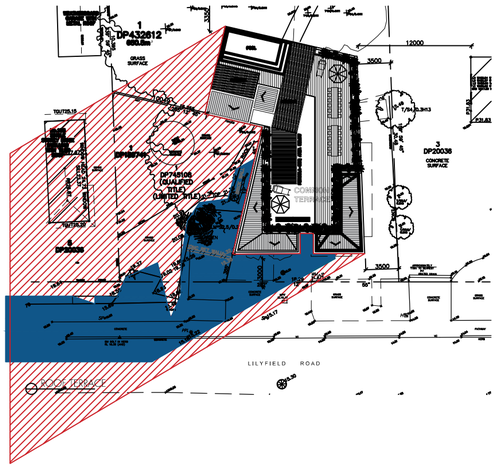

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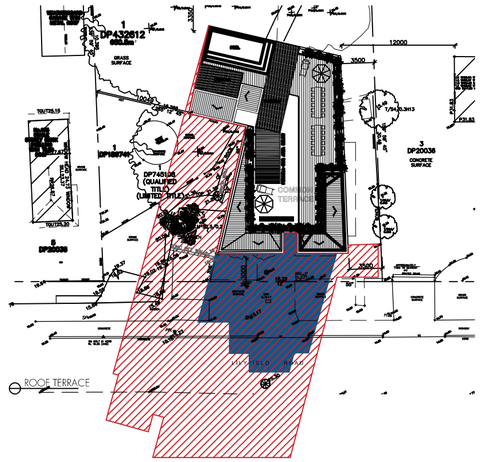

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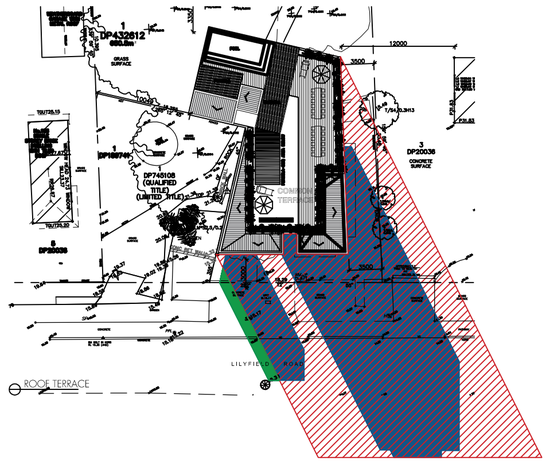

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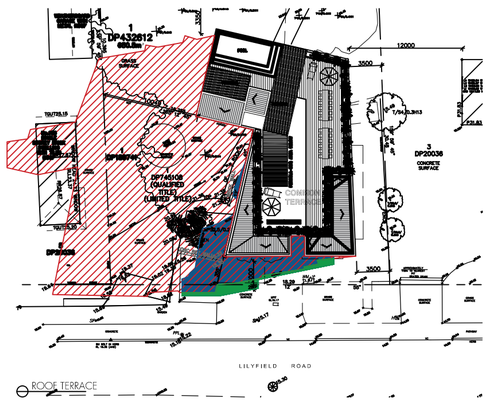

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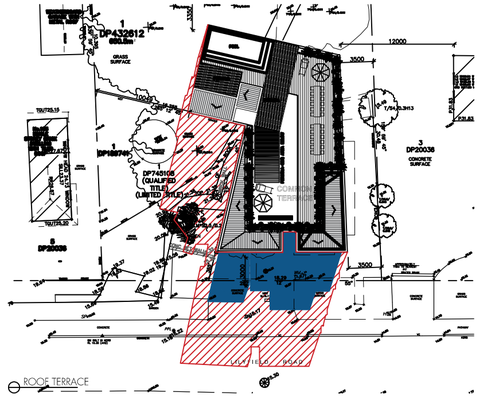

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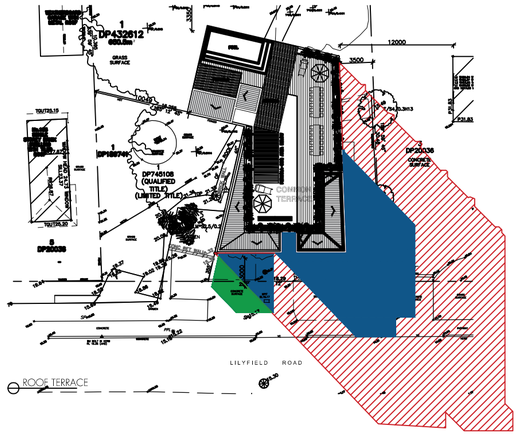


SHADOW DIAGRAM
21 MARCH - 3:00 pm

LEVEL 2, 57 RENWICK STREET,
LEICHHARDT NSW 2040
T: (02) 9518 3563 ABN: 86738976625
info@derekraithby.com.au Architect #7469

- (●) CIRCULATION
- ( ) PRE-DA
- ( ) DA
- ( ) CC
- ( ) TENDER
- ( ) CONSTRUCTION
- ( ) AS-BUILT

A1 ORIGINAL SIZE

ISSUE	DATE	AMENDMENT	BY
B	JAN 2016	UPDATED CONCEPT	DR
A	NOV 2015	ISSUED FOR DISCUSSION	DR

CLIENT
OZZY STATES Pty Ltd
C/O APP CORPORATION Pty LIMITED

PROJECT MANAGEMENT / TOWN PLANNER
APP CORPORATION PTY LIMITED
116 Miller Street Ph: (02) 9956 1295
North Sydney NSW 2060 elise.crameri@app.com.au

HYDRAULIC ENGINEER

TRAFFIC ENGINEER
TRAFFIX Consultants
Suite 208, 50 Holt St, Ph: (02) 8324 8700
Surry Hills, NSW 2010 Paul.Corbett@traffix.com.au

LANDSCAPE DESIGN

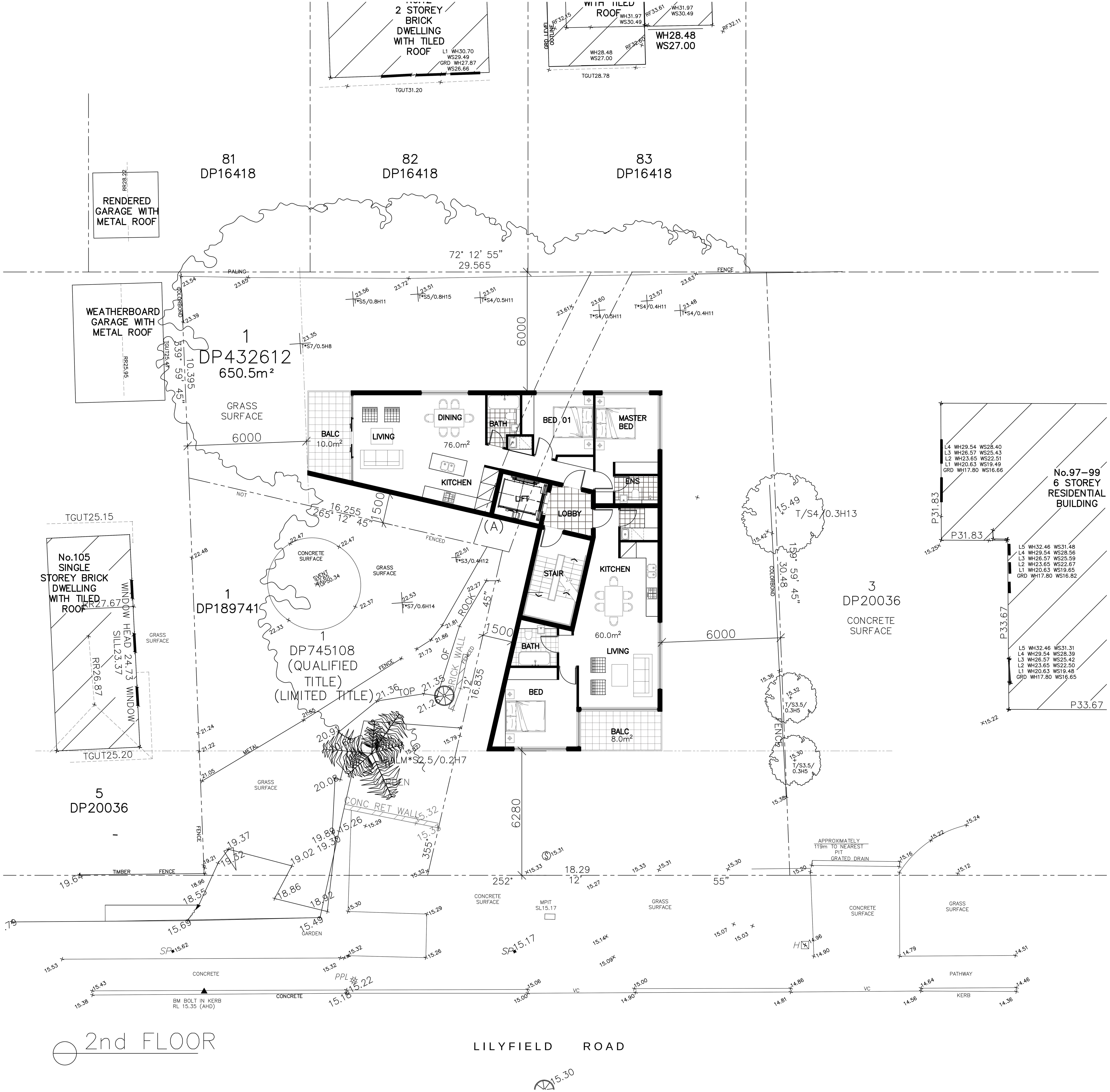
PROJECT
RESIDENTIAL DEVELOPMENT
101 LILYFIELD ROAD
LILYFIELD, NSW

DRAWING TITLE
SHADOW DIAGRAM

DATE	JAN 2016	DRAWING No.
SCALE	NTS @ A1	16
JOB No.	D1515	
DRAWN BY	DR	

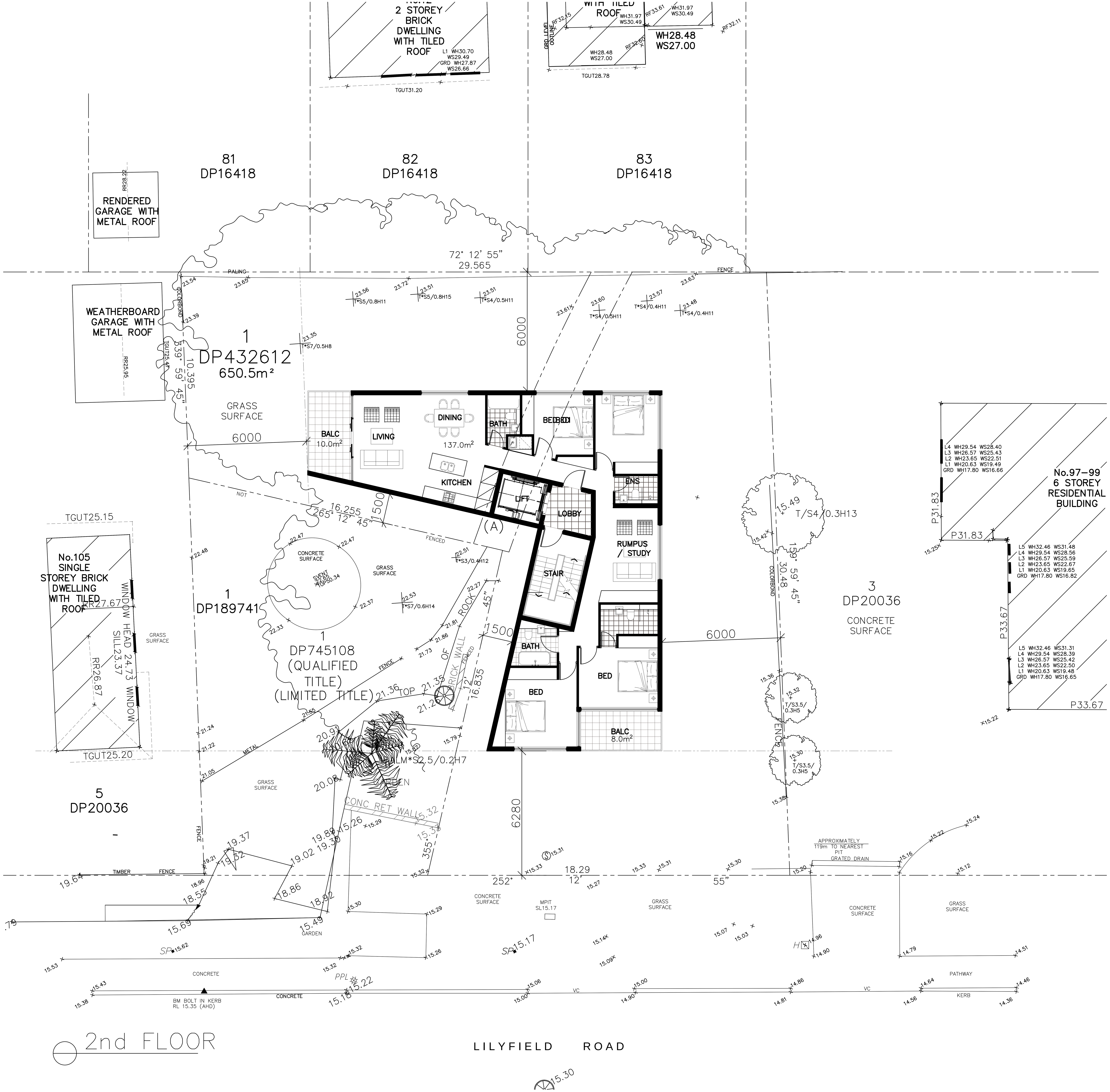
PRELIMINARY


101
Lilyfield
Road



2 STOREY BRICK DWELLING WITH TILED ROOF
WITH TILED ROOF
WH28.48 WS27.00
81 DP16418
82 DP16418
83 DP16418
RENDERED GARAGE WITH METAL ROOF
72° 12' 55"
29.565
WEATHERBOARD GARAGE WITH METAL ROOF
1 DP432612 650.5m²
GRASS SURFACE
6000
BALC 10.0m²
LIVING
DINING
76.0m²
KITCHEN
BATH
BED 01
MASTER BED
ENS
LIFT
LOBBY
(A)
STAIR
KITCHEN
60.0m²
LIVING
BATH
BED
BALC 8.0m²
No.97–99 6 STOREY RESIDENTIAL BUILDING
3 DP20036
CONCRETE SURFACE
No.105 SINGLE STOREY BRICK DWELLING WITH TILED ROOF
1 DP189741
1 DP745108 (QUALIFIED TITLE) (LIMITED TITLE)
TOP OF BRICK WALL
16.255
265° 12' 45"
159° 59' 45"
30.48
16.835
1500
6280
5 DP20036
CONC RET WALLS
18.29
252° 12' 55"
BM BOLT IN KERB RL 15.35 (AHD)
LILYFIELD ROAD

2nd FLOOR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DP16418
82
DP16418
83
DP16418
RENDERED GARAGE WITH METAL ROOF
WEATHERBOARD GARAGE WITH METAL ROOF
1
DP432612
650.5m²
GRASS SURFACE
2 STOREY BRICK DWELLING WITH TILED ROOF
72° 12' 55"
29.565
BALC
10.0m²
LIVING
DINING
137.0m²
KITCHEN
BATH
BED
ENS
LIFT
LOBBY
RUMPUS / STUDY
STAIR
BATH
BED
BED
BALC
8.0m²
(A)
6000
6000
6000
1500
1500
6280
No.105 SINGLE STOREY BRICK DWELLING WITH TILED ROOF
1
DP189741
1
DP745108
(QUALIFIED TITLE)
(LIMITED TITLE)
5
DP20036
3
DP20036
CONCRETE SURFACE
No.97–99 6 STOREY RESIDENTIAL BUILDING
TOP OF BRICK WALL
CONC RET WALLS
18.29
252° 12' 55"
LILYFIELD ROAD
BM BOLT IN KERB RL 15.35 (AHD)
APPROXIMATELY 119m TO NEAREST PIT GRATED DRAIN

2nd FLOOR

Appendix C - Traffic Assessment

Traffic Impact Assessment

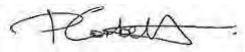
Planning Proposal – Concept Mixed Use Development
101-103 Lilyfield Road, Lilyfield

traffix
traffic & transport planners

Reference: 15.379r01v4
Date: March 2016

t: +61 2 8324 8700
f: +61 2 9380 4481
w: www.traffix.com.au
abn: 66065132961

Document Verification

Job Number:	15.379			
Project:	101-103 Lilyfield Road, Lilyfield			
Client:	Ozzy States Pty Ltd			
Revision	**Date**	**Prepared By**	**Checked By**	**Signed**
v01	02/09/2015	Kedar Ballurkar	Paul Corbett	
v02	18/02/2016	Kedar Ballurkar	Kedar Ballurkar	
v03	19/03/2016	Kedar Ballurkar	Kedar Ballurkar	
v04	19/03/2016	Kedar Ballurkar	Kedar Ballurkar	

traffix
traffic & transport planners

t: +61 2 8324 8700
f: +61 2 9380 4481
w: www.traffix.com.au
abn: 66065132961

Contents

Appendices

1. Introduction

TRAFFIX has been commissioned by Ozzy States Pty Ltd to undertake a Traffic Impact Assessment in relation to a Planning Proposal for 101-103 Lilyfield Road, Lilyfield. Approval is sought to change the allowable building height and floor space ratio for the site. Concept plans have been prepared for a development permissible under the proposed controls, comprising a six storey mixed use development with 14 residential apartments and café comprising approximately 40m^2 gross floor area.

The subject site is located within the Municipality of Leichhardt local government area and as such, the concept development has been assessed having regard for the *Leichhardt Development Control Plan 2013*.

This report documents the findings of our investigations and should be read in the context of the Planning Proposal prepared separately. The concept development would access a local road and comprises less than 300 residential apartments and 2,000m^2 GFA of retail (shops). Accordingly, it will not require referral to the Roads and Maritime Services (RMS) under the provisions of SEPP (Infrastructure) 2007.

The report is structured as follows:

- Section 2: Describes the site and its location
- Section 3: Documents existing traffic conditions
- Section 4: Describes the concept development
- Section 5: Assesses the parking requirements
- Section 6: Assesses traffic impacts
- Section 7: Discusses access and internal design aspects
- Section 8: Presents the overall study conclusions.

2. Location and Site

The subject site is located at 101-103 Lilyfield Road in Lilyfield, approximately 30 metres west of Catherine Street. In a regional context, it lies approximately 130 metres north-west of Lilyfield Light Rail Station and approximately four kilometres west of the Sydney central business district. The site is legally described as Lot 1 in DP432612.

The site has an 'L' shaped configuration with a site area of 651m^2. It has a southern frontage to Lilyfield Road that measures approximately 18 metres, whilst the remainder of the site is bordered by the following developments:

- A high density residential flat building to the west for approximately 30 metres;
- Four residential dwelling houses to the north for approximately 30 metres;
- A residential dwelling house to the west for approximately 10 metres; and
- A partially elevated land parcel accommodating a kiosk and tower structure to the south and west for approximately 17 metres and 17 metres.

The existing development on site is a two storey residential flat building. Vehicular access is provided via a single 3.0 metre wide driveway onto Lilyfield Road and serves a single on-site parking space.

A Location Plan is presented in **Figure 1**, with a Site Plan presented in **Figure 2**.

Figure 1: Location Plan

Figure 2: Site Plan

3. Existing Traffic Conditions

3.1 Road Network

The road hierarchy in the vicinity of the site is shown in **Figure 3** with the following roads of particular interest:

- City West Link: an RMS Main Road (MR650) that generally runs in an east-west direction from the Western Distributor in the east until a cycleway extension of Lilyfield Road to the west, where it continues as Dobroyd Parade thereafter. It carries approximately 69,100 vehicles per day (2012 AADT) and in the vicinity of the site, has a posted speed limit of 60 km/h. The City West Link accommodates between two and three lanes of traffic in either direction within a divided carriageway.

