjacent to the lot boundary, the risk is mitigated by the flat to upslope in this area, significantly lowering the risk. Several significant existing firebreaks and tracks along this aspect also reduce the risk from a fire attack from this direction.

3.8 *BAL Assessment*

The primary hazard (ironbark open woodland) is on the downslopes ranging between 5 to < 20 degrees. Classified vegetation on flat land or upslope relative to the proposed building envelope has an effective slope of 0 degrees (Table 2.4.5 in AS3959).

Grassland managed in a minimal fuel condition is regarded as low threat vegetation for the purposes of determining BAL (Table 2.3 AS3959- Amend 2). The lesser hazard of native

grasslands within sparse ironbark woodland was located downslope within the 15-<20 degree range (Table 2.4.5 AS3959).

The recommended fire break distances in accordance with Table 2.4.5 of the AS3959 for the proposed dwelling and ancillary building are provided inTable 1.

Table 1. Fire setback ranges and associated BAL construction standards. A dwelling within the specified distance range to hazardous vegetation (woodland) should be constructed to the associated construction standard (BAL) (Table 2.4.5 of the AS3959).

BAL Construction Rating	Dwelling fire buffer Range (m)			
Aspect & slope range	S 10-15°	W <5-10°	N <15-20°	E 0°
AS3959 vegetation class	woodland	Woodland	grassland	woodland
BAL-29	16-<24	13-<19	9-<15	9-<13
BAL-19	24-<35	19-<28	15-<22	13-<19

AS3959 vegetation classifications provided in Table 1 for easterly and northern aspects are consistent with the site vegetation. Vegetation hazard presented by vegetation to the south and west is less than indicated in the AS3959 vegetation classification. There are also additional local considerations that affect the determination on minimum distances from hazardous vegetation at the site. These considerations are reflected in minimum recommended fire breaks provided in the associated Bushfire Management Plan.

Bushfire Management Plan

4 Introduction

This Bushfire Management Plan has been developed following the guidelines set out in the State Planning Policy 1/03 Guideline "Mitigating the Adverse Impacts of Flood, Bushfire and Landslide" and the Rockhampton Regional Council Bushfire Management Planning Scheme Policy SC6.5 (2015). Construction standards and associated fire break distances are taken from the AS3959-2009 and associated amendments.

Residents must bear in mind that the site has been classified as having a **MEDIUM FIRE HAZARD**. Implementation of the Bushfire Management Plan will assist in addressing identified fire hazards on the property and in protecting life and property against bushfire.

Owners should implement all practical measures to prevent the loss of life and property. Measures should incorporate fire safety plans and escape strategies. Any new information additional to the assessment that will assist in the prevention of loss due to fire should also be considered.

Persons on the property should take the greatest caution when there is a risk of fire. In case of fire, immediate contact should be made with the relevant fire authority and all directions and advice should be followed.

The owners must implement and maintain fire management strategies and have a fire management safety plan in the event of fire.

4.1 Site Description

The subject of the Bushfire Management Plan is Lot 4 SP163932 located at 19 Eucalyptus Crescent, Norman Gardens, Qld, 4701. See the Appendix for drawings T15-1202-01 for the building location and existing fire breaks, trails and access.

4.2 Area of Application

The area of application is the identified hazard and 100 metres surrounding the hazard. The whole of the subject site is identified as having a Medium Bushfire Hazard. The Bushfire Hazard Assessment forms a part of this Bushfire Management Plan.

5 Aims of the Bushfire Management Plan

Specific outcomes addressed in this Bushfire Management Plan are:

1. Development maintains the safety of people and property by:

a) Avoiding areas of Very High or High Bushfire Hazard; or

b) Mitigating the risk through:

- Allotment design and the siting of buildings; and
- Including firebreaks that provide adequate:
    - Setbacks between buildings/structures and hazardous vegetation, and
    - Access for fire-fighting/other emergency vehicles;
- Providing adequate road access for fire-fighting/other emergency vehicles and safe evacuation; and
- Providing an adequate and accessible water supply for fire fighting purposes.

2. Public safety and the environment are not adversely affected by the detrimental impacts of bushfire on hazardous materials manufactured or stored in bulk.

6 Responsible Agencies

The responsible Fire authority is the Queensland Fire and Rescue Service (QFRS). The Rural Division of the QFRS is responsible for bushfires. The Urban Division of the QFRS is responsible for structural fires.

The Local Authority is Rockhampton Regional Council. It is the responsibility of the Council and the building certifier to ensure that the measures outlined in this Management Plan are in place prior to the occupation of any buildings that are subject to this plan.

7 Expected Fire Behavior

Vegetation Hazard on the site was assessed within the SPP 1/03 MEDIUM HAZARD RANGE.

North east to westerly winds in combination with warm dry weather conditions in late spring to early summer represent the highest risk of bushfire in the area.

Likelihood of fire and fire intensity will depend on fuel accumulation. Fires are likely to be infrequent and usually burn only under severe conditions. Fires may be severe with flame lengths of 15 to 20 metres with little ember attack.

7.1.1 Likely Direction of Bushfire Attack

Aspects to the North and west represent the greatest potential seasonal hazard on this site. However, bushfire attacks from these aspects are mitigated by the predominant low native grassland. The bushfire threat from aspects to the east and west are reduced by the flat slope. The southern aspect is also reduced by the presence of high density residual development reducing the extent of downhill vegetation.

8 Fire Fighting Requirements

The lot will have:

1. On-site water storage of not less than 20,000 litres kept full at all times to be located within 30 metres of the dwelling; and
   - 1.1. Water storage tanks are to be constructed of non-combustible materials;
   - 1.2. Are to be accessible at all times to any appliance from the Queensland Fire and Rescue Authority;
   - 1.3. Be provided with a hardstand area suitable for 2 wheel drive heavy vehicles located within 6 metres of the water source;
   - 1.4. All water storage tanks are to have a standard 50 mm ball valve and male 'cam-lock coupling' with a blanking cap attached to the tank in an accessible location to provide water for fire suppression; or
   - 1.5. For underground tanks, an access hole of 200 millimetre diameter (minimum) to allow access for suction lines.

8.1 Roads and Dwelling Locations

Access to the property is along a single driveway from Eucalyptus Crescent with an approximate length of 185 metres. There are a number of tracks and fire breaks within the lot and adjacent to lot boundary. The dwelling location, associated driveways and firebreaks are indicated in the appended drawings T15-1202 -01 and T15-1202-02

8.2 Driveways & Tracks

Access driveways are to be kept in a condition suitable for 2 wheel drive heavy vehicles with a maximum gradient of 12.5%.

Driveways to the house site must also:

1. Be maintained in a condition suitable for 2 wheel drive heavy vehicles;
2. Have a suitable turnaround area for heavy vehicles of 10 metre radius near the dwelling; and
3. Consist of a 3.5m wide formed road with a clearance height of 4.8 metres and hazardous vegetation cleared for a width of 2 metres either side of the driveway.
4. Fire trails are to be kept in a condition suitable for 4 wheel drive vehicles and otherwise to the satisfaction of the fire Brigade.

8.3 Firebreaks & Buffers

8.3.1 Fire Breaks.

The dwelling should be sited so that minimum setbacks from hazardous vegetation indicated in Table 2 are achieved:

Table 2

BAL-29 Construction Rating	**Dwelling fire buffer Range (m)**			
Aspect	S	W	N	E
Minimum Fire break distance (metres)	18	15	18	15

For woodland areas, hazardous vegetation is considered to be woodland with a canopy cover greater than 10%.

Where canopy cover is 10% or less and ground covers consist of native grassland, fire break distances will be consistent with Section 8.3.3 Landscaping.

Additionally the dwelling should be located so that it is:

1. 10 meters from any retained vegetation strips or small areas of vegetation;
2. Retained trees in the Setback Zone should provide a non-continuous canopy with a total canopy cover of less than 10%; and
3. All dead and damaged timber is to be removed within the fire break.

8.3.2 Fire lines & Trails

Maintain any additional firebreaks to the following standards:

1. No less than 6 metres wide; and
2. Slashed or poisoned on a regular basis such that vegetation is kept at a maximum height of 200 millimetres.
3. Fire trails where provided, are to be kept in a condition suitable for 4 wheel drive vehicles and to the satisfaction of the fire Brigade.

8.3.3 Landscaping

1. Lawns and Gardens within 10m width surrounding the dwelling are to be kept at no greater than 50mm in height.

2. Grassed areas and lawns for a further 10m from a residence are to be kept at no greater than 150mm.
3. Landscaping trees within 10m of residences should be fire resistant species. No tree or shrub should be in contact with or overhang buildings.

9 Construction Standards

The dwelling will conform to the following requirements:

1. The dwelling is to conform to Australian Standards AS 3959 – 2009 BAL-29 for construction of buildings in bushfire-prone areas;
2. All guttering and downpipes will be manufactured in non-combustible materials; and
3. The dwelling will have non-combustible gutter guards on all guttering.

10 Warning and Evacuation Procedures and Routes

The internal access road leads from Eucalyptus Crescent, east to the dwelling. Owners should establish a Fire Safety Plan and Emergency Evacuation Plan for the event of fire including all suitable evacuation routes from their land and dwelling for fire from all potential directions.

In the event of a fire, dialling 000 obtains emergency assistance.

10.1 Purchaser/Resident Education and Awareness Programs

Each owner should be provided with a copy of this Fire Management Plan with an alert placed either on the title or Council rate searches that the Fire Management Plan is in existence and is to be made available to subsequent owners. The hazard ratings are to be placed on council plans and / or rate notices.

Owners should read and be familiar with the information contained in this report. Owners are responsible for maintenance of fire reduction measures on the site to reduce the risk of fire. Owners should establish a Fire Safety Plan and Emergency Evacuation Plan in the event of fire.

Owners should establish a Fire Safety Plan and Emergency Evacuation Plan for the event of fire including all suitable evacuation routes from their land and dwelling for fire from all potential directions. In the event of a fire, dialling 000 obtains emergency assistance.

Residents should maintain regular contact with the Mt Morgan Rural Fire Brigade for local information updates and check the Queensland Rural Fire Service website (www.ruralfire.qld.gov.au) for any updated fire safety guides and further information.

Examples of Fire Safety Plans include the *Rural Property Fire Management Guide* and *'Plan Act Survive' - Bushfire Survival Plan*.

