

Sunraysia Drainage Strategy



Issues Paper no.3 - 2050 Scenario

June 2002



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Document History and Status

Issue	Rev.	Issued To	Qty	Date	Reviewed	Approved
Draft	1	Stakeholders		12/07/01	M.Potter	D.Sheehan
Draft	2	Stakeholders		20/11/01	T.Dando	D.Sheehan
Draft	3	Stakeholders		11/01/02		D. Sheehan
Final Draft	1	Stakeholders Hardcopies	and 50	21/01/02	T.Dando	D. Sheehan
Final	2	Mildura Rural Council	City 25	27/06/02	T.Dando	D.Sheehan

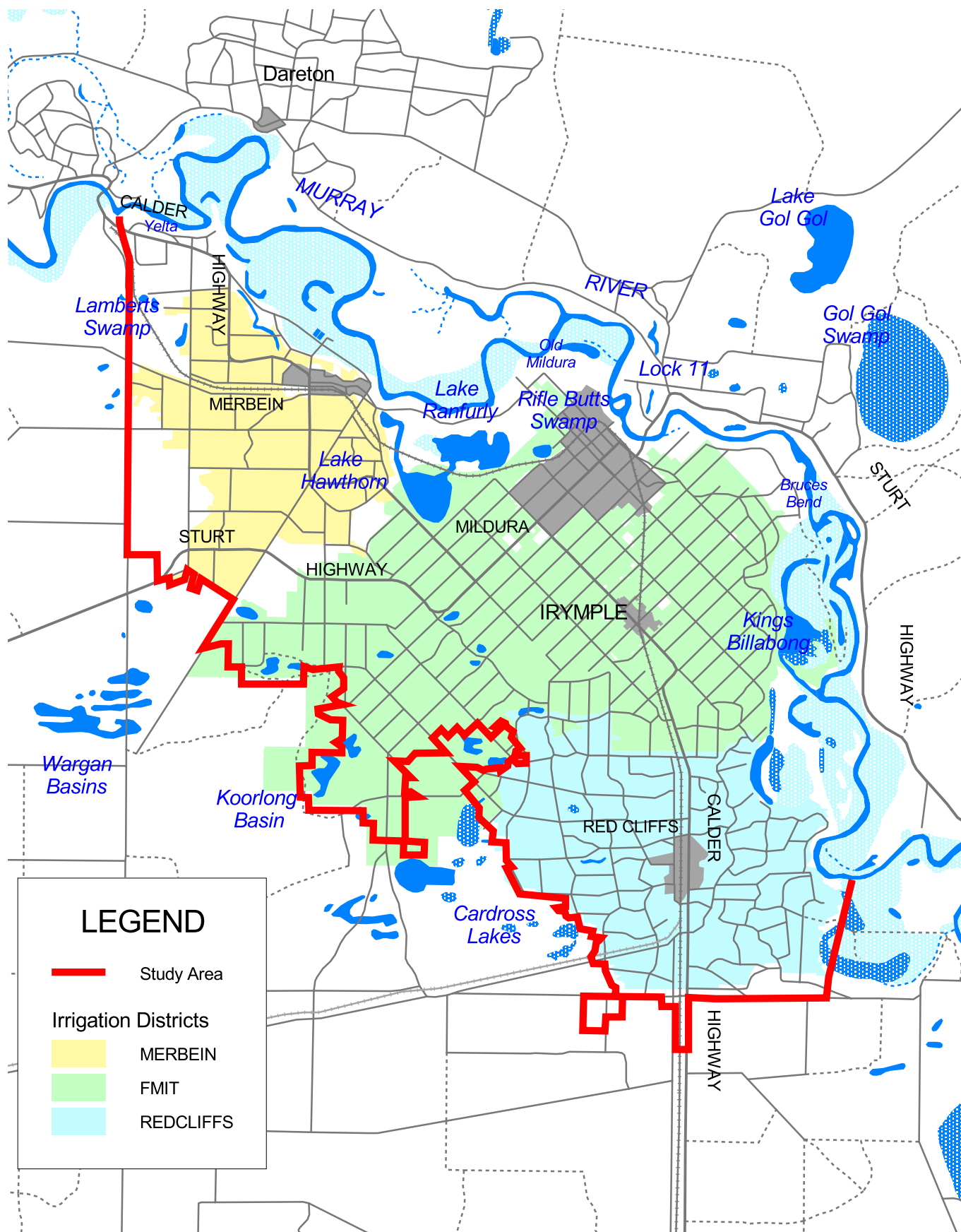
Printed: 20 June, 2002
Last Saved: 18 June, 2002
File Name: I:\WCMS\Wc01738\REP01_05.22\Final_Version_June_2002\Paper_3.Doc
Project Manager: David Sheehan
Name of Organisation: Mildura Rural City Council
Name of Project: Sunraysia Drainage Strategy and Urban Stormwater Management Plan
Name of Document: Issues paper # 3 - 2050 Scenario
Document Version: Final 2
Project Number: WC01738

1. Introduction and Background

This document is the third in a series of Issues Papers being prepared as part of the Sunraysia Drainage Strategy and Urban Stormwater Management Plan Project. The Study Area is shown on Figure 1-1.

The Paper presents background and issues relevant to the preparation of a Year 2050 Development Scenario for the Study Area. A number of alternative development scenarios are presented in the Paper. A preferred scenario was adopted following consultation with the Project's Steering Committee, Reference Group and Project Working Group.

FIGURE 1.1 - STUDY AREA



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2 0 2 4 Kilometres



2. Existing Development and Drainage Systems

2.1 Existing Development

The extents of existing urban and irrigation development in the Study Area are shown on Figure 2-1.

2.1.1 Urban

Areas of urban development in 2000 were as follows:

Mildura/Irymple	1590 ha (ref 1)
Merbein	250 ha
Red Cliffs	315 ha

2.1.2 Irrigation

Summary land use statistics for irrigated areas are presented in Table 2-1.

■ **Table 2-1 Summary of Irrigated Land Use (after Ref 3)**

Irrigation District	Crop Area (ha)							TOTAL
	Grape-vines	Citrus	Field crop /pasture	Vegetables	Fruit/nut tree	Other	Vacant/ not surveyed	
Mildura (1997)	5186	165	164	39	71	83	850	6558
Merbein (1997)	2592	233	8	46	91	6	241	3217
Red Cliffs (1997)	3899	132	37	161	100	37	327	4693
Private diverters (1997)	640	62	17	0.5	3	13	424	1158
TOTALS	12317 78.8%	592 3.8%	226 1.4%	246.5 1.6%	265 1.7%	139 0.9%	1842 11.8%	15626

Summary statistics on irrigation method are presented in Table 2-2.

