

Draft Marrangaroo Development Control Plan

Lithgow City Council

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Part A Introduction



Figure 1: Land and development to which this DCP applies

1. About the Development Control Plan

1.1 Commencement

The Marrangaroo Development Control Plan (DCP) commences upon adoption by Lithgow City Council.

Adopted Date: TBA

1.2 Objectives

The objectives of the Guide are:

- To guide the development of the Marrangaroo urban release area and employment lands, north of Lithgow.
- To promote a high quality environment with a diversity of housing, employment and recreation opportunities

1.3 Land and development to which this DCP apply

The Marrangaroo DCP applies to the Marrangaroo Urban Release Area and adjacent IN1 General Industrial land use zone as outlined in Figure 1.

1.4 Relationship to other documents

The Marrangaroo DCP was produced alongside the Marrangaroo Master Plan, which expresses the overall vision for the precinct. The Master Plan forms the basis for the DCP and it's primary components are outlined and referenced throughout this document.

This land to which this DCP applies falls under the Lithgow Local Environment Plan (LEP). The controls within this DCP provide additional controls to those outlined within the Lithgow LEP, and satisfies the provisions of Part 6.3 Development Control Plan of the Lithgow LEP.

2. How to use this DCP

1.1 How the DCP applies

The DCP must be considered for development where a development application is required for:

- Subdivision, buildings and/or works in the areas indicated in Figure 1.
- Advertising signs in the area indicated in Figure 1.

The guidelines only apply to existing, developed properties when a development application is required for alterations or additions, or to redevelop the site.

Development applications for development associated with the continued use of a residential dwelling in the applicable zone are generally not subject to the requirements of the guidelines. However the guidelines do apply for permit applications for development or use of former dwellings now used for commercial purposes.

1.2 How the DCP is structured

The DCP is structured as follows:

Part A - Provides the overall objectives for the guidelines and instructions on how they apply and should be used.

Part B - Provides guidelines for subdivision applications.

Parts C,D & E - Provides guidelines for buildings and works and signage permit applications, organised by development type.



Figure 2: How to use this document

3. The Approvals Process

3.1 Approvals Process

Most types of development require a development application to be lodged with Council prior to any works commencing,

Types of development that may need a development application include:

- New buildings and structures
- Alterations and additions to existing buildings
- Most types of change of use of existing buildings or premises i.e. residential to commercial
- Demolition of dwellings, heritage items or buildings in heritage conservation areas
- Alterations or additions to heritage items or buildings in heritage conservation areas
- Subdivision of land
- Strata title subdivision of buildings
- Advertising signs
- Earthworks, filling and clearing

Where construction activities are proposed as part of a development, a Construction Certificate will also be required. This can relate to buildings as well as subdivision construction (eg roads and services). The Construction Certificate may be issued by either the Council or a private certifier.

3.2 Making a Development Application

To make a development Application, follow these 6 steps:

- 1. Enquire with the Environment and Development Department about Council's Local Environmental Plans, policies and codes.
- 2. Consider all the design issues.
- 3. Prepare your plans and drawings.
- 4. Prepare your Statement of Environmental Effects.
- 5. Complete the Development Application Form.
- 6. Follow the lodgement instructions.

Each of these steps, plus additional information on lodging a Development Application, are clearly explained in Lithgow City Council's Development Application (DA) Guide, available on Council's website:

http://council.lithgow.com/development-application-guide/

3.3 Marrangaroo DCP and Master Plan

As part of the approvals process for the Marrangaroo Precinct, it must be able to be shown that the proposed development has considered the controls and objectives of the DCP and Master Plan.

Development is to be generally in accordance with the Master Plan design and intent as per this DCP. Legislative requirements and the written controls in this DCP take precedence over the Master Plan structure. Council accepts no responsibility for any survey inaccuracies in the Master Plan. Nothing in this plan overrides, supersedes or replaces any easement, covenant or other restriction which may exist on the title of any given property. In the event of a conflict between title requirements and the Master Plan, title requirements shall prevail. Where there are no matters arising from the property title or site survey, it is expected that proposals generally reflect what is shown in the Master Plan and Guide.

The decision to consider changes to the Master Plan will be considered by Council on a case by case basis and subject to Council's satisfaction that the proposal meets or exceeds the Master Plan and DCP aims and principles.



- Village Centre with retail and community facilities
 Planted setback to the highway
- 4. Industrial lands
- Enterprise Corridor
 Sewer pumping station
- Planted setback to the highway
 6.
 Sev

 Entry points from the highway
 7.
 Ope
 - 7. Open space corridor
- 8. Residential lots
- 9. Large residential lots
- 10. Electrical easement

Figure 3: Marrangaroo Master Plan

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4. Desired Future Character

4.1 The Vision for Marrangaroo

"Marrangaroo will be a new urban village that will provide housing, amenity, recreational and employment opportunities to a diverse range of residents and visitors, while promoting sustainability initiatives and maintaining the semi rural and natural qualities of the site."

4.2 Marrangaroo Master Plan

The Master Plan is informed and underpinned by a thorough understanding of the site's natural attributes and special qualities, its contextual relationships to surrounding land uses and by the desire to realise the vision for the Marrangaroo precinct as described above.



- 3. Electrical easement
- 4. Open space and drainage corridor
- 5. Sewer pumping station
- 8. Enterprise Corridor
- 9. Planted buffer
- 10. Shared path
- Figure 4: Marrangaroo Master Plan Northwest

- 13. Neighbourhood park
- 14. Village Centre
- 15. Gas easement



- 1. Industrial Lands
- 2. Planted buffer

- 6. Waterways through large lots Electrical easement
- **Residential lots** З.
- 7.
- Open space and drainage corridor 4.
- 5. Large lot residential lots
- Village Centre 8.

Figure 5: Marrangaroo Master Plan - Northeast



- Enterprise Corridor 1.
- 2. Open space and drainage corridor
- З. Village Centre
- Electrical easement 4.
- 5. Entry street from highway
- Planted buffer 7. Gas easement
- Rocky outcrops 8.
- **Residential lots** 9.
- 10. Shared path

Figure 6: Marrangaroo Master Plan - Southwest

- Large lot residential lots
 Neighbourhood park



1. Village Centre

- 6. Rocky outcrops
- Open space and drainage corridor 2. З.
- 7. Residential lots
- Electrical Easement
- Waterways through large lots 4.
- 5. Gas easement

- 8. Shared path
- Large lot residential lots 9.
 - 10. Neighbourhood park

Figure 7: Marrangaroo Master Plan - Southeast

4.3 Design Principles

Marrangaroo is to be developed in accordance with the following Design Principles which underpin the Master Plan:

Context and Interfaces

- Provide natural buffers between enterprise corridor and industrial and urban areas
- Ensure safe and adequate access from the highway
- Maintain the visual quality of the entrance to Lithgow
- Consider impacts of stormwater, flooding and drainage on adjacent properties
- Provide cycle and public transport connections to Lithgow
- Protect Marrangaroo Creek, its water quality and wildlife
- Separate Correctional Centre and residential housing
- Retain key landscape views from the Highway and residential areas east of the Highway
- Create a distinct and identifiable community with a strong sense of arrival

Natural Features

- Consideration of bushfire access
- Considering building heights in relation to topography
- Maintain the natural beauty of hills and ridgelines for wildlife attractiveness and recreation
- Avoid urban development in flood prone areas, bushfire danger and steep slopes
- Incorporate water sensitive urban design into all aspects of the development, utilising existing drainage corridors and waterways

Community and Amenity

- Provide a range of recreational opportunities including play spaces and access to bushland walks
- Do not plan or develop services greater than the needs to the target population
- Provide green streets that minimise road pavement and maximise green verges and trees.
 Provide and encourage walking, cycling and public transport use
- Provide a connected network of open spaces distributed throughout the development and in varying topographic locations
- Preserve and celebrate heritage features
- Promote efficient land-use for urban purposes to preserve rural land
- Create a village heart within the residential neighbourhood that provides basic services such as local retail/education/community centre

Housing and Density

- Provide large lots in areas that will contribute to landscape views, rural character and environmental protection
- Provide enough housing to sustain infrastructure costs, public transport, community facilities and a small amount of local retail.
- Locate density where amenity is the highest, such as adequate open space or neighbourhood centre.
- Provide for senior living
- Provide housing choice and diversity



Figure 8: Employment Lands Principles Plan

Employment and Economy

- Separate incompatible uses from one another
- Increase economic opportunities to live and grow in Lithgow
- Provide enough land to encourage investment and cater for future demand
- Provide employment generating land uses, including land with good access and visibility

Staging and Implementation

- Provide a robust set of development guidelines to ensure a well considered and consistent outcome into the future
- Recognise the impact of existing property boundaries on staging
- Design and implement cost effective infrastructure for the whole area to support its development
- Locate development near existing services and infrastructure where possible





Part B Subdivision Design Guidelines



Figure 9: Existing Constraints

1. Site Responsive Design

1.1 Site and Context Assessment

Before any subdivision design is undertaken, a thorough investigation of the site and its context should be undertaken, so that the new subdivision will respond to the local characteristics of the site and its context.

A series of high level site analysis diagrams that shaped the Master Plan are available in the Appendix of this DCP. These diagrams will provide an overview of some of the key constraints and considerations across the site. However, Council does not guarantee the accuracy of these diagrams and they should only serve as a guide prior to more thorough investigations to be carried out by the prospective developer.

Controls:

It will need to be demonstrated that the subdivision design responds to an analysis of the following elements:

- Surrounding existing and future land uses sensitive interfaces, key land uses etc.
- Surrounding existing and future transport networks road, pedestrian and cycle paths, and public transport.
- Areas of vegetation.
- Natural and man-made features within the site landform, exposed geological features, wind row planting etc.
- Predominant landscape and cultural heritage character of the area.
- Assessment of drainage systems both within and beyond the site.
- Views from within the site to significant land forms or water bodies and views to the site from key public locations.
- Climatic conditions including solar access and prevailing winds.

1.2 Ground Levels and Excavation

All forms of development are to respond to the local topography. Excessive cutting and filling of a site is an indication of poor design and is likely to adversely impact streetscapes, alter site drainage, hinder solar access and limit view sharing opportunities.

- Cut and fill is to be minimised with cut materials used on-site as either fill for buildings or used to even out the landforms
- Any cut is to be supported by a retaining wall or battered to a gradient of less than 1:4, provided that gradient is achievable entirely within the site boundaries
- The design of any retaining wall greater than 600mm must be accompanied by a statement from an engineer attesting that the design is fit for purpose
- Excavation for the purposes of development must not exceed a maximum depth measured from ground level (existing) of:
 - if located not more than 2m from any boundary:1m
 - if located more than 2m from any boundary: 2m
- Notwithstanding the above, excavation must not be more than 1m below ground level (existing) if the land is within 40m of a water body (natural). Such excavation must not interfere with or pose a risk of sedimentation to the water body – excavation within 40m of a water body (natural) must be accompanied by a report from a hydrologist demonstrating how the water body will be protected from harm.



Figure 10: Indicative land use and lot layout

2. Subdivision and Lot Layout

2.1 Lot Size and Shape

It is important to create suitably sized allotments that are functional, accessible, contribute positively to future streetscapes and enhance the local character of the Precinct.

Controls:

 Subdivision is to be consistent generally in accordance with the Master Plan design and intent per the DCP, as illustrated in Figure 10. Indicative land use and lot layout. Legislative requirements and written controls take precedence over the Master Plan.

Lot Size

- Lot sizes are to be of an adequate size and dimension to enable objectives and guidelines contained in Parts C-E to be satisfied for future Development.
- Applicants will be required to demonstrate that a suitable building envelope can be achieved whilst satisfying the Setback, Landscaping, Access and Built Form objectives and guidelines in Parts C-E. This does not apply where the proposed lots have an area of at least 2,000 sqm and have a frontage width of at least 30m.

Lot Shape

• Lots should be regular in shape to provide for efficient use of land.

Lot Orientation

- Orientate lots so that buildings can be sited to maximise passive solar design where possible. This would require a north-south or east-west orientated lot.
- For corner allotments with two street frontages, the lot should be orientated so that the building will front onto the higher order road within the road hierarchy.
- Orientate allotments so that buildings can capture views to surrounding landscape.
- Lots should front onto open space

2.2 Employment Lands Subdivision

The following controls are specific to the Industrial (IN1) and Enterprise Corridor (B6) lands.

Controls:

- Provide a mixture of lot sizes within the Industrial lands to cater for a range of industrial uses
- There are to be no direct industrial lot access or frontages to Reserve Road in order to reinforce a clear separation between industrial and residential uses
- Enterprise corridor superlots ideally developed as one lot to increase parking, loading and access efficiencies

2.3 Residential Subdivision

Marrangaroo is intended to provide for a wide range of housing densities and lifestyles. This is balanced with a need to provide buyers with a reasonable impression as to the character and form of the community they are joining. Accordingly, the Master Plan has assigned various lot typologies in different locations. This gives buyers an understanding of what may emerge in their chosen street and has the added benefit of enabling a high quality of urban design, providing different parts of Marrangaroo with a built environment that responds sympathetically to the natural landforms of the area.

Lot Typologies

Residential lots are categorised on the basis of the total area of the lot as follows:

Large Lots

- 4,000m² and bigger in area
- Provides for a semi-rural character on large blocks of land
- Located to the outskirts of the development and generally backing onto other rural properties or Defence land.
- Respond sympathetically to the natural landforms of the area including steeper slopes, creeklines, rocky outcrops and bushfire setbacks



Figure 11: Housing density

Standard Lots

- Between 600m² and 1000m² in area. Lots between 1000m² and 2500m² may also fall into this typology where additional lot length is appropriate to accommodate site topography or features.
- Meet traditional demand within Lithgow for generous size residential lots with space for a family dwelling, double garage and front and rear gardens.

