Wolli Creek and Bonar Street Precinct

Public Domain Plan

Adopted: 4 May 2011
Effective: 5 December 2011

ROCKDALE CITY COUNCIL
On Historic Botany Bay

PREPARED FOR ROCKDALE CITY COUNCIL BY:

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1.0 INTRODUCTION

1.1 STUDY AREA

Wolli Creek and the Bonar Street precinct are undergoing a transformation from a predominantly industrial precinct into a high quality, high density urban environment. With new mixed use developments on Arncliffe Street, Brodie Spark Drive and the streets adjacent to the station, renewal of the public domain is underway.

New street connections, parks, public open space and foreshore connections present an opportunity to define the character of Wolli Creek and Bonar Street, and to provide a high quality, integrated public domain.

1.2 PURPOSE OF REPORT

The Public Domain Plan is intended to guide and coordinate the design and construction of improvements to the public domain of Wolli Creek and Bonar Street precinct. It identifies opportunities for enhancement of all aspects of the public domain, and where possible identifies the potential for provision of more pedestrian space. Within the document the Technical Manual provides a coordinated approach to design, construction and maintenance of the public domain.

The Public Domain Plan is intended for use by:

- The general public in understanding the issues involved in protecting existing values inherent to each site, and in developing strategies for upgrading the area;
- Developers, designers, and consultants preparing proposals affecting the public domain and its components;
- Consent authorities assessing and approving the proposed development; and
- Council officers, in preparation of detailed designs within the precinct.

1.3 STRUCTURE

This document contains both the Public Domain Plan and the Technical Manual.

The Public Domain Plan (PDP) is a guideline document that proposes overall principles and strategies for the provision, structure, function and identity of the public domain within Wolli Creek and the Bonar Street precinct. The PDP is constructed to move from the broad to the particular, in order to cover all aspects affecting public domain design.

The Public Domain Technical Manual covers design and layout principles for streets. The main section is comprised of standard details and performance cri o be used as a guideline for design and construction for streets and squares within the study areas. This includes a standard range of street furniture, lighting, paving and surface treatments to ensure continuity of maintenance practices, and to unify the public domain.

1.4 RELATED DOCUMENTS

Readers should refer to the following documents for development of designs for upgrading the public domain:

- Rockdale LEP 2011
- Rockdale DCP 2011
- Discovery Point concept plan
- Street Tree Master Plan Report 2009

2.0 DESIGN PRINCIPLES

2.1 THE PUBLIC DOMAIN

The public domain is generally considered to be the land that is in public ownership and freely accessible to the public: the streets, parks and squares of the urban area. The public domain may also include the interface between public and private: – spaces where building setbacks form an extension to streets and open spaces. All these spaces have been considered together for the purposes of the Public Domain Plan.

It is essential that all elements of the public domain are considered together. Measures to control traffic should be balanced with pedestrian comfort and convenience, the geometry of streets, and the desired future character of each centre. The PDP aims to maximise amenity for all users of the public domain, and to upgrade the image of each precinct while retaining and enhancing the characteristics that form the precinct's identity.

The principles set out in this section provide a design framework for the public domain of the Wolli Creek and Bonar Street precincts . These principles underpin the strategies and improvements outlined in Section 3.

Garden surrounding Tempe House

Intersection at Magdalene Terrace

2.2 IDENTITY

Wolli Creek and the Bonar Street precinct are making a transition from a degraded industrial area to a contemporary, high quality commercial and residential area. The character of the area is influenced by its natural and cultural heritage, and by the connections that it retains to natural systems. The proximity to Alexandra Canal and Wolli Creek wetlands sets this area apart from other inner urban areas.

The northern boundary of the precinct is characterised by the presence of a Swamp Oak Forest and Coastal Saltmarsh which constitute an Endangered Ecological Community. Mangrove Scrub along Wolli Creek provides habitat linkages to Wolli Creek Regional Park and lands that are home to internationally significant migratory birds.

Tempe House

SWSOOS at Thompson Reserve

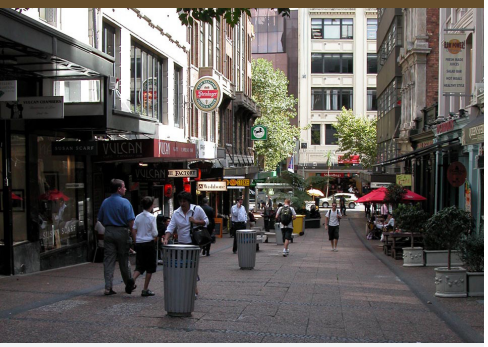
Design of the public domain must understand and reinforce the elements that make this place distinctive, but also support the aspirations of a contemporary living and working community.

Wolli Creek is framed by waterways – Wolli Creek and the Wolli Creek wetlands to the north, Alexandra Canal and Cooks River, which have been obscured by the physical ramparts of road and rail infrastructure, and by the recent development of Discovery Point. Design of public domain can reinforce the proximity, making physical and visual links, and symbolic links through planting and design of water management systems, making the movement of water explicit in the public domain. The riparian/estuarine character can be reinforced through:

- Water Sensitive Urban Design elements in streets and parks
- Views to water and wetlands
- Physical connections to water in public domain
- Character planting

Wolli Creek and Bonar Street also have a history of development that is reflected in physical remnants: Tempe House and Magdalene Chapel from a colonial past; the Southern and Western Suburbs Ocean Outfall Sewer (SWSOOS) structure that contains significant heritage elements. Although somewhat buried within past and recent developments these remnants could make a much stronger contribution to the image and character of the area through:

- Revealing the structure of the SWSOOS in the public domain;
- Ensuring visibility from streets and parks to important heritage items;
- Adaptive public reuse;
- Referencing the elements in design of the public domain through materials etc;
- Signage and interpretation.



Pedestrian laneway, Melbourne


Wide pedestrian path


Residential street, Innesdale Road

2.3 URBAN HIERARCHY

Wolli Creek has a core of commercial, retail and mixed use functions, which will potentially be the town centre - and a focus of community life. Currently, there is little to define the core area in design of streets or public spaces.

Greater differentiation between residential and commercial areas creates a hierarchy of spaces, while reinforcing the core as the principal retail and social place for the community, the heart of the suburb. The higher level of activity expected in an urban core should be reflected in:

- wider streets and footpaths;
- an urban 'hard' treatment of verges;
- the inclusion of paved civic spaces that allow for intense use by crowds;
- higher level of lighting; and
- art in the public domain.

Residential areas require a more intimate scale in privacy and separation between the buildings. The residential character may be expressed in:

- narrower streets with an intimate scale;
- green treatment of verges; and
- inclusion of local parks for passive recreation.

2.4 LANDFORM AND VIEWS

Landform helps to shape the physical identity and spatial quality of the public domain. Design of the public domain should seek to enhance the patterns that respond to landform, and to retain or open up significant views. The desire for street tree planting, for example, should often be balanced against retaining a view which may characterise a particular place. Layout, and placement of elements can contribute to character by orientation of places to a significant view. Design should also work with the qualities of landform to provide appropriate pedestrian connections and ways through spaces.

- Retain/reveal significant views from the public domain to waterways, significant sites and heritage items.
- Where possible locate public spaces on sites with significant views; and
- Identify significant views, and consider these in the selection and placement of street trees and furniture.

View across Cooks River

View through new development to Magdalene Chapel

View from top of SWSOOS to Sydney CBD

2.5 ACCESS AND TRANSPORT

A fundamental principle of public domain design is to encourage walking as a form of transport. Streets must comfortably accommodate vehicular, cycle and pedestrian use, and reduce conflict between these forms of access. The aim of plans, through design, should be to give priority to pedestrians in commercial and residential centres, to maximise comfort and safety, and make a livable, walkable place.

Use of public transport should be encouraged through ease of access to public transport, and the provision of comfortable waiting areas.

- Rationalise the layout of vehicular circulation to minimum standards where possible, to provide opportunities to enhance and extend pedestrian space;
- Identify areas of pedestrian/vehicle conflict and rectify where possible;
- Provide clear and direct access to the train station, and opportunities for changing modes of transport;
- Provide seating and shelter at bus waiting areas; and
- Provide cycle facilities in the public domain and at transport hubs where possible.

2.6 LIVABILITY

Promoting pedestrian amenity is central to design of the public domain. Encouraging pedestrian access reduces car dependency, promotes equal access and increases opportunities for social exchange and community life. Streets and public spaces should be comfortable, safe and engaging places that encourage people to visit and to stay. There should be spaces that supplement commercial activity, where people can interact socially without the need to spend money. There should also be shelter, seating and visual delight.

Pedestrian routes to and within centres should be designed to be accessible to everyone, including people with mobility impairments. They should offer a continuous path of travel or include areas without steps and steep grades. Use the opportunity provided by public domain improvements to improve disability access.v

- Provide access to streets, parks and public spaces for all users;
- Eliminate level changes, obstructions and confusing paving patterns as much as possible;
- Provide clear and generous links between high use areas, and improve the relationship of streets to associated public spaces;
- Create spaces for social interaction to supplement the street;
- Improve pedestrian environments and encourage use through pavement widening, street tree planting and upgrading of furniture and facilities; and
- Enhance safety and the perception of personal security, and implement the recommendations of Crime Prevention through Environmental Design where applicable.

Refer to the Technical Manual for specific guidelines for designing for people with a disability.

2.7 URBAN ELEMENTS

Good design in the public domain can reinforce site characteristics and contribute to the identity of a place. Quality street furniture, paving and lighting contribute to quality public domain outcomes and solutions.

Furnishing in the public domain should respond to the scale, function and location of each place. There should, however, be a limited range of elements across the precincts and the Rockdale LGA to promote a uniformity in maintenance practices. A limited palette of materials used in a variety of ways reinforces unity and allows for variation in detail where appropriate.

A Technical Manual, detailing the layout and type of paving and furniture, has been prepared for the Wolli Creek and Bonar Street Precincts, and forms Sections 4 and 5 of this document. The Technical Manual proposes a hierarchy of paving and furniture treatments, based on the size and activity of each centre, and its contribution to the identity of the locality.

2.8 PUBLIC ART

Public art is an important cultural activity. It aids legibility of place, enlivens the public domain and can define and reveal specific identity.

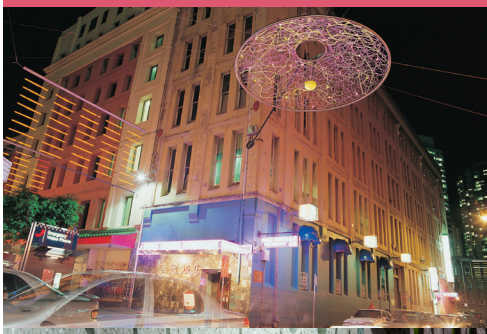
Public art ranges from the monumental to the temporal and can include:

- Free standing art objects;
- Artist involvement in the design and layout of public parks, squares and forecourts;
- Artist involvement in the design of specific elements of the public domain; and
- Festivals and other cultural events.

Wolli Creek has a local, rather than a regional focus. Public art projects should reflect this in scale, funding and level of provision.

Develop public art that will reflect the local identity, diversity and values of Wolli Creek, and that will promote sites of significant cultural and natural heritage.

- Create public art that enhances and contributes to the provision of quality facilities and amenities.
- Public art is encouraged as part of building facades and forecourts, and in public spaces within building blocks.



2.9 WATER SENSITIVE URBAN DESIGN

Design of streets, parks and small landscape spaces can integrate water sensitive urban design by encompassing and facilitating measures to harvest and reuse water for the public domain. It may be possible and appropriate to integrate measures where whole streetscapes are to be renewed, or into new landscape spaces including parks.

The potential to integrate water harvesting or filtering will be dependent on topography, and the ability to retrofit or adapt existing stormwater systems. Individual systems should also be underpinned by a catchment wide strategy for harvesting, storing and treating and re-using stormwater.

- Where possible, collect stormwater for watering street trees and landscape elements;
- Allow, where possible and appropriate, for future connections to stormwater treatment systems when renewing or rectifying stormwater infrastructure as part of public domain works;
- Treat stormwater as close to the source as possible; and
- Collect and treat stormwater from paths and roads in bioretention tree pits, rain gardens and filter gardens, and integrate seamlessly with the design of streets, parks and squares.

See Section 5.1.7 for guideline details for Water Sensitive Urban Design.

2.10 TREES

Trees contribute to the visual and spatial quality of the public domain, and improve pedestrian amenity. The placement and selection of trees contributes to the quality of human experience by affecting views, light and shadow, scent and colour. Close planted trees can create an intimate scale in residential streets. In the absence of awnings, trees also provide shade and shelter.

Tree planting is proposed for most streets in the study area, and there is a variety of planting styles and locations proposed. Definition of street hierarchy and differentiation of character will be, therefore, dependent on species selection and the detailed treatment of paving. The selection of trees should also reflect a connection to the natural environment.

This development provides an opportunity for trees that connect to what is left of the natural environment. As such the selection of tree species should be based on soil and micro-climatic conditions, as well as considerations of scale, position of services, and desired visual and spatial character.

For further information, refer to Section 4.2 and 5.1.6.

3.0 STRATEGIC OVERVIEW

3.1 CONTEXT DIAGRAMS

3.1.1 Regional Context

Located at the southern end of Sydney's employment corridor Wolli Creek is a connected and accessible urban centre through the close proximity of:

- Wolli Creek Railway Station
- M5 Motorway
- Sydney Airport

Wolli Creek is linked to a regional open space network consisting of:

- Botany Bay
- Cooks Cove
- Cahill Park
- Cooks River Foreshore
- Alexandra Canal
- Homebush Bay

Set to contain the highest population densities within Rockdale City, Wolli Creek represents both a new employment base and a distinctive high density riverside residential zone.

REGIONAL CONTEXT

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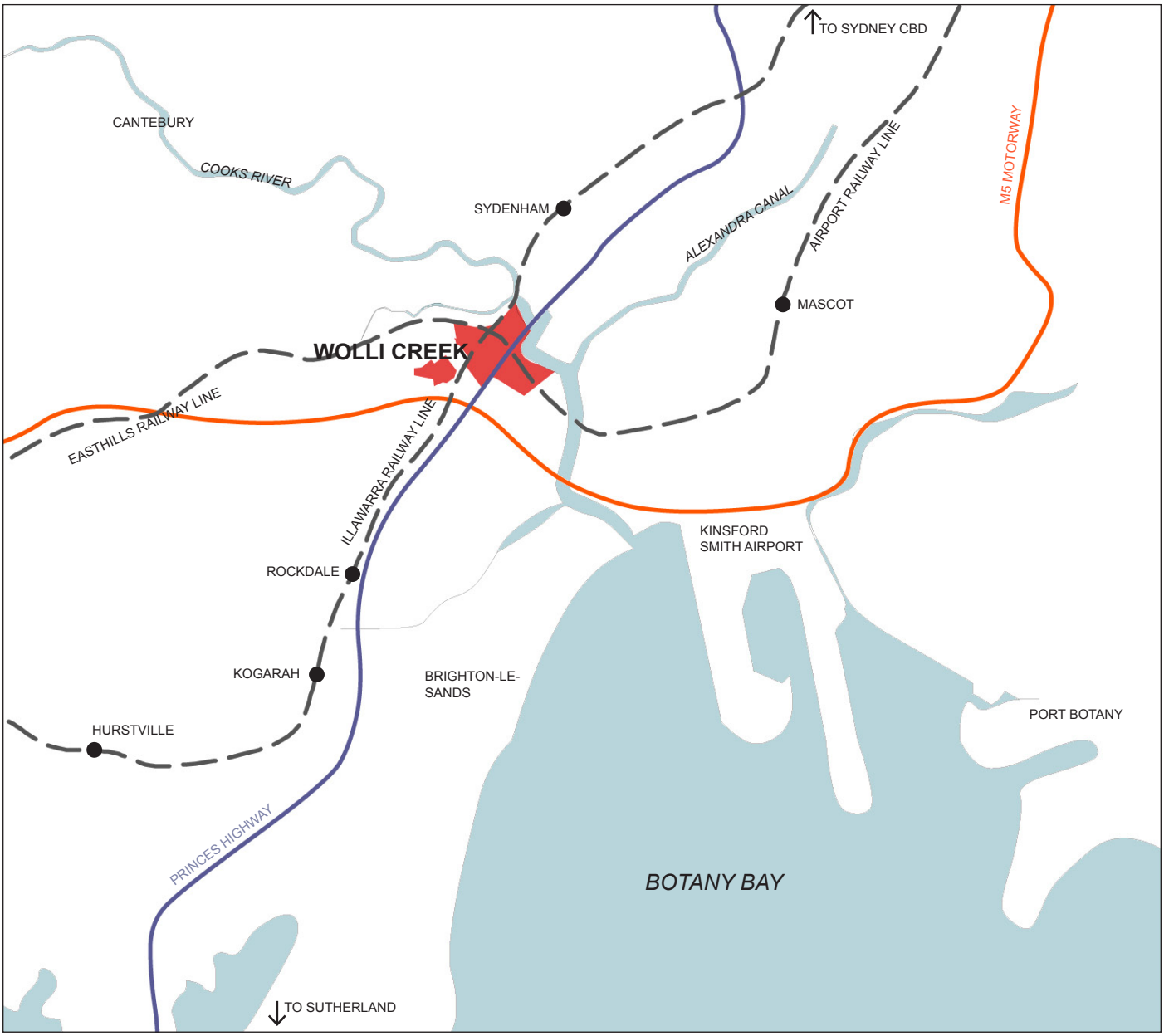


FIGURE 1.1

3.1.2 CHARACTER DEFINING ELEMENTS

Many of the elements that potentially define the character of Wolli Creek - the waterways of Wolli Creek and Cooks River including the Bonnie Doon Channel, heritage items such as the SWSOOS and Tempe House - have been largely alienated from the public domain through infrastructure and building development which visually and physically separate the public domain from these features. This Public Domain Plan aims to reveal the defining elements by:

- creating or enhancing visual and physical links to those elements;
- integrating the elements into the public domain, as part of parks and streets;
- referencing the natural and cultural history of the area in the design of the public domain and selection of materials.

The design intention is to create a strong public domain spine that connects the foreshore of the Cooks River to the heritage structure of the SWSOOS, offering an engaging journey through the heart of the town centre. The spine should be distinctive in design, referencing the character of the foreshore, and integrating the SWSOOS and Bonnie Doon channel as part of the streetscape.

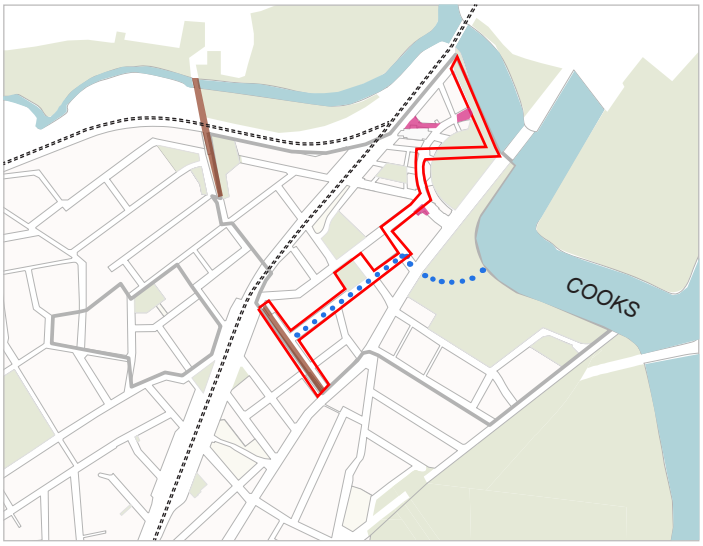
SWSOOS
Southern and Western Suburbs Ocean Outfall Sewer runs along a heritage aqueduct.

BONNIE DOON CHANNEL
A brick stormwater channel, runs along an original drainage line and captures water from a large part of Arncliffe releasing it into the Cooks River.

TEMPE HOUSE AND FORESHORE PARK
The Tempe House precinct, which is of state and local heritage significance, is located adjacent to Discovery Point Park. Tempe House and its grounds are of exceptional historical significance as a remarkably intact example of a 1830s villa still within its landscape setting. The precinct, which still includes St Magdalene's Chapel, has been recently restored in accordance with the Tempe Estate Conservation Management Plan. As Discovery Point Park and the haritage precinct are accessible to the public, they provide a valuable community asset.

WATER SENSITIVE URBAN DESIGN
As an inspiration for the design of streets, parks and civic spaces to reconnect with the natural drainage lines of the area through strategies for cleaning and managing urban runoff within the catchment.

CHARACTER DEFINING ELEMENTS



LEGEND

- Bonnie Doon Channel
- SWSOOS
- Key Plaza spaces
- Key Character Link SWSOOS to foreshore

FIGURE 1.2

FIGURE 1.3

Note: Buildings are indicative only

3.1.3 STREET HIERARCHY

REGIONAL ROAD
Princes Highway
Marsh Street

DISTRICT LINK
Gertrude Street
New Road 1
New Road 2

MAIN STREET
Arncliffe Street
Brodie Spark Drive
Magdalene Terrace

MIXED USE STREET
Argyle Street
Mt Olympus Boulevard
Guess Avenue East
Willis Street
New Road 3
New Road 4
New Road 5
New Road 6

RESIDENTIAL STREETS
Guess Avenue West
Innesdale Road
Rockwell Avenue
Levey Street
Loftus Street
Lusty Street
Thompson Street
Bonar Street
Hirst Street
Edward Street
New Road 7
New Road 8
Wollongong Road
Martin Avenue

LANEWAYS
Robert Lane
Innesdale lane
Spark Lane

Streets form the framework of the public domain, providing access to both public and private buildings, and linking open spaces and places of commerce and activity. Well designed streets can:

- Enhance the town centre's street pattern, defining a civic character for the commercial centre of Wolli Creek;
- Create a convenient pedestrian network linking parks and public spaces, unifying the city and enhancing pedestrian and recreation experience;
- Improve amenity and reduce vehicle/pedestrian conflict; and create a memorable image for Wolli Creek and the Bonar Street precinct.

The public domain of the commercial centre of Wolli Creek is structured by three main streets: Brodie Spark Drive, Magdalene Terrace and Arncliffe Street. Gertrude Street and Marsh Street connect the central area to mixed use and residential areas, and to the wider street and road network.

The Bonar Street precinct is predominantly residential, and is defined by Bonar street and the community park at the centre of the area.

The streets of the study area vary in scale, character, function and importance. Many recently built existing streets are relatively narrow, with a narrow pedestrian path, which is frequently at odds with the proposed height of buildings and the proposed pedestrian intensity. The Public Domain Plan seeks, where possible, to provide generous main streets in the commercial heart that will accommodate scale and use, and create a civic character.

Street typology outlined in the diagram is used as a basis for streetscape design strategies, that aim to provide a differentiation between civic and residential areas. Street type has been determined by analysis of:

- Street hierarchy - the importance of the street in the network.
- Level and character of activity within the street, determined by ground floor use of the built edge.
- Connections to public buildings and spaces.
- Links to the wider vehicular movement system.

Each street type should have a distinct character, defined primarily by use and built form, and reinforced through streetscape design elements such as tree planting, paving and furniture.

STREET HIERARCHY

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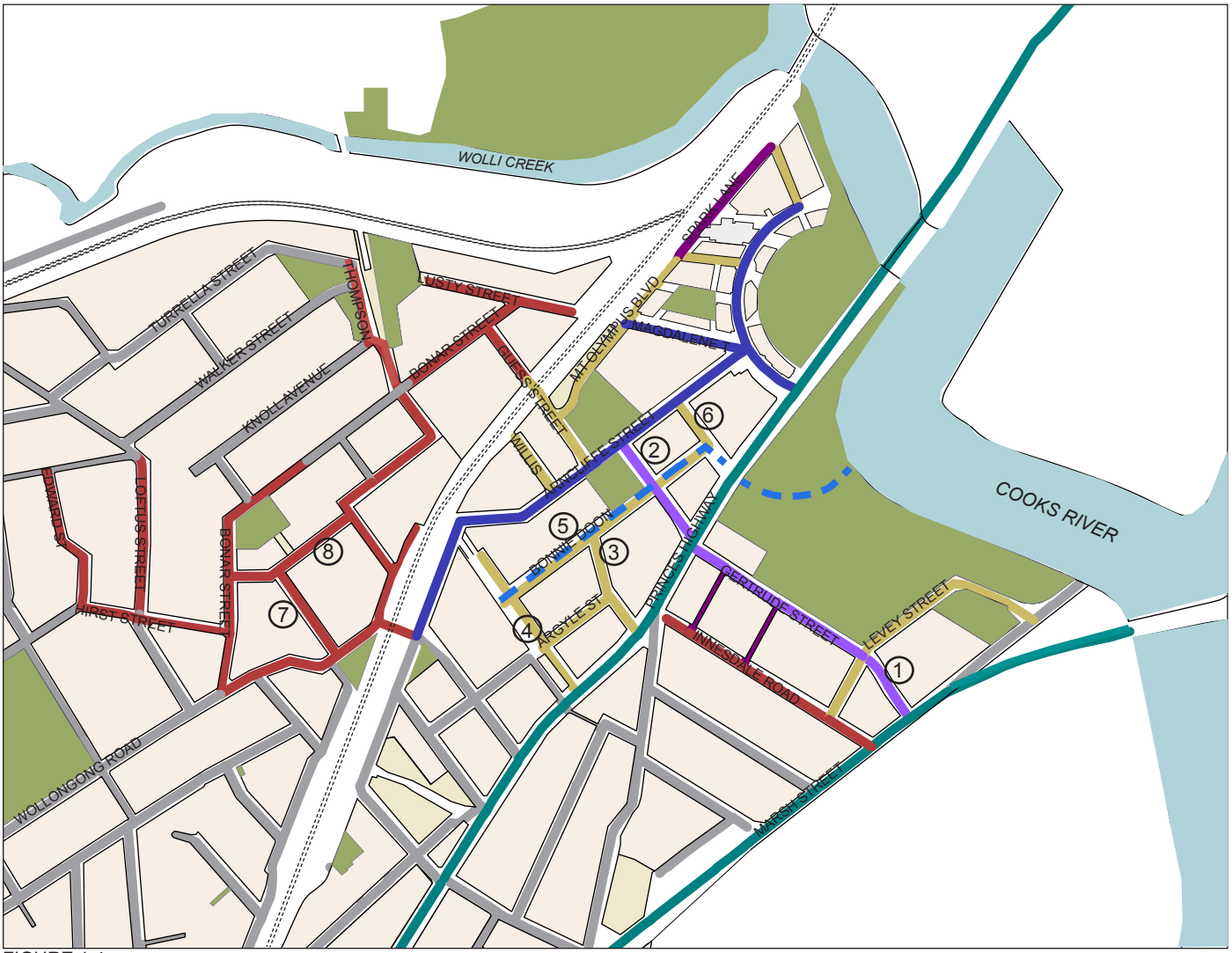

FIGURE 1.4

LEGEND

- Regional Road
- District Link
- Main Street
- Mixed Use Street
- Residential Street
- Laneway
- Bonnie Doon Channel
- Rail Infrastructure Corridor

3.1.4 PARKS AND OPEN SPACE

Parks and public open spaces should provide a range of amenity that includes all members of the community. These spaces join with streets to provide a public domain network with a variety of recreation opportunities. The design of each space should reflect function, potential or existing character, and its place within the network or hierarchy.

There are two major existing green open spaces within the study area;
- Cahill Park that accommodates organised active recreation; and
Discovery Point Park, which forms a green open space as a curtilage to Tempe House. Discovery Point Park, is privately owned but is accessible to the public.

Several smaller parks are proposed to supplement the existing open spaces, and provide for local use. The PDP also identifies a series of potential civic spaces that are formed by the configuration of streets and building edges. These spaces are essentially extensions of the street space, but provide opportunities to create spaces for civic activity that are currently lacking within the commercial centre. Civic spaces have the potential to accommodate intense use, and provide for public gatherings. In Wolli Creek, they also create valuable void spaces in a very dense built environment.

Open space can also be developed to act as supplementary habitat for the enhancement of the neighbouring Endangered Ecological Community, Saltmarsh, and Wetlands.

1. Discovery Point
Foreshore park - combining historic Tempe House, grounds and chapel, remnant mangrove edge, playground and open space. Character contained in water views, historic buildings and mature trees. (Publicly accessible private open space)
2. Cahill Park
Combines recreational sports fields with mature trees and water views, and picnic areas.
3. New Town Park (and alternate park site)
Green space as relief from high density new development. Strong relationship with commercial character of Arncliffe Street and the surrounding mixed use buildings. WSUD agenda relating to the micro catchment of streets and the proximity of Bonnie Doon Channel.
4. Bonar Street Precinct Community Park
Services the new residential precinct around Bonar Street. Functions as a gathering point, informal sports area, picnic facilities and local playground.
5. Thompson Street Reserve
Links three currently disparate open spaces into a park which features the heritage SWSOOS. Strong WSUD agenda, including stormwater management and links to the mangrove environmental protection zone on the opposite side of the rail embankment. Provides recreational space for the surrounding high density residential developments, including informal games, playground and picnic area.

PARKS AND OPEN SPACE

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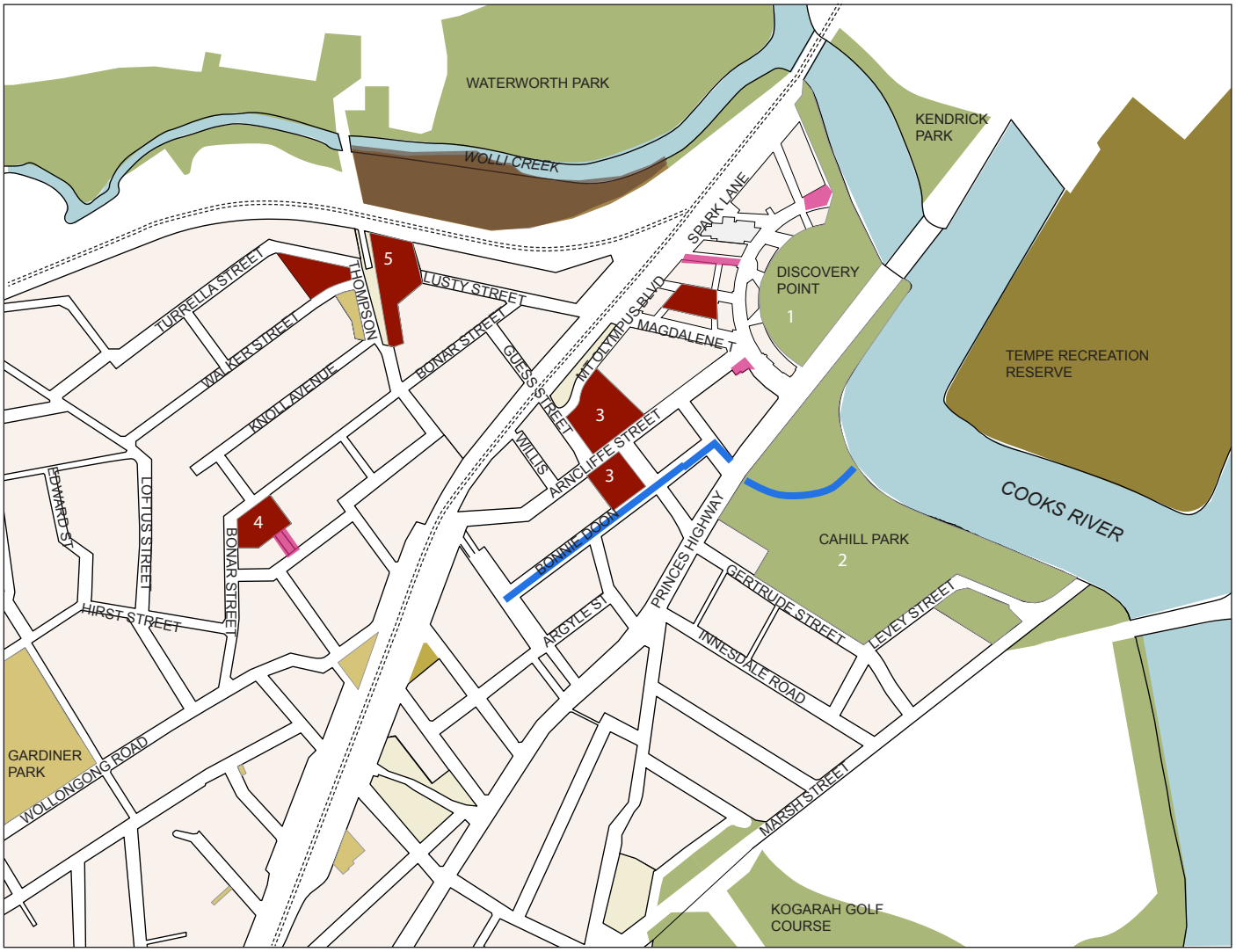

FIGURE 1.5

LEGEND

- District Open Space
- Sports Grounds
- Local Park
- Proposed Local/Town Park
- Environmental Protection Zone
- Civic Spaces
- Bonnie Doon Channel
- Rail Infrastructure Corridor

3.1.5 CONNECTIONS

Safe and convenient pedestrian and cycle connections are essential to creating a usable public domain network. Most connections will be on street, including footpaths and on road cycle lanes. There are a number of potential connections that should also be considered that enhance the usability of the internal network, and provide links to a wider public domain network.

CYCLEWAYS
On-Road
• New on-road cycleways link to existing cycleways, the station, and a network of parks and larger regional destinations.

Off-Road
• By creating a continuous linked foreshore park both pedestrian and cycle paths allow off-road movement along the Cooks River and access to surrounding parks and recreation reserves. This will require links under the Princes Highway bridge over the Cooks River and under the Railway bridge.

KEY PEDESTRIAN LINKS
• Wider footpaths throughout Wolli Creek provide better access and extend pedestrian movement to new parks and residential areas. See street sections in Section 4.2.

• Key Links across main roads and under infrastructure corridors promote overall pedestrian connections.

• Continuous pedestrian access to, and along the linear foreshore park through links under the Princes Highway Bridge and railway bridge and a public foreshore width of at least 10 metres.

• Station links to cycleways and main pedestrian movement paths. Key entrance points to station should be clearly marked.

CONNECTIONS

SCALE 1:10000

FIGURE 1.6

LEGEND

- On-road Cycleway
- Off-road Cycleway
- Key Pedestrian Routes
- Key Potential Link
- Key Existing Link
- Potential Cycleway
- Potential Pedestrian Path
- Wolli Creek Train Station Entry
- Potential rail over/underpass zone

A Existing connection across Princes Highway at Brodie Spark Drive

B Connection across Princes Highway at Gertrude Street (Traffic lights and Cycle Lane)

C Future foreshore connection under rail bridge and across Wolli Creek

D Future foreshore connection under Princes Highway Bridge

3.1.6 WATER MANAGEMENT

Wolli Creek area (or suburb) is located on a low floodplain between the Cooks River and Wolli Creek. It captures water from three catchments with urban runoff moving down from the slopes of Arncliffe. The majority of this water is redirected through the network of street drains to the larger stormwater grid and eventually into the surrounding creeks and waterways.

There are, however, key open space locations within the site in which water sensitive urban design (WSUD) projects should be initiated in order to filter and treat the runoff before it reaches the main waterways. These locations also have the potential to use the micro catchment of streets to direct water to treatment sites.

Water sensitive urban design initiatives also provide benefits in reducing localised flooding.

A network of Water Sensitive Urban Design initiatives can also be a thematic reference to the town centre's hidden water edge, reinstating the unique environmental character of Wolli Creek.

See Section 5.1.7 for WSUD types.

MICRO CATCHMENT ANALYSIS

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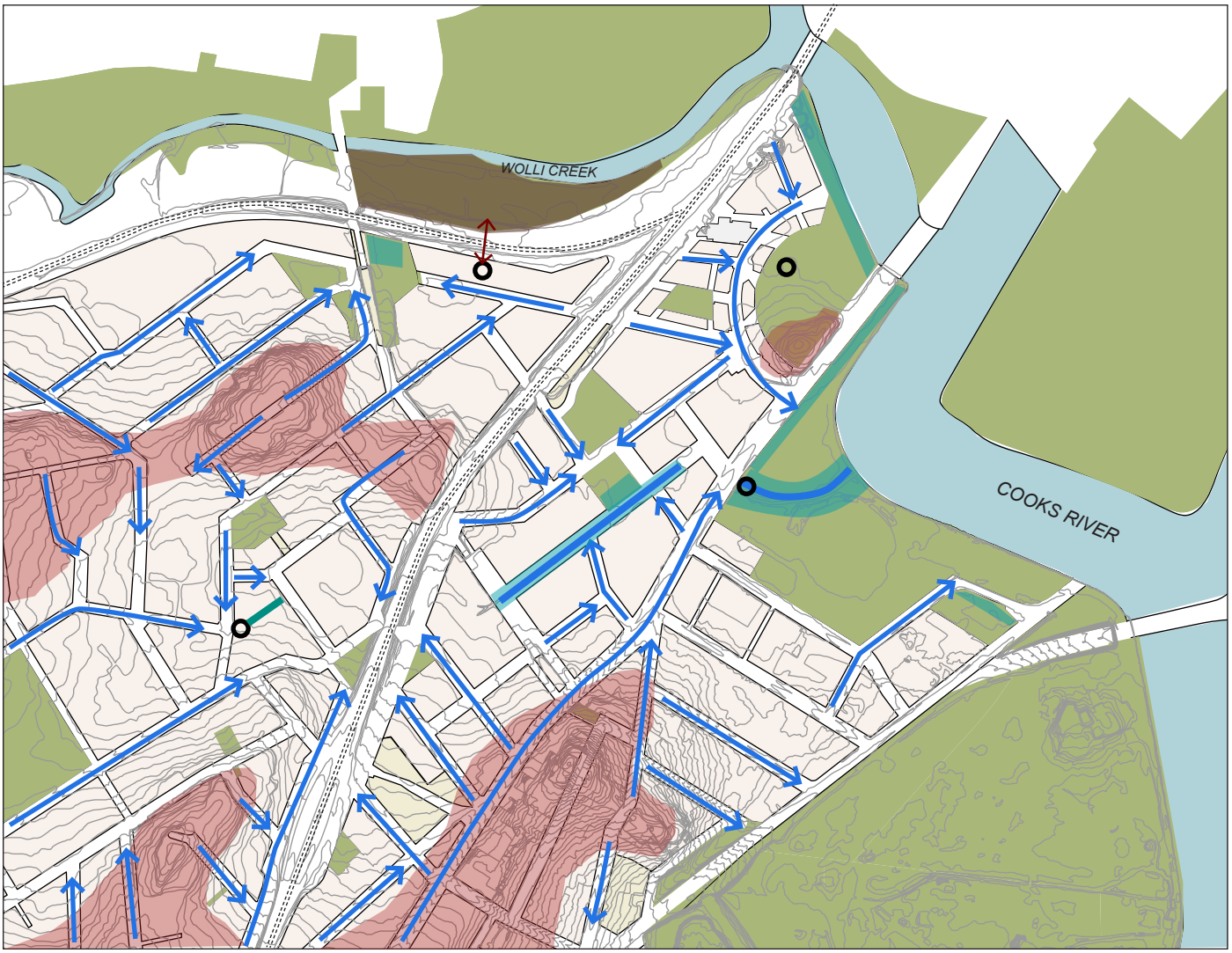

FIGURE 1.7

LEGEND

- Key WSUD Locations
- Ridge lines and high points
- Open space
- Environmental Protection Zone
- Micro catchment flow direction
- Bonnie Doon Channel
- Infrastructure Corridor
- Gross Pollutant trap
- Stormwater Outlet

3.1.7 VEGETATION STRATEGY

Located between Wolli Creek and the Cooks River, with two catchment systems comprising of steep sandstone slopes and rich alluvial flats, Wolli Creek's original vegetation pattern was diverse and significant. Industrial land use as well as recent development has seen these plant communities reduced to small isolated pockets.

SWAMP OAK FLOODPLAIN FOREST
The Swamp Oak Floodplain Forest community occurs on the coastal floodplains of NSW. It typically forms mosaics with other floodplain forest communities and wetlands, and often fringes treeless wetlands with semi-permanent standing water. The most saline forms of Swamp Oak Floodplain Forest may adjoin or intergrade with Coastal Saltmarsh.

Casuarina glauca
Eucalyptus robusta
Melaleuca linariifolia
Acmena smithii
Livistona australis

TIDAL MUDFLATS
Juncus krausii

COASTAL SALTMARSH
Saltmarsh provides habitat and food for invertebrates such as crabs, insects including mosquitoes, molluscs and spiders, as well as for fish, birds and bats. It is a breeding and nursery ground for marine life, and filters nutrients that would otherwise enter estuarine waters. Saltmarsh provides habitat for migratory shorebirds protected under international treaties

Sarcocornia quinqueflora
Suaeda australis
Triglochin striata
Sporobolus virginicus
Wilsonia backhousei
Lampranthus tegens
Halosarcia pergranulata
Juncus kraussii
Samolus repens

* See Rockdale Council's Biodiversity Strategy for more details.

ORIGINAL VEGETATION COMMUNITIES

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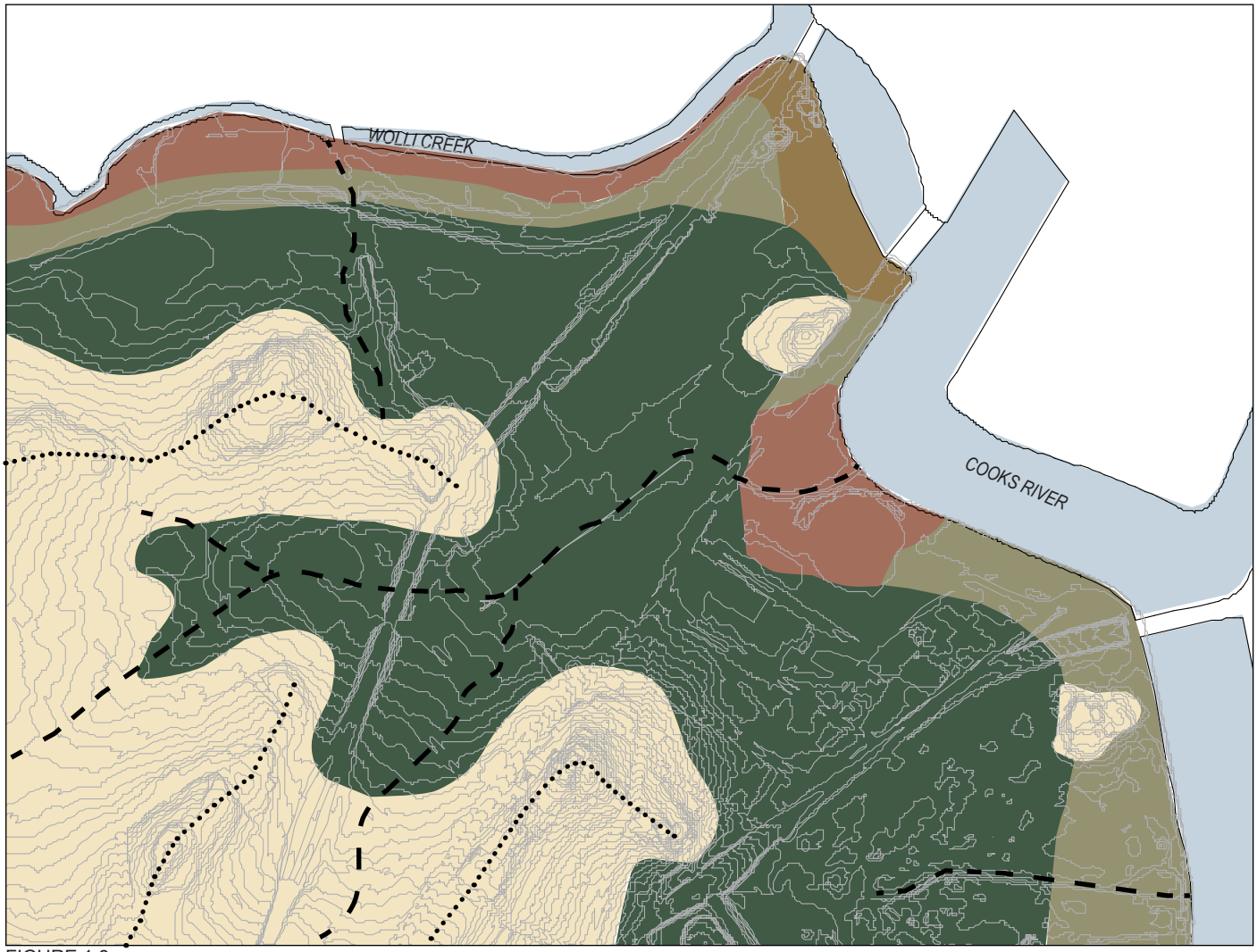

FIGURE 1.8

LEGEND

- Floodplain Forest
- Mudflats
- Saltmarsh
- Mangrove Forest
- Sandstone Woodland
- Catchment boundaries
- Original drainage lines

MANGROVE FOREST
Mangroves are trees and shrubs forming forests on the intertidal mudflats along the shores of estuaries, typically growing between saltmarsh and seagrass beds. Mangrove forests play an important role in estuarine and marine ecology, providing habitat for many fauna species. They are nursery grounds, feeding areas and shelter sites for fish such as the flat-tail mullet and silver biddy, and support many bird species. Mangrove forests are also often used by migratory shorebirds as roost sites, and sometimes as foraging sites.
In addition, mangrove forests play an important role in the protection of shorelines from erosion caused by wave action; in the filtration of pollutants from run-off; in the reduction of waterway siltation; and as a visual screen along developed shorelines.

