10 April 2022

City of Camden
70 Central Avenue,
Oran Park NSW 2570

Dear Sir/Madam,

Addendum SEE – Swadling Developments Pty Limited v The Council of Camden

I refer to the matter between Swadling Developments Pty Ltd and Council of Camden (Case Number 2021/00275052 and the Statement of Facts and Contentions (S0FAC) signed and filed with the Land and Environment Court on 3 November 2021.

This Addendum Statement of Environmental Effects (SEE) has been prepared in direct response to Council's SOFAC. This addendum SEE should be read in conjunction with the original SEE submitted with the Development Application (DA) and the amended package of documents.

The DA as amended, proposes:

- the demolition of existing structures,
- A Torrens title subdivision creating 27 Residential Lots ranging in size from 336m2 – 1207m2;
- A 1 drainage reserve (Proposed Lot 115);
- A 1 lot for road widening (Proposed Lot 116); and
- Road construction, drainage infrastructure, other associated works including restrictions and building envelope plans as needed.

The subject site is legally described as Lot 1 in DP 542867 and is known as 156 Macarthur Road, Spring Farm

The DA has been amended to address Council's Statement of Facts and Contentions and:

- Meets the current objectives of the SEPP, LEP and DCP where applicable;

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- Will not result in adverse impacts on surrounding land uses and environment; and
- Provides a development that responds to the unique and specific characteristics of the site including existing trees and vegetation and nearby heritage items.

The following sets out the specific contention and specifies how the amended design addresses specific contentions.

1.0 Contention 5 – Consistency with Subdivision Controls under CDCP

The Proposal is not consistent with the general subdivision controls in Chapter 2.3 of CDCP

Particulars

a. The proposal is inconsistent with the following objectives under Subsection 3.2.1 of the CDCP

(a) Manage subdivision throughout the Camden LGA to ensure sense of place is maintained by ensuring that development density and scale are in harmony with the existing or planned character of places;

(b) Ensure minimal adverse impacts on environmental systems; and

(c) Consider any building and/or land of heritage significance being present on, adjacent or in proximity to the site.

Comment:

The application has been amended to:

- Provide for a central road through the middle of the site, with lots either side of the road, and the reduction in filling of the land minimising the use of retaining walls and retaining all significant vegetation on the boundaries of the site.
- Larger lots to Macarthur Road with no build zones allowing for planting of vegetation to ensure that the proposed subdivision is in "harmony" with adjoining sites.

These changes along minimise impacts on nearby properties including heritage items, minimises impacts on existing vegetation and providing opportunities for new vegetation, and providing for modest residential lots that are in keeping with the local area.

b. Control 1 in subsection 3.2.1 of the CDCP states that "subdivision design must take into consideration existing site attributes and be generally consistent and compatible with the existing/approved subdivision pattern of the surrounding area."

Comment:

As detailed above, the application has been amended which results in a subdivision as amended that takes into consideration the existing attributes (trees and heritage items) that will result in a subdivision that is consistent and compatible with the existing / approved subdivisions patterns of the surrounding area.

c. *The proposed development does not take into account the existing site attributes with regard to heritage and flood risk.*

Comment:
As detailed above, the amended design has taken into account the existing site attributes, namely heritage and flood risk.

In respect of heritage, the subdivision layout has been amended, allowing for the retention of existing trees, and larger setbacks to the Macarthur Road provides opportunities for providing new vegetation providing a transition to the existing heritage items.

In respect of flooding, the applicant has amended the subdivision to take into consideration the flood affectation and all residential lots sit have suitable areas for the construction of dwellings above the Floor Planning Level, along with providing a stormwater design that addresses the flooding constraints.

2.0 Contention 6 – Consistency with Street Network Controls under DCP

The Proposal is not consistent with the additional controls for street networks within urban release areas in Subsection 3.2.5 of the CDCP.

Particulars

a. *Control 1 in Subsection 3.2.5 of the CDCP states that "the street network should be designed generally in accordance with the indicative master plan that applies to each urban release area. Where a variation to the indicative master plan is sought, or where a new urban release area is being designed, the street network must be designed to achieve the identified principles"*

b. *The master plan does not identify a street network on the subject site.*

c. *In the absence of any identified street network under the master plan, the proposed development fails to identify the principles in Control 1, which include:*
   - *(a) establish a permeable network that is based on a modified grid system but limits*
   - *(b) four-way intersections.*
   - *(c) encourage walking and cycling and reduce travel distances.*
   - *(d) maximise connectivity between residential areas and community facilities, open space and centres.*
   - *(e) take account of topography and accommodate significant vegetation.*
   - *(f) optimise solar access opportunities for dwellings.*
   - *(g) provide frontage to and maximise surveillance of open space and riparian corridors.*

(h) provide views and vistas to landscape features and visual connections to centres and centres.

(i) maximise the use of water sensitive urban design measures.

(j) minimise the use of cul-de-sac. If required, the maximum number of dwellings to be served by the head of a cul-de-sac is 6 and the maximum number of overall dwellings to be served by the cul-de-sac is 12.

d. The proposed development does not identify the principle under Control 1. Specifically, it does not

I. take account of topography (due to the significant quantum of fill proposed onsite and required on adjoining property);

II. accommodate significant vegetation (noted through the removal of 70 trees and the anticipated removal of numerous trees on the adjoining site due to the earthworks required to tie in);

III. maximise surveillance of open space (i.e. basin, due to the proposed retaining walls);

IV. maximise the use of water sensitive urban design measures

e. Concerns remain with regard to the impact that the proposed road and earthworks would have on the heritage value of the culturally significant places in proximity to the subject Site

Comment:

As detailed in particular (b) there is no specific street network on the subject site identified in the masterplan for Spring Farm.

The design has been amended to satisfy control 1, in that:

- The proposed development provides an opportunity for a permeable network should adjoining properties decide to develop into the future;
- Takes into account topography and significant vegetation;
- Optimizes solar access opportunities for dwelling;
- Retains existing landscape features; and
- Maximises the use of water sensitive urban design measures.

It is considered that the amended DA satisfies the DCP and the amended street network takes into consideration the constraints and opportunities of the site to produce a street design that satisfies the clause.

3.0 Contention 7 – Precinct Specific Provisions under DCP

The Proposal is not consistent with the precinct specific provisions in Schedule 2 to the CDCP 2019.

Particulars:

a. *Control 1 in Subsection S2.2.1 of CDCP 2019 specifies that "the master plans adopts a typical block of 60m in the traditional subdivision areas, and 50m in the small lot and medium density areas. Typically, the block length is in the order of 150m – ranging from 75m minimum and 200m maximum. This strikes a balance between the need to achieve high accessibility by having shorter block length, with extra cost and land consumption of having more roads. The maximum length of the block is governed by the need to make neighbourhoods accessible as well as to provide visual breaks to add interest to the streetscape. Perimeter blocks can be longer if the street curves, as this itself adds interest and variety".*

b. *The anticipated depth would be approximately 45m to 72m. The block length is approximately 225m (including verges).*

c. *The Applicant has not demonstrated how Control 1 of the CDCP is satisfied.*

Comment:

The application has been amended with the road layout amended incorporating a central road with residential lots located on either side of the central road.

The design has been amended to satisfy control 1, in that:

- The proposed development provides an opportunity for a permeable network should adjoining properties decide to develop into the future;
- Takes into account topography and significant vegetation;
- Optimizes solar access opportunities for dwelling;
- Retains existing landscape features; and
- Maximises the use of water sensitive urban design measures.

It is considered that the amended DA satisfies the DCP and the amended street network takes into consideration the constraints and opportunities of the site to produce a street design that satisfies the clause.

4.0 Contention 8 – SREP No. 20 - Hawkesbury-Nepean River (Strategies)

The development is inconsistent with the Sydney Regional Environmental Plan No. 20 – Hawkesbury-Nepean River.

Particulars:

a. *The proposal does not adequately address Clause 6(4) of the SREP in that the proposal is unsatisfactory with regard to recommended strategies relating to water quality as insufficient information has been provided to demonstrate that the amount of stormwater run-off and the rate at which it leaves the site does not increase in a storm event as a result of development;*

Comment:
The application has been amended to provide improved water quality strategies that are sufficient to demonstrate that the amount of run-off and the rate at which it leaves is addressed.

In this regard updated Stormwater information has been provided by Beveridge Williams.

b. *The proposal does not adequately address Clause 6(5) of the SREP in that the proposal is unsatisfactory with regard to recommended strategies relating to cultural heritage as the proposed development does not facilitate the conservation of heritage; and*

Comment:
The application has been amended to retain existing trees at the edge of the site, with restrictive covenants proposed creating "no build" zones adjacent to these trees, this is supported with detailed arborist feedback.

In addition, a large front setback to Macarthur Road has been proposed with detailed landscaping to ensure that the proposed subdivision provides a transition to heritage items nearby.

c. *The proposal does not adequately address Clause 6(7) in that the proposal is unsatisfactory with regard to recommended strategies relating to riverine scenic quality, as the proposed earthworks and retaining walls will adversely impact the landscape character and the maintenance of areas of extensive and prominent vegetation.*

Comment:
The application has been amended to ensure that earthworks across the site is minimised to ensure that retaining walls are not required, particularly adjacent to existing trees and the rear of residential lots.

The proposed development as amended results in a development that enhances the landscape character with the retention of existing significant vegetation on the edge of the subject site, along with providing new landscaping along both Macarthur Road and the edge of the rural zone.

5.0 Contention 13 – Planning

Insufficient information has been provided to carry out a thorough assessment of the Development Application.

Particulars:

a. *A Satisfactory Arrangements Certificate (SAC) is required from the Department of Planning, Industry and Environment, and has not been provided by the applicant. Council did not seek a SAC, as it was not satisfied with the proposed plan of subdivision, which is included as an attachment to the certificates signed by the Deputy Secretary.*

Comment:

The applicant is in discussions with the Department of Planning, Industry and Environment and will be addressed under separate cover**.**

b. Details are required to demonstrate that the minimum distance between each step of the proposed terraced retaining walls retaining walls is 1 metre.

Comment:

As detailed throughout this addendum SEE, the use of retaining walls has been minimised and is no longer required as part of the residential subdivision. Low retaining walls are contained within the basin as detailed in the civil plans, with maximum height shown of 500mm and made of sandstone.

c. Details are required demonstrating how Control 1 of 3.2.5 of the CDCP (Additional Controls for Street Network with Urban Release Areas) is satisfied in respect to identifying the principles.

Comment:

The amended design has been designed to be satisfy control 1 of Clause 3.2.5, in that:

- The proposed development provides an opportunity for a permeable network should adjoining properties decide to develop into the future;
- Takes into account topography and significant vegetation;
- Optimizes solar access opportunities for dwelling;
- Retains existing landscape features; and
- Maximises the use of water sensitive urban design measures.

d. Details are required demonstrating how Control 1 of Schedule 2, S2.2.1 of the CDCP (Neighbourhood and Subdivision Design) is satisfied relating to block width and depth.

Comment:

The application has been amended and satisfies Control 1 of Schedule 2, S2.2.1 relating to block width and depth. The subdivision now proposes a central road with residential lots located either side of the central road.

e. Detail are required demonstrating how SREP 20 is satisfied regarding:

I. Clause 6(4) – Water Quality,

II. Clause 6(5) - Cultural Heritage; and

III. Cluse 6(7) – Riverine Scenic Qualities.

Comment:

This particular is addressed in Section 4 of this Addendum SEE where Contention 8 is addressed.

6.0 Conclusion

Having regard to the above, and in light of the relevant heads of consideration listed under Section 4.15 of the Environmental Planning and Assessment Act, 1979 the proposal is considered acceptable and worthy of approval.

Should you wish to discuss any of the details of this response please do not hesitate to contact Jeremy on 9690 0279 or jeremy@theplanninghub.com.au.

Yours sincerely,

Jeremy Swan
DIRECTOR | THEPLANNINGHUB

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Arboricultural Impact Assessment Report

Site Location:
156 MacArthur Road Spring Farm NSW

Prepared for:
Swadling Developments c/o Shaw Reynolds Lawyers

Prepared by: Jack Williams
Urban Arbor Pty Ltd
Ref: 220317_ 156 MacArthur Rd_AIA
Date prepared: 17 March 2022 - Revision 3

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1. INTRODUCTION

1.1 Urban Arbor have been instructed by Shaw Reynolds Lawyers, on behalf of Swadling Developments, to provide an Arboricultural Impact Assessment Report for trees located at the site and adjoining neighbouring sites in relation to a proposed subdivision.

1.2 Below is a list of all documents and information provided for assessment in this report;

A) Plan of Proposed Subdivision, John M. Daly & Associates Pty Ltd, Issue G - 2 March 2022.

B) Civil Engineering Plans, Beveridge Williams, Issue E - 9 March 2022.

1.3 The site and tree inspections were carried out on 3 December 2020. Access was available to the subject site (with the exception of the walled rear garden at the rear of the existing dwelling) and adjoining public areas only.

2. SCOPE OF THE REPORT

2.1 This report has been undertaken to meet the following objectives.

2.1.1 Conduct a ground level visual assessment of all significant trees located within 10 metres of proposed development works. For the purpose of this report, a significant tree is a tree with a height equal to or greater than 5 metres.

2.1.2 Determine the trees estimated contribution years and remaining useful life expectancy and award the trees a retention value.

2.1.3 Provide an assessment of the potential impact the proposed development is likely to cause to the condition of the subject trees in accordance with AS4970 Protection of trees on development sites (2009). The development works assessed in this report includes the potential impact of development works within the building envelopes with each and proposed civil works.

2.1.4 Specify tree protection measures in accordance with AS4970-2009 for any tree to be retained during the development.

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3. LIMITATIONS

3.1 The observations and recommendations are based on the site inspections identified in section 1 only. The findings of this report are based on the observations and site conditions at the time of inspection.

3.2 All of the observations were carried out from ground level. The accuracy of the assessment of the subject trees structural condition and health is limited to the visibility of the tree at the time of inspection.

3.3 The tree inspection was visual from ground level only. No soil or tissue testing was carried out as part of the tree inspection. None of the surrounding surfaces adjacent to trees were lifted or removed during the tree inspections.

3.4 Root decay can sometimes be present with no visual indication above ground. It is also impossible to know the extent of any root damage caused by mechanical damage such as underground root cutting during the installation of services without undertaking detailed root investigation. Any form of tree failure due to these activities is beyond the scope of this assessment.

3.5 The report reflects the subject tree(s) as found on the day of inspection. Any changes to the growing environment of the subject tree, or tree management works beyond those recommended in this report may alter the findings of the report. There is no warranty, expressed or implied, that problems or deficiencies relating to the subject tree, or subject site may not arise in the future.

3.6 Tree identification is based on accessible visual characteristics at the time of inspection. As key identifying features are not always available the accuracy of identification is not guaranteed. Where tree species is unknown, it is indicated with an *spp*.

3.7 All diagrams, plans and photographs included in this report are visual aids only and are not to scale unless otherwise indicated.

3.8 Alteration of this report invalidates the entire report.

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4. METHODOLOGY

4.1 The following information was collected during the assessment of the subject tree(s).

4.1.1 Tree common name
4.1.2 Tree botanical name
4.1.3 Tree age class
4.1.4 DBH (Trunk/Stem diameter at breast height/1.4m) - millimetres.
4.1.5 Estimated height - metres
4.1.6 Estimated crown spread (diameter of crown) - metres
4.1.7 Health
4.1.8 Structural condition
4.1.1 Amenity value
4.1.2 Estimated remaining contribution years (SULE)[1]
4.1.3 Retention value (Tree AZ)[2]
4.1.4 Notes/comments

4.2 An assessment of the trees condition was made using the visual tree assessment (VTA) model (Mattheck & Breloer, 1994).[3]

4.3 Tree diameter was measured using a DBH tape or in some cases estimated. Tree height and tree canopy spread was measured with a clinometer or in some cases estimated. All other measurements were estimations unless otherwise stated. The other tools used during the assessment were a nylon mallet, compass, camera, and a steel probe.

4.4 All information was imported into our computerised geographical information system (GIS) PT-mapper pro. This software was used to measure/calculate all encroachment estimates included in this report.

4.5 All DBH measurements, tree protection zones, and structural root zones were calculated in accordance with methods set out in AS4970 Protection of trees on development sites (2009).[4]

4.6 Details of how the observations in this report have been assessed are listed in the appendices.

[1] Barrell, J. (2001), *'SULE: Its use and status in the new millennium' in Management of Mature Trees proceedings of the 4th NAAA Workshop*, Sydney, 2001. Barrell.

[2] Barrell Tree Consultancy, *Tree AZ version 10.10-ANZ*, http://www.treeaz.com/.

[3] Mattheck, C. & Breloer, H., *The body language of trees - A handbook for failure analysis*, The Stationary Office, London, England (1994).

[4] Council Of Standards Australia, *AS4970 Protection of trees on development sites* (2009).

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5. SITE LOCATION AND BRIEF DESCRIPTION OF DEVELOPMENT WORKS ASSESSED

5.1 The site is located in the suburb of Spring Farm, New South Wales, which is located in the Camden Council area. All trees at the site are subject to protection under the Camden Local Environmental Plan (LEP) 2010[5] and Development Control Plan (DCP) 2019.[6] The site is not located inside a Heritage Conservation Area or identified as a heritage item in the LEP heritage maps.[7]

5.2 The development works assessed in this report include the potential impact of development works within the building envelopes and proposed civil works.

5.3 Access was available to the subject site, with the exception of the walled rear garden at the rear of the existing dwelling and adjoining public areas only. The trunk diameter of all trees within the walled garden area have been estimated. The trunk diameter of all trees located in adjoining sites have been estimated.

6. GENERAL INFORMATION IN RELATION TO PROTECTING TREES ON DEVELOPMENT SITES

6.1 **Tree protection zone (TPZ):** The TPZ is the principle means of protecting trees on development sites and is an area required to maintain the viability of trees during development. It is commonly observed that tree roots will extend significantly further than the indicative TPZ, however the TPZ is an area identified in AS4970-2009 to be the area where root loss or disturbance will generally impact the viability of the tree. The TPZ is identified as a restricted area to prevent damage to trees either above or below ground during a development. Where trees are intended to be retained proposed developments must provide an adequate TPZ around trees. The TPZ is set aside for the tree's root zone, trunk and crown and it is essential for the stability and longevity of the tree. The TPZ also incorporates the SRZ (see below for more information about the SRZ). The TPZ is calculated by multiplying the DBH by twelve, with the exception of palms, other monocots, cycads, and tree ferns, the TPZ of which have been calculated at one metre outside the crown projection. Additional information about the TPZ is included in appendix 3.

[5] *Camden Local Environmental Plan 2010,* https://legislation.nsw.gov.au/view/whole/html/inforce/2012-04-05/epi-2010-0514, accessed 2 December 2020.

[6] *Camden Development Control Plan 2019,* https://dcp.camden.nsw.gov.au, accessed 2 December 2020.

[7] *Camden LEP Heritage Maps - Sheet Her_009*, https://legislation.nsw.gov.au/view/pdf/map/c6440e6b-4f66-4dc5-838f-d40eb131b398, accessed 2 December 2020.

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6.2 **Structural Root Zone (SRZ):** This is the area around the base of a tree required for the trees stability in the ground. An area larger than the SRZ always needs to be maintained to preserve a viable tree. The SRZ is calculated using the following formula; (DAB x 50) $^{0.42}$ x 0.64. There are several factors that can vary the SRZ which include height, crown area, soil type and soil moisture. It can also be influenced by other factors such as natural or built structures. Generally, work within the SRZ should be avoided. Soil level changes should also generally be avoided inside the SRZ of trees to be retained. Palms, other monocots, cycads, and tree ferns do not have an SRZ. See the appendices for more information about the SRZ.

6.3 **Minor encroachment into TPZ:** Sometimes encroachment into the TPZ is unavoidable. Encroachment includes but is not limited to activities such as excavation, compacted fill, and machine trenching. Minor encroachment of up to 10% of the overall TPZ area is normally considered acceptable, providing there is space adjacent to the TPZ for the tree to compensate and the tree is displaying adequate vigour/health to tolerate changes to its growing environment.

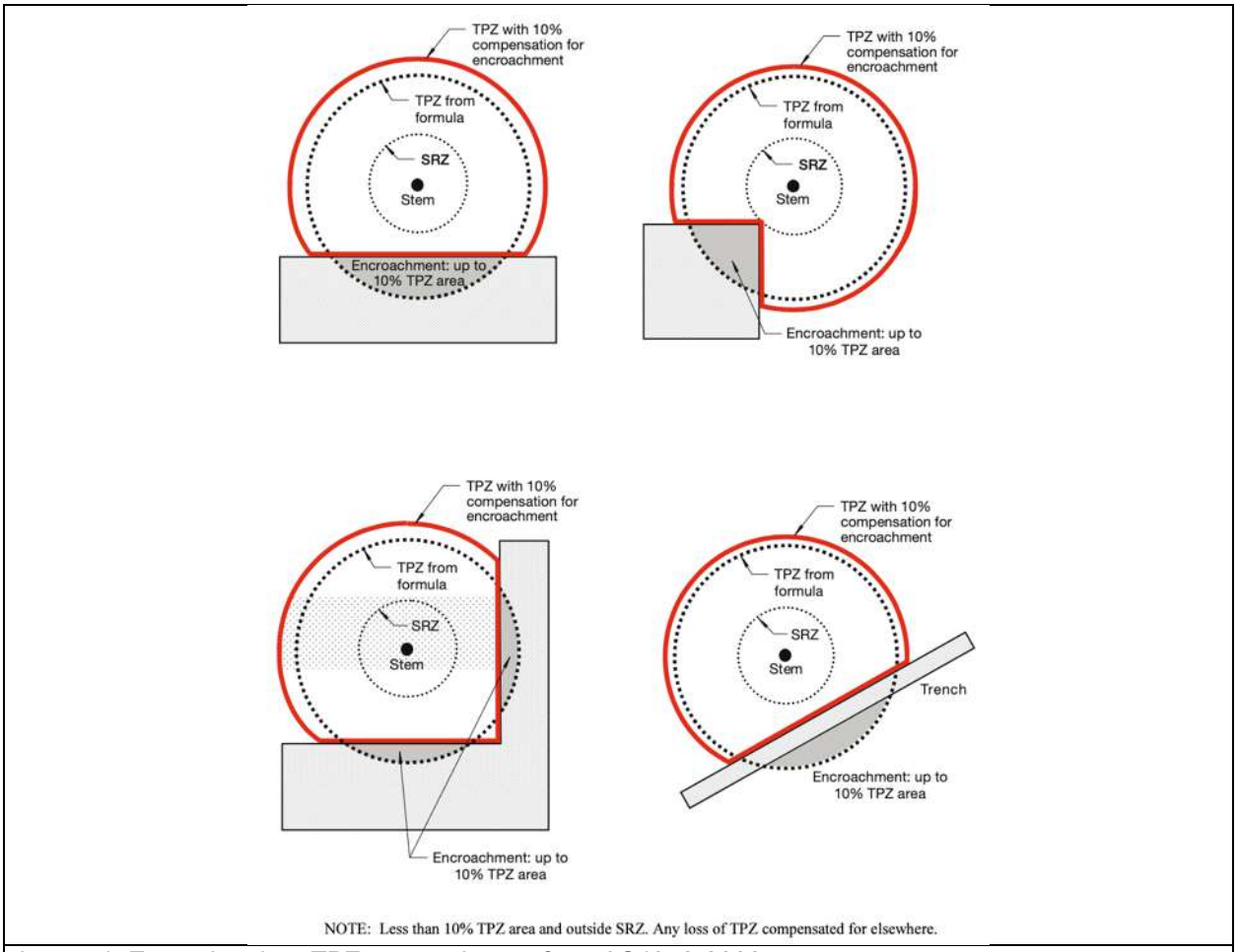

Image 1: Example minor TPZ encroachment from AS4970-2009.

6.4 **Major encroachment into TPZ:** Where encroachment of more than 10% of the overall TPZ area is proposed the project Arborist must investigate and demonstrate that the tree will remain in a viable condition. In some cases, tree sensitive construction methods such as pier and beam footings, suspended slabs, or cantilevered sections, can be utilised to allow additional encroachment into the TPZ by bridging over roots and minimising root disturbance. Major encroachment is only possible if it can be undertaken without severing significant size roots, or if it can be demonstrated that significant roots will not be impacted. Root investigations may be required to identify roots that will be impacted during major TPZ encroachment (see appendix 3 for more information in relation to root investigations).

7. OBSERVATIONS

7.1 **Tree information:** Details of each individual tree assessed, including the observations taken during the site inspection, can be found in the tree inspection schedule in appendix 2, where the indicative tree protection zone (TPZ) and Structural Root Zone (SRZ) has been calculated for each of the subject trees. The TPZ and SRZ should be measured in radius from the centre of the trunk. Each of the subject trees have been awarded a retention value based on the observations using the Tree AZ method. Tree AZ is used to identify higher value trees worthy of being a constraint to development and lower value trees that should generally not be a constraint to the development. The Tree AZ categories sheet (Barrell Tree Consultancy) has been included in appendix 3 to assist with understanding the retention values. The retention value that has been allocated to the subject trees in this report is not definitive and should only be used as a guideline.

7.2 **Site Plans:** In appendix 1 a site plan has been prepared, where the tree information including canopy spread, TPZ and SRZ have been overlaid onto the site plan.

8. ASSESSMENT OF CONSTRUCTION IMPACTS

8.1 Table 1: In the table below the impact of proposed development to all trees included in the report has been discussed.

Tree ID	Botanical Name	Retention value	TPZ radius (m)	TPZ area (m^2)	SRZ radius (m)	TPZ encroachment	Discussion/ Conclusion	Recommendation
1	*Pinus radiata*	A2	11.0	382.9	3.4	Minor	The lot 129 building envelope encroaches into the TPZ by 1% (4.2m^2) but not into the SRZ, which is minor TPZ encroachment and indicates that the tree will not be impacted.	Retain and protect
2	*Pinus radiata*	A1	6.5	134.4	2.5	None	No proposed encroachment into the TPZ.	Retain and protect
3	*Eucalyptus saligna*	AA	9.5	282.3	3.2	Minor	The lot 128 and 129 building envelopes, and a service pit/pipe, encroach into the TPZ by 6% (18.1m^2) but not into the SRZ, which is minor TPZ encroachment and indicates that the tree will not be impacted.	Retain and protect
4	*Quercus palustris*	A1	6.0	111.7	2.4	None	No proposed encroachment into the TPZ.	Retain and protect
5	*Pinus radiata*	A1	13.9	608.7	3.7	Major	The lot 126, 127 and 128 building envelopes, and 2 x service pits/pipes, encroach into the TPZ by 13% (77.2m^2) but not into the SRZ, which is major TPZ encroachment. To retain the tree in a viable condition, tree sensitive construction methods will be required to minimise the impact to the trees root system. The proposed services must be installed in accordance with AS4970-2009, see section 9.2 for more information. Tree sensitive construction within the building envelopes may also be required, for example utilising tree sensitive footings such as isolated piers or cantilevered building sections, to reduce the impact to the trees root system, see section 9.3 for more information.	Tree sensitive construction required
6	*Ulmus parvifolia*	Z10	2.6	21.9	1.8	None	No proposed encroachment into the TPZ.	Retain and protect
7	*Eucalyptus microcorys*	AA	11.4	408.2	3.6	Major	The lot 124, 125 and 126 building envelopes, and 2 x service pits/pipes, encroach into the TPZ by 14% (57.6m^2) but not into the SRZ, which is major TPZ encroachment. To retain the tree in a viable condition, tree sensitive construction methods will be required to minimise the impact to the trees root	Tree sensitive construction required

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Tree ID	Botanical Name	Retention value	TPZ radius (m)	TPZ area (m^2)	SRZ radius (m)	TPZ encroachment	Discussion/ Conclusion	Recommendation
							system. The proposed services must be installed in accordance with AS4970-2009, see section 9.2 for more information. Tree sensitive construction within the building envelopes may also be required, for example utilising tree sensitive footings such as isolated piers or cantilevered building sections, to reduce the impact to the trees root system, see section 9.3 for more information.	
8	*Eucalyptus microcorys*	A1	5.8	106.3	2.6	None	No proposed encroachment into the TPZ.	Retain and protect
9	*Pinus patula*	Z4	5.3	87.3	2.4	None	No proposed encroachment into the TPZ.	Retain and protect
10	*Cedrus deodar*	A1	6.7	141.9	2.7	Minor	A proposed service pit encroaches into the TPZ by less than 5% (<1m^2) but not into the SRZ, which is minor TPZ encroachment and indicates that the tree will not be impacted.	Retain and protect
11	*Melia azedarach*	Z10	4.0	50.9	2.3	None	No proposed encroachment into the TPZ.	Retain and protect
12	*Melia azedarach*	Z9	5.0	79.8	2.5	None	No proposed encroachment into the TPZ.	Retain and protect
13	*Dead Tree*	Z4	5.2	83.6	2.5	None	No proposed encroachment into the TPZ. The tree was dead at the time of inspection and is recommended to be removed due to its condition only.	Remove
14	*Eucalyptus robusta*	A2	10.6	350.3	3.3	Major	The lot 122 and 123 building envelopes, and a service pit/pipe, encroach into the TPZ by 18% (62.7m^2) but not into the SRZ, which is major TPZ encroachment. To retain the tree in a viable condition, tree sensitive construction methods will be required to minimise the impact to the trees root system. The proposed services must be installed in accordance with AS4970-2009, see section 9.2 for more information. Tree sensitive construction within the building envelopes will also be required, for example utilising tree sensitive footings such as isolated piers or cantilevered building sections, to reduce the impact to the trees root system, see section 9.3 for more information.	Tree sensitive construction required

