

4

Infrastructure



Aerial of Bomen
Courtesy of Matt Beaver Photography

4



This section provides an overview of the precinct enabling infrastructure and the principles for planning and designing infrastructure for a proposed development.

It applies to infrastructure projects, subdivisions and development.

- 4.1 Precinct enabling infrastructure
- 4.2 Infrastructure design principles

Timely planning and delivery of infrastructure is essential in supporting development and facilitating growth of businesses within the precinct.

Chapter 4 outlines the obligations and considerations for the planning, designing and delivering infrastructure within the precinct. It identifies the:

4.1 Precinct enabling infrastructure

which provides an overview of the regional infrastructure facilitating development within the precinct.

A high-level overview of the precinct enabling infrastructure is provided based on the reference design. This may change as part of the detailed investigations. For example, the exact location of the infrastructure may vary depending on site characteristics.

4.2 Infrastructure design principles

which provides the principles for planning and designing infrastructure projects, subdivisions and development.

This section should also be read in conjunction with other national, state and local regulatory standards and guidelines, for a complete picture of the requirements to successfully deliver infrastructure within the precinct.

4.1 Precinct enabling infrastructure

The staging and delivery of infrastructure across the precinct will be flexible and responsive to the timing of growth and land take up. The corporation is delivering infrastructure for the precinct to create opportunities within the Regional Enterprise Zone, with consideration given to future proofing the precinct.

Regional infrastructure typically services the precinct as a whole and extends across all or part of the precinct. It will typically be planned and coordinated by the corporation and delivered either by the corporation, utility providers or State agencies, or as a joint venture with private landowners or developers.

This form of infrastructure is likely to include:

- **main road upgrades** and new transport infrastructure, roundabouts, intersections, street lighting and other civil structures as required
- **development of a trunk utility corridor**
- **utilities** including water, recycled water, sewerage and optic fibre along main roads and within the trunk utility corridor
- **energy** generation plants
- **precinct wide stormwater detention basins** and water quality treatment devices that form part of the broader catchment network
- **gas and hydrogen transmission** and distribution network along main roads and within the trunk utility corridor
- **public green corridors and trails**
- **active and public transport.**

4.1.1 Enabling works

In general, new infrastructure should expand from the existing assets. As such, development across the precinct will stem from Bomen Business Park in the southern region initially and expand towards the north.

The corporation will ensure the enabling works are planned, designed and constructed in accordance with relevant standards from federal, state, and local authorities and service providers.



The corporation will deliver the following infrastructure:

- upgrades to Merino Road
- new internal road from the new Merino Road roundabout to Dorset Drive
- new internal road from the new Merino Road roundabout to RIFL Road
- upgrade to the existing Olympic Highway intersection with Bomen Road
- new street lighting at new or upgraded intersections, along Merino Road and RIFL Road
- shared user path and landscaping upgrades along some existing roads
- a 10 metre wide trunk utilities corridor for improved access to utility, future business-to-business connections and to enable circular economies
- upgrade the existing Sewage Treatment Facility recycled water network
- new potable water network to be integrated with upgraded existing water mains, pump stations and reservoirs
- new sewerage system including network and pump stations to the upgraded existing sewage mains and pump stations
- new advanced recycled treatment to convert treated effluent to Class A recycled water
- new water recycling reticulation network for the precinct, tie in with potable water network for top-up
- new stormwater detention basins, bioretention basins, overland flow swales and transverse culverts to manage overland flows
- expansion of the existing gas network
- two new 11 Kilovolt underground distribution feeders from Essential Energy Bomen Zone substation into the precinct
- spare underground electrical conduits to allow for further 11 Kilovolt distribution feeders to be added in future
- telecommunication conduits to allow for a future optic fibre network to be installed and future data centre hub.

