

TAYLORS



IRYMPLE LOW DENSITY RESIDENTIAL DEVELOPMENT PLAN

ISSUES AND OPPORTUNITIES REPORT

Prepared for Mildura Rural City Council
19 January 2024 (FINAL DRAFT)



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The current and historic (post-settlement) land use of the study area is dominated by irrigated agriculture comprising vineyards and orchards.

Acknowledgement

The Mildura Rural City Council acknowledges the Traditional Owners of the land which is today known as the municipality of the Mildura Rural City -. We pay our respects to Elders past and present and celebrate and respect their continuing cultures and acknowledge the memories of their ancestors.

Document information

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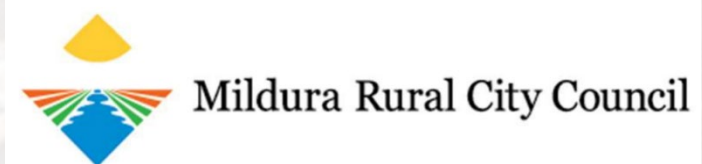
8/270 Ferntree Gully Road

Notting Hill VIC

T (03) 9501 2800

E email@tayorsds.com.au

W www.taylorsds.com.au



Deakin Avenue Service Centre

76 Deakin Avenue

Mildura VIC 3500

T 5018 8100

E mrcc@mildura.vic.gov.au

W www.mildura.vic.gov.au





The gateway to the township of Irymple, denoted by the vineyards which represent its historic farming landscape.

1 INTRODUCTION

Mildura, together with its surrounding townships and settlements are a living landscape – one which continues to grow and evolve in all dimensions, as do the spaces between the settlements. The transition area land between Mildura’s main urban area and the township of Irymple is one of its most important ‘in-between’ spaces, occupying a relatively brief 1.2 kilometre-wide stretch of land that is primarily passed through and experienced via Fifteenth Street.

Previous strategic planning by the Mildura Rural City Council (Council) has established a broad vision and planning guidance for the transition area, as well as the for the interfacing urban areas.

As one element of a wider program of projects to refine and progress implementation of the strategic planning, the Irymple Low Density Residential Development Plan (Irymple LDRDP) will provide a statutory framework to guide and coordinate the progressive development of the precinct in a way that is responsive to the particular characteristics, opportunities and constraints of the landscape and which is appropriate to the urban transition area context. The framework will integrate planning across a range of elements including drainage and servicing, built form, transport and public open space.

A staged planning process is being followed to prepare the Irymple LDRDP with involvement of MRCC staff, state government agencies, service authorities and local landowners and residents. This will occur over a period of approximately 12 months, concluding by September 2024. An overview of the planning process and associated timing is shown in Figure 1 below.

This Issues and Opportunities Report represents the outcome of the first major stage of the project. The report provides a synthesis of research and analysis related to the study area and aims to provide an accessible understanding of the complex interplay of key issues, as well as of opportunities to be explored in the next stages of the planning process.



Figure 1. Overview of planning process for the Irymple LDRDP

2 GEOGRAPHIC AND COMMUNITY CONTEXT

This section provides a brief context-based overview of the study area focussing on its geography, physical features and characteristics.

2.1 GEOGRAPHIC CONTEXT

The study area for the Irymple LDRDP is located between the main urban area of Mildura and the Irymple township, and on the south-west side of Fifteenth Street, which is the primary arterial road connection between these areas.

The study area forms part of the Mildura-Irymple Urban Transition Area which occupies the area generally between Benetook Avenue and Sandilong Avenue. The Transition Area has the important strategic land use planning function of maintaining a sense of physical separation and openness between south-eastern urban edge Mildura and Irymple (see Figure 2).

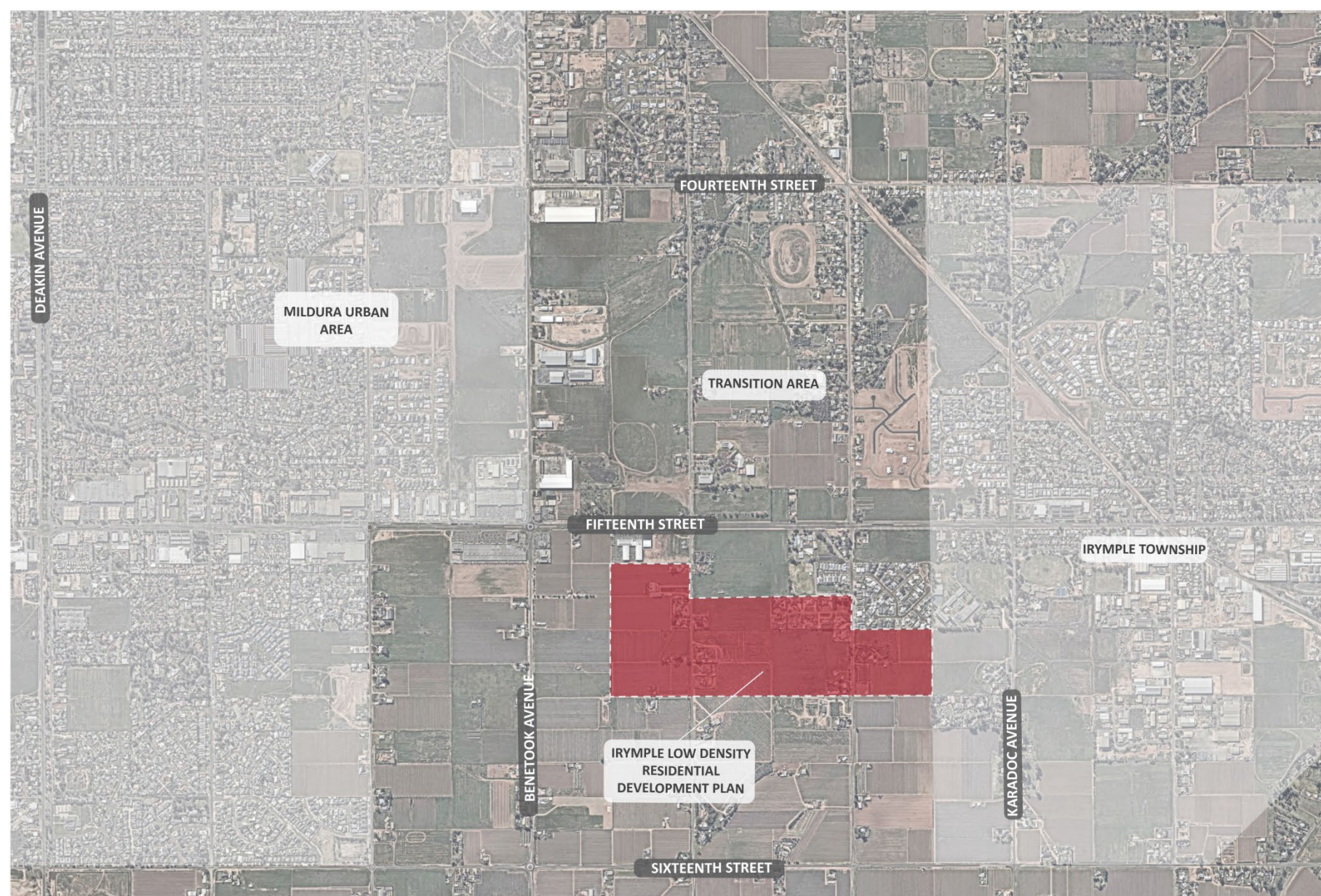


Figure 2. Geographic context of the Irymple Low Density Residential Development Plan Area

2.2 STUDY AREA DESCRIPTION AND CONTEXT

The study area occupies approximately 50 hectares of land (see Figure 3) that previously formed part of a much larger farming district established in the late 1800s – the Irymple irrigation settlement – comprising 12,000 acres (around 4,850 hectares). For the duration of the post-settlement history of Mildura, the area has been established for small-scale irrigation-based farming. The landscape has been highly modified to suit farming practices, features very limited native vegetation and has a notable lack of established trees, except in the immediate surrounds of dwellings.

In its longest dimension, the study area spans a distance of almost 1.3 kilometres and is generally located between Benetook Avenue to the north-west and Karadoc Avenue to the south-east, as well as by Fifteenth Street to the north-east. These streets do not, however, directly define the edges of the precinct. Its boundaries are instead inset from the surrounding streets and are marked by a combination of intersecting title boundaries of private lots. No public roads or other notable landscape features otherwise define the study area boundaries (see Figure 3). The lot configuration, in combination with the limited extent of public road frontage, creates considerable planning complexity – primarily for development sequencing, which will be limited by the location of trunk service locations and existing public road reserves.

The wider landscaper and land use context of the study area is also quite complex, with considerable diversity in every direction. To the north-east, along Fifteenth Street, which forms part of the main Calder Highway gateway to Mildura, both future commercial and community-based uses are proposed. To the south-west, extensive areas of small-scale farmland continue to operate, to the east (and north-east), there are pockets of existing and planned future residential areas, and to the west an extension of the industrial precinct along the Benetook Avenue corridor is proposed.

Within the study area itself, there are a total of 33 private landholdings of various sizes, though primarily constituted by 10-acres lots, often with a smaller excised lot for a dwelling. The topography of the area is generally flat with numerous very shallow undulations and a transverse gentle ridge. Access is currently available via two rural roads – Cowra and Sandling Avenues – running in a north-east to south-west alignment and connecting with Fifteenth Street and Sixteenth Street as part of a wider grid of streets.

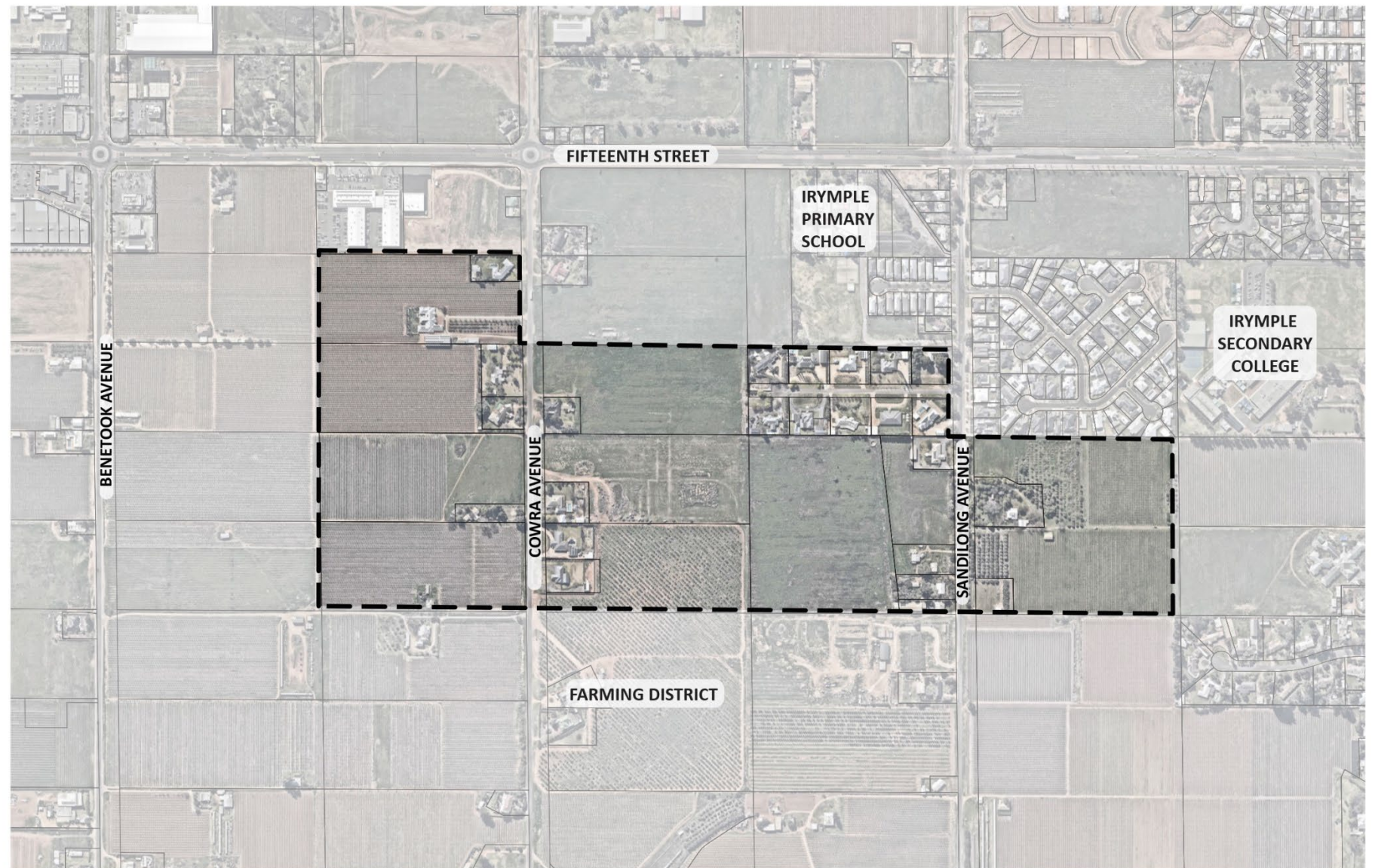


Figure 3. Geographic context of the Irymple Low Density Residential Development Plan Area



3 PLANNING AND POLICY CONTEXT

Strategic planning and policy development has been completed by the Mildura Rural City Council over the last two decades, including a number of recent thematic strategies and area-specific structure plans.

These documents provide essential planning and policy context for preparation of the Irymple LDRDP and a foundational reference for effective planning integration of the study area in accordance with established strategic planning.

3.1 EXISTING STRATEGIC PLANNING POLICY

Mildura Housing and Settlement Strategy 2013 and Amendment C89 to the Mildura Plan Scheme

The Mildura Housing and Settlement Strategy (MHSS) is the primary strategic plan of Council to guide its land use planning for residential development and was instrumental in formulating strategic planning and design parameters for the transition area, within which the study area is located, and for the study area itself.

The MHSS states the following in relation to the transition area:

While current policy seeks to maintain a 'break' between Mildura and Irymple, this is principally expressed along Fifteenth Street, where commercial and community development is proposed to occur in a 'campus' style incorporating significant vegetation and signalling the transition between the two settlements...

...The MHSS does not support the development of this land at urban densities, given the land available to the north-east of Fifteenth Street, however, opportunities for a lower density of development in this area are discussed further in the relevant section of this Strategy. p.13

It is noted the MHSS does not spatially define the extents of the transition area in its Framework Plan (see Figure 4).

The MHSS also states the following in relation to the study area and its immediate context:

"Irymple

An area is also proposed for low density residential uses at the south-western extent of Irymple. Given growth of Irymple is expected to occur to the north-east, the inclusion of some additional land (approx 50ha) in this area is considered appropriate and will add to the diversity of housing available around the settlement, without compromising longer term growth. The area identified essentially 'connects' existing isolated subdivisions and proposed development to the south of Irymple, and includes the existing low density subdivision around Angel Grove in a more suitable zone. It also allows the development of a clearer urban edge along this interface.

To ensure the objective of creating a more connected and coherent settlement pattern in the southern part of the Irymple township, including a clear boundary between the township and agriculture areas to the south, a Development Plan should be prepared. This should identify a minimum lot size of 0.4ha to ensure a clear distinction in the character between this area and the urban township, and a road boundary between the low density and farming areas. Consideration should also be given to applying this Development Plan to other areas south of Fifteenth Street' p.28

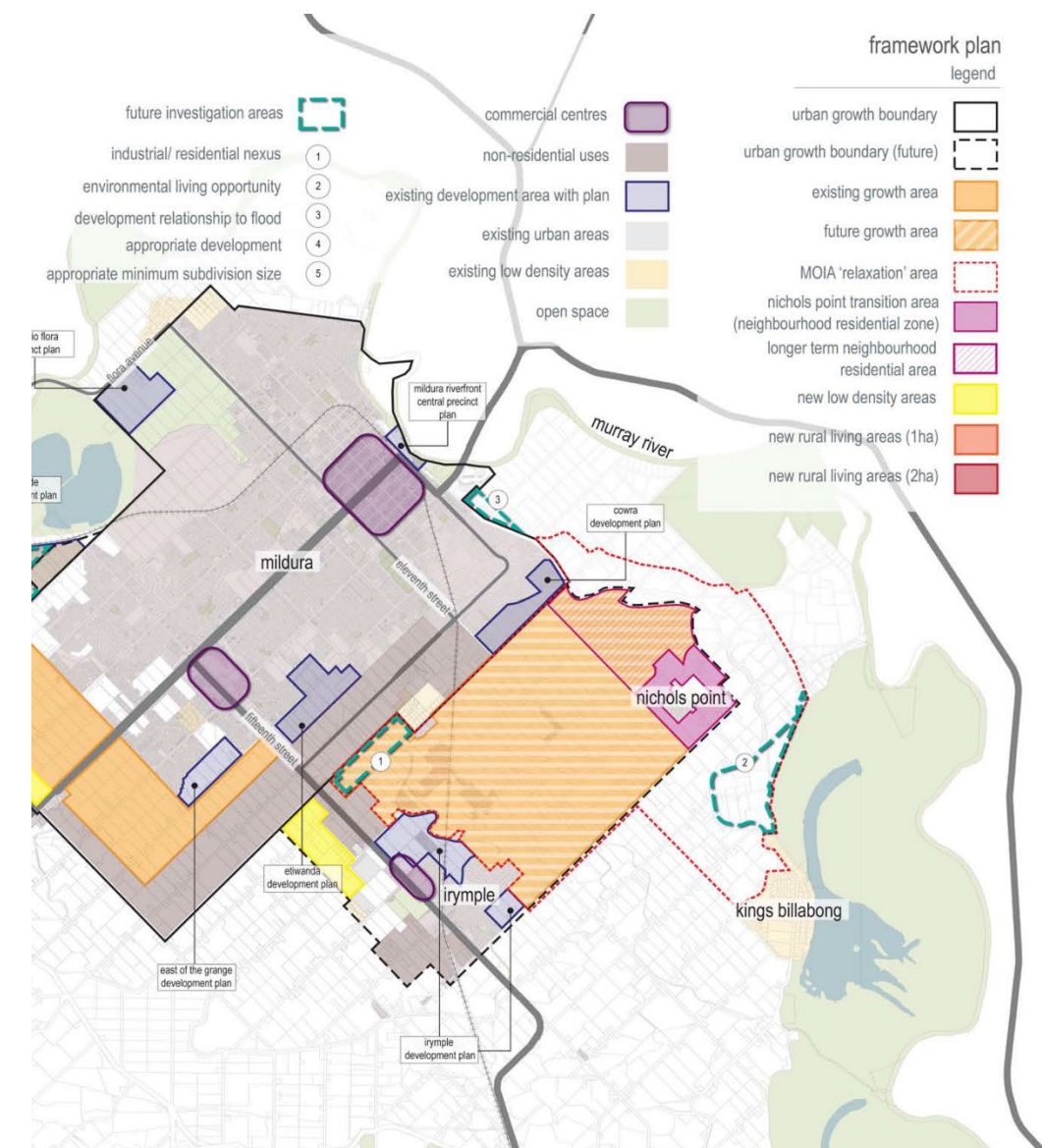


Figure 4. Framework Plan (Mildura Housing and Settlement Strategy 2013)

Municipal Planning Strategy (Mildura Planning Scheme)

Council’s Municipal Planning Strategy (MPS) is set out in Clause 02 of the Mildura Planning Scheme. The MPS provides a broad, however contextually important land use planning vision and corresponding strategic directions, with a number of relevant aspects to the study area and its Urban Transition Area context.