- Lilyfield Road: an unclassified regional road (RR7316) that runs in an east-west direction from Victoria Road in the east and terminating in a one-way loop adjacent to Maliyawul Street in the west. It is noted that west of Balmain Street, Lilyfield Road is classified as a local road and further west of the loop, Lilyfield Road extends as a cycleway until Dobroyd Parade. Lilyfield Road accommodates a single lane of traffic within an undivided carriageway and has a posted speed limit of 50 km/h.

- Balmain Road: an unclassified regional road (RR7315) that runs in a north-south direction between Park Drive in the north and Parramatta Road to the south. It is however noted that east of Perry Street, Balmain Road is classified as an RMS Main Road. It generally accommodates a single lane of traffic in either direction, increasing to two lanes on approach to intersections and has a posted speed limit of 50 km/h.

- Catherine Street: a local road that runs in a north-south direction between Lilyfield Road in the north and Parramatta Road to the south. North of the City West Link, it runs one-way in a southbound direction and accommodates three lanes with a default 50 km/h speed zoning.

It can be seen from Figure 3 that the site is conveniently located with respect to the arterial and local road systems serving the region. It is therefore able to effectively distribute traffic onto the wider road network, minimising traffic impacts.

3.2 Public Transport

The existing bus and light rail services that operate in the locality are shown in **Figure 4**. Lilyfield Light Rail Station is within 130 metres walking distance (or a 2 minute walk) from the site which lies on the L1 Dulwich Hill Line between Central in the east and Dulwich Hill to the south-west. Light rail services from this stop depart every 10 minutes during peak periods.

The site is also situated within 400 metres of bus stops on Balmain Street, Catherine Street and Lilyfield Road (which is approximately 50 metres to the west of the site). These stops are served by routes which operate within the surrounding region as well as to the Sydney CBD and Central, Balmain, Haberfield and Canterbury to the west and Dulwich Hill to the south.

3.3 Existing Site Generation

The existing residential flat building on-site is conservatively assumed to contain two apartments, each with two bedrooms. The RMS *Guide to Traffic Generating Developments* provides traffic generation rates for medium density residential developments and recommends a trip generation rate between 0.4 to 0.5 vehicle trips per dwelling for apartments containing up to two bedrooms, during both the 7:00-9:00am (AM) and 4:00-6:00pm (PM) peak periods. Application of this rate to the existing residential flat building results in the following traffic generation:

- 1 vehicle trip per hour during the AM peak period (0 in, 1 out), and
- 1 vehicle trip per hour during the PM peak period (1 in, 0 out).

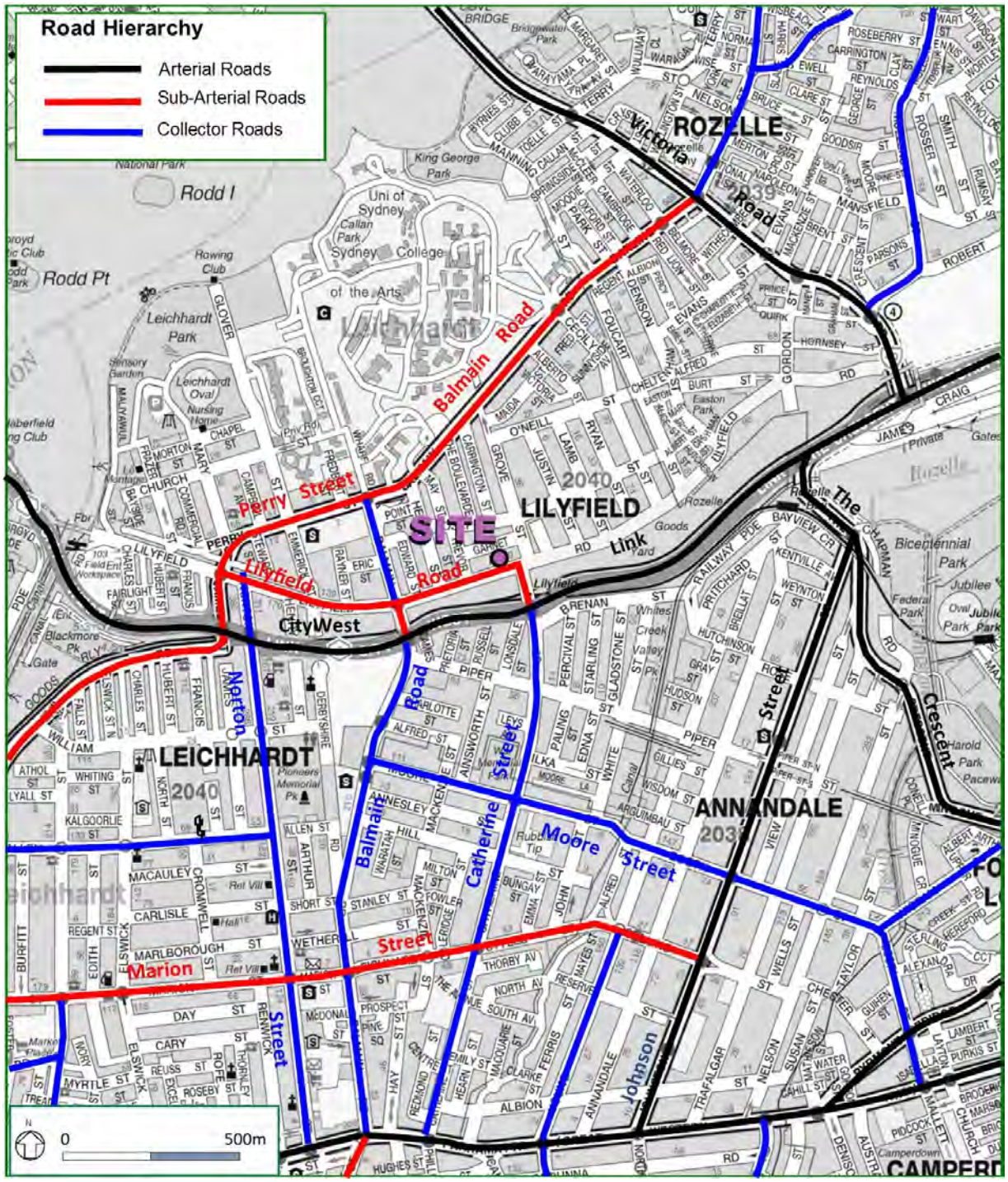


Figure 3: Road Hierarchy

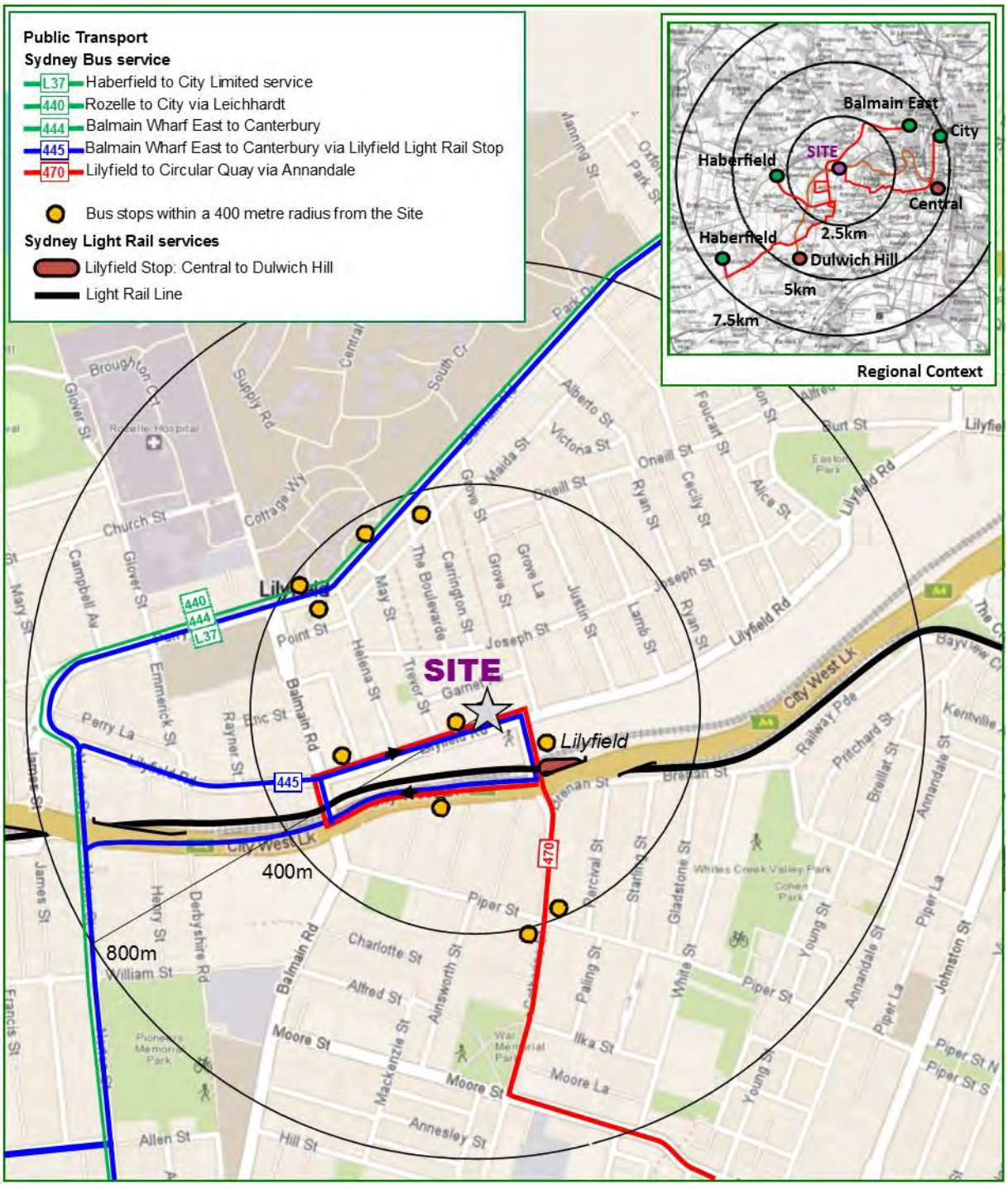


Figure 4: Public Transport

4. Description of Concept Development

A detailed description of the development potential is provided in the Planning Proposal prepared separately. In summary, the Planning Proposal seeks approval for changes to the allowable building height and floor space ratio of the site. This would permit the following six-storey mixed-use development, after the demolition of all existing structures:

- 14 residential apartments comprising:
  - 5 x one bedroom apartments; and
  - 9 x two bedroom apartments
- A café comprising approximately 40m^2 gross floor area; and
- Provision of 12 at-grade and undercroft parking spaces, to be accessed via Lilyfield Road.

The parking requirements and traffic impacts arising from this concept development scenario are discussed in Sections 5 and 6 respectively. Reference should also be made to the concept plans submitted separately, which are presented at reduced scale in **Appendix A**.

5. Parking Requirements

5.1 Council Controls

Control C1.11.1: General Vehicle Parking Rates of the *Leichhardt Development Control Plan 2013 (DCP)* requires parking for residential and café uses to be provided in accordance with the rates shown in **Table 1** below.

Table 1: Council Car Parking Rates and Provision

Type	No / GFA	Minimum Parking Rate	Maximum Parking Rate	Permitted No of Spaces[1]
Residential				
1 Bedroom	5	1 space per 3 dwellings	1 space per 2 dwellings	7-12
2 Bedroom	9	1 space per 2 dwellings	1 space per dwelling	
Visitors	15	1 space per 11 dwellings	1 space per 8 dwellings	2
Café[2]	40m^2	1 space per 80m^2	1 space per 50m^2	1
			Totals	***10-15***

[1] Parking spaces rounded up to nearest whole number in accordance with DCP.
[2] Rates adopted for café's not situated on a *'Recognised Shopping Street'*.

It can be seen from Table 1 that the concept development would be required to provide between 10 and 15 parking spaces. In response, the concept plans presented in **Appendix A** show that the ground level car park can accommodate 12 parking spaces. This demonstrates that the site is sufficiently large enough to cater for the parking demands of future development under the proposed planning controls. It is envisaged that a final parking provision can be determined during a subsequent development application stage.

5.2 Accessible Parking

Control C3.14: Adaptable Housing of the DCP requires developments containing between 10 and 15 dwellings to provide an adaptable dwelling that complies with AS4299. Though the DCP does not specify accessible parking rates for residential flat buildings, it is considered that a single accessible parking space per adaptable dwelling is a suitable rate. For café uses, *Control C1.11.2: Accessible Car Parking Rates* of the DCP requires Class 6 buildings to provide an accessible parking space to be provided for every 50 car parking spaces or part thereof (up to 1,000 parking spaces). Application of these rates to the development scenario results in two (2) accessible parking spaces nominally required, comprising a space each for residential and café use. Given Council's requirement for only a single parking space to be used by café, it is considered appropriate that the space be available for general use. Nonetheless, whilst plans for the concept development do not yet show provision for accessible parking, it is envisaged that this can be addressed during a subsequent development application stage.

5.3 Motorcycle Parking

Control C1.11 (C23): Motor Bike Parking Facilities of the DCP requires motorcycle parking to be provided at a rate of one (1) space for the first 10 car parking spaces of a development and 5% of the required vehicle parking thereafter. Application of this rate results in the development scenario needing to provide a single motorcycle parking space. Whilst the concept plans for this development do not show a level of detail for motorcycle parking, provision can be made during a subsequent development application stage.

5.4 Bicycle Parking

Control C1.11.3: Bicycle Parking Rates and Facilities of the DCP requires bicycle parking to be provided in accordance with the minimum rates shown in **Table 2** below.

Table 2: Council Bicycle Parking Rates and Provision

Type	No / GFA	DCP Parking Rate	Minimum No. Spaces Required
Residential			
Residents	14	1 space / 2 dwellings	7
Visitors	15	1 space / 10 dwellings	2
Cafe			
Staff	10[1]	1 space / 10 staff	1
Visitors	40m^2	2 spaces, plus 1 space per 100m^2 over 100m^2 GFA	2
		Totals	***12***

[1] Total number of staff assumed to be 10 people.

It can be seen that the development scenario is required to provide a minimum of 12 bicycle parking spaces, including seven (7) spaces for residents, one (1) spaces for shop staff and four (4) spaces for visitors. Whilst the concept plans for this development do not show a level of detail for bicycle parking, provision can be made during a subsequent development application stage.

5.5 Servicing

Control C1.11 (C29): Service and Loading Facilities of the DCP requires service and loading facilities in new developments to be provided in accordance with the RMS *Guide to Traffic Generating Developments*. In turn, this guide recommends a service vehicle space be provided for every 50 residential apartments (for developments containing less than 200 apartments) and for every 400m^2 GFA of shop space (for developments containing less than 2,000m^2 GFA of shop space). Application of these rates to the concept development results in no service vehicle space being warranted. As such, it is considered that servicing demands can be accommodated on-street, as well as waste collection which would be undertaken by Council's contractors.

6. Traffic Impacts

6.1 Trip Generation

6.1.1 Residential

The residential component of the development scenario would be classified as a *'medium density development'* by the RMS *Guide to Traffic Generating Developments*, which it defines as containing at least 2, but less than 20 dwellings. As all apartments in the development contain two or less bedrooms, the rates adopted in the existing site generation section of the report remain applicable. By selecting the upper range of these rates of 0.5 vehicle trips per dwelling during AM and PM peak periods, the traffic generated by the 14 residential apartments of the development scenario are:

- 7 vehicle trips per hour during the AM peak (1 in, 6 out); and
- 7 vehicle trips per hour during the PM peak (6 in, 1 out).

6.1.2 Retail

The RMS *Guide to Traffic Generating Developments* also provides traffic generation rates for secondary retail stores, defined as stores not tending to be the primary attractors to the development. It recommends an evening peak hourly trip generation rate of 4.6 vehicle trips per 100m^2 gross leasable floor area (GLFA), typically experienced on Thursdays. Whilst no rates are prescribed for morning peak hour, it is considered suitable that this be equivalent to the number of vehicle spaces permitted on the development to represent staff arrivals. When conservatively assuming GLFA to be equivalent to GFA, application of the above rates to the 40m^2 GFA café results in the following traffic generation:

- 2 vehicle trips per hour during the AM peak (2 in, 0 out); and
- 1 vehicle trips per hour during the PM peak (0 in, 1 out).

6.1.3 Combined

When accounting for all proposed uses, the development scenario is expected to generate the following traffic during peak periods:

- 9 vehicle trips per hour during the AM peak (3 in, 6 out); and
- 8 vehicle trips per hour during the PM peak (6 in, 2 out).

6.1.4 Net Change

The above traffic generation is not a net increase over existing conditions. When accounting for the existing residential development, the development scenario will generate an additional:

- 8 vehicle trips per hour during the AM peak (3 in, 5 out); and
- 7 vehicle trips per hour during the PM peak (5 in, 2 out).

6.2 Traffic Impacts

The concept development will generate no more than an additional vehicle trip every seven (7) minutes during peak periods. This is considered to cause minimal traffic impacts that can be readily accommodated within the surrounding road network. Indeed, software modelling packages are generally not sensitive to changes of this order, which are well within the fluctuations of traffic volumes experienced daily. As such, future development of the site under the proposed changes to planning controls is likely to not generate any adverse traffic impacts.

7. Access & Internal Design Aspects

7.1 Access

The concept development is to accommodate between 10 and 15 parking spaces under the DCP, with access proposed to Lilyfield Road. Accordingly under AS2890.1 (2004), the development will need a 'Category 1' driveway, having a combined entry-exit width of 3.0 metres to 5.5 metres. It is envisaged that design of the access would be undertaken during a subsequent development application stage.

7.2 Internal Design

Noting that the concept development includes on-site car parking, a subsequent detailed design would require the following to be compliant with AS2890.1 (2004) and AS2890.6 (2009):

7.2.1 Parking Modules

- All residential and staff parking spaces shall be designed in accordance with a User Class 1A having a minimum space length of 5.4m, a minimum width of 2.4m and a minimum aisle width of 5.8m.
- All spaces located adjacent to obstructions of greater than 150mm in height shall be provided with an additional width of 300mm.
- Dead-end aisles shall be provided with the required 1.0m aisle extension in accordance with Figure 2.3 of AS 2890.1 (2004).
- All accessible parking spaces shall be designed in accordance with AS 2890.6 (2009). Spaces shall be provided with a clear width of 2.4m and located adjacent to a minimum shared area of 2.4m.

7.2.2 Ramps

- All vehicular ramps shall have a maximum gradient of 20% (1 in 5), with minimum 2m long transitions at 12.5% (1 in 8), in accordance with the requirements of AS 2890.1 (2004).

- The access shall have a maximum gradient of 5% (1 in 20) for the first 6.0m inside the property boundary, in accordance with Clause 3.3 of AS 2890.1 (2004).

7.2.3 Clear Head heights

- A minimum clear head height of 2.2m shall be provided for all circulation areas and non-accessible parking spaces as required by AS 2890.1 (2004). A clear head height of 2.5m shall be provided above all accessible parking spaces as required by AS 2890.6 (2009).

7.2.4 Other Considerations

- All columns shall be located outside of the parking space design envelope shown in Figure 5.2 of AS 2890.1 (2004).

- Appropriate visual splays shall be provided at the access driveway in accordance with the requirements of Figure 3.3 of AS 2890.1 (2004).

8. Conclusions

In summary:

- The planning proposal seeks approval to change the allowable building height and floor space ratio for the subject site. A concept plan for a mixed-use development containing 14 residential apartments and a café comprising approximately 40m^2 gross floor area has formed the basis of this Traffic Impact Assessment.
- Under the *Leichhardt Development Control Plan 2013*, this development would be required to provide between 10 and 15 parking spaces. The concept plan shows 12 parking spaces on the ground level, demonstrating that the site is large enough to accommodate parking demands associated with future development of the site.
- Traffic generation for the concept plan has been assessed as a net increase over existing conditions, generating a maximum of eight (8) additional vehicle trips per hour during peak periods. This equates to an extra vehicle trip every seven (7) minutes and is considered to cause minimal traffic impacts that can be readily accommodated within the surrounding road network.
- The future access and internal car parking arrangements shall be provided in accordance with AS2890.1 (2004) and AS2890.6 (2009) to ensue safely and efficiency.