■ **Table 2-2 Summary of Irrigation Methods (after Ref 3)**

Irrigation District	Irrigation Method (ha)						
	Flood	Furrow	Overhead	Drip	Under tree	Other	Not Surveyed
First Mildura (1997)	16	2498	1391	130	536	94	1518
Merbein (1997)	0	1298	259	29	214	62	1322
Red Cliffs (1999)	0	1882	1309	342	388	139	462
Private diverters (1997)	0	120	211	75	63	15	674
TOTAL	16 0.2%	5,798 52.4%	3,170 28.6%	576 5.2%	1,201 10.8%	310 2.8%	3,976

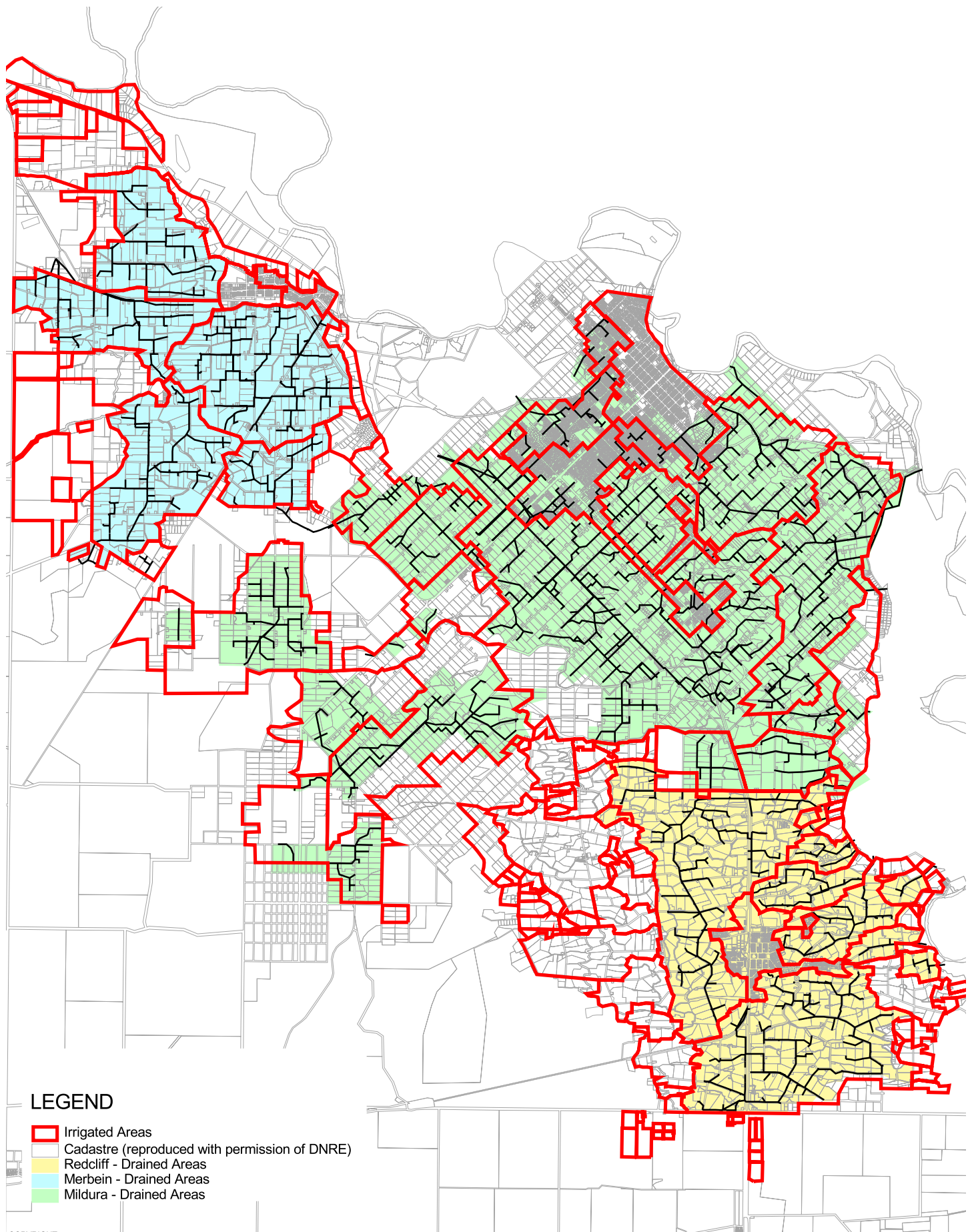
2.2 Existing Drainage Systems

Approximate areas serviced by existing urban and subsurface irrigation drainage systems are also shown on Figure 2-1. Irrigated areas, and estimated areas served by constructed irrigation drainage systems in each of the irrigation areas, are summarised in Table 2-3.

■ **Table 2-3 Existing Irrigated and Drained Areas**

Area	Existing Development			
	Irrigated Area (ha)	Irrigated Areas (ha) Served by		
		Irrigation Authority Drains	Private Drains	Undrained
Merbein Irrigation District	2914	2718	196	0
First Mildura Irrigation District	6281	5592	689	0
Red Cliffs Irrigation District	4633	2644	1989	0
Merbein area, outside of Irrigation District	1087	0	861	226
Mildura area, outside of Irrigation District	574	0	539	35
TOTAL	15,489	10,954 70.7%	4274 27.6%	261 1.7%

FIGURE 2.1 - EXISTING DEVELOPMENT

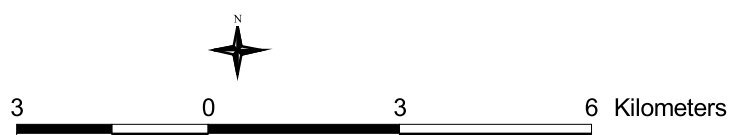


LEGEND

- ▬ Irrigated Areas
- ▬ Cadastre (reproduced with permission of DNRE)
- ▬ Redcliff - Drained Areas
- ▬ Merbein - Drained Areas
- ▬ Mildura - Drained Areas

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3. Previous Reports and Scenarios

3.1 Introduction

A number of previous studies and reports have investigated potential future growth scenarios, and these are summarised in the following sections. Information on existing development and potential future growth scenarios from these investigations has been summarised in a series of Figures as follows:

- ❑ Figures 3.1 - existing development, and current Mildura Planning Scheme
- ❑ Figures 3.2 - potential development based on availability of existing sewerage and drainage infrastructure; and
- ❑ Figures 3.3 – potential future development based on previous studies and planned infrastructure.