Additional recommendations to reduce fire risk around the dwelling are provided in Table 3

Table 3. Hazard Reduction Measures: The following recommendations provide additional measures to reduce hazards around the dwelling

Category	Issue	Action
Buildings	Maintenance: Buildings and Grounds	• Clear overhanging trees and shrubs from dwellings and associated structures; • Point LPG gas tank relief valves away from dwellings; • Store flammable items well away from dwellings (e.g. woodpiles, boxes, paper); • Secure roof and clean gutters of dry leaf debris to eliminate an ignition source for embers; • Clear fuels around the house for at least 20 metres; • Trim under fences and remove overgrown bushes and plants; • Ensure surrounding grassed areas are trimmed and well-watered; and • Install non-flammable gutter guards.
Water	Water Supply and fire fighting equipment	• Water sources for fire fighting may include an accessible dam or tank with fire brigade tank fittings, a swimming pool, bore water etc. These sources should be provided with all-weather access; • All structures should be provided with a garden hose with metal fittings attached to the water supply at all times. The hose is should be of sufficient length to reach all sides of a building; and • Regularly check that fire fighting equipment is operational.
Hazard Reduction	Close proximity of buildings to hazardous vegetation Hazard reduction: Vegetation adjacent to the building, with special attention to all down slope areas	• Trees should be located at a sufficient distance away from dwellings so that when fully mature, branches do not overhang the eaves of the house. • Create a fuel reduction zone adjacent to a dwelling. Remove hazardous vegetation. Do not cause erosion when reducing potential fuel loads in these areas. • Within the hazard reduction zones, hazardous understory vegetation (dry sclerophyll species) should be removed within the setback zone of all structures. These can be replaced with fire resistant species.
Landscaping	Growth of grasses and other fire prone vegetation in disturbed and cleared areas	• Remove hazardous grasses and undesirable regrowth from buffer areas; and • Maintain all safety buffer areas free of weeds and tall grasses to maximum heights set out in this Bushfire Management Plan.
	Landscaping species	• Plant fire resistant trees and shrubs; • Avoid using palm trees and ferny leaved trees near the dwelling. These species are susceptible to burning. • Ensure only evergreen species are planted; and • Landscaped vegetation within building setback zones should be of a low fire hazard. Rainforest species local to the area and fire resistant species are preferred.

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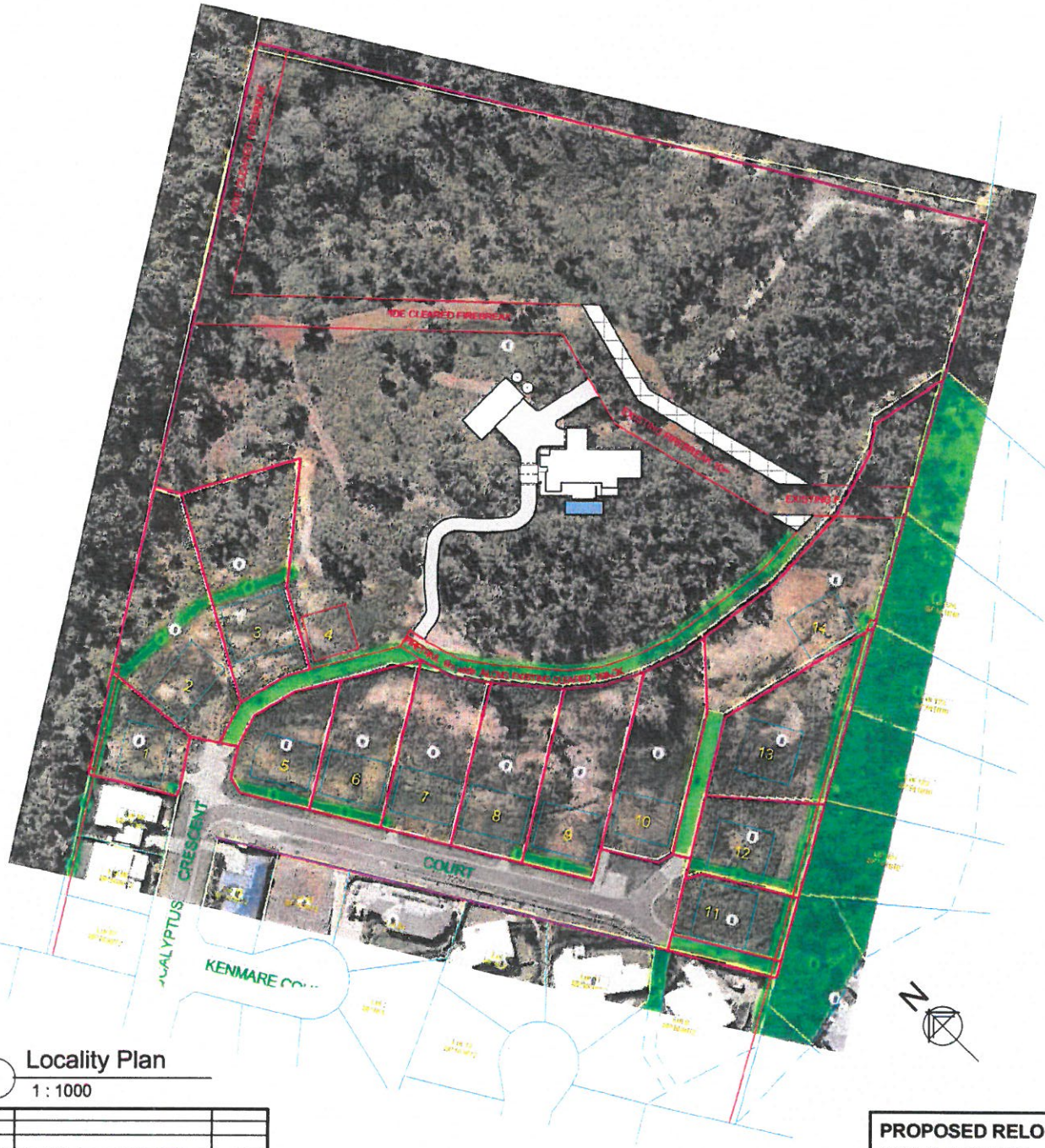
Rockhampton Regional Council, Bushfire Management Planning Scheme Policy SC6.5 (2015) http://rockeplan.rockhamptonregion.qld.gov.au/pages/plan/Book.aspx?exhibit=rrcplanningscheme&hid=20536

Rockhampton Regional Council, Bushfire Management Planning Scheme Policy (2015), Bushfire Hazard Overlay Code http://rockeplan.rockhamptonregion.qld.gov.au/pages/plan/book.aspx?exhibit=rrcplanningscheme&hid=20536

12 Appendix

Drawings T15-1202-01 & T15-1202-01

CONSTRUCTED TO LEVEL 1 (AS3959-2009)
NOTABLY:
- CONCRETE SLAB ON GROUND
- EXTERIOR WALLS, ROOF, VERANDAH MATERIALS ALL NON-COMBUSTABLE
- SEALED WALL AND ROOF JOINTS (EMBER ATTACK)
- COMBINATION OF ALUM SHUTTERS AND TOUGHENED GLASS WINDOWS AND DOORS
- FIRE-RESISTANT DOOR FRAMES AND WEATHER STRIPS WHERE APPLICABLE
- ALL METAL EXTERNAL TRIMMINGS (GUTTERS, DOWNPIPES ETC)



1 Locality Plan
1 : 1000

Ariel Photograph

- Current BLE
- Proposed Dwelling and Shed positions

REVISIONS			
01	PLANNING APPLICATION	07.02.16	
No.	DESCRIPTION	DATE	

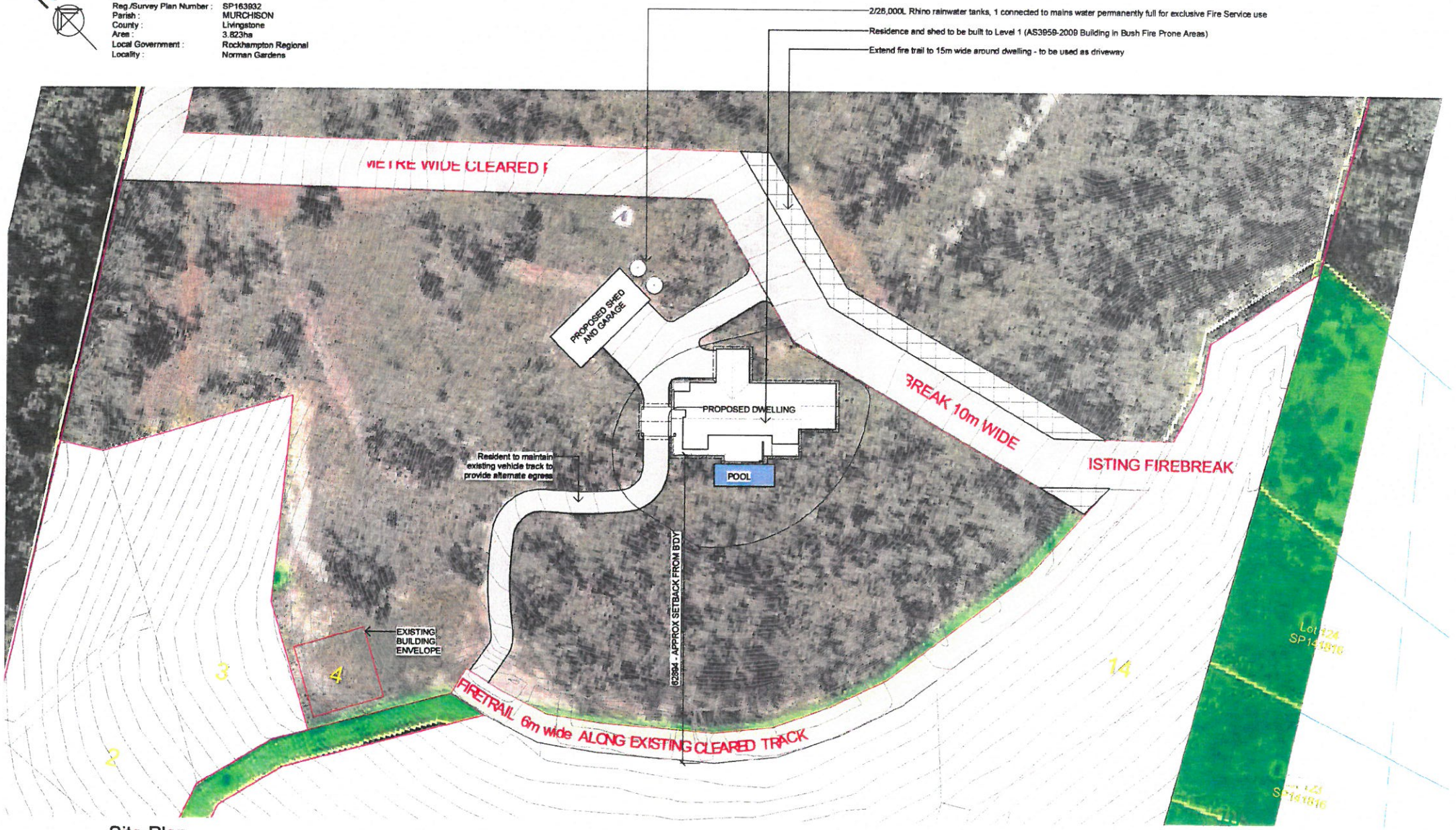
PROPOSED RELOCATION OF B.L.E.
FOR D. & K. BELL
AT LOT 4 EUCALYPTUS CRES, NORTH ROCKHAMPTON

PLAN SIZE:	WIND SPEED:	DRAWN:	CHECKED:	PROJECT No.
A2	C2	J.P.		T15-1202 -01

Builder....
Telephone....
Address....
Licenced under the QBSA Act Lic No.
Designer

SHEET 01 OF 04
REV. 01

R.P.D.
Lot Number : 4
Reg./Survey Plan Number : SP163932
Parish : MURCHISON
County : Livingstone
Area : 3.823ha
Local Government : Rockhampton Regional
Locality : Norman Gardens



1 Site Plan
1 : 500

REVISIONS			
01	PLANNING APPLICATION	07.02.16	
No.	DESCRIPTION	DATE	

CONSTRUCTED TO LEVEL 1 (AS3959-2009)
NOTABLY:
- CONCRETE SLAB ON GROUND
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PLAN SIZE:	WIND SPEED:	DRAWN:	CHECKED:	PROJECT No.
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Builder....
Telephone....
Address....
Licenced under the QBSA Act Lic No.
Designer

SHEET 02 OF 04
REV. 01

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Ecological Assessment Report

Lot 4 on SP 163932

19 Eucalyptus Crescent, Norman Gardens, 4701

Publication Details

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V1	Ian Denley, Tracey Miles	Capricorn Surveys	Electronic

Acronyms and Abbreviations

NCA: *Nature Conservation Act* 1992

RRC: Rockhampton Regional Council

SPP: State Planning Policy – state interest guideline Biodiversity, April 2016.

