



PLANNING PROPOSAL

4 Bellara Avenue North Narrabeen



Planning Proposal

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Prepared for

Sydney Water Corporation

By



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1 Introduction

This Planning Proposal has been prepared by GLN Planning Pty Ltd on behalf of Sydney Water Corporation (**Sydney Water**). It relates to the Sydney Water site located at Lot 26 in DP 236548, 4 Bellara Avenue, North Narrabeen.

This Planning Proposal is submitted to Northern Beaches Council (**Council**) to accompany a request to amend *Pittwater Local Environmental Plan 2014 (PLEP)* in accordance with Section 3.33 of the *Environmental Planning and Assessment Act 1979 (EP&A Act)*. This report has been prepared in accordance with the Department of Planning, Industry and Environment's (**DPI&E**) Guideline 'A Guide to Preparing Planning Proposals' dated December 2018 and 'A Guide to Preparing Local Environmental Plans' dated April 2013.

The proposed amendments primarily relate to the Land Zoning Map (Sheet 13) in PLEP. The proposed amendment seeks approval to rezone 565.5m² of land zoned SP2 Infrastructure (Water Supply System) to R2 Low Density Residential. The zoning changes will necessitate amendments to the Minimum Lot Size Map which are proposed to be updated in connection with this spot rezoning.

The site has been deemed surplus land to the needs of Sydney Water.

The proposed amendments to PLEP were discussed with Council on 26 February 2018. Key points from that meeting have been detailed below.

Table 1 Matters discussed at pre-lodgement meeting – 26 February 2018

Council comment	Proponent comment / response
Application of Council Strategic Plans and Policies	All applicable with adopted policies addressed in this Planning Proposal.
Flood Affection	A Flood Risk Assessment has been undertaken and an indicative building platform has been identified addressing the applicable provisions.
Geotechnical Hazard	A preliminary Geotechnical Assessment has been undertaken. Suitable reports can be a requirement of the Gateway Determination to ensure the land is suitable for residential development.
Bushland and Biodiversity	An Arborist has inspected the site and identified the trees within the site to assist with considering the development potential of the building area and is attached in Appendix B .

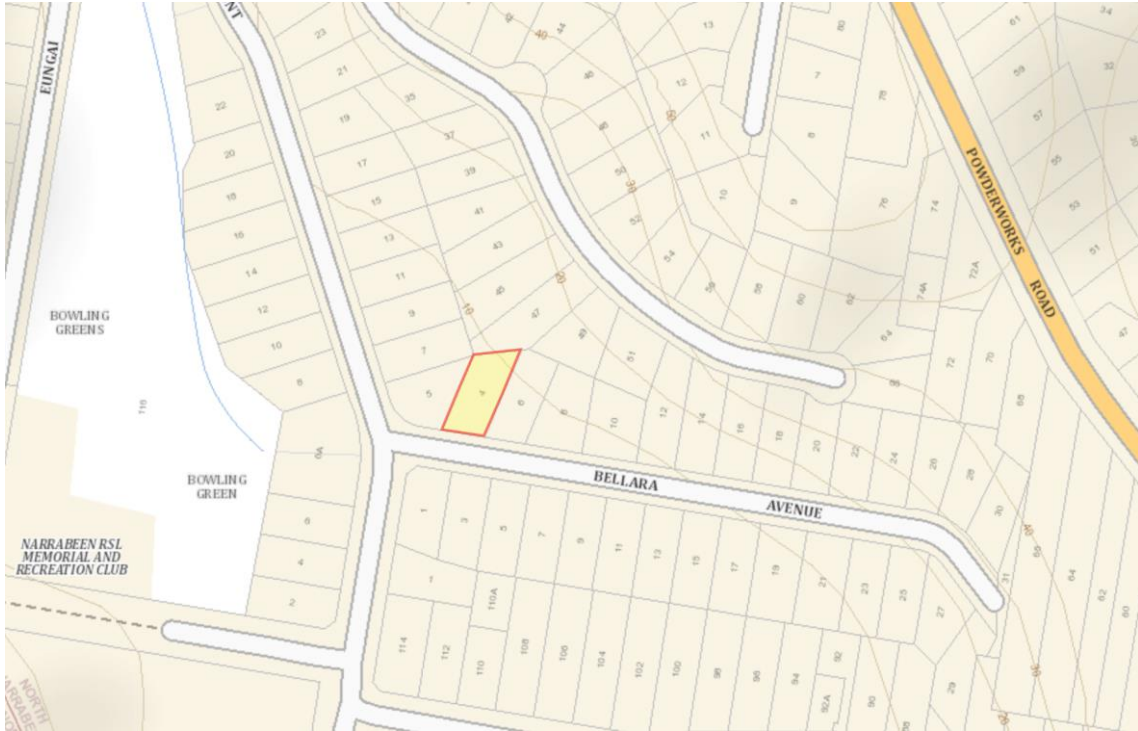


Figure 1 Site Location

Source: Sixmaps

1.1 Relevant Environmental Planning Instruments

The principal environmental planning instrument applying to the subject site is *Pittwater Local Environmental Plan 2014 (PLEP)*.

The subject site is zoned SP2 Infrastructure (Water Supply System) under PLEP as shown within Figure 6.

1.2 Site Location

The site is located to the north of Sydney, approximately 26 kilometres north of the Sydney CBD and 1 kilometre to the north west of North Narrabeen shops (**Figure 2**). The site is situated within the suburb of North Narrabeen within the Northern Beaches Local Government Area (**LGA**).

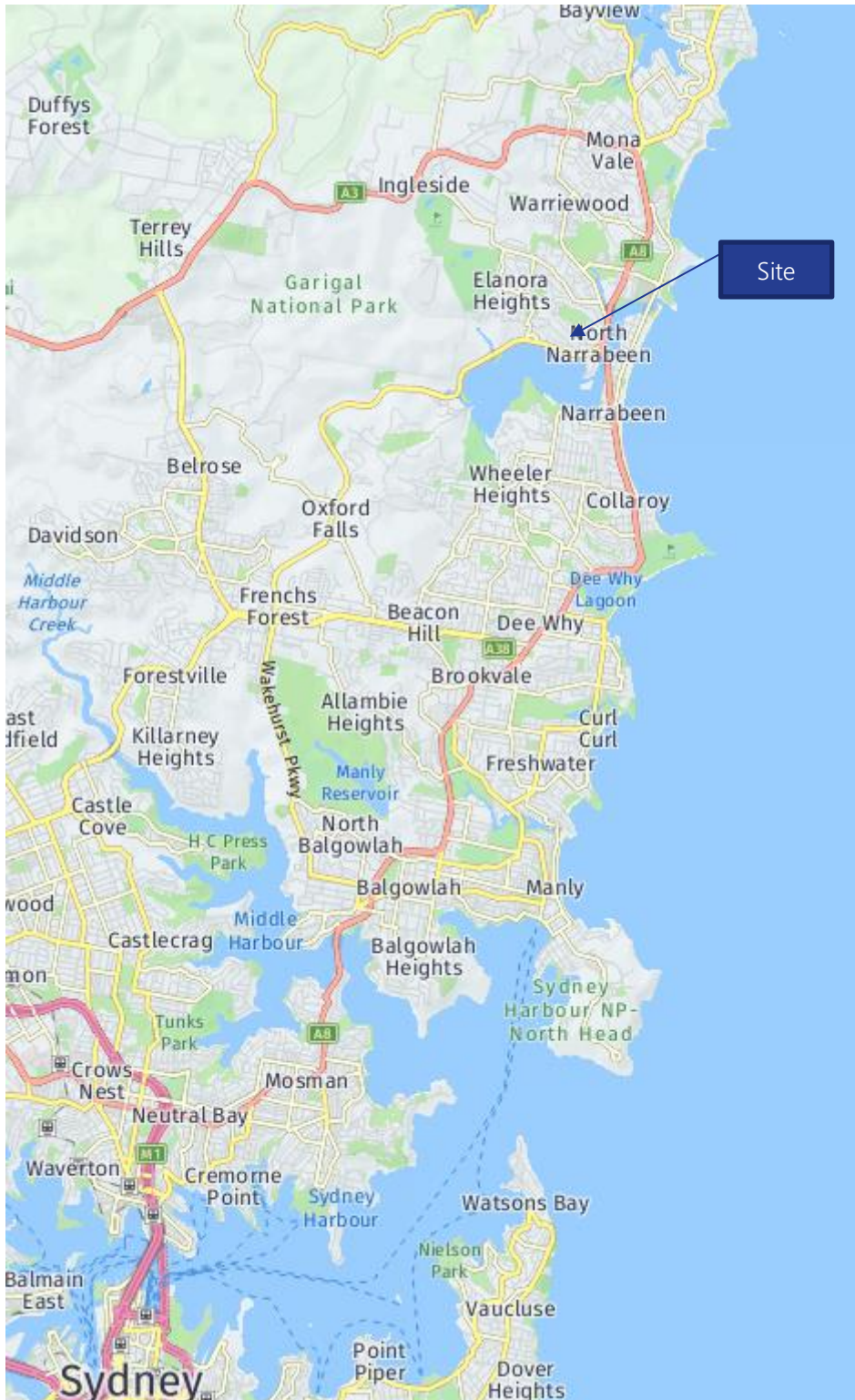


Figure 2 **Locality**

Source: profile.id.co.au



2 Planning Proposal

This section of the report outlines and discusses the components of this Planning Proposal in accordance with the Department of Planning, Industry and Environment's '*A guide to preparing planning proposals*', dated August 2016. These components include:

- Part 1: Objectives and Intended Outcome
- Part 2: Explanation of Provisions
- Part 3: Justification for the objectives, outcomes and process for implementation
- Part 4: Maps
- Part 5: Community Consultation

2.1 Part 1: Objectives or Intended Outcomes

The objective / intended outcomes of this Planning Proposal are outlined below.

1. Rezone surplus Sydney Water land to R2 Low Density residential

The primary objective of this Planning Proposal is to amend PLEP to rezone the Lot to enable development of this land for residential land uses.

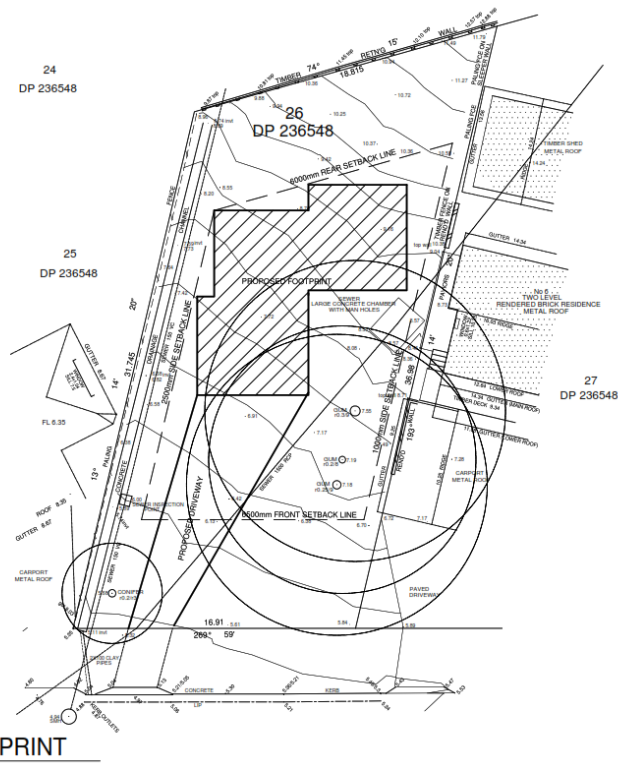
The subject site has been deemed surplus to Sydney Water's requirements. Therefore, the current SP2 zoning is no longer required and unnecessarily constrains the subject site. The site adjoins other low density residential land to the south, west and east. E4 Environmental Living residential land adjoins the site to the north. The rezoning of the site would allow for future residential development over the site consistent with the surrounding area. It also ensures the land will achieve a more desirable and practical planning outcome for the area and allow for appropriately placed residential housing.

2. Apply relevant planning controls over the area to be rezoned R2 Low Density

This Planning Proposal seeks to impose relevant planning controls over the area to be rezoned to guide future development consistent with the surrounding R2 Low Density Residential zoned land.

The intended outcomes of the Planning Proposal will facilitate future development of the subject site sympathetically with the surrounding R2 Low Density and E4 Environmental Living residential area. This would assist in maintaining the prevailing character of the area.

Sydney Water have prepared a concept plan for the development of a future dwelling which is provided to illustrate how future residential development over the site would be consistent with the existing character and streetscape. A conceptual plan is provided at **Figure 3** with plans and elevations attached at **Appendix A**.



SITE PLAN - BUILDING FOOTPRINT

Figure 3 Concept Building Footprint

2.2 Part 2: Explanation of Provisions

The explanation of provisions provides a detailed statement of how the objective or intended outcomes are to be achieved through amending PLEP.

2.2.1 Summary

It is proposed to amend PLEP 2014 as follows:

1. Update PLEP 2014 – Land Zoning Map (Sheet 013) to rezone the site from SP2 Infrastructure (Water Supply System) to R2 Low Density Residential to allow for the future residential development of the site.
2. Update PLEP 2014 – Minimum Subdivision Lot Size (Sheet 013) to apply a minimum lot size of 550m² to the site.

2.2.2 Site Description and Surrounding Development

The existing Sydney Water site (Lot 26, DP 236548) has a total site area of approximately 565.6m².

The site is vacant and is affected by two sewer lines and a drainage channel. The site has a frontage of 16.91m to Bellara Avenue and a variable depth of 31.745 to 36.98m. The site is trapezoidal in shape.

The site is consistent with size and shape of other adjoining properties having been subdivided at the same time. The immediate area is characterised by detached, single storey and two storey

dwelling houses. The dwellings to the rear are higher in elevation as the landform rises to Elanora Heights and Powderworks Road to the north.

The key features of the site are identified on the survey plan extracted in **Figure 4** and contained in **Appendix E**.

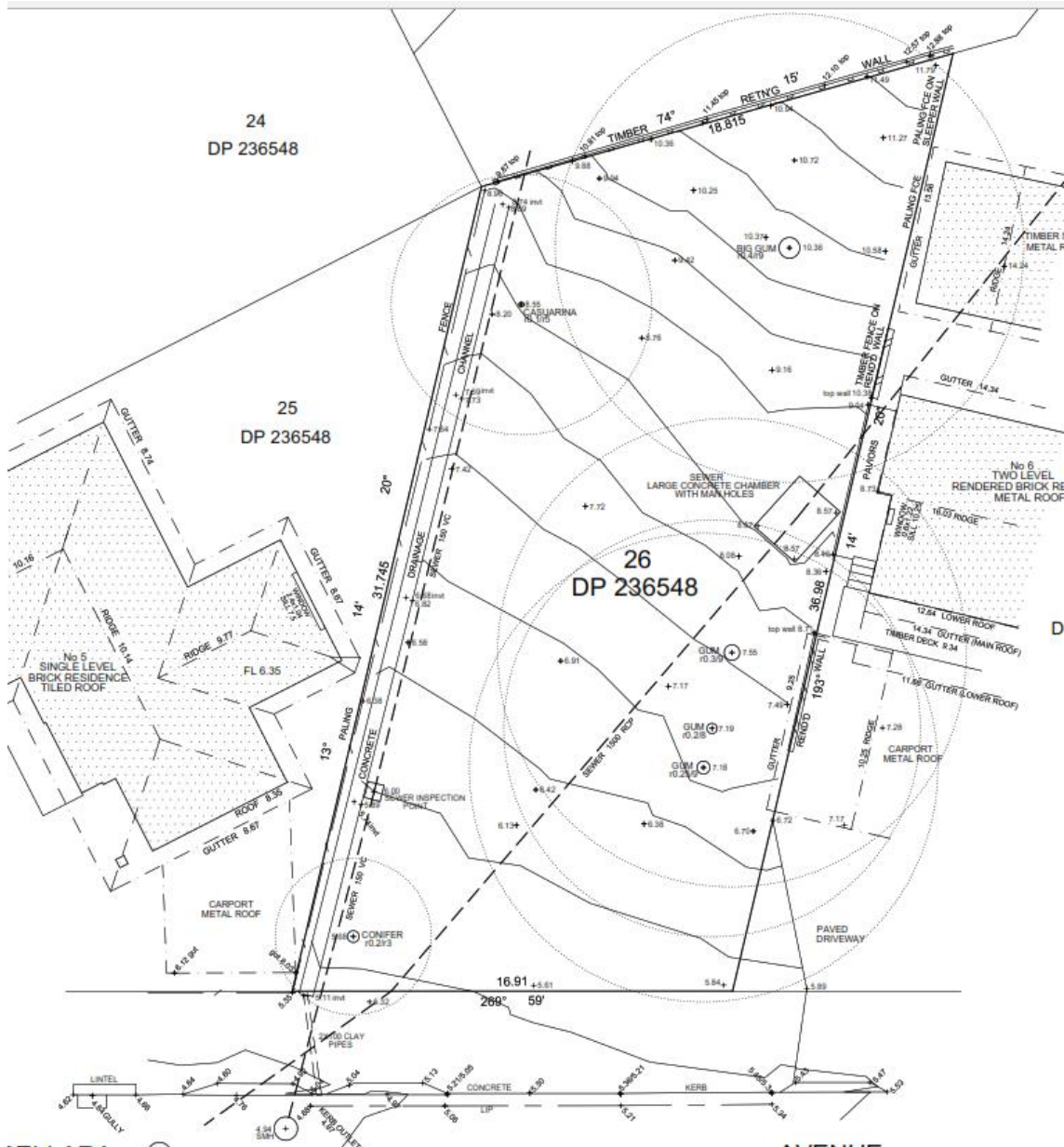


Figure 4 Surrounding Development

Source: Ident Survey Steve Davey and Associates

Figure 5 provides an aerial photograph of the site and locality.



Figure 5 Aerial Photograph subject land outlined in red

Source: Nearmap 16 June 2020

The Zones

The land is currently zoned SP2 Infrastructure pursuant to PLEP 2014. This zoning is applied to this site in isolation. The R2 Low Density Residential zoning is the predominant zone used within this locality. The land to north, zoned E4 Environmental Living, is steeper land than the site. The site characteristics are similar to that of the immediately adjoining land to the east and west of the site.

Figure 6 indicates the existing zoning of the site and adjoining lands.

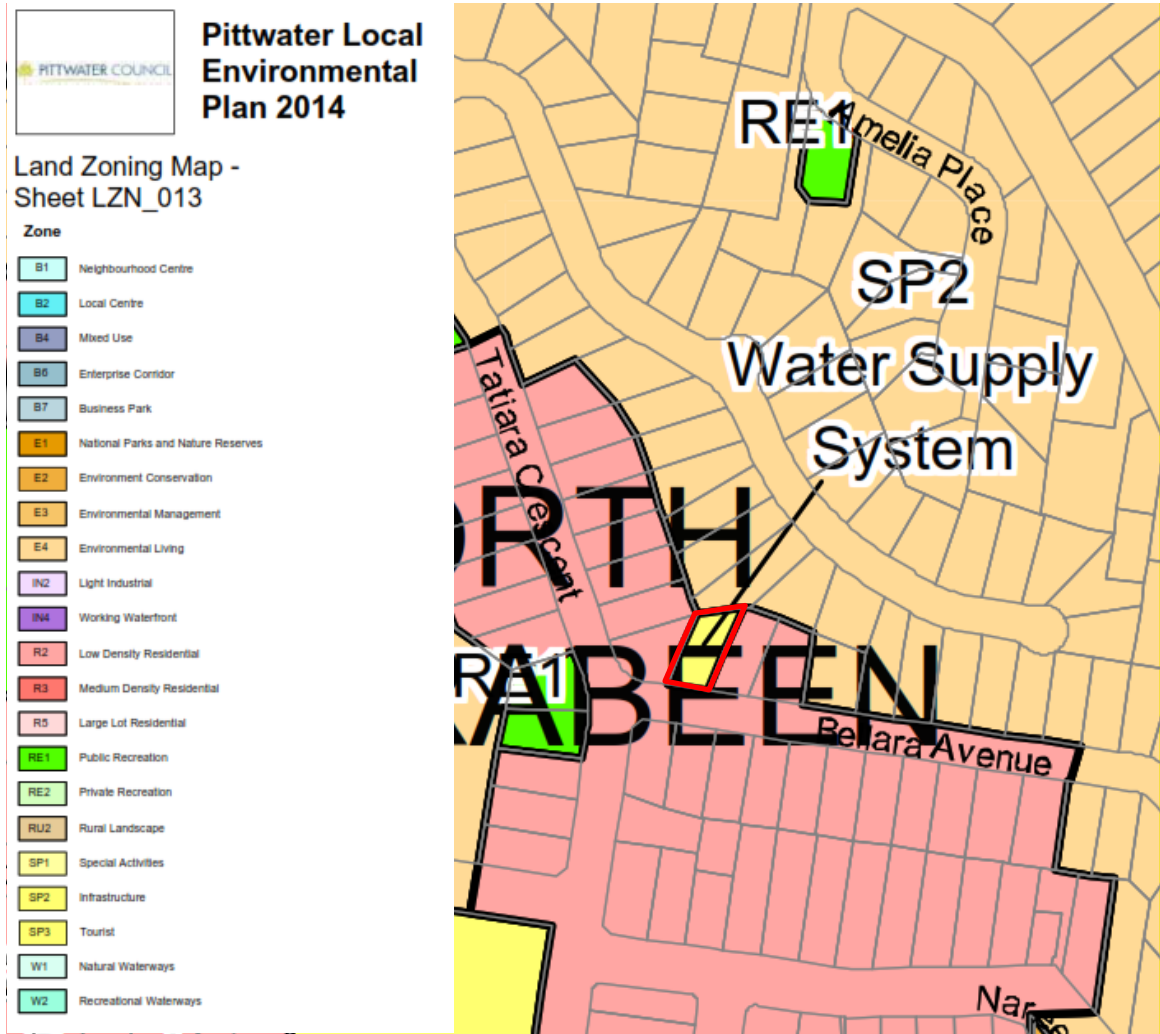


Figure 6 Current land use zoning (site shown red outline)