Clause 02.02-2 Vision

Identifies the following applicable statements:

- *Residents will be living in a variety of housing styles ranging from medium density clusters in the major towns to rural living in clearly defined rural settings*
- *The major concentration of population will be in the ‘Main Urban Area’ (MUA) of Mildura, Irymple and Nichols Point.*
- *The municipality’s towns will be clearly defined and separated.*
- *Agricultural and horticultural production will be the foundation of the strong economy and will be uninhibited by urban encroachment.*

Clause 02.03-1 Settlement

Identifies the following strategic directions for the Urban Transition Area:

- *Facilitate the urban expansion of the ‘Main Urban Area’ (Mildura, Irymple and Nichols Point) as the focal point for residential growth.*
- *Facilitate an ‘Urban Transition Area’ between Irymple and Mildura on Fifteenth Street (between Sandilong and Cowra Avenues) with a range of education, health, tourism and community uses with attractive buildings within a spacious landscape setting.*

Clause 11.01-1L-02 Urban Transition Area

This policy applies to all land within the Mildura Urban Transition Area Structure Plan to this clause. Relevant strategies are as follows:

- *Encourage development along Fifteenth Street between Mildura and Irymple that supports a sense of land use, built form and landscape transition between the settlements.*
- *Identify the western end of the Urban Transition Area as the urban edge of Mildura.*
- *Identify the eastern end of the Urban Transition Area as the urban edge of Irymple.*
- *Provide low density residential development at the periphery of Irymple and Mildura, where these will form the long term urban growth boundary.*
- *Encourage a range of education, health, tourism and community uses within the Urban Transition Area on Fifteenth Street between Sandilong Avenue and Cowra Avenue.*
- *Encourage a range of smaller scale restricted retail premises and commercial activities within the Urban Transition Area on Fifteenth Street between Benetook Avenue and Cowra Avenue.*
- *Design development on Fifteenth Street between Benetook Avenue and Sandilong Avenue that achieves a spacious landscaped setting through:*
 - *Buildings of a low scale, set back from the road.*
 - *Significantly landscaped frontages.*
 - *Car parking within the landscaped front building setback.*
 - *Breaks between buildings.*

Clause 14.01-1L-01 Sustainable agricultural land use

Relevant strategies are as follows:

- *Avoid the loss or fragmentation of land within an irrigation district.*
- *Minimise unplanned urban intrusion into horticultural areas.*
- *Protect rural and agricultural infrastructure such as roads, drainage and water supply.*
- *Avoid amenity impacts of a non-agricultural use on nearby dwellings.*
- *Avoid land use conflicts with surrounding agricultural activities.*
- *Discourage non-agricultural use other than those that contribute to value adding to agricultural activities on the site.*

Clause 15.01-1L Urban design in Mildura

The objective of this Clause is to require building and neighbourhood design to be responsive to Mildura's climate.

Relevant strategies are as follows:

- *Encourage building design to employ passive cooling techniques to reduce reliance on air conditioners.*
- *Discourage building designs that dominate public spaces or imply private ownership of public spaces.*
- *Discourage dwellings that are dominated by garages and that create a sense of disconnection between the dwelling and the street.*
- *Require the provision of generous eaves on all residential development.*
- *Require residential neighbourhoods to incorporate shaded vegetated greenways or linear parks to connect areas of activity.*
- *Design roads in new residential neighbourhoods that are able to accommodate canopy tree planting.*
- *Encourage low or transparent fencing and landscaping that allows for passive surveillance.*
- *Maximise opportunities for landscaping by providing greater permeable surfaces in public and private development.*
- *Encourage development to increase tree cover in streets, backyards and as broad scale revegetation.*
- *Discourage landscape treatments such as artificial turf and tanbark, particularly in non-natural colours.*
- *Encourage the design and orientation of all development to take advantage of passive systems and climatic factors.*
- *Use landscape design to assist in passive solar heating and cooling through providing vegetation on the east, west and north side of dwellings.*
- *Encourage the use of environmentally sustainable design techniques.*

Clause 15.01-3L Mildura subdivision design

Relevant strategies are as follows:

- *Design roads in new residential neighbourhoods that are able to accommodate canopy tree planting.*
- *Require road alignments to incorporate a broad grid network, with local roads connecting to adjoining urban areas.*
- *Design streets in subdivisions to maximise the solar orientation of lots.*
- *Avoid courts and cul-de-sacs in neighbourhood subdivision design.*
- *Require residential neighbourhoods to incorporate shaded vegetated greenways or linear parks to connect areas of activity.*
- *Provide pedestrian connections in a court bowl to allow direct pedestrian access (if a cul-de-sac is unavoidable).*
- *Require subdivision road layouts to facilitate future movement connections, including by use of easements where adjoining parcels are not developed concurrently.*

Clause 45.06 Development Contributions Plan Overlay

Three Development Contributions Plans (DCP) apply to the study area, in full or in part, for the purpose of levying contributions for the provision of works, services and facilities before development can commence.

All development types with the DCP areas will be liable for development contributions. Contribution rates for are set out on an area basis corresponding to infrastructure type (drainage, roads, open space, etc).

DCP01 – Infrastructure Works

DCP01 applies to lots within study area located to the north-west of Cowra Avenue and implements the Mildura South Development Contributions Plan (No 1) (2005).

DCP02 – Infrastructure Works

DCP02 applies to the entire study area and implements Development Contributions Plan No. 2 (2006).

DCP03 – Infrastructure Works

DCP03 applies to the entire study area and implements Development Contributions Plan No. 3 (2007).

Mildura Public Open Space Strategy 2021

The Mildura Public Open Space Strategy (MPOSS) provides a provides an overarching strategic plan for the development of a cohesive and connected public open space network in response to the needs of the region's communities. Relevant observations and strategic directions for the Irymple LDRDP are as follows:

- Public open space contributions are not nominated, generally, nor for specific areas of precincts of the municipality. A recommendation is however provided for Council to prepare a Public Open Space Contributions Policy.
- Existing and proposed provision of public open space for the Irymple area is addressed by Precinct H. No new areas of open space are nominated for the study area.
- A recommendation is also provided to prepare Public Open Space Design Guidelines.
- It is also noted that the MPOSS does not provide specific recommendations in relation to the provision of public open space in low density residential areas.

Additionally, in relation to public open space contributions, the Mildura Planning Scheme does not currently specify a contribution rate. Accordingly, public open space contributions for the study area will be provided on according to the requirements of the *Subdivision Act 1988*, which specifies a requirement of 5% of the land area to be subdivided, or an equivalent cash-in-lieu-of land contribution.

Mildura Irymple Urban Transition Area Design Guidelines 2007

The Mildura Irymple Urban Transition Area Design Guidelines provide an integrated strategic planning and design framework for Mildura's Urban Transition Area – located broadly between Benetook and Sandilong Avenues – and within which the study area for the Irymple LDRDP is located. Relevant observations and strategic directions are as follows (see also Figure 5):

Framework Plan

- A 'Farming Activities Zone' is applied to the extents of the subject study area, as well as to adjoining areas to the north-west and south-west. This direction has since been superseded by the recommendations of the Mildura Settlement and Housing Strategy 2013 and subsequent Planning Scheme Amendment C89 to implement the Low Density Residential Zone to the subject study area.
- The low density area on Angel Grove is identified as 'Existing Low Density Residential'.
- A 'Potential Special Use Zone' is also shown on Fifteenth Street, to the east of Cowra Avenue and immediately adjoining part of the north-east boundary of the subject study area.
- A proposed road is shown on an east-west alignment as an interface between the Farming Activities Zone and commercial area ('Future Business 4 Zone') along Fifteenth Street.



Figure 5. Framework Plan (Mildura Irymple Urban Transition Area Design Guidelines 2007)

Fifteenth Street Special Uses (Community Uses) Precinct Plan

The statement of intent for this precinct is as follows:

The eastern portion of Fifteenth Street, between Cowra and Sandilong Avenues is part of Irymple, indeed a point of demarcation is the junction between the Highway and Cowra Avenue. The Highway frontage to the east of this junction has an open sense of place and will continue to be inhabited by institutions, including the Irymple Primary School, Henderson College and other future community, civic and/or recreational facilities. The prevailing experience in the passage through this part of Fifteenth Street is and will continue to be of landscape.

Relevant observations and strategic directions for the Irymple LDRDP are as follows (see also Figure 6):

- An access road is shown along the southern boundary of the precinct, adjoining the subject study area.
- Institutional, civic and community buildings are depicted as 'buildings in the round' with discrete areas of car parking and large areas of open space and boundary landscaping.
- Fencing is to be permeable and consistent in style between front and side boundaries.

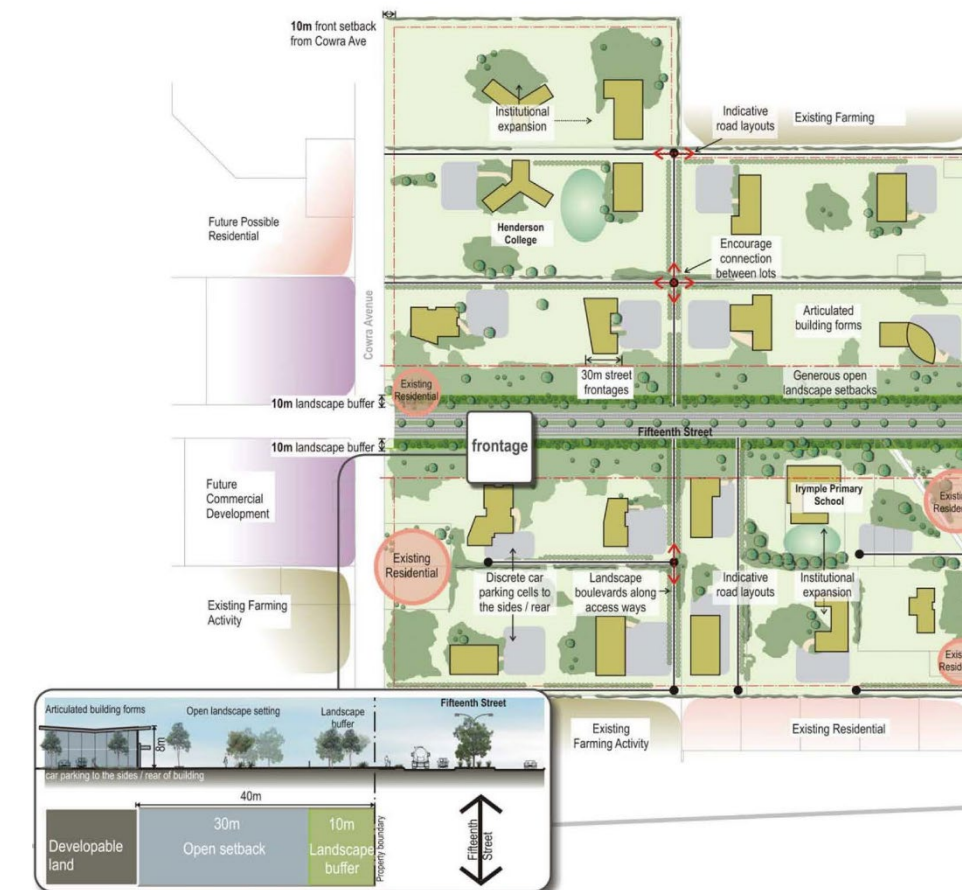


Figure 6. Fifteenth Street Special Uses (Community Uses) Precinct Plan (Mildura Irymple Urban Transition Area Design Guidelines 2007)

Industrial-Residential Area Interface

An acoustic wall is to be provided to the rear of industrial lots abutting existing or future residential land to reduce noise and visual impacts (see Figure 7).

It is noted that this design requirement has been implemented with some effect on several industrial development sites located on Benetook Avenue, to the north-east of Fifteenth Street.

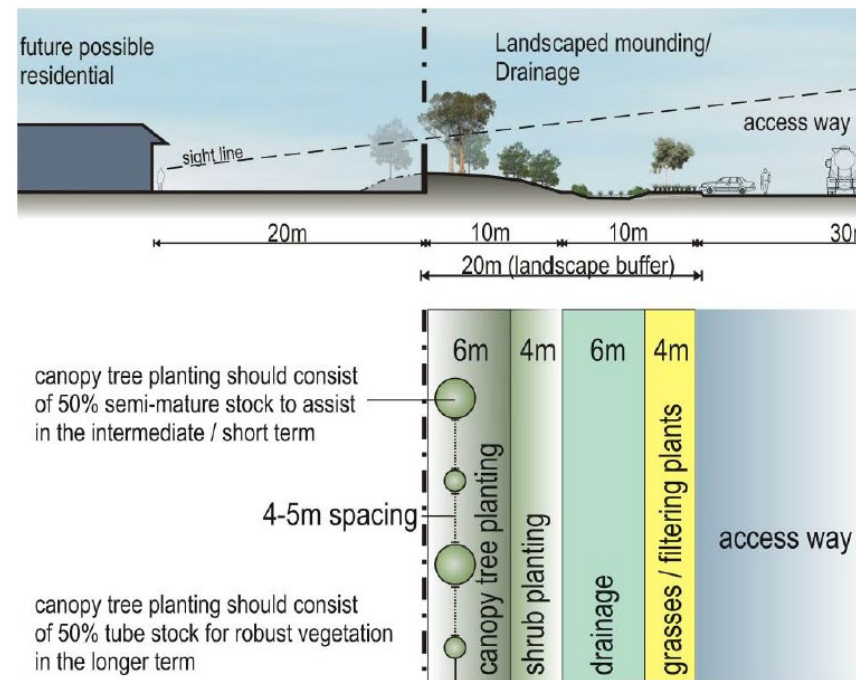


Figure 7. Rear Buffer Landscaping (Mildura Irymple Urban Transition Area Design Guidelines 2007)

Irymple Structure Plan and Urban Design Framework (2021)

The geographic scope of this plan covers the Irymple township and town centre (see Figure 8).

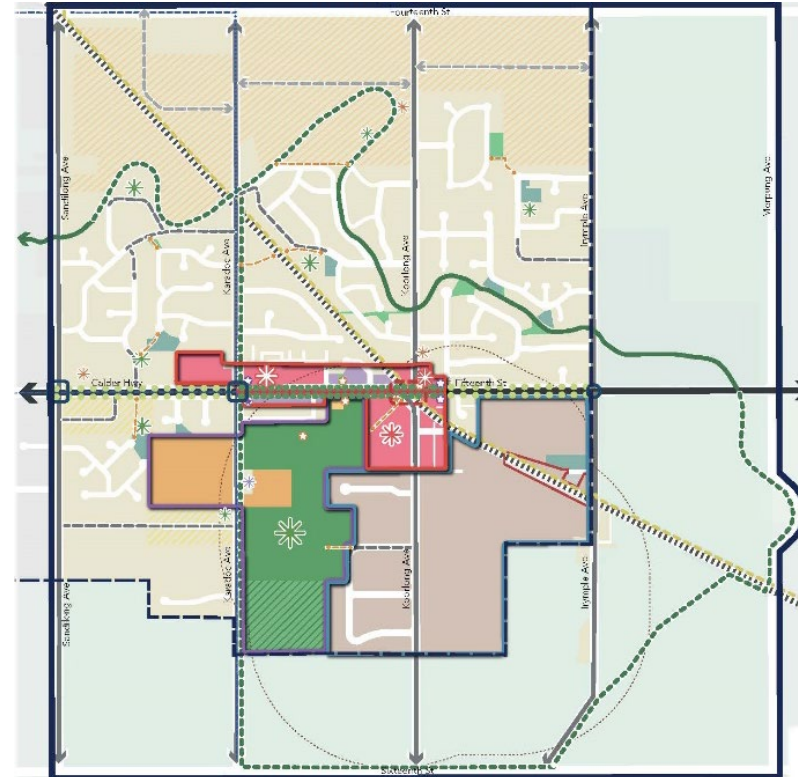


Figure 8. Overall Irymple Structure Plan (Irymple Structure Plan and Urban Design Framework 2021)

The western boundary abuts Sandilong Avenue and therefore overlaps a small part of the subject study area (see Figure 9 – area of overlap indicated by yellow outline).

Relevant strategic directions are as follows:

- Land designated as 'Potential Residential' (i.e. to be rezoned from Farming Zone to General Residential Zone).
- A proposed 'logical local road connection' between Sandilong and Karadoc Avenues, shown on an east-west alignment and with an offset from the southern boundary of Irymple Secondary College. This indicates intent for homes backing onto the school grounds and makes an assumption of lot sizes with a depth of approximately 35 metres.

The proposed local road connection is strategically important to connect to the existing and future public open space area, and associated facilities, located on the immediate east side of Karadoc Avenue.