Medium Lots

- Between 400m² and 599m² in area
- Further increase housing choice and enable more efficient development on sites with differing geometries

Compact Lots

- Between 250m² and 399m² in area
- Meet demand for smaller and more affordable housing and to meet the needs of changing demographics (e.g. smaller family sizes, aging population)

- Lot Typologies and minimum sizes are to be consistent with the Master Plan and DCP as indicated in Figure 11. Housing Density, and the LEP zoning map.
- Where an oversized lot is proposed (substantially greater than the indicative lot sizes), plans are to nominate a building envelope.

- Building envelopes on oversized lots are to be positioned in a manner that clearly enables future subdivision of the lot to a pattern consistent with the Master Plan layout and adopted minimum lot size for the land.
- Except for corner lots and large lots, all residential lots are to have a width to depth ratio of between 1:4.5 and 1:1.8 with the shorter boundary being the street frontage.
- Residential corner lots are to have greater width with a ratio of between 1:4 and 1:1.5 to allow more opportunity for the subsequent dwelling to address both frontages.
- All lots must have direct street frontage to ensure good access and property amenity. Lots 3,000m² and larger are excepted.
- To achieve a desirable solar orientation, all compact, medium and standard lots should achieve a solar orientation where the long axis of the lot is:
 - For north-south oriented lots between 20 degrees west of north or 30 degrees east of north, or
 - For east-west oriented lots between 20 degrees north of east or 30 degrees south of east.



Figure 12: Lot orientation for solar access



Figure 13: Provision of local infrastructure.

3. Local Infrastructure

3.1 Infrastructure Provisions Controls:

- Clause 7.10 of the Lithgow Local Environmental Plan 2014 establishes that development is required to be provided with essential services including:
 - ^o The supply of water,
 - ^o The supply of electricity,
 - ° The disposal and management of sewage,
 - ° Stormwater drainage or on-site conservation,
 - ^o Suitable vehicular access.
- Provision of essential local infrastructure is at the developers cost and in line with the Lithgow Development Contributions Plan. Refer also to the Infrastructure Strategy Report for infrastructure provisions.
- The design and placement of local infrastructure is to be in accordance with Lithgow City Council requirements.
- Reticulated services for water, gas, electricity and telecommunications should be provided in shared trenching to minimise construction costs and land allocation for underground services.

3.2 Staging and Precinct Infrastructure

Essential local infrastructure needs to be available or provided by the developer before a development can occur as per item 2.1 Infrastructure Provisions. This is a key factor in the staging of development at Marrangaroo.

In some locations there are additional criteria that need to be met for the safe and orderly development of the Precinct, including precinct-wide infrastructure and stormwater management.

- Large scale or precinct-wide infrastructure including water reservoirs, sewer pumping stations and electrical substations may need to be provided by, or in coordination with, Council as part of any development proposal, depending on the existing infrastructure capabilities and the extent of proposed development.
- Refer to Section 7 for stormwater guidelines and controls.
- Refer also to the Infrastructure Strategy Report for sugested precinct infrastructure and staging.



Figure 14: Bus and Cycle Network

4. Access and Circulation

4.1 Pedestrian and Cycle Access

The transport hierarchy within the development favours alternative modes (cycling and walking) of transport first, then public transport routes, then private transport.

Cycling is an essential transport mode that encourages healthy living, social interaction and a more environmentally responsible alternative to cars.

A connected commuter and recreation bicycle network is embedded within the Marrangaroo Master Plan, as shown in Figure 14. Bus and Cycle Network.

Potential walking and cycling links to Lithgow have been identified in the Master Plan and will be further explored by Council

Controls:

- A cycle network is to be implemented through a number of shared cycle/pedestrian paths in accordance with Figure 14. Bus and Cycle Network and be designed in accordance with Austroads Standards and RMS Guidelines
- Footpaths to be provided on both sides of the street consistent with the street sections the Appendix.
- Safe road crossings (e.g. marked crossings) are to be provided according to 4.3 Street Network Controls.
- Universal access to be provided throughout the development in accordance to AS.1428.1

4.2 Public Transport

Providing public transport options within Marrangaroo is considered an essential catalyst for growth of the township and population, as well as an effective means of connecting the Lithgow town centre with the new Marrangaroo Village Centre. The street network is suited to the design of an efficient, accessible public transport network.

- An indicative bus route and stops are shown in Figure 14. Bus and Cycle Network.
- Bus stops are to be provided by Council and must have a shelter that includes:
 - ° seating with arm rests and
 - ° lighting
- Bus shelters are to be positioned on either side of the street at all stops.
- Pedestrian crossings must be provided within 30m of all stops
- Continuous accessible paving must be provided from the shelter to pedestrian crossing.
- Intersections where the bus route turns are to be designed to accommodate full size coaches.



Figure 15: Street Hierarchy

4.3 Street Network

The layout of the street network has a substantial affect upon the orderly functioning and development of the Precinct. The network layout seeks to encourage alternative transport modes, such as cycling and walking as well as influencing the efficient movement of traffic.

The network incorporates a clear street hierarchy, which is described in Figure 15. Street Hierarchy and the Street Sections in Appendix 1. It is designed to efficiently manage traffic loads and to be as permeable as possible to encourage quick dispersal of traffic throughout the development area.

Establishing streets with a human scale and encouraging use by pedestrians and cyclists will be key factors in reducing traffic speeds.

Key documents for use when planning new streets are:

• Austroads 'Guide to Road Design' latest editions

Controls around the staging of roads aim to provide for development while reducing the potential for one landowner to stymie the development potential of others and reducing negative impacts on adjacent properties that are yet to develop.

Controls:

- Other than where specified in the Master Plan there are to be no cul-de-sacs or no-thru roads.
- Roundabouts are to be avoided where possible with the preference for right of way intersections and signalised intersections if necessary.
- All streets indicated on the Master Plan are to be designed and constructed in accordance with the relevant street typology diagram.
- Streets should connect to existing established road networks and enable future connections to adjoining areas, where required.
- Design street networks to integrate with natural drainage systems and accentuate the topographic features of the site.
- Orientate streets to take advantage of viewlines to surrounding landscape elements such as hills, creeklines and rocky outcrops. The street should

be orientated so that the key view is available from within the street.

- B-double truck access should be limited to locations where a B-double route is approved. A Traffic Engineer's report should be provided to demonstrate that the B-double vehicles can enter, exit and manoeuvre within the subdivision safely and efficiently, with minimal impact on the streetscape and surrounding uses.
- Intersections are to be designed to maximise ease of movement for pedestrians and cyclists and to slow vehicular traffic.
- Traffic calming measures will be implemented in suitable locations to reduce vehicle speeds. Traffic calming measures include passive measures such as intersection narrowing, minimising width of road pavements, designation of slow speed streets and use of rumble strips at pedestrian crossing points and intersections.
- Driveway crossovers are to be a maximum of 8m wide for Employment Lands uses and 4.5m wide for Residential and are not to be constructed within 6m of an intersection. Crossover pavement is to match the adjacent footpath material.
- Carparking and service areas on corner lots are to be accessed from the longer street frontage and the crossover is to be aligned adjacent to the boundary furthest from the intersection.
- Marked Crossings, Refuge Islands and /or traffic signals are to be provided at street intersections on Collector Streets, and intersections of the 'shared cycle and pedestrian path'. This will improve pedestrian and bicycle safety.
- Intersections along nominated bus routes are to be designed to accommodate the turning arc of coach buses.
- All street kerbs are to be upright not roll kerbs.
- Broken upright kerbs should be used where required for WSUD function. e.g. raingardens or bioswales.



Figure 16: Road Staging

Staging

- Where new roads are aligned along existing property boundaries the first property to develop is to include the boundary road and road reserve within their property regardless of where it is shown on the Master Plan, unless an agreement to do otherwise is reached with the adjacent landowner and/or council.
- The footpath and driveways within the outer verge of a road along the boundary are to be provided by the adjacent owner when/if their land is developed.

Note: Final intersection design is subject to more detailed traffic analysis to be provided with each subdivision application. The traffic analysis is to outline anticipated traffic volumes for each intersection with a collector street or distributor road. Where analysis indicates a service class of B or below Council may require a redesign of the intersection. In the event that such a redesign requires land acquisition either for road widening or intersection treatment, such land as is required shall be provided by the developer with no cost to Council or the RMS.



Figure 17: Public Open Space Typologies

5. Public Domain

The public domain comprises the public street, roadside reserves, parks, sports fields, creek lines and other publicly accessible spaces. The design and embellishment of the public realm plays a significant role in establishing and supporting the character of the Precinct.

5.1 Open Space Provision

The planning of open space aims for an equitable distribution of amenity and a manageable service level. The co-location of the main open spaces with the drainage corridors will maximise maintenance benefits while leveraging open space amenity, connectivity and recreation potential.

Passive monitoring from buildings into the public space actively discourages anti-social behaviour and provides a greater sense of safety and security to the area. In turn the active use of a public space helps to discourage crime and anti-social behaviour in the area, creating a cycle of positive reinforcement.

Controls:

- Land identified on the Master Plan as open space (including drainage corridors) is to be dedicated to Council as public open space upon subdivision of the parent lot
- Where subdivision involves land that contains open space, the provision and development of the open space will be considered when calculating developer contributions.

5.2 Open Space Typologies

Within Marrangaroo the open space is broken into the following typologies as indicated in Figure 17. Public Open Space Typologies.

The diversity in the scale of these open spaces will enrich the experience of living in and visiting Marrangaroo.

Village Square:

- The Village Square will be the focal public space for the village centre and provide a flexible space for small community events.
- The square connects the main street through the village centre to the hilltop village park and is to be framed by retail on one side and community

uses on the other in order to ensure it is a safe and active place

- The prominent location and role of this space warrants high quality materials with predominantly hard surfaces with an opportunity for public art
- Additional amenity should be provided through trees for shade and as a feature, seating opportunities and considering shade structures and/or awnings for weather protection.

Village Park:

- The Village Park will be a high quality public park for use by the whole community in close proximity to the village centre retail and community facilities
- The design of the park should consider the following elements to provide a high level of amenity to the community:
 - Play opportunities for all ages incorporated into the overall design of the park
 - ^o Picnic shelters and barbecue facilities
 - Open lawn to provide a space for informal recreation and events
 - Tree planting to frame views and provide shade
 - ^o Opportunity for public art
 - Viewing deck overlooking the permanent water body on eastern side of main street

Neighbourhood Parks:

- Scattered across the development, Neighbourhood Parks provide opportunities for informal recreation and gathering for the surrounding residents
- Play opportunities should be incorporated into the overall design of the parks, along with picnic shelters and other items of park furniture including seating and bike racks
- A mixture of native planting and open lawn areas, trees are to provide shade and visual amenity, with heavily planted drainage corridors and rocky outcrops providing a natural backdrop



Figure 20: Village Square with shade trees and seating



Figure 18: Village Park with a large play space and open lawn



Figure 19: Neighbourhood Park with picnic tables, play equipment, lawn and native planting
Drainage Corridors:

- The primary function of this typology is to protect natural drainage systems and allow for the treatment and management of stormwater in accordance with the guidelines in Section 7. Stormwater Management.
- Drainage corridors are to be planted out with indigenous plants and trees to maximise environmental benefit.
- Small areas of turf and shade trees may be provided for public amenity and must be located outside of the creekline vegetated riparian zone (VRZ refer to section 7 for more detail).
- Detention basins within drainage corridors may be designed as landscape features including permanent water, fountains, architectural walls etc. providing they are complimentary to the rural character of the area and don't adversely impact on water treatment.
- Treatment of infrastructure easements within drainage corridors must comply with the recommendations of the relevant infrastructure providers.
- Shared paths are to be provided throughout the corridors in accordance with the overall cycle strategy, including creek crossings where required.

Rural Open Space:

- This collection of low maintenance open spaces helps to enhance the existing natural and rural qualities of the site, with limited facilities apart from wayfinding signage at key intersections and pedestrian/cycle routes where appropriate
- These areas have and include areas adjacent to drainage corridors, rocky outcrops and services easements that are restricted in what they may contain
- A mixture of trees, native planting and open lawn areas are to provide amenity to these areas

Landscape Buffers:

- Landscape buffers provide a visual and physical buffer between key roads and employment uses.
- To be planted out with indigenous plants and trees to maximise environmental benefit, screening and rural character. Turf to be avoided.
- Landscape setbacks and buffers within the Enterprise Corridor lands (not indicated on Typologies plan) are to remain in private ownership and be planted and maintained by the property owner.



Figure 21: Open space / drainage corridor with native planting and shared path



Figure 23: Desired streetscape character



Figure 22: Combined street and path lighting staggered with street trees

5.3 Streetscapes

The street network is seen as an extension of the open space network and will be developed to enhance connectivity between open spaces, employment areas, the village centre and other areas of the Precinct.

Street trees will be integral to the establishment of quality public domain, a recognisable character and positive environmental benefits.

The provision of summer shade to footpaths encourage workers and visitors to walk for recreation and as a transportation alternative. Shade over streets and on building facades reduces heat build-up during summer months, while deciduous trees allow winter sun to warm surfaces when cold.

Establishment of linking native vegetation canopy between areas of remnant vegetation allows for the safe passage of avian species.

Controls:

- All streets indicated on the Master Plan are to be designed and constructed in accordance with section 4.3 Street Network.
- The developer shall construct all footpaths, turf all verges and provide all road infrastructure planting prior to building construction and/or sale of individual lots.
- Residential street verges are to be turfed with Council approved species except where Council requires groundcover planting
- Lithgow City Council will plant all street trees
- Maximum verge cross-fall from property boundary to kerb is to be 2%
- Longitudinal gradient of verge is to match the gradient of the adjacent kerb. Retaining walls are to be provided along property boundaries accordingly.