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Tree ID	Botanical Name	Retention value	TPZ radius (m)	TPZ area (m^2)	SRZ radius (m)	TPZ encroachment	Discussion/ Conclusion	Recommendation
15	*Eucalyptus botryoides*	Z9	11.0	382.9	3.4	Major	The lot 120 and 121 building envelopes encroach into the TPZ by 16% (60m^2) but not into the SRZ, which is major TPZ encroachment. The tree could be retained via tree sensitive construction methods. However, at the time of inspection the tree was identified as having significant defects that require detailed investigation if the tree is to be retained. The tree is not in a suitable condition to be retained in the garden of the lots, in close proximity to building envelopes/dwellings, and is therefore recommended to be removed.	Remove
16	*Pinus radiata*	Z4	8.1	204.9	3.2	None	No proposed encroachment into the TPZ.	Retain and protect
17	*Olea europaea subsp. cuspidata*	Z3	2.0	12.6	1.9	None	No proposed encroachment into the TPZ.	Retain and protect
18	*Pinus radiata*	Z4	8.0	203.1	3.0	None	No proposed encroachment into the TPZ.	Retain and protect
19	*Pinus radiata*	A1	10.7	358.3	3.4	None	No proposed encroachment into the TPZ.	Retain and protect
20	*Pinus radiata*	A1	7.7	185.3	2.9	None	No proposed encroachment into the TPZ.	Retain and protect
21	*Pinus radiata*	A1	8.8	241.1	3.1	None	No proposed encroachment into the TPZ.	Retain and protect
22	*Eucalyptus scoparia*	Z9	5.8	104.2	2.6	None	The proposed subdivision drawing indicates that a building envelope will encroach into the TPZ. However, a 'no building zone' has been marked on the subdivision drawing adjacent to the North boundary (see appendix 1, indicated by dashed line marked 'D'). The whole TPZ area is located within the 'no building zone', indicating that the tree will not be impacted by the proposed development.	Retain and protect
23	*Eucalyptus haemastoma*	AA	8.3	215.4	3.0	None	The proposed subdivision drawing indicates that a building envelope will encroach into the TPZ. However, a 'no building zone' has been marked on the subdivision drawing adjacent to the North boundary (see appendix 1, indicated by dashed line marked 'D'). The whole TPZ area is located within the 'no	Retain and protect

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Tree ID	Botanical Name	Retention value	TPZ radius (m)	TPZ area (m^2)	SRZ radius (m)	TPZ encroachment	Discussion/ Conclusion	Recommendation
							building zone', indicating that the tree will not be impacted by the proposed development.	
24	*Corymbia eximia*	AA	6.1	117.7	2.6	None	The proposed subdivision drawing indicates that a building envelope will encroach into the TPZ. However, a 'no building zone' has been marked on the subdivision drawing adjacent to the North boundary (see appendix 1, indicated by dashed line marked 'D'). The whole TPZ area is located within the 'no building zone', indicating that the tree will not be impacted by the proposed development.	Retain and protect
25	*Casuarina glauca*	AA	7.2	162.9	2.8	Footprint	The trunk is located within the footprint of the lot 105 building envelope.	Remove
26	*Casuarina glauca*	Z10	5.3	87.6	2.5	Footprint	The trunk is located within the footprint of the lot 105 building envelope.	Remove
27	*Casuarina glauca*	Z10	3.0	28.3	1.9	Footprint	The trunk is located within the footprint of the lot 105 building envelope.	Remove
28	*Banksia serrata*	A1	4.9	76.0	2.4	Footprint	The trunk is located within the footprint of the lot 106 building envelope.	Remove
29	*Syagrus romanzoffiana*	Z3	3.0	28.3	N/A	Footprint	The trunk is located within the footprint of the proposed cut/fill.	Remove
30	*Syagrus romanzoffiana*	Z3	3.0	28.3	N/A	Footprint	The trunk is located within the footprint of the proposed cut/fill.	Remove
31	*Olea europaea subsp. cuspidata*	Z3	4.3	58.6	2.2	Footprint	The trunk is located within the footprint of the proposed cut/fill.	Remove
32	*Pittosporum undulatum*	A1	4.8	72.4	2.4	Footprint	The trunk is located within the footprint of the lot 110 building envelope.	Remove
33	*Fraxinus spp*	Z10	2.0	12.6	1.6	Footprint	The trunk is located within the footprint of the lot 109 building envelope.	Remove
34	*Pinus radiata*	A1	8.4	221.7	3.0	None	No encroachment into the TPZ.	Retain and protect

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Tree ID	Botanical Name	Retention value	TPZ radius (m)	TPZ area (m^2)	SRZ radius (m)	TPZ encroachment	Discussion/ Conclusion	Recommendation
35	*Eucalyptus sideroxylon*	A1	3.7	43.5	2.1	None	No encroachment into the TPZ.	Retain and protect
36	*Olea europaea subsp. cuspidata*	Z3	2.5	18.9	1.9	Footprint	The tree has not been identified on the site plans, the trunk is located within the site boundary fence. Fill soil is proposed adjacent to the trunk, which will potentially cause collar rot.	Remove
37	*Olea europaea subsp. cuspidata*	Z3	3.7	43.5	2.1	Footprint	The tree has not been identified on the site plans, the trunk is located within the site boundary fence. Fill soil is proposed adjacent to the trunk, which will potentially cause collar rot.	Remove
38	*Cupressus spp*	A1	4.3	57.9	2.3	None	No encroachment into the TPZ.	Retain and protect
39	*Cupressus spp*	Z4	2.0	12.6	1.6	None	No encroachment into the TPZ.	Retain and protect
40	*Cupressus spp*	Z4	4.4	61.9	2.3	None	No encroachment into the TPZ.	Retain and protect
41	*Ulmus parvifolia*	A1	7.2	162.9	2.8	None	No encroachment into the TPZ.	Retain and protect
42	*Photinia glabra*	Z1	2.2	15.6	1.8	None	No encroachment into the TPZ.	Retain and protect
43	*Photinia glabra*	Z1	2.5	20.0	1.7	None	No encroachment into the TPZ.	Retain and protect
44	*Eucalyptus nicholii*	A1	7.3	168.3	2.8	None	No encroachment into the TPZ.	Retain and protect
45	*Chamaecyparis lawsoniana*	Z4	4.2	55.4	2.3	None	No encroachment into the TPZ.	Retain and protect
46	*Cupressus spp*	A1	5.4	91.6	2.4	None	No encroachment into the TPZ.	Retain and protect
47	*Cedrus deodar*	A1	6.6	136.8	2.7	None	No encroachment into the TPZ.	Retain and protect

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Tree ID	Botanical Name	Retention value	TPZ radius (m)	TPZ area (m^2)	SRZ radius (m)	TPZ encroachment	Discussion/ Conclusion	Recommendation
48	*Cedrus deodar*	A1	6.0	113.1	2.6	None	No encroachment into the TPZ.	Retain and protect
49	*Dead Tree*	Z4	7.8	191.1	2.9	None	No encroachment into the TPZ.	Retain and protect
G1	*33 x Callistemon viminalis*	Z1	N/A	N/A	N/A	Minor	This is a group of trees adjacent to the North boundary. Only a selection of the trees within the group are marked on the site plans provided. In appendix 1, the approximate location of the group of trees has been marked based on the aerial image of the site. The trees are estimated to be located in lot 102-110. The TPZ of the trees vary in radius, the largest trees in the group have a TPZ radius of 4.8m (based on a DBH of 400mm). The proposed subdivision drawing indicates that building envelopes will encroach into the TPZ of some of the trees. However, a 'no building zone' has been marked on the subdivision drawing adjacent to the North boundary (see appendix 1, indicated by dashed line marked 'D'). The trunk of the trees in the group are located approximately 1m from the site boundary. The a 'no building zone' is set back from the North boundary in each lot by a minimum 5.8m. The whole TPZ area of each tree is located within the 'no building zone', indicating that the trees will not be impacted by the proposed development.	Retain and protect

9. CONCLUSIONS

9.1 **Table 2:** Summary of the impact to trees by the development;

Impact	Reason	Category A Tree numbers		Category Z Tree numbers	Total trees
		AA	A	Z	
Trees recommended to be removed	Building construction, new surfacing and/or proximity to proposed structures/building envelopes will impact the tree, trees n poor condition, noxious weeds	25	28, 32	13, 15, 26, 27, 29, 30, 31, 33, 36, 37	13 trees
Tree sensitive design and construction required	The removal of existing surfacing/structures and/or installation of new surfacing/structures may impact the viability of the tree	7	5, 14	None	3 trees
Trees recommended to be retained	Future removal of existing surfacing/structures and/or installation of new surfacing/structures will not impact the viability of the trees	3, 23, 24	1, 2, 4, 8, 10, 19, 20, 21, 34, 35, 38, 41, 44, 46, 47, 48	6, 9, 11, 12, 16, 17, 18, 22, 39, 40, 42, 43, 45, 49, G1	33 and 1 group

9.2 **Underground Services in TPZ of tree 5, 7 and 14:** AS4970 Protection of trees on development sites (2009) recommends that all underground services located inside the TPZ of any tree to be retained should be installed via tree sensitive techniques. This should include either directional drilling methods or manual excavations to minimise the impact to trees identified for retention.

If directional drilling is proposed, section 4.5.5 of AS4970-2009 says that 'The directional drilling bore should be at least 600 mm deep. The project Arborist should assess the likely impacts of boring and bore pits on retained trees'.[8]
If manual excavations are proposed, all excavations for the services should be carried out manually under the supervision of the project Arborist (minimum qualification AQF 5). Manual excavation may include the use of pneumatic and hydraulic tools, high-pressure air or a combination of high-pressure water and a vacuum device. All roots greater than 40mm in diameter should be retained in the service trench. The service pipe should then be threaded below the retained roots where practical. Roots greater than 40mm within the alignment of the service pipe

[8] Council Of Standards Australia, *AS 4970 Protection of trees on development sites* (2009) page 18.

should only be severed/pruned under the approval of the project Arborist. All root pruning should be in accordance with AS4373 Pruning of amenity trees (2007).

9.3 **Tree Sensitive Construction within Building Envelope Tree 5, 7 and 14:** The proposed lot building envelopes encroach into the TPZ of these trees by between 10-20% but not into the SRZ. This is major TPZ encroachment and indicates that the trees could potentially be impacted. To ensure that trees are retained in a viable condition during the future development within each building envelope, the proposed construction within the building envelopes should be tree sensitive, to minimise the impact to the trees root system.

Examples of tree sensitive construction methods include the use of cantilevered building sections or pier and beam style footings to bridge over significant roots. Tree sensitive design methods can be used in combination with non-destructive root investigations to locate footings to avoid significant roots (see appendix 3 for more information in relation to root investigations). Additional measures can also be undertaken for the tree to compensate for root loss in the TPZ, such as the use of irrigation to stimulate new growth.

The design within each of these lots should be developed in consultation with a consulting Arborist (minimum AQF level 5 qualification) and will require an Arboricultural Impact Assessment Report for the development of each lot.

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10. RECOMMENDATONS

10.1 This report assesses the impact of a proposed subdivision at the subject site to all significant trees located inside or adjoining the site. Forty-nine individual trees and one group of trees have been identified and assessed.

10.2 In appendix 1 a site plan has been prepared, where the tree information including canopy spread, TPZ and SRZ have been overlaid onto the proposed site plan.

10.3 Thirteen trees have been recommended for removal to accommodate the subdivision, including tree 13, 15, 25, 26, 27, 28, 29, 30, 31, 32, 33, 36 and 37. See section 9.1 for a list of the trees by retention value.

10.4 A further three trees have been identified that will potentially be impacted by development works and require tree sensitive construction methods to be retained in a viable condition, including tree 5, 7 and 14. These trees require tree sensitive services installation in accordance with section 9.2 and tree sensitive future construction within the building envelopes, see section 9.3 for more information.

10.5 All other trees assessed in this report can be retained in a viable condition, including tree 1, 2, 3, 4, 6, 8, 9, 10, 11, 12, 16, 17, 18, 19, 20, 21, 22, 23, 24, 34, 35, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49 and group 1.

10.6 All trees to be retained must be protected in accordance with AS4970-2009, details of which are included in section 11. The tree protection is based on the proposed subdivision works only, not the future development works within each lot.

10.7 No landscape plan has been assessed in this report. See section 11.10 for general guidance in relation to minimising the impact of proposed landscaping to retained trees and replacement tree planting.

10.8 This report does not provide approval for tree removal or pruning works. All recommendations in this report are subject to approval by the relevant authorities and/or tree owners. This report should be submitted as supporting evidence with the development application.

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11. TREE PROTECTION REQUIREMENTS

11.1 **Use of this report:** All contractors must be made aware of the tree protection requirements prior to commencing works at the site. This report and a copy of the site plans (Appendix 1) drawing must also be made available to any contractor prior to works commencing and during any on site operations.

11.2 **Project Arborist:** Prior to any works commencing at the site a project Arborist should be appointed. The project Arborist should be qualified to a minimum AQF level 5 and/or equivalent qualifications and experience and should assist with any development issues relating to trees that may arise. If at any time it is not feasible to carryout works in accordance with this, an alternative must be agreed in writing with the project Arborist.

11.3 **Tree work:** All tree work should be carried out by a qualified and experienced Arborist with a minimum of AQF level 3 in arboriculture, in accordance with NSW Work Cover Code of Practice for the Amenity Tree Industry (1998) and AS4373 Pruning of amenity trees (2007).

11.4 **Initial site meeting/on-going regular inspections:** The project Arborist is to hold a pre-construction site meeting with principal contractor to discuss methods and importance of tree protection measures and resolve any issues in relation to tree protection that may arise. In accordance with AS4970-2009, the project Arborist should carryout regular site inspections to ensure works are carried out in accordance with this document throughout the development process. Site inspections are recommended on a monthly frequency throughout the development.

11.5 **Site Specific Tree Protection Recommendations:** It is the responsibility of the principal contractor to install tree protection prior to works commencing at the site (prior to demolition works) and to ensure that the tree protection remains in adequate condition for the duration of the development. The tree protection must not be moved without prior agreement of the project Arborist. The project Arborist must inspect that the tree protection has been installed in accordance with this document and AS4970-2009 prior to works commencing. See section 11.6 for requirements of tree protection.

Tree ID	Tree Species	TPZ Radius (m)	SRZ Radius (m)	Recommendations
1	*Pinus radiata*	11.0	3.4	Retain and protect. Protective fencing should be installed to create TPZ exclusion zone for tree 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 14, 44, 45, 46, 47, 48 and 49. The fencing should be aligned at the edge of the 'no building zone'. TPZ signage on fencing. Mulch area of TPZ between protective fence and boundary fence.
2	*Pinus radiata*	6.5	2.5	Retain and protect. See tree 1 for specifications.
3	*Eucalyptus saligna*	9.5	3.2	Retain and protect. See tree 1 for specifications.
4	*Quercus palustris*	6.0	2.4	Retain and protect. See tree 1 for specifications.

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Tree ID	Tree Species	TPZ Radius (m)	SRZ Radius (m)	Recommendations
5	*Pinus radiata*	13.9	3.7	Tree sensitive construction required. See tree 1 for specifications.
6	*Ulmus parvifolia*	2.6	1.8	Retain and protect. See tree 1 for specifications.
7	*Eucalyptus microcorys*	11.4	3.6	Tree sensitive construction required. See tree 1 for specifications.
8	*Eucalyptus microcorys*	5.8	2.6	Retain and protect. See tree 1 for specifications.
9	*Pinus patula*	5.3	2.4	Retain and protect. See tree 1 for specifications.
10	*Cedrus deodar*	6.7	2.7	Retain and protect. See tree 1 for specifications.
11	*Melia azedarach*	4.0	2.3	Retain and protect. See tree 1 for specifications.
12	*Melia azedarach*	5.0	2.5	Retain and protect. See tree 1 for specifications.
13	*Dead Tree*	5.2	2.5	Remove
14	*Eucalyptus robusta*	10.6	3.3	Tree sensitive construction required. See tree 1 for specifications.
15	*Eucalyptus botryoides*	11.0	3.4	Remove
16	*Pinus radiata*	8.1	3.2	Retain and protect. Protective fencing should be installed to create TPZ exclusion zone for tree 16, 17, 18, 19, 20, 21, 22, 23, 24 and group 1. The fencing should be aligned at the edge of the 'no building zone'. TPZ signage on fencing. Mulch area of TPZ between protective fence and boundary fence. TPZ signage on fencing. Mulch area of TPZ between protective fence and boundary fence.
17	*Olea europaea subsp. cuspidata*	2.0	1.9	Retain and protect. See tree 16 for specifications.
18	*Pinus radiata*	8.0	3.0	Retain and protect. See tree 16 for specifications.
19	*Pinus radiata*	10.7	3.4	Retain and protect. See tree 16 for specifications.
20	*Pinus radiata*	7.7	2.9	Retain and protect. See tree 16 for specifications.
21	*Pinus radiata*	8.8	3.1	Retain and protect. See tree 16 for specifications.
22	*Eucalyptus scoparia*	5.8	2.6	Retain and protect. See tree 16 for specifications.
23	*Eucalyptus haemastoma*	8.3	3.0	Retain and protect. See tree 16 for specifications.
24	*Corymbia eximia*	6.1	2.6	Retain and protect. See tree 16 for specifications.
25	*Casuarina glauca*	7.2	2.8	Remove
26	*Casuarina glauca*	5.3	2.5	Remove
27	*Casuarina glauca*	3.0	1.9	Remove
28	*Banksia serrata*	4.9	2.4	Remove
29	*Syagrus romanzoffiana*	3.0	N/A	Remove
30	*Syagrus romanzoffiana*	3.0	N/A	Remove
31	*Olea europaea subsp. cuspidata*	4.3	2.2	Remove
32	*Pittosporum undulatum*	4.8	2.4	Remove
33	*Fraxinus spp*	2.0	1.6	Remove

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Tree ID	Tree Species	TPZ Radius (m)	SRZ Radius (m)	Recommendations
34	*Pinus radiata*	8.4	3.0	Retain and protect. Protective fencing should be aligned at the extent of the TPZ radius within the site. TPZ signage on fencing. Mulch area of TPZ between protective fence and boundary fence. The fencing should be relocated for bulk earthworks under the approval of the project Arborist.
35	*Eucalyptus sideroxylon*	3.7	2.1	Retain and protect. Protective fencing should be aligned at the extent of the TPZ radius within the site. TPZ signage on fencing. Mulch area of TPZ between protective fence and boundary fence. The fencing should be relocated for bulk earthworks under the approval of the project Arborist.
36	*Olea europaea subsp. cuspidata*	2.5	1.9	Remove
37	*Olea europaea subsp. cuspidata*	3.7	2.1	Remove
38	*Cupressus spp*	4.3	2.3	Retain and protect. Protective fencing should be aligned at the extent of the TPZ radius within the site. TPZ signage on fencing. Mulch area of TPZ between protective fence and boundary fence.
39	*Cupressus spp*	2.0	1.6	Retain and protect. No tree protection required, the boundary fence will provide adequate protection.
40	*Cupressus spp*	4.4	2.3	Retain and protect. No tree protection required, the boundary fence will provide adequate protection.
41	*Ulmus parvifolia*	7.2	2.8	Retain and protect. No tree protection required, the boundary fence will provide adequate protection.
42	*Photinia glabra*	2.2	1.8	Retain and protect. Protective fencing should be aligned at the extent of the TPZ radius within the site. TPZ signage on fencing. Mulch area of TPZ between protective fence and boundary fence.
43	*Photinia glabra*	2.5	1.7	Retain and protect. Protective fencing should be aligned at the extent of the TPZ radius within the site. TPZ signage on fencing. Mulch area of TPZ between protective fence and boundary fence.
44	*Eucalyptus nicholii*	7.3	2.8	Retain and protect. See tree 1 for specifications.
45	*Chamaecyparis lawsoniana*	4.2	2.3	Retain and protect. See tree 1 for specifications.
46	*Cupressus spp*	5.4	2.4	Retain and protect. See tree 1 for specifications.
47	*Cedrus deodar*	6.6	2.7	Retain and protect. See tree 1 for specifications.
48	*Cedrus deodar*	6.0	2.6	Retain and protect. See tree 1 for specifications.
49	*Dead Tree*	7.8	2.9	Retain and protect. See tree 1 for specifications.
G1	*33 x Callistemon viminalis*	N/A	N/A	Retain and protect. See tree 16 for specifications.

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11.6 Tree Protection Specifications:

11.6.1 Protective fencing: The protective fencing must be constructed of 1.8 metre 'cyclone chainmesh fence'. The fencing should only be removed for the landscaping phase and this should be approved by the project Arborist. Where it is not feasible to install fencing at the specified location due to factors such restricting access to areas of the site or for constructing new structures, an alternative location and protection specification must be agreed with the project Arborist. Any modifications to the fencing locations must be approved by the project Arborist.

11.6.2 TPZ signage: Tree protection signage is to be attached to the protective fencing, displayed in a prominent position and the sign repeated at 10 metres intervals or closer where the fence changes direction. Each sign shall contain in a clearly legible form, the following information:

- Tree protection zone/No access.
- This fence has been installed to prevent damage to the tree/s and their growing environment both above and below ground. Do not move fencing or enter TPZ without the agreement of the project Arborist.
- The name, address, and telephone number of the developer/builder and project Arborist

11.6.3 Mulch: Any areas of the TPZ located inside the subject site must be mulched to a depth of 75mm with good quality mulch. Mulch must not be built-up around the trunk the trees as it can cause collar rot.

11.6.4 Ground Protection: Ground protection is required to protect the underlying soil structure and root system in areas where it is not practical to restrict access to whole TPZ, while allowing space for construction. Ground protection must consist of good quality composted wood chip/leaf mulch to a depth of between 150-300mm, laid on top of geo textile fabric, with timber/plywood boards overlaid. If vehicles are to be using the area, additional protection will be required such as rumble boards or track mats to spread the weight of the vehicle and avoid load points. Ground protection is to be specified and approved by the project Arborist as required.

11.6.5 Temporary irrigation: Temporary irrigation should distribute water evenly throughout the area of the TPZ. The irrigation should be used for at minimum one hour daily throughout all stages of the development.

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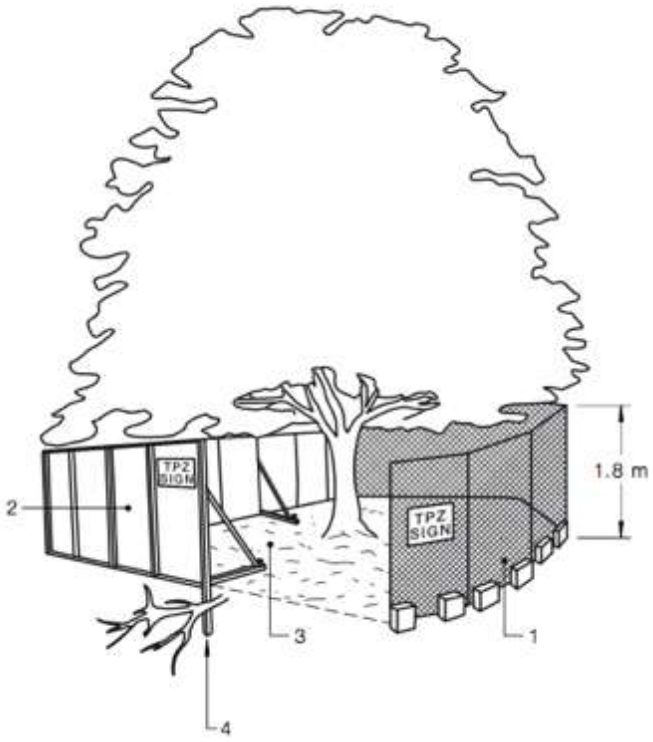
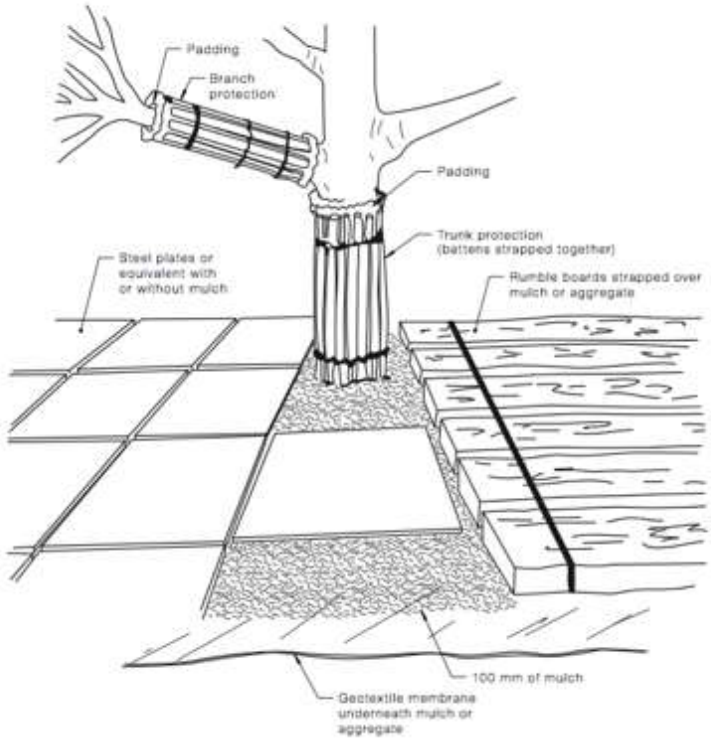


LEGEND:
1 Chain wire mesh panels with shade cloth (if required) attached, held in place with concrete feet.
2 Alternative plywood or wooden paling fence panels. This fencing material also prevents building materials or soil entering the TPZ.
3 Mulch installation across surface of TPZ (at the discretion of the project arborist). No excavation, construction activity, grade changes, surface treatment or storage of materials of any kind is permitted within the TPZ.
4 Bracing is permissible within the TPZ. Installation of supports should avoid damaging roots.

An image from AS4970-2009,[9] with example tree protection.

[9] Council Of Standards Australia, *AS4970 Protection of trees on development sites* (2009), page 16.



NOTES:

1 For trunk and branch protection use boards and padding that will prevent damage to bark. Boards are to be strapped to trees, not nailed or screwed.

2 Rumble boards should be of a suitable thickness to prevent soil compaction and root damage.

An image from AS4970-2009,[10] with example tree protection.

11.7 **Restricted activities inside TPZ:** The following activities must be avoided inside the TPZ of all trees to be retained unless approved by the project Arborist. If at any time these activities cannot be avoided an alternative must be agreed in writing with the project Arborist to minimise the impact to the tree.

A) Machine excavation.
B) Ripping or cultivation of soil.
C) Storage of spoil, soil or any such materials
D) Preparation of chemicals, including preparation of cement products.
E) Refuelling.
F) Dumping of waste.
G) Wash down and cleaning of equipment.
H) Placement of fill.
I) Lighting of fires.
J) Soil level changes.
K) Any physical damage to the crown, trunk, or root system.
L) Parking of vehicles.

[10] Council Of Standards Australia, *AS4970 Protection of trees on development sites* (2009), page 17.

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11.8 **Demolition:** The demolition of all existing structures inside or directly adjacent to the TPZ of trees to be retained must be undertaken in consultation with the project Arborist. Any machinery is to work from inside the footprint of the existing structures or outside the TPZ, reaching in to minimise soil disturbance and compaction. If it is not feasible to locate demolition machinery outside the TPZ of trees to be retained, ground protection will be required. The demolition should be undertaken inwards into the footprint of the existing structures, sometimes referred to as the 'top down, pull back' method.

11.9 **Excavations:** The project Arborist must supervise and certify that all excavations and root pruning are in accordance with AS4373-2007 and AS4970-2009. For continuous strip footings, first manual excavation is required along the edge of the structures closest to the subject trees. Manual excavation should be a depth of 1 metre (or to unfavourable root growth conditions such as bed rock or heavy clay, if agreed by project Arborist). Next roots must be pruned back in accordance with AS4373-2007. After all root pruning is completed, machine excavation is permitted within the footprint of the structure. For tree sensitive footings, such as pier and beam, all excavations inside the TPZ must be manual. Manual excavation may include the use of pneumatic and hydraulic tools, high-pressure air or a combination of high-pressure water and a vacuum device. No pruning of roots greater 30mm in diameter is to be carried out without approval of the project arborist. All pruning of roots greater than 30mm in diameter must be carried out by a qualified Arborist/Horticulturalist with a minimum AQF level 3. Root pruning is to be a clean cut with a sharp tool in accordance with AS4373 Pruning of amenity trees (2007).[11] The tree root is to be pruned back to a branch root if possible. Make a clean cut and leave as small a wound as possible.

11.10 **Landscaping:** All landscaping works within the TPZ of trees to be retained are to be undertaken in consultation with a consulting Arborist to minimise the impact to trees. General guidance is provided below to minimise the impact of new landscaping to trees to be retained.

- All excavations for landscaping works should be manual and in accordance with section 11.9.
- Replacement planting for all trees recommended for removal should be incorporated into the landscape plan. It is recommended that at minimum one tree for each tree proposed to be removed are planted to maintain/increase overall canopy cover at the site when mature. Any replacement tree must be selected in accordance with AS2303-2015 Tree stock for landscape use.
- The location of new plantings inside the TPZ of trees to be retained should be flexible to avoid unnecessary damage to tree roots greater than 40mm in diameter.

[11] Council Of Standards Australia, *AS 4373 Pruning of amenity trees* (2007) page 18

- Level changes should be minimised. The existing ground levels within the landscape areas should not be lowered by more than 50mm or increased by more 100mm without assessment by a consulting Arborist.
- New retaining walls should be avoided. Where new retaining walls are proposed inside the TPZ of trees to be retained, they should be constructed from tree sensitive material, such as timber sleepers, that require minimal footings/excavations. If brick retaining walls are proposed inside the TPZ, considerer pier and beam type footings to bridge significant roots that are critical to the trees condition. Retaining walls must be located outside the SRZ and sleepers/beams located above existing soil grades.
- New footpaths and hard surfaces should be minimised, as they can limit the availability of water, nutrients, and air to the trees root system. Where they are proposed, they should be constructed on or above existing soil grades to minimise root disturbance and consider using a permeable surface. Footpaths should be located outside the SRZ.
- Where fill/sub base is used inside the TPZ, fill material should be a coarse granular material that does not restrict the flow of water and air to the root system below. This type of material will also reduce the impact of soil compaction during construction.
- Any new fencing in the TPZ of trees should constructed carefully to avoid impacting significant roots. The location of fence posts should be flexible to allow for the retention of root greater than 40mm in diameter. The base of fence panels should be located above existing soil grades.

11.11 **Underground Services:** Where possible underground services should be located outside the TPZ of trees to be retained. All underground services located inside the TPZ of any tree to be retained must be installed via tree sensitive techniques. This should include either directional drilling methods or manual excavations to minimise the impact to trees identified for retention. No roots greater than 30mm in diameter should be severed during the installation of service pipes unless approved in writing by the project Arborist.

11.12 **Sediment and Contamination:** All contamination run off from the development such as but not limited to concrete, sediment and toxic wastes must be prevented from entering the TPZ at all times.

11.13 **Tree Wounding/Injury:** Any wounding or injury that occurs to a tree during the construction process will require the project Arborist to be contacted for an assessment of the injury and provide mitigation/remediation advice. It is generally accepted that trees may take many years to decline and eventually die from root damage. All repair work is to be carried out by the project Arborist, at the contractor's expense.

11.14 **Completion of Development Works:** After all construction works are complete the project Arborist should assess that the subject trees have been retained in the same condition and vigour. If changes to condition are identified the project Arborist should provide recommendations for remediation.