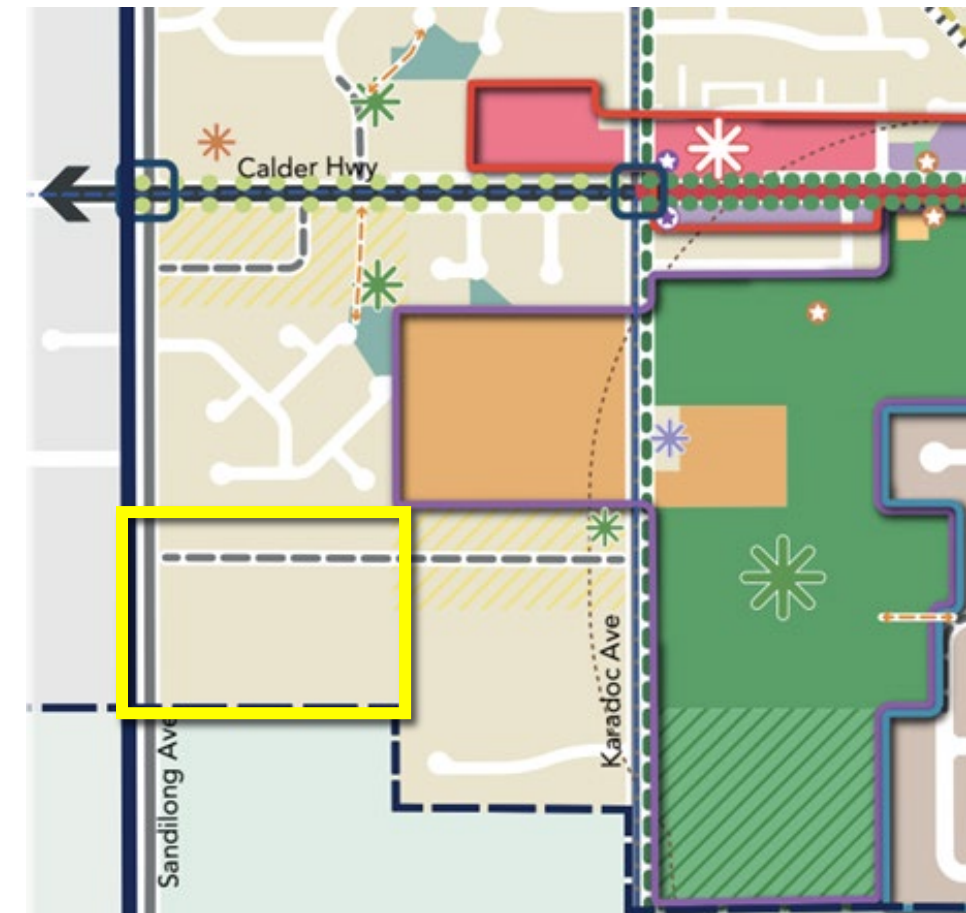


Figure 9. Extract and enlargement from Overall Irymple Structure Plan (Irymple Structure Plan and Urban Design Framework 2021)

3.2 STRATEGIC PLANNING POLICY UNDER DEVELOPMENT

Mildura Integrated Transport and Land Use Strategy (2023-)

The Mildura Integrated Transport and Land Use Strategy (ITLUS) will identify ways the transport network can improve access to key destinations such as work, education, health, recreation, social activities, services and shopping.

ITLUS will also identify gaps and opportunities to improve transport access, particularly in relation to freight transport at local, regional and national level.

Recommendations of this strategy in relation Benetook Avenue and its function as an over-dimension freight route will be relevant to the Irymple LDRDP.

Mildura Industrial Land Strategy (2023-)

Council's existing Industrial Land Use Strategy 2003, and subsequent Industrial Land Use Strategy Updated 2006, are currently under review.

Recommendations of this strategy in relation to the proposed expansion of the Benetook Avenue Industrial Area will be relevant to the Irymple LDRDP.

Mildura Urban Forest Strategy (2023-)

The purpose of this strategy is to increase the net green tree canopy cover across the urban areas of the Mildura local government area.

Recommendations of this strategy in relation to tree canopy cover targets, as well as for urban design and infrastructure recommendations related to enabling urban forest expansion and establishment, will be relevant to the Irymple LDRDP.

Mildura East Growth Area Strategic Framework Plan (2021-)

The study area for the Mildura East Growth Area Strategic Framework Plan (MEGA) extends from Irymple to Nichols Point, and from Cowra Avenue to Irymple Avenue, as well as a number of smaller areas at the edge of Mildura, for which no development plan has yet been prepared.

Phase 1 of the MEGA formulated a 30-year vision and strategic directions for the study area, including land use, built form, and public spaces. This strategy has particular focus on, managing future residential development on the basis of efficient drainage infrastructure.

The geographic scope of the MEGA does not directly apply to the study area of the Irymple LDRDP, however strategic directions adopted in Phase 1 of the project are relevant considerations for the Irymple LDRDP, as follows:

- *Rezone land to provide an additional pocket of light industrial land within the study area where it can contribute to a sense of 'separation' between the settlements of Irymple and Mildura.* This is noted to relate, at least in part, to the area of land along Benetook Avenue, and to the north-west of the Irymple LDRDP study area.

Mildura Heritage Study Part B - Stage 2 (2023-)

The aim of this current heritage study is to comprehensively review heritage items and places of the municipality. The review is focussed on updating as appropriate the 1988 Mildura Conservation Study, as well as further assessing additional heritage items and places that were nominated for consideration in Stage 1 of the study.

Recommendations of this study in relation to the protection of heritage places. Including those that may lead to potential wider application of the Heritage Overlay, will be relevant to the Irymple LDRDP.

4 ISSUES AND OPPORTUNITIES

4.1 LAND USE ISSUES

1 Role of the urban transition area

The *Mildura Settlement and Housing Strategy 2013* and its translation into the policies of the Mildura Planning Scheme (as outlined in Sections 3.2 and 3.3) establishes a clear land use strategy intent and policy for low density lots of 0.4 hectares within the study area for the purpose of creating a clear distinction in urban form and character between this area and the urban areas of Mildura and the Irymple township.

The context of the study area is however one that is distinguished by close proximity to a range of infrastructure, facilities and services, some within walking reasonable distance. This includes road and public transport infrastructure, concentrated along Fifteenth Street, existing and planned commercial and community uses (also along Fifteenth Street as well as within the Irymple Town Centre), substantial active and open space (Henshilwood Reserve), as well as a primary school and secondary school.

Notwithstanding the established strategic intent and strategic policy framework, the close local access of the study area to infrastructure, facilities and services is highly likely to elevate pressure for a higher density of development and so raises both an immediate and longer-term consideration regarding the optimal use of land within the study area.

In the first instance, the particular lot size minimum suited to a 'low density residential' outcome in the study, noting that this could conceivably vary across the study area according to land use interfaces for example. Secondly, it may or may not be appropriate to look to the much longer term and consider how the transition area might itself be enabled to 'transition' in response to future issues and pressures – some of which we can anticipate today.

2 Parameters of the Low Density Residential Zone

The application of the Low Density Residential Zone (LDRZ) – Schedule 2 to the study area puts in place a number of important parameters which must be considered and reflected by the planning and design response. Most significantly, the LDRZ includes a restriction for the subdivision of residential lots to achieve a minimum area of 4,000 square metres (0.4 hectares). Ordinarily, this coincides with an expectation of the unavailability of reticulated sewerage, and capability of individual lots to treat and retain all wastewater.

Sewer infrastructure is available within the study area (see Section 4.5 Drainage and Services for further details) and creates the potential for lots to be serviced by reticulated sewer. Whilst this in turn creates the potential for an increase in development density, the strategic intent of the *Mildura Settlement and Housing Strategy 2013*, and its translation into the Mildura Planning Scheme, is clearly not to increase development density. Rather, the LDRZ – Schedule 2 aims to establish residential lots no less than the specified minimum lot size of 0.4 hectares, for the purpose of creating a distinction in urban form and character between this area and the urban areas of Mildura and the Irymple township.

3 Development Plan Overlay Requirements

The Irymple LDRDP will provide a critical statutory tool to give effect to this strategic direction, however itself must provide clear guidance for urban and built form and public realm within the study area.

A Development Plan Overlay – Schedule 4 (DPO4) applies to the study area and sets out the requirements for a Development Plan prepared for consideration for approval by Council under this overlay. The development plan must include the following requirements:

- The means of servicing to lots, including the provision of reticulated water and sewerage to all residential lots, or alternative Environment Protection Authority Victoria approved effluent disposal systems.
- The need for open space, as considered necessary by the responsible authority, in accordance with the relevant guidelines.
- The need for any other community infrastructure, as considered necessary by the responsible authority.

- Any sites of flora or fauna significance or archaeological or heritage significance, and how these could be integrated into the design of any subdivision.
- Areas subject to the impacts of salinity.
- The application of water sensitive urban design principles.
- The comments of Lower Murray Water.
- The comments of the Mallee Catchment Management Authority.

The development plan must provide for the following:

- A clearly distinguishable road hierarchy, with the differences in road function reflected in the road width, design, layout and road reserve treatments.
- Identification of the means of draining the land.
- Identification of common trenching of compatible services.
- Appropriate interface treatments to schools and areas of public open space.
- Pedestrian linkages to Irymple Primary School and Irymple Secondary School and to Fifteenth Street and the Irymple town centre.
- Integration with the General Residential Zone to the south-east.
- Inclusion of greenways or other linear open spaces, to provide opportunities for incidental exercise and social interaction.
- Retention of any existing tree stands of value and the development of an appropriate landscaping theme for nature strips and public open space, including the use of salt tolerant plants where relevant.
- Identification of public realm treatments and interfaces which reflect the low density residential nature of the area, such as post and wire fencing (or no fencing) rather than solid fencing.

4 Adjoining areas and associated planning

The compatibility of different (existing and future) land uses in relatively close proximity will require careful planning and design, including consideration of existing policy and frameworks (see Section 3 for further detail). At each edge of the study area, there are particular land use controls and issues to recognise and address (see Figure 10).

(Future) Industrial Precinct: At least part of the western boundary should be expected to be rezoned in the future to an Industrial Zone. This will most likely be the Industrial 3 Zone (INZ3) given proximity to other sensitive land uses (including the study area itself). The range of uses and types of activities associated with INZ3 are typically more compatible with residential settings however development can be of a large scale and amenity impacts can still arise. This will require management combining a considered urban design and appropriate planning permit conditions related to operations.

Community Uses Precinct: This precinct extends along a 630-metre interface with the study area. The land use planning intent is for a mix of educational and community uses, with buildings well setback from Fifteenth Street and arranged as 'buildings in grounds' with generous separation between buildings, discrete areas of parking and extensive areas of landscaping.

Planning and design outcomes are guided primarily by the Special Use Zone – Schedule 9 and a Design and Development Overlay (Schedule 11) – Fifteenth Street – Special Use (Community Uses) Precinct. This precinct also includes the location of the Irymple Primary School (zoned Public Use Zone – Schedule 2), noting that the land use abuttal is established without scope for change.

Business Precinct: This precinct flanks both sides of Fifteenth Street between Cowra Avenue and Benetook Avenue, though only partly interfaces with the study area over a distance of around 300 metres. The land use planning intent is for restricted retail and associated business services within a landscaped setting well setback from Fifteenth Street, and with space between buildings. Approximately half of this interface has been developed (for large scale commercial car retail).

Planning and design outcomes are guided primarily by the Special Use Zone – Schedule 8 (Mildura – Irymple Urban Transition Area), which primarily calls upon the guidance provided by the *Urban Design Guidelines – Mildura Urban Transition Area (April 2008)*, and a Design and Development Overlay (Schedule 10) - Fifteenth Street – Special Use (Business) Precinct.

General residential areas: The far eastern boundary abuts two small areas of conventional density housing, one of which has been built out, and the other is partly developed with an aged care facility. An additional single parcel adjoining the latter area remains in the Farming Zone, however, is proposed to be rezoned to GRZ by the *Irymple Structure Plan and Urban Design Framework 2021*.

5 Relationship with the adjoining Farming Zone

The study area forms parts of a larger, well-established farming district comprising vineyards and orchards, and will remain in immediate proximity to functioning farms with direct abuttal to the southern boundary. The *Mildura Settlement and Housing Strategy 2013* outlines the objective to establish a clear boundary between the Irymple township (which includes the study area) and agriculture areas.

The form of the boundary has not been defined, however is identified in the project brief for Irymple Low Density Residential Development Plan as a "road boundary". The compatibility of residential and farming uses also presents some potential conflicts that need to be managed (e.g. different expectations of amenity).

6 Fragmented land tenure and cadastre constraints

A total of 33 lots are contained within the study area and are predominantly in separate ownership. The structure of land parcels is quite uniform, with a majority of lots of approximately 10 acres (2.4 hectares) in area and forming a standard rectangle with long axis oriented north-east to south-west. There are a substantial number of small, excised lots (usually less than 1 acre) for individual dwellings. These characteristics create a quite fragmented land tenure structure. Additionally, there is limited existing public road frontage available to the lots.

An important consequence of the above is complexity for infrastructure provision (e.g. road and drainage reserve locations and extents) and development sequencing. The land take burden on respective individual properties will require careful consideration, and it should be expected that initial options for development sequencing will be constrained due to the street network plan which must be connected from the limited existing street frontage. The Development Plan will be integral to coordinating planning outcomes across the land tenure.

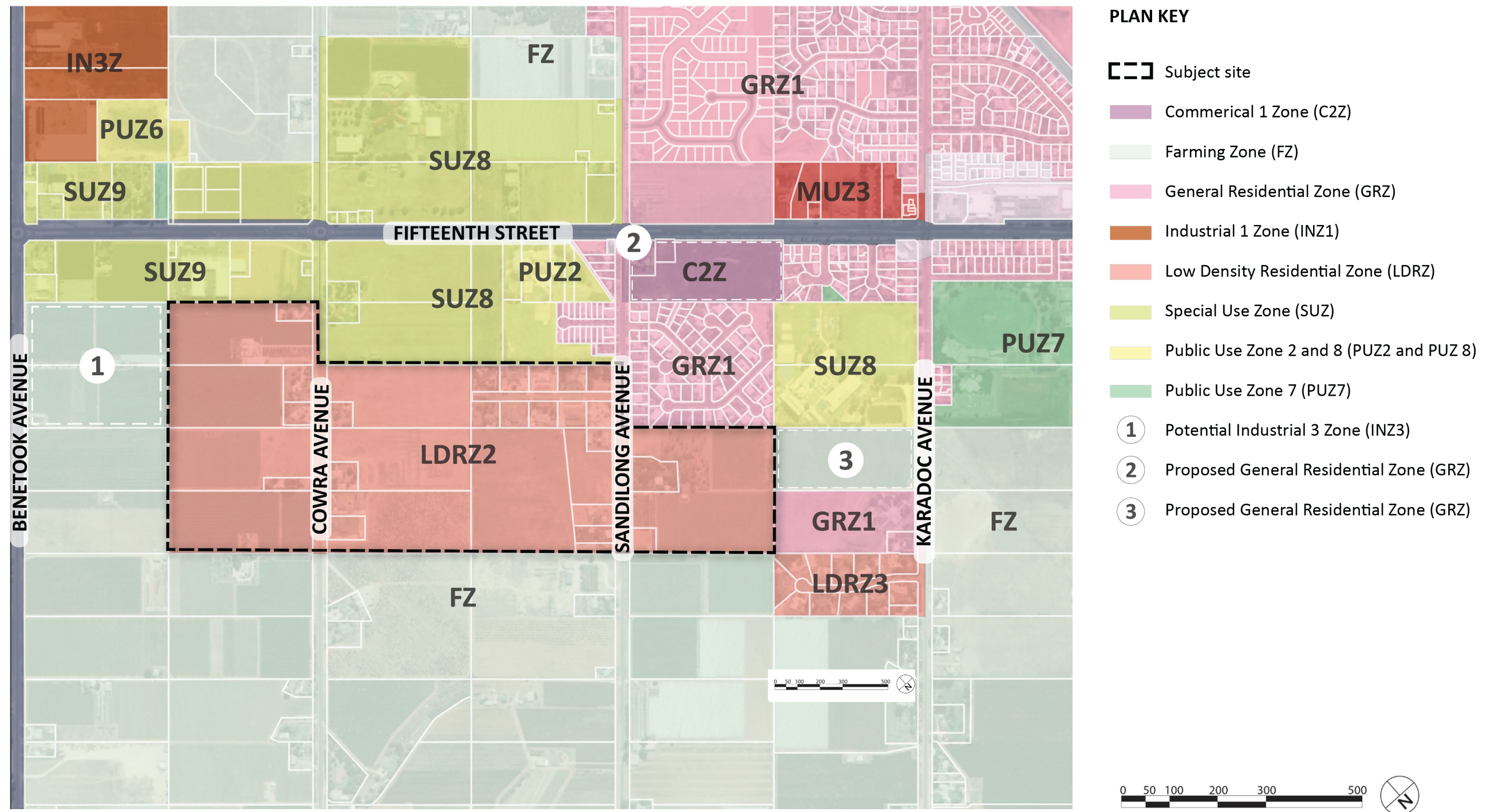


Figure 10. The pattern of existing and proposed zoning within and around the study area

4.2 LAND USE OPPORTUNITIES

1 Consider longer term land use demand

Consideration should be given to the longer term (i.e. several decades) prospect of further development pressure as a result of continuing growth and housing demand in Mildura. This is not dissimilar to the increasing pressure in metropolitan areas and larger regional cities and towns on conventional density neighbourhoods to accommodate higher density housing due to their accessible locations and infrastructure availability.

Some flexibility can be built into the planning process now to create the potential. Examples include the nomination of building envelopes to manage the siting of dwellings on larger lots that may be further subdivided in the future, as well as the considered structuring of the street network to enable a finer grain of access.

Before doing so however, a clear position must be established by Council regarding the planning approach – either to ‘lock in’ an effectively permanent low density housing pattern of settlement, or to purposefully ‘future proof’ an eventual transition to conventional density housing.

2 Create a functional residential-farming interface

Clear delineation with a road reserve is appropriate, however careful consideration is required of its form and function. Potential options include a direct through-connection that extends the street grid; or a narrowed reservation designed for local area access. An active address to the street boundary by residences is appropriate with consideration to substantial setbacks from operational farms. Use of a vegetation buffer should also be considered to mitigate issues such as spray drift from farms, whilst limiting impacts on sunlight access to growing areas.

It is noted that in at least one case, the creation of a road reserve would bisect a large parcel into two parts, within and outside the study area respective.

3 Coordinate planning with consideration to the land cadastre

In response to the highly fragmented nature of land titles within the study area and to the limited public road reserve frontage, a number of planning and design considerations can be addressed now to assist in enabling development delivery. To the greatest extent possible, the basis of should aim to demonstrate a fair, reasonable and equitable distribution of development opportunity and infrastructure obligation.

For example, the positioning and alignment of streets is particularly critical. This must be undertaken in a way that achieves an optimal planning outcome (e.g. required connectivity and a viable lot yield), based on a logical and viable sequence of development.

4 Optimise development density and yield

Noting the Net Developable Area (NDA) of approximately 40.2 hectares, and a 0.4 hectares minimum lot size, the yield of new low density residential lots will be approximately 60 at maximum. Figure 11 provides an indicative, preliminary breakdown of land use allocations and resultant residential development yield.

A further reduction in the NDA due to drainage reserve requirements is likely to reduce this yield further, however some efficiencies may be able to be achieved by elements of the urban design approach. Examples include consolidation of drainage reserves where practical and a formalised street grid.

Description	Area (Ha)	% of Area
Total Study Area	50.8	100.0%
Transport – Collector Roads (Cowra and Sandilong Avenues)	2.0	3.9%
Existing developed residential lots	8.6	17.%
Net Developable Area (NDA)	40.2	79.1%
		% of NDA
Provision of public open space (based on NDA)	2.0	5%
Provision of local roads and drainage (estimated at 35% of NDA)	14.0	35%
Anticipated residential area yield	24.2	60%
Anticipated residential lot yield (based on 0.4 Ha lot size)	60	

Figure 11. Indicative preliminary breakdown of land use allocations and net developable area

4.3 URBAN FORM, BUILT FORM AND HERITAGE ISSUES

1 Integration of an appropriate urban form

The study area and the wider surroundings of the farming district are characterised by a distinctive and uniform street grid with corresponding uniformity of lot sizes and with oblong configuration. This creates a strongly ordered urban form and character that is quite perceptible on the ground and also reinforced by other characteristics such as the relative flat topography and regimented rows of the vineyards and orchards. The instinctive inclination may be to reinforce the rigid geometry of the landscape, however alternatives should also be considered with consideration to creating a distinctive landscape context for the transition area.



