

Googong Neighbourhood 3,4 and 5

Landscape Design Report
Development Application

Quality Information





Document Googong Neighbourhood 3,4 and 5 DA

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01 Introduction

1.1 Executive Summary

The public realm streetscapes and open spaces have been designed to continue the design aspirations of previous neighbourhoods whilst responding to the unique opportunities and constraints found with NH345. A wide variety of parks and playgrounds will be provided, including Yellow Box Reserve which will preserve and enhance an area of Yellow Box Grassy woodland as well as locating the repurposed Shearing Shed building. The open space network will be connected and legible, using paths, signage, public art and interpretive elements to tell the story of the site and connect to the wider town. Tree retention has been prioritised, with habitat creation opportunities maximised in all areas, in particular Googong Common, Yellow Box Reserve and Nangi Pimble. As with previous neighbourhoods, a variety of street tree species are proposed to maximise canopy coverage, shade and public amenity.

1.2 Project Overview

Googong Township is a 25 year project being developed in partnership by Peet and Mirvac, operating as Googong Township Pty Ltd (GTPL). The emerging township is located in Southern NSW, 8km from Queanbeyan and 15km from Canberra. The Googong master plan is embedded in Queanbeyan-Palerang Regional Council's (QPRC) Googong Development Control Plan and provides the overarching structure for the township. It has been planned and is being developed as a freestanding township with five neighbourhoods, around 6,600 dwellings and a population of over 18,000 people over 25 years.

Neighbourhood's 1 and 2 (also known as Googong North and Googong Central) have completed Structure plans and DAs. Neighbourhood 2 is currently under staged construction.

The next 3 Neighbourhoods to be developed, under the next Development Application, are:

- Neighbourhood 3 (including the Hamson land) – also known as Googong West
- Neighbourhood 4 – also known as Googong South
- Neighbourhood 5 – also known as Googong East

Neighbourhood's 3, 4 and 5 (NH345) is 235Ha in size and is bounded by Old Cooma Road to the west, Neighbourhood 2 and Neighbourhood 1B to the north, the Googong Dam

foreshore and Pink Tail Worm-Lizard Conservation Area to the east and rural land to the south.

The area around Googong is characterised by rural uses, while NH345 itself is characterised as former agricultural land.

1.3 Project Objective

GTPL are seeking to submit a Development Application (DA) with QPRC for the subdivision of the land within Neighbourhoods 3, 4 & 5 (NH345).

The DA proposal seeks approval for:

Torrens title subdivision of Neighbourhoods 3, 4 and 5 to create:

- 1476 Residential lots
- 20 lots for future subdivision of higher density housing and other uses including the Neighbourhood Centre sites, to accommodate approximately 320 dwellings
- Public reserves including, local parks, a sports fields and Googong Common
- Public roads and drainage reserves.

All subdivision works to prepare the land for the future development comprising site preparation and grading, stormwater and drainage works, road construction, tree removal, public domain landscaping and structures and utilities provision. The subdivision of the higher density super lots and the construction of all buildings (housing and schools) as well as the Neighbourhood Centre sites will be subject of future applications.

1.4 Document Purpose and Structure

This Landscape Design Report prepared for Googong provides a guide for the development of open spaces within the Neighbourhood 3,4 and 5 (NH345) Development Application area. This report will address the objectives and controls identified within Googong Development Control Plan for the following areas:

- Section 3.14 'Biodiversity'
- Section 3.16 'Cultural Heritage'
- Section 3.17 'Access and Movement Network'
- Section 3.19 'Drainage Reserves'
- Section 3.20 'Water Sensitive Urban Design (WSUD)' (relevant parts)
- Section 3.23 'Town and Neighbourhood Centres (Activity)'
- Section 3.24 'Community Facilities'
- Section 3.25 'Public Open Space'
- Section 8.4 'Stormwater Management and Flooding'
- Section 8.5 'Bushfire management'
- Section 8.6 'Aboriginal Heritage'
- Section 8.8 'Tree Retention and Biodiversity'

The Landscape Design Report is divided into the following sections:

01 - Introduction: Document purpose and structure.

02 - Project Description: Provides an overview of Googong NH345 from a site wide perspective and regional context.

03 - Principles: Addresses the broadscale principles for hardworks and softworks elements, lighting, signage and water management across the neighbourhoods. These are presented as written principles and supported by relevant character imagery. The landscape elements shown exhibit the scale, material and colour to be used in the public domain.

04 - Streets: Addresses the broadscale principles for streetscapes, followed by a breakdown of planting character and species for each area.

05 - Open Space: Provides a summary description of the key open spaces within NH345. More detail can be found in the drawing package (Appendix A).

06 - Key Issues: Addresses the key issues identified during the development of the integrated landscape concept design.



Figure 1.1 Googong NH345 Master Plan - NTS

02 Project Description

2.1 Regional Context

Googong is situated on a 780 hectare site, 16 kilometres south-east of Canberra and less than 4km south of Jerrabomberra. The site is located on the Old Cooma Road in NSW adjacent to the Googong Dam. The new township will ultimately provide approximately 6600 homes as it evolves in stages over the next 25 years, creating a community of approximately 16,000 people. Sustainability, affordability and community engagement are primary goals for the development.

2.2 Site Context

The broader Googong development site has had a history of disturbance including significant agriculture and grazing. There is minimal original vegetation left; however, the original landform characterised by gently undulating slopes and plains of the upper Monaro remains largely intact. The existing vegetation is sparse, consisting of some screen planting along Old Cooma Road and scattered low trees on the remainder of the site. Topographically the land has a varying undulation

that generally falls from a high point (Nangi Pimble) on the south western side of the site, to the Montgomery Creek corridor, then rising to Googong Dam Road and the Googong Dam catchment boundary to the north and east. There is one homestead and one rental cottage on the site. To the east of the site is the Googong Dam Catchment Area where recreational facilities are publicly accessible via Googong Dam Road.

The broader Googong site is very exposed and has little shelter provided by vegetation or landform. Trees in the general locality show evidence of exposure, and wind rows/shelter belts have previously been established to lessen the impact of the prevailing winds on the properties.

There is a corridor of vegetation to the north of the site which is recognised as a significant regional ecological corridor. The indigneous vegetation community has informed the plant community mix for the development.

The unique ecological and geomorphological qualities of the site have informed the design character. Strong themes are drawn from these existing qualities of site and surrounding region.

The development site consists of five neighbourhoods. This report provides design principles for NH345. *Refer figure 2.1.*

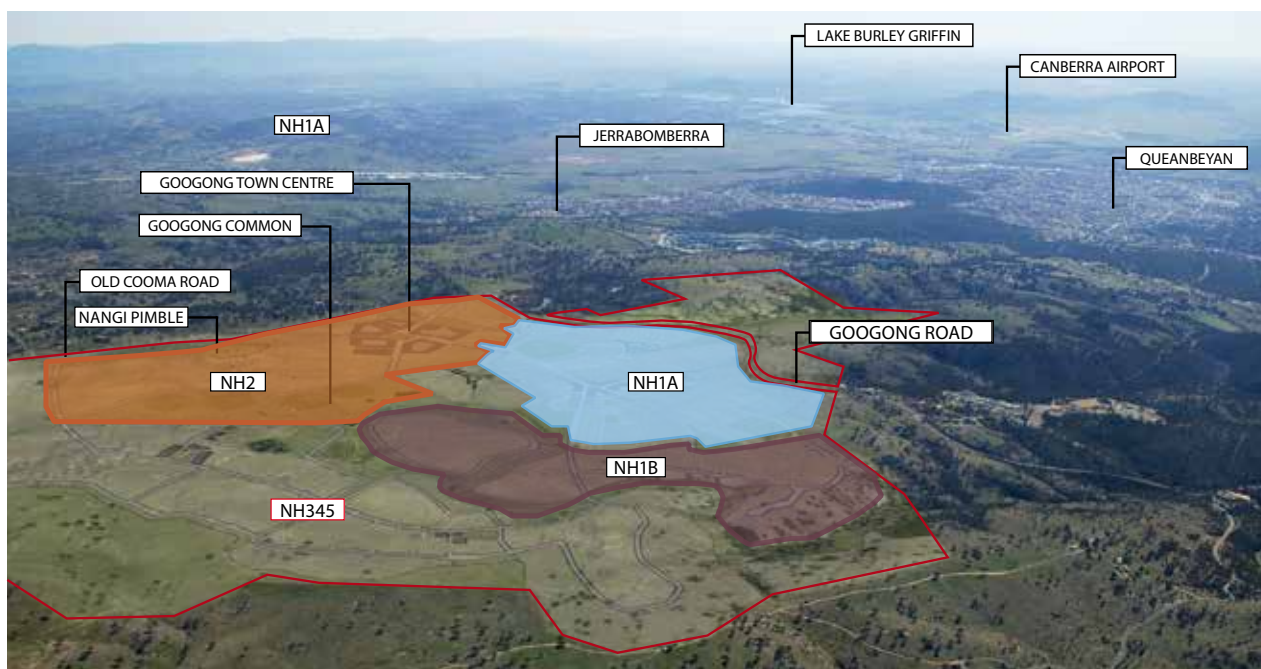


Figure 2.1 Proposed NH345 Extent

2.3 NH345 Opportunities and Constraints

There are a number of opportunities and constraints unique to the Neighbourhood 3, 4 and 5 areas.

CONSTRAINTS

- Limited public access into Googong Dam Foreshore area
- Steep topography associated with high points within and adjacent to Hill 800 (south)
- Scattered 'exceptional' and 'high quality' existing trees throughout the three neighbourhoods.
- High Constraint - Zone 1 Remnant Trees- Dry Sclerophyll Forest and Yellow Box Grassy Woodland located within NH4 and NH5.
- Potential flooding in low lying areas of Montgomery's Creek
- There are aboriginal and european archaeological sites located within NH3-5 to be considered during the design process
- Asset Protection Zones (APZ's) will be required the edges of open space, however in the main these are provided within the road corridor.

OPPORTUNITIES

Green Spaces and Connections:

- A continuous pedestrian link along Googong Common (Bunburung Thina) with connecting links through to other open spaces within NH345 and the wider site.
- Neighbourhood Park with playground integrated into Nangi Pimble (south) celebrating the unique landscape qualities and views over southern Googong.
- Neighbourhood Centre locations adjacent open space allows for seamless integration with core recreational facilities, pedestrian links and maximise views over natural landscapes from urban cores.
- Create a distinctive landscape treatment along Googong Dam Foreshore Buffer, prioritising bushland restoration and bush tracks.

- Opportunity to create a green link in NH4 linking Googong Common to the Googong Dam Foreshore Buffer via the neighbourhood park and green links.

Water:

- Within Googong Common there is a unique opportunity for the enhancement of the riparian corridor and celebrate the 'chain of ponds'.
- Integration of WSUD treatment ponds and basins into this riparian landscape so that they enhance this corridor by adding habitat and enhancing visual and pedestrian amenity.
- Collect and clean stormwater and runoff from streets within the Bunyip Drive median swale which is fully planted with native grass and tree species.

Habitat:

- Existing 'Exceptional' or 'high value' trees to be retained wherever possible in open spaces due to their high recreational and environmental potential, providing mature shade canopies to playgrounds and open spaces, and tree hollow habitats for native fauna.
- Enhancement of any remnant vegetation communities by re-establishment of indigenous vegetation, particularly to provide shade to playgrounds in parks and promote flora and fauna movement through green links.

