



2015

PHYSICAL AND COMMUNITY INFRASTRUCTURE OVERVIEW



Michael Blowfield
Maroondah City Council

CONTENTS

CONTENTS	2
INTRODUCTION - NEXUS BETWEEN INFRASTRUCTURE AND HOUSING.....	3
CONTEXT.....	4
THE TYPES OF INFRASTRUCTURE.....	5
INFRASTRUCTURE IMPOVEMENTS SINCE 1997	5
POLICY.....	7
CHANCE PRESURES AND IMPACTS	8
KEY PLAYERS IN INFRASTRUCTURE	9
INVESTMENT IN URBAN INFRASTRUCTURE.....	11
STATE OF THE SECTORS	13
ENERGY.....	13
ELECTRICITY	14
GAS	17
WATER.....	20
POTABLE WATER	21
WASTE WATER.....	24
STORM WATER	27
TRANSPORT	33
RAIL	34
BUSES	39
ROADS	43
PATHWAYS AND TRAILS	48
INFORMATION AND COMMUNICATIONS	53
NATIONAL BROADBAND	53
COMMUNITY.....	56
EDUCATION	56
OPEN SPACE	61
WHAT INFRASTRUCTURE WILL MAROONDAH NEED?.....	67
IMPLICATIONS ON URBAN INFRASTRUCTURE	67

INTRODUCTION - NEXUS BETWEEN INFRASTRUCTURE AND HOUSING

The City of Maroondah has grown into a thriving, cosmopolitan city that is playing an increasingly important role in the economic productivity, job creation, accommodating housing and population growth and livability of Melbourne's East Region.

Infrastructure delivers basic facilities and services that are fundamental to the provision of housing, transportation, community health and livable neighbourhoods. From turning on the taps, travelling to work or school in the morning, to switching on the lights at night, it's all made possible by infrastructure.

Without good supporting infrastructure any potential housing development will be ill-conceived and its liveability will be comprised. The accommodation of new housing is dependent on the quality of the infrastructure provided and its ability to operate as intended.

How to plan for sustainable housing growth and the composition of the supporting infrastructure is one of the most important decisions facing Council. The decisions will impact upon the way the City of Maroondah will develop over the next 40 years or more.

The ongoing challenge therefore is to ensure that existing infrastructure networks continue to evolve and the next round of legacy infrastructure facilities are built, to sustain the next half a century of anticipated city development, housing growth and changing lifestyle. An informed planning strategy will be essential to ensure sound infrastructure investment into the future.

CONTEXT

In order to understand where future housing growth can be accommodated within Maroondah, it is essential to first:

- Identify how infrastructure networks have progressively developed since 1997,
- Understand the strategic policy direction influencing land use and urban renewal change,
- Determine future demand impacts, and
- The extent urban infrastructure can accommodate higher dwelling density and population growth.

This overview provides a summary of a concise inquiry into the state of Maroondah's infrastructure networks within the *Physical and Community Infrastructure Discussion Paper*. The paper examines what needs to happen to the existing urban infrastructure to ensure networks can accommodate future housing and demand pressures. Based on the evidence, it offers insights into how urban infrastructure capabilities are likely to impact on the future livability, economic productivity and prosperity of Maroondah from now until 2040 and beyond.

THE TYPES OF INFRASTRUCTURE

For the purpose of this paper infrastructure has been categorised into two main types, physical and community.

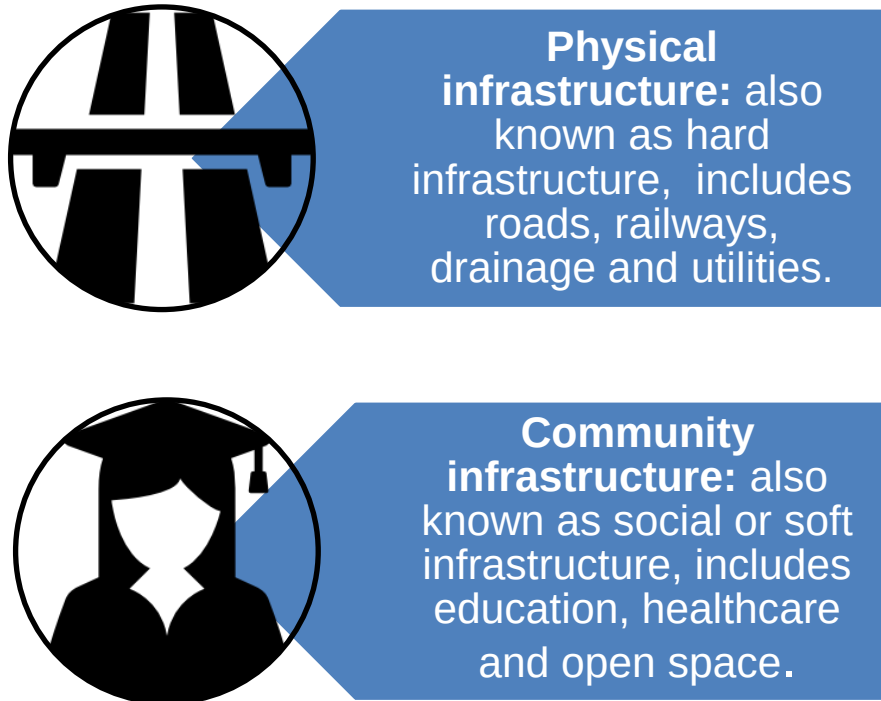


Figure 1: Types of Infrastructure.

Physical infrastructure provides people with the mobility to access work and to other important services. It enables high living standards and lifestyles by giving access to everything from safe drinking water, internet connections and electricity to run appliances and ITC equipment.

Community infrastructure covers all the institutions that are required to maintain the economic, health, cultural and social standards.

INFRASTRUCTURE IMPROVEMENTS SINCE 1997

Since the adoption of the last Maroondah Housing Strategy in 1997 the City of Maroondah progressively developed and grown. It has transformed into a thriving, cosmopolitan city that is playing an increasingly important role in the economic productivity, job creation, accommodating new housing and enhanced livability of Maroondah.

A pipeline of major infrastructure projects has assisted in unlocking development potential that has driven the urban transformation and intensification.

Major Infrastructure Projects Delivered In Maroondah

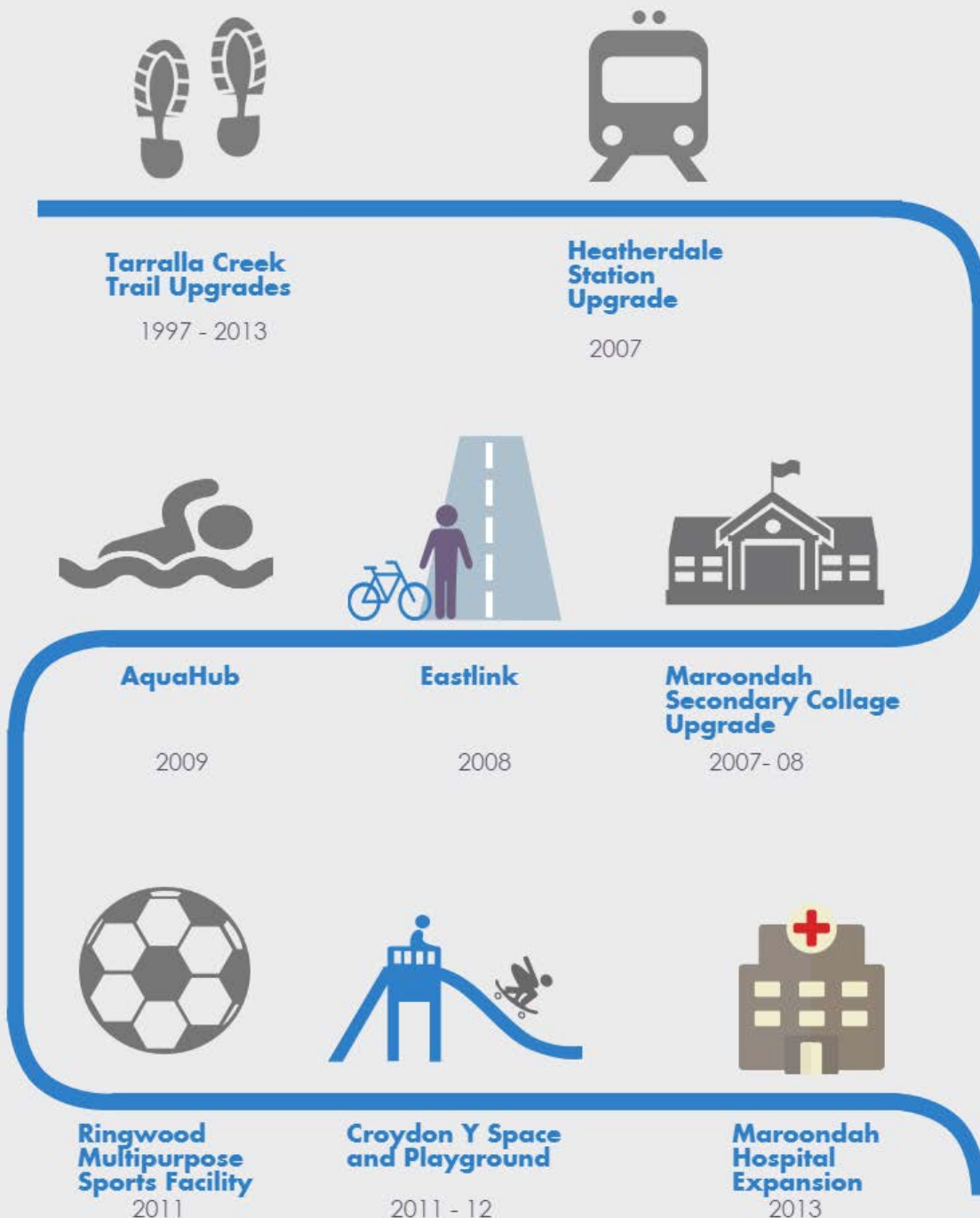


Figure 2: Major Infrastructure Projects Delivered in Maroondah after 1997.

POLICY

The creation of the Physical and Community Infrastructure Paper has been in response to recent metropolitan and local government planning strategies concerned with guiding Maroondah's growth and change over the next 40 years. Each strategy highlights the importance of infrastructure and makes a case for better infrastructure provision to sustain economic productivity, deliver a diversity of new housing and create livable neighbourhoods.

Plan Melbourne is the Victorian Government's metropolitan planning strategy. It is an integrated land use and transport strategy that is concerned with the provision of a clear city development direction for Melbourne. An important objective of plan is how to sustainably accommodate projected housing growth, offer housing choice and ensure housing affordability.

Infrastructure capacity underpins the plan's urban renewal and housing growth framework by considering:

- Melbourne's future necessary infrastructure needs,
- delivery of a pipeline of city shaping infrastructure projects, and
- Identifying areas that can accommodate future housing growth.

One of the key urban renewal precincts identified to accommodate greater housing density includes the Ringwood Metropolitan Activity Centre (MAC). A key feature of Plan Melbourne's framework for creating sustainable housing and communities within these precincts is the creation of 20 minute neighbourhoods and better planning of water energy and waste management systems. The performance and capabilities of infrastructure networks will play a key role in delivering these aspirations of the plan in Ringwood.

The importance of infrastructure is encapsulated within the attractive, thriving and well built community vision of *Maroondah 2040 Community Vision*.

"...attractive community with high quality residential and commercial areas incorporating infrastructure that meets the needs... of all ages and abilities".

The aspiration is to deliver diverse housing options and the provision of facilities to service community needs. It recognises the challenge between preserving the

heritage and natural green leafy character, whilst providing the necessary urban renewal and new housing to accommodate population growth and demographic change.

To achieve the aspiration, the community vision proposes a range of key directions to plan, encourage and support the sustainable provision of a diverse range of housing throughout Maroondah. Fundamental to this approach is the management of infrastructure and prioritisation of capital works within the considerations of demographic, climate and lifestyle changes.

CHANCE PRESURES AND IMPACTS

The city's infrastructure networks are be placed under additional pressures as a result of the impacts of economic and population growth, changing lifestyles and climate change. The diagram outlines the major impacts on infrastructure associated with each change aspect.

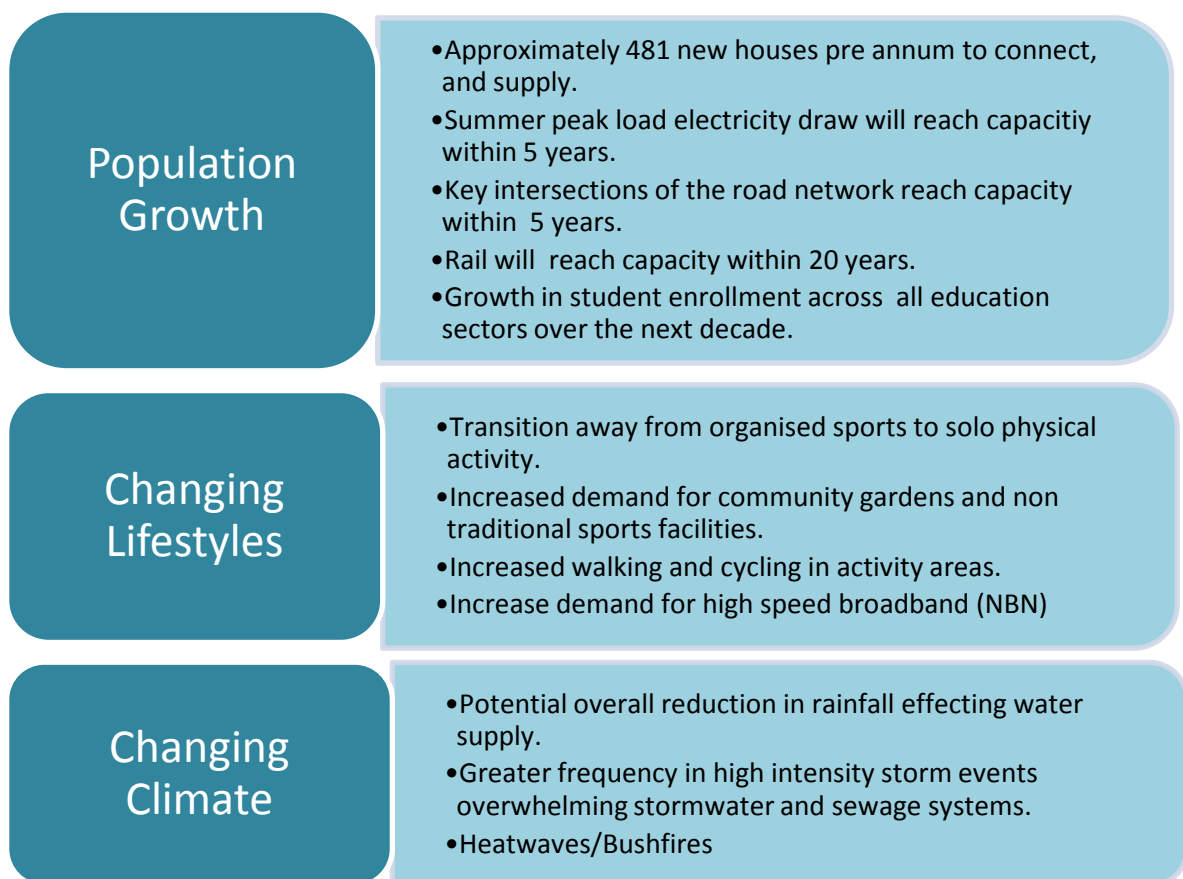


Figure 3: Summary of key impacts on infrastructure.

KEY PLAYERS IN INFRASTRUCTURE

Each infrastructure network has its own authority responsible for the planning, operation and maintenance of the infrastructure network. Management responsibilities for some networks are shared by several agencies. In these cases, each agency has specific role in the management of the network. For example, one agency will be focus on network planning, whilst another operates the system.