Source: PLEP Landuse Zoning Map 13

The PLEP 2014 Land Use Table for the SP2 Infrastructure Zone is as follows:

Zone SP2 Infrastructure

1. *Objectives of zone*

- *To provide for infrastructure and related uses.*
- *To prevent development that is not compatible with or that may detract from the provision of infrastructure.*

2. *Permitted without consent*

Nil

3. *Permitted with consent*



Aquaculture; Building identification signs; Business identification signs; Environmental protection works; Roads; The purpose shown on the Land Zoning Map, including any development that is ordinarily incidental or ancillary to development for that purpose

4. *Prohibited*

Any development not specified in item 2 or 3

The PLEP 2014 Land Use Table for the R2 Low Density Residential Zone is as follows:

Zone R2 Low Density Residential

1. *Objectives of zone*

- *To provide for the housing needs of the community within a low density residential environment.*
- *To enable other land uses that provide facilities or services to meet the day to day needs of residents.*
- *To provide for a limited range of other land uses of a low intensity and scale, compatible with surrounding land uses.*

2. *Permitted without consent*

Home businesses; Home occupations

3. *Permitted with consent*

Bed and breakfast accommodation; Boarding houses; Boat sheds; Building identification signs; Business identification signs; Centre-based child care facilities; Community facilities; Dual occupancies; Dwelling houses; Environmental protection works; Exhibition homes; Group homes; Health consulting rooms; Home-based child care; Home industries; Jetties; Oyster aquaculture; Places of public worship; Pond-based aquaculture; Respite day care centres; Roads; Secondary dwellings; Tank-based aquaculture; Veterinary hospitals; Water recreation structures

4. *Prohibited*

Any development not specified in item 2 or 3



The other relevant planning control applying to the subject site is the minimum subdivision lot size (Sheet O13) as shown within **Figure 7**

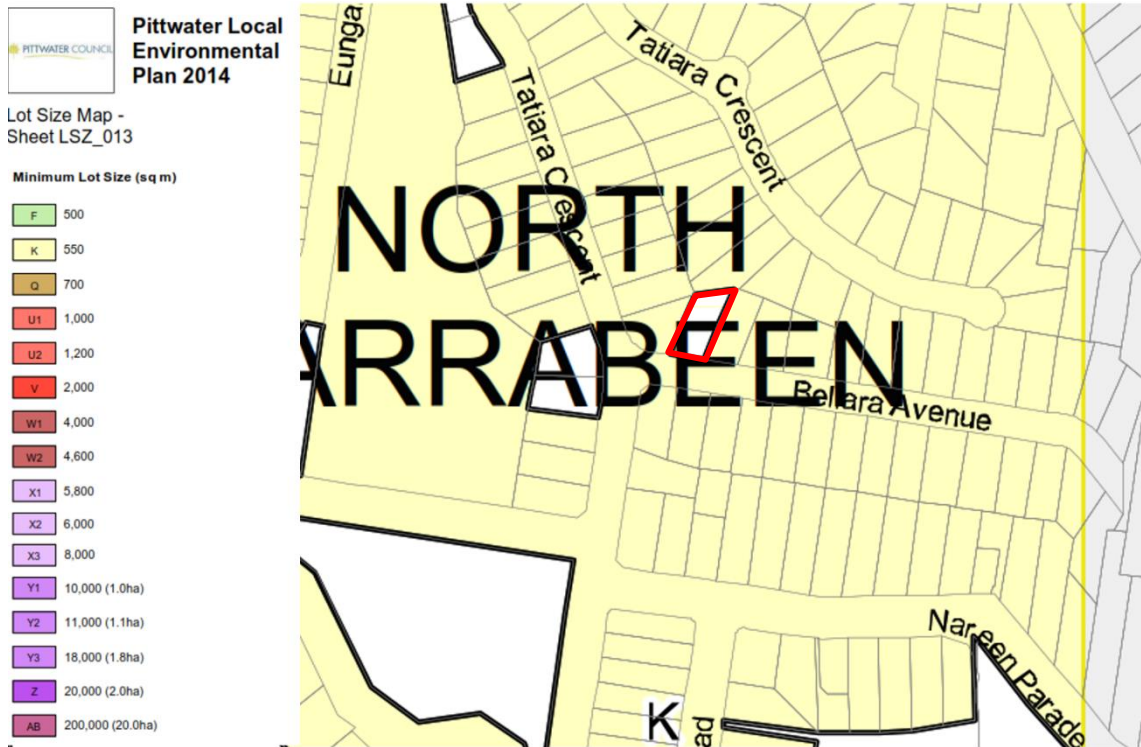


Figure 7 Current Lot Size Map (site shown red outline)

Source: PLEP Lot Size Map 13



2.3 Part 3: Justification

Section A – Need for the Planning Proposal

1. Is the Planning Proposal a result of any strategic study or report?

This Planning Proposal is not the result of any strategic study or report.

2. Is the Planning Proposal the best means of achieving the objectives or intended outcomes, or is there a better way?

Yes. Amending PLEP 2014 and rezoning the subject site to R2 Low Density Residential is the best means of achieving the objectives and outcomes of this Planning Proposal. This will facilitate a redevelopment of this land for residential purposes.

Section B Relationship to Strategic Planning Framework

3. Is the planning proposal consistent with the objectives and actions of the applicable regional or sub-regional strategy (including the Sydney Metropolitan Strategy and exhibited draft strategy)?

Greater Sydney Region Plan

The Planning Proposal has been reviewed against relevant outcomes of the Greater Sydney Region Plan “A Metropolis of Three Cities” published on 18 March 2018. The Plan identifies a number of strategic directions and specific policy settings transforming the Greater Sydney Region into a metropolis of three cities comprising the Western Parkland City, the Central River City and the Eastern Harbour City.

The Planning Proposal is informed by the Plan’s vision for the Eastern Harbour City. The Planning Proposal is not contrary to the broad Directions of the Plan. However, there are a number of Objectives that require further analysis as follows:

- *Objective 11 - Housing is more diverse and affordable*
- *Objective 25 - The coast and waterways are protected and healthier*
- *Objective 27 - Biodiversity is protected, urban bushland and remnant vegetation is enhanced*
- *Objective 28 - Scenic and cultural landscapes are protected*
- *Objective 30 - Urban tree canopy cover is increased*
- *Objective 36 - People and places adapt to climate change and future shocks and stresses*
- *Objective 37 - Exposure to natural and urban hazards is reduced*

These objectives are discussed more broadly below under the heading North District Plan, with further discussion relating to housing diversity and affordability; scenic and cultural landscapes; biodiversity and tree canopy; and natural hazards and climate change. The discussion below includes



recommendations on the additional information that should be required to be provided by the applicant should a gateway determination be issued.

North District Plan

The North District Plan (March 2018) is the relevant and applicable district plan. An assessment of the strategic and site specific merit of the Planning Proposal against this plan is outlined below.

- *Planning Priority N5 – Providing housing supply, choice and affordability, with access to jobs, services and public transport*

The Planning Proposal has the intended effect of increasing housing supply. However, the Planning Proposal does not fulfill a holistic approach to increase housing supply or choice in strategic locations identified under the District Plan as an infill development.

The Planning Proposal is unlikely to impact upon housing affordability within the local area given the single lot available for future development.

In 2017, Northern Beaches Council adopted an Affordable Housing Policy. One of the Policy statements included a commitment toward a minimum 10% affordable rental housing target for all strategic plans and planning proposals for urban renewal or greenfield development. The small scale of the planning proposal as an infill rezoning due to the site being surplus Sydney Water land, does not lend itself to the provision of affordable housing on the site. This matter can be further addressed following Gateway determination with Council.

- *Planning Priority N17 - Protecting and enhancing scenic and cultural landscapes*

The subject property is located on the edge of the escarpment . Any eventual redevelopment of the site will be required to respond in a way that is appropriate having regard to the character of existing development in the locality, relevant zone objectives and other planning controls. The draft concept scheme provided gives an indication of the likely future development of the site. The existing planning controls under Pittwater Development Control Plan will provide for more appropriate built form controls that protect and enhance the scenic landscape of the area.

- *Planning Priority N19 – Increasing urban tree canopy cover and delivering Green Grid connections*

The Planning Proposal itself will not alter the tree canopy, however the future built form outcome will have the potential to impact upon existing and future trees on the site and within the adjoining boundary areas such as Council’s roads reserves. An appropriate architectural design could be achieved which retained existing trees on the site and adjoining properties and potentially increased overall tree canopy through additional planting.

An Arborist (Hugh the Arborist) has prepared a tree plan (**Appendix B**). This Plan shows the location of trees on site and the root protection zones. Some tree removal will be required for the site to be developed. A suggested building area was identified to prepare the concept architectural plans. These matters can be addressed as part of a future development application which would be subject to a detailed Arboricultural Assessment.



- *Planning Priority N22 – Adapting to the impacts of urban natural hazards and climate change*

Council’s flood information for the locality identified the site as being partially affected by flooding during the 1% AEP rain event. A flood report was prepared by Stellen Civil Engineering (**Appendix C**) and concludes that the site has sufficient space available for the construction of residential development outside of the 1% AEP flood extent meeting all applicable flood related development controls. Detailed flood assessment reports will be required with any future development application. This Planning Proposal is consistent with Objectives 37 and 81 of the North District Plan, which aims to reduce and minimise exposure to natural hazards, and to avoid locating new development and the intensification of development in areas impacted by hazards. This matter is also considered under the Section 9.1 Ministerial Directions relating to Coastal Management and Flooding.

(a) Does the proposal have strategic merit? Is it:

Consistent with a relevant local council strategy that has been endorsed by the Department?

The proposal is consistent with the Northern Beaches Local Strategic Planning Statement – Towards 2040. The planning proposal will enable the orderly and economic use of the land which is otherwise surplus public land.

The specific directions and priorities of the Northern Beaches Local Strategic Planning Statement – Towards 2040 are discussed under the following headings

- Landscape Priority 1 - 6

The existing vegetation and trees remain protected under the existing DCP and SEPP (Vegetation) provisions. The preliminary arborists assessment indicates that future development of the lot is achievable without removal of all existing vegetation. There proposed will not impact endangered or threatened vegetation. Future residential development will be consistent with that of adjoining and nearby development in terms of amenity and appearance.

- Efficiency Priority 7

The provisions of SEPP (BASIX) will apply to future development ensuring a greater environmental efficiency than that of adjoining and nearby dwellings developed during the 1960’s to 1970s.

- Resilience Priority 8

Assessment of the likely flood and geotechnical assessment has been undertaken to ensure appropriate protection against natural hazards.

- Infrastructure and Collaboration Priority 9

The development of surplus land within an existing residential area and proximity to commercial centres supports the existing infrastructure within the immediate, nearby and broader Northern Beaches community.



- People Priority 10 - 14

Existing facilities are available and will be supported by an active local community.

- Housing Priority 15-16

The development of surplus land as an infill residential lot will provide for new housing stock within an established neighbourhood with appropriate infrastructure and community facilities existing.

- Great Places Priority 17 – 18

The development of the surplus land will enable the future housing stock to be designed and constructed to suit the needs of the future resident. The site is within close proximity of the existing recreational areas of Narrabeen Beach and Lagoon.

- Connectivity Priority 19 -21

The site is within proximity of the existing B1 bus service and existing road network. The central location of North Narrabeen provides access to centres to the south and north and west.

- Jobs and Skills Priority 22 -30

The development of the site will provide for employment of trades and associated professions. Future residents will support and have access to the existing and nearby commercial centres for shopping and employment.

(b) Does the proposal have site-specific merit, having regard to the following:

- *The natural environment (including known significant environmental values, resources or hazards)?*

The future development of the site would be consistent with the adjoining and nearby residential development. All matters can be satisfactorily addressed in a future development application and an appropriate assessment under the heads of consideration contained in Section 4.15 of the EP&A Act.

- *The existing uses, approved uses, and likely future uses of land in the vicinity of the proposal?*

The Planning Proposal is consistent with the planning controls and existing and likely future development of the adjoining and nearby residential development.

- *The services and infrastructure that are or will be available to meet the demands arising from the proposal and any proposed financial arrangements for infrastructure provision?*

The land is currently vacant and adjoined by existing residential dwellings and is serviced by existing roads and necessary utilities.



4. Is the Planning Proposal consistent with a council's local strategy or other local strategic plan?

A review has been undertaken of the Planning Proposal against certain policies and plans of Northern Beaches Council as follows:

- Pittwater Local Planning Strategy (2011)

The proposal is within the former Pittwater Council area and the Pittwater Local Planning Strategy (2011) is considered the relevant strategy. While this strategy was not endorsed by the former Department of Planning and Environment, it was used to inform the *Pittwater Local Environmental Plan 2014* which has been gazetted and came into force on 27 June 2014. This Planning Proposal is consistent with that strategy on the basis of the adjoining land to the east and west with frontage to Bellara Avenue maintaining a Low Density Residential zoning consistent with the prior controls of Pittwater Local Environmental Plan 1993.

- Land Capability Mapping

The Land Capability Mapping that accompanied the Pittwater Local Planning Strategy established the classification criteria for the suitability for the intensification of land development having regard to a range of environmental, economic or social characteristic that influences land use allocation and future management of the land.

Through this process, the subject site was not identified as being of environmental and aesthetic significance and warranting an alternative zoning of E4 Environmental Living as has been applied to the land immediately to the north.

- Dwelling Targets

Under the Northern District Plan, the Northern Beaches LGA has been assigned a target for 3,400 dwellings to 2021. This Planning Proposal will positively contribute to overall dwelling target delivery albeit in a minor manner as a single allotment.

- Affordable and Appropriate Housing

Northern Beaches Council has adopted an affordable housing policy which commits Council to a 10% affordable housing target for all rezoning's proposing new dwellings. This Planning Proposal for a single allotment of surplus government land is not urban renewal or greenfield development as identified in Council's policy.



5. Is the Planning Proposal consistent with applicable State Environmental Planning Policies?

Table 2 Compliance with State Environmental Planning Policies (SEPPs)

SEPPs (as at 16 July 2020)		Applicable	Consistent
1	Development Standards	Refer Cl 1.9 (PLEP 2014)	N/A
19	Bushland in Urban Areas	N/A	N/A
21	Caravan Parks	N/A	N/A
33	Hazardous and Offensive Development	N/A	N/A
36	Manufactured Home Estates	N/A	N/A
44	Koala Habitat Protection	N/A	N/A
47	Moore Park Showground	N/A	N/A
50	Canal Estate Development	N/A	N/A
55	Remediation of Land	Yes	Yes
64	Advertising and Signage	N/A	N/A
65	Design Quality of Residential Apartment Development	N/A	N/A
70	Affordable Housing (Revised Schemes)	YES	YES
	(Aboriginal Land) 2019	N/A	N/A
	(Affordable Rental Housing) 2009	YES	YES
	(Building Sustainability Index: BASIX) 2004	YES	YES
	(Coastal Management) 2018	N/A	N/A
	(Concurrences) 2018	YES	YES
	(Educational Establishments and Child Care Facilities) 2017	N/A	N/A
	(Exempt and Complying Development Codes) 2008	YES	YES
	(Gosford City Centre) 2018	N/A	N/A
	(Housing for Seniors or People with a Disability) 2004	YES	YES
	(Infrastructure) 2007 (N/A	N/A
	(Kosciuszko National Park - Alpine Resorts) 2007	N/A	N/A
	(Kurnell Peninsula) 1989	N/A	N/A



SEPPs (as at 16 July 2020)		Applicable	Consistent
	(Mining, Petroleum Production and Extractive Industries) 2007	N/A	N/A
	(Miscellaneous Consent Provisions) 2007	N/A	N/A
	(Penrith Lakes Scheme) 1989	N/A	N/A
	(Primary Production and Rural Development) 2019	N/A	N/A
	(State and Regional Development) 2011	N/A	N/A
	(State Significant Precincts) 2005	N/A	N/A
	(Sydney Drinking Water Catchment) 2011	N/A	N/A
	(Sydney Region Growth Centres) 2006	N/A	N/A
	(Three Ports) 2013	N/A	N/A
	(Urban Renewal) 2010	N/A	N/A
	(Vegetation in Non-Rural Areas) 2017	YES	YES
	(Western Sydney Employment Area) 2009	N/A	N/A
	(Western Sydney Parklands) 2009	N/A	N/A
	Sydney Regional Environmental Plan No 8 (Central Coast Plateau Areas)	N/A	N/A
	Sydney Regional Environmental Plan No 9 – Extractive Industry (No 2 – 1995)	N/A	N/A
	Sydney Regional Environmental Plan No 16 – Walsh Bay	N/A	N/A
	Sydney Regional Environmental Plan No 20 – Hawkesbury-Nepean River (No 2 – 1997)	N/A	N/A
	Sydney Regional Environmental Plan No 24 – Homebush Bay Area	N/A	N/A
	Sydney Regional Environmental Plan No 26 – City West	N/A	N/A
	Sydney Regional Environmental Plan No 30 – St Marys	N/A	N/A
	Sydney Regional Environmental Plan No 33 – Cooks Cove	N/A	N/A
	Sydney Regional Environmental Plan (Sydney Harbour Catchment) 2005	N/A	N/A

** Refer further discussion below.*

In relation to applicable SEPPs listed at **Table 2**, the following comments are provided regarding how the Planning Proposal is either consistent or inconsistent with the SEPPs as follows:



- SEPP No. 55 - Remediation of Land

Formerly, Clause 6(1) of SEPP 55 required consideration in preparing an environmental planning instrument to consider whether the land is contaminated. These provisions have been recently amended and are now considered under the Ministerial Directions.

The site's history indicates that it has been vacant for the last 50+ years. The possibility of contamination is considered low. This matter could, if deemed necessary, be addressed at gateway determination or as part of a future development application.

- SEPP No 70 – Affordable Housing (Revised Schemes)

SEPP 70 now identifies all parts of the state as having a need for affordable housing and enables the potential collection of affordable housing contribution pursuant to Section 7.32 (1) of the EP&A Act where either SEPP or local environmental plan authorises an affordable housing condition to be imposed.

Council has an adopted Affordable Housing Policy which is working toward amending relevant LEPs to impose a contribution toward affordable housing pursuant to the EP&A Act. Council's Policy also aims to achieve a minimum 10% of affordable housing for all planning proposals seeking rezoning or additional dwelling capacity. Given the intent of the SEPP and Council's Affordable Housing Policy, it is suggested that this should be considered as part of the gateway determination when issued.

- SEPP (Building Sustainability Index: BASIX) 2004

This SEPP applies to new residential development and requires a certain commitment toward water and energy efficiency. Any future development of the site for residential purposes would be required to meet the requirements of the SEPP. This could be addressed as part of a future development application.

- SEPP (Coastal Management) 2018

The site is not mapped under SEPP (Coastal Management) 2018 and is not applicable to this Planning Proposal.

- SEPP (Exempt and Complying Development Codes) 2008

This SEPP applies to specified development types which may be constructed in the future subject to compliance with the standards and controls of the SEPP within a R2 Low Density Residential zoning consistent with the adjoining R2 zoned lands.

6. Is the planning proposal consistent with applicable Ministerial Directions?

Applicable Directions are summarised in **Table 3** including comments on each. Where the Planning Proposal could be deemed inconsistent with a Direction it is discussed in further detail below.

2.6 Remediation of Contaminated Land

The objective of this direction is to reduce the risk of harm to human health and the environment by ensuring that contamination and remediation are considered by planning proposal authorities. There is no specific evidence of use of the site for any purposes identified in Table 1 of the



Contaminated Land Guidelines since subdivision of the land for residential purposes in the early 1960's. The possibility of contamination is therefore considered low. This matter could be addressed at gateway determination or as part of a future development application.

3.1 Residential Zones

The objectives of this Direction are to:

- (a) *encourage a variety of choice of housing types to provide for existing and future housing needs,*
- (b) *to make efficient use of existing infrastructure and services and ensure that new housing has appropriate access to infrastructure and services, and*
- (c) *to minimise the impact of residential development on the environment and resource lands.*

The proposal generally complies with this direction, but it is unlikely to provide for a variety of choice of housing types by virtue of the single lot available for development. This Planning Proposal will enable the development of surplus infrastructure land in a manner consistent with that of the adjoining lands. The preliminary consideration of the location of existing trees within the site and development of a concept dwelling design indicates that the site can be developed in a manner consistent with that of the applicable planning controls contained in PLEP and Pittwater Development Control Plan.

3.4 Integrating Land Use and Transport

The objective of this direction is to ensure that urban structures, building forms, land use locations, development designs, subdivision and street layouts achieve the following planning objectives:

- (a) *improving access to housing, jobs and services by walking, cycling and public transport, and*
- (b) *increasing the choice of available transport and reducing dependence on cars, and*
- (c) *reducing travel demand including the number of trips generated by development and the distances travelled, especially by car, and*
- (d) *supporting the efficient and viable operation of public transport services, and*
- (e) *providing for the efficient movement of freight.*

The site is located within existing residential development with access to existing centres and transport services.

4.3 Flood Prone Land

The objectives of this direction are:

- (a) *to ensure that development of flood prone land is consistent with the NSW Government's Flood Prone Land Policy and the principles of the Floodplain Development Manual 2005, and*
- (b) *to ensure that the provisions of an LEP on flood prone land is commensurate with flood hazard and includes consideration of the potential flood impacts both on and off the subject land.*



The site is identified as being impacted by the 1% AEP rain event and flood affected under Council’s applicable flood study. A dwelling complying with the relevant setback requirements of Pittwater DCP would not be subject to any floodwaters during the 1% AEP rain event.

A Flood Risk Management Report has been prepared and is submitted for Council’s consideration with this Planning Proposal in **Appendix C**.

6.2 Reserving Land for Public Purposes

The objectives of this direction are:

- (a) *to facilitate the provision of public services and facilities by reserving land for public purposes, and*
- (b) *to facilitate the removal of reservations of land for public purposes where the land is no longer required for acquisition.*

The land has been identified as Sydney Water as being surplus land and unnecessary for the provision of public services.