Cultural Heritage:

- Potential for relocation and adaptive reuse of the Googong Shearing Shed in Yellow Box Reserve

03 Key Principles

3.1 Landscape Vision and Design Principles

The Googong vision is to create a high quality, sustainable landscape with a distinctive character and diverse range of open space areas and facilities for the enjoyment and wellbeing of Googong Township's residents.

VISION

To create a high quality, sustainable landscape with a distinctive character and diverse range of open space areas and facilities for the enjoyment and wellbeing of Googong Township's residents.

DESIGN PRINCIPLES

- Formation of attractive, legible, safe, functional and sustainable streetscapes that reduce car dependency.
- Water sensitive urban design principles applied throughout the neighbourhoods
- Utilisation of recycled water to sustainably irrigate the open space;
- The establishment of special places to meet, relax, play, recreate and learn about heritage and ecological process;
- The 'Celebration of Water' through interpretive and sculptural elements;
- The promotion of active lifestyles and respect for the environment;
- Preservation of the site's unique natural features;
- Re-establishment of soil structure as a nurturing medium for future growth;
- Re-establishment of lost indigenous ecologies;
- Revelation and celebration of histories and heritage; and
- To integrate the principles of the Googong Public Art Strategy into the design of open space components.

Through consultation with stakeholders and the community for NH2, five priorities were identified which should also guide the design of open spaces in NH345. These key themes are:

1. Create a place that is fun and interesting
2. Plan for a sustainable future
3. Be structured yet nurtured
4. Be thoughtful and curated
5. Create a space that is accessible and permeable

3.2 Environmental and Socially Sustainable Outcomes

Googong is being developed with particular attention to environmentally and socially sustainable design principles and best practice:

- Integrated Water Cycle infrastructure providing recycled water for use in homes and to irrigate open space;
- On site water treatment using a combination of bioretention basins and sedimentation ponds, that will be integrated into the landscape and provide habitat and refuges for wildlife;
- Energy Management through solar passive design and efficient appliance technologies;
- Use of solar powered lighting in conjunction with dimming sensors to reduce reliance on mains electricity, minimise glare / light spill into the environment and provide efficient lighting systems for safe pedestrian and cycle movement after dark.
- Sustainable pavement materials such as Reconophalt and sourcing of locally derived products;
- Minimisation of Urban Heat Island effects through use of lighter coloured pavements and maximisation of canopy coverage and shade;
- Consideration of Universal Design within open spaces (for example, the 'Everyone Can Play Guidelines') to ensure all users and abilities are considered;
- Community services such as growers markets, community gardens, dog parks, a public art program and public amenity buildings;
- Promotion of pedestrian and cycle movement, through a network of accessible paths with secure lock up facilities for bicycles; and
- Conservation Management to key areas to ensure conservation or re-establishment of natural communities, features and processes on site.

3.3 Smart Cities Initiatives

Smart Cities technologies have been integrated into the NH2 design, and will be carried through into NH345:

- Public Wifi and CCTV cameras;
- Sensor controlled solar footpath and car park lighting;
- Smart rubbish bins that inform QPRC when full;
- Smart locking systems to amenities and facilities;
- Smart switches to barbecues to enable remote control;
- Environmental monitors and weather stations to monitor air quality
- EV charging stations and parking sensors to monitor parking numbers and busy times.

3.4 Access and Circulation

The requirement for and degree of pedestrian and cycleway access varies across NH345 in terms of user types and forecast numbers. It is important that a legible access system is established that connects throughout the development and is clear and equitable to all.

Within parks concrete paths will be used in combination with more permeable surface finishes. Other subtle connections through open spaces will be made with either gravel or decomposed granite.

Opportunities exist to integrate internal circulation with existing external networks, in particular, those walking trails associated with the Googong Dam.

All paths will be under QPRC ownership.

OBJECTIVES

- To create safe pedestrian and bicycle networks;
- To promote active transport and a healthy community;
- Provision of a network of connected key paths to promote walking, bicycle use and safety. This network should connect to site features, broader destinations and networks;
- Encourage 'street life' through provision of meeting points in parks which are readily accessible through the

pedestrian network;

- To provide equal access for all both in the public domain and access to private lots;
- Locate key paths where possible and practical to enhance connectivity to parks and other destinations and to minimise road crossings;
- Footpaths are to comply with AS1428.1 (2001) and AS1428.2-5 (1998) and are to be continuous with smooth transitions in level; and
- All pedestrian and cycle provision will be in accordance with the objectives and controls outlined in Googong DCP.

PATHS

There are a number of path networks proposed for NH2 as shown on Figure 3.1, including the following:

Cycle

- Dedicated on-road cycle lanes - bitumen - 1.5 / 1.6m width

Pedestrian and Cycle

- Share paths - brushed concrete - 2.5m width.
- Key paths - brushed concrete - 2.0 m width.

There will also be a series of smaller scale pedestrian paths throughout streets and open spaces to connect between the primary paths:

- Standard footpath - brushed concrete - 1.5m width.
- Bush track - stabilised site soil / deco granite - width to suit location.
- Boardwalks - timber / steel - width varies.





- Signalised pedestrian crossing
- Key pedestrian crossing
- On road cycle lane
- 2.5m shared path
- 2m key path
- 1.5m path

Note: 1.5m paths within the street network have not been shown.

Figure 3.1 NH2 Pedestrian and Cycle Network

3.4 Public Art

A great place is one that we attribute value to, a place that lives in our memory and one where we feel an attachment. Public art, through its many mediums, forms and scales, can be the visual reflector of a place, conceptually narrating the place values: revealing the past through history and stories; capturing the present through form and function; and glimpsing the future through creativity and innovation. It can also, through iconic statements create dramatic memorable moments.

A Public Art Strategy has been prepared for Googong as a high level visioning document that presents inspiration for the number of ways public art can be integrated to give Googong a unique place identity.

Through the landscape, we want the story of Googong to be told; to foster a sense of connection between the land and people, past and present. This may take the form of a standalone object, or as a number of interconnecting elements that move through a space. The artwork in some places may be multifunctional - visually beautiful but also encourage play, or be integrated into bespoke street furniture. Whatever form it takes, the intention is to create special moments in people's everyday experience of their surroundings, to challenge and delight, inspire and spark the imagination. Community engagement will be an essential aspect of the development of these artworks.

Refer Figure 3.2 Public Art Opportunities (based upon the Googong Public Art Strategy)

Many approaches and forms of art are possible, such as:

- Sculptural installations;
- Kinetic Art – using wind, solar, water;
- Interactive installations;
- Landform art;
- Ground paintings and wall murals;
- Integrated into functional elements: seating, walls, balustrades, lights, paths; and
- Digital / Light / auditory installations.
- Playground elements



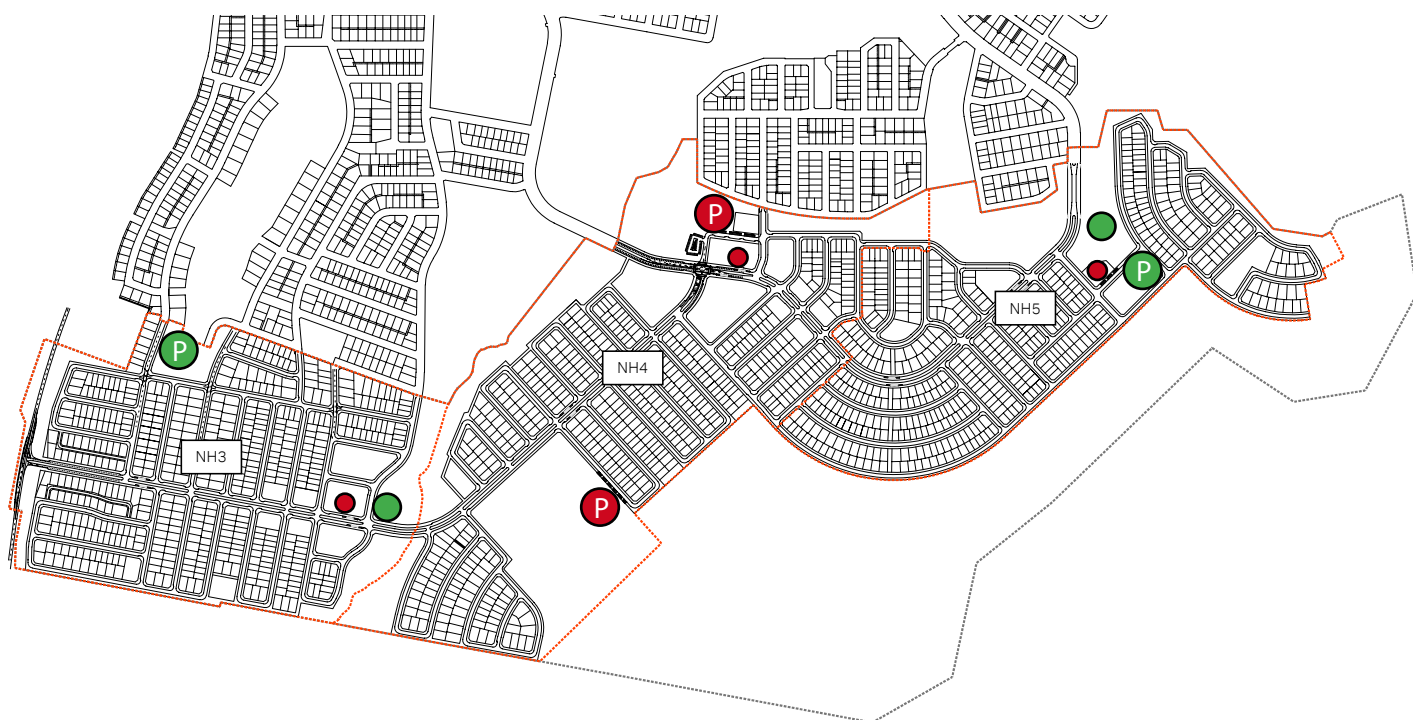
Gumnut play pods within Yerradhang Nguru Park



Sculptural Play elements within Beltana Park



'Terraformis' main entry sign



THEMES

- Ecology / Hydrology / Aboriginal History
- European History
- P** Playgrounds

Figure 3.2 Artwork Opportunities

3.5 Signage

The principles of signage (location and types) are to be continued as developed in Neighbourhoods 1 and 2:

Park Signage - Located at prominent park corners or entry points to identify Local and Neighbourhood parks.

Orientation Signage - To aid in the legibility of the Googong network of paths and open spaces, located at key decision points or nodes.

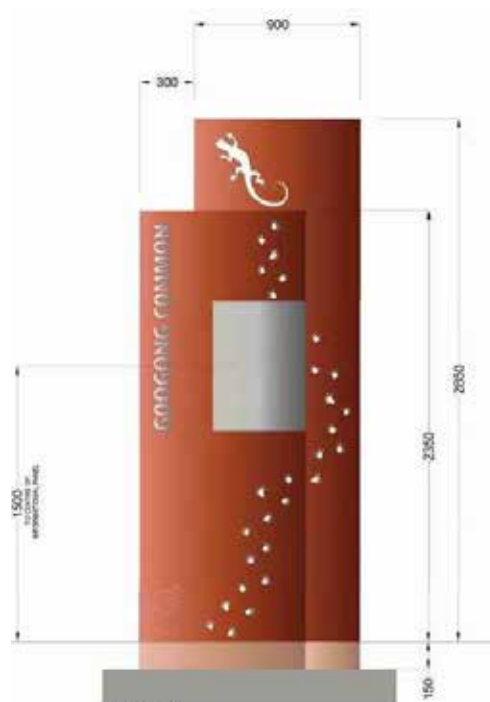
Interpretive Signage - To provide information to help explain points of environmental or historical significance.