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12. CONSTRUCTION HOLD POINTS FOR TREE PROTECTION

12.1 **Hold Points:** Below is a sequence of hold points requiring project Arborist certification throughout the development process**.** It provides a list of hold points that must be checked and certified. All certification must be provided in written format upon completion of the development. The final certification must include details of any instructions for remediation undertaken during the development. The principal contractor should be responsible for implementing all tree protection requirements.

Hold Point	Stage	Date Completed and Signature of Project Arborist Responsible
Project Arborist to hold pre construction site meeting with principal contractor to discuss methods and importance of tree protection measures and resolve any issues in relation to feasibility of tree protection requirements that may arise. Project Arborist to mark all trees approved for removal under DA consent.	Prior to development work commencing	
Project Arborist to assess and certify that tree protection has been installed in accordance with AS4970-2009 prior to works commencing at site.	Prior to development work commencing.	
In accordance with AS4970-2009 the project arborist should carryout regular site inspections to ensure works are carried out in accordance with the recommendations. Site inspections are recommended on a monthly frequency.	On-going throughout the development	
The removal of existing structures inside the TPZ of any tree to be retained, such as the existing buildings and hard surfaces must be supervised by the project Arborist.	Demolition	
Project Arborist to supervise all manual excavations and root pruning inside the TPZ of any tree to be retained. Project Arborist to approve all pruning of roots greater than 30mm inside TPZ. All root pruning of roots greater than 30mm in diameter must be carried out by a qualified Arborist/Horticulturalist with a minimum AQF level 3.	Construction	
Project Arborist to certify that all underground services including storm water inside TPZ of any tree to be retained have been installed in accordance with AS4970-2009.	Construction	
Project Arborist to approve relocation of tree protection for landscaping. All landscaping works within the TPZ of trees to be retained are to be undertaken in consultation with the project Arborist to minimise the impact to trees.	Construction/ Landscape	
After all demolition, construction and landscaping works are complete the project Arborist should assess that the subject trees have been retained in the same condition and vigour. If changes to condition are identified the project Arborist should provide recommendations for remediation.	Upon completion of development	

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14. LIST OF APPENDICES

The following are included in the appendices:

- Appendix 1: Site Plan
- Appendix 2: Tree Inspection Schedule
- Appendix 3: Further Information of Methodology

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NOTES:

1. IT IS PROPOSED TO DEDICATE ROAD TO THE PUBLIC AS ROAD
2. IT IS INTENDED TO DEDICATE THE ROAD WIDENING (LOT 116) TO THE PUBLIC AS ROAD
3. IT IS PROPOSED TO DEDICATE LOT 115 AS DRAINAGE RESERVE
4. 'A2' DENOTES PROPOSED RESTRICTION ON THE USE OF LAND FOR LANDSCAPE BUFFER 10 WIDE & VARIABLE
5. 'B' DENOTES PROPOSED "NO BUILDING ZONE" IMPOSED VIA RESTRICTIVE COVENANT TO PROTECT EXISTING TREES 9 WIDE
6. 'C' DENOTES PROPOSED DRAINAGE EASEMENT 1.5 WIDE
7. 'D' DENOTES PROPOSED "NO BUILDING ZONE" IMPOSED VIA RESTRICTIVE COVENANT TO PROTECT EXISTING TREES VARIABl WIDTH

Map Legend

- Temporary Protective Construction Fencing
- Group 1
- Tree Crown
- Tree Protection Zone
- Structural Root Zone

0 — 80m

from digital files provided (particularly PDF files) may significantly alter the ratio of the plan.

Urban Arbor Pty Ltd

PO Box 450 Turramurra NSW 2074

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Site Location: 156 MacArthur Rd
Spring Farm NSW

SCALE :	DATE :
1 : 500 @ A1	3/3/2022

URBAN ARBOR
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Plan Title: Appendix 1 - Site Plan

Prepared by: Jack Williams, Urban Arbor Pty Ltd

Appendix 2 - Tree Inspection Schedule

Tree ID	Common Name	Botanical Name	Age Class	Height (m)	Canopy Spread Radius (m)	Stem 1	Stem 2	Stem 3	Stem 4	DBH (mm)	DAB (mm)	Health	Structure	Amenity Value	SULE	Retention Value	TPZ Radius (m)	SRZ Radius (m)	Notes
1	Monterey Pine	*Pinus radiata*	Mature	15	7	920				920	1080	Good	Fair	Medium	2. Medium	A2	11.0	3.4	Co-dominant stems at 3m. Deadwood in lower crown.
2	Monterey Pine	*Pinus radiata*	Mature	8	3.5	410	230	200	190	545	520	Good	Fair	Medium	2. Medium	A1	6.5	2.5	Co-dominant stems at 1m.
3	Sydney Blue Gum	*Eucalyptus saligna*	Mature	20	9	790				790	920	Good	Good	High	1. Long	AA	9.5	3.2	None.
4	Pin Oak	*Quercus palustris*	Semi mature	9	5	320	310	220		497	460	Good	Fair	Medium	2. Medium	A1	6.0	2.4	Asymmetric crown shape.
5	Monterey Pine	*Pinus radiata*	Mature	13	7	1160				1160	1290	Good	Good	Medium	1. Long	A1	13.9	3.7	None.
6	Chinese Elm	*Ulmus parvifolia*	Semi mature	5	3	220				220	250	Good	Fair	Low	2. Medium	Z10	2.6	1.8	Asymmetric crown shape and trunk lean to East. Supressed. Not marked on survey.
7	Tallowood	*Eucalyptus microcorys*	Mature	18	9	670	390	380	290	950	1260	Good	Good	High	1. Long	AA	11.4	3.6	None.
8	Tallowood	*Eucalyptus microcorys*	Mature	17	8	450	180			485	560	Good	Fair	High	2. Medium	A1	5.8	2.6	Asymmetric crown shape with bias to West.
9	Mexican Pine	*Pinus patula*	Mature	10	3	330	290			439	450	Poor	Fair	Medium	4. Remove	Z4	5.3	2.4	East stem dead, health in decline.
10	Himalayan Cedar	*Cedrus deodar*	Mature	12	4	560				560	630	Good	Good	Medium	1. Long	A1	6.7	2.7	None.
11	White Cedar	*Melia azedarach*	Semi mature	7	3	210	180	190		336	410	Fair	Good	Low	1. Long	Z10	4.0	2.3	Co-dominant stems at 3m with included bark at union.
12	White Cedar	*Melia azedarach*	Semi mature	8	4	420				420	490	Good	Fair	Medium	3. Short	Z9	5.0	2.5	Significant decay/cavity in trunk. Asymmetric crown shape with bias to North.
13	Dead Tree	*Dead Tree*	Dead	17	4	430				430	500	Poor	Poor	Low	4. Remove	Z4	5.2	2.5	None.
14	Swamp Mahogany	*Eucalyptus robusta*	Mature	14	8	880				880	1010	Fair	Fair	High	2. Medium	A2	10.6	3.3	Damage to surface roots. Significant deadwood, approximately 5% of crown. Stem failed at 3m.
15	Bangalay	*Eucalyptus botryoides*	Mature	24	11	920				920	1090	Fair	Fair	High	3. Short	Z9	11.0	3.4	Wound in trunk at 1m with large fungal bracket. Significant deadwood and epicormic growth in crown. Staining/kino ooze from main union at 8m, possible indicator decay/defect. No central stem above union at 8m. If tree is to be retained, detailed aerial and internal trunk decay assessment required.
16	Monterey Pine	*Pinus radiata*	Semi mature	7	4	420	300	290	320	673	910	Poor	Fair	Medium	4. Remove	Z4	8.1	3.2	Health in decline.
17	African Olive	*Olea europaea subsp. cuspidata*	Semi mature	4	2	100	100	80		162	270	Good	Good	Very low	2. Medium	Z3	2.0	1.9	Exempt species.
18	Monterey Pine	*Pinus radiata*	Dead	10	5	670				670	790	Poor	Poor	Low	4. Remove	Z4	8.0	3.0	Dead tree.
19	Monterey Pine	*Pinus radiata*	Mature	14	7	890				890	1030	Good	Good	Medium	1. Long	A1	10.7	3.4	None.
20	Monterey Pine	*Pinus radiata*	Mature	14	5	640				640	760	Good	Good	Medium	1. Long	A1	7.7	2.9	None.
21	Monterey Pine	*Pinus radiata*	Mature	12	5	730				730	860	Good	Good	Medium	1. Long	A1	8.8	3.1	None.
22	Wallangarra White Gum	*Eucalyptus scoparia*	Mature	13	5	480				480	560	Fair	Fair	High	3. Short	Z9	5.8	2.6	Wound in trunk at 1m with fungal bracket, sounded with mallet and appeared to be significant decay within trunk. Species susceptible to increased rate of decay from fungal pathogens.
23	Broad-leaved Scribbly Gum	*Eucalyptus haemastoma*	Mature	13	6	690				690	820	Good	Fair	High	1. Long	AA	8.3	3.0	Wound at base of trunk.
24	Yellow Bloodwood	*Corymbia eximia*	Mature	11	6	510				510	580	Good	Good	High	1. Long	AA	6.1	2.6	None.
25	Swamp She-oak	*Casuarina glauca*	Mature	12	5	600				600	670	Good	Good	High	1. Long	AA	7.2	2.8	None.
26	Swamp She-oak	*Casuarina glauca*	Semi mature	11	3.5	440				440	520	Fair	Fair	Medium	3. Short	Z10	5.3	2.5	Supressed.
27	Swamp She-oak	*Casuarina glauca*	Semi mature	7	2.5	250				250	280	Fair	Fair	Medium	3. Short	Z10	3.0	1.9	Supressed.
28	Old Man Banksia	*Banksia serrata*	Mature	7	4	410				410	450	Good	Fair	Medium	1. Long	A1	4.9	2.4	Asymmetric crown shape with bias to West.
29	Cocos Palm	*Syagrus romanzoffiana*	Mature	12	2	320				320	N/A	Good	Good	Low	2. Medium	Z3	3.0	N/A	Exempt species.
30	Cocos Palm	*Syagrus romanzoffiana*	Mature	8	2	280				280	N/A	Good	Good	Low	2. Medium	Z3	3.0	N/A	Exempt species.
31	African Olive	*Olea europaea subsp. cuspidata*	Mature	6	3	360				360	360	Good	Good	Very low	2. Medium	Z3	4.3	2.2	Exempt species. Not marked on survey.
32	Native Daphne	*Pittosporum undulatum*	Mature	6	3	400				400	450	Good	Good	Medium	2. Medium	A1	4.8	2.4	Not marked on survey.

Appendix 2 - Tree Inspection Schedule

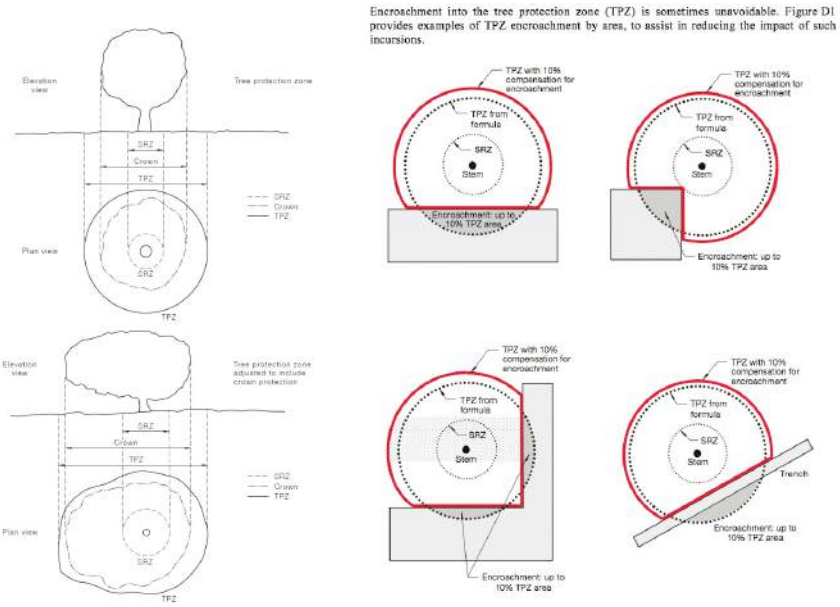
Tree ID	Common Name	Botanical Name	Age Class	Height (m)	Canopy Spread Radius (m)	Stem 1	Stem 2	Stem 3	Stem 4	DBH (mm)	DAB (mm)	Health	Structure	Amenity Value	SULE	Retention Value	TPZ Radius (m)	SRZ Radius (m)	Notes
33	Ash	*Fraxinus spp*	Semi mature	5	2	150				150	170	Good	Good	Low	1. Long	Z10	2.0	1.6	Not marked on survey.
34	Monterey Pine	*Pinus radiata*	Mature	7	5	700				700	820	Good	Good	Medium	1. Long	A1	8.4	3.0	Located in adjoining site.
35	Mugga Ironbark	*Eucalyptus sideroxylon*	Semi mature	9	3	310				310	340	Good	Good	Medium	1. Long	A1	3.7	2.1	Located in adjoining site.
36	African Olive	*Olea europaea subsp. cuspidata*	Mature	5	2.5	140	110	100		204	260	Good	Good	Very low	2. Medium	Z3	2.5	1.9	Not marked on survey, trunk located inside boundary fence. Exempt species.
37	African Olive	*Olea europaea subsp. cuspidata*	Mature	5	2.5	310				310	340	Good	Good	Very low	2. Medium	Z3	3.7	2.1	Not marked on survey, trunk located inside boundary fence. Exempt species.
38	Golden Cypress	*Cupressus spp*	Mature	7	3	320	160			358	440	Good	Good	Low	2. Medium	A1	4.3	2.3	Located in adjoining site.
39	Golden Cypress	*Cupressus spp*	Semi mature	5	1.5	150				150	180	Poor	Poor	Low	4. Remove	Z4	2.0	1.6	Located in adjoining site.
40	Golden Cypress	*Cupressus spp*	Semi mature	5	2.5	370				370	410	Poor	Fair	Low	4. Remove	Z4	4.4	2.3	Located in adjoining site.
41	Chinese Elm	*Ulmus parvifolia*	Mature	13	8	600				600	700	Good	Good	Medium	1. Long	A1	7.2	2.8	Located in adjoining site.
42	Photinia	*Photinia glabra*	Mature	5	2.5	120	100	100		185	240	Good	Good	Low	2. Medium	Z1	2.2	1.8	Not marked on survey. Tree located in close proximity to boundary, unknown if it is located within the site boundary.
43	Photinia	*Photinia glabra*	Mature	5	2.5	210				210	210	Good	Good	Low	2. Medium	Z1	2.5	1.7	Not marked on survey. Tree located in close proximity to boundary, unknown if it is located within the site boundary.
44	Willow Peppermint Gum	*Eucalyptus nicholii*	Mature	11	3.5	610				610	700	Good	Good	High	2. Medium	A1	7.3	2.8	Located in adjoining site.
45	Lawson Cypress	*Chamaecyparis lawsoniana*	Mature	7	3.5	350				350	400	Poor	Fair	Low	4. Remove	Z4	4.2	2.3	Located in adjoining site. Apical dieback.
46	Cypress	*Cupressus spp*	Mature	7	4	450				450	450	Good	Good	Medium	2. Medium	A1	5.4	2.4	Located in adjoining site.
47	Himalayan Cedar	*Cedrus deodar*	Mature	15	6	550				550	630	Good	Good	Medium	1. Long	A1	6.6	2.7	Located in adjoining site.
48	Himalayan Cedar	*Cedrus deodar*	Mature	15	7	500				500	570	Good	Good	Medium	1. Long	A1	6.0	2.6	Located in adjoining site.
49	Dead Tree	*Dead Tree*	Dead	17	5	650				650	750	Poor	Poor	Low	4. Remove	Z4	7.8	2.9	Located in adjoining site.
G1	33 x Weeping Bottlebrush	*33 x Callistemon viminalis*	Semi mature - Mature	5-7	2-4	200-400				200-400	250-450	Good	Good	Low	2. Medium	Z1	N/A	N/A	Group of 33 x trees adjacent to the North boundary.

Explanatory Notes

Tree Species - Where species is unknown it is indicated with an *'spp'*.
Age Class - Over mature (OM), Mature (M), Early mature (EM), Semi mature (SM), Young (Y).
Diameter at Breast Height (DBH) - Measured with a DBH tape or estimated at approximately 1.4m above ground level.
Diameter Above root Buttresses (DAB): Measured with a DBH tape or estimated above root buttresses (DAB) for calculating the SRZ.
Height - Height from ground level to top of crown. All heights are estimated unless otherwise indicated.
Spread - Radius of crown at widest section. All tree spreads are estimated unless otherwise indicated.
Tree Protection Zone (TPZ) - DBH x 12. Measured in radius from the centre of the trunk. Rounded to nearest 0.1m. For monocots, the TPZ is set at 1 metre outside the crown projection.
Structural Root Zone (SRZ) - $(DAB \times 50)^{0.42} \times 0.64$. Measured in radius from the centre of the trunk. Rounded up to nearest 0.1m.
Health - Good/Fair/Poor/Dead
Structure - Good/Fair/Poor
Safe Useful Life Expectancy (SULE) - 1. Long (40+years), 2. Medium (15 - 40 years), 3. Short (5 - 15 years), 4. Remove (under 5 years), 5. Small/young.
Amenity Value - Very High/High/Medium/Low/Very Low.
Retention Value: Tree AZ, see appendix 3 for categories.

Appendix 3 - Further Information of Methodology

1. **Tree Protection Zone:** The tree protection zone (TPZ) is the principle means of protecting trees on development sites. The TPZ is a combination of the root area and crown area requiring protection. It is an area isolated from construction disturbance, so that the tree remains viable. The radius of the TPZ is calculated for each tree by multiplying its DBH x 12. The derived value is measured in radius from the centre of the stem/trunk at ground level. A TPZ should not be less than 2.0 metres nor greater than 15 metres (except where crown protection is required).
   It is commonly observed that tree roots will extend significant further than the indicative TPZ, however the TPZ is an area identified AS4970-2009 to be extent where root loss or disturbance will generally not impact the viability of the tree. The TPZ is identified as a restricted area to prevent damage to trees either above or below ground during a development. Where trees are intended to be retained proposed developments must provide an adequate TPZ around trees. The TPZ is set aside for the tree's root zone, trunk and crown and it is essential for the stability and longevity of the tree. The tree protection also incorporates the SRZ (see below for more information about the SRZ). I have calculated the TPZ of palms, other monocots, cycads and tree ferns at one metre outside the crown projection. See appendices for additional information about the TPZ including information about calculating the TPZ and examples of TPZ encroachment.
   Minor encroachment into TPZ: Sometimes encroachment into the TPZ is unavoidable. Encroachment includes but is not limited to activities such as excavation, compacted fill and machine trenching. Minor encroachment of up to 10% of the overall TPZ area is normally considered acceptable, providing there is space adjacent to the TPZ for the tree to compensate and the tree is displaying adequate vigour/health to tolerate changes to its growing environment.
   Major encroachment into TPZ: Where encroachment of more than 10% of the overall TPZ area is proposed the project Arborist must investigate and demonstrate that the tree will remain in a viable condition. In some cases, tree sensitive construction methods such as pier and beam footings, suspended slabs, or cantilevered sections, can be utilised to allow additional encroachment into the TPZ by bridging over roots and minimising root disturbance. Major encroachment is only possible if it can be undertaken without severing significant size roots, or if it can be demonstrated that significant roots will not be impacted.



2. **Structural Root Zone:** This is the area around the base of a tree required for the trees stability in the ground. An area larger than the SRZ always need to be maintained to preserve a viable tree as it will only have a minor effect on the trees vigour and health. There are several factors that determine the SRZ which include height, crown area, soil type and soil moisture. It can also be influenced by other factors such as natural or built structures. Generally work within the SRZ should be avoided.
   An indicative SRZ radius can be determined from the diameter of the trunk measured immediately above the root buttresses. Root investigation could provide more information about the extent of the SRZ. The following formula should be used to calculate the SRZ.
   SRZ radius = $(D \times 50)^{0.42} \times 0.64$ (D = Diameter above root buttress).

3. **Tree Age Class:** If can be difficult to determine the age of a tree without carrying out invasive tests that may damage the tree, so we have categorised there likely age class which is defined below;
   - Young/Newly planted: Young or recently planted tree.
   - Semi Mature: Up to 20% of the usual life expectancy for the species.
   - Early mature/Mature: Between 20%-80% of the usual life expectancy for the species.
   - Over mature: Over 80% of the usual life expectancy for the species.
   - Dead: Tree is dead or almost dead.

4. **Health/Physiological Condition:** Below are examples conditions used when assigning a category for tree health.

Category	Example condition	Summary
Good	• Crown has good foliage density for species. • Tree shows no or minimal signs of pathogens that are unlikely to have an effect on the health of the tree. • Tree is displaying good vigour and reactive growth development.	• The tree is in above average health and condition and no remedial works are required.
Fair	• The tree may be starting to dieback or have over 25% deadwood. • Tree may have slightly reduced crown density or thinning. • There may be some discolouration of foliage. • Average reactive growth development. • There may be early signs of pathogens which may further deteriorate the health of the tree. • There may be epicormic growth indicating increased levels of stress within the tree.	• The tree is in below average health and condition and may require remedial works to improve the trees health.
Poor	• The may be in decline, have extensive dieback or have over 30% deadwood. • The canopy may be sparse or the leaves may be unusually small for species. • Pathogens or pests are having a significant detrimental effect on the tree health.	• The tree is displaying low levels of health and removal or remedial works may be required.
Dead	• The tree is dead or almost dead.	• The tree should generally be removed.

5. **Structural Condition:** Below are examples conditions used when assigning a category for structural condition.

Category	Example condition	Summary
Good	• Branch unions appear to be strong with no sign of defects. • There are no significant cavities. • The tree is unlikely to fail in usual conditions. • The tree has a balanced crown shape and form.	• The tree is considered structurally good with well developed form.
Fair	• The tree may have minor structural defects within the structure of the crown that could potentially develop into more significant defects. • The tree may a cavity that is currently unlikely to fail but may deteriorate in the future. • The tree is an unbalanced shape or leans significantly. • The tree may have minor damage to its roots. • The root plate may have moved in the past but the tree has now compensated for this. • Branches may be rubbing or crossing.	• The identified defects are unlikely cause major failure. • Some branch failure may occur in usual conditions. • Remedial works can be undertaken to alleviate potential defects.
Poor	• The tree has significant structural defects. • Branch unions may be poor or weak. • The tree may have a cavity or cavities with excessive levels of decay that could cause catastrophic failure. • The tree may have root damage or is displaying signs of recent movement. • The tree crown may have poor weight distribution which could cause failure.	• The identified defects are likely to cause either partial or whole failure of the tree.

6. **Amenity Value:** To determine the amenity value of a tree we assess a number of different factors, which include but are not limited to the information below.
   - The visibility of the tree to adjacent sites.
   - The relationship between the tree and the site.
   - Whether the tree is protected by any statuary conditions.
   - The habitat value of the tree.
   - Whether the tree is considered a noxious weed species.

   The amenity value is rated using one of the following values.
   - Very High
   - High
   - Moderate
   - Low
   - Very Low

7. **Safe Useful Life Expectancy (SULE), (Barrel, 2001):** A trees safe useful life expectancy is determined by assessing a number of different factors including the health and vitality, estimated age in relation to expected life expectancy for the species, structural defects, and remedial works that could allow retention in the existing situation.

Category	Description
1. Long - Over 40 years	(a) Structurally sound trees located in positions that can accommodate future growth. (b) Trees that could be made suitable for retention in the long term by remedial tree care. (c) Trees of special significance for historical, commemorative or rarity reasons that would warrant extraordinary efforts to secure their long term retention.
2. Medium - 15 to 40 years	(a) Trees that may only live between 15 and 40 more years. (b) Trees that could live for more than 40 years but may be removed for safety or nuisance reasons. (c) Trees that could live for more than 40 years but may be removed to prevent interference with more suitable individuals or to provide space for new planting. (d) Trees that could be made suitable for retention in the medium term by remedial tree care.
3. Short - 5 to 15 years	(a) Trees that may only live between 5 and 15 more years. (b) Trees that could live for more than 15 years but may be removed for safety or nuisance reasons. (c) Trees that could live for more than 15 years but may be removed to prevent interference with more suitable individuals or to provide space for new planting. (d) Trees that require substantial remedial tree care and are only suitable for retention in the short term.
4. Remove - Under 5 years	(a) Dead, dying, suppressed or declining trees because of disease or inhospitable conditions. (b) Dangerous trees because of 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 that could live for more than 5 years but may be removed to prevent interference with more suitable individuals or to provide space for new planting. (f) Trees that are damaging or may cause damage to existing structures within 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	(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.

8. **Root investigations:** The root investigations should identify roots greater than 30mm in diameter that are located along the edge of the structures footprint or in the location of footings. Root investigations must be carried out using non-invasive methods, such as manual excavations or ground penetrating radar (GPR). Any excavations for the root investigations must carried out manually to avoid damaging the roots during excavations. Manual excavation may include the use of a high-pressure air/air knife, or a combination of high-pressure water and a vacuum device. When hand excavating carefully work around roots retaining as many as possible. Take care to not fray, wound, or cause damage to any roots during excavations as this may cause decay or infection from pathogens. It is essential that exposed roots are kept moist and the excavation back filled as soon as possible. The root investigations should be carried out by a qualified Arborist minimum AQF3. Once roots are exposed, a visual assessment can be carried out by a consulting Arborist to evaluate the potential impact of the proposed root loss on the health and stability of the tree. A root map/report should be prepared identifying the findings of investigations, including photographs as supporting evidence in the report.

9. **Retention Value:** The system I have used to award the retention value is Tree AZ. Tree AZ is used to identify higher value trees worthy of being a constraint to development and lower value trees that should generally not be a constraint to the development. The table below provides a brief description of each category.

TreeAZ Categories (Version 10.04-ANZ)

CAUTION: TreeAZ assessments must be carried out by a competent person qualified and experienced in arboriculture. The following category descriptions are designed to be a brief field reference and are not intended to be self-explanatory. They must be read in conjunction with the most current explanations published at www.TreeAZ.com.

Category Z: Unimportant trees not worthy of being a material constraint

Local policy exemptions: Trees that are unsuitable for legal protection for local policy reasons including size, proximity and species	
Z1	Young or insignificant small trees, i.e. below the local size threshold for legal protection, etc
Z2	Too close to a building, i.e. exempt from legal protection because of proximity, etc
Z3	Species that cannot be protected for other reasons, i.e. scheduled noxious weeds, out of character in a setting of acknowledged importance, etc
High risk of death or failure: Trees that are likely to be removed within 10 years because of acute health issues or severe structural failure	
Z4	Dead, dying, diseased or declining
Z5	Severe damage and/or structural defects where a high risk of failure cannot be satisfactorily reduced by reasonable remedial care, i.e. cavities, decay, included bark, wounds, excessive imbalance, overgrown and vulnerable to adverse weather conditions, etc
Z6	Instability, i.e. poor anchorage, increased exposure, etc
Excessive nuisance: Trees that are likely to be removed within 10 years because of unacceptable impact on people	
Z7	Excessive, severe and intolerable inconvenience to the extent that a locally recognized court or tribunal would be likely to authorize removal, i.e. dominance, debris, interference, etc
Z8	Excessive, severe and intolerable damage to property to the extent that a locally recognized court or tribunal would be likely to authorize removal, i.e. severe structural damage to surfacing and buildings, etc
Good management: Trees that are likely to be removed within 10 years through responsible management of the tree population	
Z9	Severe damage and/or structural defects where a high risk of failure can be temporarily reduced by reasonable remedial care, i.e. cavities, decay, included bark, wounds, excessive imbalance, vulnerable to adverse weather conditions, etc
Z10	Poor condition or location with a low potential for recovery or improvement, i.e. dominated by adjacent trees or buildings, poor architectural framework, etc
Z11	Removal would benefit better adjacent trees, i.e. relieve physical interference, suppression, etc
Z12	Unacceptably expensive to retain, i.e. severe defects requiring excessive levels of maintenance, etc

NOTE: Z trees with a high risk of death/failure (Z4, Z5 & Z6) or causing severe inconvenience (Z7 & Z8) at the time of assessment and need an urgent risk assessment can be designated as ZZ. ZZ trees are likely to be unsuitable for retention and at the bottom of the categorization hierarchy. In contrast, although Z trees are not worthy of influencing new designs, urgent removal is not essential and they could be retained in the short term, if appropriate.

Category A: Important trees suitable for retention for more than 10 years and worthy of being a material constraint

A1	No significant defects and could be retained with minimal remedial care
A2	Minor defects that could be addressed by remedial care and/or work to adjacent trees
A3	Special significance for historical, cultural, commemorative or rarity reasons that would warrant extraordinary efforts to retain for more than 10 years
A4	Trees that may be worthy of legal protection for ecological reasons (Advisory requiring specialist assessment)

NOTE: Category A1 trees that are already large and exceptional, or have the potential to become so with minimal maintenance, can be designated as AA at the discretion of the assessor. Although all A and AA trees are sufficiently important to be material constraints, AA trees are at the top of the categorization hierarchy and should be given the most weight in any selection process.