Table 3 Ministerial Directions – Summary of Applicable Directions

Direction		Consistency of Planning Proposal
1	Employment and Resources	
1.1	Business and Industrial Zones	Not applicable
1.2	Rural Zones	Not applicable
1.3	Mining, Petroleum Production and Extractive Industries	Not applicable
1.4	Oyster Aquaculture	Not applicable
1.5	Rural lands	Not applicable
2	Environment and Heritage	
2.1	Environment Protection Zones	Not applicable The subject site is not within an Environment Protection Zone.
2.2	Coastal Protection	Not applicable The subject site is not within areas identified for Coastal Protection.
2.3	Heritage Conservation	Not applicable
2.4	Recreation Vehicle Areas	Not applicable
2.5	Application of E2 and E3 Zones and Environmental Overlays in Far North Coast LEPs	Not applicable



Direction		Consistency of Planning Proposal
2.6	Remediation of Contaminated Land	The land has been vacant within an existing residential area for a period exceeding 50 years. There is no evidence to suggest that the site is likely to risk human health or the environment.
3 Housing, Infrastructure and Urban Development		
3.1	Residential Zones	The proposal is consistent with this Direction. The rezoning will facilitate densities consistent with the surrounding area. The proposed rezoning is consistent with surrounding land to the north, south and east.
3.2	Caravan Parks and Manufactured Home Estates	Not applicable
3.3	Home Occupations	Not applicable
3.4	Integrating Land Use and Transport	The site's location and access to public transport and existing facilities within nearby commercial centres achieves consistency with the objectives of this policy.
3.5	Development Near Licensed Aerodromes	Not applicable
3.6	Shooting Ranges	Not applicable
3.7	Reduction in non-hosted short term rental accommodation period	Not applicable
4 Hazard and Risk		
4.1	Acid Sulphate Soils	Not applicable
4.2	Mine Subsidence and Unstable Land	Not applicable
4.3	Flood Prone Land	A Flood Risk Management Report has been prepared and is contained in Appendix C . Refer section 2.3 of this Planning Proposal.
4.4	Planning for Bushfire Protection	Not applicable
5 Regional Planning		
5.1	Implementation of Regional Strategies	The Planning Proposal is consistent with the current aims outlined for the North District Plan under the Plan for Growing Sydney. Refer section 2.3 of this Planning Proposal.
5.2	Sydney Drinking Water Catchments	Not applicable
5.3	Farmland of State and Regional significance on the NSW Far North Coast	Not applicable



Direction		Consistency of Planning Proposal
5.4	Commercial and Retail Development along the Pacific Highway, North Coast	Not applicable
5.5	Development in the vicinity of Ellalong, Paxton and Millfield (Cessnock LGA)	Not applicable
5.6	Sydney to Canberra Corridor	Revoked
5.7	Central Coast	Revoked
5.8	Second Sydney Airport: Badgerys Creek	Not Revoked
5.9	North West Rail Link Corridor Strategy	Not applicable
5.10	Implementation of Regional Plans	Refer to Section 2.3
5.11	Development of Aboriginal Land Council Land	Not applicable
6	Local Plan Making	
6.1	Approval and Referral Requirements	Not applicable
6.2	Reserving Land for Public Purposes	While the land is not identified to be acquired under PLEP, it is no longer required for a public purpose being for a Water Supply System. Sydney Water have lodged this Planning Proposal seeking to rezone part of the site to residential to facilitate the sale of this land.
6.3	Site Specific Provisions	Not applicable
7	Metropolitan Planning	
7.1	Implementation of the Metropolitan Strategy	The Planning Proposal is consistent with <i>A Plan for Growing Sydney</i> and will facilitate housing growth within an identified growth area. Refer to section 2.3. of this Planning Proposal.
7.2	Implementation of Greater Macarthur Land Release Investigation	Not applicable
7.3	Parramatta Road Corridor Urban Transformation Strategy	Not applicable
7.4	Implementation of North West Priority Growth Area Land Use and Infrastructure Implementation Plan	Not applicable



Direction		Consistency of Planning Proposal
7.5	Implementation of Greater Parramatta Priority Growth Area Interim Land Use and Infrastructure Implementation Plan	Not applicable
7.6	Implementation of Wilton Priority Growth Area Interim Land Use and Infrastructure Implementation Plan	Not applicable
7.7	Implementation of Glenfield to Macarthur Urban Renewal Corridor	Not applicable
7.8	Implementation of Western Sydney Aerotropolis Interim Landuse and Infrastructure Implementation Plan	Not Applicable
	Implementation of Bayside West Precincts 2036 Plan	Not applicable
7.10	Implementation of Planning Principles for the Cooks Cove Precinct	Not applicable

Section C – Environmental, social and economic impact

7. Is there any likelihood that critical habitat or threatened species, populations or ecological communities, or their habitats will be adversely affected as a result of the proposal?

No. The subject site is not identified as containing threatened species, critical habitat, ecological communities or their habitat.

8. Are there any other likely environmental effects as a result of the Planning Proposal and how are they proposed to be managed?

There are no other likely environmental effects that are anticipated to result from the rezoning. The gateway determination and exhibition process will enable examination of any likely environmental impacts.

The preliminary flood risk report (**Appendix C**), geotechnical assessment report (**Appendix D**), arborist assessment (**Appendix B**) and concept architectural plans (**Appendix A**) undertaken on the site conclude that residential zoning for the site provides an acceptable outcome. Future residential development would be consistent with that of the adjoining and nearby residential development.



9. Has the Planning Proposal adequately addressed any social and economic effects?

Yes. There is not considered to be any adverse social or economic effects as a result of the amendments sought. It is considered that the rezoning will have a largely positive social outcome and will be harmonious with the existing social fabric of North Narrabeen through:

- Providing an infill site for residential land uses in close proximity to open space and public transport.
- Adopting R2 Low Density Residential zoning which is consistent with the surrounding land uses.
- Facilitating future residential development in line with PLEP 2014 as illustrated within the concept plans (**Appendix B**). This rezoning will support a future residential lot to meet the housing needs of the population.

The planning proposal will facilitate future residential development within a suitable location.

Section D State and Commonwealth Interests

There is not considered to be any State or Commonwealth interests in this Planning Proposal other than ensuring general consistency with State Policies as detailed above. This typically relates to areas that result in subdivisions in excess of 150 lots, substantial urban renewal, infill development and development that will result in additional demand on infrastructure. This Proposal is relatively minor in comparison to these types of development.

10. Is there adequate public infrastructure for the planning proposal?

Yes. The residential development yield anticipated from the rezoning is relatively modest and is considered to have a negligible increase in traffic movements within the local road network.

11. What are the views of State and Commonwealth public authorities consulted in accordance with the Gateway determination?

Consultation with relevant State and Commonwealth public authorities will be undertaken as part of the exhibition of the Planning Proposal, as directed by the Gateway Determination.



2.4 Part 4 - Mapping

The following maps are associated with the Planning Proposal.

The proposed amendments to the Land Zoning Map are illustrated within **Figure 8**

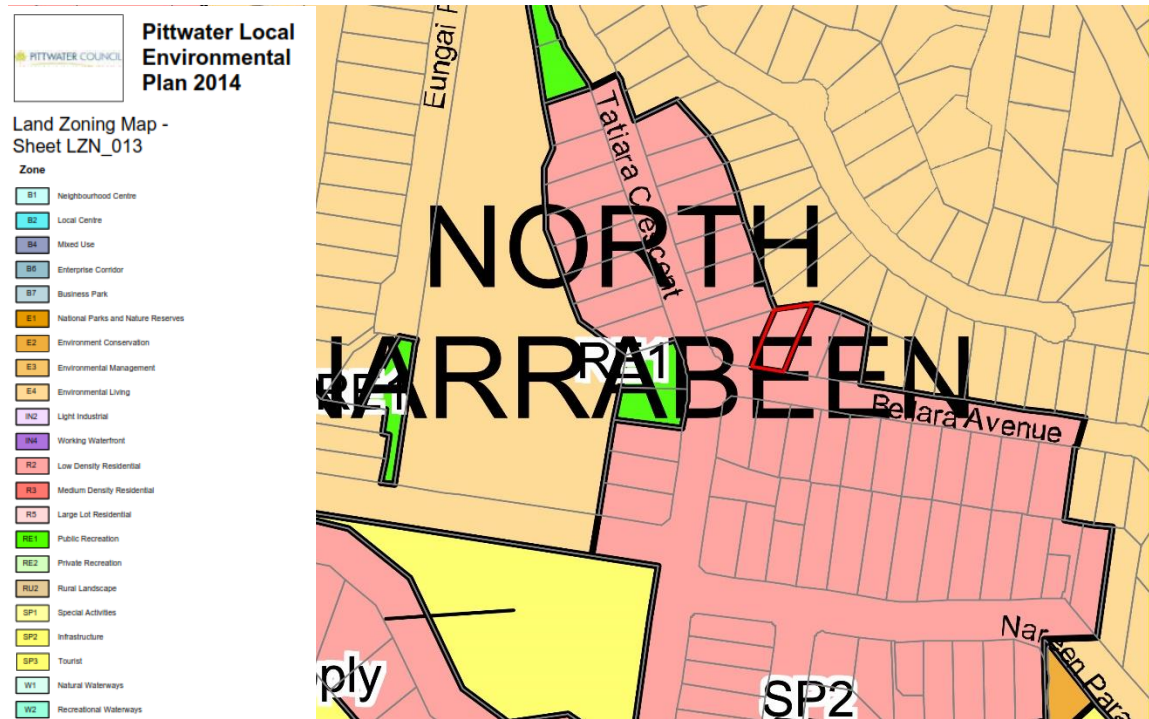


Figure 8 Land to be rezoned

Source: PLEP Landuse Zoning Map 13 (amended by GLN)

The proposed amendments to the Lot Size Map are illustrated within **Figure 9**.

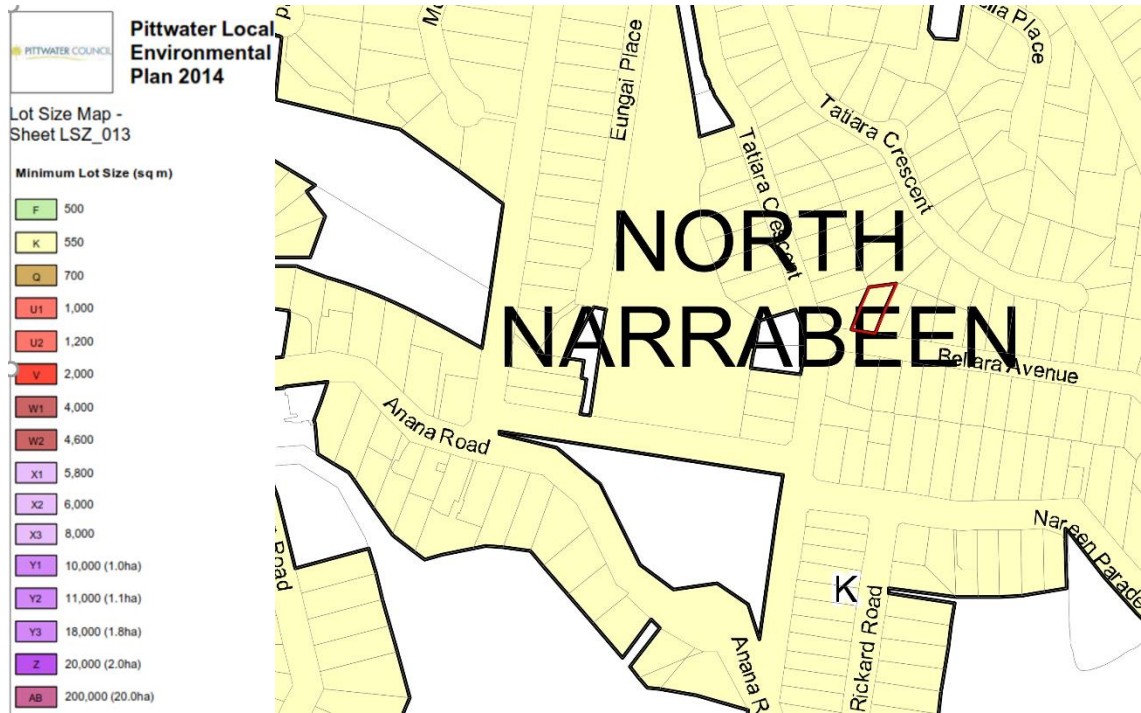


Figure 9 Amendment to Lot Size Map

Source: PLEP Landuse Zoning Map 13 (amended by GLN Planning)

2.5 Part 5 - Community Consultation

Council will place the Planning Proposal on public exhibition in accordance with future Gateway Determination and consistent with Council’s Community Engagement Policy including:

- A public notice in the Manly Daily notifying of the public exhibition;
- Letters to key stakeholders;
- Hard copies of the exhibition material at Council’s offices; and
- Electronic copies of the exhibition material on Council’s website.

If issued, the Gateway Determination will confirm the public consultation that must be undertaken.



2.6 Part 6 -Project Timeline

Task	Anticipated Timeline
Report to NBLPP	August 2020
Report to Council	September 2020
Referral to Department of Planning & Environment for Gateway determination	October 2020
Issue of Gateway determination	November 2020
Government agency consultation	December 2020
Public Exhibition period	December 2020
Consideration of Submissions	January 2021
Report to Council to determine Planning Proposal	February 2021
Submit Planning Proposal to the Department of Planning Industry and Environment for determination	February 2021

Sydney Water would appreciate consideration of fast tracking this Planning Proposal under the COVID 19 provisions on the basis that the land could be offered for sale and available for the construction of a dwelling house providing local employment opportunities immediately upon making of the plan.



3 Conclusion

This Planning Proposal seeks an amendment to the PLEP 2014 as it applies to the subject site in the Northern Beaches LGA. The proposed amendments relate to the PLEP 2014 Zoning Map and Lot Size Map (Sheet 013).

This amendment, if approved, will result in a rezoning to the site from SP2 Infrastructure (Water Supply System) to R2 Low Density Residential. This will allow for the appropriate development of non-operational Sydney Water land. The rezoning will ensure the land will achieve a more desirable and practical planning outcome for the area and allow for appropriately placed residential development.

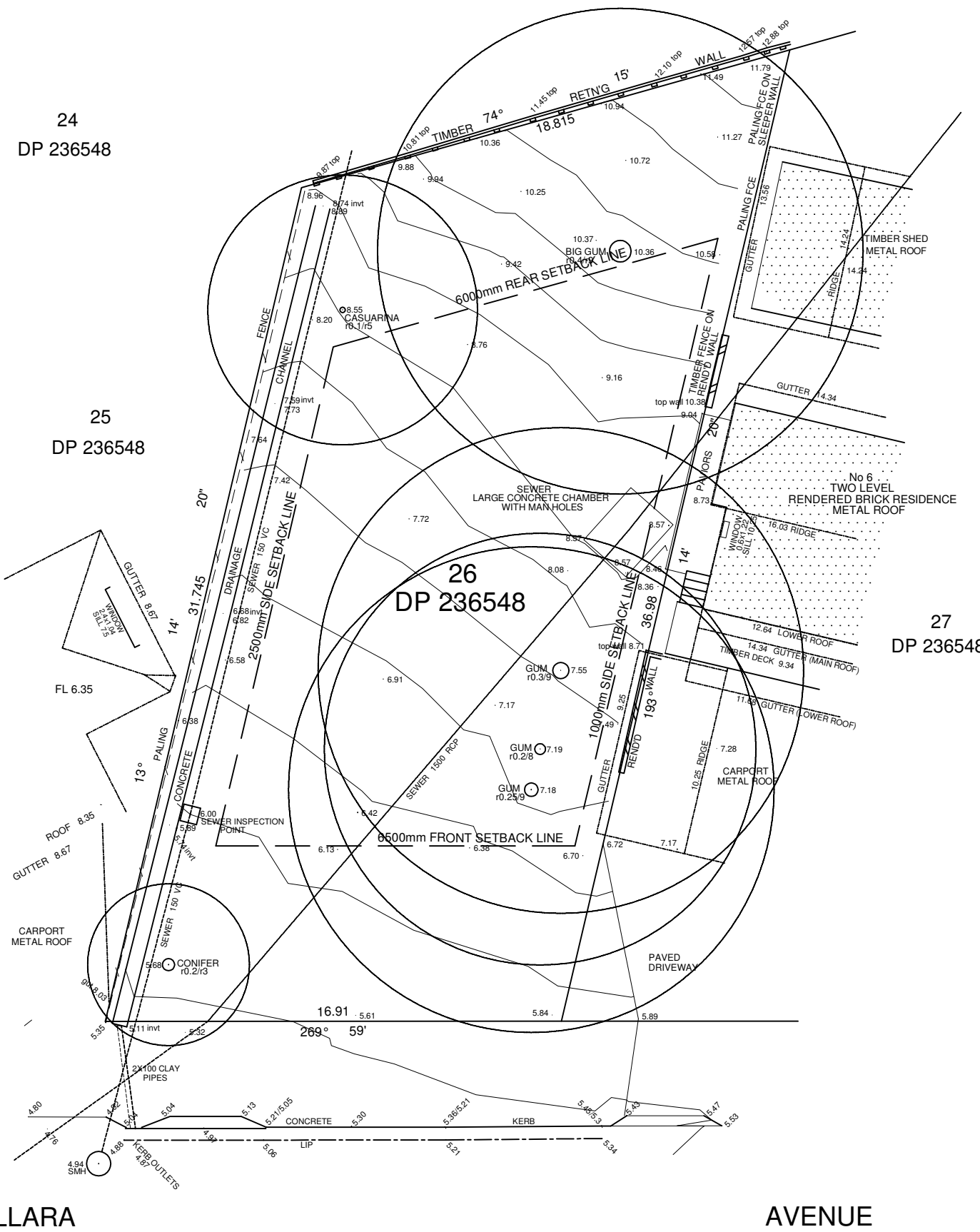
The Planning Proposal is consistent with relevant State and local policies. Its aim is to ensure clarity in the planning controls applying to the subject site.

It is therefore recommended that Council resolves to support and forward this Planning Proposal to the DPIE for Gateway determination in accordance with the EP&A Act.

)



APPENDIX A: CONCEPT ARCHITECTURAL DESIGN



BELLARA

AVENUE



SITE PLAN - BUILDING SET BACKS

All Dimensions are in millimetres
 Written Dimensions preferred to scale
 All measurements to be checked on site
 All work to BCA and AS
NOT FOR CONSTRUCTION



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Client
 SYDNEY WATER
 1 SMITH STREET
 PARRAMATTA NSW 2150

Project
 PROPOSED DWELLING
 4 BELLARA AVENUE
 NORTH NARRABEEN NSW 2101

Drawing
 SITE PLAN
 SET BACK LINES

CONCEPT PLANS

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Drawn PP	Job No.
Checked PP	Date AUG '19
Scale 1:200	Issue A

Drawing No.
SK01

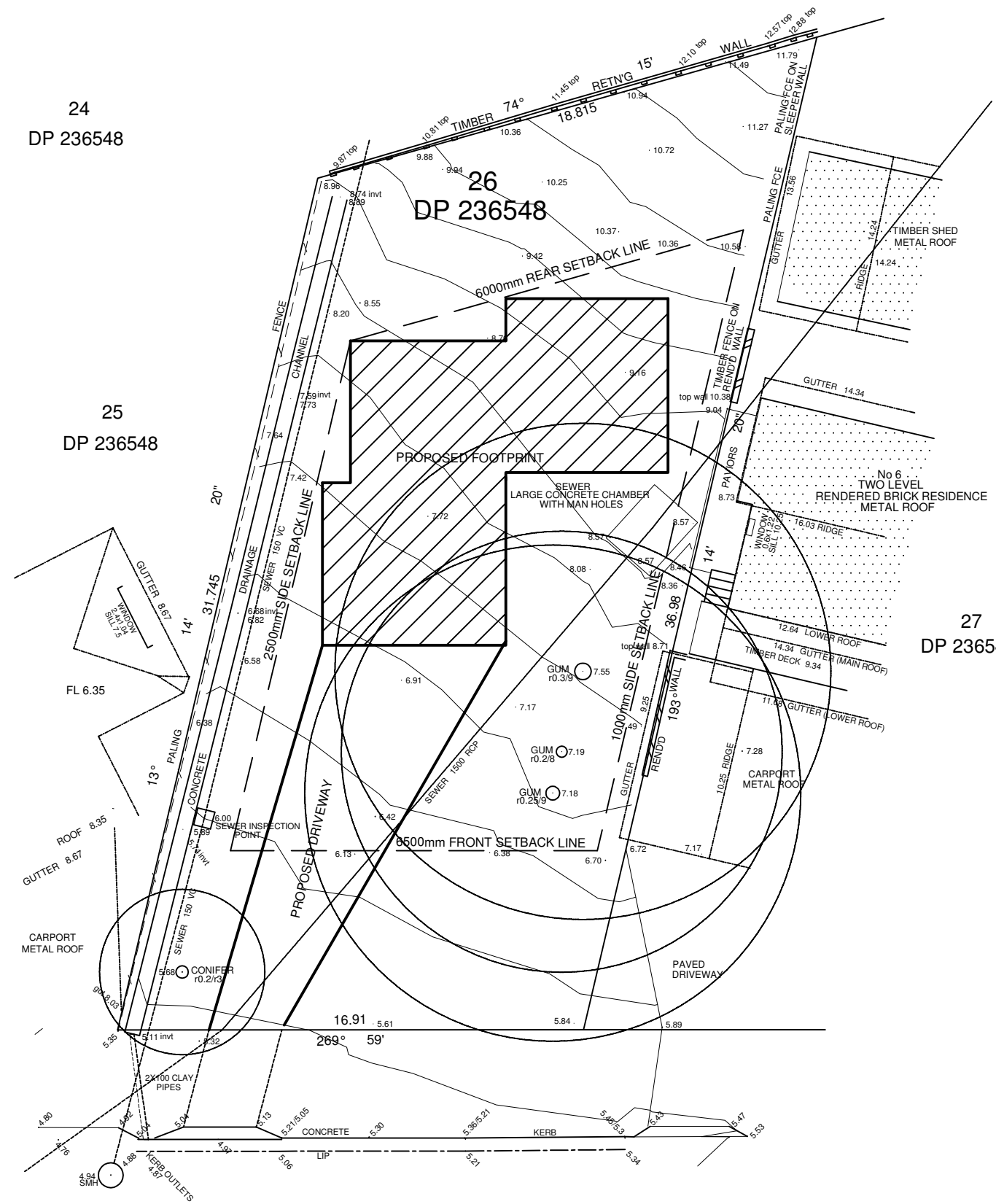
331
DP 237626

24
DP 236548

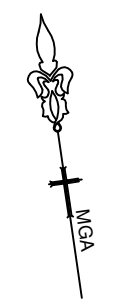
26
DP 236548

25
DP 236548

27
DP 236548



SITE PLAN - BUILDING FOOTPRINT



All Dimensions are in millimetres
Written Dimensions preferred to scale
All measurements to be checked on site
All work to BCA and AS
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Client
SYDNEY WATER
1 SMITH STREET
PARRAMATTA NSW 2150