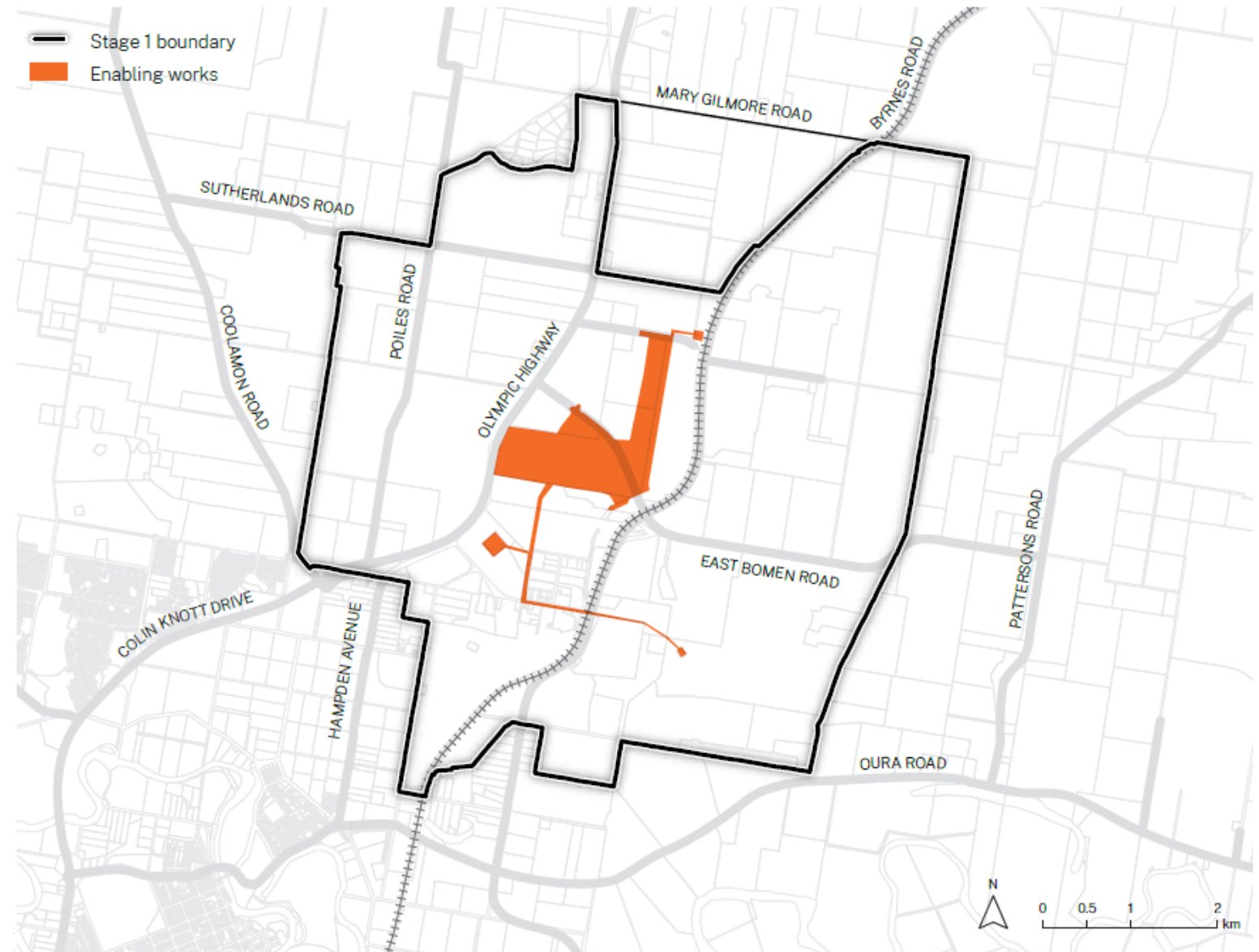
4.1.2 Infrastructure in advance of enabling works

The precinct will respond to emerging needs and demands. Proposals for out-of-sequence development may be considered if it appropriately contributes to infrastructure investment.

Variations may be considered where there is demand for a proposal and the delivery is possible in terms of:

- capacity of the network and branch infrastructure
- cost effectiveness of delivering other enabling infrastructure needed to support the out-of-sequence development
- ability and willingness of parties to contribute to the cost of the infrastructure.

Figure 17 Enabling works



4.2 Infrastructure design principles



Precinct design principles will guide planning projects, subdivisions and development across the precinct.

Local infrastructure specifically suits a single development, allotment or subdivision and includes:

- roads required to service new development, including new road connections and property access driveways
- water supply including works to connect to the precinct stormwater systems
- on site stormwater detention
- stormwater management to be provided within a site including works to connect to the precinct stormwater systems (up to and including 1% AEP flows)
- electricity supply including internal and external works to connect to the precinct infrastructure
- telecommunications including internal and external works to connect to the precinct networks

- wastewater networks including internal and external works to connect to the precinct infrastructure
- potable water and recycled water networks including internal and external works to connect to the precinct infrastructure
- gas and/or hydrogen pipelines that connect a development into the precinct network.