Glossary of Terms

Abiotic - Pertaining to non-living agents; e.g. environmental factors

Adventitious shoots - Shoots that develop other than from apical, axillary or dormant buds; see also 'epicormic'

Anchorage - The system whereby a tree is fixed within the soil, involving cohesion between roots and soil and the development of a branched system of roots which withstands wind and gravitational forces transmitted from the aerial parts of the tree

Bark - A term usually applied to all the tissues of a woody plant lying outside the vascular cambium, thus including the phloem, cortex and periderm; occasionally applied only to the periderm or the phellem

Branch:
- **Primary**. A first order branch arising from a stem
- **Lateral**. A second order branch, subordinate to a primary branch or stem and bearing sub-lateral branches
- **Sub-lateral**. A third order branch, subordinate to a lateral or primary branch, or stem and usually bearing only twigs

Branch collar - A visible swelling formed at the base of a branch whose diameter growth has been disproportionately slow compared to that of the parent stem; a term sometimes applied also to the pattern of growth of the cells of the parent stem around the branch base

Brown-rot - A type of wood decay in which cellulose is degraded, while lignin is only modified

Buckling - An irreversible deformation of a structure subjected to a bending load

Buttress zone - The region at the base of a tree where the major lateral roots join the stem, with buttress-like formations on the upper side of the junctions

Cambium - Layer of dividing cells producing xylem (woody) tissue internally and phloem (bark) tissue externally

Canker - A persistent lesion formed by the death of bark and cambium due to colonisation by fungi or bacteria

Compartmentalisation - The confinement of disease, decay or other dysfunction within an anatomically discrete region of plant tissue, due to passive and/or active defences operating at the boundaries of the affected region

Compressive loading - Mechanical loading which exerts a positive pressure; the opposite to tensile loading

Condition - An indication of the physiological condition of the tree. Where the term ‘condition’ is used in a report, it should not be taken as an indication of the stability of the tree

Crown/Canopy - The main foliage bearing section of the tree

Crown lifting - The removal of limbs and small branches to a specified height above ground level

Crown thinning - The removal of a proportion of secondary branch growth throughout the crown to produce an even density of foliage around a well-balanced branch structure

Crown reduction/shaping - A specified reduction in crown size whilst preserving, as far as possible, the natural tree shape

DAB (Diameter Above Buttress) - Trunk diameter measured above the root buttress

Defect - In relation to tree hazards, any feature of a tree which detracts from the uniform distribution of mechanical stress, or which makes the tree mechanically unsuited to its environment

Dieback - The death of parts of a woody plant, starting at shoot-tips or root-tips

Disease - A malfunction in or destruction of tissues within a living organism, usually excluding mechanical damage; in trees, usually caused by pathogenic micro-organisms

Dominance - In trees, the tendency for a leading shoot to grow faster or more vigorously than the lateral shoots; also the tendency of a tree to maintain a taller crown than its neighbours

Dormant bud - An axial bud which does not develop into a shoot until after the formation of two or more annual wood increments; many such buds persist through the life of a tree and develop only if stimulated to do so

Dysfunction - In woody tissues, the loss of physiological function, especially water conduction, in sapwood

DBH (Diameter at Breast Height) - Stem diameter measured at a height of 1.4 metres or the nearest measurable point. Where measurement at a height of 1.4 metres is not possible, another height may be specified

Deadwood - Branch or stem wood bearing no live tissues. Retention of deadwood provides valuable habitat for a wide range of species and seldom represents a threat to the health of the tree. Removal of deadwood can result in the ingress of decay to otherwise sound tissues and climbing operations to access deadwood can cause significant damage to a tree. Removal of deadwood is generally recommended only where it represents an unacceptable level of hazard

Epicormic shoot - A shoot having developed from a dormant or adventitious bud and not having developed from a first year shoot

Flush-cut - A pruning cut which removes part of the branch bark ridge and or branch-collar

Girdling root - A root which circles and constricts the stem or roots possibly causing death of phloem and/or cambial tissue

Habit - The overall growth characteristics, shape of the tree and branch structure

Hazard beam - An upwardly curved part of a tree in which strong internal stresses may occur without being reduced by adaptive growth; prone to longitudinal splitting

Incorporating extracts from Lonsdale, D. 1999. Principles of Tree Hazard Assessment. Her Majesty's Stationary Office, London

Heartwood/false-heartwood - The dead central wood that has become dysfunctional as part of the aging processes and being distinct from the sapwood

Heave - A term mainly applicable to a shrinkable clay soil which expands due to re-wetting after the felling of a tree which was previously extracting moisture from the deeper layers; also the lifting of pavements and other structures by root diameter expansion; also the lifting of one side of a wind-rocked root-plate

Included bark (ingrown bark) - Bark of adjacent parts of a tree (usually forks, acutely joined branches or basal flutes) which is in face-to-face contact

Lever arm - A mechanical term denoting the length of the lever represented by a structure that is free to move at one end, such as a tree or an individual branch

Lignin - The hard, cement-like constituent of wood cells; deposition of lignin within the matrix of cellulose microfibrils in the cell wall is termed Lignification

Lions tailing - A term applied to a branch of a tree that has few if any side-branches except at its end, and is thus liable to snap due to end- loading

Loading - A mechanical term describing the force acting on a structure from a particular source; e.g. the weight of the structure itself or wind pressure

Mycelium - The body of a fungus, consisting of branched filaments (hyphae)

Occlusion - The process whereby a wound is progressively closed by the formation of new wood and bark around it

Pathogen - A micro-organism which causes disease in another organism

Photosynthesis - The process whereby plants use light energy to split hydrogen from water molecules, and combine it with carbon dioxide to form the molecular building blocks for synthesizing carbohydrates and other biochemical products

Probability - A statistical measure of the likelihood that a particular event might occur

Pruning - The removal or cutting back of twigs or branches, sometimes applied to twigs or small branches only, but often used to describe most activities involving the cutting of trees or shrubs

Radial - In the plane or direction of the radius of a circular object such as a tree stem

Reactive Growth/Reaction Wood - Production of woody tissue in response to altered mechanical loading; often in response to internal defect or decay and associated strength loss (cf. adaptive growth)

Ring-barking - The removal of a ring of bark and phloem around the circumference of a stem or branch, normally resulting in an inability to transport photosynthetic assimilates below the area of damage. Almost inevitably results in the eventual death of the affected stem or branch above the damage

Root-collar - The transitional area between the stem/s and roots

Sapwood - Living xylem tissues

Soft-rot - A kind of wood decay in which a fungus degrades cellulose within the cell walls, without any general degradation of the wall as a whole

Stem/s - Principle above-ground structural component(s) of a tree that supports its branches

Stress - In plant physiology, a condition under which one or more physiological functions are not operating within their optimum range, for example due to lack of water, inadequate nutrition or extremes of temperature

SRZ (Structural Root Zone) - The area around the bas of the tree required for the trees stability in the ground.

Subsidence - In relation to soil or structures resting in or on soil, a sinking due to shrinkage when certain types of clay soil dry out, sometimes due to extraction of moisture by tree roots

Taper - In stems and branches, the degree of change in girth along a given length

Targets - In tree risk assessment (with slight misuse of normal meaning) persons or property or other things of value which might be harmed by mechanical failure of the tree or by objects falling from it

Topping - In arboriculture, the removal of the crown of a tree, or of a major proportion of it

Transpiration - The evaporation of moisture from the surface of a plant, especially via the stomata of leaves; it exerts a suction which draws water up from the roots and through the intervening xylem cells

TPZ (Tree Protection Zone) - A specified area above and below ground and at a given distance from the trunk set aside for the protection of a tree's roots and crown to provide for the viability and stability of a tree to be retained where it is potentially subject to damage by development.

Understory - This layer consists of younger individuals of the dominant trees, together with smaller trees and shrubs which are adapted to grow under lower light conditions

Veteran tree - Tree that, by recognised criteria, shows features of biological, cultural or aesthetic value that are characteristic of, but not exclusive to, individuals surviving beyond the typical age range for the species concerned. These characteristics might typically include a large girth, signs of crown retrenchment and hollowing of the stem

Vigour - The expression of carbohydrate expenditure to growth (in trees)

White-rot - A range of kinds of wood decay in which lignin, usually together with cellulose and other wood constituents, is degraded

Wind exposure - The degree to which a tree or other object is exposed to wind, both in terms of duration and velocity

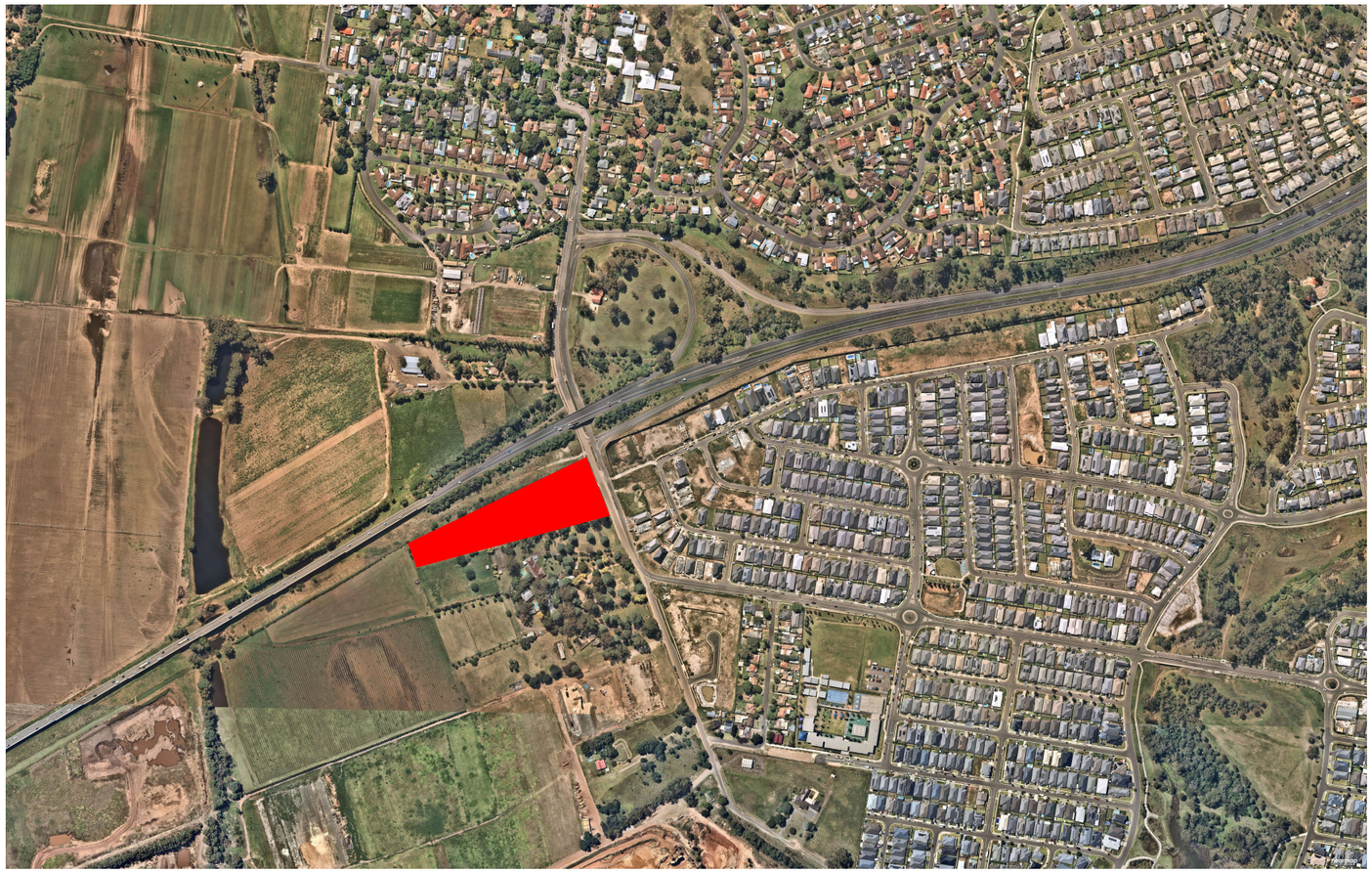
Wind pressure - The force exerted by a wind on a particular object

Windthrow - The blowing over of a tree at its roots

Incorporating extracts from Lonsdale, D. 1999. Principles of Tree Hazard Assessment. Her Majesty's Stationary Office, London

SWADLING DEVELOPMENTS

CONCEPT LANDSCAPE PLANS
TO SUPPORT DEVELOPMENT APPLICATION
FOR SUBDIVISION OF LOT 1 IN DP542867



156 MACARTHUR ROAD
SPRING FARM

PRELIMINARY NOTES;

1.0 EXCAVATION AND EARTHWORKS

ASSESS THE SITE CONDITIONS AND EVALUATE THE EXCAVATION AND EARTHWORKS REQUIRED PRIOR TO COMMENCING ANY WORK. FAMILIARISATION WITH LOCATION OF TOPSOIL STOCKPILES, ROADS AND PATHWAYS ON SITE. ESTABLISH EXACT LOCATIONS OF SERVICES, DRAINS, SEWERS, WATER, POWER AND GAS POINTS PRIOR TO COMMENCING ANY AND ALL EARTHWORKS. IT IS THE CONTRACTORS RESPONSIBILITY TO ENSURE THEIR PROTECTION DURING THE WORKS.

THE LANDSCAPE CONTRACTOR MUST TAKE ALL MEASURES TO MINIMISE EROSION AND SILTATION BUILD UP ON SITE AS A DIRECT CONSEQUENCE OF WORKS PERFORMED ON SITE AS OUTLINED BY THE SCOPE OF WORKS - REFER TO ATTACHED SPECIFICATION. THIS INCLUDES BUT NOT LIMITED TO WORK STAGING, STABILISATION OF ALL EXPOSED EXCAVATION AND EARTHWORK AREAS, DIVERSION DRAINS, DRAINAGE PITS AND SILT TRAPS WHERE REQUIRED. ANY DRAINAGE DEVICE IMPLEMENTED TO CONTAIN ON SITE EROSION AND SILTATION IS ADDITIONAL TO EXISTING DEVICES ALREADY INSTALLED IN CIVIL WORKS.

ALL SURFACE DRAINAGE SHALL DIVERT RUN OFF AWAY FROM EXCAVATIONS AND STOCKPILES. ENSURE ALL RUN-OFF IS NOT CONCENTRATED ONTO ADJOINING PROPERTIES. FINISHED SURFACES LEVELS AND GRADES MUST BE IN ACCORDANCE WITH LANDSCAPE PLANS. THE CONTRACTOR MUST PROVIDE BARRIERS FOR SAFETY WHERE REQUIRED IN ACCORDANCE WITH WORKPLACE HEALTH AND SAFETY LAWS AND CODES AND ALL OTHER RELEVANT CODES. ERECT BARRIERS AS REQUIRED TO PREVENT EXCAVATED AND STOCKPILED MATERIAL AND ROCKS FROM INTRUDING INTO ADJOINING PROPERTIES.

ALL DEMOLITION WORKS ARE TO BE CARRIED OUT ONLY WITHIN THE NOMINATED EXTENT OF WORKS AREA.

LANDSCAPE (SUB) CONTRACTOR TO LIASE WITH SITE SUPERINTENDENT AND RELEVANT AUTHORITIES PRIOR TO CARRYING OUT ANY SITE WORKS TO DETERMINE THE EXACT LOCATION OF SERVICES TO AVOID DISTURBANCE.

2.0 ENVIRONMENTAL PROTECTION

THE LANDSCAPE CONTRACTOR SHOULD CONSIDER IF THE USE OF CHEMICAL CONTROL MEASURES TO CONTROL WEED ERADICATION IS ABSOLUTELY NECESSARY BEFORE APPLICATION. THE CONTRACTOR IS TO ASSESS ALL RISKS ASSOCIATED WITH THE PRODUCT, SITE CONDITIONS AND SPECIES OF WEED TO ENSURE MINIMUM RISK TO THEMSELVES, OTHER PERSONS ON SITE AND PERSONS IN SURROUNDING AREAS AND THE ENVIRONMENT.

HERBICIDE: ERADICATION OF WEEDS USING ENVIRONMENTALLY ACCEPTABLE METHODS, SUCH AS NON RESIDUAL GLYPHOSATE HERBICIDE IN ANY OF ITS REGISTERED FORMULAE, AT THE RECOMMENDED MAXIMUM RATE.

REAPPLY ERADICATION METHODS THROUGHOUT THE COURSE OF WORKS, DURING ESTABLISHMENT AND MAINTENANCE PERIOD.

THE LANDSCAPE CONTRACTOR MUST BE A CERTIFIED OPERATOR AND TAKE APPROPRIATE SAFETY PRECAUTIONS IN ACCORDANCE WITH ALL CURRENT STATUTORY REGULATIONS WHEN APPLYING CHEMICAL CONTROL MEASURES.

ALL UNUSED AND UNWANTED CONTAINERS AND CHEMICALS MUST BE DISPOSED OF 'OFF SITE' BY THE LANDSCAPE CONTACTOR IN A SAFE MANNER IN ACCORDANCE WITH THE METHODS APPROVED BY THE RELEVANT AUTHORITIES.

THE LANDSCAPE CONTRACTOR IS REQUIRED TO ASSESS ANY AND ALL POTENTIAL WILDLIFE PROBLEMS AT THE COMMENCEMENT AND DURING THE COURSE OF THE WORKS. THE LANDSCAPE CONTRACTOR IS RESPONSIBLE FOR AND MUST MAKE ALLOWANCE FOR ANY PROTECTION OR CONTROL OF SUCH PESTS THAT THEY THINK NECESSARY THROUGH THE CONTRACT PERIOD. FAILURE TO DO THIS MAY RESULT IN A BREECH OF CONTRACT. ANY AND ALL ISSUES THAT MAY ARISE ON SITE MUST BE COMMUNICATED TO THE LANDSCAPE ARCHITECT IMMEDIATELY

ANY PROPOSED METHOD OF PROTECTION OR CONTROL OF PESTS MUST BE AGREED WITH THE LANDSCAPE ARCHITECT PRIOR TO USE ON SITE. ALL PRACTICABLE STEPS MUST BE TAKEN TO RESTRICT DUST CAUSED BY THE WORKS TO A MINIMUM AND MINIMISE NOISE RESULTING FROM SUCH WORKS.

ALL PRECAUTIONS MUST BE TAKEN TO PREVENT EROSION, CONTAMINATION AND SEDIMENTATION OF THE SITE, SURROUNDING AREAS, WATER AND DRAINAGE SYSTEMS IN ACCORDANCE WITH THE ENVIRONMENTAL PROTECTION (WATER) POLICY 1997. PROTECTION SHALL INCLUDE BUT NOT BE LIMITED:

- CONSTRUCTION OF TEMPORARY SURFACE SWALES;
- CONSTRUCTION OF TEMPORARY SILTATION FENCING;
- DIVERSION AND DISPERSAL OF CONCENTRATED FLOWS;
- CONSTRUCTION AND MAINTENANCE OF SILT TRAPS (EG HAY BALES) TO PREVENT CONTAMINATION TO DOWNSTREAM AREAS;

ANY AND ALL DAMAGE THAT HAS OCCURRED AS A RESULT OF NEGLIGENCE ON THE BEHALF OF THE LANDSCAPE CONTRACTOR, MUST RECTIFY THE DAMAGE AT THERE OWN EXPENSE. IT IS THE RESPONSIBILITY OF THE LANDSCAPE CONTRACTOR TO TAKE ALL MEASURES TO ENSURE DAMAGE DOES NOT OCCUR AND TO PROTECT THE SITE, MATERIALS AND ALL WORKS COVERED IN THEIR SCOPE OF WORKS.
ALL TEMPORARY EROSION CONTROL MEASURES MUST BE REMOVED WHEN NO LONGER REQUIRED.

3.0 EXISTING TREES

ALL EXISTING VEGETATION MUST BE PROTECTED UNLESS OTHERWISE SPECIFIED. ALL EQUIPMENT IS TO BE USED IN LINE WITH WORKPLACE HEALTH AND SAFETY STANDARDS TO ENSURE THE SAFETY OF BOTH PEOPLE AND PRODUCT. ALL VEGETATION AND WEED REMOVAL IS TO BE CARRIED OUT USING INDUSTRY STANDARD ACCEPTED SAFETY PROCEDURES. ALL PRECAUTIONS MUST BE TAKEN TO AVOID DAMAGE TO NEARBY TREES AND SURROUNDINGS. ANY DAMAGE OR DISTURBANCE TO EXISTING PLANTING AND TURF AREAS IS TO BE REINSTATED AS PER ORIGINAL LANDSCAPE DRAWINGS AND SPECIFICATIONS.

4.0 CULTIVATION & SUBSURFACE DRAINAGE

THE LANDSCAPE CONTRACTOR IS TO PROVIDE SUFFICIENT SURFACE AND SUBSURFACE DRAINAGE TO GARDEN BEDS AND TURF AREAS TO ENSURE POSITIVELY DRAINED AREAS FREE FROM PONDING AND WATER LOGGING OF SOILS.

CULTIVATION OF SUBGRADE IS TO A MINIMUM DEPTH OF 150mm PRIOR TO PLACING UNDER TURF TOPSOIL FOR ALL TURF AREAS AND TO A MINIMUM DEPTH OF 200mm FOR ALL PLANTING AREAS. CULTIVATE MANUALLY WITHIN 300mm OF PATHS OR STRUCTURES AND WITHIN THE DRIP LINE OF TREES TO A MINIMUM DEPTH OF 100mm. REMOVE STONES EXCEEDING 25mm, CLODS OF EARTH EXCEEDING 50mm. AND ALL WEED MATERIAL. GRUB OUT STUMPS AND ROOTS OVER 50mm IN DIAMETER TO A MINIMUM DEPTH OF 300mm BELOW SUB-GRADE. TRSE AND SHRUB STUMPS LESS THAN 75mm IN DIAMETER MUST BE CUT OFF AT GROUND LEVEL AND TREATED TO PREVENT RE-GROWTH. TRIM THE SURFACE TO DESIGN LEVELS AFTER CULTIVATION. **ADDITIVES** GENERAL: APPLY ADDITIVES AFTER RIPPING OR CULTIVATION AND INCORPORATE INTO THE UPPER 100mm LAYER OF THE SUBGRADE. GYPSUM: INCORPORATE AT THE RATE IN ACCORDANCE WITH THE MANUFACTURES GUIDELINES

5.0 FILL & TOPSOIL

FILL REQUIRED FOR LEVELING MUST BE FROM PREVIOUS EARTHWORKS ON SITE OR IMPORTED FROM A CERTIFIED SUPPLIER AS REQUIRED. ALL FILL MATERIAL TO BE USED MUST BE FREE FROM

- LOGS, STUMPS AND OTHER VEGETATIVE MATERIAL;
- MATERIALS SUSCEPTIBLE TO SPONTANEOUS COMBUSTION;
- CLAY OF LIQUID LIMIT EXCEEDING 90 AND/OR PLASTICITY INDEX EXCEEDING 65.
- REFUSE AND RUBBISH;
- CONCRETE AND MASONRY RUBBLE, AND
- TOXIC MATERIALS AND SUBSTANCES.

SUPPLY AND INSTALL IMPORTED TOPSOIL COMPLYING WITH AS 4419 - 1996.

- TURF AREAS 50mm
- PLANTING AREAS 300mm
- PLANTER BOXES 400mm

THE ABOVE TOPSOIL DEPTHS APPLY UNLESS OTHERWISE SPECIFIED.

SPREAD TOPSOIL ON PREPARED SUB-GRADE AND GRADE EVENLY, MAKING ALLOWANCES FOR REQUIRED FINISHED LEVELS AND CONTOURS (ALLOW FOR LIGHT COMPACTION). TURFED AREAS MAY BE FINISHED FLUSH WITH ADJACENT HARD SURFACES PRIOR TO COMPACTION OR A MINIMUM OF 15-20mm LOWER AFTER LIGHT COMPACTION - SURFACES MAY INCLUDE KERBS, PATHS AND MOWING STRIPS ETC.

THE REUSE OF MODIFIED TOPSOIL MUST BE FREE FROM STONES, VEGETATIVE MATTER, STUMPS, CLODS GREATER THAN 75mm AND TOXIC MATERIALS. MODIFIED SITE SOIL MUST HAVE GOOD DRAINAGE AND BE HIGH IN ORGANIC MATTER. ALL MODIFIED SOILS TO COMPLY WITH AS4419.
ALL TOPSOILS MUST CONTAIN A MINIMUM 20% OF HYDROCELL:

SPECIFIC:

HORIZON A: (TOP 30cm, 40cm IN PLANTER BOXES) SOIL BLEND ORGANIC SOIL CONFIRMED TO AS 4419 WITH NO MORE THAN 30% SCREENED COMPOSTED ORGANIC MATTER, HYDRAULIC CONDUCTIVITY 15-30 cm/hr PH 5-6.5 AND BLENDED WITH 20% HYDROCELL (BY VOLUME)

HORIZON B: (BELOW 30cm, 40CM IN PLANTER BOXES) SOIL BLEND CONFORMING TO AS4419 WITH NO MORE THAN 3-8% SCREENED COMPOSTED ORGANIC MATTER, HYDRAULIC CONDUCTIVITY 30-40cm/hr. PH 5-6.5, NO HYDROCELL

6.0 TURF

SUPPLY AND INSTALL 'GREENLEAS PARK' COUCH WHERE REQUIRED REFER TO PLAN - LAY TURF WITH CLOSE BUTT-JOINTED SODS ALONG CONTOUR WITH STAGGERED END JOINTS.
INSTALL TURF TO EXTENT AS SPECIFIED ON LANDSCAPE PLAN. FINISH LEVELS SHOULD BE FLUSH WITH ADJACENT SURFACES UNLESS OTHERWISE SPECIFIED. APPLY TOPSOIL AS SPECIFIED AND TRIM TO LEVELS AS INDICATED, MIX FERTILISER THOROUGHLY INTO TOPSOIL BEFORE PLACING THE TURF. APPLY LAWN FERTILISER AT THE COMPLETION OF THE FIRST MOWING TO MAINTAIN HEALTHY GRASS-COVER.

TURF TO BE FREE FROM ALL WEED AND NUTGRASS. DELIVERY OF TURF MUST BE WITHIN 24HOURS OF CUTTING FROM SOURCE. TURF MUST BE LAYED UPON DELIVERY TO SITE, MAXIMUM TIME FROM CUT TO LAY MUST BE NO MORE THAN 36 HOURS. PREVENT TURF FROM DRYING OUT BETWEEN CUTTING AND LAYING.

WATER IMMEDIATELY AFTER LAYING UNTIL THE TOPSOIL IS MOISTENED TO IT'S FULL DEPTH. CONTINUE WATERING TO MAINTAIN MOISTURE TO ITS DEPTH.

7.0 MULCH

SUPPLY AND INSTALL ORGANIC MULCH TO A MINIMUM DEPTH 100mm, GRAVEL MULCH TO A MINIMUM DEPTH OF 75mm WHERE SPECIFIED. ALL ORGANIC MULCH MUST BE FREE FROM STONES AND SOILS. .

All mulches used for landscape planting shall comply with AS 4454 and the following requirements:

(i) THE MATERIAL SHALL COMPRISE HARDWOOD CHIPS.

(ii) FINES SHALL NOT EXCEED 5 PER CENT BY VOLUME.

(iii) GRAVEL MULCH - 20-75mm ROUNDED RIVER ROCK, LAID ON GEO-TEXTILE MATTING

8.0 PLANT SUPPLY

THE CONTRACTOR SHALL SUPPLY PLANTS AS SPECIFIED IN PLANT SCHEDULE. PLANTS SHALL BE DELIVERED AS SPECIFIED UNLESS ALTERNATE ARRANGEMENTS ARE MADE FOR SUBSTITUTIONS WITH THE LANDSCAPE ARCHITECT PRIOR TO DELIVERY. ALL PLANT STOCK MUST BE FREE OF WEEDS, DISEASE AND FUNGI

ALL SUPPLIED PLANT STOCK MUST HAVE THE FOLLOWING CHARACTERISTICS:

- LARGE HEALTHY ROOT SYSTEMS, WITH NO EVIDENCE OF ROOT ROT OR POT BOUND;
- VIGOROUS, WELL ESTABLISHED STOCK, FREE FROM DISEASE AND PESTS AND HAVE GOOD GROWTH HABIT TYPICAL OF THE SPECIES OR VARIETY;
- HARDENED OFF;
- TREES: PROVIDE TREES WHICH, UNLESS REQUIRED TO BE MULTI-STEMMED, HAVE A SINGLE LEADING SHOOT.

REPLACE DAMAGED OR FAILED PLANTS WITH PLANTS OF THE SAME TYPE, SIZE AND MATURITY. THOROUGHLY WATER THE PLANTS BEFORE PLANTING, IMMEDIATELY AFTER PLANTING, AND AS REQUIRED TO MAINTAIN GROWTH FREE OF STRESS. ALL PLANTS TO HAVE SLOW RELEASE FERTILISER PELLETS OR TABS PLACED AT THE TIME OF PLANTING. ALL DELIVERED PLANT MATERIAL MUST BE PLANTED ON A DAY TO DAY BASIS, AND PLANT IMMEDIATELY AFTER DELIVERY, NO PLANT IS TO BE STORED ON SITE

9.0 CONCRETE

CONSTRUCTION SHALL BE IN ACCORDANCE WITH AUS-SPEC®1.C271 - MINOR CONCRETE WORK AND TAREE COUNCIL STANDARD DRAWING SD 103 ATTACHED.

ALL CONCRETE PATHWAYS TO BE INSTALLED ON 50MM COMPACTED CRUSHER DUST OVER COMPACTED SUB-BASE. TYPICALLY PATHWAY WIDTH 1200mm OR AS SHOWN.CONCRETE SHALL HAVE A MINIMUM 28 DAY STRENGTH OF 32 MPa AND HAVE A SLUMP OF 80mm. MAXIMUM AGGREGATE SIZE OF 20mm, SAND SHALL BE CLEAN. SHARP WASHED RIVER OR QUARRY SAND FREE FROM SILT AND ORGANIC MATTER, ALL JOINTS AND EDGES TO BE FINISHED WITH AN EDGING TOOL. PROVIDE EXPANSION JOINTS AT MAXIMUM 4m MIN AND 6m MAX CENTRES. PROVIDE CONTRACTION JOINTS AT MAX 2m CENTRES, PROVIDE EXPANSION JOINTS AT CONNECTIONS TO KERBS, STRUCTURES AND BOTH SIDES OF VEHICLE CROSSINGS, MAKE SMOOTH CONNECTIONS TO EXISTING PATHS, MAX STEP +3mm ABOVE -0.MM BELOW EXISTING, ROUND ALL EDGES. PATH CROSSFALL SHALL BE HAVE A DESIRABLE 2% CROSSFALL, MAX 2.5% . TGBS (IF INSTALLED) PLACEMENT TO BE IN ACCORDANCE WITH AS1428.4. REFER TO AS 1428.2 FOR GRADIENTS OF RAMPS, LANDINGS AND PEDESTRIAN KERB RAMPS.NOTE MIN 600mm CONTINUOUS GRADE TO BE MAINTAINED ALONG ALL PATHWAY EDGES.

FINISH
CP COLOUR NATURAL CONCRETE - BROOM FINISH

10.0 FINISHED LANDSCAPE LEVELS

ALLOW FOR ALL LANDSCAPE SURFACE FINISHES IN SITE BULK EARTH WORK. FINISHED LANDSCAPE LEVELS AS SHOWN ARE TO BE CONFIRMED ON SITE BEFORE CONSTRUCTION TO ENSURE POSITIVE DRAINAGE AWAY FROM BUILDINGS, REQUIRED CROSS FALLS ON HARDSTAND AREAS AND LONGITUDINAL GRADES ON PATHS.

11.0 IRRIGATION SYSTEM

TEMPORARY IRRIGATION SYSTEM TO BE ESTABLISHED FOR ALL PLANTING AND TURF AREAS AND TO BE MAINTAINED FOR THE EXTENT OF THE REQUIRED ESTABLISHMENT PERIOD.