Table 1 lists the network management authorities for each infrastructure network operating in Maroondah.

Infrastructure Network		Network Management Authorities
Roads		VicRoads – Arterial Network Maroondah City Council – Local Network
Rail		VicTrack Metro Trains Melbourne Public Transport Victoria (PTV) Department of Economic Development, Jobs, Transport and Resources
Bus		Public Transport Victoria (PTV) Department of Economic Development, Jobs, Transport and Resources TransDev and Ventura Bus Operators
Pathways and Trails		Maroondah City Council
Electricity		AusNet Services
Broadband Network		NBN Co Limited
Gas		Multinet Gas

Potable Water		Melbourne Water Yarra Valley Water
Waste Water		Melbourne Water Yarra Valley Water
Storm Water		Melbourne Water Maroondah City Council
Education		Child Care and Kindergartens – Local Government and Private Schools – Department of Education and Training and Independent schools University and TAFE
Open Space		Maroondah city Council

Table 1: List of Network Management Authorities

Infrastructure networks rarely function independently of other infrastructure. Each network is a component of a wider integrated system and has dependency on other networks to function. Figure 4 is a graphical representation of the interdependencies between infrastructure networks.

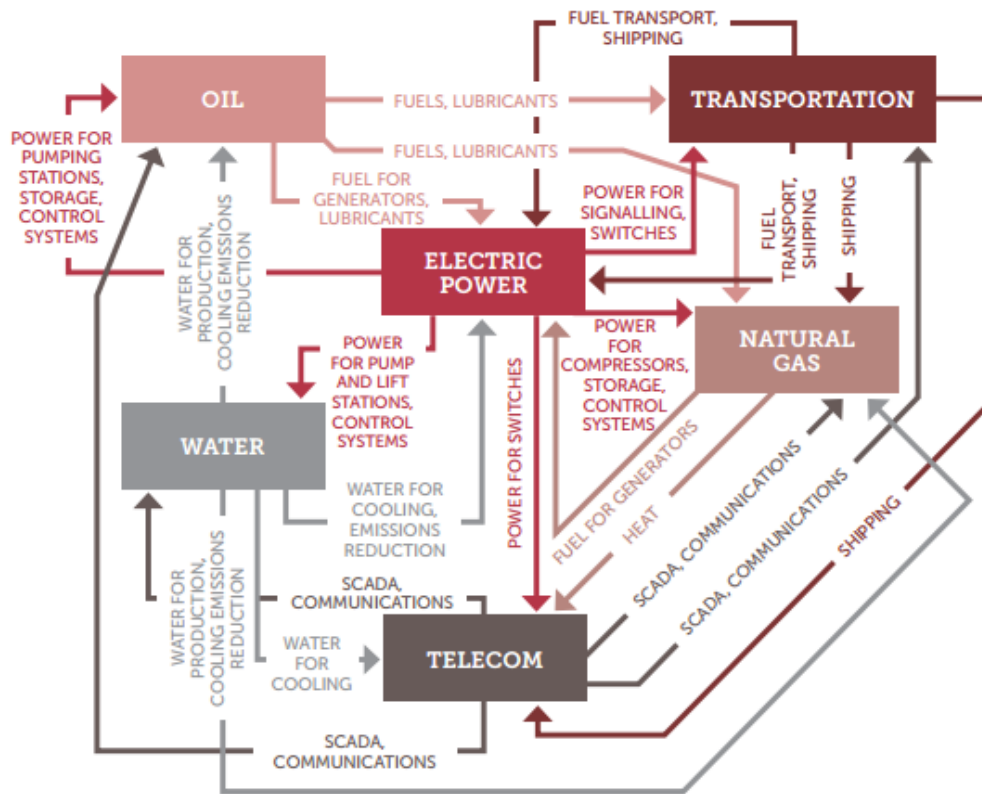


Figure 3: Example of Infrastructure Interdependencies¹

The interdependencies and intrinsic links between the networks imply that all management authorities must be cognisant of these interrelations to achieve the best outcome for infrastructure investment. Parallel planning, framework alignment, and project collaboration will be critical to achieving the greatest performance from the networks assets.

INVESTMENT IN URBAN INFRASTRUCTURE

To avoid increasing infrastructure backlog and asset failures, continued infrastructure investment is necessary obligation for Council. Strong financial planning that is linked to infrastructure improvement planning will ensuring the most beneficial improvements are adequately funded.

A range of investment opportunities exist to leverage funding for the capital works, asset renewal and land purchases. Ideally funding will be sourced from a combination of:

¹ S. Rinaldi et al., 'Identifying, Understanding and Analysing Critical Infrastructure Interdependencies, IEE Control Systems Magazine, December 2001, p. 15.

- Joint partnership programs with authorities,
- Developer contributions,
- External grants from Federal and State Government agencies, and
- Council revenue.

These investments are necessary to allow the economy to grow at the level required to maintain and improve living standards for a larger population. Delivery of the right infrastructure will allow the city to realise its potential as one of the premier centres for economic, health, education, research and social activity for the Eastern region.

STATE OF THE SECTORS

ENERGY

In Maroondah the majority of household connected to the electricity system and natural gas mains. Households consume electricity for refrigeration; lighting and heating, water heating and home entertainment. Natural gas is used for household heating, water heating and cooking. Only a minority of households are solely connected to electricity alone. Continued affordable, safe, efficient and reliable supply of electricity and gas will be essential to accommodating future housing



growth, economic productivity and sustaining community and lifestyles choices.

Figure 4: New Transformers at Chirnside Park Sub Station.

GRADE



FUNCTION

Good

CONDITION

-

CAPACITY

Good

CONFIDENCE IN DATA

Medium

NETWORK MANAGEMENT AGENCY

AusNet Services

KEY CAPACITY CREATION PROJECTS

The new Chirnside Park zone substation.

Connection of Ringwood terminal to the Rowville – Templestowe 220 kV lines.

ELECTRICITY

DEMAND – EXISTING AND FUTURE

The average estimated household consumption for both Ringwood and Croydon is 6.45 MWh². Over the last 8 years household energy consumption has only marginally increased.

Expected incremental future power consumption is equated to new connections to the grid as new housing is developed.

Domestic consumption levels will also be influenced by the extent electricity is used for heating and transport, i.e. charging of electric vehicles.

Due to increased load draw from air conditioning installations the greatest anticipated increase in domestic power consumption is during summer.

FUNCTION

Maroondah has a mature and reliable electricity grid.

The local distribution power grid carries electricity from the Ringwood transmission station to zone substations and directly to households.

Local zone substations within Maroondah are located in Ringwood North, Croydon and Chirnside Park. The southern region of Maroondah receives their power from the Boronia and Bayswater zone substations.

It is during the summer that increased peak loading threatens to exceed the carrying capacity of the Ringwood North and Croydon substations. This situation will place Maroondah's power supply at risk within 5 years.

² Australian Energy Regulator, *Energy Made Easy*, Available From <http://energymadeeasy.gov.au/bill-benchmark/results/3136/2> [8 April 2015]

POWR SUPPLY

There is sufficient power generation capacity to meet Melbourne's future power demands over the next quarter century.

CONDITION

Whilst limited information about the condition of the power grid prevented an informed assessment of condition, AusNet Services conducts asset maintenance and renewal to ensure a safe, reliable and efficient power grid.

CAPACITY

Network capacity tracking by AusNet Services over 2013 showed that the network was only close to maximum capacity for 1% of the year. For the majority of the year the network utilisation fluctuates around 60% capacity.

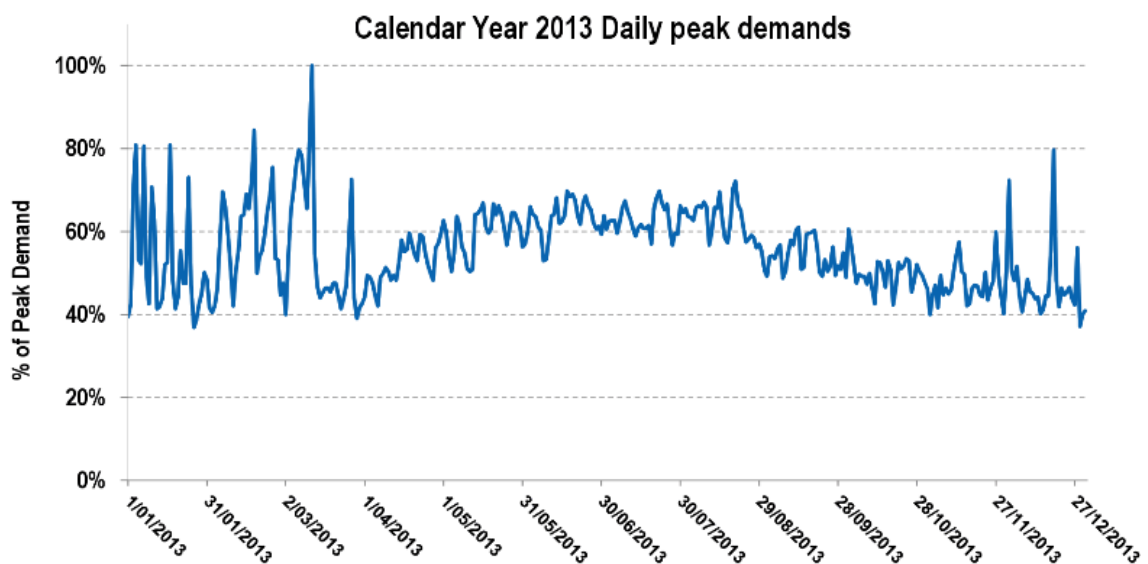


Figure 5: Daily Peak Demand on AusNet Services Grid.

The recently constructed a new zone substation at Chirnside Park and other capacity creating infrastructure projects scheduled by AusNet Services will eliminate anticipated power supply risks and constraints caused by peak load power overloading of local substation capacity.

FUTURE CONSIDERATIONS

Emerging developments within the energy sector are occurring that will affect how electricity is consumed, the way electricity supplied and priced in the future.

Changes to models of power supply and network operation include:

- continued expansion of solar photovoltaic installations and the introduction of domestic power storage systems,
- the use of the smart grid systems to inform better power supply management and customer electricity consumption,
- the trailing Grid Energy Storage Systems (GESS) and mobile generators to augment peak demand at site of significant power draw.
- the preference for placing power lines underground to reduce transmission losses, prevent asset damage and power disruptions, and
- demand reduction incentive system.

The use technology, price increases, changing behaviors and more efficient housing design will change the way electricity is consumed into the future. They will assist to increase the networks reliability and capability to respond to changing future power demands. In the process they will actively drive energy efficiency and bring about better demand management outcomes.

GRADE



FUNCTION

Very Good

CONDITION

Good

CAPACITY

Good

CONFIDENCE IN DATA

High

NETWORK MANAGEMENT AGENCY

Multinet Gas

KEY CAPACITY CREATION PROJECTS

30 year network augmentation and asset renewal program to replace ageing pipes.

GAS

DEMAND – EXISTING AND FUTURE

Based on Metropolitan Melbourne household gas connections rates, nine out of ten homes in Maroondah are connected to mains gas ³.

The Lilydale Pipeline Environment Report mentions that significant gas consumption growth over the last 10 years⁴ is associated with green field redevelopment in Lilydale, Chirnside Park Croydon and across the Dandenong Ranges.

The increasing gas prices, energy efficiency initiatives, new houses choosing to remain disconnected from mains gas, and reverse –cycle air conditioning installation are all factors that are likely to influence domestic gas consumption. To what extent that they will affect base line and peak gas demand is difficult to forecast.

FUNCTION

Maroondah has a mature and reliable gas mains network. It supplies gas at a good pressure to all areas of Maroondah. .

The network has the ability to accommodate the additional new housing connections expected in Maroondah.

SUPPLY

At projected annual consumption rates, the known Victorian natural gas reserves contain enough natural gas to meet demand for a maximum of 30 years⁵. However, should

³ Consumer Utilities Advocacy Centre, 2014, Our Gas Challenge: The Role of Gas in Victorian Households, iii.

⁴ Monarc Environmental Pty Ltd 2011, *Lilydale Pipeline Project Environmental Report*, March 2011, p 4.

⁵ Department of Economic Development, Jobs, Transport and Resources, About the Gas Sector, Available From: <<http://www.energyandresources.vic.gov.au/energy/gas/about-the-gas-sector>> [4 March 2014]

consumption increase significantly then existing reserves could be depleted much sooner.

Besides production, gas supply to Maroondah is dependent on refining capabilities of gas processing plants. Maroondah receives its main gas from the Longford gas processing plant. A proposed new Gas Conditioning Plant and a Western Outer Ring Main Project⁶ will ensure long term security of mains gas supply.

CONDITION

A particular challenge for Multinet Gas is that 211 km of its distribution network consists of aging large diameter cast iron or unprotected steel pipes. The likelihood and cost of failure of many of these pipes would be high because they are usually situated in major arterial roads.

They also have high replacement costs making asset renewal unlikely. However, increasing repair costs and maintenance difficulties is resulting in the expansion of maintenance expenditure. It is a major issue as these pipes are likely to be the last to be decommissioned because they are critical to the operation of the remaining low and medium pressure networks⁷.

CAPACITY

Distribution network capacity constraints are generally related to pipe and or facility capacity during the winter peak loading. Multinet Gas' construction of the Lilydale Gas Pipeline in 2012 provides the security of supply and increased capacity required to meet current and growing domestic gas in Lilydale, Chirnside Park Croydon and across the Dandenong Ranges.

Multinet Gas is planning to undertake a number of significant capital works programs designed to improve reliability and increase the capacity of the network. A 30 year network augmentation and asset renewal works program will enable the network to accommodate the long term forecast demand⁸. A key component of these works will involve:

- The replacement of known poor condition cast iron pipes.

⁶ APA Group 2012, *Western Outer Ring Mains*, Available from <<https://www.aer.gov.au/sites/default/files/BC083-WORM%20Project%20Redacted.pdf>> [4 March 2015].

⁷ Multinet Gas 2012, *Network Asset Management Plan 2012/13 to 2017/18*, p 18.

⁸ Duet Group 2013, *Annual Report 2013*, p 13.

- Specific projects focused on the replacement of older pipes in suburbs that have suffered water ingress in recent years.
- MG proposes to accelerate its pipe works capex program,

FUTURE CONSIDERATIONS

Similar to electricity, future price increases will affect how gas is consumed domestically. Opportunities exist to influence household consumption and free up gas main capacity by:

- Encouraging the installation of more efficient gas heaters,
- Encouraging solar hot water systems installations,
- Information technology infrastructure enhancements to ensure Multinet Gas is well deliver a reliable and efficient network, and
- Adaption of energy efficient house design.

The application of these gas reduction approaches will actively drive greater energy efficiency and bring about better demand management outcomes.

WATER

The sustaining of our city is dependent on a reliable supply of drinking water and sanitary systems. The greater Melbourne area has an extensive and well designed urban water system. These systems have served the city well, but a new approach to urban water services systems operation; management and water conservation are evolving to respond to future population growth and to Melbourne's variable climate.

Melbourne's urban water supply system comprises of three sub-systems. The three sub-systems are the:

- Potable water supply system
- Waste water system
- Storm water system.

The water sector has adopted an integrated or whole-of-water-cycle approach to securing a safe and plentiful water supply, managing our stormwater runoff and wastewater discharge, reducing urban flooding, keeping our parks and gardens green and improving the health of our waterways



Figure 6: Bushy Creek Treatment Plant

GRADE



FUNCTION

Very Good

CONDITION

Very Good

CAPACITY

Good

CONFIDENCE IN DATA

High

NETWORK MANAGEMENT AGENCY

Melbourne Water –
Regional Distribution
Network

Yarra Valley Water –
Domestic Water
System

KEY CAPACITY CREATION PROJECTS

Water mains renewal
projects for
Bayswater North and
water reliability works
for Ringwood North.

