Attachment 24

Analysis of proposed residential zones

Final report

City of Monash
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SGS Economics & Planning

Independent insight.

SGS Economics and Planning Pty Ltd
ACN 007 437 729
www.sgsep.com.au
Offices in Canberra, Hobart, Melbourne and Sydney

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GLOSSARY

Available land	Land deemed to have potential to accommodate additional housing in the next 20 years.
Development project	The categorisation of an individual housing development within the Housing and Development Data.
Dwelling	A building or part of a building used as a self-contained residence
Financial feasibility	Considers the likely financial outcomes of development by comparing costs to revenue. A development project is financially feasible when revenues exceed costs, taking into consideration the developers profit and risk.
Housing and Development Data (HDD)	A dataset of lot-by-lot housing stock and new supply. The collection of the HDD was commissioned by DTPLI and has been carried out annually by Spatial Economics since 2004.
Housing supply	An estimate of the supply of housing over a 20 year period (2012 to 2031) based on analysis of housing capacity, demographic projections, and development feasibility.
Housing capacity	An estimate of the total capacity for housing based on existing planning controls and recent housing supply trends (unconstrained by demand).
Net Housing capacity	An estimate of the remaining capacity for housing based on existing planning controls and recent housing supply trends (unconstrained by demand), minus existing dwellings.
Apartments and higher density housing	Refers to housing forms that feature dwellings that are vertically stacked and typically result in densities of over 100 dwellings per hectare, and up to 500 dwelling per hectare. These forms are generally, but not always, three or more storeys in height.
Low and medium density housing	Refers to infill housing forms that result in low to medium density development typically less than 100 dwellings per hectare and more commonly between 20 and 60 dwellings per hectare. Includes specific housing types such as duplexes, villas and townhouses. Includes the housing projects classified as 'low yield infill type' described in Section 2.1.
Site density / net density	The number of dwellings per hectare on land devoted solely to residential development. While it includes private driveways and private open space, it does not include public roads and areas of public open space.
Average density	The average number of dwellings per hectare on land devoted solely to residential development. While it includes private driveways and private open space, it does not include public roads and areas of public open space.

EXECUTIVE SUMMARY

The City of Monash is seeking to introduce new residential zones through two planning scheme amendments: Amendment C120 and Amendment C125. The latter amendment is intended to implement the 2014 Monash Housing Strategy. Monash' Councillors resolved to defer the amendment C125 and undertake further analysis including an independent review of the proposed changes with respect to:

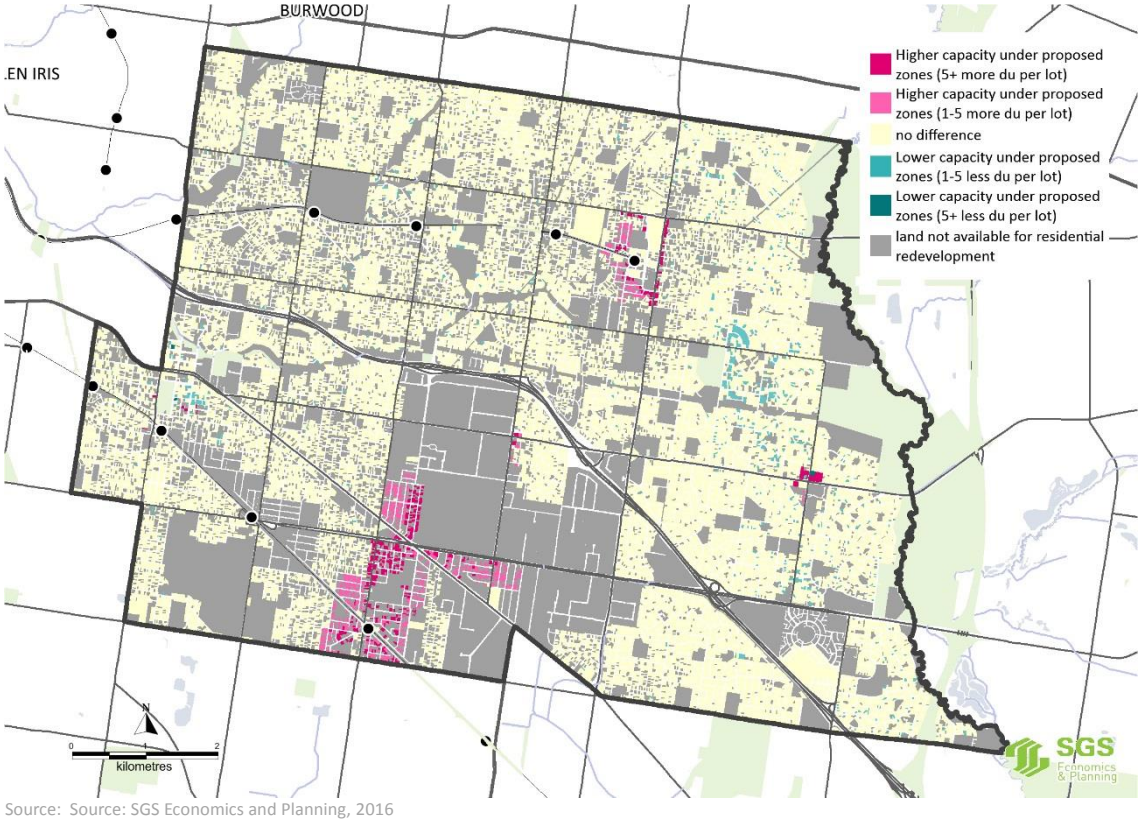
- Council's obligations to the State Government's metropolitan planning policies
- Council's obligation to accommodate the population growth
- Impact on housing affordability; and
- Impact on housing choice.

This report has been prepared to address these issues to the extent possible within the constraints of the time and data available.

Housing capacity: current and proposed zones

The estimated housing capacity under the Monash's current zones is between 55,000 and 62,500 net additional dwellings. The estimated capacity of the proposed zones is 58,000 net additional dwellings. This finding suggests that the proposed new zones result in very little change to the overall housing capacity within the Municipality relative to the current situation (see figure below).

DIFFERENCE IN CAPACITY: CURRENT ZONES VS PROPOSED ZONES (APPROACH 2)



Source: Source: SGS Economics and Planning, 2016

The main differences in housing capacity between the proposed residential zones and the existing zones occur within and directly adjacent to the Clayton and Glen Waverley activity centres. Under the proposed zones the Clayton and Glen Waverley Activity Centres are largely zoned Residential Growth Zones (3 and 4) allowing for higher housing capacity (described within the associated structure plans). The interface areas adjacent to the Clayton and Glen Waverley Activity Centres, which are proposed to be zoned General Residential Zones 6, 7 and 8, also permit higher housing densities, increasing capacity. This is also the case in the Wheelers Hill and Oakleigh Activity Centres, both of which are proposed to be zoned General Residential Zones 5. These areas are indicated in in pink and red in the maps below.

The proposed zones would result in reduced capacity in areas proposed to be zoned Neighbourhood Residential Zone 2, 3 and 4 due to the introduction of minimum subdivision requirements of 300m and a maximum of two dwellings per site.

The open space, setback and site coverage requirements within General Residential Zones 3 and 4 (when compared to those of the current GRZ2 zone) could result in modest reductions in housing capacity, if these requirements are strictly adhered too. In particular, medium density developments will be less likely on smaller lots (that is, developments of between 50 and 100 dph on lots between 500 and 800 square metres). This is likely to have only a modest impact on dwelling supply as analysis of recent housing supply trends suggests relatively few medium density developments are built in areas zoned GRZ2. Changes in housing capacity on a site by site basis are small in the GRZ3 and GRZ4 areas and for the most part fall within the category of 'minor difference' in the map above.

COMPARISON OF NET HOUSING CAPACITY: CURRENT ZONES AND PROPOSED ZONES

	Current zones (Approach 1): Net Capacity	Current zones (Approach 2): Net Capacity	Proposed zone: Net capacity	Difference between Proposed Zones and Approach 1	Difference between Proposed Zones and Approach 2
Ashwood	2,130	2,090	1,910	-220	-180
Burwood	620	600	560	-60	-40
Chadstone	3,210	3,300	3,120	-90	-180
Clayton	4,020	4,060	8,430	4,410	4,370
Glen Waverley	11,700	14,860	12,300	600	-2,560
Hughesdale	1,880	1,930	1,850	-30	-80
Huntingdale	390	530	500	110	-30
Mt Waverley	11,450	11,450	10,350	-1,100	-1,100
Mulgrave	5,240	6,800	5,410	170	-1,390
Notting Hill	760	760	760	0	0
Oakleigh	3,210	3,460	3,300	90	-160
Oakleigh East	1,400	1,470	1,410	10	-60
Oakleigh South	1,900	2,180	2,090	190	-90
Wheelers Hill	7,530	9,400	5,660	-1,870	-3,740
Total	**55,450**	**62,900**	**57,700**	**2,250**	**-5,200**

Source: Source: SGS Economics and Planning, 2016

Housing capacity, demand and impact on supply

Net capacity for new housing was compared to projected demand till 2031 to determine to what extent capacity might be a limitation on housing supply. The findings of this analysis are shown in the table below.

This comparison found that in 10 of 14 suburbs in Monash the dwelling demand to 2031 was less than 30% of the estimate capacity. This suggests housing capacity excess projected demand for the next 15 years by a significant margin.

A further comparison between capacity and demand by excluding the capacity identified in the NRZ areas (final columns in the table below). Even without the 'NRZ capacity' there appears sufficient housing capacity to meet demand.

COMPARISON OF CAPACITY AND DEMAND BY SUBURB

	Existing dwellings: (HDD 2012)	Dwelling demand to 2031	Demand vs capacity (including capacity in NRZ)		Demand vs capacity (excluding capacity in NRZ)	
			Net capacity	Demand as % capacity	Net capacity	Demand as % of capacity
Ashwood	2,620	540	1,910	29%	1,390	39%
Burwood	910	190	560	34%	460	41%
Chadstone	3,390	620	3,120	20%	2,930	21%
Clayton	5,830	2,460	8,430	29%	8,440	29%
Glen Waverley	15,030	1,460	12,300	12%	9,770	15%
Hughesdale	2,950	380	1,850	21%	1,600	24%
Huntingdale	750	70	500	13%	500	13%
Mount Waverley	12,980	1,320	10,350	13%	8,760	15%
Mulgrave	6,970	790	5,410	15%	4,690	17%
Notting Hill	840	640	760	85%	760	85%
Oakleigh	2,990	1,200	3,300	36%	2,900	41%
Oakleigh East	2,470	210	1,410	15%	1,410	15%
Oakleigh South	2,070	720	2,090	35%	2,080	35%
Wheelers Hill	7,260	1,530	5,660	27%	2,680	57%
Total	**67,060**	**12,140**	**57,650**	**21%**	**48,380**	**25%**

Source: HDD Data, 2012 and SGS Economics and Planning, 2016

Housing choice and affordability

The proposed zone changes are intended to provide additional opportunities for medium and higher density housing in and around activity centres and protect the amenity of the lower density areas. The only discernible impact on housing diversity and choice will be the limitations on medium density housing in the GRZ3 and GRZ4 areas. Any reduction in capacity for medium density housing will likely be compensated for by an increases in capacity for these forms in alternative locations.

Given the surplus of capacity relative to demand at the suburb level there is no reason to assume that the proposed zone changes will affect housing affordability as a result of a decrease in the potential capacity for new housing. To understand the extent to which zone changes impact housing affordability, times series data monitoring of housing markets would be required that considers the quantum of housing supply at various price points, controlling for external factors.

It is noted that Amendments C120 and C125 do not represent the full extent of Council ambitions with respect to planning for future housing supply. Structure plans are pending for other activity centres as well as for the 'boulevards' of Dandenong Road and Springvale Road. These initiatives are likely to provide additional capacity for housing in Monash to that identified in this report.

1 INTRODUCTION

The City of Monash is seeking to introduce new residential zones through two planning scheme amendments: Amendment C120 ('Glen Waverley Structure Plan') and Amendment C125 ('New Residential Zones'). The latter amendment is intended to implement the 2014 Monash Housing Strategy.

During the process of considering submissions on Amendment C125 Councillors resolved to defer the amendment and undertake further analysis. At a meeting held on 27 October 2015 the Councillors drafted a resolution calling for a serious of specific analyses of the likely impacts of the new zones including:

> *…an independent review of the proposed changes and seek advice in relation to the following:*
>
> *i. whether the proposed changes through C125 are likely to assist or hinder in meeting Monash's obligations pursuant to the State Government's metropolitan planning policies and Council's obligation to plan appropriately to accommodate the target population growth allocated to Monash in coming years;*
> *ii. whether the proposed changes are likely to have any impact on housing affordability; and*
> *iii. whether the proposed changes are likely to have any impact on increasing or decreasing the stock of housing choice in Monash.*

This report has been prepared to address these issues to the extent possible within the time available and the constraints of available data.

It is noted that Amendments C120 and C125 do not represent the full extent of Council ambitions with respect to planning for future housing supply. Structure plans are pending for other activity centres as well as for the 'boulevards' of Dandenong Road and Springvale Road. These initiatives are likely to provide additional capacity for housing in Monash to that identified in this report.

1.1 Objectives

The specific objectives of this review are to:

- Provide a high level review of the Monash Housing Strategy
- Determine whether amendments C120 and C125 might lead to significant changes in the quantum, mix (i.e. type) and location of housing supply in Monash over the next 10 years, compared to continuation of the current controls;
- Assess whether any identified changes in housing supply align with the policy directions set out in the Plan Melbourne and the Plan Melbourne Refresh document
- Assess whether any identified changes will assist or work against housing affordability.

This report does not consider the merits of the specific spatial application of the proposed residential zones, or the merits of the specific planning standards attached to them (e.g. heights, setbacks, site coverage, open space requirements). The analyses are confined a high level assessment of the Housing Strategy and to estimating the potential impact of the new zones on housing capacity, housing supply, and, to the extent possible, housing choice and housing affordability. The impact on the new zones on the financial feasibility on new housing developments have not been considered.

1.2 Content

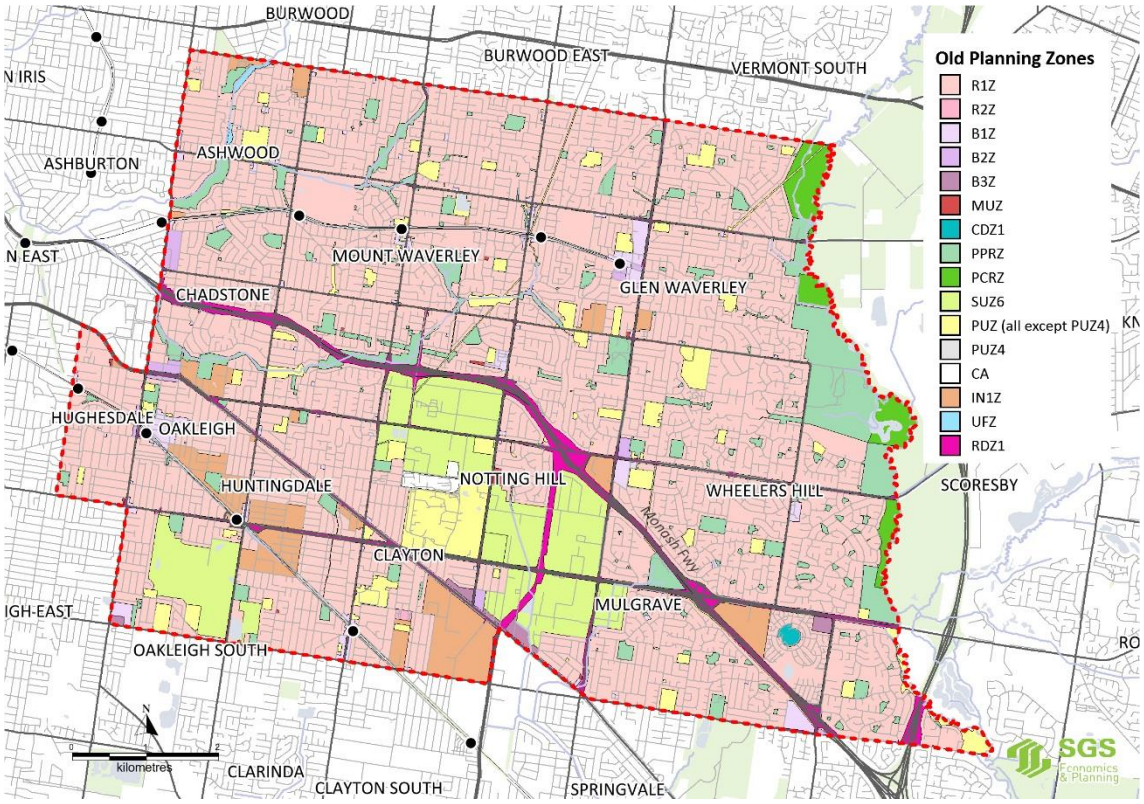
This report contains six chapters. Chapter 2 provides a brief review of the Monash Housing Strategy – the document that is intended to provide the strategic basis for Amendments C120 and C125. Chapter 3 includes analysis of recent housing supply trends, based on the Housing and Development Data (HDD). The findings of this analysis are used in the subsequent assessment of housing capacity under the existing zones. Chapter 4 considers the likely impact on the new planning zones on housing development by considering the potential impacts on the proposed planning controls on the yield. This chapter draws on analysis completed by MGS architects. Estimates of housing capacity and housing supply for the current and proposed residential zones are provided in Chapter 5. The final chapter discusses housing supply and the issues of housing choice and housing affordability.