It is therefore concluded that the concept development is supportable on traffic planning grounds and future development of the site will operate with acceptable traffic impacts.

Appendix A

Concept Plans

GROUND FLOOR

LEVEL 2, 57 RENWICK STREET,
LEICHHARDT NSW 2040
T: (02) 9518 3563 ABN: 86738976625
info@derekraithby.com.au Architect #7469

- CIRCULATION
- PRE-DA
- DA
- CC
- TENDER
- CONSTRUCTION
- AS-BUILT

A1 ORIGINAL SIZE

ISSUE	DATE:	AMENDMENT	BY
B	JAN 2016	UPDATED TO COUNCIL	DR
A	NOV 2015	ISSUED FOR DISCUSSION	DR

CLIENT
OZZY STATES Pty Ltd
C/O APP CORPORATION Pty LIMITED

PROJECT MANAGEMENT / TOWN PLANNER
APP CORPORATION PTY LIMITED
115 Miller Street Ph: (02) 9956 1295
North Sydney NSW 2060elise.cramer@app.com.au

HYDRAULIC ENGINEER

TRAFFIC ENGINEER
TRAFFIX Consultants
Suite 208, 50 Holt St. Ph: (02) 8324 8700
Surry Hills, NSW 2010 Paul.Corbett@traffix.com.au

LANDSCAPE DESIGN

GEOTECHNICAL/CONTAMINATION

BCA CONSULTANT

PROJECT
RESIDENTIAL DEVELOPMENT
101 LILYFIELD ROAD
LILYFIELD, NSW

DRAWING TITLE
GROUND FLOOR

DATE	JAN 2016
SCALE	1:100 @ A1
JOB No.	D1515
DRAWN BY	DR

DRAWING No. 02

PRELIMINARY

1ST FLOOR

LEVEL 2, 57 RENWICK STREET,
LEICHHARDT NSW 2040
T: (02) 9518 3563 ABN: 86738976625
info@derekraithby.com.au Architect #7469

- CIRCULATION
- PRE-DA
- DA
- CC
- TENDER
- CONSTRUCTION
- AS-BUILT

A1 ORIGINAL SIZE

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B	JAN 2016	UPDATED CONCEPT	DR
A	NOV 2015	ISSUED FOR DISCUSSION	DR

CLIENT
OZZY STATES Pty Ltd
C/O APP CORPORATION Pty LIMITED

PROJECT MANAGEMENT / TOWN PLANNER
APP CORPORATION PTY LIMITED
116 Miller Street Ph: (02) 9956 1295
North Sydney NSW 2060 elise.cramer@app.com.au

HYDRAULIC ENGINEER

TRAFFIC ENGINEER
TRAFFIX Consultants
Suite 208,50 Holt St Ph: (02) 8324 8700
Surry Hills NSW 2010 Paul.Corbett@traffix.com.au

LANDSCAPE DESIGN

GEOTECHNICAL/CONTAMINATION

BCA CONSULTANT

PROJECT
RESIDENTIAL DEVELOPMENT
101 LILYFIELD ROAD
LILYFIELD, NSW

DRAWING TITLE
FIRST FLOOR

DATE	JAN 2016
SCALE	1:100 @ A1
JOB No.	D1515
DRAWN BY	DR

DRAWING No. 03

PRELIMINARY

2ND FLOOR

LEVEL 2, 57 RENWICK STREET,
LEICHHARDT NSW 2040
T: (02) 9518 3563 ABN: 86738976625
info@derekraithby.com.au Architect #7469

- CIRCULATION
- PRE-DA
- DA
- CC
- TENDER
- CONSTRUCTION
- AS-BUILT

A1 ORIGINAL SIZE

B	JAN 2016	UPDATED CONCEPT	DR
A	NOV 2015	ISSUED FOR DISCUSSION	DR
ISSUE	DATE	AMENDMENT	BY

CLIENT
OZZY STATES Pty Ltd
C/O APP CORPORATION Pty LIMITED

PROJECT MANAGEMENT / TOWN PLANNER
APP CORPORATION PTY LIMITED
116 Miller Street Ph: (02) 9956 1295
North Sydney NSW 2060alise.cramet@app.com.au

HYDRAULIC ENGINEER

TRAFFIC ENGINEER
TRAFFIX Consultants
Suite 208, 50 Holt St, Ph: (02) 8324 8700
Surry Hills, NSW 2010 Paul.Corbett@traffix.com.au

LANDSCAPE DESIGN

GEOTECHNICAL/CONTAMINATION

BCA CONSULTANT

PROJECT
RESIDENTIAL DEVELOPMENT
101 LILYFIELD ROAD
LILYFIELD, NSW

DRAWING TITLE
SECOND FLOOR

DATE	JAN 2016
SCALE	1:100 @ A1
JOB No.	D1515
DRAWN BY	DR

DRAWING No. 04

PRELIMINARY

3RD FLOOR

LEVEL 2, 57 RENWICK STREET,
LEICHHARDT NSW 2040
T: (02) 9518 3563 ABN: 86738976625
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APP CORPORATION PTY LIMITED
116 Miller Street Ph: (02) 9956 1295
North Sydney NSW 2060 elise.cramer@app.com.au

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TRAFFIC ENGINEER
TRAFFIX Consultants
Suite 208, 50 Holt St, Ph: (02) 8324 8700
Surry Hills, NSW 2010 Paul.Corbett@traffix.com.au

LANDSCAPE DESIGN

GEOTECHNICAL/CONTAMINATION

BCA CONSULTANT

PROJECT
RESIDENTIAL DEVELOPMENT
101 LILYFIELD ROAD
LILYFIELD, NSW

DRAWING TITLE
THIRD FLOOR

DATE	JAN 2016	DRAWING No.
SCALE	1:100 @ A1	05
JOB No.	D1515	
DRAWN BY	DR	

PRELIMINARY

4TH FLOOR

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LEICHHARDT NSW 2040
T: (02) 9518 3563 ABN: 86738976625
info@derekraithby.com.au Architect #7469

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A1 ORIGINAL SIZE

ISSUE	DATE	AMENDMENT	BY
B	JAN 2016	UPDATED CONCEPT	DR
A	NOV 2015	ISSUED FOR DISCUSSION	DR

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OZZY STATES Pty Ltd
C/O APP CORPORATION Pty LIMITED

PROJECT MANAGEMENT / TOWN PLANNER
APP CORPORATION PTY LIMITED
116 Miller Street Ph: (02) 9956 1295
North Sydney NSW 2060 elise.cramer@app.com.au

HYDRAULIC ENGINEER

TRAFFIC ENGINEER
TRAFFIX Consultants
Suite 208, 50 Holt St, Ph: (02) 8324 8700
Surry Hills, NSW 2010 Paul.Corbett@traffix.com.au

LANDSCAPE DESIGN

GEOTECHNICAL/CONTAMINATION

BCA CONSULTANT

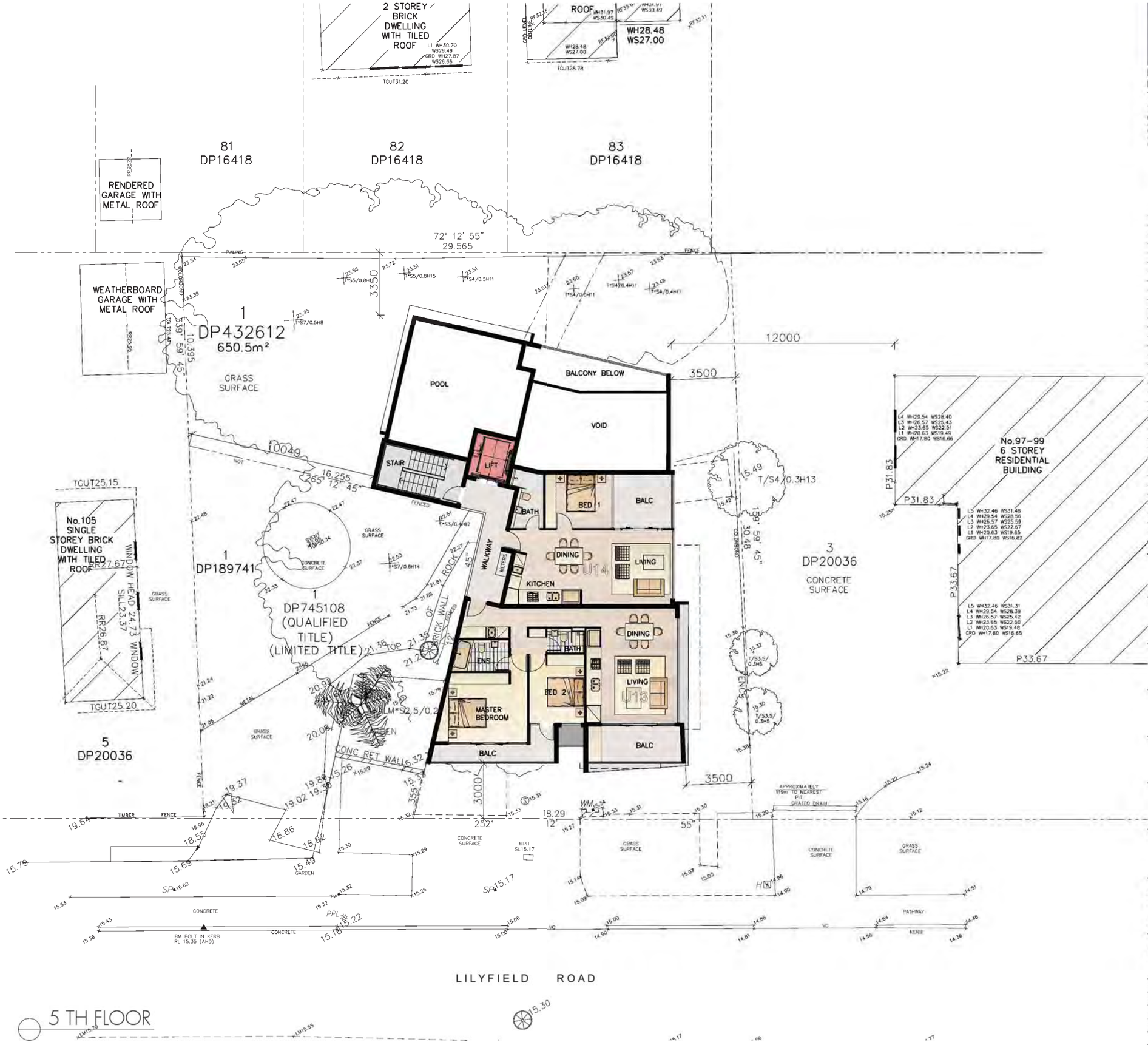
PROJECT
RESIDENTIAL DEVELOPMENT
101 LILYFIELD ROAD
LILYFIELD, NSW

DRAWING TITLE
FOURTH FLOOR

DATE	JAN 2016
SCALE	1:100 @ A1
JOB No.	D1515
DRAWN BY	DR

DRAWING No. 06

PRELIMINARY



LEVEL 2, 57 RENWICK STREET,
LEICHHARDT NSW 2040
T: (02) 9518 3563 ABN: 86738976625
info@derekraithby.com.au Architect #7469

- CIRCULATION
- PRE-DA
- DA
- CC
- TENDER
- CONSTRUCTION
- AS-BUILT

A1 ORIGINAL SIZE

ISSUE	DATE	AMENDMENT	BY
B	JAN 2016	UPDATED CONCEPT	DR
A	NOV 2015	ISSUED FOR DISCUSSION	DR

CLIENT
OZZY STATES Pty Ltd
C/O APP CORPORATION Pty LIMITED

PROJECT MANAGEMENT / TOWN PLANNER
APP CORPORATION PTY LIMITED
116 Miller Street Ph: (02) 9956 1295
North Sydney NSW 2060 elise.cramen@app.com.au

TRAFFIC ENGINEER
TRAFFIX Consultants
Suite 208, 50 Holt St, Ph: (02) 8324 8700
Surry Hills, NSW 2010 Paul.Corbett@traffix.com.au

LANDSCAPE DESIGN

GEOTECH/HAZ/CONTAMINATION

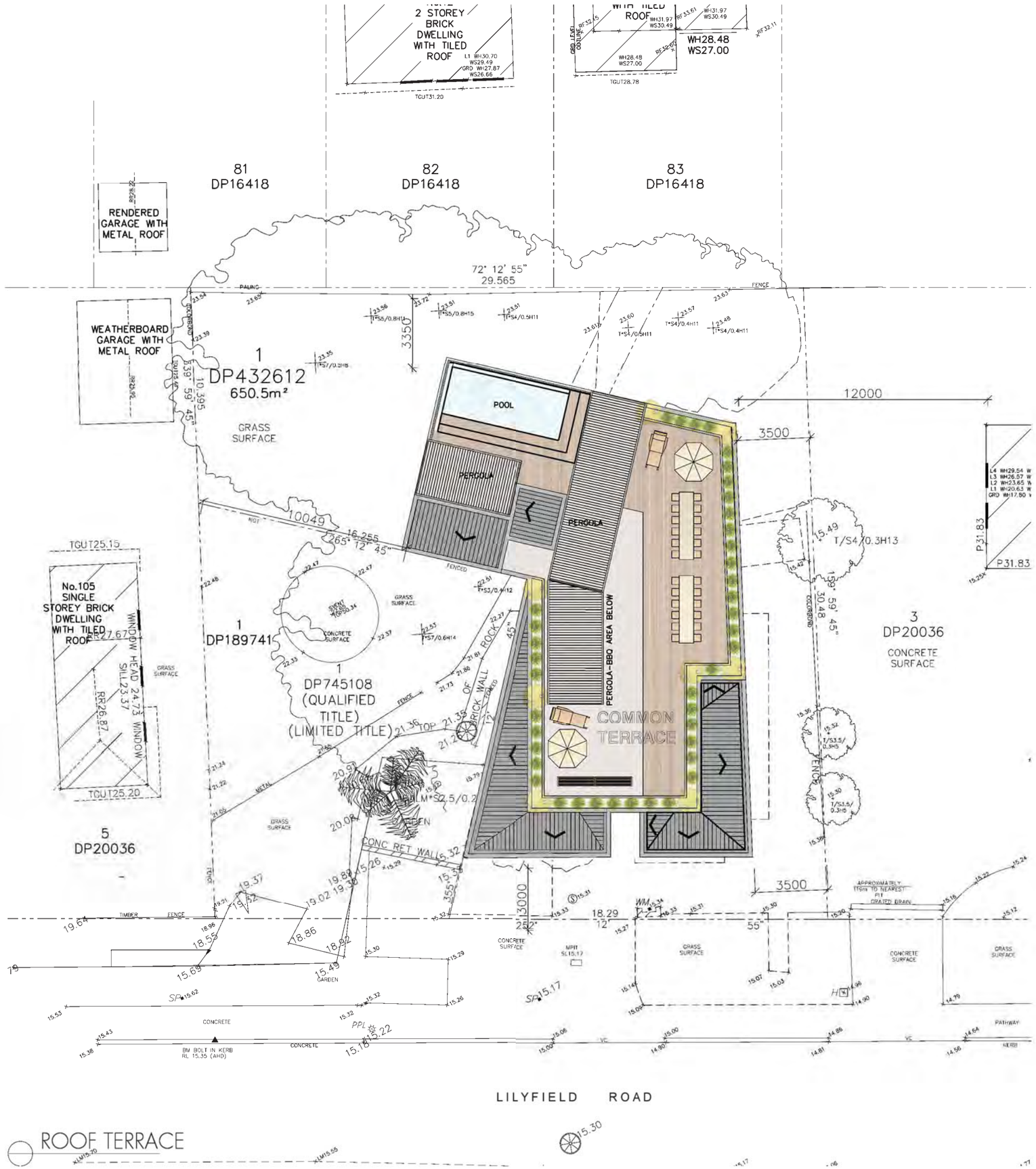
BCA CONSULTANT

PROJECT
RESIDENTIAL DEVELOPMENT
101 LILYFIELD ROAD
LILYFIELD, NSW

DRAWING TITLE
FIFTH FLOOR

DATE	JAN 2016	DRAWING No.
SCALE	1:100 @ A1	07
JOB No.	D1515	
DRAWN BY	DR	

PRELIMINARY



LEVEL 2, 57 RENWICK STREET,
LEICHHARDT NSW 2040
T: (02) 9518 3563 ABN: 86738976625
info@derekraithby.com.au Architect #7469

CIRCULATION
PRE-DA
DA
CC
TENDER
CONSTRUCTION
AS-BUILT

A1 ORIGINAL SIZE

ISSUE	DATE	AMENDMENT	BY
B	JAN 2016	UPDATED CONCEPT	DR
A	NOV 2015	ISSUED FOR DISCUSSION	DR

CLIENT
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PROJECT MANAGEMENT / TOWN PLANNER
APP CORPORATION PTY LIMITED
116 Miller Street Ph: (02) 9956 1295
North Sydney NSW 2060 elise.cramer@app.com.au

TRAFFIC ENGINEER
TRAFFIX Consultants
Suite 208, 50 Holt St. Ph: (02) 8324 8700
Surry Hills NSW 2010 Foul.Corbett@traffix.com.au

LANDSCAPE DESIGN

GEOTECHNICAL/CONTAMINATION

BCA CONSULTANT

PROJECT
RESIDENTIAL DEVELOPMENT
101 LILYFIELD ROAD
LILYFIELD, NSW

DRAWING TITLE
ROOF TERRACE

DATE	JAN 2016	DRAWING No.	08
SCALE	1:100 @ A1		
JOB No.	D1515		
DRAWN BY	DR		

PRELIMINARY

Appendix D – ADG Compliance Table

Objective	Design Criteria	Compliance
PART 3- SITING THE DEVELOPMENT		
3A Site analysis		
3A – 1 Site analysis illustrates that design decisions have been based on opportunities and constraints of the site conditions and their relationship to the surrounding context	-	Capable of being provided in support of future development application. A survey plan has been provided in support of the Planning Proposal.
3B Orientation		
3B – 1 Building types and layouts respond to the streetscape and site while optimising solar access within the development	-	Yes – future built form is capable of being designed to ensure adjoining dwellings continue to receive suitable level of solar access.
3B – 2 Overshadowing of neighbouring properties is minimised during mid- winter	-	Shadow Diagrams [drawing DA16] provided – future built form capable of being designed to limit overshadowing impacts.
3C Public Domain Interface		
3C – 1 Transition between private and public domain is achieved without compromising safety and security	-	Yes – the proposal includes small cafe on the ground floor which provides opportunities for casual interaction between residents and the public domain. Casual surveillance of the street through balconies and communal open space fronting the street capable of being provided as part of future detailed design.
3C – 2 Amenity of the public domain is retained and enhanced	-	Yes – the building entries will be designed to provide an appropriate, identifiable, secure, safe and accessible entry. Separate entries are provided for pedestrians and vehicles.
3D Communal and Public Open Space		
3D – 1 An adequate area of communal open space is provided to enhance residential amenity and to provide opportunities for landscaping	1. Communal open space has a minimum area equal to 25% of the site 2. Developments achieve a minimum of 50% direct sunlight to the principal usable part of the communal open space for a minimum of 2 hours between 9am	Yes – the proposal will be capable of providing a compliant area on the roof terrace which is over 30% of the total site area as demonstrated on the concept plans. The communal open space will receive a high level of direct sunlight.