12.0 COMPLETION

THE PLANTING ESTABLISHMENT PERIOD COMMENCES AT THE DATE OF PRACTICAL COMPLETION. THE ESTABLISHMENT PERIOD IS FOR A PERIOD NO LESS THAN 12 WEEKS. ANY STREETSCAPE AND/OR TREE WORKS REQUIRE 12 MONTHS ESTABLISHMENT. WHERE EXISTING GRASS OR PLANTING IS LOCATED WITHIN THE LANDSCAPE CONTRACT AREA, MAINTAIN IT FOR THE SPECIFIED 12 WEEK ESTABLISHMENT PERIOD MAINTENANCE WORKS MAY INCLUDE BUT NOT LIMITED TO WATERING, MOWING, PEST AND DISEASE CONTROL, FERTILISING, STAKING, TOPDRESSING PRUNING AND REPLACEMENT OF FAILED PLANTS AS NECESSARY

No.	Date	Description	By
	07/04/22	CONCEPT DEVELOPMENT	SE

Amendments

Notes

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6. The scale of this drawing may be affected by enlargement or reduction during transmission

Client: SWADLING DEVELOPMENTS
Project: SUB DIVISION
156 MACARTHUR ROAD, SPRING FARM NSW
Drawing: **COVERSHEET**

Landscape Documentation Services

SHAUN ELLIS AILA
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t 0435 842 775

Proj. No 2211 **Dwg No.** C00/
Drawn SE
Scale 1:0.96 @ A1
Comp. Ref. spring farm.pln

LEGEND

- Lot Boundarys
- No build extent
- Rain Garden
- Street trees
- No build zone
- Block turf
- Mixed height planting Native

Mixed planting to batter.
Small tree to boundary, screening shrubs, sedges and ground cover planting to batter.
Define planting and block turf area by continuous concrete edge. Refer planting and edge details on Drawing C01.

EXISTING TREES TO BE RETAINED WITHIN A NO BUILD ZONE (HATCHED)
note: under story of trees to be maintained as existing during construction. No spoil or building material stockpiles to be placed within no build zone.

SMALLER STREET TREES TO NORTHERN INTERNAL ROADWAY SIDE.
45lt minimum stock, refer to detail 01
Road verge to be block turf, refer detail 04

Landscape buffer to eastern boundary facing Macarthur Road.
Mixed planting of native trees, shrubs and ground covers. (refer Planting Schedule)
Buffer to provide both privacy within new development and continue the planting form along Macarthur Road consistent with planting to the south

Building lots, fill to be grass seeded following final placement.

Proposed dish crossing across intersection and installation of pram ramps and other road works to council requirements and engineering details,by others

Existing cycleway to remain, Turf verge as required

Refer Engineering drawings for all structural and construction details for fill, proposed access road and civil works.

Mixed planting, trees, shrubs and groundcover. Ref schedule C01

SITE PLAN
Scale 1:500

RAIN GARDEN
Refer to Engineering drawings for soil profile detail and media specifications.
Refer to drawing C01 for additional information.
Note Rain garden area to be turfed and maintained as silt trap during construction. Raingarden to be installed once civil construction etc are complete, Planting in groups of 7-30, selected gravel mulch.

TALLER STREET TREES TO SOUTHERN INTERNAL ROADWAY SIDE.
100lt minimum stock, refer to detail 01
Road verge to be block turf, refer detail 04

EXISTING TREES TO BE RETAINED WITHIN A NO BUILD ZONE (HATCHED)
note: under story of trees to be maintained as existing during construction. No spoil or building material stockpiles to be placed within no build zone.

Buffer planting extent defined by continuous concrete edge.
refer detail 07

No.	Date	Description	By
	07/04/22	CONCEPT DEVELOPMENT	SE

Amendments

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Client: SWADLING DEVELOPMENTS
Project: SUB DIVISION
156 MACARTHUR ROAD, SPRING FARM NSW
Drawing: SITE LANDSCAPE CONCEPT

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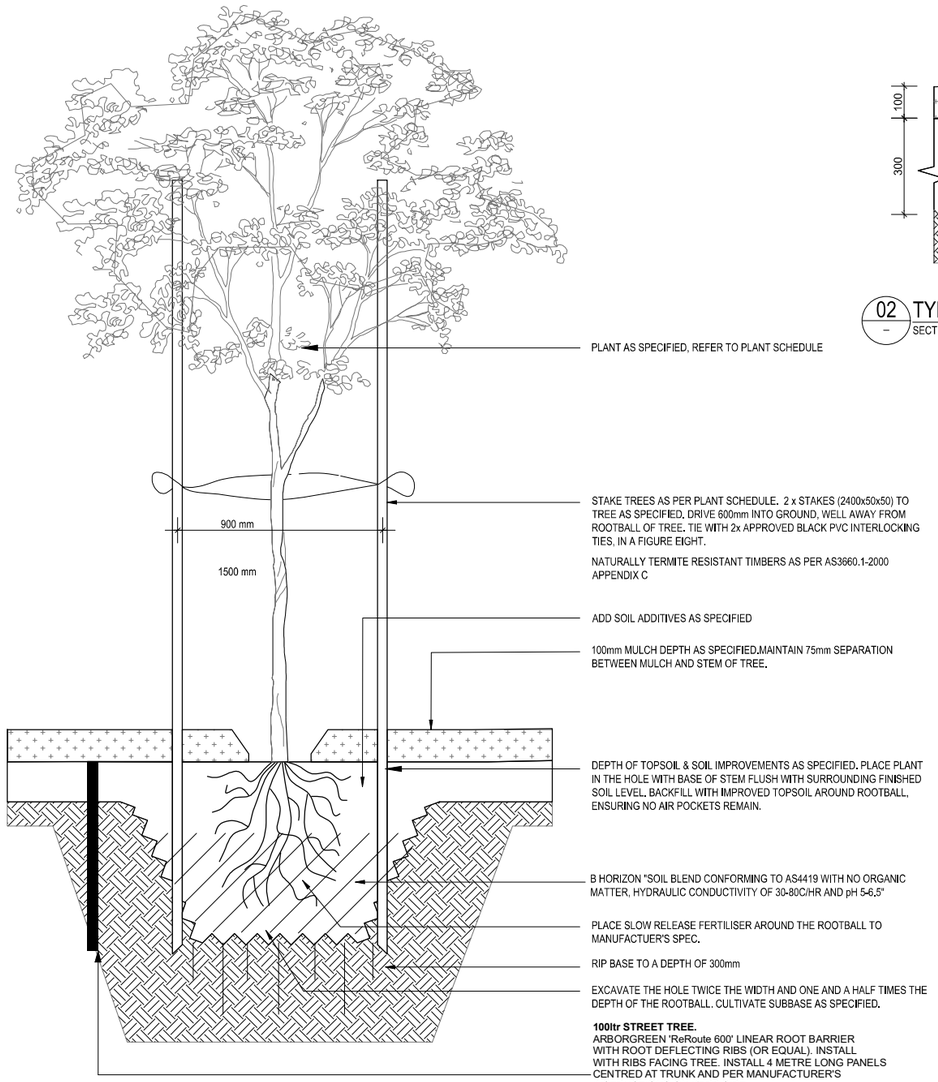
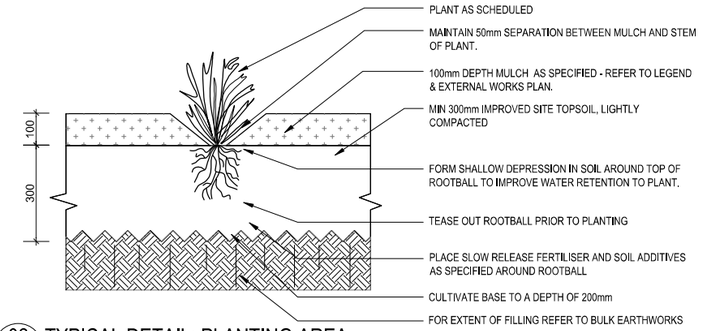
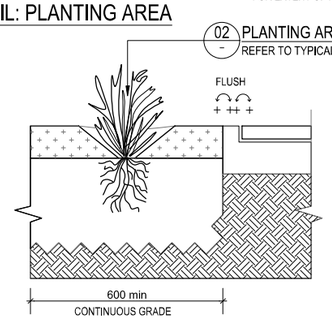
Proj. No 2211 **Dwg No.** C01/
Drawn SE
Scale 1:500, 1:100 @ A1
Comp. Ref. spring farm.pln



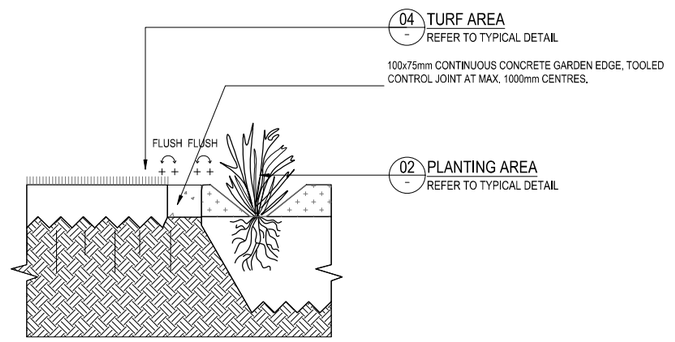
01 – TYPICAL TREE PLANTING - 45 - 200 ltr
1:10



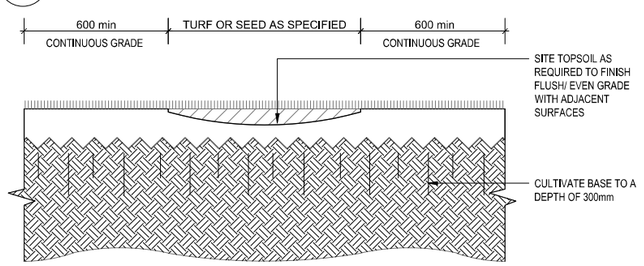
02 – TYPICAL DETAIL: PLANTING AREA
SECTION 1:10



03 – TYPICAL DETAIL: FINISH MANHOLE
SECTION 1:10



07 – TYPICAL DETAIL: CONCRETE GARDEN EDGE
SECTION 1:10



06 – TYPICAL DETAIL: MAKE GOOD DISTURBED AREA
SECTION 1:10

RAINGARDEN FILTER MEDIA

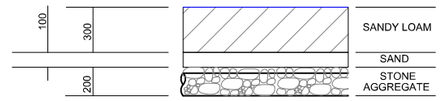
MEDIA SHALL COMPLY WITH THE GUIDELINES FOR SOIL FILTER MEDIA IN BIORETENTION SYSTEMS - (VERSION 2.0) MARCH 2008 PREPARED BY FACILITY FOR ADVANCED WATER BIOFILTRATION (FAWB) AVAILABLE FROM :- http://www.monash.edu.au/fawb/

FILTER MEDIA

- LOAMY SAND MIX

VERY FINE SAND	- 5-30%	(0.05 - 0.15mm)
FINE SAND	- 10-30%	(0.15 - 0.252mm)
MEDIUM TO COARSE SAND	- 40-60%	(0.25 - 1.0mm)
COARSE SAND	- 7-10%	(1.0 - 2.0mm)
FINE SAND	- <3%	(2.0 - 3.4mm)

- LOAMY SAND MIX
- FREE OF STONES, STUMPS, ROOTS OR OTHER WOODY MATERIAL OVER 25mm Ø
- FREE OF BRUSH OR WEEDS
- PLACED IN 300mm LOOSLEY COMPACTED LAYERS WITH NO SETTLEMENT UPON COMPLETION
- SATURATED HYDRAULIC CONDUCTIVITY TO BE 100-300mm/hr UNDER COMPACTION
- ORGANIC CONTENT - <5%
- TOTAL NITROGEN CONTENT - ≤ 800mg/kg



CODE	BOTANICAL NAME	COMMON NAME
CAREX	APPRESSA	TALL SEDGE
ELEOCHARIS	ACUTA	COMMON SPIKE RUSH
ELEOCHARIS	SPHACELATA	TALL SPIKE RUSH
UNCUS	USITATUS	TUSSOCK RUSH

TYPICAL RAIN GARDEN DETAIL (refer to Engineering Details)

CONCEPT PLANT SCHEDULE

BUFFER PLANTING

TREES	45ltr min. pot size x 45
Corymbia citriodora 'Scentuous'	
Cupaniopsis anarcardiodes	
Elaeocarpus eumundii	
Hymenosporum flavum	
Melaleuca linariifolia	
Waterhousea floribunda	
SHRUBS	200mm pot size x 902
Banksia spp	
Callistemon spp	
Doryanthes excelsa	
Grevillea shrubs – eg 'Spinebill'	
Syzygium spp.	
GROUND COVER - GRASSES	140mm pot size x 1804
Dianella caerulea	
Hardenbergia violacea	
Myoporum parvifolium	
Carex appressa	
Lomandra varieties incl 'Tanika' 'Nyalla'	
Themeda australis	

STREET TREES

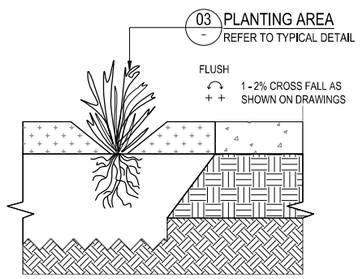
Elaeocarpus reticulatus	*100ltr*	*x 17*
Buckinghamia celsissima	*45ltr*	*x 17*

RAIN GARDEN

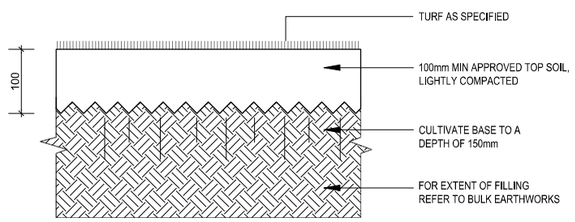
Carex appressa	*tube 300mm spacing x 1283*
Eleocharis acuta	*tube 300mm spacing x 1283*
Eleocharis sphacelata	*tube 300mm spacing x 1283*
Uncus usitatus	*tube 300mm spacing x 1283*

(plant in groups 7-30) 50% coverage, gravel mulch.

NOTE
Concept plant schedule based on Camden Council '*Tree and Landscape Species List*'



05 – TYPICAL DETAIL: PAVEMENT IN PLANTING
SECTION 1:10



04 – TYPICAL BLOCK TURF -
1:10

LANDSCAPE DETAIL

No	Date	Description	By
	07/04/22	CONCEPT DEVELOPMENT	SE

Amendments

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Client: SWADLING DEVELOPMENTS
Project: SUB DIVISION
156 MACARTHUR ROAD, SPRING FARM NSW
Drawing: LANDSCAPE DETAILS

Landscape Documentation Services

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Proj. No 2211 Dwg No. C01/
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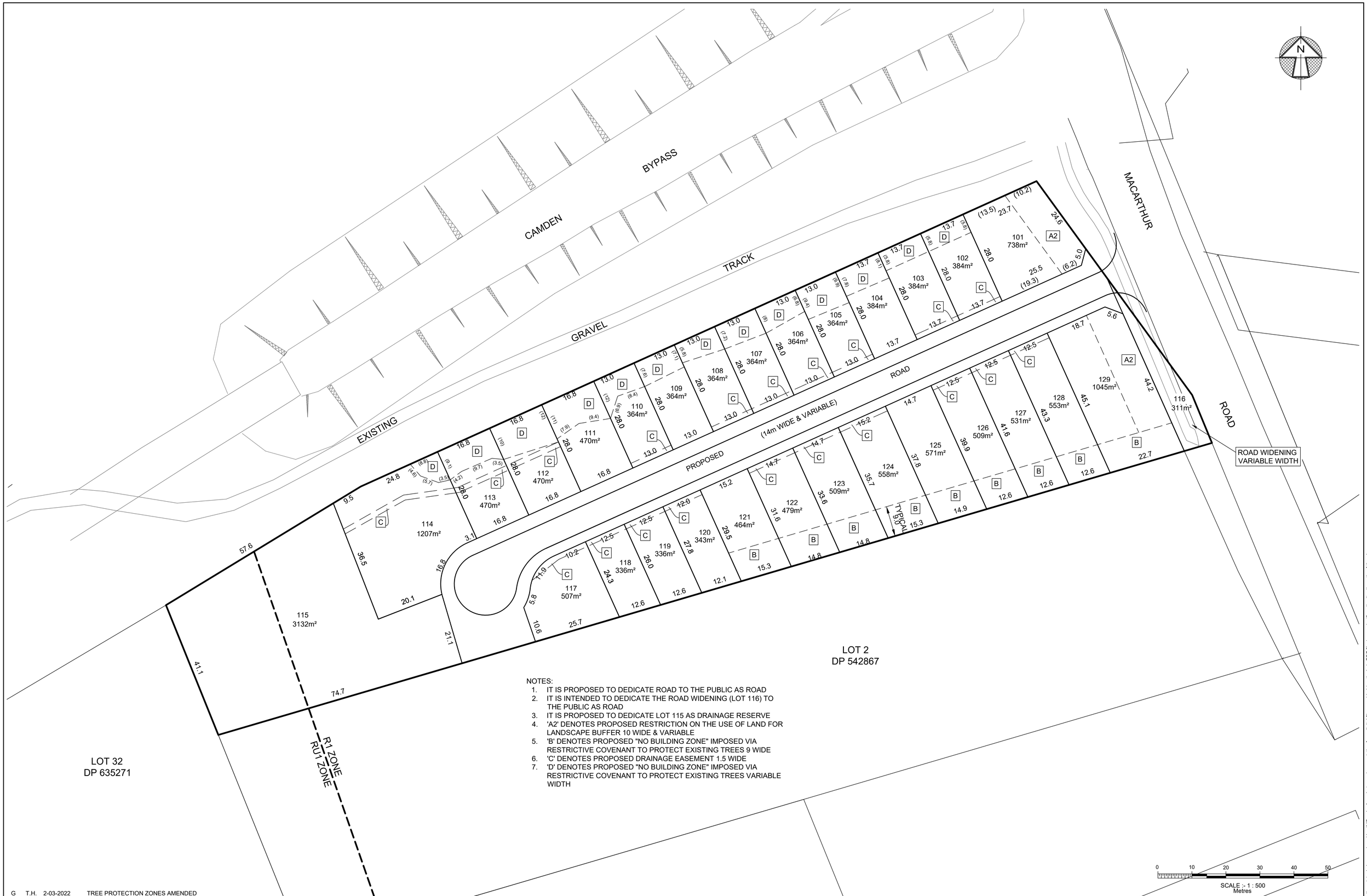
Comp. Ref. spring farm.pln



NOTES:

1. IT IS PROPOSED TO DEDICATE ROAD TO THE PUBLIC AS ROAD
2. IT IS INTENDED TO DEDICATE THE ROAD WIDENING (LOT 116) TO THE PUBLIC AS ROAD
3. IT IS PROPOSED TO DEDICATE LOT 115 AS DRAINAGE RESERVE
4. 'A2' DENOTES PROPOSED RESTRICTION ON THE USE OF LAND FOR LANDSCAPE BUFFER 10 WIDE & VARIABLE
5. 'B' DENOTES PROPOSED "NO BUILDING ZONE" IMPOSED VIA RESTRICTIVE COVENANT TO PROTECT EXISTING TREES 9 WIDE
6. 'C' DENOTES PROPOSED DRAINAGE EASEMENT 1.5 WIDE
7. 'D' DENOTES PROPOSED "NO BUILDING ZONE" IMPOSED VIA RESTRICTIVE COVENANT TO PROTECT EXISTING TREES VARIABLE WIDTH

Issue	App	Date	Description
G	T.H.	2-03-2022	TREE PROTECTION ZONES AMENDED
F	T.H.	2-03-2022	TREE PROTECTION ZONES AMENDED
E	T.H.	28-02-2022	PLAN FOR ISSUE TO COUNCIL
D	T.H.	18-02-2022	BE LOTS 106 TO 110 ADJUSTED
C	T.H.	9-02-2022	LAYOUT UPDATED TO REFLECT REVISED CIVIL DESIGN
B	T.H.	24-01-2022	NO BUILD ZONE ON NORTHERN BOUNDARY, LOT 101 UPDATED
A	T.H.	17-12-21	ISSUED FOR CLIENT REVIEW

Client: SWADLING DEVELOPMENTS

Designed by : T.H.

Date of Drawing : 17-12-2021

Ratio (A1) : 1:500

Datum : AHD

Origin of Levels : N/A

Date of Survey : 24-05-2019

JMD Development Consultants

John M. Daly & Associates PTY LTD
A.B.N. 88051977989
Surveying
Engineering
Project Management
Licensed Water Service Co ordinators
32 Iolanthe Street
P.O. BOX 25
CAMPBELLTOWN N.S.W. 2560
PH. (02) 4625 5055
FAX (02) 4628 2013
email: admin@jmd.com.au

Project : LOT 1 IN DP 542867 - 156 MACARTHUR ROAD, SPRING FARM

Sheet 1 of 1 sheets

PLAN OF PROPOSED SUBDIVISION

Ref: 17142PS2

Locality : SPRING FARM

L.G.A. : CAMDEN

CAD Ref: C:\WORK\17142 MACARTHUR RD\17142 LAYOUT 1

SWADLING DEVELOPMENTS

PRELIMINARY CIVIL ENGINEERING PLANS TO SUPPORT DEVELOPMENT APPLICATION FOR SUBDIVISION OF LOT 1 IN DP542867

LOCALITY SKETCH
(NOT TO SCALE)

SHEET NO.	DESCRIPTION	ISSUE
1	COVER SHEET	E
2	DEMOLITION PLAN	A
3	PROPOSED WORKS & SOIL & WATER MANAGEMENT PLAN	E
4	SOIL & WATER MANAGEMENT NOTES	A
5	ROAD DETAILS AND CATCHMENT PLAN	B
6	PROPOSED CUL-DE-SAC & RAINGARDEN WORKS	C
7	PROPOSED SECTIONS	A
7A	PLAN OF CUT AND FILL	C

GENERAL NOTES

G1 All work to be carried out in accordance with Camden Council's Engineering Design and Engineering Construction Specifications and to the requirements of the Certifying Authority.

G2 Inspections by the Certifying Authority are required at the following stages and the works approved prior to continuance of any future work:

(a) Prior to installation of erosion and sediment control structures/measures.

(b) Prior to backfilling pipelines, subsoil drains and dams.

(c) Prior to casting of pits and other concrete structures, including kerb and gutter but following placement of footings, formwork and reinforcement.

(d) Prior to placement of sub-base and all subsequent pavement layers, a Proof roller test of each pavement layer is required

(e) Formworks prior to pouring concrete in parking area for footpath crossing and other associated work

(f) Prior to backfilling public utility crossings in road reserves

(g) Final inspection after all works are completed and 'works as executed' plans have been submitted to Council

G3 No trees to be removed unless approval is granted by Council's Landscape Compliance Officer, or as authorised by development consultant.

G4 Make smooth junctions with existing works.

G5 No work to be carried out on Council property or adjoining properties without the written permission from the owner/s.

G6 Vehicular access and all utilities/services to be maintained at all times to adjoining properties affected by construction.

G7 All rubbish, buildings, sheds and fences to be removed to satisfaction of Council's Engineer.

G8 Council engineers have discretion to vary, as considered necessary, the engineering requirements in respect of a particular subdivision or development having regard to the site context.

EARTHWORKS NOTES

E1 Earthworks to be carried out to the satisfaction of the Council. Unsuitable materials are to be removed from roads and lots prior to filling. The contractor is to arrange and make available compaction testing results for all areas that contain fill in excess of 200mm.

E2 Compaction of earthworks shall continue until a dry density ration of 95% for site filling and 100% for road pavement subgrades has been achieved in accordance with test method AS1289.5.3.1 or AS1289.5.1.1. The control testing of earthworks shall be in accordance with the guidelines in AS3798 'guidelines on Earthworks for Commecial and Residential Developments'. Where it is proposed to use test method AS1289.5.8.1 to determine the field density, a sand replacement method shall be used to confirm the results.

E3 The geotechnical testing authority shall have a level 1 responsibility for all filling as defined in Appendix B AS 3798 'Guidelines onEarthworks for Commercial and residential Developments', and at the end of the works shall confirm the earthworks comply with the requirements of the specification and drawings by written notification.

E4 Where the slope of the natural surface exceeds 1(V):4(H), benches are to be cut to prevent slipping of the placed fill material as required by the Council.

E5 All batters are to be scarified to a depth of 50mm to assist with adhesion of top soil to batter face.

E6 Provide minimum 150mm and maximum 300mm topsoil on footpaths, filled areas and all other areas disturbed during construction. Topsoiled areas to be stabilised with approved vegetation a maximum of 14 days after topsoiling and are to be watered to ensure germination.

E7 The Contractor shall control sedimentation, erosion and pollution during construction in accordance with the requirements of the current edition of 'Managing Urban Stormwater: Soils and Construction' produced by Landcom.

E8 Table drains are to be stabilised with the placement of couch turf immediately after the completion of final trim to drain & footpath reserves. Maintain turf as required during the maintenance period.

ROADWORKS NOTES

R1 Subgrades and sub-bases to be compacted in accordance with Council's Construction Specification.

R2 Subsoil drains to be provided on both sides of roads (except where there is stormwater drainage).

R3 150 x 50 H.D. galvanised steel kerb outlets to be placed in all kerb types on low side of lots. Provide suitable adaptor to allow connection of 90mm dia. stormwater pipe.

R4 Gutter slots to be provided at regular intervals and at pits (only where temporary seal finishes below lip of gutter).

R5 Lipless Perambulator crossings to be provided in all kerb returns or where required by Council.

R6 Service conduits to be placed as directed by all public utility authorities inc. Integral Energy, Telstra and as required by Sydney Water.

R7 Proposed services crossing existing roads shall be provided for using a trenchless technique so as not to damage existing surface. All service conduits laid under roads must be laid to a minimum depth of 750mm

R8 Concrete footpath construction to be bonded with Council pending completion of services, and surrounding dwellings.

STORMWATER NOTES

S1 All pipes to be spigot and socket, rubber ring jointed.

S2 All longitudinal pipelines in roads must be located under kerb and gutter and be backfilled with approved granular material unless otherwise indicated on plans and approved by Council.

S3 Drainage lines must be backfilled with approved granular material in all areas. Three (3) metres of agline wrapped in geotech stocking is to must be provided to all downstream pits.

S4 All gully pits to Council's standard and lintels centrally placed at sag pits.

S5 All pits must be benched and streamlined. Provide SL72 reinforcement and step irons in all pits over 1.2m deep UNO.

S6 Concrete to have minimum compressive strength of 32 MPa at 28 days unless specified otherwise by Council Engineer.

S7 All interallotment drainage must have a minimum cover of 450mm to the top of pipe, and to be minimum 150mmØ unless otherwise approved by the Council Engineer.

S8 Catch drains must be constructed as required by Council's Engineer or the PCA.

S9 All common drainage lines must be laid centrally within 1.5m/3.0m easements. Cleaning eyes must be provided immediately downstream of all slope junctions.

S10 One hundred (100) year ARI overland flow paths must be formed and shown on works as executed drawings.

S11 Adequate provision to be made for scouring and sedimentation to all drainage works in accordance with Council's requirements.

S12 Common drainage lines must be installed after Sydney Water sewerage lines have been installed where sewer is proposed adjacent to inter allotment

S13 All plans (both desing and WAE) to clearly delinate the extent/ location of flood lines including the 5% AEP, 1% AEP and PMF.

S14 Pit Lintels to be stencilled with applicatble distinction stencil available from council.

S15 Soil and Water Management Plans are to be prepared for all disturbed sites and adhered to at all times during the construction and maintenance periods.

ADDITIONAL NOTES:

A1 The contractor is to paint lot no's & street no's of each lot and street names on the kerbs. Lot no's are to be a white number on a brunswick green background located on the prolongation of both common boundaries of each lot. House numbers are to be botanic/brunswick green on white background located adjacent to the middle of each lot. Street names are to be white lettering on brunswick green background located on both sides of each road at the kerb and gutter tangent points and as directed by council.

A2 The contractor shall ensure that all pit lintels are labelled with permanent stencilled signs identifying that the pit drains to "kemp's creek"

A3 The contractor shall ensure that the location of all watermain hydrants are marked by appropriate kerb markings and by the placement of raised, blue reflective pavement markers on the centreline of the road pavement adjacent to all hydrants.

A3 Root guards are to be provided to all trees that are planted within 1.5m of any pit, sub-soil drainage, footpath or kerb.

A4 Traffic management procedures & systems shall be introduced during the construction works to ensure safety of public and workers and must be in accordance with as1742.3

A5 All works and procedures carried out in association with this development shall be completed in accordance with the requirements of the workcover authority and occupational health and safety legislation and regulations.

A6 All construction and demolition works shall be restricted to the following hours. 7am to 6pm mondays to fridays (inclusive), 8am to 5pm saturdays if noise is inaudible to adjoining residential properties otherwise 8am to 4pm, and work on sundays and public holidays is prohibited.

A7 All waste shall be disposed of at an approved waste disposal depot and copies of all documentation associated with such disposal shall be provided to the principal. A waste control container shall be located on site and no waste material shall be stored on site other than in such container.