1.3 Residential zones in Monash

Former residential zones

Prior to June 13 2014 residential development in Monash was permissible on land zoned Residential 1, Residential 2, Mixed Use and Commercial 1. The latter zone replaced the Business 1 and Business 2 zone on July 2013. The Residential 1 Zone covers a significant proportion of the Monash Council area (Figure 1).

FIGURE 1. FORMER MONASH ZONES (PRE-JUNE 13 2014)



Source: SGS Economics and Planning, 2016

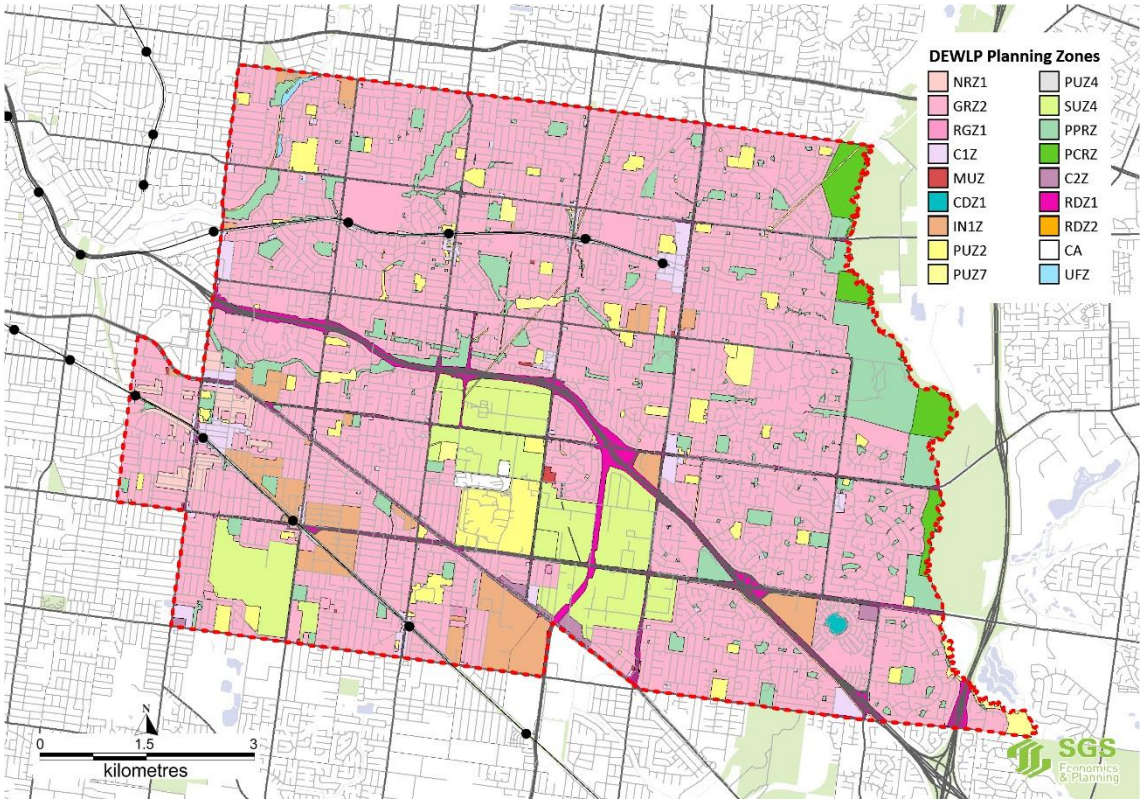
Current residential zones

On June 13 2014 a 'neutral translation' of the new residential zones saw the introduction of the Neighbourhood Residential Zone (NRZ), the General Residential Zone (GRZ) and the Residential Growth Zone (RGZ) with their default schedules (see Figure 2). The Neighbourhood Residential Zone was applied to areas in the west of the municipality that are near Oakleigh and Hughesdale Stations and covered by Heritage Overlays. The residential growth zone was applied to 2 sites covering 4 hectares in Clayton,

both close to Monash University and the Monash Medical Centre/Children's Hospital precinct. The reminder of the land that was zoned Residential 1 was converted to the General Residential Zone (shown as GRZ2 in Figure 2).

Due to the recent introduction of these zones it is not possible to assess their impact on housing capacity. The latest supply data available is for the year 2012 which pre-dates the introduction of the current residential zones. For the purposes of the analysis presented in this report it has been assumed that the former and current residential zones would result in similar outcomes with respect to housing capacity and housing supply.

FIGURE 2. CURRENT MONASH ZONES



Source: SGS Economics and Planning, 2016

Proposed residential zones

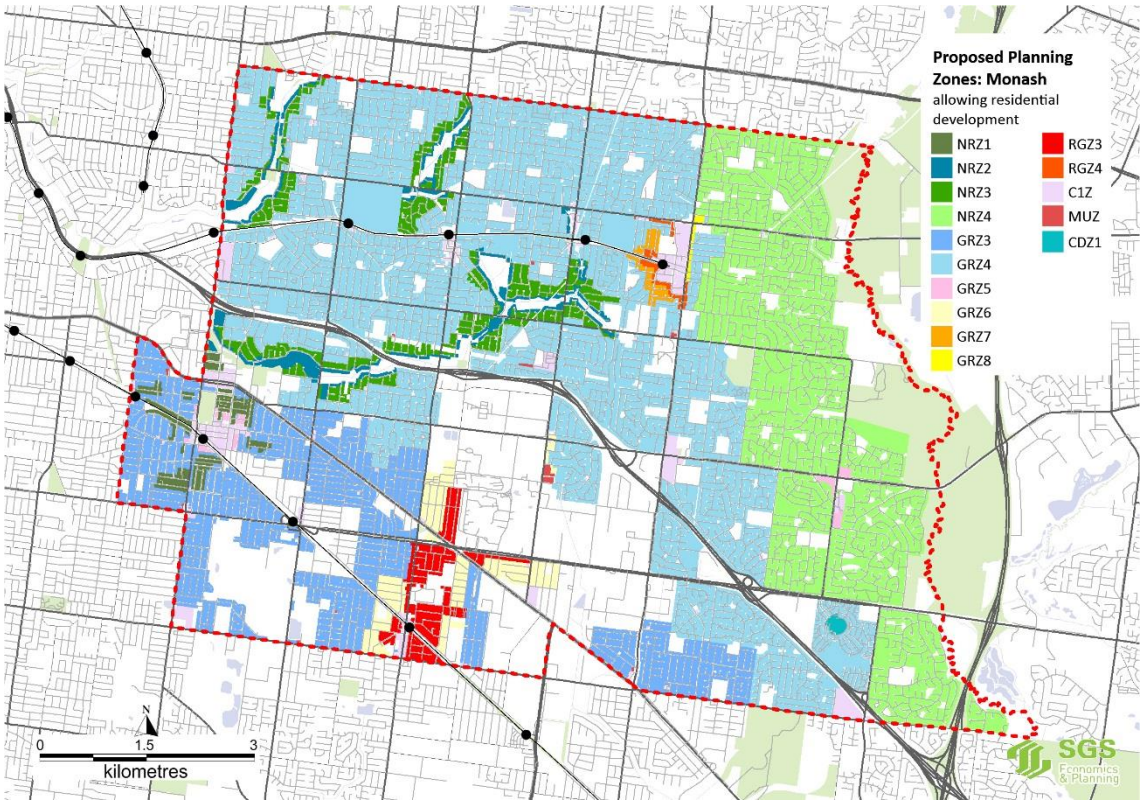
Drawing on further analysis including the 2014 Monash Housing Strategy the City of Monash has developed as series of alternative residential zones and associated schedules (Figure 3). Amendment C120 ('Glen Waverley Structure Plan') and Amendment C125 ('New Residential Zones') include the following zones:

- NRZ1 – Heritage Precincts (C125)
- NRZ2 – Creek Abuttal (C125)
- NRZ3 – Creek Environs (C125)
- NRZ4 – Dandenong Creek Escarpment (C125)
- GRZ3 – Southern Areas (C125)
- GRZ4 – Northern Areas (C125)
- GRZ5 – Oakleigh and Wheelers Hill AC (C125)
- GRZ6 – Clayton AC Housing Diversity (C125)
- GRZ7 – Glen Waverley AC Housing Diversity (C120)
- GRZ8 – Glen Waverley AC (C120)
- RGZ3 – Clayton AC (C125)

– RGZ4 – Glen Waverley AC (C120)

The schedules to these zones introduce additional requirements that differ from the ResCode requirements. These requirements address issues such as setbacks, private open space area and dimension, site coverage, landscaping (the number and size of trees), and in some cases, separation between dwellings. In some cases the zones refer the provisions of existing Structure Plans or Design and Development Overlays that provide more detailed guidance.

FIGURE 3. PROPOSED MONASH PLANNING ZONES



Source: SGS Economics and Planning, 2016

Commercial and Mixed Use zones

The capacity of land zoned Commercial and Mixed Use for housing is considered in this report however, as Amendments C120 and C125 do not impact on these areas it has been assumed there will be no difference in housing capacity in these areas between the two scenarios.

Commercial zones are clustered around all train stations that exist in the City of Monash. Large commercially zoned areas also exist at Brandon Park Shopping Centre in Wheelers Hill, Waverley Gardens Shopping Centre in Mulgrave and the big box retail centre in Chadstone which includes Harvey Norman and Officeworks.

1.4 Housing demand

Demand for housing in additional Monash is anticipated to be significant. Council's Housing Strategy, drawing on Victoria in the Future (VIF) data from 2012 suggests there will be demand for an additional 10,800 dwellings between 2011 and 2031: a growth rate of 540 dwellings per annum. Using 2014 VIF population projections SGS analysis suggests demand for around 14,000 dwellings between 2011 and 2031 which equate to 700 dwelling per annum. Between 2001 and 2011 Monash grew by approximately 870 dwelling per annum.

Demand by household type and dwelling type

The tables below are based on VIF 2014 population projections converted to household and dwelling types by SGS. Demographic change including an aging population and increasing diversity in household types are evident.

The proportions of couple family without children and lone person households are projected to increase, whereas the number of couple families with children are projected grow more slowly.

TABLE 1. HOUSING DEMAND BY HOUSEHOLD TYPE (2011 – 2041)

Household Type	No. of Dwellings				Share of Dwellings (%)			
	2011	2021	2031	2041	2011	2021	2031	2041
Couple family with no children	16,838	19,517	20,658	25,127	25.8%	26.8%	26.1%	28.0%
Couple family with children	22,108	22,788	24,860	22,749	33.9%	31.3%	31.4%	25.4%
One parent family	6,259	6,820	7,622	8,729	9.6%	9.4%	9.6%	9.7%
Other family	2,650	3,384	4,148	5,043	4.1%	4.7%	5.2%	5.6%
Lone person household	12,330	14,052	14,967	20,321	18.9%	19.3%	18.9%	22.6%
Group household	3,462	4,312	4,978	5,623	5.3%	5.9%	6.3%	6.3%
Other household	1,642	1,833	1,967	2,136	2.5%	2.5%	2.5%	2.4%
Total	**65,289**	**72,707**	**79,200**	**89,727**	**100%**	**100%**	**100%**	**100%**

TABLE 2. HOUSING DEMAND BY DWELLING TYPE (2011 – 2041)

Dwelling Type	No. of Dwellings				Share of Dwellings (%)			
	2011	2021	2031	2041	2011	2021	2031	2041
Separate House	50,539	51,797	52,112	54,265	77.4%	71.2%	65.8%	60.5%
Semi-detached	7,737	11,363	15,297	20,323	11.9%	15.6%	19.3%	22.7%
Apartment	6,857	9,376	11,607	14,929	10.5%	12.9%	14.7%	16.6%
Other	155	171	184	209	0.2%	0.2%	0.2%	0.2%
Total	**65,289**	**72,707**	**79,200**	**89,727**	**100%**	**100%**	**100%**	**100%**

Demand by suburb

VIF does not provide projections at a suburb level. Using a combination of iD forecasts, the HDD and VIF data, estimates of dwelling demand by suburb for the period to 2031 were developed (Table 3). This data will be referred to later in this report when comparing housing capacity to projected demand.

TABLE 3. HOUSING DEMAND BY SUBURB (2012 – 2031)

	Existing dwellings: (HDD 2012)	New dwelling demand (2031)
Ashwood	2,620	540
Burwood	910	190
Chadstone	3,390	620
Clayton	5,830	2,460
Glen Waverley	15,030	1,460
Hughesdale	2,950	380
Huntingdale	750	70
Mount Waverley	12,980	1,320
Mulgrave	6,970	790
Notting Hill	840	640
Oakleigh	2,990	1,200
Oakleigh East	2,470	210
Oakleigh South	2,070	720
Wheelers Hill	7,260	1,530
Total	**67,060**	**12,140**

2 MONASH HOUSING STRATEGY

The chapter provides a brief review of the 2014 Monash Housing Strategy document.

2.1 Context

The 2014 Monash Housing Strategy was prepared for Council by Planisphere. The previous strategy was prepared in 2004 by Essential Environmental Services.

Plan Melbourne

The release of Plan Melbourne in 2013 by the former Planning Minister and provided revised directions from the State Government for the metropolitan Melbourne. Key directions for housing include:

- Understand and plan for expected housing needs
- Reduce the cost of living by increasing housing supply near services and public transport
- Facilitate the supply of social housing
- Facilitate the supply of affordable housing

Plan Melbourne includes an Initiative (2.1.1) to apply the reformed residential zones to address the first direction above and suggests Councils implement the zones in a manner that is consistent with Practice Note 78 and consistent with a current local housing strategy.

Plan Melbourne expressed strong sentiments about the importance of protecting neighbourhood character to Melbourne's liveability and the Plan includes the action to deliver the NRZ "across at least 50 per cent of Melbourne's residential-zoned land". The release of a Plan Melbourne Refresh document and the Residential Zones State of Plan Reports has raised the spectre of revisiting this particular metric and the broader consideration of an appropriate balance between housing supply, affordability and diversity and the protection of neighbourhood character through restrictive zoning practices.

2.2 Purpose of the strategy

The Executive Summary clearly articulate a key challenges for the strategy as being:

> *A key issue for Monash will continue to be the management of household growth and change while at the same time preserving valued neighbourhood character and enhancing sustainability. However, addressing quantitative demand is only part of the issue. There is also a need to ensure that new housing is designed to meet the specific needs of the community as it ages and diversifies. (p. viii)*

More specifically, the document suggests the key issues confronting Monash with respect to housing area (pp. viii-ix):

- Accommodating moderate population growth through infill development.
- Facilitating a more diverse range of housing to meet changing needs, particularly in relation to housing for older residents, students and recent migrants.
- Managing an expected increase in demand for higher density development, including apartments.

- Addressing housing affordability issues.
- Promoting more environmentally sustainable urban form and building design.
- Encouraging design excellence in new development, extension and renovations.
- Protecting valued urban character, heritage and amenity, and the natural environment.
- Recognising the opportunities that larger sites may provide for more intensive development outcomes that, due to their scale, can be sensitive to the desired future character of the location.

2.3 Review

Evidence base and analysis

- There is no evidence of analysis of the effectiveness of limitations of existing planning policies.
- Have the recommendations of the MacroPlan report been addressed? Specifically, the recommendation to undertake a 'review of council's planning standards' and 'of previous (refused) planning applications'. These exercises could inform the development of a new housing strategy.

Strategy

Two key themes could be more strongly articulated in the Strategy chapter:

- There is no specific reference to the need to **ensure adequate housing supply**;
- Nor is there any explicit reference to the need for **policies that address housing affordability**, as distinct from affordable housing.

Affordable housing vs housing affordability

The Strategy does not appear to distinguish the concepts of 'affordable housing' and 'housing affordability'. The former refers to 'non-market' housing (public housing, social housing, or other subsidised housing provided by the community housing sector). The latter refers to the cost of housing generally, but in particular to the availability of housing (for purchase or rent) for households that do not qualify for government assistance and are vulnerable should the supply of 'affordable market housing' be reduced. Although related concepts there is merit in considering each separately as different policy and planning responses might be required to address each issue.

High-rise vs high-density (and medium-rise vs medium density)

The terms high-rise and medium-rise are suggestive of (but not the same as) high density and medium density. The alternate terminology is more appropriate for designating areas suitable for more intensive development. The specific form or scale of the development should be determined subsequently through more detailed planning. (High-rise development does not always provide high densities, and lower scale does not necessarily imply low density: terrace housing and low-rise walk up apartments contribute some of the highest residential densities in Australia cities; whereas taller buildings in landscape settings – such as public housing estates of the 60s and 70s – provide relatively modest densities despite their significant visual impact.)

Implementation

Although the proposed residential zones do not form part of the Strategy, some observation can be made about the relationship between the 'Residential Development Framework Map' and the proposed zones:

1. The Heritage Precincts (Category 5) and the Creek Environs (Categories 6 and 7) identified in the Framework are reflected in the proposed zones through the use of the Neighbourhood Residential Zones

2. The strategic significance of Activity and Neighbourhood Centres (Category 1) are reflected in the proposed zones through the use of the Residential Growth Zone and alternative versions of the General Residential Zone.
3. Areas designated as 'Category 2 – Accessible Areas' in the Framework have generally adopted the General Residential Zones that apply throughout much of the rest of the municipality. No distinction has been made between 'Accessible areas' and 'Garden City Suburbs'.
4. The same observation might be made for portions of the land designated in the Framework as 'Category 3 – Residential Land in the Monash National Employment Cluster.