Avicennia marina
Aegiceras corniculatum

SANDSTONE WOODLAND
Found on the erosional soils and sandstone outcrops above the floodplain this open woodland and forest incorporates a diverse range of trees which respond to exposure and drainage, with a rich understorey of shrubs.

Angophora costata
Banksia integrifolia
Eucalyptus piperita
Eucalyptus botryoides
Eucalyptus pilularis
Eucalyptus saligna
Eucalyptus robusta

Reference
(www.sydneyolympicpark.com.au/education_and_learning/environment/biodiversity/plants/coastal_saltmarsh).

Benson and Howell, 1990, *Taken For Granted*, Kangaroo Press, Sydney.

www.sydney.cma.nsw.gov.au

Rockdale Council's Biodiversity Strategy

REMNANT AND LOCALLY INDIGENOUS VEGETATION COMMUNITIES

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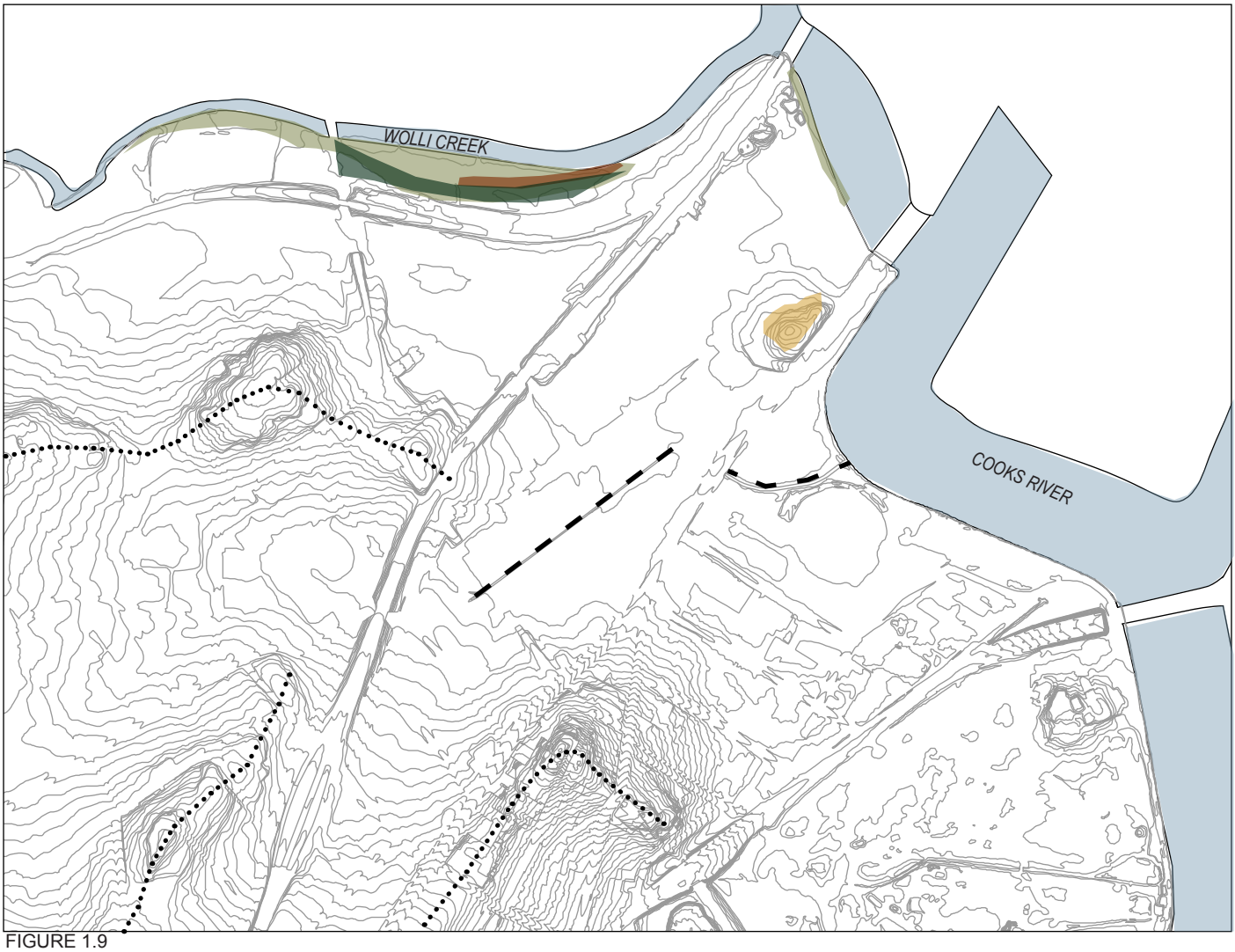


FIGURE 1.9

LEGEND

- Floodplain Forest
- Mudflats
- Saltmarsh
- Mangrove Forest
- Sandstone Woodland
- Catchment boundaries
- Current drainage lines

The vegetation corridor along Wolli Creek is of state significance and is a likely habitat for migratory birds listed under the China Australia and Japan Australia Migratory Birds Agreement. The precinct is a potential habitat for the Grey Headed Flying Fox. Vegetation links should be created with the neighbouring Cooks River Regional Park.

Remnant Swamp Oak Floodplain Forest

The Swamp Oak Floodplain Forest located between Wolli Creek and the Railway line is an Endangered Ecological Community.
The existing threatened community is not accessible to the public as it is bounded by Wolli Creek in the west and the east Hills railway line in the east. This inaccessibility has afforded it protection from human activity. Any increased access to this area would need to be considered from this viewpoint.

Foreshore Mangrove/ Saltmarsh

Strategy to reinstate original estuarine edge through replanting of mangrove forest and areas of saltmarsh.
In parks along the foreshore, preference should be given to the planting of native and particularly endemic species due to the close proximity of degraded Endangered Ecological Communities

Wetlands and Swales

Through a system of swales and artificial wetlands water from the urban catchment is captured and filtered before entering the channel and Cooks River.

Streets

Street tree planting which responds to the topography, soil type and aspect. Where possible the vegetation pattern of Floodplain Forest on the floodplain and Sandstone Woodland on the ridges is reinstated.

Parks

Planting design and vegetation species selection is to facilitate enhancement of habitat corridors and links to other open space areas. Species selection should reflect the identity of the local natural system.

1. Thompson Street Reserve

Wetlands establishing on the lower portion of the site capturing urban runoff and linking to the mangrove protection zone on the opposite side of the rail embankment.

2. Bonar Street Community Park

Floodplain Forest Species along with WSUD strategies to link to into catchment water flow.

3. Cahill Park

Establishment of mangrove edge along portion of foreshore.
Extension of Floodplain Forest species across the park. Enhance open portion of Bonnie Doon Channel which runs through park, to promote meander of a natural stream with wetland areas for water filtration and biodiversity.

POTENTIAL BIODIVERSITY COMMUNITIES

SCALE 1:10000

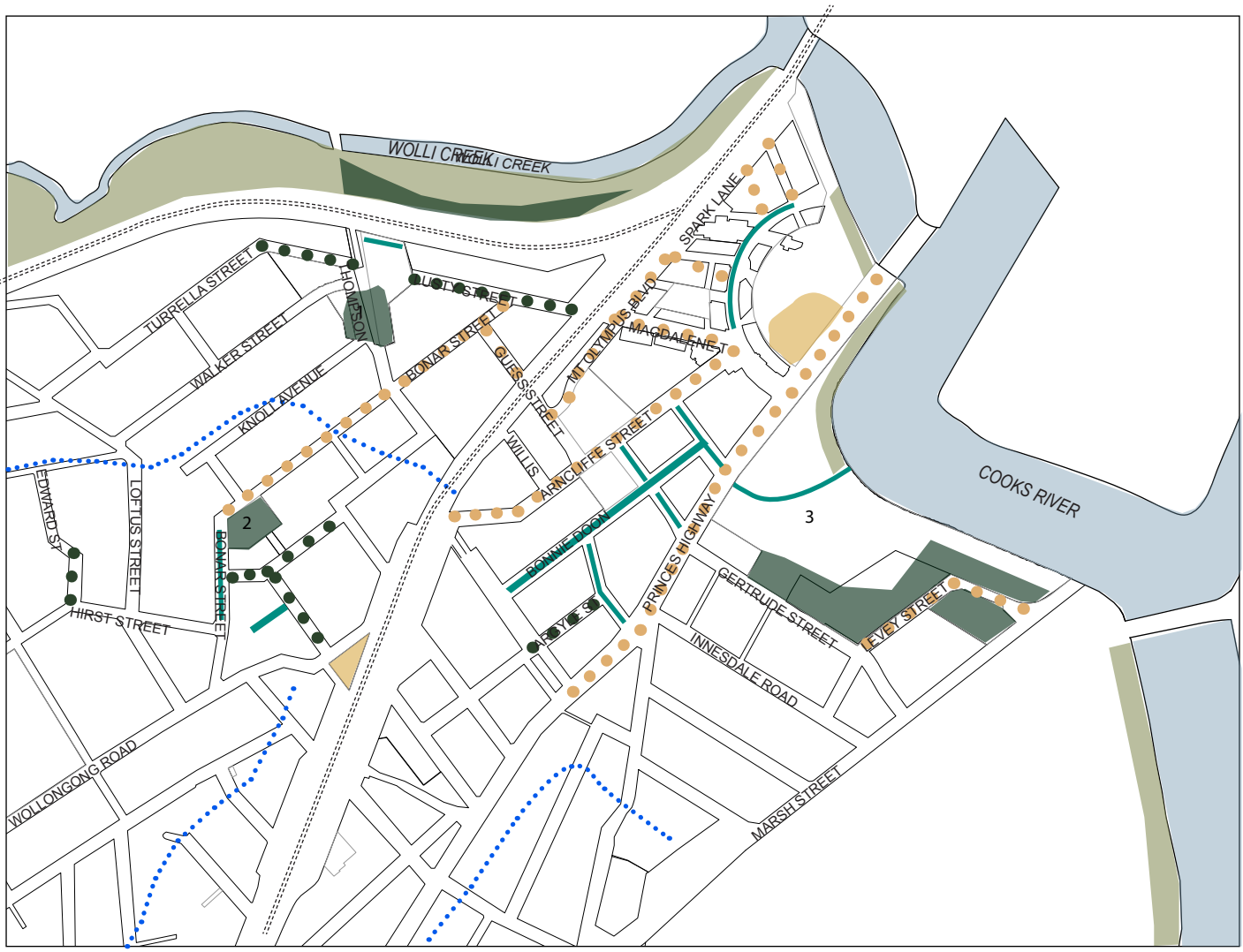


FIGURE 1.10

LEGEND

- Floodplain Forest
- Foreshore Mangrove/Saltmarsh
- WSUD Wetland/Swale
- Sandstone Woodland
- Sandstone street trees
- Wetland street trees
- Catchment boundaries

3.1.8 STREET TREE STRATEGY

Type 1 - Deciduous Avenue
Pyrus ussuriensis
Platanus digitala
Ulmus parvifolia

Type 2 - Feature Avenue
Liriodendron tulipifera
Jacaranda mimosifolia

Type 3 - Waterway Reference
Melaleuca linariifolia
Melaleuca stypheloides
Elaeocarpus reticulatus
Eucalyptus robusta
Melaleuca quinquenervia

Type 4 - Evergreen Tall
Corymbia maculata
Angophora costata
Lophostemon confertus
Eucalyptus punctata
Eucalyptus sideroxylon

Type 5 - Residential Small (overhead power lines)
Tristaniopsis laurina
Callistemon 'Hannah Ray'

STREET TREE STRATEGY

SCALE 1:10000

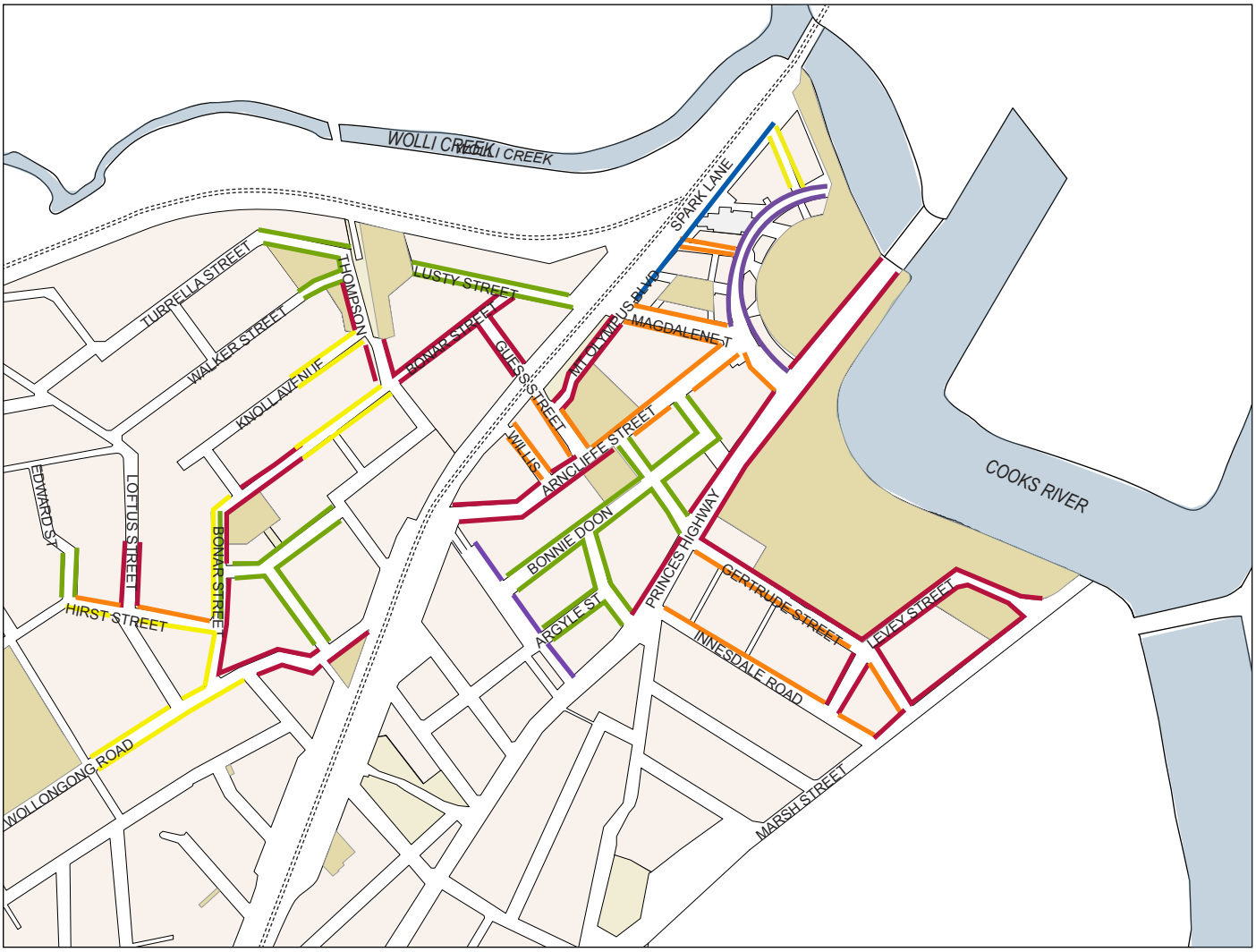


FIGURE 1.11

LEGEND

- Deciduous Avenue
- Feature Avenue
- Waterway Reference
- Evergreen Tall
- Residential Small
- Screen Planting
- Rail Infrastructure Corridor

4.0 DESIGN PRINCIPLES

4.1 DESIGN FRAMEWORK PLANS

4.1.1 New Town Park - Analysis

Proposed town park to function as relief from surrounding high density development, and as recreation/leisure opportunity for the commercial centre of Wolli Creek.

New Town Park - Site One

The site at the corner of Arncliffe Street and Guess Avenue presents a range of opportunities and constraints as the site of a new town park:

- Located between Mount Olympus Boulevard, Guess Avenue and Arncliffe Street is has strong visibility from major connecting streets within the area.
- Existing Lophostemon confertus avenue along the western boundary
- significant level change along the northern park edge to be resolved within park design
- Existing development along the north eastern boundary needs to be screened and integrated into the park design in order to resolve level change and negative frontage.
- Site provides a large area, which with resolution of levels and access can provide a range of level usable spaces to cater to a range of activities.
- Opportunity to incorporate WSUD strategy into the park design to demonstrate water filtration, collection and reuse.

New Town Park - Alternate Site

The alternate site at the corner of Arncliffe Street and Gertrude Street is ideally suited as a town park:

- Located amongst series of new streets and developments linking across the Princes Highway to Cahill Park.
- Provides a key area of porous surface within the micro catchment of street surface flow, linking to the Bonnie Doon Channel - opportunity for WSUD project.
- Level site.
- Sits within active streets with mixed use ground level.

NEW TOWN PARK - SITE ONE

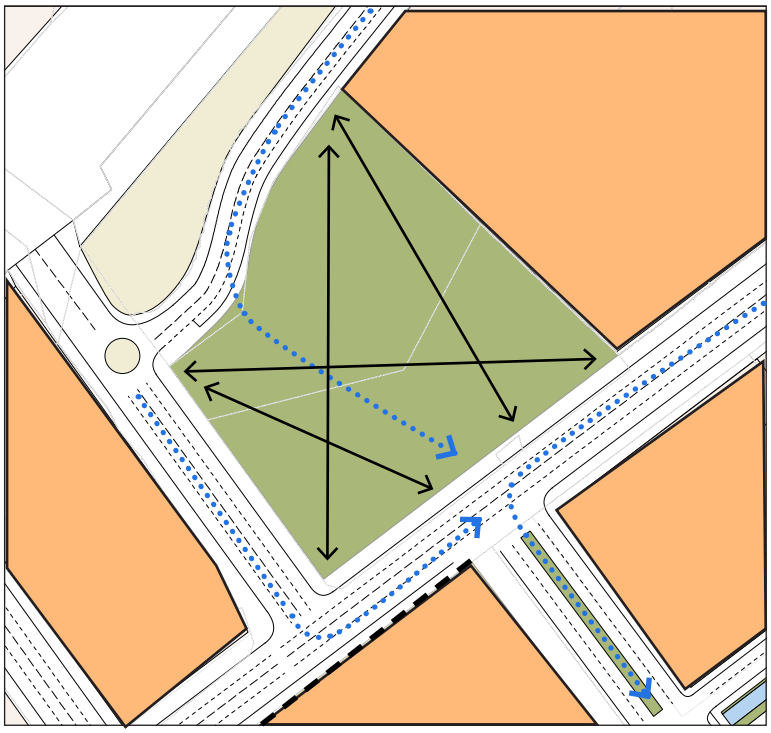


FIGURE 2.1.1

LEGEND

- Proposed park
- Mixed use development
- Micro catchment flow direction
- Bonnie Doon Channel
- Active Edge
- Pedestrian desire lines

NEW TOWN PARK -ALTERNATE SITE

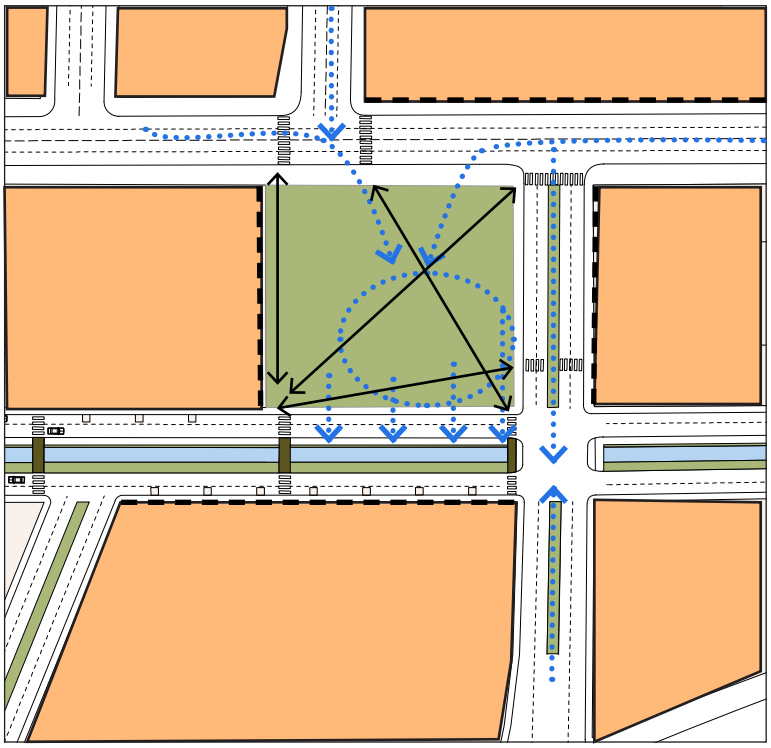


FIGURE 2.1.2

LEGEND

- Proposed park
- Mixed use development
- Micro catchment flow direction
- Bonnie Doon Channel
- Active Edge
- Pedestrian desire lines

Blaxland Park swale and material selection.

Paved urban plaza

Dyeworks Park, playground.

Pyrmont Park seating, and shelter.

New Town Park - Site One

The site at the corner of Arncliffe Street and Guess Avenue

New Town Park Principles

A new town park for passive recreational use. This will form a 'breakout' green space for the surrounding high density development, and for the commercial heart of the town centre.

1. Surrounding buildings shall take advantage of the outlook by addressing and opening up to public space to provide passive surveillance.

2. A designated children's play area located towards the centre of the site provides a fenced and sheltered zone for children within the park.

3. The park shall include amenities for park including seating and shelter. This space can also accommodate a meeting point along Arncliffe Street.

4. Water sensitive urban design (WSUD) principles are to be implemented. Opportunities include a swale down the centre of the park to relate to the movement of water on the surrounding micro catchment of streets. The central swale is to be incorporated in the stormwater management system as a temporary detention basin to address flooding in the area

5. Open space shall provide areas of refuge for passive use defined through planting .

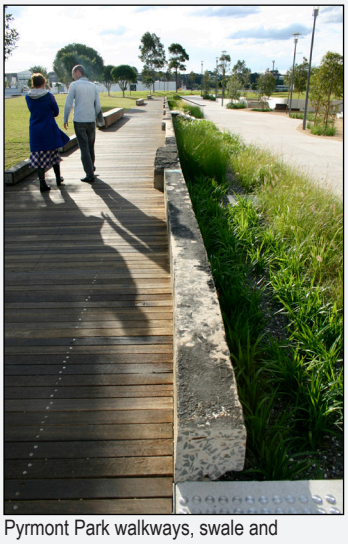
6. Maintain sight lines to surrounding streets and pedestrian crossings through a comprehensive network of access paths and the implementation of CPTED principles

7. A variety of spaces within the park shall be defined with level changes, raised seating walls, terraced grass areas and swales, and planted terraces along development boundary to mediate level changes to existing buildings. These level changes are to be designed to ensure that CPTED principles are implemented and disabled access to a minimum standard of 1428.1 design for access and mobility.

FIGURE 2.2

SCALE 1:750

INDICATIVE CONCEPT PLAN



Pyrmont Park walkways, swale and material selection.

Henriette-Herz Park, shifting planes.

Level changes and brick wall seating.

Victoria Park BBQ area, seating, and shelter.

New Town Park - Alternate Site

The site at the corner of Arncliffe Street and Gertrude Street.

New Town Park Principles

1. Surrounding buildings shall take advantage of the outlook by addressing and opening up to public space.
2. Buildings are to have an active street level frontage or contain uses compatible with casual surveillance of the park.
3. Buildings fronting the park must have be designed to architectural standards commensurate with the high quality open space setting.
4. Development around the town park must be designed to ensure that solar access to the town park (particularly during winter) is retained.
5. The park shall include amenities for park including seating and shelter. This space can also accommodate a meeting point along Arncliffe Street.
6. Water sensitive urban design (WSUD) principles are to be implemented. Opportunities include a swale at southern corner of the park to relate to function of Bonnie Doon Channel and the movement of water on the surrounding micro catchment of streets.
7. To be incorporated in the stormwater management system as a temporary detention basin to address flooding in the area
8. Open space shall provide areas of refuge for passive use defined through planting .
9. Maintain sight lines to surrounding streets and pedestrian crossings through a comprehensive network of access paths and the implementation of CPTED principles
10. A variety of spaces within the park shall be defined with level changes, raised seating walls, sunken grass areas and swales, and terraces along development boundary to mediate level changes to building entry points. These level changes are to be designed to ensure that CPTED principles are implemented and disabled access to a minimum standard of 1428.1 design for access and mobility.

SCALE 1:500

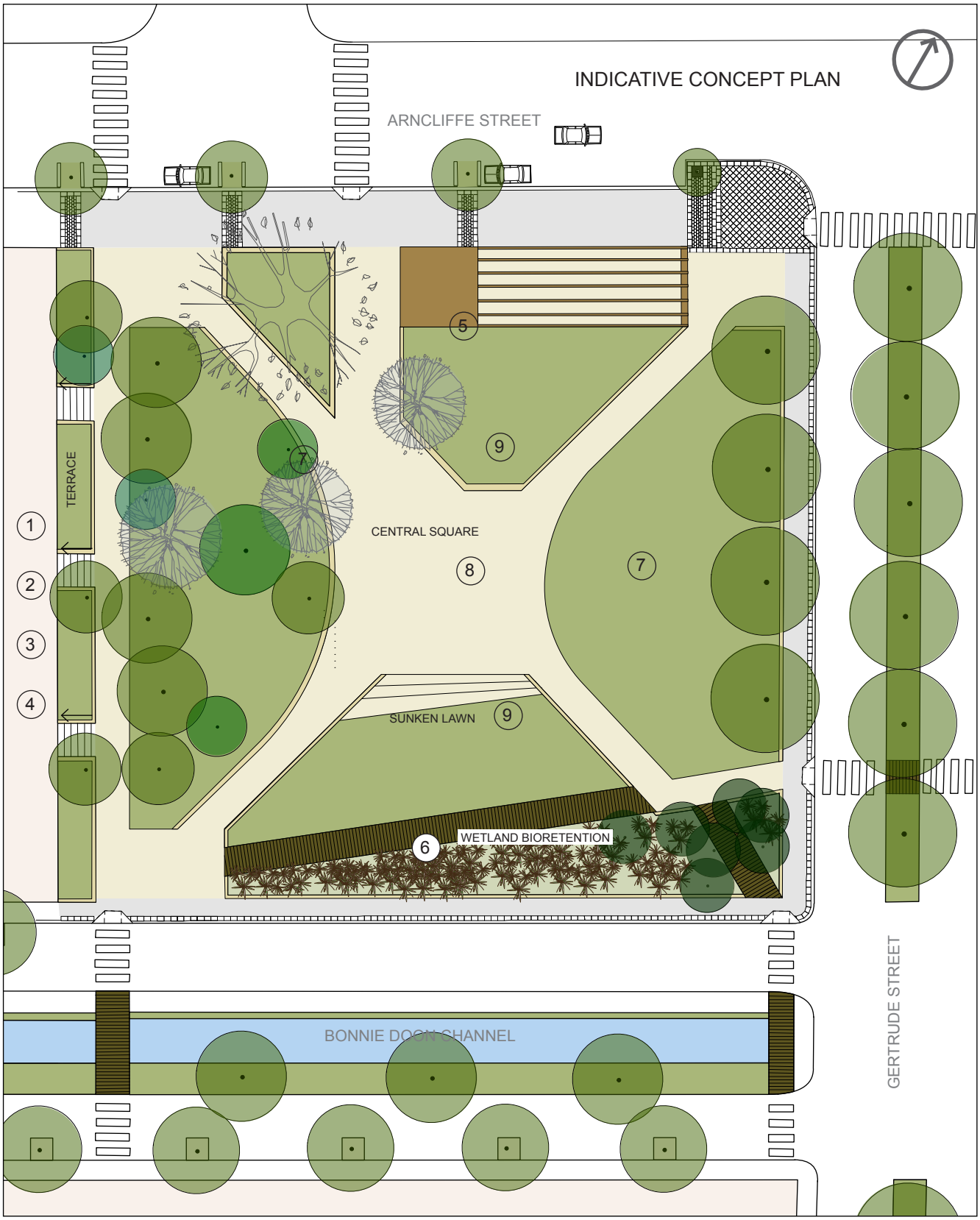


FIGURE 2.3

4.1.2 The SWSOOS


Brick arch detail - SWSOOS


Heritage arch

The Southern and Western Suburbs Ocean Outfall Sewer was constructed in 1896 to transport sewage from the southern and western suburbs to the sewage plant and ocean outfall at Long Bay.

As a significant infrastructural achievement of its time the SWSOOS aqueduct exists as a heritage feature within the district.
The SWSOOS consists of two parts:
- A two span metal lattice truss crossing Wolli Creek.
- A series of 17 brick arches across the plain.

Within the site the SWSOOS is visible in two sections:
- Lusty Street linking under the rail embankment to the bridge section over Wolli Creek.
- Between Arncliffe and Argyle Streets.

The brick arches of the SWSOOS have spans which total 166 metres in length and are large for their period.
Finished in high quality glazed bricks with detailed mouldings and decorations it forms a prominent local feature.

The SWSOOS is listed as a heritage item in Drft Rockdale LEP 2011

(Ref. Australian Heritage Commission Listing Card for Wolli Creek Sewer Aqueduct.)

SWSOOS Arncliffe Street to Princes Highway

EXISTING
Currently the SWSOOS runs between light industry with very little visible from public streets. Through the proposed redevelopment the SWSOOS will become an urban feature with a road along the northern side.

Significant elements of this section of the SWSOOS include:
- Distinct facade decoration and proportions
- Enclosed pipes
- Low arches which do not currently permit access through
- Central intersection with the Bonnie Doon Channel
- Colonisation along the top surface by urban grasses

OPPORTUNITIES
By inserting a new road on the northern side of the SWSOOS an opportunity exists to extend this access and form a pedestrian connection through the area linking with the linear park along Bonnie Doon Channel.

SCALE 1:2000

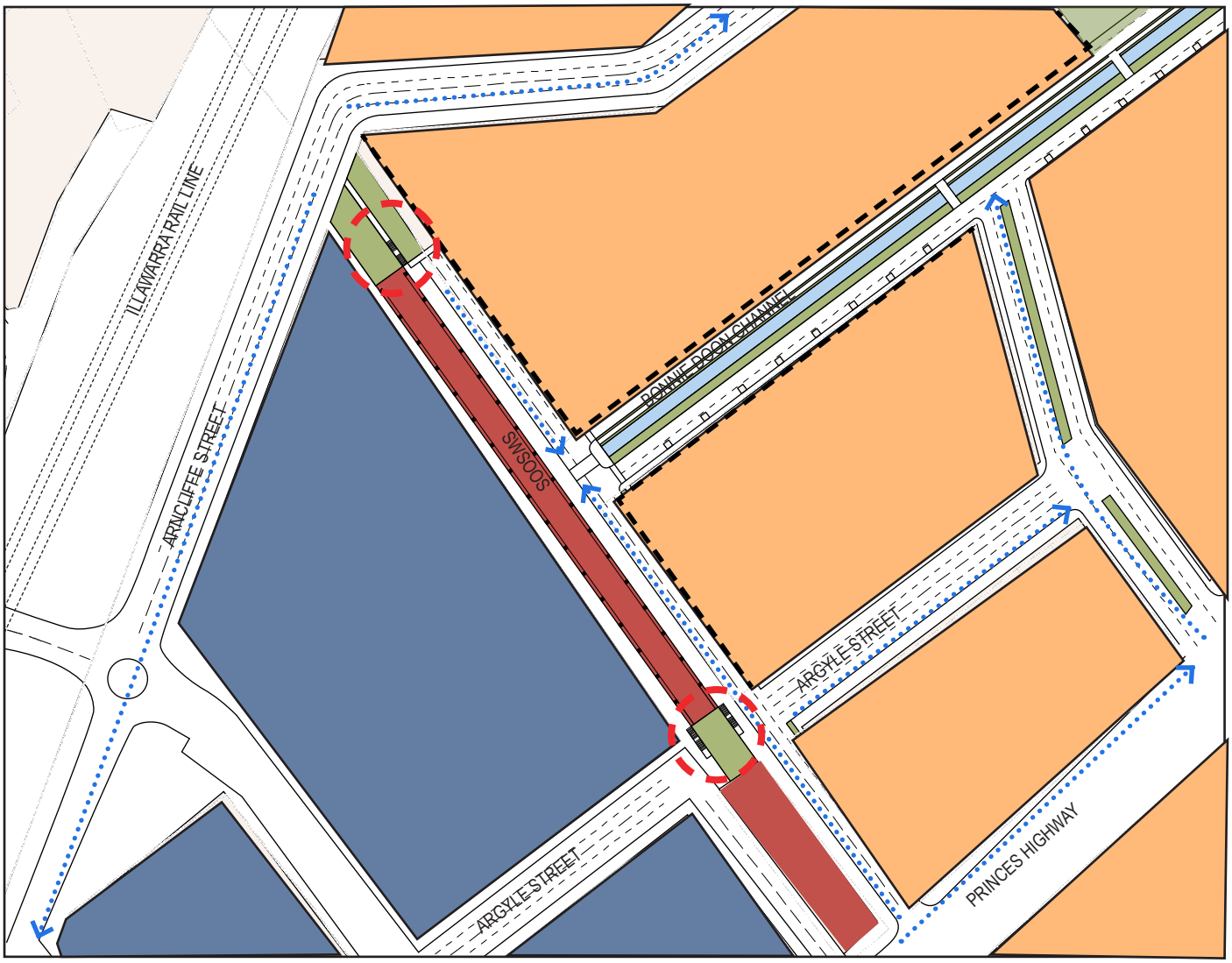


FIGURE 2.4

LEGEND

- Proposed park
- Proposed Mixed use
- Industry
- SWSOOS
- Micro catchment flow direction
- Illawarra Heavy Rail Line
- Bonnie Doon Channel
- Active Edge
- Proposed stair access

SWSOOS Design Principles

Material finish

Plant colonisation along the SWSOOS

Recycled brick feature paving, Jacaranda Square.

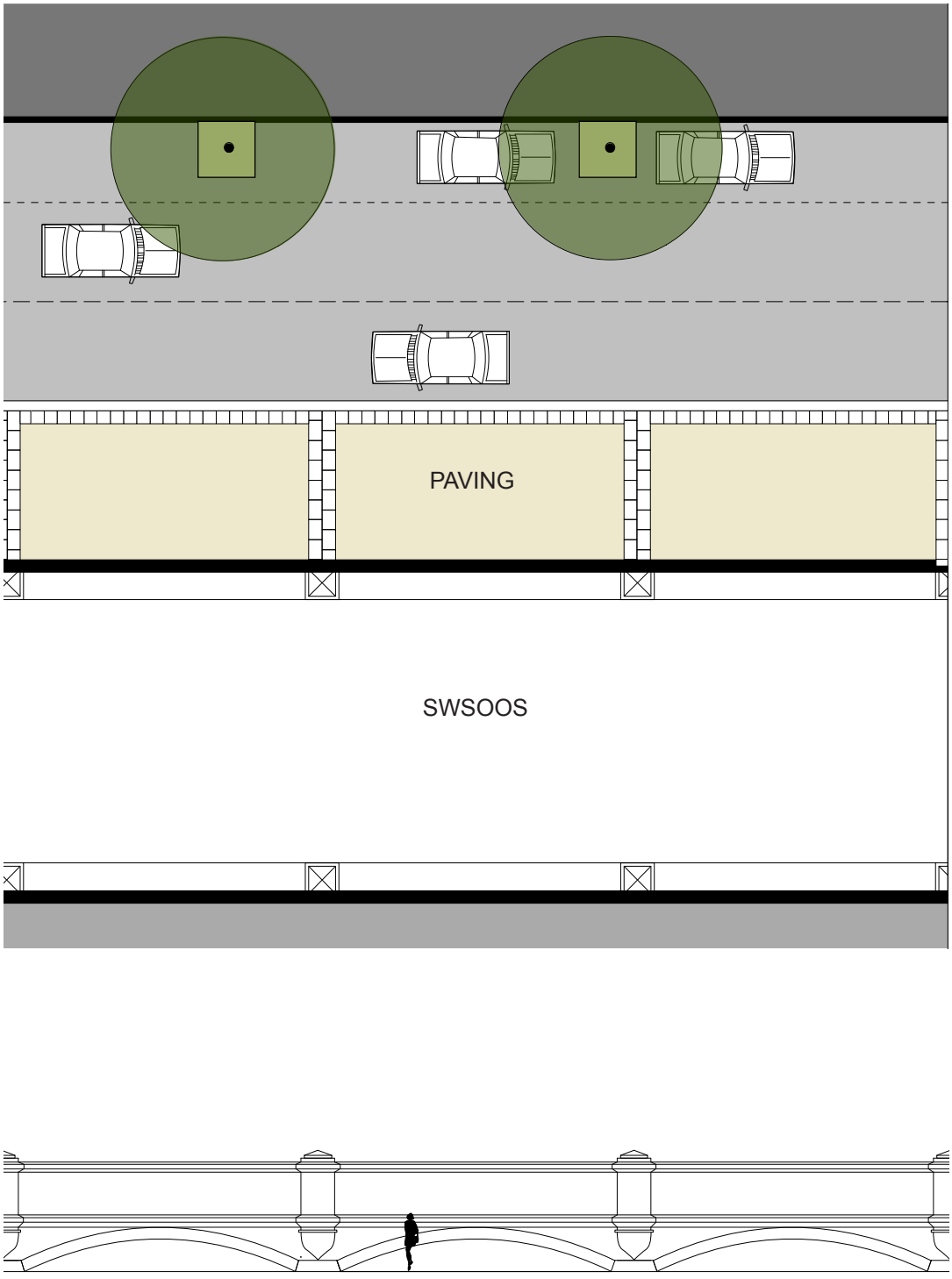
The SWSOOS aqueduct and arches form an important heritage item within Wolli Creek, and exist as a character defining element within the district of open space connections extending from the SWSOOS to the Cooks River. It forms an important feature in the open space network which links the Bonnie Doon Channel, Town Park, Cahill Park and the Cooks River foreshore.

1. Recycled brick paving (special places paving) incorporating the material quality of the SWSOOS.

2. Bands of large granite pavers extend the lines of the SWSOOS architecture into the ground plane unifying the public space.

3. New developments to provide an active frontage along the SWSOOS with good passive surveillance.

4. Brick infills within the arches of the SWSOOS to be removed. Permeable flood grills may be installed in lieu.



SCALE 1:200

FIGURE 2.5

4.1.3 Bonnie Doon Channel Design Principles


Existing channel


Existing channel


Street swale at Victoria Park

The Bonnie Doon Channel runs along a former creek line capturing water from the surrounding catchment on the Arncliffe slopes. Converted into an industrial channel with a concrete base and bricked sides, it now runs between light industry, under the Princes Highway to emerge into Cahill Park and the Cooks River.

The channel represents an opportunity within a proposed area of mixed use development for a green spine of swales and water treatment. As well, the possibility exists for it to become an active pedestrian green link between the town park and SWSOOS, provided appropriate risk management studies and measures are taken, with particular attention to flood conditions.

Utilising wetland planting, water can be collected off the street and moved through a biofiltration system before being released into the channel.

1. Bonnie Doon channel is converted into a linear park with wetland planting and pedestrian paths and bridges.
2. Adjacent streets are provided or retrofitted with central swales to collect surface water and filter it before it meets the Bonnie Doon channel
3. By opening the section of channel between the Princes Highway and the existing channel a visual link is forged between the existing section within Cahill Park.
4. The new Town Park links to the overall system with a wetland area which connects to the channel.
5. Recomend that a flood management system be prepared that can be quickly implemented to control pedestrian and vehicular movements along the new Bonnie Doon Roadway
6. A risk management study should be taken in relation to the open channel, specifically as it relates to flooding, flash flooding and required fencing.


Wetland retention area at Victoria Park

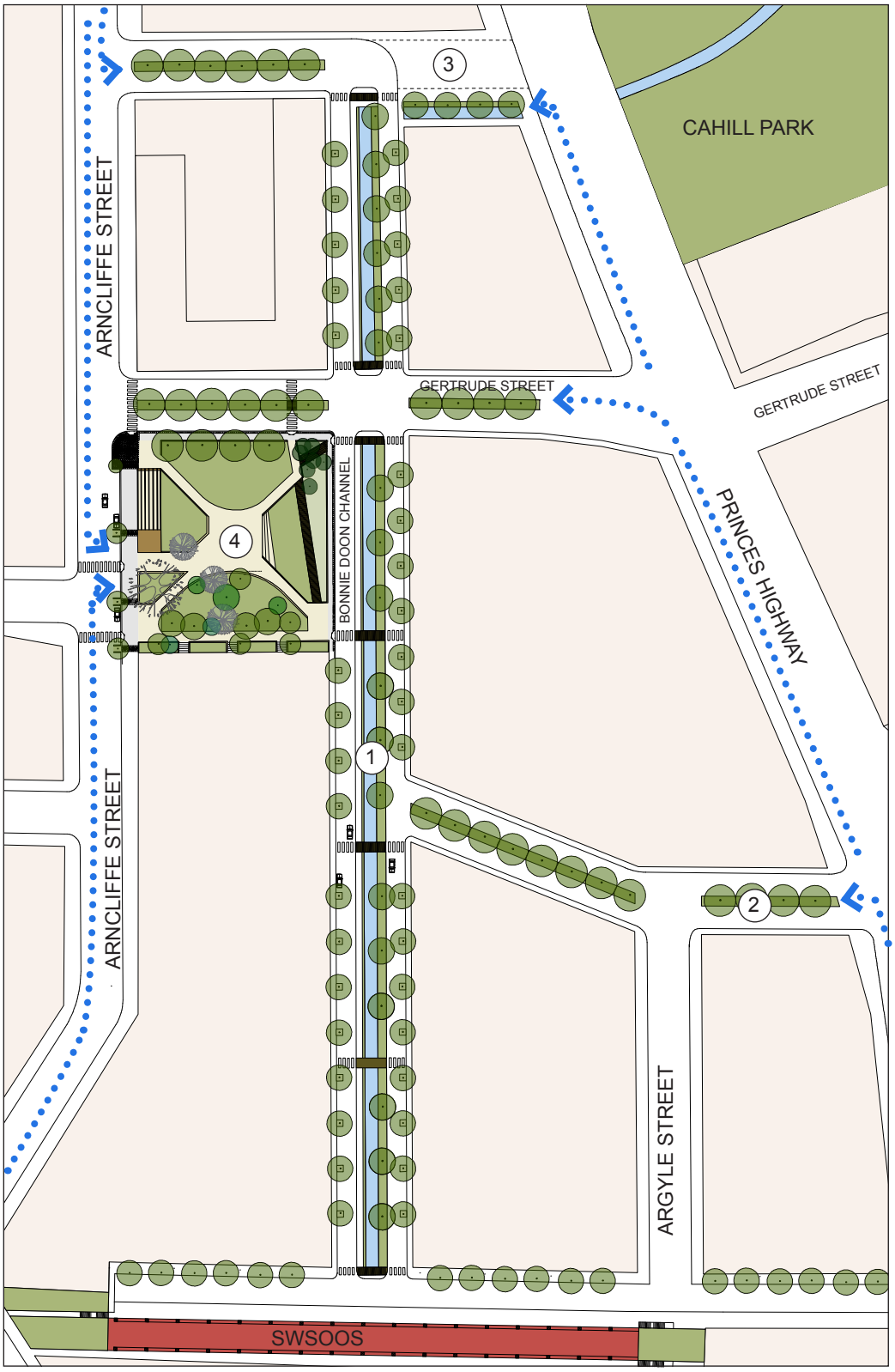


FIGURE 2.7

SCALE 1:2000

4.1.4 Thompson Street Reserve - Analysis

View through reserve from Thompson street.