MSES: Matters of State Environmental Significance

MLES: Matters of Local Environmental Significance

DEHP: Department of Environment and Heritage Protection

Table of Contents

List of Figures

Qualifications of Author

The study was undertaken by Ian Denley. Ian Denley has 20 years experience in survey, assessment and reporting of ecosystems, flora, fauna and threatening processes occurring in the Rockhampton region. CV's and relevant experience are provided in Appendix C.

1 Summary

Lot 4 on SP163932 is the subject of a development application to relocate the existing building envelope. The subject of this Ecological Assessment Report is the proposed location of the building envelope inclusive of a single dwelling and ancillary buildings on Lot 4 on SP163932.

The purpose of the Ecological Assessment Report was to identify any areas of environmental significance and assess the potential ecological impacts with reference to the SPP – state interest guideline Biodiversity and provide an Ecological Assessment Report consistent with the Rockhampton Regional Council Ecological Sustainable Development Strategies.

1.1 Site Vegetation

The subject lot is located within hilly terrain of moderate to steep slopes. Native vegetation was grassy to shrubby ironbark woodland with a VMA status of least concern.

1.2 Existing Disturbance

Existing disturbance within the subject allotment includes various tracks and firebreaks. In the broader area, there is extensive clearing to the east from residential development. Weeds were generally widespread but not in significant densities.

1.3 Impacts

The proposed development will not have a significant impact on Matters of State Environmental Significance and is considered to be a low impact development with respect to Matters of Local Environmental Significance for the following reasons:

a) The vegetation management Act status of remaining vegetation is least concern;
b) The dwelling site and associated clearing is outside an area designated as Essential Habitat for Squatter pigeon. The origin of the species record is most likely nonextant grassy woodland on flats the west of the site which is now residential development, making the presence of this species now unlikely; and
c) The proposed location of the dwelling does not impact significantly on available habitat and potential wildlife corridors in the broader area. The ironbark grassy woodland and native grasslands remaining on the site were in relatively good condition. However, vegetation on the site is already impacted by localized clearing and is located at the edge of a more extensive remnant patch to the east with developed urban areas to the west.

1.4 Mitigation

Wherever possible native woodland and grassland not required to be cleared for essential infrastructure or fire management should be retained.

2 Background and Scope

2.1 *Purpose of development*

The purpose of the development is a dwelling and associated infrastructure on Lot4/SP163932.

A plan of the proposed relocation site of the building envelope with the dwelling design and construction standards, including ancillary buildings and surrounding roads, access tracks and fire trails is provided in the Appendix A; Drawing T15-1202 – 01 & - 02.

2.2 *Site Location and Lot configuration*

The site is described as Lot 4 on SP163932 located at 19 Eucalyptus Crescent, Norman Gardens, QLD, 4701. See Figure 2 for the site location.

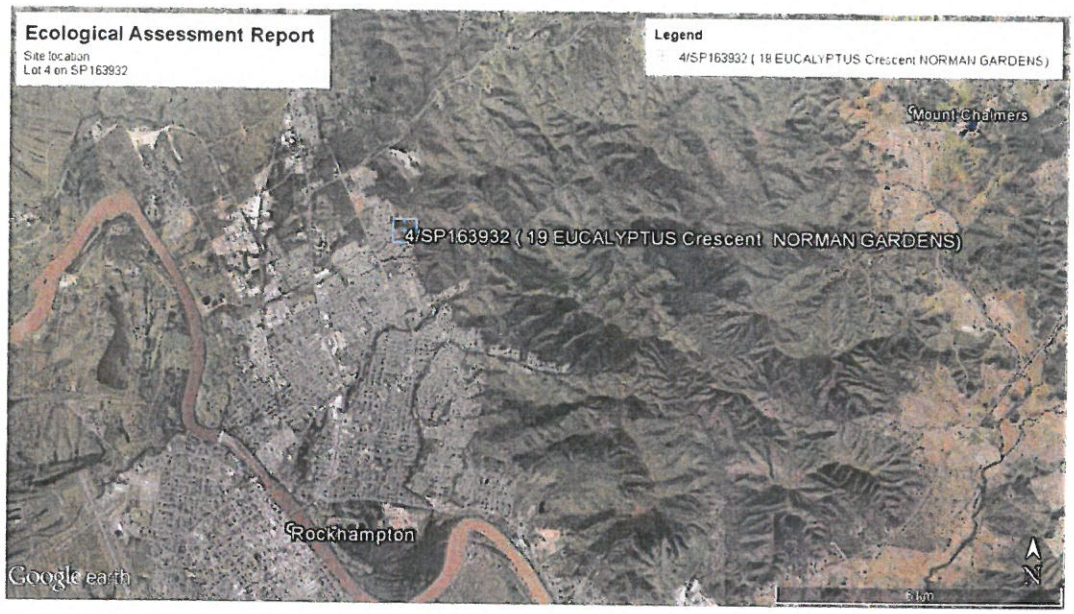

Figure 1. Site location of Lot 4 on SP163932, 19 Eucalyptus Crescent, Norman Gardens, QLD, 4701

The lot configuration is provided in Figure 3. The proposed site of the building envelope, ancillary buildings and access is provided in Figure 3. Full plans are provided in Appendix A.

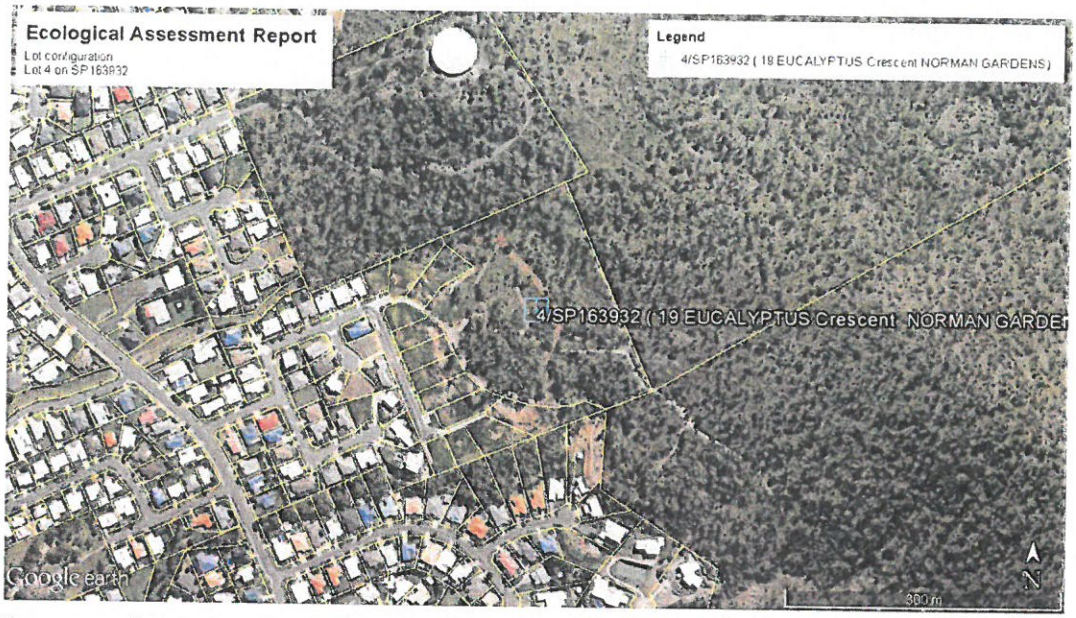

Figure 2. Configuration of Lot 4 on SP163932, located at 19 Eucalyptus Crescent, Norman Gardens, QLD, 4701.

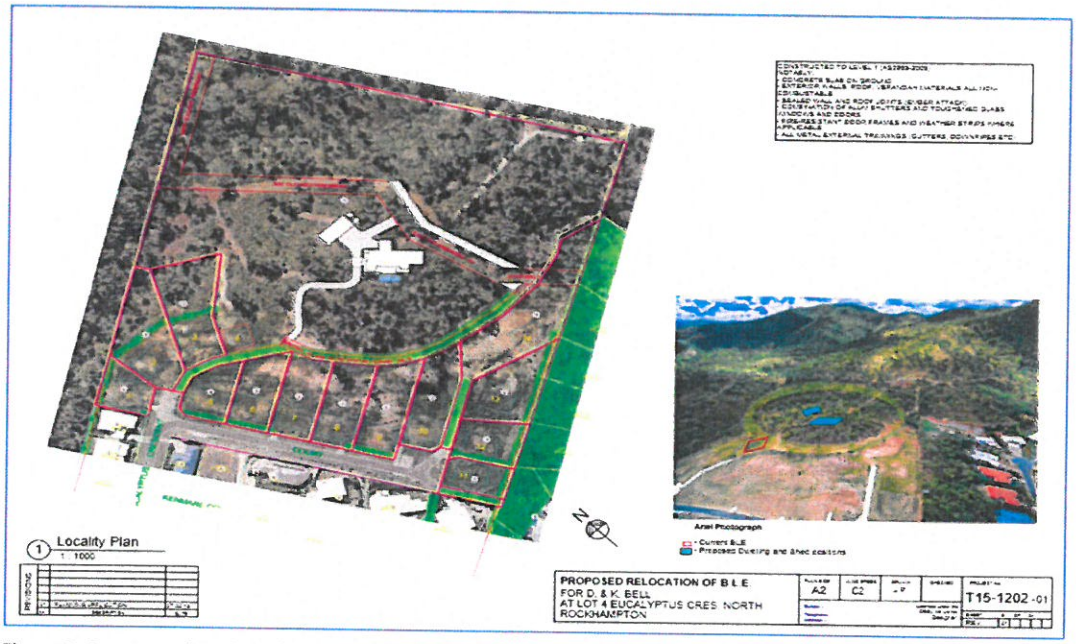

Figure 3. Surveyors drawing of the proposed building envelope including dwelling, ancillary buildings, road access, tracks and driveway.