It is understood that the matters highlighted in points 3 and 4 above whilst not addressed in the current proposals will be addressed at a later stage.[1]

There is a large number of objectives of the Strategy (p. ix). How will these be prioritised and/or reconciled where there are (inevitably) competing objectives?

2.4 Summary

The Strategy broadly aligns with the directions set out in Plan Melbourne and provides a logical framework for identification areas suitable for intensification of housing and those environments that might be protected to retain their existing suburban character or specific environmental qualities.

Discussion of the evidence base and analysis that led to the development of the Strategy could be stronger. Perhaps this is contained is supporting material that was not available as part of this reviewed.

[1] The proposed stages of implementation of Council's Housing Strategy are documented in the minutes of the Council Meeting, 28 October 2014.

3 RECENT HOUSING SUPPLY AND CURRENT RESIDENTIAL ZONES

This chapter presents the findings of analysis of recent housing supply that is based on Housing and Development Data for the years 2004 to 2012. Analysis of past housing supply trends is used to inform the forecasts of likely future housing supply were the same (or similar) planning controls to remain in place in future.

The chapter is divided into two parts: The first section considers the characteristics of recent housing supply including project size, density, lot size and locational attributes. The second section describers how this analysis will be used to model the capacity for housing under the current residential zones.

3.1 Recent housing supply in Monash

The Housing and Development Data (HDD) is collected on behalf of the State Government and provides lot by lot information on new housing projects. The distribution of HDD projects in Monash is shown in Figure 4 below. Key information provided in the HDD includes lot size, number of dwellings demolished, the count of net additional dwellings, the location of development, and the year (or years) in which the development took place. The HDD does not capture any specific data on dwelling type, total or per dwelling floor space or the number of storeys of the new housing developments.

For the period 2004 to 2012 the HDD records 3,600 individual housing projects in Monash. Details of these are provided in the table below which categorises the HDD projects by 'classes' based on the number of net additional dwellings. Roughly 1200 of these projects were dwelling replacements ('knock down rebuilds' of existing dwellings) and around 260 projects were still under construction in 2012.

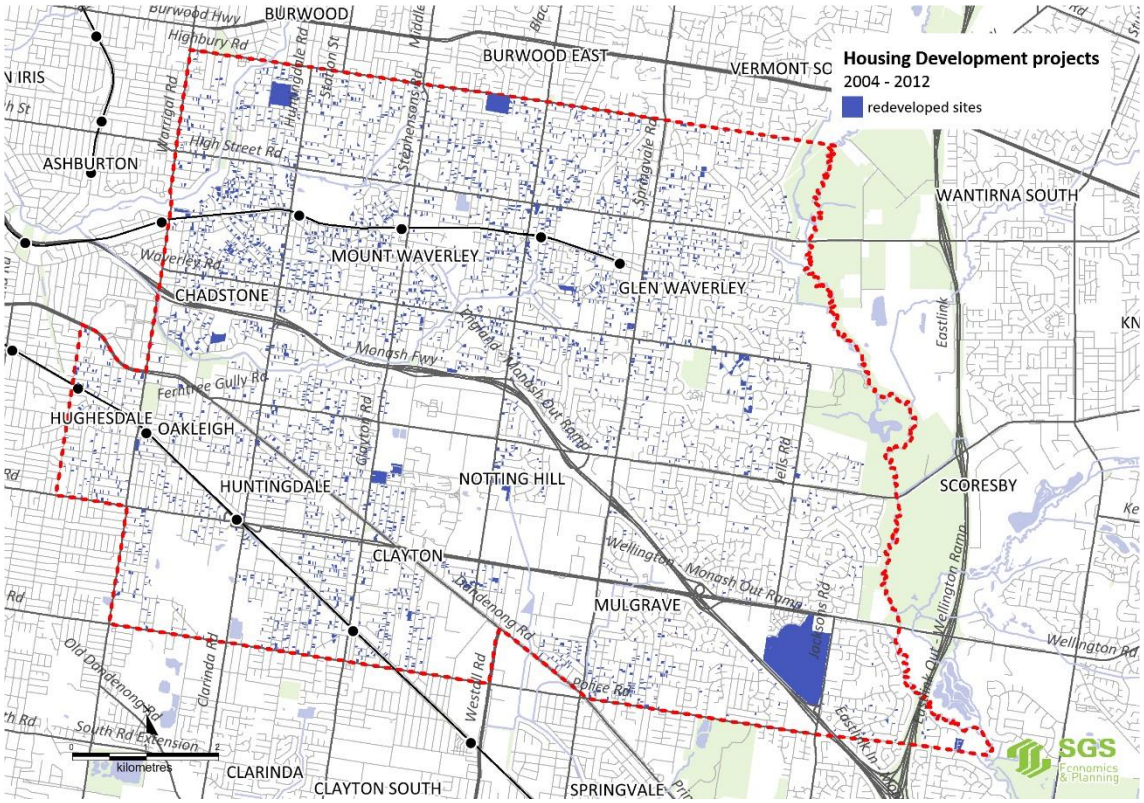
The remaining 2140 housing development projects contributed to an increase in the supply of housing in Monash. It is evident from the data presented in Table 4 that that the most common project type are those that contribute one additional dwelling; 1600 of the 2100 projects are of this type. A further 400 projects provided 2 or 3 additional dwellings (these are generally developments of 3 or 4 dwellings in total). The recent state of play report published by the Department of Transport, Planning and Local Infrastructure also noted the high proportion of single and dual occupancy developments occurring in Monash between 201 and 2014[2].

In terms of total contribution to housing supply projects of greater than 20 dwellings provided around 2400 dwellings; projects of one additional dwelling provided almost 3000 new dwellings; and projects of 2 or 3 additional dwelling provided over 1100 new dwellings.

In general, as number of dwellings in a project increase so does the average lot size. Similarly, average density increases with the number of dwellings. These patterns are perhaps to be expected: higher density projects tend to comprise more dwellings than lower density projects and more likely to occur on allotments of at least 1000 square metres of more.

[2] http://www.dtpli.vic.gov.au/__data/assets/pdf_file/0011/291386/Residential-Zones-State-of-Play-Eastern-Subregion-Report.pdf

FIGURE 4. LOCATION OF HDD PROJECTS IN MONASH (2004 – 2012)



Source: SGS Economics and Planning, 2016

TABLE 4. HDD PROJECTS IN MONASH (2004 – 2014)

Project size (net additional dwellings)	Count of projects	Total dwellings	Net additional dwellings	Av. lot size (origin lot)	Av. density
0 (knock down rebuild)*	1260	1270	0	726	15
1	1611	2923	1611	713	26
2	296	830	592	920	34
3	83	298	249	1074	36
4	19	88	76	1444	35
5-9	24	185	165	1726	62
10-14	8	128	94	4987	92
15-19	8	151	139	1579	158
20+	26	2377	1912	36084	142
Reduction in dwellings*	2	11	-296	1456	32
Mid construction*	263	n/a	n/a	n/a	n/a
Total	3600	8250	4838	1117	25

Source: Housing and Development Data, 2012.

* For the purpose of using past housing trends to inform housing capacity, these project types were excluded. The analysis is based on completed projects that have contributed *additional* dwellings to the total housing stock.

3.2 Housing development types

A of total of 7000 new dwellings were built in Monash between 2004 and 2012, excluding dwelling replacements and incomplete projects. 300 of these projects where on land zoned C1 or MUZ and the remainder where located on residentially zoned land.

Housing in Commercial 1 and Mixed Use Zones

In the period 2004 to 2012 there were 12 housing projects on land zoned Commercial 1 or Mixed Use. These projects had an average density of 150 dwellings per hectare. Seven projects had more than 10 dwellings and an average density of 220 dwellings per hectare.

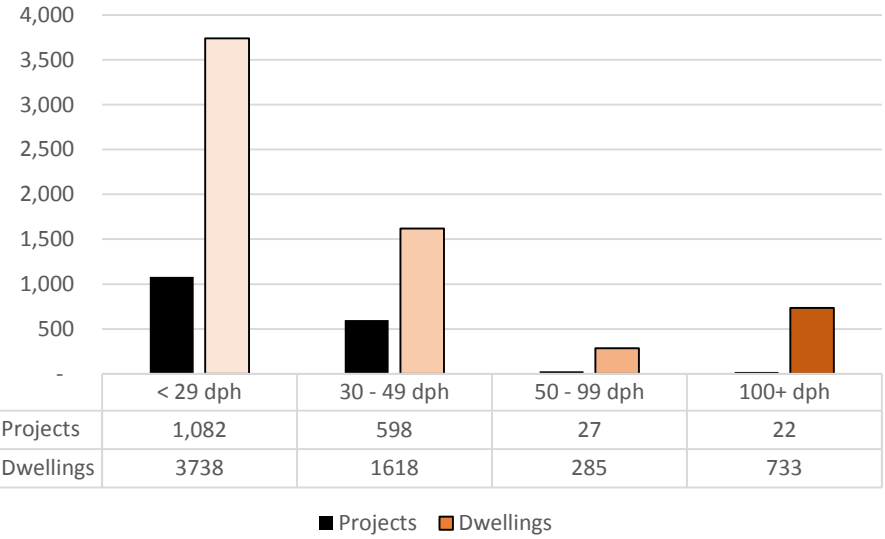
Housing in Residential Zones

Of the 6700 new dwellings constructed on residential zoned land between 2004 and 2012 roughly 300 were built on vacant sites. This is to be expected as Monash has limited vacant land. The remaining 6400 dwellings were examined in more detail as these are indicative of the likely form, type and density of future infill housing under the current zones.

Analysis of these projects by density suggest a significant proportion were relatively low density at less than 30 dph (which equates to a land area per dwelling of around 300 sqm or more). A significant proportion of recent housing in Monash is of a 'moderate' density of between 30 and 50 dwellings per hectare (between 200 and 300 sqm per dwelling). Medium density development of between 50 and 100 dwellings per hectares are less common representing less than 5% of the total infill development between 2004 and 2012. Developments at these densities are typically semi-detached or attached forms or lower scale apartments of 2 or 3 storeys. Housing developments of greater than 100 dph constituted 11% of new dwellings in Monash. Housing at these densities in the Monash context are likely to be apartments.

Some of the key characteristic of these different groupings of housing projects are described in the text box on the following page.

TABLE 5. RECENT DWELLING SUPPLY IN MONASH BY DENSITY CLASSES



	< 29 dph	30 - 49 dph	50 - 99 dph	100+ dph
Projects	1,082	598	27	22
Dwellings	3738	1618	285	733

Source: SGS Economics and Planning, 2016, based on the HDD, 2004 to 2012.

Characteristics of infill housing on residential land in Monash: 2004 to 2012

Four 'density classes' of low, moderate, medium and high density have been used to undertake further analysis of the characteristics of housing supply on land with a residential zoning in Monash.

Examples of different housing developments and different densities in Monash are provided in Appendix A.

Low density infill housing projects of up to 29 dph

- The most common form of infill housing in Monash accounting for almost 60% of new dwellings
- Generally detached dwellings and likely to be single or double storey.
- Most common on lots between 650 and 1250 square metres
- Comprise of multi-unit developments that are mostly 2 or 3 dwellings; some examples of 4 dwellings
- Over 1000 individual projects.

Moderate density infill housing projects of between 30 to 49 dph

- A significant proportion of new dwellings fall into this category: 25% of all new dwellings
- More likely to be attached dwellings than low density and more likely to be two storeys
- Most common on lots between 550 and 1150 sqm; but some on larger allotments
- Comprise of multi-unit developments that are mostly 2 to 4 dwellings; some examples of 5 or more dwellings
- Approximately 600 individual projects.

Medium density infill housing projects of between 50 to 99 dph

- Relatively small contribution to housing supply in Monash accounting for 4% of new dwellings
- Mostly attached and two storey with open space in the form of small courtyards
- Most common on lots of between 650 and 1050 sqm
- All projects were of between 4 and 7 dwellings except for one of two dwellings and another of 11
- 27 projects.

Higher density infill housing projects of 100 dph or greater

- Important contribution to housing diversity providing 11% of new dwellings
- At these densities all housing projects are apartments: single storey stacked dwellings
- Found on wide range of lots sizes as small as 600 sqm and as large as 4000 sqm
- 22 individual projects of which 18 were between 10 and 50 dwellings in size; few very large apartment projects.

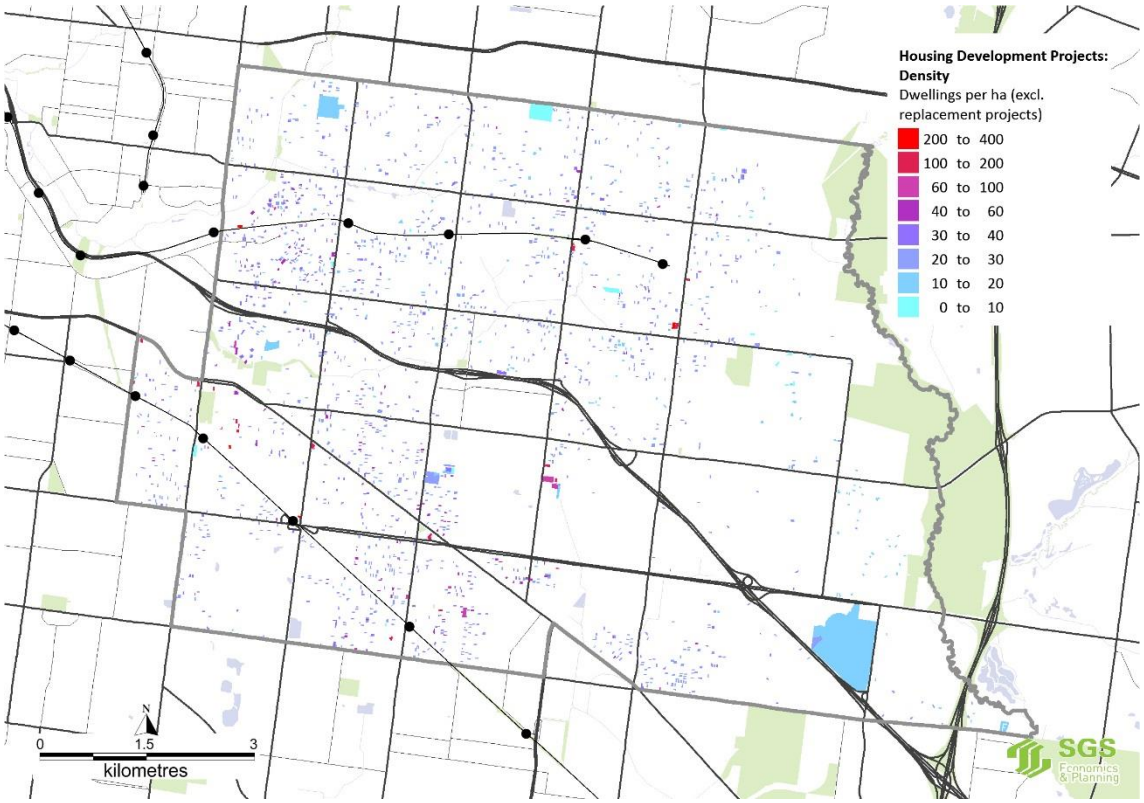
3.3 Location and density of recent housing supply

Development that increases dwelling supply

The location and density of recent housing projects in Monash are illustrated in Figure 5. This particular map does not show dwelling replacements as these do not contribute to the overall increase in dwelling supply.

The maps shows a tendency for new housing projects to have higher densities in the east of the municipality, and in clusters around Chadstone, Clayton, Glen Waverley, Oakleigh and along Dandenong Road. Housing projects on larger lots are generally low density.

FIGURE 5. DENSITY OF RECENT HOUSING PROJECTS (2004 – 2012)



Source: SGS Economics and Planning, 2016, based on HDD 2004 – 2012.

Dwelling replacements

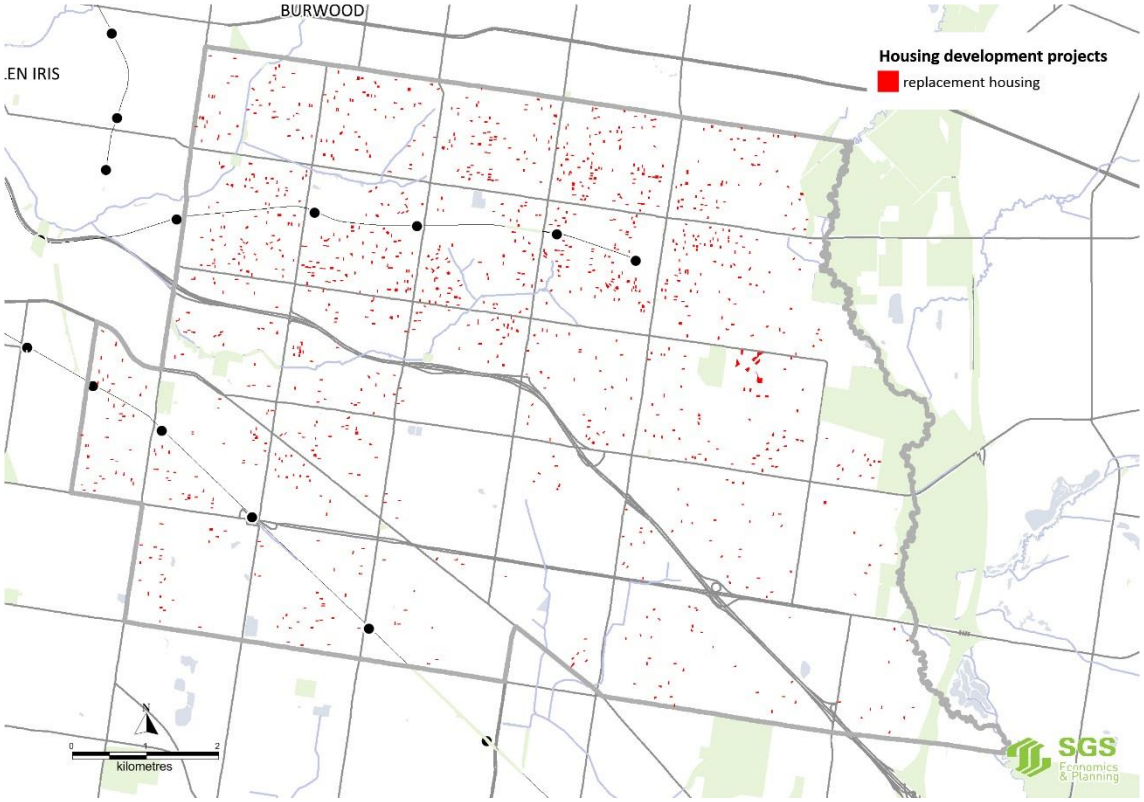
The location and density of recent replacement (knock-down rebuild) housing projects in Monash are illustrates in Figure 6. It shows an even distribution of replacement housing projects from east to west, but substantially more dwelling replacements in the north of the municipality.