Project
PROPOSED DWELLING
4 BELLARA AVENUE
NORTH NARRABEEN NSW 2101

Drawing
SITE PLAN
PROPOSED FOOTPRINT

CONCEPT PLANS

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Drawn PP	Job No.
Checked PP	Date AUG '19
Scale 1:200	Issue A

Drawing No.
SK02

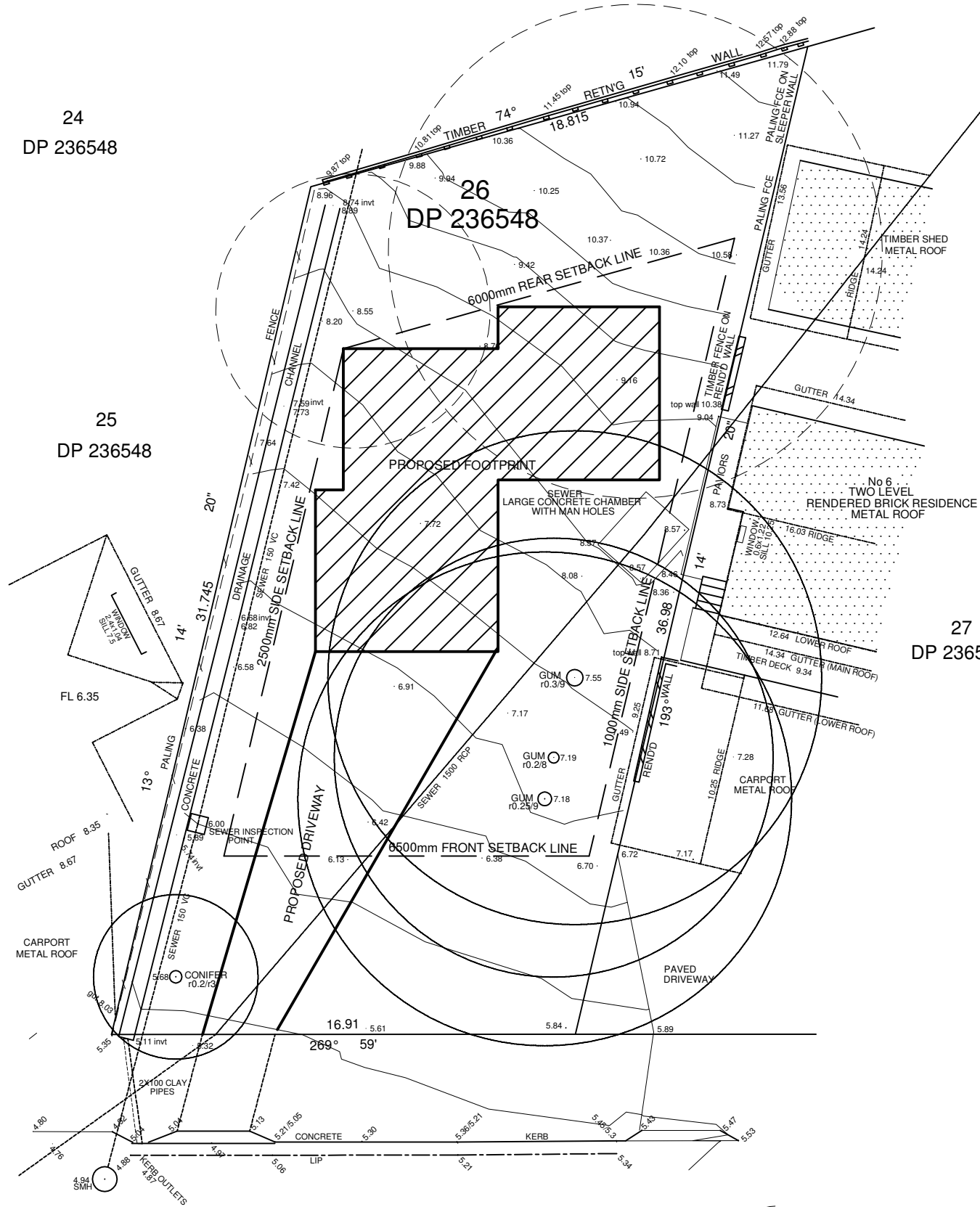
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DP 237626

24
DP 236548

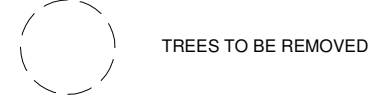
26
DP 236548

25
DP 236548

27
DP 236548



SITE PLAN - TREE REMOVAL



All Dimensions are in millimetres
Written Dimensions preferred to scale
All measurements to be checked on site
All work to BCA and AS
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Client
SYDNEY WATER
1 SMITH STREET
PARRAMATTA NSW 2150

Project
PROPOSED DWELLING
4 BELLARA AVENUE
NORTH NARRABEEN NSW 2101

Drawing
TREE REMOVAL PLAN

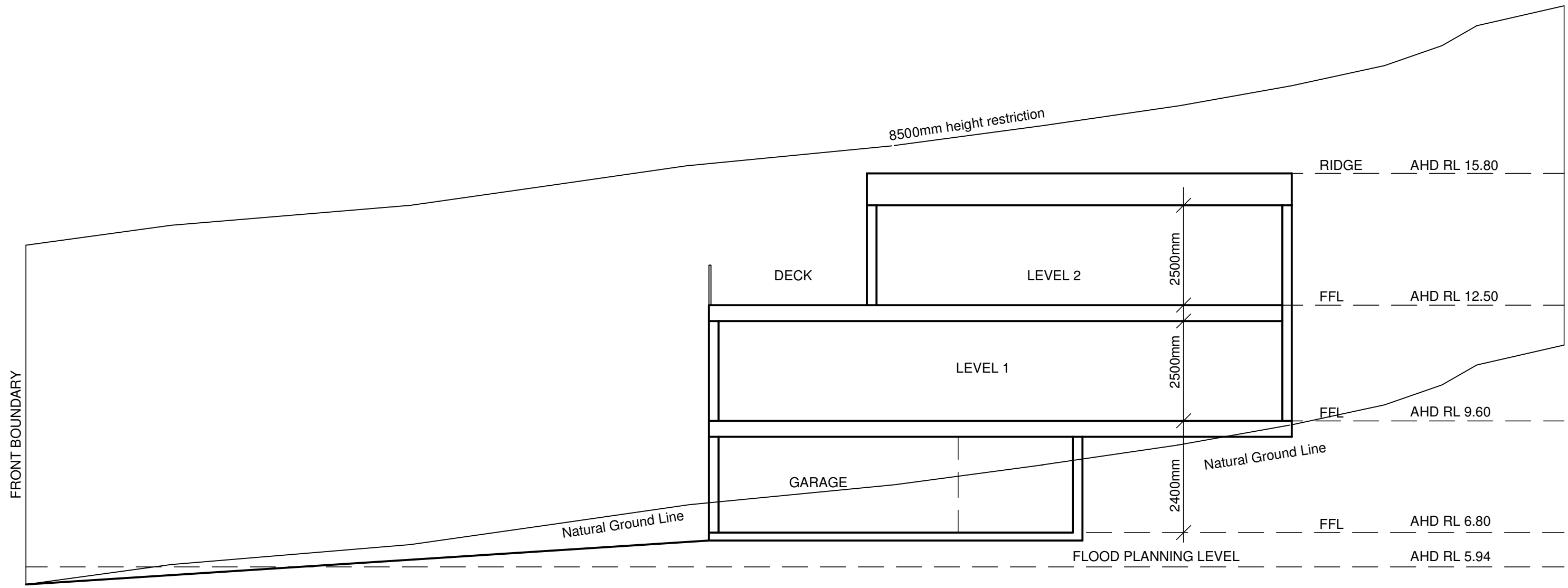
CONCEPT PLANS

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Drawn PP	Job No.
Checked PP	Date AUG '19
Scale 1:200	Issue A

Drawing No.
SK03





LONG SECTION THROUGH CENTRE OF BLOCK

All Dimensions are in millimetres
 Written Dimensions preferred to scale
 All measurements to be checked on site
 All work to BCA and AS
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Client
 SYDNEY WATER
 1 SMITH STREET
 PARRAMATTA NSW 2150

Project
 PROPOSED DWELLING
 4 BELLARA AVENUE
 NORTH NARRABEEN NSW 2101

Drawing
 SITE PLAN
 PROPOSED FOOTPRINT

CONCEPT PLANS

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Drawn PP	Job No.
Checked PP	Date AUG '19
Scale 1:200	Issue A

Drawing No.
SK04



A.1: Sample



APPENDIX B: TREE PLAN



HUGH
THE ARBORIST

Arboricultural Impact Assessment Report

Client Name: Sydney Water C/- GLN Planning
Site Address: 4 Bellara Avenue, North Narrabeen, NSW
Authors Details: Hugh Millington
Email: hugh@hughtheArborist.com.au
Phone: 0426 836 701
Date Prepared: 23 August 2019

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1. INTRODUCTION

- 1.1 Hugh the Arborist have been instructed by GLN Planning on behalf of Sydney Water to provide an Arboricultural Impact Assessment Report for trees located on and adjoining the site in relation to a proposed development.
- 1.2 Below is a list of all documents and information provided to by the client to assist with preparing this report;

Table 1: Documents provided for the assessment

Title	Author	Date	Reference on document
Architectural Plans and Section	Peter Princi Architects	August 2019	SK01-SK04 Inclusive
Survey Plan	S. Davey and Associates	July 2019	SJD/020719/A

- 1.3 The site and tree inspection was carried out on 12th July 2019. Access was available to the subject site 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 visual assessment from ground level of all significant trees within 5 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).
 - 2.1.4 This impact assessment is based on a concept architectural design only.
 - 2.1.5 Provide pragmatic recommendations for the management of trees and mitigation of construction impacts on retained trees.
- 2.2 Specify tree protection measures for trees to be retained in accordance with AS 4970-2009.

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 inspections were 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 a 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 Hugh The Arborist neither guarantees, nor is responsible for, the accuracy of information provided by others that is contained within this report.
- 3.9 While an assessment of the subject trees estimated useful life expectancy is included in this report, no specific tree risk assessment has been undertaken for any of trees at the site.
- 3.10 The ultimate safety of any tree cannot be categorically guaranteed. Even trees apparently free of defects can collapse or partially collapse in extreme weather conditions. Trees are dynamic, biological entities subject to changes in their environment, the presence of pathogens and the effects of ageing. These factors reinforce the need for regular inspections. It is generally accepted that hazards can only be identified from distinct defects or from other failure-prone characteristics of a tree or its locality.

3.11 Alteration of this report invalidates the entire report.

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 above ground level) - millimetres.

4.1.5 Estimated height - metres

4.1.6 Estimated crown spread (Radius of crown) - metres

4.1.7 Health

4.1.8 Structural condition

4.1.9 Amenity value

4.1.10 Estimated remaining contribution years (SULE)¹

4.1.11 Retention value (Tree AZ)²

4.1.12 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. All other measurements were estimations unless otherwise stated. The other tools I used during the assessment were a digital camera, Japanese made 170mm blade digging knife and a Leica DistoD410 digital laser tape.

4.4 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). See appendices for more information.

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

¹ Barrell Tree Consultancy, *SULE: Its use and status into the New Millennium*, TreeAZ/03/2001, <http://www.treeaz.com/>.

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).

5. SITE LOCATION



Site location and approximate boundary ⁴

- 5.1 The site is located in the suburb of North Narrabeen, New South Wales, which is located in the Northern Beaches Council area. All trees at the site are subject to protection under the Pittwater Local Environmental Plan (LEP) 2014⁵, Pittwater 21 Development Control Plan (DCP) 2014 ⁶ and State Environmental Planning Policy (Vegetation in Non-Rural Areas 2017).
- 5.2 The site is a vacant block divided south (front) to north (rear). This site increases in grade from front to rear and contains several mature native tree species and grass area.
- 5.3 The site is not located inside a Heritage Conservation Area and does not form part of a heritage item in the LEP heritage maps.⁷ None of the site is identified as 'biodiversity' in the LEP maps.⁸

⁴ <https://www.google.com.au/maps/place/4+Bellara+Ave,+North+Narrabeen+NSW+2101>

⁵ Pittwater Local Environmental Plan 2014 <https://legislation.nsw.gov.au/#/view/EPI/2014/320/historical2017-08-25/full>.

⁶ Pittwater 21 Development Control Plan, <https://eservices.northernbeaches.nsw.gov.au/ePlanning/live/pages/plan/book.aspx?exhibit=PDCCP>, accessed 29 October 2018.

⁷ Pittwater LEP Heritage map - Sheet HER_013, https://www.legislation.nsw.gov.au/maps/1ff3467d-6645-44d6-9956-9dcc31fd90c2/6370_COM_HER_013_010_20150325.pdf, accessed 29 October 2018.

⁸ Pittwater LEP Biodiversity map - Sheet BIO_013, https://www.legislation.nsw.gov.au/maps/9406f916-2ca4-4089-8319-3cb2c7fd35c5/6370_COM_BIO_013_010_20140217.pdf, accessed 29 October 2018.

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

- 6.1 **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.
- 6.2 **Site plan:** In appendix 1 an existing site plan has been prepared, appendix 1A contains a proposed site plan where the tree information including canopy spread, TPZ and SRZ have been overlaid.
- 6.3 **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.

- 6.4 **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; $(DAB \times 50)^{0.42} \times 0.64$. 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.
- 6.5 **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.

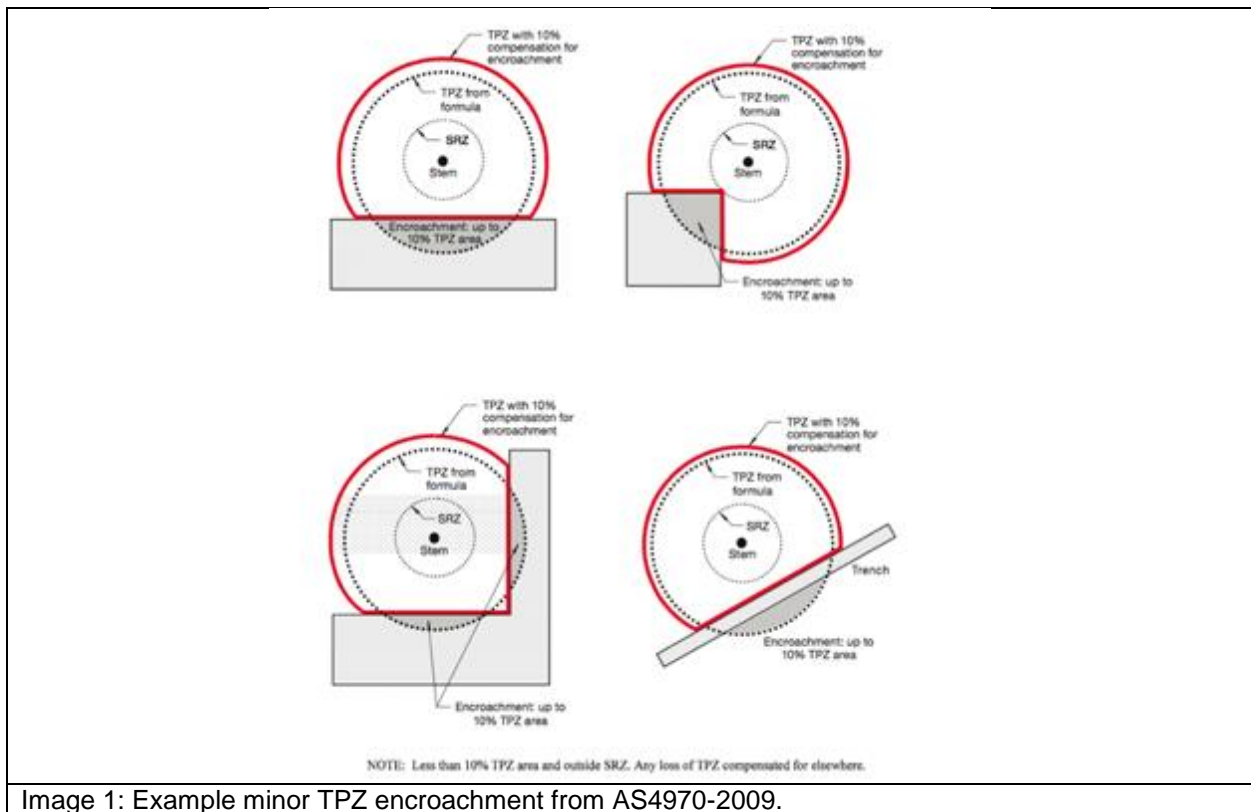


Image 1: Example minor TPZ encroachment from AS4970-2009.

- 6.6 **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. ASSESSEMENT OF CONSTRUCTION IMPACTS

7.1 **Table 2:** In the table below the impact of proposed development impact to all trees included in the report has been assessed.

Tree ID	Species	Retention value	TPZ radius (m)	SRZ radius (m)	TPZ encroachment	Discussion/ Conclusion	Recommendation
1	Cook Island Pine	A1	4.9	2.4	Major	The proposed driveway will encroach into the TPZ area and the SRZ area by up to 30%. This is considered to be a major encroachment. The encroachment may be managed at an acceptable level if the driveway is constructed on or above the existing grade. This will significantly reduce the volume of woody root severance and fibrous root loss.	Retain and protect
2	Sydney Blue Gum	A2	5.8	2.8	Minor	Less than 10% encroachment into the TPZ and none in the SRZ is proposed from the installation of the dwelling. This is considered to be of low and acceptable impact.	Retain and protect
3	Sydney Blue Gum	A1	4.4	2.4	Minor	Less than 5% encroachment into the TPZ and none in the SRZ is proposed from the installation of the dwelling. This is considered to be of low and acceptable impact.	Retain and protect



Tree ID	Species	Retention value	TPZ radius (m)	SRZ radius (m)	TPZ encroachment	Discussion/ Conclusion	Recommendation
4	Tallowood	A1	8.0	3.0	Major	<p>The proposed dwelling footprint and driveway will encroach up to a total of 20% into the TPZ area and the fringe of the structural root zone (SRZ). This is considered to be a major encroachment.</p> <p>The proposed dwelling contributes 12% encroachment in to the TPZ and the SRZ. Manual excavations will be required in the south eastern corner of the dwelling to determine the extent of the root severance required.</p> <p>AS4970 Protection of Trees on Development Sites describes major encroachment as greater than 10% or anything within the SRZ radius. Given the proposed encroachment is on the very fringe of the SRZ it is expected that through manual excavations it will be possible to demonstrate that the dwelling will be of acceptable impact to the tree.</p> <p>The proposed driveway will contribute a further 8% encroachment into the TPZ area only. This may be further reduced by constructing the driveway on or above the existing grade, reducing the requirement for excavations and root severance. The combined impact posed on tree 4 from the development is likely to have only a low to moderate effect on the trees health. This may be managed during construction by maintaining irrigation and mulch within the TPZ area.</p>	Retain and protect
5	Sydney Blue Gum	A1	9.8	3.2	Major	<p>Major encroachment of up to 21% into the TPZ area and the SRZ area from the installation of the dwelling. This is considered to be a major encroachment and will require the severance of structural roots holding the potential to destabilize the tree.</p> <p>Below ground root investigations may be carried out to determine the size and location of tree roots within the development area; this may demonstrate the tree will remain viable however given the site is vacant and providing optimum</p>	Remove and replace



Tree ID	Species	Retention value	TPZ radius (m)	SRZ radius (m)	TPZ encroachment	Discussion/ Conclusion	Recommendation
						conditions for root development it is likely the tree will be subject to unsustainable levels of impact.	
6	Swamp Oak	A2	2.9	1.9	Major	Major encroachment of up to 15.5% into the TPZ and SRZ area from the installation of the dwelling. This is considered to be a major encroachment and will require the severance of structural roots holding the potential to destabilize the tree. Tree 5 was identified as having sparse foliage density at the time of the inspection. The tree has been assessed as of less value to the site than the <i>Eucalypt Spp.</i> and its removal enables lower impact on the retained trees on the eastern side of the site.	Remove and replace
7	Sydney Blue Gum	A1	4.0	2.7	None	Tree located outside of the development footprint and will not be subject to encroachment.	Retain and protect
8	Mexican Fan Palm	A1	3.0	0.0	None	Tree located outside of the development footprint and will not be subject to encroachment.	Retain and protect
9	Bangalow Palm	A1	3.0	0.0	None	Tree located outside of the development footprint and will not be subject to encroachment.	Retain and protect
10	Bangalow Palm	A1	3.0	0.0	None	Tree located outside of the development footprint and will not be subject to encroachment.	Retain and protect
11	Kentia Palm	Z3	3.0	0.0	None	Tree located outside of the development footprint and will not be subject to encroachment.	Retain and protect
12	Kentia Palm	Z3	3.0	0.0	None	Tree located outside of the development footprint and will not be subject to encroachment.	Retain and protect



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Tree ID	Species	Retention value	TPZ radius (m)	SRZ radius (m)	TPZ encroachment	Discussion/ Conclusion	Recommendation
13	Kentia Palm	Z3	3.0	0.0	None	Tree located outside of the development footprint and will not be subject to encroachment.	Retain and protect
14	Broad Leaved Paperbark	A1	1.9	1.7	None	Tree located outside of the development footprint and will not be subject to encroachment.	Retain and protect
15	Swamp Mahogany	A1	3.0	2.1	None	Tree located outside of the development footprint and will not be subject to encroachment.	Retain and protect
16	Lilly Pilly	A1	3.0	1.6	None	Tree located outside of the development footprint and will not be subject to encroachment.	Retain and protect

8. CONCLUSIONS

8.1 **Table 3:** Summary of the impact to trees during the development;

Impact	Reason	Category A	Category Z
		A	Z
Trees to be removed	Building/landscape construction, new surfacing and/or proximity, or trees in poor condition.	5,6	None
Trees to be retained subject to acceptable development impact	Removal of existing surfacing/structures and/or installation of new surfacing/structures will not significantly impact the tree	1,2,3,4,	None
Trees not subject to encroachment	Located outside of the construction envelope	7,14,15,16	8,9,10,11, 12,13

9. PHOTOGRAPHS



Photo a: Looking north up the subject site and trees 3, 4 and 5.