Signage Wall - To provide park naming at key arrival points, in addition to or as an alternative to park signage.

Googong Common Signage - To combine identification, orientation information and safety signage within Googong Common (concept yet to be developed).

Building Signage - Integrated into the building design of key buildings such as schools, sporting pavilions and community facilities.

Refer *Figure 3.3 Signage Suite* and *Figure 3.4 Signage Strategy*.



Googong Common Signage

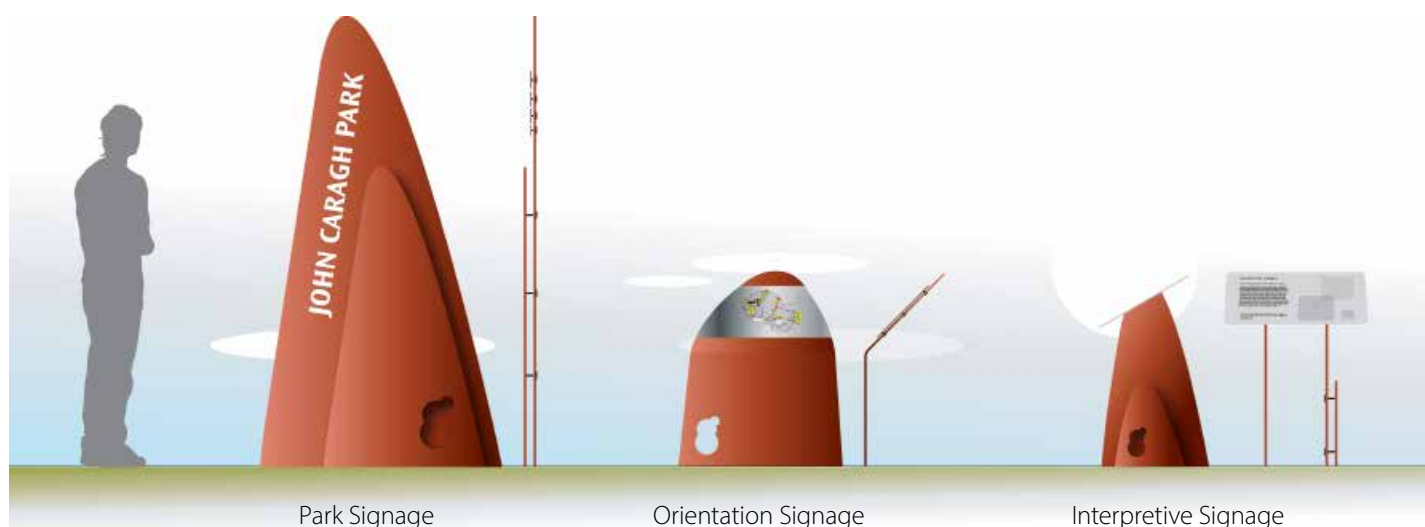


Figure 3.3 Signage Suite



Figure 3.4 Signage Strategy

04 Streetscapes

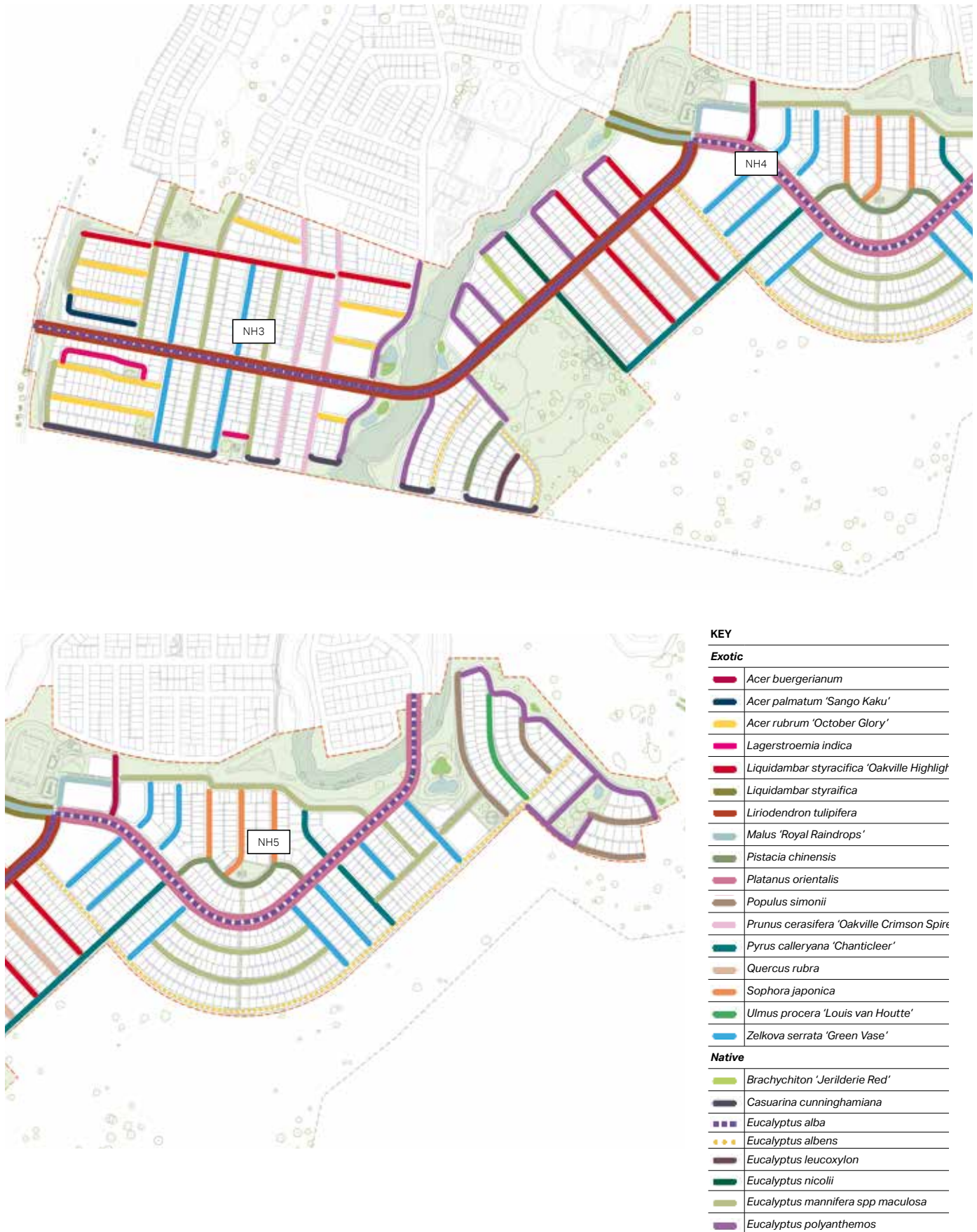


Figure 4.1 Street Tree Masterplan

4.1 Streetscape Principles

This section is to be read in conjunction with Appendix A: Plan Package, Drawings L37-L42

- **Biodiversity:** In accordance with Googong DCP Section 3.14 the NH345 master plan aims to preserve the natural ecology of the region by the nomination of locally endemic species where appropriate;
- **Sustainability:** Plant material has been selected that belongs in the region, which allows vegetation to be sourced (where possible) from local provenance seed. This has the benefits of ensuring genetic diversity, enhances chances of plant survival in the local conditions and will result in a lower impact on the environment and natural resources;
- **Deciduous Species:** Deciduous trees generally have broader canopies and larger leaves increasing shade coverage, mitigating the heat island effect and reducing energy consumption in warmer months. They allow increased solar access in cooler months, reducing heating requirements. They also reduce the potential impact of bushfires, as they are considered “steamers”, meaning they have a higher water content and minimal flammable oils compared to native species such as Eucalypts.
- **Water Sensitive Urban Design (WSUD):** In accordance with Googong DCP Section 3.20, a central swale to the median of Wellsvale Drive will be implemented. Due to its proximity to Googong Common and Montgomery’s Creek the runoff from NH345 shall be split between elements incorporated into Googong Common, Montgomery’s Creek and others located within the NH3-5 Neighbourhood parks.
- **Site Suitability:** All species to be selected in response to the harsh local environmental and climatic conditions including soil, frost, drought, dry and cold winds;
- **Access and Movement:** In accordance with Googong DCP Section 3.17, the tree and understorey planting has been selected to reinforce the nominated vehicular, pedestrian and cycle networks and to assist in wayfinding;
- **Maintenance:** plant selection criteria will include low maintenance species;
- **Site Legibility:** Key planting at entries, places and precincts. This will assist in the legibility of the neighbourhood, provide variety of experiences and help create a sense of character for different areas; and

- **Scale:** Trees selected to respond to the scale of the adjoining built form and width of the road carriageway.

4.2 Streetscape Planting

Creating an extensive tree canopy within Googong is very important in the creation a green, connected community. Works already documented within NH1 and NH2 will result in the planting of 22,346 trees, and NH345 will build upon this. The tree species proposed within NH2 are a combination of exotic and native species. *Refer Figure 4.1 Street Tree Masterplan.*

- **Wellsvale Drive:** Defined by a single deciduous tree species, (as for NH2) Liquidambar (Liquidambar styraciflua ‘Oakville Highlight’), to the verges, with Royal Raindrops Crab-apple (Malus ‘Royal Raindrops’) to the central median. Understorey planting to the central swale will be exotic groundcovers. For more detail please refer section 4.3 Wellsvale, Gorman and Bunyip Drives;
- **Gorman Drive:** The existing character established on NH1 will continue through NH3-5. Gorman Drive is lined with Plane trees (Platanus orientalis) on the verges, with White Gums (Eucalyptus alba) in the central median swale. Gorman Drive terminates at the intersection with Bunyip Drive and Wellsvale Drive, adjacent NH4 Neighbourhood Centre and Civic Space.
- **Bunyip Drive:** the main entry from Old Cooma Road into Googong through NH3 and 4 will be highlighted with Tulip Trees (Liriodendron tulipifera) , with White Box (Eucalyptus alba) to the median swale.
- **Hill 800 (South):** Streets framing this open space will be defined by Red Spotted Gum (Eucalyptus mannifera ssp. maculosa);
- **Linear Parks and connector streets:** Defined by ornamental exotic trees Chanticleer Pear (Pyrus calleryana ‘Chanticleer’). The canopy shape and size of these trees allows key view corridors to be remain unobstructed through these connector streets which link linear open spaces.
- **Green Links and streets:** These streetscapes connecting Neighbourhood Parks to Googong Common and Googong Dam Foreshore Buffer will be highlighted by Brachychiton ‘Jerilderie Red’ (Kurrajong), Red Box (Eucalyptus polyanthemus) and Narrow-leaved Black Peppermint (Eucalyptus nicolii) along the 7m street verge adjacent NP04.

- **Local Streets:** Within the residential areas, the planting has been varied to create a diverse palette of street characters to ensure complimentary texture and form, provide summer shade, autumn colour and spring blossom.
- **Village Centres:** The public edges for the Village Centres shall have more advanced tree species to define key entries and pedestrian crossing points, Groundcover planting is to be used in combination with street furniture to create attractive streets with pockets of public seating and outdoor cafe areas. Safe pedestrian crossing points shall be highlighted using planting, kerbs, signage, furniture, level changes and linemarking. .
- **Laneways:** A mixture of species will add interest and diversity to these smaller scale streets, with understory planting incorporated where possible to create habitat and make these green, pedestrian friendly spaces.