Underpass through SWSOOS.

Proposed local park to function as recreational open space and WSUD treatment site for surrounding high density development.

EXISTING
Site end of Lusty Street
- Site slopes down towards rail embankment.
- SWSOOS runs through site as steep grassed embankment, terminating in heritage brick structure of exposed pipes and arched aqueduct.
- Existing development on Lusty street requires backfill along boundary where excavation has been left.
- Steep level change along rail embankment and lower part of site due to fill from SWSOOS construction.

Ray Oxford Reserve
- Currently open undeveloped site, fenced off from public access.
- Grassed with no significant trees.
- Contaminated land issue.
- Identified for land acquisition.

Walker Street Reserve
- Currently small park with playground utilized by adjacent preschool.
- Steep level change at Knoll Avenue with exposed residential edge.

All sites experience flooding during high rainfall events.

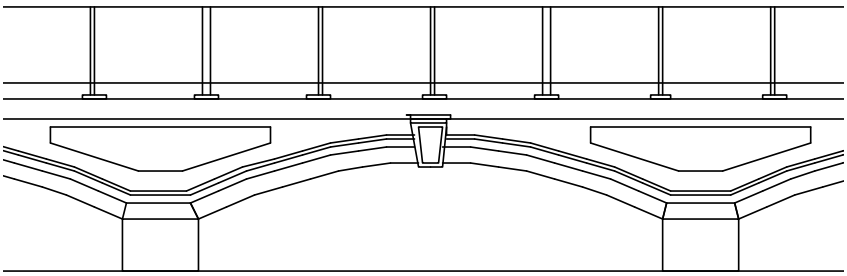


FIGURE 2.8 SCALE 1:100

View from Thompson Street side

SCALE 1:2000

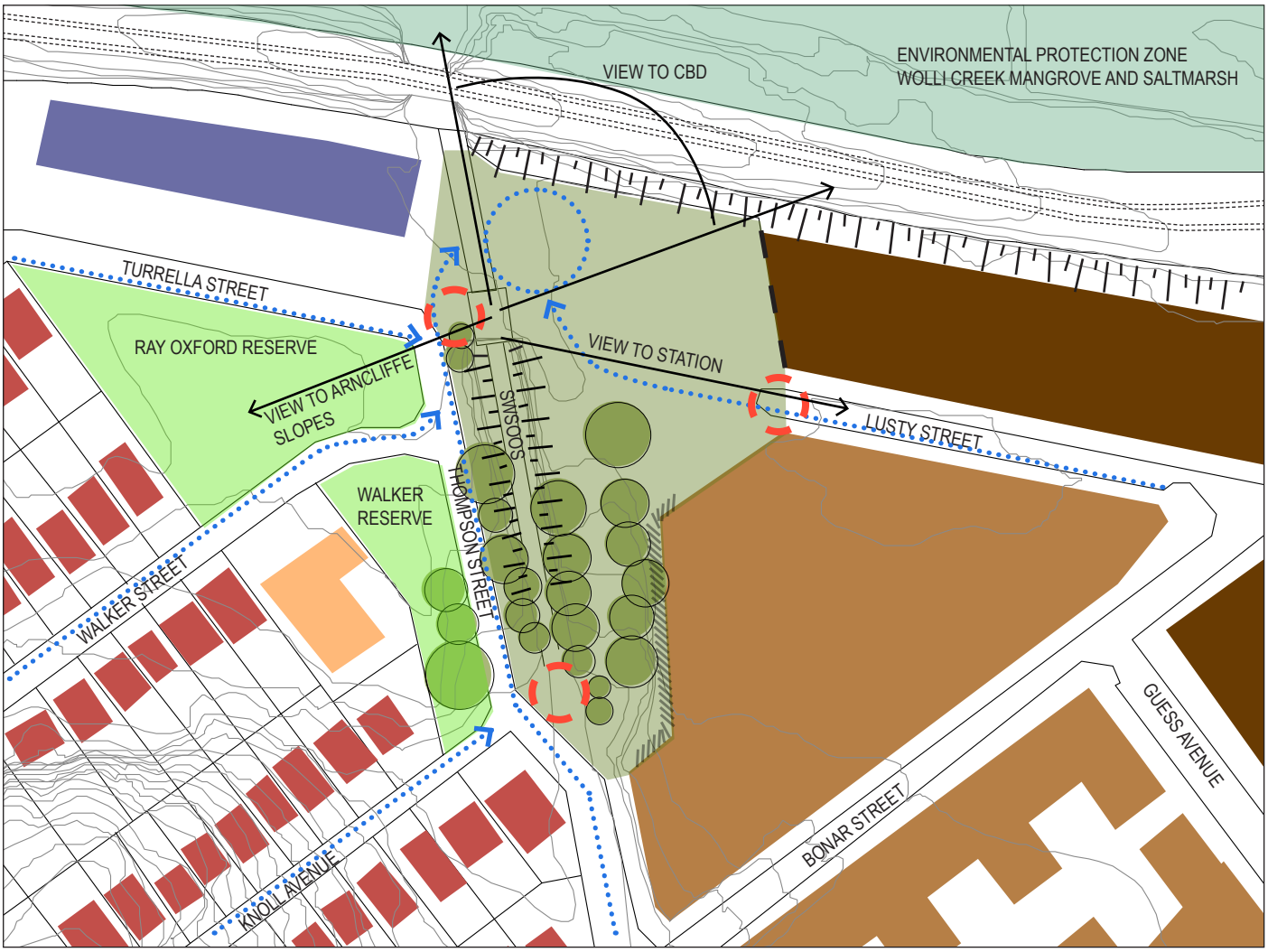
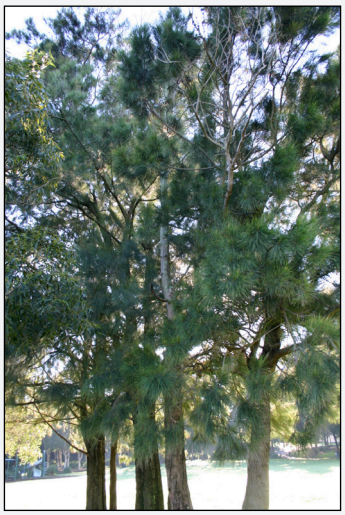


FIGURE 2.9

LEGEND

- Existing park/open space
- Proposed expanded park
- Environmental Protection zone
- New residential development
- Proposed residential development
- Existing light industry
- Existing single storey dwellings
- Preschool
- Micro catchment flow direction
- Key site view lines
- East Hills Heavy Rail Line
- Existing Trees
- Backfill to Boundary Wall
- Steep Terrain
- Key entry points
- Active Edge

Thompson Street Reserve Design Principles



Casuarina grove, Kendrick Park.

Bioretention wetland, Victoria Park.

1. Access views over surrounding area from top of SWSOOS (CBD, Wolli Creek Station, Arncliffe Slopes).
2. As the lower part of site is a critical point for micro catchment stormwater treatment before it reaches Wolli Creek's Environmental Protection Zone, establish a detention basin and wetland biofiltration system intergrated with the overall stormwater strategy. Additionally, a flood/risk management plan should be prepared.
3. Extend the play space in Walker street reserve across Thompson street to the SWSOOS, with an emphasis on free play over equipment.
4. Provide open grassed area suitable for informal games on Ray Oxford Reserve site.

   Mature existing trees on site provide link with indigenous ecology of region: *Casuarina glauca, Banksia sp., Eucalyptus sp.* Extend this planting throughout the three reserves to maintain continuity and provide habitat and shade.
5. Backfill along existing development on corner of Lusty Street and Thompson Street to meet the existing reserve level, and provide secure access from internal courtyard to the reserve.
6. The SWSOOS provides distinctive character to site as heritage feature and point of orientation within district. Access paths and material selection within the reserve should enhance this architectural feature.

   A strong link between the three reserves should be provided. This should be achieved through planting, pathways, lighting and signage.
7. Create viewing platform on top of existing SWSOOS hardstand if feasible, or adjacent. Provide ramped access via regraded eastern side of SWSOOS embankment.
8. Bund walling to contain flood flows beneath SWSOOS.
9. Incorporates stormwater management system, including detention, and a flood management strategy.

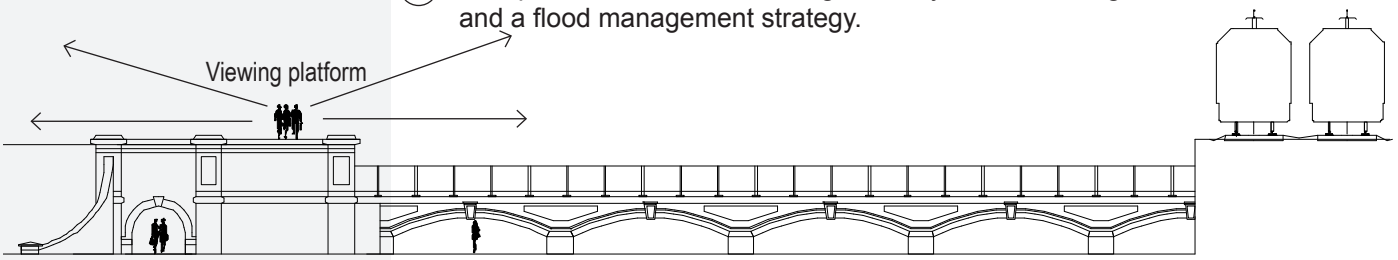


FIGURE 2.11

SCALE 1:400

View from Lusty Street side

SCALE 1:750

FIGURE 2.12

INDICATIVE CONCEPT PLAN

4.1.5 Bonar Street Community Park - Analysis

To provide a local park for the surrounding residential area and specifically for the new high density residential development within the Bonar Street Precinct.

Park needs to respond to surrounding land use by either screening or activating the surrounding development edge, but care must be taken to ensure passive surveillance is maintained.

Provide pedestrian links from the new road west to Bonar Street and Knoll Avenue to the north of the site.

Allow for visual access across the site from new road west to Bonar Street and across the corner of the site.

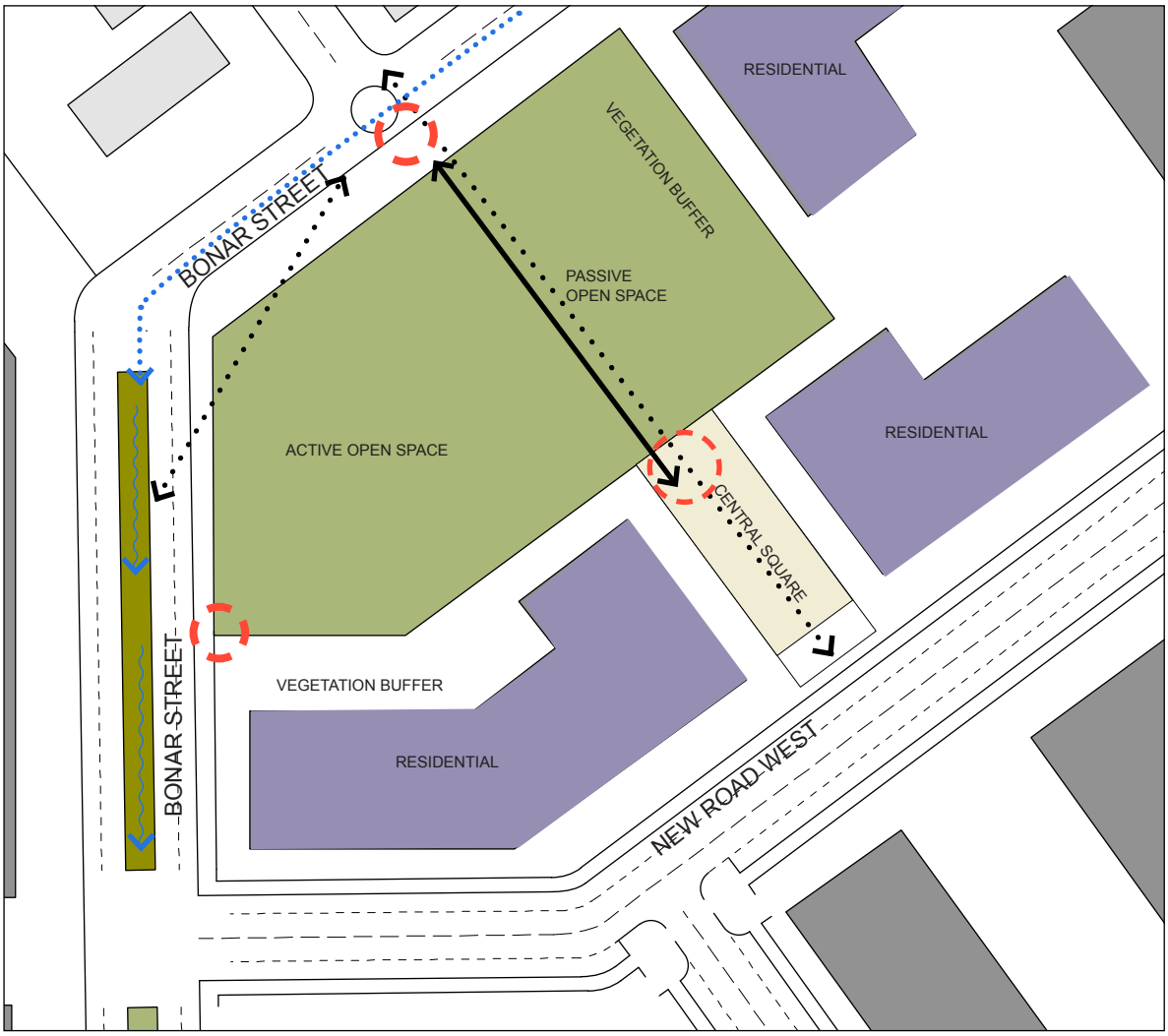


FIGURE 2.13

SCALE 1:1000

LEGEND

- Proposed parks
- Central Square
- Proposed residential development
- Pedestrian Link
- Micro catchment flow direction
- Key view lines
- Key entry points

Bonar Street Community Park Design Principles


Sand and water play area, Pyrmont Park.


Water feature play area, Pyrmont Park.


Textured hard and softscape at Prymont park.

The park forms part of the local public open space network, and provides a meeting point between the existing residential area and the new residential development. The park is to be simple and open in character allowing flexible use.

1. The Community Park should maintain clear and open sight lines along the Knoll Avenue axis, to retain the view corridor from this street, and to reinforce legibility of the public thoroughfare to the Central Square and to internal access roads. Access through the park to be reinforced with lighting to ensure safe night-time thoroughfare.

2. The eastern area of the park is to remain primarily open to enable use for informal recreation. It is to include seating and a children's playground in areas that are under passive visual surveillance from residential buildings and the central square, and also at sufficient distances to allow acoustic privacy in adjacent residential apartments.

3. The western section of the park is to include grouped tree and understorey planting with seating areas, to establish a shaded passive open space zone. The treed area also provides a transition between the more active section of the park and the adjacent residential area.

Planting is to be selected to allow passive surveillance of the park from the residential areas, whilst allowing light screening and a sense of privacy between the two. This can be achieved through large scale tree planting around the perimeter to give privacy to the residential apartments, with medium scale dense trees or dense tall shrub planting to be avoided.

Access to residential entries to be encouraged from park.


Barbecue facilities and overhead shelters at Victoria Park.

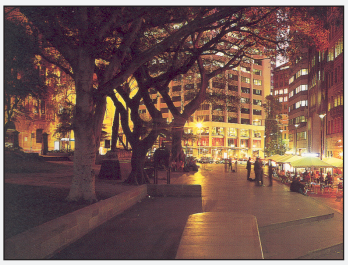
FIGURE 2.14

NOTE. Building footprints are indicative.

SCALE 1:500

INDICATIVE CONCEPT PLAN

4.1.6 Arncliffe Street Design Principles



Macquarie Place by night.

Walls between levels can act as seating.

Trees provide vertical scale on street corner.

1. Reinforce pedestrian access through pedestrian crossings which are aligned with stair access to the upper terrace.

2. Restrict planting to street trees in tree grates. Provide species which are self-sustaining and low maintenance.

3. Ensure that upper street level remains one single space, with universal access provided by ramping from street level on Brodie Spark Drive to the upper terrace level on Arncliffe Street.

4. Provide paving for special places to define corner nodes and link spaces together into a central plaza.

5. Mediate level change between upper terrace and street level through wide steps which also provide seating.

6. Balance scale of buildings through street trees, providing human scale spaces along the street.

   Provide a distinct lighting regime for the plaza spaces within the central node, to define the space and reflect the character of the town centre.

   Ensure that cycle access is provided between Arncliffe Street and the station precinct.

7. Wetland bioretention swale recessed in the centre of roundabout, references local ecology while maintaining clear sight lines across the square.

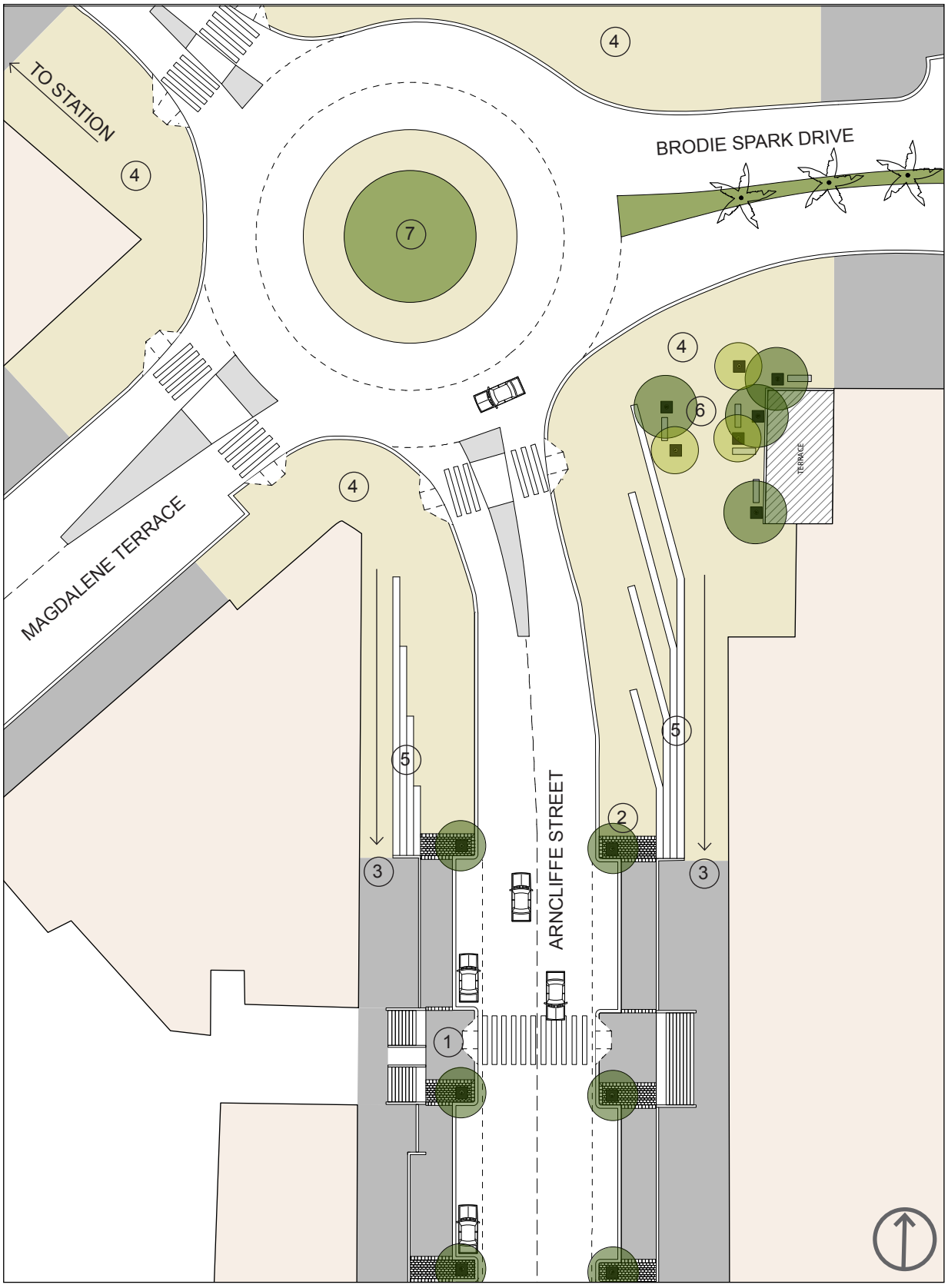
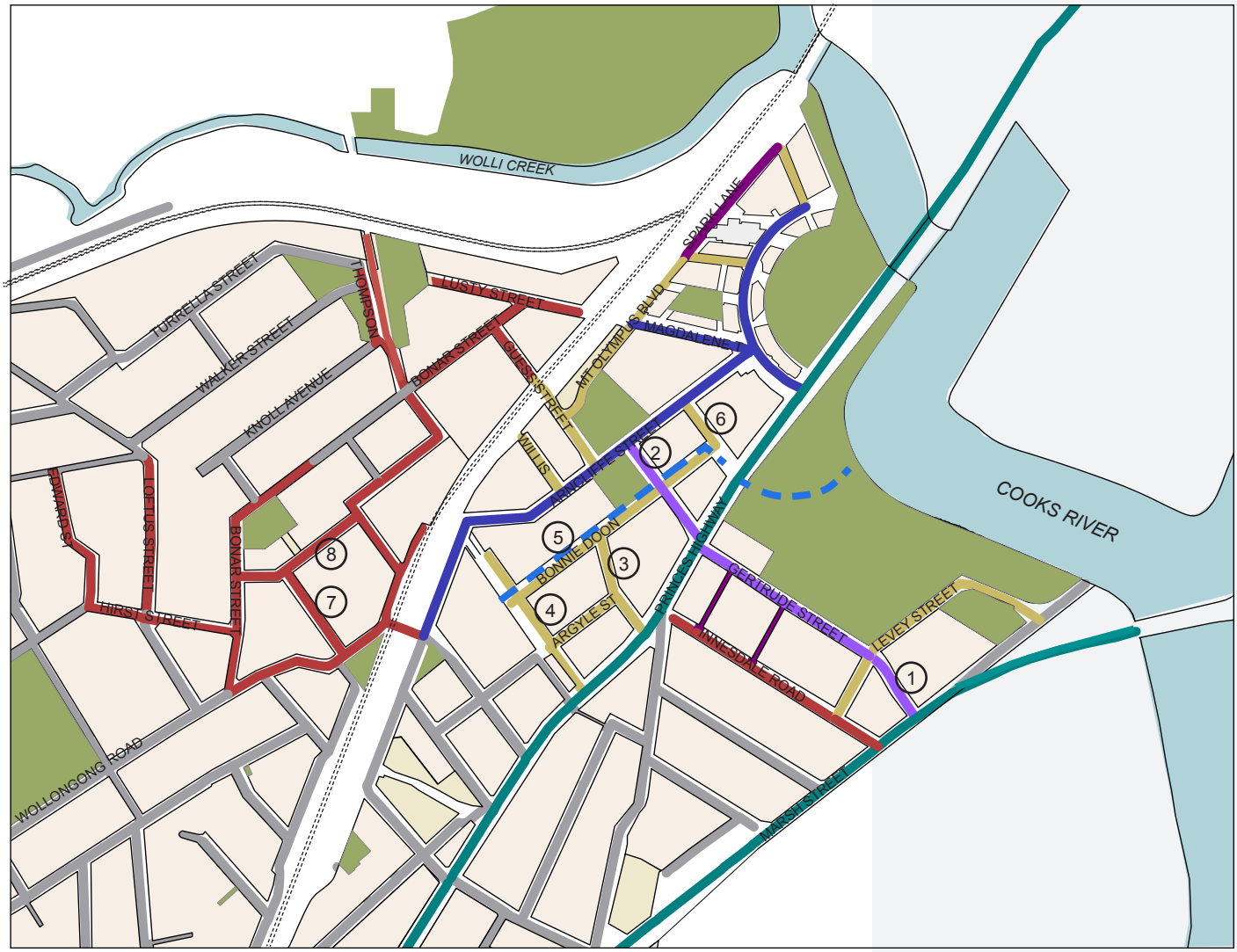


FIGURE 2.1

SCALE 1:500

4.2 STREET SECTIONS

SCALE 1:10000



REGIONAL
- Princes Highway p.59
- Marsh Street

MAIN STREET
- Arncliffe Street p.60
- Brodie Spark Drive North p.61
- Brodie Spark Drive South p.62
- Magdalene Terrace p.63

DISTRICT LINK p.64
- Gertrude Street
- New Road 1
- New Road 2

LANEWAYS
- Robert Lane p.85
- Innesdale Lane
- Spark Lane - Kiss and Ride p.86

RESIDENTIAL STREETS
- Bonar Street South p.73
- Edward Street p.74
- Guess Avenue West p.75
- Hirst Street p.76
- Innesdale Road p.77
- Levey Street p.78
- Loftus Street p.79
- Lusty Street p.80
- Martin Avenue p.81
- New Road 7 & 8 p.82
- Thompson Street p.83
- Wollongong Road p.84

Bonnie Doon Channel

Rail Infrastructure Corridor

MIXED USE STREET
- Argyle Street p.65
- Guess Avenue East p.66
- Mt Olympus Boulevard p.67
- New Road 3 p.68
- New Road 4 p.69
- New Road 5 (Bonnie Doon) p.70
- New Roads 6 p.71
- Willis Street p.72

REGIONAL

PRINCES HIGHWAY AND MARSH STREET

CHARACTER
High vehicle traffic. Connecting Wolli Creek to the CBD, Airport and other regional centres. Cahill Park located along one edge.

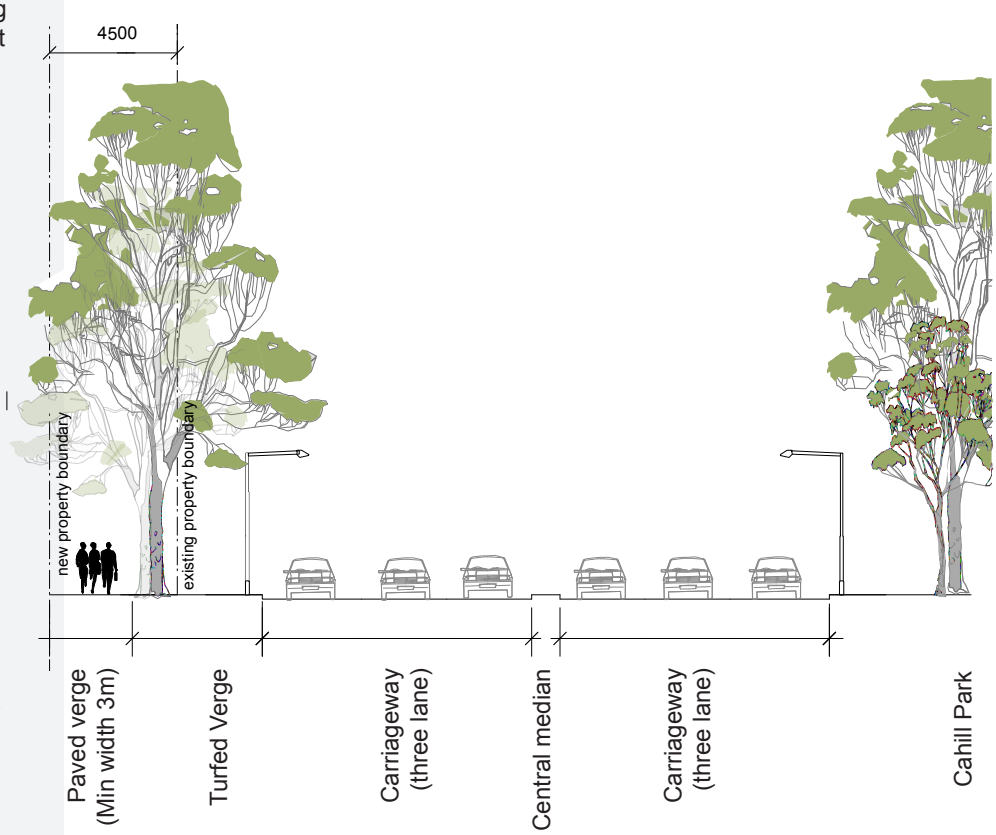
PAVING TYPE - PRINCES HIGHWAY AND MARSH STREET
Mixed Use type.
(refer to section 5.1.1)

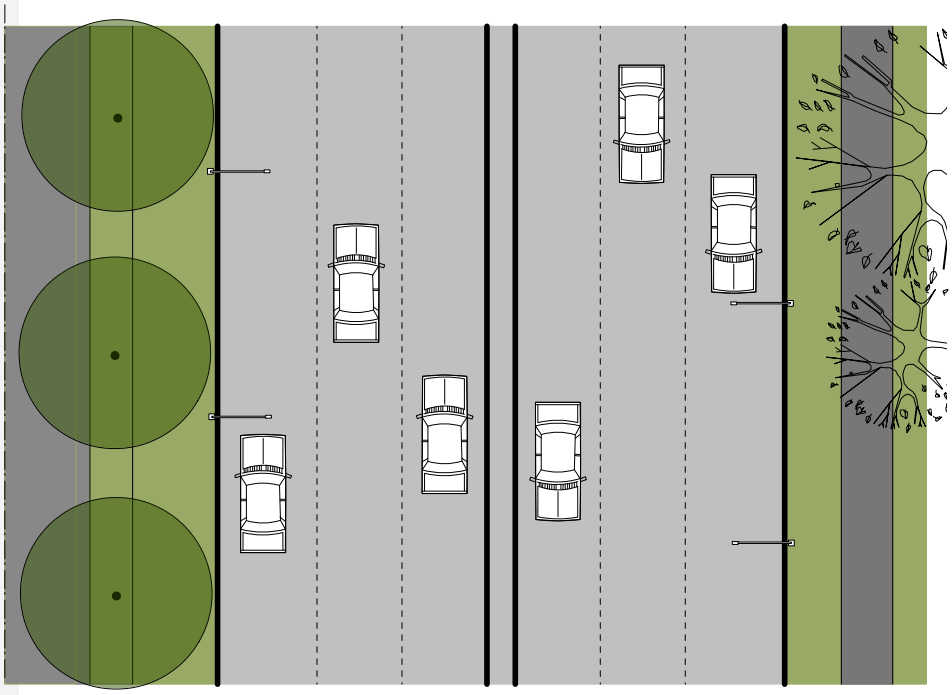
FURNITURE AND FITTINGS
na.

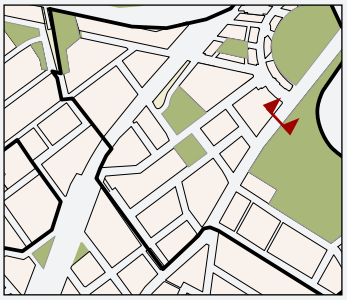
LIGHTING
(RTA issued lighting)

STREET TREES - PRINCES HIGHWAY
Lophostemon confertus
8m spacing in turf verge

NOTE:
Road widening applies to west side of Princes Highway only





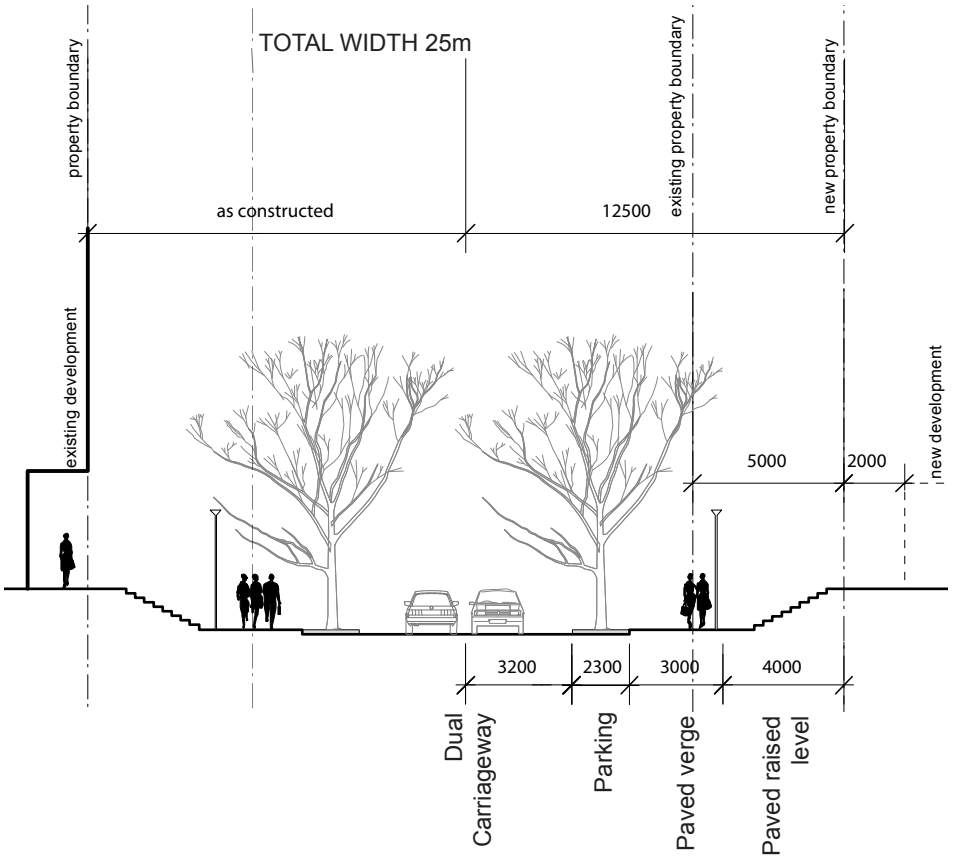


LOCATION PLAN

FIGURE 3.2

SCALE 1:250

ARNCLIFFE STREET



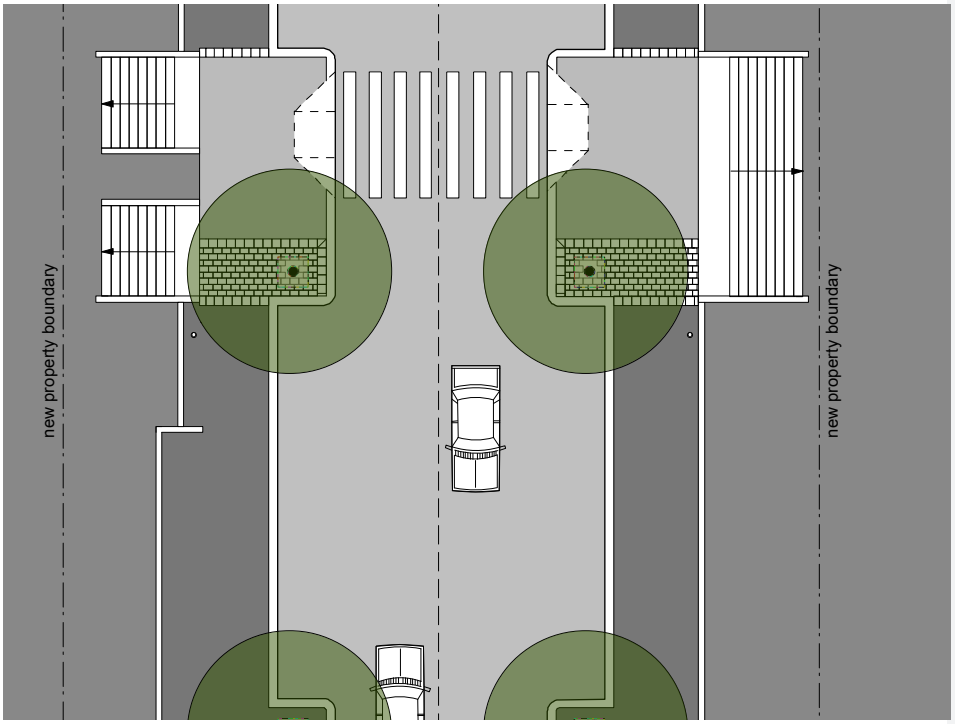


FIGURE 3.3

SCALE 1:250

MAIN STREET

CHARACTER
Moderate vehicle and pedestrian traffic. Connecting town centre to Arncliffe.
Town Park located at centre.

PAVING TYPE
Main Street Type
(refer to section 5.1.1)

FURNITURE AND FITTINGS
Seating/Benches (SSE/SS/A/EG2) (WBSE/A/SS)
Bins (WBE em224)
Bike racks (BR475B)
Tree grate (Furphy GOV 36)
(refer to section 5.1.3)

LIGHTING
Type 1 - BEGA (8085)

STREET TREES
Pyrus ussurensis
14m spacing from Brodie Spark Drive to Guess Avenue
Angophora costata
14m spacing from Willis Street to Burrows Street

NOTE
Cycle lanes (minimum width 1.2m) to be included south of New Road 2

LOCATION PLAN

MAIN STREET

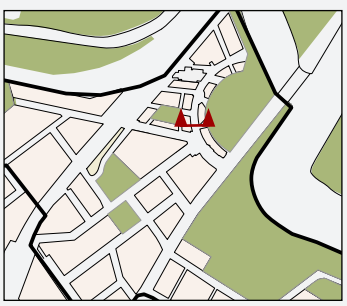
CHARACTER
Moderate vehicle and pedestrian traffic to station. Views to Tempe House, Chapel and grounds.

PAVING TYPE
Main Street Type
(refer to section 5.1.1)

FURNITURE AND FITTINGS
Banner Poles (BEGA Group 12 pole 733)
Seating/Benches (SSE/SS/A/EG2) (WBSE/A/SS)
Bins (WBE em224)
Bike racks (BR475B)
Tree grate (Furphy GOV 36)
(refer to section 5.1.3)

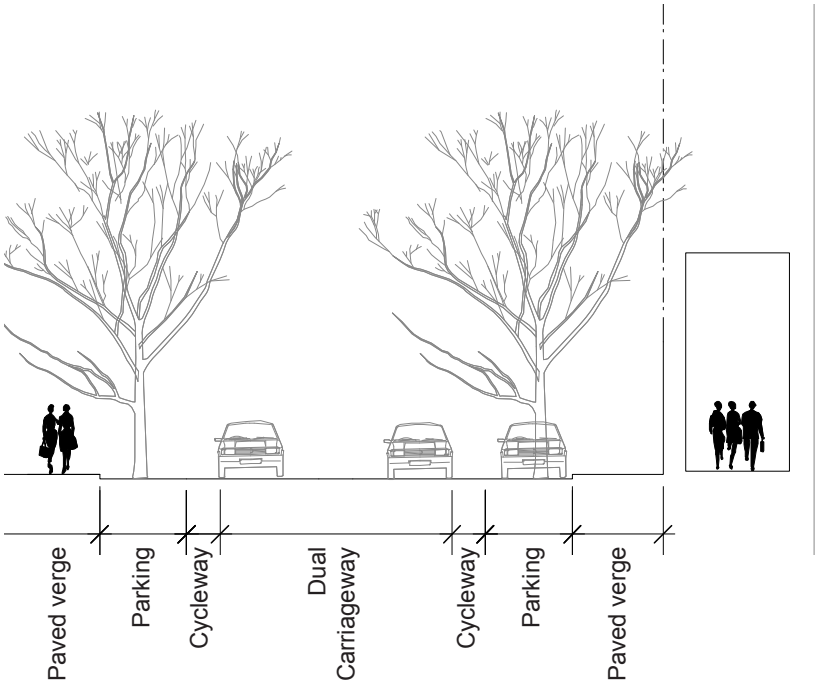
LIGHTING
Type 1 - BEGA (8085)

STREET TREES
Platanus digitala
14m spacing



LOCATION PLAN

BRODIE SPARK DRIVE NORTH



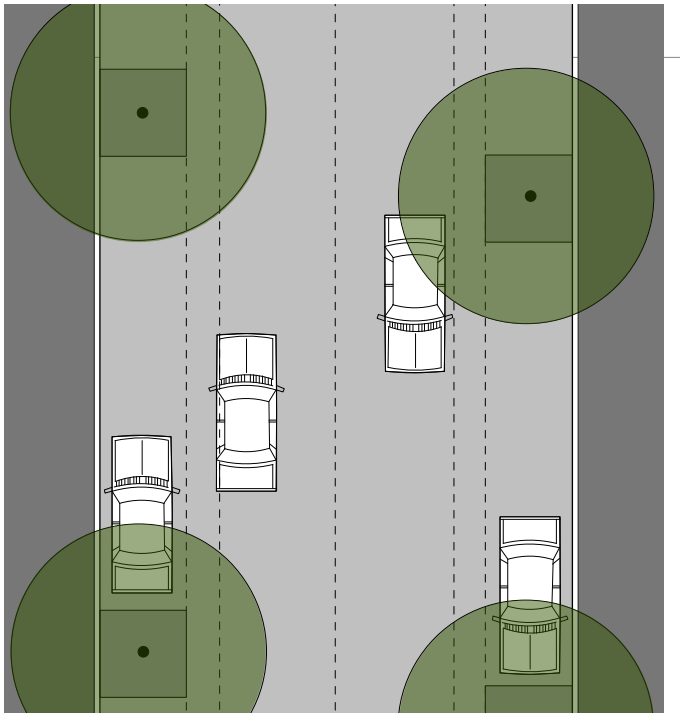
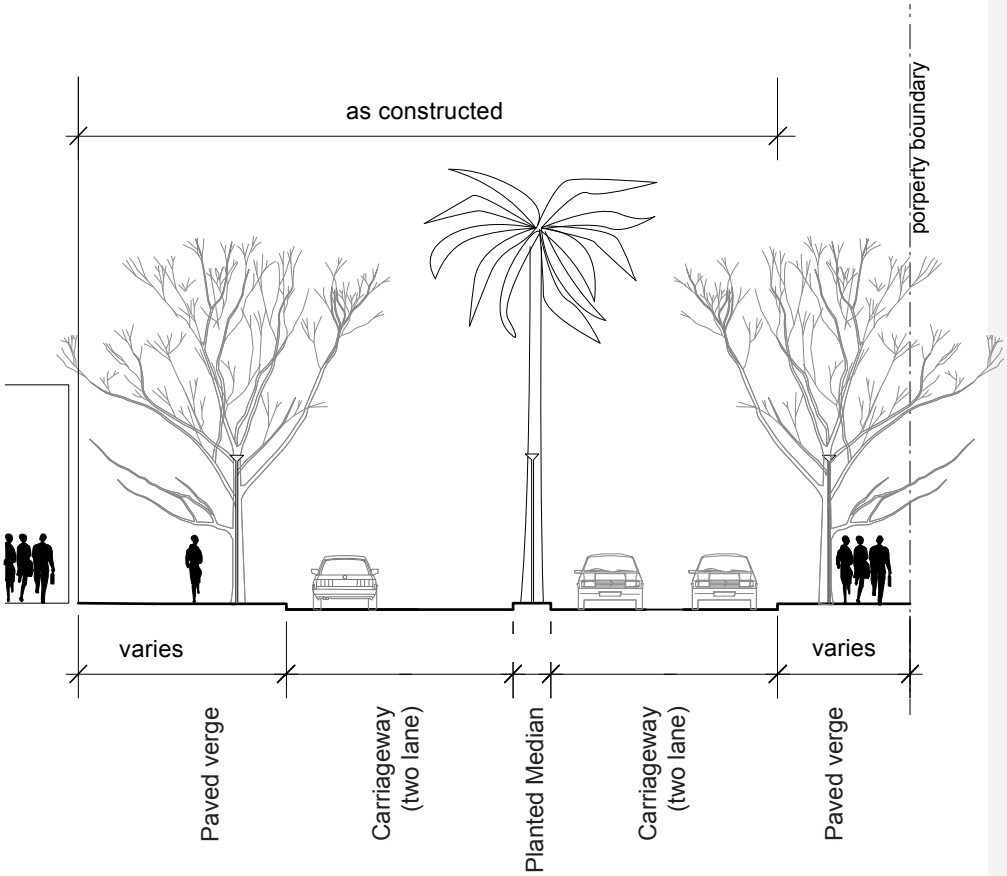


FIGURE 3.4

SCALE 1:200

BRODIE SPARK DRIVE SOUTH



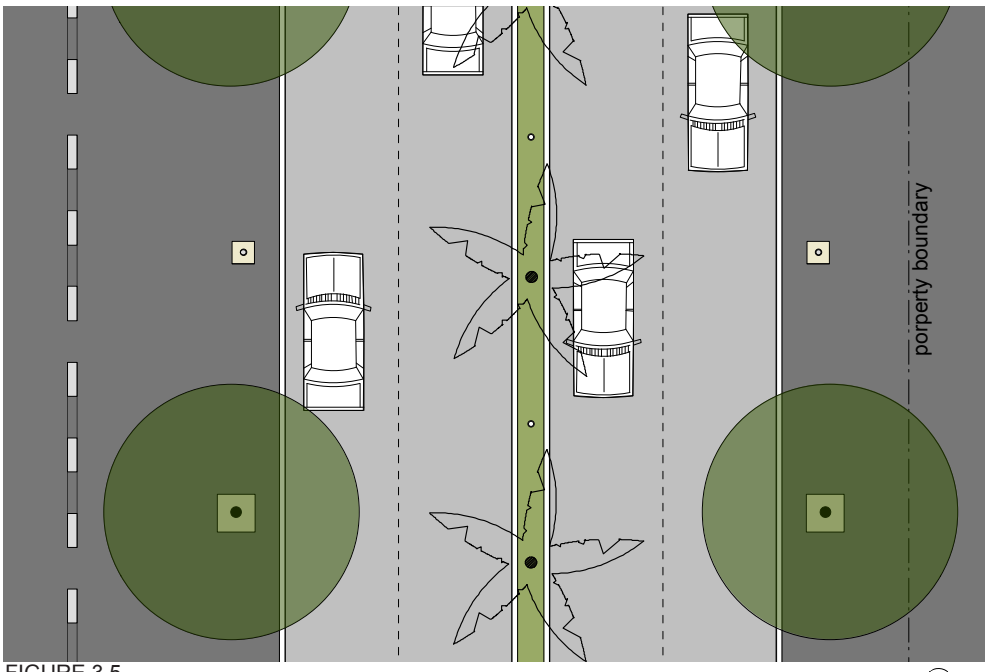


FIGURE 3.5

SCALE 1:200

MAIN STREET

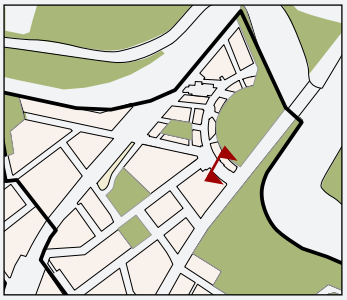
CHARACTER
Moderate vehicle traffic from Princes Highway. Gateway to Wolli Creek.