3 Survey Materials and Methods

Ecological significance is assessed with reference to the RRC SC6.9 Ecological Assessment Planning Scheme Policy and the SPP 1/03 guideline.

Vegetation structural description is taken from the Australian Standard 3959. Vegetation density scales (very sparse, sparse, medium, dense etc.) are from Melzer (2011). Vegetation heights and degree of slope are calculated using a Suunto clinometer. A Suunto compass is used to determine aspect.

A field inspection of the study site was undertaken to ascertain the plant community types, confirm the state ecosystem classification and search for plants of significance likely to occur on site.

Ian Denley conducted the searches and vegetation descriptions. In addition to unaided visual searches, binoculars were used to identify vegetation and plants of interest at a distance.

Sites and areas of interested were recorded on an Android device using Open Data Kit (ODK) software and a custom data collection form with GPS location data provided by a Garmin Glo GPS logger.

4 Environmental Database & Mapping Results

4.1 *Matters of State Environmental Significance (MSES)*

A search of the DEHP State Protected Matters data base identified a small percentage (2.1%) of protected area over Lot 4/SP163932 under the *Nature Conservation Act 1992* (see Figure 4). The area was identified as potential for threatened wildlife under the NCA. For the full MSES Report see Appendix B. Table 1 shows the value of land for the MSES criteria.

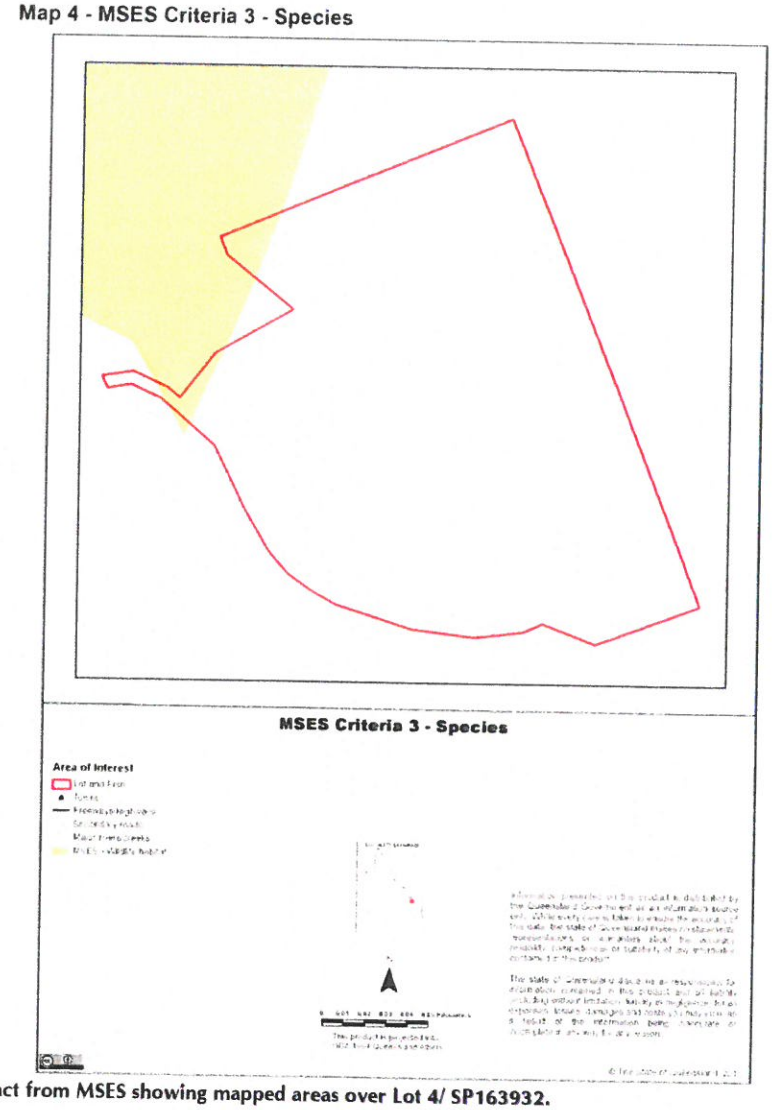

Figure 4. Extract from MSES showing mapped areas over Lot 4/ SP163932.

Table 1. Extract from MSES showing land value of potential threat to wildlife on Lot 4/SP163932. For the full MSES Report see Appendix B.

MSES Criteria 3 - SPECIES	0.078ha	2.1%
3.1 Threatened species and Iconic species	0.078ha	2.1%

4.2 *Matters of Local Environmental Significance*

A search of Rockhampton Regional Planning Scheme data base indicates a High level of Matters of Local Environmental Significance is mapped for the entire area over Lot 4/SP163932 (see Figure 5).

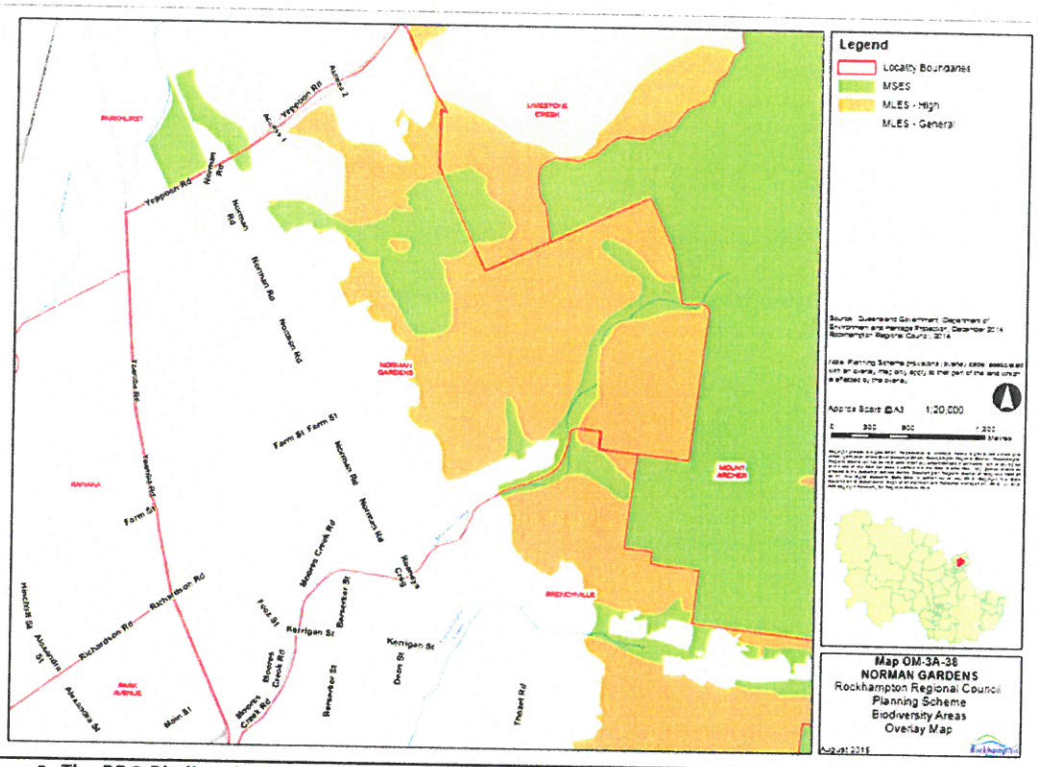

Figure 5. The RRC Biodiversity Overlay Map OM-3A-38 Norman Gardens with mapped areas of High MLES over the entire lot 4/SP163932.

4.2.1 *Regional Ecosystems*

The site is mapped as entirely within Regional Ecosystems 11.12.1; *Eucalyptus crebra* woodland on igneous rocks (REDD, 2016). A full description of this regional ecosystem with associated sub-systems is provided in Table 2 and an extract of the Regional Ecosystems supporting map (QLD Globe) is provided in Figure 6.

Table 2. Regional Ecosystems occurring on the site with VMA status and Biodiversity Status (REDD, 2016)

RE Code and Status	Full Description
RE 11.12.1 VMA Status: Least Concern BD Status: No concern at present	Eucalyptus crebra +/- Corymbia erythrophloia shrubby woodland. E. melanophloia is often present and may be locally dominant. Also includes localised areas dominated by E. persistens. Occurs on ranges on igneous rocks. (BVG1M: 13c) Vegetation communities in this regional ecosystem include: 11.12.1a: Eucalyptus crebra +/- E. exserta woodland. Occurs on undulating rises. (BVG1M: 13c) 11.12.1b: Eucalyptus persistens low woodland. (BVG1M: 19d) 11.12.1c: Dichanthium spp. grassland +/- scattered Eucalyptus crebra, Corymbia erythrophloia. (BVG1M: 30b)

Figure 6. An extract of the Regional Ecosystems Supporting Map (QLD Globe) shows the site is wholly within Regional Ecosystem 11.12.1.

4.2.2 *Essential Habitat*

A portion of the north west extent of the subject allotment is mapped as Essential Habitat in the Vegetation Management Supporting Map (Appendix B) The species indicated is Squatter pigeon (*Geophaps scripta scripta*).

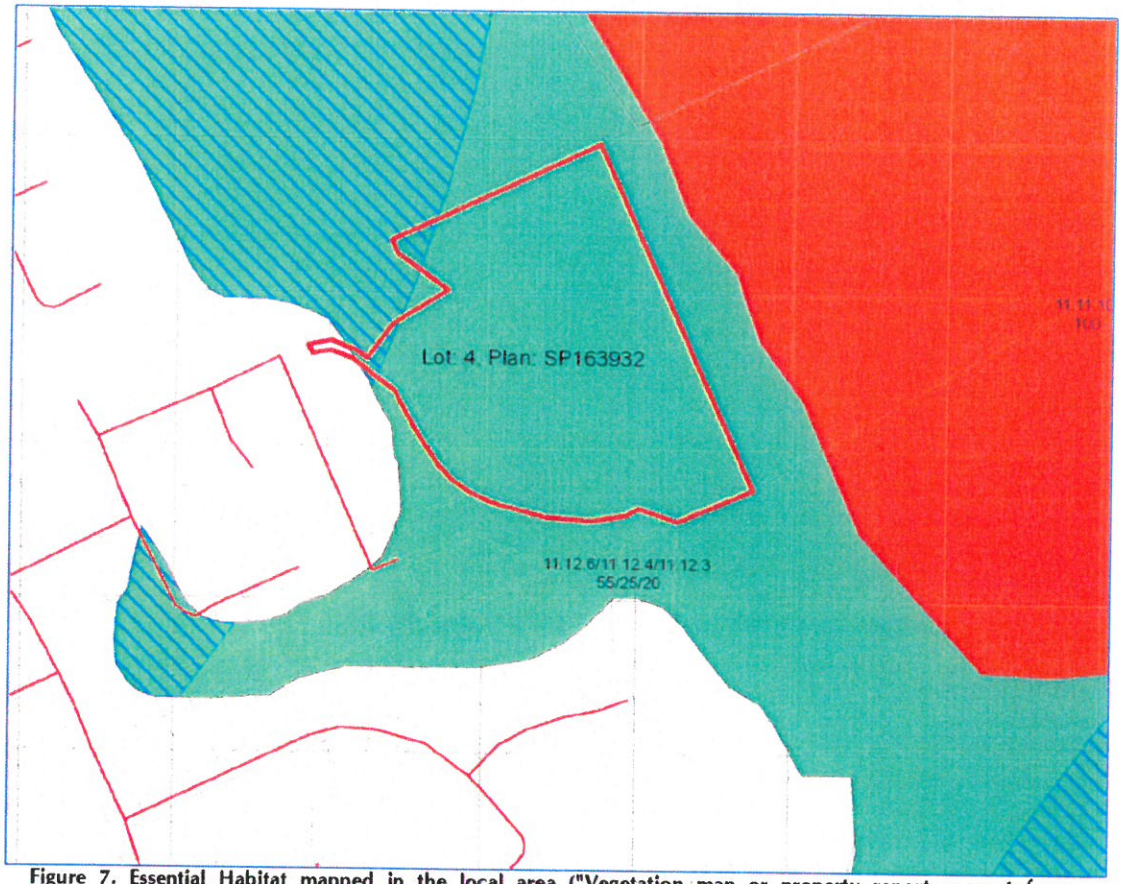

Figure 7. Essential Habitat mapped in the local area ("Vegetation map or property report request form - Department of Natural Resources and Mines", 2016)

