



# Arboricultural Impact Assessment Report

1-3 Walker St & 2-4 Caldwell Ave  
East Lismore

Client

NSW Land and Housing  
Corporation



Northern Tree Care  
ABN 73 674 526 681  
6 Abalone Place, Ballina. NSW 2478

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## **1. Introduction**

1.1 Peter Gray has compiled this report on request from the NSW Land and Housing Corporation. The LAHC are constructing a new housing development at 1 & 3 Walker St and 2 & 4 Caldwell Ave, East Lismore.

1.2 This report is an Arboricultural Impact Assessment Report. In September 2022 a Preliminary Arborist Report was compiled by Northern Tree Care. That report described the trees growing on the site and identified trees that constitute a material constraint to the development. The Preliminary Arborist Report was intended to inform the design process with respect to trees growing on the site.

## **2. Scope**

2.1 This report is an Arboricultural Impact Assessment Report. The report follows the Preliminary Arborist Report prepared by Northern Tree Care in September 2022. This report focuses on the trees proposed to be retained in the development. The unique numbers assigned to the trees is followed in this report.

2.2 A set of plans and drawings of the proposed development has now been supplied. This report assesses the likely impact of the proposed development on the trees to be retained. Where trees are retained in the development, recommendations for their management are made. Recommendations for the protection of these trees during construction is made.

### 3. Method

3.1 The trees were assessed visually from the ground. The diameter at breast height (DBH) was measured at 1.4 m above the ground. The height of the trees were measured using a hypsometer or estimated where the view of the trees was partially obstructed. The conventions and methods recommended in the Australian Standard AS 4970-2009 Protection of trees on development sites were used to assess the trees. The data collected in September 2022 was used to inform this report. A further inspection of the trees has not been carried out.

3.2 The health and condition of the trees were assessed using the Visual Tree Assessment method (Mattheck & Breloer 2003). This is a method of assessing trees using the body language or shape and features of the tree to indicate their condition. These tree shapes or body language are a reliable indicator of the underlying condition of that part of the tree. The trees were identified using the signs and features present at the time of inspection.

3.3 The trees were inspected by P. Gray of Northern Tree Care on 19th September 2022. This report is compiled from information gathered during the inspection and from plans and documents supplied by Kennedy Associates Architecture. The plans and documents include:

- *Demolition Plan.* NSW Land and Housing Corporation. Rev A 26/04/2023
- *Site Plan.* NSW Land and Housing Corporation. Rev A 26/04/2023
- *General Arrangement Ground Floor.* NSW Land and Housing Corporation. . Rev. A. 26/04/2023.
- *Detail Survey.* NSW Land and Housing Corporation. . 04/07/2022.



## 4. Observations

4.1 The property subject of this report is described as 1-3 Walker St and 2-4 Caldwell Avenue Lot Lots 2 in DP 38118; Lots 1 & 2 in DP 121500 and Lot 25 in DP 38118. The land is zoned R1 General Residential.

4.2 The property is bounded by private residences to the east, Walker St to the north, Caldwell Av to the south and Dibbs St to the west. The land is flat and the soil is clay loam.

4.3 There are four existing residences on the property. It is proposed to demolish the existing buildings and construct sixteen new residential units and parking.

4.4 In order to construct the new units all of the existing trees on the property as noted in the Preliminary Arborist Report will be removed with the exception of four trees. These are trees # 6, # 9, # 11 & # 12. Tree # 6 is growing on the road verge in Caldwell Ave and tree # 9 is growing close to the eastern boundary of the property. Trees # 11 & 12 are growing wholly on the property to the east. Tree # 6 is owned by the Lismore City Council and the ownership of tree # 9 is unclear.

4.5 The trees are described in Table 1. Tree Data.

**Table 1. Tree Data**

Tree #	Name	Age	Health	Height m	DBH mm	Crown m	TPZ m
6	Bottlebrush <i>Callistemon viminalis</i>	Mature	Good	5-10	710	12	8.5
9	Mango <i>Mangifera indica</i>	Mature	Good	5-10	500	6	6.0
11	Exotic Sp	Mature	Good	5-10	350	5	4.2
12	Tibouchina <i>Tibouchina urvilleana</i>	Mature	Good	5-10	350	5	4.2

## 5. Tree Significance

5.1 When considering the retention value of trees, two major issues were considered. They are the significance of the tree and its estimated life expectancy.

