

## 7.0 Stakeholder Consultation



**As part of the development and formulation of the Mooroopna West Structure Plan, the Mooroopna West community participated in a comprehensive stakeholder consultation program. The main observations and feedback received during the stakeholder consultation program has been summarised within the following section.**

The Mooroopna West community participated in a stakeholder consultation program that has underpinned and informed the preparation of the Structure Plan and DCP Reports. The study team consulted with key government agencies, landowners, real estate agents and community group stakeholders. Meetings with individual organisations were also conducted. These included sessions with representatives from VicRoads' Regional Office and the VicRoads' Goulburn Valley Highway Project Office.

The key observations that emerged during the stakeholder consultation process can be summarised as follows:

- Traffic circulation, access and congestion problems are likely to arise for the Mooroopna West Growth Corridor without the introduction of a North-South Road;
- A North-South Road will need to be designed and managed properly to ensure that heavy vehicle traffic do not use it. Concern was expressed that it may become an alternative bypass or route for traffic using the Echuca – Mooroopna Road and Midland Highway;
- Direct access from individual lots onto Midland Highway should be avoided and the off ramp from the Shepparton Bypass should be considered in the detailed planning for the south-western corner of the Mooroopna West Growth Corridor. VicRoads indicated that they do not want slow moving local traffic impacting on fast moving highway traffic;
- The residential market in Mooroopna according to those surveyed has been very buoyant in recent times. There was general consensus that land transaction volumes are moderating but only slightly and not back to historical levels;
- A critical lack of vacant residential land within the existing Mooroopna township area was identified by a number of parties. It was noted that as properties or new subdivisions come on to the market, they are sold very quickly;
- Typical lot sizes in this area range from 800m<sup>2</sup> up to 900m<sup>2</sup> but over the last 5 years there have been a number of medium density developments on larger sites. It was acknowledged that lots under 500m<sup>2</sup>, should only be encouraged if they are evenly distributed throughout a subdivision. It was suggested that clustered small lots represent a sub-optimal product in the local market;
- The lack of unconstrained, residentially zoned land was considered to be the main land development issue impacting on the Mooroopna West Growth Corridor. Views were expressed that there is an insufficient supply of residential land to develop on and unless new land is released, the overall growth of the township would be impeded;
- The issue of finished floor levels in new buildings was identified as an issue. In this respect, concern related to the provision of disabled access and the extra cost incurred with the construction of new buildings;
- As there are only a limited number of drainage assets existing within the Mooroopna West Growth Corridor, drainage is a key issue to consider in the design, planning and approval of new residential subdivisions;
- Previous subdivisions have required localised retardation areas to manage and detain stormwater runoff;
- G-MW has specific requirements for open space provision including the need to avoid flood easements and stay outside G-MW Reserves and Easements;
- The future individual and cumulative impacts on the Ardmona (Community Drain) 7P needs to be carefully considered in planning for new residential development; and
- Developing the PowerCor network piece-meal as individual subdivisions come in will result in a less than optimal development of the electricity network.

## 8.0 Residential Demand Forecast



This section examines the following as part of a residential demand forecast for the Mooroopna West Growth Corridor:

- Current land supply zoned for residential purposes;
- Historical trend analysis in terms of dwelling and subdivision approvals; and
- Future supply of residential land and population distribution.

## 8.1 Current Land Supply Zoned for Residential Purposes

The growth of Mooroopna has been traditionally characterised by incremental residential development at the periphery of the existing urban area. Land development pressures are intensifying on the Council with the completion of the final stages of existing land developments, such as the Finborough Estate. More remote land subdivision has already occurred within the northern part of the growth corridor to satisfy an increasing underlying demand for residential lots. Available land zoned for residential purposes within the Mooroopna West Growth Corridor is summarised within Table 6.

**Table 6: Available Residential 1 Zoned Land**

Land	Area
Gross Mooroopna West Growth Corridor total	260 hectares
Land potentially developable for residential purposes but not currently zoned for residential purposes	111.64 hectares
Land currently zoned for residential purposes	52.00 hectares

Note: The above figures represent total available land areas. Non-developable land is not identified within these figures.

At 52.00 hectares, available residentially zoned land is limited within the Mooroopna West growth corridor. Looking to the future, it can be reasonably expected that detached housing will continue to be the dominant housing form in the Mooroopna West growth corridor, although at higher densities than current residential development. To understand the likely future demand for residential land, an examination of historical trends in dwelling commencements and residential lot creation provides a useful insight into the future demand for housing within the study area. Fundamentally, there is a need to provide infrastructure commensurate with population growth.

## 8.2 Historical Trend Analysis

Forecasting future residential demand is a challenging task as there are a number of factors (at an international, state and local scale) that will influence residential development activity in the future. To ensure the timely delivery of physical and community infrastructure, it is important to develop an appreciation and understanding of future residential demand for the growth corridor. To establish an overall level of demand within the Mooroopna West Growth Corridor, an analysis of dwelling approvals and subdivision approvals (i.e. number of lots certified) has been undertaken to identify past residential development trends. This analysis provides a valuable insight into how residential development demand has been accommodated at Mooroopna and at what rate.

### 8.2.1 Dwelling Approvals

In order to gauge new dwelling commencements in Mooroopna an analysis of Census and the Council dwelling approval data has been undertaken. Due to the limited information on Mooroopna dwelling approvals, data from the Shepparton area, which is also within the same statistical region, can be used to estimate the average dwelling commencement and potential demand.

Building approval data indicates that between 1999 and 2006, averages of 418 new dwellings were approved within the City of Greater Shepparton. Approximately 85% of building approvals were recorded in Shepparton and Mooroopna, the main population growth areas in Greater Shepparton, with an average of 355 dwelling approvals per annum.

The Council records for Mooroopna indicate that 88 dwelling approvals were issued from 2004 – 2006, an average of 29.3 dwellings per annum. Refer to Table 9.

**Table 7: Dwelling Approvals 1999 – 2006 Greater Shepparton (Year Ended 30 June)**

Year	1999	2000	2001	2002	2003	2004	2005	2006	Total	Average per annum
Total	377	555	323	509	431	353	405	391	3344	418

Source: ABS National Regional Profile 1379.0.55.001 and Building Approvals

**Table 8: Dwelling Approvals 1999 – 2006 Greater Shepparton (C) – Pt A (Shepparton Urban & Mooroopna Area) (Year Ended 30 June)**

Year	1999	2000	2001	2002	2003	2004	2005	2006	Total	Average per annum
Total	304	470	280	438	369	310	336	339	2846	355

Source: ABS Source: ABS National Regional Profile 1379.0.55.001 and Building Approvals

**Table 9: Dwelling Approvals 2004 – 2006 Mooroopna (Year Ended 31 December)**

Year	2004	2005	2006	Total	Average per annum
Total	17	33	38*	88	29

\* Estimate based on half yearly dwelling approval figure of 19. Source: City of Greater Shepparton Records

An analysis of dwelling approvals in the Shepparton/Mooroopna area over the last 8 year period reveals that the number of dwellings rose steadily, with an average of 355 dwellings per year over that period.

The average percentage increase for Mooroopna area only between years 2004 – 2006 was 31.5%. However, given the steadying trend experienced in the last two years a more conservative percentage change of 13.2% can be applied to extrapolate future building approval activity in Mooroopna. Table 10 shows the predicted dwelling approval numbers for Mooroopna. Over a seven year time future frame a total of 441 dwelling approvals are likely to occur, with an average of 63 per annum (say 60).

**Table 10: Predicted Dwelling Approvals Activity for Mooroopna**

Year	2007	2008	2009	2010	2011	2012	2013
No. of Dwelling Approvals	43	48	54	61	69	78	88

## 8.2.2 Certified Residential Lots

The analysis of residential/ lot subdivision data also provides valuable insights into the demand for housing. Limited historical data on subdivision activity precludes a thorough analysis and comparison with dwelling approval numbers in this instance. However, recent information on a subdivision proposed as part of a planning application in Mooroopna West, indicates that a total of 206 lots are to be created. Using the predicted approvals at Table 9, the existing subdivision proposal would meet the predicted dwelling demand up until 2010.