4.3 *Existing Environment*

4.3.1 *Physical features*

The subject lot is located within hilly terrain of moderate to steep slopes. Surrounding vegetation is primarily open ironbark (*Eucalyptus crebra*) / bloodwood (*Corymbia* spp.) woodland (RE 11.12.3/11.12.6) over native grassland. Surrounding land use is residential and rural lands. Surrounding land use is residential and undeveloped Berserker Conservation Area.

4.3.2 *Existing disturbance*

Vegetation on the lot is located at the edge of an extensive area of remnant vegetation to the north and east. In relation to the proposed dwelling there are extensive residential areas located to the west and south. Within the subject allotment there is localized clearing from fire breaks and various fire trails and access tracks.

While some weeds are present, native vegetation remaining on the site was considered to be in good condition. The most prevalent introduced plant was stylo (*Stylosanthes* sp.) with red natal (*Melinis repens*) also common beside tracks and other disturbance. Lantana (*Lantana camara*) and prickly pear (*Opuntia stricta*) also occurred in very low densities.

4.3.3 Site Vegetation

Vegetation on the subject lot consisted of two distinct communities:

Ironbark (*Eucalyptus crebra*) grassy to shrubby woodland with bluegum (*Eucalyptus tereticornis*) and bloodwood (*Corymbia erythrophloia, C. clarksoniana*) associated. Ground cover was dominated by black spear grass (*Heteropogon contortus*) with kangaroo grass (*Themeda triandra*) associated. Lower canopy and shrubs was generally isolated to sparse and included brushbox (*Lophostemon confertus*), soapbush (*Alphitonia excelsa*) and medicine bush (*Pogonolobus reticulatus*). See Figure 8.

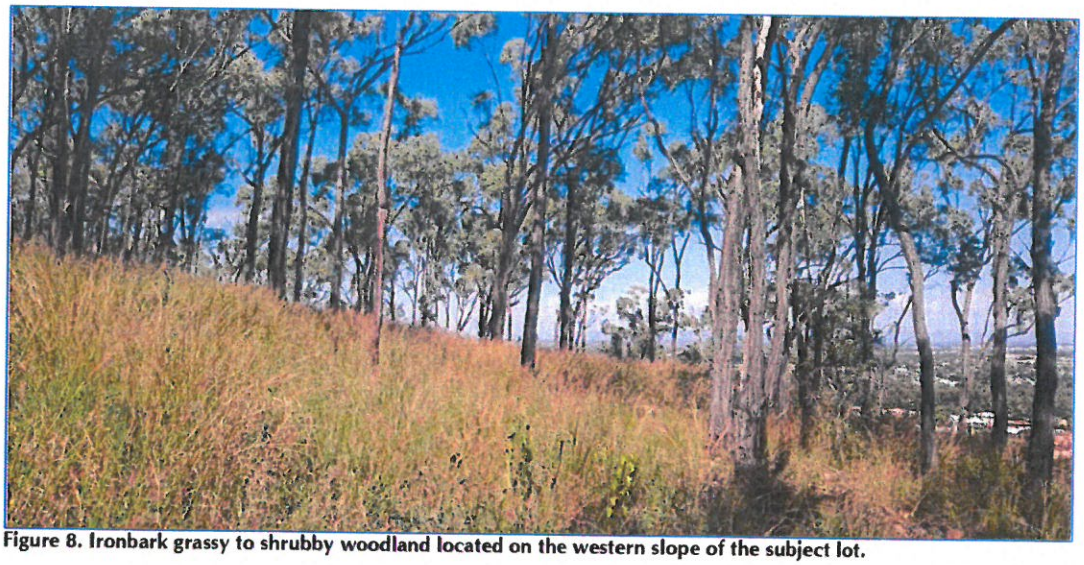

Figure 8. Ironbark grassy to shrubby woodland located on the western slope of the subject lot.

Grassy open woodland to grassland of black spear grass was located on the northern slope. Trees were isolated consisting of ironbark and blood woods. Black spear grass was dominant with scattered patches of kangaroo grass present. See Figure 9.

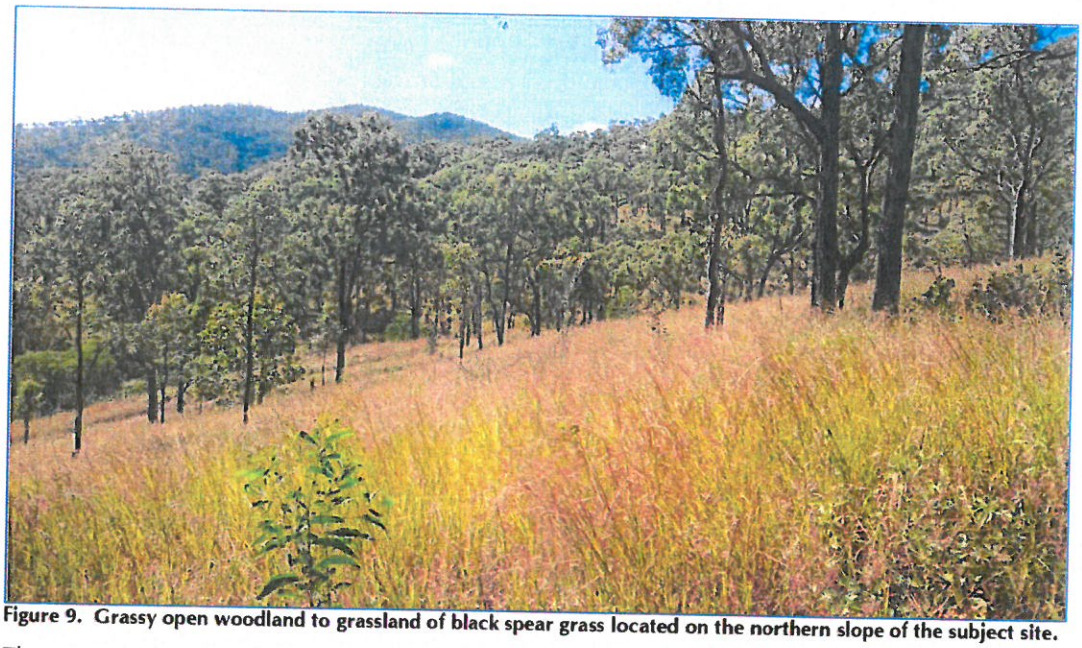

Figure 9. Grassy open woodland to grassland of black spear grass located on the northern slope of the subject site.

The vegetation on the site was consistent with the Regional Ecosystems classification for 11.12.1 Ironbark woodland on igneous rocks (least concern).

4.3.4 Threatened Species

No threatened species were identified in the study area.

The likelihood of spotter pigeon occurring on the site is marginal. While actual sightings are most probably the origin of the Essential Habitat area indicated in the Regulated Vegetation Management Supporting Map, the central origin of the sighting is located on the flats to the north west of the subject lot in what was grassy eucalypt plains and is now residential development. However, there is some suitable habitat on the site ("Geophaps scripta scripta — Squatter Pigeon (southern)", 2016) and this will largely be unaffected.

5 Potential impacts of the proposed development

The proposed development will not significantly impact on underlying natural ecosystem processes and interactions that affect or maintain matters of state or local (high) environmental significance. Any clearing of vegetation for the purpose of the development will not significantly affect the biodiversity, ecological values and processes in areas of state or local (high) environmental significance.

The study area was classified as containing remnant vegetation of Ironbark open woodland, within native grass groundcover. No threatened or locally significant species were identified in the study area. The site is located on the margin of extensive woodlands to the east with extensive residential areas to the west. Cleared areas were noted at the site of the proposed dwelling. As such impacts will be relatively small scale, located within existing partly disturbed areas and potential impacts to wildlife connectivity in the area is minimised by locating development and the margin of remaining woodland tracts..

5.1 Mitigation Strategies

Native woodland and grasslands outside fire management areas should be retained in areas not required to be cleared for fire safety and maintained as far as reasonable in a natural condition. The extent of clearing for bushfire is outlined in the Bushfire Management Plan (Denley Environmental, 2016).

6 References & Bibliography

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7 Appendix A

Drawings T15-1202 -01 & -02

8 Appendix B

MSES Results

Regional Ecosystems and Essential Habitat Mapping

9 Appendix C

Qualifications and Experience

Denley Environmental.

Denley Environmental has been operating in the Central Queensland Region for the last 15 years. Denley Environmental provides services in biological sciences, landscape ecology and environmental assessment, management & restoration.

Our office is located at 334 Bungundarra Road, Bungundarra 4703

Contact details are: ian@denley.com.au. Ph: 07 4939 8887. www.denleyenvironmental.com.au

Examples of threatened species survey and management undertaken by Denley Environmental include:

2003 to current. Survey, mapping and management planning for *Cycas ophiolitica* in Livingstone Shire and Rockhampton Regional Council areas. Denley Environmental has many projects on record concerning development applications within these council areas. In particular, there are no less than five properties within or immediately adjacent to the proposed Panorama Drive route that have been the subject of surveys and recommendations for the management *of Cycas ophiolitica*. Other threatened species projects and clients served by Denley Environmental include:

2004 Survey and translocation plan for *Cycas megacarpa* (endangered), Mt Larcom for Powerlink Queensland.

2005 Survey, mapping and management of a significant populion of *Cupaniopsis shirleyana* (vulnerable), Mt Larcom for Powerlink Queensland

2005 Survey, mapping and management of *Cycas megacarpa* (endangered), Mt Larcom for Powerlink Queensland.

2006. Targeted surveys for *Dicanthium queenslandicum* (endangered), and *Marsdenia brevifolia* (vulnerable). Rolleston Springsure proposed powerlines for Ergon Energy

2011. *Trioncinia retroflexa* (endangered) population survey, mapping and recommended management, Springsure Rolleston Road for Ergon Energy.