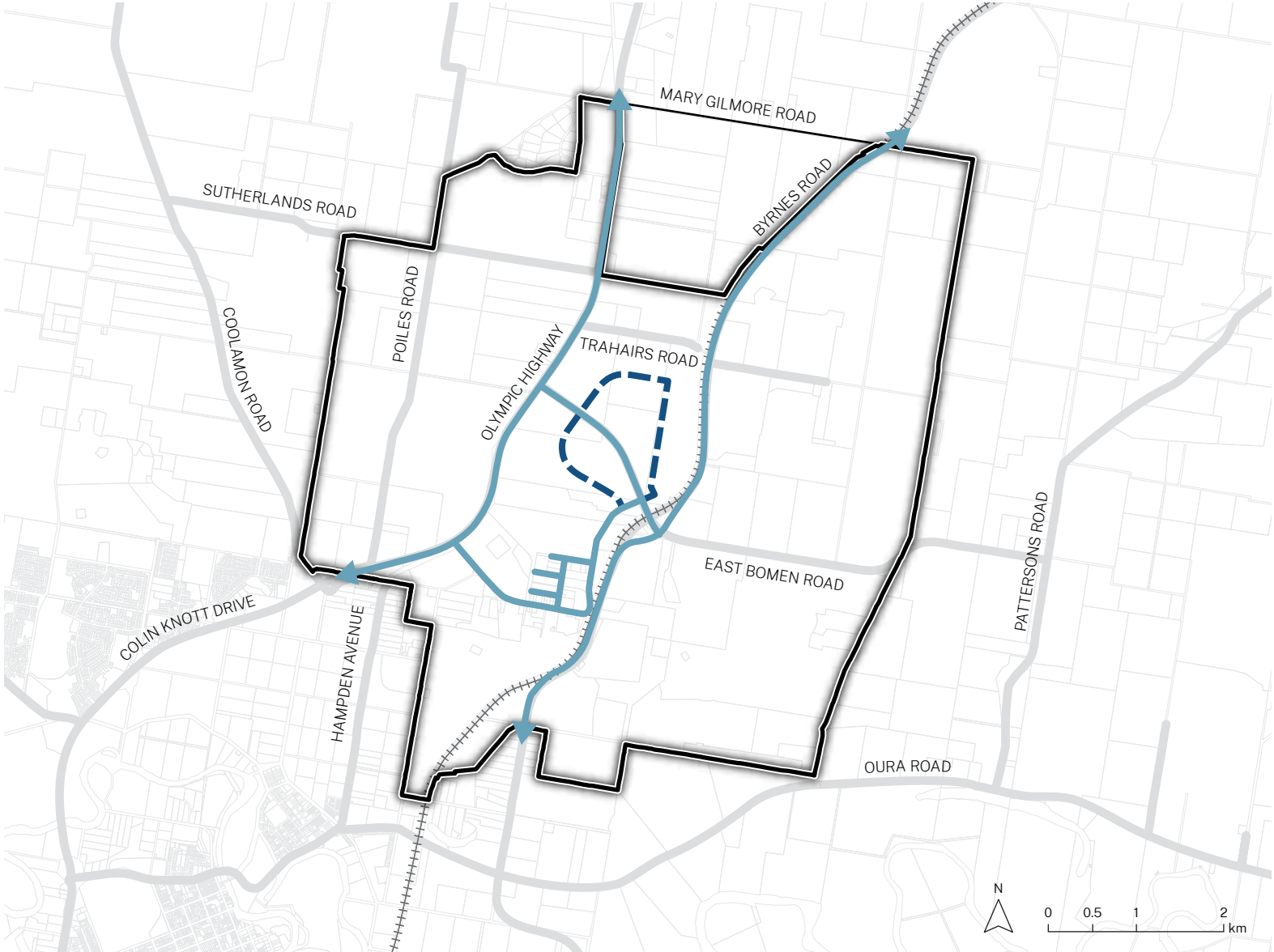
The design of infrastructure within the precinct will be based on the following principles.

4.2.1 Roads

- accommodate a B-Triple/A-Double design vehicle
- roundabouts are to be mountable where required
- cul-de-sacs and temporary turning heads allow continuous turning of heavy vehicles without the need for multi-point movements
- road levels set equal to or above the 1% Annual Exceedance Probability (AEP) overland flooding
- pavement design takes into consideration the high centripetal axle loads expected due to large truck turning movements
- all rail crossings are to be grade separated with bridges across the rail line to allow for double-stacking of containers and meet safety requirements as well as those of ARTC
- make use of recycled materials as part of the new pavement profile for either road subbase or on the shared use path
- works on classified roads are generally limited to intersection upgrades and landscape treatments. These works are to be undertaken in consultation with Transport for NSW (TfNSW)
- street networks consider the NSW Heavy Vehicle Access Policy Framework
- preferred truck routes include Merino Road, Dorset Drive, Bomen Road, Internal Roads A and B and RIFL Road, as shown in Figure 18.

Figure 18 Heavy truck routes

- Stage 1 boundary
- Existing heavy vehicle route
- New heavy vehicle route



The following table provides the road standards for existing roads and roads to be upgraded as part of the enabling regional infrastructure within the precinct.

Name	Road type	Road classification	Target design speed (km/h)	Number of lanes	Minimum widths (m)			Shared user path width	Kerb type
					Road reserve	Carriageway (Including shoulder)	Verge (typical)		
Bomen Road	Premier Boulevard	Collector	60	2 lanes	30	20	5m, 5m	2.5m both sides	Barrier
	Premier Avenue	Collector	60	2 lanes	30	20	5m, 5m	3m LHS	Barrier
Old Bomen Road	Avenue	Local	60	2 lanes	29	13	10m, 6m	2.5m LHS	Barrier
Merino Road	Premier Boulevard	Distributor	70	Dual carriageway with 4 lanes	54.3	23	16.9m, 7.5m	3m LHS, 2.5m RHS	N/A
	Premier Avenue	Distributor	70	4 lanes	38.5	17	16.9m, 4.6m	3m LHS	N/A
Rifl Road	Premier Avenue	Collector	60	2 lanes	35	15	10m, 8m	1.5m RHS	Barrier
Dorset Drive	Premier Avenue	Collector	60	2 lanes	29	13	10m, 6m	2.5m LHS	Barrier
Loop Road (Internal Roads A & B)	Avenue	Local Collector	70	2 lanes	29	13	10m, 6m	2.5m LHS	Barrier

The following table details the requirements for local roads within the precinct.

Road type	Road classification	Target design speed (km/h)	Number of lanes	Minimum widths (m)			Shared user path width	Kerb type	Landscaping
				Road reserve	Carriageway	Verge			
Local road within the Regional Enterprise Zone	Local	60	2 lanes	29	13	10m, 6m	2.5m one side	Barrier	Avenue Plantings
Local road for Commercial Nodes	Local	50	2 lanes	20	10.2	3.9m, 3.9m	1.5m one side	Barrier	Avenue Plantings
Local road within the Rural Activity Zone	Local	80	2 lanes	23	8.5	10m, 4.5m	N/A	N/A	Avenue Plantings

Road sections

The following section provides the road sections for the road types within the precinct.