A8 Contractor shall erect a sign (minimum size of 300mm x 400mm) at the entrance to the site prior to the commencement of any works advertising the following:-
- full details of the pca
- full details of the construction certificate
- full details of development consent no da-30/2011
- full details of the builder/contractor

VER	BY	AMENDMENTS	DATE
A	T.H.	ISSUED FOR DA	09-02-2022
B	T.H.	ISSUE REGISTER UPDATED SHTS 1,3,5,7A	18-02-2022
C	T.H.	ISSUE REGISTER UPDATED SHTS 1 AND 3	28-02-2022
D	T.H.	ISSUE REGISTER UPDATED SHTS 1,3,6,7A	2-03-2022
E	T.H.	ISSUE REGISTER UPDATED SHTS 1,3,6,7A	9-03-2022
F			
G			

- THE POSITION OF SERVICES SHOWN ON THIS DRAWING ARE INDICATIVE ONLY AND HAVE BEEN PLOTTED FROM PLANS AND DRAWINGS SUPPLIED BY RELEVANT AUTHORITIES.
- SERVICE AUTHORITY PITS, MANHOLES, POLES, MARKER POSTS, ETC., WHERE SIGHTED AT TIME OF SURVEY, HAVE BEEN LOCATED. THE SURVEY DOES NOT INCLUDE INVESTIGATION OR LOCATION OF UNDERGROUND INFRASTRUCTURE.
- SERVICES INFORMATION SHOWN ON THIS DRAWING HAS BEEN OBTAINED THROUGH A DIAL BEFORE YOU DIG SEARCH AND IS VALID FOR THE PERIOD OF TIME FROM THE DATE OF ISSUE NOMINATED BY THE AUTHORITY.
- PRIOR TO ANY DEMOLITION, EXCAVATION OR CONSTRUCTION ON OR ADJACENT TO THE SITE IT IS THE RESPONSIBILITY OF THE DEVELOPER AND CONTRACTORS TO APPLY FOR AND OBTAIN UP TO DATE PLANS THROUGH A NEW DIAL BEFORE YOU DIG SEARCH AND TO CONTACT ALL THE RELEVANT AUTHORITIES TO ESTABLISH AND CONFIRM THE DETAILED LOCATION AND DEPTH OF ALL UNDERGROUND SERVICES.

www.dialbeforeyoudig.com.au DIAL1100 BEFORE YOU DIG

CLIENT: SWADLING DEVELOPMENTS

Beveridge Williams
Land Development Consultants
Registered Surveyors
Miranda (02) 9524 4073 www.beveridgewilliams.com.au

DETAILS:
LOT 1 IN DP 542867
156 MACARTHUR ROAD, SPRING FARM
DA CIVIL WORKS
COVER SHEET

ORIGINAL
SCALE N/A SHEET SIZE A1
CAD REFERENCE: 17142E4_COVER

SURVEYOR:	X.X.
DRAWN:	X.X.
CHECKED:	T.H.
SURVEY DATE:	24-05-2019
VERTICAL DATUM:	AHD
HORIZONTAL DATUM:	MGA

PROJECT No. 17142
DRAWING REF. 17142E4
VERSION C
SHEET 1 OF 7

LEGEND

DENOTES EXISTING PAVEMENT TO REMAIN

DENOTES EXISTING TREE TO BE RETAINED

DENOTES EXISTING TREE TO BE REMOVED

N

BYPASS

CAMDEN

TRACK

GRAVEL

EXISTING

MACARTHUR

ROAD

EXISTING STORAGE CONTAINERS TO BE REMOVED

EXISTING DWELLING AND SHEDS TO BE DEMOLISHED AND REMOVED FROM SITE

EXISTING POOL AND CONCRETE SURROUNDS TO BE DEMOLISHED AND REMOVED FROM SITE

EXISTING SHEDS TO BE DEMOLISHED AND REMOVED FROM SITE

UNSEALED TRACK TO BE DEMOLISHED & REMOVED FROM SITE

SAWCUT, REMOVE & DISPOSE OFFSITE EXISTING CYCLE ACROSS PROPOSED INTERSECTION & MAKE SMOOTH CONNECTION TO EXISTING

VER	BY	AMENDMENTS	DATE
A	T.H.	ISSUED FOR DA	09-02-2022
B			
C			
D			
E			
F			
G			

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www.dialbeforeyoudig.com.au DIAL1100 BEFORE YOU DIG

CLIENT:
SWADLING DEVELOPMENTS

Beveridge Williams
Land Development Consultants
Registered Surveyors
Miranda (02) 9524 4073 www.beveridgewilliams.com.au

DETAILS:
LOT 1 IN DP 542867
156 MACARTHUR ROAD, SPRING FARM
DA CIVIL WORKS
DEMOLITION PLAN

ORIGINAL SHEET SIZE A1
SCALE 1:500
CAD REFERENCE: 17142 layout 1
0 10 20 30
SCALE ON ORIGINAL DRAWING AT 1:500

SURVEYOR:	X.X.
DRAWN:	X.X.
CHECKED:	T.H.
SURVEY DATE:	24-05-2019
VERTICAL DATUM:	AHD
HORIZONTAL DATUM:	MGA

PROJECT No. 17142
DRAWING REF. 17142E4
VERSION A
SHEET 2 OF 7

LEGEND

- EXISTING TREES TO REMAIN
- 675Ø — DENOTES PROPOSED STORMWATER DRAINAGE PIT, PIPE & PIPE SIZE
- x71.42 — DENOTES EXISTING SURFACE LEVELS
- DENOTES BUILDING ENVELOPE DIMENSIONS
- 7/1 — DENOTES GRATED SURFACE INLET PIT WITH HOUSE CONNECTION & PIT No.
- 73.5 — DENOTES EXISTING SURFACE CONTOURS
- 70.5 — DENOTES PROPOSED SURFACE CONTOURS
- DENOTES PROPOSED PATH PAVING TO COUNCIL'S REQUIREMENTS
- DENOTES GRAVEL KERB INLET SEDIMENT TRAP
- DENOTES GEOTEXTILE FILTER AROUND GRATED SURFACE INLET PITS
- DENOTES STABILISED ACCESS POINT
- DENOTES 1.8m HIGH TEMPORARY MANPROOF FENCE
- SF — DENOTES SEDIMENT FENCING
- DENOTES APPROX. EXTENT OF FILL IN RESIDENTIAL LOT AREAS

N

CONSTRUCT HEADWALL OUTLET AND RIP RAP ROCK LINING TO EXISTING OUTLET DRAIN

1500 X 450 RCBC OUTLET

RIPRAP SCOUR PROTECTION

PROPOSED DISCHARGE CONTROL PIT 4m X 4m

PROPOSED BASIN WITH RAINGARDEN CONSTRUCTED IN THE BOTTOM. PROPOSED BASIN TO BE USED AS TEMPORARY SEDIMENT BASIN UNTIL WORKS ARE COMPLETED AND SITE IS STABILISED

0.5m HIGH SANDSTONE LOG RETAINING WALLS (TYPICAL)

RIPRAP SCOUR PROTECTION

3.0m WIDE MAINTENANCE ACCESS TO BASIN

BATTER TO EXISTING AT BOUNDARY AT1 IN 6. NO FILL AROUND TREES ON BOUNDARY

CONSTRUCT NEW PATH PAVING INCLUDING PRAM RAMPS TO COUNCIL'S SPECIFICATIONS

PROPOSED DRAINAGE WORKS BY GEOLYSE PROJECT NO. 319118 AND DATED 15/05/2019

PROPOSED DISH CROSSING ACROSS INTERSECTION TO COUNCIL'S REQUIREMENTS

EXISTING LINEMARKING & DRAINAGE IN MACARTHUR ROAD TO REMAIN

SAWCUT, REMOVE & DISPOSE OFFSITE EXISTING CYCLEWAY ACROSS PROPOSED INTERSECTION & PROVIDE PRAM RAMPS TO COUNCIL'S REQUIREMENTS

EXISTING CYCLEWAY TO REMAIN

SILT FENCE IS SHOWN OUTSIDE BOUNDARY FOR CLARITY ONLY AND TO BE INSTALLED WITH PROPERTY BOUNDARY

BASED ON MOTT MACDONALD PLANS VIEWED AT CAMDEN COUNCIL 34 MARCH 2019 825mm PIPE DISCHARGES TO MACARTHUR RD 1640L/s IN 1 IN 5 YEAR EVENT.
PIT SL=75.31 INV 73.34
LOW (3 MONTH) FLOWS TO BE DIVERTED TO RAIN GARDEN ON WESTERN SIDE OF MACARTHUR RD
1 IN 1 YEAR FLOW = 50% OF 1 IN 5 YEAR FLOW (APPROX)
3 MONTH FLOW = 50% OF 1 IN 1 YEAR FLOW (APPROX)
THUS 3 MONTH FLOW ACROSS ROAD = 1640*.5*.5 = 410L/s.
NOMINAL CAPACITY OF 525mm PIPE AT 1% = 475L/s
PROPOSAL IS TO CREATE A SUMP IN BASE OF PIT TO DIVERT LOW FLOWS TO WEST.

CALCULATION OF HEAD REQUIRED TO GET 410l/S INTO 525mm PIPE
Q=0.6ASQRT(2gh) Q=0.41CUMECS
A=0.216m²
h= 0.52m

THUS INVERT OF LOW FLOW PIPE FROM EXISTING PIT TO CROSS MACARTHUR RD = 72.90-.52 = 72.38

VER	BY	AMENDMENTS	DATE
A	T.H.	ISSUED FOR DA	09-02-2022
B	T.H.	TPZ UPDATE BE 106 TO 110 AMENDED	18-02-2022
C	T.H.	TREE PROTECTION ZONES UPDATED	28-02-2022
D	T.H.	ENVELOPES REMOVED	2-03-2022
E	T.H.	TREE PROTECTION ZONES UPDATED	9-03-2022
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156 MACARTHUR ROAD, SPRING FARM
DA CIVIL WORKS
PROPOSED WORKS & SOIL & WATER MANAGEMENT PLAN

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CAD REFERENCE: revised eng
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SCALE ON ORIGINAL DRAWING AT 1:500

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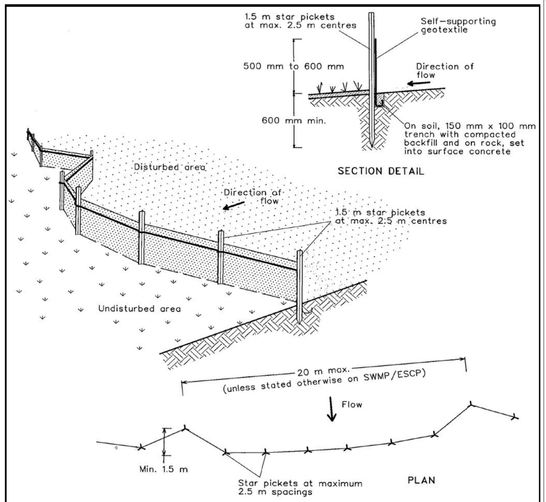
PROJECT No. 17142
DRAWING REF. 17142E4
VERSION D
SHEET 3 OF 7



Construction Notes

1. Construct sediment fences as close as possible to being parallel to the contours of the site, but with small returns as shown in the drawing to limit the catchment area of any one section. The catchment area should be small enough to limit water flow if concentrated at one point to 50 litres per second in the design storm event, usually the 10-year event.
2. Cut a 150-mm deep trench along the upslope line of the fence for the bottom of the fabric to be entrenched.
3. Drive 1.5 metre long star pickets into ground at 2.5 metre intervals (max) at the downslope edge of the trench. Ensure any star pickets are fitted with safety caps.
4. Fix self-supporting geotextile to the upslope side of the posts ensuring it goes to the base of the trench. Fix the geotextile with wire ties or as recommended by the manufacturer. Only use geotextile specifically produced for sediment fencing. The use of shade cloth for this purpose is not satisfactory.
5. Join sections of fabric at a support post with a 150-mm overlap.
6. Backfill the trench over the base of the fabric and compact it thoroughly over the geotextile.

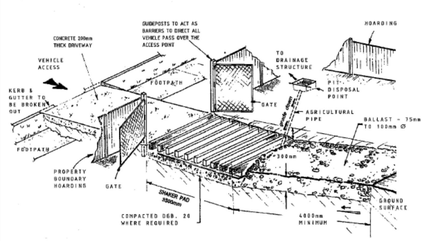
SEDIMENT FENCE **SD 6-8**

STABILISED ACCESS POINT

TYPE II SAP

THE TYPE II SAP DESIGN IS MORE DEFINED IN THAT IT REQUIRES AN AREA OF BALLAST WITHIN THE SITE COMBINED WITH A SHAKER PAD, ADJACENT THE SHAKER PAD AND IN THE PUBLIC WAY IS A TEMPORARY (CONCRETE) VEHICULAR CROSSING. (SEE DIAGRAM)

STABILISED ACCESS POINT - TYPE 2



NOTES

IN BOTH TYPE I AND TYPE II SAPS, THE TEMPORARY VEHICULAR CROSSING MUST:

CONNECT TO AN EXISTING GUTTER LAYBACK (WHERE KERB AND GUTTER EXIST). IF A GUTTER LAYBACK DOES NOT EXIST THEN THE CONNECTION MUST BE MADE TO THE GUTTER BY REMOVING THE ADJACENT KERB SECTION ONLY.
CONNECT TO A DISH CROSSING (WHERE KERB AND GUTTER DOES NOT EXIST). IF A DISH CROSSING DOES NOT EXIST, THEN IT MUST BE CONSTRUCTED IN ACCORDANCE WITH DETAILS CONTAINED IN COUNCIL'S ISSUED FOOTPATH CROSSING LEVELS.

IT SHOULD BE NOTED THAT THESE TYPES OF SAPS ARE CONSIDERED TO BE APPLICABLE FOR THE MAJORITY OF ACTIVITIES HOWEVER SOME SITES MAY REQUIRE SPECIAL CONSIDERATION.

SHAKER PAD (CATTLE-GRID)

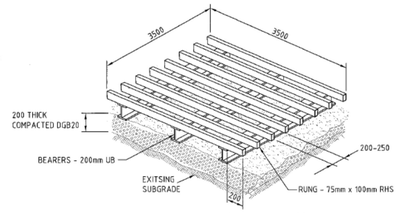
A CORRECTLY DESIGNED AND INSTALLED SHAKER PAD WILL ASSIST IN PREVENTING SEDIMENT TRANSFER FROM A SITE. ANY STABILISED ACCESS POINT (SAP) CAN BE DESIGNED WITH A SHAKER PAD (COMPULSORY IN TYPE II SAP'S).

SHAKER PADS CAN BE DESIGNED AND CONSTRUCTED TO ENABLE RE-USE ON FUTURE PROJECTS.

THE SHAKER PAD:

- MUST BE DESIGNED AND CERTIFIED BY A PRACTICING STRUCTURAL ENGINEER. THE CERTIFIED DESIGN SHOULD BE SUBMITTED WITH THE RELEVANT APPLICATION
- CAN BE CONSTRUCTED FROM ANY SUITABLE MATERIAL
- MUST BE LOCATED ON A SUITABLY PREPARED AND COMPACTED SUB-GRADE/BASE MATERIAL
- MUST BE SITUATED SUCH THAT THE RUNGS OF THE SHAKER PAD ARE LEVEL WITH THE ADJOINING NATURAL SURFACE
- MUST BE A MINIMUM 3.5M IN LENGTH
- MUST BE A MINIMUM 3.5M IN WIDTH
- MUST HAVE CLEAR SPACING BETWEEN RUNGS OF 200 - 250MM
- RUNGS MUST HAVE A MAXIMUM WIDTH (BEARING AREA) OF 75MM
- MUST HAVE A MINIMUM CLEAR DEPTH OF 300MM IE FROM THE TOP OF THE RUNG TO THE FINISHED SUB-GRADE/BASE LEVEL

THE SHAKER PAD MUST BE PROVIDED WITH SUITABLE BARRIERS AT THE SIDES TO ENSURE THAT ALL TYRES OF VEHICLES LEAVING THE SITE TRAVERSE THE DEVICE.

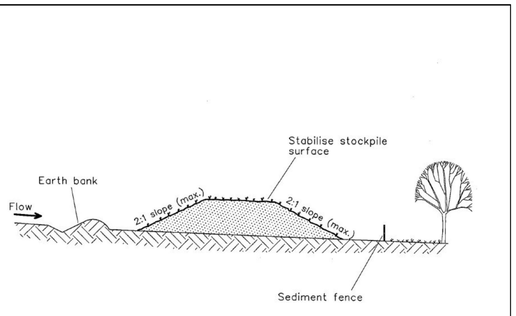


SHAKER PAD (CATTLE-GRID)

A	JAN 2009	FIRST ISSUE	A.P.	C.M.
REVISION	DATE	DESCRIPTION	DRAWN	APP.

camden council

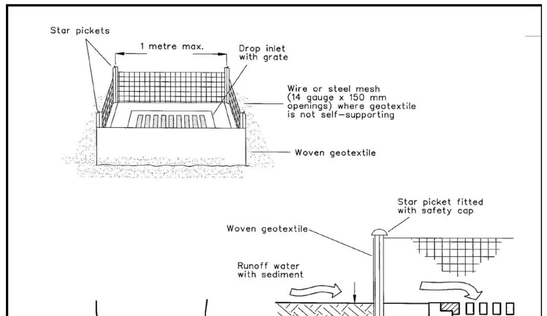
TITLE			SCALE
STABILISED ACCESS POINT			NTS
APPROVED	DATE	DRAWING No.	REV
C. McINTYRE	JAN 2009	SD31	A



Construction Notes

1. Place stockpiles more than 2 (preferably 5) metres from existing vegetation, concentrated water flow, roads and hazard areas.
2. Construct on the contour as low, flat, elongated mounds.
3. Where there is sufficient area, topsoil stockpiles shall be less than 2 metres in height.
4. Where they are to be in place for more than 10 days, stabilise following the approved ESCP or SWMP to reduce the C-factor to less than 0.10.
5. Construct earth banks (Standard Drawing 5-5) on the upslope side to divert water around stockpiles and sediment fences (Standard Drawing 6-8) 1 to 2 metres downslope.

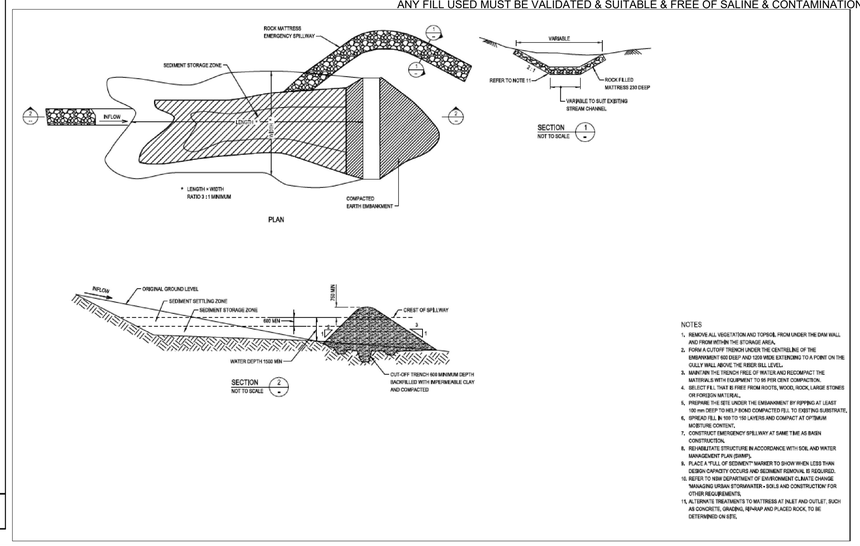
STOCKPILES **SD 4-1**



Construction Notes

1. Fabricate a sediment barrier made from geotextile or straw bales.
2. Follow Standard Drawing 6-7 and Standard Drawing 6-8 for installation procedures for the straw bales or geofabric. Reduce the picket spacing to 1 metre centres.
3. In waterways, artificial sag points can be created with sandbags or earth banks as shown in the drawing.
4. Do not cover the inlet with geotextile unless the design is adequate to allow for all waters to bypass it.

GEOTEXTILE INLET FILTER **SD 6-12**



NOTES

1. REMOVE ALL VEGETATION AND TOPSOIL FROM UNDER THE DAM WALL AND FROM WITHIN THE STORAGE AREA.
2. FORM A CUTOFF TRENCH UNDER THE CENTRELINE OF THE EMBANKMENT 600 DEEP AND 1200 WIDE EXTENDING TO A POINT ON THE GULLY WALL ABOVE THE RISER (ALL LEVEL).
3. MAINTAIN THE TRENCH FREE OF WATER AND RECOMPACT THE MATERIALS WITH EQUIPMENT TO 95 PER CENT COMPACTION.
4. SELECT FILL THAT IS FREE FROM ROOTS, WOOD, ROCK, LARGE STONES OR FOREIGN MATERIAL.
5. PREPARE THE SITE UNDER THE EMBANKMENT BY RIPPING AT LEAST 100 mm DEEP TO HELP BOND COMPACTED FILL TO EXISTING SUBSTRATE.
6. SPREAD FILL IN 150 TO 150 LAYERS AND COMPACT AT OPTIMUM MOISTURE CONTENT.
7. CONSTRUCT EMERGENCY SPILLWAY AT SAME TIME AS BASIN CONSTRUCTION.
8. REVEGETATE STRUCTURE IN ACCORDANCE WITH SOIL AND WATER MANAGEMENT PLAN (SWMP).
9. PLACE A 'FULL OF SEDIMENT' MARKER TO SHOW WHEN LESS THAN DESIGN CAPASITY OCCURS AND SEDIMENT REMOVAL IS REQUIRED.
10. REFER TO NSW DEPARTMENT OF ENVIRONMENT CLIMATE CHANGE 'MANAGING URBAN STORMWATER – SOILS AND CONSTRUCTION' FOR OTHER REQUIREMENTS.
11. ALTERNATE TREATMENTS TO MATTRESS AT INLET AND OUTLET, SUCH AS CONCRETE, GRADING, REPAIR AND PLACED ROCK, TO BE DETERMINED ON SITE.

NOTES

ALL EROSION AND SEDIMENT CONTROL MEASURES ARE TO BE INSTALLED AND MAINTAINED IN ACCORDANCE WITH THE LANDCOM'S MANUAL "MANAGING URBAN STORMWATER" 4TH EDITION AUGUST 2004 .

EROSION AND SEDIMENT CONTROL MEASURES AFFECTED BY WORKS ARE TO BE RE-ESTABLISHED PRIOR TO THE COMPLETION OF EACH DAY'S WORK.

THE CONTRACTOR IS TO STABILISE ALL STOCKPILES AND DISTURBED AREAS AS SOON AS THEY ARE FORMED TO FINAL LEVELS. STABILISATION TO BE BY HYDROSEEDING, OR AS DIRECTED BY THE SUPERINTENDENT AND/OR COUNCIL ENGINEER. ALL SEEDED AREAS ARE TO BE WATERED AT LEAST TWICE WEEKLY UNTIL GRASS IS ESTABLISHED OR COVERED WITH
BITUMEN HAY MULCH.

SEED MIXTURE FOR FOOTWAYS AND OTHER AREAS UNDER THE CONTROL OF COUNCIL ARE TO BE IN ACCORDANCE WITH CAMDEN COUNCIL'S SPECIFICATION.

ALL SEEDED AREAS ARE TO BE WATERED TWICE WEEKLY UNTIL ESTABLISHED OR COVERED WITH BITUMEN STRAW MULCH.

WHERE SURFACE SLOPES ARE MORE THAN 6H:1V BITUMEN STRAW MULCH SHALL BE APPLIED AFTER SEEDING AT THE FOLLOWING RATES:-

- MULCH 0.5kg/sqm
- BITUMEN EMULSION 0.25l/sqm (50% WATER, 50% SLOW BREAKING ANIONIC EMULSION MIX

DUST CONTROL MEASURES SHALL BE IMPLEMENTED CONTINUOUSLY DURING CONSTRUCTION WORKS. SUCH MEASURES ARE TO BE TO THE SATISFACTION OF THE SUPERINTENDENT AND COUNCIL.

TOPSOIL SHALL BE RESPREAD ON CONSTRUCTION AREAS AND STABILISED AS SOON AS POSSIBLE WITHIN 60 DAYS OF DISTURBANCE. ALL DISTURBED AREAS ARE TO BE LEFT WITH A SCARIFIED SURFACE AT ALL TIMES TO ENCOURAGE WATER INFILTRATION AND ASSIST WITH KEYING OF TOPSOIL.

FOLLOWING COMPLETION OF WORKS AND STABILISATION OF ALL DISTURBED SURFACES, ALL MATERIALS AND CONTROL MEASURES ARE TO BE REMOVED FROM SITE AND TEMPORARY BASINS FILLED, COMPACTED AND STABILISED.

ALL SITE ACCESS TO BE ACHIEVED FROM DESIGNATED SITE ACCESS. SITE ACCESS TO BE PROTECTED BY THE INSTALLATION OF A STABILISED ACCESS POINT TYPE II. STABILISED ACCESS POINT TYPE II TO BE TO DETAIL AND REGULARLY MAINTAINED TO ENSURE EFFECTIVENESS.

UPON COMPLETION OF FINAL EARTHWORKS OR AFTER WRITTEN DIRECTION OF COUNCIL, IMMEDIATE SILT CONSERVATION TREATMENTS SHALL BE APPLIED SO AS TO RENDER AREAS THAT HAVE BEEN DISTURBED, EROSION PROOF WITHIN 14 DAYS.

THE AREA OVER ALL STORMWATER, POWER, TELEPHONE, GAS AND SEWER LINES NOT WITHIN STREETS IS TO BE MULCHED AND SEEDED AS SOON AS POSSIBLE BUT NO LATER THAN WITHIN 14 DAYS AFTER BACKFILL.

NO MORE THAN 150m OF TRENCH IS TO BE OPEN AT ANY ONE TIME.

ALL TEMPORARY EARTH BERMS, DIVERSION AND SEDIMENT BASIN EMBANKMENTS ARE TO BE TRACK ROLLED, SEEDED OR MULCHED OR SPRAYED WITH BITUMEN AS SOON AS THEY HAVE BEEN FORMED.

ALL FILLS ARE TO BE LEFT WITH A WINDROW AT LEAST 20cm HIGH AT THE TOP OF THE SLOPE AT THE END OF EACH DAY'S EARTHWORKS AND ALL EARTHWORK AREAS SHALL BE ROLLED EACH EVENING TO "SEAL" THE EARTHWORKS.

STABILISATION OF ALL CUT AND FILL SLOPES SHALL BE COMMENCED WITHIN 14 DAYS OF FORMATION TO FINISHED LEVEL.

THE CONTRACTOR SHALL MAINTAIN AND PRODUCE ON REQUEST A LOGBOOK ON SITE DETAILING THE FOLLOWING:-

- RECORDS OF ALL RAINFALL
- DAILY CONDITION OF ALL EROSION AND SEDIMENT CONTROL MEASURES
- ANY APPLICATION OF FLOCCULATION AGENTS TO BASINS
- VOLUMES OF WATER DISCHARGED FROM BASINS
- METHOD OF DISPOSAL OF WATER FROM BASINS
- ANY ADDITIONAL REMEDIAL WORKS REQUIRED.

THE ORIGINAL LOGBOOK SHALL BE ISSUED TO THE PROJECT MANAGER ON COMPLETION OF THE WORKS.

SEDIMENT BASINS

SEDIMENT BASINS TO BE MAINTAINED SUCH THAT THE STATED REQUIRED VOLUMES ARE AVAILABLE AT ALL TIMES.

WATER FROM BASINS TO BE UTILISED FOR DUST CONTROL AND WATERING OF HAUL ROADS AND CONSTRUCTION AREAS.

WATER IN BASINS NOT REQUIRED FOR WATERING OF CONSTRUCTION AREAS IS TO BE TREATED WITH GYPSUM TO ACHIEVE THE REQUIRED WATER CLARITY AND PUMPED ONTO DISPOSAL AREAS. 150 NTU REQ'D. COUNCIL'S ENGINEER TO INSPECT TEST RESULT AND GIVE APPROVAL PRIOR TO PUMP OUT OF THE SEDIMENT BASIN BY CONTRACTOR. TREATMENT TO OCCUR WITHIN 48 HOURS OF CONCLUSION OF STORM, WATER TO BE DISCHARGED WITHIN 72 HOURS OF TREATMENT.

SEDIMENT TO BE REMOVED FROM BASINS AS REQUIRED SUCH THAT NOT LESS THAN 70% OF THE DESIGN CAPACITY IS AVAILABLE AT ANY TIME.

MARKERS WITH DEPTH INDICATORS ARE TO BE PLACED IN EACH SEDIMENT BASIN TO INDICATE WHEN SEDIMENT HAS EXCEEDED 30% OF BASIN CAPACITY.

STOCKPILES TO BE MAX 2 METRE HIGH WITH SEDIMENT FENCING TO LOW SIDE LOCATED CLEAR OF WATERCOURSES

ALL STORMWATER PITS TO BE BLOCKED DURING CONSTRUCTION UNTIL SITE STABILISED.ROAD FLOWS TO BE DIVERTED TO SEDIMENT BASINS BY TEMP DIVERSION DRAINS.

DURING CONSTRUCTION WORKS ANY WORK AND STORAGE AREAS WHERE SPILLAGE MAY OCCUR MUST BE BUNDED. THE SIZE OF THE AREA TO BE BUNDED AND HEIGHT OF THE BUND WALLS MUST BE CALCULATED AS BEING EQUAL TO 110% OF THE TOTAL VOLUME STORED OR EQUAL TO THE LARGEST STORAGE CONTAINER, WHICH EVER IS GREATER. ALL PIPE WORK EXTENDING FROM THE BUNDED AREA MUST BE DIRECTED OVER THE BUND WALL AND HOSE COUPLINGS MUST BE PLACED SUCH THAT LEAKS AND SPILLAGE'S ARE CONTAINED. THE AREAS MUST BE GRADED TO A PIT/SUMP TO FACILITATE EMPTYING.

ANY FILL USED MUST BE VALIDATED & SUITABLE & FREE OF SALINE & CONTAMINATION.