5.4 Lighting

Lighting is to be provided to all areas of the public domain to enhance safety, to attract use and to enhance aesthetics. Pedestrian and cyclist amenity along with public safety and crime prevention is of primary importance in the design of lighting installations. Particular attention is required at street crossings, bus stops and urban areas to create a welcoming and safe environment for all residents and visitors. Lighting within public open space is to be provided in accordance with the open space typology, and to ensure sufficient lighting to major connecting pedestrian/ cycle links.

Controls:

• All lights are to use energy efficient LED luminaires or equivalent and approved by Council.

• Street lighting is to be designed to meet the current Australian Standards AS/NZS 1158 series.

• Enhanced levels of lighting are to be installed at major recreation pedestrian/cycle link crossings and at pedestrian crossings.

• Street trees and street lights are to be staggered so that footpaths maintain sufficient light levels.

Acer platanoides Globosum* Designer Maple Small 6 × 5 6 × 5 6 × 5 Acer nuturm Rad maple Medium 13 × 10 6 6 6 Argophona costata Smooth Barked Apple Large 20 × 15 6 6 6 Barksia servata Old Man Banksia Meelum 12 × 6 6 6 6 Calitatemon viminalis Weeping Bottlebrush Small 6 × 4 6 6 6 Cashrine sativa Chrestnut Large 30 × 20 6 6 6 6 Carlins atlanitica Glocdwood Large 30 × 20 6 <	Botanical Name	Common Name	Size	Height x Crown Estimate	Green Entry Street	Collector Street	Main Street	Local Street	Large Lot Access Street	Laneway	Enterprise Corridor Street	Industrial Street	Suitable for small and medium sized yards
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	Ulmus glabra 'Lutescens'	Golden Elm	Medium	10 x 12									

Figure 24: Tree Species List

5.5 Street Tree Strategy

Street trees will be integral to the establishment of quality public domain, a recognisable character and positive environmental benefits within the Marrangaroo Precinct.

The provision of summer shade to footpaths encourage residents and visitors to walk for recreation and as a transportation alternative. Shade over streets and on building facades reduces heat build-up during summer months, while deciduous trees allow winter sun to warm surfaces when cold.

Establishment of linking native vegetation canopy between areas of vegetation allows for the safe passage of avian species.

Figure 24: Tree Species List provides several suitable tree species for each street typology that meet requirements for the public domain, character and environmental ideals.

Controls:

- Lithgow City Council will provide and plant all street trees in accordance with the Street Tree Species List and at spacings outlined in the street typologies in the Appendix.
- Existing trees are to be incorporated into the street verges where possible, especially where mature rows of trees align with the proposed Master Plan street orientation.

5.6 Public Domain Vegetation

The species selected for use within the public domain will have a large impact on the success of these spaces. The landscape treatment of the public domain should respond to the local characteristics and qualities of the site, as well as being suitably robust and adapted to the local environmental conditions.

There are currently a large number of existing mature trees that greatly contribute to the overall ecological and aesthetic character of Marrangaroo. The Master Plan seeks to retain a large number of these existing trees within the Public Domain, where they will help to emphasise the existing character of the area and provide important canopy cover across the development.

- Significant existing mature trees are to be retained where possible and incorporated into the public domain and/or streetscapes.
- Public domain planting, including tree pit and median planting, is to be low maintenance, non-invasive native species suited to the Lithgow climatic conditions.



Figure 25: Great Western Highway interface with adjacent lots



Figure 26: Great Western Highway interface with a new frontage road

6. Interface Treatments

6.1 Great Western Highway

The interface to the Great Western Highway is key to creating a sense of arrival to both the Marrangaroo development and also to Lithgow town centre itself as part of the approach from the north.

It is therefore important to both acknowledge the visibility and Highway frontage required by many businesses along the Enterprise Corridor, and balance this with a strong landscape setting and buffers along the Highway.

Controls:

- There are to be no direct access points to individual lots from the Great Western Highway unless approved by the RMS.
- Where indicated on the Master Plan or otherwise deemed appropriate, provide a 20m landscaped zone and a road between the Highway and the Enterprise Corridor land so that development can front the highway. The developer shall maintain ownership of the landscaped zone and is responsible for it's ongoing maintenance.
- For lots directly adjoining the highway, a 20m planted landscaped buffer is required within the development lot in accordance with Parts C-E.

6.2 Precinct Entry Roads

Reserve Road and the other entry road(s) from the Highway provide access to both the residential areas and employment areas at Marrangaroo. As such it is important that these streets provide an attractive streetscape that isn't visually dominated by industrial or business uses.

Controls:

• Provide a 15m landscaped zone between employment lands and entry roads. For Industrial zoning this landscaped zone is to be dedicated to Council. Within the enterprise corridor, the landscaped zone is to be owned and maintained by the developer.

6.3 Waterways and Open Space

Waterways and Open Spaces provide important visual, ecological and recreational amenity. The way these spaces interface with development plays a

key role in determining if these spaces are treated as positive assets within the Precinct, or become leftover spaces that run the risk of becoming degraded or perceived as unsafe.

Controls:

• Where indicated on the Master Plan or otherwise deemed appropriate, provide a road between open space, creek lines or water bodies and the proposed subdivision, so that development can front onto the interface to provide passive surveillance and capture an attractive outlook.

6.4 Residential

The Master Plan for Marrangaroo promotes a clear separation between industrial and business uses and residential areas, generally through open space or street connections.

It must be acknowledged however, that this is the long term vision for the precinct and that the development of the Employment Lands will occur over a number of stages and across many years. There will therefore likely be cases in the interim of industrial lands being developed against existing rural residential uses, for which buffers are required in order to respect the privacy and amenity of the residential lots.

- Create a separation between proposed industrial and business areas, and existing or future residential, low density residential and sensitive uses, by providing:
 - a road, if indicated in the Master Plan or otherwise deemed appropriate; or
 - a landscape buffer in accordance with Part C -Employment Lands Development



Figure 27: Existing Watercourse classifications

Stream order	Stream Vegetated order Riparian		off- Cycleways ting and paths	Detention basins		Stormwater outlet	Stream realignment	Road crossings				
	(VRZ) (Either side of channel)	RC uses de el)		Only within 50% outer VRZ	Online	and essential services		Any	Culvert	Bridge		
1 st	10m	•	•	•	•	•	•	•				
2 nd	20m	•	•	•	•	•		•				
3 rd	30m	•	•	•		•			•	•		
4 th +	40m	•	•	•		•			•	•		

Figure 28: Riparian corridor matrix

7. Stormwater Management

7.1 Riparian Corridors

The blue lines on Figure 27 indicate watercourses that are officially recognised by NSW Office of Water (NOW). NOW uses the Strahler ordering method of classifying the significance of a stream. This is described in the text below.

Numbering begins at the top of a catchment with headwater ('new') flow paths being assigned the number 1. Where two flow paths of first order join, the section downstream of the junction is referred to as a second order stream. Where two second order streams join, the waterway downstream of the junction is referred to as a third order stream, and so on. Where a lower order stream (e.g. first order) joins a higher order stream (e.g. third order), the area downstream of the junction will retain the higher number (i.e. it will remain a third order stream).

NOW have produced guidelines for riparian corridors on waterfront land. Riparian corridors are to provide a transition zone between the land and the river or watercourse as shown in Figure 29.

The width of the vegetated riparian zone (VRZ) on each side of the channel is proportional to the stream order. Generally speaking the VRZ needs to be 10m on each side of the channel for a 1st order stream, 20m on each side for a 2nd order stream, 30m on each side for a 3rd order stream and 40m on each side for a 4th or greater order stream.

Development within these VRZ's may be classed as integrated development requiring a controlled activity approval under the Water Management Act and will be referred to NOW for assessment. Integrated development requires an additional fee for the referral and is subject to a 21 day referral period. Generally speaking to be considered a watercourse the "stream" needs to have a defined channel rather than just being an area of overland flow. NOW have acknowledged that some of the topographic mapping showing 1st order streams in NSW may not be entirely accurate. If an applicant wants to contest a 1st order stream (according to the Strahler system) on a topographic map, they will need to supply NOW with evidence and request that they make a determination.

This may involve a NOW staff member inspecting the site or the applicant providing detailed supplementary information, such as on-site photos. NOW will determine if the watercourse will be considered a 1st order stream for the purposes of a controlled activity approval under the WM Act. Where NOW provide an exemption to the WM Act requirements written confirmation of the exemption is to be included in the Development Application to Council.

Riparian corridor matrix

The riparian corridor matrix (Figure 28) enables applicants to identify certain works and activities that can occur on waterfront land and in riparian corridors. Applicants should note that the matrix relates to controlled activity approvals under the WM Act only. They are still required to comply with other relevant government legislation, such as threatened species, flood planning levels and fisheries guidelines.

More details on the NOW guidelines and requirements can be found by searching the NOW website www.water.nsw.gov.au



Figure 29: Riparian Corridor



Figure 30: Stages of Stormwater Treatment

7.2 Stormwater Management

The Marrangaroo Master Plan promotes current 'best practice' Water Sensitive Urban Design (WSUD) principles. WSUD will augment a traditional pit and pipe system. The street network, linear open spaces and public open spaces will facilitate WSUD and water detention.

The main focus of WSUD treatment at Marrangaroo will be the protection of natural systems, the integration of storm water treatment into the landscape, the protection of water quality, and the reduction of runoff and peak flows. In order to meet the objectives of all of these goals, the treatment process is broken down into three main categories – primary, secondary, and tertiary, refer Figure 30. Stages of stormwater treatment. Treatment will be most effective when the primary, secondary, and tertiary systems are used in conjunction.

Controls:

- Stormwater and drainage infrastructure should be provided in accordance with Lithgow Council's Guidelines for Civil Engineering Design and Construction.
- In addition to the engineering standards, design for stormwater and drainage should:
 - Take into account the natural drainage characteristics of the site and surrounds and design the system to integrate with these features.
 - Retain and enhance the function of natural drainage features in the area including drainage corridors and waterways.
 Development should be set back from the drainage corridors and waterways in accordance with any referral authority requirements and State Planning Policies.
 - Aim to minimise stormwater run-off by limiting the amount of impervious surfaces and utilising pervious surfaces to maximise infiltration.
 - Retard and treat stormwater on-site or within a consolidated area before it is discharged into the drainage system or waterways to the satisfaction of Lithgow City Council and the

relevant referral authority.

- Be designed to be economically maintained and create attractive features within sites or streetscapes.
- Incorporate Water Sensitive Urban Design features to manage run-off in streets and public open space.
- Optimise capture, retention, treatment and re-use of water on site by addressing an integrated 'whole of water cycle' approach to water management, involving permeable surfaces, storage, wetlands and roof collection as appropriate.
- Post development peak flows are to be less than pre-development peak flows, with equal to or better than pre-development water quality, at the development outlets for each overall development site. Figure 31. Stormwater Management illustrates estimated water detention measures required to achieve this. Note future development will require more detailed modelling on a case-by-case basis to ensure compliance with the above controls.



- Waterway and VRZ
- -> Swale
 - OSD/WSUD Basins:
 - 1. 2000m² bioretention basin
 - 2. 1100m² bioretention basin
 - 3. 685 bioretention basin
 - 4. 6230m³ off-line+1950m² bioretention
 - 5. $6930m^3$ off-line + 2650m² bioretention
 - 6. 2420m³ off-line+750m² bioretention

Figure 31: Stormwater Management

- 7. 4400m³ off-line+1420m² bioretention
- 8. 5000m² bioretention basin
- 9. $30000m^3$ on-line + 250m² bioretention
- 10. 1400m² bioretention basin
- 11. 970 m^2 bioretention basin
- 12. 800m² bioretention basin
- 13. 620m² bioretention basin
- 14. 490m² bioretention basin
- 15. 650m² bioretention basin

- 16. 2700m² bioretention basin
- 17. 800m² bioretention basin
- 18. 1000m² bioretention basin
- 19. 270m² bioretention basin
- 20/21. 23000m³ on-line+2200m² bioretention basin
- 22. 2000m² bioretention basin
- 23. 2350m² bioretention basin
- 24. 17000m³ on-line basin

8. Environmental Hazards

8.1 Flooding

There are several flood hazard areas within the Marrangaroo site, most notably to the north adjacent Marrangaroo Creek and along the ephemeral creek lines.

Controls:

 All new development must meet relevant flood protection criteria. If development occurs in the vicinity of an open waterway or floodway, appropriate freeboard requirements for the development should be adopted as determined by the responsible authority or referral authority and to the satisfaction of the responsible authority.

8.2 Bushfire

The Marrangaroo site is surrounded by areas of bushland that create a fire hazard that must be recognised in any development within the area, in particular the boundary sites with an interface to mature vegetation.

Controls:

• All new development must meet all other relevant bushfire protection criteria to the satisfaction of the responsible authority, including Planning for Bush Fire Protection 2006 (NSW Rural Fire Service).

8.3 High Pressure Gas Pipeline

APA owns and operates the Young – Lithgow Natural Gas Pipeline (YLNGP) that runs through the site. The pipeline is located within an easement (of approximately 20m width) which runs through the site from north to south.

APA has responsibilities for managing the risks associated with land use well outside of the pipeline easements. This includes both increased risk of physical damage to the pipeline from development and ongoing land use activities, as well as the risk to surrounding development from a loss of containment.

Controls:

• All new development must retain the existing gas easement as indicated on the Master Plan.