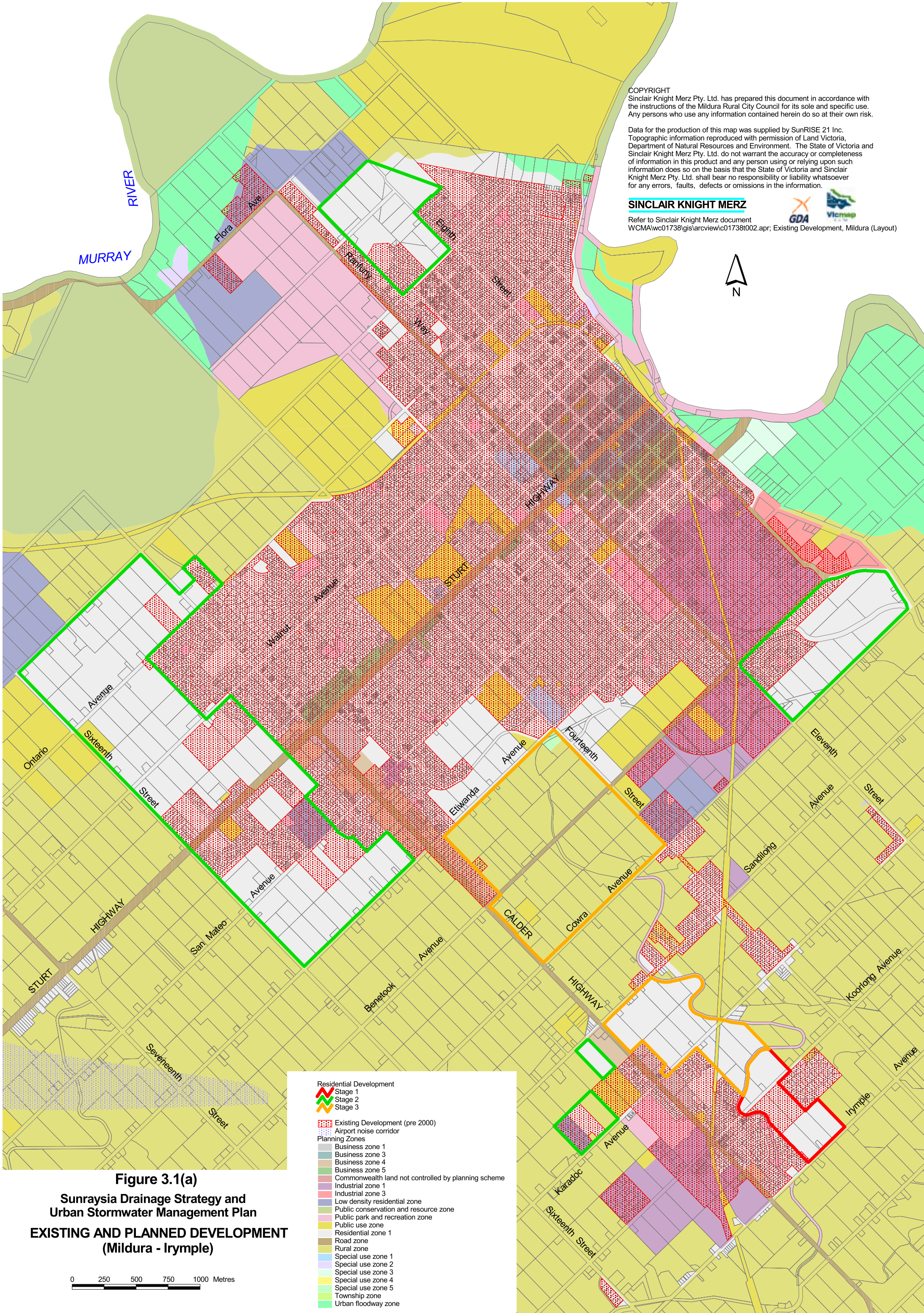
Further background is provided in the following sections.

3.2 Sunraysia Drainage Strategy 2000 - Current Situation Report

Mildura Rural City Council has produced a Current Situation Report (ref 1) as part of the current Project. This Report investigated growth rates based on examination of Lower Murray Water records of subdivisions and new connections. It concluded that the rates of growth in Red Cliffs and Merbein were less than 1 ha per year in the 14 years from 1986 to 2000. Over the same period, the rate of growth in Mildura/Irymple was 40 ha per year, distributed as follows:

Pre 1986	1040 ha
Additional 1986 to 1992	253 ha
Additional 1992 to 2000	297 ha
 Total to 2000	 1590 ha

The areas of existing development shown on Figures 3.1(a) and 3.2(a) are based on information presented in this Report. The Report also presented an indication of the area of potential development to 2050, assuming a continuation of the recent historic growth rate of 40 ha per year. The Report notes that whilst this was intended to be indicative of the size of the area of potential development, it did not necessarily represent the precise location of the development. This information is shown on Figure 3.3.