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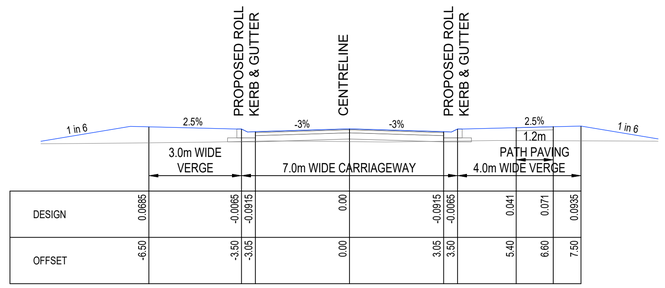
SHEET 4 OF 7

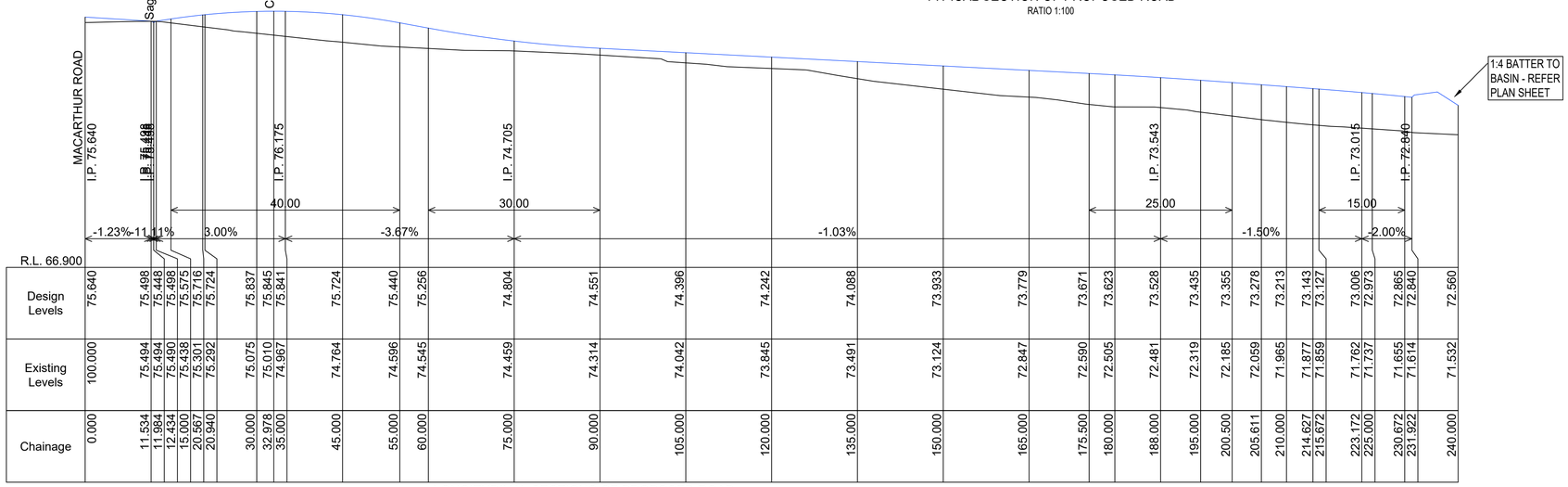
pit no	Surface Level	d/s pit	pipe length	catchment area (sqm)	Description	area impervious directly connected	%	area impervious indirectly connected	%	area pervious	%
1 1	75.48	1--2	11.5	77000	upstream reidential		0.0%		0.0%		0.0%
1 2	75.64	1--3	56.8	0	junction						
4 1	74.62	4--2	4.2	738	landscape/re sidential	184	24.9%	184	24.9%	370	50.1%
4 2	75.59	4--3	13.7	0	junction						
5 1	74.46	4--3	4.2	384	residential	131.6	34.3%	131.6	34.3%	120.8	31.5%
4 3	75.15	4--4	13.7	0	junction						
6 1	74.38	4--4	4.2	384	residential	131.6	34.3%	131.6	34.3%	120.8	31.5%
4 4	74.72	1--3	5.8	0	junction						
15 1	74.48	15--2	34.9	1045	landscape/re sidential	185.6	17.8%	185.6	17.8%	673.8	64.5%
15 2	75.88	15--3	12.5	0	junction						
16 1	74.33	15--3	33.2	553	residential	175.6	31.8%	175.6	31.8%	201.8	36.5%
15 3	75.59	15--4	12.5	0	junction						
17 1	74.19	15--4	31.4	531	residential	166.8	31.4%	166.8	31.4%	197.4	37.2%
15 4	75.14	15--5	12.5	0	junction						
18 1	74.1	18--1	29.7	509	residential	158	31.0%	158	31.0%	193	37.9%
15 5	74.82	2--1	4.2	0	junction						
2 1	74.66	1--3	6.1	293	rd	117.2	40.0%	117.2	40.0%	58.6	20.0%
1 3	74.65	1--4	65.7	332	rd	132.8	40.0%	132.8	40.0%	66.4	20.0%
7 1	74.29	7--2	4.2	384	landscape/ residential	103.2	26.9%	103.2	26.9%	177.6	46.3%
7 2	74.52	7--3	13	0	junction						
8 1	74.21	7--3	4.2	364	landscape/re sidential	106	29.1%	106	29.1%	152	41.8%
7 3	74.37	7--4	13	0	junction						
9 1	73.91	7--4	4.2	364	residential	124.8	34.3%	124.8	34.3%	114.4	31.4%
7 4	74.25	7--5	13	0	junction						
10 1	73.62	7--5	4.2	364	residential	124.8	34.3%	124.8	34.3%	114.4	31.4%
7 5	74.11	7--6	13	0	junction						
11 1	73.36	7--6	4.2	364	residential	124.8	34.3%	124.8	34.3%	114.4	31.4%
7 6	73.96	1--4	5.8	0	junction						
19 1	74.03	19--2	27.6	571	residential	174.8	30.6%	174.8	30.6%	221.4	38.8%
19 2	74.59	19--3	15.2	0	junction						
20 1	73.87	19--3	25.5	558	residential	168	30.1%	168	30.1%	222	39.8%
19 3	74.45	19--4	14.7	0	junction						
21 1	73.77	19--4	23.5	509	residential	149.2	29.3%	149.2	29.3%	210.6	41.4%
19 4	74.3	19--5	14.7	0	junction						
22 1	73.53	19--5	4.2	479	residential	137.2	28.6%	137.2	28.6%	204.6	42.7%
19 5	74.12	3--1	7.7	0	junction						
3 1	73.91	1--4	6.1	425	rd	170	40.0%	170	40.0%	85	20.0%
1 4	73.9	1--5	26	493	rd	197.2	40.0%	197.2	40.0%	98.6	20.0%
12 1	73.04	12--2	5.3	364	residential	124.8	34.3%	124.8	34.3%	114.4	31.4%
12 2	73.83	12--3	13	0	junction						
13 1	72.72	12--3	6.7	364	residential	124.8	34.3%	124.8	34.3%	114.4	31.4%
12 3	73.66	1--5	5.8	0	junction						
1 5	73.63	1--6	24	194	rd	77.6	40.0%	77.6	40.0%	38.8	20.0%
1 6	73.35	1--7	24.5	182	rd	72.8	40.0%	72.8	40.0%	36.4	20.0%
23 1	73.12	23--2	5.2	464	residential	130.4	28.1%	130.4	28.1%	203.2	43.8%
23 2	73.98	23--4	12	0	junction						
24 1	73.02	23--3	5.2	343	residential	137.2	40.0%	137.2	40.0%	68.6	20.0%
23 3	73.84	23--4	12.5	0	junction						
25 1	72.81	23--4	6.1	336	residential	134.4	40.0%	134.4	40.0%	67.2	20.0%
23 4	73.73	23--5	12.5	0	junction						
26 1	72.49	23--5	6.3	315	residential	126	40.0%	126	40.0%	63	20.0%
23 5	73.59	23--6	10.2	0	junction						
27 1	72.43	23--6	6.4	507	residential	202.8	40.0%	202.8	40.0%	101.4	20.0%
23 6	73.42	1--7	15.3	0	junction						
1 7	73.05	1--8	15.1	506	rd	202.4	40.0%	202.4	40.0%	101.2	20.0%
1 8	72.85	1--9	4	625	rd	250	40.0%	250	40.0%	125	20.0%
1 9	72.3	1--10	34	0	gpt						
1 10	68.6	headwall									
14 1	72.73	14--2	16.9	470	landscape/ residential	107.2	22.8%	107.2	22.8%	255.6	54.4%
14 2	72.74	14--3	16.8	470	landscape/ residential	97.2	20.7%	97.2	20.7%	275.6	58.6%
14 3	72.74	14--4	15.3	470	landscape/ residential	97.2	20.7%	97.2	20.7%	275.6	58.6%
14 4	72.62	14--5	30	1207	landscape/ residential	482.8	40.0%	482.8	40.0%	241.4	20.0%
14 5	68.6	headwall									

CATCHMENT SUMMARY

CATCHMENT PLAN
1:500



TYPICAL SECTION OF PROPOSED ROAD
RATIO 1:100



LONGITUDINAL SECTIONS OF PROPOSED ROAD
H=1:500 V=1:100

VER	BY	AMENDMENTS	DATE
A	T.H.	ISSUED FOR DA	09-02-2022
B	T.H	CATCHMENT PLAN ADDED	18-02-22
C			
D			
E			
F			
G			

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CLIENT: SWADLING DEVELOPMENTS

SCALE ON ORIGINAL DRAWING AT 1:100 (0 2 4 6)

SCALE ON ORIGINAL DRAWING AT 1:500 (0 10 20 30)

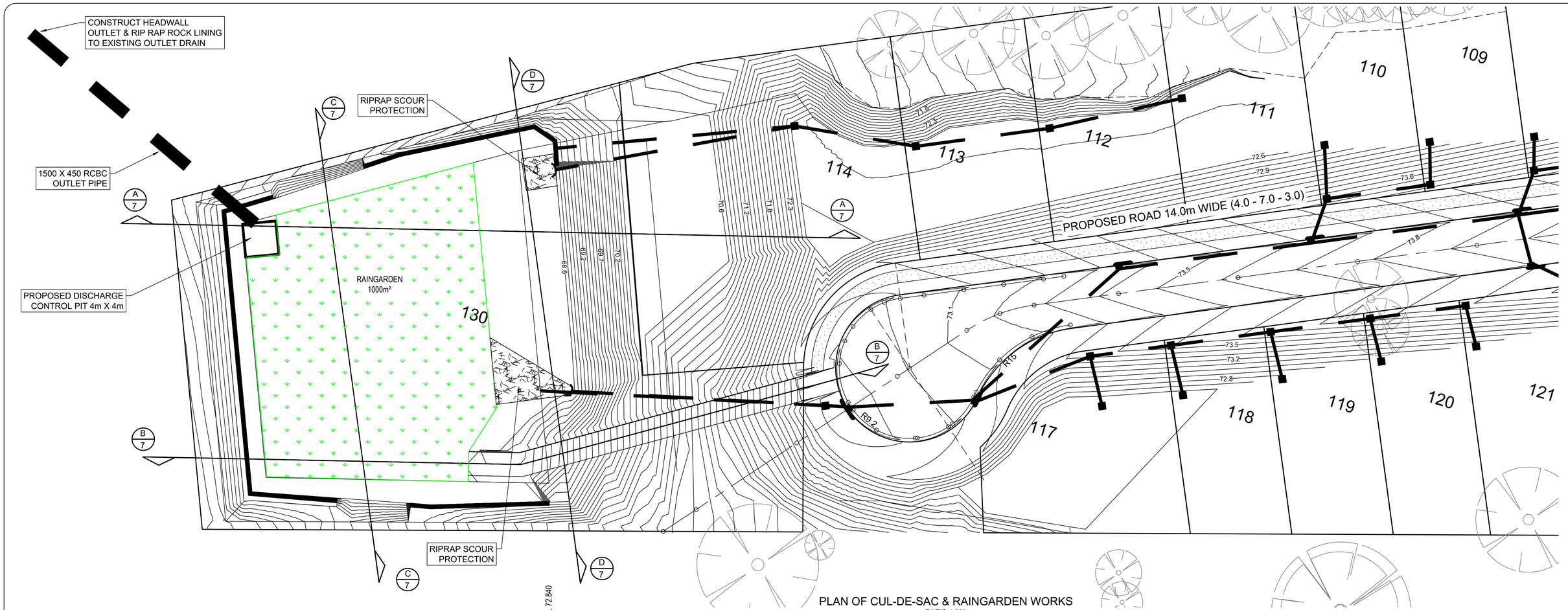
Beveridge Williams
Land Development Consultants
Registered Surveyors
Miranda (02) 9524 4073 www.beveridgewilliams.com.au

DETAILS:
LOT 1 IN DP 542867
156 MACARTHUR ROAD, SPRING FARM
DA CIVIL WORKS
ROAD DETAILS AND CATCHMENT PLAN

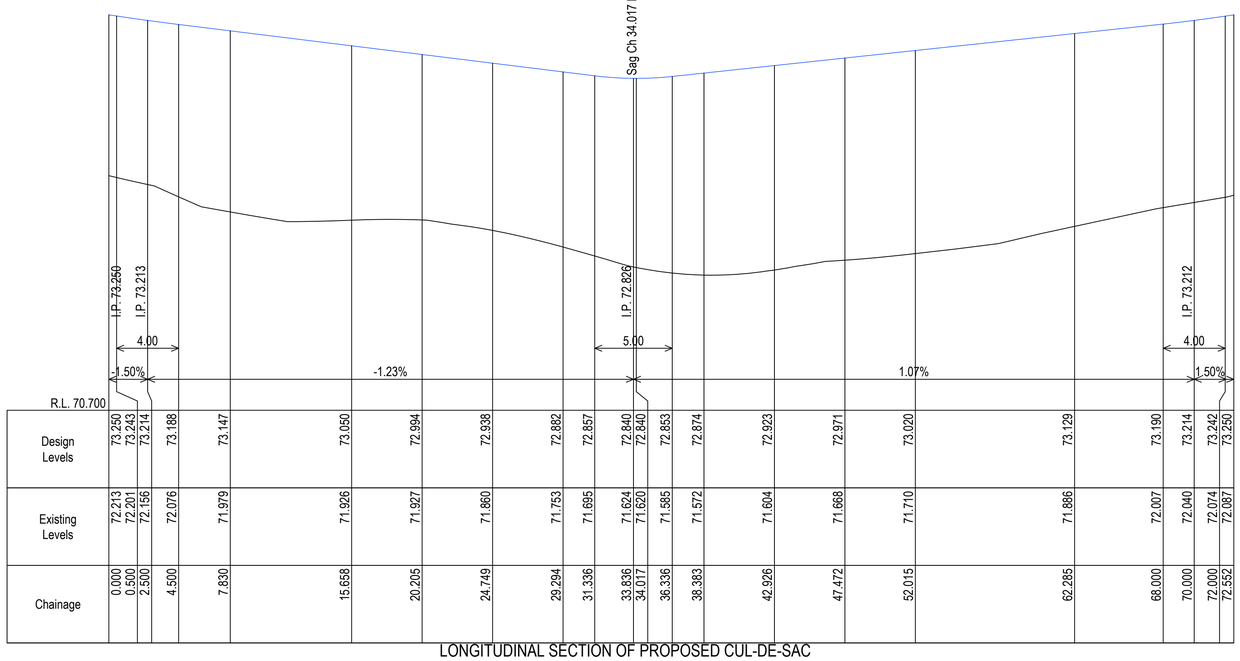
ORIGINAL
SCALE 1:500/1:100 SHEET SIZE A1
CAD REFERENCE: revised eng

SURVEYOR:	X.X.
DRAWN:	X.X.
CHECKED:	T.H.
SURVEY DATE:	24-05-2019
VERTICAL DATUM:	AHD
HORIZONTAL DATUM:	MGA

PROJECT No. 17142
DRAWING REF. 17142E4
VERSION A
SHEET 5 OF 7



PLAN OF CUL-DE-SAC & RAINGARDEN WORKS
RATIO 1:250



R.L. 70.700

Design Levels	73.250	73.243	73.214	73.188	73.147	73.050	72.994	72.938	72.882	72.857	72.840	72.840	72.853	72.874	72.923	72.971	73.020	73.129	73.190	73.214	73.242	73.250
Existing Levels	72.213	72.291	72.156	72.076	71.979	71.926	71.927	71.860	71.753	71.695	71.624	71.620	71.585	71.572	71.604	71.668	71.710	71.886	72.007	72.040	72.074	72.087
Chainage	0.000	0.500	2.500	4.500	7.830	15.658	20.205	24.749	29.294	31.336	33.836	34.017	36.336	38.383	42.926	47.472	52.015	62.285	68.000	70.000	72.000	72.552

LONGITUDINAL SECTION OF PROPOSED CUL-DE-SAC
H= 1:200 V=1:20

VER	BY	AMENDMENTS	DATE
A	T.H.	ISSUED FOR DA	09-02-2022
B	T.H.	BUILDING ENVELOPES REMOVED	2-03-2022
C	T.H.	TREE PROTECTION ZONES UPDATED	9-03-2022
D			
E			
F			
G			

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CLIENT: SWADLING DEVELOPMENTS

0 0.4 0.8 1.2
SCALE ON ORIGINAL DRAWING AT 1:20
0 4 8 12
SCALE ON ORIGINAL DRAWING AT 1:200

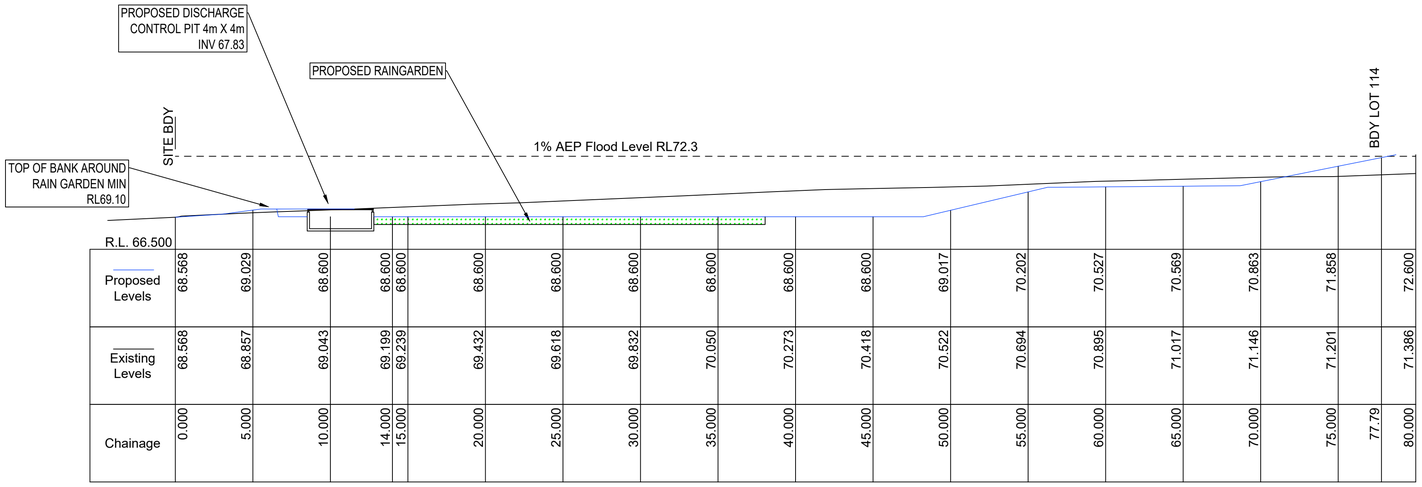
Beveridge Williams
Land Development Consultants
Registered Surveyors
Miranda (02) 9524 4073 www.beveridgewilliams.com.au

DETAILS:
LOT 1 IN DP 542867
156 MACARTHUR ROAD, SPRING FARM
DA CIVIL WORKS
PROPOSED CUL-DE-SAC & RAINGARDEN WORKS

ORIGINAL SHEET SIZE A1
SCALE 1:250/1:200/1:20
CAD REFERENCE: 17142-CDS
0 5 10 15
SCALE ON ORIGINAL DRAWING AT 1:250

SURVEYOR:	X.X.
DRAWN:	X.X.
CHECKED:	T.H.
SURVEY DATE:	24-05-2019
VERTICAL DATUM:	AHD
HORIZONTAL DATUM:	MGA

PROJECT No. 17142
DRAWING REF. 17142E4
VERSION B
SHEET 6 OF 7



Proposed Levels	68.568	69.029	68.600	68.600	68.600	68.600	68.600	68.600	68.600	68.600	68.600	69.017	70.202	70.527	70.569	70.863	71.858		72.600
Existing Levels	68.568	68.857	69.043	69.199	69.239	69.432	69.618	69.832	70.050	70.273	70.418	70.522	70.694	70.895	71.017	71.146	71.201		71.386
Chainage	0.000	5.000	10.000	14.000	15.000	20.000	25.000	30.000	35.000	40.000	45.000	50.000	55.000	60.000	65.000	70.000	75.000	77.79	80.000

SECTION A-A

1:200 NATURAL

Design Levels	69.551	69.278	68.600	68.600	68.600	68.600	68.600	68.600	68.600	68.600	68.600	68.600	68.600	69.203	69.278	69.273
Existing Levels	69.551	69.278	69.369	69.371	69.425	69.455	69.495	69.509	69.501	69.461	69.376	69.376	69.344	69.317	69.278	69.273
Chainage	0.000	5.000	10.000	10.119	15.000	20.000	25.000	30.000	35.000	40.000	45.000	45.007	46.404	50.000	55.000	56.404

SECTION C-C

1:200 NATURAL

Design Levels	72.948	73.001	73.013	72.994	72.867	72.805	72.181	71.557	70.933	70.309	69.686	69.062	68.912	68.678	68.618	68.604	68.600	68.600	68.60	68.60	68.60	68.60	68.60	68.60	68.60	69.1	68.486	68.347
Existing Levels	71.556	71.500	71.476	71.449	71.422	71.413	71.334	71.271	71.162	71.009	70.797	70.561	70.486	70.344	70.293	70.266	70.246	70.246	70.105	69.906	69.649	69.434	69.237	69.020	68.879	68.738	68.486	68.347
Chainage	0.000	1.500	2.166	3.000	4.500	5.000	10.000	15.000	20.000	25.000	30.000	35.000	36.200	38.700	40.000	40.670	41.196	41.200	45.000	50.000	55.000	60.000	65.000	70.000	72.617	75.000	80.000	81.172

SECTION B-B ALONG CENTRE OF BASIN ACCESS

1:200 NATURAL

Design Levels		70.091	68.600	68.600	68.600	68.600	68.600	68.600	68.600	69.055	69.117	69.754	70.420		
Existing Levels	70.207	70.091	70.188	70.349	70.408	70.463	70.371	70.353	70.485	70.553	70.515	70.433	70.420	70.451	70.462
Chainage	0.000	5.000	10.000	15.000	20.000	25.000	30.000	35.000	40.000	45.000	50.000	55.000	52.916	60.000	62.916

SECTION D-D

1:200 NATURAL

VER	BY	AMENDMENTS	DATE
A	T.H.	ISSUED FOR DA	09-02-2022
B			
C			
D			
E			
F			
G			

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DIAL 1100
BEFORE YOU DIG

CLIENT:
SWADLING DEVELOPMENTS

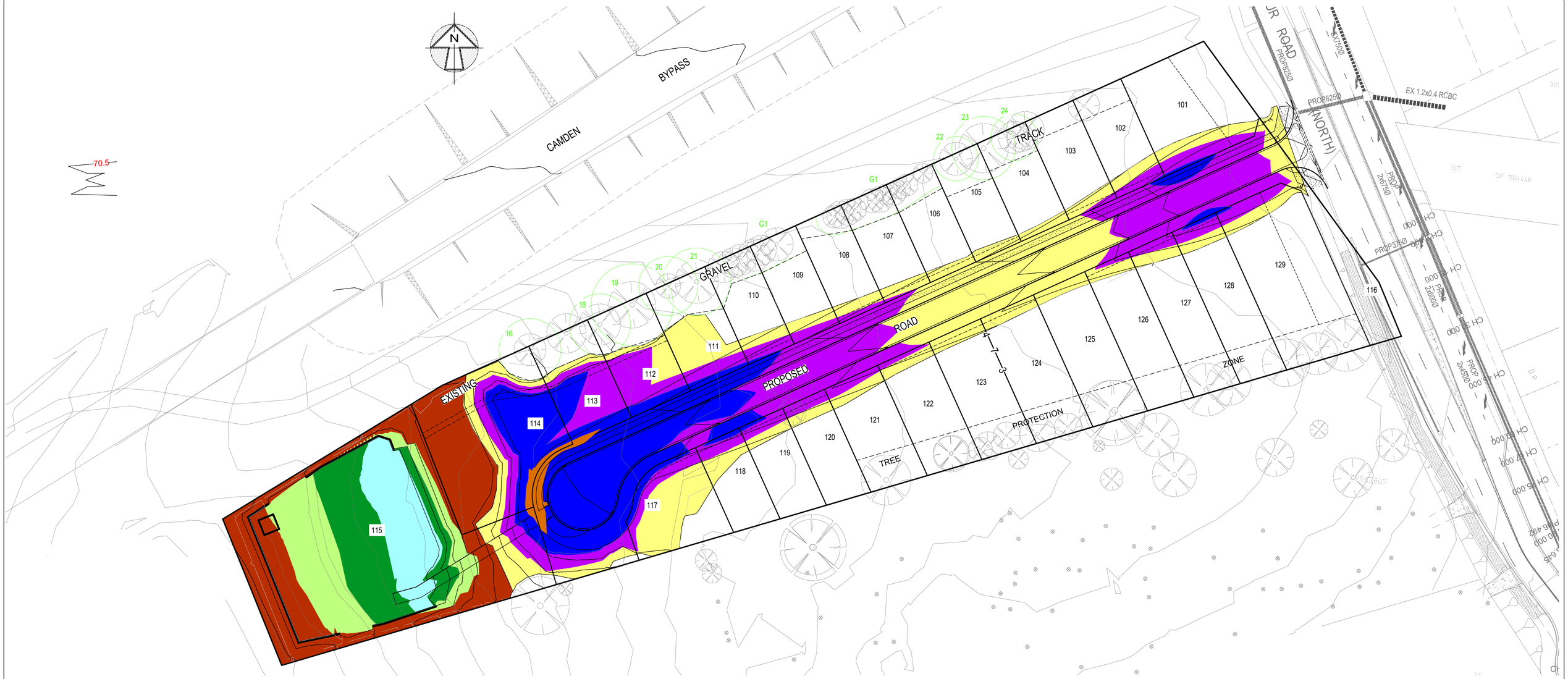
Beveridge Williams
Land Development Consultants
Registered Surveyors
Miranda (02) 9524 4073
www.beveridgewilliams.com.au

DETAILS:
LOT 1 IN DP 542867
156 MACARTHUR ROAD, SPRING FARM
DA CIVIL WORKS
PROPOSED SECTIONS

ORIGINAL
SCALE 1:200
SHEET SIZE A1
CAD REFERENCE: revised eng
0 4 8 12
SCALE ON ORIGINAL DRAWING AT 1:200

SURVEYOR:	X.X.
DRAWN:	X.X.
CHECKED:	T.H.
SURVEY DATE:	24-05-2019
VERTICAL DATUM:	AHD
HORIZONTAL DATUM:	MGA

PROJECT No. 17142
DRAWING REF. 17142E4
VERSION A
SHEET 7 OF 7



LEGEND

- DENOTES 1.5m TO 2m FILL
- DENOTES 1m TO 1.5m OF FILL
- DENOTES 0.5m TO 1m OF FILL
- DENOTES 0m TO 0.5m OF FILL
- DENOTES 0m TO 0.5m OF CUT
- DENOTES 0.5m TO 1m OF CUT
- DENOTES 1m TO 1.5m OF CUT
- DENOTES 1.5m TO 2m CUT

NO CHANGE TO EXISTING LEVELS PROPOSED IN AREAS OF SITE WITH NO COLOUR SHOWN.

VER	BY	AMENDMENTS	DATE
A	T.H.	ISSUED FOR DA	18-02-2022
B	T.H.	EXTENT OF FILL ADJUSTED	2-03-2022
C	T.H.	TREE PROTECTION ZONES UPDATED	9-03-2022
D			
E			
F			
G			

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CLIENT: SWADLING DEVELOPMENTS

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Registered Surveyors
Miranda (02) 9524 4073 www.beveridgewilliams.com.au

DETAILS:
LOT 1 IN DP 542867
156 MACARTHUR ROAD, SPRING FARM
DA CIVIL WORKS
PLAN OF CUT AND FILL

ORIGINAL SCALE 1:500 SHEET SIZE A1
CAD REFERENCE: revised eng
0 10 20 30
SCALE ON ORIGINAL DRAWING AT 1:500

SURVEYOR:	X.X.
DRAWN:	X.X.
CHECKED:	T.H.
SURVEY DATE:	24-05-2019
VERTICAL DATUM:	AHD
HORIZONTAL DATUM:	MGA

PROJECT No. 17142
DRAWING REF. 17142E4
VERSION B
SHEET 7A OF 7

LEGEND

- GROUND FLOOR AREA: MAX 50% OF LOT AREA
- UPPER FLOOR AREA: MAX 30% OF LOT AREA
- BALCONY MIN 50% OF BUILDING ENVELOPE
- GARAGE FLOOR AREA:
- ARTICULATION ZONE
- LANDSCAPING AREA: MIN 40% OF FRONT SETBACK AREA
- PRINCIPAL PRIVATE OPEN SPACE (PPOS) MIN 4m x 4m
- WASTE BAY BEHIND BUILDING SETBACK
- B — NO BUILD ZONE 9.0m WIDE
- C — DRAINAGE EASEMENT 1.5m WIDE
- D — NO BUILD ZONE 1.0m WIDE
- A2 — LANDSCAPE BUFFER ZONE 10.0m & VARIABLE

SUBDIVISION BUILDING ENVELOPE PLAN

Scale 1:1000

Drawing Title:

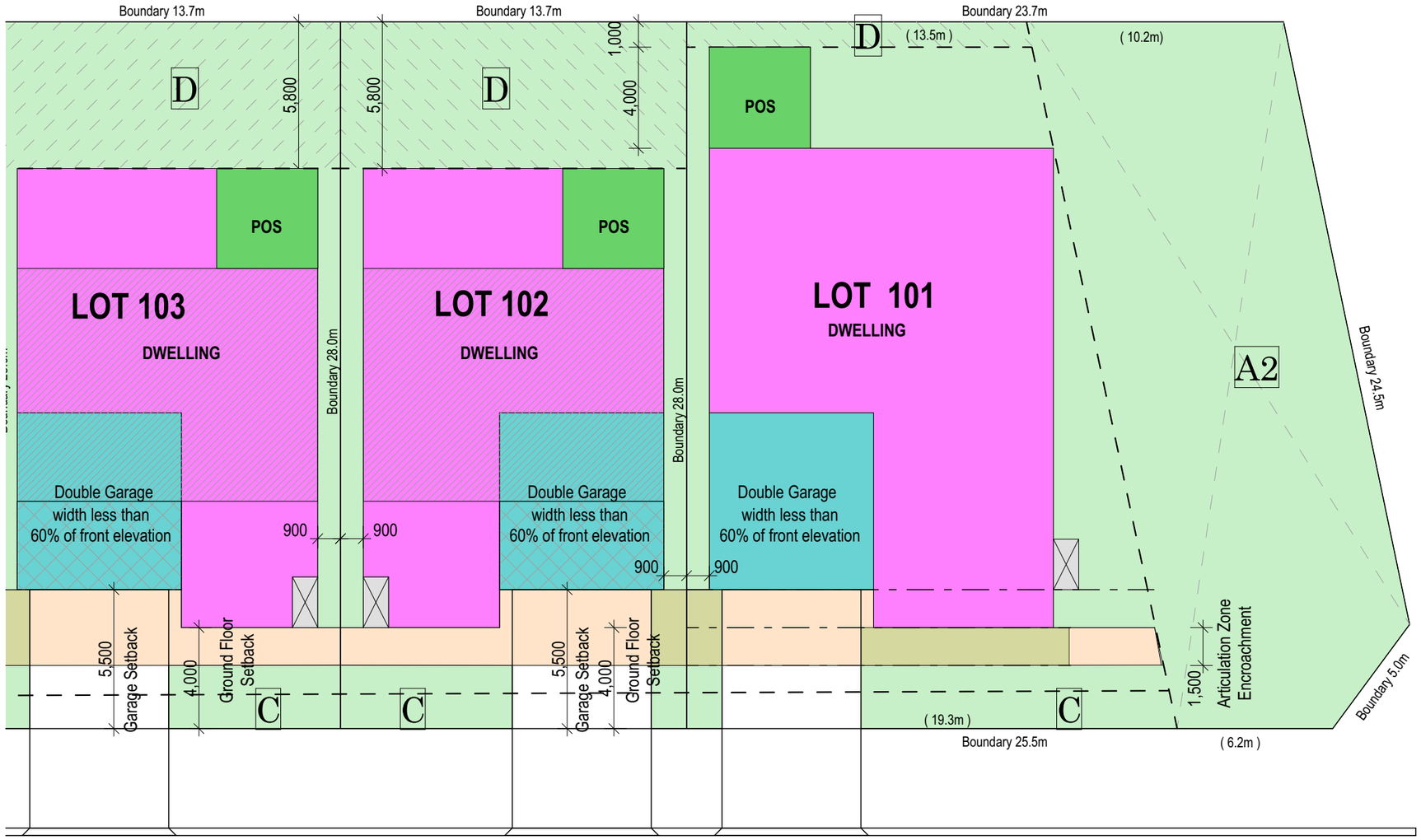
development application 10/04/2022

WAYNE ELLIS ARCHITECT
Nominated Architect: Wayne Ellis Rego No: 4415
abn 72 549 047 017
PO Box 1892 Potts Point NSW 1335
Email: wayne@wearchitect.com.au Ph 0417 664 731