POTABLE WATER

DEMAND – EXISTING AND FUTURE

Maroondah domestic consumption of potable water is currently around 6,218 ML annually⁹. Residential consumption makes up the largest proportion of potable consumption (81%) in Maroondah.

Water consumption is weather dependant. In 2013/14 winter water use was recorded as 149 litres per person per a day¹⁰. During summer water consumption increase to 169 litres per person per a day¹¹.

Melbourne Water's expects the greater Melbourne region's water usage to incrementally increases over the long term. The anticipated growth will be associated with increase in mains connections from new residential and commercial developments, rather than rising individual customer consumption.

FUNCTION

Maroondah receives all of its water supply from the nearby Silvan Reservoir. Maroondah's closeness and favourable topography means that water is very cheaply and reliably transferred by gravity to Maroondah, without the need for pumping. Thus, Maroondah has highly reliable supply of water, with excellent pressure, throughout the municipality.

Maroondah is also fortunate that the closed catchment provides high quality drinking water that requires low level filtration and treatment.

SUPPLY

Silvan water storage is currently at 88.1% capacity. At this level, water storage levels are within the secure zone. Under

⁹ Maroondah City Council 2015, *Draft Water Sensitive City Strategy*, Melbourne, p 3

¹⁰ Melbourne Water, 2014, *Water Outlook for Melbourne*, Melbourne, p 1

¹¹ Melbourne Water, 2014, *Water Outlook for Melbourne*, Melbourne, p 1

a range of modelled climate and demand scenarios the existing water supply system will least five years of water without entering the emergency circumstances zone.

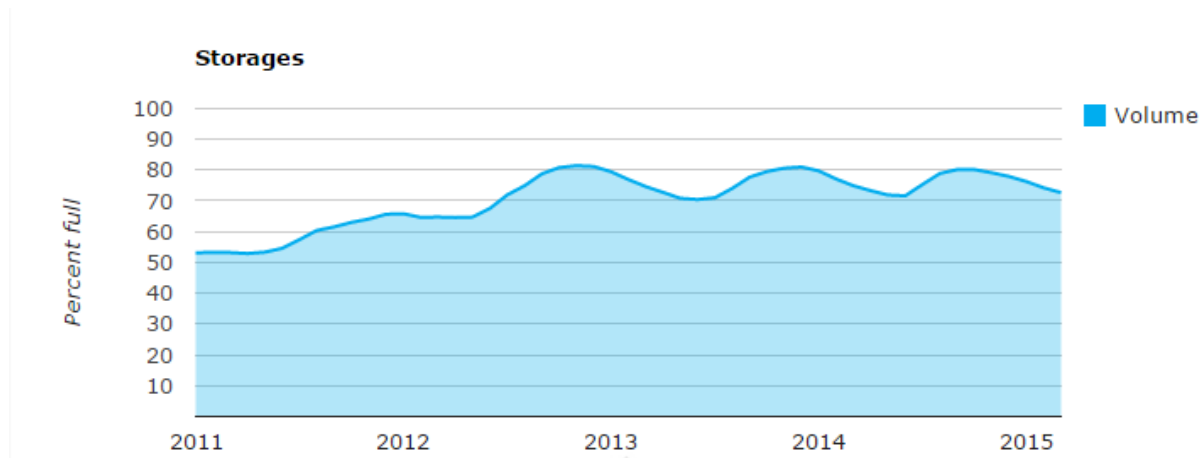


Figure 7: Silvan Reservoir Water Storage Levels

In addition to the bulk water supply in Silvan, a small proportion of drinking water is supplied from:

- ground water is released for private use (30 GL).
- Class A recycle water from the Eastern and Western treatment plants (50 GL).

No water is supplied from the desalination plant which remains off line due to ample water supplies in the catchments.

The onset of climate change is expected to decrease regular rainfall over Melbourne. The Yarra River catchment is expected to have a decrease in runoff between 5 and 30% by 2030¹². The resulting reduction in water catchment will potentially lead to reductions in long term water yields for the Silvan reservoir, exposing Maroondah to the risk of future drinking water shortages and returns to water restrictions.

CONDITION

The water mains are in good condition. The water authorities' continued to investment in a first class maintenance and asset renewal program to insure the good condition of the mains network and minimise failures. In recent years due to a combination of water mains pressure reduction and, pipe renewals the volume of pipe failures have declined¹³.

CAPACITY

¹² Climate Change Taskforce 2008, *Future Map Melbourne 2013*, Sydney, p. 14.

¹³ Yarra Valley Water, 2014, *Yarra Valley Annual Report Water*, Melbourne, p. 8

The water mains are functioning at below capacity. They have adequate capacity to accommodate anticipated dwelling connections that will result from Maroondah's population growth. This includes the accommodation of predicted intensity of peak water volumes during summer and daily peak times.

FUTURE CONSIDERATIONS

Melbourne Water and Yarra Valley Water are moving away from major capacity increasing capital work projects to a more effective demand management and existing network optimisations approach. They have identified that significant system performance and value can be achieved by:

1. a series of planned smaller capital works and extensive maintenance program,
2. the adoption of whole of water cycle management to reduce the variance of water flows through Melbourne's water cycle systems.
3. the adoption of digital metering and intelligent water network systems to informed better demand management of the water cycle systems to lessen peaks.
4. Trialling of 'ice-pigging' water mains cleaning technology, which is proving to be a more effective water mains cleaning process.
5. continue to provide water efficiency education and advice to communities to maintain community commitment to water saving

Council partnership with the water sector can take steps to decrease Maroondah's water vulnerability and establish long term water security by:

- encouraging and applying a diversity of household and urban water harvesting and storage facilities,
- encouraging greater water recycling within homes,
- increasing the adoption of water saving installations within existing and new homes, and
- continued community water saving campaigns.

The application of these initiatives will drive greater household water efficiency and more responsive demand management systems from sector authorities. In the process assisting to efficiently manage future domestic water demand and ensure long term water security

GRADE



FUNCTION

Fair

CONDITION

Good

CAPACITY

Good

CONFIDENCE IN DATA

Medium

NETWORK MANAGEMENT AGENCY

Melbourne Water

Yarra Valley Water

KEY CAPACITY CREATION PROJECTS

Brushy Creek
Treatment Plant
Upgrade

Inflow and Infiltration
in Ringwood Project

Greasy Waste
Program

Maroondah Works
Program (Water Plan
3)

WASTE WATER

DEMAND – EXISTING AND FUTURE

Sewage volumes are affected by changes in water consumption. Sewage volumes have only minimal increases since the lifting of water restrictions. At present, 5,995 ML of waste water from Maroondah is treated annually by the Eastern Treatment Plant¹⁴.

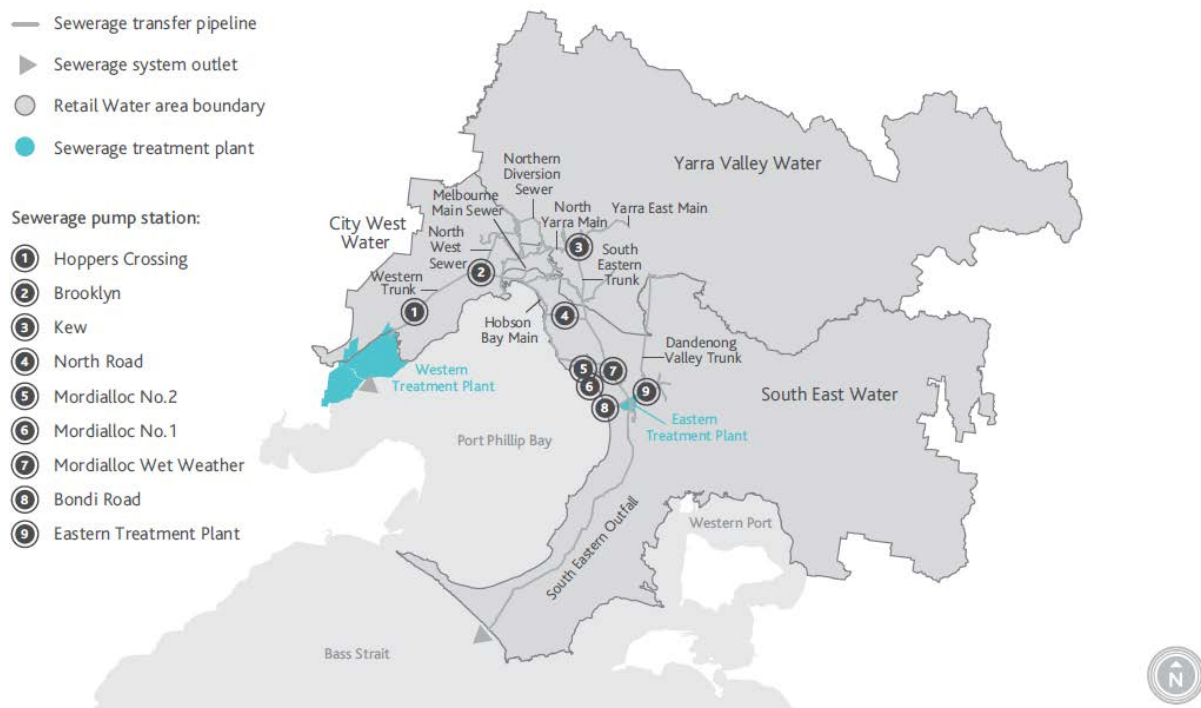
Given the annual 1% population growth of Maroondah, it is anticipated that sewage volumes will grow slightly due to new household connections. The extent of the growth is difficult to forecast due to the number of variables that impact upon domestic water consumption.

FUNCTION

Waste water from Maroondah discharges into the Dandenong Valley Trunk transfer pipeline through the Ringwood interception sewer.

The majority of the waste water flows by gravity to the Eastern Treatment Plant for processing. A small percentage is processed locally at Brushy Creek Sewage Treatment Plant.

¹⁴ Maroondah City Council, 2015, *Draft Water Sensitive City Strategy*, Melbourne, p 3



Map 1: Melbourne's Sewerage Network

With few pumping stations Maroondah has a highly reliable and resilient sewage system with no bottlenecks or constraints affecting service to any suburbs.

The sewer system performs well on dry to mild rain days. However, during high intensity rain fall events the system capabilities are exceeded by storm water infiltration and sewerage overflows to the surface. Parts of Ringwood and Croydon are particularly susceptible to these surfaces over flows.

CONDITION

Melbourne Water's and Yarra Valley Water's extensive maintenance and renewal program ensures blockages are prevented or cleared quickly through camera inspections.

The camera inspections and other leak detection processes have improved the detection of damaged or failing pipes. Prompt repair or replacements of failing pipes are conducted to prevent discharges in soil and ground water.

Asset monitoring and a planned renewal program are ensuring aging pipes are replaced before they fail. Given this extensive management and renewal program the sewerage system that services Maroondah is in a good condition.

CAPACITY

The sewerage system is operating half capacity during peak dry level follows. The volume drops to 20 to 30% full outside of the peak periods on a dry day. During wet level follows it increase to 50% full outside peak periods and close to full during peaks.

Up to 75 per cent of the capacity of sewerage mains is dedicated to handling stormwater that enters the system. If storm water infiltration of the sewerage network were resolved, the existing sewer system has the capacity to accommodate Maroondah's projected dwelling and commercial connections in to the long term.

The Eastern Treatment Plant is currently functioning at 50% capacity. The plant has the capacity to accommodate the substantial growth of the City of Casey and Dandenong for the next 20 years without detrimentally affecting waste water processing from Maroondah.

FUTURE CONSIDERATIONS

The water sector is increasingly viewing the byproducts of sewage treatment as a resource, in particular recycled water. Recycled water is being viewed as viable alternative substitute for drinking water in industrial, commercial and domestic realms. .

Maroondah currently uses 26 ML of recycled water annually from the Brushy Creek Treatment Plant¹⁵. Of this 14 ML is used by residential properties in Croydon Hills and Chirnside Park.

With the upgrade of the Brushy Creek Sewage Treatment Plant opportunities exist for Council to work in partnership with the water sector to increase recycle water use in residential urban renewal developments. Incorporating dual pipe infrastructure will enable the supply of recycle water for toilet flushing, garden watering and streetscape and open space watering.

¹⁵ Maroondah City Council 2015, *Draft Water Sensitive City Strategy*, Melbourne, p 3

GRADE



FUNCTION

Fair

CONDITION

Fair

CAPACITY

Variable

CONFIDENCE DATA

Medium

NETWORK MANAGEMENT AGENCY

Melbourne Water

Maroondah City Council

KEY CAPACITY CREATION PROJECTS

Flood mitigation capital works projects in Ringwood North, Ringwood East, Croydon North and Croydon.

STORM WATER

The storm water drainage network composes of residential drains that collect excess water from properties. Council's drains disperse the water into larger and higher volume regional drains that direct water into the nearest river or creek. The water then flows eventually into the bays.

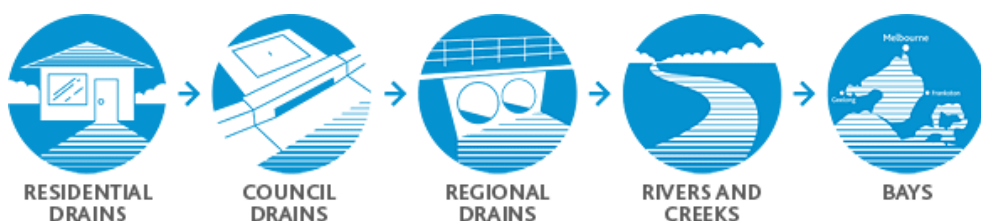


Figure 8: Storm water pathway

DEMAND – EXISTING AND FUTURE

Maroondah's experiences an annual rainfall of approximately 50,330 ML¹⁶. The rainfall produces 17,528 ML of storm water runoff a year¹⁷.

Future storm water inflows will be dependent on future rainfall volumes. The changes in Melbourne's climate will bring less but more erratic rain events. The impact on the storm water system will be:

Increase in magnitude and frequency of high intensity storm events beyond the 1 in 5 year capacity rating of storm water pipes. The intensity of the runoffs increases the risk of inundation of existing drainage system and local flooding.

Lower regular rainfall volumes will decrease runoff inflows into the storm water system. Under this circumstance the storm water system will be underutilise.