- Any development over the easement is to be coordinated with APA and in compliance with their recommendations.
- Roads are not to run along the easement and roads crossing the easement should be avoided. Temporary road crossings may be acceptable if required for staging purposes, under the condition they are removed when later development allows. Points where services cross the gas easement are to be minimised.
- Any development considered within the
 Measurement Length (ML) of the pipeline should
 undertake a Safety Management Study (SMS) as
 advised by APA prior to development in order to
 maintain pipeline integrity and community safety.
 The Measurement Length (ML) of the pipeline
 extends for 165m each side of the pipeline. The
 SMS process typically recommends improving
 the physical protection of the pipeline and
 excluding sensitive uses from the ML, which
 include:
 - ° child care centre
 - ^o entertainment facility
 - ^o correctional centre
 - ° educational establishment
 - ^o hospital
 - ^o place of public worship
 - ^o residential care facility
 - ^o retail premises
 - ^o seniors housing
 - ^o service station

8.4 Electrical Easements

Endeavour Energy own an 11kV feeder L584 from Lithgow ZS, passing the proposed development and 66kV feeder 857 which supplies Lithgow ZS, through the site.

Controls:

• Any development impacted by electricity assets and easements must comply with Endeavour Energy's guidelines.

Part C Employment Lands Development



Minimum 3m planted landscape setback to boundary

Figure 32: Example layout of an Enterprise Corridor development

1. Access and Circulation

1.1 Pedestrian and Cyclist Access

The transport hierarchy within the development favours alternative modes (cycling and walking) of transport first, then public transport routes, then private transport.

Cycling is an essential transport mode that encourages healthy living, social interaction and a more environmentally responsible alternative to cars.

Controls:

- Provide clearly defined pedestrian entry points from the footpath path into the industrial or business site. The pedestrian entry should be separated (eg. by landscaping) from all vehicle movements.
- Separate pedestrian and bicycle circulation from vehicle movements, particularly loading and servicing vehicles.
- Provide secure bicycle storage, lockers and showers for staff and employees in accordance with the following:
 - Industrial lands 1 bicycle space for each 1000sqm of net floor area
 - Business lands 1 bicycle space for each 300sqm of leasable floor space + 1 visitor bicycle space for each 500sqm of leasable floor space
 - If 5 or more employee bicycle spaces are required, 1 shower is to be provided for the first 5 employee bicycle spaces, plus 1 to each 10 employee bicycle spaces thereafter.
- Pedestrian access within the site should be designed to achieve Disability Discrimination Act (DDA) compliance.

1.2 Vehicle Access

Vehicle access is to be safe, convenient and efficient, with the aim of minimising impacts of traffic on pedestrian /cycle access, streetscapes and surrounding land uses.

Controls:

• Developments should be designed to allow all vehicles to enter and exit a site in a forward motion. This applies to all sites regardless of lot size.

- Locate vehicle access points in a location that enables clear sight lines along the road enabling vehicles to enter and exit safely and efficiently.
- New developments should minimise the impact of traffic on surrounding sensitive land uses including residential and shopping areas. A traffic engineer's report may be required for some developments where considered necessary by the Responsible Authority.
- Limit driveway crossovers to one consolidated entry and exit point for each site in order to minimise disruption to footpaths. Additional crossovers may be permitted for larger sites where a loop circulation network is required within the site.

1.3 Loading and Servicing

Developments are to provide safe and efficient loading and servicing while minimising the visual impact of loading bays and service areas when viewed from the surrounding streets and areas.

- Loading areas should be located to the rear or side of the property away from the primary street frontage.
- Where practical, integrate loading areas into the design of the building so that loading occurs internally. Where external loading areas are visible from adjoining land uses, they should be screened with landscaping or articulated built form.
- Loading and servicing should occur with the vehicle completely contained within the site. No part of the vehicle should extend into the public road reserve.
- Loading and servicing should be designed to service a range of vehicle types in order to provide for flexibility.
- Access to loading areas should be clearly separated from pedestrian and bicycle access routes.
- Ensure storage and loading areas are or sufficient size and dimensions to avoid the use of car parks for temporary storage of goods.
- Loading areas should be clearly defined with line

Storage areas from public view. Integrate loading into the design of the building. Additional parking to side of building. Shade trees and planting distributed throughout parking areas. Min 1m planting between parking and side boundar

Minimum 3m planted landscape setback to boundary



Figure 33: Example layouts of Industrial developments

marking, designed to allow unobstructed vehicle access and provide appropriate turning areas in accordance with Australian Standards AS 2890.2 - Parking facilities Part 2: Off-street commercial vehicle facilities.

• Allow for sufficient and safe collection of waste materials.

1.4 Car Parking Provision

Developments are to provide sufficient car parking within the site without adverse impacts on streetscapes.

Controls:

- Car park spaces will be provided for visitors and occupants in accordance with the following:
 - Industrial and warehouse uses 1 car space per 100sqm of gross floor area or 1 space per 2 employees whichever is greater.
 - Bulky goods, large format retail 1 car space per 50sqm of gross floor area.
 - Other uses as required to provide sufficient car parking without adverse impacts on the streetscape.
- A change in car park provision may be considered where a development is being purpose built for a known end user and it can be demonstrated that alternate car park numbers are required on the basis of employee numbers, alternative transport options and likely client / visitor numbers.
- Car parking bays for people with disabilities should be provided in accordance with the standards outlined in the Disability Discrimination Act (DDA).

1.5 Car Parking Layout and Design Controls:

Siting

 Car parking within the front setback of the site should be generally restricted to visitor parking. Visitor spaces should be clearly distinguished with suitable signage or pavement markings and should be made permanently available for visitor use. Staff parking may be provided in the front setback if it can be demonstrated that sufficient car parks have been provided for visitors.

- A maximum 18m width of parking (2 bays + aisle) is to be located between building entries and the street. Larger areas of parking are to be located to the side or rear of buildings. A deviation from this is acceptable under the following condition:
 - Maximum of 36m width of parking (4 bays + 2 aisles) is acceptable within the Enterprise Corridor adjacent secondary roads. A secondary road is a road that doesn't have open space or the highway to one side.
- Car parking is not allowed within 3m of the front property boundary to allow sufficient space for landscaping.
- Land uses which require the parking and regular movement of trucks should provide designated truck parking areas. This does not include truck movements within loading areas.

Access

- Clearly define pedestrian / cyclist access between the car park and the entrance to the building.
- Car parking spaces, loading docks and vehicle route directions should be permanently marked out on the pavement surface in accordance with the approved parking and access layout.

Design

- Car parking spaces and access ways should be designed in accordance with the dimensions specified in the relevant Australian Standards.
- Buildings should be designed to address car parking areas with windows and active uses such as entrances to provide passive surveillance.
- Parking areas shall contain tree planting to provide shade for vehicles and to soften the visual impact of parking facilities in accordance with Section 5.1 of these guidelines.
- Car parks and vehicle turning areas should be constructed and sealed with an all weather pavement surface and adequately drained. Unsealed surfaces may be permitted for low trafficked areas to the satisfaction of the Responsible Authority.



Building setback: Minimum 5m to secondary road boundary

/// Parking zones:

Minimum 21m to primary road boundary, with 5m articulation zone included within 21m Maximum 18m width between primary road boundary and building Maximum 36m width between secondary road boundary and building



Figure 34: Setback requirements for Enterprise Corridor developments

2. Building Siting and Orientation

The siting and orientation of buildings can help to reinforce the rural character of the precinct as well as create cohesive streetscapes with buildings that address the streets.

2.1 Setbacks

Controls:

• Development to avoid construction over existing or required easements.

Front Setbacks

- Front setbacks to be no less than 5 metres from the front property boundary to enable sufficient space for landscaping and building access.
- Within the Enterprise Corridor lands, front setbacks to primary roads to be no less than 21m from the boundary, with an articulation zone between 16 and 21m from the boundary to be built out with a maximum of 30% of the total building frontage. A primary road is a road with the highway or open space to one side.
- Front setbacks should be landscaped in accordance with Section 5 of these Guidelines and should not be used to store goods, materials or waste.

Rear and side setbacks

• No rear building setbacks and 2m side building setbacks are required except under the following conditions:

- Corner sites minimum 3m landscaped setback to side street boundary. Setbacks on corner sites should enable adequate sight lines for vehicular traffic in accordance with the relevant Australian Standard.
- Adjacent to a public reserve or environmentally sensitive land - minimum 3m landscaped setback
- Existing residential minimum 3m landscaped setback, plus additional setbacks if required as illustrated in Figure 35.
- For lots directly fronting the Great Western Highway, setbacks to the Highway should be no less than 30m from the property boundary.

2.2 Building Orientation

- Buildings should be orientated so that the building frontage (i.e. entrance, reception, customer service area) is parallel with the primary street frontage.
- Orientate buildings so that they take advantage of the north / north east aspect to maximise opportunities for passive solar heating and cooling.
- Buildings should be orientated so that loading and servicing, and large areas of car park will occur to the rear or the side of the site.



Figure 35: Setback requirements adjacent residential dwellings



Figure 36: The front facade contributes to the streetscape with a large proportion of glazing



Figure 37: The main building entry is clearly defined and has direct pedestrian access from the street

3. Built Form

The design of the built form within the Employment Lands should contribute positively to the character of the wider precinct and provide passive surveillance to streets and public spaces. Building details and forms are to be designed to reinforce the rural character of the area.

3.1 Building Address

Controls:

- Pedestrian generating uses including customer service, retail and office components, should be located at the street frontage to provide visual interest to the street, create a more pedestrianised scale and assist in passive surveillance of the public realm.
- Customer service, retail and office components should be articulated by varying building setbacks, utilising glazing, and varying building materials, finishes and colours.
- Building entries are to be located and orientated to the street frontage, and located at the same level as the street or car park in order to provide logical and convenient access for visitors.
- Buildings on corner allotments should address both street frontages with articulated facades.
 Provide taller built form or roof elements to emphasise prominent locations.
- Buildings should generally front onto public open space. Where this is impractical, the building should address the open space with articulated built form and habitable rooms or spaces. This will improve passive surveillance of the open space and provide visual interest when the development is viewed from the open space.
- Avoid blank, unarticulated walls to public viewing areas.

3.2 Building Design and Detail Controls:

- Buildings are to be of a responsive architectural style and reflect an industrial or commercial form of development appropriate to the rural character of the area. Avoid excessive detailing in facades.
- Office components are to utilise greater

articulation within facades and a greater proportion of glass.

- All building walls that are visible from the street, public open space or key public viewing areas should be articulated to provide visual interest. Avoid excessive blank walls.
- Articulation can be achieved by varying building setbacks or projecting building elements, varying roof forms, utilising glazing, and varying building materials, finishes and colours.
- Buildings should provide a minimum of 30% glazing in the facade that fronts the street.
 Where this is not practical, it will need to be demonstrated that the front facade contributes positively to the streetscape and provides passive surveillance of the street.
- Design outbuildings to be consistent with the overall design theme of the site.

3.3 Colours, Materials and Finishes Controls:

- Utilise materials that reinforce the rural built form and landscape such as corrugated iron, timber and textured concrete. Avoid the excessive use of heavy looking materials and unfinished precast concrete walls.
- Utilise a mix of materials and colours particularly within the visible facades, to provide articulation to the buildings and visual interest to the street.
- Materials should utilise muted, earthy tones. Avoid the use of bright, bold colours that are not compatible with the muted tones of the natural landscape.
- External finishes should be of low reflectivity to minimise glare and reflection to surrounding areas.

3.4 Building Heights

Controls:

• Building heights should respond to the scale of existing development in the street, and incorporate lower elements towards the street to relate to the pedestrian scale.



Figure 38: Entry and directional signage should be consistent in style and form



Figure 39: Signage is of an appropriate scale and integrated into the front facade of the building

- Where an industrial development is located opposite a residential area, building heights at the street frontage should relate to the scale of residential buildings.
- Building heights should generally not exceed 9m unless a taller built form is required for the purpose of the industry or business. In this case, it will need to be demonstrated that the taller element will have minimal visual impact on views from surrounding residential and rural living areas, views from key public viewing areas, views from the adjoining street and views to and from significant landscapes.
- Buildings should not generally overshadow public footpaths or public open space between the hours of 11:00AM and 2:00PM at the Winter Solstice, June 21.

3.5 Roof Forms

Controls:

- Utilise varied roof forms to provide visual interest to the street whilst providing forms that are compatible with the character and function of industrial and office buildings. Avoid bulky or highly detailed roof forms.
- Roof forms should be designed to integrate with the prevailing roof forms in the industrial or business area.
- Roof forms should generally be of a low pitch unless necessitated by the particular industry function.
- Utilise roof forms to differentiate between the various elements of the building. This could include the transition between the office / sales area through to the larger shed behind.
- Building infrastructure which is located on the roof including air conditioning units, plant room, lift motor rooms, exhaust systems, rooftop car parking etc. is to be screened from adjoining streets and areas utilising roof forms or parapets that integrate with the overall design of the building.
- Incorporate natural lighting into the roof design for large span buildings.

3.6 Signage and Advertising

Signage and advertising must provide clear business identification while remaining compatible with the rural character of the area. Signage should be informative and coordinated in a way that enables customers to easily locate the industry or business and determine its services.

- Signage should be integrated into the design of buildings by forming a logical element of the front facade and be in keeping with the scale of the facade.
- Signage should be limited in numbers to avoid visual clutter and unnecessary repetition.
- Where the are multiple business occupancies within the one site, one shared sign should be provided that details the location of the businesses. A small identification sign may be provided for each business that it is co-ordinated with the shared sign in terms of style and materials.
- Freestanding signage should be avoided and will only be permitted if it can be demonstrated that signage on the building facade will not provide effective business identification. If freestanding signage is permitted, it should integrate with the overall design of the site in terms of scale, form, landscaping and materials, and should not detract from the streetscape character and key views to the area.
- Signage attached to front fences and temporary A-Frame signage on footpaths should be avoided.
- In visually sensitive areas, signage should be designed so that it does not detrimentally affect the character of the area and does not unduly diminish key views within the area.
- Directional signage should be provided within sites to delineate entries and exits, staff and visitor parking, office /reception areas, and loading areas. Directional signage within the site should be consistent in style and form.