Merino Road

Merino Road is central to the Precinct and, unlike other major roads, connects east-west. This makes Merino Road an important access route to virtually all corners of the Precinct. Direct property access is generally not permitted, however may be considered for large sites. Short and long term improvements to the environmental function and amenity of Merino Road are required, including street trees, swales, and a shared path on at least one side. Duplication provides an opportunity for a central median and to manage level changes.

Figure 19 Merino Road –indicative cross section showing future widening and public realm

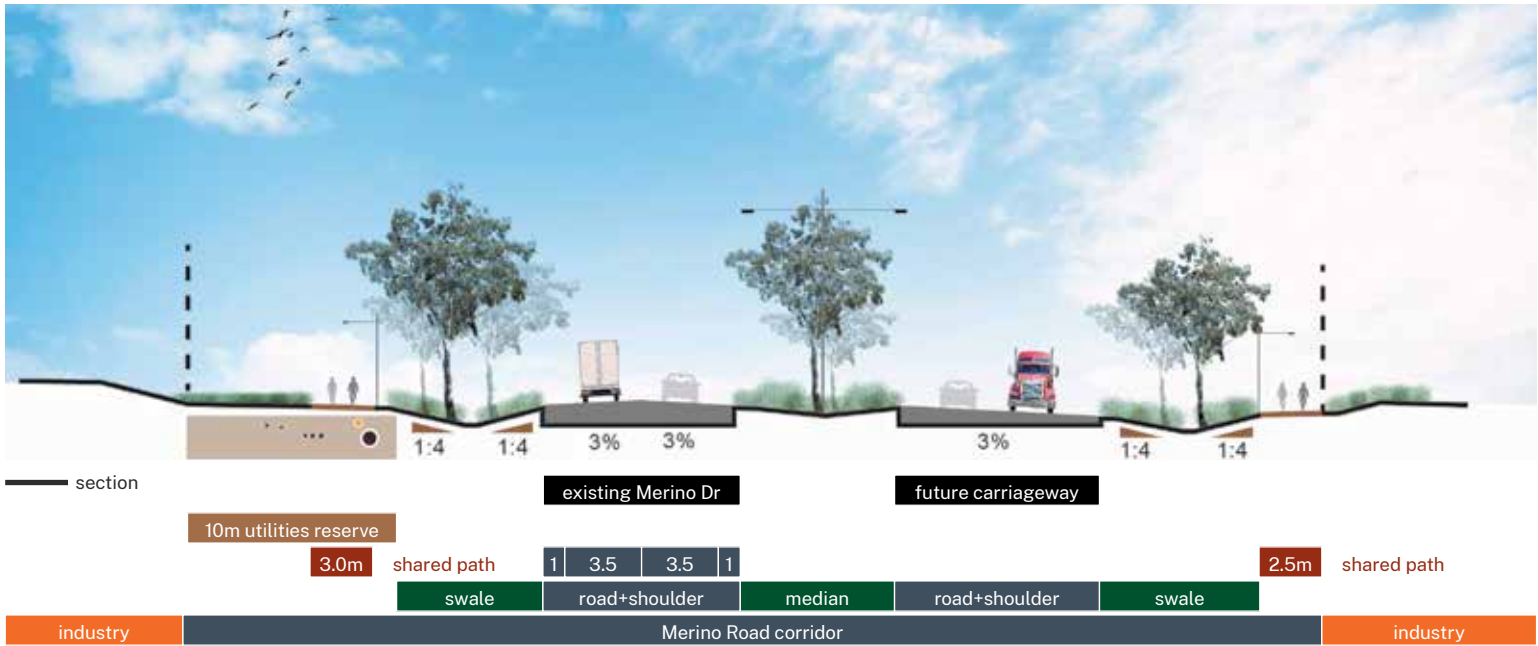


Figure 20 Location plan



Bomen Road

Bomen Road will continue to be an important road in the precinct servicing existing businesses and saleyards from North Wagga Wagga and the town centre. Its wide roadway can be retained for maximum flexibility, but with new shared paths, lighting, street trees and build outs at street corners making it easier and safer to walk in this area, and improving the amenity and image of Bomen.