FUNCTION

Maroondah's storm water drainage system can withstand

¹⁶ Maroondah City Council 2015, *Draft Water Sensitive City Strategy*, Melbourne, p 3

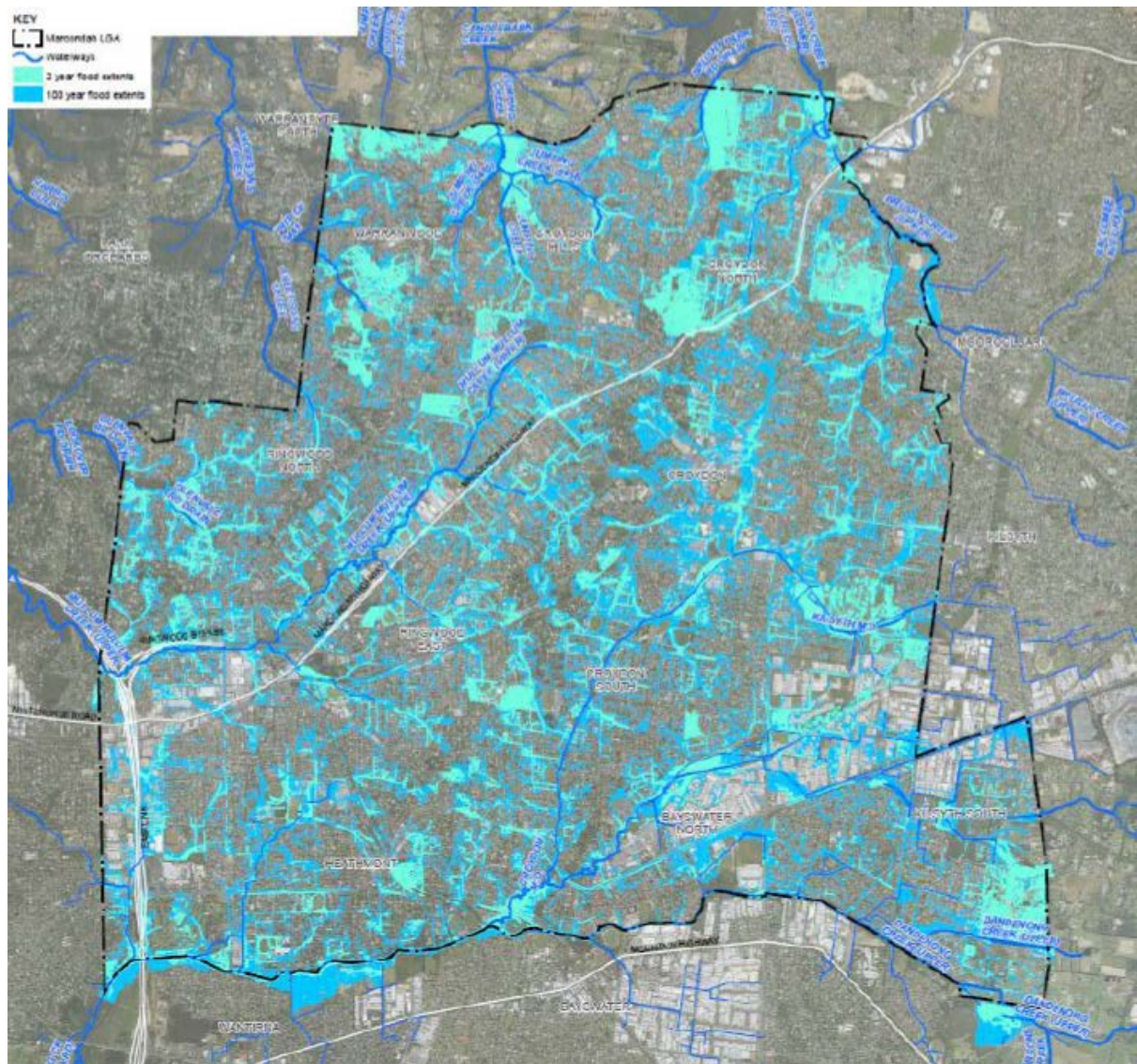
¹⁷ Maroondah City Council 2015, *Draft Water Sensitive City Strategy*, Melbourne, p 3

storm events within 1 – 5 year storm capacity rating. It can adequately drain the runoff to prevent flooding.

The system struggles to drain the run off produced by larger than 1 in 5 year storm events increasing the risk of localise flooding. Flood modelling identified that there are 1,887 properties across Maroondah that are exposed to the highest risk of flooding¹⁸. 10% of Maroondah's properties will be affected by over land flash flooding in by 1 in 100 magnitude storm event. Map 9 presents the flood extent for both 1 in 2 and 1 in 100 events.

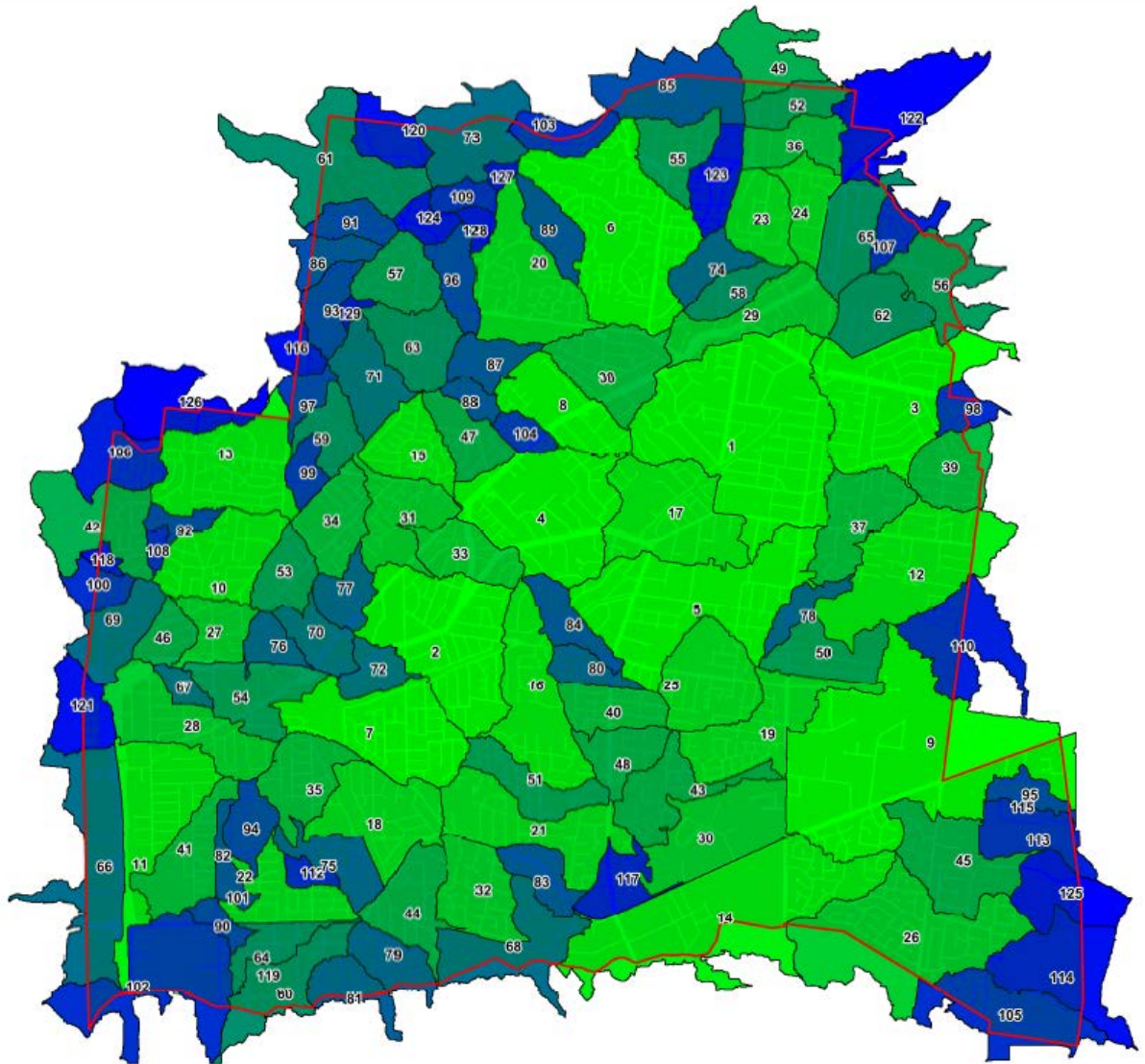
The residential areas susceptible to low intensity rainfall flooding are situated in Ringwood North, Warranwood, Corydon, and Croydon North. In addition to these areas, properties in Croydon, Croydon South and Ringwood East are at risk of extreme intensity storm events.

¹⁸ Hyder 2009, *Storm Water Drainage Strategy: Framework to Identify Flood Risk Areas and Priorities Mitigation Measures*.



Map 2: Flood Extent for 1 in 2 and 100 ARI Flood Events

Map 3 shows flooding susceptibility by the volume of properties that are at risk of flooding. The lighter the colour green equates to a greater the number of properties at risk. It further substantiates that Croydon and Ringwood East have the highest concentration of flood risk properties.



Map3: Property Flooding by Amount of Vulnerable Dwellings.

CONDITION

The condition of Council's storm water system is declining due to ageing assets.

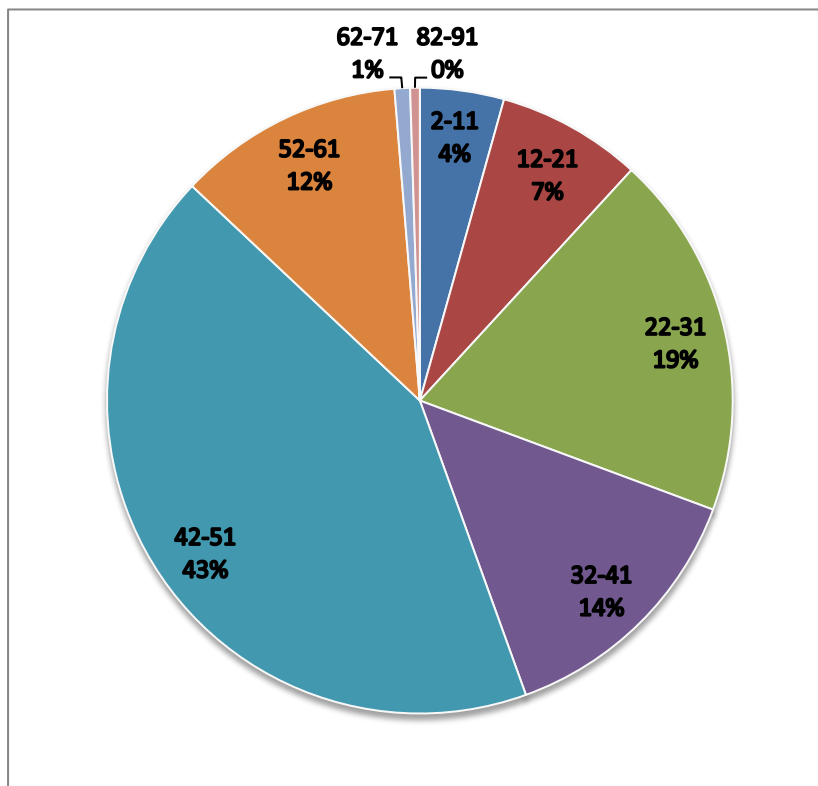


Figure 9: Breakdown of Stormwater Asset Age

Good maintenance and renewal programs are required to maintain high operational performance and reduce asset.

Consequently, Council can expect an escalation of asset renewal capital works to replace end of life drains from 2070 to 2080.

CAPACITY

The existing capacity of Maroondah's storm water system will be sufficient to drain the runoff from low to mid range intensity rainfall.

The system will continue to be overwhelmed by extreme storms until either greater drainage capacity is provided or the volume runoff is reduced by increasing storm water harvesting.

Over the last half a century, the storm water system has lost its redundancy to effectively deal with the flooding from an overload storm water system. The open space corridors that were originally intended as the storm water overflow spillways; have been lost due to urban expansion and development. The system no longer has the vacant low lying land to capture and flood waters when drains overflow.

FUTURE CONSIDERATIONS

Melbourne Water and Council will work in partnership to deliver of a series of street level and large scale storm water management projects. These capital works projects will install high capacity drainage, and where possible overland spillways, to cope with 1 in 100 storm events.

Any reductions to storm water runoff will have positive impacts on Maroondah's storm water and sewerage systems. Melbourne Water and Council can support the domestic application of water sensitive design and water harvesting by:

- Encouraging the installations of rainwater harvesting system, i.e. first flush diverters, gutter guards and rain water tanks, and
- Increase water preamble spaces in home and garden designs by applying water sensitive design.

Water harvesting has the added benefit of converting collected storm water in to a valuable alternative water supply. Capturing just half of Maroondah's existing storm water runoff, would provide in excess of Maroondah's total potable water consumption.

TRANSPORT

Transport permits the mobility which enables the liveability, efficiency and productivity of cities. The continued effectiveness of Melbourne's transport network will play a significant role in not only maintain existing standard of liveability, productivity and society capital, but to support the continued economic, population and societal growth.



Figure 4: The Proposed New Ringwood Station

GRADE



FUNCTION

Very Good

CONDITION

Poor

CAPACITY

Good

CONFIDENCE DATA

IN

High

NETWORK MANAGEMENT AGENCY

VicTrack

Metro Melbourne

Trains

Public Transport Victoria (PTV)

Department of Economic Development, Transport and Resources

Jobs, and

KEY CREATION PROJECTS

CAPACITY

RAIL

DEMAND – EXISTING AND FUTURE

Patronage the Belgrave and Lilydale rail lines has grown rapidly over the last decade and strong growth is anticipated in the years ahead.

The anticipated passenger growth on the Maroondah section of the line is expected to be modest over the next 16 years. The commuter loading during the morning peak is anticipated to be between 6,000 to 10,000 boardings.

In the long term, towards 2040, patronage growth is predicted to grow beyond the capacity of the existing rail services.

FUNCTION

The rail network provides Maroondah's only mass transit system. It provides high frequency, long duration and reasonably quick and efficient commuting.

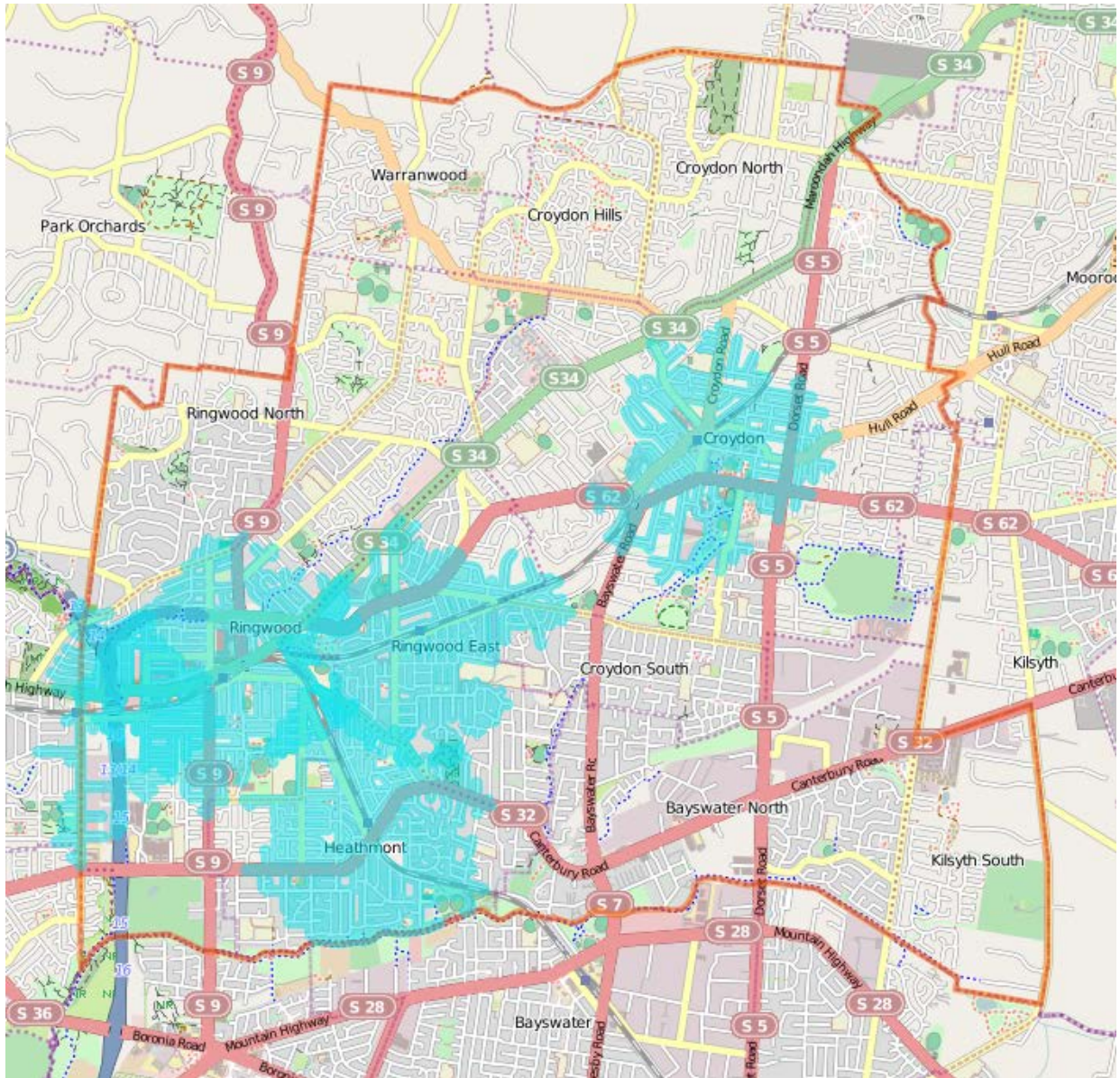
The efficiency, reliability and quality of the rail service are only restrained by:

- Signal sections of track at ends of the line,
- At grade crossing along the line,
- Quality of passenger facilities, and
- Disruptions to service caused by failure of infrastructure or the train.