PAVING TYPE
Main Street Type
(refer to section 5.1.1)

FURNITURE AND FITTINGS
Seating/Benches (SSE/SS/A/EG2) (WBSE/A/SS)
Bins (WBE em224)
Bike racks (BR475B)
Tree grate (Furphy GOV 36)
(refer to section 5.1.3)

LIGHTING
Type 1 - BEGA (8085)

STREET TREES
Platanus digitala
10m spacing
Phoenix canariensis
Central median planting



LOCATION PLAN

MAIN STREET

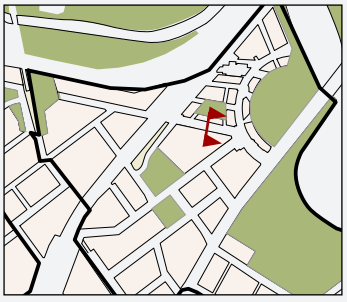
CHARACTER
Moderate pedestrian and vehicle traffic. Active ground floor with cafes.

PAVING TYPE
Main Street Type
(refer to section 5.1.1)

FURNITURE AND FITTINGS
Seating/Benches (SSE/SS/A/EG2) (WBSE/A/SS)
Bins (WBE em224)
Bike racks (BR475B)
Tree grate (Furphy GOV 36)
(refer to section 5.1.3)

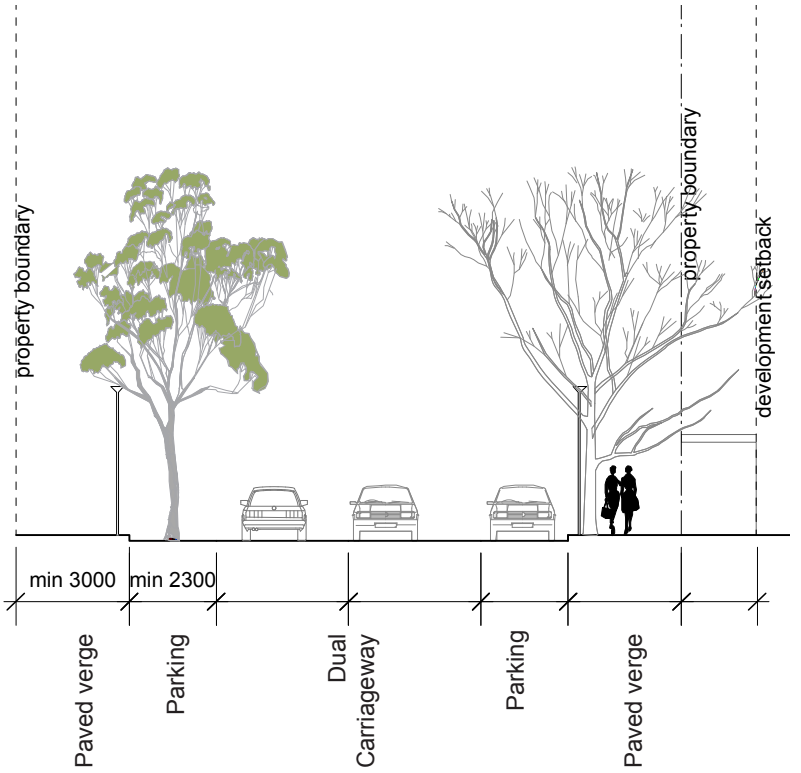
LIGHTING
Type 1 - BEGA (8085)

STREET TREES
Pyrus ussuriensis
14m spacing



LOCATION PLAN

MAGDALENE TERRACE



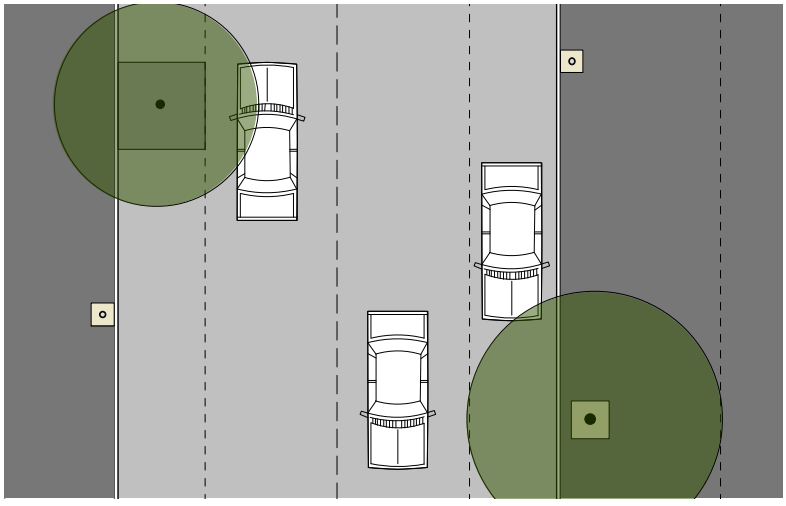
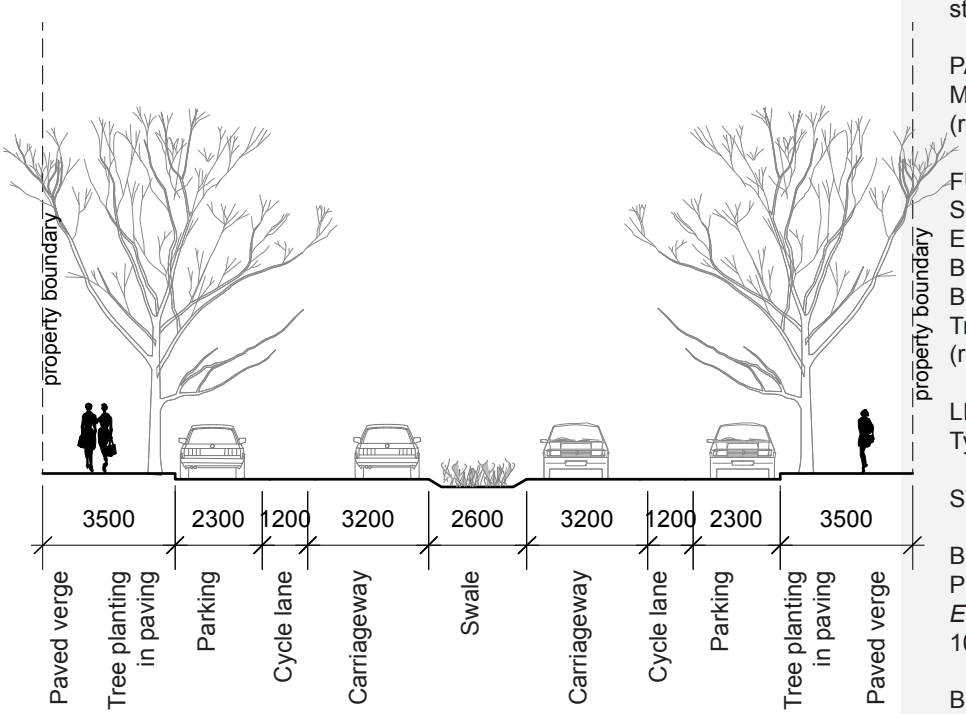


FIGURE 3.6

SCALE 1:200

NEW ROAD 1, NEW ROAD 2 & GERTRUDE STREET

TOTAL WIDTH 23m



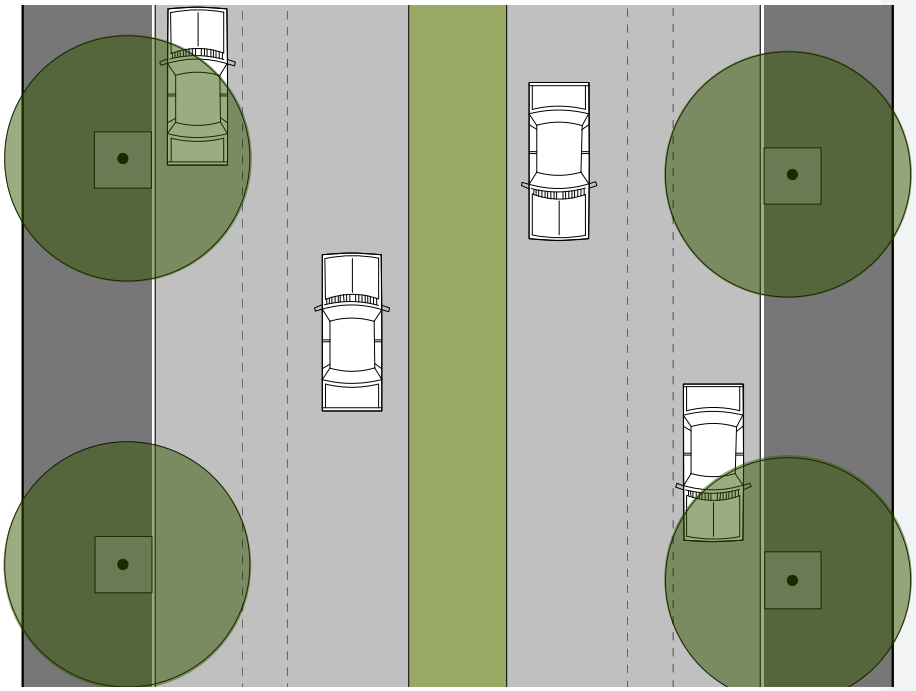


FIGURE 3.7

SCALE 1:200

Note: This section only applies to New Roads 1 and 2

DISTRICT LINK

CHARACTER
High vehicle traffic to Arncliffe street. Active ground floor.

PAVING TYPE
Mixed Use Type
(refer to section 5.1.1)

FURNITURE AND FITTINGS
Seating/Benches (SSE/SS/A/EG2) (WBSE/A/SS)
Bins (WBE em224)
Bike racks (BR475B)
Tree grate (Furphy GOV 36)
(refer to section 5.1.3)

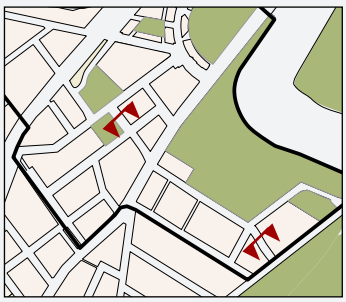
LIGHTING
Type 1 - BEGA (8085)

STREET TREES

Between Arncliffe Street and Princes Highway
Eucalyptus robusta
10m spacing

Between Princes Highway and Levey Street
North Side *Angophora costata*
10m spacing
South side *Ulmus parvifolia*
10m spacing

Between Levey Street and Marsh Street
Eucalyptus Punctata
10m spacing



LOCATION PLAN

MIXED USE

CHARACTER
Minor through traffic. Active ground floor with the SWSOOS forming visual interest at southern end of street.

PAVING TYPE
Mixed Use Type
(refer to section 5.1.1)

FURNITURE AND FITTINGS
Seating/Benches (SSE/SS/A/EG2) (WBSE/A/SS)
Bins (WBE em224)
Bike racks (BR475B)
Tree grate (Furphy GOV 36)
(refer to section 5.1.3)

LIGHTING
Type 1 - BEGA (8085)

STREET TREES
Melaleuca linariifolia
8m spacing

LOCATION PLAN

ARGYLE STREET

TOTAL WIDTH 20m

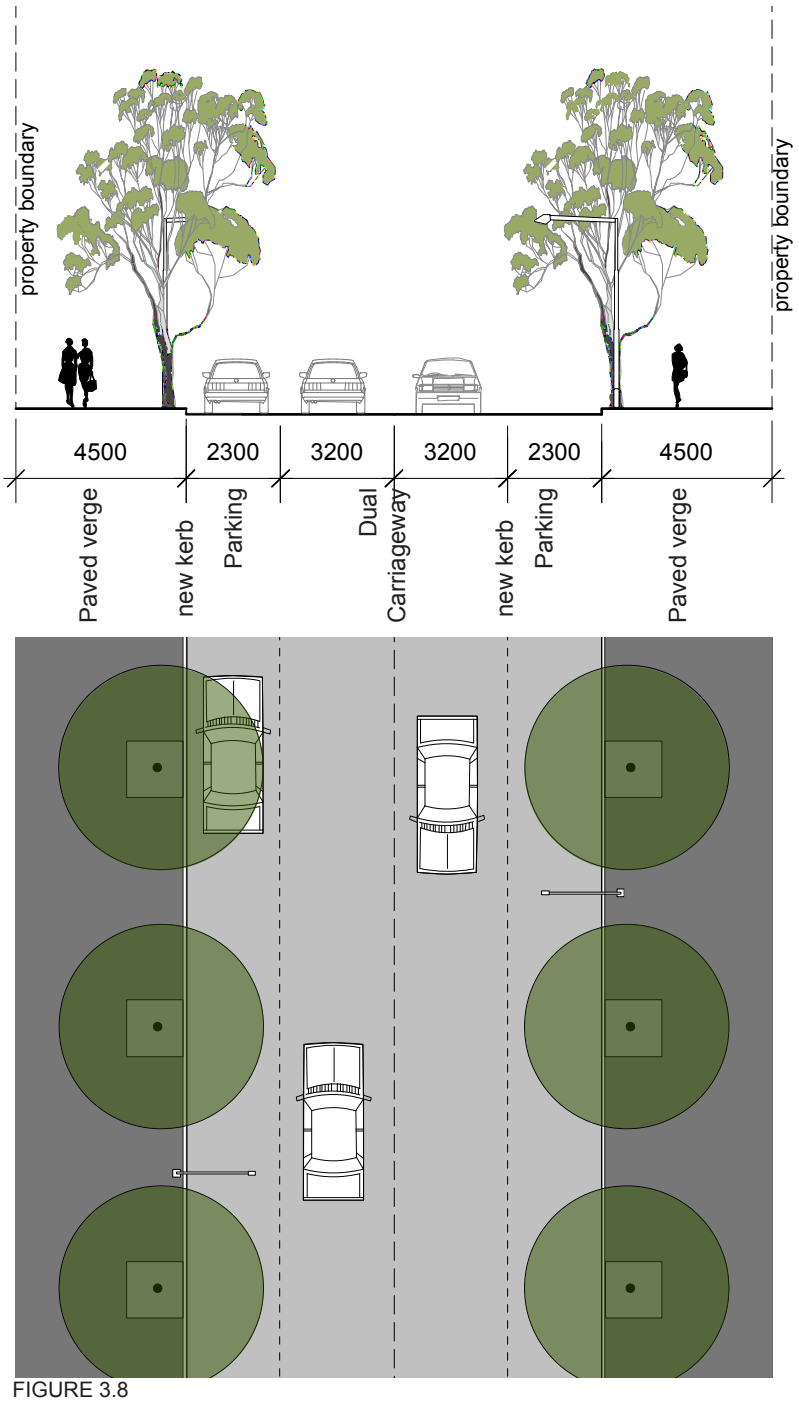
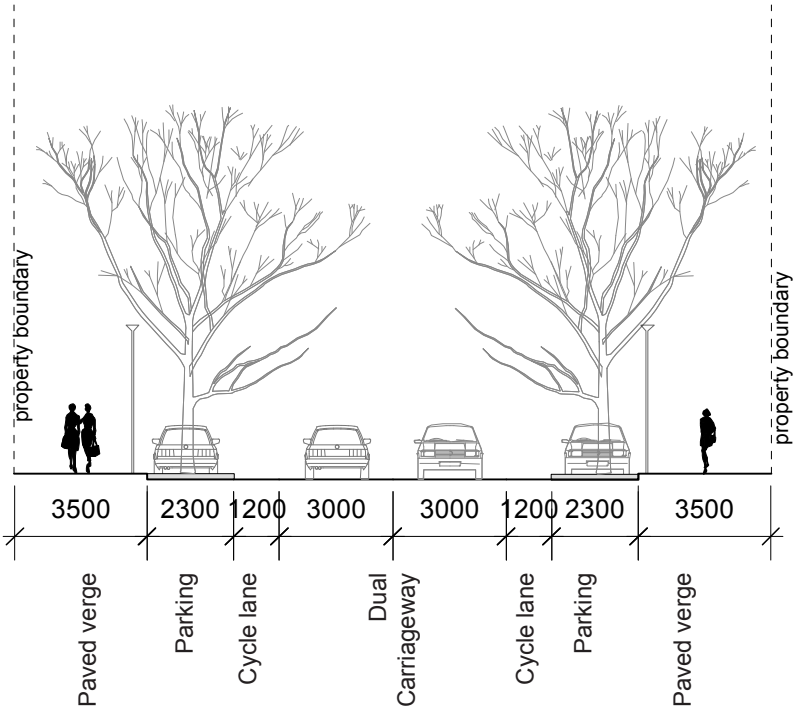


FIGURE 3.8

SCALE 1:200 ⊗

GUESS AVENUE EAST

TOTAL WIDTH 20m



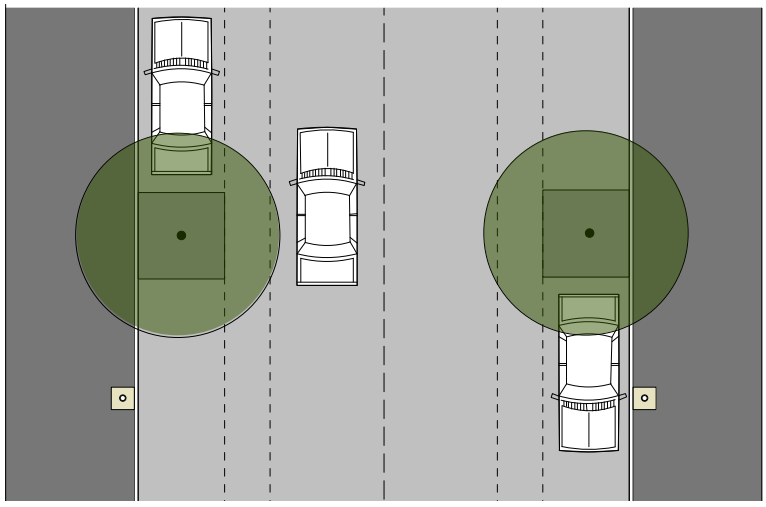


FIGURE 3.9

SCALE 1:200

MIXED USE

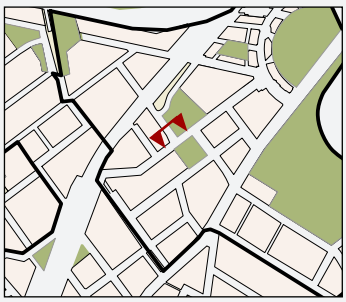
CHARACTER
Moderate vehicle traffic with rail underpass and pedestrian route to station. Street views terminating at the town park.

PAVING TYPE
Mixed Use Type
(refer to section 5.1.1)

FURNITURE AND FITTINGS
Seating (SSE/SS/A/EG2)
Bins (WBE em224)
Bike racks (BR475B)
Tree grate (Furphy GOV 36)
(refer to section 5.1.3)

LIGHTING
Type 1 - BEGA (8085)

STREET TREES
Ulmus parvifolia
14m spacing



LOCATION PLAN

MIXED USE

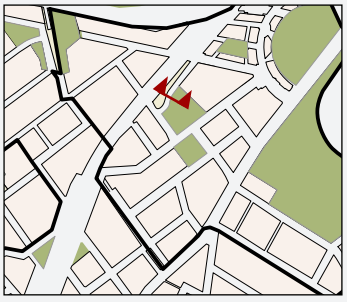
CHARACTER
Minor and pedestrian activity. One side planted railway embankment. Pedestrian connection to station.

PAVING TYPE
Mixed Use Type
(refer to section 5.1.1)

FURNITURE AND FITTINGS
Seating (SSE/SS/A/EG2)
Bins (WBE em224)
Bike racks (BR475B)
Tree grate (Furphy GOV 36)
(refer section 5.1.3)

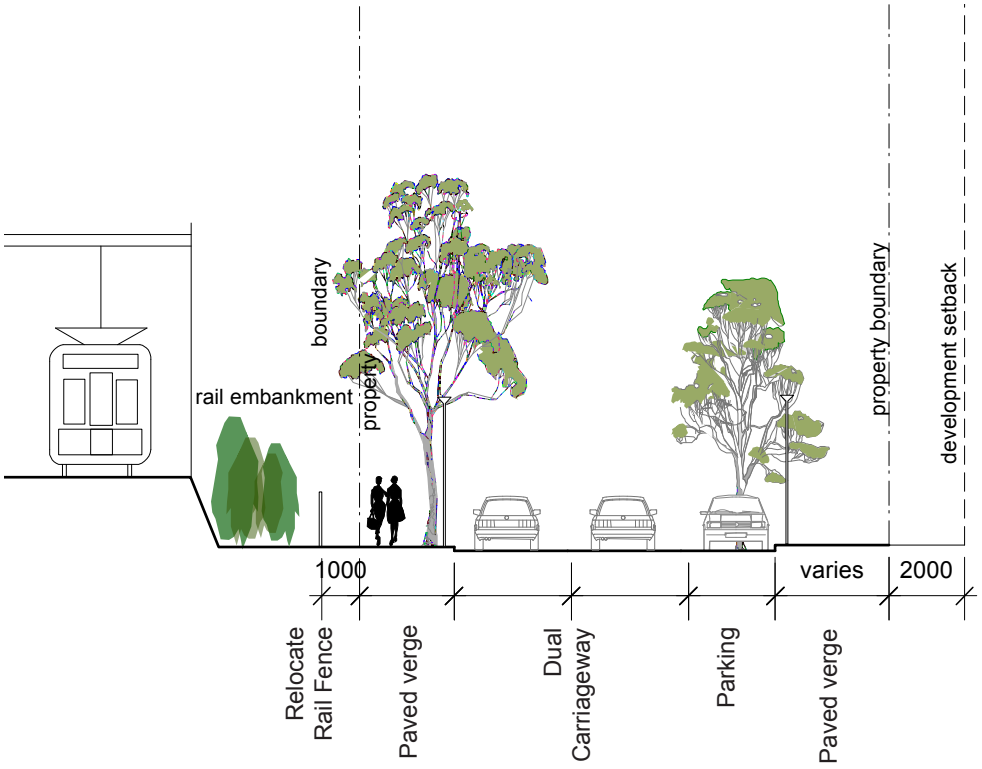
LIGHTING
Type 1 - BEGA (8085)

STREET TREES
Angophora costata
14m spacing



LOCATION PLAN

MT OLYMPUS BOULEVARD



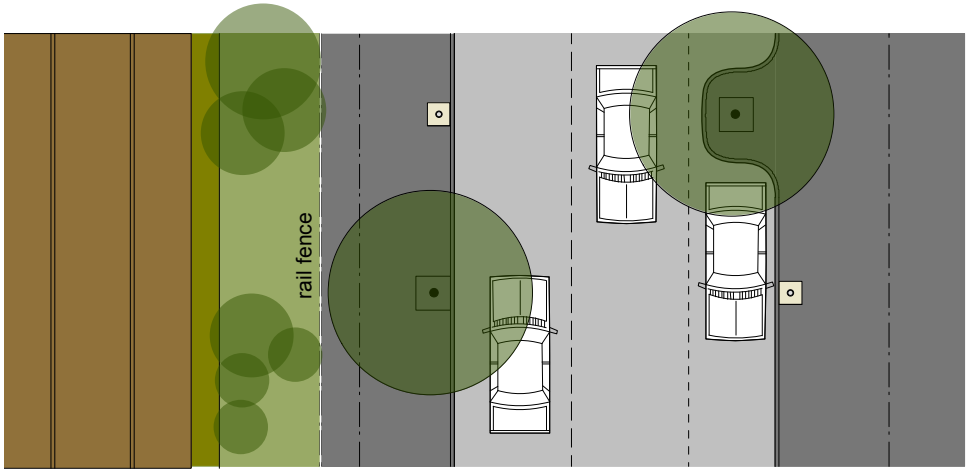
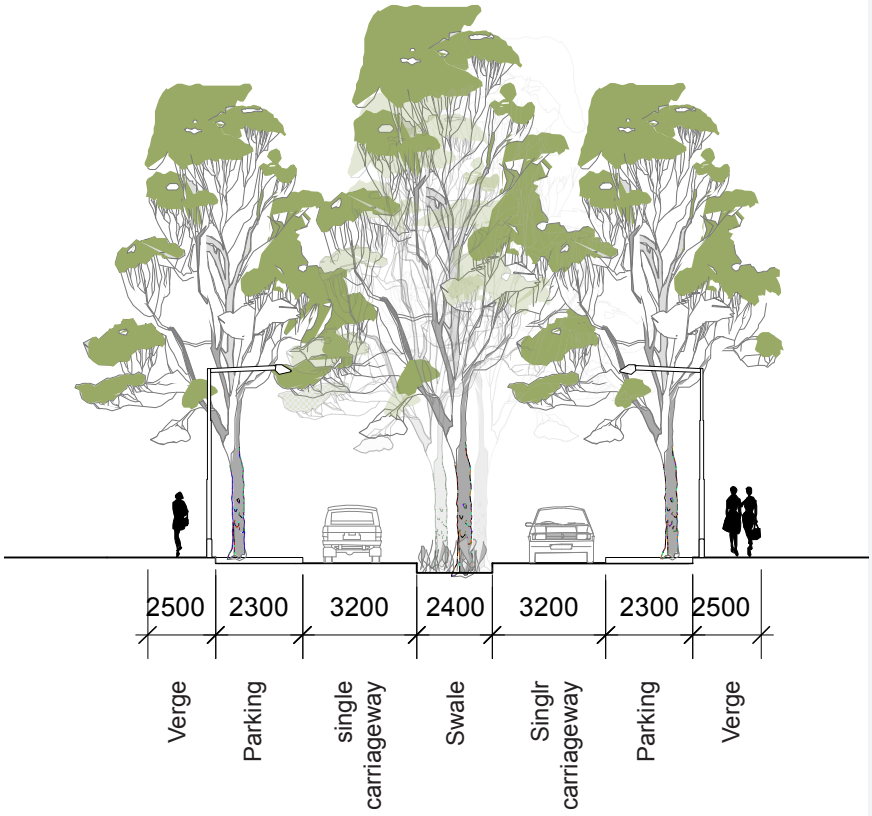


FIGURE 3.10

SCALE 1:200

NEW ROAD 3

TOTAL WIDTH 18.4m



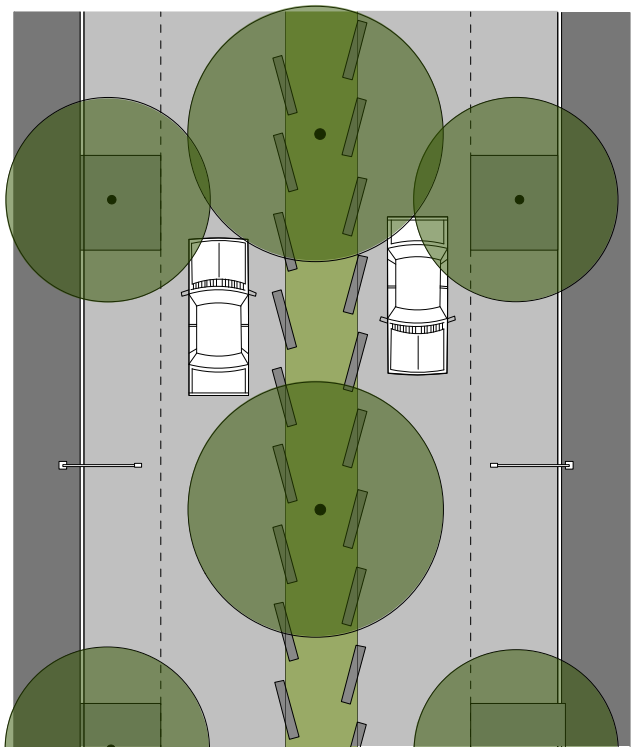


FIGURE 3.11

SCALE 1:200

MIXED USE

PAVING TYPE

LIGHTING
Type 1 - BEGA (8085)

STREET TREES
Eleocarpus Reticulatus
14m spacing
Eucalyptus Robusta
in swale

LOCATION PLAN

MIXED USE

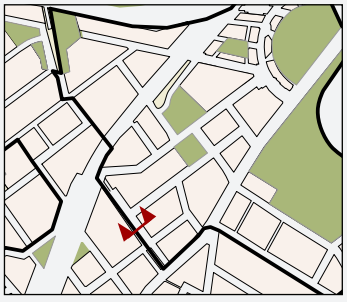
CHARACTER
New road alongside SWSOOS.

PAVING TYPE
Mixed Use Type
(refer to section 5.1.1)

FURNITURE AND FITTINGS
Seating (SSE/SS/A/EG2)
Bins (WBE em224)
Bike racks (BR475B)
Tree grate (Furphy GOV 36)
(refer to section 5.1.3)

LIGHTING
Type 1 - BEGA (8085)

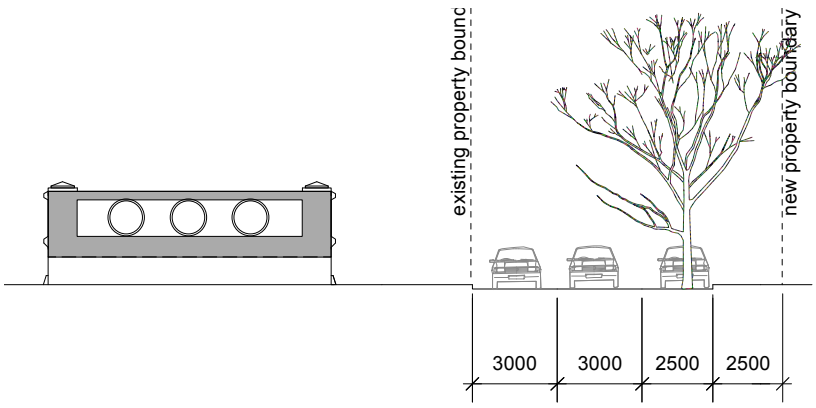
STREET TREES
Jacaranda mimosifolia
10m spacing



LOCATION PLAN

NEW ROAD 4

TOTAL WIDTH 11m



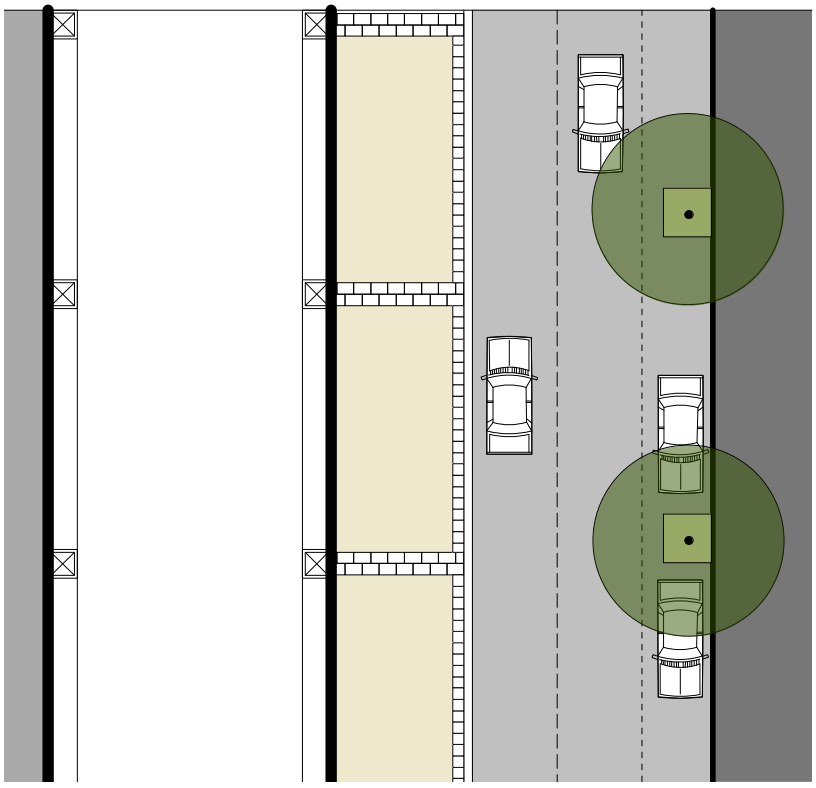
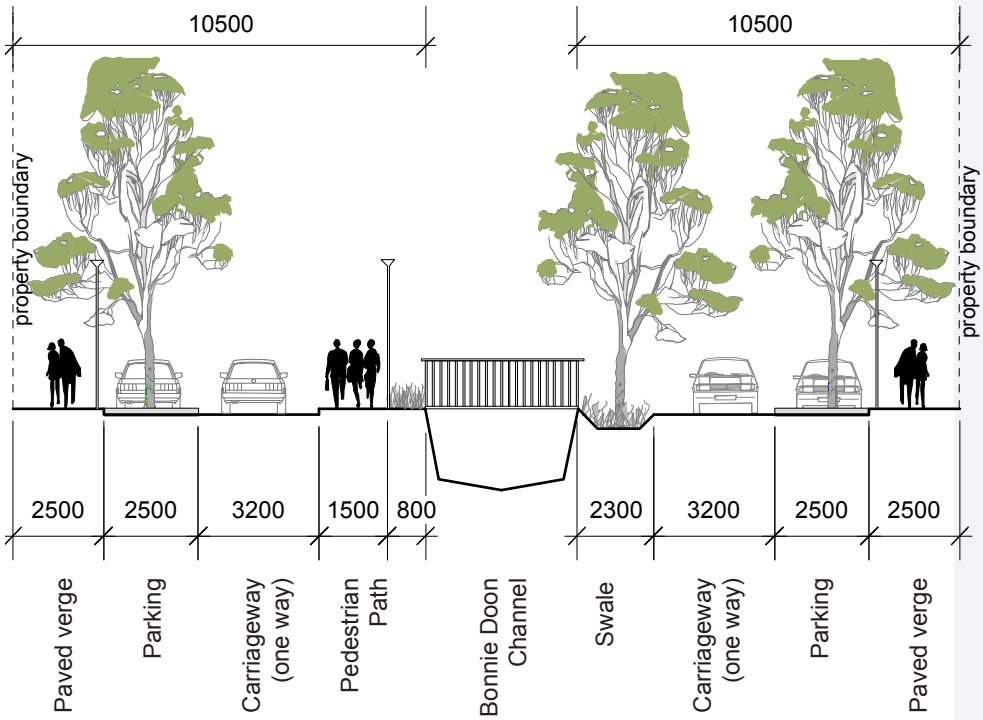


FIGURE 3.12Note. For details on paving between SWSOOS and property boundary see Section 4.1.2

NEW ROAD 5 (BONNIE DOON CHANNEL)



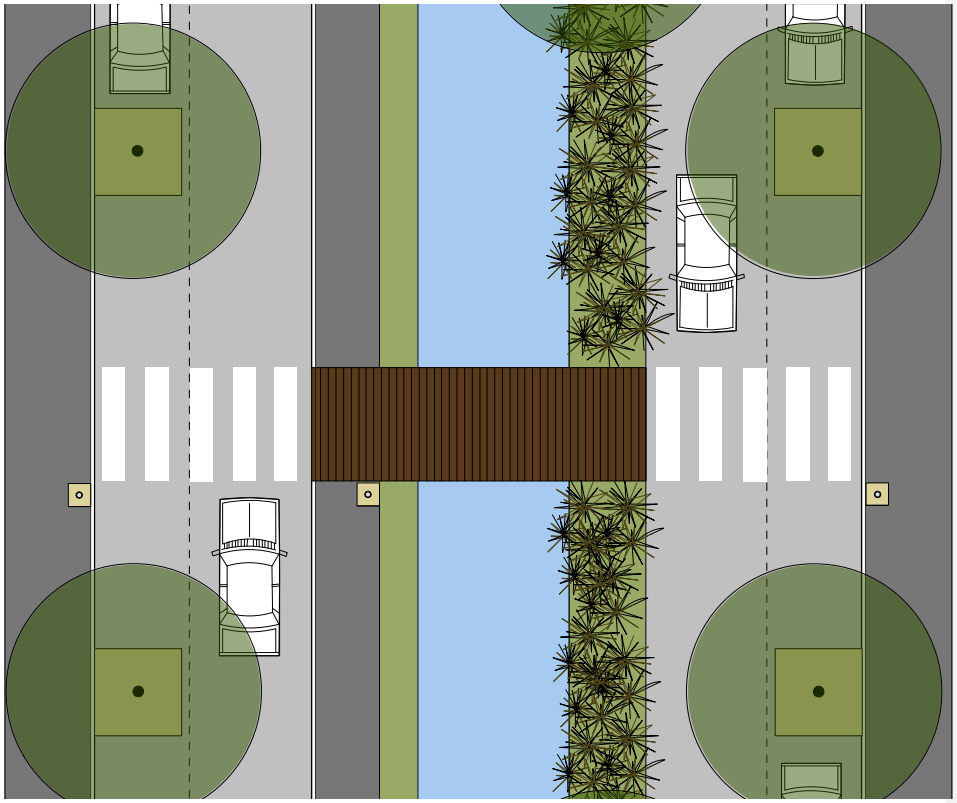


FIGURE 3.13

SCALE 1:200

MIXED USE

CHARACTER
Combining stormwater channel and WSUD treatment to form a linear water treatment strategy integrating surrounding streets.