Unlike housing projects that increased the number of dwellings, replacement housing projects do not show any strong tendency of clustering around public transport, or proximity to the CBD. More than one third of individual housing projects are single dwelling replacements (see Table 4).

Dwelling replacements are important to consider as they:

- Demonstrate significant investments in typically larger dwelling stock
- Contribute to the changing character of the municipality
- Do not contribute to increasing housing supply
- Prevent additional dwelling supply on those sites for the practical life of the new dwelling.

FIGURE 6. DWELLING REPLACEMENTS (KNOCK-DOWN REBUILD) (2004 – 2012)



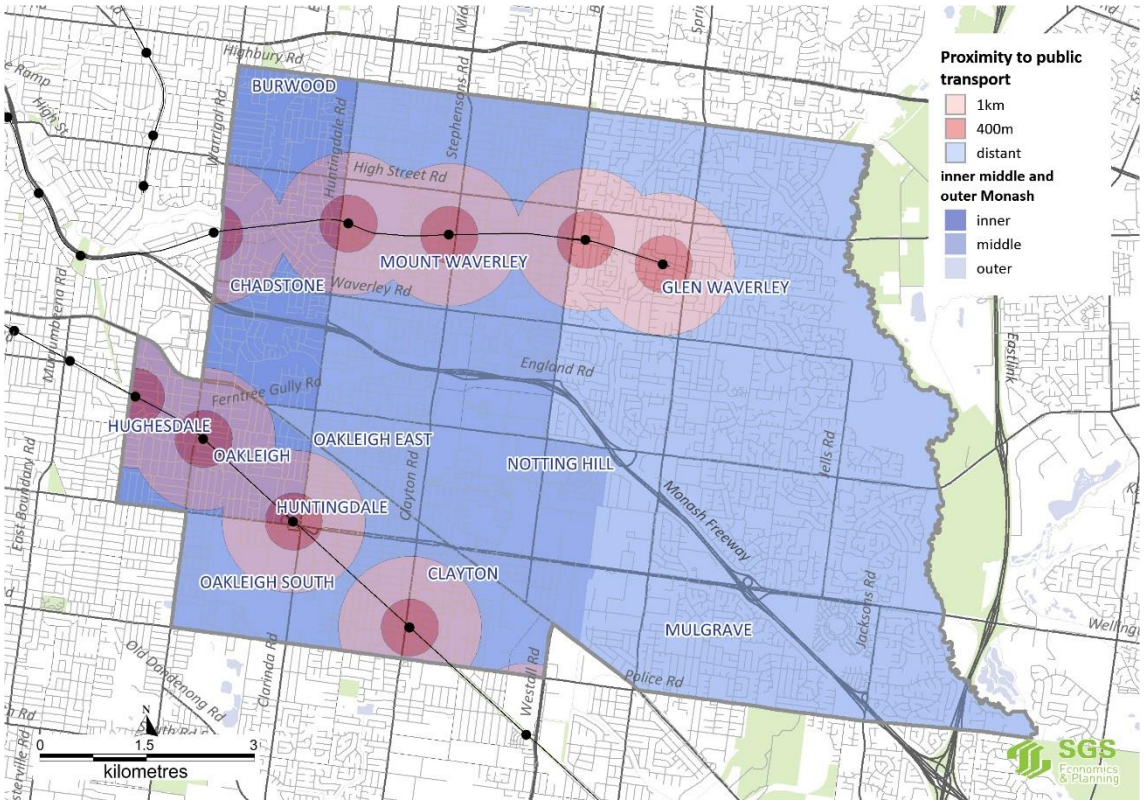
Source: SGS Economics and Planning, 2016, based on HDD 2004 – 2012.

Housing density by location

Drawing on these patterns of density further analysis was undertaken dividing the City of Monash into categories based on proximity to rail stations and proximity to the CBD (Figure 10). There are three bands from east to west, indicating proximity to the city centre and described in this report as inner, middle and outer. This distinction was made as there was a distinguishable increase in the average density of new development based on greater proximity to the CBD. Proximity to public transport was also divided into three categories: within 400m from rail stations, between 400 metres and 1,000 metres from rail stations, and more than 1,000 metres from rail. This distinction was also made as there was some increases in average density based on greater proximity to public transport.

The average density of new housing projects within these categories – proximity to the central city and proximity to public transport – are presented in Table 6 and Table 7. The average is of site density (in dwellings per hectare) for those projects that resulted in a net increase in dwellings. Dwelling replacements that did not contribute to a net increase in dwellings were excluded from the analysis.

FIGURE 7.PUBLIC TRANSPORT AND CBD PROXIMITY



Source: SGS Economics and Planning 2016

Density of housing development on residential land

The density of new development on residential land in Monash was found to be relatively consistent across locations and averaged around 30 dwellings per hectare. Development in the Inner band is slightly higher than this average (32 dph) and overall average density for projects in the Outer band was found to be lower (27 dph).

The average density of development in the outer band and close to public transport was 50 dwellings per hectare. This anomaly in the general pattern of the data might be explained by the absence of Commercial of Mixed Use zoned land in the eastern end of Monash and, as a result, higher density development near stations have occurring on residential rather than commercial land. For example, in Syndal three developments less than 200m from Syndal station yielded densities between 165 and 275 dph. Without these projects the average density of projects in the outer band and close to rail drops below 30 dph.

TABLE 6. DENSITY OF RECENT DEVELOPMENTS – RESIDENTIAL ZONED LAND

'Band'	400m from Rail		> 400 and < 1km		> 1km from rail		All projects	
	Average Dph	# of projects	Average Dph	# of projects	Average Dph	# of projects	Average Dph	# of projects
Inner	**34**	41	**33**	265	**30**	187	**32**	489
Middle	**30**	58	**30**	331	**30**	611	**30**	999
Outer	**50**	23	**33**	114	**24**	438	**27**	575
Total	**35**	122	**31**	706	**28**	1235	**30**	2063

Source: Housing and Development Data, 2012

Density of housing development on Commercial and Mixed Use zoned land

Land that is commercially zoned but has been developed for residential generally yields projects of greater density. While the sample number of projects is small – 12 projects in total – the lowest average density observed is 50 dph and the highest 221 dph. The latter was the average of developments in areas most proximate to public transport and towards the western end of Monash, corresponding to the suburbs of Chadstone, Hughesdale and Oakleigh.

TABLE 7. DENSITY OF RECENT DEVELOPMENTS – COMMERCIAL & MIXED USE

'Band'	400m from Rail		> 400 and < 1km		> 1km from rail		All projects	
	Average Dph	# of projects	Average Dph	# of projects	Average Dph	# of projects	Average Dph	# of projects
	221	6	**131**	4	**n/a**	n/a	**185**	10
middle	**50**	1	**n/a**	n/a	**63**	1	**57**	2
outer	**n/a**	n/a	**n/a**	n/a	**n/a**	n/a	**n/a**	0
Total	**197**	7	**131**	4	**63**	1	**164**	12

Source: Housing and Development Data, 2004 – 2012

Density of housing development by suburb

The average density of recent housing developments by suburb is provided in the table below. These average include development on Residential, Commercial and Mixed Use zoned land. The range of range of averages is relatively narrow with most suburbs having averages of between 24 and 30 dwellings per hectare, with the exception of Oakleigh (34 dph) and Wheelers Hills (13 dph).

The average density of development projects in Wheeler's Hill is particularly low compared with other suburbs. Some parts of Monash including parts of Wheelers Hill have areas covered by various covenants, including single storey covenants, single dwelling covenants and lot size covenants. This might in part explain why parts of Wheelers Hill experience limited growth compared to other suburbs

TABLE 8. DENSITY OF RECENT DEVELOPMENT BY SUBURB – ALL ZONES

	Count of HDD projects	Average density
Ashwood	212	24
Burwood	43	20
Chadstone	308	26
Clayton	372	30
Glen Waverley	801	20
Hughesdale	125	29
Huntingdale	30	27
Mount Waverley	897	20
Mulgrave	221	22
Notting Hill	42	28
Oakleigh	126	34
Oakleigh East	152	25
Oakleigh South	106	25
Wheelers Hill	165	13

Source: Housing and Development Data, 2004 – 2012

3.4 Housing supply, project size and lot size

For smaller housing projects of less than 5 dwellings there is a strong correlation between project size and lot size. The table below shows the count of housing projects (not dwellings) by the total number of dwellings constructed (project size) and lot size. The colour coding of this table shows the most prevalent lot size within each project size.

For projects of 2 or 3 dwellings 700 to 750 square metres is by far the most common lot size. Three dwelling projects are also common on lots between 850 and 950 square metres. Four dwelling projects can often be found on lots between 950 and 1050 square metres, but the majority are found on lots greater than 1500 square metres in area. Projects of five dwellings or more are most commonly developed on lots larger than 1500 sqm.

Given a significant proportion of infill housing projects in Monash are relatively small in terms of yield (90% are developments between 2 to 4 dwellings) and occurred on smaller lots (between 600 to 1200 square meters) these characteristics could be used to model future development potential. For example, assuming past development trends are a good indication of future trends, on a lot that is between 700 and 750 square metres we can infer there is a 90% probability that the development of that lot will yield 2 dwellings; and a 9% probability that it would yield 3 dwellings; and so on. The use of this logic to estimate housing capacity under the current zones is expanded on in the following section.

TABLE 9. COUNT OF PROJECTS BY TOTAL DWELLINGS AND LOT SIZE

Total dwellings	1 dw. on vacant site	2	3	4	5	6	7	8	9	10	>10	Total
Lot size												
<150												
150-200	2											2
200-250	33											33
250-300	28											28
300-350	11											11
350-400	12	1										13
400-450	12											12
450-500	9	1										10
500-550	31	4										35
550-600	27	34										61
600-650	39	105	10							1	1	156
650-700	44	195	20		2	1						262
700-750	38	525	52	5						1	2	623
750-800	19	221	22	1	2		1			1		267
800-850	8	112	19		4		1					144
850-900	2	54	30	1								87
900-950	7	32	32	3		1				1		76
950-1000	1	16	22	6	1							46
1000-1050		8	14	6	2	1					1	32
1050-1100		9	9	3							1	22
1100-1150	3	1	9	3							1	17
1150-1200		3	6	2	2						1	14
1200-1250	1		6		1							8
1250-1300	1	1	3	4								9
1300-1350	1	1	2	1								5
1350-1400		1	2	3		1						7
1400-1450		1		4	1							6
1450-1500		1	1	2	1	1						6
>1500	2	7	2	9	10	5	2	3	1	2	28	71
All	331	1333	261	53	26	10	4	3	1	6	35	2063

Source: Housing and Development Data, 2004 – 2012

3.5 Assumptions for capacity analysis of existing residential zones

Drawing on the analysis present above two approaches where used to estimate the capacity for housing under Monash's existing residential zones.

The approach first used density assumptions based on locational characteristics with respect to rail and 'band' (proximity to the city centre) discussed above. The second approach used lot size as the primary determinant of the number of dwellings likely to be realised by infill development. In both cases generic assumptions were applied for the average density of housing development on Commercial and Mixed Use zone land.

Both approaches assume there would be no substantive changes to planning controls that would result in different development outcomes in the future compared to those of the recent past (the period for with the HDD available: 2004 to 2012).

Approach one: capacity based on average density of past development

This approach is based on analysis of the average density of past residential development by location (proximity to the central city and proximity to major public transport infrastructure) to estimate the likely density of future development. For land zoned Neighbourhood Residential, General Residential and Residential Growth average densities (dwelling per hectare) where applied to land that was deemed available for future development based on recent past trends within these sub-geographies. The specific assumptions are set out in the table below.

TABLE 10. DENSITY ASSUMPTIONS APPLIED IN HOUSING CAPACITY APPROACH 1

Band	Less than 400m from rail	Between 400m and 1000m from rail	More than 1000m from rail
Inner	34	33	30
Middle	30	30	30
Outer	30	24	27

Source: SGS Economics and Planning; HDD, 2004 – 2012.

Approach two: yield based on lot size of past development

A second approach to estimating housing capacity also draws on analysis of past housing supply trends but in this case lot size rather than location was used as the key determinant of likely dwelling yield. Drawing on detailed data of past development trends in the HDD a 'probability-based' approach to estimate housing capacity was used. This analysis assumes that, for lots of up to 1500 sqm, the past propensity for lot size to influence dwelling yield is a reliable indicator of the likely housing outcomes on land that might be available for housing development in the future.

For lots of up to 1500 sqm where land is zoned Neighbourhood Residential, General Residential and Residential Growth, the estimated dwelling yields were based on the concordance of lot size and project size in the table below. For lots larger than 1500 sqm the capacity from approach 1 (density based approach) was used.

TABLE 11. CONCORDANCE OF PROJECT SIZE AND LOT SIZE BASED ON HDD (04-12)

Total dwellings	2	3	4	5	6	7	8	9	10	>10	Average dwellings for projects >10
Lot size (sqm)											
500-550	100%										
550-600	100%										
600-650	79%	11%							4%	6%	17
650-700	84%	13%		2%	1%						
700-750	83%	12%	2%						1%	3%	16
750-800	82%	12%	1%	2%		1%			2%		
800-850	73%	19%		6%		2%					
850-900	53%	45%	2%								
900-950	34%	51%	6%		3%				5%		
950-1000	25%	52%	19%	4%							
1000-1050	14%	36%	21%	9%	5%					16%	19
1050-1100	24%	36%	16%							24%	18
1100-1150	3%	46%	20%							31%	18
1150-1200	11%	34%	15%	19%						21%	11
1200-1250		78%		22%							
1250-1300	7%	33%	59%								
1300-1350	17%	50%	33%								
1350-1400	8%	23%	46%		23%						
1400-1450	9%		70%	22%							
1450-1500	8%	13%	33%	21%	25%						
>1500	1%	0%	1%	2%	1%	1%	1%	0%	1%	92%	82

Source: HDD, 2004 – 2012

Capacity in commercial and mixed use areas

The preceding analysis of recent past housing supply suggests the density of development in Commercial and Mixed Use zones is significantly higher than that on residential land. For land that is zoned Commercial or Mixed Use the blanket assumption of 200 dwelling per hectare for new developments will be used. It will be used for estimation of capacity for current zones (under approach 1 and 2) and for proposed zones. This consistent application ensured that there was no influence on the analysis of the difference in housing capacity projections between the current residential zones and the proposed residential zones. This figure constitutes the 75% percentile of the 12 projects documented in Commercial and Mixed Use zones in Monash between 2004 and 2012. This figures was chosen in preference to the average (164 dph) or median (174 dph) densities for these past developments.

4 PROPOSED NEW ZONES

This chapter describes the residential zones proposed in Amendments C120 and C126, including the key controls and standards included in the schedules to these zones. Drawing on the analysis undertaken by MGS Architects and the key planning standards to infer the likely impacts on housing capacity of the new zones when compared to the current zones. The final section of this chapter outlines the capacity assumptions used to estimate the housing capacity of the proposed zones.

4.1 Monash's new residential zones

The schedules to the proposed new zones include planning standards that new developments must address that differ from the standard ResCode requirements. These standards address issues such as setback, private open space area and dimension, site coverage, landscaping (number and size of trees), and in some cases, separation between dwellings. A selection of these requirements are shown in the tables below with the ResCode standards. The main points of departure from the ResCode are side and rear setbacks, private open space requirements, maximum site coverage and minimum permeable area.