Figure 40: Trees and planting in car parking areas provide shade and soften the visual impact



Figure 41: Existing trees are an important feature and should be protected and retained where possible.



Figure 42: Planted areas add visual appeal, increase biodiversity and help with natural infiltration of water

4. Landscaping

4.1 Landscape Design

The landscape treatment within development sites contributes greatly to the character and amenity of the area. Landscaping should respond to the local characteristics and qualities of the site in a way that enhances the setting of buildings in the street.

Controls:

Siting and Areas requirements

- Buildings and landscaping should be sited and designed to retain existing vegetation on site to the satisfaction of the responsible authority. Trees and other vegetation can be retained within building setbacks, building recesses, or within future open space areas. Buildings should be setback beyond the TPZ (tree protection zone) of existing trees. A max 10% incursion is permitted within TPZs and no incursion is permitted within SRZs (structural root zones) of existing trees to be retained.
- Where canopy trees are to be provided, landscaped areas should be a minimum of 3 metres in width to enable sufficient space for root zones. Landscaped areas of shrub, grasses, sedges and groundcovers should be a minimum of 2 metres to provide for the effective impact of planting.
- Consolidate landscape areas to maximise the effect of the landscape and allow sufficient space for tree growth.

Landscaped Setbacks

- Front setbacks should be designed with at least a 3m wide landscape strip that incorporates clean trunk canopy trees that will reach over 8m in height, and enable clear views between the street and the front of the building. Low shrubs, grasses, sedges and ground covers can be utilised in combination with the canopy trees provided uninterrupted views at ground level are maintained. Semi-mature trees should be utilised when appropriate and turf is not permitted.
- Tree species should be carefully selected and sited so that the root systems and canopy do not impact negatively on assets within the road reserve or users of the road reserve.

- Consider accessible seating within the front setback that will encourage the use of the space by staff and visitors.
- Corner sites should provide landscaped setbacks to both street frontages.
- Landscaping in rear setbacks should be provided if the rear of the site adjoins a public street, is visible from key public viewing areas eg railway line, freeway, or a rural or residential area.

Car park landscaping

- Parking areas shall contain tree planting to provide shade for vehicles and to soften the visual impact of parking areas. 1 tree is to be planted for every 5 parking bays, with trees distributed evenly throughout the car parking. Each tree is to sit within minimum 10m² of planting with min 2m width in any direction. The tree species should be selected to provide shade for vehicles and pedestrians, and allow clear views between pedestrians and the vehicles.
- A landscape strip of at least 1 metre should be provided to separate car parks from side and rear boundaries.
- Landscaped areas should be separated from vehicle access through the use of kerbs or raised edging to ensure the maintenance of vegetation.
- Utilise water sensitive urban design techniques to treat stormwater run-off from car parks and passively irrigate vegetation.

Staff Amenity Areas

 Where provided for or where the features of a site or proposal make it feasible or necessary, functional outdoor staff areas should be located to take advantage of northern aspect, connection to internal staff meals areas, and be landscaped with shade trees and seating.

Visual and Acoustic Screening

- Where a landscape screen / buffer is required, it should consist of a variety of trees, shrubs, grasses, sedges and groundcovers.
- Screen planting should be provided where an undesired element of the site will be visible



Figure 43: Use trees and planting to provide visual and acoustic screening

from the Great Western Highway, main roads or township entries, or adjoining rural or residential properties. Elements to be screened include loading areas, goods storage areas, waste and recycling areas, electrical substations and heavy machinery.

- Utilise landscaped mounding in combination with planting of shrubs and canopy trees for effective screening.
- For screening that is required for acoustic purposes, provide dense tree and tall shrub planting with a combination of mounds / walls as required.

4.2 Species Selection Controls:

- Species should be selected to integrate with the surrounding landscape character and connect and integrate with the landscape of adjoining sites where appropriate.
- Landscape areas should be planted with species that are low maintenance and hardy, and do not require irrigation from the potable water supply. Species selection should generally provide an emphasis on native and indigenous plants that are appropriate to the site and landscape character of the area.
- Exotic species may be utilised in areas where they are considered to be an important element of the landscape character or for emphasis planting provided the plants do not require potable water supply for irrigation.

Establishment and Maintenance

- Landscaping should be completed within 3 months of building construction completion and be carried out in accordance with the approved landscape plan.
- Provide for the ongoing maintenance of landscaped areas and generally utilise low maintenance and durable landscaping techniques.

4.3 Fencing Controls:

- Fencing along the front boundary should generally be avoided unless accepted by the responsible authority. Utilise landscaping to delineate the front property boundary.
- Where front fencing is permitted and is not required for security purposes, the fence should be:
 - ^o Unobtrusive and not exceed 1.5m in height.
 - Allow clear views between the street and the business.
 - ^o Utilise materials and colours appropriate to the location, and building and landscape design.
 - Avoid the use of high and/or solid structures / materials.
- If security fencing is required, it should have a high degree of transparency and be constructed with black plastic coated chain link wire or black steel post style. Provide landscaping around the fencing to soften the visual impact and avoid the use of razor or barbed wire fencing.
- If security fencing is required along the front boundary, it should be provided at or behind the building line to enable stronger visual and physical connection between the street and building entries.
- Where screen fencing is required, it should be designed to integrate with the materials and colours utilised throughout the site.

4.4 Paving

- Impervious paving materials including concrete, stone and brick should be minimised in landscaped areas to allow for natural infiltration of water and passive irrigation of plants.
- Utilise appropriately treated, robust materials in areas that are highly trafficked by pedestrians or utilised for vehicle manoeuvring and parking.
- Provide shade to large paved areas to minimise the 'heat island effect.'
- Minimise run-off from paved areas.

5. Site Amenity

5.1 Waste Storage

Controls:

- All sites are to provide dedicated waste and recycling storage areas.
- Waste storage and recycling areas should be located away from the street frontage, staff amenity areas and stormwater drains. They should not be located in front of the building, within landscaped areas, driveways, car and truck parking spaces and vehicle turning areas.
- Waste and recycling storage areas should be adequately screened from the public realm, staff amenity areas and adjoining rural or residential properties utilising landscaping or structural screening.
- New developments are to demonstrate methods to minimise the production of waste as well as recycling and the re-use of waste materials.

5.2 Goods Storage

Controls:

- Goods storage areas should be located behind the building line and located away from stormwater drains. Goods storage areas should not be located within landscaped areas, driveways, car and truck parking spaces and vehicle turning areas.
- Goods storage areas should be appropriately screened from key public viewing locations.
- If goods storage areas are to be accessed by customers on a regular basis, safe pedestrian access should be provided.

5.3 Lighting

Lighting should be adequate for the purposes of navigation for pedestrians and security, with minimal spill onto adjoining and nearby properties.

Controls:

- Lighting should be provided on site for the purposes of security and safe pedestrian access to buildings and car parks. It should be designed so that it does not adversely impact on the safety of road users
- Lighting is to be directed, baffled and of a height that prevents light spillage onto adjoining, and nearby residential, low density residential and rural properties.
- Utilise sensor lighting where appropriate to reduce energy consumption and impacts on surrounding areas.

5.4 Acoustic Treatments Controls:

- Where practical, utilise acoustic treatments internal to the building through the design of the building layout, and the use of acoustic insulation or suitable building materials.
- Where external acoustic treatments are required, utilise tree and shrub planting, mounding, acoustic walls or a combination of each as required. The acoustic treatment areas should be accessible and maintained.
- Design the acoustic treatment so that it contributes positively to the public realm and adjoining properties, and integrates with the design of the building and landscaping.

6. Interface Treatments

6.1 Great Western Highway

The interface to the Great Western Highway is key to creating a sense of arrival to both the Marrangaroo development and also to Lithgow town centre itself as part of the approach from the north.

It is therefore important to both acknowledge the visibility and Highway frontage required by many businesses along the Enterprise Corridor, and balance this with a strong landscape setting and buffers along the Highway.

Controls:

- There are to be no direct access points to individual lots from the Great Western Highway unless approved by the RMS.
- For lots adjoining the Great Western Highway, setbacks to the Highway should be no less than 20m from the property boundary.

Precinct Entry Roads

- For lots adjoining entry roads from the Great Western Highway, setbacks to the entry roads should be no less than 15m from the property boundary.
- Uses that provide for higher quality built form outcomes should be located at street intersections with the highway and along the entry roads.
- At the Reserve Road intersection, retain clear views to the heritage chapel building from the highway and Reserve Rd as well as creating a strong landscape setting between the chapel and the two road interfaces.

6.2 Waterways and Open Space

Waterways and Open Spaces provide important visual, ecological and recreational amenity. The way these spaces interface with development plays a key role in determining if these spaces are treated as positive assets within the Precinct, or become leftover spaces that run the risk of becoming degraded or perceived as unsafe.

Controls:

• Buildings should generally front onto public open space. Where this is impractical, the building

should address the open space with articulated built form and habitable rooms or spaces. This will improve passive surveillance of the open space and provide visual interest when the development is viewed from the open space.

• For lots that directly adjoin public open space, a pedestrian connection from the development lot to open space pathways is recommended.

6.3 Residential

The Master Plan for Marrangaroo promotes a clear separation between industrial and business uses and residential areas, generally through open space or street connections.

It must be acknowledged however, that this is the long term vision for the precinct and that the development of the Employment Lands will occur over a number of stages and across many years. There will therefore likely be cases in the interim of industrial lands being developed against existing rural residential uses, for which buffers are required in order to respect the privacy and amenity of the residential lots.

Controls:

• For lots that share a boundary with existing or future residential uses, a landscape buffer along the boundary of at least a 3m wide is required. The buffer is to incorporates landscape screening and noise attenuation techniques such as planting and mounding.

7. Specific Requirements

7.1 Factoryettes

Factoryette developments are typically small industry or warehouse units with shared access and car parking areas. Buildings are generally attached at the side wall.

Development need to enable flexibility for a variety of land uses as well as providing safe and convenient pedestrian, cycle and vehicle access, adequate car parking, and contribute positively to the streetscape.

Controls:

- Development should provide built form that addresses the primary street frontage as well as the internal access lanes. Car parking in front street setback areas should be minimised.
- Where practical, provide a rear lane for service and loading traffic so that it is separated from visitor access and parking.
- Clearly separate pedestrian building entries into developments from vehicle and servicing entries by providing a pedestrian door to an office area and a separate roller or tilt door for vehicle access.
- Provide a central waste area that is screened from public view and easily accessible by tenants and waste collection vehicles.
- Storage areas are to be completely contained within the buildings or at the rear of the building and appropriately screened from view.
- Divide sign space equally between retailers for ground signs to avoid corporate dominance.

7.2 Motor Vehicle Repairs Controls:

- Sites should be of a sufficient size to enable all vehicle storage and other storage, visitor and staff parking, to be completely contained within the site.
- Visitor car parking spaces should be permanently reserved for visitor access and not utilised for storage of cars to be repaired.

8. Environmental Hazards

8.1 Flooding

There are several flood hazard areas within the Marrangaroo site, most notably to the north adjacent Marrangaroo Creek and along the ephemeral creek lines.

Controls:

 All new development must meet relevant flood protection criteria. If development occurs in the vicinity of an open waterway or floodway, appropriate freeboard requirements for the development should be adopted as determined by the responsible authority or referral authority and to the satisfaction of the responsible authority.

8.2 Bushfire

The Marrangaroo site is surrounded by areas of bushland that create a fire hazard that must be recognised in any development within the area, in particular the boundary sites with an interface to mature vegetation.

Controls:

• All new development must meet all other relevant bushfire protection criteria to the satisfaction of the responsible authority, including Planning for Bush Fire Protection 2006 (NSW Rural Fire Service).

8.3 High Pressure Gas Pipeline

APA owns and operates the Young – Lithgow Natural Gas Pipeline (YLNGP) that runs through the site. The pipeline is located within an easement (of approximately 20m width) which runs through the site from north to south.

APA has responsibilities for managing the risks associated with land use well outside of the pipeline easements. This includes both increased risk of physical damage to the pipeline from development and ongoing land use activities, as well as the risk to surrounding development from a loss of containment.

Controls:

• All new development must retain the existing gas easement as indicated on the Master Plan.

- Any development over the easement is to be coordinated with APA and in compliance with their recommendations.
- Any development considered within the Measurement Length (ML) of the pipeline should undertake a Safety Management Study (SMS) as advised by APA prior to development in order to maintain pipeline integrity and community safety. The Measurement Length (ML) of the pipeline extends for 165m each side of the pipeline. The SMS process typically recommends improving the physical protection of the pipeline and excluding sensitive uses from the ML, which include:
 - ^o child care centre
 - ° entertainment facility
 - ^o correctional centre
 - ° educational establishment
 - ° hospital
 - ^o place of public worship
 - ° residential care facility
 - ^o retail premises
 - ^o seniors housing
 - ^o service station

8.4 Electrical Easements

Endeavour Energy own an 11kV feeder L584 from Lithgow ZS, passing the proposed development and 66kV feeder 857 which supplies Lithgow ZS, through the site.

Controls:

• Any development impacted by electricity assets and easements must comply with Endeavour Energy's guidelines.



Figure 44: Consider on-site production of renewable energy



Figure 45: Maximise natural lighting through skylights and light coloured internal surfaces



Figure 46: Incorporate rain gardens, bioretention basins and permeable paving to minimise and treat stormwater runoff

9. Environmentally Sustainable Design

9.1 Integrated Water Management

The objective of Water Management at Marrangaroo is to protect natural systems, integrate storm water treatment into the landscape, protect water quality, and reduce runoff and peak flows.

In addition to these wider goals, development should take steps to reduce the on-site potable water consumption.