<table>
<tr><td></td><td>and 3pm on 21 June</td><td></td></tr>
<tr><td>3D – 2
Communal open space is designed to allow for a range of activities, respond to site conditions and be attractive and inviting</td><td>-</td><td>Yes – the proposal includes a common roof terrace which includes a bbq area, pool, seating areas and landscaped roof gardens.</td></tr>
<tr><td>3D – 3
Communal open space is designed to maximise safety</td><td>-</td><td>Yes – safety balustrades and devices will be incorporated into the design in accordance with building code of Australia / NCC.</td></tr>
<tr><td>3D – 4
Public open space, where provided, is responsive to the existing pattern and uses of the neighbourhood</td><td>-</td><td>Yes – public open space will be provided within the front setback. The street interface conserves the prevalent patterns and retains the existing use of the café.</td></tr>
<tr><td colspan="3">3E Deep Soil Zones</td></tr>
<tr><td>3E – 1
Deep soil zones provide areas on the site that allow for and support healthy plant and tree growth. They improve residential amenity and promote management of water and air quality</td><td>Deep soil zones are to meet the following minimum requirements:
<table><tr><th>Site Area</th><th>Min Dimension</th><th>Deep Soil Zone (%)</th></tr><tr><td>< 650m2</td><td>-</td><td rowspan="4">7%</td></tr><tr><td>650-1500m2</td><td>3m</td></tr><tr><td>>1500m2</td><td>6m</td></tr><tr><td>>1500m2 with significant existing tree cover</td><td>6m</td></tr></table></td><td>Yes – 177.5 m2 or 27% of deep soil capable of being achieved as part of a future proposal.</td></tr>
<tr><td colspan="3">3F Visual Privacy</td></tr>
<tr><td>3F – 1
Adequate building separation distances are shared equitably between neighbouring sites, to achieve reasonable levels of external and internal visual privacy</td><td>Separation between windows and balconies is provided to ensure visual privacy is achieved. Minimum required separation distances from buildings to the side and rear boundaries are as follows:
<table><tr><th>Building height</th><th>Habitable rooms and balconies (m)</th><th>Non-habitable Rooms (m)</th></tr><tr><td>Up to 12m (4</td><td>6</td><td>3</td></tr></table></td><td>No – concept schemes have demonstrated that strict compliance with the minimum 3m shared separation distance to the western boundary cannot be physically accommodated. This particular non-compliance is capable of being addressed through a combination of improved design, orientation of living areas, enhanced landscaping and external screening to achieve the underlying intent of the guide.</td></tr>
</table>

	storeys)			Building separation distances to the northern and eastern boundaries have been designed to comply in the concept schemes.
	Up to 25m (5-8 storeys)	8	4,5	
	Over 25m (9+ storeys)	12	6	
3F – 2 Site and building design elements increase privacy without compromising access to light and air and balance outlook and views from habitable rooms and private open space	-			Yes – Privacy devices will need to be incorporated into the future design.
3G Pedestrian Access and Entries				
3G -1 Building entries and pedestrian access connects to and addresses the public domain	-			Yes – the concept schemes include one main pedestrian entry, separate vehicle entry and frontage for a cafe. The entries are visible and easy to identify.
3G – 2 Access, entries and pathways are accessible and easy to identify	-			Yes – as per above
3G – 3 Large sites provide pedestrian links for access to streets and connection to destinations	-			N/A
3H Vehicle Access				
3H – 1 Vehicle access points are designed and located to achieve safety, minimise conflicts between pedestrians and vehicles and create high quality streetscapes	-			Yes – the vehicle entry is recessed and separated from the pedestrian entry and appears less dominant considering the focus of the street interface will be on the café and building signage (refer photomontage). The street interface also provides for landscaping and outdoor dining as shown on the concept photomontages.
3J Bicycle and Car Parking				
3J – 1 Car parking is provided based on proximity to public transport in metropolitan Sydney and centres in regional areas	1. For development in the following locations: • on sites that are within 800 metres of a railway station or light rail stop in the Sydney Metropolitan Area; or			Yes – the proposal is within 800m of light rail and is capable of providing for 11 residential car spaces and 1 visitor space in accordance with minimum and maximum amounts required.

	• on land zoned, and sites within 400 metres of land zoned, B3 Commercial Core, B4 Mixed Use or equivalent in a nominated regional centre the minimum car parking requirement for residents and visitors is set out in the Guide to Traffic Generating Developments, or the car parking requirement prescribed by the relevant council, whichever is less. The car parking needs for a development must be provided off street	
3J – 2 Parking and facilities are provided for other modes of transport	-	Yes – the proposal can provide scooter or bicycle spaces.
3J – 3 Car park design and access is safe and secure	-	Yes – the future car park will need to adhere to the guidelines for safe and secure design.
3J – 4 Visual and environmental impacts of underground car parking are minimised	-	N/A
3J – 5 Visual and environmental impacts of on-grade car parking are minimised	-	As above.
3J – 6 Visual and environmental impacts of above ground enclosed car parking are minimised	-	N/A
PART 4- DESIGNING THE BUILDING		
AMENITY		
4A Solar and Daylight Access		
4A – 1 To optimise the number of apartments receiving sunlight to habitable rooms, primary windows and private open space	1. Living rooms and private open spaces of at least 70% of apartments in a building receive a minimum of 2 hours direct sunlight between 9 am and 3 pm at mid-winter in the Sydney Metropolitan Area and in the Newcastle and Wollongong local government areas	Yes – 100% of apartments will be capable of receiving at least 2 hours of direct sunlight. Refer to Solar Access Diagram [DA-15].

	2. In all other areas, living rooms and private open spaces of at least 70% of apartments in a building receive a minimum of 3 hours direct sunlight between 9am and 3 pm at mid-winter 3. A maximum of 15% of apartments in a building receive no direct sunlight between 9 am and 3 pm at mid-winter	
4A – 2 Daylight access is maximised where sunlight is limited	-	Yes
4A – 3 Design incorporates shading and glare control, particularly for warmer months	-	Yes – the proposal provides balconies that extend far enough to shade summer sun, but allow winter sun to penetrate living areas. Also shading devises have been incorporated. Refer to elevations and artist's impression drawings [DA09-DA11].
4B Natural Ventilation		
4B – 1 All habitable rooms are naturally ventilated	-	Yes
4B – 2 The layout and design of single aspect apartments maximises natural ventilation	-	Yes – the design of single aspects apartments allows for cross ventilation.
4B – 3 The number of apartments with natural cross ventilation is maximised to create a comfortable indoor environment for residents.	1. At least 60% of apartments are naturally cross ventilated in the first nine storeys of the building. Apartments at ten storeys or greater are deemed to be cross ventilated only if any enclosure of the balconies at these levels allows adequate natural ventilation and cannot be fully enclosed 2. Overall depth of a cross-over or cross-through apartment does not exceed 18m, measured glass line to glass line	Yes – 100% of units are capable of being cross-ventilated.
4C Ceiling Height		
4C – 1 Ceiling height achieves sufficient natural	1. Measured from finished floor level to finished ceiling level, minimum ceiling heights are:	Yes

<table>
<tr>
<td>ventilation and daylight access</td>
<td>
<table>
<tr><th colspan="2">Minimum ceiling height for apartment and mixed use buildings</th></tr>
<tr><td>Habitable rooms</td><td>2.7m</td></tr>
<tr><td>Non-habitable rooms</td><td>2.4m</td></tr>
<tr><td>For 2 storey apartments</td><td>2.7m for main living area floor
2.4m for second floor, where its area does not exceed 50% of the apartment area</td></tr>
<tr><td>Attic spaces</td><td>1.8m at edge of room with a 30 degree minimum ceiling slope</td></tr>
<tr><td>If located in mixed use areas</td><td>3.3m for ground and first floor to promote future flexibility of use</td></tr>
<tr><td colspan="2">These minimums do not preclude high ceilings if desired</td></tr>
</table>
</td>
<td></td>
</tr>
<tr>
<td>4C – 2
Ceiling height increases the sense of space in apartments and provides for well-proportioned rooms</td>
<td>-</td>
<td>Yes – capable of achieving compliance.</td>
</tr>
<tr>
<td>4C – 3
Ceiling heights contribute to the flexibility of building use over the life of the building</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td colspan="3">4D Apartment size and layout</td>
</tr>
<tr>
<td>4D – 1
The layout of rooms within an apartment is functional, well organised and provides a high standard of amenity</td>
<td>1. Apartments are required to have the following minimum internal areas:

<table>
<tr><th>Apartment Type</th><th>Min Internal Area</th></tr>
<tr><td>Studio</td><td>35m2</td></tr>
<tr><td>1 Bedroom</td><td>50m2</td></tr>
<tr><td>2 Bedroom</td><td>70m2</td></tr>
<tr><td>3 Bedroom</td><td>90m2</td></tr>
</table>
The minimum internal areas include only one</td>
<td>Yes – Refer to all concept Floor Plans.</td>
</tr>
</table>

<table>
<tr><td></td><td>bathroom. Additional bathrooms increase the minimum internal area by 5m2 each A fourth bedroom and further additional bedrooms increase the minimum internal area by 12m2 each

2. Every habitable room must have a window in an external wall with a total minimum glass area of not less than 10% of the floor area of the room. Daylight and air may not be borrowed from other rooms</td><td></td></tr>
<tr><td>4D – 2
Environmental performance of the apartment is maximised</td><td>1. Habitable room depths are limited to a maximum of 2.5 x the ceiling height
2. In open plan layouts (where the living, dining and kitchen are combined) the maximum habitable room depth is 8m from a window</td><td>Yes – Refer to all concept Floor Plans.</td></tr>
<tr><td>4D – 3
Apartment layouts are designed to accommodate a variety of household activities and needs</td><td>1. Master bedrooms have a minimum area of 10m2 and other bedrooms 9m2 (excluding wardrobe space)
2.Bedrooms have a minimum dimension of 3m (excluding wardrobe space)
3.Living rooms or combined living/dining rooms have a minimum width of:
- 3.6m for studio and 1 bedroom apartments
- 4m for 2 and 3 bedroom apartments
4. The width of cross-over or cross-through apartments are at least 4m internally to avoid deep narrow apartment layouts</td><td>Yes – Refer to all concept Floor Plans.</td></tr>
<tr><td colspan="3">4E – Private Open Space and Balconies</td></tr>
<tr><td>4E – 1
Apartments provide appropriately sized private open space and balconies to enhance residential amenity</td><td>1. All apartments are required to have primary balconies as follows:
<table><tr><th>Dwelling Type</th><th>Min Area</th><th>Min Depth</th></tr><tr><td>Studio</td><td>4m2</td><td>-</td></tr><tr><td>1 Bedroom</td><td>8m2</td><td>2m</td></tr><tr><td>2 Bedroom</td><td>10m2</td><td>2m</td></tr><tr><td>3+ Bedroom</td><td>12m2</td><td>2.4m</td></tr></table>The minimum balcony depth to be counted as contributing to the balcony area is 1m</td><td>Yes – Refer to all concept Floor Plans.</td></tr>
</table>

<table>
<tr><td></td><td>2. For apartments at ground level or on a podium or similar structure, a private open space is provided instead of a balcony. It must have a minimum area of 15m2 and a minimum depth of 3m</td><td></td></tr>
<tr><td>4E – 2
Primary private open space and balconies are appropriately located to enhance liveability for residents</td><td>-</td><td>Yes</td></tr>
<tr><td>4E – 3
Private open space and balcony design is integrated into and contributes to the overall architectural form and detail of the building</td><td>-</td><td>Yes – refer Artist’s Impression drawing.</td></tr>
<tr><td>4E – 4
Private open space and balcony design maximises safety</td><td>-</td><td>Yes – capable of being designed to comply.</td></tr>
<tr><td colspan="3">4F Common Circulation and Spaces</td></tr>
<tr><td>4F – 1
Common circulation spaces achieve good amenity and properly service the number of apartments</td><td>1. The maximum number of apartments off a circulation core on a single level is eight
2. For buildings of 10 storeys and over, the maximum number of apartments sharing a single lift is 40</td><td>Yes – maximum 3 units will be accessible from circulation area.</td></tr>
<tr><td>4F – 2
Common circulation spaces promote safety and provide for social interaction between residents</td><td>-</td><td>Yes</td></tr>
<tr><td colspan="3">4G Storage</td></tr>
<tr><td>4G – 1
Adequate, well designed storage is provided in each apartment</td><td>1. In addition to storage in kitchens, bathrooms and bedrooms, the following storage is provided:
<table>
<tr><th>Dwelling Type</th><th>Storage Size Volume (m3)</th></tr>
<tr><td>Studio</td><td>4</td></tr>
<tr><td>1 Bedroom</td><td>6</td></tr>
</table></td><td>Yes – adequate storage can be provided.</td></tr>
</table>

	2 Bedroom: 8 3+ Bedroom: 10	
4G- 2 Additional storage is conveniently located, accessible and nominated for individual apartments.	-	Yes – adequate storage can be provided.
4H Acoustic Privacy		
4H – 1 Noise transfer is minimised through the siting of buildings and building layout	-	Yes - adequate building separation is provided. All noise sources will be minimised as necessary.
4H – 2 Noise impacts are mitigated within apartments through layout and acoustic treatments	-	Yes – acoustic insulation and discontinuous construction will be incorporated amongst other measures.
4J Noise and Pollution		
4J - 1 In noisy or hostile environments the impacts of external noise and pollution are minimised through the careful siting and layout of buildings	-	Yes - The proposed development will need to comply with the requirements of the BCA. Party walls will be designed with the minimum RW rating according to BCA and the majority of the apartment layouts provide similar rooms adjoining each other where possible. Noise from external sources will be treated to ensure compliance with Council's requirements.
4J – 2 Appropriate noise shielding or attenuation techniques for the building design, construction and choice of materials are used to mitigate noise transmission	-	Yes – as above.
CONFIGURATION		
4K Apartment Mix		
4K – 1 A range of apartment types and sizes is provided to cater for different household types now and into the future	-	Yes – Suitable apartment mix capable of being achieved.
4K – 2	-	Yes – Refer to all concept Floor Plans.

The apartment mix is distributed to suitable locations within the building		
4L Ground Floor Apartments		
4L - 1 Street frontage activity is maximised where ground floor apartments are located	-	N/A
4L – 2 Design of ground floor apartments delivers amenity and safety for residents	-	N/A
4M Facades		
4M – 1 Building facades provide visual interest along the street while respecting the character of the local area	-	Yes - The building elements will be designed with regard to the elements, textures, materials and colours of the existing neighbourhood. The façade is intended to reduce the visual bulk of the building. Ventilations louvres and car park entry are considered with overall façade design.
4M – 2 Building facades provide visual interest along the street while respecting the character of the local area	-	Yes – as above.
4N Roof Design		
4N – 1 Roof treatments are integrated into the building design and positively respond to the street	-	Yes – The roof design is appropriate as it relates to the desired built form and minimises overshadowing and visual impact.
4N – 2 Opportunities to use roof space for residential accommodation and open space are maximised	-	Yes – the proposal includes communal open roof terrace.
4N – 3 Roof design incorporates sustainability features	-	N/A
4O Landscape Design		
4O – 1 Landscape design is viable and sustainable	-	Yes – The proposal includes landscaping at ground level at the front and rear of the building, and at the rooftop

		terrace. A landscape plan will be provided with min. 80% native plant species.
4O – 2 Landscape design contributes to the streetscape and amenity	-	Yes – the street interface includes landscaping together with entries and an outdoor dining area.
4P Planting on Structures		
4P – 1 Appropriate soil profiles are provided	-	Yes.
4P – 2 Plant growth is optimised with appropriate selection and maintenance	-	Yes – landscape design will be prepared to comply with requirements.
4P – 3 Planting on structures contributes to the quality and amenity of communal and public open spaces		Yes – the proposal includes planters and green walls. Refer to Artist's Impressions [DA11].
4Q Universal Design		
4Q – 1 Universal design features are included in apartment design to promote flexible housing for all community members	-	Yes.
4Q – 2 A variety of apartments with adaptable designs are provided	-	Yes – can be achieved.
4Q – 3 Apartment layouts are flexible and accommodate a range of lifestyle needs	-	Yes.
4R – Adaptive Reuse		
4R – 1 New additions to existing buildings are contemporary and complementary and enhance an area's identity and sense of place	-	N/A
4R – 2 Adapted buildings provide residential amenity while not precluding future adaptive reuse	-	N/A
4S Mixed Use		

4S – 1 Mixed use developments are provided in appropriate locations and provide active street frontages that encourage pedestrian movement	-	The proposal intends to relocate the existing café within the new development on the ground floor. Parking is also at ground level screened by the development.
4S – 2 Residential levels of the building are integrated within the development, and safety and amenity is maximised for residents	-	Yes.
4T Awnings and Signage		
4T – 1 Awnings are well located and complement and integrate with the building design	-	N/A
4T – 2 Signage responds to the context and desired streetscape character	-	N/A
PERFORMANCE		
4U Energy Efficiency		
4U – 1 Development incorporates passive environmental design	-	Yes – the proposal will incorporate passive environmental measures including but not limited to thermal (walls, floor and roof), passive solar design where possible, amongst other measures.
4U – 2 Development incorporates passive solar design to optimise heat storage in winter and reduce heat transfer in summer	-	Yes – the proposal provides overhang balconies which optimise heat storage and heat transfer. Insulation and smart glass will be incorporated.
4U – 3 Adequate natural ventilation minimises the need for mechanical ventilation	-	Yes – all apartments will be cross-ventilated and all habitable rooms will be naturally ventilated.
4V – Water Management and Conservation		
4V – 1 Potable water use is minimised	-	Yes – can be achieved.

4V – 2 Urban stormwater is treated on site before being discharged to receiving waters	-	TBC
4V – 3 Flood management systems are integrated into site design	-	TBC
4W – Waste Management		
4W – 1 Waste storage facilities are designed to minimise impacts on the streetscape, building entry and amenity of residents	-	Yes – waste storage will be accommodated on ground floor level.
4W – 2 Domestic waste is minimised by providing safe and convenient source separation and recycling	-	TBC
4X – Building Maintenance		
4X – 1 Building design detail provides protection from weathering	-	Yes – can be achieved.
4X – 2 Systems and access enable ease of maintenance	-	Yes – can be achieved.
4X – 3 Material selection reduces ongoing maintenance costs	-	Yes – materials used in the project will be robust and easy to clean.