Maroondah is fortunate to have four stations that provide access to train services. All stations have a healthy walk up catchments and the following map shows the estimated local walking catchment zones for each station¹⁹. Given the preference of commuters to drive or buses to the premium stations, these stations will have a considerably larger catchment beyond the walk up zone than those of

¹⁹ Based on walking up to 1.5 kilometers.

the smaller stations. Western Maroondah enjoys the greatest concentration of stations.



Map 4: Local Walk Up Catchments for Stations

CONDITION

Successive decades of under investment in the rail network infrastructure has limited rail infrastructure upgrades and caused a gradual decline in the condition of rail assets.

The poor condition of tracks, overhead powerlines and the outdated automated block signalling system, affects the reliability of train services. Repeated track and signalling faults continue to be the main sources of infrastructure related disruptions.

With little redundancy in the lines these disruption often cause flow on delays through the network that take considerable time to clear.

Certain models of trains in the fleet have had a varied service history. Trains have been taken out of services to fix braking problems, air conditioning issues and remove graffiti. Taking trains out of service to fix these problems has reduced the number of services that can be provided across the network.

CAPACITY

Given the low patronage growth rate Public Transport Victoria expects that sufficient capacity exists on Lilydale and Belgrave lines to meet demand for the next decade.

As required, greater capacity can leveraged through streamlining operations that will:

- diminish train dwell times;
- avoidance of delay form train mergers ,and
- demerges intersecting lines and allow increase in train services²⁰.

All network branch lines will also benefit from the major city shaping rail projects that will create greater capacity at the heart of the network, i.e. Melbourne Metro Rail.

In the long term, towards 2040, it is enviable that population and employment growth along the lines will eventually grow beyond the capacity that can be gained through rail system optimisation.

Overcrowding is an indicator of passenger capacity on train services. Overcrowding is yet to become an issue on the Maroondah section of the line. There remains passenger capacity to accommodate Maroondah's patronage growth.

²⁰ Public Transport Victoria, 2012, *Network Development Plan – Metropolitan Rail*, Government of Victoria, Melbourne, p 57.

However, as rail patronage grows, overcrowding during peak periods is anticipated to spread down the line and become more common. In contrast, substantial passenger capacity will remain contra flow to peak wise transit.

FUTURE CONSIDERATIONS

The State Rail strategy and planning relatively clear and well developed in The Network Development Plan. The plan's strategies to remove capacity constraints and expand services are:

- Grade separations,
- Track duplication and fourth track between Burnley and Camberwell, and
- High capacity signal system installation.

The Victorian Government is committed removing at grade crossing across the metropolitan transport network. Four crossings on the Belgrave and Lilydale line are marked for grade separation:

- Blackburn Road, Blackburn
- Maroondah Highway, Lilydale
- Mountian Highway, Bayswater
- Scoresby Road, Bayswater

In addition to these for the State Government has also announced a commitment to the grade separation of Heatherdale Road.

To accommodate the planned increase train services the existing single line section from Mooroolbark to Lilydale and Ferntree Gully to Belgrave will require duplication.

To enable the operation of express services from the end of the branch lines to Burnely, the quadruplicate of the rail line between Burnley and Camberwell and ultimately onto Box Hill is proposed. The express services will speed up journey times for Maroondah's commuters.



Map 1: The level crossing and grade separation projects²¹.

The Network Development Plan designates Belgrave and Lilydale line as the last part of the metropolitan network to have high capacity signalling installed²². The key benefits of high capacity signalling will be improved capacity and service reliability obtained from being able to trains at greater frequency due to smaller timetable intervals.

²¹ Victorian Labor, 2014, *Project 10,000*, Office of the Leader of the Opposition, Victorian Labor Party, 20 – 21.

²² Public Transport Victoria, 2012, *Network Development Plan – Metropolitan Rail*, Government of Victoria, Melbourne, p 135

GRADE



FUNCTION

Fair

CONDITION

Good

CAPACITY

Very Good

CONFIDENCE IN DATA

High

NETWORK MANAGEMENT AGENCY

Public Transport Victoria (PTV)

Department of Economic Development, Transport and Resources

TransDev and Ventura Bus Operators

KEY CAPACITY CREATION PROJECTS

TransDev network improvements

BUSES

DEMAND – EXISTING AND FUTURE

All except three bus services operating within Maroondah have experienced growth in patronage since 2008. The highest patronage growth can be seen on SmartBus and main bus routes. Local routes have more modest growth in comparison. There is a strong correlation between patronage growth and the quality of service provided by the bus routes.

Bus patronage for the City of Maroondah is forecast to continue to increase by 4.6% per annum to 2021. This is a low growth rate compared to the central suburbs and growth areas of Melbourne.

FUNCTIONS

The existing bus network provides good coverage of Maroondah with the majority of households¹ having access to a nearby bus on weekdays from 7am to 9pm.

Pockets of poor bus coverage exist in the Croydon Hills, Heathmont, Ringwood East, Bayswater North and Kilsyth due to:

- Restrictive local geography, and
- Road layout that constrain bus access and

movements.

Many of Maroondah's key industrial areas in Bayswater North, Croydon South and Kilsyth also experience inadequate bus services.

Unfortunately the coverage decreases as bus services reduce after dusk and over the weekends. On a Sunday, six bus routes cease to run, reducing the network coverage.

The coverage is at its worst after dusk, where the bus

services coverage is reduced to half.

The existing network remains almost unchanged since its establishment during the 1960'. As new housing estates have developed and communities needs have changes it is likely that some existing routes are not providing the access required for these new developments.



Map 2: Coverage of Existing Bus Network

CONDITION

Over the last decade, State Government and bus companies have progressively upgraded bus fleets to provide modern low floor accessible buses. Both companies have extensive maintenance and cleaning schedules that ensure the fleet remains in excellent condition.

The outcome of a successful bus stop upgrade program between Council, State Government and Adshel has delivered high quality bus stops across Maroondah.

CAPACITY

At present the crowding of bus services is only occurring on peak services operating on the highest patronage growth routes, i.e. SmartBus, 737, 670 & 742. These buses services are the only ones to reach full patron carrying capacity. The remainder bus routes and services are underutilized and retain abundant carrying capacity.

The capacity of bus network to run a more frequent and reliable service is constrained predominately by:

- Level of State Government investment ,and
- congestion of the road network.

State Government investment in the bus network has only maintained the operation of the existing network. Small incremental funding increases have only resulted in minor improvement to the level of service in Maroondah.

Congestion is the primary cause of buses running late. It is a major source of frustration for bus commuters and bus operators. Bus operators have to factor in delay caused by congestion within bus timetables. Consequently, route journey times and time between services are inflated. Providing dedicated bus priority treatments at congested intersections is a proven model for enabling bus service to bypass congestion.

FUTURE CONSIDERATIONS

For the bus network to become a more attractive transportation alternative, the existing operations models and network configuration requires reform. There needs to be a shift towards:

- high service frequency,
- longer durations of service,
- route alignments that better respond to urban development and changing community needs,
- quicker and more direct routes,
- Develop a bus brand similar to the SmartBus to create a positive bus brand,
- allied promotional campaign to change negative community perceptions of buses.
- bus interchanges that provide a welcoming, safe and comfortable place to interchange.
- Supply commuters with real time running information, i.e. Bus Smart Tracker.

Applying this integrated approach to enhanced network operations, better bus service and promotion will provide the best opportunity to encourage patronage growth on buses.

GRADE



FUNCTION

Poor

CONDITION

Good

CAPACITY

Fair

CONFIDENCE IN DATA

High

NETWORK MANAGEMENT AGENCY

VicRoads - Arterial

Maroondah City Council - Local

KEY CAPACITY CREATION PROJECTS

Heatherdale Grade Separation

Maroondah Highway, Oban Road and Old Lilydale Road Intersection

Canterbury and Armstrong Road Intersection

ROADS

DEMAND – EXISTING AND FUTURE

VicRoad's traffic volume data²³ and Council's traffic reports confirm the traffic across the Maroondah's road network is growing annually. Maroondah's busiest intersections are:

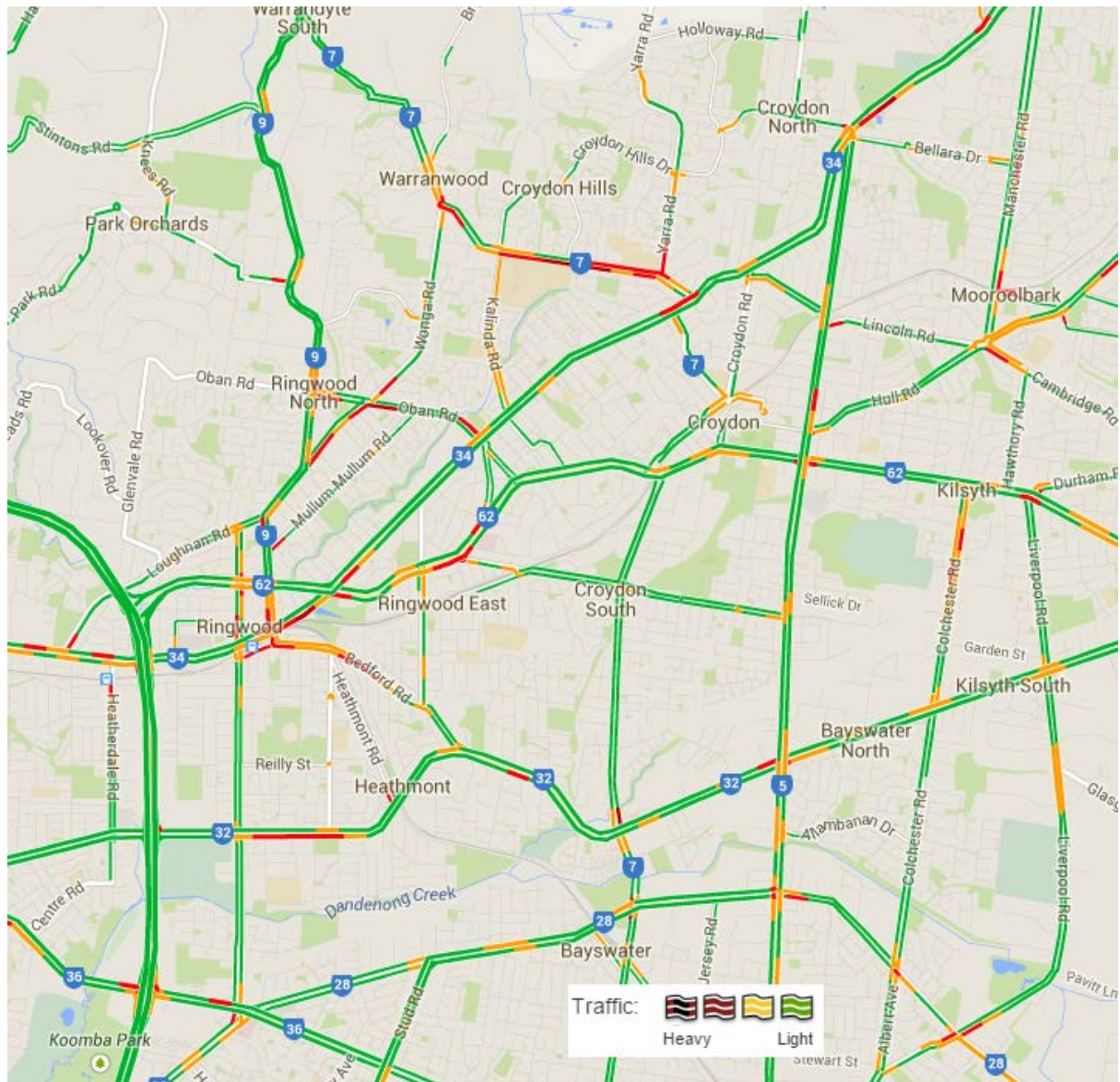
- Ringwood Bypass - grown from 14 million to more than 18 million vehicles per year.
- Maroondah Highway volumes have reduced only slightly from 13 million down to 12.5 million vehicles per year.
- Maroondah Highway in Croydon (near Kent Avenue) has similar volumes to Ringwood Bypass in Ringwood;
- Mt Dandenong Road in Croydon has annual traffic volumes of around 11 - 12 million;
- Kent Avenue and Croydon Road have significantly lower annual traffic demands of around 3.5 - 4 million and 2 – 2.3 million, respectively.

FUNCTIONS

The volume of traffic transiting the road network is the single largest factor influencing the road network's performance. As vehicles volumes increase, the space becomes saturated and the performance of the network declines.

There is evidence that transportation through Maroondah is suffering from symptoms of approaching or at capacity at certain times of the day, i.e. reduced vehicles speeds, increased delays and greater travel time variability.

²³ VicRoads, July 2014, *Traffic Volume Data for Victoria*, Information Management and Technology.



Map7: Weekday Traffic Volume, 8:30am

Based on VicTraffic traffic volumes data, the map shows weekday traffic volumes during the morning peak. Congestion is most prominent:

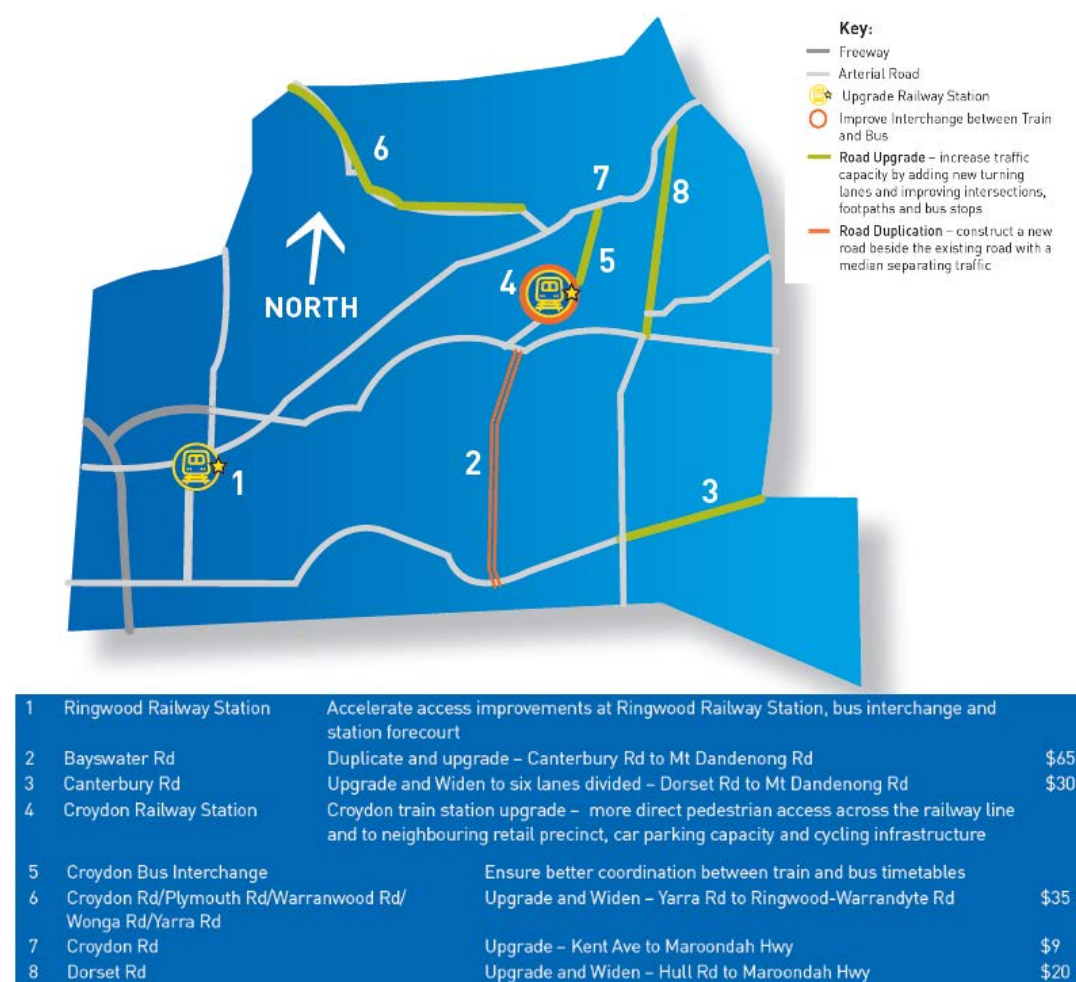
- Within and surrounding the Ringwood Activity Centre,
- The Ringwood Bypass and the Eastlink exit to the Maroondah Highway,
- On Yarra and Plymouth Roads,
- Oban Road and Wonga Roads,
- Colchester Road
- Sections of Canterbury Road, and
- Maroondah Highway, Exeter, Dorset Road Intersection.