5.2 When assigning a value to the significance of the tree, a number of factors should be considered (Moreton 2003). The significant outcomes have been determined in **Attachment 4. Significance of Trees in the Landscape.**

## 6. Tree Retention Values

Landscape Significant Rating								
Est. Life Expectancy years		Significant	Very High	High	Moderate	Low	Very Low	Insignificant
		High Retention Value			Moderate Retention Value		Low Retention Value	Very Low Retention Value
	> 40							
	15-40			# 6			# 9, 11, 12	
	5-15							
	<5							
	Dead							

Ref: Modified from Couston, Howden (2001) Tree Retention Values Table. Footprint Green Pty Ltd, Sydney Australia.

6.1 Where trees have a high retention value they should be retained if possible. Where the development is considered to be more important than the trees they may be removed (Barrell 2006).



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## 7. Discussion

7.1 Trees # 6, 9, 11 & 12 are proposed to be retained in the development. There is no or a minor encroachment into the TPZ of trees 3 11 & 12. There is an encroachment into the TPZ of trees # 6 & 9.

7.2 The encroachment if the sewer line is installed by digging a trench into the TPZ of tree # 6 is calculated to be 25%. This is a major encroachment as defined by the Australian Standard AS 4970-2009 Protection of trees on development sites. If the sewer line were to be installed by underboring, the encroachment extent would be the retaining wall. The encroachment of the retaining wall into the TPZ is calculated to be 16%. This is also a major encroachment.

7.3 Where services must be installed near trees, the lines can be installed by underboring rather than digging an open trench. This will not impact on the trees root system and will not cause the tree to become unviable. If the sewer line is installed by underboring, the encroachment into the TPZ will consist of the retaining wall. This is a much smaller encroachment into the TPZ than a trench that would be needed for the sewer line. If the encroachment is less than the encroachment calculated for the sewer line then it will also not cause the tree to become unviable.

7.4 The encroachment into the TPZ of tree # 9 is calculated to be 23%. This is a major encroachment as defined by the Australian Standard *AS 4970-2009 Protection of trees on development sites. Sect 3.3.3 Major encroachment*. The Standard allows for a major encroachment where it can be demonstrated that the tree will remain viable. The considerations for the encroachment are examined in **Table 2. Encroachment Considerations**.

**Table 2. Encroachment Considerations.**

AS 4970 Section 3.3.4 Encroachment considerations for tree # 6. Encroachment of 23%		Considerations for this tree
a	Location and distribution of roots to be determined through non destructive investigation methods.	Given that locating individual roots will not inform the assessment process, it is considered that root mapping is not appropriate or necessary to determine the viability of this tree.
b	The potential loss of root mass resulting from the encroachment.	A sewer line is proposed to be constructed just outside the Structural Root Zone of the tree. If the line is installed by digging a trench the encroachment will be 25%. If the sewer line is installed by underboring, the encroachment will be the retaining wall and the encroachment will be 16%.
c	Tree species and tolerance to root disturbance.	This species of tree is hardy and tolerant of root loss.
d	Age, vigour and size of the tree	The tree is a mature aged tree in good health and with fair vigour.
e	Lean and stability of the tree	The tree has an upright form
f	Soil characteristics	The soil is clay loam. It is well suited to the growth of trees.
g	The presence of existing or past structures	The tree is growing on the road reserve. It is expected that there will be a significant presence of tree roots where the work is proposed.
h	Design factors	The installation of the sewer line can be done by way of underboring. This will significantly reduce the impact of the development on the tree.

**Table 3. Encroachment Considerations.**

AS 4970 Section 3.3.4 Encroachment considerations for tree # 9. Encroachment of 23%		Considerations for this tree
a	Location and distribution of roots to be determined through non destructive investigation methods.	Given that locating individual roots will not inform the assessment process, it is considered that root mapping is not appropriate or necessary to determine the viability of this tree.
b	The potential loss of root mass resulting from the encroachment.	A retaining wall is planned to be constructed approximately 2.8 m from the boundary. This will require excavation of the soil to build the wall. The roots of the tree will be severed at this location.
c	Tree species and tolerance to root disturbance.	This species of tree is hardy and tolerant of root loss.
d	Age, vigour and size of the tree	The tree is a mature aged tree in good health and with fair vigour.
e	Lean and stability of the tree	The tree has an upright form
f	Soil characteristics	The soil is clay loam. It is well suited to the growth of trees.
g	The presence of existing or past structures	The existing building will have inhibited the growth of roots in part of the encroachment zone. It is considered that this is not a significant factor however.
h	Design factors	The retaining wall has been pushed out to maximise the distance from the tree. The site constraints make it necessary to construct a retaining wall in this position.



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## 8. Recommendations

8.1 It is recommended that trees # 6, 9, 11 and 12 be retained in the development. The other trees growing on the site should all be removed to enable construction of the development.