TABLE 12. KEY PLANNING STANDARDS IN PROPOSED NEW ZONES – PART 1

Zone	Description	Height (m)	Height - sloping site (m)	Front setback (m)	Side setback - side 1 (m)	Side setback - side 2 (m)	Rear setback	Separation between adjacent dwellings
ResCode		9	10	Min. of 9m or existing	1m; +0.3m for every metre over 3.6; +1.0m for every metre over 6.9			
NRZ1	Heritage Precincts	8	9	7.6	1.0	3.0	5.0	
NRZ2	Creek Abuttal	9	10	7.6	1.2	3.0	7.0	3.0
NRZ3	Creek Environs	9	10	7.6	1.2	3.0	6.0	3.0
NRZ4	Dandenong Creek Escarpment	9	10	8	1.0	2.0	5.0	
GRZ3	Southern Areas	9	10	7.6	1.0	2.0	5.0	
GRZ4	Northern Areas	9	10	7.6	1.0		5.0	
GRZ5	Oakleight and Wheelers Hill AC	SP		SP*	SP		SP	
GRZ6	Clayton AC Housing Diversity	9 or 11.5**		4	1.0		4.0	
GRZ7	Glen Waverley AC Housing Diversity	9	10	5	1.0		5.0	
GRZ8	Glen Waverley AC	DD012 (C120)						
RGZ3	Clayton AC	9 to 18**		3 or 4	1.5		3 (min)	
RGZ4	Glen Waverley AC	13.5		5			5 (min)	

*SP = requirements are set out in the Structure Plan

** Height varies based on lot size

TABLE 13. KEY PLANNING STANDARDS IN THE PROPOSED NEW ZONES – PART 2

Zone	Description	Maximum site cover	Minimum permeable area	Landscaping requirements (trees by height)	Total private open space (sqm)	Primary private open space (sqm)	Minimum dimension for primary POS (m)
ResCode		60%	20%	None specified	40	25	3
NRZ1	Heritage Precincts	40%	40%	2 x 8m	75	35	5
NRZ2	Creek Abuttal	40%	40%	3 x 12m	80	60	5
NRZ3	Creek Environs	40%	40%	3 x 10m	80	60	5
NRZ4	Dandenong Creek Escarpment	40%	40%	2 x 10m (1 in fr	75	60	5
GRZ3	Southern Areas	50%	40%	2 x 8m	75	60	5
GRZ4	Northern Areas	50%	30%	3 x 10m	75	60	5
GRZ5	Oakleigh and Wheelers Hill AC	SP*	SP*	SP*	75	35	5
GRZ6	Clayton AC Housing Diversity	60%	20%	2 x 10m	50	35	5
GRZ7	Glen Waverley AC Housing Diversity	60%	30%	2 x 10m	60	50	5
GRZ8	Glen Waverley AC	60%	20%	3 x 10m (2 in fr	40	35	3
RGZ3	Clayton AC	60%	20%	1 x 10m (1 in fr	40	35	3
RGZ4	Glen Waverley AC	60%	20%	3 x 10m (2 in fr	40	35	3

4.2 Impact of the proposed zones on housing capacity

Estimating the impact of changes to zones and associated planning controls on housing capacity is complex. While individual minor changes might have only minor impact, the cumulative impact of many minor changes could be more significant. Changes to the design or yield of development projects can in turn impact on the financial feasibility. In some cases projects that are 'technically' possible under the rules imposed by planning controls and guidelines may not be financially feasible at least in the short term. Overtime however land and dwelling prices do change and developments that were previously unfeasible become profitable.

The most robust method for testing the likely impacts of the new zones would be to undertake a full architectural design and feasibility assessment across for the full range of zones and development types that will be impacted. This would involve drafting partial resolved architectural plans for a complying development and then testing the financial feasibility of this development based on cost of land, constructions, finance as well as developer profit and achievable dwelling sales prices for the resulting dwellings. This process would be repeated for the different zones and different development types (e.g. low vs moderate vs medium vs high density development types).

However for the purpose of estimating the impacts of the proposed zones on housing capacity more efficient methods have been used.

Potential impacts

The main changes proposed in the new zones relative to the ResCode standards in the zone schedules are as follows:

- Larger rear setbacks (NRZ1, NRZ2, NRZ3, NRZ4, GRZ3, GRZ4, GRZ6, GRZ7)
- Change in minimum dimensions of private open space (GRZ3, GRZ4)
- Lower maximum site coverage (NRZ1, NRZ2, NRZ3, NRZ4, GRZ3, GRZ4)
- High minimum permeable area (NRZ1, NRZ2, NRZ3, NRZ4, GRZ3, GRZ4)
- Requirements for canopy trees

In summary it can be anticipated that the requirements will reduce the allowable building footprint area compared to the absence of these controls.

MGS analysis

MGS Architects were commissioned to consider the potential impact of the provisions of the GRZ3, GRZ4, NRZ1, NRZ2, NRZ3 and NRZ4 on development outcomes on lots between 500 and 800 square metres. These studies sought to investigate the impact on the new zones on existing recent development approvals. The lot size and zone combinations considered are shown in the table below with a total of 40 studies completed. An example is show in Figure 8.

TABLE 14. LOT SIZE BY ZONES STUDIES COMPLETED BY MGS ARCHITECTS

	COMPLETED LOT SIZES																							
Zone	<400				401-550			551-600			601-650			651-700			701-750			751-800			>800		
	A	B	C	D	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C
GRZ3							C			C	A			A		C	A						A		
GRZ4								A			A			A		C	A	B		A			A	B	
NRZ1											A			A		C	A	B		A					
NRZ2											A			A		C	A	B		A					
NRZ3											A			A		C	A	B		A					
NRZ4											A			A		C	A	B		A					

Source: MGS Architects, 2016.

The examples tested are generally lower density: 37 of the 40 examples yield densities of between 23 and 31 dwellings per hectare. The other three examples tested where 33, 36 and 40 dwelling per hectare. All were two dwellings with the exception of one three dwelling examples of a 1050 sqm metre lot in the RGZ4 zone.

Impacts of proposed zones on lower density developments

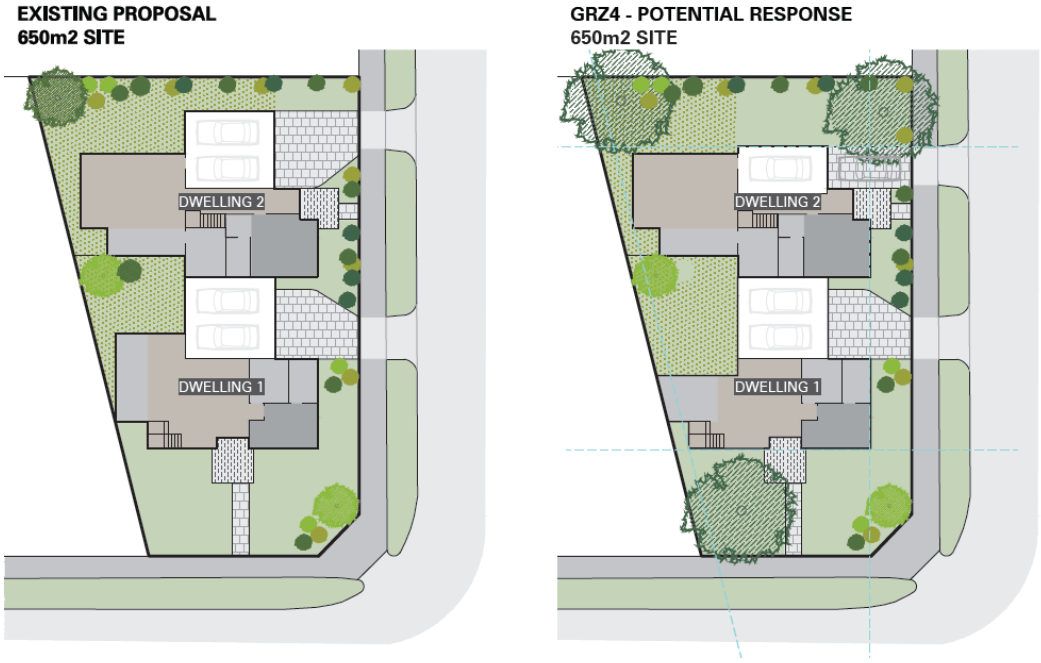
In the example shown the lot is approximately 650 square metres and the zone GRZ4. The plan in Figure 8 is based on an existing approval while that on the right is the potential design response that complies with the new controls for that zone. Specific changes to the design include: the garage of Dwelling 2 top has been moved away from the site boundary to accommodate a larger 'rear' setback; and the footprint of Dwelling 1 has been reduced to accommodate the minimum consolidated open space area requirement (60 square metres with minimum width 5 metres); three larger 'canopy trees' are shown in the front and rear setbacks.

In this particular case the resulting dwellings are slightly smaller with a total area of approximately 320 square metres compared to 350 square metres for the approved development. In this case the number of bedrooms and bathrooms between the approved and modified design is unchanged however the latter sees the second on-site parking space provided in front of the garage rather than a double garage.

In the other examples similar modifications were required to accommodate setback and open space requirements. In most instances (but not all) the changes resulted in reductions to the overall size of the dwellings. Across the 16 examples for GRZ3 and GRZ4 the dwellings were on average 10% smaller. Dwellings in the NRZ2 and NRZ3 were on average 9% smaller and those in NRZ1 and NRZ4 were 3% smaller. In some cases these reductions resulted in the loss of a bedroom or bathroom or both. In some cases the parking and garages were reconfigured replacing double garages with single garages and the use of tandem parking arrangements to accommodate two car spaces per dwelling.

Despite these changes to the size of dwelling the type and total number of dwellings were, for the most part, unchanged as a result of modifications to comply with the proposed GRZ3, GRZ4, NRZ1, NRZ2, NRZ3 and NRZ4 zones.

FIGURE 8. EXAMPLES OF MGS YIELD STUDY



Source: MGS Architects, 2016.

Impacts of proposed zones on moderate and medium density developments

Analysis presented in the previous chapter found that around 60% of new dwellings constructed in Monash were in low density developments (less than 29 dwelling per hectare), 25% where in moderate density developments, 4% in medium density developments and the remaining 11% at densities of 100 dwellings per hectare or greater.

The MGS analyses suggests that dwelling yields for low density infill housing developments would be largely unaffected by the proposed new zones. The requirements for lower site coverage, higher permeable areas and additional open space can be accommodated through changes to the dwelling design without reducing dwelling yield. Three examples of two dwelling developments in the MGS analyses achieved densities 33, 36 and 40 dwellings per hectare respectively. However this analysis was not intended to consider the impact of the proposed zones of moderate and medium density developments on larger allotments.

Recent development trends show that moderate and medium density infill housing development are most common in land that is proposed to have the GRZ3 or GRZ4 zoning (Table 15). If implement strictly, the proposed private open space requirements – a minimum single area of 60 square metres (up from 35 square metres) – will impact on the viability of medium density infill housing development in these zones.

TABLE 15. HOUSING PROJECTS BY DENSITY CLASS (DPH) AND PROPOSED ZONE

Row Labels	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100	>100	Grand Total
GRZ3	40	171	320	109	44	6	1	1		1	5	698
GRZ4	143	826	650	192	44	7	5			1	6	1874
GRZ5	2	1	2	1							1	7
GRZ6	12	22	73	18	30	3		1	1		5	165
GRZ7	5	20	5	1								31
GRZ8	1										2	3
NRZ1	1	17	17	3	2							40
NRZ2	10	24	13	7	6		2	1	1		2	66
NRZ3	20	68	77	22	3	2		1	1	1	1	196
NRZ4	55	268	73	11	5		1					413
RGZ3	15	6	35	7	7				3	1	2	76
RGZ4	2	3	4									9
Grand Total	**306**	**1426**	**1269**	**371**	**141**	**18**	**9**	**4**	**6**	**4**	**24**	**3,578**

Source: HDD, 2004 to 2012.

Impacts of proposed zones on higher density developments

Higher density development is anticipated in the Residential Growth, Commercial and Mixed Use zones which are generally supportive of higher density development.

Commercial and mixed use zones

No changes are envisaged to these zones. For the purpose of estimating housing capacity in commercial and mixed use zone land the same methodology will be used for both the existing and proposed zones.

4.3 Assumptions for capacity of proposed zones

Estimating housing capacity for proposed zones drew on a range of methods, depending on the proposed zone.

TABLE 16. ASSUMPTIONS FOR CAPACITY OF PROPOSED RESIDENTIAL ZONES

Zone	Total Capacity	Comment
NRZ1	2 dwellings (max) per lot	Based on the existing NRZ1 guidelines (unchanged in the proposed zone guidelines), a maximum of 2 dwellings per lot was permitted on NRZ1.
NRZ2, NRZ3, NRZ4	NRZ2, 3 and 4 location and PT band table	For NRZ2, NRZ3 and NRZ4, a similar method to approach 1 was used- proximity to public transport and location bands.
GRZ3 and GRZ 4: lots under 1500sq.m	GRZ3 and GRZ4 adjusted concordance of project size and lot size table	Similar to approach 2, All HDD projects (2004 and 2012) that occurred within proposed GRZ3 and GRZ4 areas were analysed based on project size and lot size. This was then adjusted to reflect the anticipated effect of the proposed zones on project size.
GRZ3 and GRZ 4: lots over 1500sq.m	Public transport proximity and location bands table (as used in approach 1)	The capacity (dph) of large lots zoned GRZ3 and GRZ4 is assumed to not be substantially affected by the new zones, as larger lots have greater flexibility in development style in adhering to the proposed zone requirements. As a result, the same approach was used as for approach 1- average density figures were applied based on proximity to public transport and location bands
GRZ5	Average densities derived from structure plan	The structure plan for Oakleigh and Wheelers Hill was analysed, with notional densities identified for each precinct(dwellings per hectare)
GRZ6	Average project size derived from proposed zone schedule	Each lot size was assessed based on the zone requirements, and a maximum dwellings per lot size was identified
GRZ7	Average project size derived from proposed zone schedule	Each lot size was assessed based on the zone requirements, and a maximum dwellings per lot size was identified
GRZ8	Average densities derived from structure plan	Structure plan for Glen Waverley Activity Centre analysed, with notional densities identified (dwellings per hectare)
RGZ3	Average densities derived from structure plan	Structure plan for Clayton Activity Centre was analysed, with notional densities identified for each precinct within(dwellings per hectare)
RGZ4	Average densities derived from structure plan	Structure plan for Glen Waverley Activity Centre was analysed, with notional densities identified for each precinct within (dwellings per hectare)
C1Z and MUZ	200 dwellings per hectare	As commercial and mixed use zones are not the focus of this analysis, the same measure of 200 dwellings per hectare was used across all approaches so as not to effect the analysis.

Neighbourhood Residential Zone 1

For lots that are under the proposed Neighbourhood Residential 1 zone, a maximum capacity of 2 dwellings per existing lot is assumed. This is consistent with the existing residential zone NRZ1, and the same rules were applied as for current zones.

Neighbourhood Residential Zone 2, 3 and 4

For lots that are under the proposed Neighbourhood Residential 2, 3 or 4 zones the densities within Table 17 were applied. Table 17 was derived from all HDD developments that exist in Monash, and occur on land within the proposed zones NRZ2, NRZ3 and NRZ4 zoned land. In order to factor in the 300 sq. metre minimum lot size and maximum of 2 dwellings per lot that applies, all HDD developments that exceeded 33 dwellings per hectare were excluded in the preparation of this table. Where data was unavailable the average density for the location band was applied. These figures are shown in square bracket in the table below.

TABLE 17. DENSITY ASSUMPTIONS FOR PROPOSED ZONES NRZ2, NRZ3 AND NRZ4

Band	Less than 400m from rail	Between 400m and 1000m from rail	More than 1000m from rail
inner	[27]	28	28
middle	[27]	21	21
outer	21	26	26

General Residential Zone 3 and 4: lots less than 1500 square metres

General Residential Zones 3 and 4 incorporate larger rear setbacks and a change in open space and site coverage requirements compared to current zones. As previously noted, this may result in a reduced dwelling size rather than a loss in yield. For some site sizes, it is anticipated that there may be a loss in yield, compared to recent developments that have occurred (HDD 2004 -2012 data), for example where a three dwelling development becomes a two dwelling development. It is important to note that site shape has a strong impact on any potential changes in yield that may occur as a result of the proposed zones. This was outside the scope of this analysis.

For lots that were zoned General residential 3 or 4 and smaller than 1500 square metres, previous HDD projects that occurred within proposed GRZ3 and GRZ4 areas were analysed based on project size and lot size, as shown in table 17. The percentage of projects occurring in each project size group is given for each lot size. A separate analysis of the requirements of proposed zones identified project size cut off points for each lot size, given the revised open space, site coverage and setback requirements within these proposed zones (refer to the appendix for more detail).

In Table 18, projects that were deemed unfeasible under the proposed General Residential zones 3 and 4 are outlined in black. Where HDD projects were larger than the identified cut off points and therefore not possible, the percentage of HDD projects occurring was shifted to the highest possible project size bracket for the given lot size that it could occur within.

Table 19 shows the shift of these percentages into smaller project sizes. These cells are outlined in red. For example, the 9% of projects that were greater than 10 dwellings per project on lots between 1050 and 1100 square metres was above the identified cut off point. This 9% was shifted to the nearest project size, 6 dwellings per hectare, outlined in red. Appendix 2 includes the adjusted concordance.