Figure 21 Bomen Road –making Bomen Road a functional and attractive street

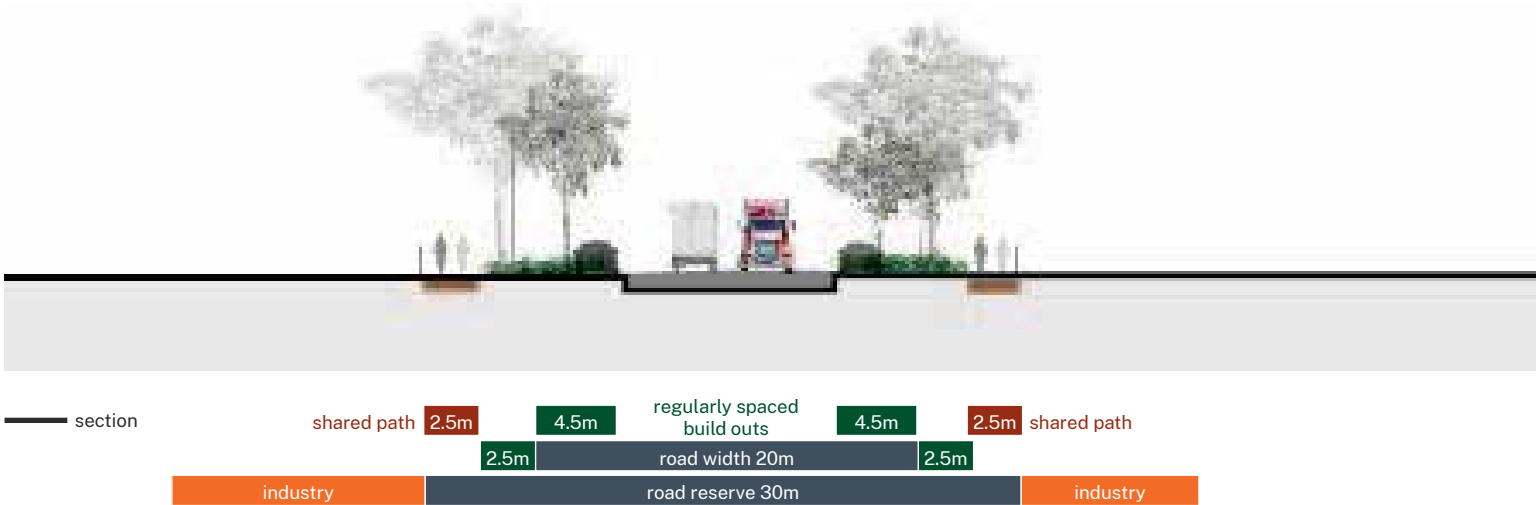


Figure 22 Location plan



Local industry roads

Local industry roads in a reserve of 29m provides for truck access, with street trees, footpaths and services also easily accommodated.

Figure 23 Local road –Industrial road cross section

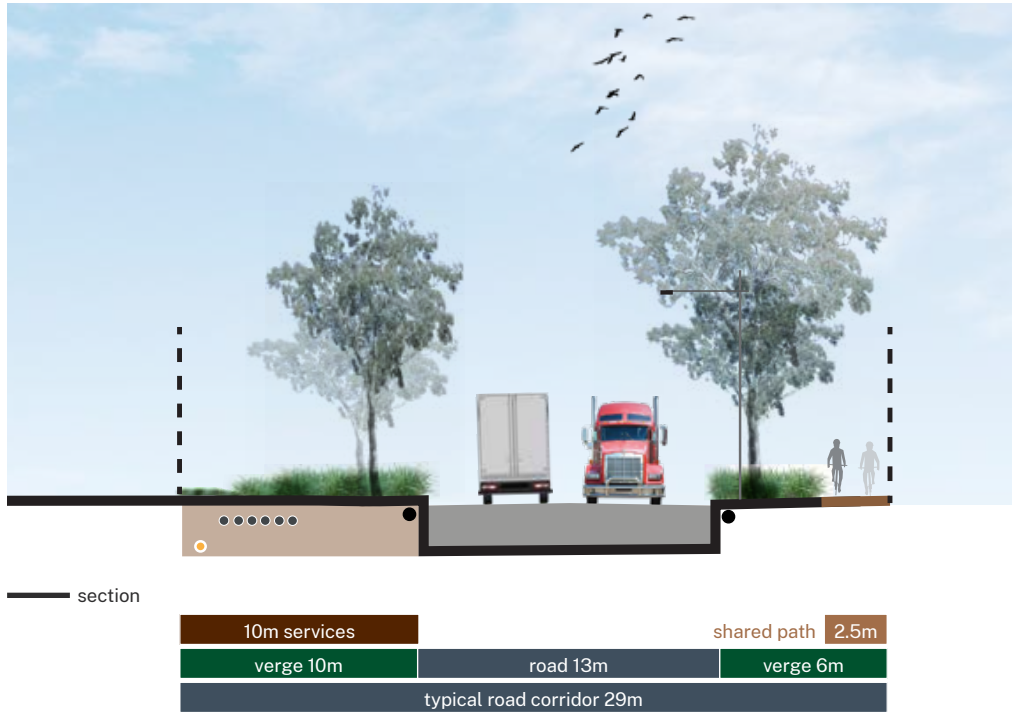


Figure 24 Location plan





4.2.2 Rail

- rail infrastructure within the precinct is designed and installed in accordance with Specifications, Standards and Procedures listed in the ARTC Track and Civil Code of Practice
- ensure all design, materials, equipment, workmanship and installations relating to rail infrastructure complies with the latest revision of the ARTC Engineering Standards and Australian Standards as relevant
- rail sidings and spurs to incorporate appropriate horizontal and vertical clearances for double-stacked freight trains along the alignment
- ensure for orderly and coordinated provision of rail infrastructure and associated facilities within the precinct.



4.2.3 Stormwater

Stormwater quantity

- stormwater infrastructure includes on-site management measures, along with precinct wide measures that form part of the broader stormwater and flood management strategy for the precinct
- on site detention which connects to the regional detention basins includes the provision of lot scale detention to maintain pre-development flowrates for all events up to and including the 1% AEP event and regional detention basins that will account for the differential between the 1% AEP and the 0.5% AEP runoff (the 0.5% AEP generally reflects the 1% AEP plus climate change)
- no increase to peak discharges from overland flows or local stormwater runoff from the pre to post development case scenario
- kerb and gutter with piped drainage network for local and local collector roads
- longitudinal drainage swales are provided for the conveyance of stormwater along distributor road alignments. Diversion swales are provided to direct runoff to the regional treatment and detention facilities
- cross drainage culverts sized to provide a 0.5% AEP flood immunity at waterway crossings to maintain natural flow paths.