Appendix E – View Analysis

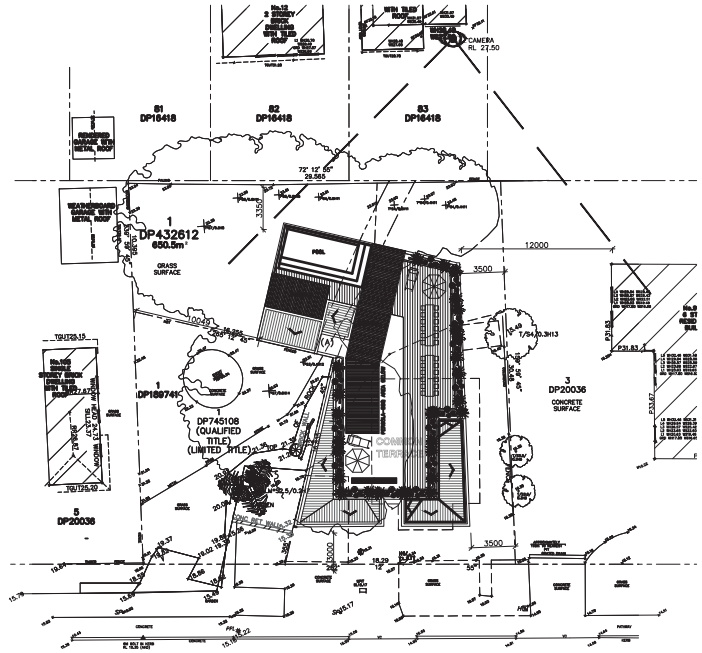
EXISTING PHOTOGRAPHY

EXISTING PHOTOGRAPHY WITH WIREFRAME

EXISTING PHOTOGRAPHY WITH PHOTOMONTAGE

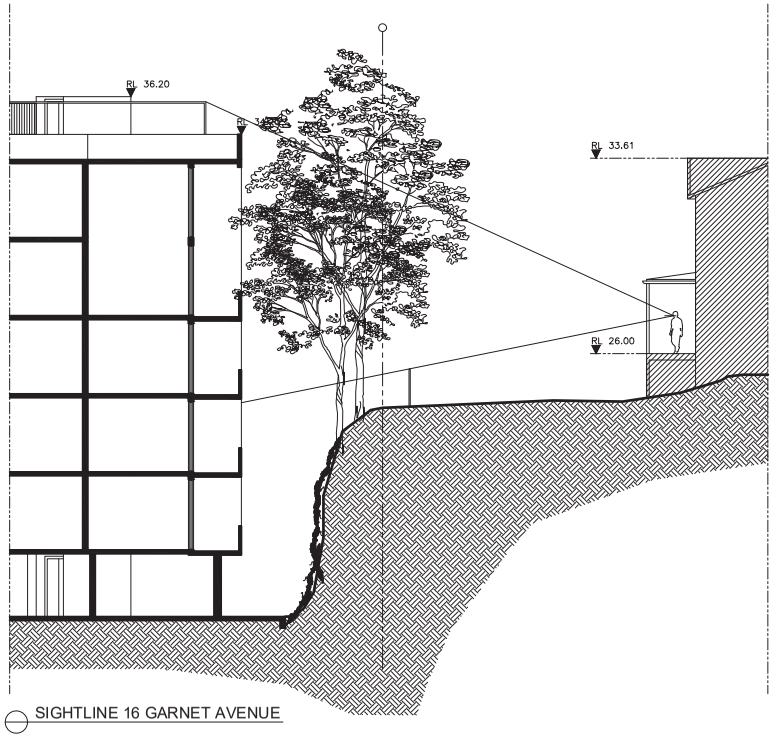
CAMERA: CANON EOS 500D DSLR
LENSE: 20mm WIDE ANGLE
ACCESSORIES: 32GB STORAGE DISK
DATE TAKEN: 16TH MAY 2016
TAKEN BY: DEREK RAITHBY

SURVEYOR: STRATASURV SURVEYORS
QUALIFICATIONS: B. SURVEYING, REG. NSW



LILLYFILED ROAD

POSITION OF CAMERA



SIGHTLINE 16 GARNET AVENUE

LEVEL 2, 57 RENWICK STREET,
LEICHHARDT NSW 2040
T: (02) 9518 3563 ABN: 86738976625
info@derekraithby.com.au Architect #7469

- CIRCULATION
- PRE-DA
- DA
- CC
- TENDER
- CONSTRUCTION
- AS-BUILT

A1 ORIGINAL SIZE

ISSUE	DATE	AMENDMENT	BY
C	MAY 2016	ADDITIONAL DRAWINGS	DR
B	JAN 2016	UPDATED CONCEPT	DR
A	NOV 2015	ISSUED FOR DISCUSSION	DR

CLIENT
OZZY STATES Pty Ltd
C/O APP CORPORATION Pty LIMITED

PROJECT MANAGEMENT / TOWN PLANNER
APP CORPORATION PTY LIMITED
116 Miller Street Ph: (02) 9956 1295
North Sydney NSW 2060 elise.crameri@app.com.au

HYDRAULIC ENGINEER

TRAFFIC ENGINEER
TRAFFIX Consultants
Suite 208, 50 Holt St, Ph: (02) 8324 8700
Surry Hills, NSW 2010 Paul.Corbett@traffix.com.au

LANDSCAPE DESIGN

PROJECT
RESIDENTIAL DEVELOPMENT
101 LILYFIELD ROAD
LILYFIELD, NSW

DRAWING TITLE
SIGHTLINES

DATE	MAY 2016
SCALE	1:150 @ A1
JOB No.	D1515
DRAWN BY	DR

DRAWING No. 17

PRELIMINARY

Appendix F – Arboricultural Impact Assessment

URBAN FORESTRY AUSTRALIA

TREE MANAGEMENT CONSULTING ARBORICULTURISTS

ARBORICULTURAL IMPACT ASSESSMENT

for

Ozzy States Pty Ltd
C/- APP Corporation Pty Ltd
Level 7, 116 Miller Street
NORTH SYDNEY NSW 2060

SITE ADDRESS

101–103 LILYFIELD ROAD
LILYFIELD

MAY 2016

Accredited member of
INSTITUTE OF AUSTRALIAN
IACA
CONSULTING ARBORICULTURISTS ®

URBAN FORESTRY AUSTRALIA
Consulting Arboriculturists
www.urbanforestryaustralia.com.au

PO Box 533
Wyong NSW 2259
email:cat@urbanforestryaustralia.com.au

MANAGING URBAN TREES
Telephone: (02) 4351 8640
Mobile: 0414 997 417

CONTENTS

1 INTRODUCTION

1.1 This Arboricultural Impact Assessment (AIA) prepared by Urban Forestry Australia (UFA) was commissioned by Mr. Remolo Nigro of Ozzy States Pty Ltd, on behalf of the owners of the subject site. "The site" is identified as Lot 1 in D.P. 432612, and known as 101–103 Lilyfield Road, Lilyfield, New South Wales.

1.2 This AIA is to accompany a development application to Leichhardt Council for the proposed residential and commercial development of the site.

1.3 The purpose of this report is to assess the *vigour* and *condition* of the surveyed trees, and identify the potential impacts the proposed development may have on those trees to be retained in proximity to the works.

1.4 This report gives recommendations for tree retention or removal, and provides guidelines for tree protection and maintenance.

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

1.6 This AIA is not intended as an assessment of any impacts on trees by any proposed future development of the site, other than the current development application.

1.7 This report is not intended to be a comprehensive tree *risk* assessment; however, the report may make recommendations, where appropriate, for further assessment, treatment or testing of trees where potential structural problems have been identified, or where below ground investigation may be required.

2 METHODOLOGY

2.1 In preparation for this report, ground level, *visual tree assessments*[1] (VTA), or limited VTA (e.g. where trees are located within adjoining properties), of twenty-three (23) trees or tree groups were undertaken by Narayan David of UFA on 9th May, 2016. Inspection details of these trees are provided in Appendix E—*Schedule of Assessed Trees.*

2.2 This AIA takes account of prescribed trees pursuant to Clause 5.9 (2) of the Leichhardt Local Environment Plan 2013 (LLEP), and prescribed and non-prescribed (exempt) trees as specified in Part C1.14.3 and C1.14.4 of the Leichhardt Development Control Plan 2013 (LDCP).

2.3 Tree heights and canopy spreads were visually estimated or measured using Nikon ForestryPro and Leica Distometer Laser measurers. Unless otherwise noted in Appendix F, all trunk diameters were measured at approximately 1.4 metres above ground level ("the DBH"). Field observations were written down, and photographs of the site and trees were taken using a smartphone or Canon EOS1000D digital SLR camera.

2.5 No *aerial inspections, root mapping* or woody tissue testing were undertaken as part of this tree assessment. Information contained in this tree report covers only the trees that were examined and reflects the condition of those trees at the time of inspection.

2.6 Plans and documents referenced for the preparation of this report include:

- Details and Levels Plan ("the survey plan"), Dwg No. 3805DT-01, issue date 19/08/2015, prepared by StrataSurv.
- Concept Plans 01–14, dated January 2016, prepared by Derek Raithby Architecture.
- AS4970-2009 *Protection of trees on development sites*, Standards Australia.

2.7 No hydraulic service or landscape plans have been reviewed in preparation of this report.

2.8 The subject trees are shown on marked-up excerpts of the survey plan. These marked-up plans are attached as Appendix E—Tree Location Plan.

[1]Visual Tree Assessment (VTA) is a procedure of defect analysis developed by Mattheck and Breloer (1994) that uses the growth response and form of trees to detect defects.

3 OBSERVATIONS AND DISCUSSION

3.1 Assessed Trees

3.1.1 Under cl. C2 of Part C1.14.3 of the LDCP, a prescribed tree is:

a. a tree of more than six (6) metres in height and having a trunk diameter of more than 200 millimetres when measured at a height of 1.4m from the ground, growing on privately owned land; or
b. a tree that is or forms part of a Heritage Item or is within a Heritage Conservation Area; but
c. excludes any tree listed as an exempt species as outlined within C1.14.2 - Work that may be carried out without Council approval.

3.1.2 Twenty-three (23) trees were assessed or identified and included in this report. Details of these are included in the Schedule of Assessed Trees – Appendix E. Of these trees:

- seven (7) are located on adjoining properties—Trees 1, 2, 3, 4, 7, 8 and 23;
- thirteen (13) site trees are prescribed (see C.1.14.3 of the LDCP) and subject to protection—Trees 5, 9, 10, 12–16, 18–22, and
- two (2) trees are listed as weeds of local significance (although not included in the list for 'exempt' species under the LDCP)—Trees 6 and 17.
- One (1) does not achieve the requisite dimension identifying as a 'prescribed' tree—Tree 11.

3.1.3 Of the 14 prescribed site trees and 7 adjoining trees:

- five (5) are introduced exotic species—Trees 2 and 23 (adjoining), 10, 18, 22;
- seven (7) are locally indigenous species—Trees 5, 7, 8, 9, 19, 20 and 21, and
- eight (8) are introduced Australian native species—Trees 1, 3, 4 (adjoining), 11, 12, 13, 14, 15, and 16.

3.1.4 Of the 23 assessed trees (including weed species), the following Retention Value (RV)[2] was ascribed to each:

HIGH RV	MEDIUM RV		LOW RV	
7, 8—Swamp Mahoganies	**4**—Sydney Blue Gum **5**—Port Jackson Fig **12**—Yellow Gum **13**—Silky Oak **15**—Narrow-leaved Black Peppermint	**16**—Red Ironbark **18**—Monterey Pine **19, 20, 21**—River She-oaks	**1**—Bangalow Palm **2**—Tamarisk **3**—Weeping Bottlebrush **6**—Camphor Laurel **9**—Swamp Mahogany	**10**—Jacaranda **11**—Kentia Palm **14**—Red Ironbark **17**—African Olive **22**—Jacaranda **23**—Peach

[2] Retention Value (RV) refers to the retention value of a tree based on its estimated *Useful Life Expectancy* (ULE) and the significance of the tree in the landscape (see Stars-Appendix C). Note: Where further investigation (e.g., where a lack of access to a tree prevents clear visual assessment) or testing of trees is required, a RV cannot be accorded to that tree until the detailed assessment, investigation or testing has taken place. Refer to Appendix C for more detail.

3.1.5 Tree 15—*Eucalyptus nicholii* (Narrow-leaved Black Peppermint) is listed as a vulnerable species under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* and also under the Threatened Species Conservation Act 1995 (New South Wales). However, the species' conservation status applies to its restricted range of occurrence from the Walcha-Niangala region (east of Tamworth) to just north of Glen Innes, in NSW. Its conservation status would not be expected to apply to a single specimen tree planted in an urbanised area well outside its natural range. However, if necessary, this could be confirmed by an ecologist as I am not qualified in this area of expertise.

3.1.6 The site is not within a Heritage Conservation Area, and does not contain a listed Heritage Item (Heritage Map Sheet HER_004 and Schedule 5 of the LLEP).

3.2 Proposed Removal of Prescribed Trees

3.2.1 Eleven (11) of the 23 assessed trees are proposed to be removed as they fall within, or are too close to the proposed development footprint to be reliably retained:

- Tree 5—*Ficus rubiginosa* (Port Jackson Fig)
- Tree 9— *Eucalyptus robusta* (Swamp Mahogany),
- Tree 10—*Jacaranda mimosifolia* (Jacaranda),
- Tree 12—*Eucalyptus ?leucoxylon 'Rosea'* (Red-flowered Yellow Gum),
- Tree 15—Narrow-leaved Black Peppermint,
- Tree 16—*Eucalyptus sideroxylon* (Red Ironbark),
- Tree 18—*Pinus radiata* (Monterey Pine),
- Trees 19, 20 and 21—*Casuarina cunninghamiana* (River She-oak), and
- Tree 22—Jacaranda.

Note: Trees 6, 11 and 17, not included in the above list, are non-prescribed trees, and/or weeds of local significance. These trees would also be removed.

3.3 Proposed Tree Retention

3.3.1 The following nine (9) prescribed trees on the site and assessed trees on adjoining properties are proposed to be retained:

- Tree 1—*Archontophoenix cunninghamiana* (Bangalow Palm);
- Tree 2—*Tamarix aphylla* (Tamarisk), adjoining tree;
- Tree 3—*Callistemon viminalis* (Weeping Bottlebrush), adjoining;
- Tree 4—*Eucalyptus saligna* (Sydney Blue Gum);
- Tree 7—*Eucalyptus robusta* (Swamp Mahogany), adjoining;
- Tree 8—*Eucalyptus robusta* (Swamp Mahogany), adjoining;
- Tree 13—*Grevillea robusta* (Silky Oak);
- Tree 14—*Eucalyptus sideroxylon* (Red Ironbark), and
- Tree 23—*Prunus* sp. Peach (adjoining)

3.4 Potential Impacts on Trees Proposed for Retention

3.4.1 Under the Australian Standard 4970-2009 *Protection of trees on development sites* ("AS4970"), encroachments less than 10% of the *Tree Protection Zone* ("the TPZ") are considered to be minor. No specifications are provided in AS4970 for potential impacts of 10% or greater. This 10% is taken as the threshold figure, and is the trigger where arboricultural investigations into TPZ encroachments beyond this figure need to be considered.

3.4.2 The potential extent of root zone impacts to protected trees to be retained can be generally rated using the *Impact Level Rating* ("ILR") table 1.

IMPACT LEVEL RATING	
0	0 – 0.9% of root zone impacted – ***no*** impact of significance
L	1 to 10% of root zone impacted – ***minor*** (low) level of impact
L–M	>10 to 15% of root zone impacted – ***minor*** (low) ***to moderate*** level of impact
M	>15 to 20% of root zone impacted – ***moderate*** level of impact
M–H	>20 to 25% of root zone impacted – ***moderate to high*** level of impact
H	>25 to 35% of root zone impacted – ***high*** level of impact
S	>35% of root zone impacted – ***significant*** level of impact

Table 1: Guideline to the rating of impacts on trees to be retained.
Based on discussions with executive members of the Institute of Australian Consulting Arboriculturists.

3.4.3 Disturbance within the *Structural Root Zone* (SRZ), and extent of encroachments into the TPZ's of protected trees to be retained are summarised in table 2, below.

Tree No.	Tree	Tree located on site	SRZ affected	TPZ area (m^2)	TPZ encroachment (approx. m^2)	TPZ encroachment (approx. %)	ILR
1	Bangalow Palm	✗	NA	10	0	0	0
2	Tamarisk	✗	✓	15	6	40	S
3	Weeping Bottlebrush	✗	✓	55	25	45.5	S
4	Sydney Blue Gum	✗	✓	28	11	39.5	S
7	Swamp Mahogany	✗	✗	72	5.5	7.65	L
8	Swamp Mahogany	✗	✓	55	26.5	48.2	S
13	Silky Oak	✓	✗	64	0	0	0
14	Red Ironbark	✓	✗	163	23	14.2	L—M
23	Peach	✗	✗	129	0	0	0

Table 2:*Estimated encroachments into the SRZ and TPZ of trees proposed for retention.*
Note 1: These figures are based on the *notional* SRZ and TPZ's offsets of the trees as calculated under AS4970 and do not necessarily reflect the actual root zones of the trees; existing at or below ground structures, site topography and soil hydrology will influence the presence, spread and direction of tree root growth.
Note 2: The encroachment areas above are based on expected maximum estimates. The type of construction materials and methods used, and/or extent of change to soil/grade conditions during development may result in encroachment impacts lower or higher than estimated at the time of preparing this tree impact assessment.

3.4.4 **Tree 1**—Bangalow Palm (adjoining—see Figure 1)

This palm on the adjoining property is located over 4m from the site boundary and will not be affected by the proposed development.

3.4.5 **Tree 2**—Tamarisk (adjoining—see Figure 1)

This non-prescribed tree is on the adjoining property to the west. It appears the proposed basement and building footprint will be within the SRZ and TPZ of this small tree. The existing concrete parking area within the site may have prevented root growth into the site, but it is also quite possible that woody roots will be severed, and the removal of this tree may be required.

Adequate clearance for machinery engaged in the basement excavation and ancillary works will require pruning of the tree.

3.4.6 **Tree 3**—Weeping Bottlebrush (adjoining—see Figure 1)

As above, noting the tree is restricted by pavements to two sides of its root zone.

3.4.7 **Tree 4**—Sydney Blue Gum (adjoining—see Figure 1)

This tree is limited in space by surrounding concrete pavement and utilities in the site over most of the SRZ. It is possible structural roots will be affected by the proposed basement excavation on the boundary, within 300mm from the centre of the tree's trunk (CoT), potentially about 150mm from the rootflare at the base of the tree.

The estimated significant TPZ encroachment is based on the symmetrical, notional TPZ offset using AS4970 guidelines. Existing constraints and/or opportunities for root growth could affect the encroachment estimate; however, the likely SRZ impact would probably remain significant, as anticipated.

3.4.8 **Tree 7**—Swamp Mahogany (adjoining—see Figure 1)

The tree will not be affected by works within its SRZ. The estimated TPZ encroachment is low and very unlikely to adversely affect the tree.

3.4.9 **Tree 8**—Swamp Mahogany (adjoining—see Figure 1)

This tree will be significantly affected by works within its SRZ and a large proportion of its TPZ, particularly as the existing bank to the east is likely to have encouraged anchoring roots to the north where the proposal requires excavation into this region.

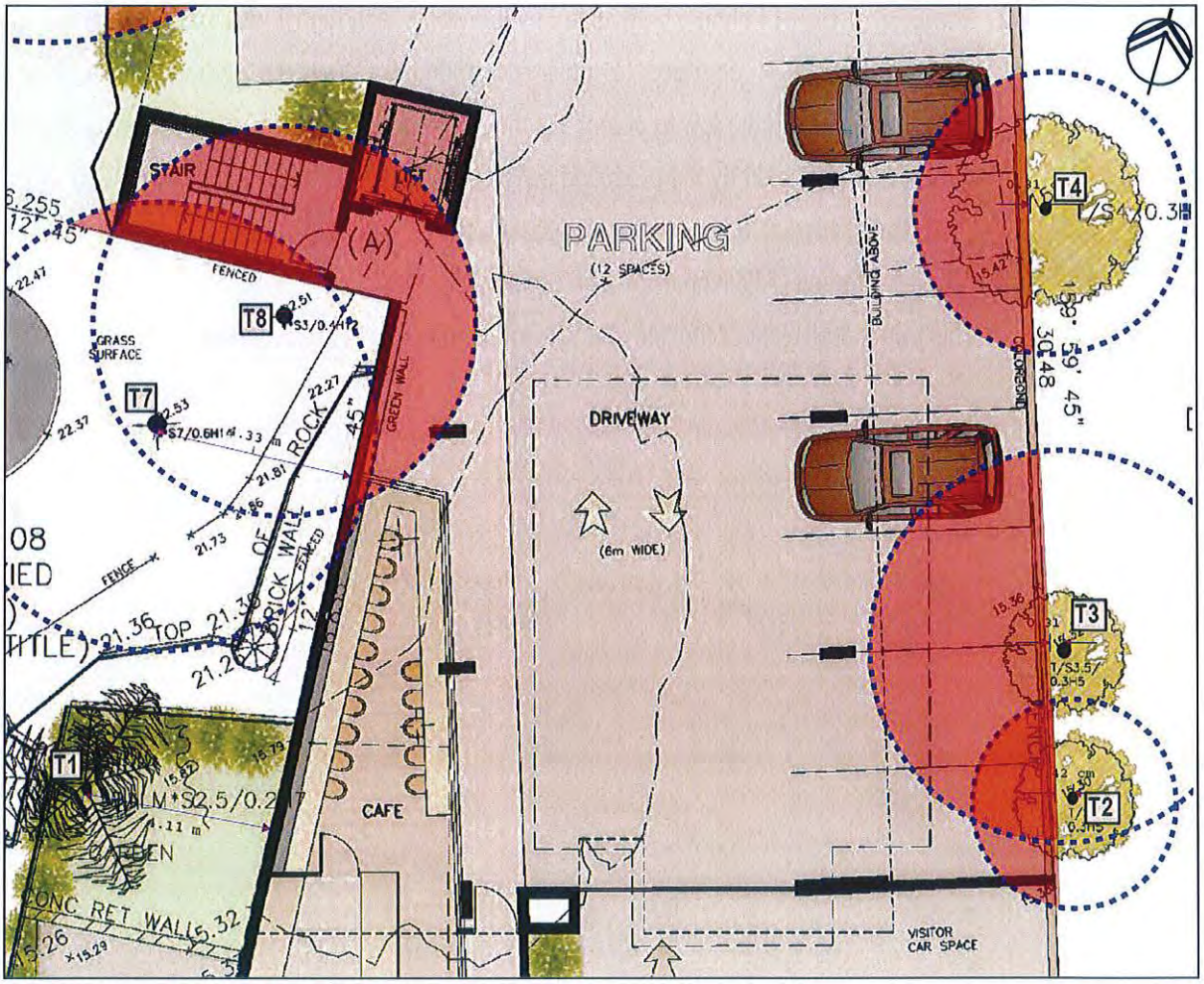


Figure 1—Adjoining trees 1, 2, 3, 4, 7 and 8
Shows the notional TPZ radius (blue dotted circles) of each of the adjoining trees.
Trees 2, 3, 4 and 8 will have SRZ encroachments (SRZ offsets not illustrated) due to the proximity of the basement excavations.
The areas of TPZ encroachments for each tree are shown shaded red on the plan.
Excerpt of Ground Floor Plan—Dwg. No 02 by Derek Raithby Architects. Marked up by C. Mackenzie. Diagram not to scale.