TABLE 18. CONCORDANCE OF PROJECT SIZE AND LOT SIZE IN GRZ3 AND GRZ4

Total dwellings for lots zoned GRZ 3 and GRZ4	2	3	4	5	6	7	8	9	10	>10	Total
Lot size (sq.m)											
500 to 550	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%
550 to 600	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%
600 to 650	86%	12%	0%	0%	0%	0%	0%	0%	0%	2%	100%
650 to 700	91%	9%	0%	0%	0%	0%	0%	0%	0%	0%	100%
700 to 750	92%	8%	0%	0%	0%	0%	0%	0%	0%	0%	100%
750 to 800	89%	11%	0%	0%	0%	0%	0%	0%	1%	0%	100%
800 to 850	77%	23%	0%	0%	0%	0%	0%	0%	0%	0%	100%
850 to 900	54%	43%	2%	0%	0%	0%	0%	0%	0%	0%	100%
900 to 950	36%	54%	6%	0%	2%	0%	0%	0%	2%	0%	100%
950 to 1000	15%	67%	19%	0%	0%	0%	0%	0%	0%	0%	100%
1000 to 1050	27%	50%	18%	5%	0%	0%	0%	0%	0%	0%	100%
1050 to 1100	27%	45%	18%	0%	0%	0%	0%	0%	0%	9%	100%
1100 to 1150	22%	56%	11%	0%	0%	0%	0%	0%	0%	11%	100%
1150 to 1200	44%	22%	22%	0%	0%	0%	0%	0%	0%	11%	100%
1200 to 1250	0%	83%	0%	17%	0%	0%	0%	0%	0%	0%	100%
1250 to 1300	14%	43%	43%	0%	0%	0%	0%	0%	0%	0%	100%
1300 to 1350	0%	67%	33%	0%	0%	0%	0%	0%	0%	0%	100%
1350 to 1400	33%	0%	67%	0%	0%	0%	0%	0%	0%	0%	100%
1400 to 1450	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%	100%
1450 to 1500	25%	25%	25%	25%	0%	0%	0%	0%	0%	0%	100%

Source: HDD, 2004 to 2012. And SGS Economics and Planning, 2016

TABLE 19. ADJUSTED CONCORDANCE IN GRZ3 AND GRZ4

Total dwellings for lots zoned GRZ 3 and GRZ4	2	3	4	5	6	7	8	9	10	>10	Total
Lot size (sq.m)											
500 to 550	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%
550 to 600	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%
600 to 650	86%	14%	0%	0%	0%	0%	0%	0%	0%	0%	100%
650 to 700	91%	9%	0%	0%	0%	0%	0%	0%	0%	0%	100%
700 to 750	92%	8%	0%	0%	0%	0%	0%	0%	0%	0%	100%
750 to 800	89%	12%	0%	0%	0%	0%	0%	0%	0%	0%	100%
800 to 850	77%	23%	0%	0%	0%	0%	0%	0%	0%	0%	100%
850 to 900	54%	43%	2%	0%	0%	0%	0%	0%	0%	0%	100%
900 to 950	36%	54%	10%	0%	0%	0%	0%	0%	0%	0%	100%
950 to 1000	15%	67%	19%	0%	0%	0%	0%	0%	0%	0%	100%
1000 to 1050	27%	50%	18%	5%	0%	0%	0%	0%	0%	0%	100%
1050 to 1100	27%	45%	27%	0%	0%	0%	0%	0%	0%	0%	100%
1100 to 1150	22%	56%	22%	0%	0%	0%	0%	0%	0%	0%	100%
1150 to 1200	44%	22%	33%	0%	0%	0%	0%	0%	0%	0%	100%
1200 to 1250	0%	83%	0%	17%	0%	0%	0%	0%	0%	0%	100%
1250 to 1300	14%	43%	43%	0%	0%	0%	0%	0%	0%	0%	100%
1300 to 1350	0%	67%	33%	0%	0%	0%	0%	0%	0%	0%	100%
1350 to 1400	33%	0%	67%	0%	0%	0%	0%	0%	0%	0%	100%
1400 to 1450	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%	100%
1450 to 1500	25%	25%	25%	25%	0%	0%	0%	0%	0%	0%	100%

Source: HDD, 2004 to 2012. And SGS Economics and Planning, 2016

General Residential Zone 3 and 4: lots larger than 1500 square metres

It is assumed that the capacity of large lots zoned GRZ3 and GRZ4 would not be substantially affected by the new zones. This is due to the greater flexibility in design/development style for large lots (greater than 1500 square metres) in adhering to the proposed zone requirements. As a result, the same densities used for estimating the net capacity of General Residential zones in approach 1 were applied to estimating the net capacity of large lots in proposed zones GRZ3 and GRZ4. Here, average density figures (dwellings per hectare) were applied based on proximity to public transport and location bands (see Table 10).

General Residential Zone 5

Proposed General Residential Zone 5 is associated with Oakleigh and Wheelers Hill Structure Plans. Within this structure plan, both of these areas were divided up into a number of precincts. For each precinct a nominal potential density level was identified based on the conditions within the structure plan. The potential density was mediated by height limits, front, rear and side setbacks and open space requirements. The density levels that were applied are listed below.

TABLE 20. POTENTIAL SITE DENSITIES FOR GENERAL RESIDENTIAL ZONE 5

Proposed Zone	Structure Plan and Precinct	Site Density (dph)
GRZ5	Oakleigh 4a	120
GRZ5	Oakleigh 4b	90
GRZ5	Oakleigh 4c	120
GRZ5	Oakleigh 4d	150
GRZ5	Oakleigh 4e	150
GRZ5	Oakleigh 3c	150
GRZ5	Oakleigh 5b	30
GRZ5	Wheelers Hill 4 storeys	135
GRZ5	Wheelers Hill 3 storeys	95
GRZ5	Wheelers Hill 2 storeys	55

Source: Oakleigh and Wheelers Hill Activity Centre Structure Plans, provided by the City of Monash.

General Residential Zone 6

Proposed General Residential Zone 6 functions as an interface between General Residential Zone 3 and the higher density Oakleigh Activity Centre. The proposed zone requirements were assessed based on height limits, front, rear and side setbacks and open space requirements, and tested against project sizes. It is assumed that the proposed zones are likely to affect project size in different ways depending on lot size. For each lot size group, a project size was estimated and applied.

General Residential Zone 7

Proposed General Residential Zone 7 functions as an interface between General Residential Zone 4 and the higher density Glen Waverley Activity Centre. The proposed zone requirements were assessed based on height limits, front, rear and side setbacks and open space requirements, and tested against project size. It is assumed that the proposed zones are likely to affect project size in different ways depending on lot size. For each lot size group, a project size was estimated and applied.

General Residential Zone 8

Proposed General Residential Zone 8 is associated with the Glen Waverley Activity Centre and structure plan. The Activity Centre is divided into precincts, most of which occur on commercial or mixed use zoned land. Three precincts occurred on residential zoned land, two were zoned General Residential Zone 8 and the third was Residential Growth Zone 3.

TABLE 21. PROJECT SIZE AND LOT SIZE GRZ3, GRZ4, GRZ6, GRZ7, RGZ3

	RGZ3	GRZ 3 and 4	GRZ6	GRZ7
Lot size	Dwellings per lot			
500 to 550	5	2.00	3	3
550 to 600	6	2.00	3	3
600 to 650	6	2.15	4	4
650 to 700	7	2.09	4	4
700 to 750	8	2.08	4	4
750 to 800	8	2.13	5	5
800 to 850	9	2.23	5	5
850 to 900	9	2.48	5	5
900 to 950	10	2.74	6	6
950 to 1000	10	3.04	6	6
1000 to 1050	15	3.00	7	7
1050 to 1100	16	2.99	8	7
1100 to 1150	16	2.99	10	7
1150 to 1200	17	2.88	11	8
1200 to 1250	18	3.33	11	8
1250 to 1300	19	3.29	12	8
1300 to 1350	20	3.33	12	9
1350 to 1400	20	3.33	13	9
1400 to 1450	28	4.00	13	9
1450 to 1500	29	3.50	14	10
1500 to 2000	30	density band	14	10
2000 to 2500	50	density band	20	13
2500 to 3000	62	density band	25	17
3000 to 3500	75	density band	30	20
3500 to 4000	87	density band	35	25
4000 plus	100	density band	40	25

Source: HDD, 2004 to 2012. and SGS Economics and Planning, 2016

TABLE 22. POTENTIAL SITE DENSITIES FOR GENERAL RESIDENTIAL ZONE 8

Proposed Zone	Structure Plan and Precinct	Site Density (dph)
GRZ8	Glen Waverley Activity Centre J	350
GRZ8	Glen Waverley Activity Centre I	250

Source: Glen Waverley Structure Plan, provided by the City of Monash

Residential Growth Zone 4

Residential Growth Zone 4 occurs in the Glen Waverley Activity Centre. It covers one precinct identified within the Structure Plan. Assessment of the structure plan indicated that an average density of 200 dwellings per hectare was possible given the requirements of the precinct.

Residential Growth Zone 3

Residential Growth Zone 3 occurs within the Clayton Activity Centre. The Structure Plan for the Clayton Activity Centre used lot size as a basis for varying height limits within the Activity Centre. The requirements of the structure plan were assessed, and potential site densities for the different lot size/height limit categories were identified. These was then converted into potential project sizes (potential dwellings per lot). The estimated potential densities used for RGZ3 are listed in Table 23.

TABLE 23. POTENTIAL SITE DENSITIES FOR RESIDENTIAL GROWTH ZONE 3

Proposed Zone	Structure Plan and Precinct	Site Density (dph)
RGZ3	Clayton activity centre 1000m	115
RGZ3	Clayton activity centre 1000-1400m	154
RGZ3	Clayton activity centre 1400-2000m	205
RGZ3	Clayton activity centre 2000m plus	250

Source: Clayton Activity Centre Structure Plan, provided by the City of Monash

5 AVAILABLE LAND

The analysis in this chapter provides a summary of land in Monash. It looks at the total land area, available land area, number of dwellings and number of lots across current residential zones and across suburbs. When reviewing these results a number of definitions should be considered:

- **Total land** refers to all land where residential development is permitted. It excludes public roads, parks, footpaths, but incorporates private driveways. The analysis excludes land in the Public Use Zone (PUZ), Priority Development Zone (PDZ) and Comprehensive Development Zone (CDZ). These zones allow for residential uses but are not considered to contribute significantly to overall capacity.

- **Available land** is derived after all constraints have been considered, and excludes all non-developable areas based on a defined set of assumptions.

- **Lots** may have no dwellings (i.e. vacant or non-residential), one dwelling or multiple dwellings (i.e. apartments). A lot does not directly translate to rateable properties.

- **Total dwellings** refer to all housing stock within each zone as of 2012. This existing housing may be on available or unavailable land.

5.1 Approach

Available land represents all land (except in the SUZ, PUZ, PDZ and CDZ) that has the potential to generate additional housing supply for Monash. This does not mean that it is necessarily feasible or that property owners are ready or willing to develop these sites. Typically only a small portion of available lots are likely to change in any one year. A number of constraints were identified were used to exclude lots from available land. These constraints are not effected by any changes to residential zones, and therefore remain the same for the analysis of housing capacity under current residential zones and proposed residential zones in chapter 6.

The constraints to land availability used in the analysis are identified below. Where any of these conditions exist, land is considered unavailable for development.

Strata and multiple ownership shared lots

Locations where there are multiple property owners (i.e. strata title) or where the original subdivision pattern has been further subdivided (i.e. shared lots) are likely to significantly limit the development potential of these sites. Therefore these have been identified and excluded from available land.

Strata lots were identified using the property rates dataset provided by Council. Lots with a strata title or a land use type indicating a strata were excluded; these represent only a small proportion of residential lots (typically apartment blocks).

Shared lots were identified separately. These include unit, townhouse and village developments with common driveways likely controlled by multiple land owners. These ‘shared lots’ were identified through data queries of the property rates dataset and through a visual assessment of the cadastre.

Community infrastructure and key assets

These sites, located on both residential and commercial land, serve as community infrastructure for the public and are not considered suitable for new housing development. Types of land use include education, aged care facilities, child care facilities, churches, community centres and halls, car parks, public parks. Community infrastructure and key asset sites were initially identified using the property rates dataset provided by Council. Based on building type, sites that were education facilities, parks, churches, community centres and halls and car parks were identified in this layer. A visual assessment of sites larger than 1,000 square metres was then conducted to identify other outstanding key assets.

Small lots

Given small lots also have limited development potential, and the large size of lots across the City of Monash, lots less than 500 square metres were considered not available for development. Although they may be developed as replacement (knock-down rebuild) developments, this has no effect on increasing housing supply in the municipality.

Recently completed buildings

Buildings that were recently completed are unlikely to be redeveloped again and have also been excluded from the capacity analysis. This applies to all residential and commercial land within the LGA.

Recently completed buildings were identified using a number of data sources. Using the property rates dataset provided by council, any building that was constructed after 2000 was identified and excluded. A second layer identified and excluded sites that had been redeveloped between 2004 and 2012 using HDD data supplied by DELWP.

UDP data

A third layer identified and excluded sites that were listed as completed between 2013 and 2015 using Urban Development Program (UDP) data also supplied by DELWP. Visual assessments were further conducted for all properties identified as completed within the UDP that were not also identified within the property rates dataset, in order to ensure that no buildings that had not yet been constructed were excluded from the available land analysis.

Covenants

Some parts of Monash including parts of Wheelers Hill are subject to single storey covenants, single dwelling covenants, double storey covenants and lot size covenants. This data was not available to SGS and is therefore not reflected in the analysis.

5.2 Available land analysis

Table 24 identifies the total net land and available land by suburb. It also indicates the total number and available number of lots and the total number of dwellings that exist.

Across the municipality there is 4,483 hectares of net residential zoned land, of which 70% is available for development, or 3,121 hectares.

Glen Waverley has the largest amount of land available for residential development: 766ha. Mount Waverley and Wheelers Hill also have significant amounts of land available for residential development with 629 hectares and 493 hectares respectively. Wheelers Hill also has the highest proportion of total land available for development with 81% of land available for development. Mulgrave also has high proportions of land available for development, with 78% of residential zoned land, equivalent to 395 hectares. Clayton and Chadstone both have lower than average proportions of land available for development: 50 and 54% respectively.

As noted in the definitions provided at the start of this chapter, these proportions of available land do not take into account development feasibility nor a landowners' willingness to develop a site. Nor does it account for the existence of single dwelling/single storey covenants that exist in some parts of the City of Monash.

TABLE 24. LAND AVAILABLE FOR RESIDENTIAL DEVELOPMENT IN SUBURBS

	Land			Lots		Dwellings
	Total (ha)	Avail land (ha)	% available land	Total (No)	Available (No)	Total dwellings (2012)
Ashwood	158	106	67	2,650	1,440	2,590
Burwood	55	33	60	970	470	880
Chadstone	215	116	54	3,530	1,560	3,390
Clayton	284	144	51	5,950	1,820	5,830
Glen Waverley	1,047	766	73	15,950	10,070	15,030
Hughesdale	146	89	61	2,890	1,230	2,950
Huntingdale	38	28	74	740	450	750
Mount Waverley	945	629	67	14,330	8,140	12,970
Mulgrave	507	395	78	7,270	5,490	6,880
Notting Hill	47	36	77	630	470	840
Oakleigh	173	114	66	3,120	1,680	2,990
Oakleigh East	136	82	60	2,630	1,110	2,470
Oakleigh South	126	90	71	2,100	1,250	2,070
Wheelers Hill	606	493	81	7,540	6,330	7,260
Total	**4,483**	3,121	70	70,300	**41,510**	**66,900**

Source: HDD Data, 2012 and SGS Economics and Planning, 2016

Table 25 illustrates how most land in Monash that is zoned for residential development is zoned General Residential Zone 2 under the current zones: 3019 hectares of available land is GRZ2. A limited amount of land available (42 hectares) is zoned Neighborhood Residential Zone 1, and only negligible amounts of land have other residential zonings. It notable that there is a negligible amount of land zoned for residential growth, and of this, none of it is available for residential development.

TABLE 25. LAND AVAILABLE FOR RESIDENTIAL DEVELOPMENT IN CURRENT ZONES

	Land(ha) Total (ha)	Avail land (ha)	% available land	Lots Total	Available	Total dwellings (2012)
NRZ1	53	42	79	910	600	910
GRZ1	12	8	67	10	0	0
GRZ2	4,286	3,019	70	67,590	40,720	65,300
RGZ1	1	0	0	1	0	0
RGZ2	3	0	0	80	0	210
C1Z	122	51	42	1,620	170	320
MUZ	5	1	20	70	10	160
Total	**4,482**	**3,121**	**70**	**70,280**	**41,500**	**66,900**

Source: HDD Data, 2012 and SGS Economics and Planning, 2016

Table 26 illustrates the distribution of land, and land available for development under the proposed residential zones. While the majority of available land exists in General Residential Zone 3 and General Residential Zone 4, there is also a sizeable amount of land in the neighbourhood residential zones.

There is 1094 hectares of land available in the proposed Neighbourhood Residential Zones and 2003 hectares of land available in General Residential Zones. Compared to the current zones, there is substantially more land zoned for residential growth (RGZ1 and RGZ2). The proposed residential growth

zones include 89 hectares of land, with 43 of those available for residential development, compared to no land in residential growth zones available for development under the current residential zones.