8.2 It is recommended that the sewer line be installed by underboring through the TPZ of tree # 6. The boring must be carried out so that the top of the underbore is at least 600 mm below the surface of the soil. If this is not feasible the line can be installed by digging a trench. This would result in an encroachment of 25% into the TPZ. This is not ideal but is unlikely to cause this tree to become unviable.

8.3 There construction of the retaining walls for both trees # 6 and 9 will require some footings for the retaining walls. The footings should be excavated with an earthmoving machine. Where roots are encountered that are less than 100 mm in diameter they should be broken off with the earthmoving machine. They should not be cut cleanly (Gray 2023).

8.4 The trees # 11 and 12 are growing on the adjacent property to the east. It is considered that the site fencing will provide sufficient protection for those trees. Trees # 6 and 9 should be protected during construction. The specifications for the protection of these trees is given in **9. Tree Protection.**



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## 9. Tree Protection

9.1 The trees retained on the site should be protected during construction in accordance with the recommendations of the Australian Standard *AS 4970-2009 Protection of trees on development sites*. The Standard sets out a Tree Protection Zone that is calculated to be an area around the tree with a radius of 12 x diameter at breast height (DBH). The TPZ has a minimum of 2 m and maximum of 15 m. The TPZ should be protected during construction as effectively as is practicable.

9.2 The Standard lists activities that are prohibited in the TPZ. They are:

- a. Machine excavation
- b. excavation for silt trenching
- c. cultivation
- d. storage
- e. preparation of chemicals, including preparation of cement products
- f. parking of vehicles and plant
- g. refuelling
- h. dumping of waste
- i. wash down and cleaning of equipment
- j. placement of fill
- k. lighting of fires
- l. soil level changes
- m. temporary or permanent installation of utilities and signs and
- n. physical damage to the tree.

9.3 The proposed construction of the development is planned to be undertaken within the TPZ of some of the trees. In order to ensure that the trees remain viable it is important to protect them during construction as much as is practicable. Any of the activities detailed above should not be undertaken in the TPZ of the tree unless absolutely necessary. A 1.8 m high panel mesh fence should be erected around the trees. An example of a suitable protective fence is shown in Figure 1. The location of the fence is shown in Figure 2 and 3.

9.4 The protective fencing must be installed before commencement of works and not removed before the building works are completed.



Figure 1. An example of a suitable protective fence.

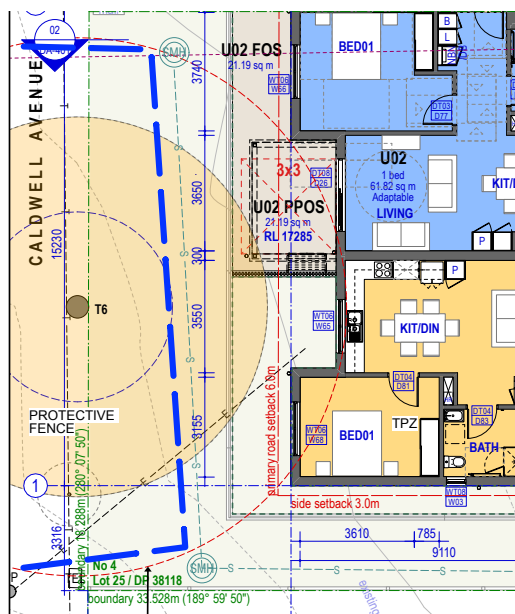


Figure 2. Location of protective fence tree # 6.

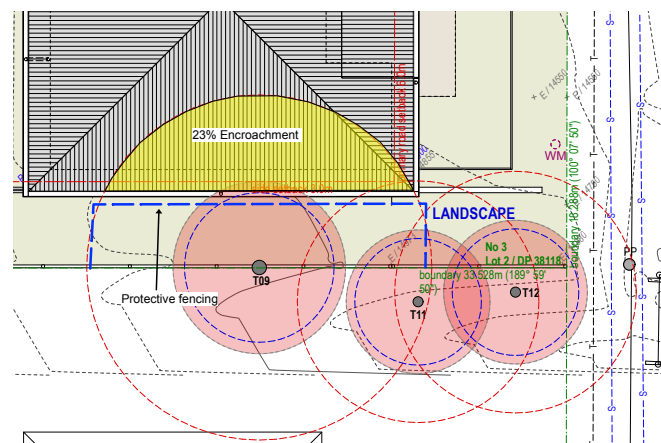


Figure 3. Location of protective fence tree # 9.