Controls:

Stormwater minimisation

- Incorporate rainwater tanks on each building of at least 5,000 litres to collect runoff from roof areas. The water should be used for landscape irrigation, cleaning and toilet flushing.
- Utilise pervious and porous surfaces and minimise impervious sealed services in order to maximise onsite stormwater infiltration.
- Utilise grass swales for channelling stormwater and perforated stormwater drainage pipes in order to increase infiltration.

Stormwater Treatment

- Incorporate water sensitive urban design techniques to treat stormwater before it is discharged from the site. Techniques include:
 - Use of a sediment basin, wetland and pond to treat water and release into receiving waters at predevelopment flows.
 - Use of bioretention swales, basins or rain gardens to improve stormwater quality and provide attractive landscape features.

Water Recycling and Re-use

 Where practical, incorporate grey water treatment and re-use systems (in accordance with EPA requirements) to provide additional water sources for irrigation of landscapes, cleaning and toilet flushing.

Potable water conservation

• Provide water efficient taps and fittings and utilise recycled or tank water to minimise consumption of potable water.

9.2 Energy Efficient Building and Site Design

Increasing energy efficiency through building and site design helps to minimise greenhouse gas emissions from industrial and business sites. These solutions need to be economically viable and can help to save on energy and resource costs in the long run.

Controls:

Site Layout and Building Orientation

- Strategically locate deciduous trees to provide shade to windows and outdoor spaces in summer, and allowing sun entry in winter.
- Orientate buildings and position windows, awnings and shutters to capture solar access in winter and provide appropriate shading in summer.

Heating and Cooling

- Utilise natural systems to provide cross flow ventilation of buildings while ensuring openings are sealed in winter to minimise draft.
- Utilise insulation in combination with other materials that maximise thermal performance.

Energy Conservation / Renewable Energy Production

- Maximise natural lighting through skylights, light wells and positioning windows to capture northern light.
- Utilise light coloured internal finishes to reflect light.
- Utilise energy efficient lighting and appliances.
- Consider on-site production of renewable energy through photovoltaic cells and solar hot water systems. Maximise north facing roof spaces to facilitate energy production.
- Wind generation may be considered if it can be demonstrated that the turbines have minimal impact on the streetscape and adjoining properties.

Building Materials

• Where practical, source local or recycled building materials. Selection should also take into account the embodied energy required in the production of the material.
Part D Residential Development



Figure 47: Building Character - Compact Lots



Figure 48: Higher housing densities overlooking public open space

1. Lot Typology and Site Coverage

1.1 Lot Typologies

The Marrangaroo Master Plan includes a wide mix of lot sizes which can accommodate semi-detached and freestanding dwellings. Compact lots, standard lots and larger lots meet a range of demographic demands, including singles, couples, families, older people and people with low and high incomes.

Residential lot typologies relate to the size of the residential lot size as follows:

- Large Lots 4,000m² and larger
- Standard Lots 600m² to 1000m². Lots between 1000m² and 2500m² may also fall into this typology where additional lot length is appropriate to accommodate site topography or features.
- Medium Lots 400m² to 599m²
- Compact Lots 250m² to 399m²

Controls:

 Residential building designs, lot typologies and dwelling mixes are to be consistent with the Master Plan and housing typology diagrams in Appendix 2: Residential Lot Typologies.

1.2 Site Coverage

The site coverage ratio is the ratio between the overall site area and the combined footprint of all buildings on the property.

Controls:

The maximum site coverage ratio allowed for each type of lot is:

- 60% for compact lots
- 50% for medium lots
- 45% for standard lots
- 30% for large lots



Figure 49: Corner lot addressing both street frontages



Figure 50: Articulation Zone

2. Building Siting and Orientation

2.1 Setbacks

Controls:

- Building setbacks including articulation zones are to be consistent with the housing typology diagrams in Appendix 2: Residential Lot Typologies.
- For large lots the following controls apply to building setbacks:

Building setback	Large Lots
Primary frontage setback	8.0m
Secondary frontage setback	3.0m
Garage / Carport setbacks	10.0m
Rear and side setback	1.5m
Rear lane setbacks	3.0m

- Upper floor side facades to be setback to achieve at least 2.4m between neighbouring houses at that upper level. This increases privacy and natural light to both houses and decreases overshadowing. This control does not apply to east-west oriented compact lots.
- For corner lot homes:
 - ^o Address both street frontages.
 - On the secondary street frontage, set back the house at least 2 metres from the boundary
 - ^o Setback the front facade at least 2m from any point on the splayed corner boundary.
- For lots backing onto Defence Lands:
 - Provide a minimum building setback of 40m to the Defence Lands boundary. Note this setback does not apply to lots facing onto Reserve Road.

2.2 Articulation zone

Where a dwelling has a front setback of 3m or greater an "articulation zone" shall be deemed to exist. The articulation zone is a notional area projecting up to 1.5m forward of the building. The notional area is shown in Figure 50. Articulation Zone.

Controls:

- Articulation zones and setbacks are to be consistent with housing dwelling typologies in Appendix 2: Residential Lot Typologies.
- Up to 40% of the articulation zone, when viewed from above, may include articulation elements. Articulation elements may include, for example, bay windows or building entries.
- Awnings and other sun shading devices placed over windows are permitted in the articulation zone and are excluded from the 40% limit.
- Verandahs, patios and landscape trellises are encouraged. Whilst they must not project forward of the articulation zone, there is no limit to the percentage which they occupy within the articulation zone.

2.3 Building Orientation

- Dwellings on compact, medium and standard lots should be orientated so that the building frontage is parallel with the primary street frontage.
- Orientate buildings where possible to take advantage of the north / north east aspect to maximise opportunities for passive solar heating and cooling.



Figure 51: High set windows to capture natural light

3. Solar Access

3.1 Solar access

The amount of solar access to residential dwellings and gardens has a significant impact on quality of life. Properties that are sunny throughout the year are more pleasant to live in and have health benefits to their occupants. For the benefit of new and existing Marrangaroo residents, designs for new dwellings and alterations to existing dwellings within Marrangaroo must provide adequate solar access to habitable areas of dwellings and to garden spaces.

Objective:

Promote high amenity residential development by ensuring dwellings are designed and sited to provide solar access to:

- Habitable rooms on site and on adjoining sites.
- Private open spaces on site and on adjacent sites.
- Adjacent public open spaces (where applicable).

Planning Principles:

Controls and numerical guidelines must be applied with the following principles in mind, where relevant:

- At low densities, there is a reasonable expectation that a dwelling and some of its open space will retain its existing sunlight. At higher densities sunlight is harder to protect and the claim to retain it is not as strong.
- Overshadowing arising out of poor design is not acceptable, even if it satisfies numerical

guidelines.

- For a window, door or glass wall to be assessed as being in sunlight, regard should be had not only to the proportion of the glazed area in sunlight but also to the size of the glazed area itself.
- For private open space to be assessed as receiving adequate sunlight, regard should be had of the size of the open space and the amount of it receiving sunlight. A usable strip adjoining the living area in sunlight usually provides better solar amenity, depending on the size of the space. The amount of sunlight on private open space should ordinarily be measured at ground level but regard should be had to the size of the space as, in a smaller private open space, sunlight falling on seated residents may be adequate.
- Overshadowing by fences, roof overhangs and changes in level should be taken into consideration. Overshadowing by vegetation should be ignored, except that vegetation may be taken into account in a qualitative way, in particular dense hedges that appear like a solid fence.
- The impact on what is likely to be built on adjoining sites should be considered as well as the existing development.

(Reference: LECNSW 09/10848 The Benevolent Society v Waverley Council).

Achieving solar access to living areas:

1. High set windows, lightwells and skylights are other options available for achieving natural light to living areas to the south.





2. External shading devices which provide summer shade to living areas such as eaves and pergolas with angled louvres can help to provide winter sun.



3. For north facing lots with living areas to the south, side setbacks and narrow eaves may be required to allow sunlight into living areas (including neighbouring houses).



4. It may be appropriate to locate a living area towards the street frontage to achieve northern solar access requirements.



5. It may be appropriate to locate a living area on the upper storey to achieve solar access requirements.

Controls:

- Development sites and neighbouring dwellings less than 500m² are to achieve a minimum of 2.5 hours direct sunlight between 9am and 3pm on 21 June onto at least 1sqm of living area windows and at least 50% of the minimum amount of private open space.
- Development must not create any additional overshadowing on existing housing where solar access is less than two hours between 9am and 3pm on 21 June. (This control does not apply to windows within 1.5m and facing a side boundary.)
- Setback side walls and roofs of dwellings by minimum 900mm in situations where (i) walls are opposite side windows of adjoining dwellings and (ii) windows are 1.5m or less away from side boundaries and (iii) windows on adjoining dwellings are the only windows to living areas. The setback is to be a minimum of 2.4m to either side of the opposite window.
- Excess summer solar access should be avoided through use of awnings and other shading devices.

- The Development Application is to include diagrams in plan and elevation that show the shadow impact of the proposal at 9am, 12 noon, and 3pm at midwinter with area calculations of the amount of space receiving solar access.
- Optimise solar access by:
 - locating habitable rooms where light levels are best within dwellings;
 - controlling garage size and location where garages would block sunlight;
 - orienting and locating windows where sunlight would best access habitable rooms;
 - selecting roof pitch and forms that reduce shadow to neighbouring properties; and,
 - use of skylights and high set windows to enhance natural lighting.

Refer to the adjacent and following examples for measures of achieving these solar access controls.



Figure 52: Daylight access to living areas

Achieving solar access for North Facing Compact Lots:

The following examples are to assist building designers meet the controls.

A. SINGLE STOREY HOUSE

- Mimimal overshadowing to the south and to neighbours
- Note that further articulation to sides of house may be required to achieve solar access to living areas located on the southern side of the house

B. DOUBLE STOREY HOUSE WITH SETBACKS TO SECOND LEVEL

- Setbacks to second storey minimise additional shading to the south and do not increase overshadowing to the south on neighbours' properties
- Note that further articulation to southern edge of house may be required to achieve solar access to living areas located on the southern side of the house

C. DOUBLE STOREY HOUSE WITH NO SETBACKS TO SECOND LEVEL

- · Building overshadows private open space to the south
- Building overshadows neighbour's private open space to the east and west
- Building restricts solar access to neighbour's living areas to the east and west. Refer to following diagrams.

Complies

Complies

Does not comply



NOTE:

These diagrams are based on north facing compact lots including DCP's guidelines for site coverage and setbacks. They are shown to demonstrate principles only and individual lots should be assessed on a case by case basis against DCP requirements.



Setbacks to sides and back of second level reduces overshadowing impact.

Two storey house (C) overshadows private open space to the south. (Does not achieve DCP requirements)

Minimal overshadowing constraints to lots with north facing private open space and living areas.

9:00 AM MID WINTER



3:00 PM MID WINTER

Two storey house (C) overshadows neighbours' (B and D) private open space and restricts solar access to neighbours' living areas. (Does not achieve DCP requirements)

The two storey house with setbacks (B) and single storey house (C) do not excessively impact on the neighbouring properties.

NOTE:

These diagrams are based on north facing compact lots including DCP's guidelines for site coverage and setbacks. They are shown to demonstrate principles only and individual lots should be assessed on a case by case basis against DCP requirements.

Achieving solar access for East-West Compact Lots:

The following examples are to assist building designers meet the controls.

A. DOUBLE STOREY HOUSE WITH REAR SETBACK TO SECOND LEVEL

- Mimimal overshadowing to neighbours
- High set north-facing window allows light into the rear living area without requiring further articulation
- Pitched roof configuration to above-garage room reduces overshadowing (best configuration above the garage)

B. DOUBLE STOREY HOUSE WITH REAR SETBACK TO SECOND LEVEL

- Mimimal overshadowing to neighbours
- 3m setback to northern boundary at ground level allows light into the rear living area
- Articulation of second storey above garage reduced overshadowing

C. SINGLE STOREY HOUSE

- Mimimal overshadowing to neighbours
 - 3m setback to northern boundary allows light into the rear living area

D. DOUBLE STOREY HOUSE WITH NO SETBACKS TO SECOND LEVEL

No setbacks to the rear of the second story has major overshadowing impact on neighbours

Complies

Complies

Complies

Full height room above garage restricts solar access to neighbour's open space



NOTE:

These diagrams are based on east facing compact lots including DCP's guidelines for site coverage and setbacks. They are shown to demonstrate principles only and individual lots should be assessed on a case by case basis against DCP requirements.



11:00AM MID WINTER



12:00PM MID WINTER



Two storey house with no setbacks (D) overshadows neighbour's open space. (Does not achieve DCP requirements)

High set north facing windows (A) can allow for morning light to living areas without the need for additional building articulation or setbacks

Setbacks (3m from northern boundary) allow for morning light to living areas when adjacent single storey houses.

Two storey house with no setbacks (D) overshadows neighbour's living area. (Does not achieve DCP requirements)

Rear setbacks (min 2.5m) to second storey (A and B) reduce overshadowing to neighbour's living areas. 3m setbacks to northern boundary (B and C) allows sunlight to rear living areas from 12pm.

Rear setbacks (min 2.5m) to second storey (A and B) reduce overshadowing to neighbour's living areas. 3m setbacks to northern boundary (B and C) allows sunlight to rear living areas.

Full height room above garage (D) restricts solar access to neighbour's open space. Pitched roof room above garage (A) has less of an overshadowing impact.

2:00PM MID WINTER

NOTE:

These diagrams are based on east facing compact lots including DCP's guidelines for site coverage and setbacks. They are shown to demonstrate principles only and individual lots should be assessed on a case by case basis against DCP requirements.



Figure 53: Building Character - Compact and Medium Lots



Figure 54: Building Character - Medium Lots

4. Garages, Carports and Driveways

The DCP aims to create quality streetscapes by setting controls on garages on housing lots. Single garages are encouraged on narrower lots but innovative responses to the controls may be considered. Alternatives that retain a high level of passive surveillance and activated street frontages are more likely to be deemed acceptable than those that seek to divorce the public and private realms.