Existing Beltana Avenue tree planting



Existing Local streets tree planting



Character image - village centres

05 Open Space



- 1 Googong Common Upper Montgomery Creek
- 2 Sport fields
- 3 Town Centre / Neighbourhood centres
- 4 Neighbourhood park
- 5 Local park
- 6 Hill 800
- 7 Googong Dam Catchment Protection Reserve
- 8 Road buffer corridor
- 9 Multipurpose centre
- 10 Neighbourhood community facility

Figure 5.1 Googong Township Open Space VPA Commitments (extract from NH345 Structure Plan)



Figure 5.2 NH345 Landscape Masterplan

5.1 Open Space Principles

The following key principles have been used to underpin the design of the open spaces:

- Establish an open space system which caters for and supports the development of Googong Township;
- Create safe public open spaces, with appropriate level of passive surveillance;
- Provide for a variety of recreational and sporting opportunities in close proximity to all residents;
- Provide spaces for community expression and engagement;
- Open space areas to integrate and celebrate stormwater management and environmental strategies;
- Enhance ecological function within Googong through the provision of native fauna habitat and the re-establishment of significant flora communities;
- Respond to natural systems, protecting and enhancing areas of natural, indigenous and scenic importance and biodiversity. To identify and enhance areas of ecological society, specifically the Monaro Grassland and chain of ponds;
- Create environmental micro climates for the comfort of residents;
- Create a landscape imbued with meaning to the local community and the Monaro landscape;
- Build non-vehicular networks into and across open space areas to create effective connectivity;
- Provide safe and secure access for all users (pedestrian and cycle);
- Capitalise on key views, natural character and heritage of the site;
- Encourage appreciation of the both indigenous Googong landscape and European heritage through interpretation, protection and celebration of culture, artefacts and structures; and
- To build in sustainable use of materials and functionality.

5.2 LPA Requirements

As defined in the Structure plan and as required in the LPA, there are thirteen open spaces that have been provided within the NH2 development area. This section of the report will summarise the concept design for each of these open spaces. These spaces are:

- Neighbourhood Parks 3, 4 and 5
- Yellow Box Reserve
- Googong Common
- Local Parks 11, 12 and 13
- Green links
- Entry and Old Cooma Road buffer

The following table outlines the relevant LPA requirements and identifies what is proposed within this DA, along with explanation of any inconsistencies.

Table 1: LPA Requirements Summary Table

Element	Comments
1.03 Embellishment of Playgrounds, Sportsfields and associated Recreational Facilities	
Sportsfield 7 (located in Googong Common) Sportsfield 7 (located in Googong Common) Double soccer field (100x76) co-use with Rugby League (122x68), irrigation and floodlighting. Amenities building, spectator seating and car parking.	<ul style="list-style-type: none"> Single Soccer field Athletics Track provided in lieu of the Double soccer field. Amenities to be co-located with Community facilities as 1 building. Irrigation, flood lighting, spectator seating and car parking provided.
Element	Comments
1.06 Embellishment of Googong Common	
The Developer is to embellish open space in Googong Common generally consistent with that described in the LOSS, specifications including:	
- Feature entry area to include paved access, arts and signage elements, shelters, feature planting, major water feature and access to creekline and carparking.	<ul style="list-style-type: none"> Provided in NH2
- Hard landscaping to include share path, bush track and multi use trail networks with lighting, bicycle racks, pedestrian access paths with pedestrian lighting, access to creekline and pedestrian bridges (6) across creekline, wayfinding signage and arts elements, benches, water bubblers, bins and carparking.	<ul style="list-style-type: none"> share path, bush track and multi use trail networks with lighting, bicycle racks, pedestrian access paths with pedestrian lighting, access to creekline - all provided. 2 accessible and 1 bush track pedestrian crossings provided in NH1B. 3 accessible pedestrian crossings provided in NH2. 2 accessible crossing will be provided within this DA.
- 2 x local playgrounds suitable for ages 1–12	<ul style="list-style-type: none"> These 2 x local playgrounds associated with the Common are provided within NH1B (not in this DA)
- 2 x local playgrounds suitable for ages 1–12 years	<ul style="list-style-type: none"> Local Playground 5 and 6 provided in previous DAs
- 1 x regional playground suitable for all ages	<ul style="list-style-type: none"> This will be provided within Yellow Box Reserve.

Table 1: LPA Requirements Summary Table (continued)

<ul style="list-style-type: none"> - 14 x small shelters, - 5 x small shelters with BBQ, - 4 x small shelters with interpretive signage, - 3 x medium shelter, - 4 x medium shelter with BBQ, - 3 x large shelter with BBQ 	<ul style="list-style-type: none"> • Shelters or their equivalent and BBQs have been provided in previous stages of the Common and within this DA.
<ul style="list-style-type: none"> - 1 x Community Garden 	<ul style="list-style-type: none"> • One community garden is already included in the common within the NH1A Stage 6 works. Another potential community garden site is also proposed within NH345 subject to a future DA
1.07 Embellishment of Nangi Pimble (formerly Hill 800)	
The Developer is to embellish open space in Nangi Pimble to be generally consistent with that described in the LOSS, specifications include:	
<ul style="list-style-type: none"> - Lookout structure with pedestrian access and interpretive signage. 	<ul style="list-style-type: none"> • A lookout structure to the top of Nangi Pimble has been provided in previous DA. The southern part of this connection will be provided as part of the DA.
<ul style="list-style-type: none"> - Hard landscaping to include share path network, bicycle racks, wayfinding signage, 1 x small shelter with interpretive signage, water bubbler, bins and carparking. 	<ul style="list-style-type: none"> • Due to the steep, rock terrain the share paths (2.5m wide) have been replaced with key paths (2m wide) • Bicycle racks, wayfinding signage, 1 x small shelter with interpretive signage, water bubbler, bins have been provided at the northern entry • On street car parking has been provided • Refer to NH3 Park for details of other facilities to be provided in the southern stage of Nangi Pimble
<ul style="list-style-type: none"> - Soft landscaping. 	<ul style="list-style-type: none"> • Provided
1.08 Embellishment of Neighbourhood Parks	
<p><i>Neighbourhood Park 3 (Neighbourhood 3)</i></p> <ul style="list-style-type: none"> - Hard landscaping to include pedestrian access paths with pedestrian lighting, bicycle racks, wayfinding signage and minor arts element, benches, waterbubblers, bins 1 x Neighbourhood Playground (NP03)suitable for all ages, 1 x medium sized shelter with BBQ. Soft landscaping to include feature planting at entries and general landscaping. 	<ul style="list-style-type: none"> • All elements included

Table 1: LPA Requirements Summary Table (continued)

<p><i>Neighbourhood Park 4 (Neighbourhood 4)</i></p> <p>- Hard landscaping to include pedestrian access paths with pedestrian lighting, bicycle racks, wayfinding signage and minor arts element, benches, waterbubblers, bins 1 x Neighbourhood Playground (NP04)suitable for all ages, 1 x medium sized shelter with BBQ. Soft landscaping to include feature planting at entries and general landscaping.</p>	<ul style="list-style-type: none"> • All elements included
<p><i>Neighbourhood Park 5 (Neighbourhood 5)</i></p> <p>- Hard landscaping to include pedestrian access paths with pedestrian lighting, bicycle racks, wayfinding signage and minor arts element, benches, waterbubblers, bins 1 x Neighbourhood Playground (NP05)suitable for all ages, 1 x medium sized shelter with BBQ. Soft landscaping to include feature planting at entries and general landscaping.</p>	<ul style="list-style-type: none"> • All elements included
<p>1.09 Embellishmentof Local parks</p>	
<p><i>Local Park No. 10 (NH3)</i></p> <p>Hard landscaping to include pedestrian access paths with pedestrian lighting, bicycle racks, wayfinding signage and minor arts element, small shelter (1), benches, water bubbler and bins. Car parking in adjacent streets. Soft landscaping to include feature planting at entries and general landscaping.</p>	<ul style="list-style-type: none"> • All provided
<p><i>Local Park No. 11 (NH3)</i></p> <p>Hard landscaping to include pedestrian access paths with pedestrian lighting, bicycle racks, wayfinding signage and minor arts element, benches, water bubbler and bins. Car parking in adjacent streets. Community facilities include Local Playground (LP07) and small shelter (1). Soft landscaping to include feature planting at entries and general landscaping.</p>	<ul style="list-style-type: none"> • All provided
<p><i>Local Park No. 12 (NH5)</i></p> <p>Hard landscaping to include pedestrian access paths with pedestrian lighting, bicycle racks, wayfinding signage and minor arts element, small shelter (1), benches, water bubbler and bins. Car parking in adjacent streets. Soft landscaping to include feature planting at entries and general landscaping.</p>	<ul style="list-style-type: none"> • All provided • Park to also contains WSUD 11
<p><i>Local Park No. 11 (NH5)</i></p> <p>Hard landscaping to include pedestrian access paths with pedestrian lighting, bicycle racks, wayfinding signage and minor arts element, benches, water bubbler and bins. Car parking in adjacent streets. Community facilities include Local Playground (LP08) and small shelter (1). Soft landscaping to include feature planting at entries and general landscaping.</p>	<ul style="list-style-type: none"> • All provided

Table 1: LPA Requirements Summary Table (continued)

1.10 Civic space – Embellishment of local open space	
<p><i>1 x civic space located in each of Neighbourhoods 3,4 and 5</i></p> <p><i>Hard landscaping to include feature paved access/ spaces, pedestrian lighting, minor arts and signage elements, wayfinding signage, benches, water bubblers, bins and 1 x medium shelter. Soft landscaping to include street trees, feature planting at key areas and general landscaping.</i></p>	<ul style="list-style-type: none"> Detailed design of civic spaces subject to future DA
1.11 Environmental management – Embellishment of local open space	
<p>Drainage Reserves</p> <p>The Developer is to restore the bushland generally consistent with the LOSS, comprising:</p> <ul style="list-style-type: none"> - bushland regeneration – removal of weeds/burns/soil scarification/introduced planting, or - assisted bushland regeneration – the above and replanting of species missing from the vegetation structure, or - bushland reconstruction – the above and replanting of vegetation (where little veg exists). <p>Soft landscaping to include screen planting and general landscaping of water recycling plant drainage reserve</p>	<ul style="list-style-type: none"> Googong Common riparian corridor: In most areas the Riparian Corridor (RC) –Vegetated Riparian Zone (VRZ) plus marshy meadow – is to be retained undisturbed. These areas will undergo bush regeneration to monitor weed removal, erosion control, and nominate areas where additional planting may be required. Where the RC consists of disturbed land or earthworks these areas shall be replanted in keeping with the existing plant species palette.
<p>Buffer Corridor – Old Cooma</p> <p>Generally consistent with the LOSS. Hard landscaping to include a path within open space, wayfinding signage and benches.</p> <p>Soft landscaping to include general landscaping to meet APZ requirements.</p>	<ul style="list-style-type: none"> All provided. Signage and benches provided within NH2
<p>Dam Foreshore Protection</p> <p>Generally consistent with the LOSS.</p> <p>Hard landscaping to include bush track, small shelter with 1 x interpretive signage, wayfinding signage and benches.</p> <p>Soft landscaping to include bushland restoration and general landscaping to meet designation requirements.</p>	<ul style="list-style-type: none"> Elements integrated into Yellow Box Reserve which bounds the Dam Foreshore Protection area Additional works will be part of a future DA

5.3 Entry and Old Cooma Road Buffer

Refer Drawing L16 for concept plan and details

There is one entry into NH3 from Old Cooma Road onto Bunyip Drive. There is another entry into NH4 from NH2 via Wellsvale Drive and a third across Montgomery Creek from NH1B into NH5.