4.2.2 Electrical

- utilisation of residual spare capacity (currently ~20MVA) in the Essential Energy Bomen Zone substation for the initial stages of the precinct
- the design of future energy networks will support security of supply by making use of dual feeders and ring main units (RMU)
- electrical connections are designed in accordance with Essential Energy standards.

Figure 25
Stormwater Quantity Strategy
Arrangements

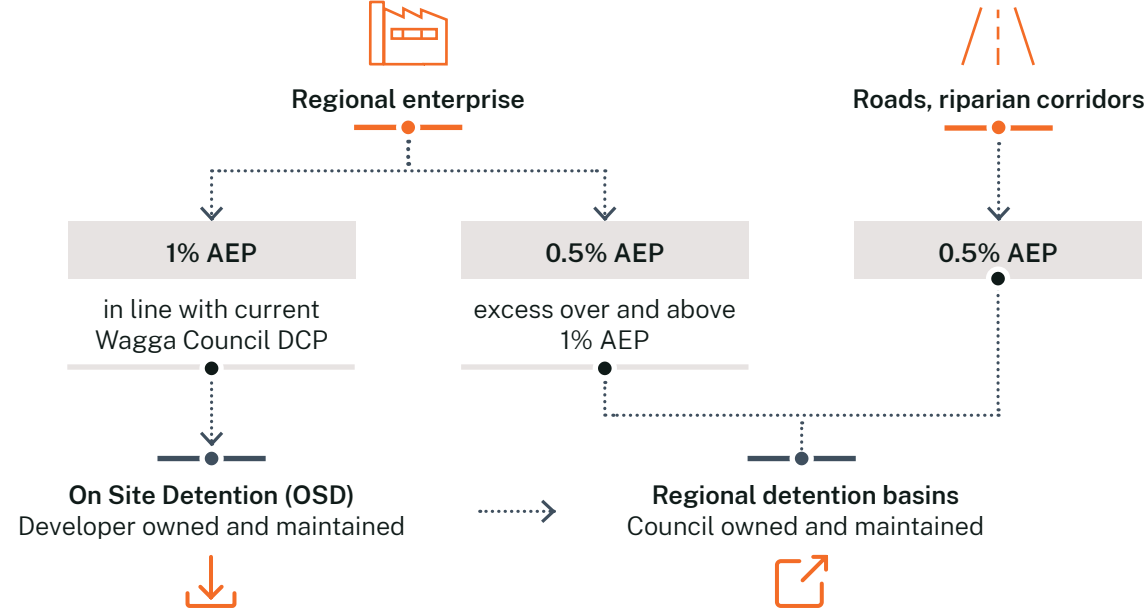
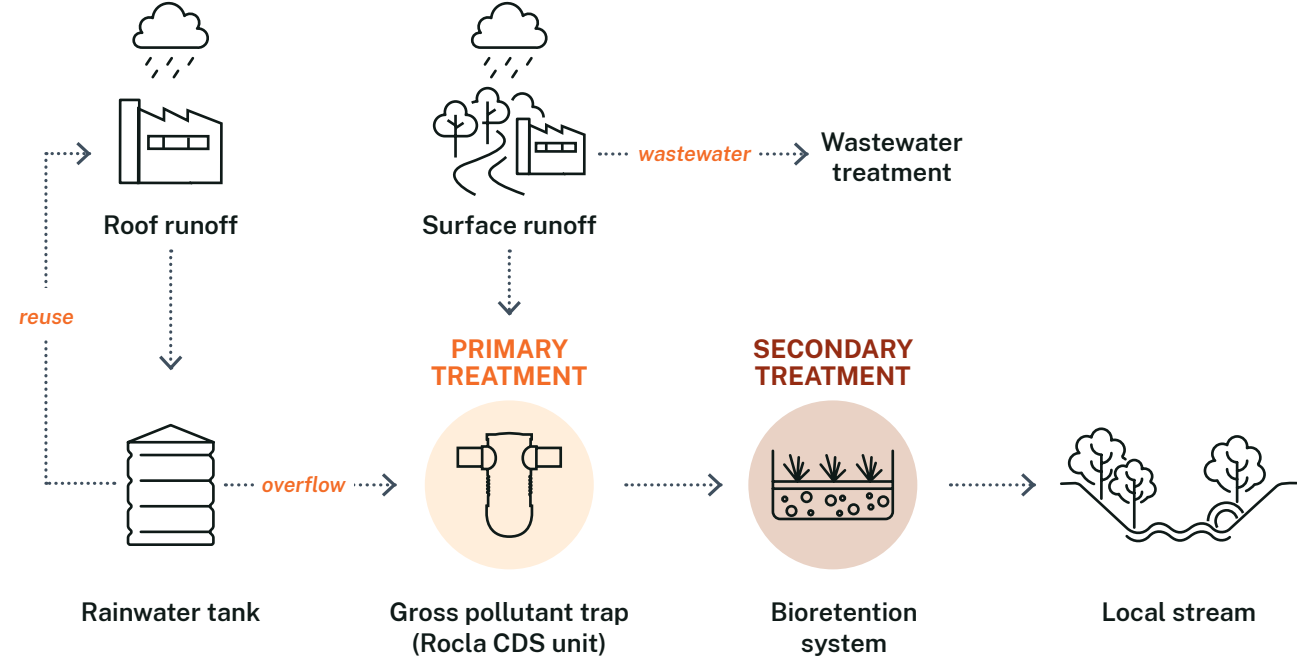


Figure 26
Stormwater Quality Strategy





4.2.5 Lighting

- smart lighting is to be delivered as part of the precinct lighting design
- smart lights are to use a mix of sensors and internal programming to automatically adjust lighting levels in response to changing conditions. Sensors can be used to detect movement and communicate with each other over a basic mesh network
- features such as maintenance factor harvesting, dimming and trimming and general presence detection are readily available
- street lighting will be provided along Merino Road corridor, along with the following intersections:
 - RIFL Access Road and Internal Road B
 - Dorset Drive and Internal Road A
 - Bomen Road and Olympic Highway.