Controls:

- Ensure garages do not dominate the streetscape by setting garages back from the main building frontage and using colours and materials that compliment those of the rest of the dwelling.
- Garages and carports are to be set back in accordance with the building typology diagrams and the large lot setback table
- Garages and carports adjoining rear access lanes are to ensure safe vehicle manoeuvring can be achieved
- For corner lots:
 - Garages and carports are to be accessed from the longer street frontage
 - Carports facing secondary frontages, where all sides are open and the roof form is a flat skillion may be closer to the boundary than the building, are to be set back 2.0m and

the uprights are to be coloured to match any secondary frontage fence

- The maximum width of any garage or carport facing a public street is 6.0m, providing the combined garage or carport width is no greater than 50% of the lot frontage
- Wider garages that are oriented side-on to the street may be considered only where the front wall is setback and designed to have a residential appearance
- Driveways must be no greater than 4.5m in width at the boundary line and are not to be constructed within 6m of an intersection.
- Driveway pavement may be coloured or patterned within the property boundary. Driveway pavement between the property boundary and street is to match the adjacent footpath material.
- Driveways are to be positioned 1.0m from the side boundary to allow for driveway landscaping.
- Another storey may be added onto a separated garage (e.g. 'granny' flat) so long as solar access requirements are met.



Figure 55: Garage design example



Figure 56: Garages adjoining a rear lane





Figure 57: Building Character - Standard Lots

5. Building Design

5.1 Porches and entries

These features should create a clear and visible entry area which provides shelter for those entering the house. On corner lots an entry should be on the long side of the lot to avoid a blank face to that street. These areas should form an integral part of the building.

Controls:

- Provide a covered entry to the home at least 1.5m deep and clearly visible from the street
- On corner lots the main entry could be located on the secondary street frontage.

5.2 Outdoor living spaces

Verandas, pergolas, balconies and terraces should provide usable external living areas for the home. They should be designed as to create a seamless link between indoor and outdoor living.

Verandahs and balconies should be provided to all elevations that are exposed to western sun. These elements appear as an extension of the house and improve energy efficiency by shading windows. They should be made from durable materials such as timber and metal.

Balconies and terraces provide usable external living areas for the upper level of the home. These areas give additional opportunities for outlook to the street and garden, improving safety by encouraging passive surveillance.

Controls:

- Feature entries may extend beyond the front facade so long as they comply with the articulation zone setbacks and requirements.
- Verandahs and pergolas are encouraged to provide outdoor living spaces around the house and may extend beyond the front facade, within the extents of the articulation zone.

5.3 Materiality and Proportions

Durability, detailing, appearance and diversity should be considered when selecting materials to ensure a high quality appearance over time. Variety and individuality are important, and considered materials selection creates a harmonious balance on the facades of the house. Well-balanced proportions are also important for improving the appearance of the dwelling, helping to relate various elements such as doors, windows and entries. Well proportioned elements on the facade of the house significantly improve its aesthetic value.

Controls:

- Utilise materials that reinforce the rural built form and landscape.
- Utilise a mix of materials and colours particularly within the visible facades, to provide articulation to the buildings and visual interest to the street.
- Materials should utilise muted, earthy tones. Avoid the use of bright, bold colours that are not compatible with the muted tones of the natural landscape.
- Exterior walls, roofs and trims of all buildings, including tanks, sheds, carports and other outbuildings are to be constructed of low reflectivity materials to minimise glare and reflection to surrounding areas.

5.4 Facades, Roofs and Roof Eaves:

Flat parapet roofs need to be considered within the overall streetscape and need to relate harmoniously with the neighbouring buildings. Importantly, low-pitched roofs behind a parapet need to successfully integrate with the side and rear elevations. Roof eaves should provide shading and weather protection to windows and doors.

- Eaves of at least 450mm (to the fascia) are required on all pitch roofs except where the roof portion is zero lotted. However, where practical, 600mm eaves should be considered to achieve an increased degree of shading to windows and for enhanced aesthetic appeal
- Where flat roofs are proposed, alternative shading devices are required
- Eaves are not mandatory on garages where they are located on the southern side of the main house
- Water tanks are not permitted on roofs.





Figure 58: Building Character - Large Lots

5.5 Privacy

All residents (neighbours and future occupants of proposed developments) should be afforded reasonable protection from overlooking of habitable rooms and primary outdoor entertainment spaces.

Controls:

- Where practicable upper floor windows of habitable rooms are to be aligned at intervals to the windows of habitable rooms in neighbouring properties
- Where a potential privacy conflict may exist upper floor habitable room windows are to be designed to restrict views below the horizontal This may be achieved by:
 - ^o Raised window sill heights,
 - Use of attached fixed slats angled to deny views below the horizontal
 - ^o Window boxes
 - ^o Or any combination of the above.
- Frosted or obscure glazing is to be used for the windows of any upper floor bathroom, en suite, laundry or WC
- The primary private courtyard area should not be positioned immediately adjacent to a neighbouring primary private courtyard area, unless a solid masonry fence to 1.8m in height is provided between them
- Air-conditioning compressors and pool pumps are to be located so that noise measured at the property boundary does not exceed 5dB above ambient night-time background noise.

5.6 Universal Design

Thoughtful house design can minimise or even prevent the need for expensive modifications as the home owners age.

- Provide direct and level access from car parking to the house
- Front door entrances require a minimum internal clearance width of 850mm
- Internal entry doorways require a minimum clearance of 820mm
- Internal entry level corridors require a minimum width of 1000mm
- Bedroom space on ground / entry level should be large enough for a queen size bed, wardrobe and circulation space (ie. 3.5 x 3.2m/3.0 x 3.7m)
- Window sills on the ground/entry level to be at a maximum height of 730mm above floor level (excluding bathroom and kitchen)



Figure 59: Landscaped setbacks



Figure 60: Landscaping and fences



Figure 61: Compact lot rear garden

6. Private Domain Landscape

6.1 Landscape and Private Open Spaces

The design of private open space in combination with the streetscape is vital to the character of the neighbourhood. Attractive landscaped front gardens in combination with views of rear garden planting and street trees has the ability to define the street.

Controls:

- For Large Lots landscaping is to include a range of planting types including trees which provide good shade and partial screening of development
- Existing trees are to be incorporated within lots. Dwelling configurations and ground levels should ensure existing tree health and longevity.
- A usable area of outdoor private open space is required as follows:
 - At least one area of minimum 20m², with a minimum dimension of 4m
 - directly accessible to a living area and orientated to achieve at least 3 hours of solar access between 9am and 3pm on the winter solstice
 - For larger and standard lots, at least 50% of the dwellings floor space is to be provided
 - In all cases private open space does not include any of the front setback
- Front and rear gardens must include at least 1 tree, installed at 75L pot size. Refer to Figure 24: Tree Species List for some suggested species.
- Bins should be concealed within a storage area so they are not visible from the street or an adjacent park.

6.2 Fences

Fencing provides a delineation between public and private realms and an essential privacy device between private properties. Fencing helps to establish defensible space and is also one of the most prominent elements in the urban environment and a major contributor to streetscapes.

Front fences are defined as the fence along the street frontage and that part of side boundaries that are forward of the building line.

Secondary frontage fencing relates to corner lots only and is defined as being that part of the longer street frontage directly between the front building alignment and rear building alignment.

Side and rear fencing relates to the side boundary between two lots behind the front building alignment, the rear boundary and that part of a secondary frontage behind the rear building alignment.

Controls:

- Front fencing (all fences forward of the building line) is to be a maximum of 1.2m in height and a minimum of 30% open
- Secondary frontage fencing is to be a maximum of 1.8m and set back from the primary frontage by half of the lot length. The rest of the secondary boundary may be fence as per the front fencing controls above.
- Side and rear boundary fencing may be 1.8m in height
- Fences that are not visually permeable, such as colorbond, are not permitted on boundaries along open spaces or larger lots, or where visible from streets
- Demarcation of boundaries through the use of hedges and tree planting is encouraged
- Larger lots require open "rural style" fencing using post and rail, timber and wire, with visual permeability from ground up. Fences should not exceed 1.4m in height. Hedgerows and planting are encouraged along boundaries
- Where property boundary fencing is situated on a drainage easement it is to be designed with a ground clearance between the vertical supports of at least 300mm so that drainage is not hindered.

Note: Side and rear fencing between lots is subject to the Dividing Fences Act. That Act establishes the process for negotiating with neighbours in terms of reasonable standard of fencing required, cost sharing between neighbours and reasonable access to construct a dividing fence. The Dividing Fences Act does not confer any authority upon Council and disputes between neighbours are a civil matter outside of Council's jurisdiction.

7. Environmental Hazards

7.1 Flooding

There are several flood hazard areas within the Marrangaroo site, most notably to the north adjacent Marrangaroo Creek and along the ephemeral creek lines.

Controls:

 All new development must meet relevant flood protection criteria. If development occurs in the vicinity of an open waterway or floodway, appropriate freeboard requirements for the development should be adopted as determined by the responsible authority or referral authority and to the satisfaction of the responsible authority.

7.2 Bushfire

The Marrangaroo site is surrounded by areas of bushland that create a fire hazard that must be recognised in any development within the area, in particular the boundary sites with an interface to mature vegetation.

Controls:

• All new development must meet all other relevant bushfire protection criteria to the satisfaction of the responsible authority, including Planning for Bush Fire Protection 2006 (NSW Rural Fire Service).

7.3 High Pressure Gas Pipeline

APA owns and operates the Young – Lithgow Natural Gas Pipeline (YLNGP) that runs through the site. The pipeline is located within an easement (of approximately 20m width) which runs through the site from north to south.

APA has responsibilities for managing the risks associated with land use well outside of the pipeline easements. This includes both increased risk of physical damage to the pipeline from development and ongoing land use activities, as well as the risk to surrounding development from a loss of containment.

Controls:

• All new development must retain the existing gas easement as indicated on the Master Plan.

- Any development over the easement is to be coordinated with APA and in compliance with their recommendations.
- Any development considered within the Measurement Length (ML) of the pipeline should undertake a Safety Management Study (SMS) as advised by APA prior to development in order to maintain pipeline integrity and community safety. The Measurement Length (ML) of the pipeline extends for 165m each side of the pipeline. The SMS process typically recommends improving the physical protection of the pipeline and excluding sensitive uses from the ML, which include:
 - ^o child care centre
 - ^o entertainment facility
 - ° educational establishment
 - ^o place of public worship
 - ^o residential care facility
 - ^o seniors housing

7.4 Electrical Easements

Endeavour Energy own an 11kV feeder L584 from Lithgow ZS, passing the proposed development and 66kV feeder 857 which supplies Lithgow ZS, through the site.

Controls:

 Any development impacted by electricity assets and easements must comply with Endeavour Energy's guidelines.

7.5 Defence Lands

Properties near Defence Lands may be subject to noise and vibration due to proximity to the Marrangaroo Training Area (MTA).

Controls:

• To reduce impacts on both residents and the MTA, dwellings are to be set back from the MTA boundary by a minimum of 40m.

8. Environmentally Sustainable Design

8.1 Building Sustainability Index

The Building Sustainability Index (BASIX) aims to deliver equitable, effective water and greenhouse gas reductions across the state. BASIX is implemented under the Environmental Planning and Assessment Act and applies to all residential dwelling types. BASIX is part of the development application process in NSW.

Controls:

- BASIX sets sustainability targets for water and energy as well as minimum performance levels for the thermal comfort of the proposed development. The targets are expressed as a percentage saving against the NSW benchmark and must be met for all new residential developments. Refer to www.basix.nsw.gov.au for more information.
- Refer to 8.2 and 8.3 for additional controls that will assist in meeting BASIX requirements for water and energy.

8.2 Integrated Water Management

The objective of Water Management at Marrangaroo is to protect natural systems, integrate storm water treatment into the landscape,protect water quality, and reduce runoff and peak flows.

In addition to these wider goals, development should take steps to reduce the on-site potable water consumption.

Controls:

Stormwater minimisation

- Incorporate rainwater tanks where practical to collect runoff from roof areas. The water should be used for landscape irrigation, cleaning and toilet flushing.
- Utilise pervious and porous surfaces and minimise impervious sealed services in order to maximise onsite stormwater infiltration.

Water Recycling and Re-use

• Where practical, incorporate grey water treatment and re-use systems (in accordance with EPA requirements) to provide additional water sources for irrigation of landscapes, cleaning and toilet flushing. Potable water conservation

• Provide water efficient taps and fittings and utilise recycled or tank water to minimise consumption of potable water.

8.3 Energy Efficient Building and Site Design

Increasing energy efficiency through building and site design helps to minimise greenhouse gas emissions. These solutions need to be economically viable and can help to save on energy and resource costs in the long run.

Controls:

Site Layout and Building Orientation

- Strategically locate deciduous trees to provide shade to windows and outdoor spaces in summer, and allowing sun entry in winter.
- Orientate buildings and position windows, awnings and shutters to capture solar access in winter and provide appropriate shading in summer.

Heating and Cooling

- Utilise natural systems to provide cross flow ventilation of buildings while ensuring openings are sealed in winter to minimise draft.
- Utilise insulation in combination with other materials that maximise thermal performance.

Energy Conservation / Renewable Energy Production

- Maximise natural lighting through skylights, light wells and positioning windows to capture northern light.
- Utilise light coloured internal finishes to reflect light.
- Utilise energy efficient lighting and appliances.
- Consider on-site production of renewable energy through photovoltaic cells and solar hot water systems. Maximise north facing roof spaces to facilitate energy production.

Building Materials

• Where practical, source local or recycled building materials. Selection should also take into account the embodied energy required in the production of the material.