## 10. References

- Barrell J. 2006. *Workshop Manual Trees on Construction Sites*. Barrell Tree Consultancy. Brisbane.
- Gray P. 2023. *Tree Roots: Cut or Break?* Arbor Age. April/May 2023. Docklands.
- Harden G. MacDonald W. Williams J. 2009. *Rainforest Trees and Shrubs*. Gwen Harden Publishing. Nambucca Heads.
- Mattheck C. Breloer H. 2003. *The Body Language of Trees*. TSO. London.
- Moreton A. 2003. *Criteria for Assessment of Landscape Significance*. 7th National Street Tree Symposium 2006.
- Standards Australia. 2009. *AS 4970 Protection of Trees on Development Sites*. Australian Standards. Sydney.



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## 11. About The Author

10.1 This report was compiled by Peter Gray of Northern Tree Care. The author is an arborist who has been providing Arboricultural Reports for Local Government, State Government and private clients for over 20 years. His qualifications include:

Graduate Certificate of Arboriculture (AQF 8)

Diploma of Arboriculture (AQF 5)

Diploma of Horticulture (Arboriculture)

Quantified Tree Risk Assessment (QTRA)

Tree Risk Assessment Qualification (ISA)

VALID Tree Risk-Benefit Validator.

10.2 Peter Gray is an AQF level 8 Consulting Arborist general member No. 2344 with Arboriculture Australia. He is a trained and registered practitioner of Quantified Tree Risk Assessment (QTRA) Registered User number 980. In 2020 he was appointed as a director to the board of Arboriculture Australia.

10.3 I declare that I have compiled this report impartially using best professional judgement. I have no financial interest in the outcome of the report.