2 Built form and neighbourhood character

The post-settlement history of the area as an irrigation farming district has resulted in a quite distinctive pattern of built form consisting of single detached dwellings amidst contained clusters of established vegetation, dotted across the farming landscape (see Figure 12). A further unifying characteristic that dwellings are often be situated on small, excised lots, and most are located close to the street frontage (i.e. with relative shallow front setbacks of less than 20 metres).

There is considerable variety in the age and form of dwellings, noting a prevalence of single storey homes. Boundary fencing, particularly along property frontages is predominantly recessive, being of a farming or residential types. There is a notable overall limited presence of taller and opaque fencing types (e.g. colourbond-style) which should generally be considered inappropriate to a low density residential setting. In some instances, front fencing is absent altogether, in favour of soft landscaping, reflecting the farming character of the area. though there are several examples

These characteristics in particular are highly compatible with a future low density residential urban setting and potentially form the basis of a distinctive attributes to guide the future development of the transition area.



3 Existing and potential heritage values in the landscape

There are notable recognised and potential heritage values within and in close proximity to the study area (see Figure 12). Two properties within the study area are individually listed under the Heritage Overlay (HO). One is dwelling and associated farming property over approximately 12 hectares (Arlington), located at 941 Cowra Avenue and listed as HO102. This property immediately abuts the southern boundary of the study area, over a distance of around 300 metres, and will require careful consideration as a sensitive interface. The second is the Wesleyan Church, located at 811-817 Sandilong Avenue and listed as HO176. The church building and immediate surrounds are included within the HO, noting that the wider grounds of the church toward Angel Grove are excluded.

Several other dwellings within the study area, as well a number of others immediately adjoining or in close proximity, have period features which indicate potential heritage significance connected with the historic settlement and farming use of the district. Subject to confirmation of the heritage significance, careful consideration of other properties may be required relative to recommendations for the placement of infrastructure and siting of future dwellings and structures.

4 View lines in the landscape

There are several notable view lines or viewsheds from current public (and potential future public) vantage points within the study area (see Figure 12). Available view lines are focused along the two main road corridors – Cowra and Sandilong Avenues. The viewing experience along Sandilong Avenue is noticeably more enclosed and framed by vegetation in contrast to the more open views of Cowra Avenue.

The viewshed from the future low density residential area across the farming landscape to the south-west will be a distinctive characteristic of this area – the impacts of which should be considered, as should the farming area perspective of the study area.

A viewing experience quality to consider that will become more tangible following the development of the study area, is the transition between the wide open and less built-up landscape of the farming district to the south-west, and the more built up and more densely vegetated character of the low density residential setting.

The history of the study area is evident on Cowra Avenue
(Arlington located to the left of image)



Open view lines of farmland south-west of the study area
as seen from Cowra Avenue





4.4 URBAN FORM, BUILT FORM AND HERITAGE OPPORTUNITIES

1 Define a ‘transition area’ urban form and character

Clear urban design guidance is needed with the aim of distinguishing the study area, and therefore the Transition Area, from the nearby Mildura and Irymple urban settings.

The planned low density of development provides the opportunity for vegetation and landscape to be visually dominant compared to built form – which itself will provide considerable contrast with the more built-up adjoining urban areas.

In relation to urban form and settlement pattern, there is an opportunity to either reinforce the existing uniform geometry, which should be noted to have a degree of historical significance, or to depart from this with a more informal structure of streets and lots (see Figure 13). Each of these options will lead to a distinctly different urban development outcomes, and a hybridised combination of the two may be considered. Which is preferred will be influenced by a weighing of different factors, including the functional layout and yield of the study area, and the vision for the urban design and landscape character for the precinct.

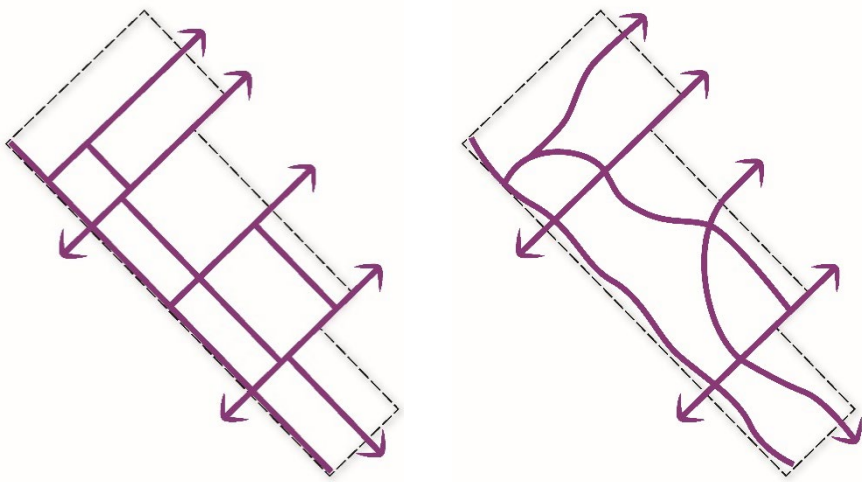


Figure 13. Formal and informal conceptual geometries for urban design of the study area street network

2 Reinforce low density built form

Urban design guidance can shape the progressive development of low-rise built form which presents as ‘buildings in grounds’, including ample separation between neighbouring dwellings and a generous sense of open space in lot frontages at the private/public interface.

This may include consideration to minimum front and side setbacks (as well as rear setbacks in interface locations) and indication of building envelopes and/or maximum site coverage control.

In combination with built form, landscape details are also important contributors to an overall low density character (see Section 4.7).



3 Respond to heritage sites and preserve heritage built form

Heritage values should be recognised and preserved by considered planning and urban design (see Figure 14). The alignment and design of the interface road/street along the southern boundary of the study area should respond to the Arlington heritage site on Cowra Avenue, in particular the dwelling due to its close proximity to the study area boundary.

Other dwellings in the study area with potential historical significance should be further investigated to determine the nature of heritage values present and possible suitability for heritage protection under the Planning Scheme. Whilst such investigation is noted to be outside the scope of this project, a degree of heritage protection is provided by the existing pattern of subdivision (i.e. existing separate lots that are ineligible for further subdivision). Additionally, planning for the study area should be undertaken with consideration to potential heritage sites by sensitively aligning major infrastructure such as roads and providing an enhancing landscape setting.

4 Sensitively integrate or separate adjoining land uses

The different land uses surrounding the study area (existing and proposed) create a range of interface scenarios with differing degrees of suitability for integration or separation, and therefore require tailored urban design responses (see Figure 14).

The **community uses interface** to the north-east lends itself to a more integration-focussed approach which provides for physical connection (street connection). There is also a synergy between the intended landscape character of both the community uses precinct and low density residential area which can be carried through the interface (i.e. building in grounds with prominent landscape presence).

The **farming interface** to the south-west requires a mix of integration and separation – a strong visual link however with physical separation (provided by a road reserve) and a degree vegetative screening to mitigate any issues of spray drift and noise related to farming activities.

The **industrial interface** to the north-west requires separation in the interest of amenity protection. Two primary options are available. The first is a 'buffer-style' treatment consisting of a physical separation between buildings, an acoustic wall, earthen berm and landscaping (see opposite), and implemented further north-east on Benetook Avenue (outside the study area). The setback requirement would need to be balanced across the affected residential and industrial lots. This option optimises amenity issues however creates significant urban connectivity limitations. The second option is to create an interface street wide enough to accommodate an industrial road pavement and broader roadside verges for footpaths and landscaping. This option improves connectivity, accessibility and casual surveillance though will be less effective in mitigating industrial use amenity impacts.

5 Enhance available view lines

Existing view lines should be enhanced and new view lines created (see Figure 14). The linear corridor view lines south-westward to the farming areas along Cowra and Sandilong Avenues will be framed by the introduction of residential buildings and associated gardens. This will create a stronger sense of enclosure within the study area itself, which then gives way to the more open and exposed rural landscape.

The significant viewshed across the farming landscape from the southern edge of the study area is also contextually important and can be preserved to some degrees by a considered design response to the interface treatment (i.e. placement and density) of vegetation, noting that operational farming issues also need to be considered here).

There is also an opportunity to establish a continuous view line from Fifteenth Street southward to the study area, through the Community Uses precinct. This can be achieved by coordinating the alignment of public street between the two areas and framing this corridor with vegetation.

Industrial-residential interface treatment (Fourteenth Street)





Figure 14. Urban form, built form and heritage opportunities

4.5 DRAINAGE AND SERVICING ISSUES

1 Challenging site drainage characteristics

The landform of the study area is characterised as flat (nearly level) with the land falling at shallow grades between 0.5% to 2%. The land falls in varying directions resulting in four localised catchments within the site boundary.

The land north-east of Cowra Avenue generally falls towards the north-east corner of the study area, and the land between Cowra Avenue and Sandilong Street generally falls towards the centre of the site to flat fields north of Angel Grove. The land south-west of Sandilong Street is divided by a gentle ridge and slopes towards the southernmost corners.

The undulating land and resultant natural sub-catchments cause challenges for managing drainage holistically across the site. The site may need to be built up in some areas if it is intended to convey and manage the stormwater drainage to a single location.

2 Constraints associated with existing main drainage infrastructure

The existing drainage infrastructure to the north and north-east of the study area services parts of the wider Irymple Township and Mildura East catchment through a series of retarding basins, pumps and gravity drains along Fifteenth Street to ultimately outfall to Lake Hawthorn, located approximately 5 kilometres to the north-west of the study area (see Figure 15).

The existing main drain outfall along Fifteenth Street is at capacity and cannot accommodate stormwater flows from additional direct catchments associated with the study area.

The lack of adequate outfall infrastructure could require significant augmentation works or new head works to manage an outfall. Alternative ways to manage the stormwater locally within the site should be explored in the interest of a more cost-effective and sustainable drainage design outcome.

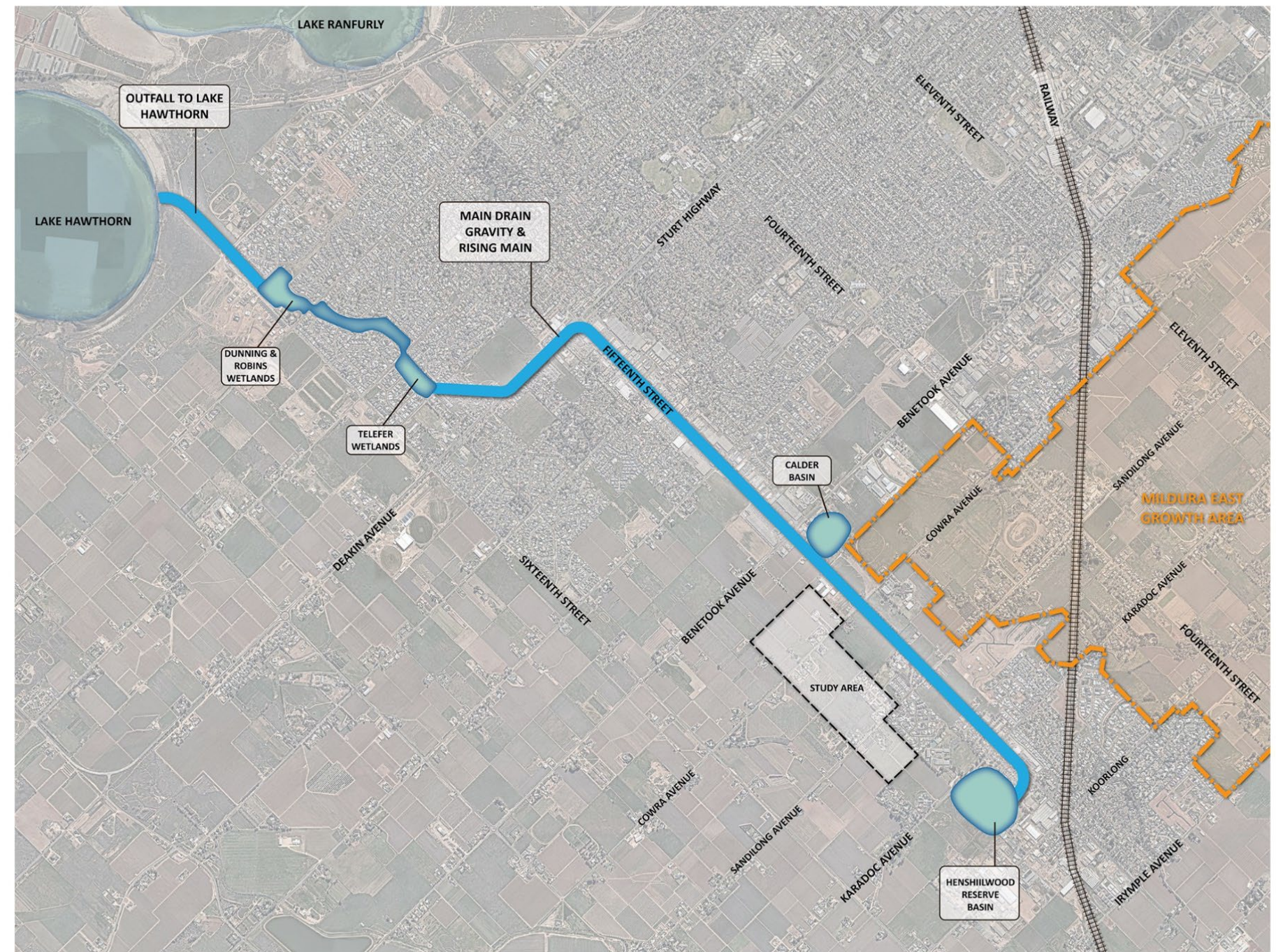


Figure 15. Existing main drainage infrastructure

3 Drainage reserve requirements and conventional design constraints

Based on assessment of local topography and catchments, it is likely that at least one, and potentially multiple basins (up to a maximum of four without any site filling), will be required within the study area under a conventional drainage management scenario.

The application of retarding basins to manage stormwater, if not planned and implemented carefully, can result in poor land use outcomes and provide limited public use or amenity. Examples of small, isolated retarding basins to service small-scale developments with small local catchments are not uncommon, both in Mildura and across the State (see opposite). However, more integrated land use planning design outcomes are also increasingly common and are more readily achievable with increased scale of development area.

The study area presents a scale of development that is relatively small in scale and with some complexities due to local topography and catchments, however an efficient and integrated approach to managing the site's stormwater is critical. All drainage assets should be designed with careful consideration to as part of the wider urban design context and with aim of providing secondary amenity to the community.

Conventional drainage basin at Sandilong Ridge Estate



4 Pros and cons of localised drainage solutions

The Mildura Rural City Council have trialled the implementation of alternative strategies for local drainage management. A notable example is the scheme used at Angel Grove within the study area (see opposite). This consists of 9 0.2 hectare low density residential lots, each with provision for a small basin/depression within the front setback to manage stormwater runoff generated by the immediate property and adjacent area of road reserve. The requirement to provide and maintain the drainage basin is legally established by a Section 173 Agreement under the *Planning Environment Act 1987* for each lot.

Individual lot drainage basin example in Angel Grove, Irymple



5 Use of roadside swales

A more widely used alternative for drainage management in residential environments is roadside swale drains. These are in place across a number of existing and in-progress development across Mildura. The design consists of a shallow invert swale for managing low stormwater flows, combined with reticulated stormwater to manage occasional high stormwater flow events that would otherwise overwhelm the shallow swales.

Culvert crossings of the swale drains are provided for residential driveways. The finished surface is typically irrigated lawn or no-fines crushed rock. A temporary irrigation system is installed to enable the establishment of street trees located in the swales.

6 Limitations created by groundwater salinity

Although the study area is unaffected by the Salinity Management Overlay, it is noted that the Victorian Groundwater Database identifies the site as having high salinity (>35,000mg/l) and groundwater at depths less than 5m in some areas. Whilst the area is zoned for low density residential development, urbanisation can have significant consequences for the area's groundwater which should be further considered in the development plan.

The *Site Salinity Management Guidelines* (2009) prepared for MRCC does not cover the study area, however, does consider the Irymple township immediately north-east of the site to have low to moderate urban salinity risk. It is recommended that sites of low and moderate risk classifications implement efficient water use practices to prevent influences from salinity. This should include collection of roof water to rainwater tanks or with direct connection to Council drainage to reduce the groundwater recharge. Providing direct sewerage connection through reticulation mains in lieu of on-site disposal systems will also reduce recharge.

Shallow or perched water tables can be managed with the use of imported fill to build up the land and increase depth of groundwater. And installation of suitable drainage, such as subsoil drainage to channel water infiltration to a municipal drainage can also be considered within public and/or private land. The depth of stormwater basins should be minimised as much as practical, ideally to 1-1.5m to avoid the potential of groundwater ingress.

It is recommended that soil testing is conducted to identify groundwater levels and verify the level of salinity risk within the study area. Site specific soil testing and groundwater assessment will help to inform the appropriateness of the above proposals for preventing and managing the impacts of salinity on study area's urban infrastructure and vegetation.

Roadside swale drain in residential area (Merbein)



7 Services availability and capacity

The availability of servicing infrastructure within the study area is indicated in Figure 16 and described below, and is generally commensurate with the standard of servicing provided to conventional residential development land. The study area is therefore fully serviceable for the intended land use and proposed development density.

Sewer and Water

The responsible authority for sewerage reticulation and water supply in the area is Lower Murray Water (LMW).

Water mains exist along both Sandilong Street and Cowra Avenue within the study area and will likely have capacity to service partial development of the land at the proposed density. Minor upgrades will be required to service increased demand for the entire area.

There is an existing 450mm rising sewer main along Cowra Avenue within the study area, and a 150mm gravity sewer exists in Sandilong Avenue which terminates at the frontage to the Angel Grove development. LMW have indicated that the existing network has limited capacity and upgrades will likely be required to service development of the entire study area. It is also noted that the area north of Cowra Avenue is outside of the networks catchment area and further work is required to assess the capacity of the existing sewer pump station.

Electricity

Powercor is the responsibility for the provision of electricity supply to the subject area.

Existing high voltage overhead electricity lines are located on the south-east side of the Sandilong and Cowra Avenues road reservations.

Telecommunications

The NBN is available within the study area and both Telstra and NBN infrastructure exists within the nature strips of Sandilong and Cowra Avenues.

Gas

APA Group high-pressure gas mains run along Fifteenth Street and Sandilong Avenue.