As detailed within Table 6 available land currently zoned for residential purposes within the Mooroopna West Growth Corridor is 52.00 hectares. Adopting an average rate of 15 lots per hectare and allowing for 60 new dwellings / lots per annum, there is currently 13 years supply of land zoned for residential purposes existing within the Mooroopna West Growth Corridor.

### 8.3 Future Supply of Residential Land

In assessing the future supply of residential land, recognition must be given to an array of factors influencing supply. Various constraints such as flooding, the location of the Shepparton Bypass, the proximity to agricultural activities and individual landowner development intentions, will all impact on the capacity to make new residential land available. Total developable land within the Mooroopna West Structure Plan, including land currently zoned Farming, has been summarised in Table 13.

### 8.4 New Development and Population Distribution

Utilising an average household size of 2.46 persons, the fully developed capacity of the Mooroopna West Growth Corridor is expected to support a resident population of 4534, based on a total lot yield of 1843. The ultimate number of new dwellings required within the Mooroopna West Growth Corridor by the year 2020 will be influenced not only by the projected net population increase that the municipality will experience up to that year, but also by a range of factors which will govern household structure. Age profile, household income structure and household type (choice) will all influence household formation. Having undertaken the above analysis, the foregoing projections are based on historical dwelling increases rather than market based forecasts.

In projecting a future population for the Mooroopna West Growth Corridor, an annual growth rate rounded up 1.0% has been adopted based on Census data. Refer to Table 11.

**Table 11: Population Growth for Mooroopna**

1996 Pop	2006 Pop	Difference	Average Annual Growth Rate (1991-2006)
6582	7203	621	(0.94%) - 1%

A total of 8279 persons are expected to reside in Mooroopna by 2020, an additional 1076 persons from 2006. Based on an average household size of 2.4, a total of 448 new households will be required by 2020. The majority of this growth will need to occur within the Mooroopna West Growth Corridor. The projected future residential land supply identified within the Mooroopna West Growth Corridor land budget will readily accommodate the projected population for Mooroopna based on the growth scenario as outlined in this report above.

The nature of the foregoing assessments requires the application of a number of assumptions. Being assumption based, the ultimate projections that emerge from the analysis will be significantly influenced by the particular assumptions that are ultimately adopted.

### 8.5 Land Budget

To achieve housing densities that will support compact and walkable neighbourhood and the efficient provision of public transport services throughout the growth corridor, a mix of conventional lots (average of 650m<sup>2</sup>) and medium density lots (average 350m<sup>2</sup>) are proposed together with two local commercial centres. A differential split between conventional and medium density lots has been applied to the forward land consumption projections for each precinct. Applying an annual uptake of 60 lots per annum and extrapolating the current average household size (2.46 persons per household) with a total yield of 1600 lots within the township of Mooroopna, a resident population of 3937 persons can be expected to reside within the Mooroopna West Growth Corridor when fully developed.

The extent of growth envisaged within the Mooroopna West Growth Corridor is summarised within Table 12: Mooroopna West Growth Summary.

**Table 12: Mooroopna West Growth Corridor Summary**

Characteristic	Value
Total Conventional Residential Lots (Ave 650m <sup>2</sup> )	1436
Total MDH Residential Lots (Ave 350m <sup>2</sup> )	164
Total Dwelling Yield	1600
Annual Dwelling Commencement (Ave)	60 dwellings
Total Land Consumption Timeframe	27 years
Total Population (Based on Ave. 2.46 persons per household)	3937 persons

**Table 13: Mooroopna West Growth Corridor Land Budget**

Precinct A	Land Use	Size of Lot m2	Proportion of Developable Area	Total Developable Area (ha)	No. of Dwellings
	Conventional Residential	650	93%	37.18	572
	Medium Density Residential	350	7%	2.80	80
	School	35000		3.50	
	Commercial	8000		3.32	
		Total	100%	46.80	652
Precinct B	Land Use	Size of Lot m2	Proportion of Developable Area	Total Developable Area (ha)	No. of Dwell
	Conventional Residential	650	95%	7.46	115
	Medium Density Residential	350	5%	0.39	11
	Private School	30,000		3.00	
		Total	100%	10.86	126
Precinct C	Land Use	Size of Lot m2	Proportion of Developable Area	Total Developable Area (ha)	No. of Dwell
	Conventional Residential	650	95%	12.49	192
	Medium Density Residential	350	5%	0.66	19
	Commercial	2700		0.27	
		Total	100%	13.42	211
Precinct D	Land Use	Size of Lot m2	Proportion of Developable Area	Total Developable Area (ha)	No. of Dwell
	Conventional Residential	650	95%	36.20	557
	Medium Density Residential	350	5%	1.91	54
		Total	100%	38.11	611
			<b>Grand Total Conventional Residential</b>	93.34	1436
			<b>Grand Total Medium Density Residential</b>	5.75	164
			<b>Grand Total</b>	109.18	1600

## 9.0 Sustainable Growth Principles



**A series of sustainable growth principles have been prepared for application within the Mooroopna West Growth Corridor to facilitate sustainable land use and development outcomes. The following section details sustainable growth principles for:**

- **Subdivision design and layout;**
- **Building design;**
- **Water sensitive urban design;**
- **Transport network planning; and**
- **Public open space design and provision.**

The Mooroopna West Structure Plan sets the overarching planning framework to accommodate future residential growth for Mooroopna West growth corridor. A series of sustainable growth principles have been prepared for application within the Mooroopna West growth corridor to facilitate sustainable land use and development outcomes. The application of these principles will ensure that an interactive, vibrant, self sustaining community is produced within the Mooroopna West growth corridor. The principles will be used to inform local decision-making and influence urban design responses. Planning applications made within the Mooroopna West Growth Corridor should have regard to the following sustainable growth principles and the particular residential subdivision provisions of Clause 56. It is noted that these principles are to be applied across all of the precincts identified in the Mooroopna West Growth Corridor.

## 9.1 Subdivision Design and Layout

The design of energy efficient subdivisions is a key action listed within the Local Action Plan as part of the Cities for Climate Protection Program. It is acknowledged that subdivision layout and lot diversity, distribution and design are important considerations for improving energy efficiency and ultimately in achieving a sustainable development outcome. The following principles should underpin all new subdivisions within the Mooroopna West Growth Corridor.

- The creation of smaller lot sizes is encouraged, as local land supply is finite, particularly given the physical constraints to the further outward expansion of Mooroopna and the state-wide planning objective of providing more compact and walkable neighbourhoods;
- The creation of a range and mix of lot sizes to provide for a diversity of household needs;
- Distribute lots such that dwellings are located no more than 400 metres street walking distance to nearest existing or proposed bus stops;
- Lots supporting medium and high density development housing should be located in and within 400 metres street walking distance of the proposed local clusters or POS;
- The use of rectangular shaped allotments with appropriate dimensions aligned on a north-south axis to provide the optimal orientation for solar access. Narrow and long allotments should be avoided;
- The use of rectangular building envelopes to:
  - support the siting and design of dwellings to meet energy rating requirements
  - protect solar access on adjoining properties
  - to protect existing or proposed easements and significant vegetation and/or site features
- Cul de sacs in subdivision design should be minimised. It is generally difficult to consolidate lots within cul de sacs and the configuration of lots within cul de sacs generally do not support or facilitate new land uses;
- The design and layout of a subdivision should seek to achieve interactivity and permeability within the local context. Street width, length and pavement materials impact on energy consumption;
- The alignment of roads and open space reserves should be responsive to the natural direction of overland flood flows to minimise flow obstructions;
- Stormwater management systems shall be integrated with the overall development plan including the street and public open space networks and landscape design;
- Use of water sensitive urban design features to manage run-off in streets and public open space;
- Underground electricity supply and combine infrastructure trenching. The co-location of physical services is encouraged;
- Standardise public lighting systems. Variable lighting design raises maintenance costs and often product sourcing problems. Using metal halide or compact fluorescent lamps for street lighting can achieve reduced energy emissions;
- Allow for street tree planting in accordance with the recent and new residential areas section of the Council's Street Tree Planting Strategy. Deciduous trees should be utilised in the private realm and evergreens within the public realm;
- Allow for planting and landscaping of public open spaces, promoting the use of drought tolerant and low maintenance plants appropriate to the intended use of the public open space;

- Prepare a construction site management plan to manage site run-off, dust, erosion, litter, construction waste, chemical contamination and identification of vegetation and natural features to be retained. Construction materials are to be collected, re-used, and recycled; and
- Utilise recycled material, where practicable for the construction of street, shared paths and other infrastructure.