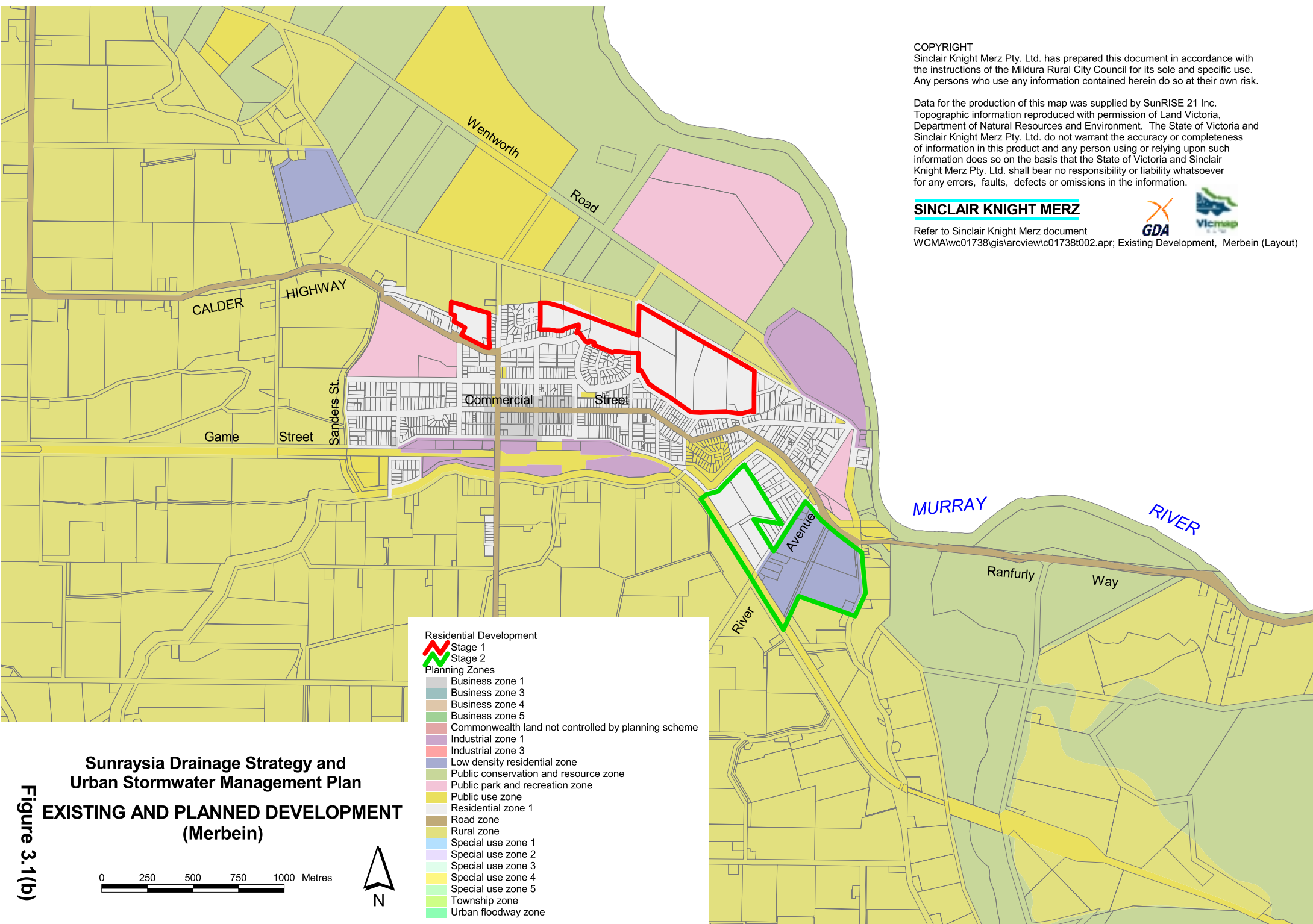


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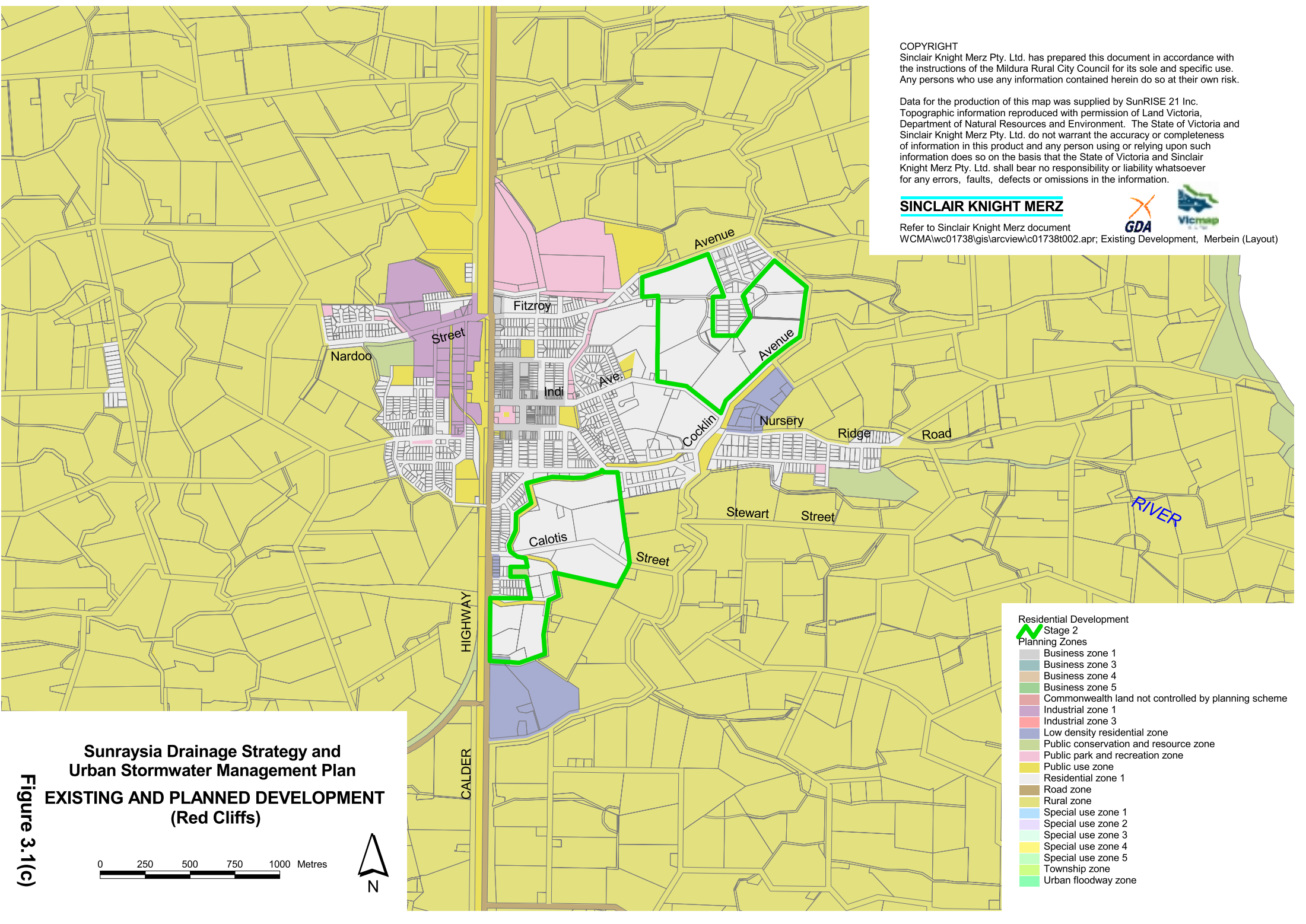
Sunraysia Drainage Strategy and Urban Stormwater Management Plan

EXISTING AND PLANNED DEVELOPMENT (Merbein)

0 250 500 750 1000 Metres



Figure 3.1(b)