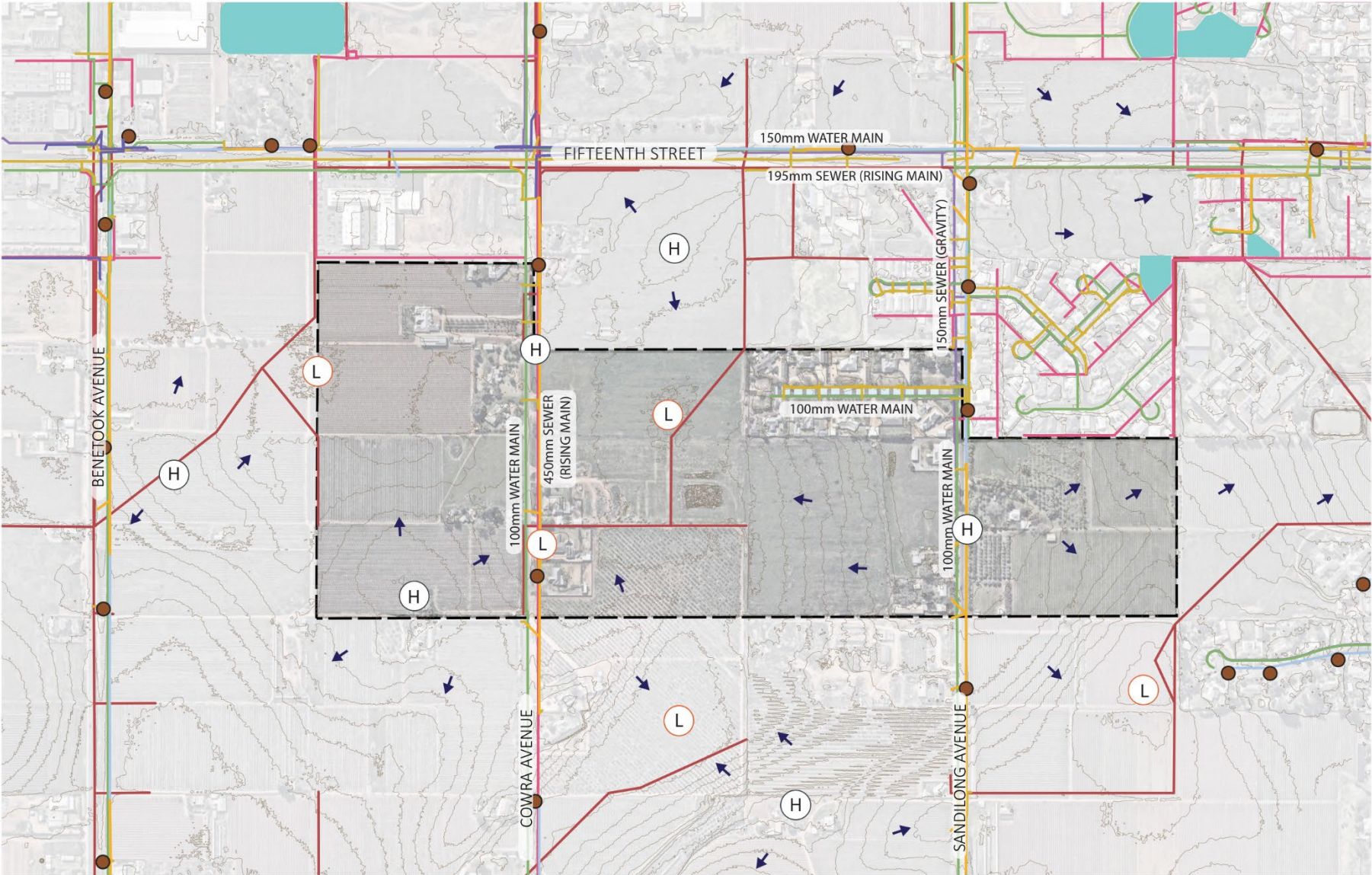
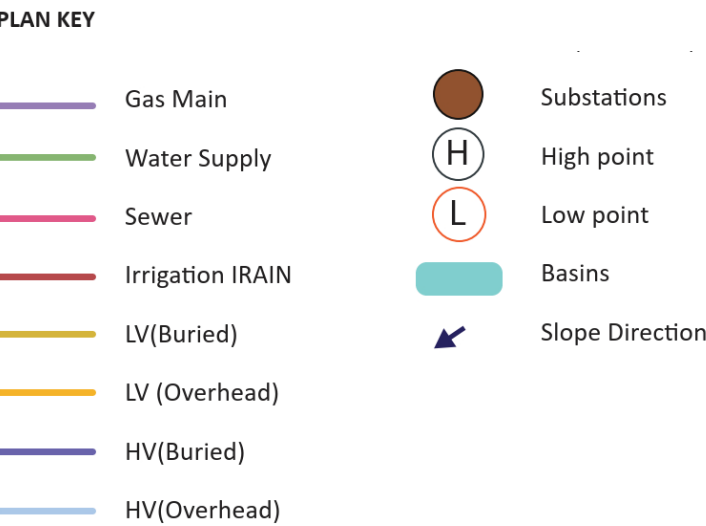


Figure 16. Existing services infrastructure



4.6 DRAINAGE AND SERVICING OPPORTUNITIES

1 Identify a preferred site drainage management solution

A number of drainage options are open to consideration as the basis of a Development Plan for the study area, noting that the chosen drainage scheme will have implications for other aspects of the urban design, including the alignment and cross-sectional design of streets and the use of available public open space contributions, as well as implications for associated benefits and costs.

Conventional drainage scheme with multiple drainage reserves

A standard drainage outcome – which adheres to the existing topography of the study to achieve gravity drainage and which minimises any associated filling of land – is a baseline option. This involves the allocation of several retarding basins, each serving localised catchment with allocation of space necessary to provide safe battering of basins and access for maintenance purposes (see Figure 17).

With this approach, additional improvements such a perimeter vegetation can be provided without significantly increasing the land take.

Integrated drainage scheme

A contemporary and overall more integrated alternative can be considered which involves consolidated drainage reserves at two locations. The main central reserve would providing the focal point not only for drainage functions of the study area, but also for community passive use by combining an area of public open space with the drainage reserve.

This approach would require limited filling of some areas to modify local drainage catchments and direct surface flows, however some efficiencies are possible in relation to the required land take due to the reduced number of basins required. This will have flow on benefits for asset maintenance also (see Figure 18).

Overland flow will be conveyed via the local road network and directed to the proposed basins, and more frequent storm event flows will be captured and conveyed via pit and pipe network to the basins.

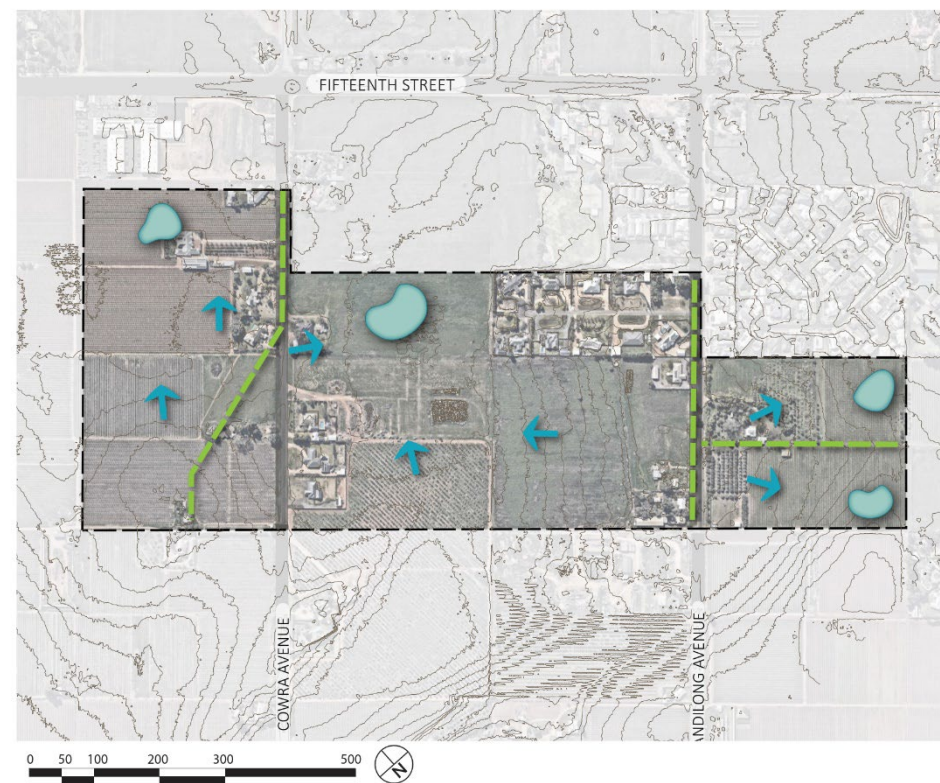


Figure 17. Conventional drainage scheme

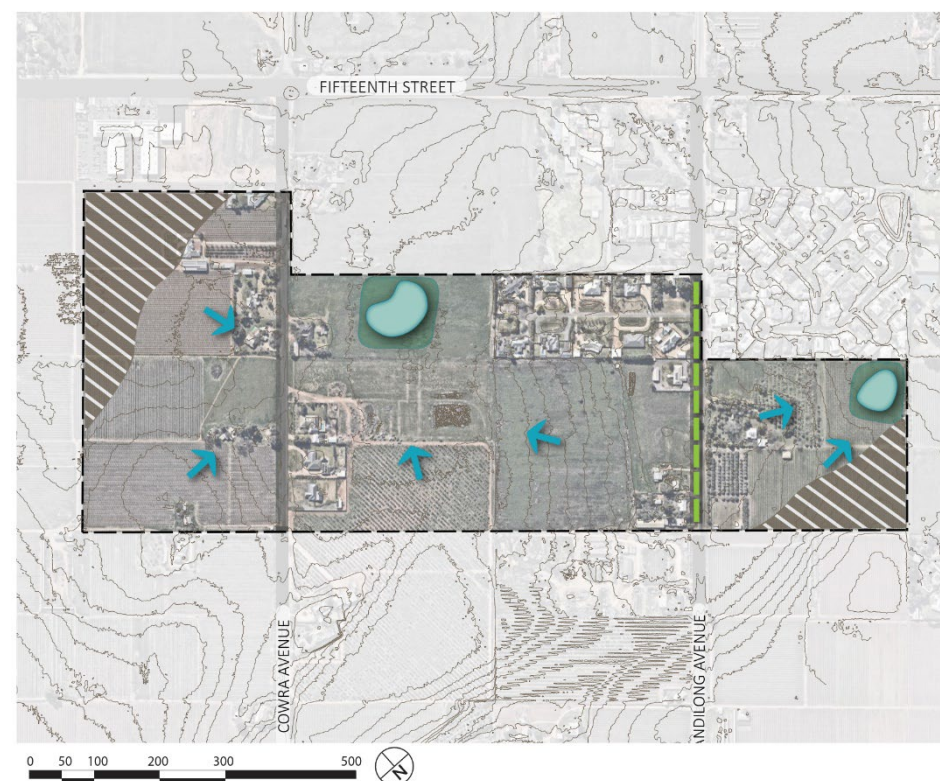








Figure 18. Integrated drainage scheme

Local area drainage scheme

The simplest potential arrangement for drainage management across the study area is an expansion of the localised drainage scheme already employed at Angel Grove. This has the advantage of being able to be implemented incrementally as different parts of the study area are developed. However, the management and maintenance responsibility rests with individual private landowners, and involves the complication of administration through Agreements on title. These arrangements may also create some limitations for the delineation of private / public realm interface in residential streets, however these may be overcome with good design.

It is noted also that the sum land area required for capture and management of stormwater flows within private lots would likely be much larger than an alternative basin and outfall arrangement if a drainage outfall is not made available to the subject land. In one scenario the localised option may be considered to manage only the private realm and be implemented in a combined solution with the public realm managed through a separate underground pit and pit network. This could have the potential to take pressure off the receiving drainage infrastructure and encourage stormwater capture and reuse from landowners.

PLAN KEY

-  Subject Site
-  Drainage catchment boundary
-  Direction of fall
-  Retarding basin (Integrated with open space)
-  Contours
-  Approximate area to fill

2 Identify a preferred drainage outfall solution

The Subject Land has several opportunities for drainage outfalls which are considered in parallel with the internal drainage options and **will be required to be confirmed upon completion of a detailed surface stormwater management strategy.**

Gravity drain connections to Fifteenth Street Drainage Network

Assumptions:

This drainage option proposes to connect the subject land retarding basins via gravity drains to the existing drainage network at the Henshilwood Basin and Calder Basin which connect to the Fifteenth St drainage outfall (see Figure 19).

A stormwater management Strategy (SWMS) prepared by E2DesignLabs for the Mildura East Growth Area has modelled the Irymple Catchment and provides recommendations to upgrade the Fifteenth Street drainage network. The SWMS includes the southern portion of the study area up to Cowra Avenue as undeveloped farmland (10% impervious) in its RORB model of the Irymple Catchment. On this basis it is assumed a total of 200L/s from the study area can enter the drainage network.

The following example divides the study area into 3 sub-catchments and splits the permissible discharge accordingly. Two scenarios are given:

Option 1: Drainage basins within the study area will retain up to the 20% AEP and detain flows up to the 100% AEP to 200L/s. The drainage basins may require land area up to the following:

- Sub-catchment A: Approximately 1ha
- Sub-catchment B: Approximately 2.5ha
- Sub-catchment C: Approximately 0.7ha

Benefit:

This scenario is likely to reduce the total outflow into the existing drainage system and will have no discharge in minor storm events.

Option 2: Drainage basins will detain flows up to the 100% AEP back to 200L/s, with no retention of flows. The drainage basins may require land area up to the following:

- Sub-catchment A: Approximately 0.8ha
- Sub-catchment B: Approximately 1.5ha
- Sub-catchment C: Approximately 0.5ha

Benefit:

This scenario will likely require less land area to accommodate the drainage basins than the previous option.

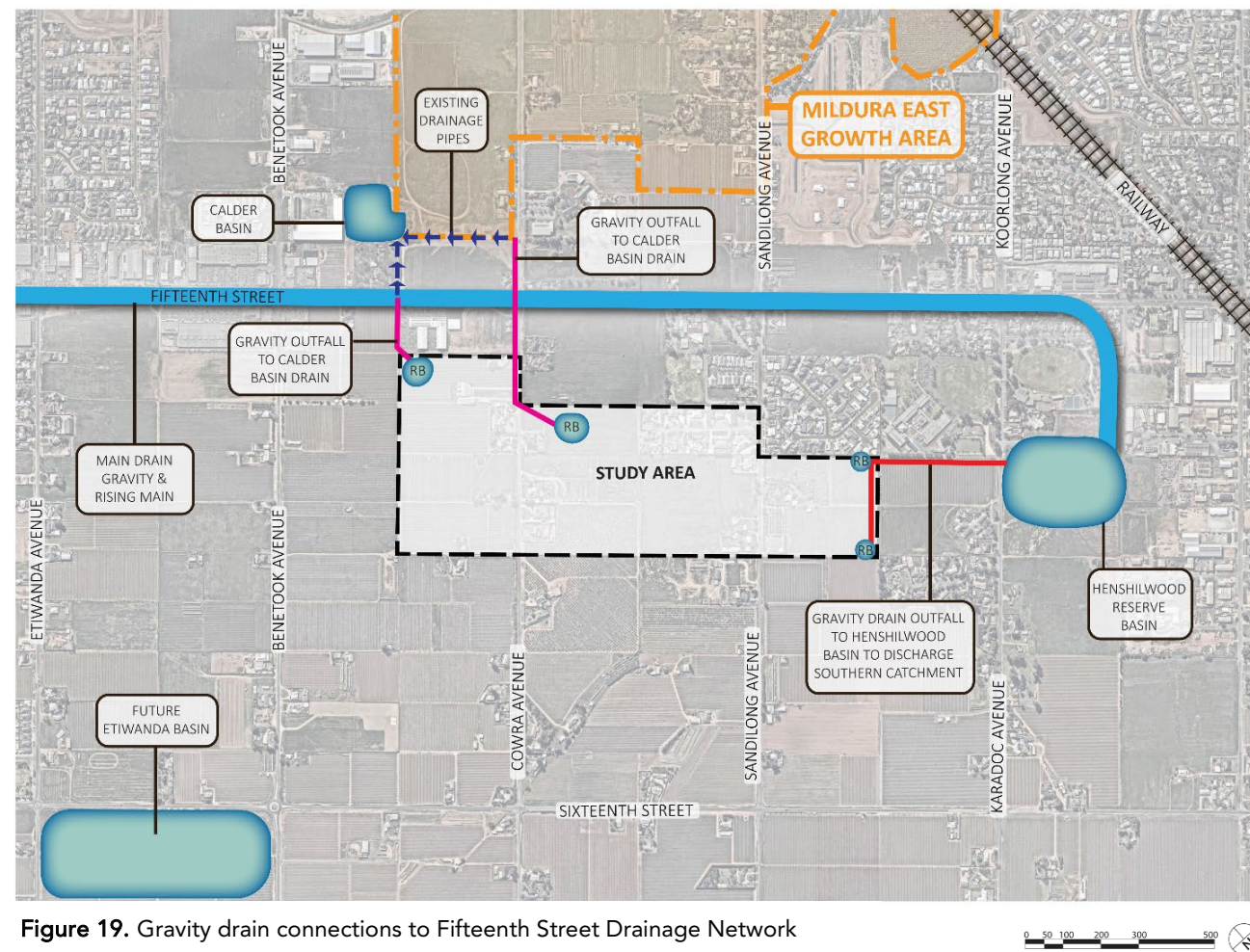


Figure 19. Gravity drain connections to Fifteenth Street Drainage Network

Stand-alone Outfall to Lake Hawthorn

Assumptions:

This option does not rely on the existing drainage network and instead will require a separate DN225 rising main outfall to Lake Hawthorn with capacity to discharge 80L/s. Lake Hawthorn is approximately 5km west of the study area and consequently the outfall could be up to 6km long (see Figure 20).

The following examples allow 80L/s discharge from a drainage basin servicing the whole study area. Two scenarios are given:

Option 1: Drainage basin will retain flows up to the 20% AEP and detain flows up to the 100% AEP back to 80L/s. The drainage basin may require land up to 7.5ha.

Option 2: Drainage basins will detain flows up to the 100% AEP back to permissible discharge (80L/s), and no retention of flows. The drainage basin may require land up to 5ha.

Both scenarios would remove all flows already entering the Fifteenth Street drainage network and may alleviate some of the existing drainage issues; however, Option 1 will have a lesser pumping time; albeit a greater land take.