## 9.2 Building Design

Similar to the design and layout of subdivisions, the design of buildings contributes significantly to the creation of a sustainable development outcome. The Council encourages the adoption of the following principles by way of the use of design guidelines in designing new dwellings within the Mooroopna West growth corridor.

- Position new dwellings close to the street frontage. Extensive front setbacks necessitate longer driveways (hard surfacing) and increased piping length for the underground services;
- Design new dwellings to achieve a five star energy rating;
- Design new dwellings to avoid dark roofs and to have minimal paving as these contribute to urban areas being up to 10 degrees hotter than surrounding rural areas;
- Urban heat island mitigation such as eliminating pavement surface and strategic tree planting will result in significantly reduced temperatures, (City of Greater Shepparton Cities for Climate Protection Program – Local Action Plan);
- Finished floor levels of dwellings located within the Land Subject to Inundation Overlay area must be constructed a minimum of 300mm above the estimated 1 in 100 ARI event;
- Acoustic measures as may be appropriate concerning the Shepparton Bypass;
- Avoid the incorporation of minimum dwelling size restrictions on Title. Reduced building mass should be encouraged via the stipulation of maximum dwelling sizes or building envelopes. Smaller outbuildings should be encouraged as they also allow for a higher level of site permeability;
- Employ attached and / or multi storey construction with medium density housing;
- Improve energy efficiency through the use of external cladding materials such as face brickwork and tiled roofs;
- Utilise eaves, particularly on the northern side of a dwelling and skylights;
- Encouragement of the use of solar generated hot water;
- Position windows to allow for cross ventilation; and
- Plan for shaded areas. Use pergolas, sails and trees to create cooler external areas within developments.

## 9.3 Water Sensitive Urban Design

Water Sensitive Urban Design ('WSUD') represents the broad philosophy that aims to substantially manage and conserve water in the urban environment. WSUD pertains specifically to the interaction between the built environment such as roads and buildings with the natural environment such as landscaped areas and the urban water cycle.

The core initiatives of sustainable water resource management are conservation and reuse. These initiatives are reflected in the particular provisions of Clause 56.07 of the Greater Shepparton Planning Scheme where integrated water management objectives specify standards in drinking water supply, water re-use and recycling, waste water management and urban run-off management which need to be achieved as part of subdivision design.

Conservation initiatives ensure available water sources are used for the most appropriate purposes. The reuse of stormwater addresses both water conservation and stormwater management and reduces the demand on potable water resources and reduces the volume of stormwater runoff from the site.

There are a number of WSUD measures that can function within an overall network of stormwater elements to achieve management objectives. The selection of the most appropriate network of stormwater management measures for a particular site requires an understanding of the functionality of each measure and the operational limitations based on hydraulic loading, pollutant loading and site conditions. The stormwater treatment measures selected within the Mooroopna West Growth Corridor should complement drainage infrastructure in accordance with the “major minor” drainage approach and be designed to minimise stormwater run-off and protect environmental values and physical characteristics of the receiving waters.



The WSUD features considered most suitable for future residential development within the Mooroopna West Growth Corridor include gross pollutant traps, continuous deflection separators (CDS) or similar systems and bio-retention swales. The use of appropriate landscape design techniques to support integrated water management systems should also be considered, particularly within the public open space areas. The design of any local drainage network within the Mooroopna West Growth Corridor should include WSUD features and any subdivision application should articulate the maintenance responsibilities, requirements and costs. In addition any stormwater management system and reuse of urban run-off design must meet current best practice performance objectives for stormwater quality and be designed in accordance with the requirements of G-MW, as the relevant drainage and water authority.

## 9.4 Transport Network Planning

Integrating land use and transport is a key objective of sustainability. An efficient movement network with good circulation and accessibility must be planned for within the Mooroopna West growth corridor. The following sustainable development growth principles should be considered within the Mooroopna West growth corridor.

- Create a distinct road hierarchy providing for safe and efficient vehicular movements;
- Connectivity with existing residential subdivisions external to the Mooroopna West growth corridor is critical and should be properly planned for;
- Integrate public transport facilities and routes within new subdivisions;
- Permeability and linkages is the key to planning for people movement;
- Opportunities for pedestrian and cycle networks should be planned for on both the local road network and within the public open space reserves. Priority areas for pedestrians and bicycles should be established;
- Provide road widths and on carriageway parking to satisfy the level of activity expected along the road;
- Design local roads with traffic calming measures to encourage pedestrian, bicycle and landscape use of spaces; and
- Design local road widths to be as narrow as is practicable to save land, construction resources, rainwater runoff, energy costs and improving public amenity.

## 9.5 Public Open Space Design and Provision

The Mooroopna West Growth Corridor provides significant scope to accommodate a high quality, linear public open space network. The public open space opportunity is primarily derived from the Ardmona (Community Drain) 7P running south – north through the Mooroopna West Growth Corridor which is to be enhanced via the development of linkages to existing open space assets outside the Mooroopna West Growth Corridor (including regional and district playgrounds and recreational facilities). It is also anticipated that the public open space along the Ardmona (Community Drain) 7P will be interconnected with future local parks and playgrounds within the Mooroopna West Growth Corridor via park infrastructure and landscape embellishments.

The linear open space network and proposed shared pathway will encourage active use by pedestrians and cyclists and contribute to the movement of people between other open spaces – such as Gemmills Wildlife Reserve, Craigmuir Lake and John Gray Reserve, and to existing and proposed commercial centres, community facilities (i.e. schools) and other residential precincts.

The size, orientation and multiple functions of the linear open space will facilitate the implementation of the overall vision for public open space within the Mooroopna West Growth Corridor, which is to return the land back to its natural state comprising both low level grasslands and native bush areas. In time, it is envisaged that the public open space will become an active wildlife corridor with a diverse ecosystem rather than an unkempt dry floodway reserve. The linear open space also affords the provision of integrated urban water management system where water bodies will contribute to the visual aesthetics incorporating natural features. The provision of formal edges along an open space spine, including a shared pathway will provide a transition from the wildlife corridor to informal recreation areas adjacent to residential development and community facilities. Further open space experiences will be achievable through various landscape embellishments including but not limited to signage, fencing, and park furniture, such as seats, bicycle racks, bins and exercise stations.

The provision of large, local parks of at least one hectare will provide unencumbered public open space areas within the Mooroopna West Growth Corridor where other facilities such as playgrounds can be developed and linked with the proposed linear network. Large local parks are able to support embellishments and facilities which contribute to improving access, safety and responsiveness to community open space and recreational needs. Small local parks which are not connected to broader open space network are less likely to meet changing recreational needs or support additional infrastructure and facilities thereby limiting overall usage. In addition, larger parks reduce maintenance costs which are afforded by their economies of scale.

The provision of landscaping is an important feature in the development of attractive and continuous open space networks. It is the Council's expectation that landscapes appropriate to the intended public use, such as passive and active recreation, trails, bushland and nature areas, exercising of pets, playgrounds, picnic areas and shaded areas, should be provided. Improvements to existing regional and district public open space assets (including playgrounds, parks and recreational reserves) will also enhance the accessibility and diversity of open space opportunities on offer for the enjoyment and use by future residents of Mooroopna West.