PAVING TYPE
Mixed Use Type
(refer to section 5.1.1)

FURNITURE AND FITTINGS
Seating (SSE/SS/A/EG2)
Bins (WBE em224)
Bike racks (BR475B)
Tree grate (Furphy GOV 36)
(refer to section 5.1.3)

LIGHTING
Type 1 - BEGA (8085)

STREET TREES
Melaleuca quinquenervia
14m spacing
Elaeocarpus reticulatus
in swale

LOCATION PLAN

MIXED USE

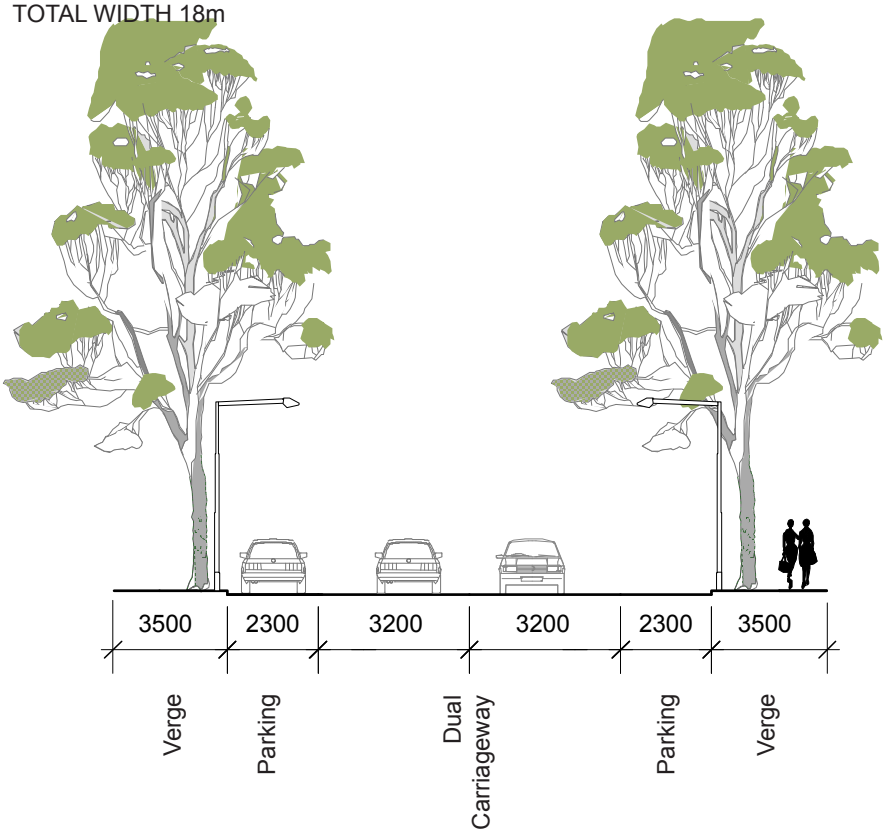
PAVING TYPE
As per street hierarchy

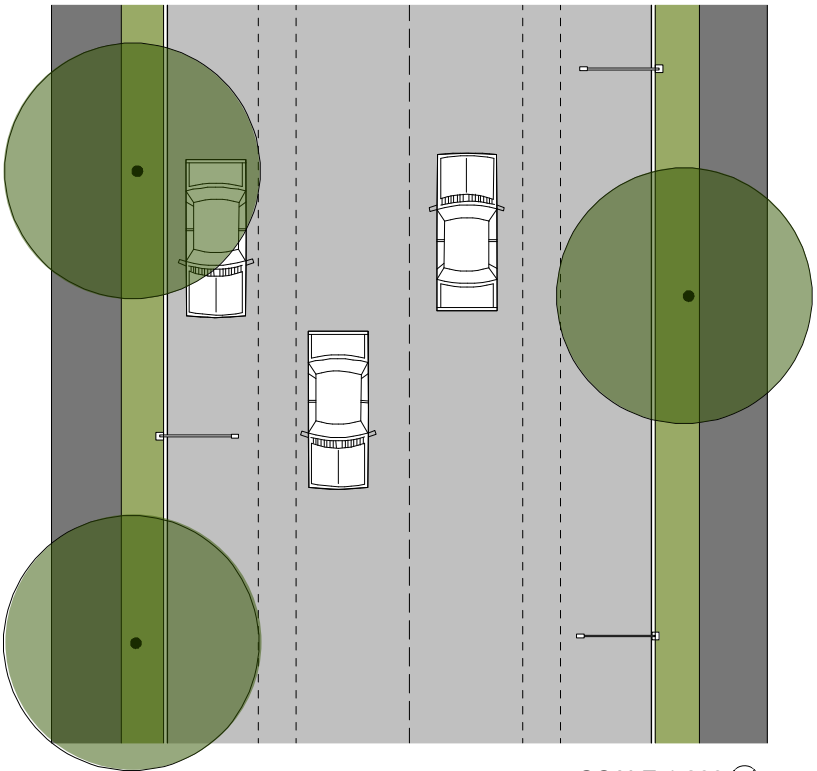
LIGHTING
Type 1 - BEGA (8085)

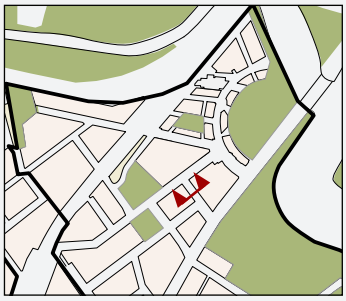
STREET TREES
Elaeocarpus reticulatus
8m spacing

NEW ROAD 6

TOTAL WIDTH 18m







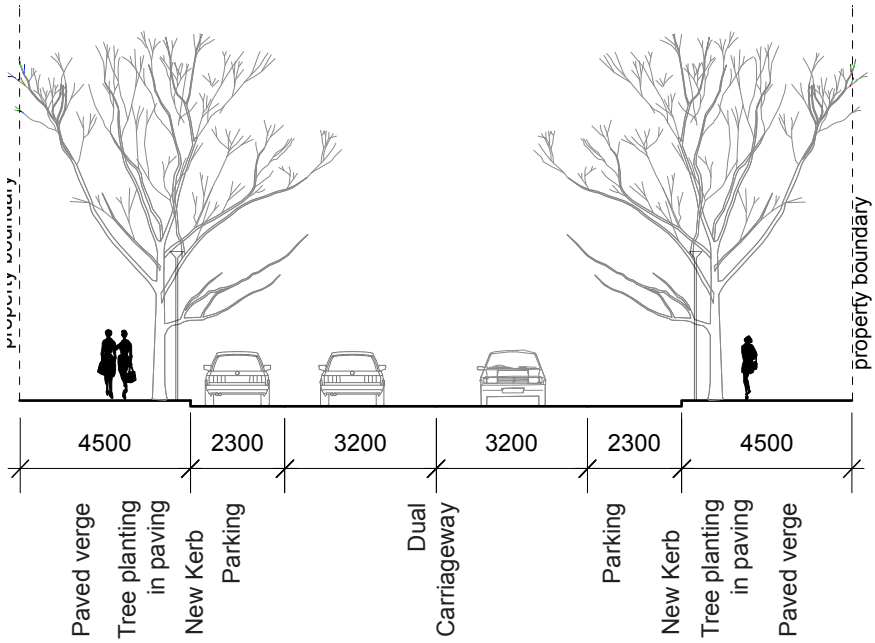
LOCATION PLAN

FIGURE 3.14

SCALE 1:200

WILLIS STREET

TOTAL WIDTH 20m



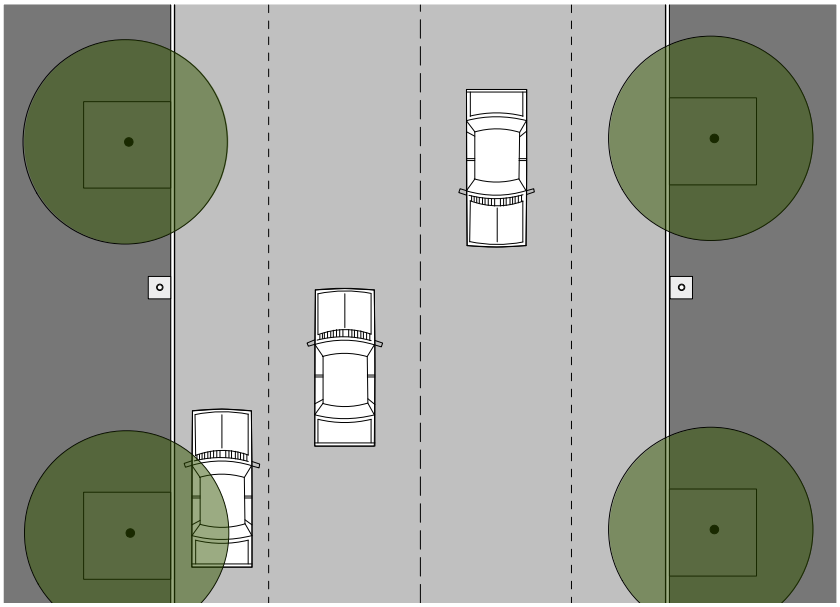


FIGURE 3.15

SCALE 1:200

MIXED USE

CHARACTER
Light vehicle and pedestrian activity. Short street terminating in planted rail embankment.

PAVING TYPE
Mixed Use Type
(refer to section 5.1.1)

FURNITURE AND FITTINGS
Seating/Benches (SSE/SS/A/EG2) (WBSE/A/SS)
Bins (WBE em224)
Bike racks (BR475B)
Tree grate (Furphy GOV 36)
(refer section 5.1.3)

LIGHTING
Type 1 - BEGA (8085)

STREET TREES
Pyrus ussuriensis
8m spacing

LOCATION PLAN

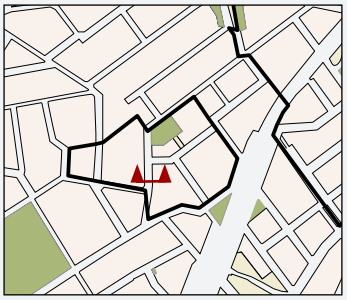
RESIDENTIAL

CHARACTER
Light pedestrian and vehicle activity.
Triple avenue to establish intimate scale and define parking bays.

PAVING TYPE
Residential Type
(refer to section 5.1.1)

LIGHTING
Type 1 - BEGA (8085)

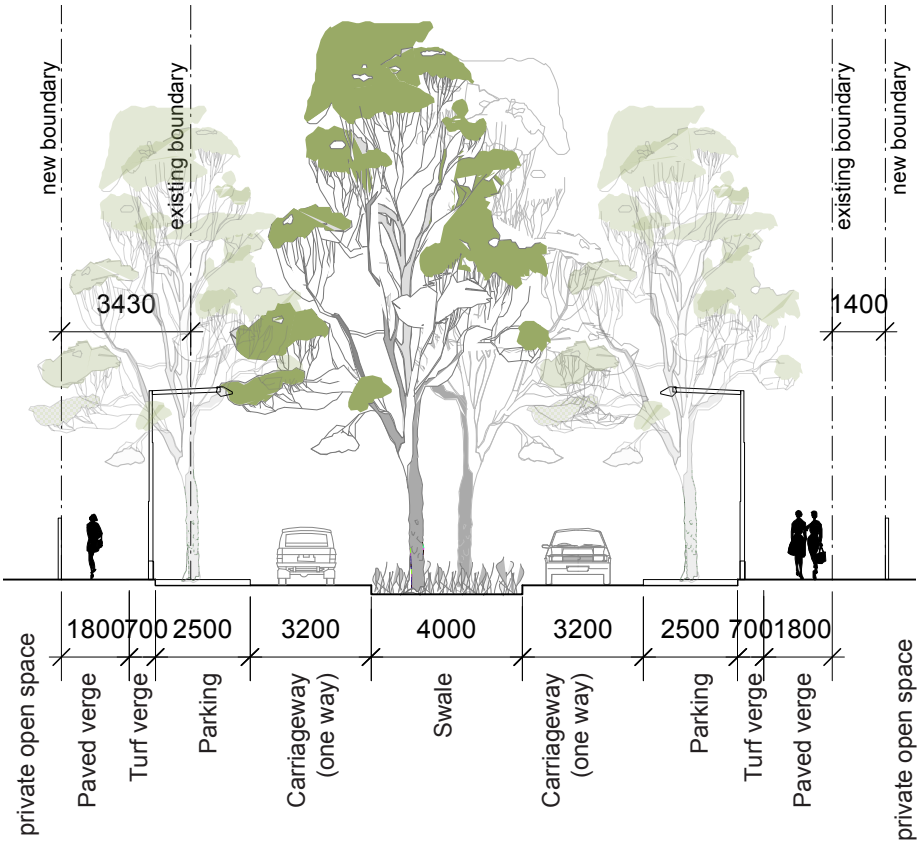
STREET TREES
Melaleuca linariifolia
spacing 8m central median
Eucalyptus punctata
spacing 14m



LOCATION PLAN

BONAR STREET SOUTH

TOTAL WIDTH 20.4m



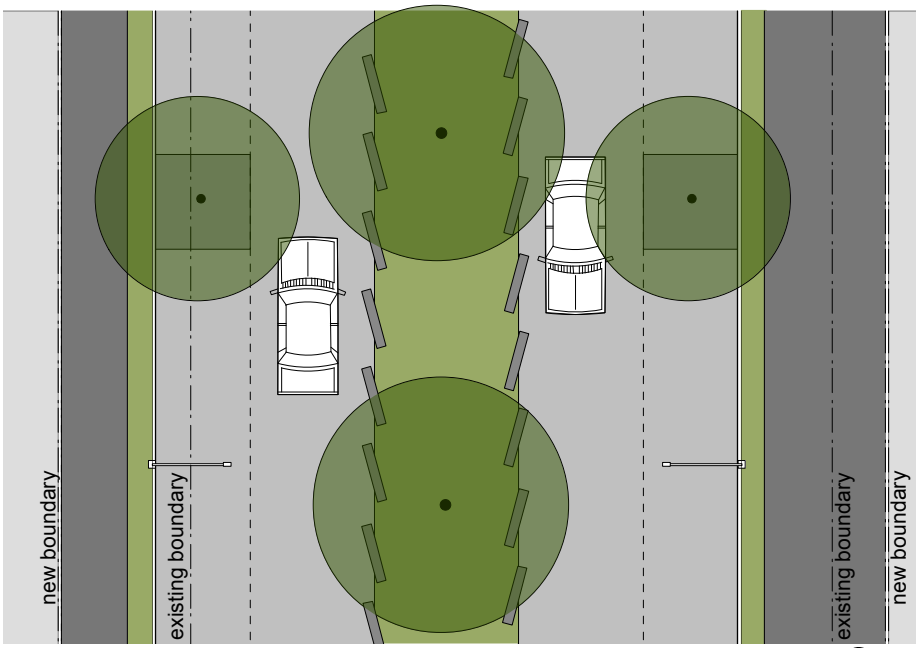
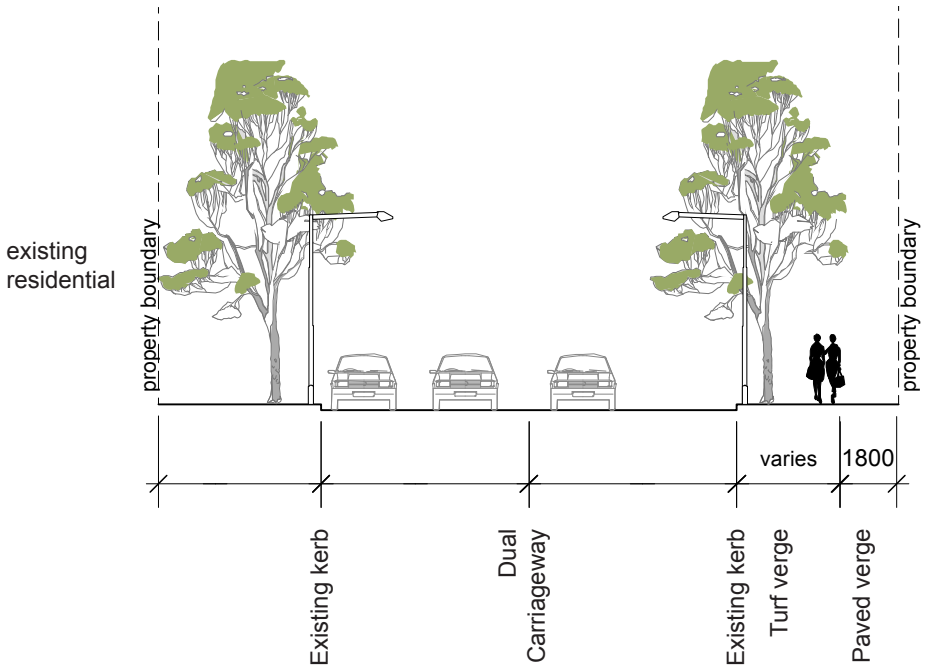


FIGURE 3.16

SCALE 1:200

EDWARD STREET

TOTAL WIDTH 20m



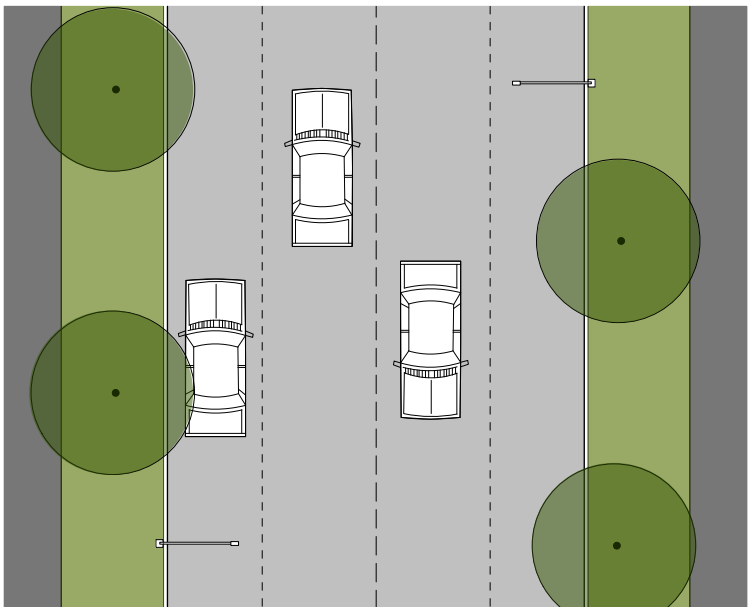


FIGURE 3.17

SCALE 1:200

RESIDENTIAL

CHARACTER
Low through traffic and pedestrian activity. Evergreen street tree planting for North-south orientated street.

PAVING TYPE
Residential Type
(refer to section 5.1.1)

LIGHTING
Type 1 - BEGA (8085)

STREET TREES
Melaleuca linariifolia
8m spacing

LOCATION PLAN

RESIDENTIAL

CHARACTER
Moderate through traffic under rail overpass.

PAVING TYPE
Residential Type
(refer to section 5.1.1)

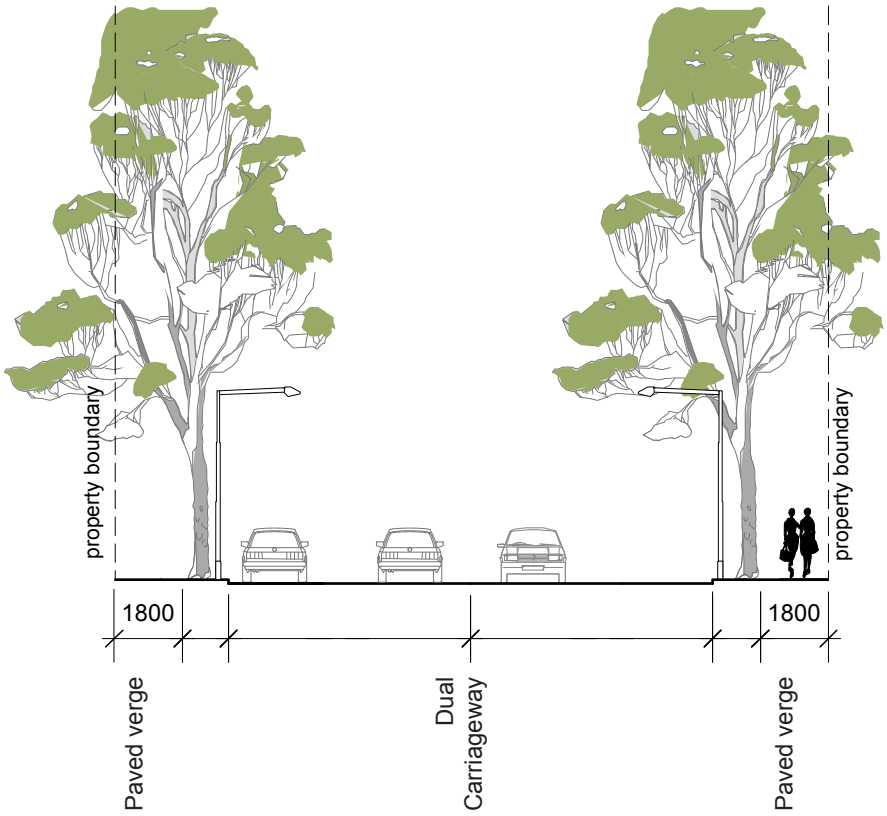
LIGHTING
Type 1 - BEGA (8085)

STREET TREES
Corymbia maculata
8m spacing

LOCATION PLAN

GUESS AVENUE WEST

TOTAL WIDTH18.7m



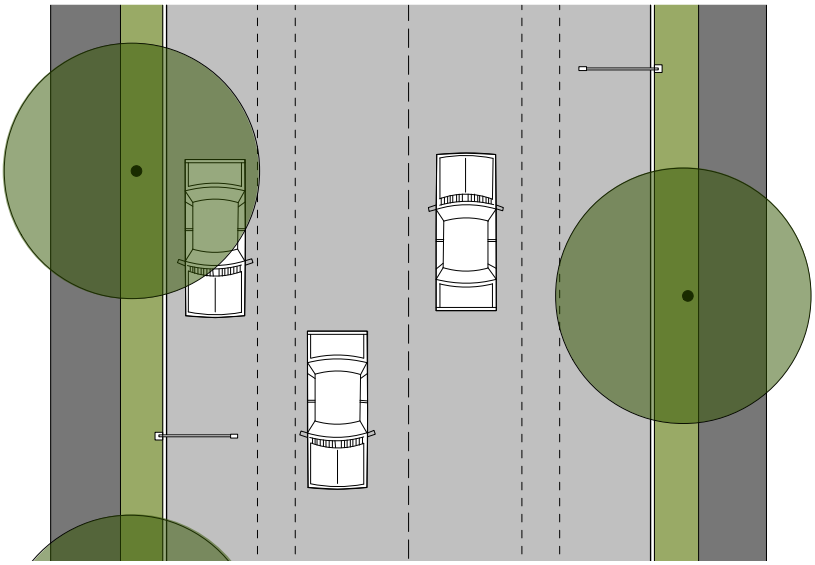
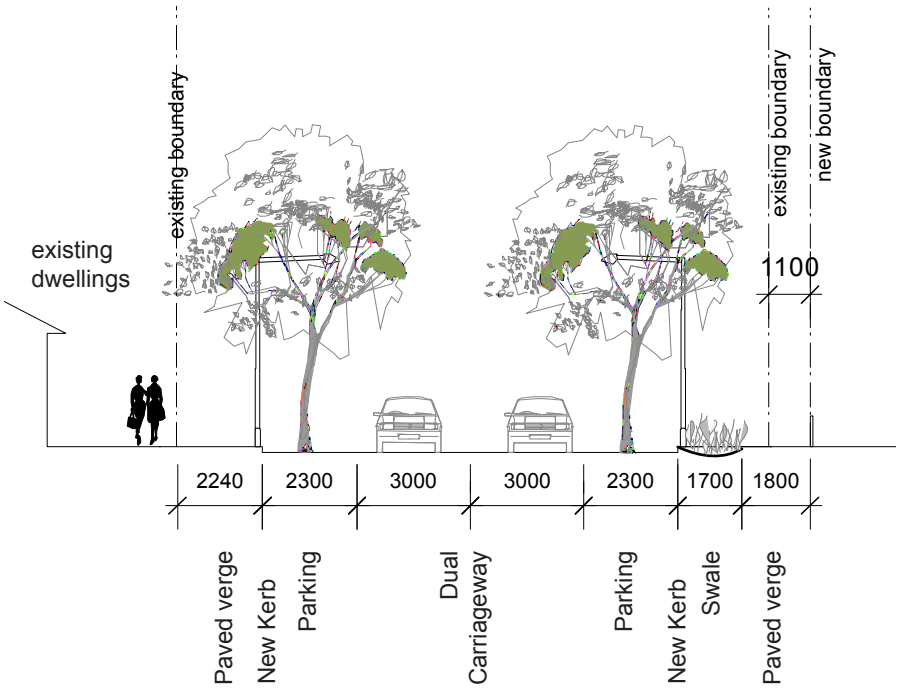


FIGURE 3.18

SCALE 1:200

HIRST STREET

TOTAL WIDTH 16.34m



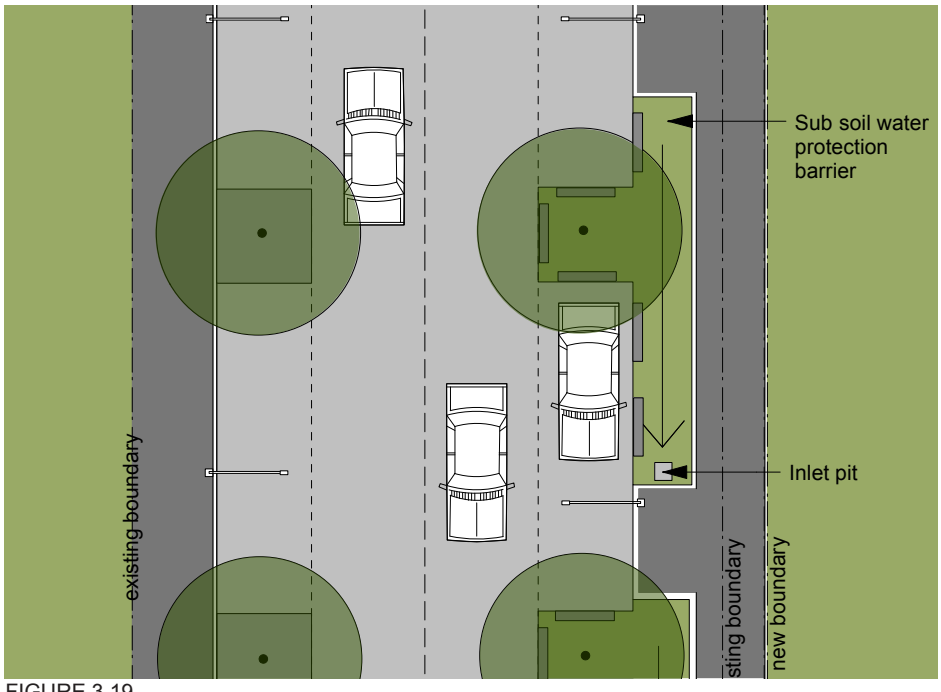


FIGURE 3.19

SCALE 1:200

RESIDENTIAL

CHARACTER
Minor through traffic and pedestrian activity. Single storey red brick housing along one side.

PAVING TYPE
Residential Type
(refer to section 5.1.1)

LIGHTING
Type 1 - BEGA (8085)

STREET TREES
Ulmus parvifolia
14m spacing
(underground powerlines)
Callistemon 'Hannah Ray'
14m spacing
(overhead powerlines)

NOTE
Road widening, north side from Edward Street to Loftus Street to be 2.05m

LOCATION PLAN

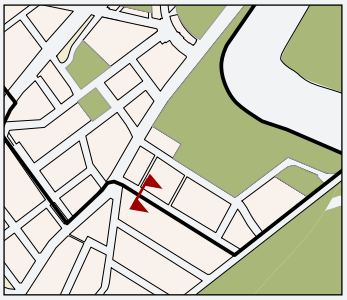
RESIDENTIAL

CHARACTER
Light vehicle traffic with no direct access to Princes Highway. Well established street tree canopy of mixed species.

PAVING TYPE
Residential Type
(refer to section 5.1.1)

LIGHTING
Type 1 - BEGA (8085)

STREET TREES
Ulmus parvifolia
8m spacing infill existing planting where needed.



LOCATION PLAN

INNESDALE ROAD

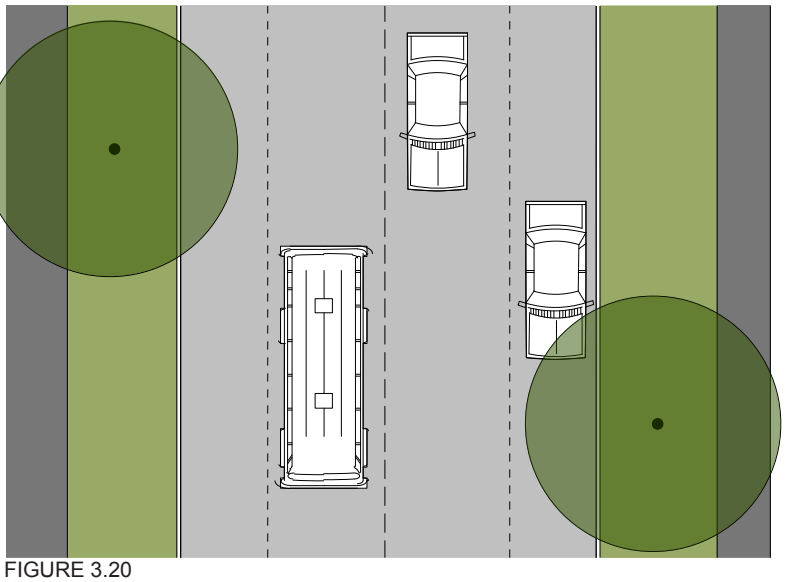
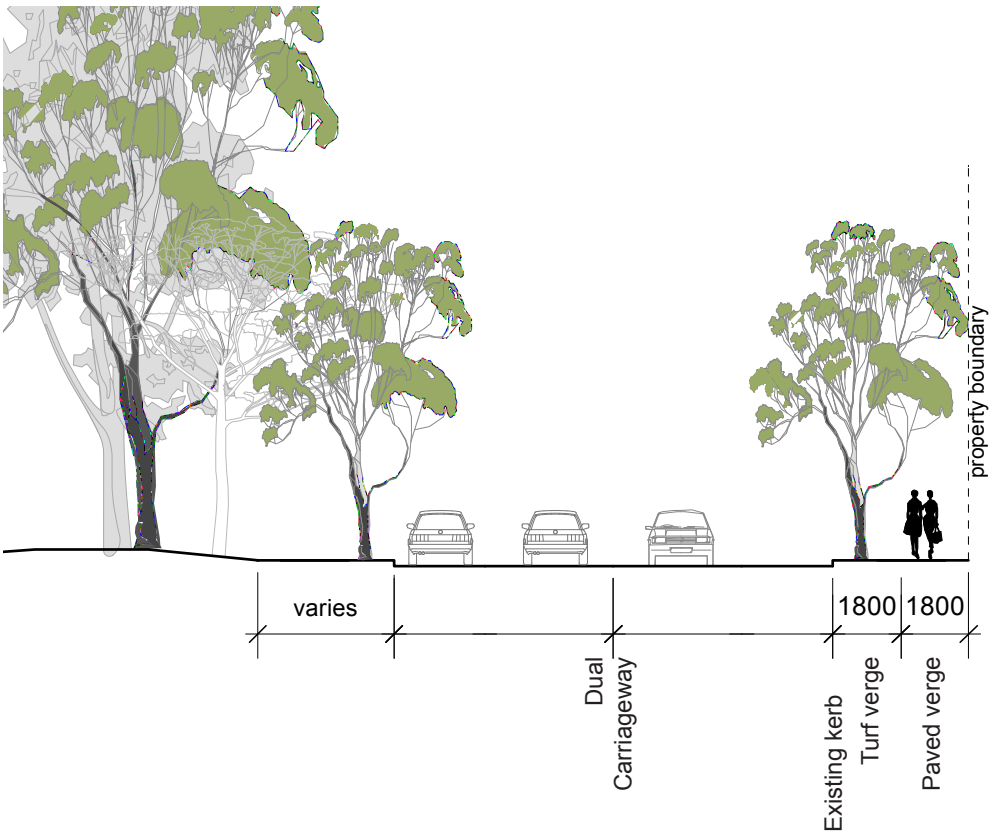


FIGURE 3.20

SCALE 1:200

LEVEY STREET

TOTAL WIDTH 20m



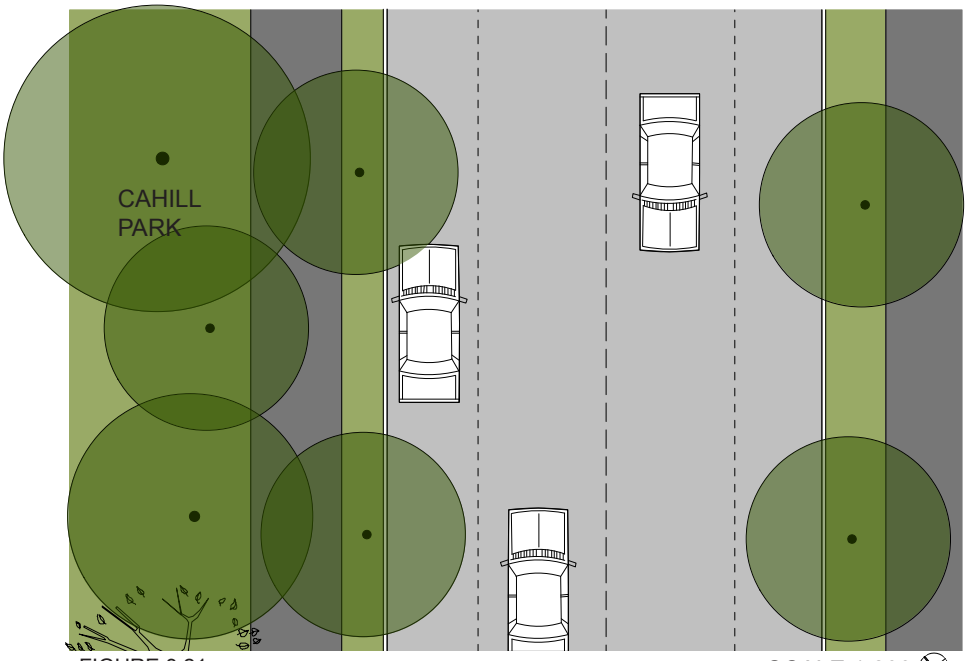


FIGURE 3.21

SCALE 1:200

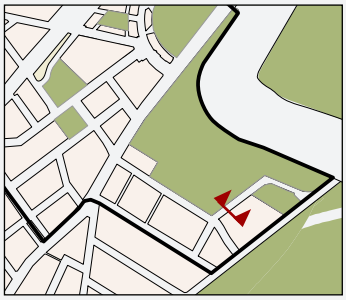
RESIDENTIAL

CHARACTER
Heavy vehicle traffic to Gertrude Street.
Cahill Park along one side.

PAVING TYPE
Residential Type
(refer to section 5.1.1)

LIGHTING
Type 1 - BEGA (8085)

STREET TREES
Angophora costata
8m spacing



LOCATION PLAN

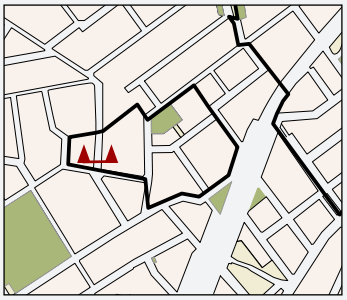
RESIDENTIAL

CHARACTER
Minor collector route with some through traffic and pedestrian activity. Street trees to be evergreen as north-south orientated street. Mature tree canopy within school grounds forms feature of the street.

PAVING TYPE
Residential Type
(refer to section 5.1.1)

LIGHTING
Type 1 - BEGA (8085)

STREET TREES
Melaleuca linariifolia
8m spacing in swale
Tristaniopsis laurina
14m spacing
(in parking bays)



LOCATION PLAN

LOFTUS STREET

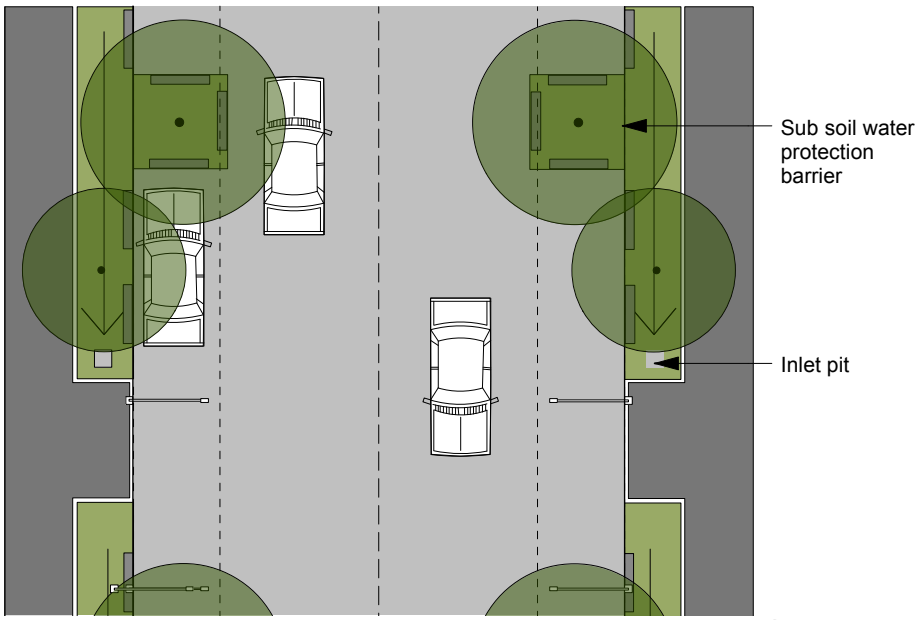
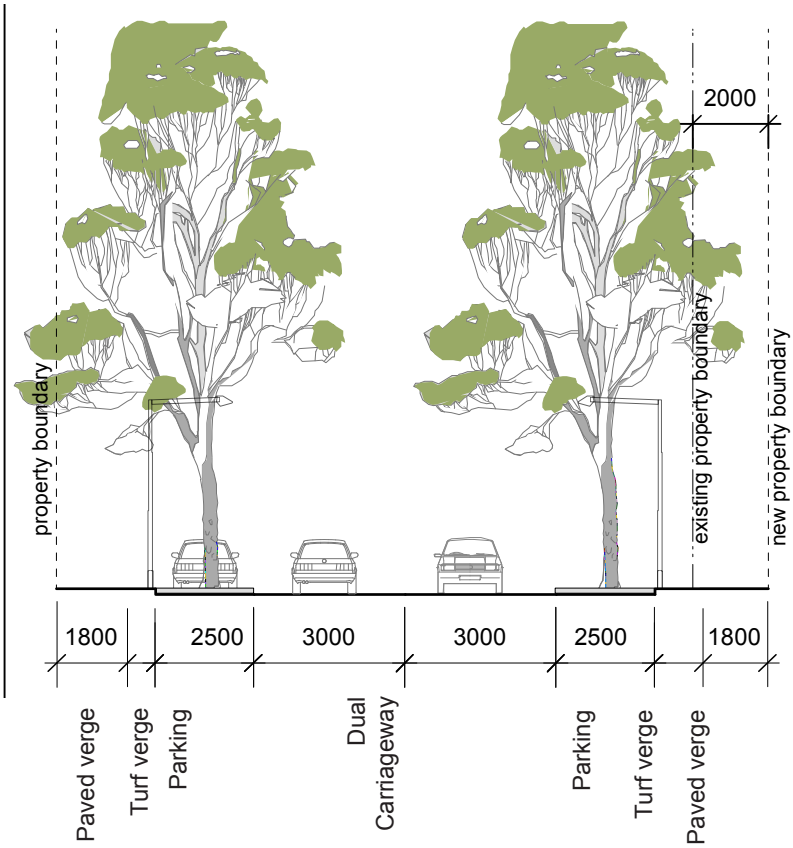


FIGURE 3.22

SCALE 1:200

LUSTY STREET

TOTAL WIDTH 17m



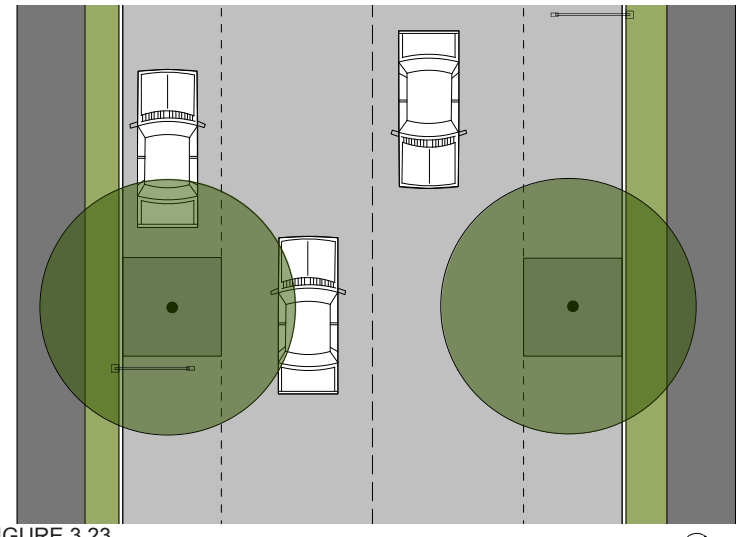


FIGURE 3.23

SCALE 1:200

RESIDENTIAL

CHARACTER
Light vehicle traffic, with cycleway connection.
Terminating at public reserve.

PAVING TYPE
Residential Type
(refer to section 5.1.1)

LIGHTING
Type 1 - BEGA (8085)

STREET TREES
Corymbia maculata
14m spacing in carriageway

LOCATION PLAN

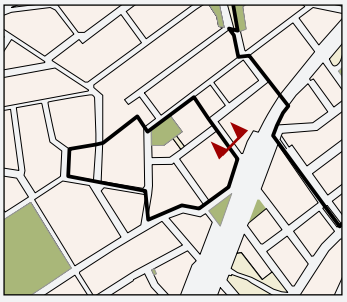
RESIDENTIAL

CHARACTER
Minor though traffic and pedestrian activity. Deciduous street trees for east-west orientated street.

PAVING TYPE
Residential Type
(refer to section 5.1.1)

LIGHTING
Type 1 - BEGA (8085)

STREET TREES
Pyrus ussuriensis
8m spacing in verge
Tristaniopsis laurina
14m spacing
(in parking bay)



LOCATION PLAN

MARTIN AVENUE

TOTAL WIDTH 16.84m

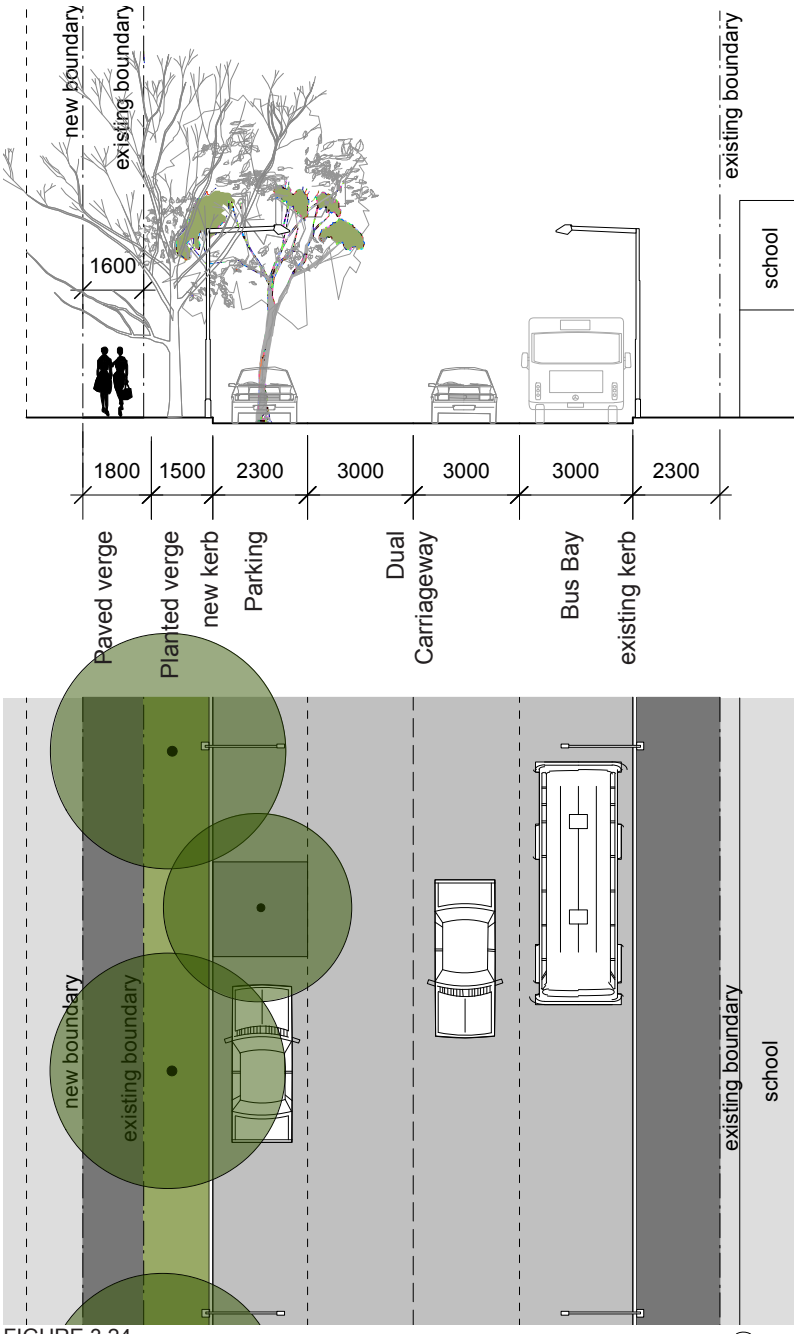
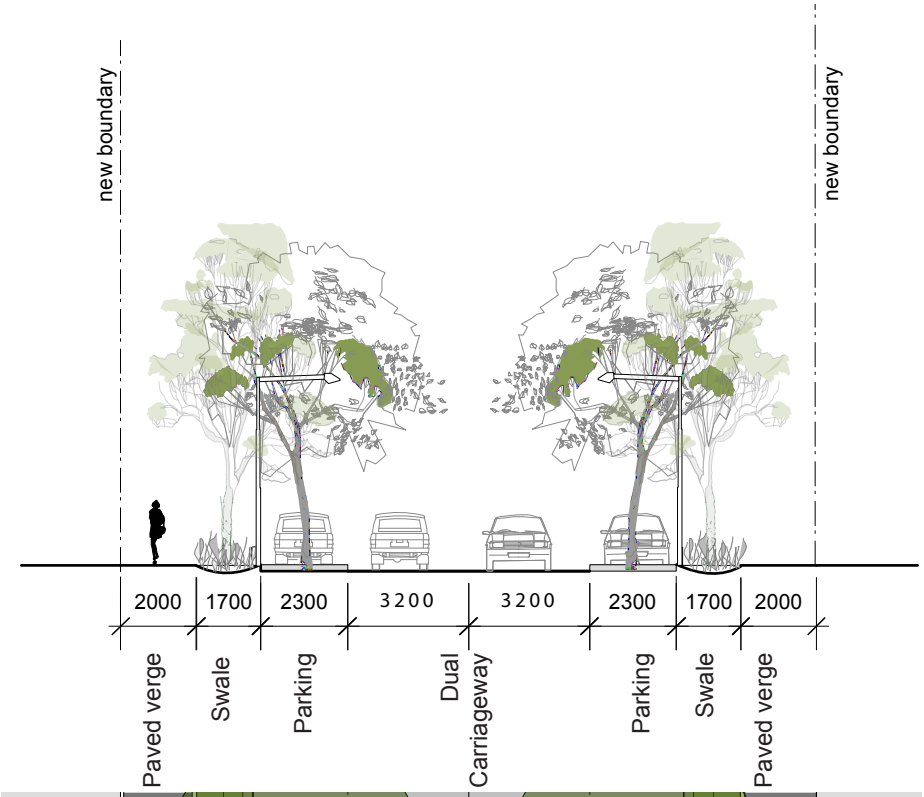


FIGURE 3.24

SCALE 1:200

NEW ROADS 7 AND 8 (BONAR STREET PRECINCT)

TOTAL WIDTH 18.4m



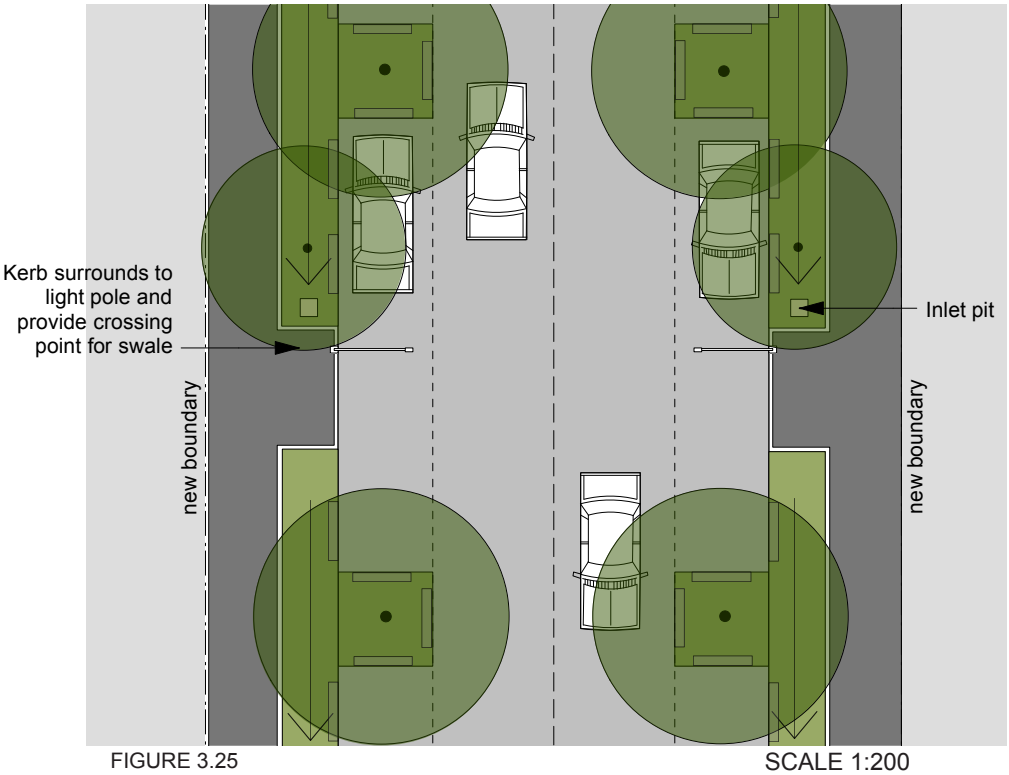


FIGURE 3.25

SCALE 1:200

RESIDENTIAL

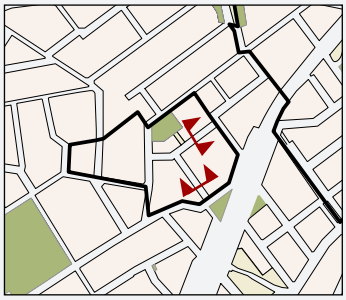
CHARACTER
Controlled traffic access with moderate pedestrian activity as a thoroughfare connecting the public park to Wollongong Road.