2014. Rapid roadside habitat and cultural heritage surveys including threatened species (*Corymbia xanthope* (vulnerable), *Macrozamia serpentina* (endangered) and *Cycas ophiolitica* (endangered). Bruce Highway Clearzone survey, Benaraby to St Lawrence for the Department of Transport and Main Roads.

2014-2016. DEHP Protected plant flora surveys in the Rockhampton and Livingstone Shires for *Cycas ophiolitica, Cycas megacarpa, Macrozamia serpentina, Corymbia xanthope, Marsdenia brevifolia, Stackhousia tryonii, Pimelea leptospermoides, Parsonsia larcomensis, Grevillea venusta* and *Samadera bidwillii.*

Ian Denley. (BSc Biology CQU)

Ian Denley has over 35 years continual experience in flora identification spanning QLD, NSW and WA.

Specific experience in the identification of Queensland flora over the last 10 years includes numerous Property Map of Assessable Vegetation applications, Herbarium map change applications and EIA and EIS flora surveys.

Experience in undertaking surveys for EVNT species includes

- Rolleston Xstrata flora surveys including targeted threatened species searches;
- numerous Ergon Energy and Powerlink targeted threatened species searches and
- extensive targeted threatened species searches and vegetation mapping in the Livingstone Shire and Rockhampton Regional Council areas including surveys for *Cycas ophiolitica* within the majority of the area described in this report and extending throughout the area of the proposed Panorama Drive.

CV of Ian Denley

Ian as over 35 years experience of providing ecological expertise and expert consultancy to clients in environmental assessment, management and restoration. Ian's experience extends from large scale survey, mapping and management in vegetation, fauna and weeds; mine rehabilitation 'sign off' assessments and mine revegetation; threatened species searches and conservation management plans and fauna rescue (spotter catcher) to large scale collections of native seed for revegetation and research. Clients are provided skilled and comprehensive experience gained from 35 years of hands-on ecological investigation, assessment and restoration.

Ian has experience in:

- Bushfire management and strategy
- Company director /business and HR management
- Environmental Impact Assessment (EIA) & Impact studies (EIS)
- Environmental legislation; Federal, State and local government
- Environmental Relevant Activities applications (ERA)
- Fauna habitat survey and fauna management
- GIS
- Marine Plant Survey and marine plant removal permits
- Mine rehabilitation sign off studies
- native seed collection, storage & direct seeding. Commercial and scientific.
- PMAV and herbarium map change applications
- Revegetation of large scale projects
- Review of Environmental Factors (REF)
- Threatened species survey and management
- Vegetation and marine offset assessment, acquisition and management
- Vegetation and marine plant offsetting
- Vegetation survey and mapping
- Weed mapping, planning and strategy

Career Summary

Date	Position	Organisation
2012 – current	Owner Manager	Denley Environmental
2004 - 2012	Managing Director	Denley Environmental Consultants
2009 - 2010	Director	Environmental Offset Management
2002 - 2004	Environmental Scientist	Connell Wagner P/L
1998 – 2002	Contract	Livingstone Shire Council
1997 - 1998	Research Assistant	Central Queensland University
1992 -1996	Partner	Re-Flora Australia
1985 - 1991	Owner Manager	Australian Native seed Merchants
1978 - 1984	Partner	Harvest Seed Company

Relevant Project Experience

- Ergon Burrum Heads EIA. Flora and fauna survey and impact assessments. Mitigation strategies.
- Ergon Mt Seaview communications tower EIA.
- Ergon Springsure to Rolleston powerlines. EIA. Vegetation survey, threatened species survey and management, weed survey and management, vegetation clearing scoping.
- Ergon Nebo powerlines. Survey and assessment of EPBC significance blue grass communities, weed survey and management strategy.
- Ergon Hay Point powerlines. REF. Survey of vegetation and weeds. Fire and vegetation management strategy.
- Ergon Toogoom powerlines REF. Survey of regional ecosystems vegetation. Assessment of significant vegetation communities and fauna habitat. Assessment of impacts for alternative routes.
- Ergon Springsure to Rolleston powerlines. Threatened species management; Belyando Cobblers Pegs.
- Ergon Nielsen's creek powerlines Vegetation Impact Assessment, revegetation strategy.
- Ergon Hay Point Powerlines Weed Survey and strategy.
- Powerlink Larcom Creek substation Weed Survey and Management. Fauna habitat assessments and spotter catcher for clearing operations.
- Powerlink QRN transmission lines Duaringa, Bluff, and Wycarbah. Weed Survey and washdown strategy.
- Powerlink Calvale to Stanwell transmission lines Weed survey and washdown strategy. Stakeholder meetings.
- Powerlink Stanwell to Broadsound Transmission Lines Weed Survey. Fauna habitat assessments and spotter catcher for clearing operations.
- Powerlink Yarwun to Larcom Creek Transmission Lines Weed Survey. Fauna habitat assessments and spotter catcher for clearing operations.
- Powerlink Wycarbah to Stanwell QRN lines. Threatened Species Management. Brigalow Scaly Foot diurnal survey and management strategy.
- Powerlink Lilyvale to Broadsound Transmission lines. Survey and assessment of endangered brigalow communities. Management strategies.

- Powerlink, Gladstone to Larcom Creek transmission lines. Threatened species management Cupaniopsis shirleyana, Cycas megacarpa, and Hernandia bivalvis.
- Powerlink, Gladstone to Larcom Creek transmission lines. EIS vegetation survey, weed survey, threatened species survey. EPBC management plans and submissions for a controlled action.

Professional Development

- Certificate IV in Assessment and Workplace training, Learning Network QLD, 2005
- English as a Second Language. Voluntary Tutor Training, AFE, 2007
- Managing Multiple Projects, Objectives and Deadlines, Skillpath, 2002
- Open Surface Coal Induction, New Horizons, 2010
- Small Business Operations, Pulse Training, 1998

Professional Associations

- Member, (15 years), Australian Network for Plant Conservation
- Member, (4 years), Australasian Wildlife Management Society
- Member, (4 years), Birds Australia
- Member, (4 years), Society for Conservation Biology
- Member, (6 years), Ecological Society of Australia Inc.
- Member, (8 years), Central Queensland Mining Rehabilitation Group

Licences and Permits

Queensland Driver's license Class C, R & boat, Commercial Operator's License & Ground Distribution Contractor License (ACDC Act), Rehabilitation permit (S12(D) *Nature Conservation (Administration) Regulation* 2006, Construction Industry Card (white card) 30670.

Experience

Aecom. Proposed Rockhampton Road and Rail Bypass. Likelihood analysis and targeted surveys for threatened flora and vegetation communities.

Cement Australia. East End mine. Semi evergreen vine thicket vegetation survey and management plan

Cement Australia. Mt Etna Mine. Mine signoff studies including baseline vegetation surveys, soils microbiology, soils chemistry, fauna surveys, rehabilitation resilience assessments and rehabilitation monitoring.

Cheetham Salt EIA. Marine and woodland vegetation survey and mapping.

Connell Wagner. Wiggin Rail Coal Terminal EIS. Vegetation Survey and mapping. Verification and mapping of threatened vegetation communities

Ergon Energy. numerous targeted surveys for threatened flora and communities including Riordanvale, Dawes Range and Double Sloping Hummock Ubinet projects, Springsure to Rolleston powerlines, Toogoom Powerline and Avoca substation

Iwasaki Sango. Delineation of EPBC significant coastal rainforest communities for a development application.

Livingstone Shire Council. Survey and mapping of EPBC significant population of Cycas ophiolitica and associated management plans

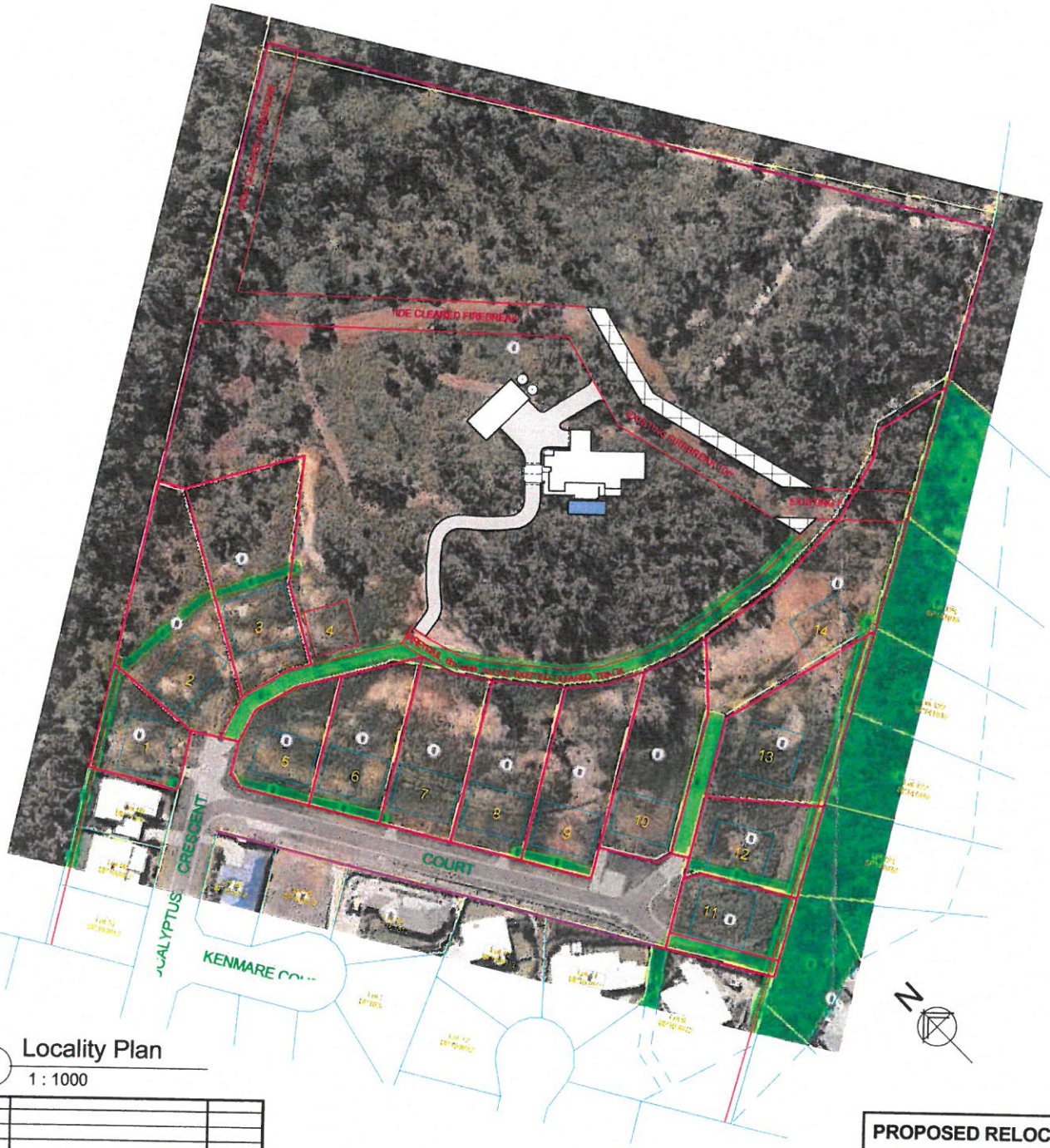
Powerlink Queensland. Yarwun to Larcom creek transmission line construction. Targeted searches for Cupaniopsis shirleyana, Atalaya rigida and Hernandia bivalvis. Survey of population characteristics of an EPBC significant community (Cupaniopsis shirleyana) and recovery after clearing.