3.4.10 **Tree 13**—Silky Oak (on-site—see Figure 2)

This tree is unlikely to be affected as the proposal is clear of the tree's notional TPZ offset.

3.4.11 **Tree 14**—Red Ironbark (on-site—see Figure 2)

The excavation into rock is unlikely to require any batter, although it would be expected some disturbance beyond the excavation and building footprints would encroach into the tree's TPZ, as pictured in Figure 2, on the following page.

3.4.12 The SRZ of Tree 14 should be avoided by the works, although it would be prudent to ensure an arboriculturist is engaged to supervise during these works near the tree. The TPZ encroachment is in the low to potentially moderate range at worst, and the tree is unlikely to be adversely affected by the proposed development.

3.4.13 **Tree 23**—Peach (adjoining tree—see Figure 2, below).
This tree is well clear of the site and will not be affected by the proposal.

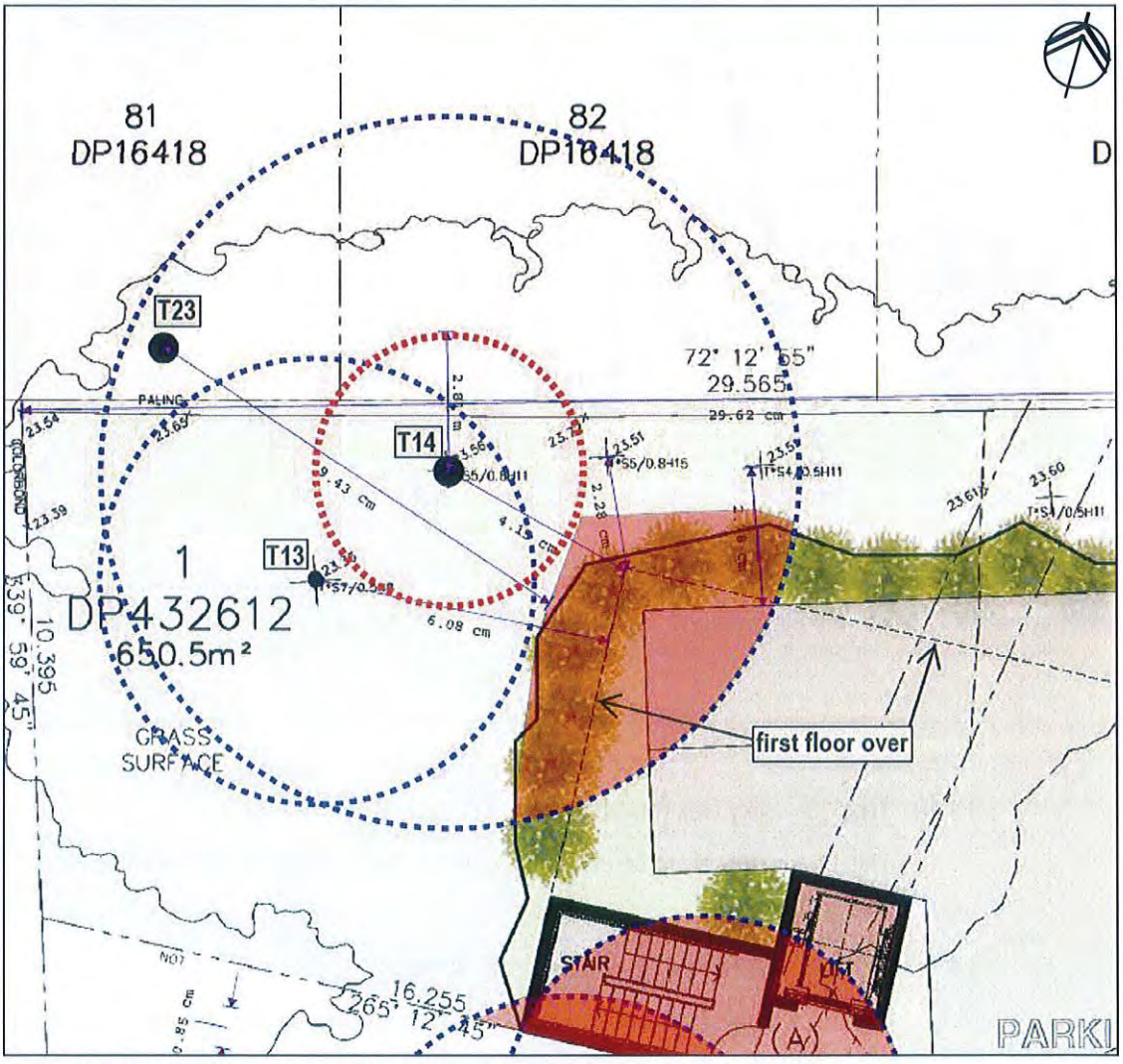


Figure 2—Site trees to be retained 13 and 14, and off-site tree 23.
Shows the notional TPZ radius (blue dotted circles) of each of the trees, and the SRZ offset for T14.
The areas of TPZ encroachments for each tree are shown shaded red on the plan.
Excerpt of Ground Floor Plan—Dwg. No 02 by Derek Raithby Architects. Marked up by C. Mackenzie. Diagram not to scale.

4 CONCLUSIONS

- A total of twenty-three (23) trees are included in this Arboricultural Impact Assessment. Of these:
  - Nineteen (19) trees are prescribed (protected) trees or palms;
  - Three (3) site trees and one (1) adjoining tree are non-prescribed trees (includes three noxious weeds or weeds of local significance) and are exempt from protection under the DCP Controls;

- One (1) tree on the site was identified as an endangered species, however the tree is well outside its natural range and is likely to be a planted specimen, i.e. Tree 15—*Eucalyptus nicholii*.
- Two (2) trees on the west adjoining property were identified as having High Retention Values:
  - Trees 7 and 8—Swamp Mahoganies.
- Eleven (11) prescribed trees are proposed to be removed to accommodate the proposal—5, 9, 10, 12, 15, 16, 18–22.
- Six (6) large mature trees in the northeast corner area of the site are recommended to be removed, regardless of the development proposal, as these trees have structural defects that pose considerable issues with risk, safety and site management (Trees 14, 16, 17, 18, 19 and 20).

- Two (2) prescribed site trees and seven (7) adjoining trees are proposed to be retained (Trees 13, 14, 1, 2, 3, 4, 7, 8 and 23).

- Of the trees proposed to be retained, the following impact levels ratings (ILR) have been estimated:
  - 0–Low (nil and up to 10%) = Tree 1—Bangalow Palm, Tree 13—Silky Oak, and Tree 23—Peach;
  - Low to Moderate (10–15%) = Tree 14—Red Ironbark;
  - Significant (>35%) = Adjoining trees; Tree 2—Tamarisk, Tree 3—Weeping Bottlebrush, Tree 4—Sydney Blue Gum, and Tree 8—Swamp Mahogany.

- Adjoining trees 2, 3, 4 and 8 are likely to be adversely impacted and may require removal if they lose stability as a result of basement excavations.

- Provided the recommendations of this report are adopted and a site arboriculturist provides appropriate supervision and management of the trees to be retained during development, adverse impacts on tree vigour and structural condition will be managed as practically as possible.

5 RECOMMENDATIONS

5.1 Tree Removal

5.1.1 The eleven (11) prescribed site trees to be removed are 5, 9, 10, 12, 15, 16, 18, 19, 20, 21 and 22. These are also identified in the Schedule of Assessed Trees—Appendix F and Tree Location Plan—Appendix G.

5.1.2 Remove non-prescribed site trees—6, 11 and 17. These trees are identified in Appendix E and F.

5.2 Minimising Impacts on Trees to be Retained

5.2.1 A suitably qualified and experienced arboriculturist should be engaged as the project arboriculturist (PA) for managing the trees to be retained during site development, including demolition and construction, and liaise with Council officers, site engineers, architects, etc where necessary.

5.2.2 Consideration should be given to reducing the basement excavation to a minimum 2.5m radial offset from adjoining trees to be retained. Alternatively, consent to remove any of the adjoining trees would need to be gained from the owner of the trees, and also from Council.

5.2.3 Tree 1—Bangalow Palm (adjoining)

- The project arboriculturist must advise on all aspects of tree protection prior to and during construction.
- The existing ground around this palm should be fenced to discourage any activities relating to site development that might physically affect the palm or contaminate the ground.

5.2.4 Trees 2, 3 and 4—Tamarisk, Weeping Bottlebrush and Sydney Blue Gum (adjoining)

- Tree protection devices are to be placed as advised by the project arboriculturist or Council, and prior to any site works commencing.
- Any works proposed within **3m** of the trees is to be directly supervised by an arboriculturist with a minimum Australian Qualification Framework (AQF) Level 5 in arboriculture (AQF5). This includes any proposed demolition of existing pavements, amenity buildings or utilities.

- Refer to sections 5.3 – 5.4 and Appendix D for additional recommendations that may require adoption during development.
- The project arboriculturist must advise on all aspects of tree protection prior to and during construction.
- Any pruning of the trees is to be undertaken prior to demolition by an AQF Level 3 tree worker, in accordance with Australian Standard 4373-2007 Pruning of Amenity Trees and NSW WorkCover guidelines for the Amenity Tree Industry.

5.2.5 Tree 8—Swamp Mahogany

- As above, except the offset where an AQF5 arboriculturist is required to supervise works is **5m** from the tree.
- The project arboriculturist must advise on all aspects of tree protection prior to and during construction.

5.2.6 Tree 13—Silky Oak

- Tree protection devices are to be placed as advised by the project arboriculturist or Council, and prior to any site works commencing, including demolition.
- Refer to sections 5.3 – 5.4 and Appendix D for additional recommendations that may require adoption during development.
- Any potential conflicts with tree retention and approved works must be discussed with the project arboriculturist *before commencement* to ensure the most appropriate methods for the works are adopted and minimise impacts on the tree.
- The project arboriculturist must advise on all aspects of tree protection prior to and during construction.

5.2.7 Trees 14—Red Ironbark

- Tree protection devices are to be placed as advised by the project arboriculturist or Council, and prior to any site works commencing, including demolition.
- All works within **5m** of the tree must be supervised by the project arboriculturist.
- Refer to sections 5.3 – 5.4 and Appendix D for additional recommendations that may require adoption during development.
- Any potential conflicts with tree retention and approved works must be discussed with the project arboriculturist *before commencement* to ensure the most appropriate methods for the works are adopted and minimise impacts on the tree.
- Any pruning requirements must be discussed with the project arboriculturist *prior to commencing those works,* to ensure pruning is kept to the minimum required to facilitate site development.

5.3 Tree Protection

5.3.1 The Tree Protection is to be in accordance with the following:

- Tree Protection Devices (TPD) may include mulching, tree guards and other devices other than fencing.
- The TPD must be in place prior to any site works commencing, including clearing, demolition or grading.

- The most appropriate fencing for tree protection is 1.8m chainlink with 50mm metal pole supports. During installation, care must be taken to avoid damage to significant roots. The practicality of providing this fencing on this site must be addressed by the arboriculturist.
- Locate large primary roots by careful removal of soil within the fencing area. ***Do not drive any posts or pickets into tree roots.*** Replace soil back over tree roots.
- It is recommended that the arboriculturist provide written certification that the TPD is/are installed and will satisfy tree protection requirements.
- Nothing should occur inside the tree protection fenced areas, so therefore all access to personnel and machinery, storage of fuel, chemicals, cement or site sheds is prohibited.
- Signage should explain exclusion from the area defined by TPD and carry a contact name for access or advice (see Appendix E – Tree Protection Devices).
- The TPD cannot be removed, altered, or relocated without the project arborists' prior assessment and approval.

5.4 Arboricultural advice

5.4.1 Stockpiling and location of site sheds

- It is advised that any ground identified for proposed stockpiling that is within the TPZ of trees to be retained must be covered with thick, coarse mulch, placement of wooden pallets over the mulch, covering of the pallets with a tarpaulin (or similar,), and the placement of materials on top of this device to prevent for loose or potentially contaminating materials from moving into the soil profile.

5.4.2 Fill Material

- Placement of fill material within the TPZ of trees to be retained should be avoided where possible. Where placement of fill cannot be avoided, the material should be a coarse, gap graded material such as 20 — 50mm crushed basalt or equivalent to provide some aeration to the root zone. Note that roadbase or crushed sandstone or other material containing a high percentage of fines is unacceptable for this purpose.
- The fill material should be consolidated with a non-vibrating roller to minimise compaction of the underlying soil.
- A permeable geotextile may be used beneath the sub-base to prevent migration of the stone into the sub-grade. No fill material should be placed in direct contact with the trunk.

5.4.3 Fencing and walls within the SRZ and TPZ of retained trees.

- Where fencing and/or masonry walls are to be constructed along site boundaries, they must provide for the presence of any living woody tree roots greater than 50mm diameter.
- Hand digging must occur within the SRZ of trees to be retained.
- For masonry walls or fences it may be acceptable to delete continuous concrete strip footings and replace with suspended in-fill panels (e.g. steel or timber pickets, lattice etc) fixed to pillars.

5.4.4 Pavements

- Pavements should be avoided within the TPZ of trees to be retained where possible.
- Proposed paved areas within the TPZ of trees to be retained is to be placed above grade to minimise excavations within the root zone, avoiding root severance and damage.

5.4.5 Landscaping within tree root zones.

- The level of introduced planting media into any proposed landscaped areas within the TPZ is not to be greater than 75mm depth, and be of a coarse, sandy material to avoid development of soil layers that may impede water infiltration.
- Container size of proposed plants within the SRZ of trees should be determined prior to purchase of plants. This is to identify planting locations, and container size of plants at the time of planting. Otherwise, any proposed landscaping within the SRZ must consist of tubestock only. This is required to ensure that damage to tree roots is avoided.
- Mattocks and similar digging instruments must not be used within the TPZ of the trees. Planting holes should be dug carefully by hand with a garden trowel, or similar small tool.
- Where possible, do not plant canopy trees beneath, or within 6 - 8m of overheard power lines.

5.5 Post Construction Tree Care

5.5.1 Tree preservation requires a long-term commitment to monitoring and rectifying problems associated with trees.

- Mulching – removal of mulch after construction to remove any contaminants. Replacement with a good quality mulch and addition of 10% organic matter will improve beneficial soil micro-organisms, retain moisture and improve aeration and water infiltration.
- Irrigation – An arboriculturist should determine whether irrigation should be carried out during extended periods of drough
- Pest management – Monitoring is required as trees under stress are more prone to insect attack.
- Hazard Management – monitoring and management of the trees and routine re-assessment by a qualified arboriculturist is required for adequate long-term safety of residents

Report prepared by Catriona Mackenzie and Narayan David

May, 2016

Accredited member of
INSTITUTE OF AUSTRALIAN CONSULTING ARBORICULTURISTS ®

Australian Institute of Horticulture

Consulting arboriculturist, horticulturist and landscape designer.
International Society of Arboriculture Tree Risk Assessment Qualification (TRAQ) 2014
Certificate of Horticulture *Honours*
Diploma of Horticulture (Arboriculture) *Distinction*
Associate Diploma of Applied Science (Landscape) *Distinction*
Member of the Australian Institute of Horticulture
Member of the International Society of Arboriculture
Founding Member of the Institute of Australian Consulting Arboriculturists

Narayan David

Consulting arboriculturist and horticulturist.
Diploma of Horticulture 2012
Diploma of Arboriculture 2014

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APPENDIX A

TERMS AND DEFINITIONS

TERMS AND DEFINITIONS

The following relates to terms or abbreviations that may have been used in this report and provides the reader with a detailed explanation of those terms.

Aerial inspection Where the subject tree is climbed by a professional tree worker or arborist specifically to inspect and assess the upper stem and crown of the tree for signs or symptoms of defects, disease, etc.

Age classes

Y	*Young* refers to a well-established but juvenile tree
SM	*Semi-mature* refers to a tree at growth stages between immaturity and full size
EM	*Early-mature* refers to a tree that is more or less full sized and vigourously growing.
M	*Mature* refers to a full sized tree with some capacity for further growth
LM	*Late Mature* refers to a full sized tree with little capacity for growth, not yet about to enter decline
OM	*Over-mature* refers to a tree about to enter decline or already declining.

Condition refers to the tree's form and growth habit, as modified by its environment (aspect, suppression by other trees, soils) and the state of the scaffold (i.e. trunk and major branches), including structural defects such as cavities, crooked trunks or weak trunk/branch junctions. These are not directly connected with health and it is possible for a tree to be healthy but in poor condition.

Crown All the parts of a tree arising above the trunk where it terminates by its division forming branches, e.g. the branches, leaves, flowers and fruit: or the total amount of foliage supported by branches.

Deadwood refers to any whole limb that no longer contains living tissues (e.g. live leaves and/or bark). Some dead wood is common in a number of tree species.

Diameter at Breast Height (DBH) refers to the tree trunk diameter at breast height, i.e. measured at 1.4 m above ground level.

Epicormic Shoots which arise from adventitious or latent buds. These shoots often have a weak point of attachment. They are often a response to stress in the tree. Epicormic growth/shoots are generally a survival mechanism, often indicating the presence of a current, or past stress event such as fire, excessive pruning, drought, etc.

Health (syn. vigour) refers to the tree's vigour as exhibited by the crown density, leaf colour, presence of epicormic shoots, ability to withstand disease invasion, and the degree of dieback.

Impact Level Rating (ILR) refers to the estimated percentage of the Tree Protection Zone (TPZ) affected by development impacts. These figures may vary due to the specific conditions and constraints on a particular site, tree species tolerance to impacts, age, vigour, condition of the tree, etc.

-	0 – 1% of root zone impacted – ***no*** impact of significance
L	>1 to 10% of root zone impacted – ***low*** level of impact
L - M	>10 to 15% of root zone impacted – ***low to moderate*** level of impact
M	>15 to 20% of root zone impacted – ***moderate*** level of impact
M – H	>20 to 25% of root zone impacted – ***moderate to high*** level of impact
H	>25 to 35% of root zone impacted – ***high*** level of impact
S	>35% of root zone impacted – ***significant*** level of impact

Note: This is a general guide only. These figures may vary due to the specific conditions and constraints on a particular site, tree species tolerance to impacts, age, vigour, condition of the tree, etc.

Lean Where the tree's trunk grows or moves away from upright. A lean may occur anywhere along the trunk influenced by a number of contributing factors. A leaning tree may maintain a static lean or display an increasing, progressive lean over time. Slight lean = 0°–15°; Moderate lean = 15°–30°; Severe lean = 30°–45°; Critical lean = >45°.

Lopping Cutting between branch unions (not to branch collars), or at internodes on a tree, with the final cut leaving a stub. Lopping may result in dieback of the stub and can create infection courts for disease or pest attack.

Root Mapping The exploratory process of recording the location of roots usually in reference to a datum point where depth, root diameter, root orientation and distance from trunk to existing or proposed structures are measured. It may be slightly invasive (disturbs or displaces soil to locate but not damage roots, e.g. hand excavation, or use of air or water knife), or non-invasive (does not disturb soil, e.g. ground penetrating radar).