PAVING TYPE
Residential Type
(refer to section 5.1.1)

FURNITURE AND FITTINGS
Seating (SSE/SS/A/EG2)
(refer section 5.1.3)

LIGHTING
Type 1 - BEGA (8085)

STREET TREES
Lophostemon confertus
14m spacing in parking bay
Melaleuca linariifolia
8m spacing in swale



LOCATION PLAN

RESIDENTIAL

CHARACTER
Light vehicle and pedestrian activity. Established street trees screen the shift in scale from new residential development and existing detached housing.

PAVING TYPE
Residential Type
(refer to section 5.1.1)

LIGHTING
Type 1 - BEGA (8085)

STREET TREES
Eucalyptus sideroxylon
8m spacing supplement existing avenue
Tristaniopsis laurina
8m spacing under overhead powerlines

LOCATION PLAN

THOMPSON STREET - AS CONSTRUCTED

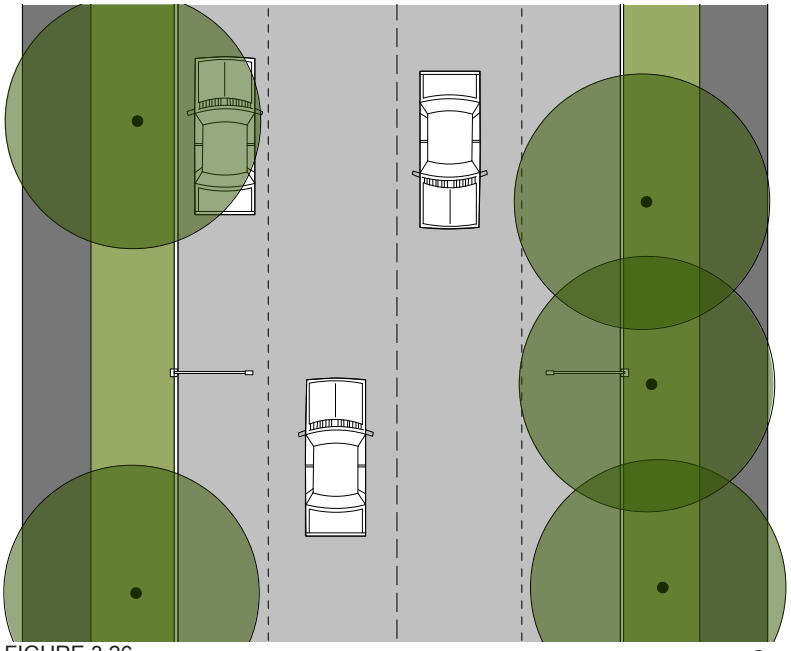
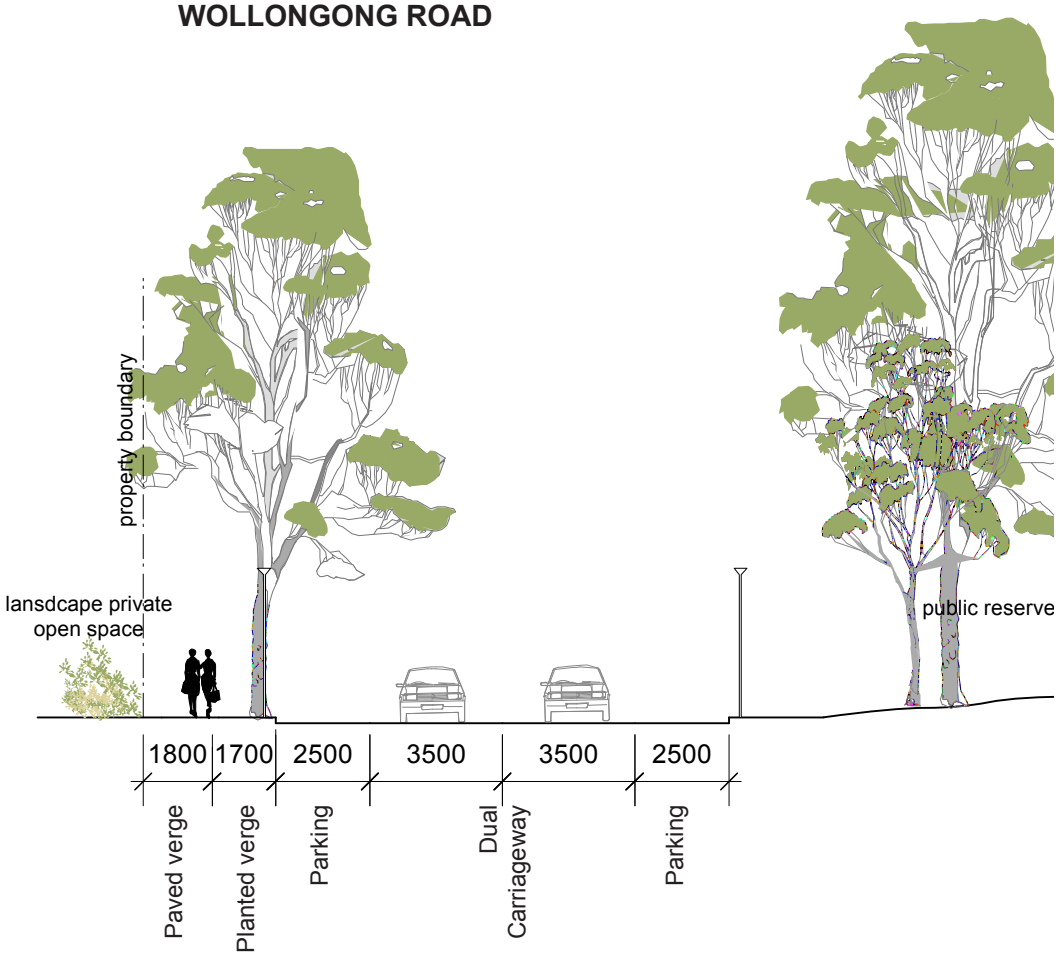


FIGURE 3.26

SCALE 1:200

WOLLONGONG ROAD



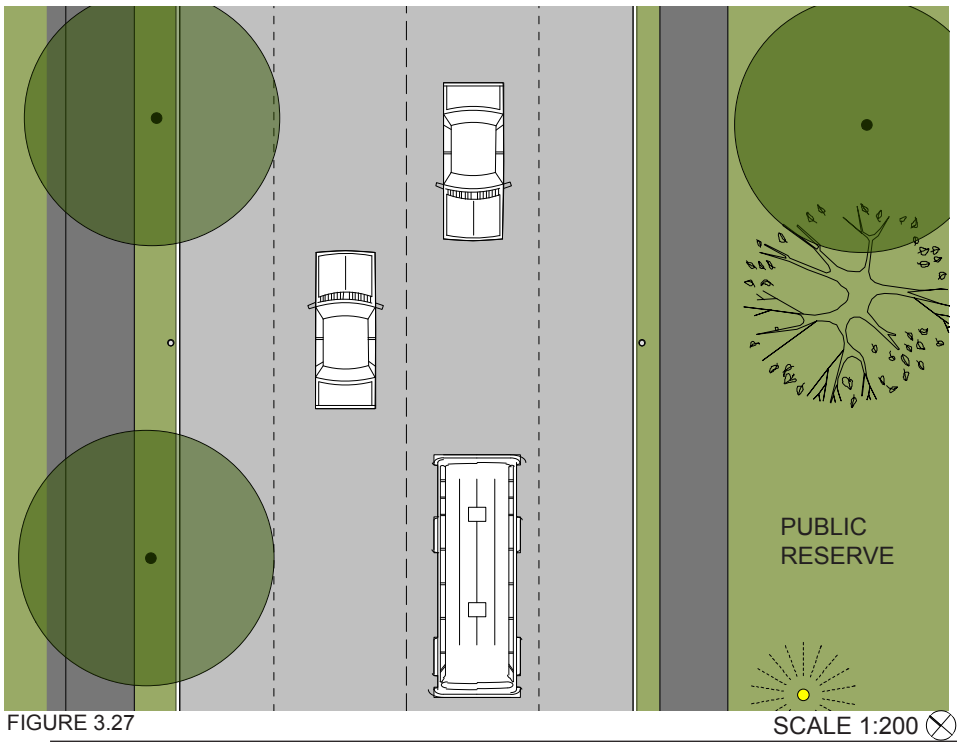


FIGURE 3.27

SCALE 1:200

RESIDENTIAL

CHARACTER
Collector road with moderate vehicle and pedestrian activity. Highly treed streetscape extending to Arncliffe shops and Gardiner Park.

PAVING TYPE
Residential Type
(refer to section 5.1.1)

FURNITURE AND FITTINGS
Bus Shelter
(refer section 5.1.3)

LIGHTING
Type 1 - BEGA (8085)

STREET TREES
Corymbia maculata
Tristaniopsis laurina
alternate spacing 8m

LOCATION PLAN

LANEWAY

CHARACTER
Well lit pedestrian connection through to Cahill Park.

PAVING TYPE
Laneway Type
(refer to section 5.1.1)

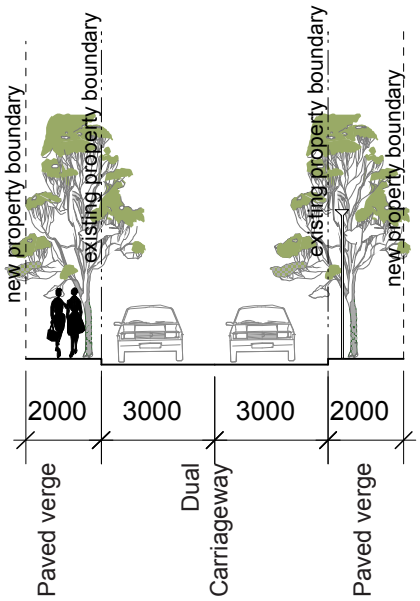
LIGHTING
Type 1 - BEGA (8085)

STREET TREES
Cupanipsis anacandiodes
8m spacing

LOCATION PLAN

LANEWAYS

TOTAL WIDTH 10m



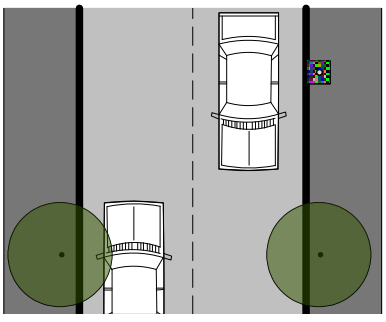


FIGURE 3.28

SCALE 1:200

SPARK LANE - KISS AND RIDE

TOTAL WIDTH 13m

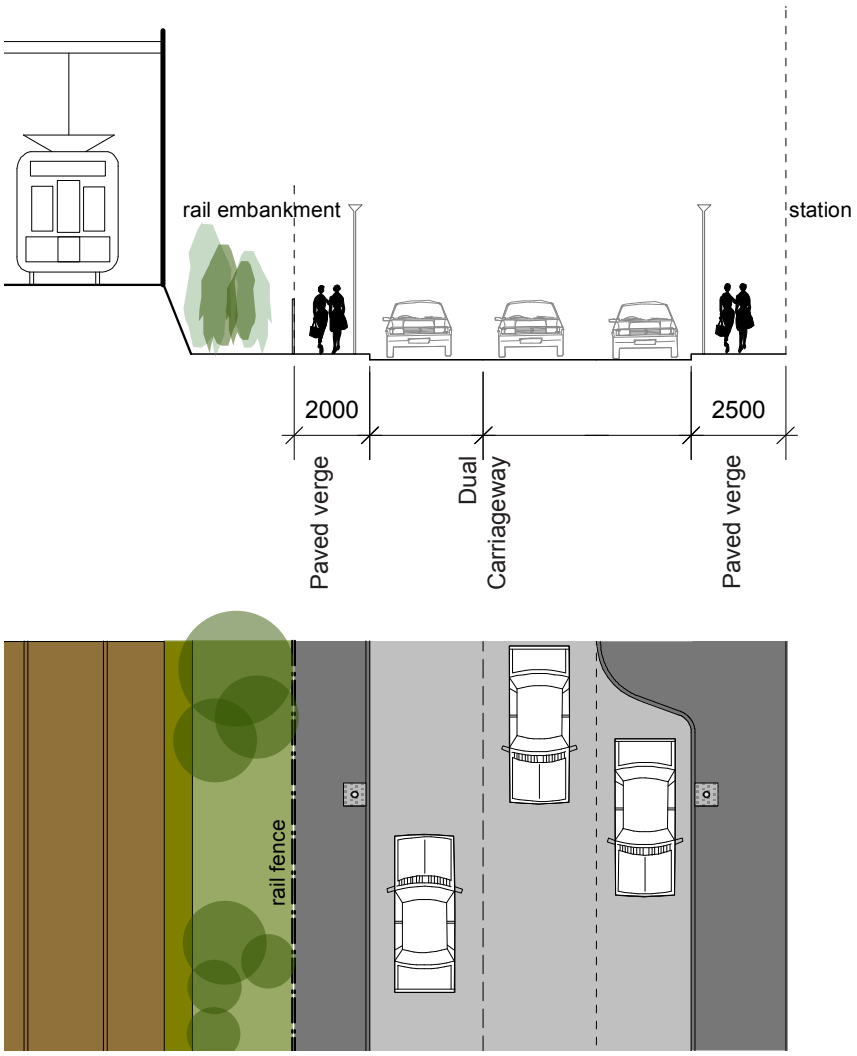


FIGURE 3.29

SCALE 1:200

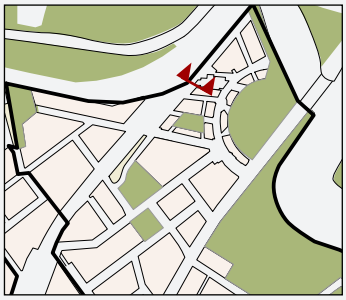
LANEWAY

CHARACTER
Pedestrian connection to station with light vehicle traffic utilising drop-off zone.

PAVING TYPE
Laneway Type
(refer to section 5.1.1)

FURNITURE AND FITTINGS
Bins (WBE em224)
Bike racks (BR475B)
Benches (WBSE/A/SS)
(refer section 5.1.3)

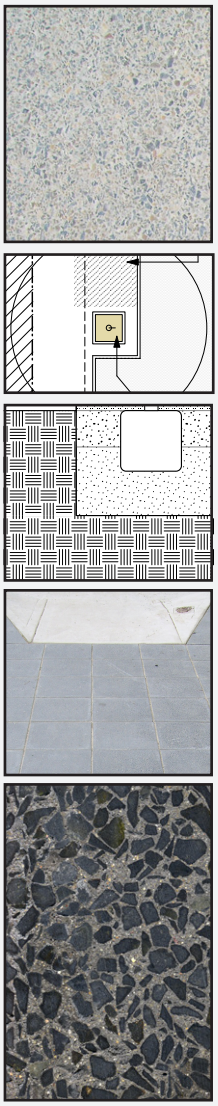
LIGHTING
Type 1 - BEGA (8085)



LOCATION PLAN

Wolli Creek and Bonar Street Precinct

Public Domain Technical Manual



5.0 TECHNICAL MANUAL

5.0.1 Street Layout Principles

Introduction

This section outlines principles for the layout of pavements, lighting and furniture for the streets and civic spaces of Wolli Creek and the Bonar Street precinct.
There are basic principles that apply to all street types across the study area, with variation in the detail applying for each street type, according to intensity of pedestrian use.

The layout of kerbs, pavement extensions, kerb ramps and street furniture should:

- Reinforce the orthogonal geometry established by the built edge;
- Create a formal geometry at pavement edge, and for kerb extensions;
- Establish a clear line of travel for pedestrians separate from the carriageway;
- Promote accessibility and comfort through provision of kerb ramps at all street corners, and regular placement of seating; and
- Prioritise pedestrian movement through a tighter kerb radius at corners to slow turning traffic; and minimise clutter.

5.0.2 Typical Street Layout

The following principles apply particularly to main streets and mixed use streets of Wolli Creek, that will have a greater intensity of use than residential streets. The layout of residential streets is covered in Section 4.2.

Layout Principles
Horizontal layout - allow a minimum of 2.4m passage unimpeded by streetscape elements or dining areas. This may be adjacent to either the building alignment or the kerb, depending on the width and function of the pavement, and the services provided.

Parking
Proposed parking lanes to be in accordance with Australian Standard AS 2890.5-1993 'Parking facilities Part 5: On-street parking

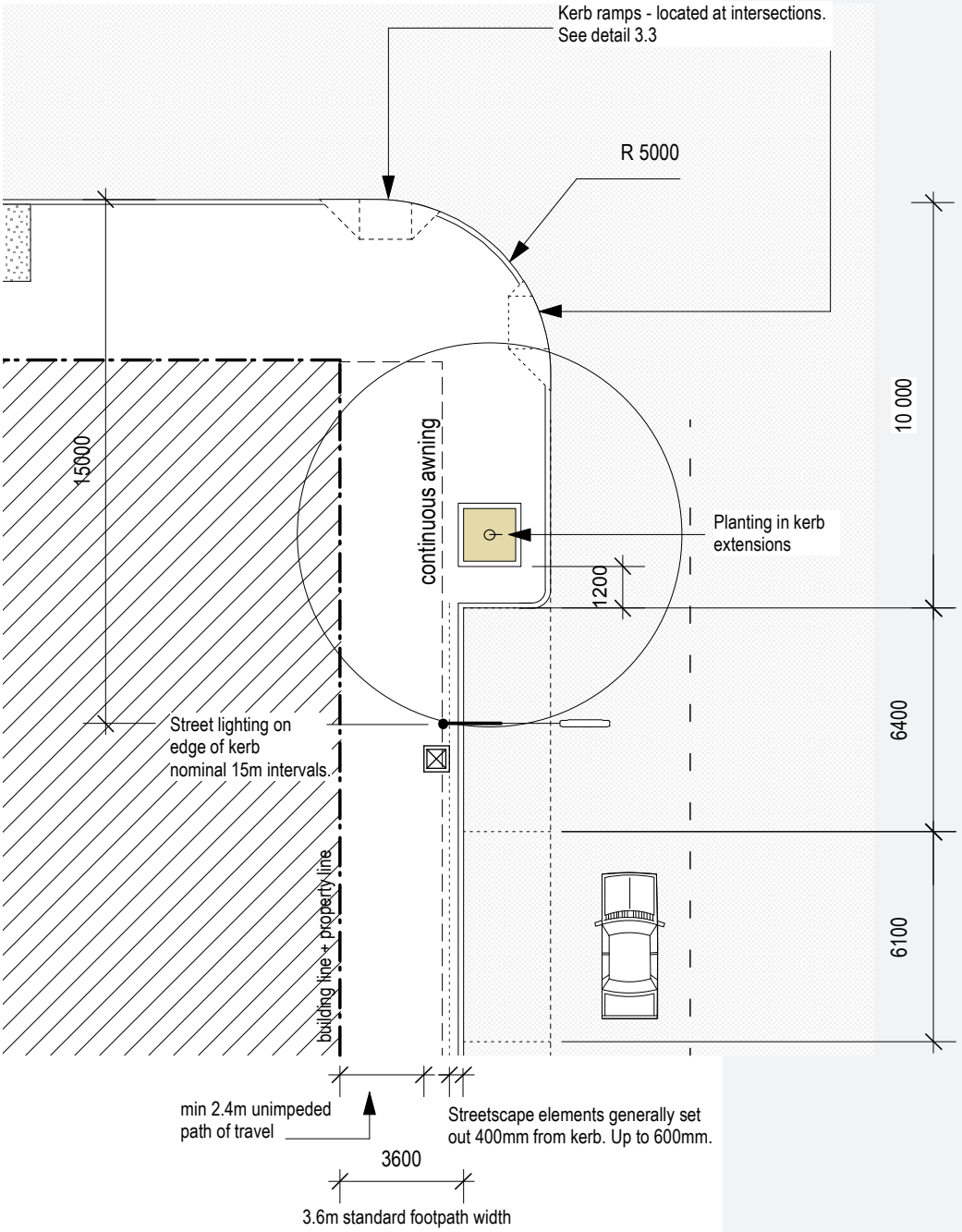
Street Trees
Tree spacing to be designed to ensure that when the trees grow they do not inhibit the extent of the proposed street lighitng and therefore require additional lighting to comply with Australian Street Lighting Standard.

Paving
Allow a minimum of 2.4m paved passage between property/ building edge and any street elements. The area between kerb and building alignment is to be fully paved, with a maximum cross fall to the kerb of 1:40.

Lighting
Street lights are to be located 15m from face of kerb at corner and spaced evenly along dimension of block, staggered spacing on opposite sides of the street. Light poles are to be located 400mm - 600mm from the face of the kerb. Pedestrian lighting should generally be mounted under awnings, with pole lighting in larger public spaces or where awnings are absent.

Seating
Seating is to be located in relation to street trees, and at bus stops, drop off points and near community facilities and public institutions.

Bins
Bins are to be located 1.2m distance from lights at corners.



TYPICAL STREET LAYOUT WITH KERB EXTENSION - SCALE 1:200
FIGURE 4.0

Pavement extension and parking bay.

5.0.3 Street Corners + Kerb Ramps

Design Intent:
To maximise pedestrian safety at intersections and crossing points.

Performance Criteria:
Locate kerb ramps as close as possible to the line of pedestrian travel- minimise offsets.

Maintain a tight kerb radius to slow turning traffic, prioritise pedestrian movement and provide a more formal appearance.

Minimum radius for local traffic streets should be 3.5m to 5m, depending on requirements for buses. A radius of up to 6m is allowed where heavy vehicles and buses use intersections, to allow for delivery of goods.

Design and construct kerb ramps in pairs opposite to create direct pedestrian crossings. Position kerb ramps along the direction of travel, ideally at 90 degrees to the carriageway. Locate kerb ramps also at accessible car and community bus parking spaces, and taxi drop off zones, as required.

Maximise the kerb area of the ramp on the straight. Only one ramp to be located within the radius section of the kerb.

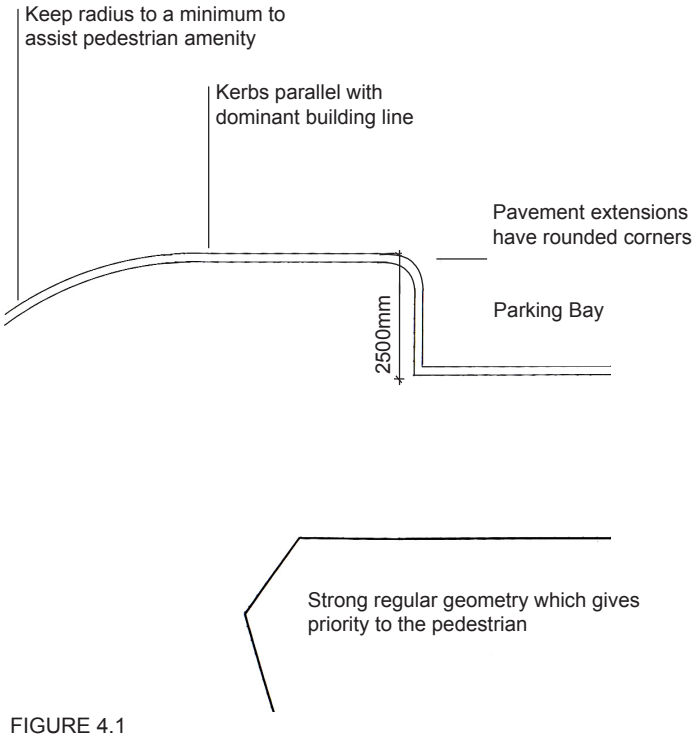
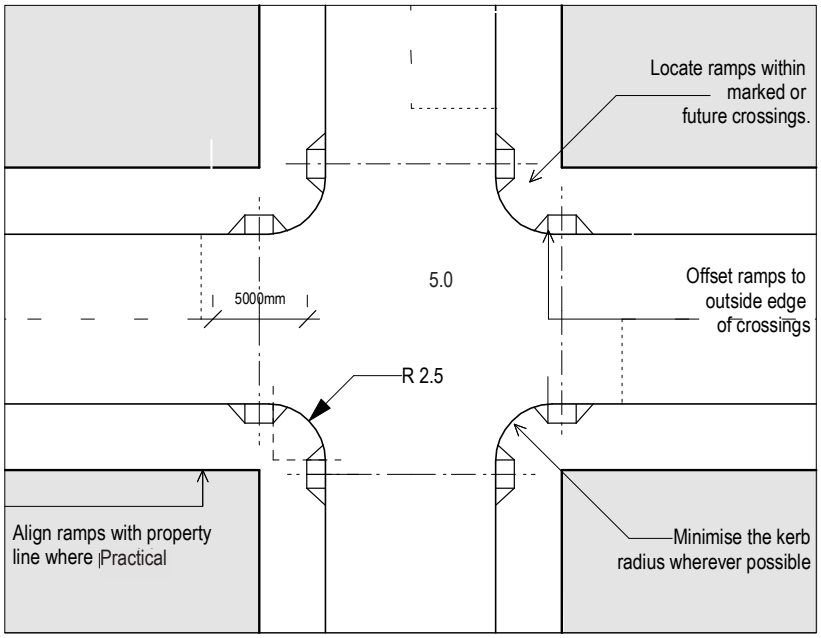
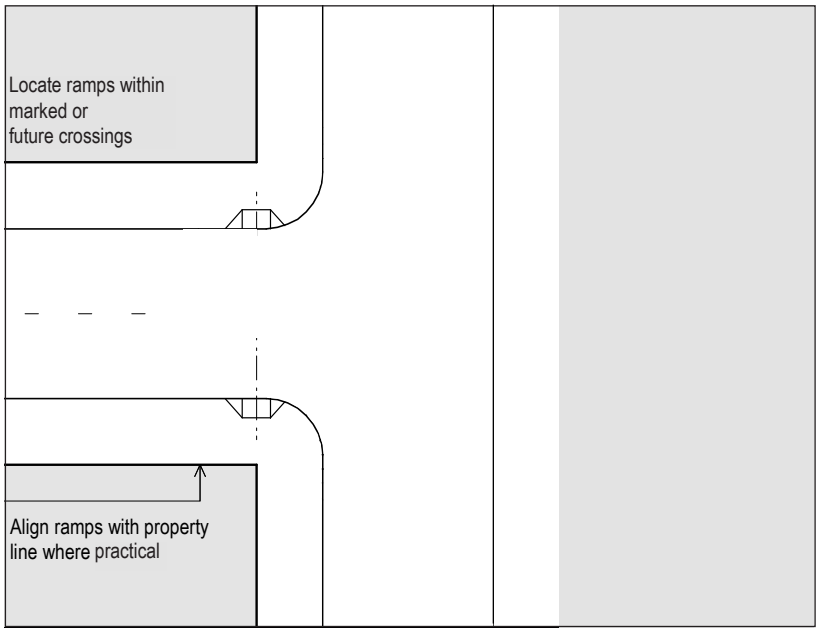


FIGURE 4.1



PEDESTRIAN RAMPS AT INTERSECTIONS
FIGURE 4.2



PEDESTRIAN CROSSOVER
FIGURE 4.3

5.1 PUBLIC DOMAIN ELEMENTS

5.1.1 Paving and Surface Treatments

Materials used in the public domain should be durable, robust, and easily maintainable and should meet the requirements of environmental sustainability. Selection of paving materials and surface treatments is particularly important in coordination of the public domain to ensure consistency and continuity.

Footpaths should be a unifying element in the streetscape where buildings, signs, objects and people provide constant variation and change. They are to give a clear expression of pedestrian priority, and this message must be obvious to pedestrians and drivers. Continuity of footpath dimensions, levels, materials and edges are therefore important. Permanent and semi-permanent objects such as kerb ramps, footpath crossings, pedestrian refuges and street furniture are to appear as occasional interruptions in the overall pattern rather than as dominant elements of the streetscape.

All footpaths must provide ease of movement for everyone, including people with different degrees of disability. Visual simplicity and observation of pedestrian desire lines is important, as is the use of contrasting pavement textures and markings to alert street users to potential hazards such as intersections and footpath crossings.

Appropriate design of surfaces in streets is essential in meeting the access needs of all pedestrians. Establish a smooth, non slip, durable and even surface with a continuous crossfall (maximum 1:40). Ensure that accessibility considerations comply with best practice standards, and meet the recommendations of AS 1428.1:2001.

Asphalt and concrete have been traditionally used for paving in many urban centres. They are historically appropriate materials that complement each other and provide a neutral setting for architecture. Both these materials are relatively long lasting, and can be easily recycled.

Pattern and variation can be introduced to the base paving to create a variation in character and reinforce a hierarchy of centres. It is essential that each street is considered as a whole in design development, to ensure consistency along each street, and throughout the centre.

Paving Type 1: P1
Stylestone 40
200 x 300 x 40
300 x 300 x 40
400 x 400 x 40

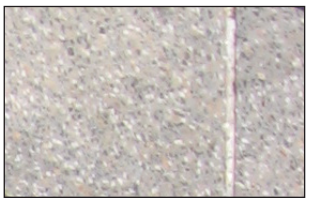
Paving Type 2: P2
Granite
200 x 300 x 60
400 x 600 x 60

Paving Range

A range of paving treatments is proposed that responds to the hierarchy of streets, and to define special places in the commercial centre of Wolli Creek. Simple finishes are proposed for streets, with trim used to highlight focal points in the street system, rather than the use of banding on all pavements.

Selection of pavements has been based on robustness, longevity, lifecycle costs, maintenance requirements and colour. Generally, the paving materials have been selected from a range that is in use through the Rockdale LGA, to promote consistency of maintenance.

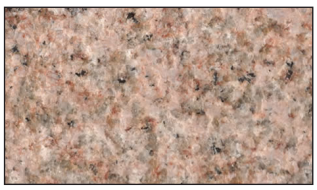
Paving Type 1: P1



Equal to Stylestone 40 - River Grey honed finish, Boral.

Paving Type 2: P2

Equal to Diamond Black [UG-11] United Stone exfoliated finish



Equal to Diamond Gold [UG-17] United Stone exfoliated finish

Equal to Diamond Green [UG-30] United Stone exfoliated finish

Paving Type 3: P3

Granite Setts hand dressed or guillotine edges

Paving Type 4: P4

Asphaltic concrete paving

Paving Type 4: P4

Broom finish concrete paving (recycled aggregate)

Tactile Indicators

To comply with AS.1428.4 Design for Access and Mobility - Part 4 Tactile Indicators.

Paving Type 3: P3
Granite Setts
100 x 100 x 50

Paving Type 4: P4
Asphaltic concrete paving

Paving Type 5: P5
Recycled Aggregate Concrete

Tactile Indicators
Full Stainless Steel
No. Profile 3
AUSTACT

Corner Detail - Main Street Type 1

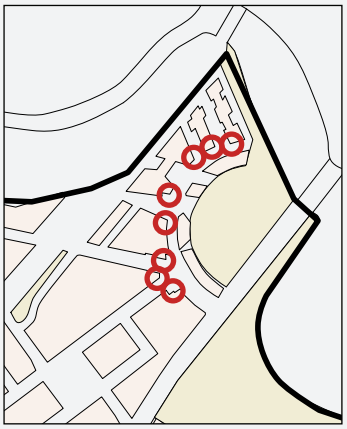
Design Intent

High quality paving with a high level of detail. Unit paving with a contrast to the general paving field is used to highlight ends of blocks, and widened pedestrian zones. Detailed banding of granite pavers emphasises street tree planting.

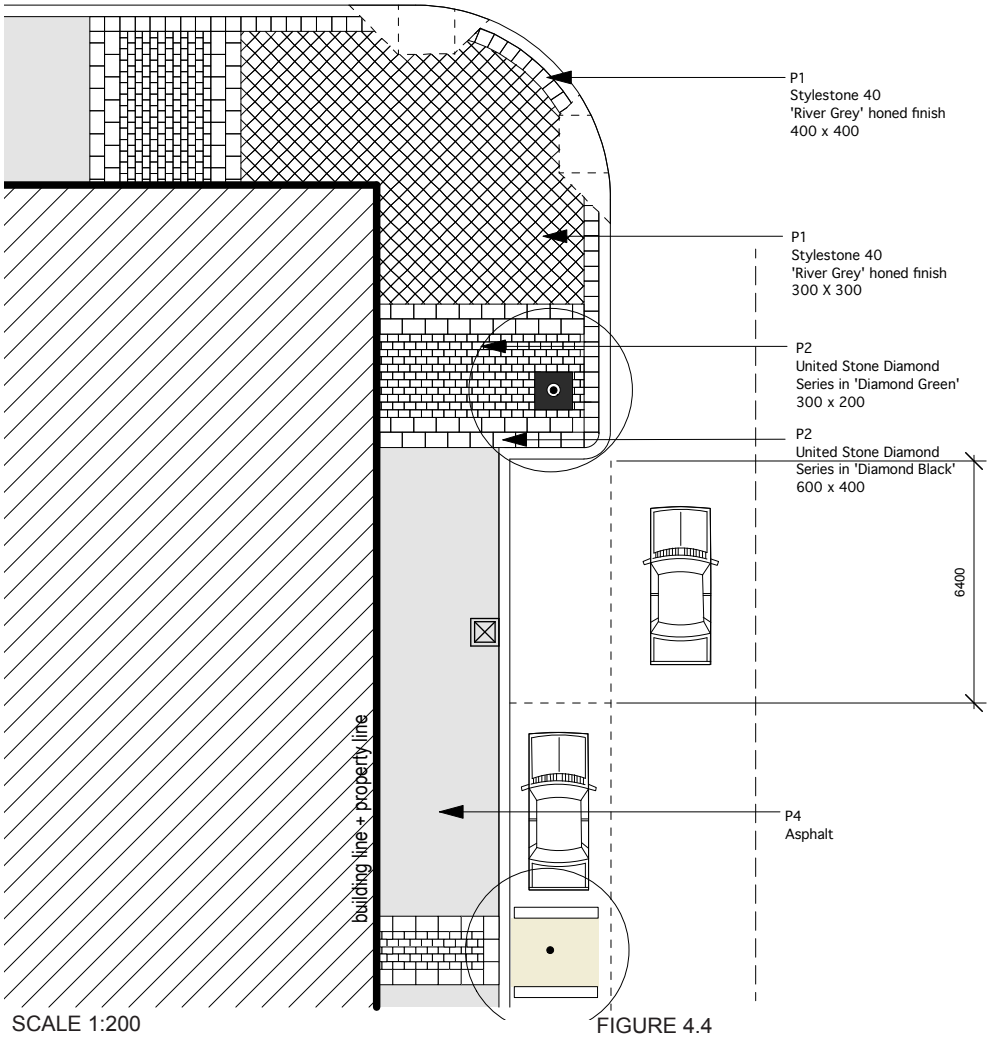
Materials

- P1 - Stylestone 40 - River grey honed finish
  300 x 300
  400x 400
- P2 - Granite ‘Diamond’ United Stone
  ‘Diamond Black’ 600 x 400
  ‘Diamond Green’ 300 x 200
- P4 - Asphalt

STREETS
Brodie Spark Drive
New streets
Magdalene Terrace
Arncliffe Street

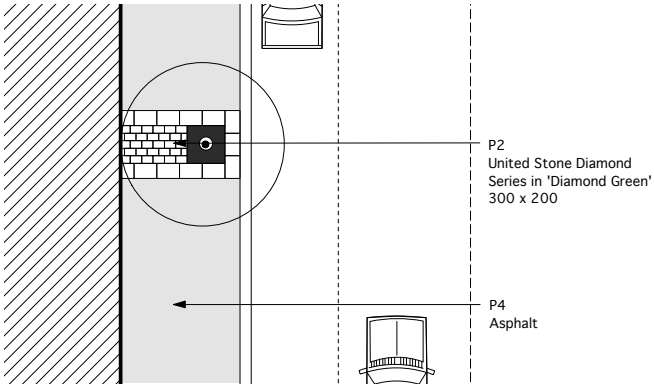


LOCATION PLAN

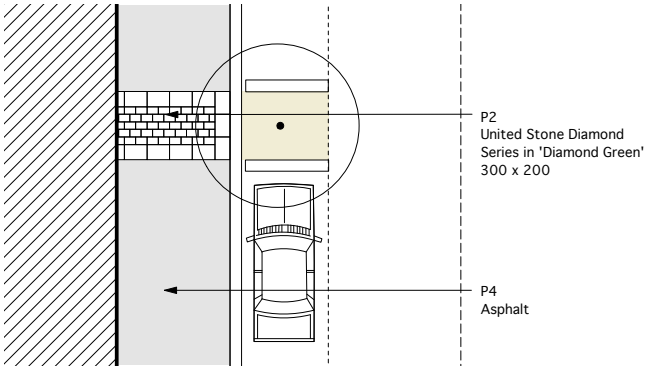


SCALE 1:200

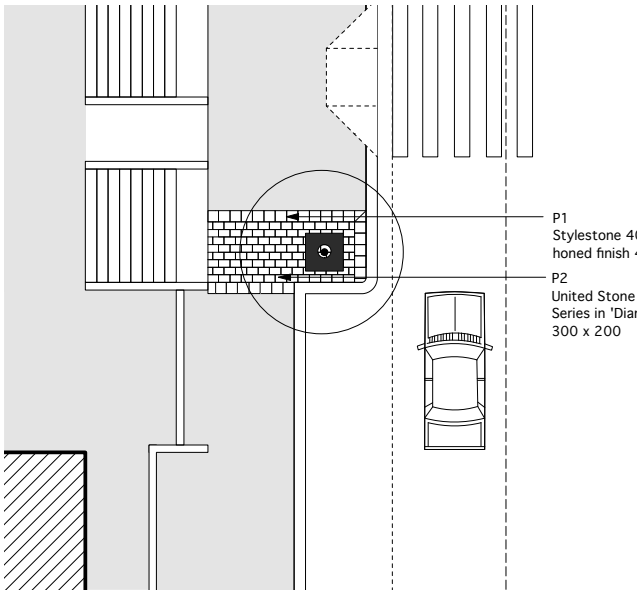
FIGURE 4.4



MAIN STREET TYPE 1 - STREET TREE IN PAVING - SCALE 1:200
FIGURE 4.5



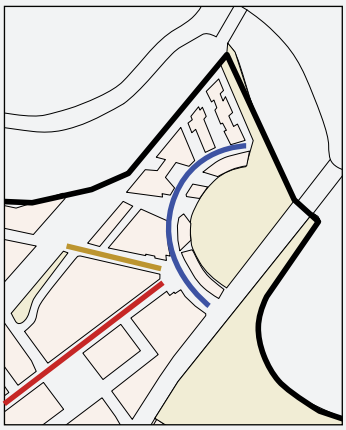
MAIN STREET TYPE 2 - STREET TREE IN CARRIAGEWAY - SCALE 1:200
FIGURE 4.6



MAIN STREET TYPE 3 - ARNCLIFFE STREET - SCALE 1:200
FIGURE 4.7

STREETS

Main Street Type 1
Main Street Type 2
Main Street Type 3



LOCATION PLAN

Corner Detail - Mixed Use Street

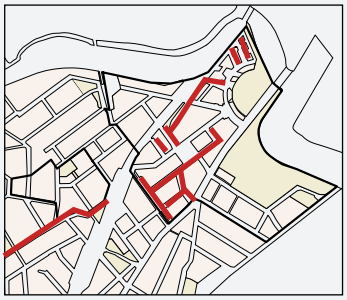
Design Intent

Ordinary, well detailed paving with little detail. Asphalt should be selected to suit existing paving adjacent. Asphalt paving should not be saw cut. Detailed banding of granite pavers emphasises street tree planting.