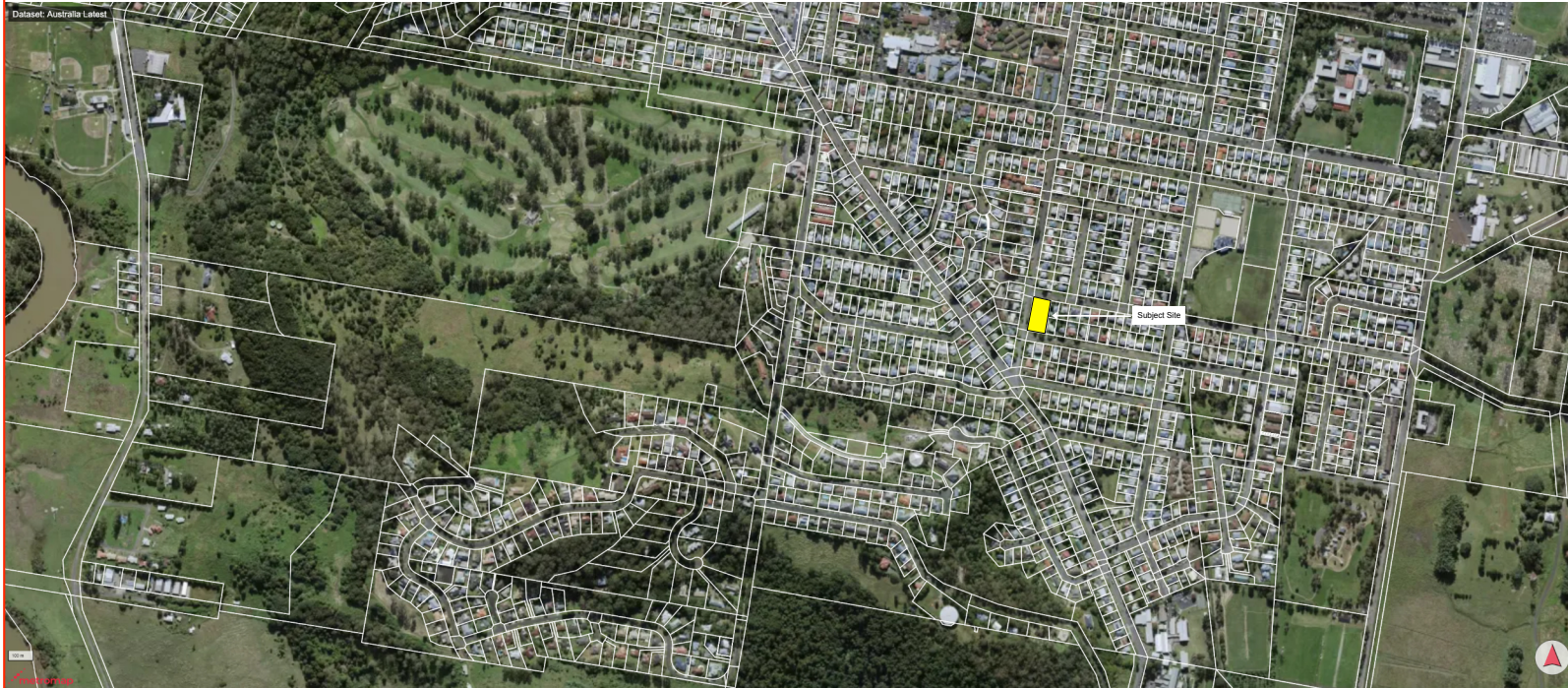
Signed Peter Gray, Northern Tree Care

26 June 2023





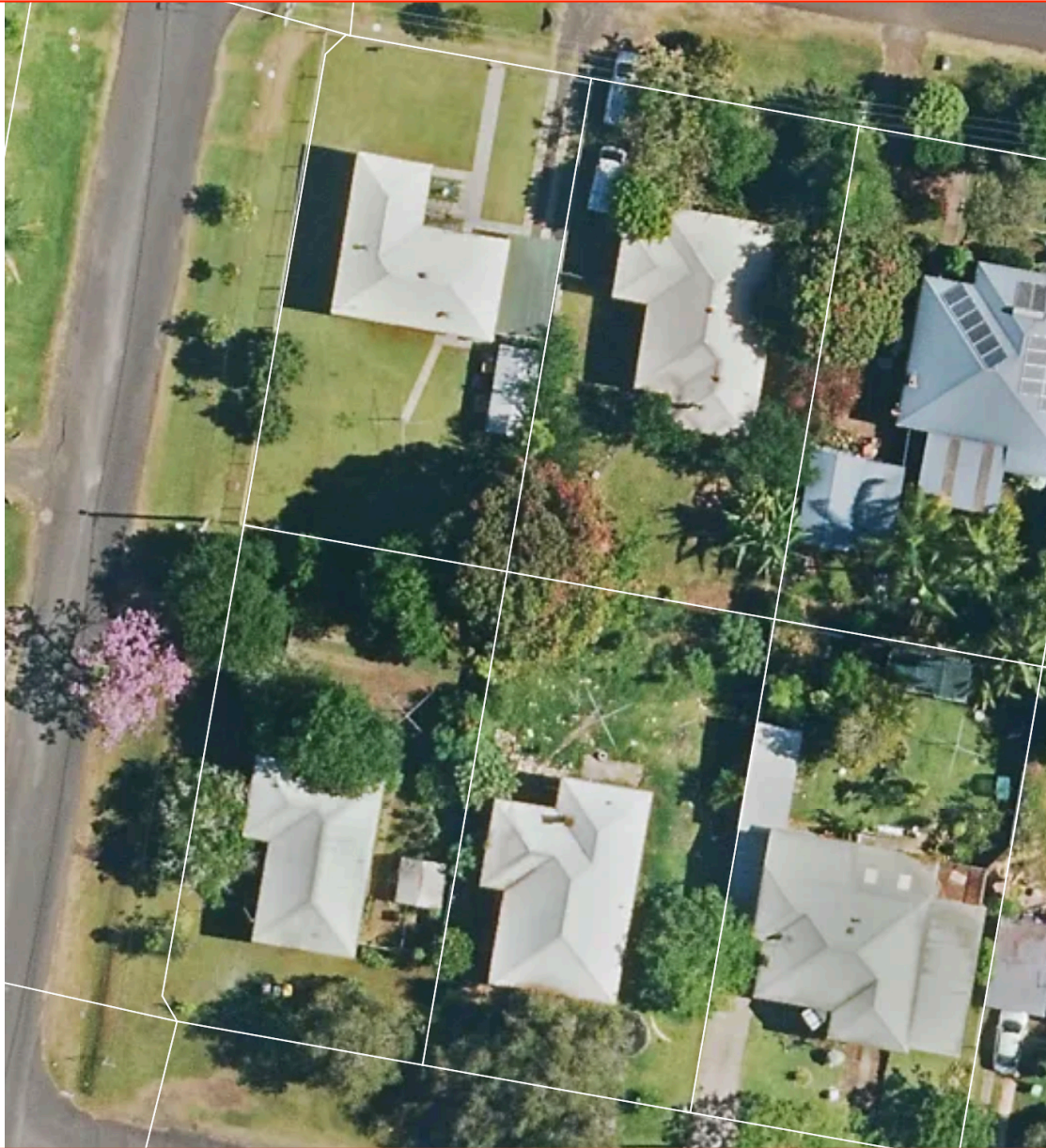
## 12. Attachment 1 Location







**13.  
Attachment 2  
Aerial Photo**







## 14. Attachment 3 Survey

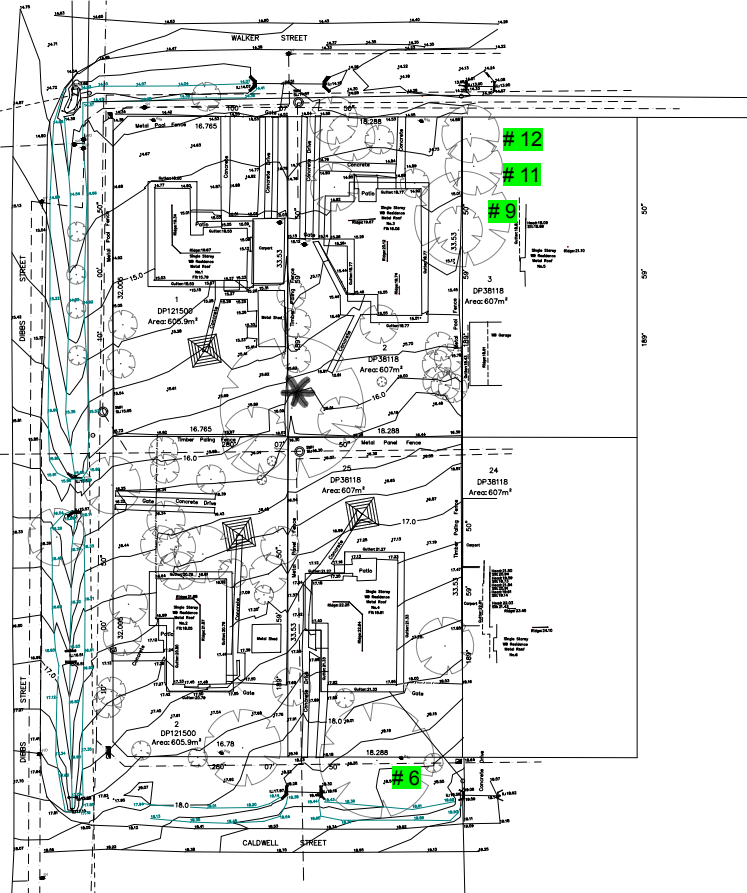
LISMORE