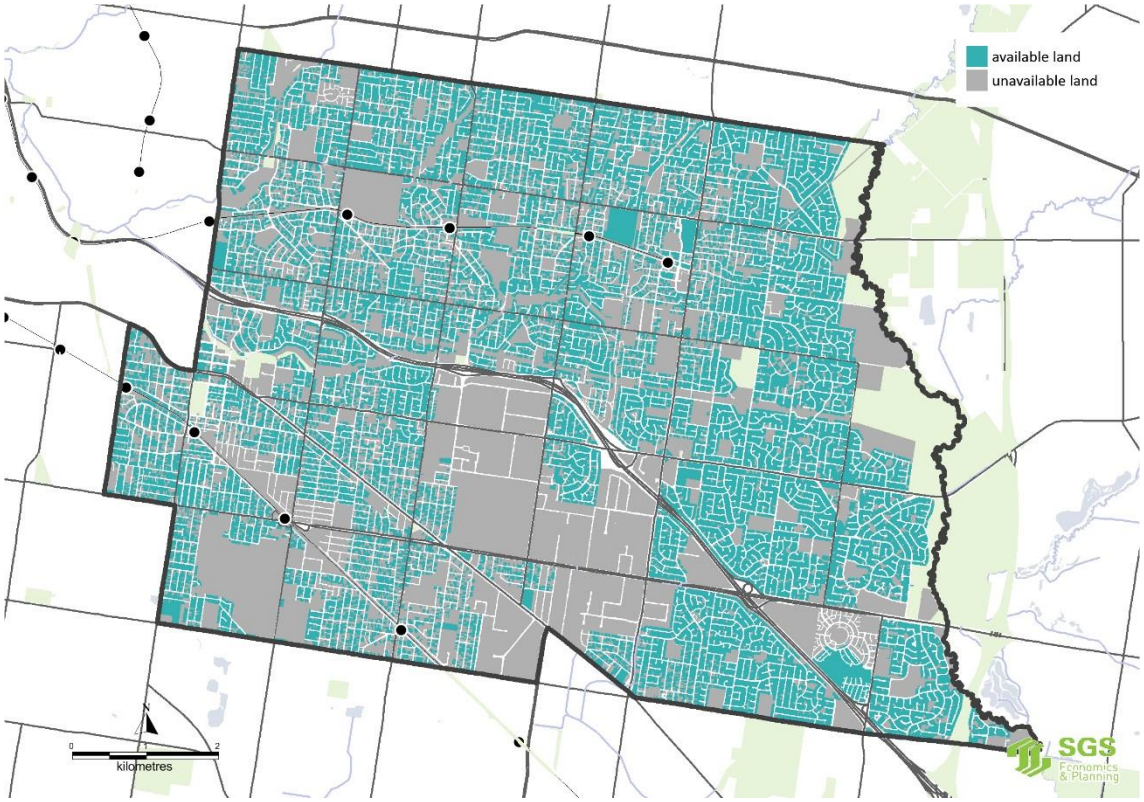
TABLE 26. LAND AVAILABLE FOR RESIDENTIAL DEVELOPMENT IN PROPOSED ZONES

	Land		Lots		Dwellings	
Proposed zones	Total	Available	Total	Available	Total	Net Capacity
NRZ1	53	42	910	600	910	400
NRZ2	102	61	1250	720	1170	1110
NRZ3	188	149	2970	1950	2930	2470
NRZ4	996	842	13630	11140	13090	11630
GRZ3	691	472	12920	6790	12780	7540
GRZ4	2092	1469	32590	19830	30950	22470
GRZ5	14	6	160	40	190	160
GRZ6	97	44	2020	590	2140	760
GRZ7	16	10	290	130	250	130
GRZ8	4	2	20	20	40	50
RGZ3	79	37	1680	460	1830	680
RGZ4	10	5	140	60	150	80
C1Z	122	38	1620	150	320	7650
MUZ	5	2	70	10	160	340
Total	**4469**	**3179**	**70270**	**42490**	**66910**	**55470**

Source: HDD Data, 2012 and SGS Economics and Planning, 2016

The map in Figure 9 shows the distribution of available land across Monash. Land available for residential development is distributed relatively evenly across the municipality, with major voids created by Monash University, the industrial areas of Mulgrave, Clayton, Notting Hill and Huntingdale and golf courses in Oakleigh and Huntingdale.

FIGURE 9. AVAILABLE LAND IN MONASH



Source: Source: SGS Economics and Planning, 2016

6 HOUSING CAPACITY

This chapter presents estimates of housing capacity and housing supply in Monash based on the current zones and the proposed zones. The first section discussed the overall approach. The subsequent sections set out the result of each step of the analysis of housing capacity and supply.

6.1 Approach

The available land analysis presented in chapter 5 determined land that is likely to be available in the future for residential development. This provides the basis for an analysis of housing capacity. The capacity analysis uses the assumptions discussed in the previous chapters for the form/density/type of development that is though likely to occur on available land as a result of the current and proposed zones.

The analysis in this chapter provides a summary of additional dwelling capacity in Monash on land which is available and where residential development is permitted. When reviewing these results a number of definitions should be considered:

- **Available land** is derived after all constraints have been considered, and excludes all non-developable areas based on a defined set of assumptions.
- **Housing supply** is an estimate of the supply of housing over a 20 year period (2012 to 2031) based on analysis of housing capacity, demographic projections, and development feasibility
- **Net dwelling capacity** refers to the potential yield on available land (i.e. after all constraints are considered) minus existing dwellings. This is a definition of capacity which does not consider economic or technical feasibility of redevelopment or whether landowners are willing/able to develop their site. Typically, only a small portion of net dwelling capacity is likely to be realised in any one year.
- **Total dwelling capacity** refers to the potential yield on all land (i.e. after all constraints are considered) including existing dwellings. It is the sum of existing dwellings and net dwelling capacity.

Where data existing on a site being redeveloped in the Urban Development Program, this was used in the capacity analysis, overriding SGS capacity calculations and land availability assumptions.

6.2 Housing capacity under current zones

Chapter 3 described two approaches to estimating housing capacity under the current zones in Monash. These two approaches provided very similar results, with some variation across suburbs. Approach 1 incorporated the effects of proximity to the CBD and proximity to public transport resulted in a net housing capacity of 55,000 dwellings, while approach 2 looked at the size of developments occurring on different lot sizes. Table 27 shows the total number of existing dwellings, and the net housing capacity estimated for each zone, under approach 1 and 2.

Table 27 shows that approach 2 yielded slightly higher net housing capacity, with 62,900 dwelling capacity under approach 2. Approach 1 yields 55,450 dwellings. Land zoned GRZ1 under the current zones currently has no dwellings, but has capacity for a further 510. Land zoned GRZ2 understandably absorbs the majority of housing capacity due to land area, with capacity for a total of between 47,100 and 62,900 dwellings.

TABLE 27. NET HOUSING CAPACITY: CURRENT ZONES (APPROACH 1), BY ZONE

Suburb	Total existing dwellings (2012)	Approach 1 : Net Housing Capacity	Approach 2 : Net Housing Capacity
NRZ1	910	590	740
GRZ1	0	510	500
GRZ2	65,300	47,100	54,400
RGZ1	0	0	0
RGZ2	210	10	10
C1Z	320	7,160	7,160
MUZ	160	80	80
Total	**66,900**	**55,450**	**62,900**

Source: HDD Data, 2012 and SGS Economics and Planning, 2016

Table 28 summarises net housing capacity under both approaches by suburb. The majority of housing capacity is found in Glen Waverley and Mount Waverley. Each of these suburbs have capacity for at least 11,000 dwellings. Other suburbs with significant capacity include Wheelers Hill, Mulgrave and Clayton. For Wheelers Hill, Mount Waverley, and Oakleigh, housing capacity is roughly equivalent to the number of dwellings currently in existence.

TABLE 28. NET HOUSING CAPACITY: CURRENT ZONES (APPROACH 1), BY SUBURB

Suburb	Total dwellings (2012)	Approach 1 : Net Housing Capacity	Approach 2 : Net Housing Capacity
Ashwood	2,590	2,130	2,090
Burwood	880	620	600
Chadstone	3,390	3,210	3,300
Clayton	5,830	4,020	4,060
Glen Waverley	15,030	11,700	14,860
Hughesdale	2,950	1,880	1,930
Huntingdale	750	390	530
Mount Waverley	12,970	11,450	11,450
Mulgrave	6,880	5,240	6,800
Notting Hill	840	760	760
Oakleigh	2,990	3,210	3,460
Oakleigh East	2,470	1,400	1,470
Oakleigh South	2,070	1,900	2,180
Wheelers Hill	7,260	7,530	9,400
Total	**66,900**	**55,450**	**62,900**

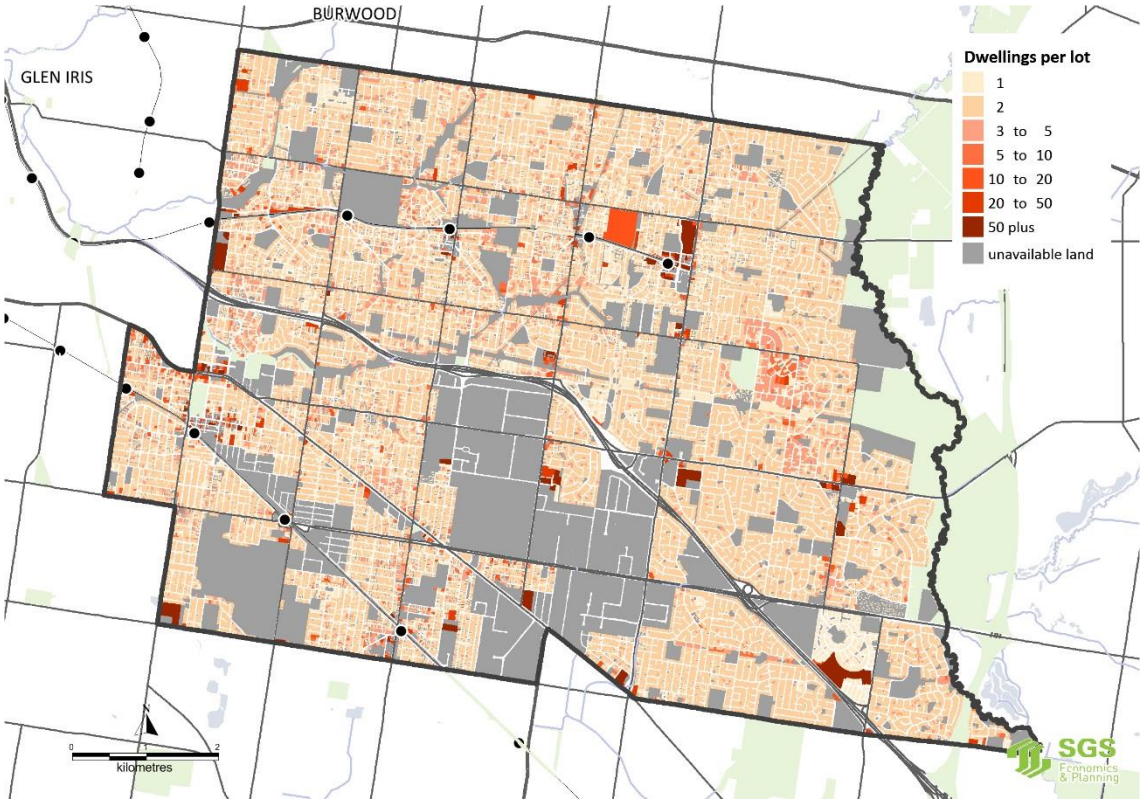
Source: HDD Data, 2012 and SGS Economics and Planning, 2016

One of the key differences between the two estimates of net housing capacity is found in Glen Waverley. Approach 1 yielded 11,700 net capacity, while approach 2 yielded 14,860 net capacity. Approach 2 also yielded notably more net housing capacity in Wheelers Hill with approach 1 yielding 7,530 dwellings and approach 2 yielding 9,400 dwellings.

Figure 10 and Figure 11 indicates the total housing capacity across Monash under current zones as estimated by the two approaches. They show total housing capacity as number of dwellings per lot. Total housing capacity incorporates existing dwellings and dwellings on available land to show coverage of the entire suburb.

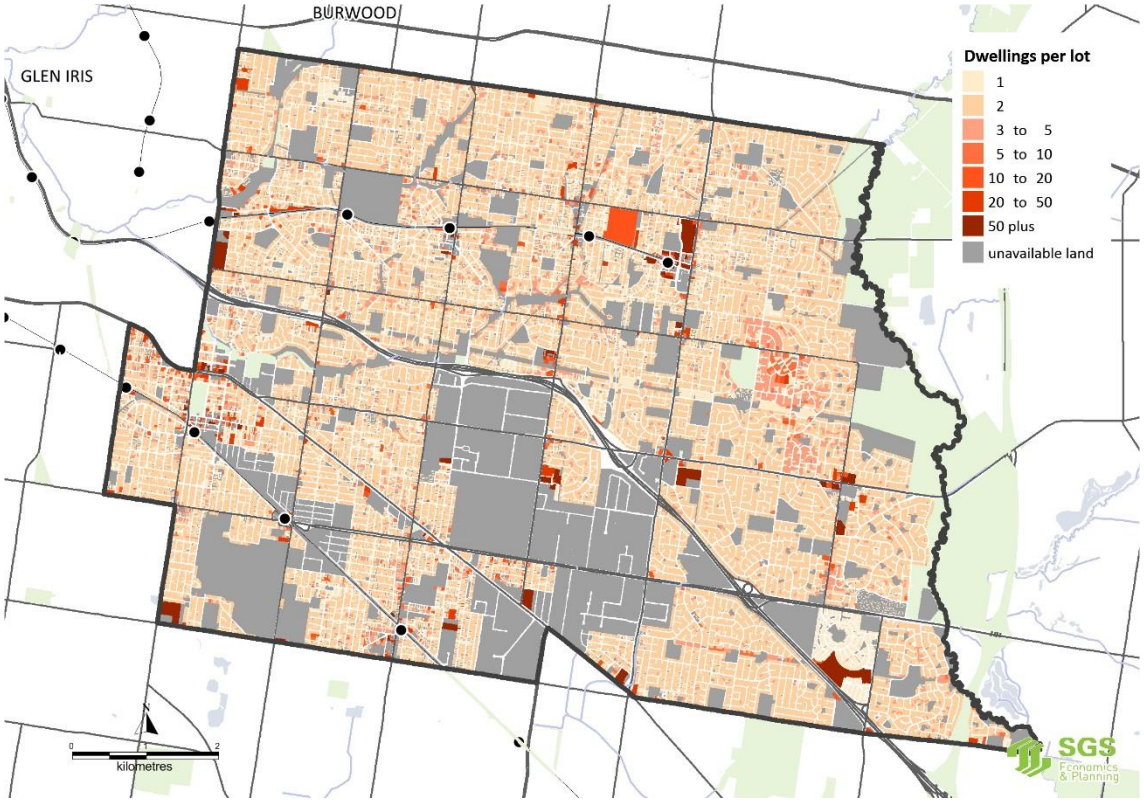
Figure 10 shows greater capacity on larger lots, and also slightly greater capacity around train stations and in areas with greater proximity to the CBD. In all total housing capacity maps, it is worth noting that a number of the sites with high dwelling capacity are on commercially zoned land, and total housing capacity for these sites remains unchanged under the proposed residential zones.

FIGURE 10. TOTAL HOUSING CAPACITY: CURRENT ZONES (APPROACH 1)



Source: Source: SGS Economics and Planning, 2016

FIGURE 11. TOTAL HOUSING CAPACITY: CURRENT ZONES (APPROACH 2)



Source: Source: SGS Economics and Planning, 2016

6.3 Housing capacity under proposed zones

Chapter 3 described a method for estimating housing capacity under the proposed zones in Monash. Table 29 shows that there is substantial net capacity in Neighbourhood Residential Zone 4, and General Residential Zones 3 and 4, which is consistent with the large proportions of available land that exist in these proposed zones.

TABLE 29. NET HOUSING CAPACITY: PROPOSED ZONES

Proposed zones	Total dwellings (2012)	proposed zone net capacity
NRZ1	910	590
NRZ2	1,170	1,000
NRZ3	2,930	1,730
NRZ4	13,090	5,700
GRZ3	12,780	8,250
GRZ4	30,950	23,430
GRZ5	190	880
GRZ6	2,140	2,720
GRZ7	250	390
GRZ8	40	480
RGZ3	1,830	3,970
RGZ4	150	1,020
C1Z	320	7,160
MUZ	160	80
Total	**66,910**	**57,700**

Source: HDD Data, 2012 and SGS Economics and Planning, 2016

Table 30 shows the net housing capacity by suburb under the proposed zones. Clayton and Oakleigh both have greater net housing capacity than the current amount of dwellings that exist in these suburbs. This suggests a particularly high capacity for growth in these suburbs. Mount Waverley and Glen Waverley also have significant net housing capacity, which is consistent with the large amount of available land in these suburbs. Wheelers Hill has less capacity than any other suburb, relative to the total number of dwellings suggesting a reduced capacity for growth.