The entry from Old Cooma Road is a secondary Googong Township entry and should not compete visually with the main entry in NH2. The wayfinding theming at this entry will be through landscaping such as feature trees and meadow bulb planting.

A design language based around a clear use of form and material is proposed for all the entries to establish a visual identity and orientation for the site. This will create a clear sense of arrival and departure and assist in navigation throughout Googong and will support the development of unique marketing and neighbourhood identities for these 3 precincts.

The Old Cooma Road Buffer runs south from NH2 to the southern boundary of the Googong Township, and contains a 35m wide electrical easement.

Within the easement there is a combination of planting; Plant material with a mature height of less than 3m in height is proposed within the offset areas, with small trees up to 7m tall outside these offset areas. Refer Section 6.7 Electrical Easement for more details.

A 2.0m key path will be included linking Bunyip Drive to the southern boundary road to form a circulation route.

5.4 Wellsvale, Gorman and Bunyip Drives

Refer Drawings L37- L42 for concept plans and details

There are three roads within NH3-5 of the street typology AV1, which consists of 5m verges with 2.0m key paths, on-road cycle routes, and fully planted central median swales. Wellsvale Drive is the main 'connector' street running through western Googong, linking the Town Centre with the southern 3 neighbourhoods. At the intersection of Wellsvale and Bunyip Drive, Gorman Drive commences and connects NH3-5 with NH1, crossing over Googong Common East to NH1B. These grand avenues of formally arranged exotic trees and an informally planted median continues the character established along Gorman Drive through NH1. This provides both WSUD opportunities and ecological connection through native grass planting and native tree habitat.

5.5 Village Centres

Refer Drawings L08- L15 for concept plan and details

There are three Neighbourhood Centres and associated Civic Spaces which will be the main focus of identity and community gathering for the neighbourhoods and for the whole of Googong.

The Neighbourhood Centres incorporate the commercial and retail buildings, small civic plazas and also have adjacent open spaces which will be integrated into the overall Neighbourhood Centre design to create village hearts to facilitate community interaction.

All open space elements noted below are consistent with the requirements of the Local Planning Agreement.

Key Design Principles: of the Neighbourhood Centres, Civic Spaces and associated open spaces include:

- Feature tree planting is to be integrated with the street tree strategy in terms of species and character;
- Shade will be provided in the form of a medium shelter and feature tree planting to ensure it is comfortable for year round use;
- Groundcover planting is to be used in combination with street furniture to create attractive streets with pockets of public seating and outdoor cafe areas;
- Safe pedestrian crossing points shall be highlighted using planting, kerbs, signage, furniture elements, level change and linemarking;
- Minor arts and signage elements will be included within the streetscape, plazas and open spaces to reflect upon cultural themes, integrated into signage, paving and street furniture;
- Feature paved access/spaces, pedestrian lighting, signage and wayfinding markers, benches, bicycle parking, water bubblers and bins shall be provided.
- WSUD elements such as rain gardens will be integrated where possible.

5.6 Neighbourhood Parks

Refer Drawings L18- L22 for concept plan and details

There are three Neighbourhood Parks within NH3-5. NP03 forms the southern end of the Hill 800 open space and is further characterised in section 3.7. Although each Neighbourhood park will have a distinct character appropriate to its unique location, a consistent approach will be taken to ensure the successful Googonian theming and quality is present in all.

NP04 is the largest, which is connected to both Googong Common and the Googong Dam Foreshore Buffer by a 7m streetscape verge Green Link. NP04 includes a Neighbourhood playground (designed to meet the NSW Everyone Can Play guideline, 2019) and will feature a diverse range of play experiences including nature play, traditional play equipment and gathering spaces. It will be fully fenced and be in close proximity to amenities such as toilets and change facilities.

NP05 sits within the north-east pocket of NH5 and has views across the Pink Tailed Worm Lizard Conservation Area to the north east.

All open space elements noted below are consistent with the requirements of the Local Planning Agreement.

Key design principles include:

- Provision of well-programmed places for a variety of appropriate activities;
- To use terracing, landform and planting to deal with level change and ensure safe boundaries with adjoining roads where applicable;
- Creation of several playspaces for a range of ages that provides a variety of challenges and also works as a sculptural / visual element in the landscape;
- Hard landscaping to include a shared path with lighting, bicycle racks, pedestrian access paths with pedestrian lighting, wayfinding signage, benches, water bubblers, bins, small and medium shelters with barbeques;
- Soft landscaping to include feature planting at entries and general landscaping;
- Minor public art elements are to be integrated into the spaces which may be a stand alone sculpture or integrated into built elements / furniture;
- WSUD elements may be integrated within the parks as swales, raingardens and bio-retention basins.

5.7 Local Parks

Refer Drawings L27-L34 for concept plan and details

There are four local parks located across NH3-5. Small parks can provide valuable amenity if suitably located and designed into the streetscape and provide a moment of respite within the suburban street form. They are critical in developing a sense of place and orientation within the neighbourhoods.

All open space elements noted below are consistent with the requirements of the Local Planning Agreement.

Key design principles include:

- Hard landscaping to include pedestrian access paths with pedestrian lighting, bicycle racks, wayfinding signage and minor arts element, one small shelter, benches, a water bubbler and bins. Car parking will be provided in adjacent streets;
- Soft landscaping to include feature planting at entries and general landscaping; and

There are three local playgrounds, with LP10 and LP11 in NH3 and LP13 in 5, which would draw on the unique natural features of their respective sites, including any existing trees to be retained to create exciting everyday play opportunities with a focus on nature play experiences and materiality.

5.8 Nangi Pimble (South)

Refer Drawings L18-19 for concept plan and details

As the highest elevation point on the site, Hill 800 occupies a dominant position. It is visible from most of the Googong site and 360 degree views extend in all directions from its summit. Neighbourhood Park 03 forms the southern section of the Hill 800 open space. This provides a key open space link between NH3 and the NH2 Town Centre, supplementing the primary open space corridor through Googong Common.

Key design elements include:

- Neighbourhood playground with creative use of the topography, theming based on the ecological/geological aspects of this unique site and which captures key views over southern Googong;
- The regeneration of native grasslands and re-establishment of Glossy Black Cockatoo habitat.

5.9 Yellow Box Reserve

Refer Drawings L23-L26 for concept plan and details

Yellow Box Reserve will be an open space that is focussed on the retention and regeneration of the existing Yellow Box Woodland plant communities. The majority of this space will remain undisturbed, with existing trees retained and grassland unmown. Key elements within this regeneration area include:

- A series of low key paths and trails to provide access through the site
- Small seating areas to pause and rest
- Interpretive signage
- A small number of regenerative Box Gum tree plantings including *Eucalyptus blakelyi* (Blakely's Red Gum), *Eucalyptus dives* (Broad-leaved Peppermint), *Eucalyptus melliodora* (Yellow Box), *Eucalyptus nortonii* (Norton's Box) and *Eucalyptus polyanthemus* (Red Box).

A Regional Playground is proposed to be located on the northeast edge of the reserve. This will be themed around farming and sheep shearing and will contain the relocated Shearing Shed, which we are proposing to repurpose as a play structure - refer Section 6.8 for more detail of this. This regional playground will contain the following elements:

- Repurposed Shearing Shed
- Play features relating to farming and sheep shearing
- Shelters with seating, BBQs, bubblers, bins and bike racks
- Associated 90 degree on street parking
- Planting that is responsive to the local indigenous ecology
- Wayfinding signage

5.10 Googong Common and Drainage Reserve

Refer Drawing 35-36 for concept plans and details

The Common will provide a range of recreational activities, predominantly:

- A network of footpaths, bridges and cycleways connecting to the rest of the Common and creekline including share paths and bush tracks with lighting at key crossing points;
- Seating shall also be provided at regular locations along the proposed path network to offer rest stops and viewing opportunities;
- Signage elements will be located at neighbourhood entry points and other locations to assist with orientation and interpretation; and
- Public art will be a subtle feature of the corridor, with small art pieces throughout Googong Common (South). These may be sculptures in their own right or may also perform other functions such as informal play elements, bridge structures, balustrades or be integrated into paving / street furniture.

The Drainage Reserve within the Common addresses stormwater quality, waterway stability and vegetation irrigation and includes the Montgomery Creek riparian corridor.

Montgomery Creek is the major watercourse on the site and flows through a broad floodplain from the southern boundary of Googong to a clearly defined waterway in the north eastern corner. Within the Common the creek has a swampy, chain of ponds character. The stream classification is 2nd order – VRZ width 20m (Office of Water Guidelines 01/07/2012).

Along the northern edge of Neighbourhoods 4 and 5, a tributary of Montgomery Creek wraps around the southern edge of Montgomery Rise. Limiting disturbance to this existing landscape to key crossing points only, with a shared path linking NH4 and 5 Neighbourhood Centres with Googong Common to the west and NH1 to the north, is important.

5.11 Linear Parks and Green Links

Refer Drawings L43-44 for concept plan and details

The open space elements of linear parks and green links provide transition and connectivity. Often flanked by residential lots to both sides they are well defined and controlled areas, but provide a critical functional and aesthetic role. There are a number of linear parks and green links spaces that help to connect the key open spaces within Googong NH3-5. Other local parks have been located to ensure preservation of particularly significant trees, such as those along the southern boundary of NH3, and maintain and enhance significant view corridors, such as in NH5 linking the rural residential lots to the Googong Dam Foreshore Buffer.

Key Design Principles:

- Retain significant existing trees (individual or clusters) to ensure mature trees are present in the newly constructed parks, and to retain any habitat value which can be retained through the construction process. Green links are key to maintaining these habitat corridors for the safe movement of flora and fauna, including the 7m street verge adjacent Neighbourhood Park 04, linking Googong Common to the Googong Dam Foreshore Buffer.
- Maximise ecological functionality through planting of endemic species;
- Celebrated within streetscape profiles to enhance character and perception of open space;
- Linear parks may link neighbourhood and local parks and other key community focal points into the continuous
- Facilitate overland flow requirements;
- Integrate non-vehicular circulation to increase safety and connectivity; and
- Celebrate, enhance and frame important internal and external views and vistas.

06 Key Issues

6.1 Stormwater Quality

The WSUD elements proposed within NH345 address stormwater quality, waterway stability and irrigation.

Bioretention systems will be used to treat stormwater to best practice standards. Detention areas and stormwater harvesting will be used to limit post-development changes in flow rate and flow duration for the protection of receiving environments. This is critical for the protection of the terrestrial and aquatic environments north of the site, particularly in limiting the impacts of urban development on the channel bed and minimising bank erosion.

Early installation of WSUD elements is proposed, to ensure minimal impact of construction works on the creek corridor.

6.2 Detention

Changes to the natural catchment hydrology resulting from urbanisation will be managed through flood detention and high flow attenuation. Attenuating peak flows and the duration of high flow discharges mitigates the erosive effects of high flow events, particularly on the bed and banks of watercourses and associated vegetation. The area to the south of the Montgomery Creek road crossing will have both ecological and hydrologic function within the landscape, whilst providing amenity and serving an aesthetic function.