Photo b: Tree 1 at the front of the site.

11. RECOMMENDATIONS

Refer to Table 2 and 3 for individual tree identification.

- 11.1 This report assesses the impact of a proposed development at the site to all significant trees within 5 meters of proposed development works. Sixteen trees have been identified and assessed.
- 11.2 Two trees have been recommended for removal if the proposal is to go ahead. Tree 6 is a category A2 tree and tree 5 is a higher value category A1 tree. It may be possible to retain tree number 5 if root mapping is carried out along the edge of the proposal to identify the location and significance of roots within the development area and demonstrate the trees viability in the long term.
- 11.3 Ten trees are located outside of the development area and will not be impacted by the proposal.
- 11.4 Four trees will be subject to acceptable levels of impact from the proposal on the provision the following recommendations are implemented.
- 11.5 The proposed driveway should be constructed on or above the existing grade and require minimal excavation. Piers are to be located outside of 2.4 metres radius of tree 1 (No piers within the structural root zone). This area should be cantilevered over.
- 11.6 Manual excavations are required to be carried out along the southern and eastern edge of the building line with the TPZ of tree 4.
- 11.7 Minor canopy pruning is likely to be required for tree 4 at the south eastern corner of the proposed dwelling. Pruning should consist of crown raising only, be supervised by the project Arborist and comply with Australian Standard 4373 Pruning of Amenity Trees (2007)
- 11.8 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.
- 11.9 No services plan has been assessed in this report, all services plans should be subject to review by a consulting Arborist. 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.
- 11.10 No landscape plan has been assessed in this report. See section 12.11 for general guidance in relation to minimising the impact of proposed landscaping to retained trees.

12. ARBORICULTURAL WORK METHOD STATEMENT (AMS) AND TREE PROTECTION REQUIREMENTS

- 12.1 **Use of this report:** All contractors must be made aware of the tree protection requirements prior to commencing works at the site and be provided a copy of this report.
- 12.2 **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.
- 12.3 **Tree work:** All tree work must 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).
- 12.4 **Initial site meeting/on-going regular inspections:** The project Arborist is to hold a pre-construction site meeting with principle 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. I recommend regular site inspections on a frequency based on the longevity of the project, this is to be agreed in the initial meeting.

12.5 Site Specific Tree Protection Recommendations:

Table 4: Protection Requirements: See appendix 1A for indicative fencing location. See section 12 for specifications of tree protection.

Tree Number	Protection Specification
1	- Protective fencing required to be installed 3.4m setback from the western boundary fence and to the extent of the TPZ radius elsewhere.
2,4,12,13, 14,15 and 16	- Group fencing to be installed as per appendix 1A,
4	- In addition to tree protective fencing, ground protection to be installed over the structural root zone where fencing will conflict with the dwelling development.
11	- Protective fencing to a 2 metre radius from the trunk
7,8,9,10	- Boundary fence will provide adequate protection.
All retained trees	- Apply 100mm deep mulch and within the protective fencing and maintain for the duration of development. - Project Arborist to advice on irrigation depending of climatic conditions at the time of commencement.

12.6 Tree protection Specifications: See section 12.5 for site/tree specific requirements. It is the responsibility of the principle 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.

12.6.1 Protective fencing: 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. Where the installation of fencing in unfeasible due to restrictions on space, trunk and branch protection will be required (see below). The protective fencing must be constructed of 1.8 metre 'cyclone chainmesh fence'. The fencing must only be removed for the landscaping phase and must be authorised by the project Arborist. Any modifications to the fencing locations must be approved by the project Arborist.

12.6.2 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

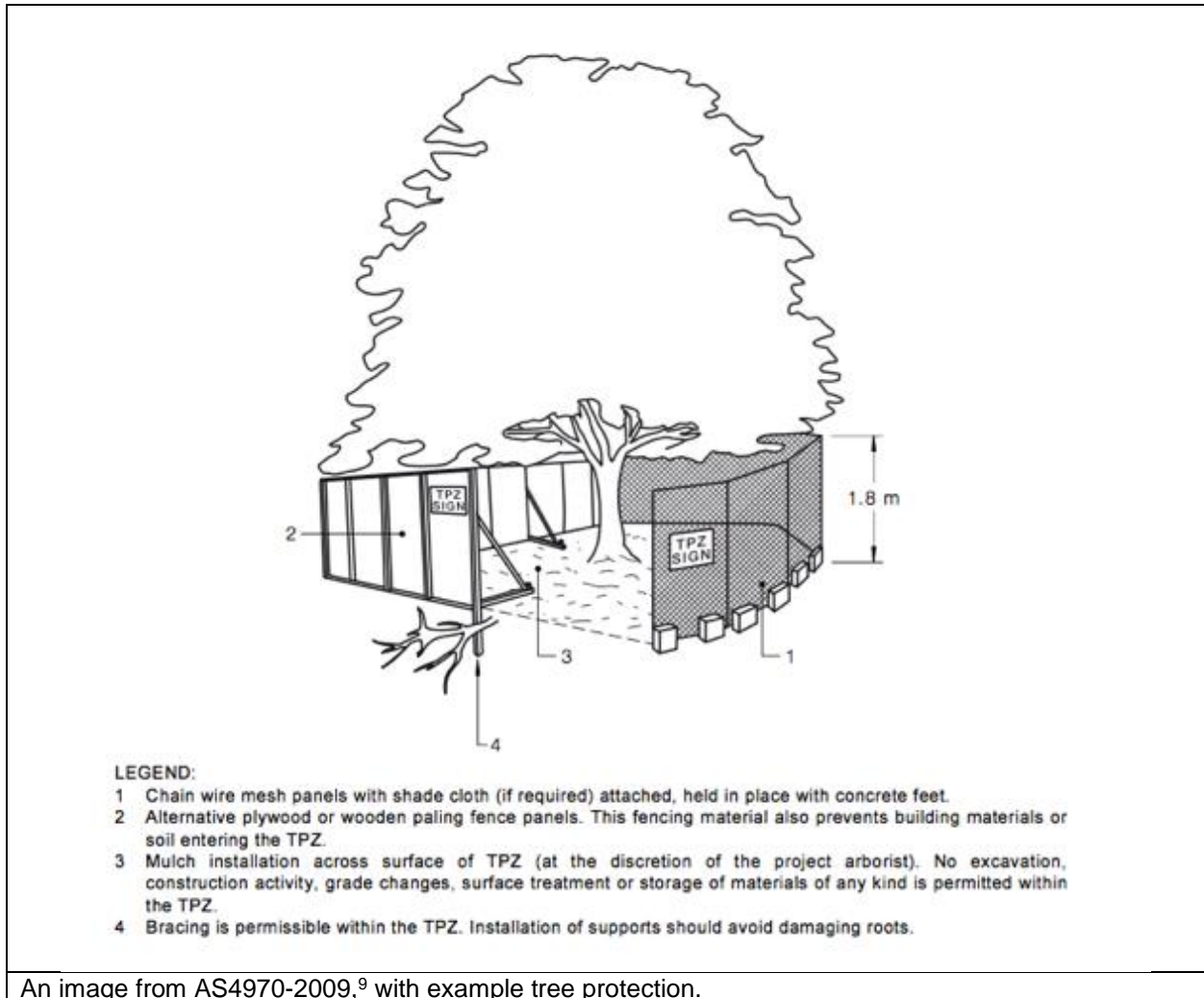
closer where the fence changes direction. Each sign shall contain in a clearly legible form, the following information:

- 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

12.6.3 Trunk and Branch Protection: The trunk must be protected by wrapped hessian or similar material to limit damage. Timber planks (50mm x 100mm or similar) should then be placed around tree trunk. The timber planks should be spaced at 100mm intervals, and must be fixed against the trunk with tie wire, or strapping and connections finished or covered to protect pedestrians from injury. The hessian and timber planks must not be fixed to the tree in any instance. The trunk and branch protection shall be installed prior to any work commencing on site and shall be maintained in good condition for the entire development period.

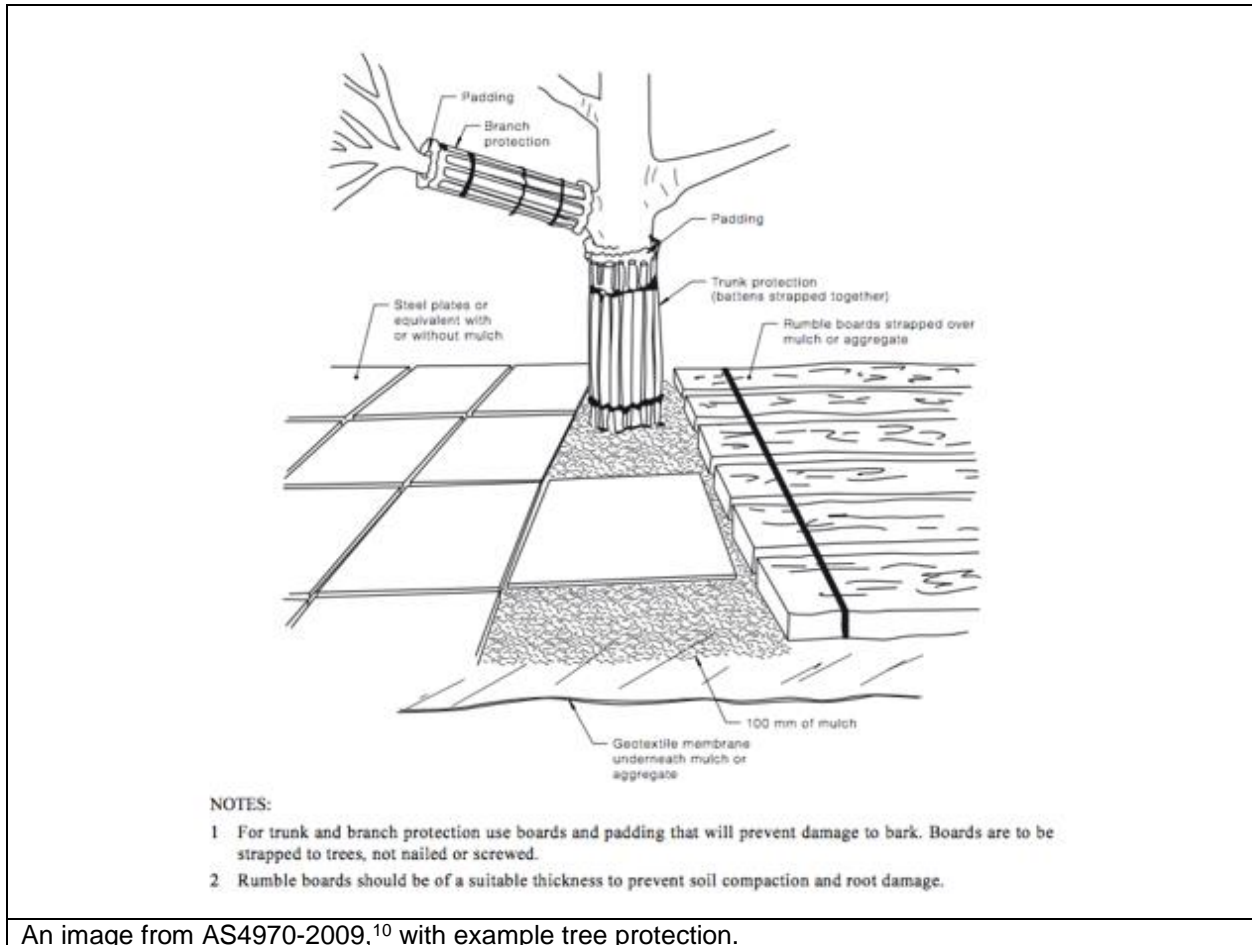
12.6.4 Mulch: Any areas of the TPZ located inside the subject site (only trees to be retained directly adjacent to site works must be mulched to a depth of 75mm with good quality composted wood chip/leaf mulch.

12.6.5 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, overlaid with durable timber boards/plywood. 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 by the project Arborist as required.



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.



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

12.7 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) Refueling.
- F) Dumping of waste.

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

- 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.

12.8 **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.

12.9 **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 10mm 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.

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

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

- 12.11 **Landscaping:** All landscaping works within the TPZ of trees to be retained are to be undertaken in consultation with a consulting Arborist to minimize the impact to trees. General guidance is provided below to minimise the impact of new landscaping to trees to be retained.
- 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. Footpath 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.
 - 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 30mm in diameter.
- 12.12 **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.
- 12.13 **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.

- 12.14 **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.

13. HOLD POINTS

13.1 **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.

13.2 **Hold points applicable to the development have been shaded in grey.**

Hold Point	Stage	Responsibility	Certification	Complete Y/N and date
Project Arborist to hold pre construction site meeting with principle 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.	Prior to work commencing.	Principle contractor	Project Arborist	
Project Arborist to assess and certify that tree protection has been installed in accordance with section 12 and AS4970-2009 prior to works commencing at site.	Prior to development work commencing.	Principle contractor	Project Arborist	
In accordance with AS4970-2009 the project arborist should carryout regular site inspections to ensure works are carried out in accordance with the recommendations. I recommend site inspections on a monthly frequency.	Ongoing throughout the development	Principle contractor	Project Arborist	
Project Arborist to supervise all manual excavations and demolition inside the TPZ of any tree to be retained.	Construction	Principle contractor	Project Arborist	



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Project Arborist to certify that all pruning of roots greater than 30mm in diameter has been carried out in accordance with AS4373-2007. All root pruning must be carried out by a qualified Arborist/Horticulturalist with a minimum AQF level 3.	Construction	Principle contractor	Project Arborist	
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	Principle contractor	Project Arborist	
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 minimize the impact to trees.	Landscape	Principle contractor	Project Arborist	
After all construction works are complete the project Arborist should assess that the subject trees have been retained in the same condition and vigor and authorize the removal of protective fencing. If changes to condition are identified the project Arborist should provide recommendations for remediation.	Upon completion of construction	Principle contractor	Project Arborist	
Any wounding or injury that occurs to a tree during the demolition/construction process will require the project arborist to be contacted for an assessment of the injury and provide mitigation/remediation advice. All remediation work is to be carried out by the project arborist, at the contractor's expense.	Ongoing throughout the development	Principle contractor	Project Arborist	

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15. LIST OF APPENDICES

The following are included in the appendices:

- Appendix 1 - Existing Site Plan
- Appendix 1A – Proposed Site Plan and Tree Protection Plan
- Appendix 2 - Tree inspection schedule
- Appendix 3 - Health
- Appendix 4 – Tree Protection Zone
- Appendix 5 – Structural Root Zone
- Appendix 6 – Amenity Value
- Appendix 7 – Age Class
- Appendix 8 – Structural Condition
- Appendix 9 – SULE Categories
- Appendix 10 – Retention Values
- Appendix 11 – Trees AZ

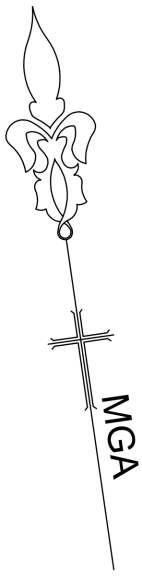
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NC Forestry and Arboriculture III (UK)
RFS Tech. Cert. II (UK)
QTRA Registered User
ISA Tree Risk Assessment Qualification

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No 47 TATIARA CRES
TWO LEVEL
BRICK AND TIMBER RESIDENCE
METAL ROOF

TIMBER SHED
METAL ROOF

TIMBER SHED
METAL ROOF

331
DP 237626

24
DR 236548

T7

T5

25
DP 236548

T10

26
DP 236548

T3

T2

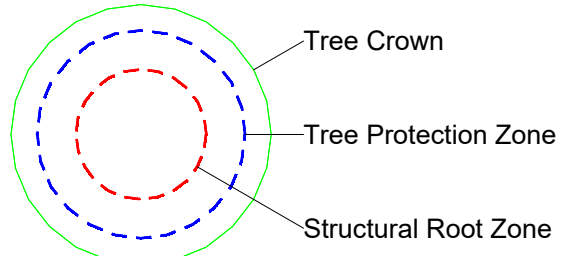
T1

27
DP 236548

No 6
TWO LEVEL
RENDERED BRICK RESIDENCE
METAL ROOF

No 5
SINGLE LEVEL
BRICK RESIDENCE
TILED ROOF

Plan Legend



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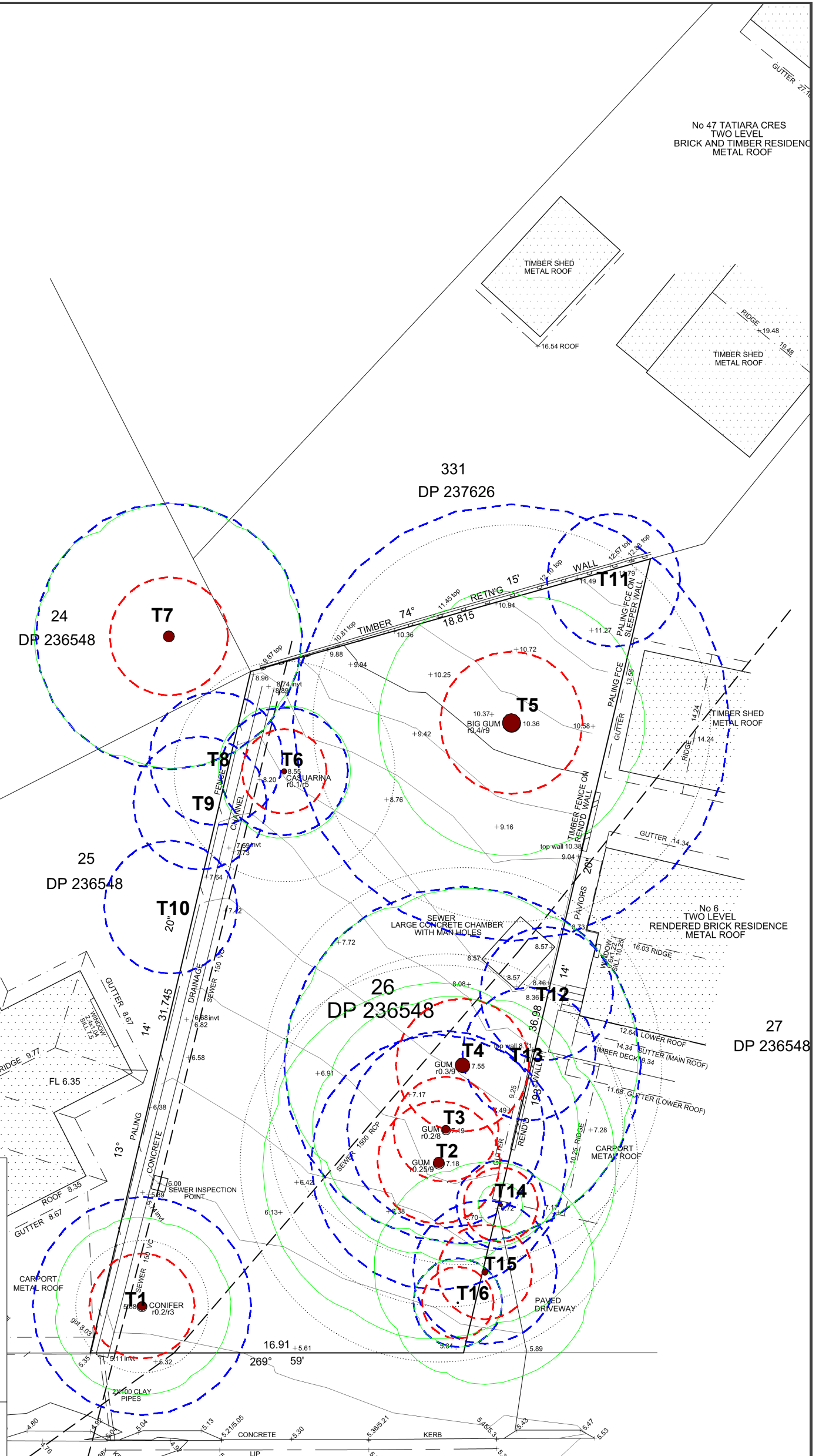
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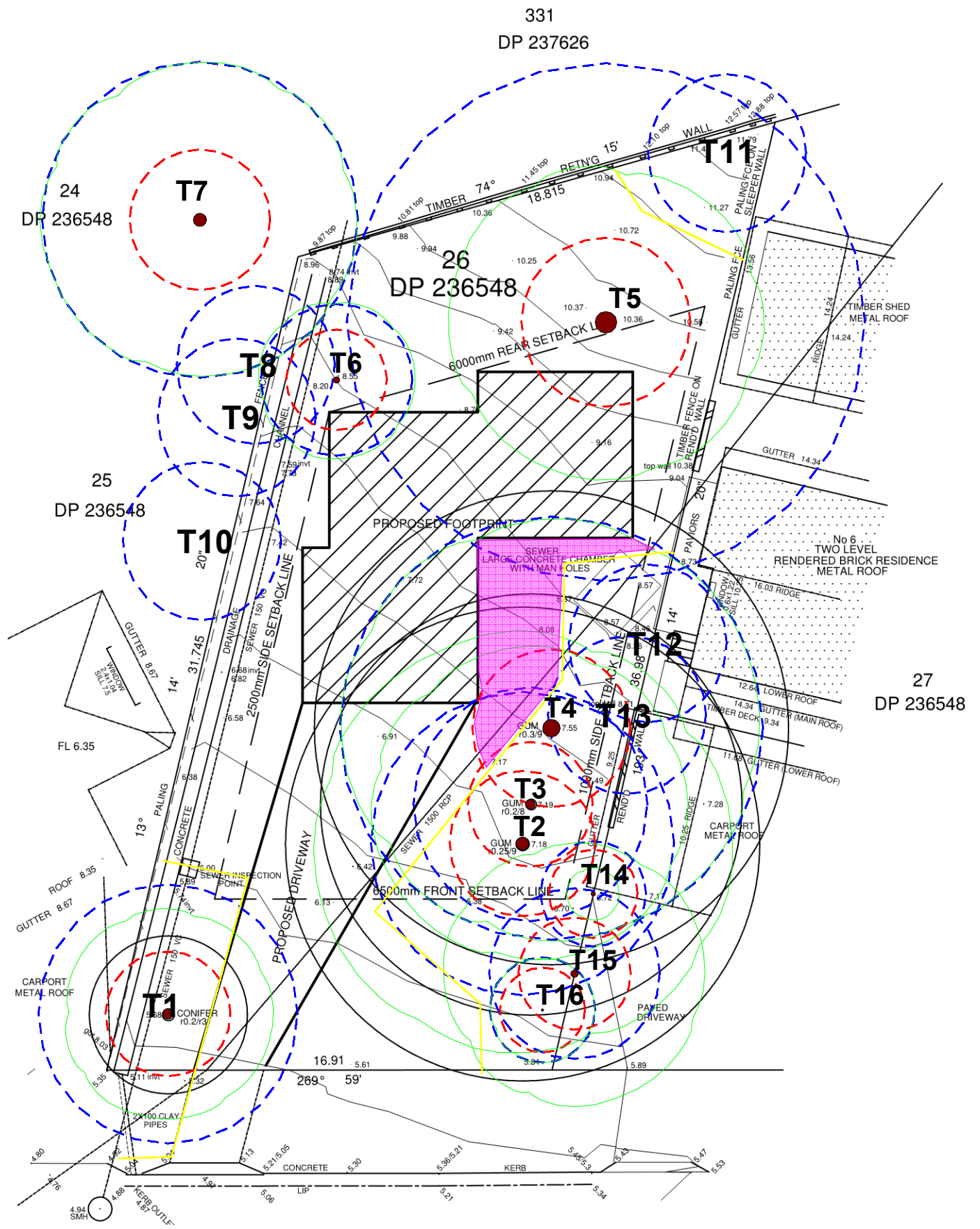
MAP FILENAME : Appendix 1 Existing Site Plan