The network exhibits congestion at the same locations during the afternoon peak. Congestion dissipates quicker in the morning than in the afternoon, due to the longer afternoon peak.

During the middle of the day, traffic volumes are lower and spread more evenly across the network.

CONDITION

The rural condition of many of Maroondah's arterial roads remains a cause of concern. The lack of service roads, kerb and channel for drainage, connected footpaths and integrated bus stop facilities makes sections hazardous and limit opportunities better traffic management.



Map8: Transport Priorities for Maroondah, including priority Road Network Improvements²⁴

²⁴ RACV, 2012, *Growing Pains: Keeping Pace with Transport Needs in Outer Melbourne and Geelong*, Melbourne, p 29 – 30.

CAPACITY

The network requires long-overdue road duplication and upgrades to unlock greater capacity. Two way connector roads, complex intersections and level crossings are all required to increase the road network's ability to disperse traffic at the volumes now required and into the future.

Map 8 lists the necessary infrastructure upgrades required to Maroondah's arterial roads to accommodate infill developments and activity centre urban renewal.

Recently, the State Government has committed to deliver the following road upgrade projects in Maroondah within the short term.

- Heatherdale Grade Separation,
- Maroondah Highway, Oban Road and Old Lilydale Road Intersection, and
- Canterbury and Armstrong Road Intersection.

FUTURE CONSIDERATIONS

To optimise road network efficiency, VicRoads' has moved to a strategic network management model call Smart Roads. The model is strongly informs transport decisions with land use planning²⁵.

SmartRoads Network Operation Plans allocates road space to transport modes by a hierarchy, depending on the time of day, public transport routes and land use. The resulting transportation prioritisation optimises the limited road space to ensure the greatest movement of people and freight throughout the network.

The operation plan designates:

- The principal freight routes along Dorset Road, Canterbury Road, Eastlink and the Ringwood Bypass.
- Bus priority is allocated to roads that carry existing buses routes.
- Traffic routes along Mount Dandenong, Croydon Scoresby. Hull, Plymouth, Warrandyte, Warranwood, Wonga Roads and Wicklow Avenue.
- Pedestrian Priority Areas within the Ringwood and Croydon Activity Centres.
- 2 Future traffic routes, Northern Arterial and Healesville Freeway.

²⁵ VicRoads 2011, *SmartRoads Connecting Communities*, Government of Victoria, Melbourne, p 4

The introduction of traffic monitoring and network operation systems has enabled VicRoad's to quickly respond to incidents and events that may dispute traffic flow and become a hazard to road user safety. The quick notification and response to the disruption reduces the traffic congestion and the risks of further incidents.

Continued advances network operation strategy, traffic monitoring and network operating systems will enable road management authorities to continue to extract efficiencies from the existing road network.

GRADE



FUNCTION

Fair

CONDITION

Fair

CAPACITY

Very Good

CONFIDENCE IN DATA

High

NETWORK MANAGEMENT AGENCY

Maroondah City Council

KEY CAPACITY CREATION PROJECTS

Continued construction of Principal Pedestrian Network

Ringwood to Box Hill Bikeway

Carrum to Warburton Bikeway

PATHWAYS AND TRAILS

Walking and cycling have an important role in local trips and interchanging between public transport.

Together with the shared pathways and trails, the footpath network constitutes the municipality's pedestrian network.

DEMAND – EXISTING AND FUTURE

Pedestrians congregate in areas with the greatest access to employment, retail, schools and services. So naturally, foot traffic is highest within Maroondah's activity centres.

It is anticipated that increased housing density and commercial activity within activity centers will bring about greater pedestrian activity. Where pedestrian volumes approach 50 people each way per an hour, wider footpaths will be required to accommodate the bustle.

The volume of cyclists varies across the cycling network. Cyclist and pedestrian counts indicated that the Dandenong Creek Trail and Eastlink are the busiest cycling corridors²⁶. Both these corridors attract the highest recreational and commuter cycling volumes.

It is anticipated cycling will make a greater contribution to Maroondah's transport mix into the future, as it increase in popularity.

FUNCTION

The pedestrian network is at its most dense in Ringwood, Croydon, Croydon South, Croydon North and Bayswater North. It becomes discontinuous within

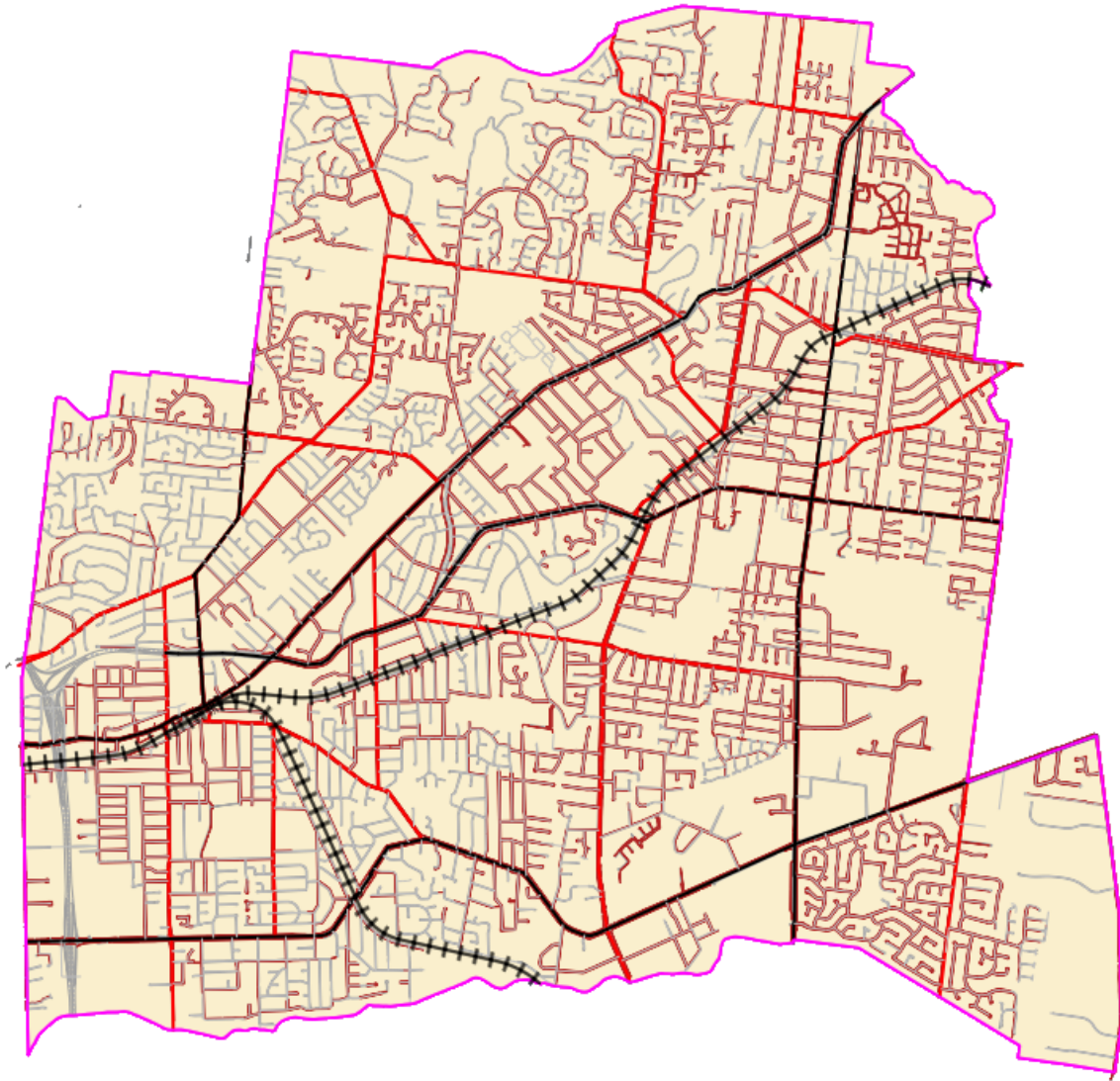
²⁶ Maroondah City Council, 2012 & 2014, *Super Sunday and Super Tuesday Reports*, Bicycle Network Victoria.

Ringwood North, Ringwood East, Warrenwood, Croydon Hills and Heathmont. The irregularity of the footpath network diminishes the walkability of these suburbs.

The bicycle network is composed of bike lanes and shared pathways. Even more so than the footpath network, the bicycle network is discontinuous due to gaps. At present cycling corridors often terminate prematurely at the activity center boundaries. There is very little permeability into the heart of the centers. The Ringwood Metropolitan Activity Centre is the greatest example of this short coming.

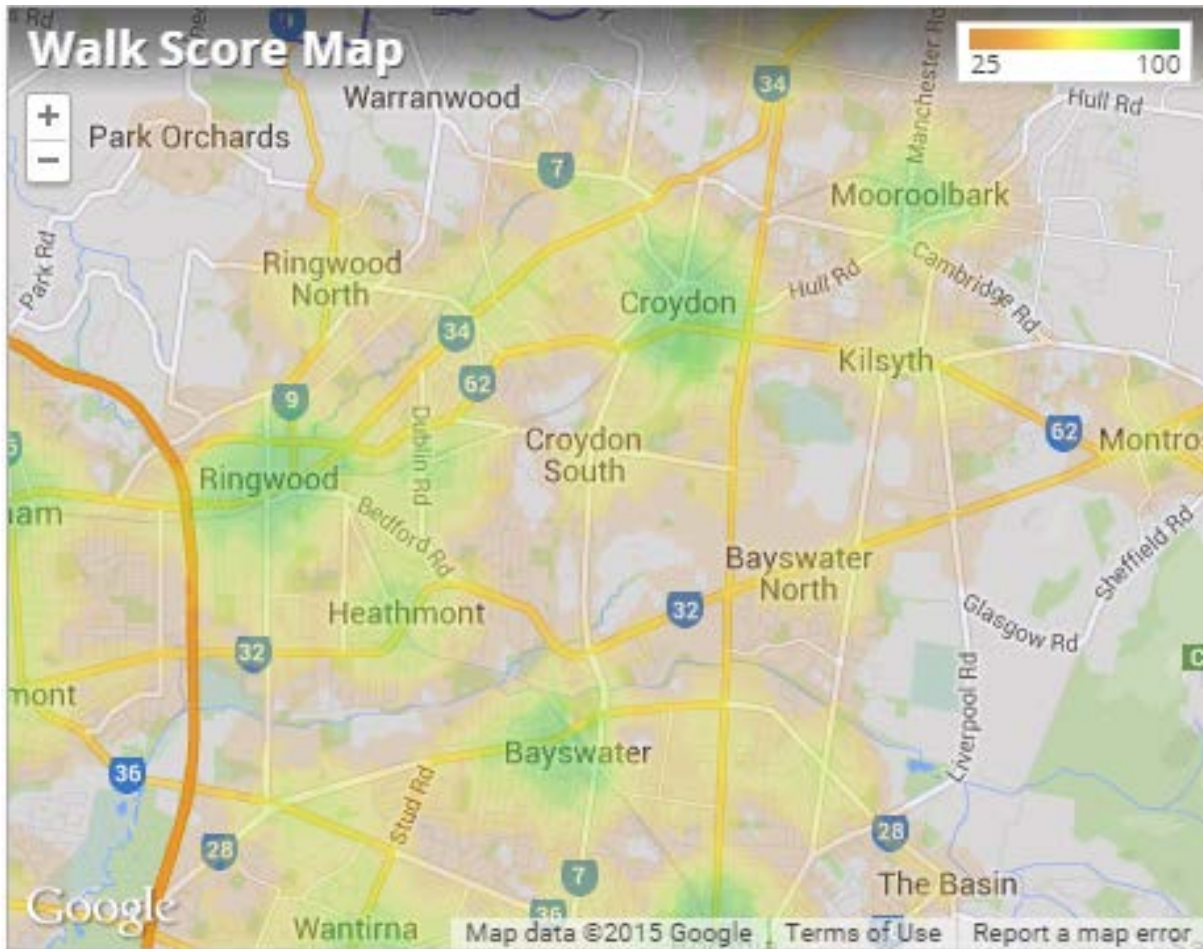


Map 3: Bicycle Network



Map 4: City of Maroondah Footpath Network

The provision pedestrian asset is not the only determinant of good neighbourhood walkability and cyclability. A variety local destination is just as important. Walkscore is a walkability scoring tool that assess walkability by the density and range of destinations within that can be accessed in an area.



Map 11: WalkScore Across the City of Maroondah

The suburbs of Ringwood, Croydon, Ringwood East and Heathmont have the highest walk scores. These green areas have the best scores in the municipality; however there are still opportunities for walkability improvements. The structure plans these activity centers details a framework for urban realm revitalization and pedestrian connectivity improvements.

CONDITION

A recently completed Council report into the condition of footpaths found that their condition is variable. There exist sections in poor condition and other sections in very good condition. The overall condition of the network was considered fair.

Over the last decade, Maroondah City Council has progressively improved the quality and condition of shared pathways, trails and footpaths. These upgrades have resulted in the gradual increase in the quality and condition of pedestrian and cycling assets.

CAPACITY

The cycling and pedestrian volumes on the network are within the capacity of the existing assets specifications. Overcrowding is rare and reports of conflict on shared and trail networks are low.

In the long term, growing commuter cycling volumes will require Council to strategically manage these shared assets to minimize conflicts between the dual usages of these assets.

Better connectivity and integration will be obtained as capital works projects link the existing pathways and trails.

FUTURE CONSIDERATIONS

Council has access to an extensive prospectus of approaches, facilities and initiatives to better plan, design and integrate walkability into the urban realm and built form. Greater walkability can be achieved through:

- strengthening the Maroondah Planning Scheme to encourage innovations in streetscape and building design,
- apply pedestrian boulevards and shared spaces at identified high pedestrian locations,
- Higher priority and longer crossing times given by pedestrian crossing ,
- progressively constructing footpaths along known key pedestrian routes,
- encouraging workplaces to provide end of trip pedestrian and cycling facilities,
- explore pedestrian tracing technology,
- increase public lighting,,
- roll out pedestrian wayfinding network, and
- traffic calming management techniques.

The application of these methods will allow the accommodation for greater pedestrian traffic, permeability, improved safety, providing equitable access and public space amenity.