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7. LEVELS ARE BASED ON AUSTRALIAN HEIGHT DATUM (AHD) USING PM8048 WITH RL OF 14.066m LOCATED AT OBBES STREET, EAST LISMORE.
8. ORIGIN OF CO-ORDINATES PM 8048 WITH MGA (SDA2020) CO-ORDINATE VALUES OF E528312.687 N6811429.812
9. CONTOURS ARE AN INDICATION OF LANDFORM AND SHOULD NOT BE TAKEN IN PREFERENCE TO SPOT LEVELS SHOWN.

### LEGEND

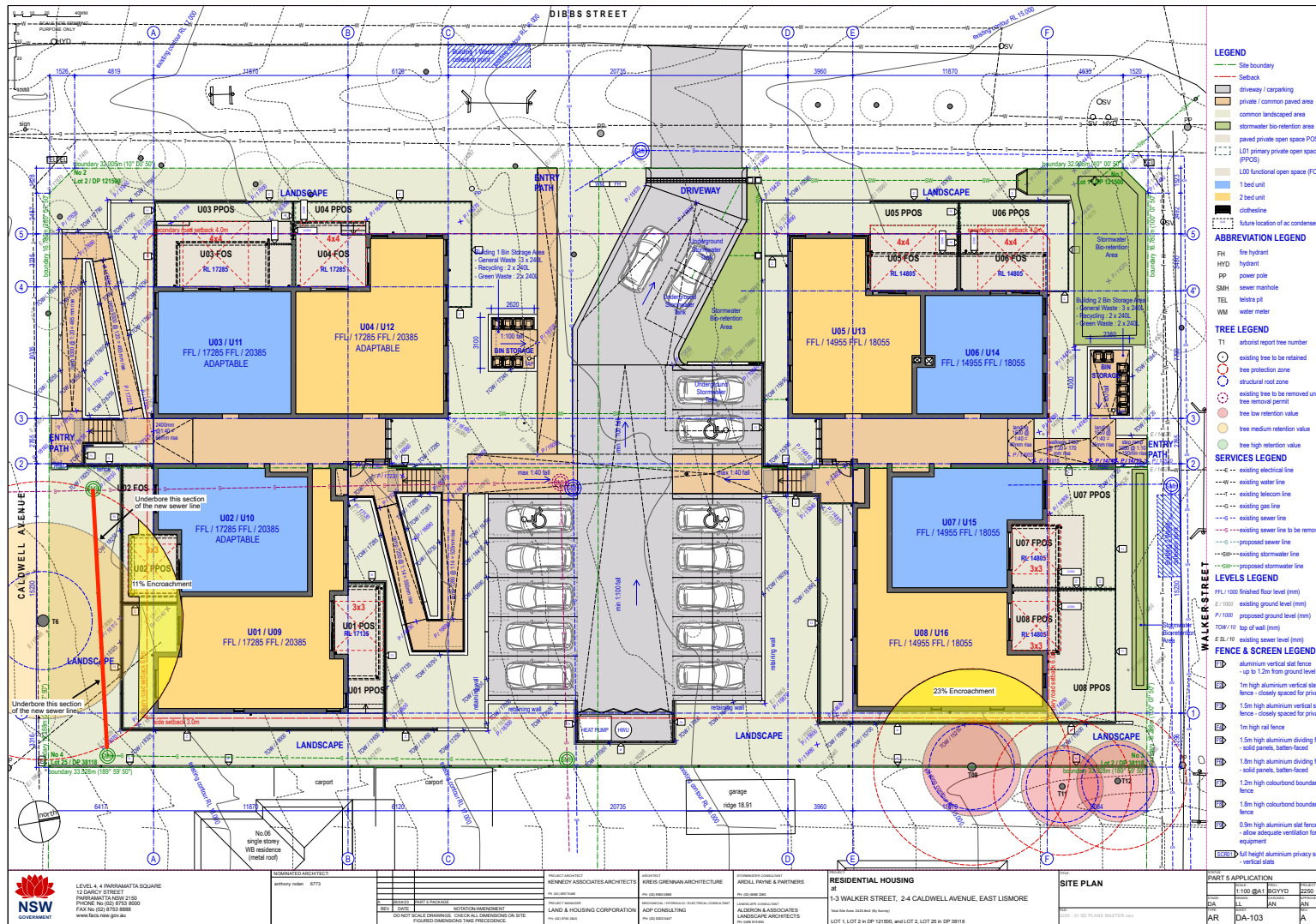
	SEWER MANHOLE		FENCE
	SEWER INSPECTION POINT		SEWER
	POWER POLE		WATER
	GAS		TELSTRA
	HYDRANT		GAS
	STOP VALVE		OVERHEAD POWER
	WATER METER		BOUNDARY
	TAP		MINOR CONTOUR
	TELSTRA PILLAR		MAJOR CONTOUR
	TELSTRA PIT		TREE
	PHOTOGRAPH		