4.2.6 Water

- water demand for the precinct has been designed for an overall peak demand of 18.96 ML/day based on 1.8 kL/d/ET
- the initial precinct water network will utilise additional spare capacity in the East Bomen Reservoir until such time as an upgrade to the East Bomen Reservoir is required to provide a total of 18 ML
- potable water storage and reticulation is designed in accordance with Riverina Water standards
- water mains are designed and sized to ensure pipeline velocities less than or equal to 1.5 m/s during peak flows.



4.2.7 Wastewater

- a wastewater network will be delivered in the first stage of the precinct and will prioritise the use of a gravity trunk network and maximise the areas serviced by gravity connections
- the design will minimise the number of pumps in the trunk network and minimise the area (developable lots) requiring local pumps to discharge into the trunk network
- discharge to the wastewater network will require a trade waste agreement with Wagga Wagga City Council
- the corporation will provide trunk sewerage infrastructure developed in stages as growth occurs.



4.2.8 Recycled water

- recycled water demand is estimated to be 1.29 ML/d for the precinct
- recycled water produced should meet Class A quality
- recycled water will be supplied through the creation of an initial 1.0 ML/d Advanced Water Recycling Facility (AWRF) (and associated storages and pump stations) at the upgraded BISTIF sewerage treatment plant. Further upgrades to the AWRF will be made in 1.0 ML/d increments as demand grows.
- recycled water customers will be responsible for building their recycled water infrastructure connecting to the proposed trunk network
- recycled water reticulation to be designed in accordance with WASA (Water Services Association of Australia) standards.



4.2.9 Gas

- gas demand for the precinct is estimated to be approximately 7 TJ/d
- an upgrade of the existing 250 kPa gas distribution network within the precinct is proposed, with gas pipelines to be extended throughout the precinct
- gas network to be designed in accordance with APA standards and guidelines.



4.2.10 Telecommunications

- multiple conduits are to be installed within the services corridor to enable optic fibre installations for future smart infrastructure
- where appropriate, all infrastructure should be provided with digital connectivity access to allow for ease of performance monitoring and communication between networks to improve operational efficiency.