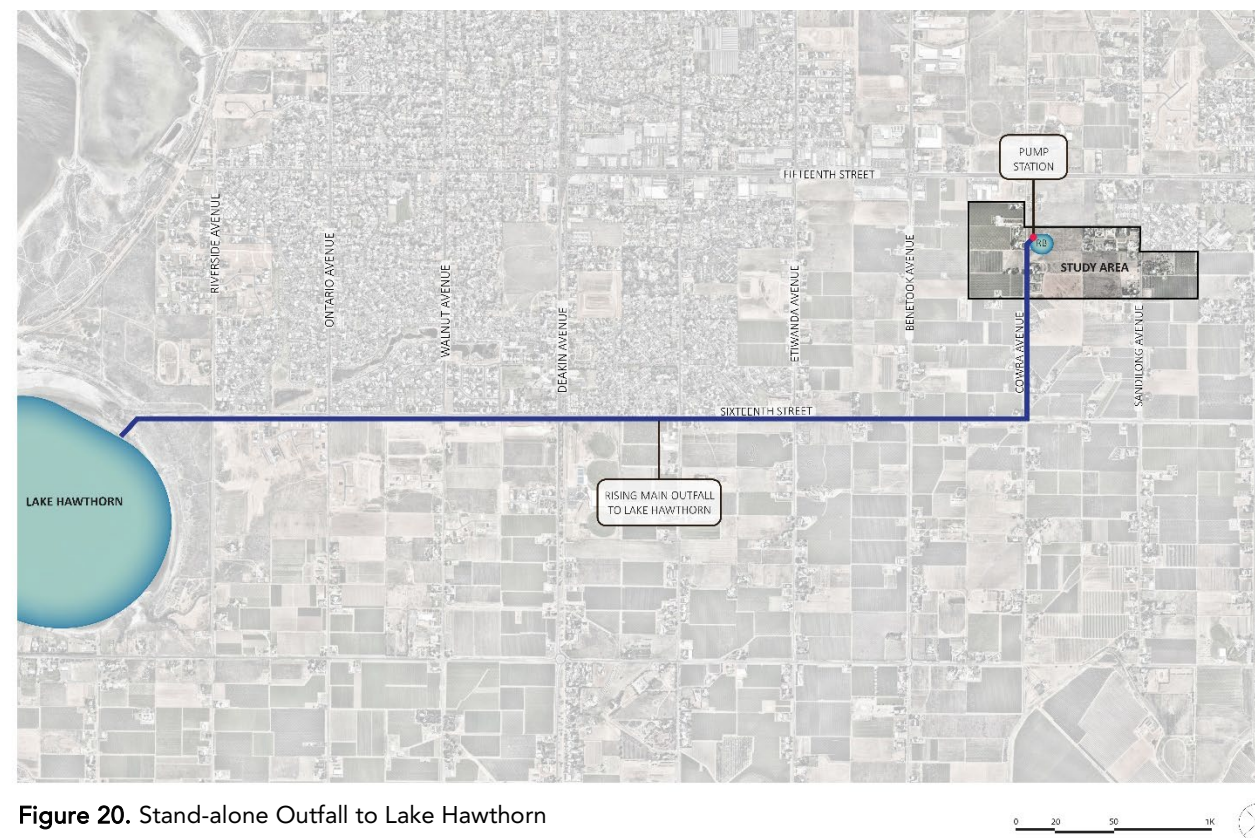


Figure 20. Stand-alone Outfall to Lake Hawthorn

Private Drainage Basins

This option looks at enforcing privately owned drainage basins on each private lot to retain flows generated on private land. It is expected that one or multiple drainage basins would still be required to mitigate runoff from public road reserves and as such this option will likely also incorporate an outfall option previously discussed (see Figure 21).

As an example, a private allotment may require a basin area up to 800sq.m to retain flows in a 1% AEP storm event. The remaining public land would then only require an area up to 1ha to detain road runoff back to permissible discharge.

Benefit:

This scenario has the potential to significantly reduce the size and cost of shared retarding basins infrastructure within the study area.

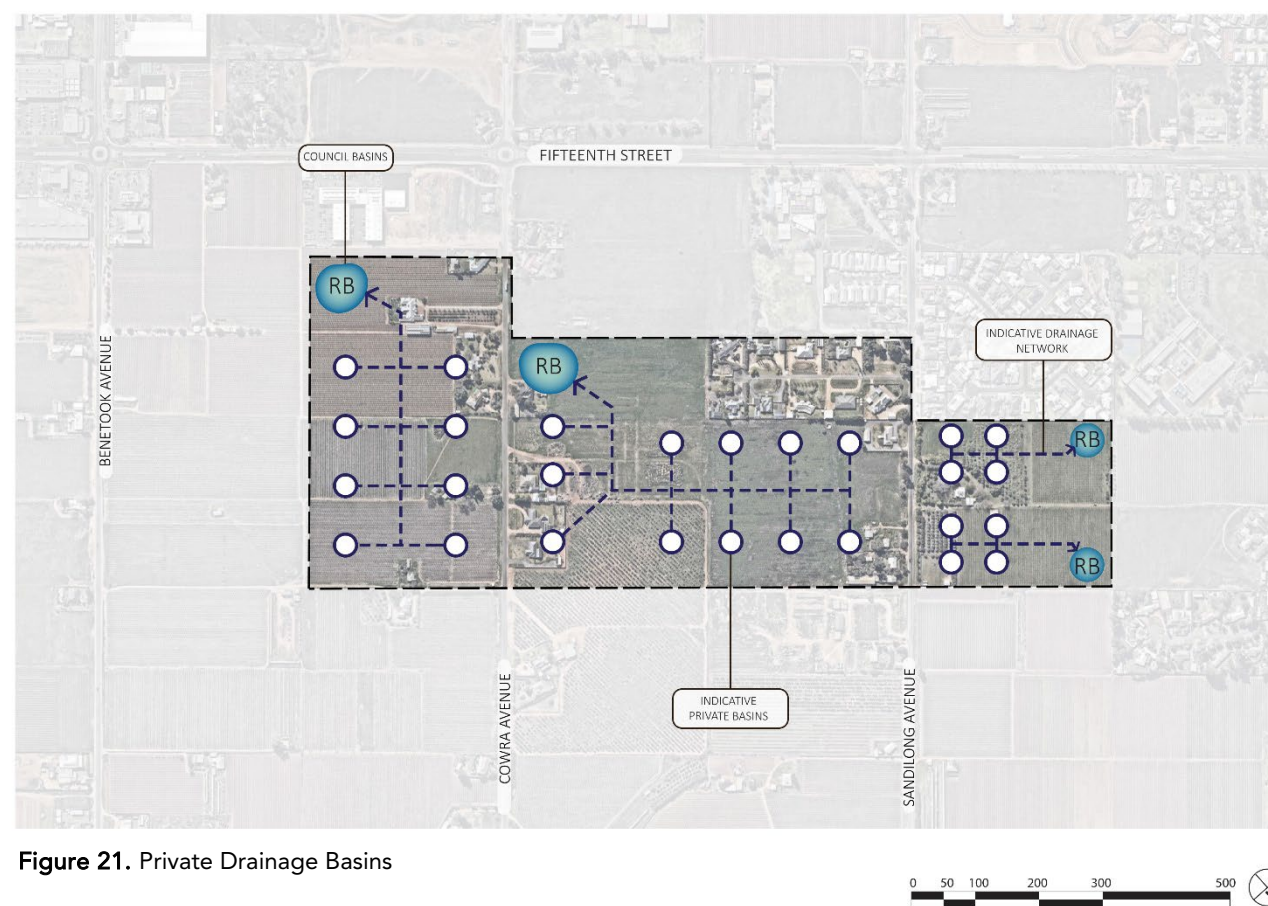


Figure 21. Private Drainage Basins

Outfall main drain to future Etiwanda Basin

This option proposes to discharge from the northern basins within the study area to the future Etiwanda Basin located on Sixteenth Street, between Benetook and Etiwanda Avenues, via a rising main (see Figure 22).

Unlike the previously discussed gravity drain connection to Fifteenth Street, this option will require extensive headworks to deliver approximately 1.8km of drainage pit and pipe infrastructure to discharge to the future basin. The Etiwanda Basin itself is currently unconstructed and is proposed to be funded through a Development Contribution Plan (DCP). The timing of construction of the basin is unknown and could block development of the northern half of the site until the basin is delivered. We anticipate that the outfall drain does not form part of the current DCP scope.

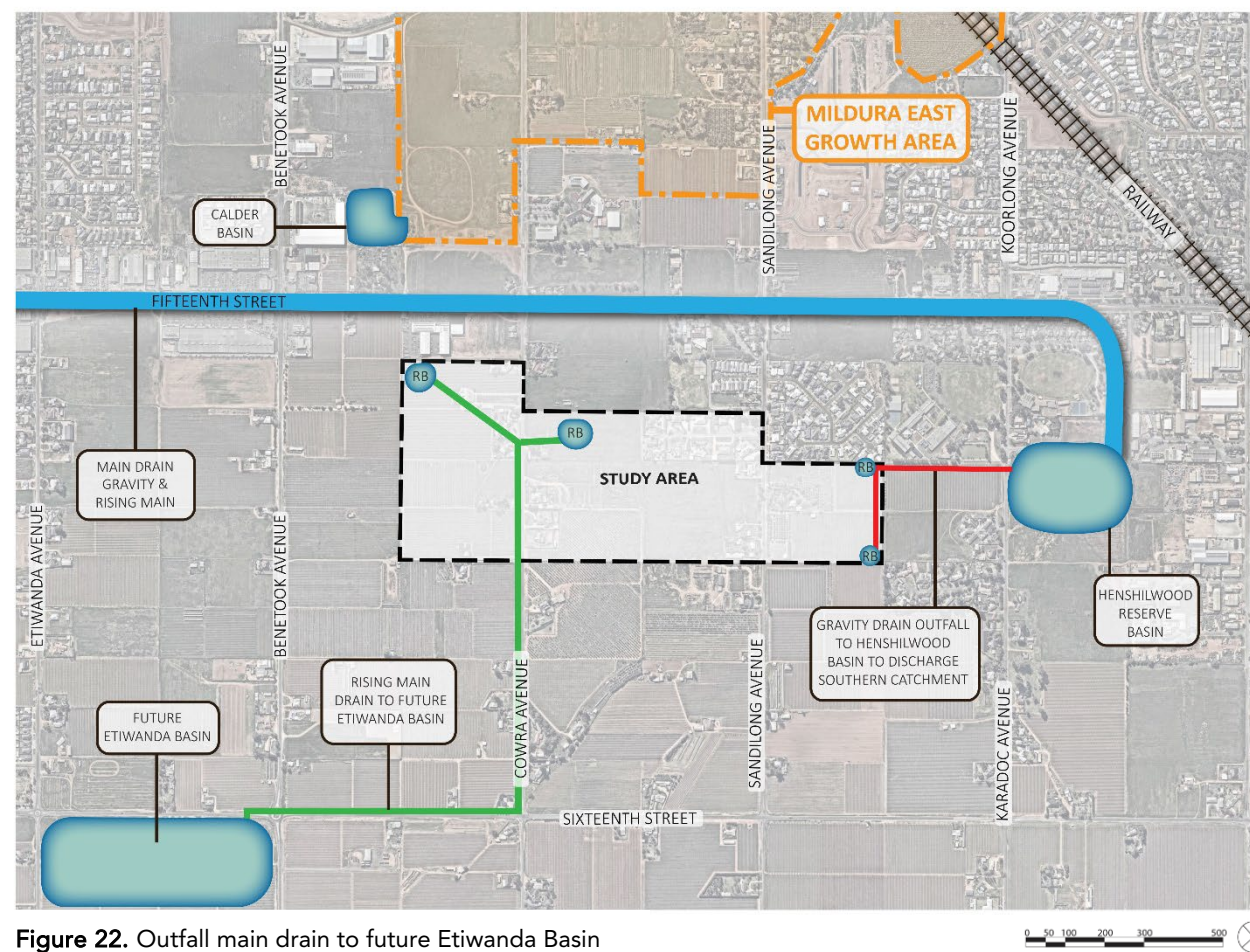


Figure 22. Outfall main drain to future Etiwanda Basin

Pumped outfall to the Lower Murray Water Irrigation Network

Another consideration is to utilise the existing irrigation network within the study area noting that 600mm diameter concrete pipes exist in Sandilong Avenue and are currently owned and maintained by Lower Murray Water (see Figure 23).

The existing 600mm pipe will have a limited discharge capacity of 500L/s and can receive flows via a pump from the central basin. Pairing this option with one of the others will reduce the impact on the main receiving drainage infrastructure. It is noted that the existing infrastructure is old and its condition unknown. An assessment of the current condition would be necessary to confirm the practicality of this option. Feedback has also been sought from Lower Murray Water regarding their acceptance of this proposal, as well as connection permits or decommissioning of the irrigation network.

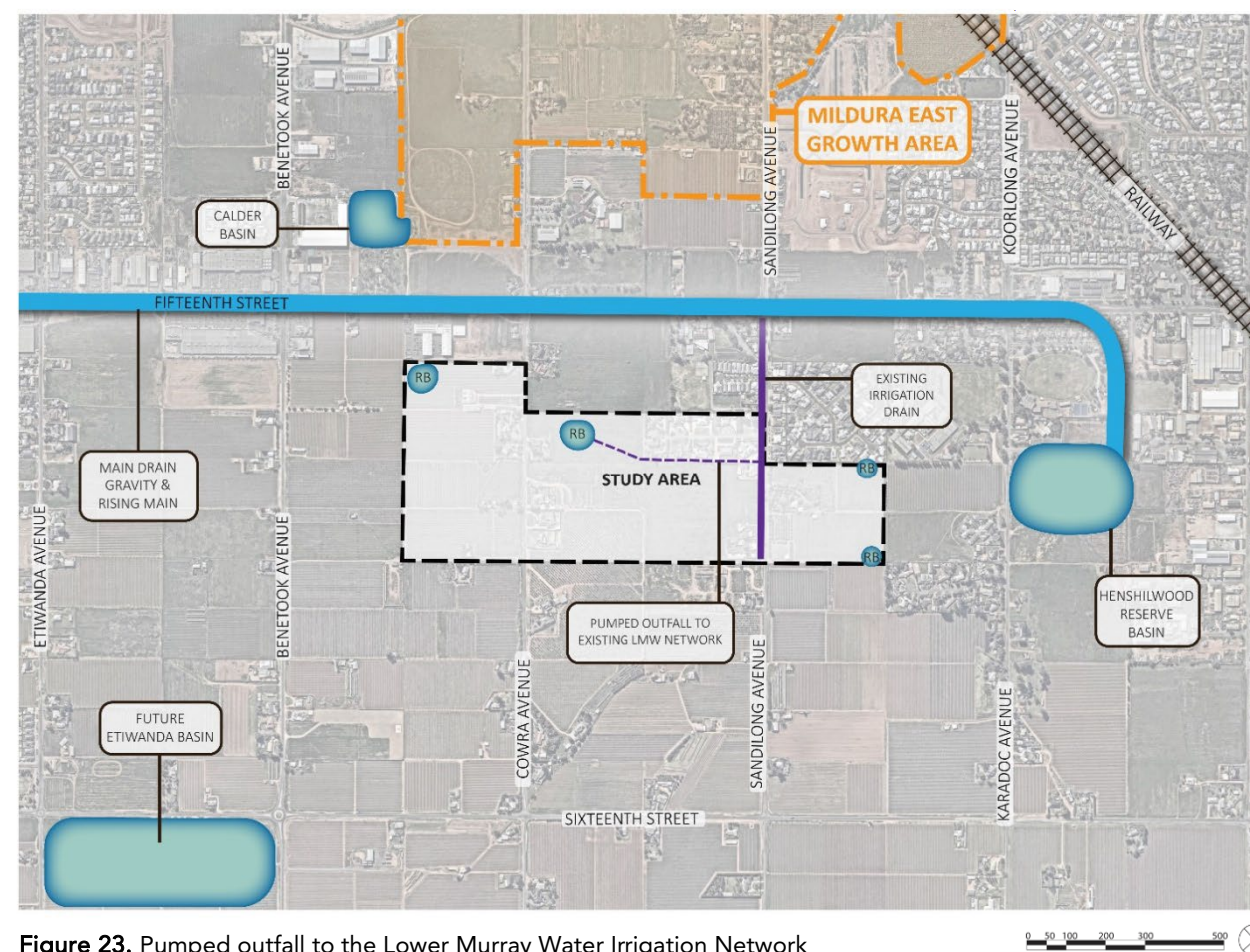


Figure 23. Pumped outfall to the Lower Murray Water Irrigation Network

3 Integration drainage reserves with public open space

Working with the natural fall of the land to achieve gravity drainage will likely result in one or multiple drainage basins within the subject area. This presents opportunities for multi-use open space when basins are located and designed thoughtfully within the urban design context and provide a secondary recreational use. Basins should adopt a shallow landform with gentle batter grades to encourage public use. Vegetation and native planting should also be applied to further enhance amenity and promote habitats (see opposite).

4 Make good use of Water Sensitive Urban Design

The application of water sensitive urban design (WSUD) can provide significant benefits to public amenity in addition to improving stormwater quality and sustainability outcomes. Examples of WSUD that can be incorporated into public streets include vegetated swales and bioretention swales. Incorporating swales into road reserves to convey stormwater flow instead of typical piped drainage can enhance street aesthetics with increased vegetation. It is noted that road reservation size should be considered as extra width is typically required to accommodate shallow swales in roadsides. The location of any swales should also consider the slope of the land and should achieve adequate grades $>2\%$ to avoid becoming waterlogged. The land immediately north-east and south-west of Sandilong Avenue where natural grades are around 2% would be appropriate for roadside swales.

Similarly, WSUD can be incorporated into drainage basins by providing bio-retention cells at the base of the basin. It is noted however that this option would place some limitations on other public use of the land.

5 Employ passive irrigation for greener streets

Increased street vegetation can be supported by directing and capturing stormwater to infiltrate into nature strips and/or shallow roadside swales to passively irrigate vegetation and trees in public road reserves. Examples of this include an infiltration trench or slotted pipe located in the nature strip which is fed from an opening in the kerb. Consideration to using the legal point of discharge from residential lots with Diverting roof stormwater and/or overflow from domestic water tanks to the legal point of discharge in the road reserve is an additional opportunity to supplement street tree irrigation.

Some form of passive irrigation is essential in the low rainfall climate of Mildura to support the healthy establishment of street trees and prompt broad canopy cover to provide shade and improve the overall street aesthetic.

Integrated drainage basin and passive parkland
at Galloway Street, Epsom, Victoria



6 Servicing Opportunities

Sewer and Water

Lower Murray Water (LMW) have indicated there may be some capacity in the existing water and sewer networks to service partial development of the site.

It is expected that new connections can be made to the existing water mains, and internal reticulation should be installed to service the development area. Connections will require application to LMW at the time of the development and minor upgrades to the existing networks is likely required to service the development of the entire site.