INFORMATION AND COMMUNICATIONS

NATIONAL BROADBAND

DEMAND – EXISTING AND FUTURE

The internet, smart devices, Wi-Fi and cloud systems are as necessity to modern lifestyles as it is to the conveyance of businesses. Access to data has become an intrinsic part of the planning and operation of cities.

FUNCTION

The infrastructure most often used to provide broadband in Maroondah is asymmetric digital subscriber line (ADSL) technology over the copper access network and 3G and 4G mobile networks.

The existing fixed broadband network provides a variable quality of service throughout the City of Maroondah²⁷.

Cable and ADSL access and speed is reduced due to:

- the distance to the exchange,
- the condition of the hardware, i.e. the copper line can also affect the service quality.

Mobile networks are limited by signal coverage, interference are susceptible to drop in speeds due to too high traffic volume.

The eastern, central and northern suburbs of Maroondah, have the highest quality of internet connectivity. In contrast, the poorest quality is within Croydon South, Heathmont and Bayswater North.

GRADE



FUNCTION

Variable

CONDITION

-

CAPACITY

Fair

CONFIDENCE DATA

IN

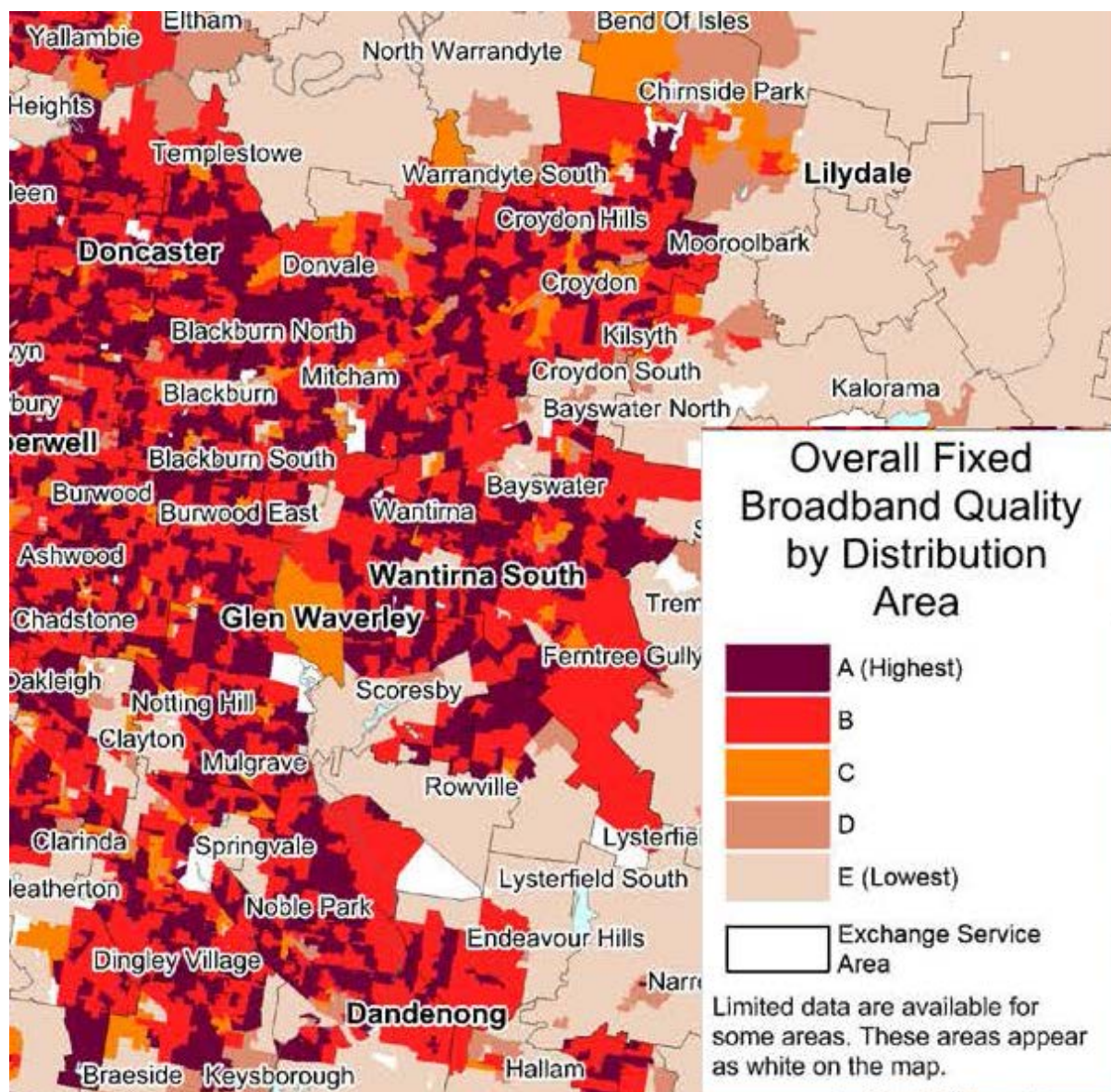
High

NETWORK MANAGEMENT AGENCY

NBN Co Limited

KEY CAPACITY CREATION PROJECTS

²⁷ Department of Communications 2013, *Broadband Availability and Quality Report*, Australian Government Canberra, p 48.



Map 5: Overall Fixed Broadband Quality in Eastern Melbourne²⁸.

CONDITION

An accurate assessment of the condition of the communication lines and cables could not be made due to the limited information available.

CAPACITY

The National Broadband Network (NBN) will enable higher speed broadband access by a combination of technologies that is best suited to regions. At present, the Range Housing estate is the only part of the City of Maroondah that currently has NBN.

²⁸ Department of Communications, 2013, *Broadband Availability and Quality Report*, Australian Government, Sydney, p 48

NBNCo will prioritise greenfield developments and areas without adequate fixed line broadband to receive the NBN first. It is likely that the NBN will be phased in over the next 3 - 5 years within the southern suburbs of the City of Maroondah. The NBN will be completely implemented across the City of Maroondah by 2021 when the nationwide network is completed.

FUTURE CONSIDERATIONS

The future may hold technologies that can deliver levels of connectivity that cannot be envisioned today. In planning the city to accommodate population growth, community composition change, densification of dwellings and expansions of local business and industry, consideration must be given to the flexible adoption of new communication technologies.

GRADE



FUNCTION

Variable

CONDITION

Variable

CAPACITY

Good

CONFIDENCE DATA IN

Variable

NETWORK MANAGEMENT AGENCY

Child Care and Kindergartens – Local Government and Private

Schools – Department of Education and Training and Independent schools

University and TAFE

KEY CAPACITY CREATION PROJECTS

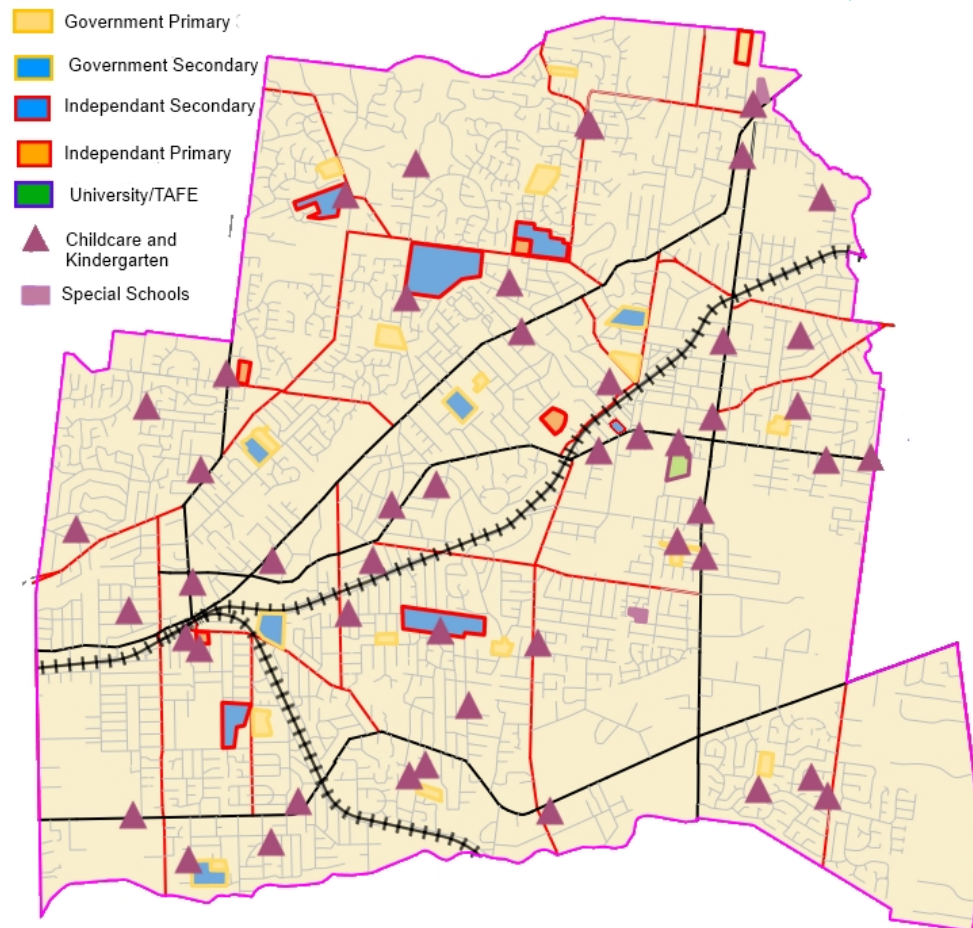
Eastwood Primary School rejuvenation and new specialist deaf facilities.

COMMUNITY

EDUCATION

The education services available in Maroondah are composed of:

- 55 Early Childhood Centres
- 32 Kindergartens
- 25 Primary Schools, 18 public and 7 independent
- 9 Secondary Schools, 4 public and 5 independent
- 2 Special Schools
- 1 university/TAFE



Map 6: Location and Type of Education Facilities in the City of Maroondah

DEMAND – EXISTING AND FUTURE

Preschool

The child care and kindergartens within the municipality are attended by 1,954 preschoolers²⁹. Preschool enrollments have increased markedly by around 24%.

The number of infants and preschoolers in care is expected to grow steadily over the next 21 years. Just over 1,582 additional child care and kindergarten enrolments will need to be accommodated.

Looking towards 2040, the greatest density of households with families with infants, toddlers and preschoolers are expected in Warranwood, Ringwood, Croydon and Croydon Hills.

Primary and Secondary Schools

The majority of the primary and secondary student access education within Maroondah. Only a small percentage of students attend school outside Maroondah.

The school system provides education for over 17,251 students in 2014³⁰. 10,341 students (60%) attend government schools. The remaining 6,910 students (40%) attend independent schools.

Student enrolments in government schools have recently stabilised after a period of contracting enrolments. In contrast, non government school enrolments are increasing by around 3% at primary and 17% for secondary. If enrollments continue to increase as expected, the independent school sector will need to expand to accommodate the market demand.

Population forecasting expects that the primary, secondary and tertiary student population will grow. Primary school population will increase the greatest over the next decade. The growth will transition through the education sector as children naturally progress.

²⁹ Department of Education and Training 2013, *Maroondah Growth 2012 Figures*, Melbourne, p 1.

³⁰ Department of Education and Early Childhood Development, 2014, *Summary Statistics Victoria Schools*, Available from: <http://www.education.vic.gov.au/about/departments/Pages/factsandfigures.aspx> [5 February 2015]

Higher Education

The higher education sector, that includes university and TAFE provide further education to 7455 students within the City of Maroondah. Between 2006 and 2011 there have been an extra 333 TAFE enrollments and 808 University enrollments.

The following University and TAFE campuses attract the greatest proportion of the student from the City of Maroondah.

- Box Hill Institute³¹
- Deakin University – Burwood campus
- Holmesglen (TAFE) Chadstone and Waverley campuses³²
- Monash University – Clayton campus
- Swinburne University of Technology – Croydon and Hawthorn
- University of Melbourne.

FUNCTION

The quality of school infrastructure is important in supporting a good learning environment in kindergartens and schools. The Department of Education and Training has policies and standards to guide new building construction and planned maintenance of buildings, property and facilities. They set a ten year aspiration that all education facilities meet a minimum condition of standard that is fit to deliver contemporary teaching and learning practices.

Particularly at the secondary level, schools are exploring multi use, shared facilities to unlock funding and obtain the greatest benefits from assets. A good example of such collaboration is the Maroondah Education Coalition's Performing Arts Centre and Stadiums at Norwood Secondary Collage.

Maroondah is fortunate to have a verity of preschools and schools that provide a variety of teaching and learning options. Families can choose the kindergarten or school that that best support a student's learning. Analysis of student population place of residency data supplied by the Department of Education and Training indicates that many parents and families do exercise their right of choice and don't necessary attend their local primary or secondary school.

³¹ Regional Development Australia and Regional Development Victoria 2012, *Journey to Study in Melbourne East*, p 66 - 68.

³² Regional Development Australia and Regional Development Victoria 2012, *Journey to Study in Melbourne East*, 57 - 65.

Importantly it includes two special schools, the Croydon Special Development School and Blackburn English Language School. These schools operate with a tailored curriculum to cater for the education of children with disabilities and migrant children respectfully.

The limited tertiary education opportunities within or close to Maroondah are a concern. Maroondah has only one tertiary education site, the Croydon campus of Swinburne TAFE. This campus is dedicated to trade related training.

The closure of the Swinburne Lilydale campus has reduced the opportunity for Maroondah students to access higher education locally. The Victorian Government is committed to work in partnership with a higher education institution to reopen the Lilydale campus. The timeframe for the reopening is unclear. In the meantime, Box Hill Institute has opened a community campus in Lilydale.

The next closest external tertiary education facilities and their distance from Maroondah are:

- Box Hill Institute, Box Hill Campus - 11.9 km
- Deakin University – Burwood campus - 16.6 km
- Holmesglen (TAFE) Chadstone and Waverley campuses - 22 km
- Monash University – Clayton campus - 21 km
- Swinburne University of Technology, Hawthorn Campus – 25 km.

To offer greater local study opportunities, Maroondah City Council in partnership with the tertiary education can explore the possibilities to open additional tertiary campuses within Maroondah.

CONDITION

State Government funding of schools is not sufficient to invest in a full program of maintenance. It is common for schools to have to dedicate maintenance towards urgent infrastructure repairs and renewal. This often leaves non critical repairs or upgrades not being carried out. Consequently, many schools have a back log of building, grounds and facilities maintenance.

Leverage of school fee and donations allows independent schools to dedicate a greater amount of funds towards building renewal and property maintenance. Thus,

the conditions of private sector education campuses are better than those of government education sector.

CAPACITY

There remains enough spare capacity within the early childhood sector to absorb the expected enrollment growth over the next decade. Child care center capacity to accommodate further enrolments will be influenced by a Federal Government policy to introduce a national industry child to carer ratio. If introduced the ability for centers to take additional enrollments may be reduced.

School's ability to accommodate extra students is directly linked to school site's ability to accommodate additional classrooms. Based on available space, the following Maroondah schools have the greatest capacity to accommodate future growth.

- Bayswater North Primary
- Croydon Primary
- Great Ryrie Primary
- Kalinda Primary
- Warranwood Primary
- Heathmont Collage
- Melba Secondary Collage

FUTURE CONSIDERATIONS

There exists a town planning rule of thumb for determining school demand based on new dwelling numbers³³. The rule states that for every 3,000 new dwellings in metropolitan Melbourne creates a need for a new primary school of 450 students. For every 10,000 new dwellings will require a new government secondary school of 1,100 students.

Based on the expected Maroondah's forecast for new dwelling, Maroondah will need an additional secondary school and four primary schools. These will need to be accommodated near the growth areas of Ringwood, Croydon, Heathmont and Ringwood East.

³³ Planning News, *There are Better Ways to Forecast School Demand*, February 2015, Volume 41, p 13.