Structural Root Zone (SRZ) Refers to the radial distance in metres, measured from the centre of the tree stem, which defines the critical area required to maintain stability of the tree. Only thorough investigation into the location of structural roots within this area can identify whether any minor incursions into this protection zone are feasible. Note: The SRZ is calculated on the diameter measured immediately above the root/stem buttress (DAB). Where this measurement is not taken in the field, it is calculated by adding 12.5% to the stem diameter at breast height (DBH). Note: The SRZ may not be symmetrical in shape/area where there is existing obstruction or confinement to lateral root growth, e.g. structures such as walls, rocky outcrops, etc).

Suppressed In crown class, trees which have been overtopped, whose crown development is restricted from above.

Tree Protection Zone (TPZ). Refers to the radial distance in metres, measured from the centre of the tree stem which defines the *tree protection zone* for a tree to be retained. This is generally the minimum distance from the center of the tree trunk where protective fencing or barriers are to be installed to create an exclusion zone. The **TPZ** surrounding a tree aids the tree's ability to cope with disturbances associated with construction works. Tree protection involves minimising root damage that is caused by activities such as
construction. Tree protection also reduces the chance of a tree's decline in health or death and the possibly damage to structural stability of the tree from root damage.
To limit damage to the tree, protection within a specified distance of the tree's trunk must be maintained throughout the proposed development works. No excavation, stockpiling of building materials or the use of machinery is permitted within the TPZ. Note: In many circumstances the tree root zone does not occupy a symmetrically radial area from the trunk, but may be an irregular area due to the presence of obstructions to root spread or inhospitable growing conditions.

USEFUL LIFE EXPECTANCY (ULE) In a planning context, the time a tree can expect to be usefully retained is the most important long-term consideration. ULE i.e. a system designed to classify trees into a number of categories so that information regarding tree retention can be concisely communicated in a non-technical manner. ULE categories are easily verifiable by experienced personnel without great disparity. A tree's ULE category is the life expectancy of the tree modified first by its age, health, condition, safety and location (to give the life expectancy); then by economics (i.e. cost of maintenance - retaining trees at an excessive management cost is not normally acceptable); and finally, effects on better trees, and sustained amenity (i.e. establishing a range of age classes in a local population). ULE assessments are not static but may be modified as dictated by changes in tree health and environment. Trees with a short ULE may at present be making a contribution to the landscape, but their value to the local amenity will decrease rapidly towards the end of this period, prior to them being removed for safety or aesthetic reasons. For details of ULE categories see Appendix B, modified from Barrell 2001.

Vigour (syn. health) refers to the tree's health as exhibited by the crown density, leaf colour, presence of epicormic shoots, ability to withstand disease invasion, and the degree of dieback.

Watershoots Epicormic shoots growing from latent buds in older wood. Such shoots are vigourous, usually upright and arise above the ground, at a graft union, or from the trunk and lower branches.

Woody roots usually used in reference to the first order roots i.e. structural (anchor) roots and woody lateral roots within the Structural Root Zone. Damage, disturbance to, or severing of these roots can compromise the stability of the tree.

APPENDIX B

ULE CATEGORIES

Useful Life Expectancy (ULE) CATEGORIES (after Barrell 1996, updated 01/04/01)

The five categories and their sub-groups are as follows:

1. Long ULE - tree appeared retainable at the time of assessment for over 40 years with an acceptable degree of risk, assuming reasonable maintenance:

A. structurally sound trees located in positions that can accommodate future growth
B. trees which could be made suitable for long term retention by remedial care
C. trees of special significance which would warrant extraordinary efforts to secure their long term retention

2.Medium ULE - tree appeared to be retainable at the time of assessment for 15 to 40 years with an acceptable degree of risk, assuming reasonable maintenance:

A. trees which may only live from 15 to 40 years
B. trees which may live for more than 40 years but would be removed for safety or nuisance reasons
C. trees which may live for more than 40 years but would be removed to prevent interference with more suitable individuals or to provide space for new planting
D. trees which could be made suitable for retention in the medium term by remedial care

3. Short ULE - tree appeared to be retainable at the time of assessment for 5 to 15 years with an acceptable degree of risk, assuming reasonable maintenance:

A. trees which may only live from 5 to 15 years
B. trees which may live for more than 15 years but would be removed for safety or nuisance reasons
C. trees which may live for more than 15 years but would be removed to prevent interference with more suitable individuals or to provide space for new planting
D. trees which require substantial remediation and are only suitable for retention in the short term

4. Removal - trees which should be removed within the next 5 years

A. dead, dying, suppressed or declining trees
B. dangerous trees through instability or recent loss of adjacent trees
C. dangerous trees because of structural defects including cavities, decay, included bark, wounds or poor form.
D. damaged trees that are clearly not safe to retain.
E. trees which may live for more than 5 years but would be removed to prevent interference with more suitable individuals or to provide space for new planting.
F. trees which are damaging or may cause damage to existing structures within the next 5 years.
G. trees that will become dangerous after removal of other trees for the reasons given in (a) to (f).
H. trees in categories (a) to (g) that have a high wildlife habitat value and, with appropriate treatment, could be retained subject to regular review.

5. Small, young or regularly pruned - Trees that can be reliably moved or replaced.

A. small trees less than 5m in height.
B. young trees less than 15 years old but over 5m in height.
C. formal hedges and trees intended for regular pruning to artificially control growth.

APPENDIX C

SIGNIFICANCE OF A TREE ASSESSMENT RATING

Significance of a Tree, Assessment Rating System (STARS)©
(IACA 2010)©

In the development of this document IACA acknowledges the contribution and original concept of the Footprint Green Tree Significance & Retention Value Matrix, developed by Footprint Green Pty Ltd and Andrew Morton in June 2001.

The landscape significance of a tree is an essential criterion to establish the importance that a particular tree may have on a site. However, rating the significance of a tree becomes subjective and difficult to ascertain in a consistent and repetitive fashion due to assessor bias. It is therefore necessary to have a rating system utilising structured qualitative criteria to assist in determining the retention value for a tree.
This rating system will assist in the planning processes for proposed works, above and below ground where trees are to be retained on or adjacent a development site. The system uses a scale of *High*, *Medium* and *Low* significance in the landscape. Once the landscape significance and *Useful Life Expectancy*of an individual tree has been defined, the retention value can be determined.

Tree Significance - Assessment Criteria

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1. High Significance in landscape

- The tree is in good condition and good vigour;
- The tree has a form typical for the species;
- The tree is a remnant or is a planted locally indigenous specimen and/or is rare or uncommon in the local area or of botanical interest or of substantial age;
- The tree is listed as a Heritage Item, Threatened Species or part of an Endangered ecological community or listed on Councils significant Tree Register;
- The tree is visually prominent and visible from a considerable distance when viewed from most directions within the landscape due to its size and scale and makes a positive contribution to the local amenity;
- The tree supports social and cultural sentiments or spiritual associations, reflected by the broader population or community group or has commemorative values;
- The tree's growth is unrestricted by above and below ground influences, supporting its ability to reach dimensions typical for the taxa *in situ* - tree is appropriate to the site conditions.

2. Medium Significance in landscape

- The tree is in fair-good condition and good or low vigour;
- The tree has form typical or atypical of the species;
- The tree is a planted locally indigenous or a common species with its taxa commonly planted in the local area
- The tree is visible from surrounding properties, although not visually prominent as partially obstructed by other vegetation or buildings when viewed from the street,
- The tree provides a fair contribution to the visual character and amenity of the local area,
- The tree's growth is moderately restricted by above or below ground influences, reducing its ability to reach dimensions typical for the taxa *in situ*.

3. Low Significance in landscape

- The tree is in fair-poor condition and good or low vigour;
- The tree has form atypical of the species;
- The tree is not visible or is partly visible from surrounding properties as obstructed by other vegetation or buildings,
- The tree provides a minor contribution or has a negative impact on the visual character and amenity of the local area,
- The tree is a young specimen which may or may not have reached dimension to be protected by local Tree Preservation orders or similar protection mechanisms and can easily be replaced with a suitable specimen,
- The tree's growth is severely restricted by above or below ground influences, unlikely to reach dimensions typical for the taxa *in situ* - tree is inappropriate to the site conditions,
- The tree is listed as exempt under the provisions of the local Council Tree Preservation Order or similar protection mechanisms,
- The tree has a wound or defect that has potential to become structurally unsound.

Environmental Pest / Noxious Weed Species

- The tree is an Environmental Pest Species due to its invasiveness or poisonous/ allergenic properties,
- The tree is a declared noxious weed by legislation.

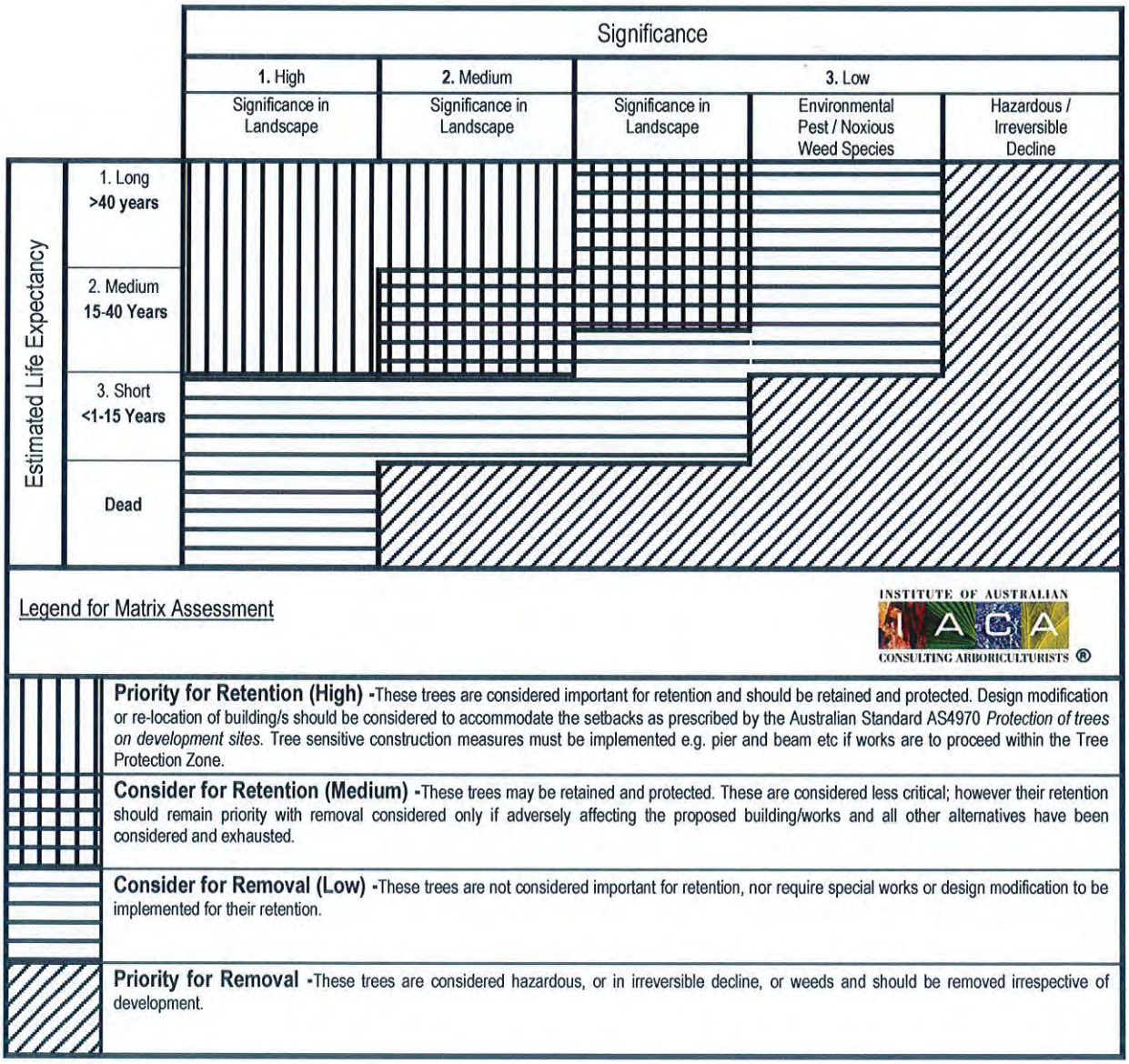
Hazardous/Irreversible Decline

- The tree is structurally unsound and/or unstable and is considered potentially dangerous,
- The tree is dead, or is in irreversible decline, or has the potential to fail or collapse in full or part in the immediate to short term.

The tree is to have a minimum of three (3) criteria in a category to be classified in that group.

Note: The assessment criteria are for individual trees only, however, can be applied to a monocultural stand in its entirety e.g. hedge.

Table 1 - Tree Retention Value - Priority Matrix.



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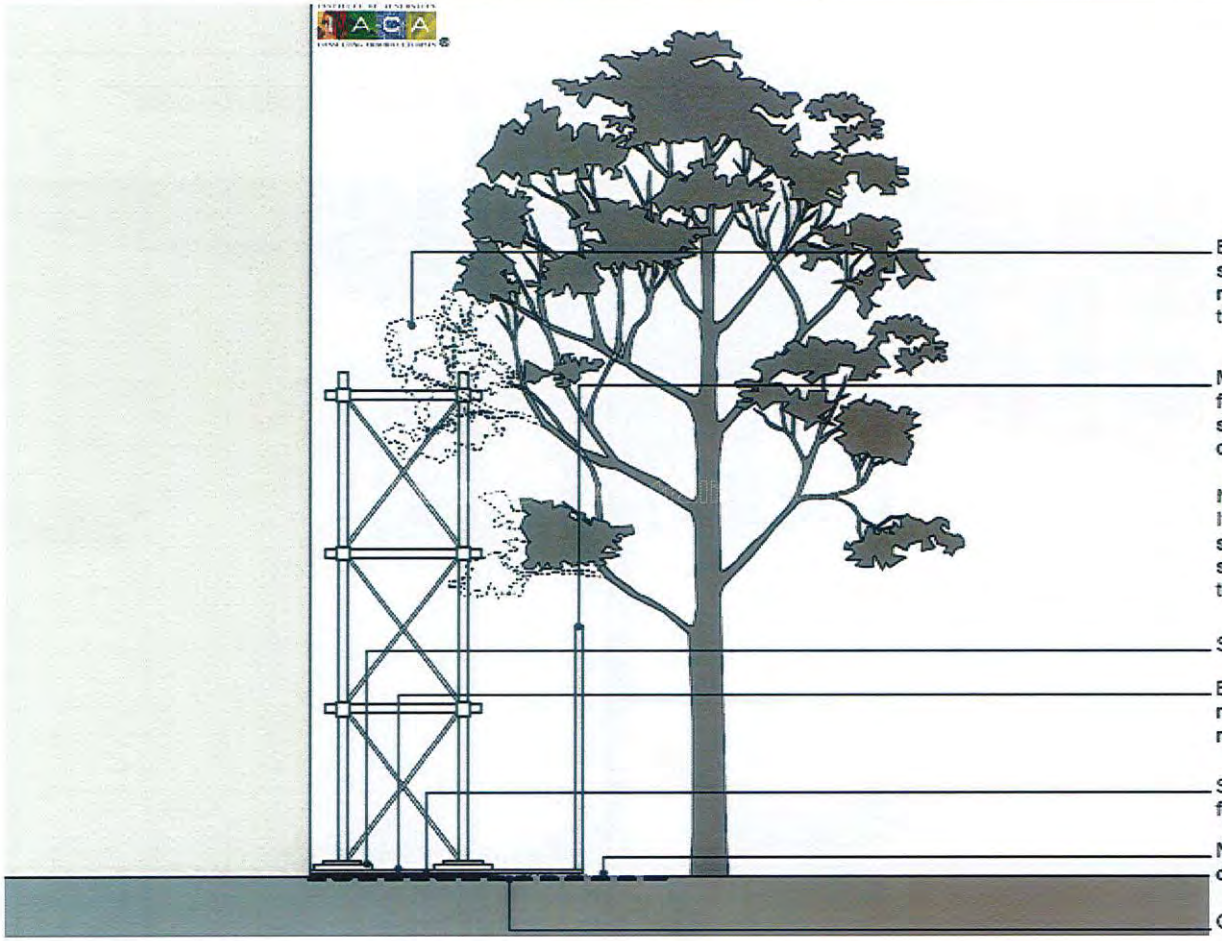
Footprint Green Pty Ltd 2001, *Footprint Green Tree Significance & Retention Value Matrix*, Avalon, NSW Australia, www.footprintgreen.com.au

APPENDIX D

TREE PROTECTION DEVICES

Figure 1



Branches may require pruning to erect scaffolding. Pruning may be subject to local regulations. Flexible branches should be tied back in preference to pruning.

Minimum 1.8m high hoarding. Temporary fencing may be incorporated into scaffolding as either containment screening or as hoarding.

Note:
If excavation is required for installation of support post for fencing, the Project Arborist should assess any pruning of roots greater than 20mm diameter.

Scaffold planks

Boards or plywood to be installed over mulch or aggregate layer for any areas requiring access within the TPZ.

Soleplate over geotextile. No excavation for soleplate within TPZ.

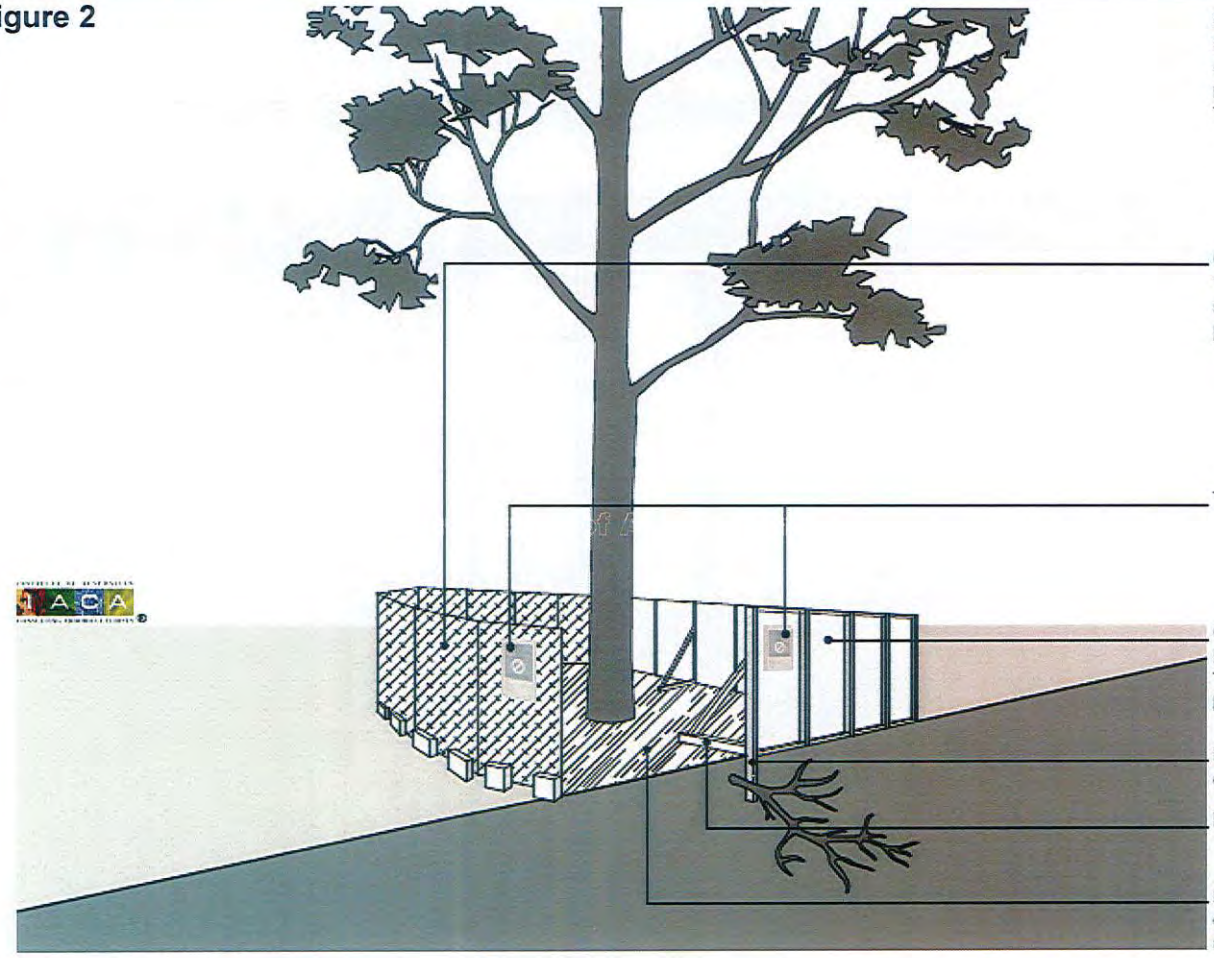
Maximum 100mm and minimum 50mm depth mulch or aggregate layer within TPZ.