Client: Swadling Developments PL
Project: Proposed Residential Subdivision
156 Macarthur Rd. Spring Farm

Scale 1:1000, 1:200 @ A3
Comp. Ref. 2201 BUILDING ENVELOPE PLANS.pln

Proj. No 2201
Dwg No. **BP 01/**



STREET FRONTAGE

LEGEND

	GROUND FLOOR AREA: MAX 50% OF LOT AREA	212m2 AS SHOWN
	UPPER FLOOR AREA: MAX 30% OF LOT AREA	
	BALCONY MIN 50% OF BUILDING ENVELOPE	
	GARAGE FLOOR AREA:	
	ARTICULATION ZONE	
	LANDSCAPING AREA: MIN 40% OF FRONT SETBACK AREA	
	PRINCIPAL PRIVATE OPEN SPACE (PPOS) MIN 4m x 4m	
	WASTE BAY BEHIND BUILDING SETBACK	
B	NO BUILD ZONE 9.0m WIDE	
C	DRAINAGE EASEMENT 1.5m WIDE	
D	NO BUILD ZONE 1.0m WIDE	
A2	LANDSCAPE BUFFER ZONE 10.0m & VARIABLE	

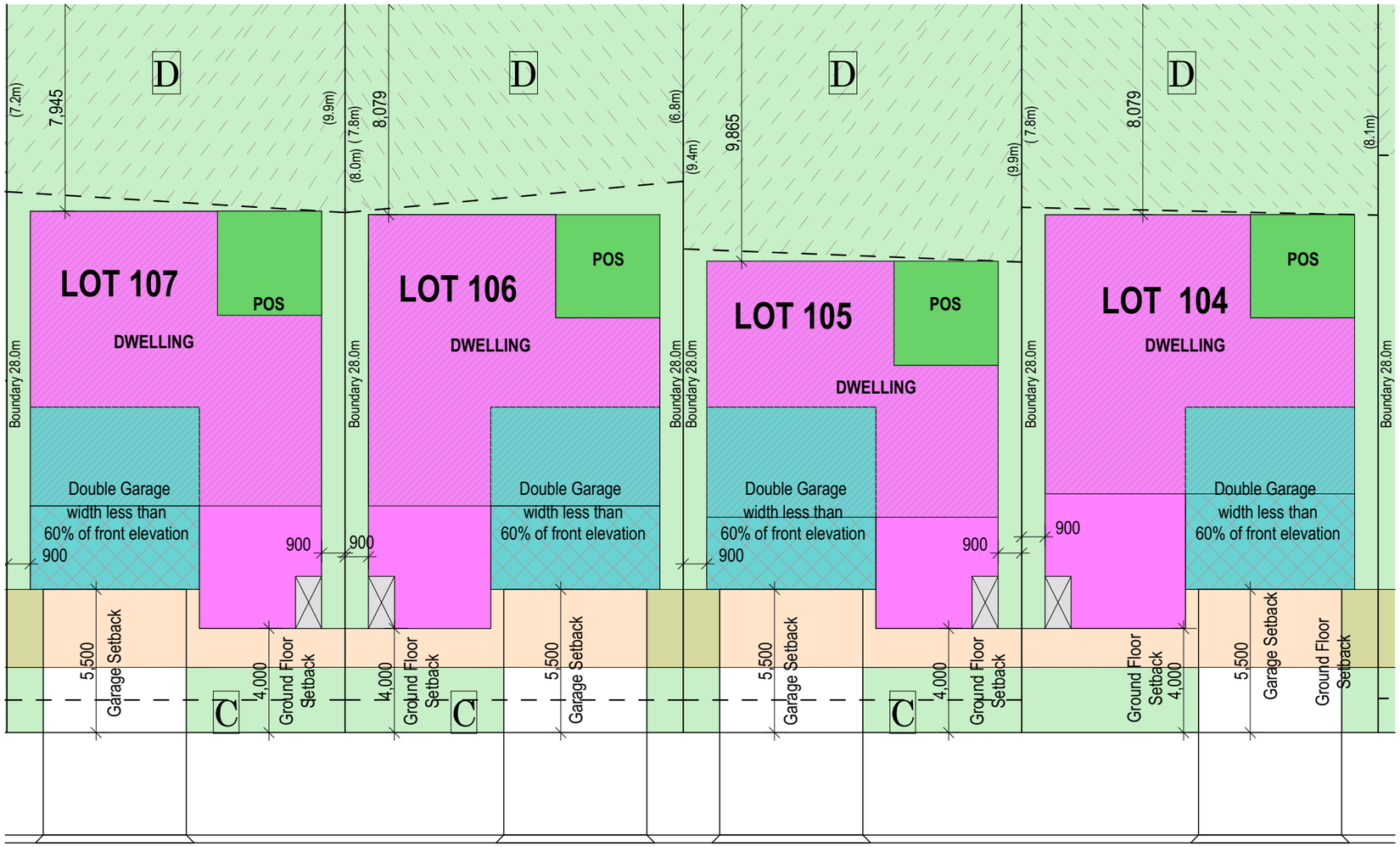
Drawing Title:
development application 10/04/2022

WAYNE ELLIS
ARCHITECT
Nominated Architect: Wayne Ellis Rego No: 4415
abn 72 549 047 017
PO Box 1892 Potts Point NSW 1335
Email: wayne@wearchitect.com.au Ph 0417 664 731

Client: Swadling Developments PL
Project: Proposed Residential Subdivision
156 Macarthur Rd. Spring Farm

Scale 1:200 @ A3
Comp. Ref. 2201 BUILDING ENVELOPE PLANS.pln

Proj. No 2201
Dwg No. **BP 02/**



LEGEND

- GROUND FLOOR AREA: MAX 50% OF LOT AREA
- UPPER FLOOR AREA: MAX 30% OF LOT AREA
- BALCONY MIN 50% OF BUILDING ENVELOPE
- GARAGE FLOOR AREA:
- ARTICULATION ZONE
- LANDSCAPING AREA: MIN 40% OF FRONT SETBACK AREA
- PRINCIPAL PRIVATE OPEN SPACE (PPOS) MIN 4m x 4m
- WASTE BAY BEHIND BUILDING SETBACK
- B — NO BUILD ZONE 9.0m WIDE
- C — DRAINAGE EASEMENT 1.5m WIDE
- D — NO BUILD ZONE 1.0m WIDE
- A2 — LANDSCAPE BUFFER ZONE 10.0m & VARIABLE

Drawing Title:

development application 10/04/2022

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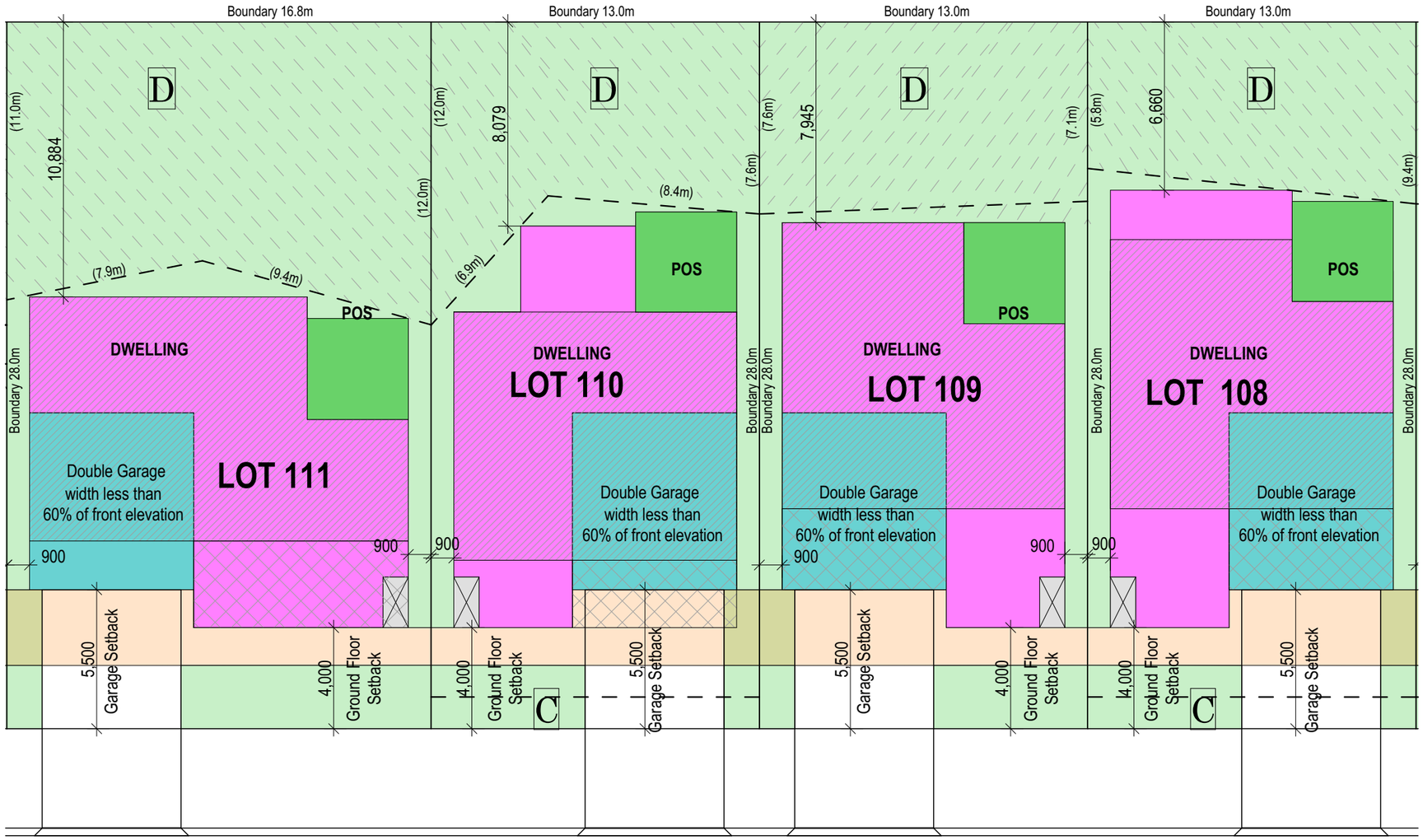
Client: Swadling Developments PL
Project: Proposed Residential Subdivision
156 Macarthur Rd. Spring Farm

Scale 1:200 @ A3
Comp. Ref. 2201 BUILDING ENVELOPE PLANS.pln

Proj. No 2201
Dwg No. **BP 03/**



STREET FRONTAGE

LEGEND

- GROUND FLOOR AREA: MAX 50% OF LOT AREA
- UPPER FLOOR AREA: MAX 30% OF LOT AREA
- BALCONY MIN 50% OF BUILDING ENVELOPE
- GARAGE FLOOR AREA:
- ARTICULATION ZONE
- LANDSCAPING AREA: MIN 40% OF FRONT SETBACK AREA
- PRINCIPAL PRIVATE OPEN SPACE (PPOS) MIN 4m x 4m
- WASTE BAY BEHIND BUILDING SETBACK
- B — NO BUILD ZONE 9.0m WIDE
- C — DRAINAGE EASEMENT 1.5m WIDE
- D — NO BUILD ZONE 1.0m WIDE
- A2 — LANDSCAPE BUFFER ZONE 10.0m & VARIABLE

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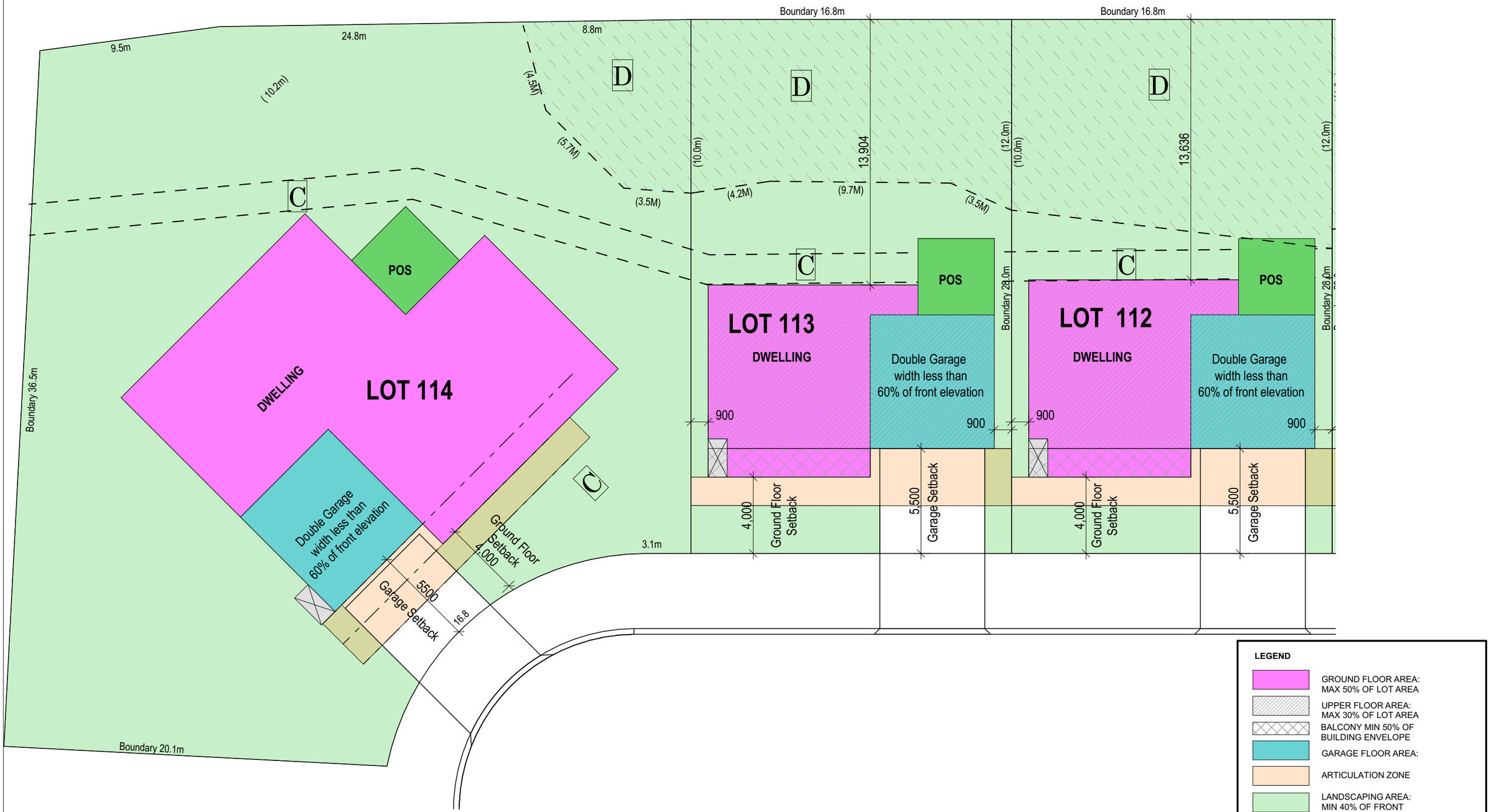
Proj. No 2201
Dwg No. **BP 04/**



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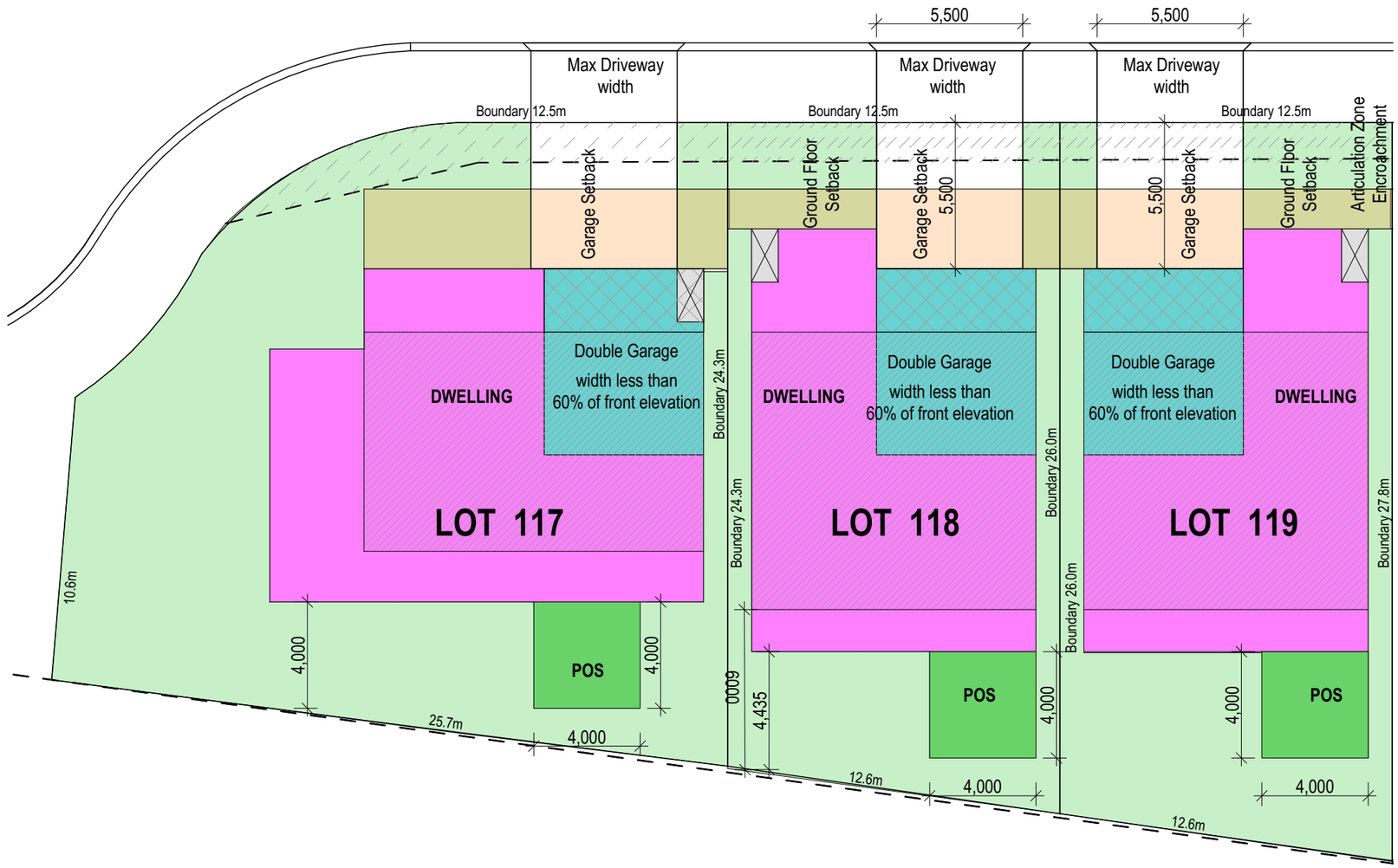
Scale 1:200, 1:303.39 @ A3
Comp. Ref. 2201 BUILDING ENVELOPE PLANS.pln

Proj. No 2201
Dwg No. **BP 05/**



LEGEND

- GROUND FLOOR AREA: MAX 50% OF LOT AREA
- UPPER FLOOR AREA: MAX 30% OF LOT AREA
- BALCONY MIN 50% OF BUILDING ENVELOPE
- GARAGE FLOOR AREA:
- ARTICULATION ZONE
- LANDSCAPING AREA: MIN 40% OF FRONT SETBACK AREA
- PRINCIPAL PRIVATE OPEN SPACE (PPOS) MIN 4m x 4m
- WASTE BAY BEHIND BUILDING SETBACK
- B — NO BUILD ZONE 9.0m WIDE
- C — DRAINAGE EASEMENT 1.5m WIDE
- D — NO BUILD ZONE 1.0m WIDE
- A2 — LANDSCAPE BUFFER ZONE 10.0m & VARIABLE

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Scale 1:200 @ A3
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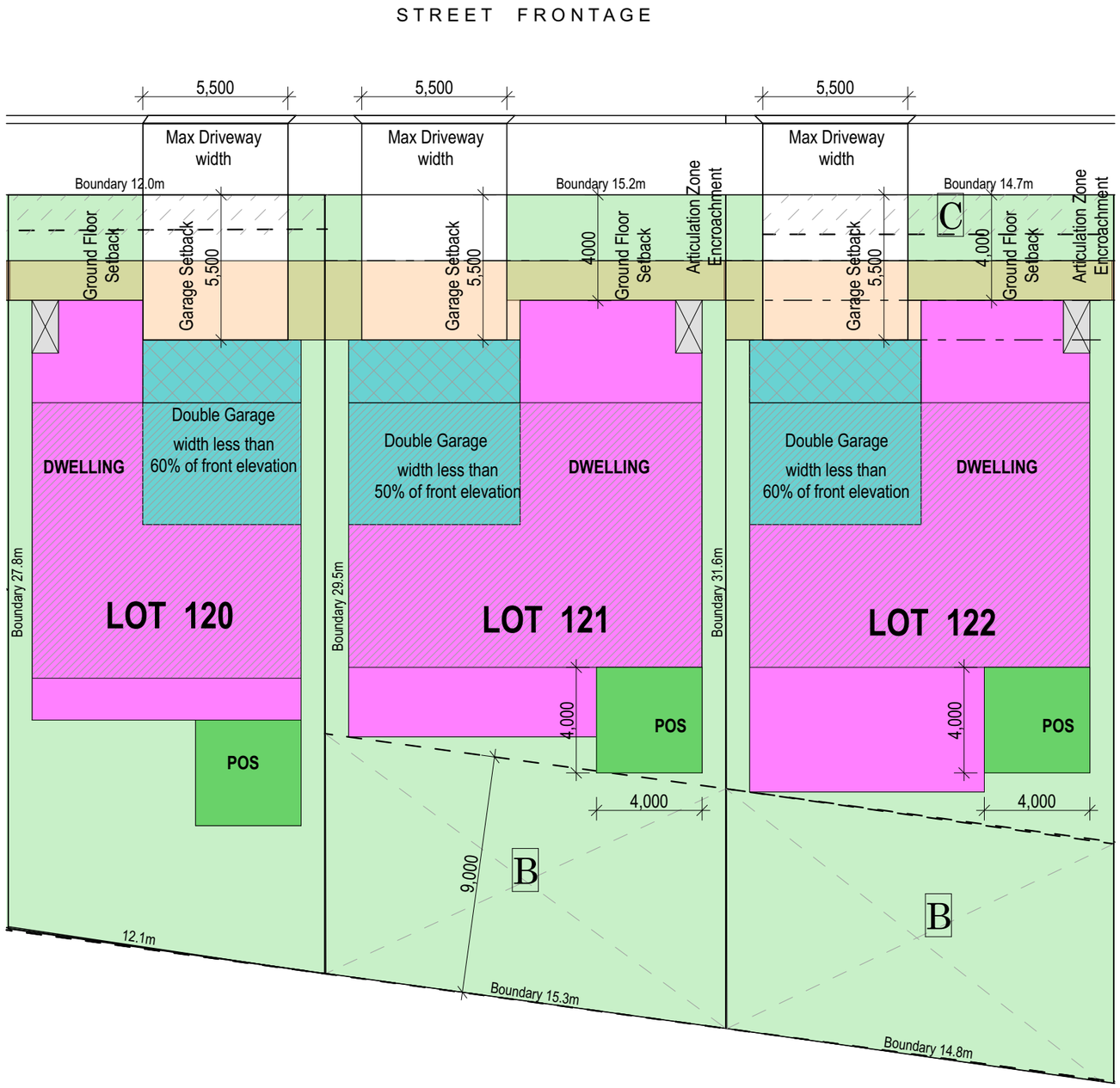
Proj. No 2201
Dwg No. **BP 06/**



LEGEND

	GROUND FLOOR AREA: MAX 50% OF LOT AREA	156m2 SHOWN
	UPPER FLOOR AREA: MAX 30% OF LOT AREA	139m2 SHOWN
	BALCONY MIN 50% OF BUILDING ENVELOPE	
	GARAGE FLOOR AREA:	
	ARTICULATION ZONE	
	LANDSCAPING AREA: MIN 40% OF FRONT SETBACK AREA	
	PRINCIPAL PRIVATE OPEN SPACE (PPOS) MIN 4m x 4m	
	WASTE BAY BEHIND BUILDING SETBACK	
B	NO BUILD ZONE 9.0m WIDE	
C	DRAINAGE EASEMENT 1.5m WIDE	
D	NO BUILD ZONE 1.0m WIDE	
A2	LANDSCAPE BUFFER ZONE 10.0m & VARIABLE	

LOT PLANS

Drawing Title:
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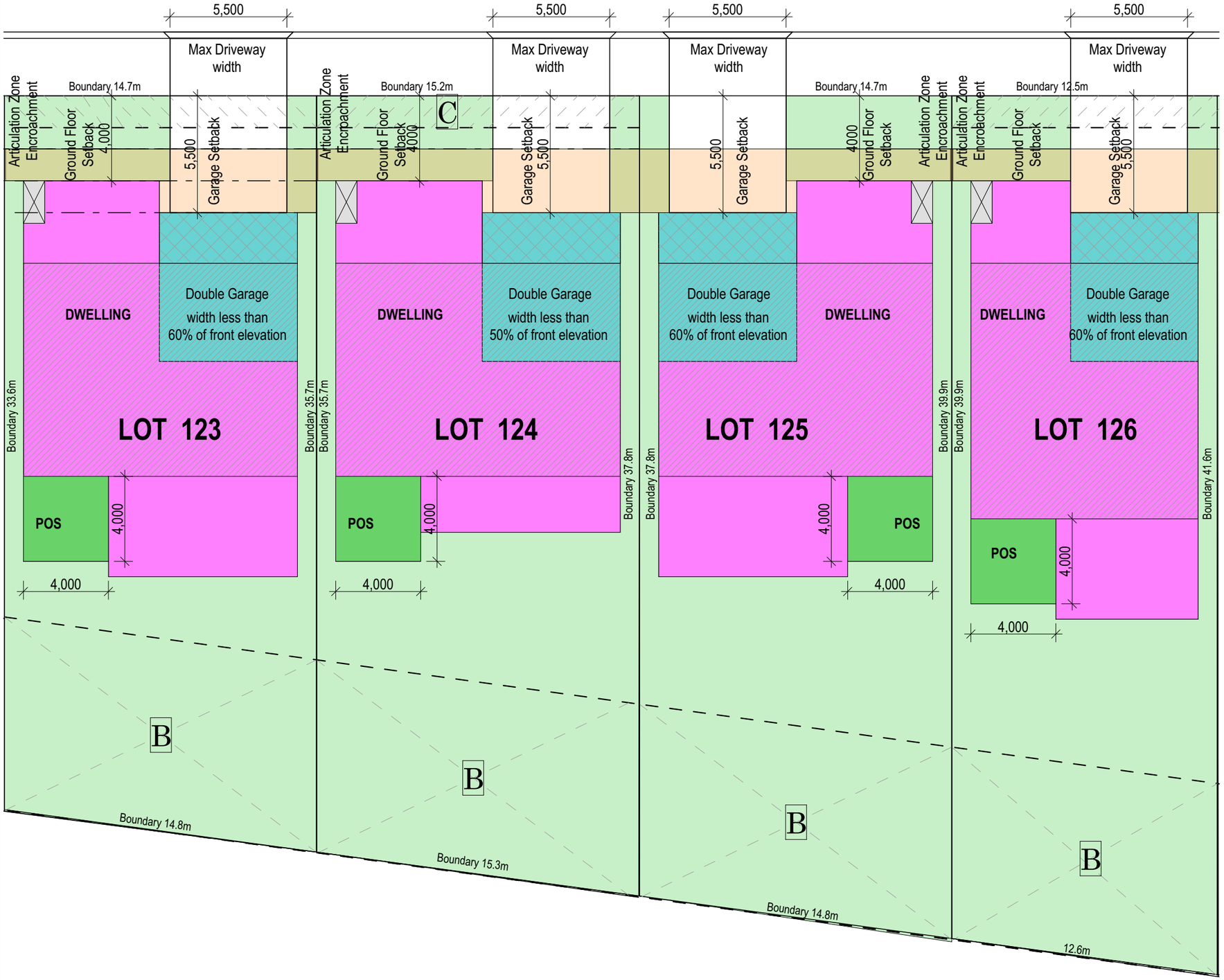
Scale 1:200 @ A3
Comp. Ref. 2201 BUILDING ENVELOPE PLANS.pln

Proj. No 2201
Dwg No. **BP 07/**



LEGEND

- GROUND FLOOR AREA: MAX 50% OF LOT AREA
- UPPER FLOOR AREA: MAX 30% OF LOT AREA
- BALCONY MIN 50% OF BUILDING ENVELOPE
- GARAGE FLOOR AREA:
- ARTICULATION ZONE
- LANDSCAPING AREA: MIN 40% OF FRONT SETBACK AREA
- PRINCIPAL PRIVATE OPEN SPACE (PPOS) MIN 4m x 4m
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- A2 — LANDSCAPE BUFFER ZONE 10.0m & VARIABLE

Drawing Title:
development application 10/04/2022

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Scale 1:200 @ A3
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Proj. No 2201
Dwg No. **BP 08/**

LEGEND

- GROUND FLOOR AREA: MAX 50% OF LOT AREA
- UPPER FLOOR AREA: MAX 30% OF LOT AREA
- BALCONY MIN 50% OF BUILDING ENVELOPE
- GARAGE FLOOR AREA:
- ARTICULATION ZONE
- LANDSCAPING AREA: MIN 40% OF FRONT SETBACK AREA
- PRINCIPAL PRIVATE OPEN SPACE (PPOS) MIN 4m x 4m
- WASTE BAY BEHIND BUILDING SETBACK
- B — NO BUILD ZONE 9.0m WIDE
- C — DRAINAGE EASEMENT 1.5m WIDE
- D — NO BUILD ZONE 1.0m WIDE
- A2 — LANDSCAPE BUFFER ZONE 10.0m & VARIABLE

Drawing Title:

development application 10/04/2022

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Proj. No 2201
Dwg No. **BP 9/**