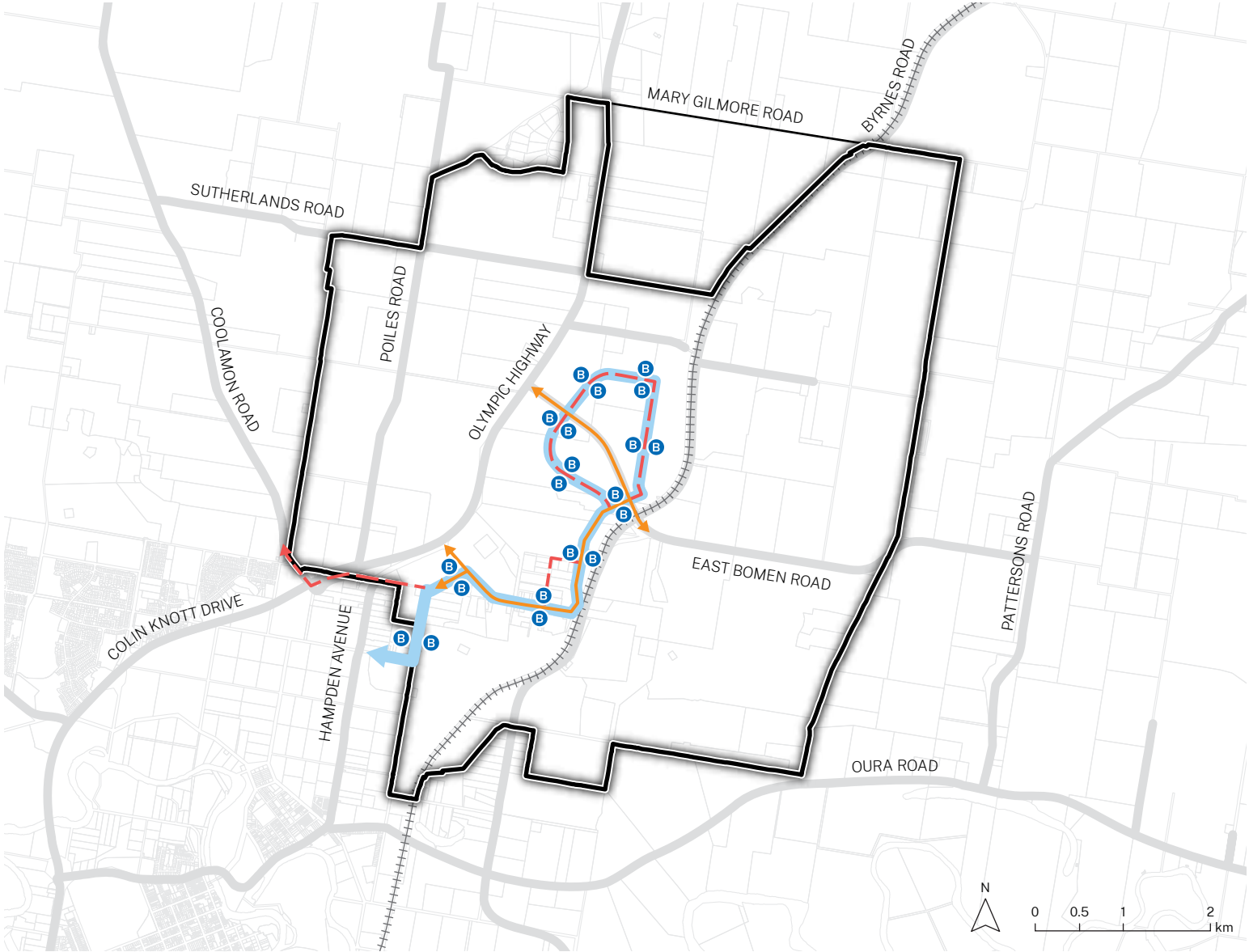
4.2.11 Active and public transport

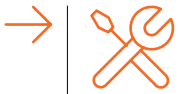
- all streets within the precinct will feature a shared use path, separated from the road carriageway, for active transport and safety purposes. These shared use paths will be able to accommodate both pedestrians and cyclists.
- shared use paths will be 2.5 metres in width, except for Merino Road which will comprise a 3 metres wide shared path, and bitumen sealed
- in some areas of the precinct avenue plantings either side of a shared use path will be established to provide shade for users
- rest areas and signage will be established along shared use paths
- any pedestrian or cycle paths constructed on private land will be covered by a free and unrestricted right of way on the title and connect with adjacent pathways to create a continuous path along the streetscape
- individual site layouts will provide clear lines of sight for entry points and public shared use paths.
- public transport stops will be integrated into road verges in appropriate locations
- each commercial node is to provide bus route connections, which link efficiently with existing network.
- taxi zones are to be located at each commercial node. A specific pick up and drop off zone should be easily visible and accessible for all users with appropriate signage and lighting provided.

Figure 27 Active and public transport

- Stage 1 delivery plan boundary
- Indicative bus stop location
- Public transport route
- Share path on both sides of the road
- Share path on one side of the road

Note: Any crossing of Olympic Highway to be signaled or grade separated.





4.2.12 General utilities and services corridor

- a services corridor(s) will be provided to support new underground services required to activate the precinct including:
 - recycled water main
 - medium pressure gas pipeline
 - water main
 - provision for high voltage electricity
 - provision for future telecommunications
 - provision for future Hydrogen
 - spare space in the corridor for unknown future pipes/conduits.
 - provision for a circular economy easement
- the new underground services will be organised inside the services corridor in accordance with the NSW Streets Opening Coordination Council Guide 2018
- the services corridor will be approximately 10 metres in width and is to be accommodated within the road reserve
- the services corridor to be grassed or covered with low level plantings that can easily and cost effectively be removed and replaced if required. No trees should be planted above the services corridor but may be in the vicinity, providing the appropriate authority's protection measurements for the assets are implemented. If trees are in the vicinity of services, root barriers are required to protect the asset as well as any extra protection deemed by the asset authority
- the design, operation, maintenance and protection of new utilities will be in accordance with the specifications of the different asset owners for the entire precinct.
- every asset will have the required space as per the asset owner specifications and enough clearance from other services to protect and allow maintenance activities, as well as easy access for replacement, if required
- the sequencing and staging of the services will be as per the specification of the various asset owners, and in coordination with the overall construction program
- consultation with APA must be carried out if the high-pressure gas pipeline corridor needs to be crossed to complete any upgrade in the precinct (installing a new service or relocating an existing one). APA will provide guidelines on how to work around this asset, precautions and protections required as well as the minimum safe working distance to be maintained at all stages
- utilities and services must be integrated with precinct infrastructure and where possible, integrated or aligned with road or active transport networks.

4.2.13 Other considerations

Other considerations should include:

Cost effectiveness

- the costs and standards for infrastructure design and construction should address the appropriate lifespan. Designs should achieve efficiencies in maintenance without over scoping and unnecessarily increasing development costs within the precinct.

Future proofing

- infrastructure planning should accommodate the anticipated demand for each stage, without compromising future development potential, or significant capital investment costs for upgrading or replacing infrastructure ahead of its planned lifespan. Infrastructure should be fit-for-purpose and provide value for money
- infrastructure design should embrace innovation and future change, without introducing onerous construction and operation costs.

Smart Infrastructure

- smart infrastructure and smart technology should be implemented where possible.
- infrastructure should be established and designed in accordance with the NSW Government's Smart Infrastructure policy.

Asset management standards

- infrastructure design is to consider consistency of componentry to access spares, technical familiarity and efficiency, along with quality of construction, maintenance periods and asset longevity.

4.2.14 A collaborative approach

multiple conduits are to be installed within the services corridor to enable optic fibre installations for future smart infrastructure

where appropriate, all infrastructure should be provided with digital connectivity access to allow for ease of performance monitoring and communication between networks to improve operational efficiency.