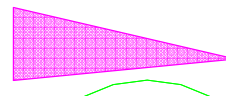
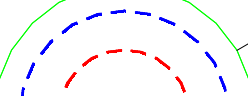


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For Sydney Water and GLN Planning



AVENUE



Plan Legend

-  Tree Protective Fencing
-  Ground Protection
-  Tree Crown
-  Tree Protection Zone
-  Structural Root Zone



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SCALE : 1 : 200 @ A3 DATE : 23/08/2019

MAP FILENAME : Appendix 1 Proposed Site Plan and Tree Protection Plan



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Appendix 2 - Tree Inspection Schedule

Tree ID	Common Name	Botanical Name	Age Class	Height (m)	Canopy Spread Radius (m)	Stem 1 (mm)	Stem 2 (mm)	DBH (mm)	DAB (mm)	Health	Structure	Amenity Value	SULE	Retention Value	TPZ Radius (m)	SRZ Radius (m)	Notes
1	Cook Island Pine	<i>Arucaria columnaris</i>	Mature	10	4	410		410	450	Good	Good	High	1. Long	A1	4.9	2.4	None.
2	Sydney Blue Gum	<i>Eucalyptus saligna</i>	Mature	16	8	480		480	650	Good	Good	High	1. Long	A2	5.8	2.8	Some canker growth in canopy.
3	Sydney Blue Gum	<i>Eucalyptus saligna</i>	Mature	17	6	370		370	450	Good	Good	High	1. Long	A1	4.4	2.4	Slight cambial decline at base on western side.
4	Tallowood	<i>Eucalyptus microcorys</i>	Mature	19	8	670		670	790	Good	Good	High	1. Long	A1	8.0	3.0	None.
5	Sydney Blue Gum	<i>Eucalyptus saligna</i>	Mature	20	6	820		820	930	Good	Good	High	1. Long	A1	9.8	3.2	None.
6	Swamp Oak	<i>Casuarina glauca</i>	Mature	8	3	240		240	270	Good	Good	Medium	2. Medium	A2	2.9	1.9	Sparse canopy.
7	Sydney Blue Gum	<i>Eucalyptus saligna</i>	Mature	18	6	500		500	600	Good	Good	High	1. Long	A1	4.0	2.7	Neighboring tree.
8	Mexican Fan Palm	<i>Washingtonia robusta</i>	Mature	11	2	400		400	0	Good	Good	Medium	1. Long	A1	3.0	0.0	Neighboring tree.
9	Bangalow Palm	<i>Archontophoenix cunninghamiana</i>	Mature	7	2	170		170	0	Good	Good	Medium	1. Long	A1	3.0	0.0	Neighboring tree.
10	Bangalow Palm	<i>Archontophoenix cunninghamiana</i>	Mature	7	2	170		170	0	Good	Good	Medium	1. Long	A1	3.0	0.0	Neighboring tree.
11	Kentia Palm	<i>Howea forsteriana</i>	Mature	5	2	150		150	0	Good	Good	Medium	1. Long	Z3	3.0	0.0	Exempt species.
12	Kentia Palm	<i>Howea forsteriana</i>	Mature	5	2	150		150	0	Good	Good	Medium	1. Long	Z3	3.0	0.0	Exempt species.
13	Kentia Palm	<i>Howea forsteriana</i>	Mature	5	2	150		150	0	Good	Good	Medium	1. Long	Z3	3.0	0.0	Exempt species.
14	Broad Leaved Paperbark	<i>Melaleuca quinquenervia</i>	Semi-mature	6	1	158		158	200	Good	Good	Medium	1. Long	A1	1.9	1.7	None.
15	Swamp Mahogany	<i>Eucalyptus robusta</i>	Mature	10	5	270		270	350	Good	Good	High	1. Long	A1	3.0	2.1	None.
16	Lilly Pilly	<i>Acmena smithii</i>	Semi-mature	5	2	50	50	71	180	Good	Good	Medium	1. Long	A1	3.0	1.6	None.

Explanatory Notes

Tree Species - Botanical name followed by common name in brackets. 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), Dead (D).

Diameter at Breast Height (DBH) - Measured with a DBH tape or estimated at approximately 1.4m above ground level. Where DBH has been estimated it is indicated with an 'est'.

The (1) indicates the stem number and the (t) indicates the total DBH when calculated in accordance with AS4970-2009 definition.

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 x 50)^{0.42} x 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.

(x) Indicates the measurement taken for the diameter at tree base above the buttress roots.

(E) Indicates estimated measurements.

Appendix 3 – Condition/Overall health

<u>Category</u>	<u>Example condition</u>	<u>Summary</u>
Good	<ul style="list-style-type: none"> • 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. • 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. 	<ul style="list-style-type: none"> • The tree is in above average health and condition and no remedial works are required. • The tree is considered structurally good with well developed form.
Fair	<ul style="list-style-type: none"> • 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 may have minor structural defects within the structure of the crown that could potentially develop into more significant defects. • The tree may have 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. 	<ul style="list-style-type: none"> • The tree is in below average health and condition and may require remedial works to improve the trees health. • 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	<ul style="list-style-type: none"> • The tree 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 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. 	<ul style="list-style-type: none"> • The tree is displaying low levels of health and removal or remedial works may be required. • The identified defects are likely to cause either partial or whole failure of the tree.

	<ul style="list-style-type: none">• The tree crown may have poor weight distribution which could cause failure.	
Dangerous	<ul style="list-style-type: none">• The tree is dead or almost dead.• The tree is an imminent danger to people or property.	<ul style="list-style-type: none">• The tree should generally be removed.

Appendix 4 - Tree Protection Zone (TPZ)

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 TPZ incorporates the structural root zone (SRZ).

Determining the TPZ

The radius of the TPZ is calculated for each tree by multiplying its DBH × 12.

$$\text{TPZ} = \text{DBH} \times 12$$

Where

DBH = trunk diameter measured at 1.4 m above ground

Radius is measured from the centre of the stem at ground level.

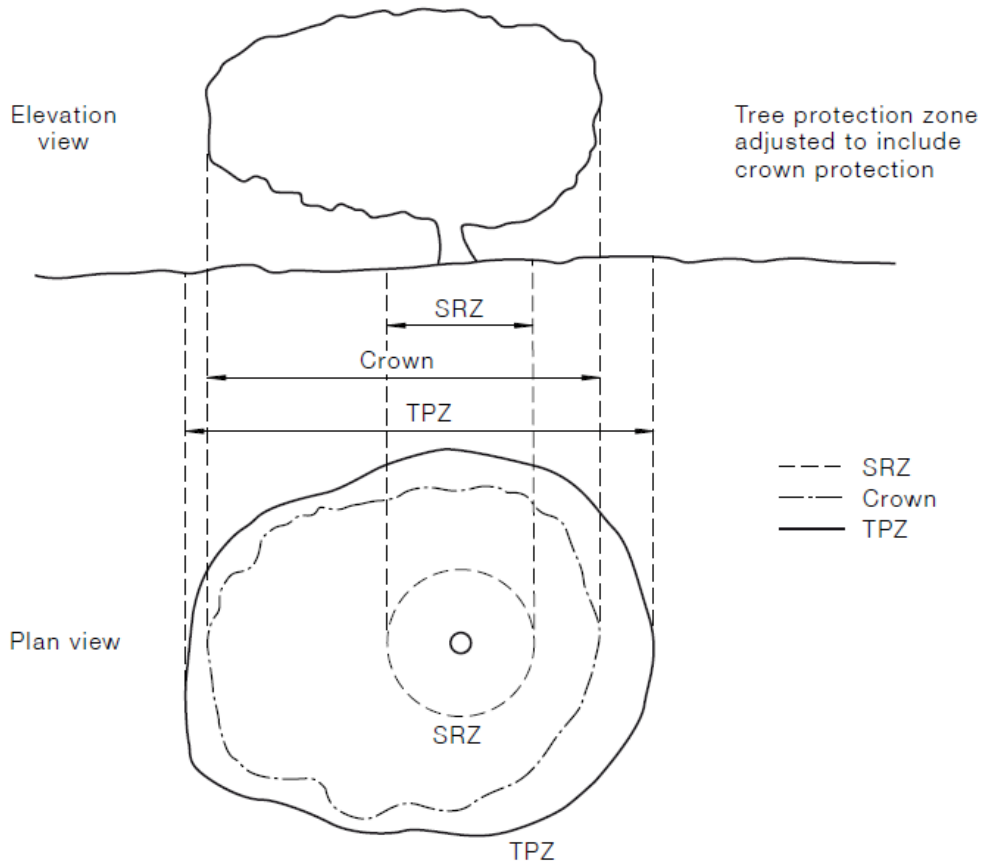
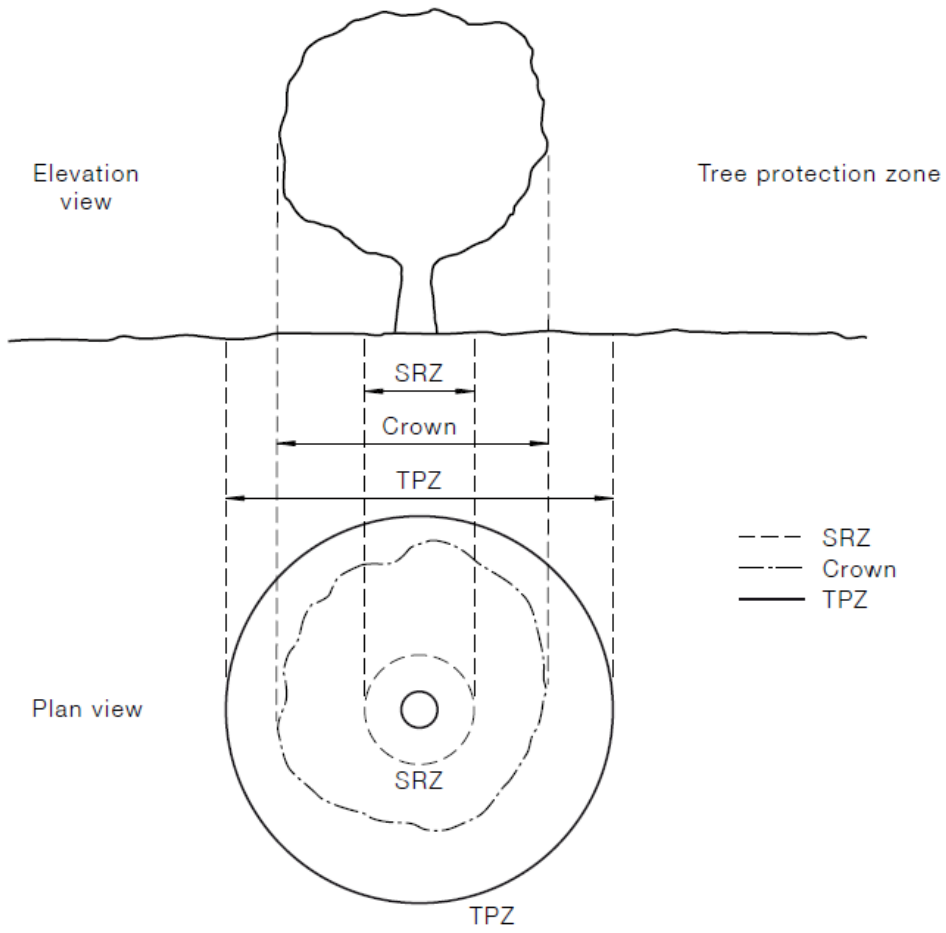
A TPZ should not be less than 2 m nor greater than 15 m (except where crown protection is required).

Minor encroachment into the TPZ

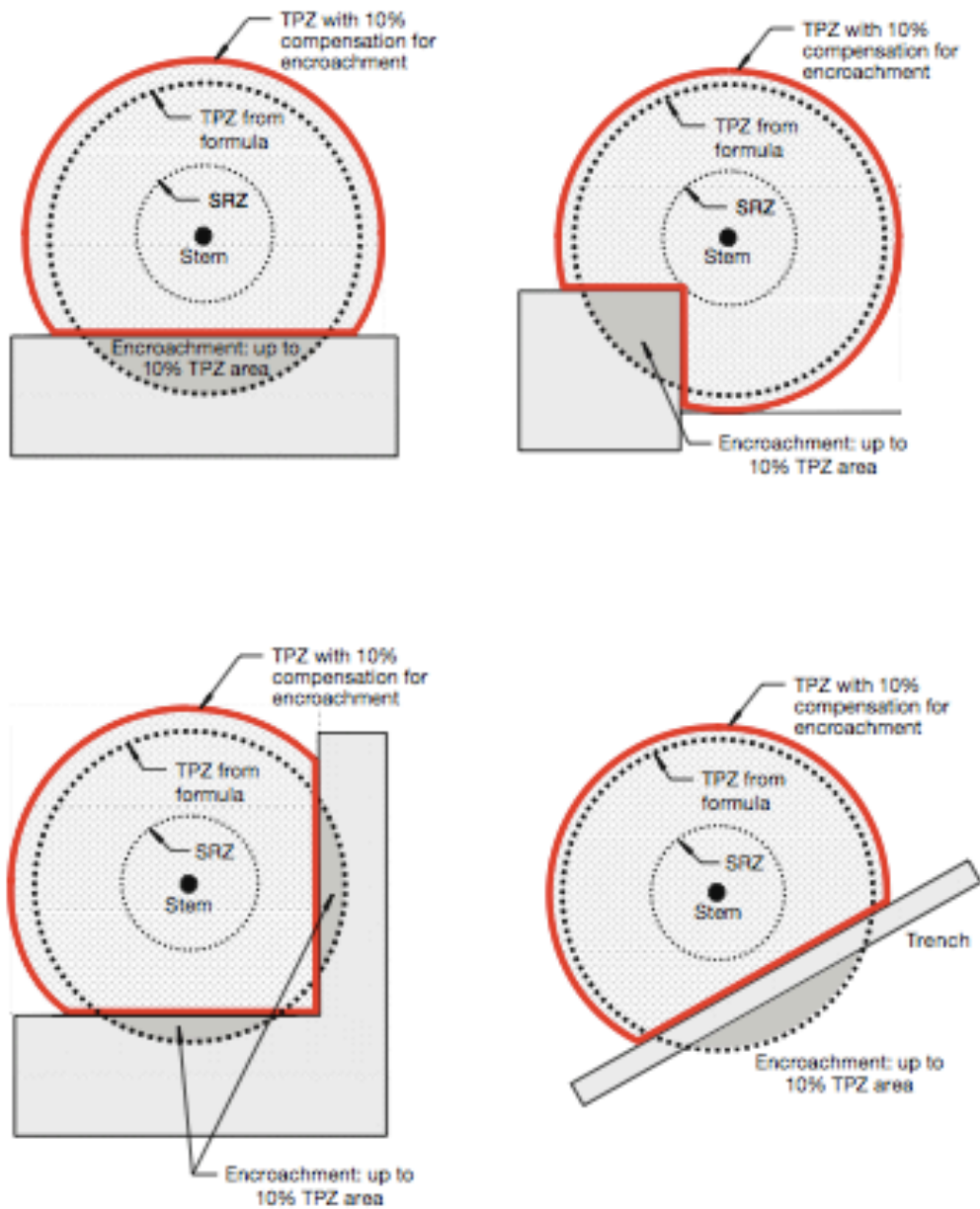
Where encroachment into the TPZ is unavoidable it is generally accepted that encroachment of under 10% of the total TPZ is possible without carrying out detailed root investigations. This minor loss of root area is normally compensated by the roots developing elsewhere.

Major encroachment into the TPZ

If an encroachment of more than 10% is proposed into the TPZ it would be necessary to demonstrate that the tree would remain viable. Non-destructive root investigations may be required to determine any potential impact the encroachment may have on the tree.



Encroachment into the tree protection zone (TPZ) is sometimes unavoidable. Figure D1 provides examples of TPZ encroachment by area, to assist in reducing the impact of such incursions.



NOTE: Less than 10% TPZ area and outside SRZ. Any loss of TPZ compensated for elsewhere.

Appendix 5 - 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 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.

Determining the SRZ

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.

$$\text{SRZ radius} = (D \times 50)^{0.42} \times 0.64$$

where

D = trunk diameter in m, measured above the root buttress.

Note - The SRZ for trees with trunk diameters less than 0.15 will be 1.5m.

Appendix 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 statutory conditions.
- The habitat value of the tree.
- Whether the tree is considered a noxious weed species.

Appendix 7 - 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.

<u>Category</u>	<u>Description</u>
Young/Newly planted	<ul style="list-style-type: none">• Young or recently planted tree.
Semi Mature	<ul style="list-style-type: none">• Up to 20% of the usual life expectancy for the species.
Early mature/Mature	<ul style="list-style-type: none">• Between 20% - 80% of the usual life expectancy for the species.
Over mature	<ul style="list-style-type: none">• Over 80% of the usual life expectancy for the species.
Dead	<ul style="list-style-type: none">• Tree is dead or almost dead.

Appendix 8 - Structural condition

<u>Category</u>	<u>Example condition</u>	<u>Summary</u>
Good	<ul style="list-style-type: none"> • 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. 	<ul style="list-style-type: none"> • The tree is considered structurally good with well developed form.
Fair	<ul style="list-style-type: none"> • The tree may have minor structural defects within the structure of the crown that could potentially develop into more significant defects. • The tree may have 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. 	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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. 	<ul style="list-style-type: none"> • The identified defects are likely to cause either partial or whole failure of the tree.

Appendix 9 - Safe Useful Life Expectancy (SULE), (Barrel, 2001)

A tree's 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	<ul style="list-style-type: none"> (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	<ul style="list-style-type: none"> (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	<ul style="list-style-type: none"> (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	<ul style="list-style-type: none"> (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.
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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 <u>cannot</u> 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 <u>temporarily</u> 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.