Powerlink Queensland Yarwun to Larcom creek transmission line construction. Survey, management and mitigation strategy to conserve a population of the endangered Cycas megacarpa.

Powerlink. Larcom Creek substation. Damage Mitigation Permit and translocation strategy for a population of Cycas megacarpa

Powerlink Queensland. Gladstone to Larcom Creek EIS. Vegetation survey and mapping. Targeted searches for significant flora species, EPBC mitigation submission for management of threatened ecological communities (semi-evergreen vine thicket).

CTSCo. Vegetation and landscape condition surveys. Wowan Queensland.



1 Locality Plan
1 : 1000

CONSTRUCTED TO LEVEL 1 (AS3959-2009)
NOTABLY:
- CONCRETE SLAB ON GROUND
- EXTERIOR WALLS, ROOF, VERANDAH MATERIALS ALL NON-COMBUSTABLE
- SEALED WALL AND ROOF JOINTS (EMBER ATTACK)
- COMBINATION OF ALUM SHUTTERS AND TOUGHENED GLASS WINDOWS AND DOORS
- FIRE-RESISTANT DOOR FRAMES AND WEATHER STRIPS WHERE APPLICABLE
- ALL METAL EXTERNAL TRIMMINGS (GUTTERS, DOWNPIPES ETC)

Ariel Photograph

- Current BLE
- Proposed Dwelling and Shed positions

REVISIONS			
	02	TREE SURVEY ADDED	17.05.16
	01	PLANNING APPLICATION	07.02.16
	No.	DESCRIPTION	DATE

PROPOSED RELOCATION OF B.L.E.
FOR D. & K. BELL
AT LOT 4 EUCALYPTUS CRES, NORTH ROCKHAMPTON

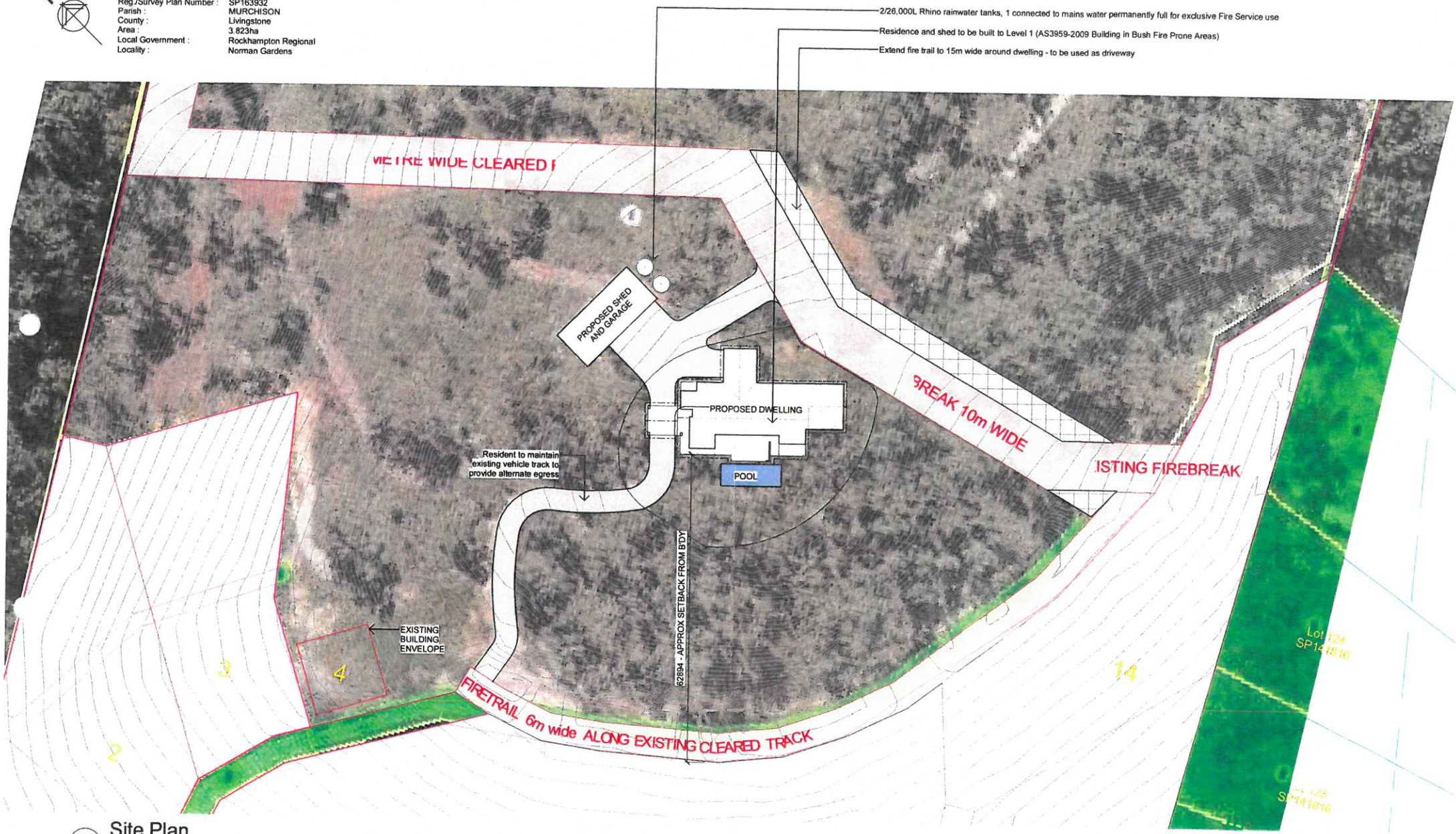
PLAN SIZE:	WIND SPEED:	DRAWN:	CHECKED:	PROJECT No.
A2	C2	J.P.		T15-1202 -01

Builder....
Telephone....
Address....
Licenced under the QBSA Act Lic No.
Designer

SHEET 01 OF 05
REV. 01 02

R.P.D.

Lot Number :	4
Reg./Survey Plan Number :	SP163932
Parish :	MURCHISON
County :	Livingstone
Area :	3.823ha
Local Government :	Rockhampton Regional
Locality :	Norman Gardens



1 Site Plan

1 : 500

REVISIONS			
02	TREE SURVEY ADDED	17.05.16
01	PLANNING APPLICATION	07.02.16
No.	DESCRIPTION	DATE

CONSTRUCTED TO LEVEL 1 (AS3959-2009)
NOTABLY:
- CONCRETE SLAB ON GROUND
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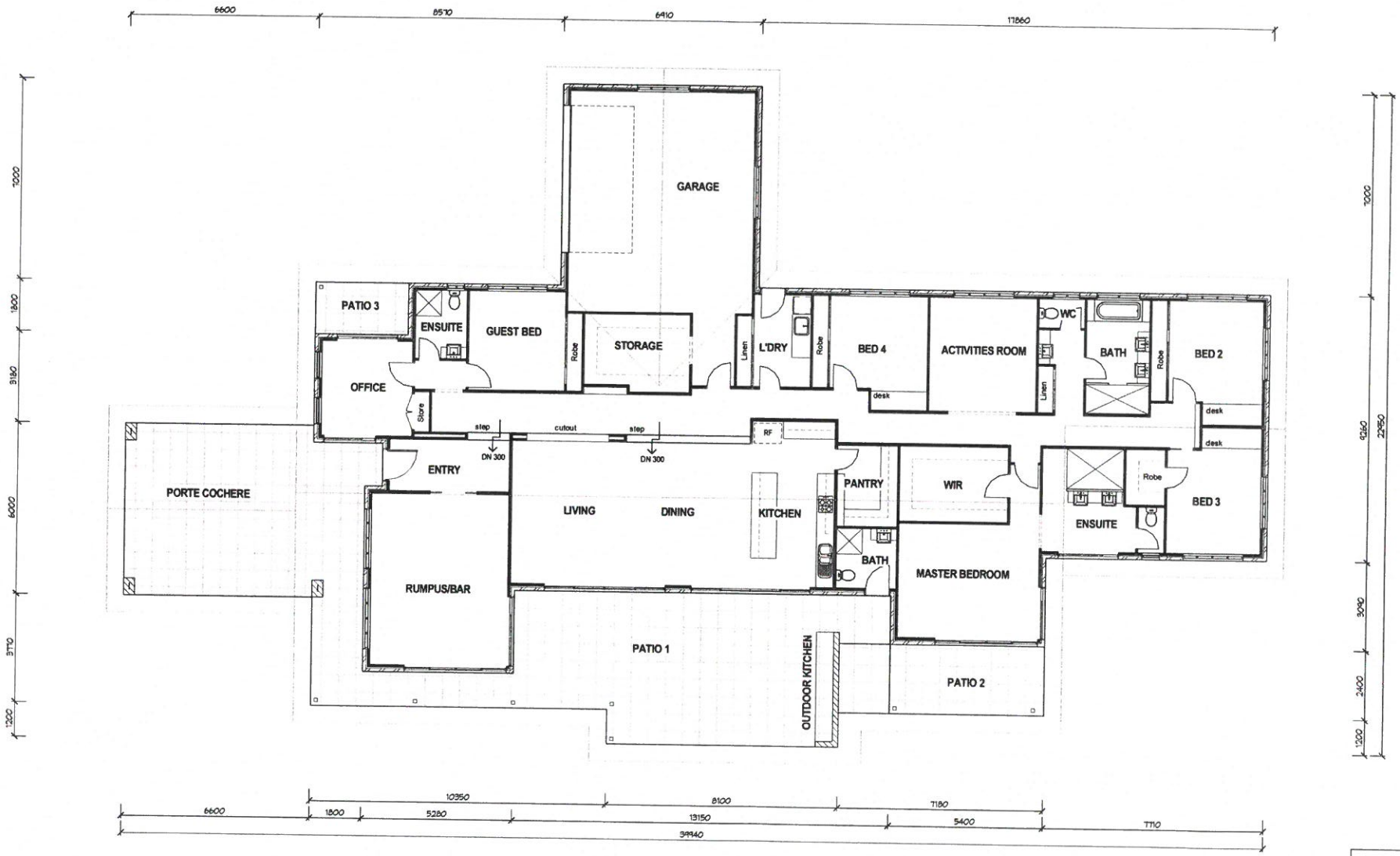
PROPOSED RELOCATION OF B.L.E.
FOR D. & K. BELL
AT LOT 4 EUCALYPTUS CRES, NORTH ROCKHAMPTON