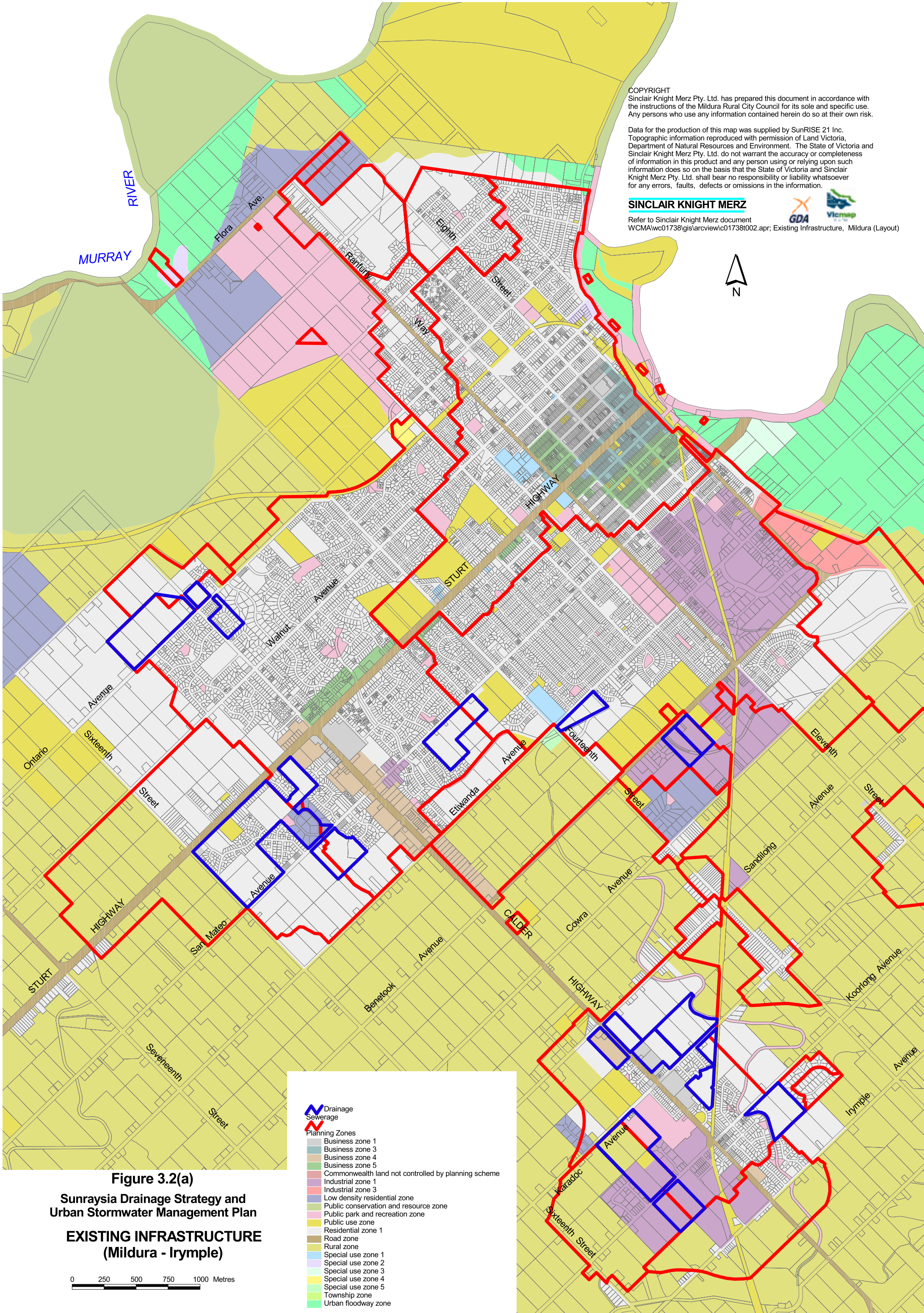
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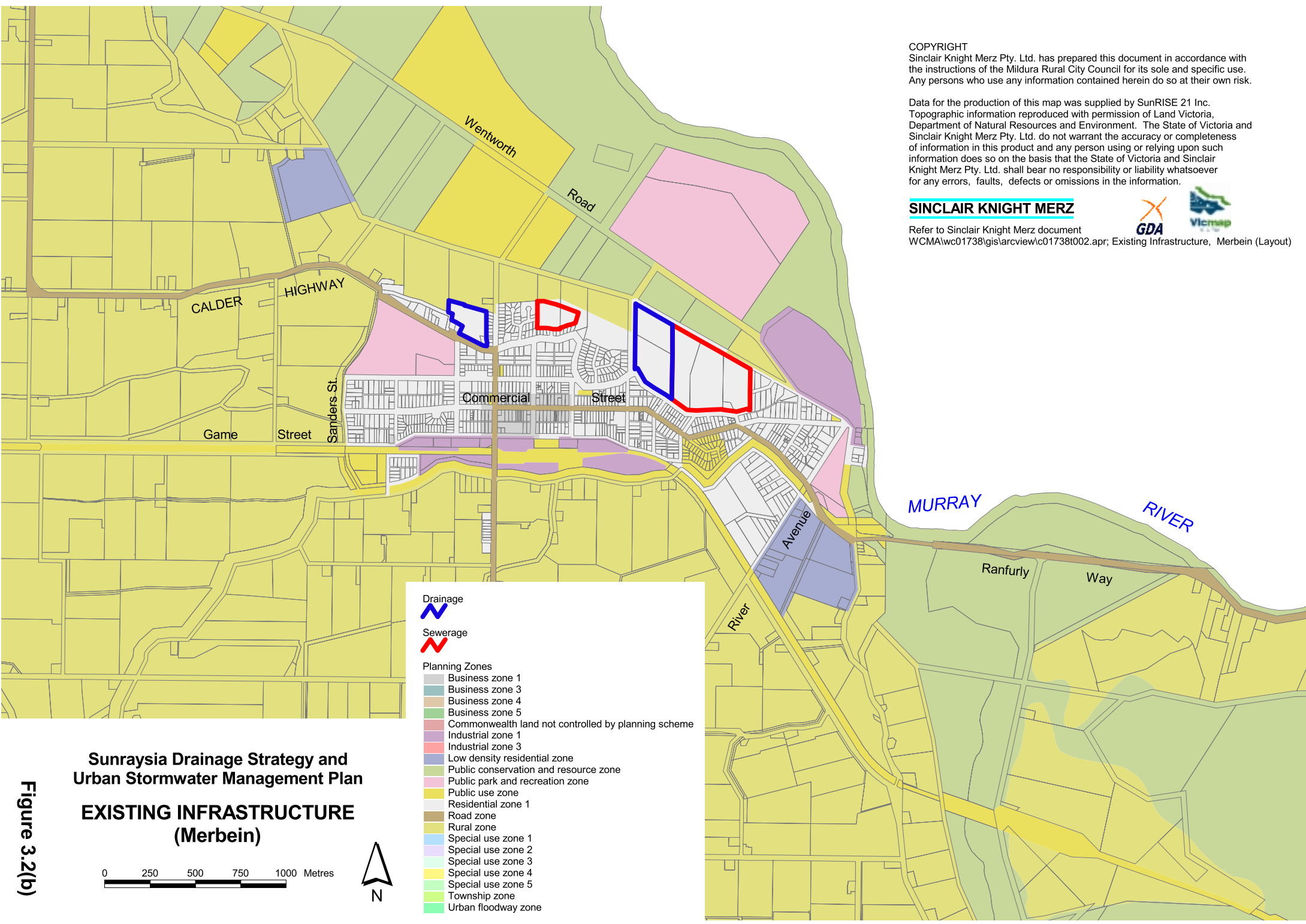
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- Residential Development**
Stage 2
- Planning Zones**
- Business zone 1
 - Business zone 3
 - Business zone 4
 - Business zone 5
 - Commonwealth land not controlled by planning scheme
 - Industrial zone 1
 - Industrial zone 3
 - Low density residential zone
 - Public conservation and resource zone
 - Public park and recreation zone
 - Public use zone
 - Residential zone 1
 - Road zone
 - Rural zone
 - Special use zone 1
 - Special use zone 2
 - Special use zone 3
 - Special use zone 4
 - Special use zone 5
 - Township zone
 - Urban floodway zone