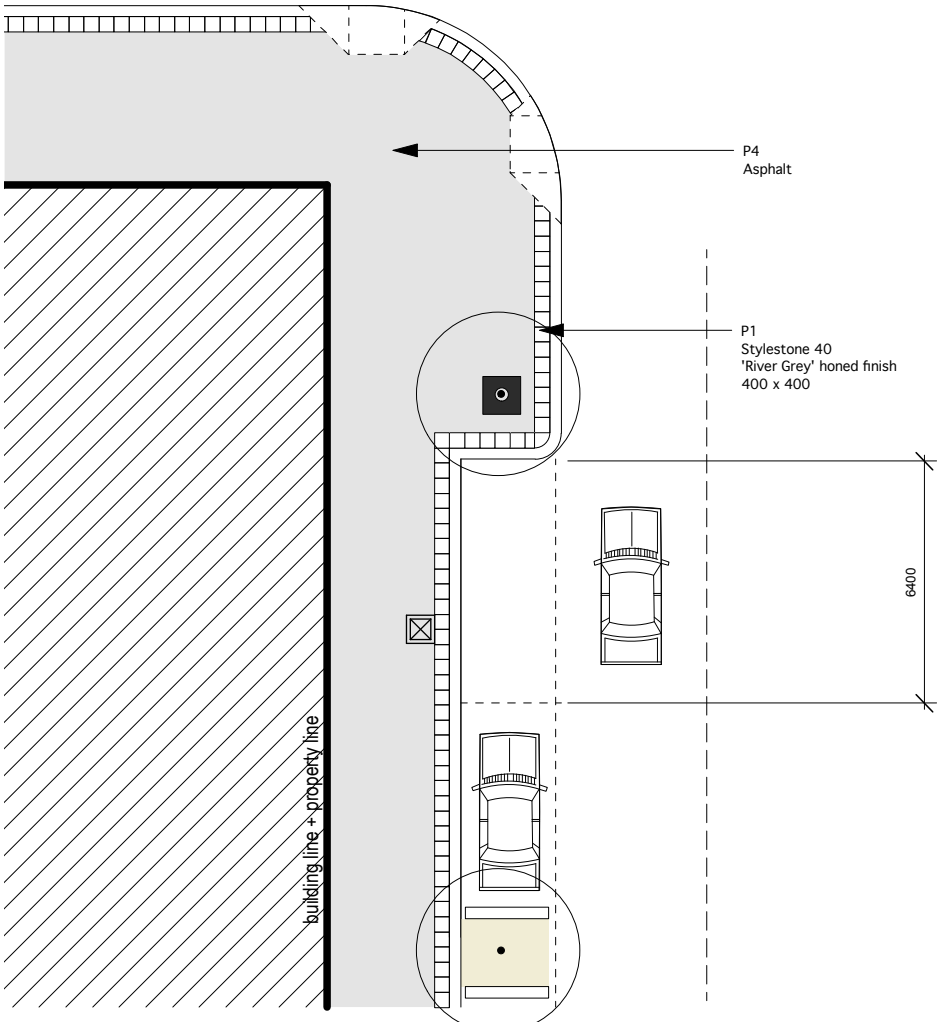
Materials

- P1 - Stylestone 40 - River grey honed finish 400x 400
- P4 - Asphalt

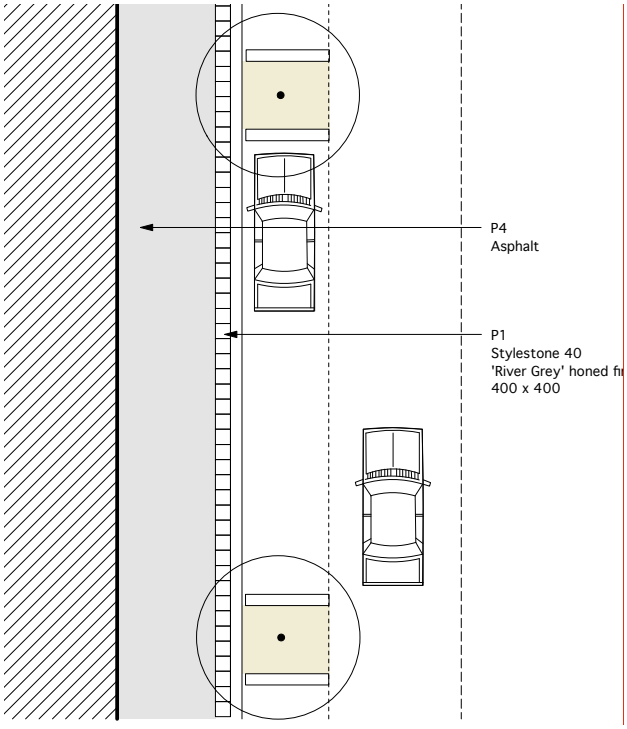
STREETS
Argyle Street
Mt Olympus Boulevard
Guess Avenue East
Willis Street
John Verge Place
Wollongong Road
New Road 1-5
New Road 8



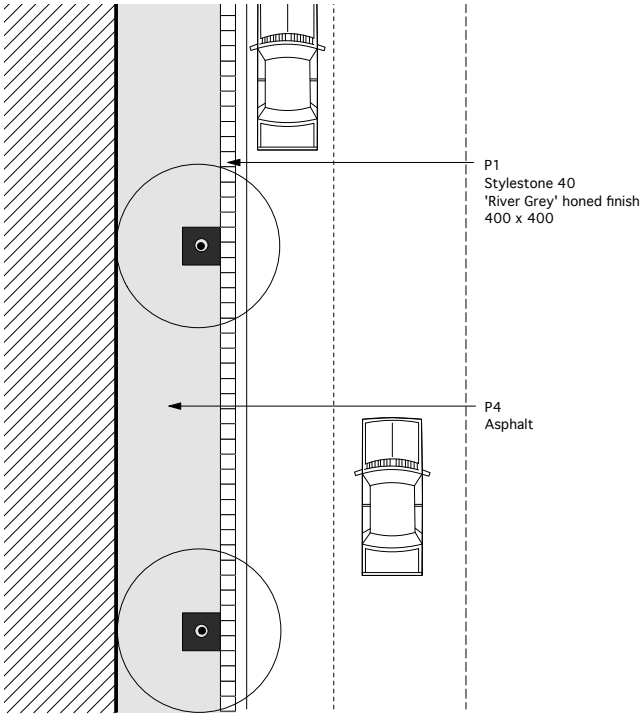
LOCATION PLAN



SCALE 1:200
FIGURE 4.8



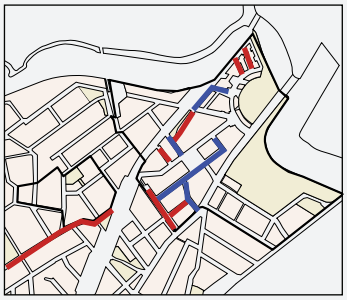
MIXED USE TYPE 1 - STREET TREE IN CARRIAGEWAY - SCALE 1:200
FIGURE 4.9



MIXED USE TYPE 2 - STREET TREE IN PAVING - SCALE 1:200
FIGURE 4.10

STREETS

Mixed Use Street Type 1
Mixed Use Street Type 2



LOCATION PLAN

Typical Paving Layout Residential

Design Intent

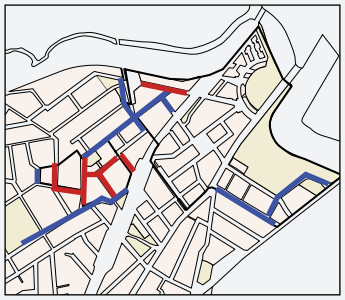
Ordinary, well detailed paving with little detail. Concrete paving should be selected to suit existing paving adjacent.

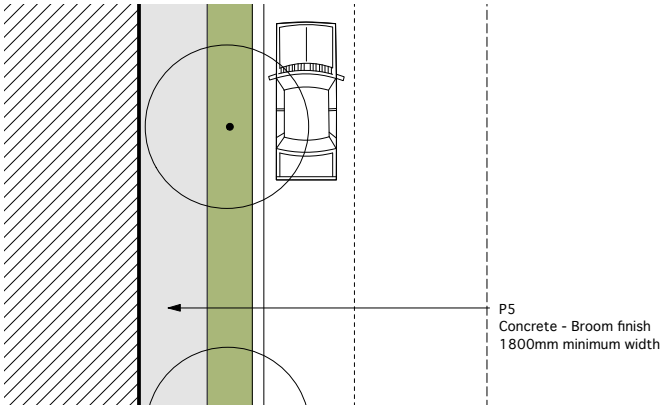
Materials

- P5 - Recycled Aggregate Concrete

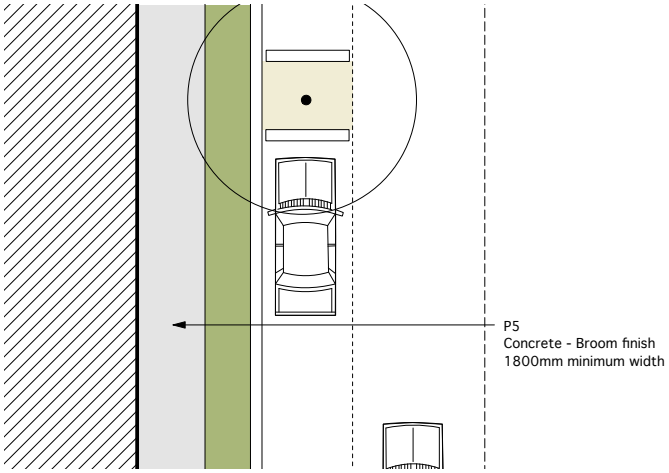
STREETS
Guess Avenue West
Innesdale Road
Rockwell Avenue
Levey Street
Loftus Street
Lusty Street
Thompson Street
Bonar Street
Hirst Street
Edward Street
New Road 6
New Road 7
Wollongong Rd

Residential Street Type 1
Residential Street Type 2





RESIDENTIAL TYPE 1 - STREET TREE IN PAVING - SCALE 1:200
FIGURE 4.11



RESIDENTIAL TYPE 2 - STREET TREE IN CARRIAGEWAY - SCALE 1:200
FIGURE 4.12

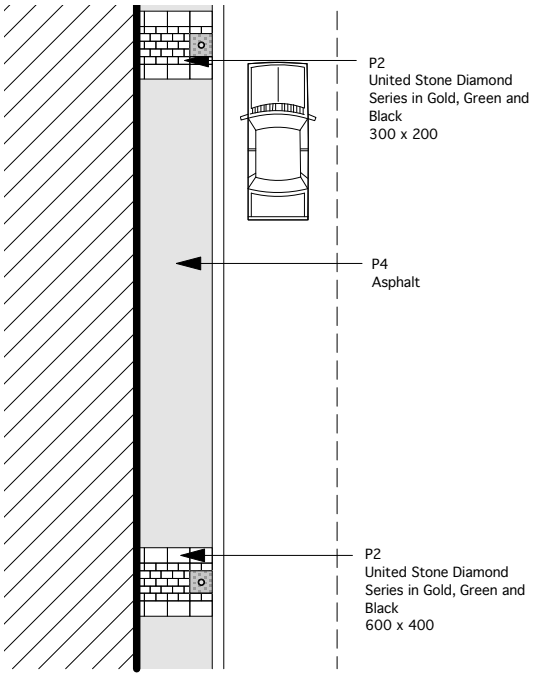
Typical Paving Layout Laneway

Design Intent

High quality paving with a high level of detail. Granite banding of varying widths.

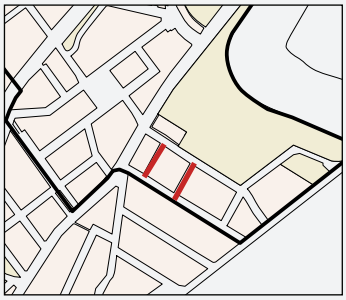
Materials

- P2 - Granite 'Diamond' United Stone
  (Gold, Green and Black)
  600 x 400
  300 x 200

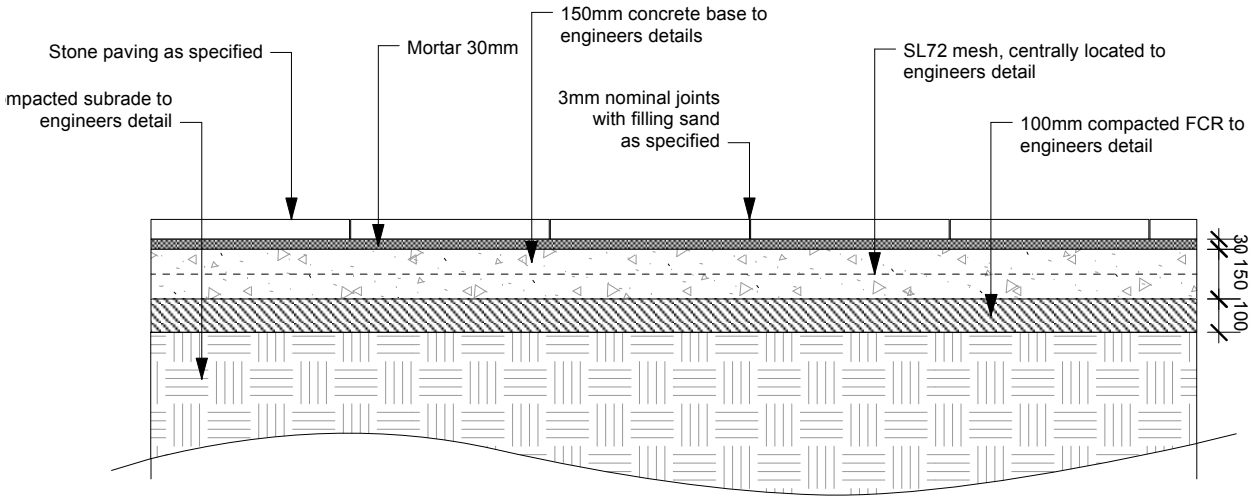


LANEWAY TYPE 1 -SCALE 1:200
FIGURE 4.13

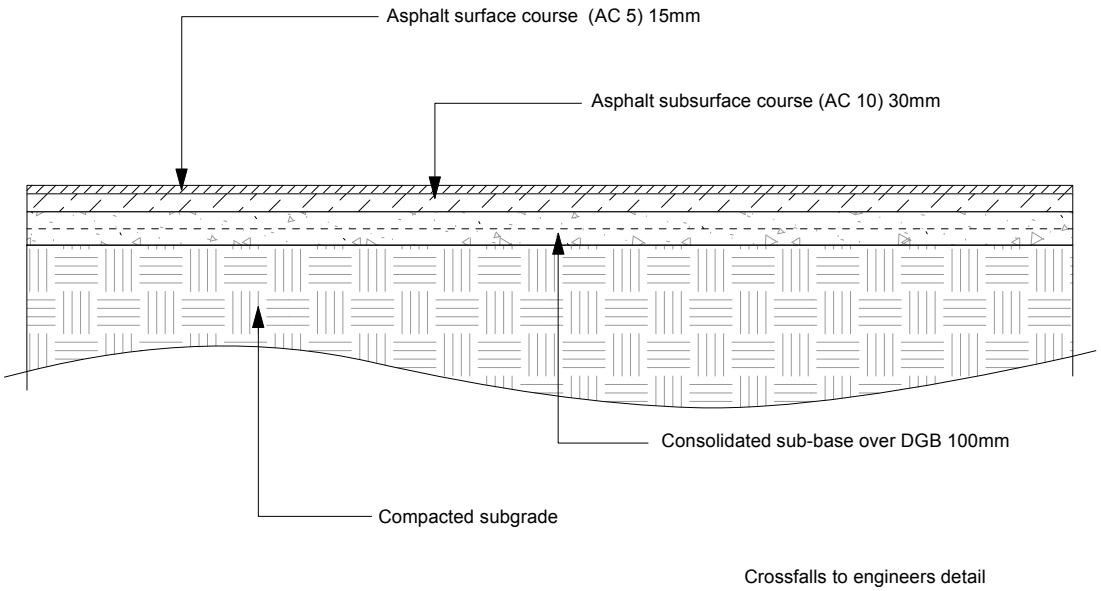
STREETS
Robert Lane
Innesdale Lane
Spark Lane



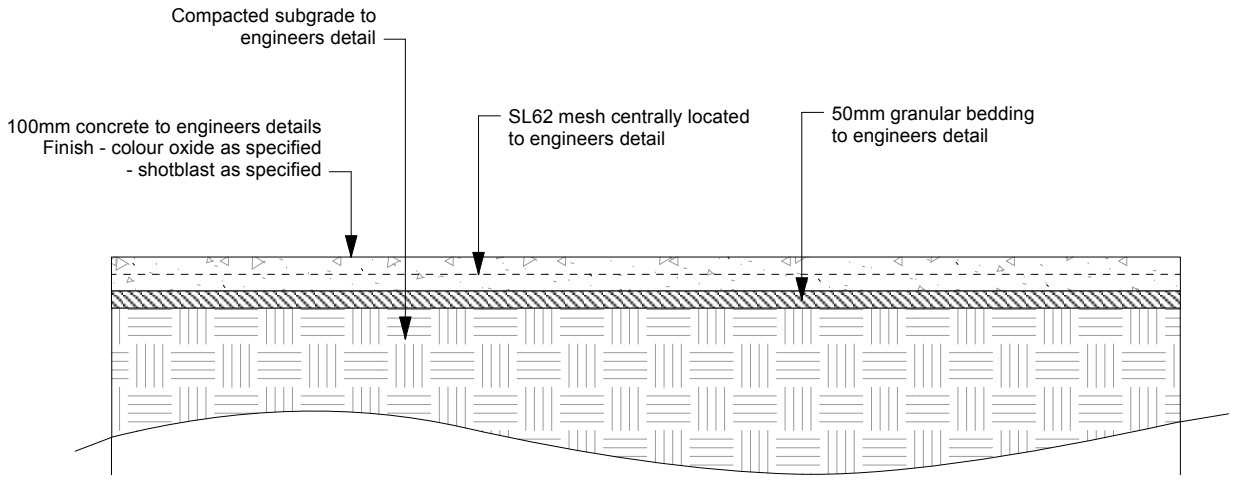
Typical Section Paving Footpath



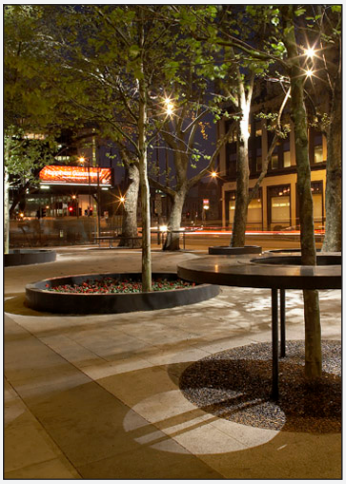
PAVING DETAIL - STONE 1:20
FIGURE 4.14



PAVING DETAIL - ASPHALT 1:20
FIGURE 4.15



PAVING DETAIL - CONCRETE 1:20
FIGURE 4.16


Promenade of Light, Islington, London.

Paving Special Places

Within the commercial centre of Wolli Creek there are several small civic spaces that are created by the configuration of building edge and street edge or corner. These spaces are openings between buildings, or extensions of the street space, and are a valuable supplement to streets. They offer opportunities for gathering and events, as well as casual socialisation, and add clarity to the urban form by forming void spaces in this very dense area.

Small civic spaces should be treated as special places in the public domain, as they offer opportunities to highlight focal points, and express the particular character of Wolli Creek. Each place can have either individual paving that contrasts with the standard street paving, utilise the standard paving in a particular way, or integrate standard street paving with a different material. Paving can also incorporate art work, special tree pit surrounds, or individual lighting projects.

Paving for special places can employ materials that express the cultural heritage of Wolli Creek. Materials recommended are brick and sandstone, both used in heritage elements that help define the character of the area - brick and stone in the chapel at Discovery Point,


Modifying standard unit paving


Recycled Brick paving at Jacaranda Square.


Customs Square, Sydney

Kerb Ramps

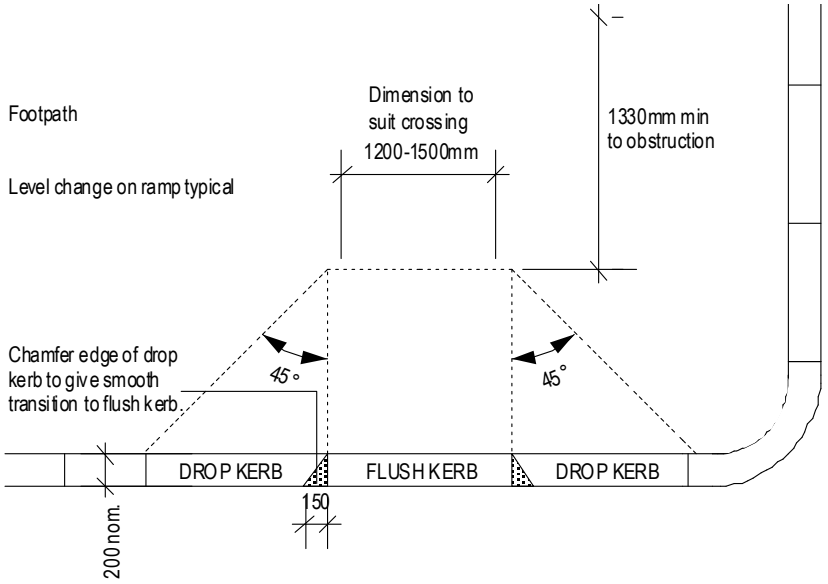
Design Intent

To maximise pedestrian safety for all users, particularly at crossing points and intersections, and to integrate the design of crossings into the general street geometry.

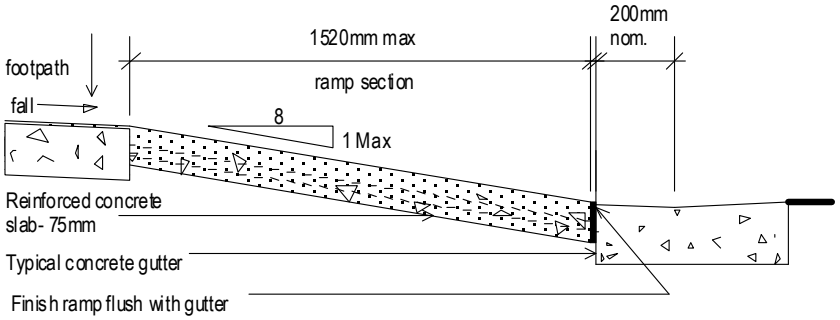
Kerb ramp Mount Olympus Boulevard.

Performance Criteria

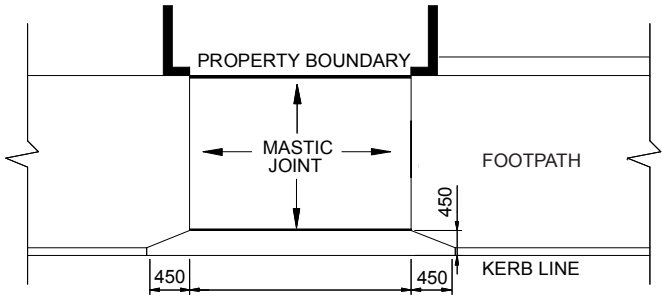
- Comply with best practice standards and where appropriate meet the recommendations of AS1428.4:2002.
- Provide a ramp at all points where pedestrians need to cross the road and at accessible drop off points, bus zones and taxi stands;
- Construct ramps of materials consistent with adjoining footpath - concrete in concrete paths, unit paver in paved areas etc;
- Mark pedestrian kerb ramps with a contrast in texture and luminescence to the general paving, using strips or dots that meet Australian Standard 1428.4:2002; Alternatively, introduce a minimum of 30% tonal differentiation at ramp crossings in lieu of tactiles at crossing.
- Maintain kerb lines with generously proportioned drop kerbs at ramps;
- Meet all necessary Australian Standards 1428.1:2001 for ramp gradient and width; and
- Pedestrian crossings are to be designed in accordance with the relevant RTA standards and to the satisfaction of Council's Traffic Engineer.



DETAIL - PEDESTRIAN RAMP TYPICAL PLAN N.T.S
FIGURE 4.16

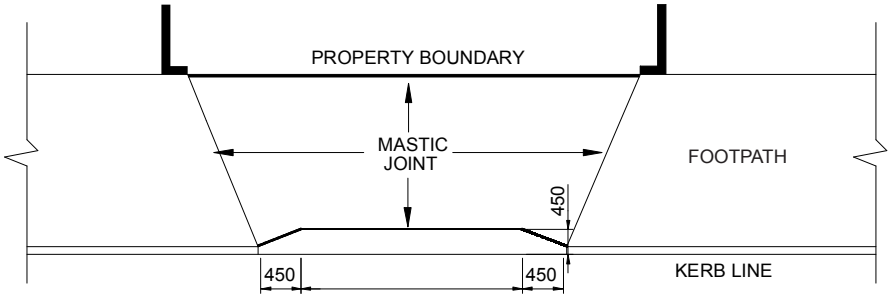


DETAIL - PEDESTRIAN RAMP TYPICAL SECTION N.T.S
FIGURE 4.17



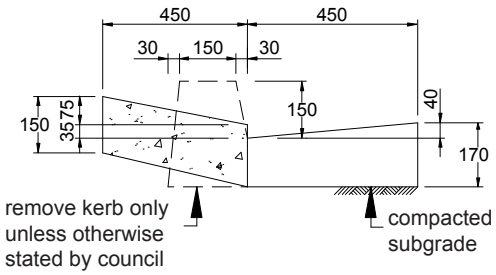
PLAN

TYPICAL SINGLE VEHICLE CROSSING - N.T.S
FIGURE 4.18



PLAN

TYPICAL DOUBLE VEHICLE CROSSING - N.T.S
FIGURE 4.19



SECTION OF LAYBACK
FIGURE 4.20

Refer standards in Rockdale City Council - Vehicle Entrance Policy, 2004.

Paving over service covers.

Asphalt over service covers

Paving Detail - Services

The provision of services has the potential for impact on the quality of streetscapes, through the location and materiality of service covers and the provision of overhead services. Consideration of service provision is essential in the design of the street.

The following are key principles for integration of services into the streetscape:

- Liaise with service authorities to determine future service requirements over whole blocks;
- Underground overhead wires as part of streetscape upgrades;
- Use infill pit covers for electrical and Telstra pits, to allow continuity of paving,
- Use service cover frames that allow for paving to finish flush with frames.
- Tactile indicators should be used in large areas where directional information is required and at the top and bottom of stairs. A 30% (minimum) tonal differentiation at ramp crossings in lieu of tactiles at the crossings should also be condidered.

Infill Service Covers
Design Intent:
Reduce the intrusion of service covers in the pavement as far as possible by infill paving surfaces of larger covers to match surrounding paving, and by minimising or avoiding concrete surrounds to covers.

Materials

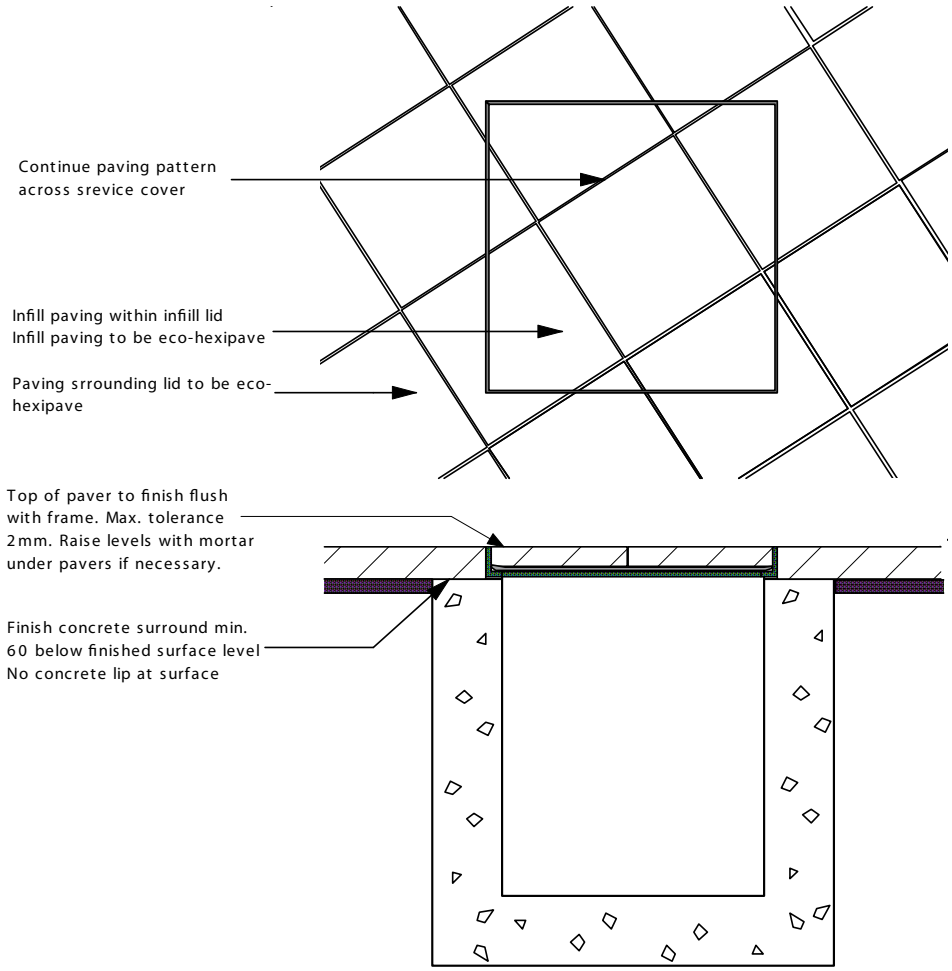
- Recessed telephone pit covers in cast aluminium, paving to match set into lid;
- ACO Polycrete single and multi part access covers, heavy guage steel frames; and
- ACO Polycrete 2379L stormwater pit covers.

Telstra also provides a range of suitable service covers.

Seek further advice from relevant service authority.

Additional Service Details

- Developers are required to include hydrants within their property boundary to minimise imposition on the public domain
- Developers are required to include electical boxes within their property boundary to minimise imposition on the public domain



TYPICAL INFILL PAVING SERVICE COVER 1:20
FIGURE 4.21

Paving units in Terrabond surface

Terrabond surface

Cast iron tree grate

Tree Pit Surrounds

Tree pit surrounds provide a detail in the paving and contribute to the character and quality of the streetscape. Because of the presence of awnings, tree pits are generally located in kerb extensions, small civic spaces or street closures.
Tree pits should be sized to suit the size of paving units in the dominant surrounding paving, to avoid cutting units.

The choice of tree pit surround should respond to the dominant paving condition.

There are three possible standard tree pit surrounds:

- Cast Iron Tree grate GOV 35, 1000 x 1000mm, supplied by Furphy Foundry. Suitable for all areas of high pedestrian use;
- Paving units in Terrabond surface
- Terrabond surface

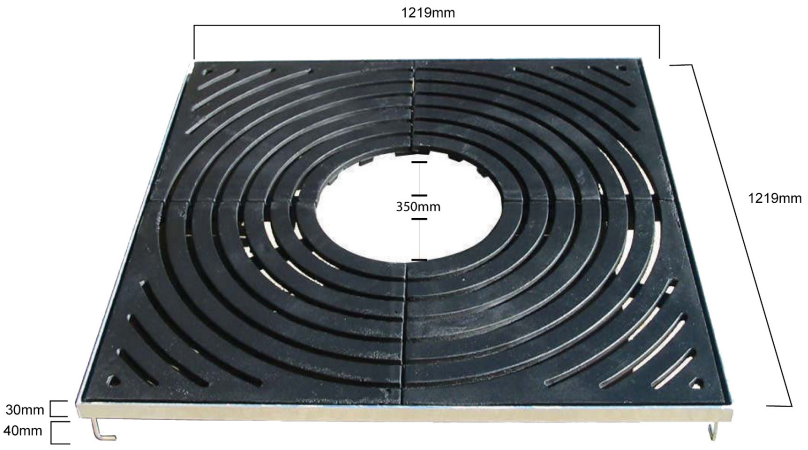
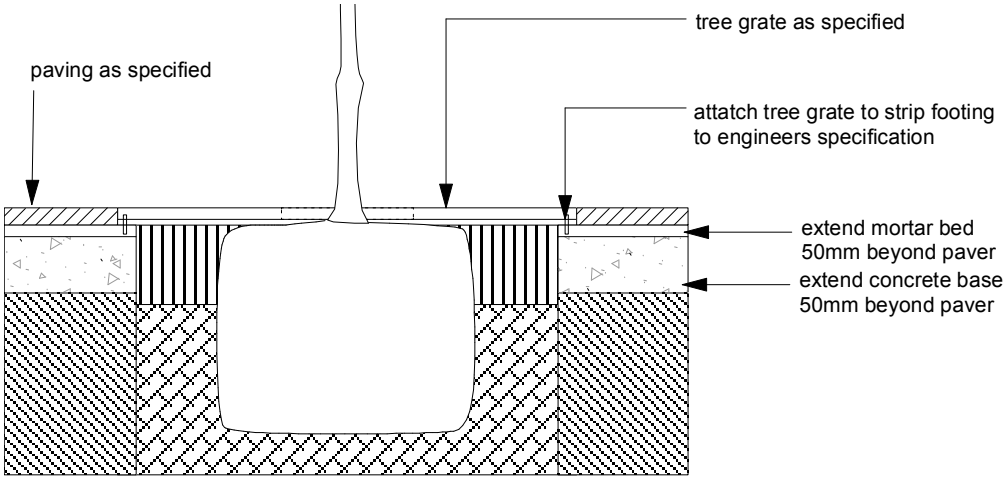


FIGURE 4.22



TREE GRATE DETAIL - SCALE 1:20
FIGURE 4.23

Existing tree grate, Magdalene Terrace


In-situ concrete steps


Pre-cast concrete steps

5.1.2 Change of Level

Steps

Design Intent

Establish a consistent design language for steps.

Performance Criteria

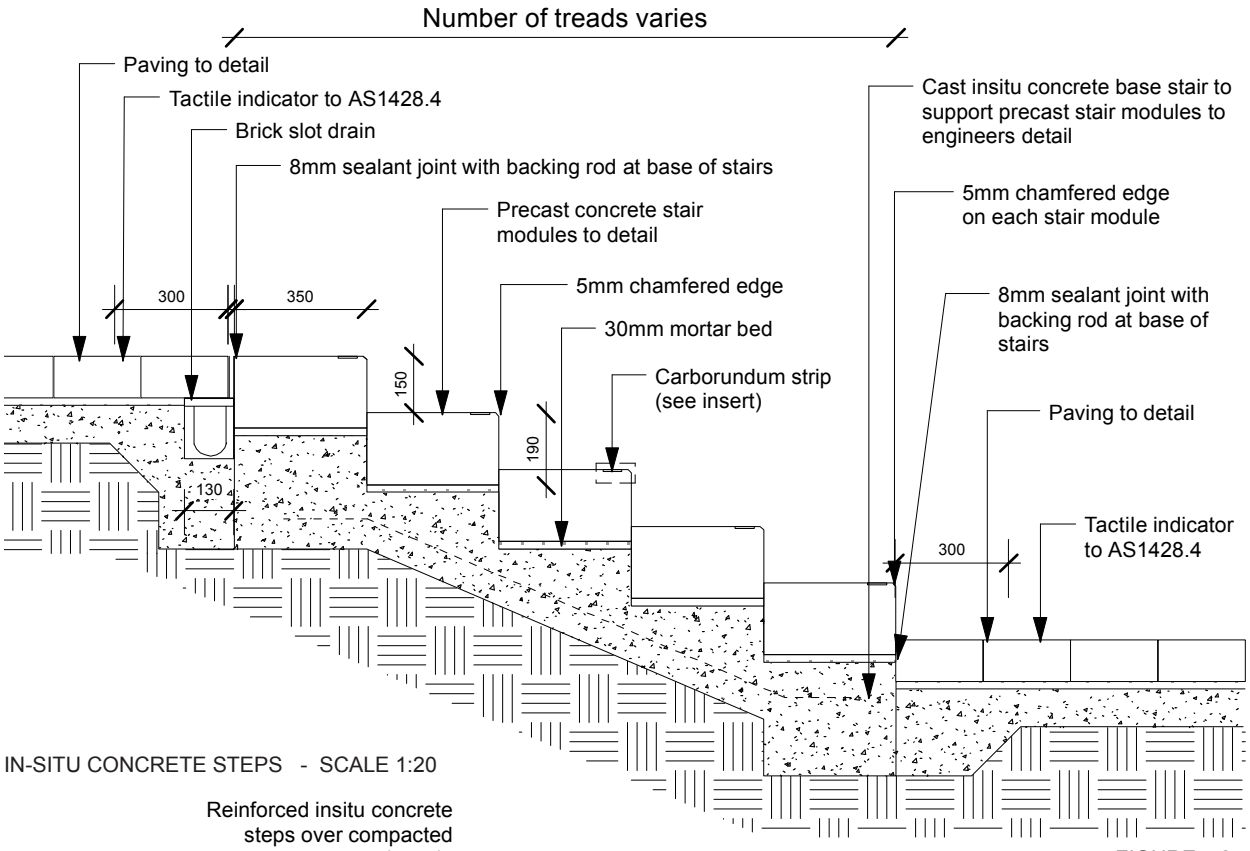
Steps

- Use cast in situ concrete, or precast concrete where possible, in a plain concrete colour;
  use brick steps in brick paved areas, or where suited to the character of a particular place;
- Edge each step with a textured carborundum strip to increase grip and to meet standards set out in AS1428.1;
- Dimension and set out of steps to conform with relevant sections of the Building Code of Australia; and
- Handrails should conform with relevant standards for access AS1657-1992
- Tactile indicators are to be used at top and bottom of stairs

Materials

- Concrete
- Recycled Brick

PRE CAST CONCRETE STEPS - SCALE 1:20



IN-SITU CONCRETE STEPS - SCALE 1:20

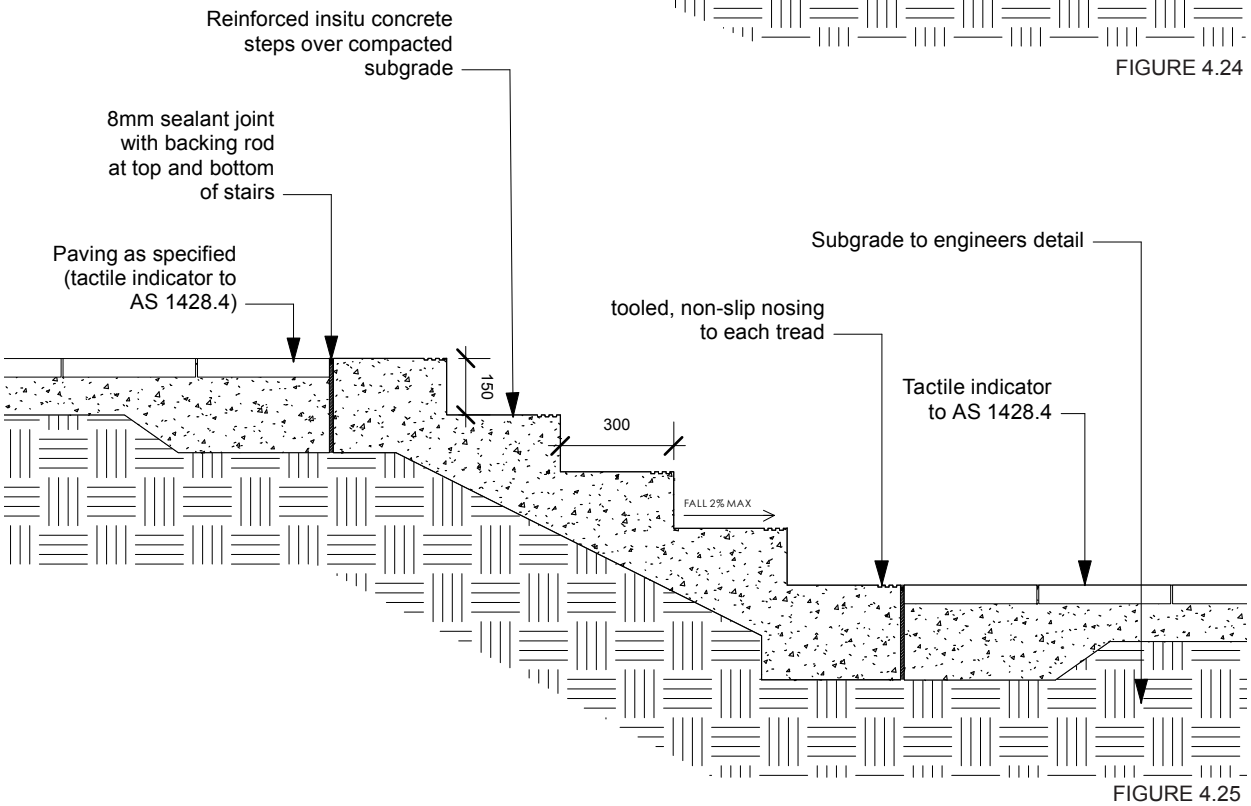


FIGURE 4.25

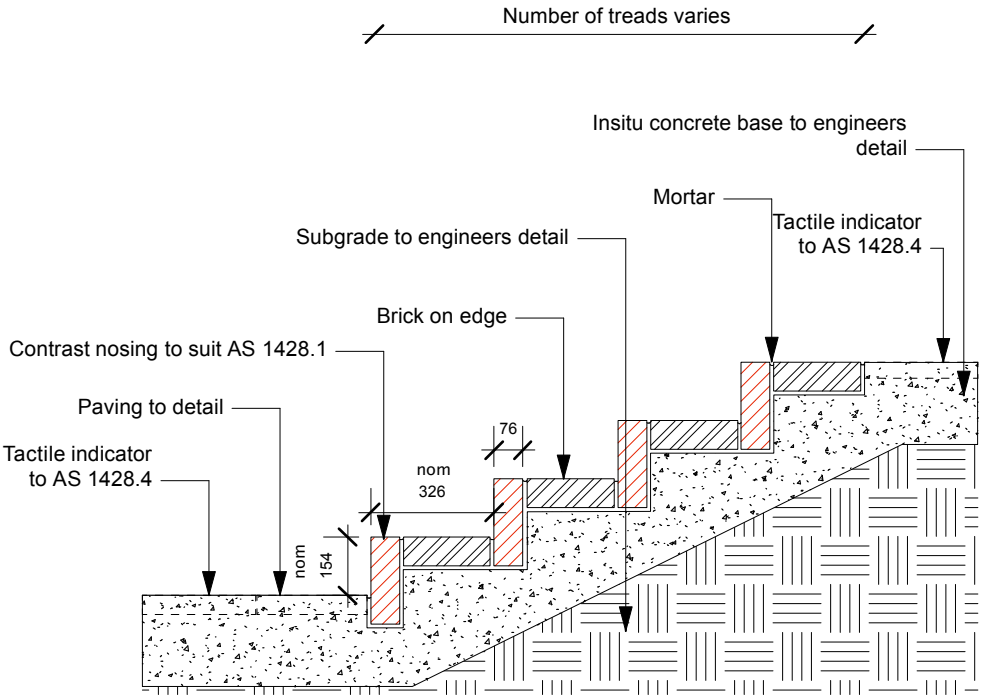
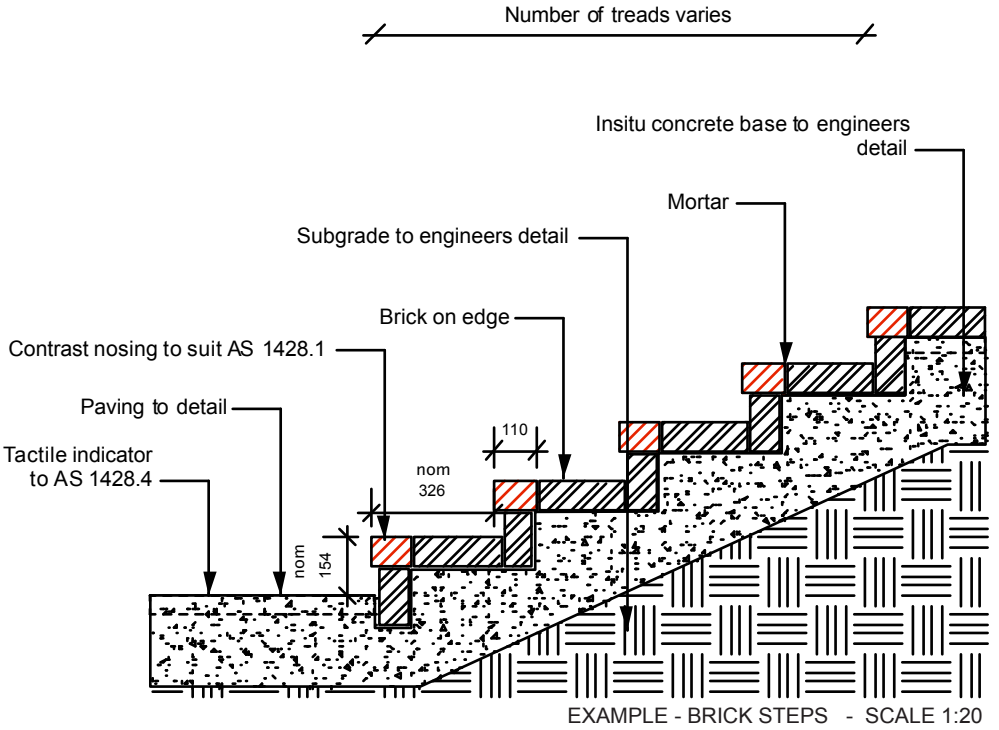


FIGURE 4.26

EXAMPLE - BRICK STEPS - SCALE 1:20



EXAMPLE - BRICK STEPS - SCALE 1:20

*Both details are indicative of the standards for brick stairs. Alternate designs need to meet standards for tread and riser ratios and contrasting nosing.