Geotextile fabric

Indicative Scaffolding within a Tree Protection Zone (TPZ)

Not to Scale

Figure 2



Note:
No excavation, construction activity, grade changes, surface treatment or storage of materials of any kind is permitted within the TPZ.

Option 1 - Fencing
1.8m high chain wire mesh panels with shade cloth attached (if required), held in place with concrete feet.

Tree Protection Zone (TPZ) sign

Option 2 - Fencing
Plywood or wooden panel paling fence. This type of fencing material also prevents building materials or soil entering the TPZ.

Installation of supports should avoid damaging roots.

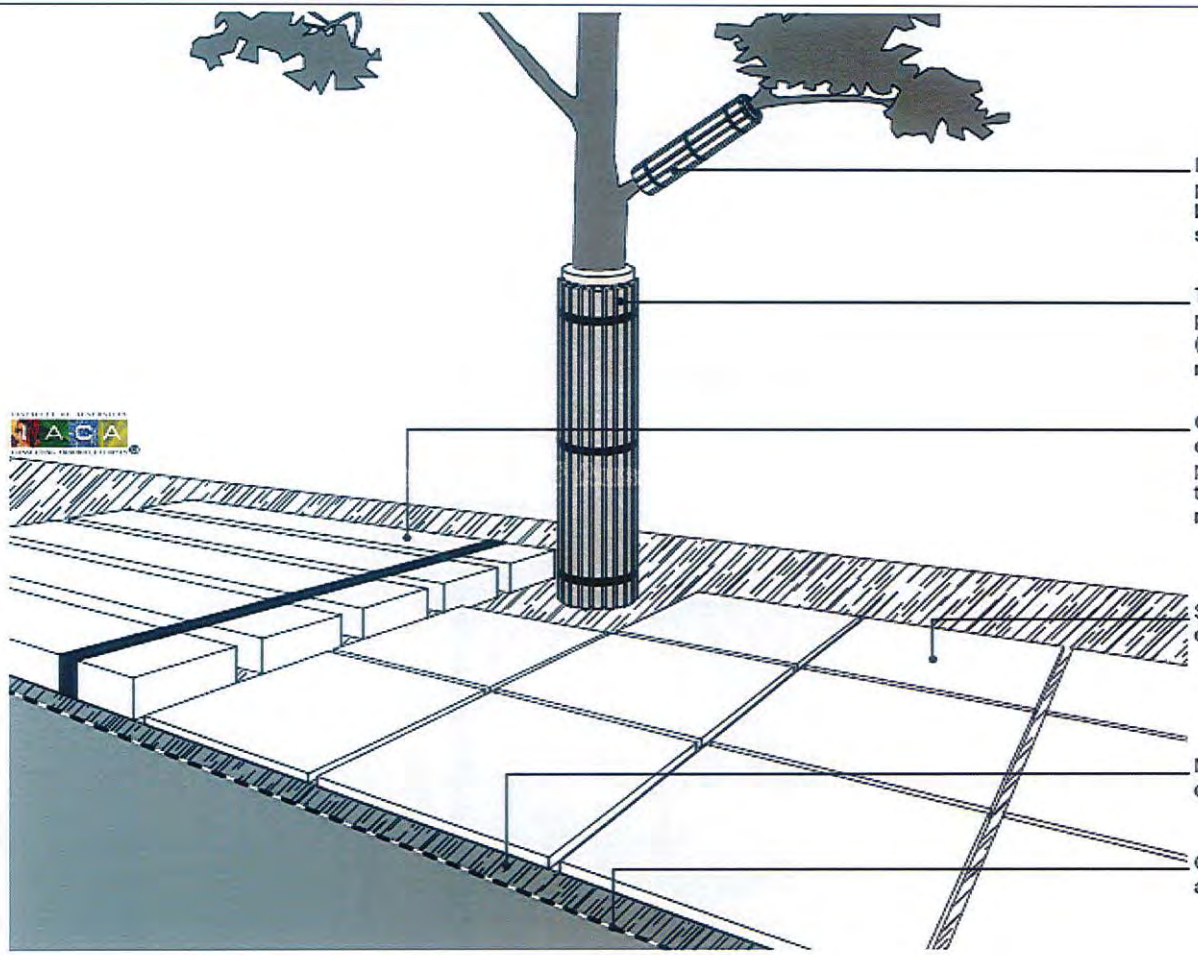
Bracing is permissible within the TPZ.

Maximum 100mm and minimum 50mm depth mulch or aggregate layer installed across surface of TPZ.

Tree Protection Fencing

Not to Scale

Figure 3



Branch Protection - use boards and padding to prevent damage to bark on branch. Boards are to be strapped, not screwed or nailed to the branch.

Trunk Protection - use boards and padding to prevent damage to bark (minimum 2m). Boards are to be strapped, not screwed or nailed to the trunk.

Ground Protection - use device strapped over mulch or aggregate layer. Ground protection device should be of a suitable thickness to prevent soil compaction and root damage.

Steel plates (or approved equivalent) with or without mulch or aggregate layer below.

Maximum 100mm and minimum 50mm depth mulch or aggregate layer.

Geotextile fabric underneath mulch or aggregate layer.

Examples of Branch, Trunk and Ground Protection

Not to Scale

Figure 4

Example of Tree Protection Zone (TPZ) Signage

Scale 1:5 @ A4

APPENDIX E

SCHEDULE OF ASSESSED TREES

Schedule of Assessed Trees – 101 Lilyfield Road, Lilyfield. May 2016.

Tree No.	*Genus & species* **Common Name**	Ht (m)	Sp (m)	DBH (mm)	Age	V	C	Comments and Recommendations	ULE	TSR	RV	SRZ (m)	TPZ (m)	TPZ (area)	ILR
1	*Archontophoenix alexandrae* **Alexandra Palm**	7.5	2	*200	SM	G	G	Introduced native species. On neighbouring property. No special problems visibly apparent at time of inspection.	2A	L	L	NA	2	10	0
2	*Tamarisk aphylla* **Tamarisk**	6	5	*100 + 150 (175)	M	F	F	Class 5 noxious weed. On neighbouring property. Limited inspection. Poor shape/asymmetrical crown. Damaged at base. Minor **deadwood** to 10%. Potential weed species.	3B	L	L	1.7	2.2	15	S
3	*Callistemon viminalis* **Weeping Bottlebrush**	8	6	*2 x 225, 150 (350)	M	F	G	Introduced native species. On neighbouring property. Limited inspection.	3A	L	L	2.3	4.2	55	S
4	*Eucalyptus saligna* **Sydney Blue Gum**	16	4	*250	SM	G	G	Introduced native species. On neighbouring property. Limited inspection. Root zone covered by pavements on east and west sides. Toilet block and services within **SRZ**.	2A	M	M	2.1	3.0	28	S
5	*Ficus rubiginosa* **Port Jackson Fig**	10	6	*500 + 600 (775)	M	G	F	Locally indigenous species. Growing on rock ledge with poor SRZ symmetry. Rubbing, crossing branches. Has previously been **lopped**. Minor insect damage to SE side of **crown**.	2B	H	M	3.1	9.3	272	NA
6	*Cinnamomum camphora* **Camphor Laurel**	8	4	500	M	P	P	Introduced exotic species. Identified as locally significant weed species in Leichhardt. Growing on rock ledge. Poor root plate symmetry. Lopped and multi-stemmed. Poor shape.	3B	L	L	2.7	6.0	113	NA
7	*Eucalyptus robusta* **Swamp Mahogany**	15	6	*400	SM	G	G?	Locally indigenous species. Outside property boundary—limited inspection. No special problems visibly apparent at time of inspection.	2A?	H?	H?	2.5	4.8	72	L
8	*Eucalyptus robusta* **Swamp Mahogany**	15	5	*350	SM	G	G?	Locally indigenous species. Outside property boundary—limited inspection. No special problems visibly apparent at time of inspection.	2A?	H?	H?	2.3	4.2	55	S
9	*Eucalyptus robusta* **Swamp Mahogany.**	7	3.5	300@ base (275)	SM	G	F	Locally indigenous species. Poor habit and form. Previously lopped near GL.	3B	L	L	2	3.3	35	NA

Tree No.	*Genus & species* **Common Name**	Ht (m)	Sp (m)	DBH (mm)	Age	V	C	Comments and Recommendations	ULE	TSR	RV	SRZ (m)	TPZ (m)	TPZ (area)	ILR
10	*Jacaranda mimosifolia* **Jacaranda**	6.5	5	100, 125, 150, (225)	SM	F	P	Introduced exotic species. Multi-stemmed, **watershoots**. **Suppressed**, etc.	3C	L	L	1.9	2.7	23	NA
11	*Howea forsteriana* **Kentia Palm**	4	3	150	SM	F	G	Introduced native species. Non-prescribed tree (i.e. <6m high <200mm DBH).	5A	L	L	NA	2.5	19	NA
12	*Eucalyptus ?leucoxylon* 'Rosea' **Pink-flowered Yellow Gum**	12	9	200 + 300 (375)	SM	G	G	Introduced native species. Slight suppression.	2A	M	M	2.3	4.5	64	NA
13	*Grevillea robusta* **Silky Oak**	12	6	375	SM	G	F	Introduced native species. Asymmetrical crown due to shading/competition from other trees.	2D	M	M	2.4	4.5	64	0
14	*Eucalyptus sideroxylon* **Red Ironbark**	20	10	600	M	P	F	Introduced native species. Very sparse crown. Minor Ø deadwood. No special problems visibly apparent at time of inspection.	3D	H	L	2.8	7.2	163	L-M
15	*Eucalyptus nicholii* **Narrow-leaved Black Peppermint**	20	6	600	M	F	F	Introduced native species. Minor deadwood. 10% **epicormic** growth. Large Ø branch facing NW over adjoining property.	3A	H	M	2.8	7.2	163	NA
16	*Eucalyptus sideroxylon* **Red Ironbark**	15	8	400	M	G	F	Introduced native species. Growing on **lean** to E. Asymmetrical crown biased to E.	2A	M	M	2.5	4.8	72	NA
17	*Olea europaea* subsp. *cuspidata* **African Olive**	10	4	275 @ base	SM	G	F	Weed species of local significance due to its ease of dispersal and establishment in parks, reserves, bushland, etc.	3C	L	L	2	3	28	NA
18	*Pinus radiata* **Monterey Pine**	12	3	275	SM	F	F	Introduced exotic species.	2C	M	M	2.1	3.3	35	NA
19	*Casuarina cunninghamiana* **River She-oak**	12	4	225	SM	F	F?	Introduced native species. Ivy up stems & difficult to see if any structural issues present.	2A?	M	M?	1.9	2.7	23	NA
20	*Casuarina cunninghamiana* **River She-oak**	14	4	100 + 175 (225)	SM	F	F?	Introduced native species. Ivy up stems & difficult to see if any structural issues present.	2A?	M	M?	1.8	2.4	18	NA
21	*Casuarina cunninghamiana* **River She-oak**	12	3	300	SM	F	F?	Introduced native species. Ivy up stems & difficult to see if any structural issues present.	2A?	M	M?	2.2	3.6	41	NA

Tree No.	*Genus & species* **Common Name**	Ht (m)	Sp (m)	DBH (mm)	Age	V	C	Comments and Recommendations	ULE	TSR	RV	SRZ (m)	TPZ (m)	TPZ (area)	ILR
22	*Jacaranda mimosifolia* **Jacaranda**	5	4	150 + 300 (325)	SM	F	P	Introduced exotic species. Very poor shape and form due to overcrowding, competition, etc.	3B	L	L	2.2	3.9	48	NA
23	*Prunus* sp. **Peach**	13	8	*600 @ base	M	F	F?	Introduced exotic species. Within neighbouring property. Limited inspection. Has been lopped. Does not overhang site.	3D?	L	L	2.6	6.4	129	0

KEY

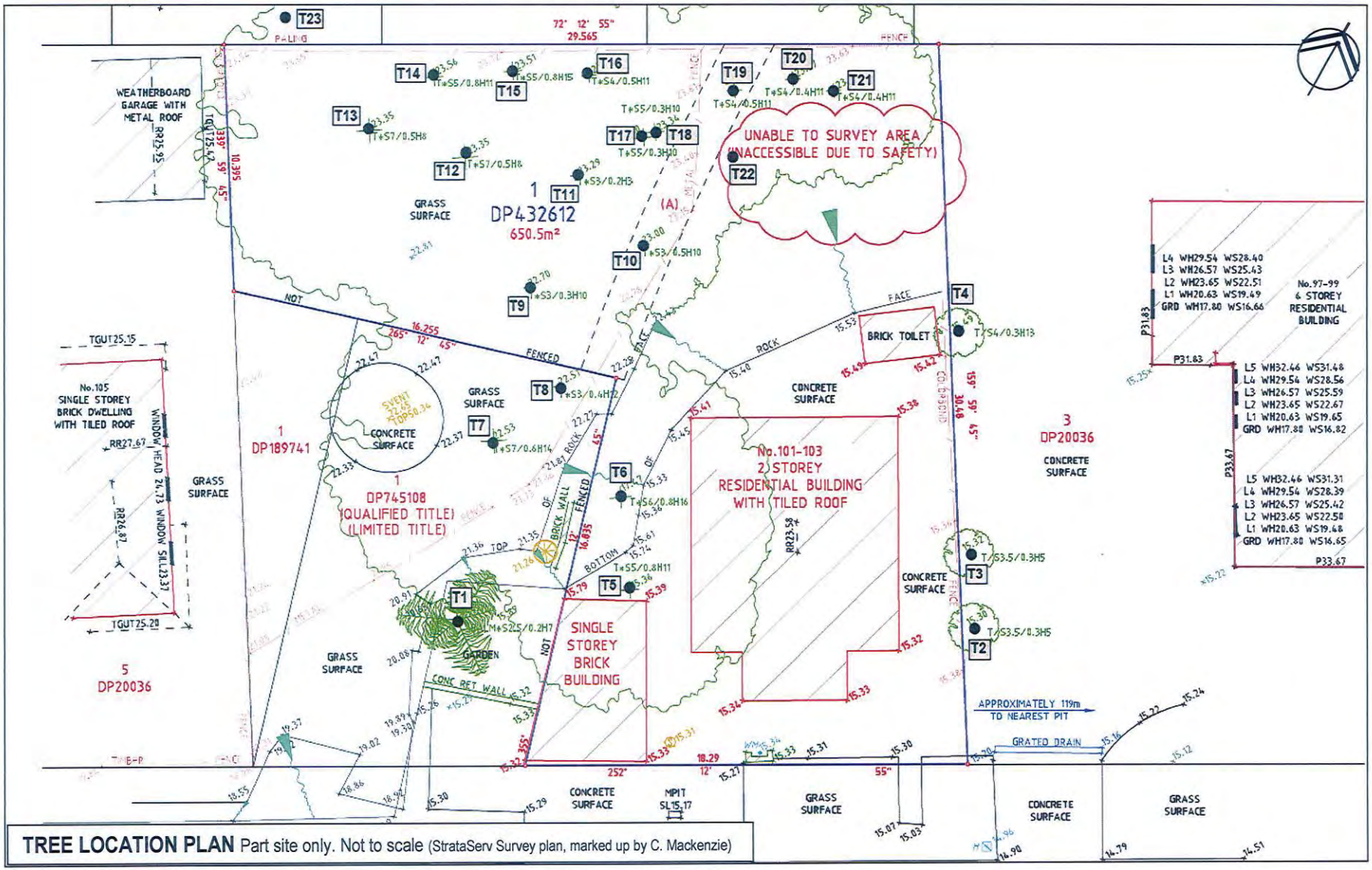
##	Tree to be retained.
##	Dead or non-prescribed tree or palm on site that may be removed or retained without Development Consent or Tree Management Permit.
##	Trees proposed to be removed.
L	Low Retention Value-These trees are not considered important for retention.
M	Medium Retention Value-These trees may be retained and protected.
H	High Retention Value -These trees are considered important for retention and should be retained and protected

* DBH is visually estimated (usually adjoining trees or those that are hard to access). AB – above *buttress*. AGL - above ground level.

H refers to the approximate height of a tree in metres, from base of stem to top of tree crown.
Sp refers to the approximate and average spread in metres of branches/canopy (the 'crown') of a tree.
DBH refers to the approximate diameter of tree stem at breast height i.e. 1.4 metres above ground (unless otherwise noted), and expressed in millimetres.
Age refer to Appendix A -Terms and Definitions for more detail.
V refers to the tree's vigour (health) Refer to Appendix A -Terms and Definitions for more detail.
C refers to the tree's structural condition. Refer to Appendix A -Terms and Definitions for more detail.
ULE refers to the estimated *Useful Life Expectancy* of a tree. Refer to Appendices A and B for details.
TSR The *Tree Significance Rating* considers the importance of the tree as a result of its prominence in the landscape and its amenity value, from the point of public benefit. Refer to Appendix C – Significance of a Tree Assessment Rating for more detail.
RV Refers to the retention value of a tree, based on the tree's ULE *and* Tree Significance. Refer to Appendix C – Significance of a Tree Assessment Rating for more detail.
SRZ Structural Root Zone (SRZ) refers to the critical area required to maintain stability of the tree. Refer to Appendix A -Terms and Definitions for more detail.
TPZ Tree Protection Zone (TPZ) refers to the *tree protection zones* for trees to be retained. Refer to Appendix A -Terms and Definitions for more detail.
ILR Impact Level rating. Refer to Appendix A -Terms and Definitions for more detail.

APPENDIX F

TREE LOCATION PLAN



TREE LOCATION PLAN Part site only. Not to scale (StrataServ Survey plan, marked up by C. Mackenzie)

Appendix G – Correspondence from AUSFLOW Pty Ltd

Ausflow Pty Ltd.
ABN: 86 097 766 428
Level 1, Unit 3, 323a Darling St,
Balmain NSW 2041
T (02) 9555 7979 F: (02) 9555 8289
Email: info@ausflowsydney.com.au
Web: www.ausflowsydney.com.au

AUSFLOW PTY LTD
A satellite office of
MGP Building & Infrastructure Services Pty Ltd
ABN: 11 156 378 442
Licensed Water Servicing Coordinators for Sydney Water

Date: 20-04-2016

Attention: Remolo Nigro
Ozzy States Pty Ltd
PO Box 1791
Rozelle NSW 2039

Dear Remolo,

Re: 101 Lilyfield Road, Lilyfield

This letter is to confirm as per our discussion, Sydney Water may or may not approve development works for the above-mentioned project.

Sydney Water will only assess this once a DA is approved and a formal application is made to them for a Section 73 Certificate and Building Plan Approval.

It would be beneficial for Council to Condition this in the DA approval rather than request for Sydney Water to make or provide an assessment at such a preliminary stage.

The relevant applications will be submitted to Sydney Water once appropriate council approvals have been obtained, however we are aware that these Sydney Water items may take some time to be resolved.

Should you require any further information regarding the above or this project, please do not hesitate to contact our office on (02) 9555 7979.

Kind regards,

Jeanette Russo-Nunez
Project Manager
AUSFLOW PTY LTD
(C/o MGP Building & Infrastructure Services)