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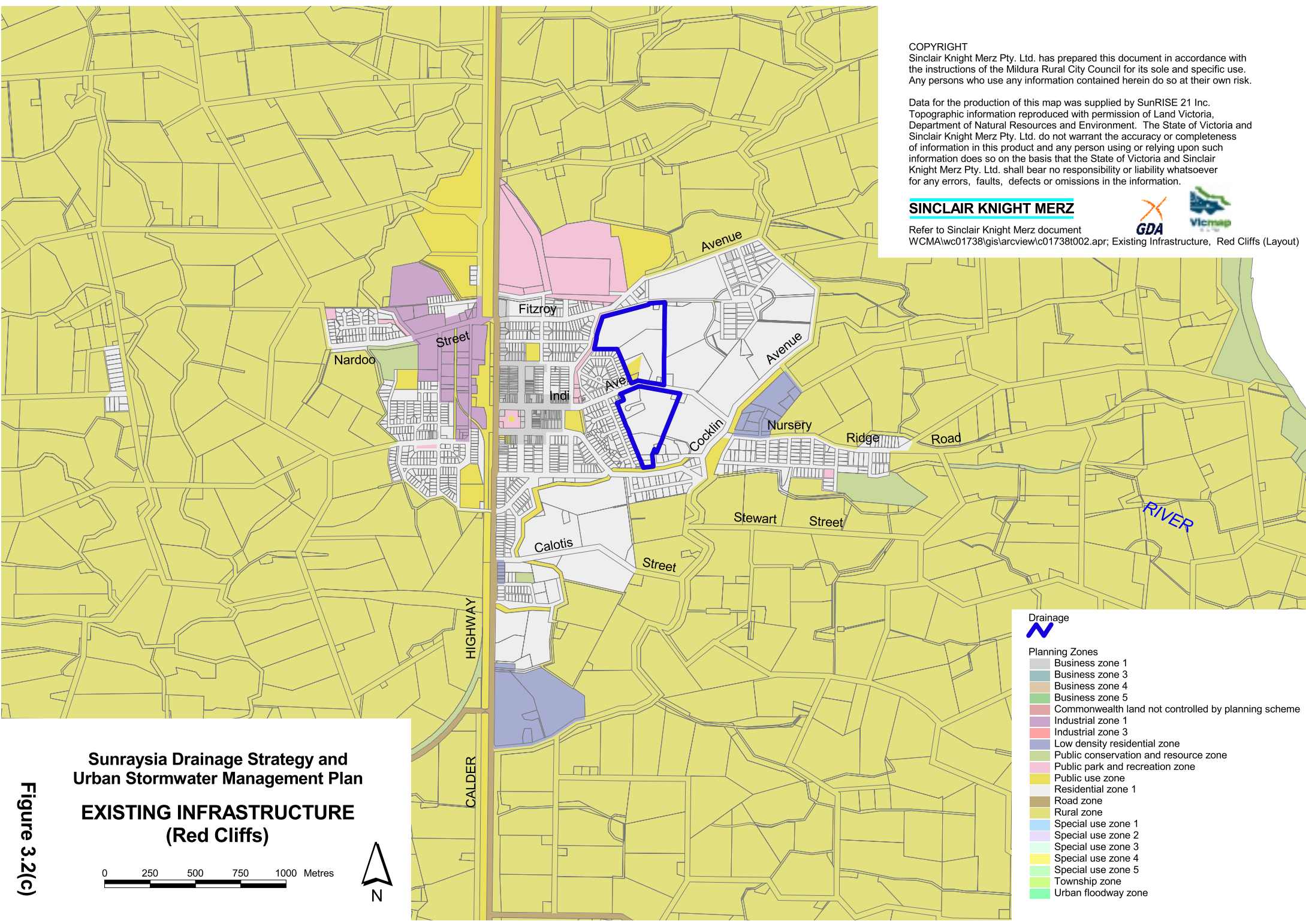
Figure 3.2(b)

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- Planning Zones**
- Business zone 1
 - Business zone 3
 - Business zone 4
 - Business zone 5
 - Commonwealth land not controlled by planning scheme
 - Industrial zone 1
 - Industrial zone 3
 - Low density residential zone
 - Public conservation and resource zone
 - Public park and recreation zone
 - Public use zone
 - Residential zone 1
 - Road zone
 - Rural zone
 - Special use zone 1
 - Special use zone 2
 - Special use zone 3
 - Special use zone 4
 - Special use zone 5
 - Township zone
 - Urban floodway zone