GRADE**FUNCTION****Good****CONDITION****Fair****CAPACITY****Good****CONFIDENCE IN DATA****Low****NETWORK MANAGEMENT AGENCY****Maroondah Council City****KEY CAPACITY CREATION PROJECTS****Opening AquaNation. of****Ringwood Town Square****OPEN SPACE****DEMAND – EXISTING AND FUTURE**

The majority of Maroondah residents participate in some form of physical activity. Personal fitness, health and wellbeing and enjoyment are the main drivers of physical activity participation.

Over the last seven years, the most popular activities in Maroondah were walking, aerobics/fitness/gym, swimming, running/jogging and cycling. The growing preference for these activities is indicative of the community's shift towards flexible, non-competitive leisure pursuits.

Even so, half of Maroondah residents still participate in organized sport. Dance, tennis, basketball, soccer, netball, golf, Australian football and martial arts have the highest participation.

Basketball, soccer, dance and netball are the fastest growing sport memberships in Maroondah. The greatest participation growth is associated with the emergent girls and women's leagues.

Tennis and golf are sports in decline.

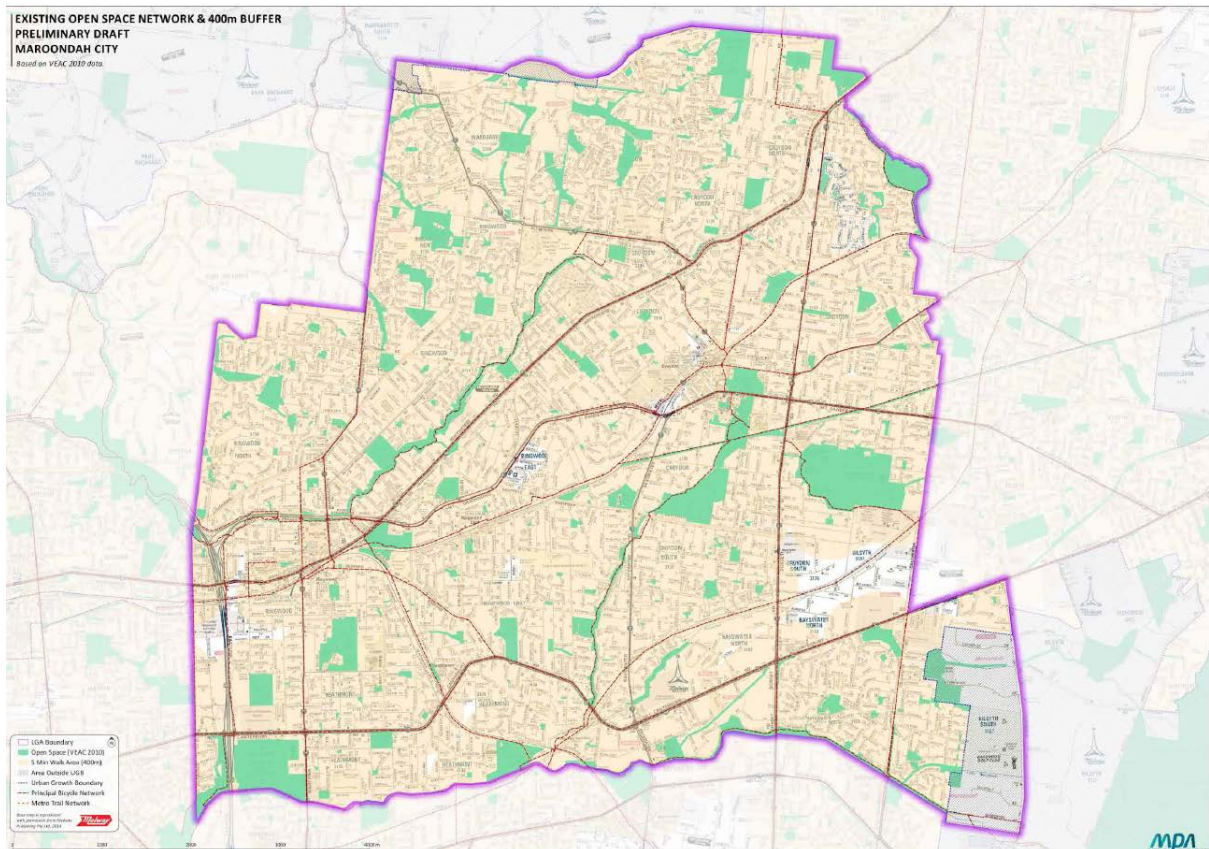
Maroondah has three community gardens, Ringwood, Glen Park and Bayswater North are already oversubscribed. The plot numbers and turnover is not sufficient to meet community demand.

FUNCTION

Predominantly (67.9%) sport, leisure and recreational activity are done within the City of Maroondah. Only a third (32.1%) of physical activity is conducted outside of the municipality. Lack of facilities within Maroondah

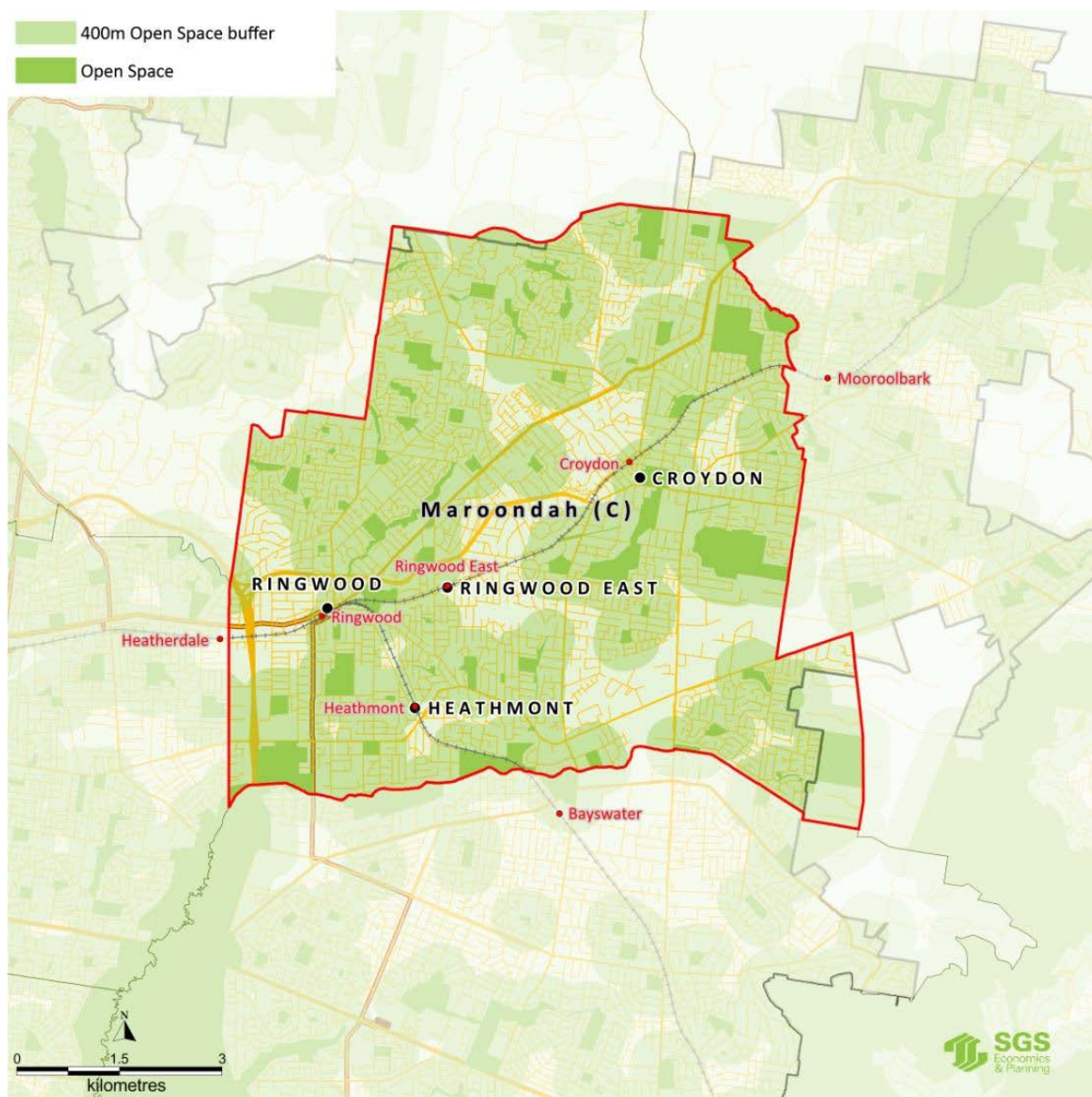
was the main reason cited for traveling outside of Maroondah for sport and recreation.

Map 14 produced by Metropolitan Planning Authority, shows areas of the Maroondah that don't have access to any green space within 400m. The coverage is almost complete with only small pockets existing in Ringwood, Ringwood East and Croydon. The largest area without local open space is the Bayswater North industrial precinct.



Map 7: Access to Open Space within 400m, 2010.

Some areas of Maroondah's only have access to small local pocket parks or reserves. The next map shows the extent of Maroondah that has access to open space greater than 5,000sqm. It reveals that the areas to the west of the Ringwood CAA, the north of Croydon and throughout Ringwood East, lack local access to large parcel of open space.



Map 8: Access to Open Space Larger than 5,000sqm within 400m, 2013.

CONDITION

Open space assets are generally in a fair to good condition. However there is a large amount of infrastructure such as pavilions, toilets, fencing, furniture, paths, playgrounds that require replacement in next 10 years.

CAPACITY

According to Council's Leisure Services Plan 2009 – 2013, there are 259 organisations offering physically active leisure pursuits. The number of actual opportunities would be in excess of this figure, as this list only accounts for the listed

organisation and does not cover individual or group activities offered by the facility or service³⁴.

Sports Facilities

Most of Maroondah's sports grounds are at or over capacity including football, cricket, soccer, netball. Regional grounds with multiple sports often reach capacity at weekends due to car parking limits. Ground and facilities will be stretched further by the expansion of leagues in Maroondah's most popular sports, especially the expansion of girls and woman's leagues. .

To meet club demands for training facilities, Council has entered into agreements with schools to use school facilities. Lower grounds condition and limited facilities at schools limit agreements being reached for matches.

The mainstreaming and popularity of previous niche sports or recreational activities will in some cases required renewal of existing facilities or the building of new specific facilities. For Maroondah the most notable examples of growing sports that will require specialized facilities are skating, BMX and mountain biking.

Golf courses are significant open space areas that provide important habitat. Only the Dorset Golf Course currently provides perimeter walking opportunities. With an aging population, more walking circuits and to a lesser extent cycling pathways will increasingly become important for maintaining health, wellbeing, mobility and community connection.

With 21 dances and 15 martial arts providers Maroondah is well placed to accommodate future growth of both these activities.

The opening of AquaNation will assist to meet the expected continued demand for access to swimming pools, aerobics and fitness classes and the gym. The pools will allow for the expansion of learn to swim program, aqua classes and offer greater opportunity for lap swimmers and warm water rehabilitation. The centre will also accommodate swim club training and events as well as school swim carnivals. The fitness rooms will provide additional opportunities to run a range of group fitness classes from Pilates to spin classes.

³⁴ Maroondah City Council, 2009, *Leisure Services Plan 2009 – 2013*, Melbourne, p 25.

Parks and Gardens

At present few recreational parks are close to capacity except for Ringwood Lake Park at weekends. Most local and precinct parks also have capacity for selected uses.

The increase in urban densities will result in more people needing to use open space to maintain their physical and mental health and wellbeing. Existing open spaces within high density areas of Ringwood, Croydon and to a lesser extent Ringwood East and Heathmont will be experience the greatest pressure.

The creation of the new Ringwood Town Square will provide more open space within the heart of Ringwood.

The opportunities to create additional community garden plots by either existing garden expansion or new community gardens are limited. Council can play a key role in identifying additional land for garden space, supporting the establishment of new gardens and providing policy, funding and in-kind support to enable community garden expansion to meet the high demand.

Play equipment is expensive to install and maintain. Where possible Council has sort consolidated smaller closely situated play grounds to produce a larger, higher quality play space. The most notable example being the Croydon Town Park and the mix play activity space, consisting of skate facility, play ground and Parkour space. The advent of the indoor play spaces are providing an alternate play experience to the community and assisting to supplement demand for larger play facilities.

FUTURE CONSIDERATIONS

New approaches to upgrading and delivering new open space are being identified in response to global city planning trends, changing societal needs and urban design advancement. Contemporary ideas about how to unlock, reclaim and incorporate open space within urban renewal are evolving. These include where open space has been reclaimed from existing roadways, roundabouts, railway reserves, roof top gardens and drainage reserves.

Local governments are also developing new land acquisition process to identify important property and the ability to move quickly once the property is listed for private sale. The challenge for Council will be to identify and act on opportunities to

adopt and apply these new approaches to maximise open space and deliver greater outcomes for community and the environment.

A defining and valued aspect of the City of Maroondah is the green and leafy natural environment that permeates the suburbs. The trees and other flora that line the streets and inhabit the waterways, the parks, wetlands and bushland reserves contribute enormously to this status. The Maroondah's urban forest assists to provide habitat for fauna, protection of biodiversity and reduces the urban heat island effect.

To better inform the management of trees and to better protect against future vulnerability Council recently conducted a cataloguing and mapping Council owned trees. A more accurate database that better records the position, species and condition of our trees inform better management schedules and renewal programs. A further step in establishing a future strategic road map to protect and expanding Maroondah's valued green infrastructure could be to develop an urban Forest Strategy.

WHAT INFRASTRUCTURE WILL MAROONDAH NEED?

IMPLICATIONS ON URBAN INFRASTRUCTURE

This paper has identified the expected impacts of the following demand generators on Maroondah's urban infrastructure networks over the next 25 years.

- population growth,
- housing stock and property markets,
- development patterns,
- economic, demographic and climate change, and
- changing lifestyle choices.

Base on the evidence, it is possible to determine the implications new housing and urban densification will have on Maroondah's urban infrastructure. The summary table of each network's ability to accommodate future housing shows that the implications will be diverse.

Networks, such as roads, rail, and storm water are exceeding capacity during peak periods and will continue to come under increasing pressure as demand increase into future. Without capacity improvement and behavior change interventions these systems will continue to experience efficiency decline and increase in system failure.

Potable water, waste water and open space have supply dependencies that impact on future capacity. Uncertainty towards rain water catchment volumes, extent of storm water overflow mitigation and land acquisitions dedication to open space are variables that make it difficult to accurately ascertain future capacity.

Other networks are better placed to accommodate future growth and demand. These networks are indicated on the table by the green ticks. The condition, latent capacity and service supply within these networks are sufficient to continue to operate as intended. In fact, continued planned infrastructure investment will improve the network capabilities to better service the City of Maroondah.

Infrastructure Category	Capacity to Accommodate Housing Growth to 2040.	Key Capacity Creation Project (next 5 years)
Electricity		New Chirnside Park Zone Sub Station
Gas		Lilydale Gas Pipeline
Potable Water		Water mains renewal for Bayswater and Ringwood North
Waste Water		Brushy Creek Treatment Plant Upgrade
Storm Water		Flood mitigation works in Ringwood, Ringwood North and Croydon
Rail		Ringwood Station Upgrade. Grade separations.
Bus		TransDev network upgrades.
Road		Colchester, Canterbury and Lincoln Road upgrades Heatherdale Road Grade Separation
Pathways and Trails		Box Hill to Ringwood Bikeway Carrum to Warburton Bikeway
Broadband		NBN rollout
Education		Maroondah Education Precinct Projects
Open Space		AquaNation and park renewal projects.

Table 2: Summary of Future Infrastructure Network Capacity to Accommodate Housing Growth.

ⁱ Department of Transport (2010), *Knox/Maroondah/Yarra Ranges Bus Service Review*, Booz & Company, Melbourne, p 6