All drainage reserves have been designed to manage 1 in 1 year Average Recurrence Interval (ARI) peak flows and flow duration targets for waterway protection as well as providing 1 in 100 year ARI flood protection.

6.3 Integrated Water Cycle Management

Googong's proposed Integrated Water Cycle Management Plan (IWCMP) aims to target greater than 60% saving in potable water use and up to 80% recycling of waste water.

Recycled water will be used for the irrigation of Sportsfield 7 and key open spaces.

6.4 Riparian Corridor

Creek Classification

The section of Montgomery Creek within NH2 is a 2nd order watercourse. This requires A VRZ of 20m either side of the channel. This will give a total RC width of 40m, plus the channel width.

Allowable Works and Activities

For a 2nd order creek the following works are allowed:

- RC offsetting for non RC uses (such as Asset Protection Zones) within the outer 50% of the VRZ;
- Cycleways and pathways within the outer 50% of the VRZ;
- Online detention basins (temporary flood detention only);
- Detention basins within the outer 50% of the VRZ;
- Stormwater outlet structures and essential services; and
- Any road crossings.

Chain of Ponds Concept

There is no one defined channel within the chain of ponds section, rather a swampy meadow with many smaller ponds linked by numerous channels, and a clearly defined flood zone. The following key principles will be applied:

- Wherever possible the existing swampy meadow is to be retained undisturbed. As it is difficult to determine the exact 'top of bank' location due to the flat terrain, the extent of *Carex aplessa*, which grows in the more boggy areas has been used to indicate the existing extent;
- Where it has been unavoidable for earthworks to encroach into the channel (swampy meadow) in the northern part of the Common, these areas have been offset by providing new areas of replacement habitat within the creek bed. Due to the change of hydrology of the creek, it may be worthwhile to monitor the water flow after the earthworks have taken place to see what path the water naturally takes before new planting occurs;
- Where it has been unavoidable for earthworks to encroach into the VRZ (in the northern part of the Common) these areas have been offset with new areas of riparian vegetation; and
- The adjacent bioretention basins and batters (outside the RC) will all be planted with indigenous species, in keeping with the existing riparian corridor. This will extend the habitat and create a buffer between the sporting / recreation facilities and the RC.

Landscape Treatment

Where possible, existing vegetation within the Montgomery Creek Riparian Zone will be retained to act as the final nutrient removal defence within the creek system. Upstream of the existing vegetation new plantings will occur within the planned stormwater treatment systems employed along the creek. Within the chain of ponds area we are proposing to maintain as much as possible the existing open character with low native grasses, with any trees scattered and limited to the edges. The proposed earthworks surrounding the RC

will result in a significantly altered hydrological system for Montgomery Creek. This will affect the way that the water moves through the creek and may result in altered areas of swampy meadow. The chain of ponds ecosystem will be monitored through a bush management / regeneration strategy to monitor these changes and assess the need for weed removal, erosion control and any required areas of additional planting. Any areas requiring erosion control due to basin outlets etc. shall be carefully designed using site sourced boulders and be interplanted to minimise an overly engineered appearance.

Some bunds existing within the RC will need to be removed to allow water flow; however, where possible these and their associated pools will be retained.

Project experience indicates that the establishment of planting within bioretention basins should occur at a time when the home building phase of the project is well advanced. This allows for the future basins and wetlands to be utilised as temporary sediment & erosion control ponds as protection against the poor practices of home builders. When the catchment is relatively stable the temporary basins will be cleaned and properly established, which should result in a successful and efficient nutrient removal system. GTPL will work with QPRC at DA & CC phase to determine the best stormwater management approach and the appropriate time to establish biomass plantings.

It is intended to use the 2.5m share path in most places to define the edge between the riparian corridor and adjacent recreational areas. Crossing points over the RC have been provided as per the VPA. These shall be boardwalks where required to minimise impact on the vegetation, and shall also utilise existing farm tracks or bunds in places.

Any Aboriginal heritage items located within the RC will be collected and buried either in an appropriate place within the RC or elsewhere on site. *Refer Section 6.9 Heritage.*

Refer to Spiire Documentation package for details of Riparian Corridor proposed offsets and WSUD basins.