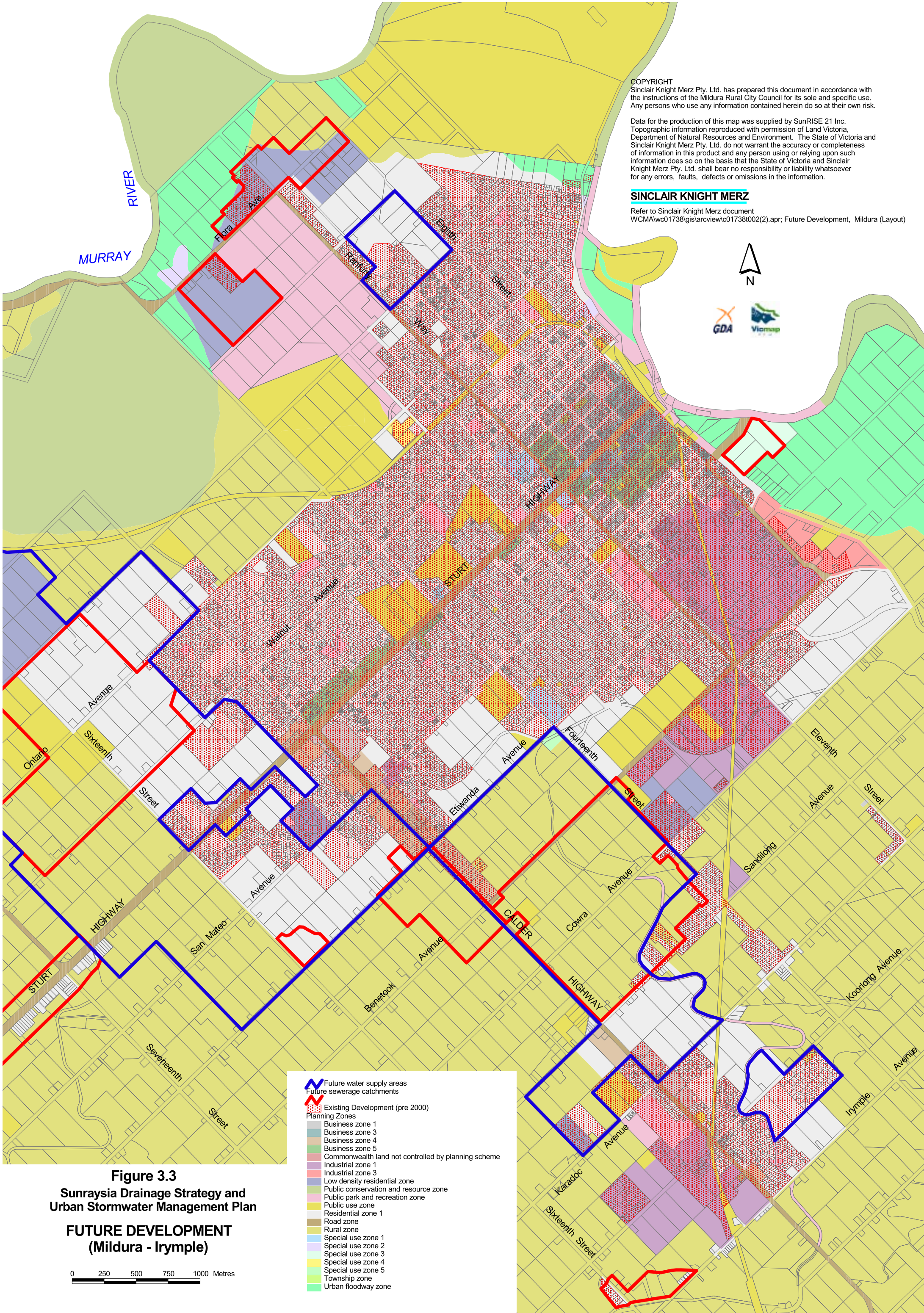
Sunraysia Drainage Strategy and Urban Stormwater Management Plan

EXISTING INFRASTRUCTURE (Red Cliffs)

0 250 500 750 1000 Metres



Figure 3.2(c)



3.3 Sunrise 21 assessment of sewerage and stormwater

In 1996, Sunrise 21 completed “A Sewerage and Stormwater Assessment of Potential Urban Areas adjoining Mildura, Irymple, Mildura South, Nichols Point, Merbein, Red Cliffs et al” (ref 2).

This Report is understood to have been prepared in consultation with Mildura Rural City Council and Lower Murray Water. It classified land that had either already been designated for urban development, or with likely potential for urban development, into five categories, according to availability of sewerage and stormwater drainage. This approach was adopted on the premise that these are the most expensive urban infrastructure services to develop, and require the greatest lead times. The categories and associated priorities were defined as follows:

Priority 1	Immediate - both services available
Priority 2	Sewerage available
Priority 2	Stormwater available
Priority 3	Neither available – works required
Priority 4	Neither available – major works required

The sewerage element of this report has been superseded by later Lower Murray Water reports, which are discussed below in Section 3.4. The areas of existing drainage infrastructure shown on Figures 3.2 (a), (b) and (c) have been derived from the 1996 Sunrise 21 report.

3.4 Lower Murray Water sewerage reports

Two 2001 Lower Murray Water reports document existing and proposed future pumped sewerage catchments for each of Mildura/Irymple (ref 4), Red Cliffs and Merbein (ref 5). This information is presented on Figures 3.2 (a), (b) and (c), and 3.3. The reports do not indicate any time frame for development of the proposed future catchments.

3.5 Lower Murray Water water supply planning

Lower Murray Water has also provided information regarding areas of planned expansion of its water supply system in the vicinity of Mildura and Irymple over the next 40 years. These are shown on Figures 3.3.

3.6 Mildura Planning Scheme

The Mildura Planning Scheme (ref 6) documents existing land use zonings for the entire municipality. The Scheme includes Town Structure Plans for each of Mildura, Irymple, Red Cliffs and Merbein. These define three stages of future development as follows:

- Stage 1* – zoned Residential 1 and has immediate access to all services;
- Stage 2* – zoned Residential 1 and access to some but not all services. Stage 2 land can be released when Stage 1 land has reached 50% capacity; and
- Stage 3* – zoned Rural and nominated for future residential development. Stage 3 land can be released when Stage 2 land has reached 50% capacity.

The Scheme indicates availability of 80 ha of Stage 1, 400 ha of Stage 2 and 150 ha of Stage 3 land in Mildura. Locations of Stages 1, 2 and 3 land shown on the four Town Structure Plans are shown on Figure 3.1 (a).

The Scheme has allowed for approximately 160 to 250 additional dwellings for annum over the next ten years, which it has equated to development of approximately 20 ha of additional residential land per annum.

Then Scheme specifically includes a greenbelt of rural development to provide continued separation between Irymple and Mildura. It also includes provision for continued separation between urban Mildura and the Nichols Point village.

During the course of the Project, Council's Planning Department has also provided an indication of where it sees the next areas of potential residential development in Irymple and Mildura beyond the three Stages indicated in the Town Structure Plans. These comprise:

- ❑ In-fill of area bounded by Riverside Avenue, Seventeenth Street, Cowra Avenue and Fifteenth Street;
- ❑ Small area around Flora Avenue;
- ❑ Area bounded by Cureton Avenue, Cowra Avenue, Sandilong Avenue and Eleventh Street. Council has noted with respect to this area that it is not proposed to extend the residential area further south, as this may impinge on an area likely to be earmarked for use in conjunction with the likely recommendations of the North West Freight Strategy;
- ❑ Area to the north of Stage 1 and 2 area in Irymple, south of Fourteenth Street between Karadoc Avenue and Irymple Avenue; and
- ❑ Small area to the south of Irymple fronting the east side of Sandilong Avenue.

4. Relevant Issues

4.1 Urban growth rates

The area of assumed additional urban development over the next 50 years depends entirely on assumed urban growth rates. Two very different rates have been presented in the information outlined in the previous Chapter.

The Current Situation Report (ref 1) assumes a growth rate of 40 hectares per year, on the basis of historic growth rates over the period from 1986 to 2000. A similar figure appears to have been adopted by Lower Murray Water in its water supply planning for the next 40 years, in which it has assumed an additional area of 1506.5 hectares, or 37.7 hectares per year.