The following principles should be adopted in the detailed design of new public open space areas within the Mooroopna West Growth Corridor:

- Open space should be designed and planned to accommodate the needs and aspirations of people of all abilities, cultures and ages without compromising the desired environmental objectives. Broad-community access to open space should be maximised;
- Safe and convenient areas must be provided for residents;
- Design open space areas and recreational facilities to accommodate the needs of active and passive users;
- Open space design should be drought and frost proof;

- Protect water quality. Use wetlands in appropriate locations to not only create visual interest but also provide for water filtration and detention;
- Vegetation will block winds and create shade. Increased vegetation in open space areas will also allow for increased carbon sequestration;
- Enhance the identity and aesthetic image of different sections within the open space areas by proposing specific planting themes;
- Factor in safe, low maintenance play spaces for children in appropriate locations; and
- Plan for the future management and protection of open space areas. Where appropriate, seek to ensure that links between public open space are in public ownership.

The area subject to flooding and included within the Urban Floodway Zone is essentially non-developable land. On this basis, the non-developable land should be transferred to the Council the time of subdivision of associated developable land.

## 10.0 Traffic Investigation



**This section details the findings and recommendations from the Traffic Investigation Report and further reports undertaken by John Piper Traffic Pty Ltd.**

**In the context of a new North-South Road, this section considers the following:**

- **Operation of the future road network with the Shepparton Bypass;**
- **Traffic flows within the Mooroopna West Growth Corridor;**
- **Road alignment and cross sectional details; and**
- **Intersection upgrades.**

As an important precursor to the preparation of the Structure Plan and DCP, Maunsell prepared a Traffic Investigation Report, November 2006 and further work was undertaken by John Piper Traffic Pty Ltd (JPT). A full copy of the Traffic Investigation Report is attached and marked **Appendix A**. In essence, the Traffic Investigation Report provides the findings and recommendations from a detailed traffic investigation undertaken to determine whether an appropriate justification exists for the establishment of a North-South Road through the Mooroopna West Growth Corridor, based upon the likely future development traffic.

The investigation included:

- Undertaking traffic counts, and reviewing existing counts to establish existing AM and PM traffic volumes;
- Reviewing existing information pertinent to the investigation, including the flood study, current development trends, the accident history and traffic patterns;
- Estimating future development traffic generation and assignment;
- Assessing the impact of the development traffic with and without the proposed future North-South Road; and
- Recommendations on the layout of the North-South Road and its intersections.

The overall recommendation of the Traffic Investigation Report was that a North-South Road be introduced within the Mooroopna West Growth Corridor between the Midland Highway in the south to Echuca – Mooroopna Road in the north. From the analyses of future traffic loads and the function of the North-South Road and further traffic work undertaken by JPT, the following traffic engineering recommendations were made in relation to the design and operation of the road and its intersections.

The relevant JPT reports relied upon are attached as **Appendix B** and **Appendix C** to this report.

## 10.1 Operation of Future Road Network – Shepparton Bypass

One possible major change to the existing road network is the introduction of the Goulburn Valley Highway – Shepparton Bypass (Bypass). One section of the Bypass is planned from the Midland Highway, following an alignment immediately west of the Mooroopna West Growth Corridor (along the existing alignment of the Excelsior Road), heading north to Echuca Road, immediately north of the Mooroopna West Growth Corridor. The local impact of the Bypass would be to remove a significant proportion of the heavy vehicle traffic that currently utilises Echuca Road and the Midland Highway. This would help to reduce the currently increasing congestion levels experienced at the township's major intersection of Echuca Road and Midland Highway. The staging of the Bypass will be dependent upon a number of factors, including the possible introduction of a new multi-modal freight terminal south of Mooroopna. It is likely that the Bypass will not be fully operational for many years. Therefore, for the purposes of the traffic assessment for the Mooroopna West Growth Corridor, it has been assumed that the Bypass is not operational. However, its ultimate alignment will be considered in the planning of the North-South Road and other intersection designs.

It should be noted that (in the absence of a Bypass) that the introduction of a new North-South Road through the Mooroopna West Growth Corridor, could potentially create an attractive alternate bypass for any Echuca Road-Midland Highway vehicles. Among other things, as 30% of the potential bypass vehicles are heavy vehicles, it will be necessary to ensure that the North-South Road is not used as an alternative heavy vehicle route, and that appropriate traffic management measures are implemented to discourage these vehicles from using the North South Road and entering the residential area. Options include introducing a load limit restriction with signage installed at either end of the Mooroopna West Growth Corridor and various traffic calming measures.

## 10.2 Traffic Flows

The forecast traffic flows to be carried by the North-South Road will vary along its length. The estimated traffic flows have been based upon the predicted number of lots in the development, plus up to an additional 20% load to account for trips from the existing residential areas that may transfer to this new road. Therefore, a summary of the likely traffic flow range in different sections of the North-South Road is provided in Table 14: Traffic Volumes on North-South Road.

**Table 14: Traffic Volumes on North South Road**

Location	AM PEAK HOUR		PM PEAK HOUR	
	Northbound (vehicles/hour)	Southbound (vehicles/hour)	Northbound (vehicles/hour)	Southbound (vehicles/hour)
South-West of Echuca Road	360-450	130-170	190-240	320-400
North of MacIsaac Road/ North of Knight Street	170-210	260-330	260-330	190-240
North of Midland Highway	210-270	1090-1200	950-1040	400-500

There may be variation in the traffic flows beyond the above ranges, depending on the access options provided to and from the existing and new residential development areas, access to the new road and/or access to other roads. In addition, if the North-South Road becomes an attractive bypass route, there is a potential for cut-through non-local traffic to use the route. It will be important to control this by ensuring that any non-local heavy vehicle traffic is discouraged or prevented from using the route (i.e. load limits).

The peak traffic flows on the North-South Road are expected to be around 600 vehicles per hour (two-way flow). However, immediately north of the Midland Highway, volumes will be higher, and could reach up to 1500 vehicles per hour.

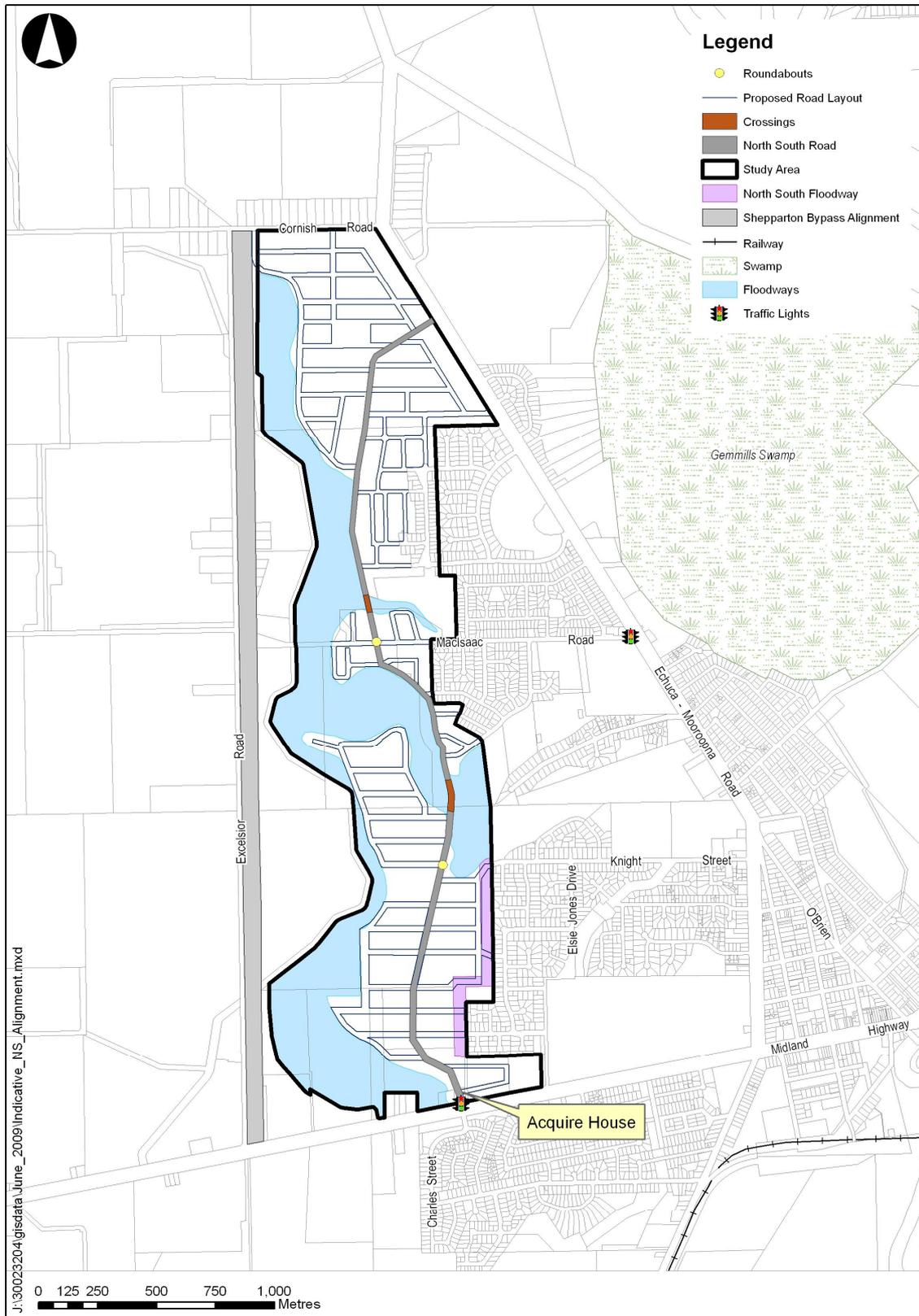
The route is expected to carry an average weekday traffic volume of between 6,000 to 12,000 vehicles per day. This range is compatible with the expected traffic flows for a collector to arterial road in a suburban environment. However, it is generally preferable to maintain traffic flows at less than 8000 vehicles per day for residential collectors, to retain manageable traffic volumes near residential properties. In any event, traffic flows north of Knight Street are unlikely to exceed this volume, and accordingly, impacts associated with traffic noise and volume are not expected to be significant.