PLAN SIZE:	WIND SPEED:	DRAWN:	CHECKED:	PROJECT No.
A2	C2	J.P.		T15-1202 -02

Builder....
Telephone....
Address....
Licenced under the QBSA Act Lic No.
Designer

SHEET 02 OF 05
REV. 01 02



1 Proposed Floor Plan

1 : 100

REVISIONS			
	02	TREE SURVEY ADDED	17.05.16
	01	PLANNING APPLICATION	07.02.16
	No.	DESCRIPTION	DATE

CONSTRUCTED TO LEVEL 1 (AS3959-2009)
NOTABLY:
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- EXTERIOR WALLS, ROOF, VERANDAH MATERIALS ALL NON-COMBUSTABLE
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- ALL METAL EXTERNAL TRIMMINGS (GUTTERS, DOWNPIPES ETC)

FLOOR AREAS	
HABITABLE	333.5 m²
PATIO 1	69.3 m²
GARAGE/STORAGE	68.0 m²
PORTE COCHERE	50.2 m²
PATIO 2	20.2 m²
PATIO 3	5.8 m²
GRAND TOTAL	547.1 m²

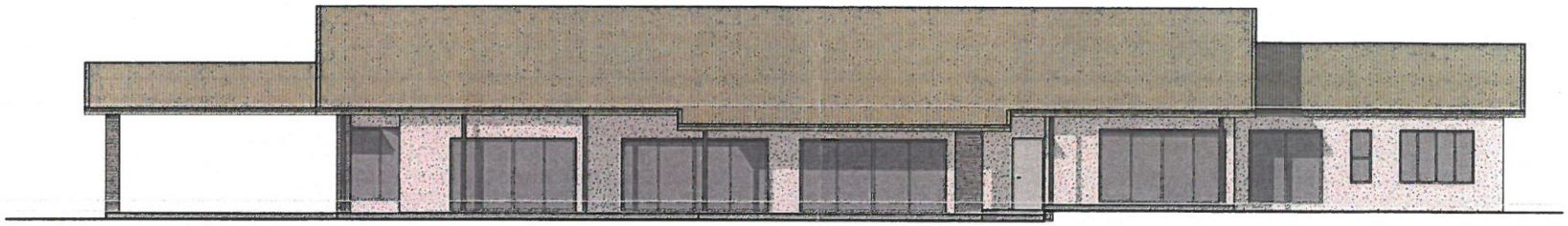
PROPOSED RELOCATION OF B.L.E.
FOR D. & K. BELL
AT LOT 4 EUCALYPTUS CRES, NORTH ROCKHAMPTON

PLAN SIZE:	WIND SPEED:	DRAWN:	CHECKED:	PROJECT No.
A2	C2	J.P.		T15-1202 -03

Builder....
Telephone....
Address....

Licenced under the QBSA Act Lic No.
Designer

SHEET 03 OF 05
REV. 01 02



Top Plate
106240

Ground Floor Level
103500

Living Floor Level
103200

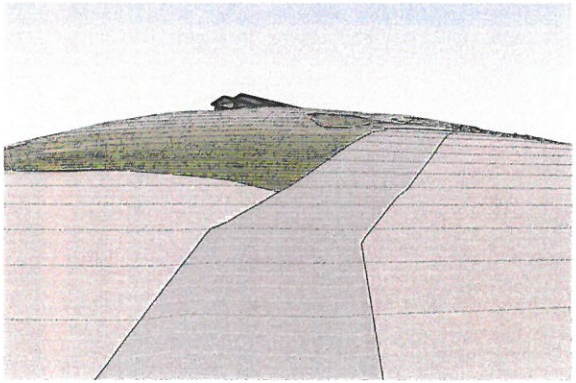
1 ELEVATION 1 (SOUTH-WEST)

1 : 100

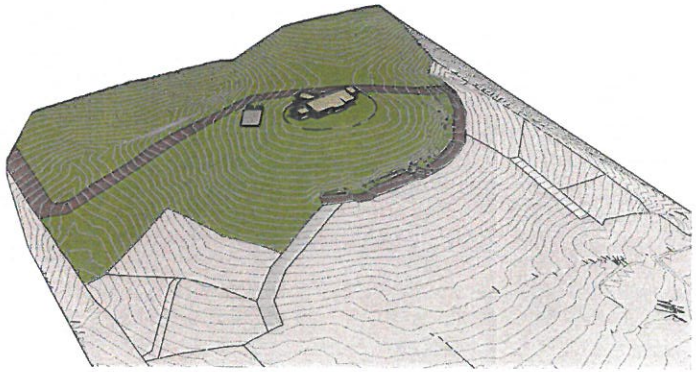
2 ELEVATION 4 (NORTH-WEST)

1 : 100

CONSTRUCTED TO LEVEL 1 (AS3959-2009)
NOTABLY:
- CONCRETE SLAB ON GROUND
- EXTERIOR WALLS, ROOF, VERANDAH MATERIALS ALL NON-COMBUSTABLE
- SEALED WALL AND ROOF JOINTS (EMBER ATTACK)
- COMBINATION OF ALUM SHUTTERS AND TOUGHENED GLASS WINDOWS AND DOORS
- FIRE-RESISTANT DOOR FRAMES AND WEATHER STRIPS WHERE APPLICABLE
- ALL METAL EXTERNAL TRIMMINGS (GUTTERS, DOWNPIPES ETC)



3 VISUAL IMPACT FROM DRIVEWAY



4 3D View - ELEVATED N-W ANGLE

REVISIONS			
02	TREE SURVEY ADDED	17.05.16
01	PLANNING APPLICATION	07.02.16
No.	DESCRIPTION	DATE

PROPOSED RELOCATION OF B.L.E.
FOR D. & K. BELL
AT LOT 4 EUCALYPTUS CRES, NORTH ROCKHAMPTON

PLAN SIZE:	WIND SPEED:	DRAWN:	CHECKED:
A2	C2	J.P.	

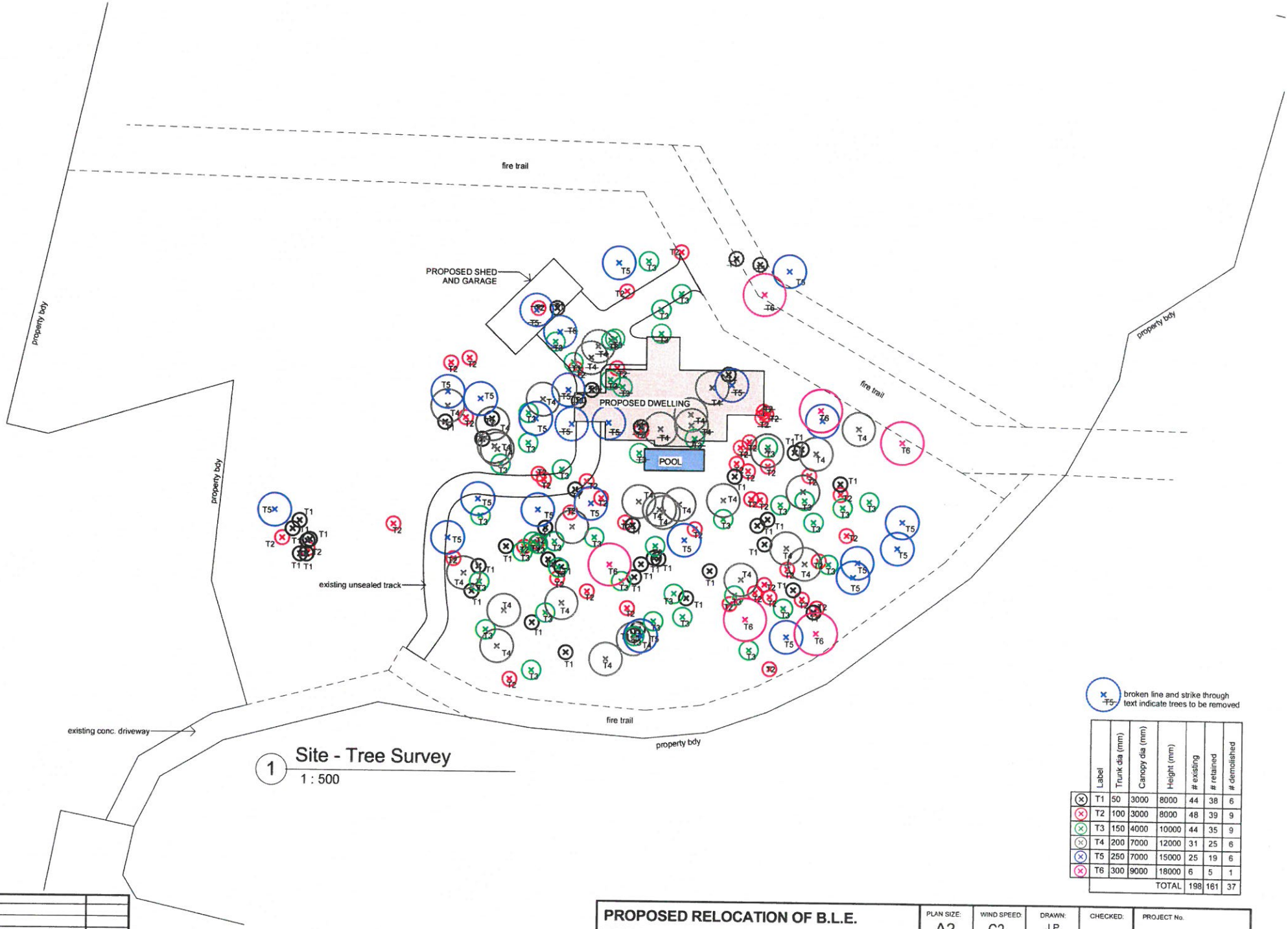
Builder....
Telephone....
Address....

Licenced under the QBSA Act Lic No.
Designer

PROJECT No. T15-1202 -04

SHEET 04 OF 05

REV. 01 02



1 Site - Tree Survey
1 : 500

broken line and strike through text indicate trees to be removed

	Label	Trunk dia (mm)	Canopy dia (mm)	Height (mm)	# existing	# retained	# demolished
⊗	T1	50	3000	8000	44	38	6
⊗	T2	100	3000	8000	48	39	9
⊗	T3	150	4000	10000	44	35	9
⊗	T4	200	7000	12000	31	25	6
⊗	T5	250	7000	15000	25	19	6
⊗	T6	300	9000	18000	6	5	1
				TOTAL	198	161	37

REVISIONS			
03	LEGEND UPDATED	11.07.16
02	TREE SURVEY ADDED	17.05.16
01	PLANNING APPLICATION	07.02.16
No.	DESCRIPTION	DATE

PROPOSED RELOCATION OF B.L.E.
FOR D. & K. BELL
AT LOT 4 EUCALYPTUS CRES, NORTH ROCKHAMPTON

PLAN SIZE:	WIND SPEED:	DRAWN:	CHECKED:
A2	C2	J.P.	

Builder...
Telephone...
Address...

Licenced under the QBSA Act Lic No.
Designer

PROJECT No. T15-1202 -05

SHEET 05 OF 05
REV. 01 02 03