Similarly, the existing sewer network will likely require upgrades to service the entire site. The existing sewer reticulation can be extended to service individual allotments and can likely facilitate partial development of the site before existing network upgrades will be required. Alternatively, allotments can be serviced with the provision of on-site wastewater treatment.

Electricity

Power is available to the study area with the extension and possible upgrades to the existing infrastructure. Powercor will need to be consulted to confirm substation requirements and locations at the time of development within the study area.

Telecommunications

NBN Co is likely to accept applications to supply developments within the study area. It will be the developers' responsibility to provide design and installation of internal pit and pipe infrastructure to authority specifications.

Gas

The extension of supply of reticulated gas within the study area should be in accordance the State Government's Gas Substitution Roadmap which is based on a policy to prohibit the connection to reticulated gas of new residential dwellings requiring a planning permit – in this case associated with the subdivision of land – by 1 January 2024.

Co-location and alignment of services

Street verges will need to be sufficiently wide to contain essential services without restricting other important public functions and amenities such as street lighting, street trees, footpaths. The potential co-location / shared trenching of services should be determined in consultation with service authorities. Additionally, the cross-sectional design can potentially be modified – including asymmetric cross-sections and/or widened road reserves – to increase open for services placements and alignments,

4.7 PUBLIC REALM AND OPEN SPACE ISSUES

1 Limited public open space network

The location of the study area within the urban transition area and currently under farming use means that access to public open space is, unsurprisingly, somewhat limited. A large (9 hectares) active open space centred around Henshilwood Reserve is located approximately 1.2 kilometres to the east of the study area. This is a reasonable walking distance to active open space from a low density residential area, however needs to be linked by street and path connections.

An additional area of public open space, comprising around 2.5 hectares is located on the north-east side of Fifteenth Street however is dedicated primarily to drainage functions and is otherwise lacking in public amenity and accessibility. A further informal open space area is associated with the Wesleyan Church though lacks any amenities and despite being publicly-accessible, cannot truly be regarded as public open space (see Figure 24).

2 Provision of open space in a low density setting

A relatively small public open space contribution will be available to the study area, amounting to approximately 2 hectares (based on an approximated Net Developable Area of 40 hectares and 5% contribution rate). The low density nature of the residential area should not be assumed to correspond with a lack of demand for access to open space by residents due to having relatively large areas of private open space. Accordingly, there are a number of potentially suitable options for the allocation of available public open space, including:

- Designation of a dedicated passive open space reserve in an appropriate accessible location
- Co-location of the open space with drainage reserve/s
- Co-location of open space with the primary street network as a narrow linear open space corridor

3 Landscape setting and microclimate

The farming history and use of the study area (and wider environs) has created an environment lacking in tree cover and shade, essentially in the interest of maximising agricultural production. The farming landscape is however extensively irrigated, which contributes to some greening and cooling, however is well-suited to a domestic living environment for humans, or for wildlife. A change in land use to a low density residential development will alter the landscape setting and microclimate dramatically – potentially for the better in respect to tree and vegetation cover to create a more habitable environment.

4 Absence of remnant vegetation

There is no evidence of remnant indigenous vegetation in the study area, which is consistent the highly modified farming landscape in the interest of maximising sunlight access and minimising competition for water and nutrients (noting that a detailed assessment has not been completed for the purpose of this analysis).

5 Pockets of vegetation around dwellings

The main areas of notable vegetation are primarily associated with gardens around dwellings and comprise various ornamental trees with some areas of understorey (see Figure 24). These are made more visually prominent by the contrasting open character of the surrounding vineyards.



Established vegetation around a dwelling on Cowra Avenue

6 Limited significant vegetation in road reserves

The road reserves are largely devoid of vegetation with a few notable exceptions, such as the pair of large Olive trees located in the road reserve of Cowra Avenue, and several established native trees, as well as several old Peppercorns in the Sandilong Avenue road reserve (see Figure 24).

7 Lack of public realm connectivity

With the exception of Cowra and Sandilong Avenues there are no areas of public reserve that provide public access through the study area. This is expected for a relatively contained area of farmland, however will require improved public realm connectivity to support a functioning residential living environment (see Figure 24).

8 Inappropriate public realm infrastructure

The types of infrastructure typical of urban environments - for example wide roads, extensive use of kerb and channel and extensive street lighting - may be unsuitable or unnecessary for a low density residential setting. The prominence of urban infrastructure could potentially detract from the character and feel of the area. Consideration also must be given to the cost-effectiveness of urban infrastructure to be used by a small local population.

9 Blurring of the public and private realm

Traditional design of low density residential areas can lack a strong sense of public realm and feel semi-private. This can be due to design features such as narrow, winding streets, often ending at a cul de sac, the absence of footpaths and most of all, property frontages that appear to extend to the kerbline. Within the study area, Angel Grove very much demonstrates these characteristics. Consideration is needed to the design parameters for the study area to establish an appropriate degree of definition between public areas and private lots.

10 Rural road environments

Cowra Avenue and Sandilong Avenue have a rural character and very limited public realm amenities - an asphalted carriageway with streetlights at major intersections. This serves rural use however the change to a residential environment will require improvements to public realm design. The design and character transition of the road environment from residential to farming also requires consideration.

Possible remnant vegetation on Sandilong Avenue



Roadside verges of Angel Grove appear privatized due to the extension of gardens to the street





Figure 24. Public realm and open space issues

4.8 PUBLIC REALM AND OPEN SPACE OPPORTUNITIES

1 Integrate public open space

The benefits of the limited available public open space contributions can be optimised by integration with other areas of public land and public realm in two main ways:

- Co-location with drainage reserve/s to provide a useable component of land for passive recreational use. This could potentially include an informal play/kickabout space as well as more secluded and landscape pockets of space for quiet contemplation
- Providing additional linear open space along the primary street connection. This will widen the effective street corridor and increase options for a range of public amenity, including roadside swales, walking paths, verge plantings and a connect canopy of street trees

2 Maximise the continuity of the public realm

Ensure that the street layout is based on a connected grid (whether formally or informally laid out) to provide continuous public access throughout the study area, as well as access to public streetscapes in adjoining precincts (e.g. the community uses precinct to the north-east) (see Figure 25).

If a through-street connection cannot be provided in a particular location due to other constraints, provision for a sufficiently wide walk-through link should be made (as is intended for Angel Grove).

3 Strengthen the pedestrian function of primary walking routes

The legibility, continuity, safety and amenity of primary pedestrian routes can be improved in several important fundamental to optimise their appeal and use. This includes providing a continuous, wider footpath (preferably 2.5m width), providing pedestrian amenities (broad canopies trees for shade and occasional seating) and by providing simple infrastructure upgrades at street crossing points such as kerb extensions/buildouts to reduce crossing distances, raised thresholds and road surface material changes/markings (see Figure 25).

4 Optimise street widths and available street space

Sufficient street width is needed to accommodate important street functions – the road carriageway, safe pedestrian and cycle access, some provision for on-street parking, and roadside verges wide enough to support the establishment of large trees with spreading shade canopies. Street width of at least 16m will be required, with additional width – nominally up to 20m overall width – for primary street corridors connecting the study area. Additional street width also allows the carriageway to meander within the right of way.

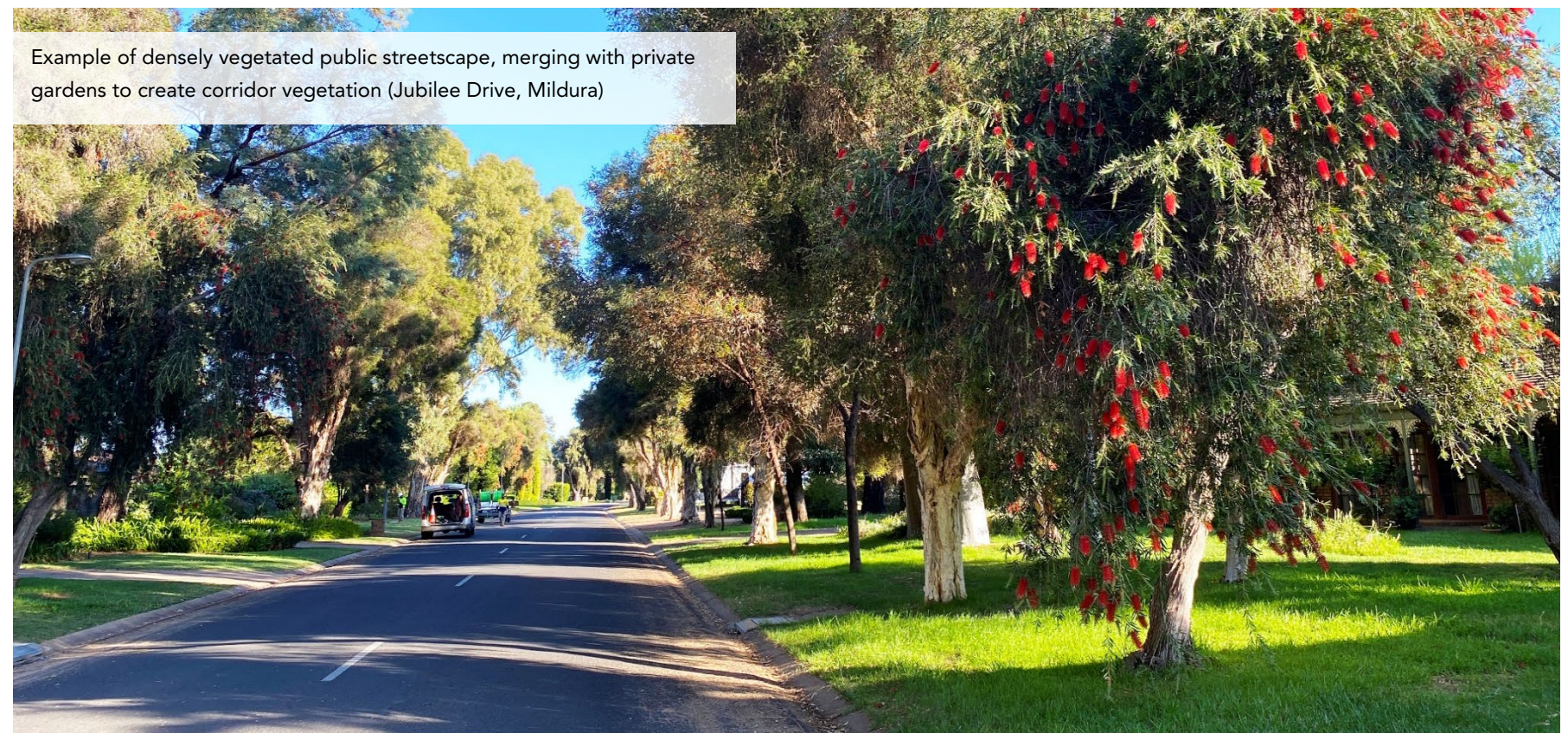
A shift away from standard symmetrical street design in targeted locations can help to optimise available street width and improve the function and benefits of the street environment. For example, a widened verge on one side can improve the amenity, function, safety and visual prominence of the pedestrian zone by allowing for a wider footpath, additional street tree plantings and roadside swales (depending on overall drainage strategy).

The flexibility of available space within a road reserve can potentially also be increased by the alignment and co-location of underground services, thereby reducing services constraints.

5 Create connected corridors of vegetation and canopy cover (greenways)

Public road reserves across the study area can be designed to increase the amount of vegetation, including tree canopy cover (see Figure 25). Multiple benefits can be realised. These include contributing to a green, vegetated character of the urban transition area, shade cover (especially on key pedestrian routes) and connected habitat for wildlife. A range of design techniques can be applied to achieve this outcome such as widened roadside verges to support more vegetation, informal copses/clusters of street trees (rather than linear rows) and use of understorey plantings in targeted locations (see example below).

To support the establishment of a connected tree canopy across the study area, a canopy cover target may be an appropriate mechanism to achieve this. Council's *Urban Forest Strategy* (under preparation) will include these recommendations, however a provisional target of at least 30% is noted to be appropriate and has become an established benchmark (e.g. the Victorian Planning Authority apply a minimum 30% target to all residential development in Precinct Structure Planning areas across the state).



6 Retain roadside vegetation

The few instances of roadside vegetation, which consist of established exotic and native trees, contribute a small sense of amenity and established character to the landscape, and should be preserved as a priority due to their location in existing public reserves. This *in situ* vegetation will be complemented by substantial additional street tree plantings.

7 Retain and encourage vegetation around dwellings

The pockets of garden vegetation associated with existing dwellings are contained within subdivided lots which are not large enough to permit further subdivision. This, *in situ* vegetation can effectively be retained in the landscape, noting that is not considered to be of significance to justify consideration of tree protection controls (e.g. Vegetation Protection Overlay). Therefore, landowners would retain control over decisions about the long term retention or removal of vegetation on these lots.

For all new low density residential lots, the large minimum lot size will ensure ample space will be available to support the establishment of vegetation, including large trees to complement plantings within the public realm. The planning system offers no current mechanism to require tree planting on private lots, however this should not be regarded as a constraint in view of how larger low density lots tend to be established. In contrast, smaller low density lots (of approximately 0.2 Ha or less) would present a considerable constraint and risk in this regard.

8 Strengthen the residential-to-farming character transition

The transition from the low density character of the study area to the rural landscape to the south-west will be experienced along Cowra and Sandilong Avenues. Rows of homes in garden settings lining these streets will give way to the more open and exposed farmland. This can be further reinforced by landscaping of the road reserves to frame and enclose the streetscape.

9 Scaled infrastructure and materials use suited to low density setting and character

The prominence of urban infrastructure can potentially be downplayed, depending on functional requirements. For example, the use kerb and channel can be limited subject to local drainage conditions and the overall drainage design. Similarly, areas of hard surfacing (road pavement, walking paths) can be scaled to according to use volumes/demand, and street lighting fixtures set to pedestrian scale (excepting at major intersections).

The selection of public realm materials should also be restrained to a simple, robust palette (e.g. consideration to natural or asphalt path surfaces for less formal character).

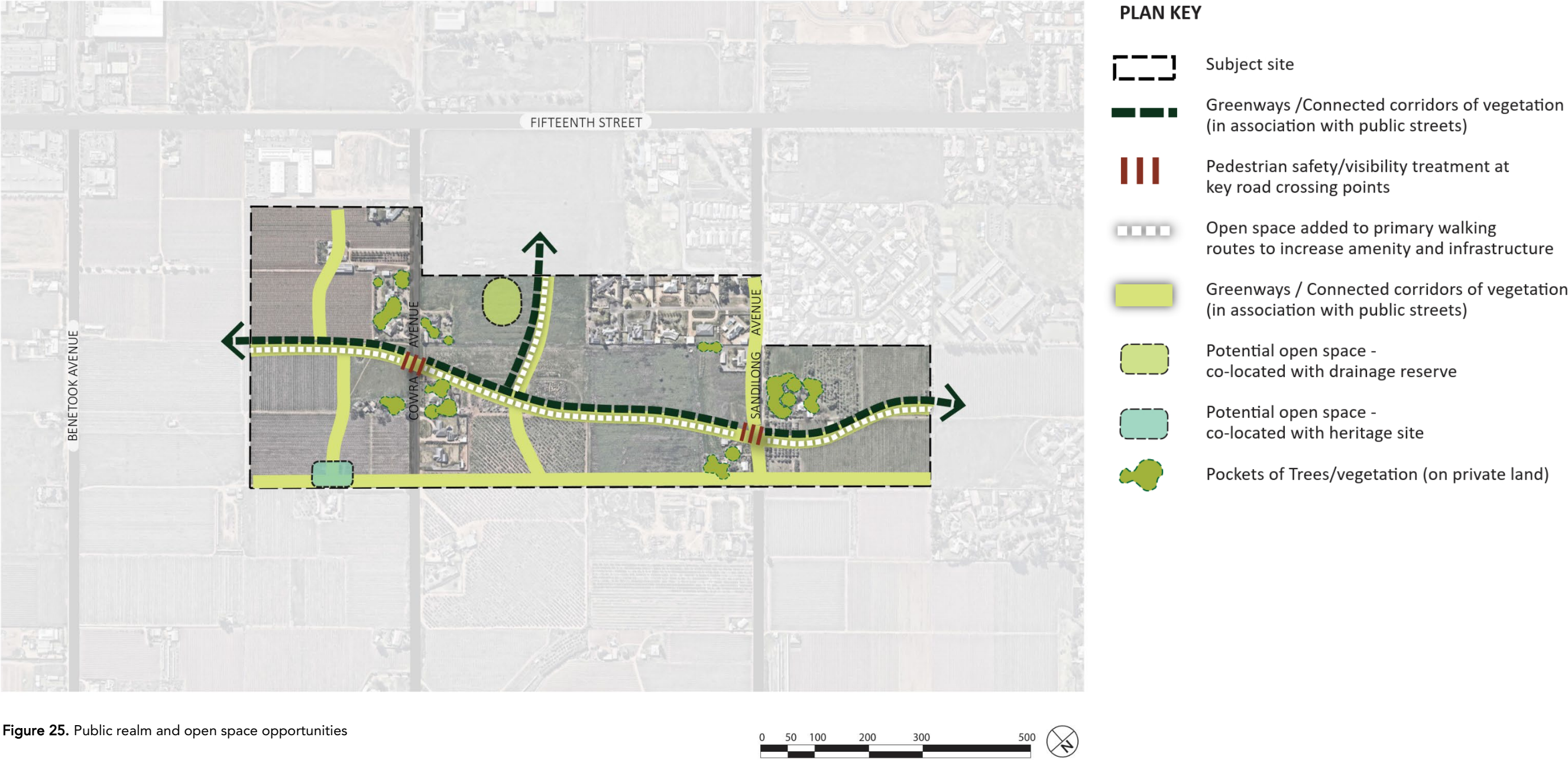


Figure 25. Public realm and open space opportunities

4.9 ACCESS AND MOVEMENT ISSUES

1 Lack of footpaths and pedestrian infrastructure in low density areas

Low density residential areas with large lots often lack basic infrastructure to support walking. There are several such examples within Mildura and the practice is common State-wide. This outcome tends to be the product of presumptions that car transport will be dominant and that low traffic volumes make walking on roads possible. The Irymple LDRDP provides the opportunity to establish more appropriate contemporary standards for pedestrian access in a low density residential setting.

2 Limited local walking access and connectivity

Existing conditions for pedestrians are generally poor within the study area, reflecting the predominant farming/semi-rural landscape currently, though are a somewhat improved in the immediate surrounding area (see Figure 26).

A part sealed/part unsealed shared path is provided along both sides of Fifteenth Street between Cowra Avenue and Sandilong Avenue, with both extending to the north-west towards Mildura and only the south-east side continues east towards the centre of Irymple.