## 10.3 Road Alignment and Cross-Section

### 10.3.1 Alignment

In order to maximise developable land within the Mooroopna West Growth Corridor, it is proposed to locate the road as close as practical to the edge of the existing Urban Floodway Zone. The preferred road alignment is shown in Figure 11: Indicative North – South Road Alignment.

Figure 11: Indicative North – South Road Alignment



## 10.4 Cross Section

The North-South Road is intended to operate as a connector road. It is therefore intended to carry higher traffic volumes than the other local roads within the network; however it is not expected to be classified as a declared road, and will effectively be a Council controlled road. In its capacity as a connector through a residential environment, it is expected to have relatively high pedestrian and cyclist activity, and is therefore required to operate safely for these potentially vulnerable road users. A 50 km/hr speed limit should therefore apply to this road. Its alignment and cross-section should also be designed to discourage higher speeds from the outset. Some typical Local Area Traffic Management techniques applied to connector roads include:

- Roundabouts and/or mid-block splitter islands at about 500 metre spacing;
- Median islands or barrier lanes to restrict overtaking (and allow for incorporation of pedestrian refuges);
- Carriageway width confined to one lane in each direction of travel;
- Definition of parking lanes by line marking to help confine traffic to one travelling lane; and
- 50 km/hr speed limit.

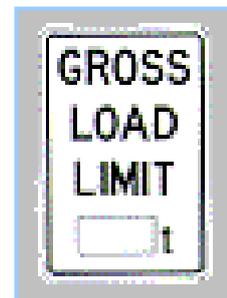
The use of vertical displacement devices such as speed humps or single lane slow points could also be considered as appropriate treatments to discourage excessive traffic volumes. However, as this road is an entirely new infrastructure item, (a road deliberately designed to achieve lower speeds from the start), initial emphasis should be placed on designing an appropriate curvilinear road alignment. Long straight roads, with unimpeded sight lines over long distances, are more likely to attract and encourage higher vehicle speeds and such alignments should therefore be avoided. Gentle curvilinear alignments are preferable to straight alignments as they can actively promote lower speeds over the length of the road without compromising safe sightlines.

### 10.4.1 Capacity

In order to carry the traffic volumes predicted for this road, one lane in each direction is adequate. However, immediately north of the Midland Highway, this road section may require some localised widening at intersections to prevent the higher traffic flows from causing delays. Two lanes in each direction may be warranted for a short section of the North South Road to the north of Midland Highway. Treatments appropriate for this part of the road may include right turn lanes and left turn deceleration lanes to enable through traffic to proceed unimpeded, and improve access to and from the residential streets running west off the North-South Road. In the southbound direction, flaring at the intersection with the Midland Highway will be essential to maintain adequate intersection capacity.

### 10.4.2 Vehicle Restrictions

To reduce the incidence of heavy vehicles using the North-South Road, signage should be used in conjunction with the 50km/h speed limit and curvilinear road alignment. The most appropriate signage to be used would be weight restrictions, as using length restrictions will not stop some heavy vehicles entering the area. The use of roundabouts on the North-South Road will assist in restricting access to longer vehicles.



### 10.4.3 Bicycles

It will be desirable to allow for on-road cycle lanes in the carriageway profile. The proposed cross-section should therefore include on-road cycle lanes. This will complement the shared pathway network contained within the public open space corridor throughout the Mooroopna West Growth Corridor.

#### **10.4.4 Parking**

Parking may be necessary in some locations, to facilitate access to adjacent land uses. Parking should be indented, to reduce the wide expanse of pavement that a continuous parking lane would provide.

#### **10.4.5 Median**

A range of local area traffic management treatments such as splitter islands, refuges etc. are recommended to improve pedestrian safety, promote a narrower road environment, and prevent overtaking manoeuvres. One mechanism that could achieve this objective for the North-South Road is the introduction of a median along the southern part of its length.

#### **10.4.6 Buses**

The North-South Road is also expected to ultimately cater for a bus route, and an allowance should be made for bus stops. The current preferred practice for bus stops is to not provide indented bays, as such treatments can reduce visibility and delay buses in trying to “pull back” into the traffic stream. Accordingly, bus stops should be located within the normal carriageway width, without an indented bay. However, at special locations such as layover areas, timing points, a major bus interchange, or at the proposed school the use of specially designed solutions may be necessary.

#### **10.4.7 Pedestrians**

Pedestrian footways should be provided on at least one side of the road, desirably on both sides. If footpaths are provided on both sides, one path may provide a more “recreational” function and connect to the network of recreational walkways and reserves. Such a footpath may not necessarily follow directly alongside the North-South Road, but could meander between reserves and open spaces.

### **10.5 Intersection Upgrades**

#### **10.5.1 North-South Road and Echuca Road Intersection**

Traffic signals may be warranted for the intersection of the North-South Road and Echuca Road as during the AM peak one hour period, vehicles turning right from North-South Road onto Echuca Road may experience delays. Since the North-South Road is intended to attract traffic to use this route (in preference to other local roads in the area), an exclusive right turn lane from Echuca Road (north approach) into the North-South Road may be required as part of later stages of the development of Precinct D.

#### **10.5.2 Echuca Road and MacIsaac Road Intersection**

This priority control junction would be unable to sustain the additional traffic flows from the Mooroopna West Growth Corridor traffic. The increased traffic is expected to lead to long queues and delays for right turns from MacIsaac Road into Echuca Road. The results indicate that the intersection would need to be signalised, with only minor modifications to ensure safe and efficient access to Echuca Road.

#### **10.5.3 North-South Road and Midland Highway**

Based upon a cross-intersection with Charles Street, and a duplicated carriageway, traffic signals would be required at this intersection to ensure it operated safely and without long queues and delays. The duplicated carriageway is not essential for the operation of the signals, but was incorporated on the basis of duplication of the southern part of the North South Road for riverine flood mitigation purposes.

#### **10.5.4 Echuca Road and Knight Street**

This intersection will continue to operate satisfactorily without the need for signalisation given the introduction of the North South Road and the availability of alternative signalised east-west connections at Echuca Road / MacIsaac Road and Echuca Road/ North South Road. It is expected that Knight Street will not sustain additional traffic volumes due to the 'easier' North-South Road route and as such no traffic lights or upgrades will be required.