Part C Village Centre Development



- 2. Retail facing onto main street
- Community facilities З.
- 4. Village Square
- 5. Car parking

Figure 62: Village Centre

- Village Park
- 7. All-ages playground
- Rocky outcrops 8.
- Shared path 9.
- 10. Electrical easement
- 11. Stormwater treatment basin
- 12. Park overlooking the permanent pond
- 13. Permanent pond

1. Function and Layout

1.1 Function of the Village Centre

The Marrangaroo Precinct is of a significant size and will ultimately be home to a substantial population. Marrangaroo's future population and its position relative to Lithgow means that the most immediate day-to-day needs of residents can be catered for within the Precinct.

A small compact village centre with limited retail and community functions has the ability to provide a focal core for the emerging community. By providing a B1 Neighbourhood Centre including community facilities and adjacent to key pieces of public open space, the Precinct has the potential to develop a thriving and vibrant centre which can enhance community spirit and identity within the broader Lithgow context.

Controls:

- The village centre will be zoned B1 Neighbourhood Centre.
- A Village Centre Masterplan, consistent with the road layout and public realm aspects of the Master Plan, is required to be prepared by the Developer for B1 zoned land, with input from Council and relevant stakeholders, prior to submission of a DA.
- Future retail provision based on estimated demand is as follows and should be used as a guide for the development of the Neighbourhood Centre:
 - ^o up to 1700sqm of retail floorspace, anchored by a grocer of no larger than 1000sqm.
- All development proposals within the village centre will be the subject of detailed design negotiations between the proponent and Council to ensure high quality development outcomes, including site planning, building design, massing, car parking, environmental sustainability and public domain treatments.
- All community and retail functions in the village centre are to include activated street frontages. A 'fine grain' building pattern is encouraged.
- Community facilities to be considered include a pre-school / kindergarten and/or a community centre to service the future needs of the community.

1.2 Safety and Design

All development is vulnerable to crime and vandalism to some degree. However, non-residential development, particularly in quiet neighbourhoods, can be subject to more frequent abuse. Therefore all non-residential development shall, as a minimum, be required to demonstrate consistency with the following Crime Prevention Through Environmental Design principles.

- Clear sight lines between the public realm and the development shall be provided to promote passive surveillance.
- Clear lighting around the approaches to doorways and windows enhance monitoring. Such lighting shall be directed and hooded to contain the illumination within the property and prevent glare spilling into neighbouring residential properties.
- Landscaping shall be comprised of low ground covers, typically below 300mm in height and trees where low branches are above 1600mm in height. This approach preserves a clear line of sight through landscaping and avoids concealment opportunities.
- Colour selection below the awning level should comprise bright shades so as to enhance passive surveillance.



Figure 63: Car parking with trees and planting



Figure 64: Bike parking

2. Access and Circulation

2.1 Pedestrian and Cyclist Access

The transport hierarchy within the development favours alternative modes (cycling and walking) of transport first, then public transport routes, then private transport.

Controls:

- Provide clearly defined pedestrian entry points from the footpath to retail and community facilities.
- Separate pedestrian and bicycle circulation from vehicle movements, particularly loading and servicing vehicles.
- Provide bike parking in convenient locations.
- Pedestrian access throughout the Village Centre should be designed to achieve Disability Discrimination Act (DDA) compliance.

2.2 Car Parking

Developments are to provide sufficient car parking within the site without adverse impacts on streetscapes.

Controls:

- Car parking for the retail and community facilities should be combined with a consolidated circulation system and entry and exit points and located to the rear of the buildings as indicated in the Master Plan.
- Parking numbers are to be determined by the developer through a qualified traffic consultant and tailored to the specific retail and community services being provided.
- Car parking bays for people with disabilities should be provided in accordance with the standards outlined in the Disability Discrimination Act (DDA).
- Car parking spaces, loading docks and vehicle route directions should be permanently marked out on the pavement surface in accordance with the approved parking and access layout.
- Car parking spaces and access ways should be designed in accordance with the dimensions specified in the relevant Australian Standards.

- Buildings should be designed to address car parking areas with windows and active uses such as entrances to provide passive surveillance.
- Parking areas shall contain tree planting to provide shade for vehicles and to soften the visual impact of parking facilities.

2.3 Loading and Servicing

Developments are to provide safe and efficient loading and servicing while minimising the visual impact of loading bays and service areas when viewed from the surrounding streets and areas.

- Loading areas should be located to the rear or side of the property away from the primary street frontage.
- Where practical, integrate loading areas into the design of the building so that loading occurs internally. Where external loading areas are visible from adjoining land uses, they should be screened with landscaping or articulated built form.
- Loading and servicing should occur with the vehicle completely contained within the site. No part of the vehicle should extend into the public road reserve.
- Loading and servicing should be designed to service a range of vehicle types in order to provide for flexibility.
- Access to loading areas should be clearly separated from pedestrian and bicycle access routes.
- Ensure storage and loading areas are or sufficient size and dimensions to avoid the use of car parks for temporary storage of goods.
- Loading areas should be clearly defined with line marking, designed to allow unobstructed vehicle access and provide appropriate turning areas in accordance with Australian Standards AS 2890.2
 Parking facilities Part 2: Off-street commercial vehicle facilities.
- Allow for sufficient and safe collection of waste materials.



Figure 65: Neighbourhood Centre architectural character



Figure 66: Village Square, retail and community facilities

3. Built Form

3.1 Building façades, entrances and articulation

In the B1 Neighbourhood Centre zone all buildings are to address public roads and any adjoining parkland or public open space with an active frontage. To be considered an active frontage the building façade must be punctuated with door and window openings. Articulation of the frontage is required to provide further interest and visual appeal.

Controls:

- All street frontages, other than service lanes, shall be provided with no less than one window or door every 4m
- Ground floor primary façade is to be minimum 50% clear glazing
- Fence heights forward of the building line are to be no higher than 1.2m
- Large expanses of blank, unarticulated facades are not permitted. Facades are to have architectural detail and variations in surface materials
- All public entrances are to be distinct, legible and of a scale consistent with the overall building
- All commercial and retail buildings are to be designed with logical locations for outdoor advertising that complement the architectural form. Generally logical locations:
 - ° Are situated at awning level or below,
 - ^o Are of a scale consistent with the building,
 - Are capable of supporting both a message face and a border or buffer,
 - All outdoor advertising is to be located within logical locations on the building façade so that the architectural features and embellishments are not obscured.

- Balconies and verandahs are encouraged on primary frontages and street corners
- Continuous awnings are to be provided alongside retail and commercial properties
- Pedestrian access (e.g. doorways) are to be provided along primary street frontages of shops and commercial uses
- Tilt-up concrete panel construction is not permitted. Buildings should be of a human-scale and be comprised of varied materials and finishes such as brick, timber and stone

3.2 Setbacks

Controls:

- Retail stores along the Main Road through the Village Centre should form a consistent edge to the street with no setbacks from the footpath for the majority of the building frontage along the street.
- Community facilities may be set back from main roads provided the landscape treatment in front of the building positively contributes to the character of the street and emphasises the building's public character.

3.3 Building Height

Controls:

 uildings are to be a maximum of two storeys within the Neighbourhood Centre and up to a maximum height of 8m.

Appendix

1. Street Typologies

Green Entry Street





Notes:

- Central planted median (with WSUD if appropriate)
- On-street car parking and/or two lanes in each direction
- Footpaths to both sides
- Native low-maintenance verge and median planting
- Street trees at typical 15m centres
- 2.5m shared path to one side refer to master plan for location

Collector Street



Notes:

- On-street car parking
- Planted tree pits within parking lanes at typical 20m centres
- Footpaths to both sides with turf verges
- Street trees at typical 20m centres (offset with parking lane trees)
- 2.5m shared path to one side refer to master plan for location

Main Street



Notes:

- Full width paving along the town centre side of the street
- Planted tree pits in the carriageway and footpath
- Street trees at typical 20m centres (offset with parking lane trees)
- Retail built to property boundary with a continuous awning over the footpath
Local Street



- Narrow carriageway with unmarked parking to both sides
- Footpaths to both sides with turf verges
- Street trees at typical 10m centres, with a minimum of 1 tree in front of every lot

Large Lot Access Street





- Narrow carriageway
- Turf verges with no footpaths
- Grass swale in verge if required for stormwater drainage
- No upright kerbs to carriageway
- Street trees at typical 10m centres

Laneway



- Narrow carriageway
- No footpaths
- No parking
- Rear lane access to residential blocks
- Small street trees to one side



Enterprise Corridor Street

- On-street car parking
- Planted tree pits within parking lanes at typical 20m centres
- Footpaths to both sides with turf verges
- Street trees in verge at typical 20m centres (offset with parking lane trees)
- Mixed traffic for cyclists

V 0.6 1.2 2.2 path 12.6 2.2 1.2 0.6 carriageway path] 20.6m road reserve

Industrial Street

- On-street car parking
- Footpaths to both sides with turf verges
- Street trees at typical 15m centres
- Mixed traffic for cyclists



Industrial Street with swale



- Drainage swale with native planting
- On-street car parking to one side only no parking against swale
- Footpaths to both sides
- Street trees at typical 15m centres, informal tree planting along swale
- Mixed traffic for cyclists

Park Edge Street



- 500mm verge on park side of the road
- Footpath on park side to be located within park and accessible from the street
- Verge and parking configuration on development side as per street typology
- Option to have on-street car parking and footpath to one side only (No parking against buffer/park edge)

2. Residential Lot Typologies

Compact Lot

• 250m² to 399m²



Medium Lot

• Medium Lots - 400m² to 599m²



Standard Lot

• 600m² to 2500m²



Corner Lot (all sizes)



note: refer to relevant lot size typology for all other controls

Rear Lane Lot (all sizes)



note: separated enclosed garages count towards building site coverage refer to relevant lot size typology for all other controls

Draft Marrangaroo Development Control Plan

3. Existing Lots Master Plan Overlay



Figure 67: Industrial lands with existing lots (red)



Figure 68: Industrial lands with existing lots (red)

4. Site Analysis



4.1 Location and Context

The Marrangaroo Project Area is located approximately mid way between the urban centres of Lithgow and Wallerawang and approximately 150km west-north-west of Sydney.

The area and immediate surrounds are enclosed by steep and vegetated slopes and the area is bounded on the east by the Great Western Highway.

The project area is predominantly semi rural in character with scattered rural lifestyle development and highway service land use including a motel and service station. A maximum security correctional centre adjoins the employment lands to the north with the western most boundary of the project area adjoining a defence facility.

The project area comprises 339.22ha of land within the Marrangaroo Urban Release Area (URA) and 54.85ha of IN1 zoned land (employment lands as mapped in Lithgow Local Environmental Plan 2014). Within the URA there is 41.22 ha of land zoned for B6 Business Corridor and 298 ha of land zoned R1 General Residential.

The Project Area has approximately 38 individual landowners with one land holding of 143.9ha in single ownership in the centre of the URA representing 36.4 % of the project land area or 42.4% of the URA land area.

Figure 69: Site Context and Location



Recent Industrial Development



Open farmland and rolling hills



Highway service station



Mature vegetation and surrounding woodland

Figure 70: Existing Character



Ephemeral creeks









Heritage chapel



Figure 71: Natural Features



Figure 72: Bushfire Assessment



Figure 73: Hydrology, Flooding and Stormwater Management



Figure 74: Infrastructure



Figure 75: Slope Analysis



Site Boundary
5m contour intervals

Figure 76: Topography



Figure 77: Views



Figure 78: Views



Figure 79: Constraints

4.2 Constraints and Considerations

Location and Context

- The site is physically separated from Lithgow with the topography providing a visual and physical barrier and car access available only via the Great Western Highway. This provides the opportunity to make Marrangaroo a distinct place of it's own.
- The site's projected population and proximity to Lithgow mean that the development will rely on Lithgow for many essential services, including schools and community facilities.

Land Ownership

- Existing lot boundaries and ownership will impact on staging and future development boundaries. Individual landowner's stances on development to be acknowledged.
- Having one landowner for 36% of the site area reduces the constraints on the site.

Heritage

• The chapel at the corner of Reserve Road and the highway is the only heritage constraint.

Natural Features

- The site has significant woodland areas to the north, south and east with associated environmental protection and bushfire buffers. These areas also provide a picturesque backdrop to any future development.
- There are a large number of mature trees on site that should be retained where possible.
- Rocky outcrops create a natural feature that should be retained where possible.
- Several ephemeral feeder creeks run north-south across the site. These have associated environmental protection buffers that pose a constraint to development.

Slope and Topography

- Steep slopes occur across parts of the site, including a north-south stretch of land that divides the site as well as two hills to the south and east.
- The topography generally slopes down to the north, resulting in the best views across the site and to surrounding areas from the south.

• The topography creates a natural division between the site and Lithgow, with potential future pedestrian and/or vehicle access via a saddle to the south of the site.

Drainage and Hydrology

- Potential flood zones occur along the creek lines.
- Existing creeks, dams/water bodies and overland flow paths to be incorporated into the overall drainage strategy.
- Any increased drainage load resulting from development will need to be accommodated in water sensitive design measures across the site.

Infrastructure

Roads

- Reserve Road is currently the only sealed road within the site.
- Access from Great Western Highway to be limited to Reserve Road and one other left-in / left-out access point.

Water

- Limited water infrastructure Current water infrastructure under councils control includes 100mm water main along Reserve Road and 250mm water main along the Great Western Highway.
- Additional reservoir required north of the site (no smaller than 20ML)

Sewer

 Dedicated trunk infrastructure to Lithgow STP required for future development (current infrastructure at capacity)

Gas

- Existing gas line with 20m easement runs N-S through the site and constrains development
- 160m buffer zone to gas line to be confirmed this would be a major constraint to development

Electricity

 Minor transmission lines run across the site
potential to redirect with development to be explored