5.1.2 Change of Level

Walls & Barriers

Design Intent

Establish a consistent design language for walls and barriers to accommodate level change for flood levels within Wolli Creek.

Performance Criteria

Walls

- Existing walls should be retained and restored wherever possible;
- New walls along footpaths must be clear of planting and solid to a maximum of 1500mm high;
- Height and construction of walls should conform to relevant Australian Standards and acceptable engineering practice.

Barriers

- Balustrades should be of light construction to allow for views to the street (not glass on Main Streets or Mixed Use streets);
- Height and construction of barriers should conform to relevant Australian Standards and acceptable engineering practice.

Materials

Robust materials of concrete, brick or stone for walls. A rendered finish is not considered robust enough for main streets and civic spaces.

Steel or aluminium balustrades in Main Street and Mixed Use streets.

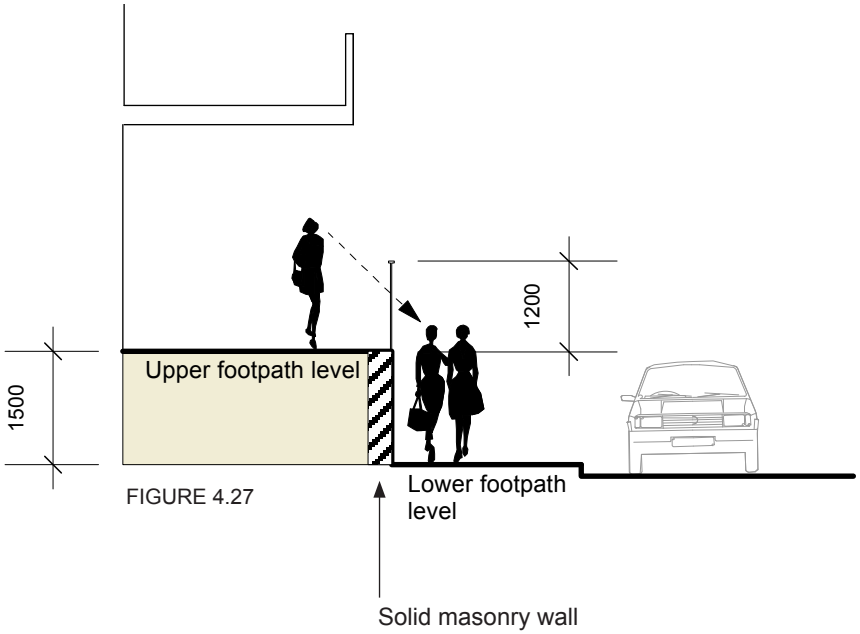


FIGURE 4.27

Victoria Park

Change in level accommodated through steps, London

Change in level accommodated through steps, China

5.1.3 Furniture

Introduction

The selection of furniture and lighting for streets should be based on the following criteria:

- Fitness for purpose – comfort, safety and robustness;
- Cost effectiveness – including recurrent maintenance costs;
- Equity of access – provision of accessible furniture; and
- Visual and environmental appropriateness within the particular context.

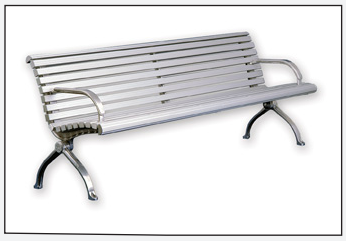
The technical manual sets out a range of furniture for streets and public open spaces.
Generally, a limited range of elements is suggested for streets, to reduce clutter and maintenance, while providing an acceptable level of amenity. The range of furniture should promote unity within the streets system, while providing for some diversity to denote differing conditions and character.

Commercial and retail streets, and streets with a direct relationship with public transport and places of community focus will have a high level of pedestrian activity and require a relatively dense placement of furniture, particularly seats and bins.

The layout of furniture is described in Section 5.0.2, and the level of provision set out for each street in Section 4.2

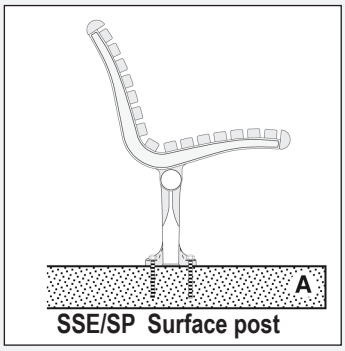
Urban furniture, Rockdale.

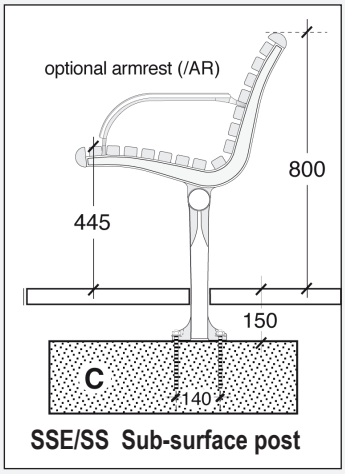
Seats + Benches

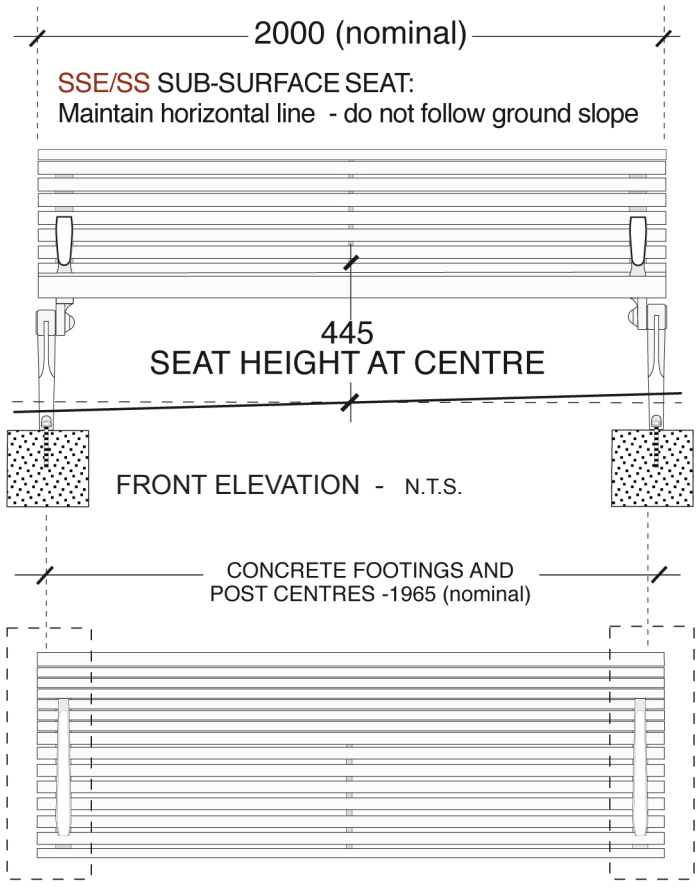


Seats

The following seat should be installed
SSE 'CITY' SEAT: SSE/SS/A/AR3/LOGO2 with sub-surface posts, armrests, enamelled Rockdale City Council logos, linished end-frames and clear anodised aluminium planking
Supplied by 'Town and Park Furniture'





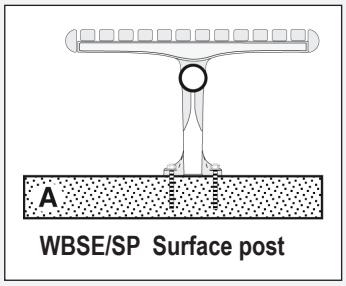


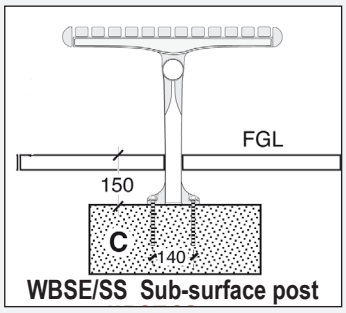
PLAN VIEW - N.T.S.
FIGURE 4.28

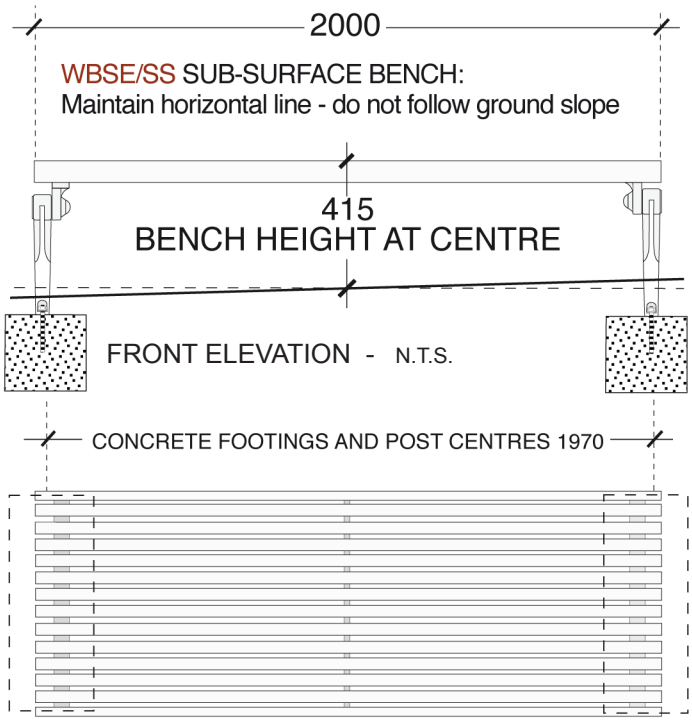
Benches

The following bench should be installed to supplement the seats with backs. The benches can be particularly appropriate in busy areas with a high turnover, and in places with food outlets. The benches allow a flexibility of use, including doubling as a temporary table.

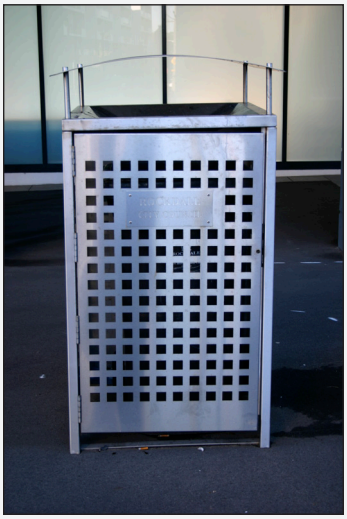
WBSE 'CITY' WIDE BENCH: WBSE/A/SP Surface post and WBSE/A/SS Sub-surface post (x 2.0m), linished end-frames and clear anodised aluminium planking; supplied by 'Town and Park Furniture'.







PLAN VIEW - N.T.S.
FIGURE 4.29



Litter bin, Rockdale

Litter Bin and pavement banding.

Litter Bins

Design Intent

A consistent bin casing has been selected for use throughout, to house 240 litre bins. Older style bins will need to be replaced as part of streetscape upgrades.

Locate bins to avoid restricting major pedestrian thoroughfares or blighting important views. Locate within reasonable distance of eating areas and at perimeters of the retail precinct.

Manufacturer:
Emerdyn
Model:
WBE em224
Materials:
Stainless Steel
Colour/Finish:
steel

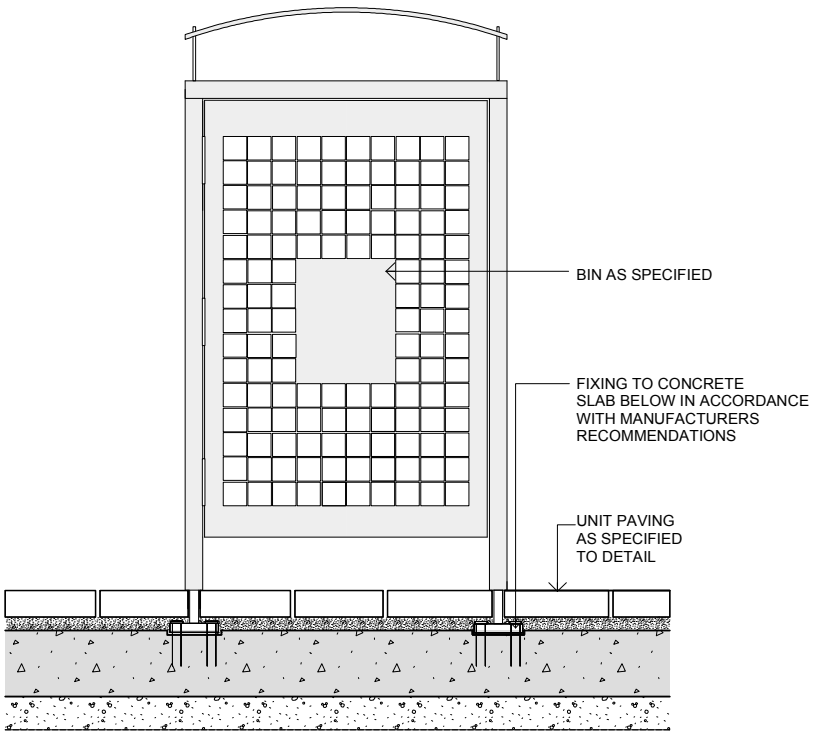


FIGURE 4.30

NOT TO SCALE

Lighting

Design Intent

The street lighting selected for use throughout Wolli Creek in based on replication of existing Bega Lighting installations using available models, and Wolli Creek Type 1 street lighting shall be used.

In the Bonar Street precinct the street lighting shall be type 1 or Type 2.

Design Standards

Locate street lighting at regular intervals to satisfy the requirements of the applicable Australian Standard. Street light location should avoid restricting major pedestrian thoroughfares, and also avoid water sensitive urban design features.

Type 1

Manufacturer:
Bega (distributed by Zumtobel Australia)
Description:
Pole-top luminaries with symmetrical light distribution, mounting heights 3500 mm – 5000 mm

Model:	**Lamp:**
8183	Compact Fluorescent (32 W or 42 W)

Pole:
Height 3500 mm – 5000 mm, Top Ø 76 mm
Colour/Finish:
Graphite

Type 2

Manufacturer:
Bega (distributed by Zumtobel Australia)
Description:
Pole-top luminaries with asymmetrical flat beam light distribution, mounting heights 4000 mm – 9000 mm

Model:	**Lamp:**
7960/7962 (single/double)	Compact Fluorescent (32 W or 42 W)

Pole:
Height 4000 mm – 6000 mm, Top Ø 76 mm
Colour/Finish:
Graphite

Bicycle racks.

Existing bicycle racks, Magdalene Terrace.

Bicycle Racks

Design Intent

Include cycle racks wherever possible, with numbers to suit the size and intensity of use of each centre. Position racks outside the general path of travel.

Manufacturer:
Leda Securities Products Pty. Ltd.
Model
Securabike, BR475B (Fixed baseplate).
Materials
Stainless Steel Pipe, Grade 304.
Colour/Finish
Finished Stainless steel.
Maintenance
To manufacturers recommendations.

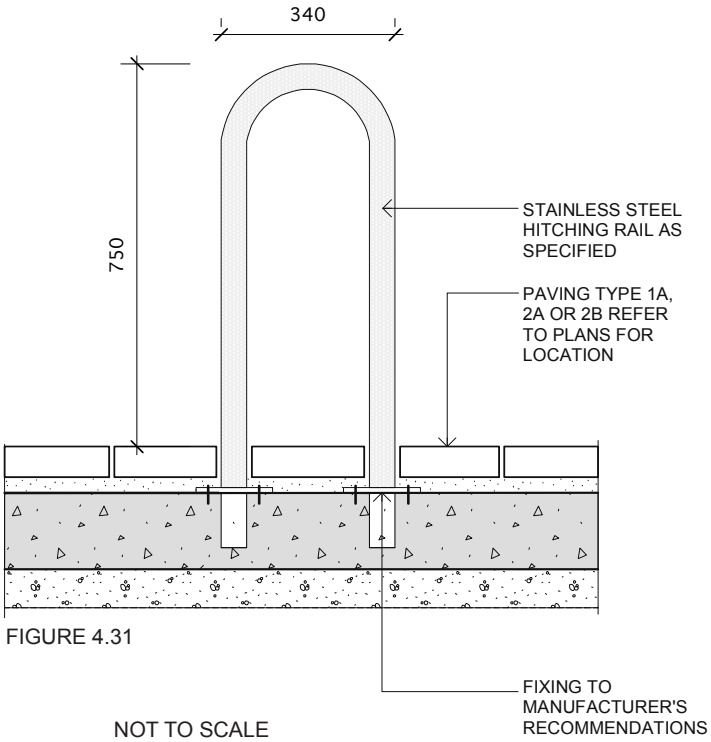


FIGURE 4.31

NOT TO SCALE

Furniture for Special Places

Within Wolli Creek there are special places that punctuate the streetscape. These places are focal points in the street and contribute a special amenity in terms of community use and street character. They are often formed by kerb extensions, street closures or by the particular geometry of street intersections.

These places will often have a variation in paving from the standard, which can be complemented by special furniture and lighting. The character of these spaces may be formed through the design and layout of seating, particularly in areas designed primarily as rest, or social spaces. Seating may be off the shelf, or custom designed to suit the space, function and budget.

Material selection should draw inspiration from the historic features of the district, Tempe House and grounds and the SWSOOS.

Selection of paving should employ the criteria outlined in section 5.1.1 - Paving and Surface Treatment in relation to fitness for purpose, cost effectiveness, equity of access, and visual and environmental appropriateness.

Custom designed seating at Jacaranda Square.

Concrete seating

Brick wall seating, Pyrmont.

SWSOOS material quality as material pallette

Heritage wall at Tempe House.

5.1.4 Traffic Control

Central median- rumble strip

Rumble strip, Arncliffe Street.

Introduction

Traffic calming measures should be fully integrated into the general streetscape design, and should be part of the character of each particular street. Medians, pedestrian refuges, roundabouts and islands are often added to a street as an afterthought, and clash with streetscape character in terms of geometry and materiality. These measures may also focus on traffic management to the detriment of pedestrian convenience.

The design of each traffic device should be considered from the earliest stages of streetscape design. Coordination between the engineering designer and streetscape designer will be essential to achieving solutions that balance traffic management, pedestrian convenience and streetscape character and quality.

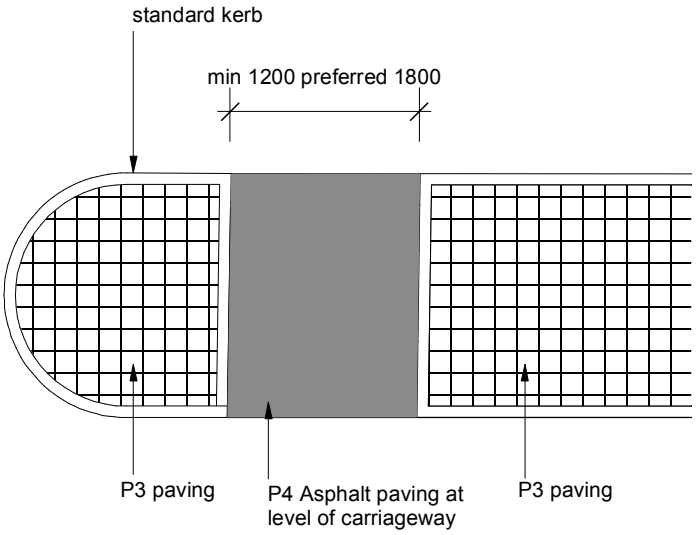
As far as possible, traffic management devices should employ the materials and elements of the general streetscape, to maintain continuity throughout the street. Kerbs of these elements should be the same type as used for street edges. The geometry of medians, kerb extensions and traffic islands should follow as far as possible the dominant geometry set up by buildings and kerb lines.

Median and Pedestrian Refuge
Design Intent

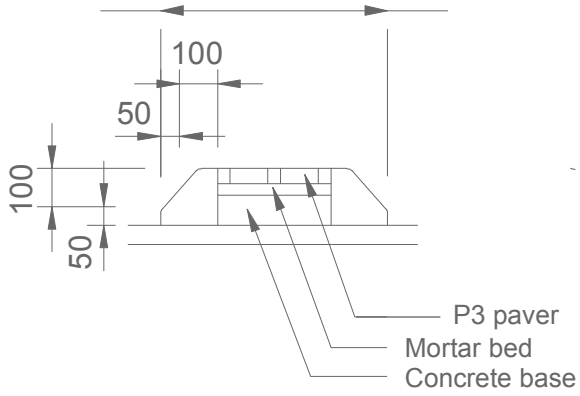
Establish a consistent geometry for kerb-lines, medians, pedestrian refuges and kerb extensions that emphasises the dominant geometry set up by the built edges. The geometry should reinforce the urbanity of the pedestrian environment, rather than be designed solely for traffic calming.

Performance Criteria

- Kerbs should provide a clear separation between the pedestrian space and traffic;
- Design corners and intersections to suit pedestrian comfort and safety. Use of minimum radii at corners will enhance pedestrian convenience;
- Avoid creating isolated islands at corners. Extend the footpath width to consolidate the potential pedestrian zone. Alter drainage to suit this condition; and
- Lay out footpath kerbs, extensions and medians with a simple alignment of elements and edges, ideally parallel to the predominant built edge.



TYPICAL MEDIAN/ PEDESTRIAN REFUGE - N.T.S.
FIGURE 4.32



SECTION THROUGH MEDIAN - SCALE 1: 20
FIGURE 4.33

Guess Avenue roundabout.

Brodie Spark Drive roundabout.

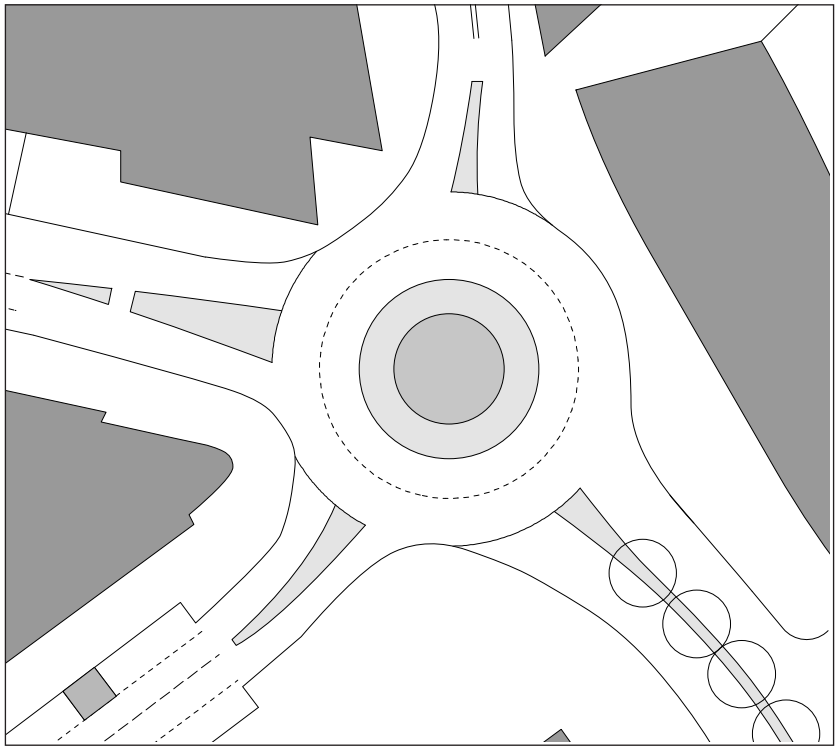
Roundabout

Design Intent:
Roundabouts can be used on local streets to discourage high traffic speeds and the intrusion by very large vehicles. Provisions for emergency and service vehicles need to be considered in the design of these roundabouts.

The central island can be landscaped provided it does not block sight lines between entering lanes. Planting can also discourage pedestrians from using this as a crossing point.

Performance Criteria:

- The approach curve to the roundabout should be the same radius or smaller than the radius of the curved path that a vehicle would be expected to travel through the roundabout;
- Entry width can vary depending on the design vehicle and approach roadway width. The entry width should be less than or equal to the circulating width;
- Splitter islands should be provided on all roundabouts. They provide shelter for pedestrians, guide traffic into the roundabout, and deter right turns from dangerous short-cuts through the roundabout. On arterial road roundabouts, the splitter islands should be of sufficient size to shelter a pedestrian and be a reasonable target to be seen by approaching traffic;
- Planting roundabouts is an important Water Sensitive Urban Design feature designed to reduce runoff. Planting should use species selection of native plants with low water needs.



LOCATION DIAGRAM - ROUNDABOUT
FIGURE 4.34

5.1.5 Signage

Street Name Signage.

Introduction

Signage must contribute to the character and amenity of the public domain, and provide a clear and informative system that reflects the process of access, and the hierarchy of facilities within Wolli Creek.

The level of signage should be sufficient to address user's needs without causing clutter.

Refer to Council's Style Manual for further details.

Street Name Signs

Used at intersections to show street names and to provide directions. Street name signs should indicate both streets and show both directions. At busy intersections each of the four corners should be signed and at least two for minor roads. Street names are always located at the top of a sequence of signs. No sign blade should be lower than 2100mm.

Directional Signage

Directional signage should be provided where pedestrian and cycle paths enter and move through the village centres. Additionally it should provide clear direction for pedestrian and cycle access to other park systems.

It may also be appropriate to provide links to community facilities and public buildings, where these are either outside the street-scape, or hidden from general view.

These directions may be supported by maps and community information where appropriate.

Identification Signage

Used to identify parks and other facilities to passing traffic. Signs should be at major entrances and set on the boundary line back from the footpath parallel to the direction of traffic.

For corner locations the sign may be set at 45 degrees. On long strip parks, e.g. Cook Park the sign may be repeated along its length. Entrances or appropriate T intersections from major roads are preferred locations.

Where the sign is used at a road entrance it may be sited at 90 degrees to the traffic and have secondary sign slats for additional information or to provide directions. In large open areas with fast moving traffic a larger 2360mm wide version of the sign may be used.

Directional Signage

5.1.6 Street Trees

Street tree planting is restricted by the presence of awnings in many of the local village centres. Planting is clustered instead in kerb extensions and small open spaces, forming pockets of green along the street.

Selection and placement of street trees should reference the design principles and guidelines in the Public Domain Plan, and species lists in the Tree Management Plan. A number of principles guide the selection of individual specimens, the placement of trees and the preparation of planting holes, namely:

- Super advanced or semi mature specimens should be used at all times for planting in streets and squares. As a guide, trees should be 3 - 5m tall. See 'Purchasing Landscape Trees' [1] for a guide to selection.
- Preference should be given to the planting of native and particularly endemic species due to the close proximity of degraded Endanged Ecological Communities
- Care should be taken with underground services. Some existing services may require root protection such as concrete encasement. This requirement will vary depending on specific site conditions.
- Consideration should be given to creating appropriate subsurface conditions for trees, including:
- Adequate sizing of tree holes to allow a reasonable quantity of soil;
- The use of structural soils under pavements to extend the root zone;
- The use of watering devices, particularly during the establishment period; and
- Careful specification of suitable growing mixes.

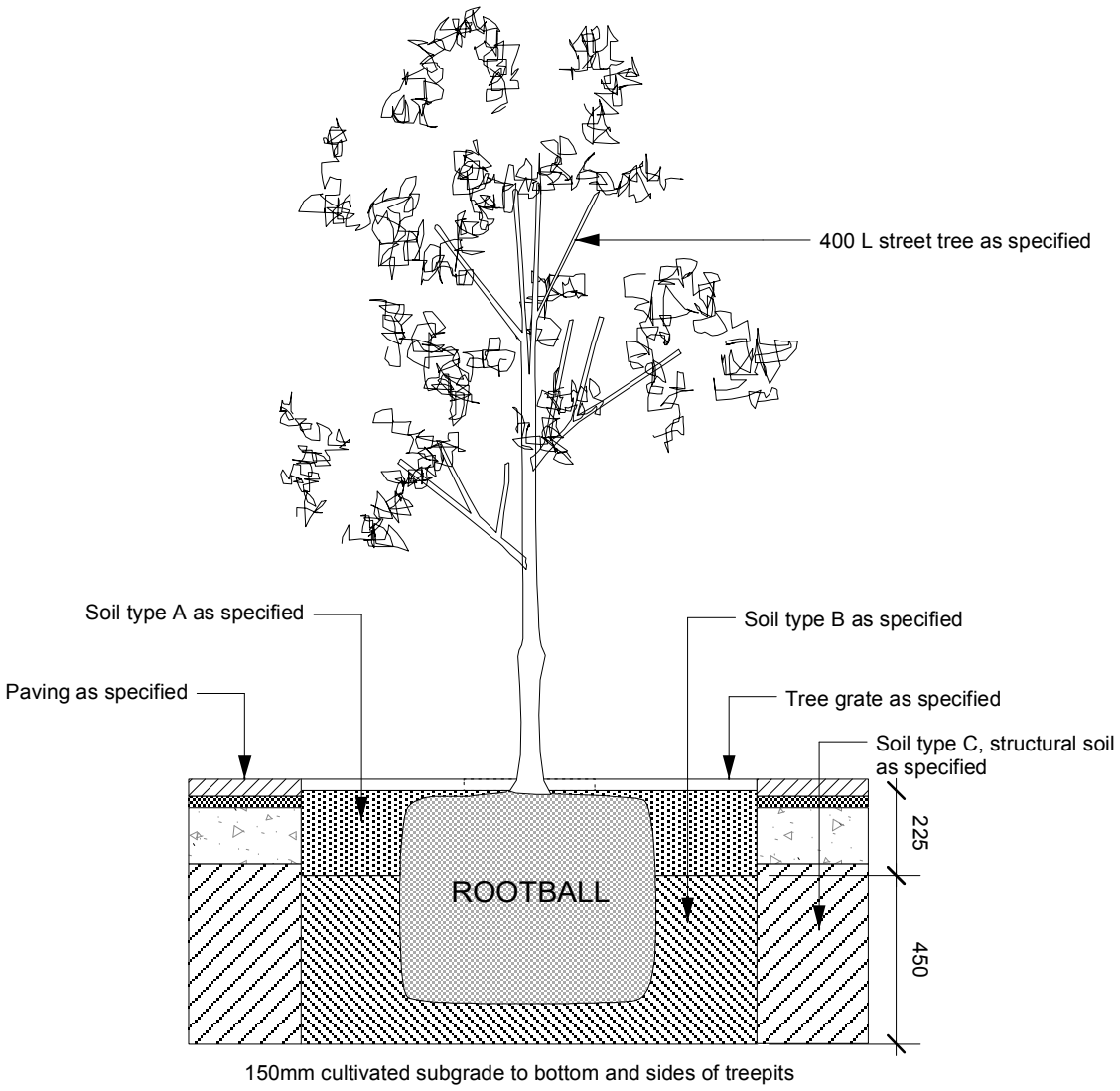
Refer to Council's Planting Guide for further detail on planting specifications, tree guards and grates.

Street tree planting in verge, Guess Avenue.

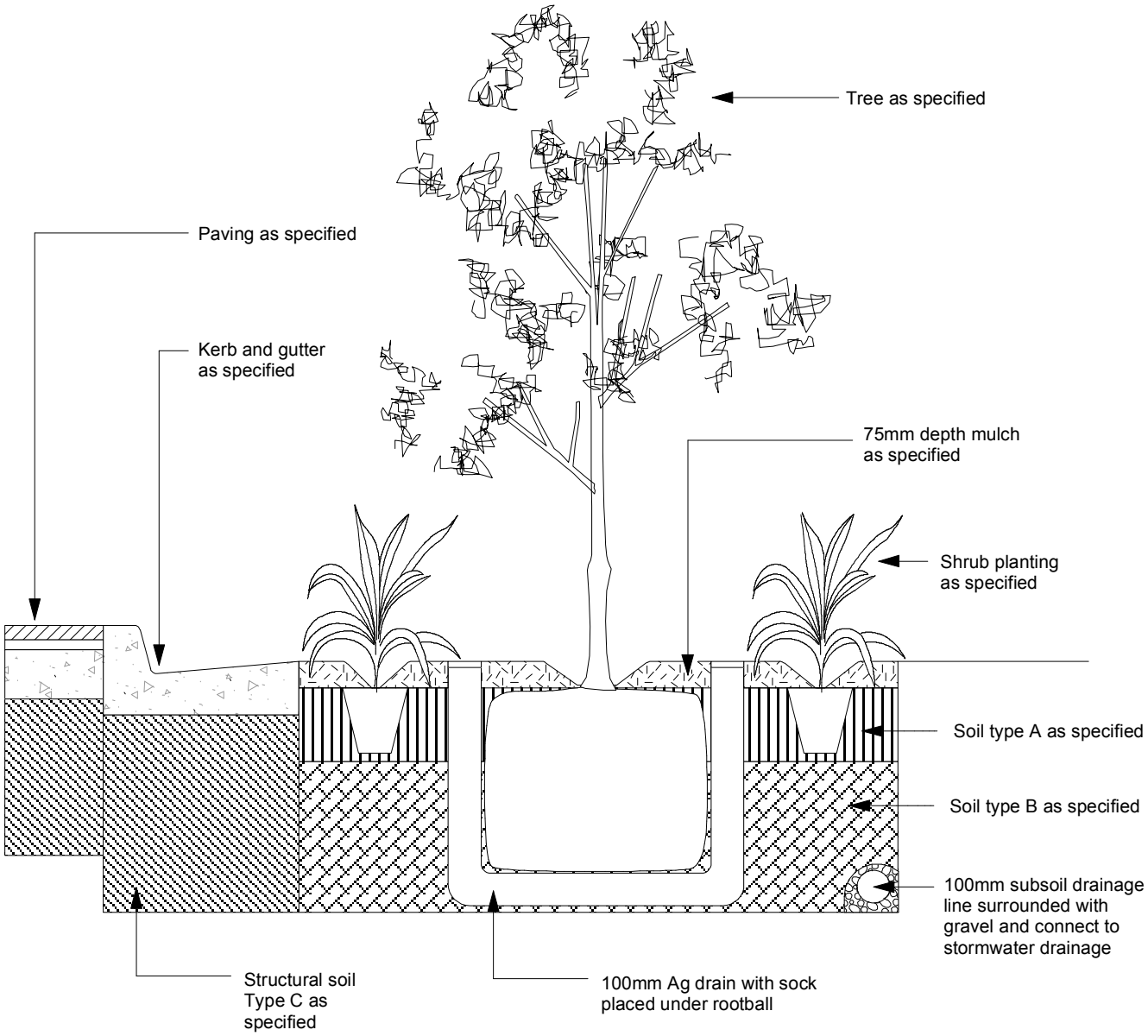
Street tree planting in pavement, Arncliffe Street.

Street tree in parking bay, Brodie Spark Drive.

1 Clarke, R. (1996). Purchasing Landscape Trees: a guide to assessing tree quality. Natspec Guide No.2, Construction Information Systems, Milsons Point NSW. [Currently under review].



TREE PLANTING IN PAVING - N.T.S.
FIGURE 4.35



SECTION TREE PLANTING IN PARKING BAY - N.T.S.
FIGURE 4.36

5.1.7 Water Sensitive Urban Design

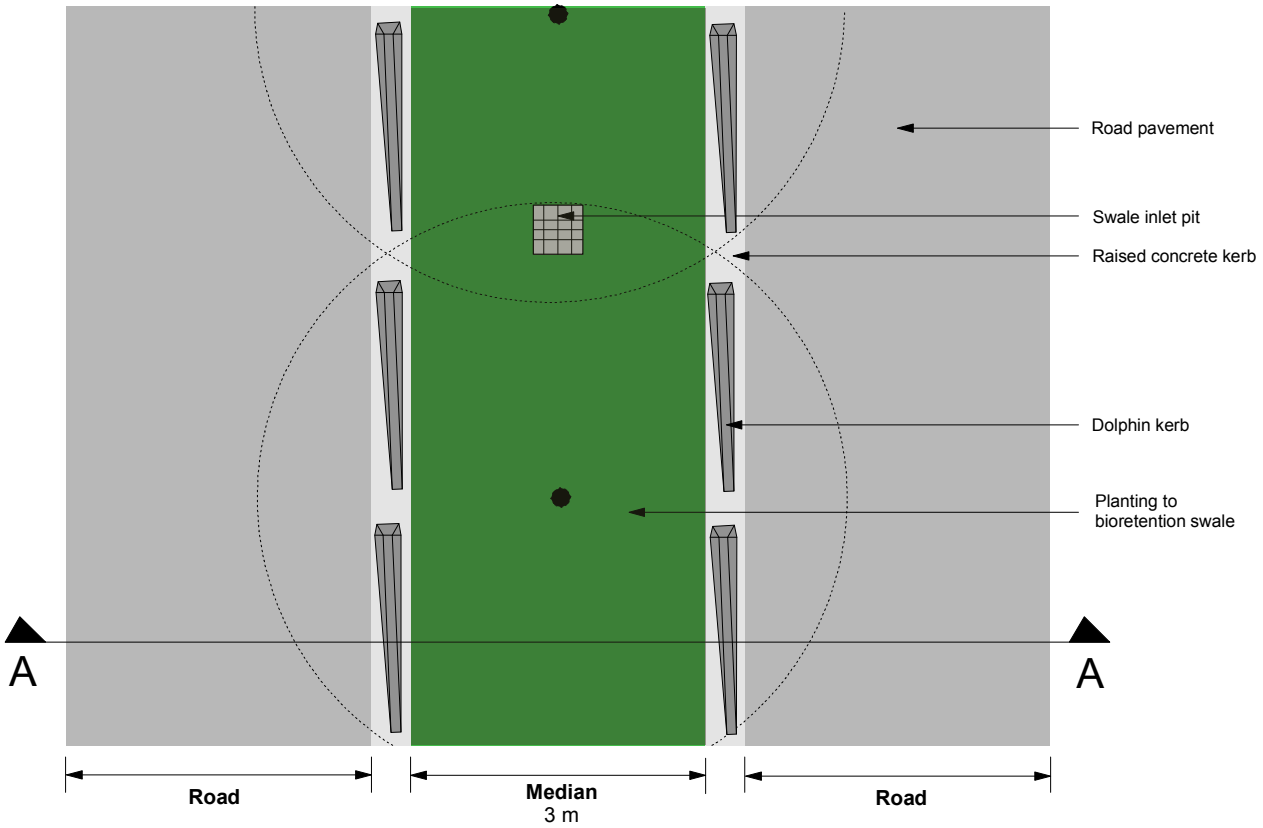
The following details are examples of water sensitive urban design devices that use natural systems for the filtration and treatment of surface runoff water in the public domain. They employ permeable surfaces and water retention trenches for protection of water quality entering the stormwater system and the beaches.

The bio-retention systems comprise stone or soil filled trenches through which stormwater runoff is diverted, and from which water gradually infiltrates into the ground. Their longevity is enhanced by incorporating a filter strip, gully or sump pit to remove excess solids at the inflow. Pollutants are removed by absorption, filtering and microbial decomposition in the surrounding soil. Systems can be designed to successfully incorporate both filtration and filter systems.

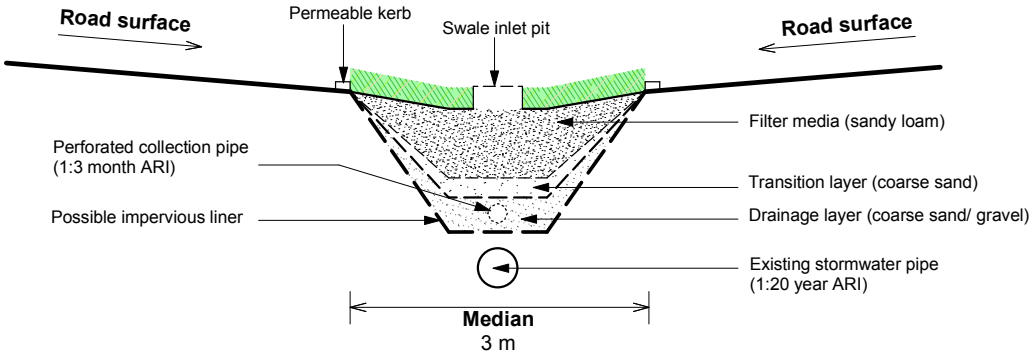
The systems illustrated are representative of a number of bio-retention and filtration systems available. Details should be fully integrated into each particular streetscape, using the opportunities offered by medians, planting beds or the requirement for new trees. Design should be balanced against considerations of pedestrian safety and accessibility, as well as the overall character of the streetscape.

Typical tree bay (with subsoil water protection barrier for pavement).

Central road swales



BIORETENTION MEDIAN SWALE SYSTEM - PLAN N.T.S.



BIORETENTION MEDIAN SWALE SYSTEM - SECTION AA N.T.S.
FIGURE 4.37

5.1.8 Quality Principles

To achieve continuity and cohesiveness through the public domain improvements, it is preferable to prepare the detailed design of each street as a whole entity, rather than preparing a design for each property frontage. Piecemeal design of streets is evident in some of the existing streets, where different finishes, patterns and parking measures exist along the length of the street, resulting in loss of legibility and quality.

Implementation on this scale in one stage may not always be possible. Sometimes a new development will be required to implement the improvements as part of its obligation to make good the existing streetscape, or as part of a contribution to the upgrade. In these cases, detailed designs should be prepared for each section, showing how the section fits into the overall design for the street. In particular, the design plans should include:

- The relevant section of street shown as part of the block or overall street;
- Details of junctions with existing portions of the street;
- Dimensioned drawings showing set out of all elements, including parking bays, street trees, kerb alignment, paving set out;
- A full schedule of materials, including street trees;
- Details of junctions with the private domain, showing levels and alignment with adjacent materials.
- Specifications and details for soils, trees, and hardscape materials.

Designs and documentation may be commissioned by Council, or by developers for each site. In all cases, coordination and review of detailed design drawings, and inspection of quality of works during construction will be required by Council's urban designer/landscape architect and engineers to ensure cohesiveness of design and implementation.

5.2 SUPPLIERS

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www.boral.com.au

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Gladesville NSW 1675
p: + 2 9817 4799
f: + 2 9817 8560
www.ledasecurity.com.au

'Furphy Foundry'
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www.furphyfoundry.com.au

'Street Furniture Australia'
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Alexandria NSW 2015
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f: + 2 9318 1343
e: mail@streetfurniture.net
www.streetfurniture.net

'Town and Park Furniture'
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f: + 2 9907 6422
e: info@townandpark.com.au
www.townandpark.com.au

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