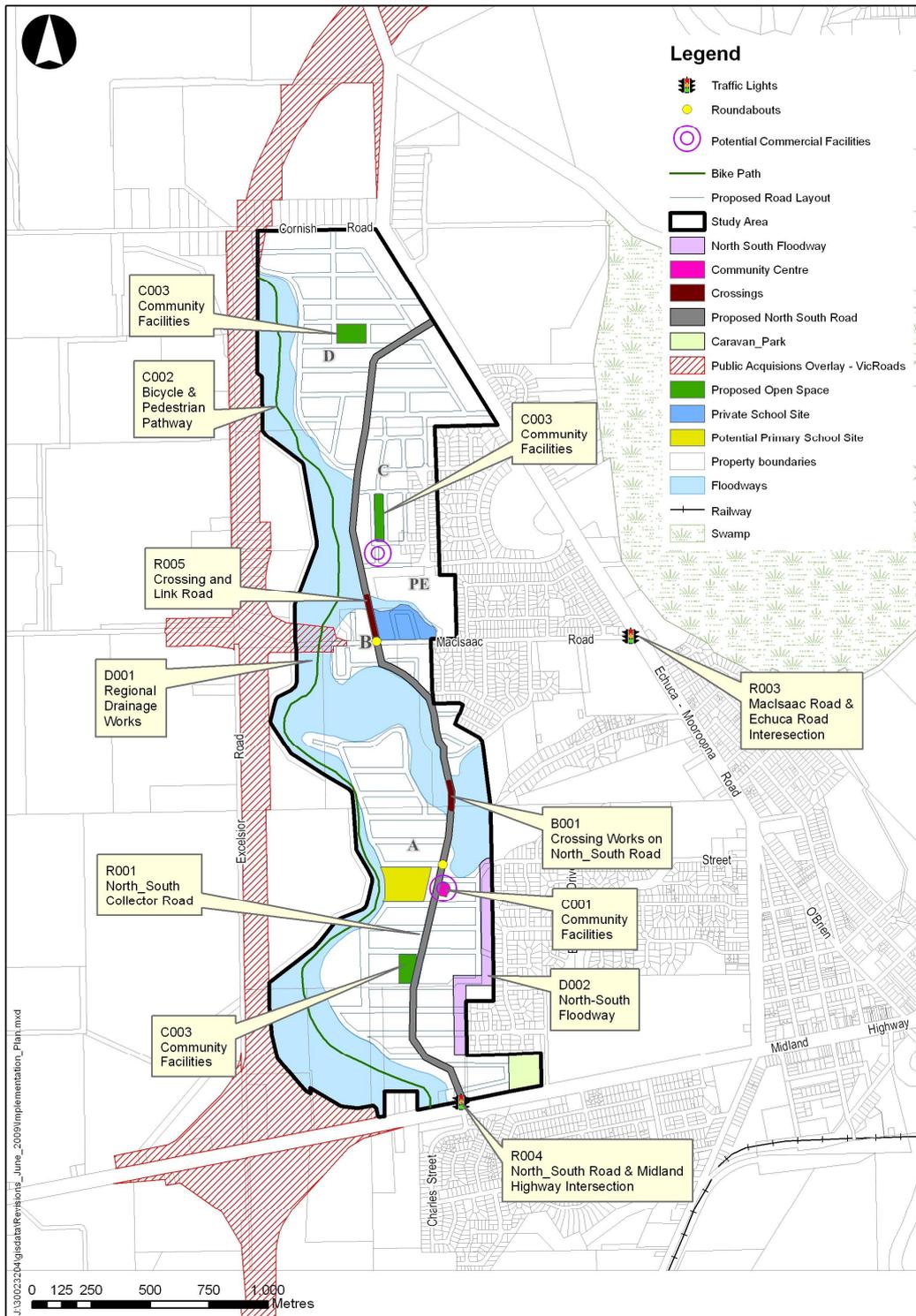
## 11.0 Structure Plan Implementation Requirements



**This section provides a series of specific implementation requirements, which have been prepared to guide and support the establishment of new land uses and development within the Mooroopna West Growth Corridor.**

A series of specific implementation projects will be required to accommodate and facilitate the development of the Mooroopna West Growth Corridor. The conceptual layout for the Mooroopna West Growth Corridor should be used as a basis for the preparation of development plans and detailed plans of subdivision as well as new land use and development proposals.

Figure 12: Mooroopna West Growth Corridor Projects Implementation Plan



## 11.1 North – South Road

Based on the Traffic Investigation Report, it is recommended that a North-South Road be introduced in the Mooroopna West Growth Corridor between the Midland Highway in the south to the Echuca-Mooroopna Road to the north. The peak traffic flows on the North-South Road are expected to be around 800 vehicles per hour (two way flow). As a connector road, the North-South Road will link the local street network with the arterial road network. From a road management perspective, it will be a Council controlled road.

### 11.1.1 Land Acquisition

It is the Council's expectation that individual developers will construct relevant sections of the North-South Road as necessary as land is developed and released to the market. To ensure that the North-South Road alignment is given an appropriate level of "planning certainty", it may be necessary for some limited sections of the alignment to be acquired by the Council. If required, the Public Acquisition Overlay would be used to formally reserve the missing link land for the North-South Road and to ensure that any changes to the use or development of the land do not prejudice establishment of the road. Furthermore, a reference denoting the Council as the acquiring authority and the reservation purpose will need to be inserted within the schedule following the Public Acquisition Overlay at Clause 45.01 of the Greater Shepparton Planning Scheme.

The approach to establishing the North-South Road will be centred on individual developers constructing sections of road as necessary.

At the time of acquisition, the value of the land to be acquired will be determined by way of a professional valuation of the land in accordance with the Victorian Valuer General requirements.

### 11.1.2 Traffic Management

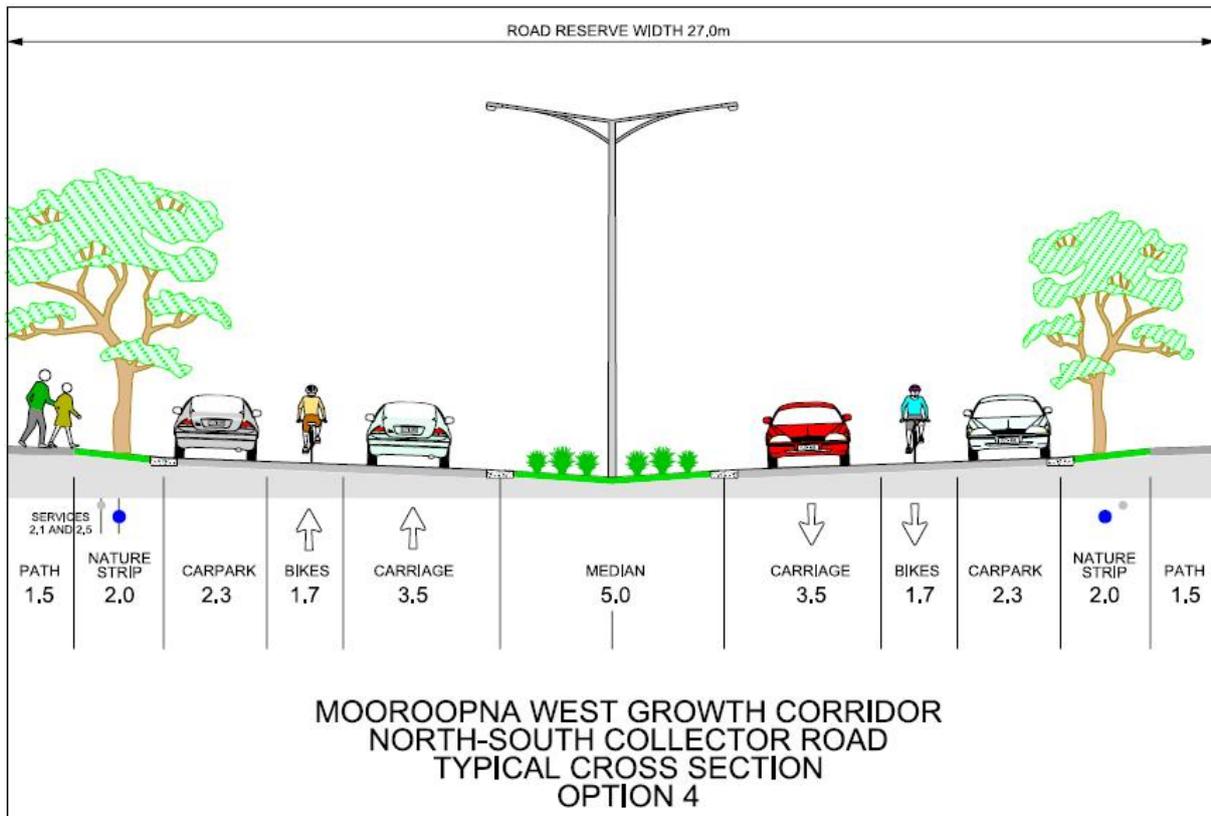
Signalisation at various locations will be required consistent with the recommendations of the Traffic Investigation Report and subsequent reports by JPT. Some specific local area traffic management techniques that should be applied to accommodate the North-South Road include:

- Roundabouts and/or mid block splitter islands at about 500 metre spacing;
- Median islands or barrier lanes to restrict overtaking (incorporating pedestrian refuges);
- Carriageway width confined to one lane in each direction of travel;
- Definition of parking lanes by line marking to help confine traffic to one travelling lane; and
- Adopting a 50km/hr speed limit.

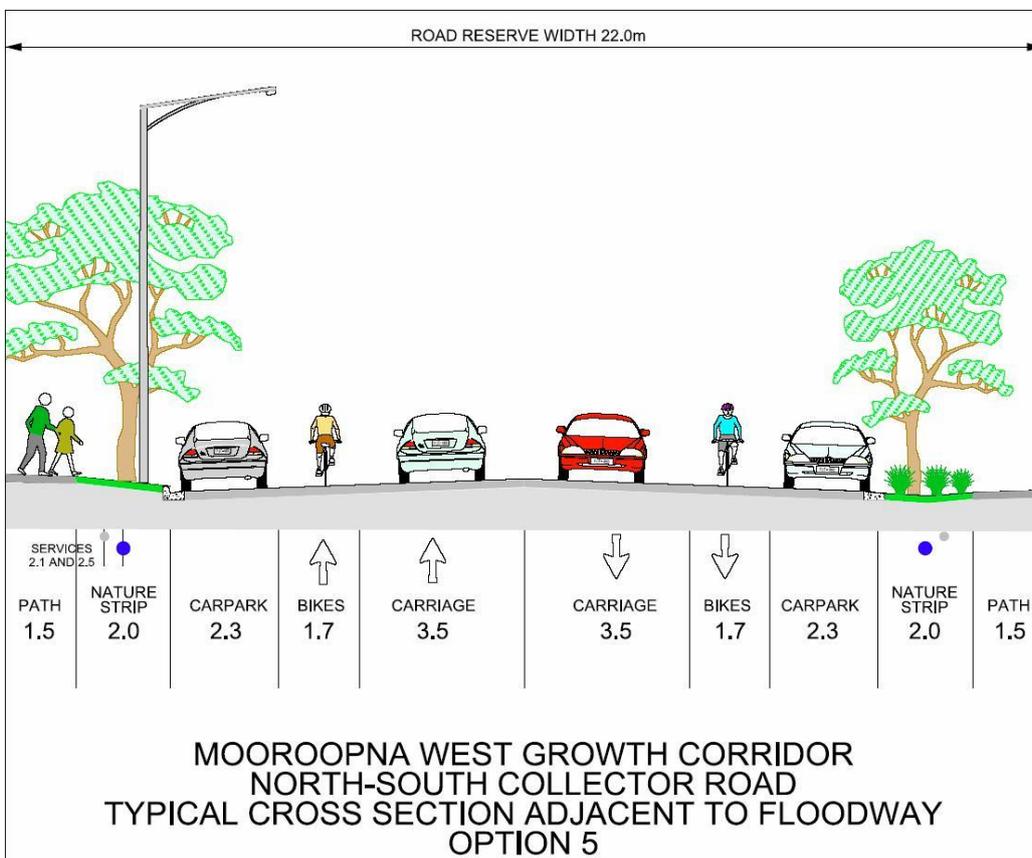
Indicative cross sections for the North-South Road are detailed in Figure 13.

Figure 13: North South Road Cross Sections

Indicative North-South Road Cross Section for Precinct A



Indicative North-South Road Cross Section where it abuts the regional floodway



## 11.2 Management of Surface Water

### 11.2.1 Stormwater

Current best practice urban stormwater management aims to satisfy multiple objectives. These include:

- Provision of stormwater conveyance capacity to provide safe passage of stormwater runoff, and to avoid nuisance flooding and flood damage to private property. Minor drainage systems to be designed for a 5 year ARI design storm event.
- Provision of stormwater retention within the public open space to mitigate the increased discharge rates and runoff volumes resulting from urban development. The objective is to protect the aquatic ecosystems of receiving waters and avoid increased flooding in downstream waterways and drainage systems.
- Provision of stormwater treatment measures to remove water borne contaminants transported within the urban stormwater runoff.
- Integration of stormwater conveyance and treatment systems into the overall urban and landscape design of urban residential areas.

The Victorian Planning Provisions requires new urban development to comply with the stormwater quality objectives provided in the Victorian BPEM Guidelines. For the Mooroopna West Growth Corridor area, water quality discharge parameters were sourced from Goulburn-Murray Water (“G-MW”). These provide the acceptable rate of discharge to drains and waterways.

G-MW water quality objectives are summarised in Table 15 below.

**Table 15 G-MW Water Quality Objectives**

Pollutant	Receiving Water Objective	Current BPEM Best Practice
Suspended Solids	Not exceed the 90 <sup>th</sup> percentile of 80mg/L	80% retention of the typical urban annual load
Total Phosphorous	Base flow concentration not to exceed 0.06mg/L	45% retention of the typical urban annual load
Total Nitrogen	Base flow concentration not to exceed 0.7mg/L	45 % retention of the typical urban annual load
Litter (BPEM Guidelines)	No litter in waterways	70% reduction of the typical urban annual load

### Water Sensitive Urban Design

Water Sensitive Urban Design (“WSUD”) represents the broad philosophy that aims to substantially manage and conserve water in the urban environment. WSUD pertains specifically to the interaction between the built urban form i.e. roads, buildings, and landscaped areas and the urban water cycle.

The core initiatives of sustainable water resource management are conservation and reuse. Conservation initiatives ensure available water sources are used for the most appropriate purposes. The reuse of stormwater addresses both water conservation and stormwater management and reduces the demand on potable water resources and reduces the volume of stormwater runoff from the site.

There are a number of WSUD measures that can function within an overall network of stormwater elements to achieve management objectives. The selection of the most appropriate network of stormwater management measures for a particular site requires an understanding of the functionality of each measure and the operational limitations based on hydraulic loading, pollutant loading and site conditions. The stormwater treatment measures selected should complement drainage infrastructure in accordance with the “major minor” drainage approach.

## Retarding Basins

Major retarding basins will be required to provide storage for excess runoff from the development areas to permit controlled discharge to the G-MW Ardmona Main Drain. Such retarding basins can be incorporated in the design of wetlands. Major retarding basins will be confined to the Urban Floodway Zone. The use of “air space” or the volume above the wetland treatment area and dead floodplain storage area will be used to maintain and balance floodplain storage along the active floodplain.

There appears to be no other alternative major water use being available within the development apart from small parkland areas, therefore there appears to be no benefit in providing permanent storage capacity within the retarding basin design.

## Stormwater Reuse

Stormwater reuse at the allotment scale needs to be encouraged and implemented where practical as part of the strategy. Stormwater reuse would offer measurable benefits for mitigating stormwater discharge from the development and reducing the demand on mains water consumption where the water is directed to continuous uses such as hot water systems and toilet flushing. Appropriate support and encouragement should be provided to ensure rainwater tanks of at least 3-5 KL capacity will be fitted and suitably plumbed on houses within the development.