No.	DATE	NOTATION/AMENDMENT	No.	DATE	NOTATION/AMENDMENT	CONTOUR INTERVAL: 0.25m DATUM: AHD GRID OF DATUM: PM8048	LEGEND OF COMMONLY USED SYMBOLS	REDUCTION RATIO: 1 : 1000	DATE OF SURVEY: 08 / 06 / 2022 SURVEY CONSULTANT:	LOCATION: LISMORE
1	04/02/2022	Initial Detail Plan				100 YEAR FLOOD RL RECOMMENDED MINIMUM FLOOD RL SOURCE OF FLOOD INFO		LAND TITLE INFORMATION LOTS: Lots 1 and 2 and Lots 2 and 25 PLAN NO: DP121500 and DP38118 OTHER: AREA:	RPS Australia East Pty Ltd SURVEYED BY: T. WELLS REGISTERED SURVEYOR	STREET ADDRESS: 1-3 Walker St and 2-4 Caldwell St TYPE: S SITE LAYOUT JOB SHT. 1 OF 3
		FILE: 15187 - 1-3 Walker Street and 2-4 Caldwell Street Est Lismore Detail Plan.dwg			FILE SIZE (MB): 0.02MB	CHECKED BY: DA			Detail Survey	

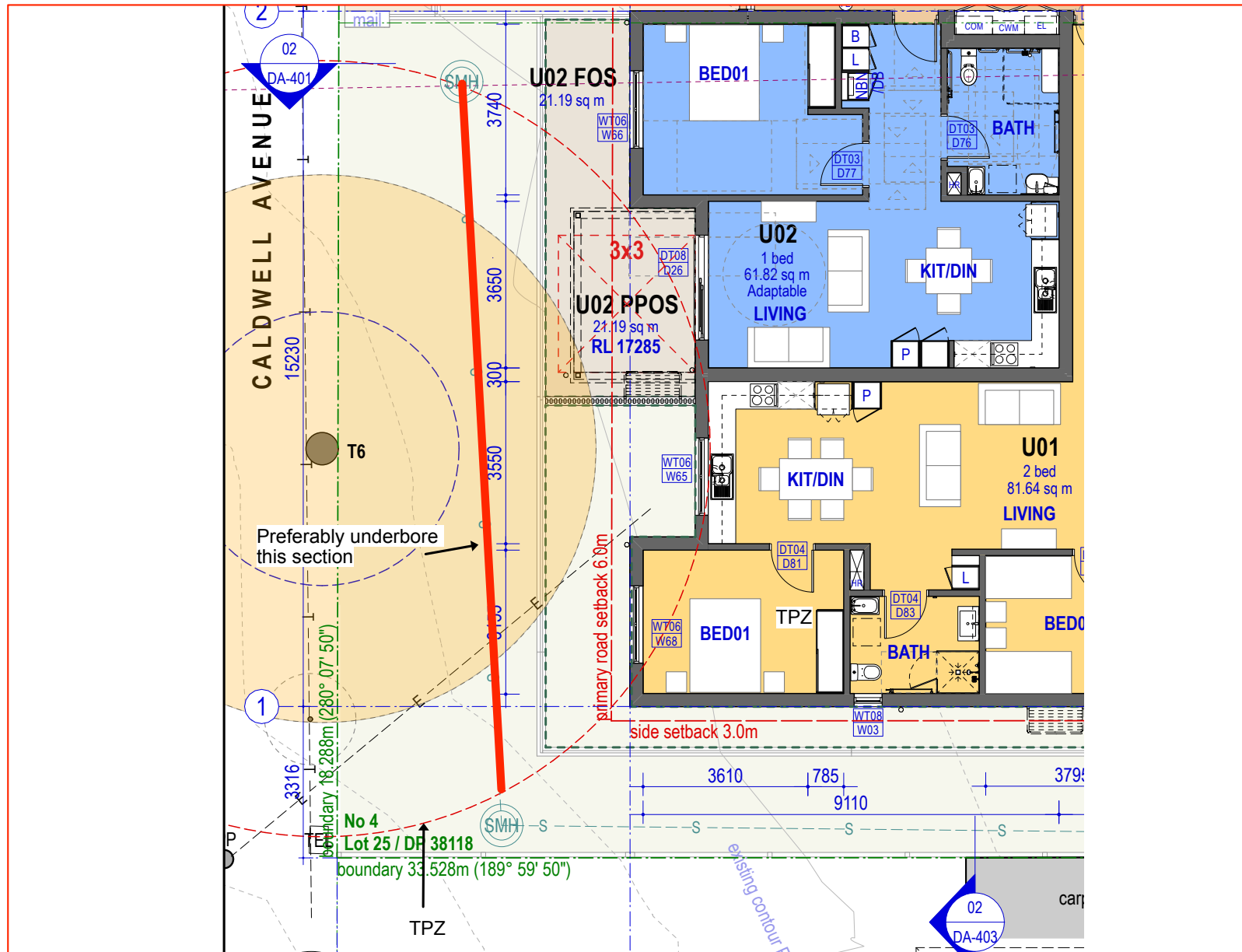


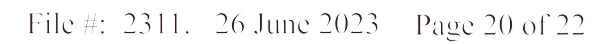
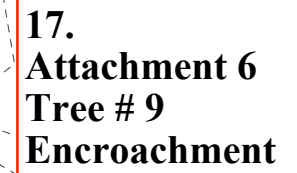
## 15. Attachment 4 New Building Design





**16.  
Attachment 5  
Tree # 6  
Underbore**







## 18. Attachment 7. Significance of Trees

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Tree #	Name	Condition	Vigour	Protected	Environmental value	Amenity value	Significance
6	Bottlebrush <i>Callistemon viminalis</i>	Good	Good	Yes	Medium	High	High
9	Mango <i>Mangifera indica</i>	Good	Good	No	Low	Low	Low
11	Exotic Sp	Good	Good	No	Low	Medium	Low
12	Tibouchina <i>Tibouchina urvilleana</i>	Good	Good	No	Low	Medium	Low





## 19. Attachment 8. Photos



Photo 1. Tree # 6. Bottlebrush

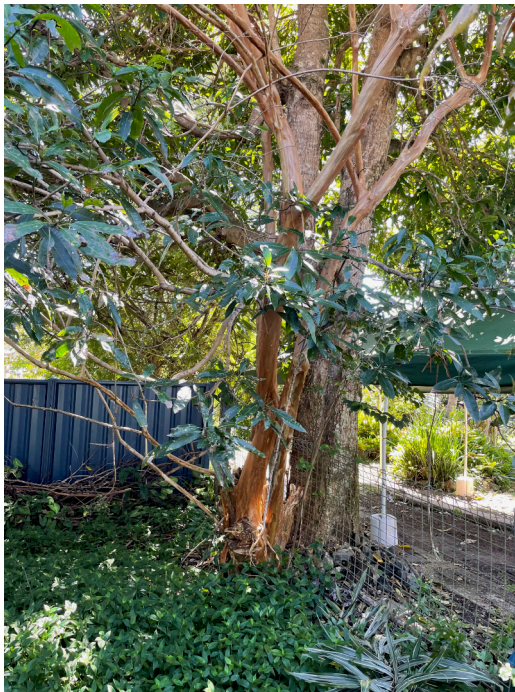


Photo 2. Tree # 9. Mango tree.