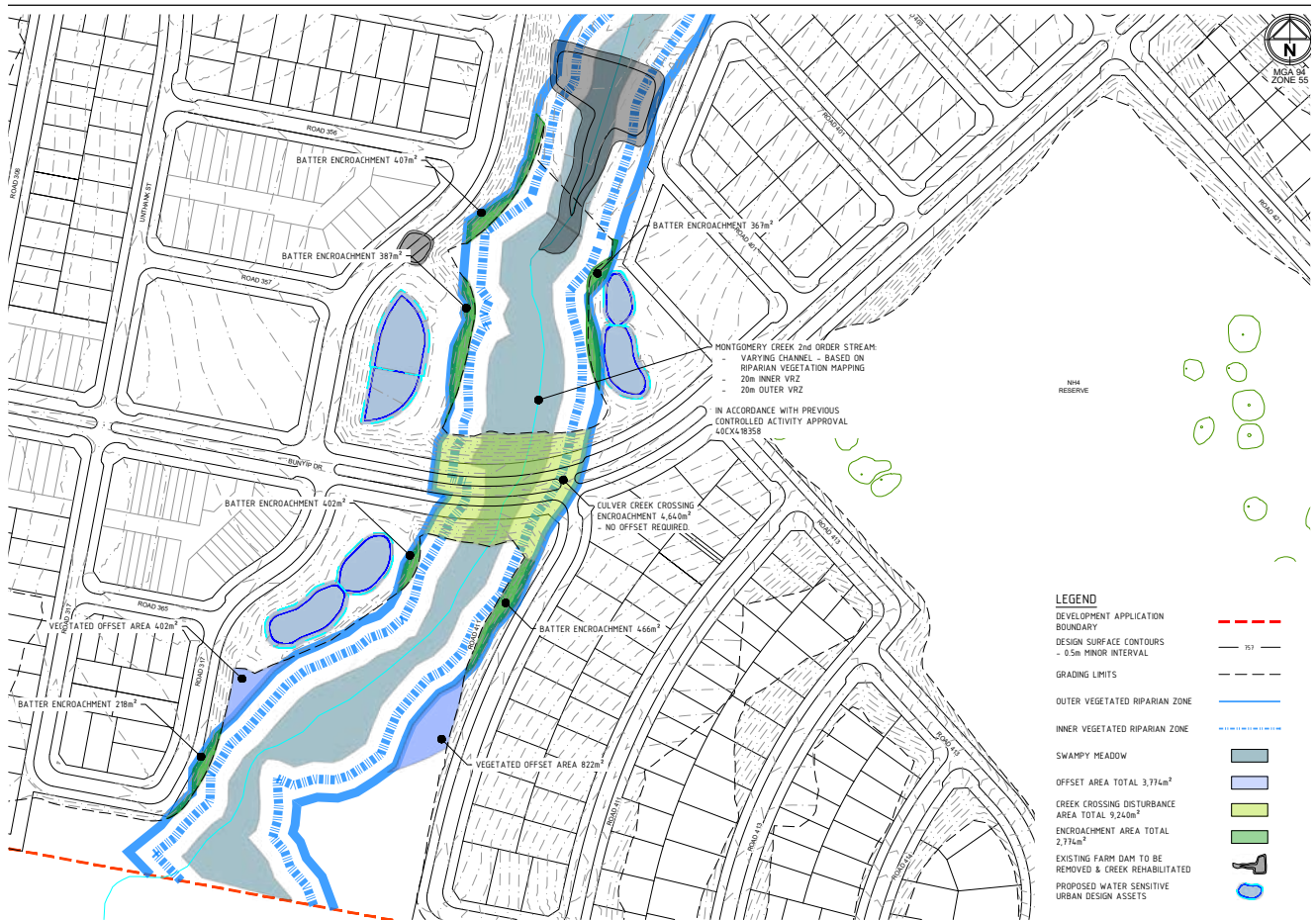


Figure 6.1 Riparian Corridor - Extract from Spiire Civil engineering drawings

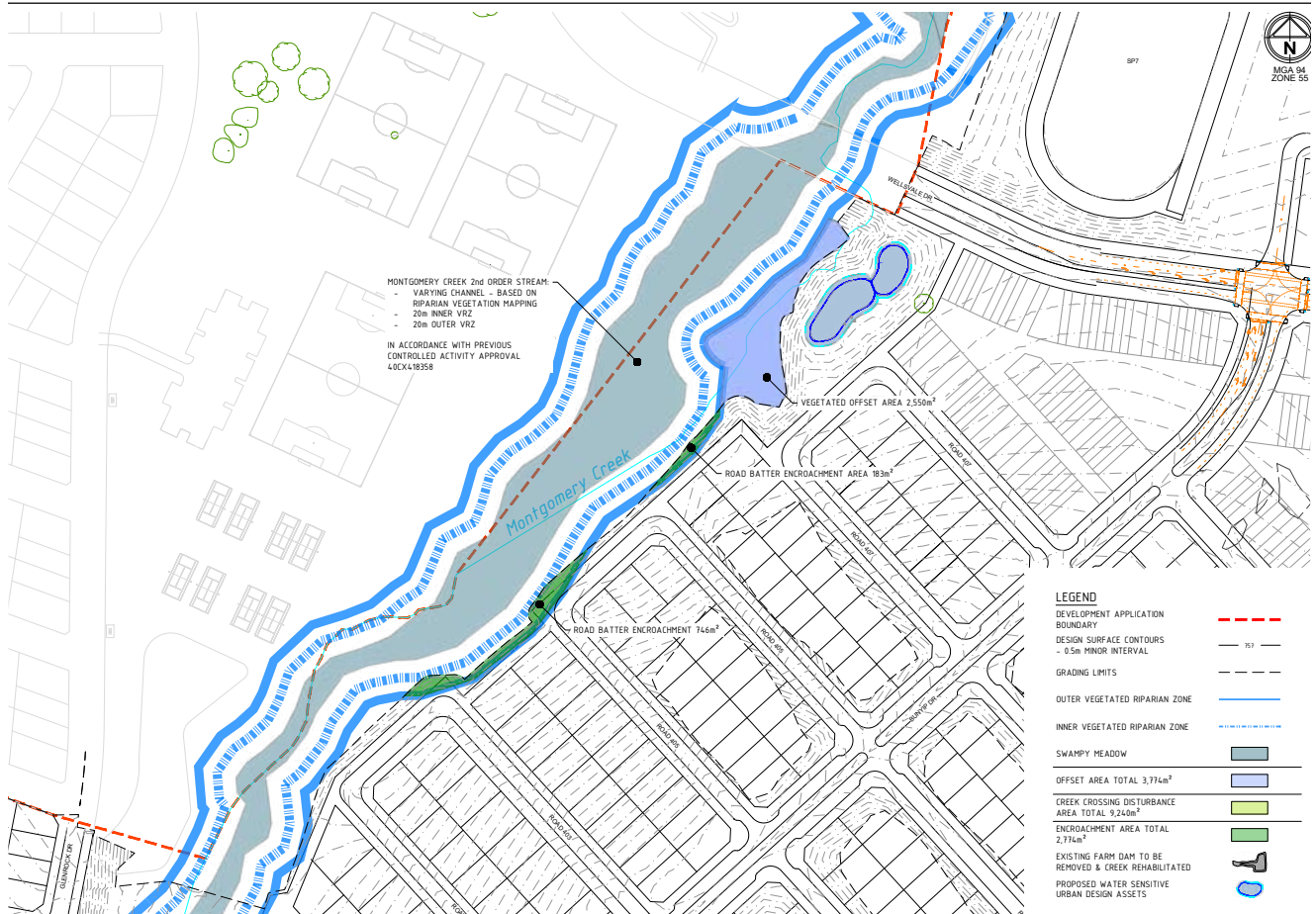


Figure 6.2 Riparian Corridor - Extract from Spiire Civil engineering drawings

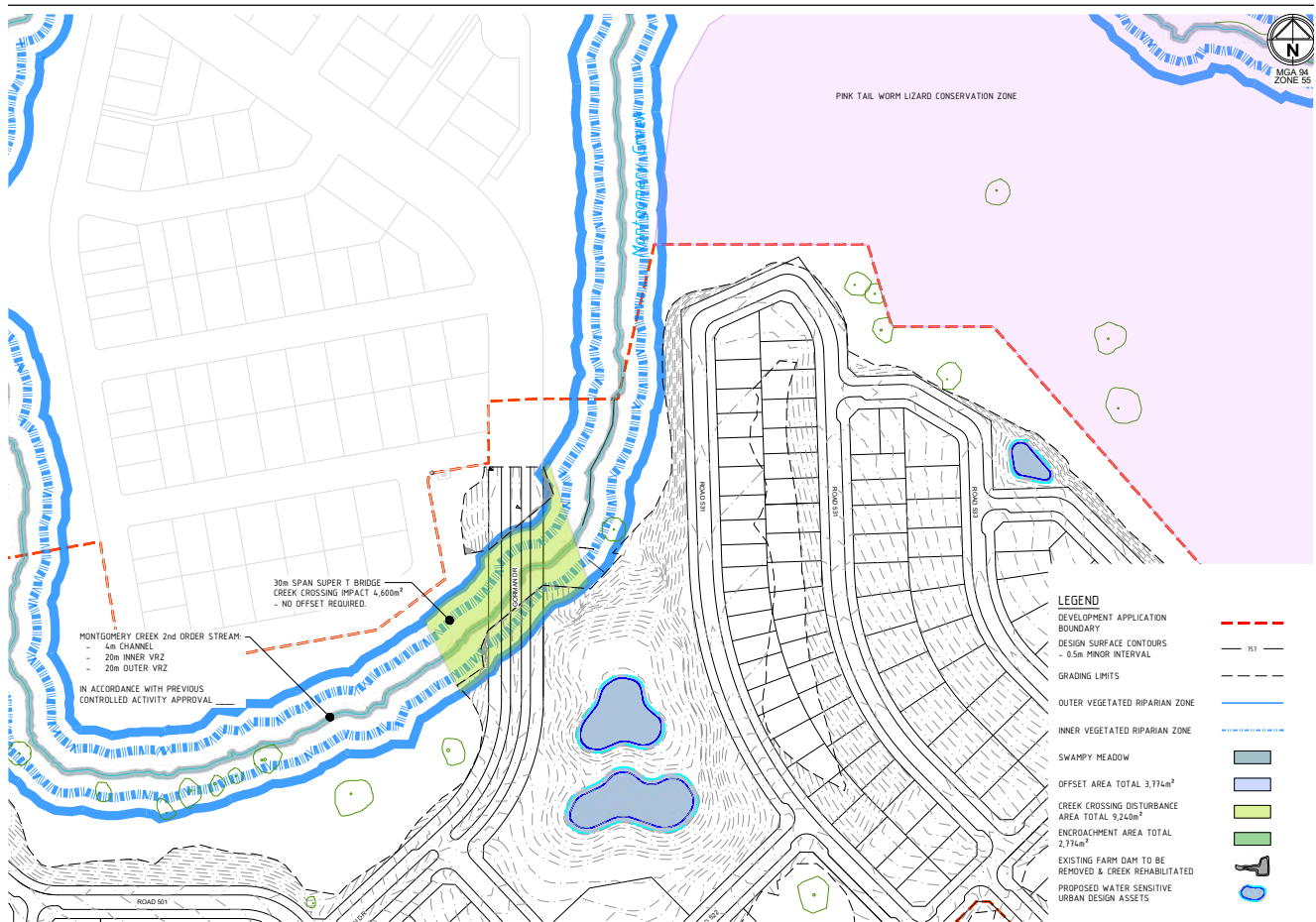
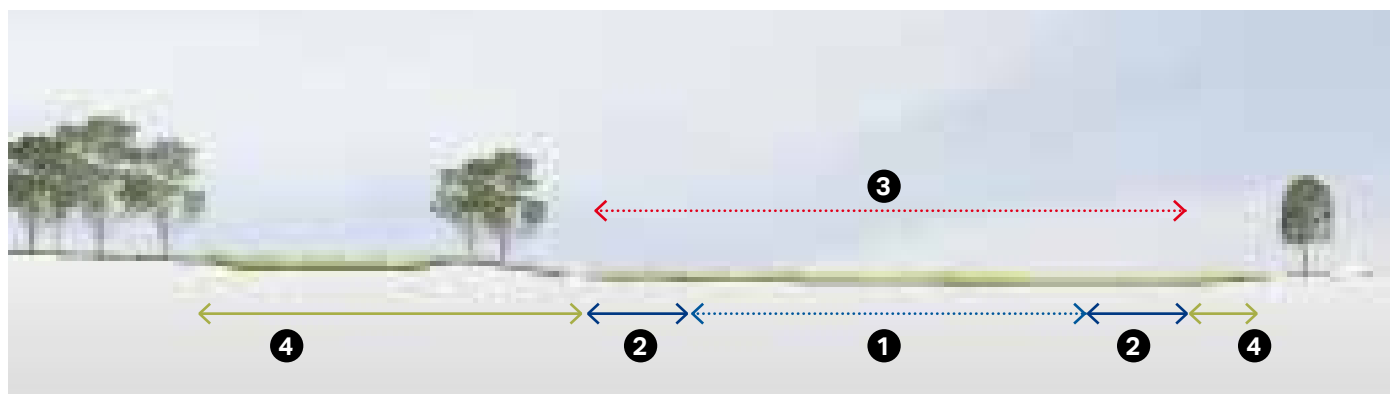


Figure 6.3 Riparian Corridor - Extract from Spiire Civil engineering drawings



- 1** Watercourse / chain of ponds swampy meadow
- 2** 20m Vegetated Riparian Zone (VRZ) each side (total 40m)
- 3** Total Riparian Corridor (RC)
- 4** Adjacent native planting to batters / bioretention basins

Figure 6.4 Typical section - Riparian Corridor

6.5 Car Parking Provision

Car parking will be provided generally in accordance with QPRC DCP Section 2, which states the following objectives:

- Car parking is to be provided on-site which will cater for the increased demand brought about by the development of the site;
- Adequate car parking for people with disabilities;
- The provision of car parking which is functional, safe and attractive;
- Functional loading and unloading facilities are provided to cater for the development of the site; and
- The construction of car parking areas, service areas and associated areas to be in accordance with good engineering practice.

Sportsfield 7 and NH4 Village Centre: Car parking to service the sport and recreation facilities within these areas has been provided as a combination of off street car parks, and on street indented parallel parking. A total of 92 spaces will be provided of which 4 will be accessible - refer Figure 6.5 below.

NH5 Village Centre: 17 on street 90 degree parking spaces of which 2 will be accessible .

Yellow Box Reserve: Adjacent to the proposed Regional playground there is proposed to be on street 90 degree parking which will provide 28 spaces, 2 of which will be accessible.

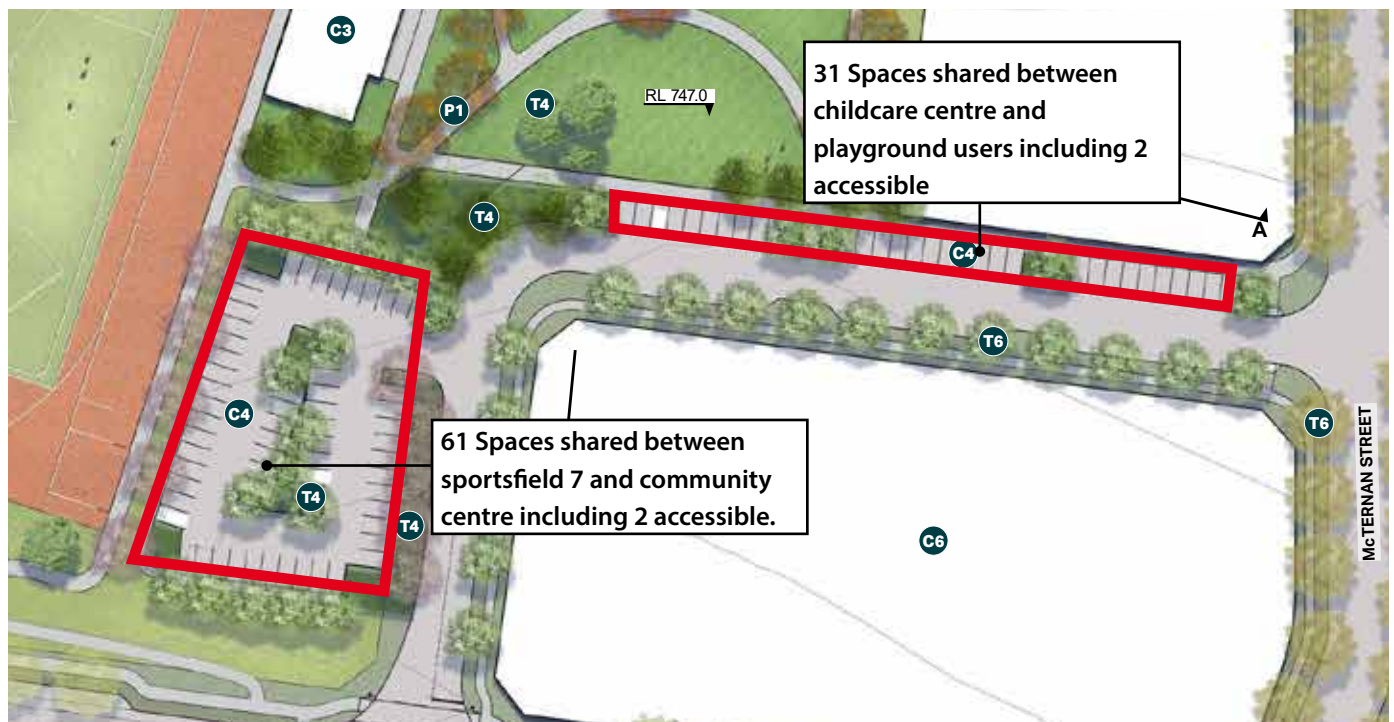


Figure 6.5 Off street parking provision - Sportsfield 7 and NH4 Village Centre

6.6 Lighting

Lighting shall be provided within the proposed open spaces to ensure that they are safe and accessible for the community to enjoy. Lighting levels provided shall be in accordance with AS/NZS 1158. The main categories shall be:

- Key connections and links within parks, where the street lighting does not provide adequate illumination;
- Feature lighting to plazas and other focal elements;
- Floodlighting to sportsfields
- Lighting to off street parking areas.

Lighting shall be designed in such a way as to ensure that glare into neighbouring properties meets the relevant Australian Standard.