Controlled pedestrian crossing of Fifteenth Street is provided at the signalised intersection between Sandilong Avenue and Fifteenth Street. Pram ramps and pedestrian refuge points are provided on all four legs of the roundabout at Cowra Avenue and Fifteenth Street, with some connections and landing via gravel / unsealed paths.

Pedestrian paths and crossing points are not fully sealed in the surrounding area, making use difficult for people with mobility devices such as wheelchairs, prams and walkers. Within the study area, neither Cowra Avenue or Sandilong Avenue have formal footpaths in place that connect back to Fifteenth Street. Pedestrian connections between neighbouring residential allotments do not exist. Footpath connections from the subject area to the nearest bus stops are not provided.

3 Minimal options for cycling

The shared path (previously described) along both sides of Fifteenth Street between Cowra Avenue and Sandilong Avenue can be used by cyclists for access to/from Mildura and heading eastward to the Irymple township (see Figure 26).

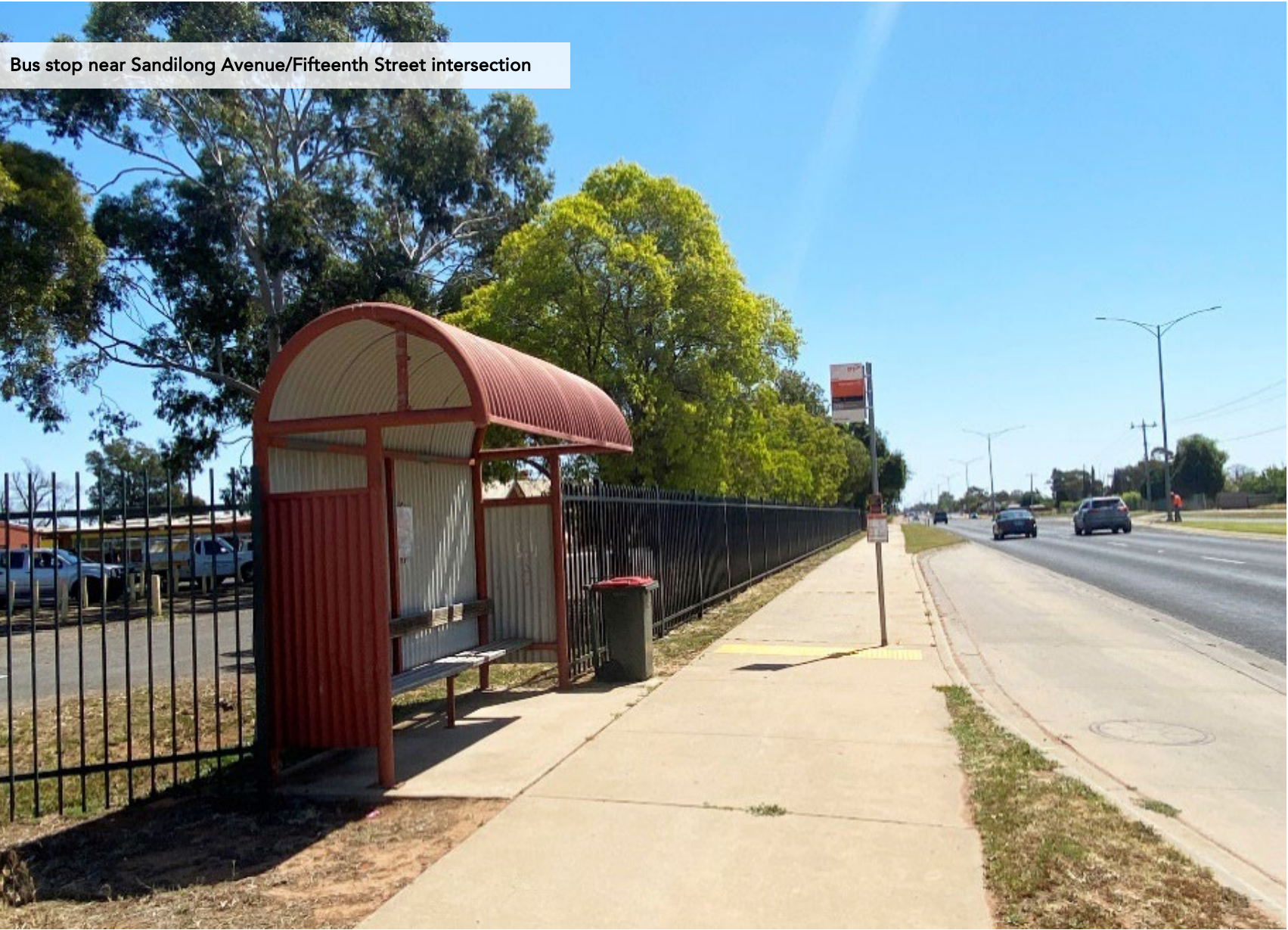
Within the study area itself, cyclists are forced to share the road with vehicles that could be travelling at high speeds along both Cowra Avenue and Sandilong Avenue before they can connect to the shared path along Fifteenth Street.



4 Limited local public transport availability

One bus service operates along Fifteenth Street that runs between Mildura and Red Cliffs and is serviced in Irymple by bus stop signage and shelters (see Figure 26). The bus service currently operates every hour throughout the day, and the nearest bus stops to the subject area is located approximately 100 metres west of Sandilong Avenue and approximately 75 metres west of Cowra Avenue.

The bus stop on Fifteenth Street to the north-west of Cowra Avenue does not provide a shelter and the pedestrian waiting area appears to be restricted in width by fencing to the adjacent site. Footpath connections to the bus stops are not fully sealed along Fifteenth Street.



5 Fragmented road network

There is no south-east to north-west connection between Cowra Avenue and Sandilong Avenue other than via Fifteenth Street or Sixteenth Street. The existing local road network throughout Irymple is fragmented, with discrete residential subdivisions lacking in permeability and connectivity to neighbouring lots.

6 Traffic volumes and safety

Cowra Avenue has a speed limit of 80 km/h between Fifteenth Street and Sixteenth Street. A small portion of vehicles were observed to travel at high speed. Sandilong Avenue has a varying speed limit between Fifteenth Street and Sixteenth Street; with it being 40 km/h during school times to the east of the subject area (otherwise 60 km/h), 60 km/h within the subject area and 80 km/h to the west of the subject area.

Traffic volume information along Cowra Avenue between Fifteenth Street and Sixteenth Street has been provided by Council, who undertook traffic volume and speed surveys for an 18-day period in April/May 2015 (16 April 2015 to 4 May 2015). A view of the daily vehicle volumes as well as the speeds recorded is provided in Table 1 below. It is worth noting that along with the average and 85th percentile speeds, several high speeds were recorded along Cowra Avenue during the survey period, with the maximum speed recorded between 150 km/h and 160 km/h.



6 Heavy vehicle bypass

Benetook Avenue is a designated Over-Dimensional (OD) arterial route carrying substantial volumes of large or heavy mass vehicles including A-double, B-doubles and road trains.

The OD route runs parallel with, though does not abut, the west boundary of the study area (see Figure 26). The intervening land is proposed to become a future industrial precinct however as previously note the southern extent of the precinct remains subject to a current study. The integrity of this corridor for freight movement is significant and a potential road connection originating from the study area, with additional intersection, is likely to be inappropriate.



Benetook Avenue, viewed from the north-west, is a key heavy freight route located close to the study area

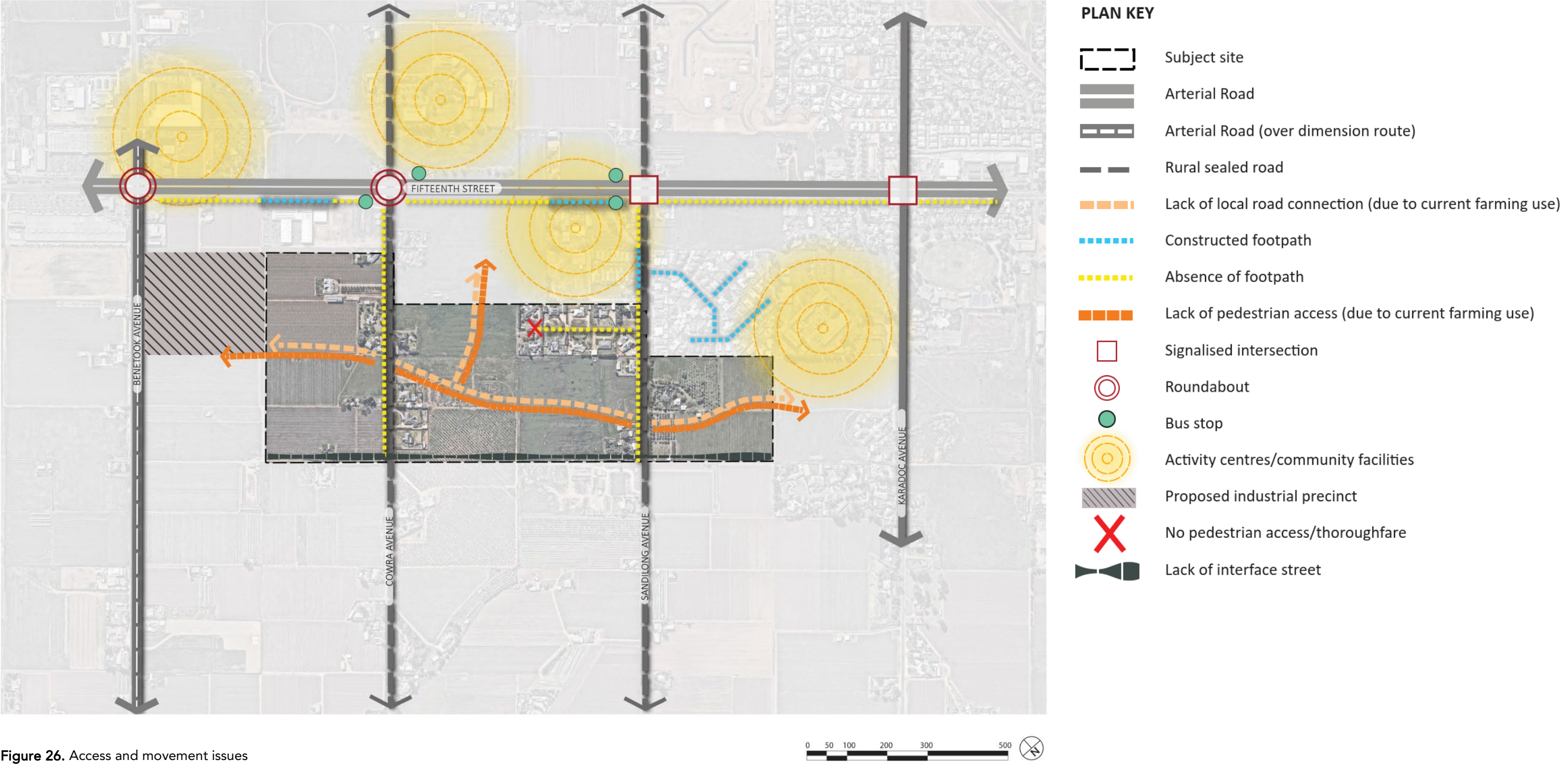


Figure 26. Access and movement issues

4.10 ACCESS AND MOVEMENT OPPORTUNITIES

1 Create strategic walking links to key destinations

Pedestrian connections to the variety of surrounding land uses, both existing and planned, are important for access to services, recreation and employment, as well as in the interest of providing connectivity between residential neighbourhoods. Most trips local to Irymple should be encouraged to occur on foot when weather permits.

There are several notable strategic walking connections to be considered in this regard (see Figure 27). These include a prominent link with the Community Precinct to the north-east, as well as a residential neighbourhood link to the east, extending to Karadoc Avenue.

A walking connection should also be considered to the Commercial Uses area along Fifteenth Street, noting that provision for a continuous public walkway through to Fifteenth Street itself may be difficult to achieve due to the nature of land tenure. A walking connection to the proposed Industrial Precinct to the west, and potentially through to Benetook Avenue, could also be achieved by coordinated planning for this precinct with the Irymple LDRDP.

It is realistic to expect that formalised walking connections south-west of the study area to the adjoining farming landscape are unlikely to be viable.

2 Provide a simple walking network hierarchy

All local streets within the study area should include provision for safe walking options. The level of pedestrian infrastructure provided in a particular should relate to its role as part of a simple hierarchy, keeping in mind the low density residential setting and relative low traffic volumes to be expected for most streets.

In most instances a footpath on at least one side of the street should be provided. For strategic connections to external destinations and for a 'trunk' connection through the study area, twin footpaths may be more appropriate.

In limited circumstances, certain streets, or sections of streets may be able to function safely without a dedicated footpath.



An example of walkable low density residential street with informal footpath meandering along the roadside through vegetation and with overhead tree canopy (Jubilee Drive, Mildura)

3 Provide pedestrian facilities at key crossing points

The safe walkability of the study area will be assisted by infrastructure and urban design at crossing points with heightened risk of conflict with motor vehicles. Two notable examples are the existing rural roads of Cowra and Sandilong Avenues which will require new intersection with local streets to service the study area.

At these locations, the visual prominence of these crossing points in the streetscape, including appropriate sightlines, is critical for safe passage at these locations, as may be the use of infrastructure such as kerb buildouts to narrow the requires crossing distance (if kerb and channel is to be proposed) The use of measures to slow local traffic speeds in higher risk locations, such as at Angel Grove, should also be considered.

4 Enable safe cycling access

A low density residential setting generally does not warrant provision of dedicated infrastructure for cycling, particularly due to relatively low local traffic volumes, which otherwise allow for the safe shared use of road space. Local streets should be structured to connect with the existing off-road shared paths along the length of Fifteenth Street to enable cycling access to the town centre. A continuous cycling-friendly connection across the breadth of the study area would be beneficial (see Figure 27).

Local take-up of cycling as a transport mode and also for recreation can be encouraged by relatively simple and cost-effective street design measures such as narrowed road pavements and traffic calming to discourage speeding, and provision of amenities such as shade and lighting.

5 Create a well-connected street network

Road connections linking the new residential developments together should be considered when planning the local road network. However, the connectivity between lots should be balanced so that the major roads will continue to be the primary routes utilised to accommodate the majority of traffic movements.

Local road connections could be introduced to better facilitate local vehicle movements across the breadth of the study area, however care should be taken so as not to introduce a rat run. To this end, and in the interest of wider traffic safety, new roads should avoid cross intersections.

As a result of the relatively low lot yield, it is not anticipated that the total traffic generation from the low-density residential development area will result in high traffic volumes throughout the internal streets, with all streets likely to operate well within their traffic volume capacity. As such, there is an opportunity to be more flexible with the layout and design of the new road network to provide more opportunity for landscaping and streetscaping rather than focussing on the movement of vehicles.



An example of an informal residential street with narrowed road pavement to create low-speed shared space for all street users (Glenburnie Avenue, Mitcham, Victoria)

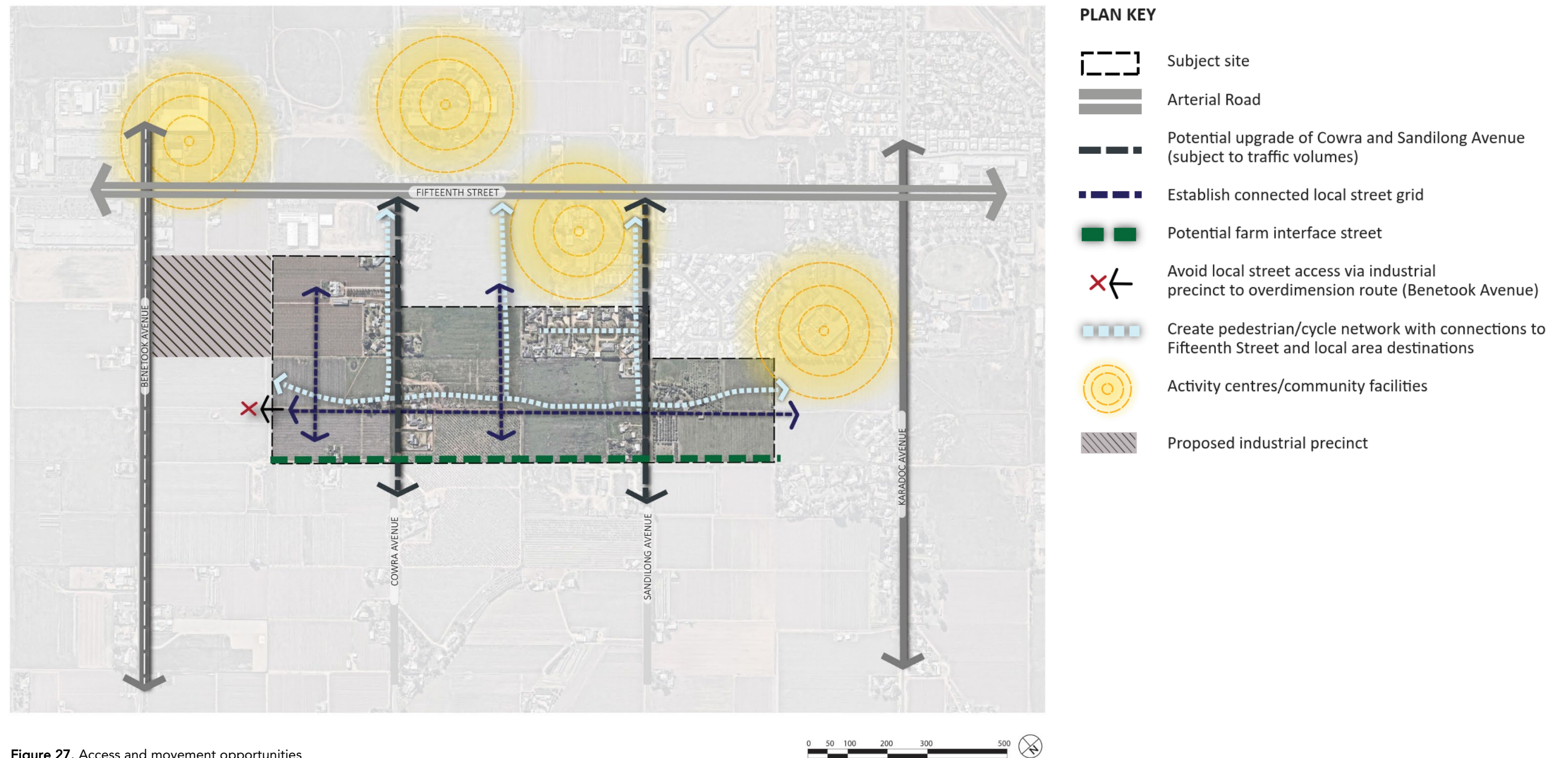


Figure 27. Access and movement opportunities

Melbourne

8/270 Ferntree Gully Road
Notting Hill VIC 3168
Australia

Tel: +61 3 9501 2800

www.taylorsds.com.au