### 11.2.2 Riverine Flooding

The Mooroopna West Growth Corridor covers a large area to the west of the existing Mooroopna floodplain. An investigation into the potential changes to flooding behaviour associated with the Mooroopna West Growth Corridor has been prepared by Cardno Lawson Treloar Pty Ltd (CLT). **Appendix F** contains the reports by CLT. These reports deal with the re-establishment of the existing hydraulic model for the study area, determine the impact of the proposed Mooroopna West Growth Corridor development on flood flows at surrounding properties and determine mitigation measures required to reduce the impact of the Mooroopna West Growth Corridor on flood flow and levels at the surrounding properties.

The investigation concluded that the following mitigation options were considered the most practical options to minimise the impact of proposed development on existing flood levels:

- Use of series of east – west roadways to convey floodwater through the development from east to west. The Goulburn Broken Catchment Management Authority has allowed a flood depth of 0.50 m in these roads. The exact location and configuration of these roads may change during final design.
- The southern section of the north – south road is proposed to be used as a floodway during extreme events.
- Regrading of existing floodways along the west and east boundary of the development is required to compensate for loss on floodplain storage.

### 11.3 Infrastructure Services

Another key infrastructure issue relates to sewerage capacity. Goulburn Valley Water has advised that extensive development to the west of Mooroopna is likely to require an independent sewerage network that will connect into the existing outfall rising main on Echuca Road. The outfall rising main currently delivers waste to the Waste Management Facility situated to the north of Mooroopna. The growth expectations envisaged will necessitate some form of augmentation of the outfall rising main in the future. The capital cost for future sewerage upgrade works will be met by headworks charges levied by Goulburn Valley Water rather through the development contributions process managed by Council.

In relation to water, if population growth rates track at 1% compounding per annum in accordance with Goulburn Valley Water's Master Plan, little modification to the existing water supply system will be required. As more ambitious growth expectations are identified within the Mooroopna West Growth Corridor, augmentation of the water supply system may be required.

This could include, additional distribution mains and clear water storage and increased capacity of the Shepparton Water Treatment Plant and the Shepparton to Mooroopna transfer pipeline. The cost of the necessary off site infrastructure upgrades will therefore need to be apportioned by GMW across contributory subdivisions.

### 11.4 Utility Works

The capacity of the following physical infrastructure services will need to be upgraded or augmented to accommodate expected future residential development within the Mooroopna West Growth Corridor.

#### 11.4.1 Power

Powercor's preference would be to bring a 22 kV backbone circuit along the North-South Road, with branches off to distribution substations supplying customers. There would also be branches off to tie with adjacent circuits to form a meshed network. A meshed network makes it possible to isolate supply to any section for access, without having to interrupt supply to a large number of customers.

There are three existing 22 kV feeders either in or bounding the Mooroopna West Growth Corridor. Building a new zone sub-station at Tatura would release adequate capacity at the Mooroopna sub-station and on the three feeders, which together supply the Corridor. The existing 66 kV circuit through the middle of the Corridor, along MacIsaac Road, would form the start of the line taking supply from the Mooroopna sub-station to the Tatura sub-station.

Council encourages the provision of underground power supply to all new subdivisions within the Mooroopna West Growth Corridor.

#### 11.4.2 Sewerage

An independent sewerage network that will connect into the existing outfall rising main on Echuca – Mooroopna Road will be required to accommodate residential development within the Mooroopna West Growth Corridor. Each area must be separately investigated to ascertain whether there is capacity within existing sewerage network connections. A series of pump stations may be required and the augmentation of the primary outfall rising main may become necessary in the future.

## 11.5 Bicycle and Pedestrians

Consistent with National participation trends, the Greater Shepparton Household Survey 1996 identified walking as the leisure activity that has the highest participation rate of any leisure activity within the municipality. A total of 47 percent of the population participate in walking as a leisure activity. Whilst bicycle and pedestrian paths will be integrated with the local road networks where appropriate, the Mooroopna West Structure Plan provides for the formal establishment of a 2.5 metre wide bicycle and pedestrian path of 3.5 kilometres duration to traverse the full length of the Growth Corridor. To be constructed of standard asphalt surfacing with timber edging, the bicycle and pedestrian path will ensure that the Midland Highway to the south is linked to Gemmill Swamp in the northeast.

## 11.6 Playgrounds

The provision of local parks of at least one hectare will provide open space areas within the Mooroopna West Growth Corridor that can accommodate public facilities including playgrounds, park furniture and barbeques. It is the vision of the Council to link the local parks containing playgrounds with the proposed south-north linear open space network. From a community perspective, large local parks are better able to support landscape embellishments, community facilities and recreational needs than small parks.

Children from a very early age require the contact and socialisation opportunities to play with other children. Council values highly the benefits that public play spaces provide for the physical, cognitive and social development of children. The indicative location of the playground facilities have been identified on the Mooroopna West Growth Corridor Concept Plan. The objective of providing playgrounds is to provide children with a public play area and to be a substitute for private "back yard" play areas. The playgrounds should be positioned at the focus of a residential block. Access via foot should be encouraged and street crossings should be minimised.

## 11.7 Community Infrastructure

The future population and household growth expected within the Mooroopna West Growth Corridor will bring with it a need to extend existing and create new community infrastructure to satisfy local needs and expectations for community services. Growth within the Mooroopna West Growth Corridor will necessitate a new, small community centre and other community infrastructure project identified by Council as a result of population growth within the Mooroopna West Growth Area.

## 11.8 Planning Approval Process

The Mooroopna West Growth Corridor Structure Plan will be a guide for future land use and development within the growth corridor. Council in its capacity as the responsible authority under the *Planning and Environment Act* will consider individual planning applications for their overall level of consistency with the Concept Plan, the Sustainable Growth Principles and the Implementation Requirements contained within the Mooroopna West Structure Plan Report.

To ensure that appropriate statutory recognition is afforded to the Structure Plan within the Greater Shepparton Planning Scheme, a schedule to the Development Plan Overlay will be introduced. The schedule will detail the specific requirements that must be satisfied by a development plan and a planning permit in addition to the more general development outcomes articulated within the Mooroopna West Structure Plan.

## 11.9 Development Contributions Plan

In association with the Structure Plan, the DCP has been prepared for the growth corridor. The plan is a full cost apportionment plan, which has been prepared on behalf of the Council in accordance with Section 46J of the *Planning and Environment Act, 1987*.

The DCP is a formal statutory mechanism that will be used to levy new development for the provision of development infrastructure. The development infrastructure projects that have been included within the Mooroopna West Growth Corridor DCP have been determined by the Council to be essential to the health, safety and wellbeing of the local community. It is relevant to note that the DCP excludes infrastructure that is required to be provided as part of a land subdivision including internal roads, footpaths, local drainage systems as well as the provision of gas, power, sewerage and water services.

The Structure Plan identifies both the need and location for new infrastructure and the DCP, which should be read in conjunction with this report, details the appropriate costs and funding approaches to delivering new development infrastructure.

## 12.0 Development Staging



**This section outlines Council's expectations for the staging of development within the Mooroopna West Growth Corridor.**

The staging and release of new residential development within the Mooroopna West Growth Corridor will be determined on the basis of:

- Supply and demand projections for residential development within each of the precincts;
- The logical and cost effective extension of existing physical infrastructure and services;
- The establishment of the North-South Road through the growth corridor;
- Existing and future land ownership considerations; and
- Council policy to discourage out of sequence development.

The sequencing of development within the Mooroopna West Growth Corridor should generally result in development occurring east to west (away from the established residential areas) before expanding to the south and north. Given the disparate land ownership structure within the Mooroopna West Growth Corridor, cost effective infrastructure provision and local market dynamics will determine the specific location and timing of land release.

The Schedule 14 to the Development Plan Overlay (see **Appendix G**) requires infrastructure plans to be part of an approved development plan to ensure that necessary infrastructure is provided in an orderly manner and is coordinated with the development of land within the Mooroopna West Growth Corridor