B.1:



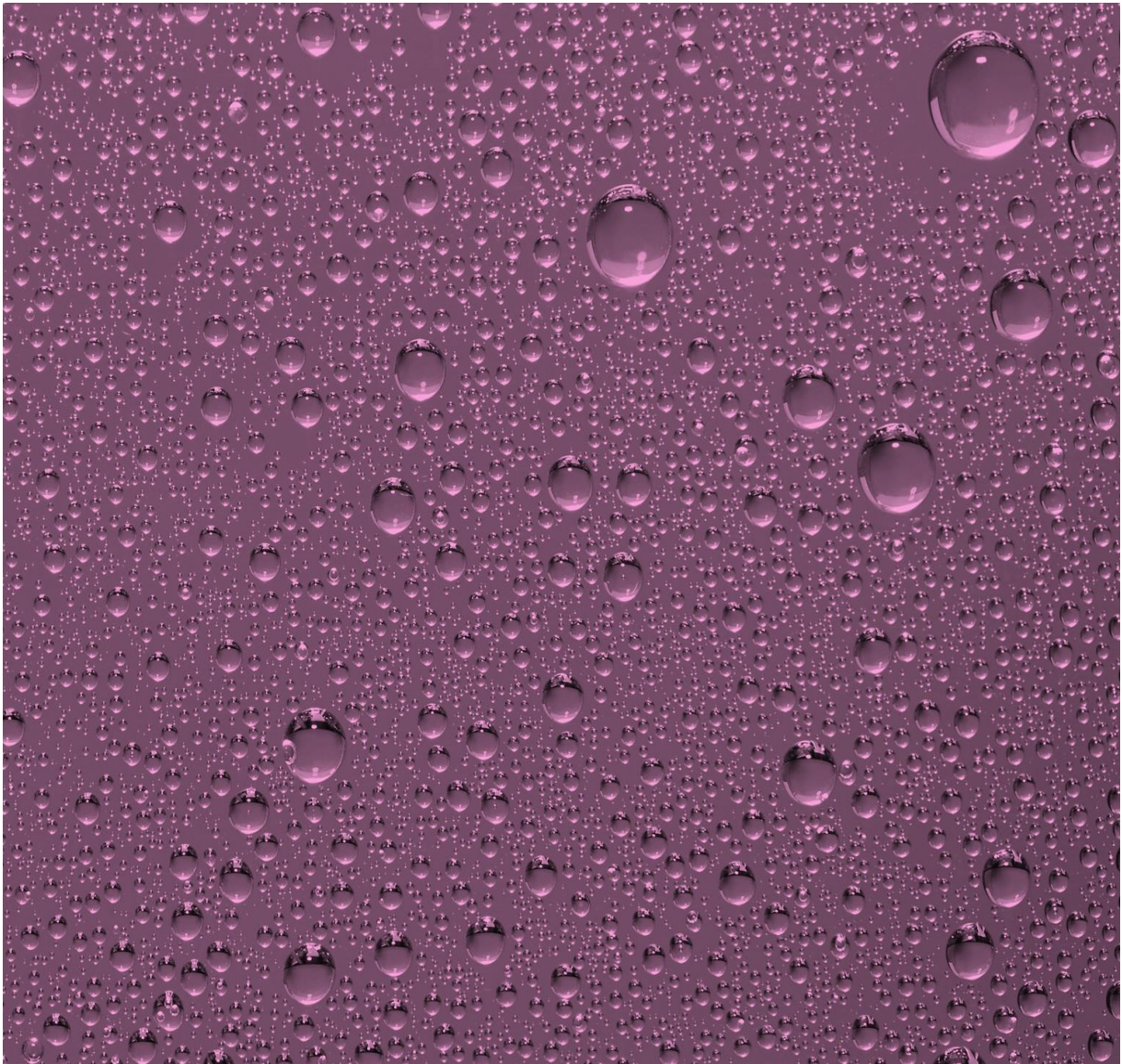
APPENDIX C: FLOOD RISK ASSESSMENT REPORT



C.1:

FLOOD RISK MANAGEMENT REPORT

PROPOSED REZONING (SP2 TO R2) OF
4 BELLARA AVE, NORTH NARRABEEN



Flood Risk Management

Proposed rezoning (SP2 to R2) of 4 Bellara Ave, North Narrabeen

20 September 2019

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1.0 Executive Summary

Stellen Consulting was engaged to assess the proposed rezoning, from SP2 Infrastructure to R2 Low Density Residential, of 4 Bellara Avenue in reference to potential impacts arising from flooding. This report provides flooding information specific for the subject site and uses a theoretical building footprint to assess the suitability of the site for rezoning.

Based on the evaluations of the proposed building footprint and flood information provided by Council, the following can be concluded:

1. The proposed rezoning of the site, from SP2 Infrastructure to R2 Low Density Residential, is not precluded by the flood affectation of the site.
2. The site has sufficient space available for the construction of a residential development outside of the 1% annual exceedance period (AEP) flood extent and can meet all flood related development controls applicable to the site.
3. The proposed development will not have an adverse impact on upstream or downstream flood levels.
4. The proposed development will not increase flood inundation elsewhere within the floodplain.
5. In the event of an emergency, refuge can be taken at the entry floor level of the proposed dwelling which is higher than the Probable Maximum Flood (PMF) level.

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2.0 Introduction

Stellen Consulting was engaged to assess the proposed rezoning of 4 Bellara Ave, North Narrabeen from SP2 Infrastructure to R2 Low Density Residential in reference to potential risks and impacts connected with flooding. This report provides flooding information specific for the subject site and uses a theoretical building footprint to assess the suitability of the site for rezoning.

3.0 Information Relied Upon

The following documentation has been used in the preparation of this overland flow assessment report:

- Survey and architectural drawings listed in Appendix A
- Council provided flood information in Appendix B

4.0 Description of the Site and Proposed Development

The subject site is currently undeveloped and contains a number of established and mature trees. The property is identified in the hatched area of Figure 1. It has an area of approximately 560m², and frontage of approximately 16.7m to Bellara Avenue, and it adjoins to developed properties at the North, East and West. A small drainage system appears to have been constructed along the boundary with 5 Tatiara Crescent. The site has a moderate North-South slope down to Bellara Avenue of approximately 6m.

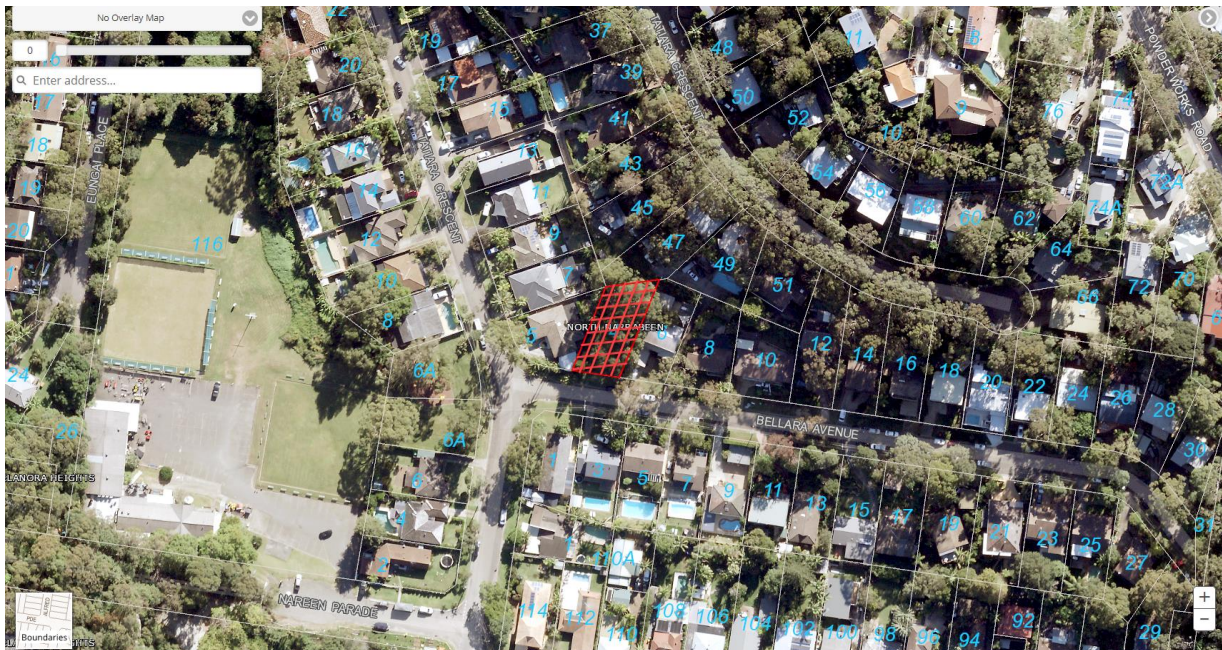


Figure 1: Location of Subject Site

For the purpose of assessing the development potential of the site a theoretical building footprint has been located at the northern end of the site and is shown in Figure 2. Details of the building are attached in Appendix A.

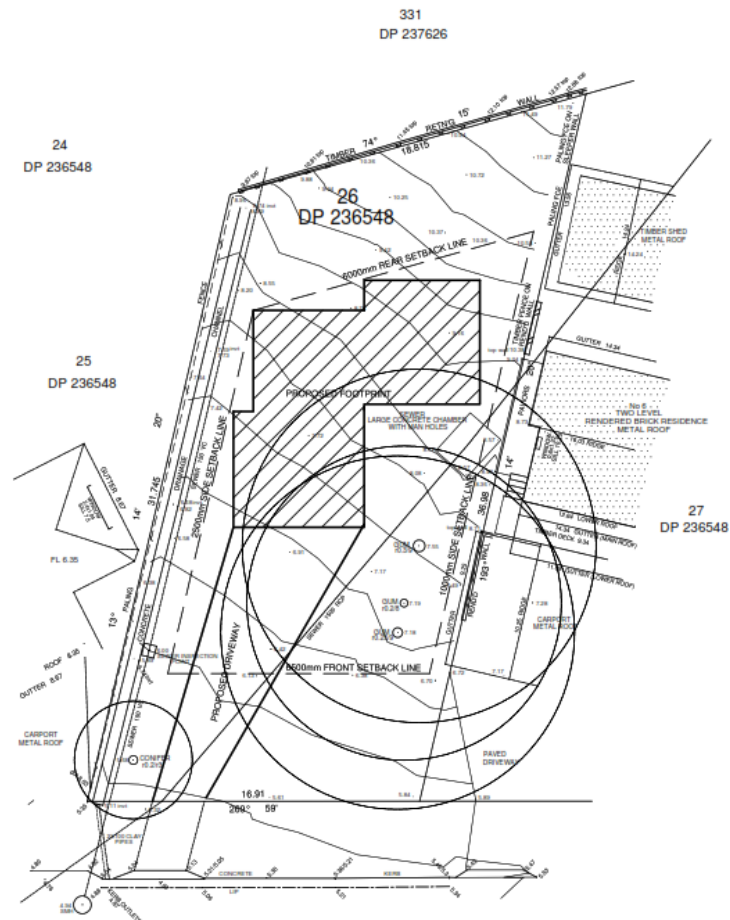


Figure 2: Proposed building footprint

5.0 Flooding

Council flood information for the locality identifies the site as being partially affected by flooding during the 1% AEP rain event. Council supplied flood information (Appendix B) was used to determine flooding extents, impacts, and to assess associated risks to the development.

The development site is partially located within the medium risk precinct flood hazard zone as identified within Northern Beaches (Pittwater) Council's Flood Hazard Map (Figure 3). Therefore, the site requires a Flood risk report to be conducted to support the development application to rezone the site.

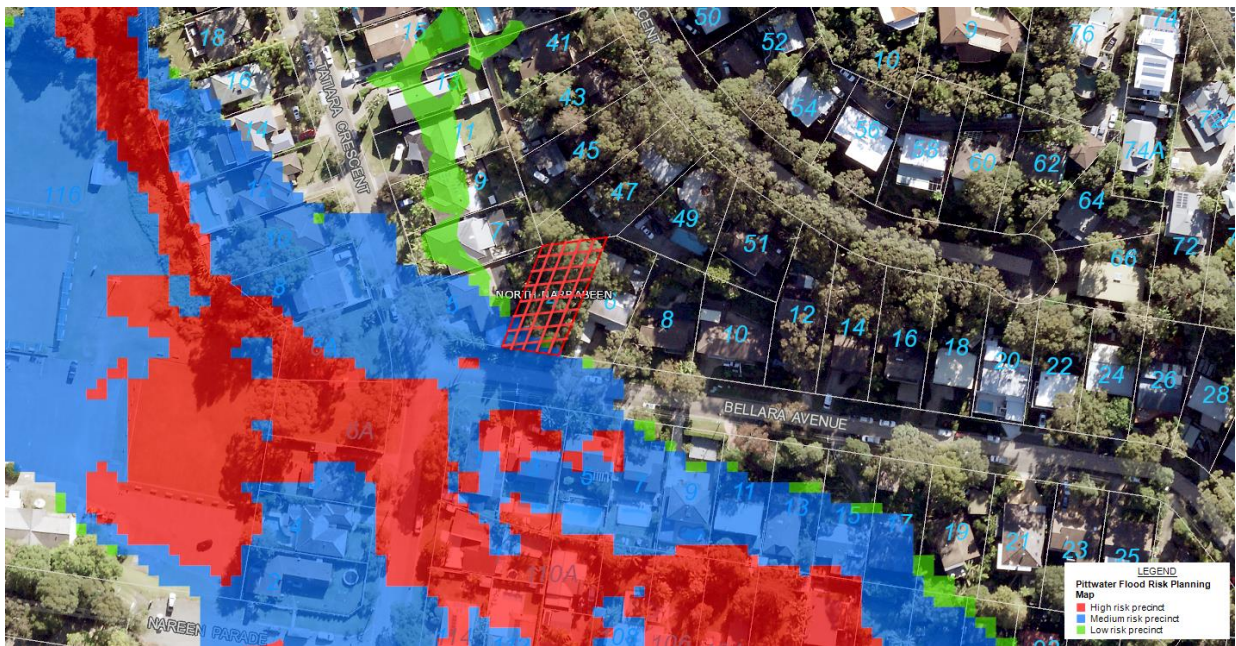


Figure 3 - Northern Beaches Council, Flood Hazard Map

5.1 Analysis & Assessment of Impacts

Council’s flood data predicts that during the 1% AEP rain event the site will be partially inundated with flood waters arising from Bellara Ave, running in a south-east direction toward South Creek.

The proposed building footprint is not subject to any floodwaters during the 1% AEP rain event, but the site is partially affected by Medium risk Precinct at the south-western edge of the property and is therefore classified as Medium Risk (refer Figure 3).

Table 1 summarises the flood characteristics for the site.

Table 1. Summary of flood characteristics

Summary	Proposed Dwelling
Existing FFL / surface level ⁽¹⁾ (mAHD)	6.91
Proposed FFL ⁽¹⁾ (mAHD)	6.91 – 10.37
Natural Surface Level ⁽¹⁾ (mAHD)	6.91
Flood Risk Precinct ⁽²⁾	Medium
Predicted 1% AEP Flood Level ⁽³⁾ (mAHD)	5.44
Flood Planning Level ⁽³⁾ (mAHD)	5.94
Probable Maximum Flood Level ⁽³⁾ (mAHD)	5.96
Flood Life Hazard Category ⁽³⁾	H1-H2 and H3-H4

1. Refer attached survey and architectural plans (Appendix A)
2. Flood Map, Figure 3
3. Notes of Pre-Lodgement meeting: Planning Proposal report section 5.5 Flood Affection (Appendix B)

5.2 Assessment of Impacts

All aspects of the proposed development are categorised as residential and medium-risk. In accordance with Pittwater Council 21DCP sB3.11, flood controls are applicable to the development.

Table 2 provides a summary of the applicable controls for the proposed residential dwelling.

Table 2. DCP flood controls, Medium flood risk precinct, concessional development

#	Prescriptive controls	Compliance with controls			Relevant Controls
		NA	Yes	No	
A	Flood effects caused by development		✓		A1, A3
B	Drainage infrastructure and creek works	✓			B1, B2
C	Building components and structural		✓		C1, C2, C3
D	Storage of goods		✓		D1, D2
E	Flood emergency response		✓		E1, E2
F	Floor levels		✓		F1, F2, F3, F4, F6, F8, F9
G	Car parking		✓		G1, G2, G3, G5, G6, G7, G8
H	Fencing		✓		H1
I	Pools		✓		I1

NA – Not Applicable

1.1.1 Addressing the Controls

Control A - Flood effects caused by development

- A2. The certification shall be provided in accordance with Northern Beaches Council's Standard Hydraulic Certification Form (Forms A and A1 of Northern Beaches Council's Guidelines for preparing a Flood Management Report) to the effect that the works have been designed and can be constructed to adequately address flood risk management issues.

Refer to form 1

- A3. No filling is proposed below the 1% AEP flood level.

Control B - Not applicable

Control C - Building components and structural

- C1. The proposed primary dwellings footings, slab and structure, shall be designed / checked by a structural engineer and constructed of flood compatible materials in accordance with Reducing Vulnerability of Buildings to Flood Damage: Guidance on Building in Flood Prone Areas, Hawkesbury-Nepean Floodplain Management Steering Committee (2006).
- C2. NA – The proposed development is above the FPL and PMF water surface level.
- C3. All new electrical equipment, power points, wiring, fuel lines, sewerage systems or any other service pipes and connections must be waterproofed and/or located above the FPL.

Control D - Storage of goods

- D1. Hazardous or potentially polluting materials shall not be stored below the FPL unless adequately protected from floodwaters in accordance with industry standards.
- D2. Goods, materials or other products which may be highly susceptible to water damage are to be located/stored above the FPL.

Control E - Flood emergency response

E1. The proposed building is fully above the PMF water Level. The recommended emergency response is to shelter-in-place. In the event that floodwaters overtop the boundary fronting Bellara Ave at any point the recommended actions are:

- The occupants of the property shall be directed to remain in the dwelling above the PMF water surface level.
- Emergency services shall be contacted stating the property's location; the situation faced, number of people on the property and any evacuation measures to be carried out.

E2. The proposed dwelling is fully above the PMF water level, sufficient space is therefore available for the occupants of the site.

Control F - Floor levels

- F1. The proposed dwelling is above the PMF water level.
- F2. Not applicable – The proposed dwelling is outside of the 1% AEP flood extent.
- F3. Not applicable – The proposed dwelling is outside of the 1% AEP flood extent.
- F4. Not applicable – No existing structure and/or floor levels are proposed to be maintained.
- F6. Not applicable – No existing structure and/or floor levels are proposed to be maintained.
- F8. The first floor level of the proposed dwelling is set above the PMF.
- F9. Not applicable – The proposed dwelling is outside of the 1% AEP flood extent.

Control G - Not applicable

- G1. Not applicable – No open carpark area and/or carport is proposed.
- G2. Not applicable – No open carpark area and/or carport is proposed.
- G3. Not applicable – No enclosed carpark area is proposed.
- G5. The proposed garage is above the PMF
- G6. Not applicable – No carport is proposed
- G7. A small amount of cut is proposed for the construction of the driveway. No filling of the land is proposed below the 1 % AEP flood level.
- G8. Not applicable – Development is for a single residential dwelling only.

Control H - Not applicable

- H1. Any fencing, including pool fencing, shall be designed so as not to impede the flow of flood waters and not to increase flood affectation on surrounding land. Appropriate fencing must comply with the Flood Prone Land Design Standard in addition to other regulatory requirements of pool fencing.

Control I - Not applicable

- I1. Not applicable – No pool is proposed.

6.0 Conclusion

This Flood Risk Assessment Report has been undertaken in accordance with Pittwater Council 21DCP Section B3.11 and is based on the supplied information listed in Section 3.

Council flood information predicts a generally shallow sheet flow from north to south that is likely to be present on the neighbouring properties and the subject property during the 1% AEP rain event. The proposed development is categorised as residential development and falls within the medium risk precinct. These works are assessed under the Pittwater Council 21DCP Section B3.11 as medium risk and subject to flood controls.

The proposed rezoning of the land, from SP2 Infrastructure to R2 Low Density Residential, is not precluded as a result of the flood affectation of the land, and the site has sufficient space available for the construction of residential development outside of the 1% AEP flood extent, meeting all applicable flood related development controls.

Based on the information contained within this report, the proposed rezoning, if carried out in accordance with the recommendations within this report, is consistent with the flood-related development controls outlined in Section B3.11 of Northern Beaches Council's Development Control Plan (Pittwater 21DCP). Therefore, from a flood impact assessment perspective, we recommend the proposed rezoning as a safe and practical solution.

References

- Australian Institute for Disaster Resilience, 2014, *Technical Flood Risk Management Guideline: Flood emergency response classification of the floodplain*, Australian Disaster Resilience Handbook Collection, Handbook 7.
- Ball J, Babister M, Nathan R, Weeks W, Weinmann E, Retallick M, Testoni I, (Editors), 2016, *Australian Rainfall and Runoff: A Guide to Flood Estimation*, Commonwealth of Australia.
- DECC (NSW Department of Environment and Climate Change), 2007, *Floodplain Risk Management Guideline*, Flood Emergency Response Classification of Communities, DECC, Sydney.
- New South Wales Government, 2005, *Floodplain Development Manual: For Management of Flood Liable Land*.
- Pittwater 21 Development Control Plan – 2014, *Section B General Controls*. Available from: Northern Beaches Council's Planning Controls.
- Notes of Pre-Lodgement meeting: Planning Proposal section 5.5 *Flood Affectation* Northern Beaches Council

Appendix A – Architectural plans and site survey

Architectural Plans by Peter Princi Architect (dated: August.19)

SK01	SITE PLAN - BUILDING SET BACKS	Rev. A
SK02	SITE PLAN - BUILDING FOOTPRINT	Rev. A
SK03	SITE PLANE-TREE REMOVAL	Rev. A
SK04	LONG SECTION THROUGH CENTRE OF BLOCK	Rev. A

Survey by STEVE DAVEY AND ASSOCIATES PTY LTD

PLAN No : SJD/020719/A

DATE OF SURVEY : JULY 2019

Appendix B – Excerpt from PLM Notes (PLM2018/0039) dated 26.02.2018

6. NATURAL HAZARDS AND INTERNAL REFERRALS

5.5 Flood Affectation

(a) The property has been identified as flood affected.

(b) This hazard must be addressed in the Planning Proposal and justification provided as to why the site is capable of being developed for residential purposes. This includes but is not limited to addressing the S9.1 Direction 4.3 Flood Prone Land (formerly S117 Directions).

(c) The following flood information is provided from Council's Floodplain Management Officer:

(i) AEP (100 year) flood level: 5.44m AHD.

(ii) Freeboard: 0.5m.

(iii) Flood Planning Level (FPL): 5.94m AHD.

(iv) Flood Risk Precinct: Affected by the Medium Risk Precinct.

(v) Probable Maximum Flood (PMF) level: 5.96m AHD.

(vi) Flood Risk Hazard Category: Affected by H1-H2 and H3-H4.

Appendix C – Form 1 Statement

Attachment A

NORTHERN BEACHES COUNCIL STANDARD HYDRAULIC CERTIFICATION FORM

FORM A/A1 – To be submitted with Development Application

Development Application for

Address of site: 4 Bellara Ave, North Narrabeen

Declaration made by hydraulic engineer or professional consultant specialising in flooding/flood risk management as part of undertaking the Flood Management Report:

I, Logan English-Smith on behalf of Stellen Consulting
(Insert Name) (Trading or Business/ Company Name)

on this the 20 July 2020 certify that I am engineer or a
(Date)

professional consultant specialising in flooding and I am authorised by the above organisation/ company to issue this document and to certify that the organisation/ company has a current professional indemnity policy of at least \$2 million.