The Mildura Planning Scheme (ref 6) has adopted a much lower growth rate of 20 hectares per year. The major reasons for this difference appear to be assumptions regarding:

- ❑ future lot sizes. Council is keen to encourage smaller lot sizes for future urban residential development;
- ❑ extent of inner city redevelopment. Council is keen to encourage unit and similar redevelopment in inner Mildura, close to services and the River. This is consistent with the area's increasing proportion of older residents; and
- ❑ possible differences in definitions. The Planning Scheme's definition may relate to residential land only, whereas other figures may include total development allowances including industrial and commercial, roads and public open space.

4.2 Availability of infrastructure

The provision of infrastructure, particularly sewerage and urban stormwater drainage, will have a significant influence on development costs, as these are the most expensive services to provide and require the greatest lead times. It is therefore reasonable to assume that availability of these services will have some influence on location and timing of future development. Infrastructure is particularly expensive where pumping is required. The landlocked catchment around Irymple is a significant example of an area that will need to be serviced by a pumped drainage system.

Lower Murray Water's existing sewerage system includes allowance for a system of pumping stations and rising mains, many of which are understood to have been sized to service catchments that have yet to be fully developed. As development proceeds, reticulated sewerage will be installed and connected to this existing system. Lower Murray Water's sewerage system also allows for future pumped sewerage catchments that will serve specifically identified areas.

In some areas, trunk drainage infrastructure has also been installed in anticipation of future development. Where this has not been done however, developers have generally been required to construct costly stand-alone drainage systems to either:

- ❑ contain all runoff within the development; or
- ❑ pump runoff to remote disposal sites.

4.3 Mildura Planning Scheme

Mildura Rural City Council is the local statutory planning authority for the Study Area, and applies and administers the Mildura Planning Scheme. The Scheme is reviewed every three years. In the absence of any changes to the Planning Scheme, urban development will occur in accordance with the Scheme, and specifically the three land stages shown on the four Town Structure Plans.

4.4 Availability of land

Whilst there is some vacant land in and around Mildura and Irymple, it is expected that the majority of urban expansion around these towns over the next 50 years will take up land that is currently used for irrigated agriculture.

Whilst there is some scope for in-fill irrigation development in the FMIT District, there are relatively few similar opportunities in the Merbein and Red Cliffs Districts (Andrew Sinn, pers comm). The only significant exception to this is land abutting the western boundary of the Study Area (Meridian Road) to the south of Fifth Street, in the Merbein District. Sunraysia Rural Water expects this to be taken up for irrigation within the next ten years.

5. Recommended Scenario(s)

A number of potential development scenarios have been prepared taking account of information and issues presented in Chapters 3 and 4.

5.1 Mildura/Irymple

Provision of drainage infrastructure to the landlocked catchment around Irymple will be relatively costly due to the need to dispose of runoff by pumping. The difficulties associated with this are evidenced by the inadequacies of the current drainage system to cater for existing development. On the basis of this relative difference in drainage costs, and the Planning Scheme's requirement for continuation of a greenbelt between Mildura and Irymple, three development scenarios have been developed for Irymple as follows:

- ❑ Scenario 1 – no additional development in Irymple. Although this Scenario is clearly impractical and would require back-zoning, it is presented for completeness, as it almost certainly represents the most cost effective drainage scenario for the Mildura/Irymple area;
- ❑ Scenario 2 – development in Irymple restricted to areas currently zoned for residential, commercial and industrial use in the Mildura Planning Scheme. This represents an additional area, above existing development, of approximately 140 ha; and
- ❑ Scenario 3 – development in Irymple restricted to Scenario 2, plus the additional areas indicated by Council's Planning Department as suitable for future residential expansion of the township. This represents an incremental additional area above Scenario 2 of approximately 80 hectares, for a total additional area of 220 ha.

Two annual growth rates of 20ha/yr (total 1,000 ha to 2050) and 40ha/yr (total 2,000 ha) have been considered in accordance with Section 4.1. This then results in six overall Scenarios, with growth in Irymple in accordance with the three cases presented above, and the balance up to the total requirements of 1,000 and 2,000 ha to be taken up in Mildura as shown in Table 5-1.

■ **Table 5-1 Development Scenarios**

Scenario	Growth Rate (ha/yr)	Additional Development Area Required in Mildura (ha)
1a	20	1000
1b	40	2000
2a	20	860
2b	40	1860
3a	20	780
3b	40	1780

The locations of the areas of additional development area in Mildura have then been prioritised taking account of:

- ❑ Likely costs of drainage and sewerage infrastructure, viz. areas that can be drained by gravity preferred to areas requiring pumped drainage;
- ❑ Locations of Stage 2 and 3 areas in the Mildura Town Structure Plan. It should be noted that no Stage 1 areas have been identified, and Stage 1 development is all classed as in-fill;
- ❑ Proximity to existing urban development;
- ❑ Need to maintain a greenbelt between Irymple and Mildura, and to provide separation between Mildura and Nichols Point, in accordance with the Planning Scheme; and
- ❑ Locations of areas of potential future residential expansion beyond the Stage 2 and 3 areas, provided by Council's Planning Department.

Accordingly, priorities were assigned to areas of potential future development as follows:

Priority 1 - Stage 1, 2 and 3 areas – total available 580 ha.

Priority 2:

- ❑ Area bounded approximately by Sixteenth Street, Seventeenth Street, Etiwanda Avenue and Riverside Avenue, that can drain by gravity to Lake Hawthorn – 390 ha;
- ❑ Existing low density residential zone around Flora Avenue – 90 ha.

Priority 3:

- ❑ Area bounded by Eleventh Street, Cowra Avenue, Sandilong Avenue and Fifth Street – 80 ha;
- ❑ In-fill area to west of Cowra Avenue and north of Fourteenth Street – 30 ha; and
- ❑ Area bounded by Seventeenth Street, Etiwanda Avenue, Fifteenth Street and Cowra Avenue, which is within the upper reaches of the Irymple basin – 370 ha.

Priority 4 - An area to the east of Mildura beyond that identified by Council's Planning Department for future residential expansion, but within catchments that drain to the River. The area is irregular and bounded approximately by Cowra Avenue, Cureton Avenue, Koorlong Avenue and Fourteenth Street. A significant proportion of this area is covered by Lower Murray Water's existing or proposed future sewerage pumping catchments – 340 ha.

The four practical Scenarios are shown on Figure 5-1.

The Steering Committee and Reference Group resolved to adopt a maximum feasible 2050 development scenario. This has been rationalised to catchments as shown on Figure 5-2. This represents a total increase in urbanised area in Mildura/Irymple of 2644 ha.