Figure 6.6 Concept lighting strategy - Googong Common

6.7 Electrical Services Easement

Electricity will be provided to the Googong Development by an expansion of the Essential Energy electricity network, which will include the installation of medium voltage (132 kv) and low voltage (11kv) electricity supply mains within the Googong Development by GTPL and the construction of the Zone Substation on the Substation Site by Essential Energy. These supply mains are located in an electrical services easement running along the eastern side of Old Cooma Road.

The easement within NH345 is 35m wide and has a 132 kv overhead transmission line and 11kv below ground cable. Within this easement the planting will be dryland grass, with patches of shrubs (max height 3m) and trees (max height 7m) located min 4m away from 11kv cable to screen adjoining back fences. All taller trees will be located outside the easement.

Refer figure 6.7 for typical section.

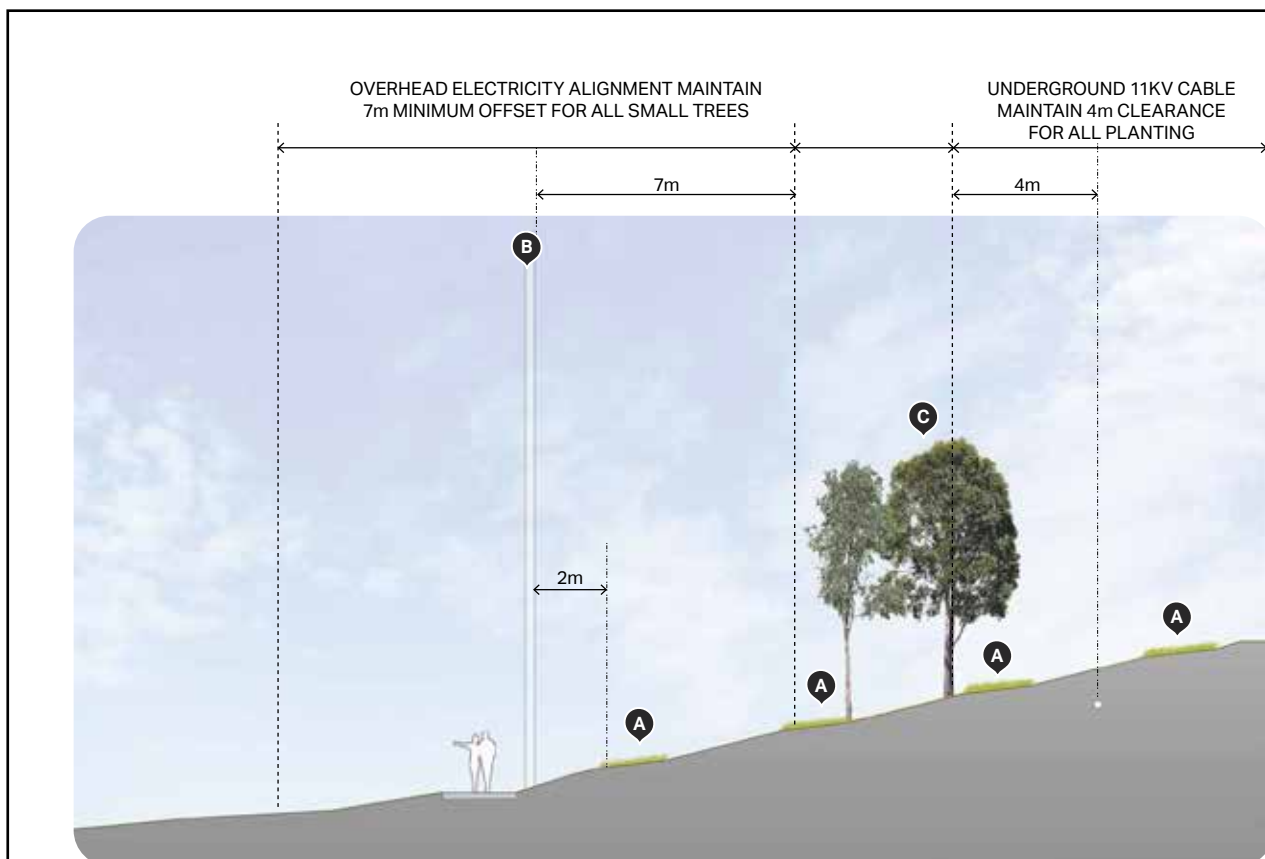


Figure 6.7 Electrical easement typical section

6.8 Heritage Items

Aboriginal Cultural Heritage:

The Montgomery Creek corridor was an important resource for prehistoric groups, with its watercourses, ephemeral creeks and small ponds. The geology of the region also provided a plentiful supply of stone, suitable for tool making. These site assets, along with the close proximity of a variety of ecological zones, made the Googong area suitable for the needs of hunter-gatherer groups.

A number of Aboriginal sites have been found across the NH345 site - refer *Googong, Neighbourhood 3-5 Aboriginal Cultural Heritage Assessment (Navin Officer)*. Some of these sites fall within the undisturbed areas of the riparian corridor of Montgomery Creek.

The GNH3-5 ST01 Scar Tree has been retained within the development, however will not be highlighted through signage. Where sites exist within open spaces care will be taken during the design process to ensure that they are undisturbed.

The Shearing Shed:

Refer Drawings L24 - L26 for concept plan and details

It is proposed to relocate the existing Shearing Shed to a new location within Yellow Box Reserve, and adapt

its structure to enable it to be used as a play element. It will be located within a wider playground themed around farming and sheep shearing and showcasing the European history from the local area. The intent is to keep the overall character and materiality of the building both internally and externally, with much of the internal structure, floors and machinery retained or reused. It is proposed that the overhead gear be kept in its original state but be made safe. Additionally, it is proposed that the wool press be kept and located in a corner of the shed excluded from direct interaction but showcased in a way that could be viewed for educational purposes.

It is proposed to add some skylights to the roof structure, and new external elements would be low maintenance materials such as modwood or steel.

Unsafe areas will be removed, with new openings provided within the walls to facilitate access and connect the shed to the surrounding playground. The internal space is proposed to be split level with an upper level that focuses on the sheep chute slides, and a lower level sand play area. Access into the upper area will be via generous steps or a new accessible ramp, with 3 slides that reference the existing chutes. The original timber floor will be retained here, with seating, sculptural sheep play and fun interpretive signage relating to sheep shearing. The lower level sand play area will be at grade with the surrounding area and include an accessible raised sand playtable as well as other sand play activities.



Figure 6.8 Shearing Shed Artist's Impression

6.9 Ecology

During the Structure Plan phase of the NH345 Masterplan, careful consideration was given to the shaping and sizing of open spaces and green linkages in order to preserve some of the better trees on the site. The trees shown for retention are generally of exceptional, high or medium value, and treatment of the surrounding landscape aims to give them best chance of long term survival. On Nangi Pimble and in Yellow Box Reserve some of the poorer quality trees have also been shown for retention due to their habitat potential.

The open spaces and site grading have been designed to avoid any change to existing ground levels within the dripline of the existing canopies and to minimise disturbance to tree roots. All trees shown for retention shall be protected and fenced to the full extent on the canopy to avoid compaction of the ground or damage to the trunks.

The following principles as outlined in *Googong NH2 Flora and Fauna Assessment (Capital Ecology)* will be followed where appropriate:

- Local native species to be used for landscaping to the fullest extent practicable;
- Where practicable and appropriate within open space areas, all strata will be re-established (i.e. groundcover, midstorey shrubs, and canopy trees) to create habitat complexity. This will discourage urban adapted species and encourage small woodland birds to visit the neighbourhood. Open space plantings will where possible and appropriate comprise species appropriate for the applicable original plant community type;
- Wetland areas and marshy meadow to be planted with a buffer of restored woodland (with planted Yellow Box and Blakely's Red Gum) or grassland, and if possible contain island habitat inaccessible to cats and foxes. Such design features will encourage visitation, and potentially breeding, by waterbirds; and

- Interpretive signs shall be located in key areas educating the public on the valuable native flora and fauna being conserved within the Googong open space network. Key areas suitable for specific habitat creation and existing trees to be protected and retained within the development are shown on *Figure 6.7. Tree Retention Plan*.

6.10 Asset Protection Zones

All asset protection zones (APZs) are accommodated within road reserves, apart from:

- Along the southern edge of the development, where a temporary APZ will be provided.
- Along the boundary adjacent to the Pink Tailed Worm Lizard conservation area, where an APZ is located between the road reserve and the PTWL fencing as indicatively shown on Figure 6.7.
- Refer *Bushfire Assessment Report by Ember Bushfire Consulting*.



- ❶ Proposed fully structured Glossy Black Cockatoo habitat
- ❷ Existing marshy meadow habitat - protected and enhanced
- ❸ Proposed wetland and ephemeral habitat
- ❹ Restored woodland species to the edge of riparian corridor and open spaces
- ❺ Restored woodland species to Old Cooma Road buffer zone
- ❻ Yellow Box Woodland preservation and restoration reserve
- temporary bushfire APZ
- bushfire APZ not accommodated within road reserves

Note: Existing trees to be retained shown in dark green

Figure 6.9 Tree Retention / Ecology/ Bushfire Plan

6.12 Maintenance

The long term maintenance of the streets and open space areas by QPRC have been carefully considered during the design process. The following key principles are:

Open Space: To create parks and open spaces that require minimal ongoing maintenance. Large areas of shrub planting that require high ongoing maintenance costs have been avoided, with planting beds restricted to high profile areas or areas of high public use. Predominantly tree planting is proposed to create valuable and attractive spaces in the long term.

Street Trees: Species have been selected to ensure their site suitability in terms of climate and soil, as well as their potential to cause disturbance to footpaths and underground services. Root barriers are proposed for species with potentially damaging root systems.

Riparian Corridor and Bioretention Elements: The following design concepts will assist in the long term maintenance of these areas:

- Mown batters will be at a maximum grade of 1 in 4;
- All groundcover species proposed have low maintenance and low water requirement, known to perform well in this landscape;
- Where possible the paths will act as a management edge between the managed recreational areas and the riparian corridor;
- The plant densities for the bioretention areas need to be high enough to reduce weed competition. If plant densities are reduced, required ongoing maintenance for infill planting and weeding will be increased;
- Once surrounding development occurs then there will be changes to the hydrological flows that may cause additional erosion within the chain of ponds area and the incised valley. This will need to be monitored and addressed as required using planting or other means; and
- It is the intention to allow the chain of ponds area and

the incised valley areas to regenerate naturally, which will happen once grazing has been removed from the land. This will need to be monitored to ensure that the tree canopy does not exceed that allowed under the Bushfire classification for 'Grassland'.

Management of Sedimentation Basins During

Construction: The sedimentation and bioretention basins will be used as detention basins during the civil construction period. During this period, the civil contractor will flocculate the sediment-laden water and test the water to ensure it meets ANZEC guidelines prior to releasing the water into the environment. The Civil contractor will aim to keep the water level no greater than 40% of the overall pond capacity while under construction. In some cases the civil contractor will build up the embankments during the civil construction period thus enabling greater holding capacity.

Once the civil contractor has completed the construction of a particular stage, they will reduce the embankments to design levels, but will leave the pond without the bioretention material. GTPL will take over management in the same manner until 90% of housing within the stage is complete (generally 2 – 4 years). At this point GTPL will engage a contractor to remove the sediment sludge and install bioretention material and plants.

Appendix A

Plan package