Flood Management Report Details:

Report Title: Flood Risk Management - Proposed Rezoning (SP2 to R2) of 4 Bellara Ave, North Narrabeen

Report Date: 20 September 2019

Author: Yasser Al-Ashmori

Author's Company/Organisation: Stellen Consulting

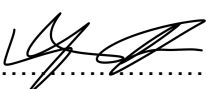
I: Logan English-Smith
(Insert Name)

Please tick all that are applicable (more than one box can be ticked)

have obtained and included flood information from Council (must be less than 12 months old) **(This is mandatory)**

have followed Council's Guidelines for Preparing a Flood Management Report

have requested a variation to one or more of the flood related development controls. Details are provided in the *Flood Management Report*.

Signature 
Name Logan English-Smith



APPENDIX D: GEOTECHNICAL REPORT

**GEOTECHNICAL RISK MANAGEMENT POLICY FOR PITTWATER
FORM NO. 1 – To be submitted with Development Application**

Development Application for _____	Name of Applicant _____
Address of site 4 Bellara Avenue, North Narrabeen	

Declaration made by geotechnical engineer or engineering geologist or coastal engineer (where applicable) as part of a geotechnical report

I, Troy Crozier on behalf of Crozier Geotechnical Consultants on this the 11th June 2019, certify that I am a geotechnical engineer or engineering geologist or coastal engineer as defined by the Geotechnical Risk Management Policy for Pittwater - 2009 and I am authorised by the above organisation/company to issue this document and to certify that the organisation/company has a current professional indemnity policy of at least \$2million. I:

- have prepared the detailed Geotechnical Report referenced below in accordance with the Australia Geomechanics Society's Landslide Risk Management Guidelines (AGS 2007) and the Geotechnical Risk Management Policy for Pittwater - 2009
- am willing to technically verify that the detailed Geotechnical Report referenced below has been prepared in accordance with the Australian Geomechanics Society's Landslide Risk Management Guidelines (AGS 2007) and the Geotechnical Risk Management Policy for Pittwater - 2009
- have examined the site and the proposed development in detail and have carried out a risk assessment in accordance with Section 6.0 of the Geotechnical Risk Management Policy for Pittwater - 2009. I confirm that the results of the risk assessment for the proposed development are in compliance with the Geotechnical Risk Management Policy for Pittwater - 2009 and further detailed geotechnical reporting is not required for the subject site.
- have examined the site and the proposed development/alteration in detail and I am of the opinion that the Development Application only involves Minor Development/Alteration that does not require a Geotechnical Report or Risk Assessment and hence my Report is in accordance with the Geotechnical Risk Management Policy for Pittwater - 2009 requirements.
- have examined the site and the proposed development/alteration is separate from and is not affected by a Geotechnical Hazard and does not require a Geotechnical Report or Risk Assessment and hence my Report is in accordance with the Geotechnical Risk Management Policy for Pittwater - 2009 requirements.
- have provided the coastal process and coastal forces analysis for inclusion in the Geotechnical Report

Geotechnical Report Details:

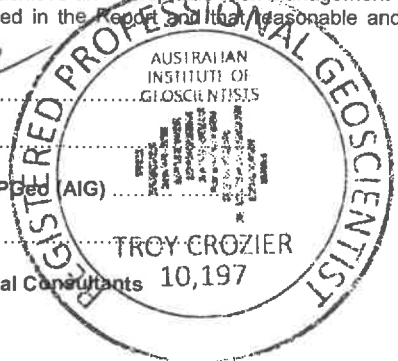
Report Title: Geotechnical Report for Proposed Re-zoning at 4 Bellara Avenue, North Narrabeen	
Report Date: 11 th June 2019	Project No.: 2019-077
Author: J. Yan and T. Crozier	
Author's Company/Organisation: Crozier Geotechnical Consultants	

Documentation which relate to or are relied upon in report preparation:

Not Applicable

I am aware that the above Geotechnical Report, prepared for the abovementioned site is to be submitted in support of a Development Application for this site and will be relied on by Pittwater Council as the basis for ensuring that the Geotechnical Risk Management aspects of the proposed development have been adequately addressed to achieve an "Acceptable Risk Management" level for the life of the structure, taken as at least 100 years unless otherwise stated and justified in the Report and that reasonable and practical measures have been identified to remove foreseeable risk.

Signature Troy Crozier
 Name ... Troy Crozier
 Chartered Professional Status... Registered (AIG)
 Membership No. ... 10197
 Company... Crozier Geotechnical Consultants 10,197



GEOTECHNICAL RISK MANAGEMENT POLICY FOR PITTWATER
FORM NO. 1(a) - Checklist of Requirements For Geotechnical Risk Management Report for Development Application

Development Application for _____	Name of Applicant _____
Address of site <u>4 Bellara Avenue, North Narrabeen, NSW</u> _____	

The following checklist covers the minimum requirements to be addressed in a Geotechnical Risk Management Geotechnical Report. This checklist is to accompany the Geotechnical Report and its certification (Form No. 1).

Geotechnical Report Details:

Report Title: Geotechnical Report for Proposed Re-zoning at 4 Bellara Avenue, North Narrabeen	Project No.: 2019-077
Report Date: 11 th June 2019	Author: J. Yan and T. Crozier
Author's Company/Organisation: Crozier Geotechnical Consultants	

Please mark appropriate box

- Comprehensive site mapping conducted 5th June 2019 _____
(date)
- Mapping details presented on contoured site plan with geomorphic mapping to a minimum scale of 1:200 (as appropriate)
- Subsurface investigation required
 - No Justification ...No site works proposed, no stability issues identified.
 - Yes Date conducted
- Geotechnical model developed and reported as an inferred subsurface type-section
- Geotechnical hazards identified
 - Above the site
 - On the site
 - Below the site
 - Beside the site
- Geotechnical hazards described and reported
- Risk assessment conducted in accordance with the Geotechnical Risk Management Policy for Pittwater - 2009
 - Consequence analysis
 - Frequency analysis
- Risk calculation
- Risk assessment for property conducted in accordance with the Geotechnical Risk Management Policy for Pittwater - 2009
- Risk assessment for loss of life conducted in accordance with the Geotechnical Risk Management Policy for Pittwater - 2009
- Assessed risks have been compared to "Acceptable Risk Management" criteria as defined in the Geotechnical Risk Management Policy for Pittwater - 2009
- Opinion has been provided that the design can achieve the "Acceptable Risk Management" criteria provided that the specified conditions are achieved.
- Design Life Adopted:
 - 100 years
 - Other specify
- Geotechnical Conditions to be applied to all four phases as described in the Geotechnical Risk Management Policy for Pittwater - 2009 have been specified
- Additional action to remove risk where reasonable and practical have been identified and included in the report.
- Risk assessment within Bushfire Asset Protection Zone.

I am aware that Pittwater Council will rely on the Geotechnical Report, to which this checklist applies, as the basis for ensuring that the geotechnical risk management aspects of the proposal have been adequately addressed to achieve an "Acceptable Risk Management" level for the life of the structure, taken as at least 100 years unless otherwise stated, and justified in the Report and that reasonable and practical measures have been identified to remove foreseeable risk

Signature *T. Crozier*
 Name ... **Troy Crozier**
 Chartered Professional Status... **RFGeo (AIG)**
 Membership No. ... **10197**
 Company... **Crozier Geotechnical Consultants**



Date: 11th June 2019

Project No: 2019-077

Page: 1 of 7

**GEOTECHNICAL REPORT FOR PROPOSED RE-ZONING
4 BELLARA AVENUE, NORTH NARRABEEN, NSW**

1. INTRODUCTION:

This report details the results of a geotechnical assessment carried out for proposed re-zoning at 4 Bellara Avenue, North Narrabeen, NSW. The assessment was undertaken by Crozier Geotechnical Consultants (CGC) at the request of the client Sydney Water Corporation.

It is understood that it is proposed to re-zone the land to residential to allow future development proposals.

This site is partly located within the H1 (highest category) landslip hazard zone as identified within Northern Beaches (Pittwater) Councils Geotechnical Risk Management Map. Therefore, the site requires a Geotechnical Landslip Risk Assessment to be conducted to allow support of the rezoning.

The assessment and reporting were undertaken as per the Tender P19-149, Dated: 23rd April 2019. This report includes a detailed description of the field work, site specific risk assessment where landslip hazards are identified and recommendations for stabilising works where necessary.

The assessment comprised:

- a) A detailed geotechnical inspection and mapping of the site and adjacent land by a Geotechnical Engineer.

2. SITE FEATURES:

2.1. Description:

The site is located on the high north side of Bellara Avenue, near the intersection with Tatiara Crescent. An aerial photograph of the site and its surrounds is provided below, as sourced from NSW Government Six Map spatial data, as Photograph 1.



Photograph: 1 – Aerial photo of site and surrounds.

The site is located within gently to moderately southwest dipping topography. It is currently vacant. A general view of the site is provided in Photograph 2 below.



Photograph: 2 – General view of the site, facing north

2.2. Geology:

Reference to the Sydney 1: 100,000 Geological Series sheet (9130) indicates that the site is underlain by Newport Formation (Rnn) of the Upper Narrabeen Group. Newport Formation (Upper Narrabeen Group) is of middle Triassic Age and typically comprises interbedded laminite, shale and quartz to lithic quartz sandstones and pink clay pellet sandstones.

Narrabeen Group rocks are dominated by shales and thin siltstone/sandstone beds and often form rounded convex ridge tops with moderate angle (<20°) side slopes. These side slopes can be either concave or convex depending on geology, internally they comprise interbedded shale and siltstone beds with close spaced bedding partings that have either close spaced vertical joints or in extreme cases large spaced convex joints. The shale often forms deeply weathered profiles with silty or medium to high plasticity clays and a thin silty colluvial cover.



3. FIELD WORK:

3.1 Method:

The fieldwork comprised a walk over inspection of the site and adjacent properties on the 5th June 2019 by a Geotechnical Engineer. It involved geological/geomorphological mapping of the site and inspection of adjacent land with examination of soil and garden slopes, retaining walls and associated structures for stability.

3.2. Field Observations:

The site is situated on the high north side of Bellara Avenue within gently to moderately southwest dipping topography. Bellara Avenue contains a bitumen pavement and is gently ($<-2^{\circ}$) east dipping where it passes the site. A grass reserve lies between the road and the site boundary. There were no signs of excessive cracking or deformation within the road pavement to suggest any movement or underlying geotechnical issues.

The site is devoid of development and is covered by grass with some tall trees on the sides. It is concave, gently dipping at 7° in the front half and increased to moderately dipping at 12° in the rear half of the site.

The neighbouring property to the west (No. 5 Tatiara Crescent) contains a single storey brick house located broadly in the front with raised backyard. The building structure appears to be in a good condition with no signs of settlement or cracking on its external walls. The common boundary is formed by a timber fence with a concrete surface stormwater gutter. The ground floor level of the house appears cut into the slope. As such, it is up to 1.50m lower than the ground level of the site along the common boundary with the remainder of the block having a similar topography to the site. The building structure is located within 0.50m of the common boundary.

The neighbouring property to the north (No. 47 Tatiara Crescent) contains a single storey brick house with a studio and a lawn area at the rear. The level of the lawn is approximately 1.00m higher than the ground level of the site. It is retained by a timber retaining wall along the common boundary, which is in a good condition with no signs of deformation. The building structure is located within approximately 4.00m of the common boundary.

The neighbouring property to the east (No. 6 Bellara Avenue) contains a two storey rendered house with a car port at the front and a single level weatherboard structure at the rear. The building structures appear to be in good condition with no signs of settlement or cracking on external walls. The property is at a similar ground level as the site along the common boundary with the remainder of the block having a similar topography to the site.

The neighbouring buildings and properties were only inspected from within the site or from the road reserve however the visible aspects did not show any signs of slope instability or other major geotechnical concerns which would impact the site or proposed developments.

4. COMMENTS:

4.1. Geotechnical Assessment:

The inspection and assessment identified no obvious credible landslip hazards within the site or adjacent properties. The soil slopes within and around the site are gently to moderately sloping with no signs of any instability or significant creep movement. The retaining walls around the site area are relatively low and appear stable at present though they are located in neighbouring properties. No signs of surface flow or erosion over the slope were identified within the site.

4.2. Slope Stability & Risk Assessment:

Based on our site mapping, no credible geological/geotechnical landslip hazards were identified. As such a risk assessment is not required for rezoning purposes.

Further analysis is required for any future Development Applications.

The entire site and surrounding slopes have been assessed as per the Northern Beaches (Pittwater) Council Geotechnical Risk Management Policy 2009 and no credible landslip hazards were identified, therefore the site is considered to meet the Acceptable risk management criteria for the design life of the development, taken as 50 years, provided the property is maintained as per the recommendations of this report.

5. CONCLUSIONS:

The inspection and assessment identified no obvious significant slope movement, excess surface stormwater flow or seepage, erosion or instability within the site or adjacent properties. The entire site and surrounding slopes have been assessed as per the Northern Beaches (Pittwater) Council Geotechnical Risk Management Policy 2009 and no credible landslip hazards were identified. It therefore achieves the "Acceptable" risk management criteria and no further assessment is considered necessary as put at the rezoning application.

Prepared By:



Jun Yan
Geotechnical Engineer

Reviewed By:



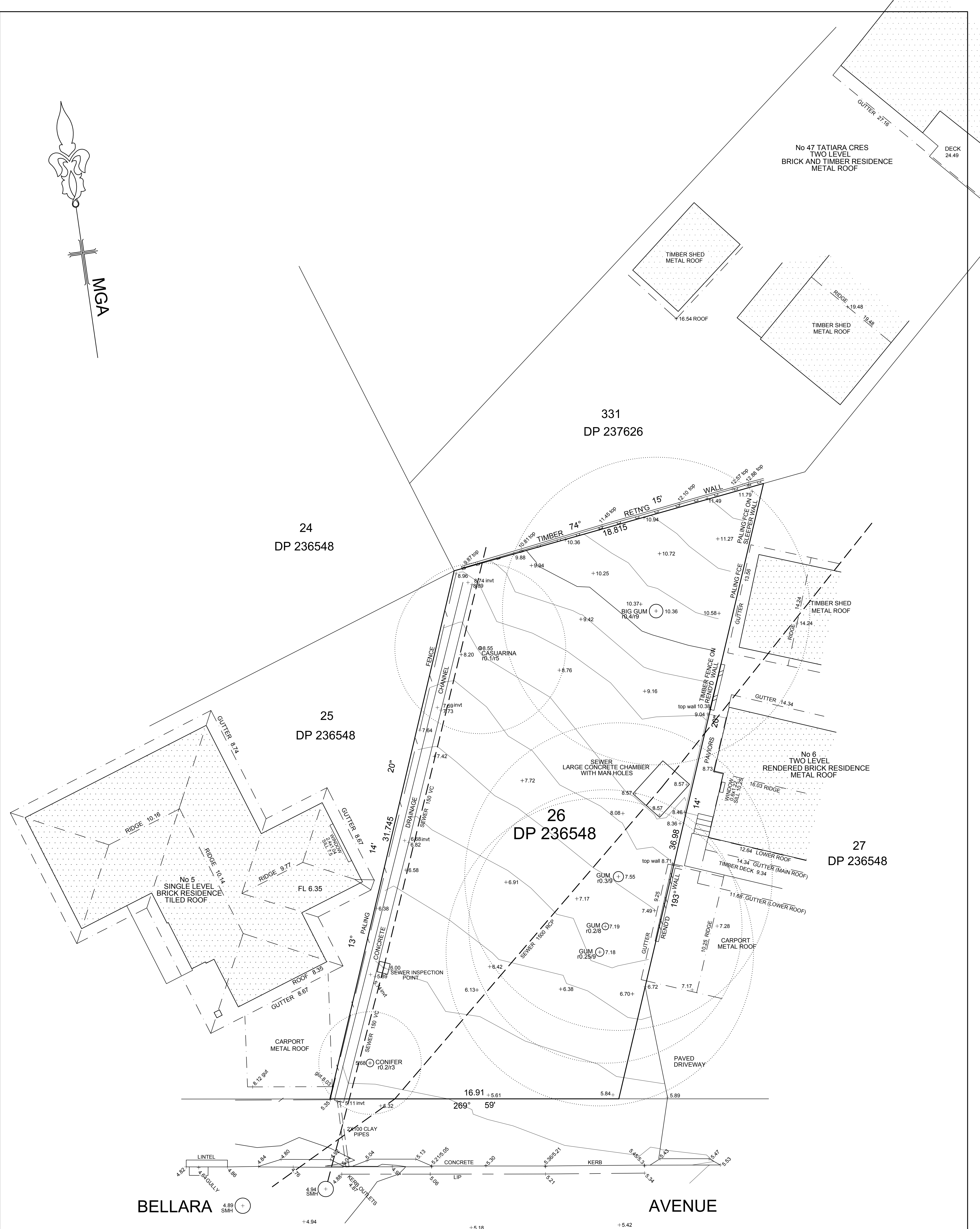
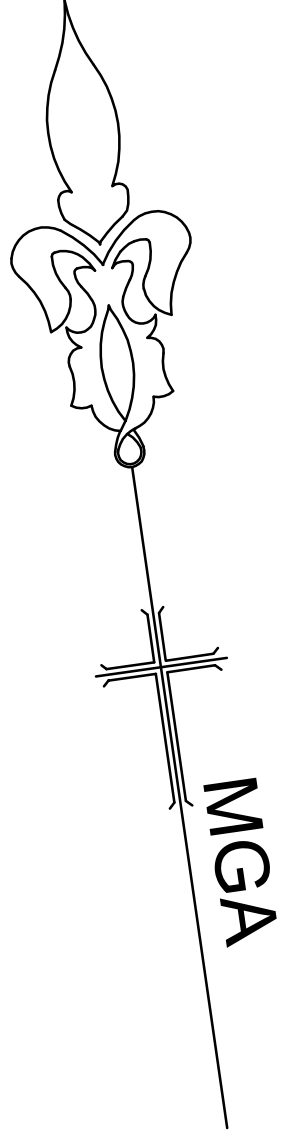
Troy Crozier
Principal
MAIG, RPGeo ó Geotechnical and Engineering
Registration No.: 10197

6.0. REFERENCES:

1. Australian Geomechanics Society 2007, "Landslide Risk Assessment and Management", Australian Geomechanics Journal Vol. 42, No 1, March 2007.
2. Geotechnical Risk Management Policy for Pittwater, 20th July 2009.
3. V. Gardiner & R. Dackombe 1983, "Geomorphological Field Manual" by George Allen & Unwin.



APPENDIX E: SURVEY PLAN



THE INFORMATION SHOWN ON THIS PLAN REMAINS THE PROPERTY OF STEVE DAVEY AND ASSOCIATES PTY LTD
 THIS INFORMATION IS FOR USE BY SYDNEY WATER ALONE
 SEWER LOCATION : THE LOCATION OF THE SEWER HAS BEEN TAKEN FROM A SEWER DIAGRAM SUPPLIED BY SYDNEY WATER
 IT SHOULD BE CONSIDERED APPROXIMATE
 SERVICES : ONLY APPARENT SERVICES ARE SHOWN. THIS IS NOT A PLAN SHOWING ALL SERVICES
 CONTOURS : CONTOURS ARE BY NATURE AN APPROXIMATION OF LEVEL. THE CONTOUR INTERVAL SHOWN IS 0.5 METRES
 TREES : THE TREES SHOWN ARE DIMENSIONED. RADIUS TRUNK/ RADIUS CANOPY SPREAD
 THE LOCATION AND SIZE OF THE TREES IS APPROXIMATE ONLY AND THEY ARE NOT SYMMETRICAL AS SHOWN
 ADJOINING HOUSES : THE ADJOINING RESIDENCES HAVE BEEN SURVEYED BY REMOTE METHODS
 AS A CONSEQUENCE THE INFORMATION SHOWN ON THESE PROPERTIES MUST THEREFORE BE CONSIDERED APPROXIMATE
 ORIENTATION : THE BEARINGS SHOWN ARE THOSE OF THE TITLE DIAGRAM (DP236548)
 THE NORTH POINT SHOWN IS ORIENTED TO MGA
 THE CERTIFICATE OF TITLE INDICATES A RESTRICTION OVER THE SUBJECT LAND

AREA OF LOT 26 565.6m²

PLAN OF DETAIL AND LEVELS
 ADDRESS : 4 BELLARA AVENUE, NARRABEEN
 LGA : NORTHERN BEACHES
 LAND : LOT 26 IN DP236548

CLIENT : SYDNEY WATER

DATE OF SURVEY : JULY 2019
 LEVELS SHOWN ARE TO AUSTRALIAN HEIGHT DATUM
 LEVELS ARE BASED ON RL 3.799 AT PM5321

STEVE DAVEY AND ASSOCIATES PTY LTD
 LAND AND ENGINEERING SURVEYORS
 WARRIEWOOD
 Tel 0416 183 071 Email sjdavey@bigpond.com
 PLAN No : SJD/020719/A

STEVE DAVEY AND ASSOCIATES PTY LTD

LAND AND ENGINEERING SURVEYORS

16/30 MACPHERSON STREET,
WARRIEWOOD 2102.
Tel 9979 8123, Mob 0416 183 071

12th April 2019

Sydney Water

Finance Services
Level 13, 1 Smith Street,
Paramatta, NSW 2150

Attention Mr Christian Pollock
Project Manager - Disposals

Dear Mr Pollock,

As requested I have made a survey of land comprised in Certificate of Title Folio 26/236548 being Lot 26 in Deposited Plan number 236548.

The land is known as number 4 Bellara Avenue and has a frontage of 16.91 metres to Bellara Avenue.

My sketch is attached to this report showing my survey.

No residence stands on the land.

The information furnished to me shows a sewer passing through the land. I have surveyed the features of that sewer apparent at the surface and they are shown on my sketch.

As requested I have located the substantial trees within the lot and they are shown.

The land is partially fenced and the fencing and walls along the eastern boundary of the land are somewhat irregular with multiple encroachments onto the subject land.

The roof and gutter of a metal carport encroach over the eastern boundary by up to 330 millimetres.

The posts supporting a timber retaining wall along the northern boundary encroach by up to 80 millimetres.

The Certificate of Title lists The Metropolitan Water Sewage and Drainage Board in the First Schedule.

The land is subject to the Restrictions on Use imposed with the registration DP236548.



Stephen Davey
Registered Surveyor