TABLE 30. NET HOUSING CAPACITY: PROPOSED ZONES, BY SUBURB

Proposed zones	Total dwellings (2012)	proposed zone net capacity
Ashwood	2,590	1,910
Burwood	880	560
Chadstone	3,390	3,120
Clayton	5,830	8,430
Glen Waverley	15,030	12,300
Hughesdale	2,950	1,850
Huntingdale	750	500
Mount Waverley	12,970	10,350
Mulgrave	6,880	5,410
Notting Hill	840	760
Oakleigh	2,990	3,300
Oakleigh East	2,470	1,410
Oakleigh South	2,070	2,090
Wheelers Hill	7,260	5,660
Total	**66,900**	**57,700**

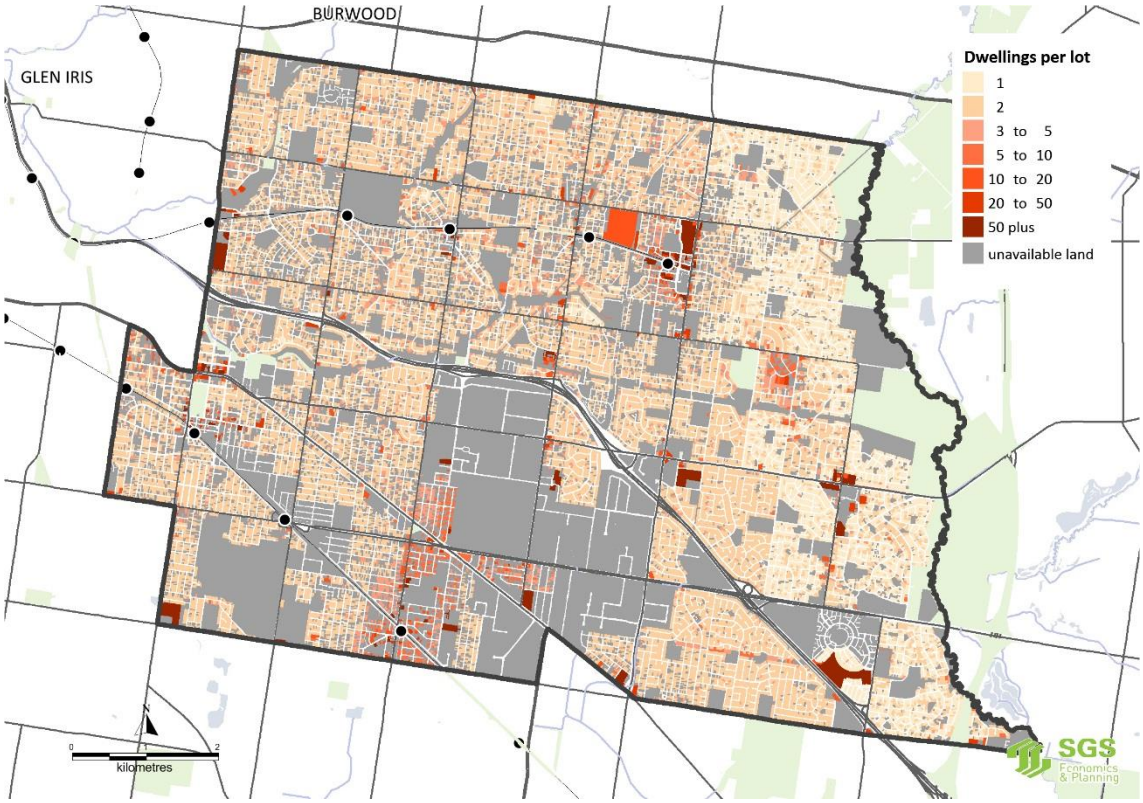
Source: HDD Data, 2012 and SGS Economics and Planning, 2016

Figure 12 shows the distribution of total housing capacity across Monash under the proposed zones, using dwellings per lot as the measure. It suggests that the east of the municipality will have slightly reduced capacity compared to the central and western parts of the municipality. Higher capacity is clustered around key areas, parts of Glen Waverley and Clayton in particular. There are also pockets of higher capacity in Oakleigh and Wheelers Hill.

The higher capacity around Glen Waverley is largely a result of amendment C120, the Glen Waverley structure plan. The other pockets of higher capacity are most often directly related to the activity centre structure plans that exist in these areas. These structure plans informed the estimations of housing capacity in these areas. The relevant structure plans are namely the Wheelers Hill, Oakleigh and Clayton Activity Centre Structure Plans. The capacity of the two residential growth zones (RGZ3 and RGZ4) are determined by the Clayton and Glen Waverley Activity Centre structure plans respectively.

As previously noted in this report, there are other Activity Centre Structure plans, as well as structure plans for main boulevards such as Springvale Road pending finalisation. These were not included in this capacity analysis and are anticipated to create additional specific areas of higher capacity within Monash, and contribute to an overall increase in net capacity across the municipality.

FIGURE 12. TOTAL HOUSING CAPACITY: PROPOSED ZONES



Source: Source: SGS Economics and Planning, 2016

6.4 Housing capacity compared

Table 31 compares the estimated capacity of the current zones and the proposed zones. It is organised by the geographical area defined by the proposed zones. As previously noted, the current zones and the proposed zones yield roughly similar overall net capacities. However there are some distinctive differences when areas within the proposed zones are looked at.

Under the proposed zones, areas zoned Neighbourhood Residential Zone 4 (NRZ4) have significantly less capacity than the same areas under the current zones. In areas zoned NRZ4, the proposed zone capacity is less than half the estimated capacity under current zones. However this is balanced out by areas with increased capacity under the proposed zones. Areas covered by the proposed zones RGZ3 have substantially higher net housing capacity under the proposed zones (more than 4 times the net capacity) and GRZ6 also sees a significant increase in net housing capacity, increasing net housing capacity from 1400 dwellings to 2720 dwelling.

TABLE 31. NET HOUSING CAPACITY: CURRENT ZONES AND PROPOSED ZONES

	Current Zones Approach 1 : Net Capacity	Current Zones Approach 2 : Net Capacity	Proposed zone net capacity	Difference between Proposed Zones and Approach 1	Difference between Proposed Zones and Approach 2
NRZ1	590	740	590	0	-150
NRZ2	1,270	1,310	1,000	-270	-310
NRZ3	2,390	2,500	1,730	-660	-770
NRZ4	11,170	14,340	5,700	-5,470	-8,640
GRZ3	7,680	8,660	8,250	570	-410
GRZ4	21,730	24,680	23,430	1,700	-1,250
GRZ5	600	600	880	280	280
GRZ6	1,400	1,400	2,720	1,320	1,320
GRZ7	120	140	390	270	250
GRZ8	50	50	480	430	430
RGZ3	800	800	3,970	3,170	3,170
RGZ4	150	160	1,020	870	860
C1Z	7,160	7,160	7,160	0	0
MUZ	80	80	80	0	0
Total	**55,190**	**62,620**	**57,700**	**2,510**	**-4,920**

Source: HDD Data, 2012 and SGS Economics and Planning, 2016

The proposed zones also lead to differing capacities across suburbs. Table 32 summarises the net capacity of the current zones and the proposed zones by suburb, including the results for both approaches to estimating current zone capacity.

Net housing capacity in Clayton is substantially higher under the proposed zones, with a net capacity of around 4000 dwellings under the current zones and almost 8,500 dwellings under the proposed zones.

Wheelers Hill is estimated to see a notable reduction in net housing capacity under the proposed zones. The proposed zones have a net housing capacity that is around 60-75% of the net capacity under the current zones.

Despite the large area, Mount Waverley has a roughly similar net capacity under the current zones and the proposed zones, between 10,500 and 11,500 dwellings. The net capacity of Glen Waverley is also unlikely to be substantially effected by the proposed zones, although the results from the two estimations of capacity under current zones differed markedly.

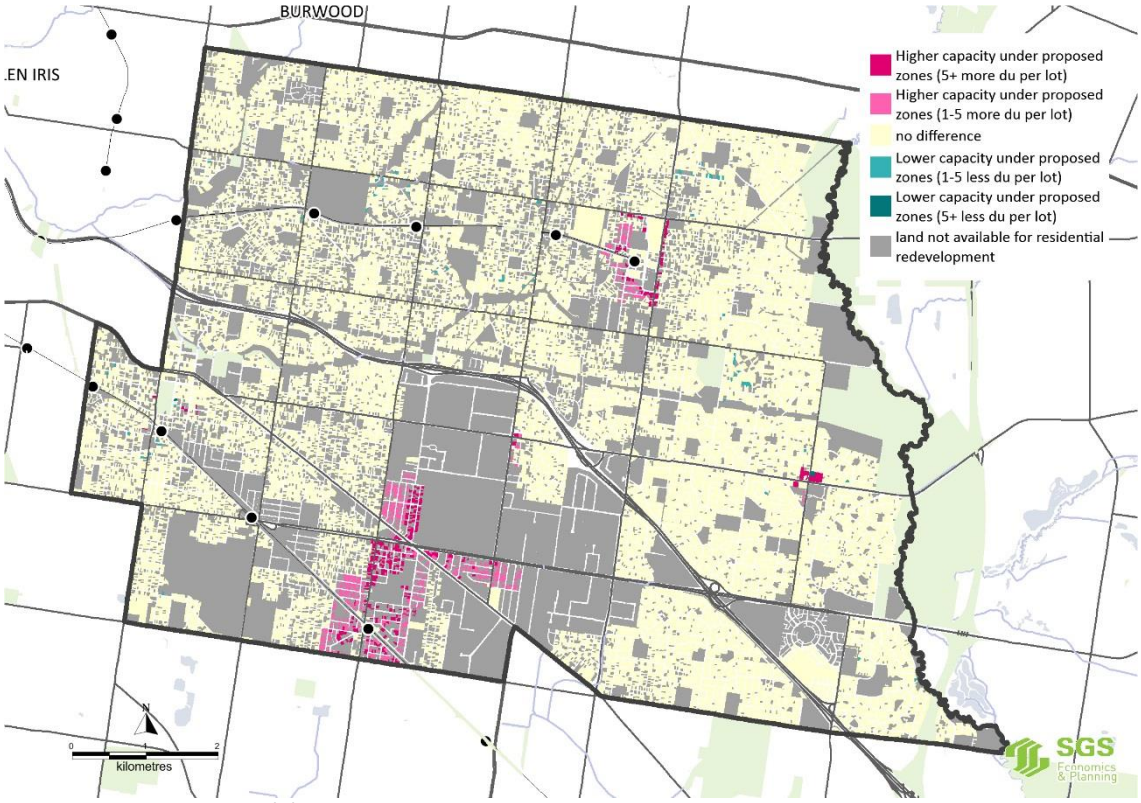
TABLE 32. NET HOUSING CAPACITY: CURRENT ZONES AND PROPOSED ZONES

Suburb	Current Zones Approach 1:Net Capacity	Current Zones Approach 2:Net Capacity	Proposed zone net capacity	Difference between Proposed Zones and Approach 1	Difference between Proposed Zones and Approach 2
Ashwood	2,130	2,090	1,910	-220	-180
Burwood	620	600	560	-60	-40
Chadstone	3,210	3,300	3,120	-90	-180
Clayton	4,020	4,060	8,430	4,410	4,370
Glen Waverley	11,700	14,860	12,300	600	-2,560
Hughesdale	1,880	1,930	1,850	-30	-80
Huntingdale	390	530	500	110	-30
Mount Waverley	11,450	11,450	10,350	-1,100	-1,100
Mulgrave	5,240	6,800	5,410	170	-1,390
Notting Hill	760	760	760	0	0
Oakleigh	3,210	3,460	3,300	90	-160
Oakleigh East	1,400	1,470	1,410	10	-60
Oakleigh South	1,900	2,180	2,090	190	-90
Wheelers Hill	7,530	9,400	5,660	-1,870	-3,740
Total	**55,450**	**62,900**	**57,700**	2,250	-5,200

Source: HDD Data, 2012 and SGS Economics and Planning, 2016

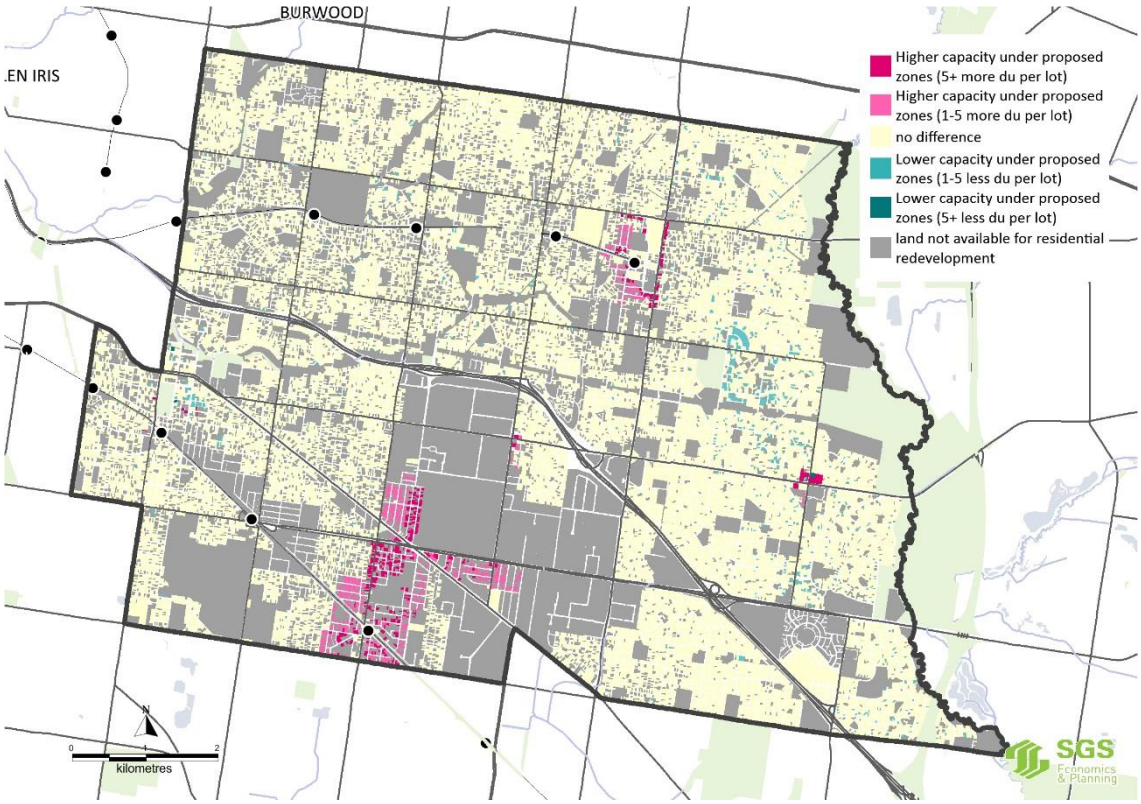
Figure 13 and Figure 14 spatially demonstrate the difference in capacity between the proposed zones and the current zones, based on the two approaches for assessing capacity under current zones. Larger versions of these can be found in Appendix D and Appendix E. A primary difference between the current and proposed residential zones is that the proposed zones concentrate higher densities in parts of Clayton and Glen Waverley. The comparisons also suggest that under the proposed zones a slight reduction in total capacity in the East of the municipality may occur. This reduction is most apparent in Figure 14.

FIGURE 13. CAPACITY DIFFERENCE: PROPOSED VS CURRENT ZONES (APPROACH 1)



Source: Source: SGS Economics and Planning, 2016

FIGURE 14. CAPACITY DIFFERENCE: PROPOSED VS CURRENT ZONES (APPROACH 2)



Source: Source: SGS Economics and Planning, 2016

7 HOUSING SUPPLY

A relative scarcity of opportunities to accommodate demand for housing results in upward pressures. For housing market to work efficiently the potential supply of new dwellings (that is, the net housing capacity) must exceed demand. In the context of infill housing it can be assumed that one a limited number of land owners will be willing to sell or redevelop their land at any one time. For this reason the amount of housing capacity in excess of demand needs to be a significant.

7.1 Capacity and demand compared

To consider the question impact of changes to capacity on housing supply the findings of the capacity analysis were compared to dwelling demand projections to 2031. It has been assumed for the purposes of this analysis that suburbs represent housing sub-markets and therefore each housing submarket should be relatively self-contained with respect to housing demand and capacity to satisfy this demand.

The comparison of housing demand and net housing capacity by suburb is shown in Table 33. This comparison found that for 10 of 14 suburbs in Monash dwelling demand to 2031 was less than 30% of the estimated capacity. This suggests capacity is well in excess of projected demand. In the case of Notting Hill housing demand to 2031 is 85% of net housing capacity which is high. This might be balanced out by the fact that Notting Hill is adjacent to the suburbs of Clayton, Mulgrave and Glen Waverley, all of which high capacity relative to demand.

A further comparison was made where the capacity identified in the NRZ areas was excluded (also shown in Table 33). This comparison is intended to test the impact on supply if those areas zoned NRZ made no net contribution to future housing supply. This is an unrealistic scenario but provides a point of reference to consider the influence of the NRZ if it were to significantly restrict housing supply in Monash. The results of this second comparison also show that in all suburbs, with the exception of Notting Hill, net housing capacity exceeds demand to 2031 by a significant margin. Even without the 'NRZ capacity' there would appear to be sufficient capacity to meet demand in the medium term.

TABLE 33. HOUSING CAPACITY AND HOUSING DEMAND BY SUBURB

	Existing dwellings: (HDD 2012)	Dwelling demand to 2031	Demand vs capacity (including capacity in NRZ areas)		Demand vs capacity (excluding capacity in NRZ areas)	
			Net capacity	Demand as % capacity	Net capacity	Demand as % of capacity
Ashwood	2,620	540	1,910	29%	1,390	39%
Burwood	910	190	560	34%	460	41%
Chadstone	3,390	620	3,120	20%	2,930	21%
Clayton	5,830	2,460	8,430	29%	8,440	29%
Glen Waverley	15,030	1,460	12,300	12%	9,770	15%
Hughesdale	2,950	380	1,850	21%	1,600	24%
Huntingdale	750	70	500	13%	500	13%
Mount Waverley	12,980	1,320	10,350	13%	8,760	15%
Mulgrave	6,970	790	5,410	15%	4,690	17%
Notting Hill	840	640	760	85%	760	85%
Oakleigh	2,990	1,200	3,300	36%	2,900	41%
Oakleigh East	2,470	210	1,410	15%	1,410	15%
Oakleigh South	2,070	720	2,090	35%	2,080	35%
Wheelers Hill	7,260	1,530	5,660	27%	2,680	57%
Total	**67,060**	**12,140**	**57,650**	**21%**	**48,380**	**25%**

Source: HDD Data, 2012 and SGS Economics and Planning, 2016

7.2 Implications for housing choice and diversity

The proposed zone changes are intended to bring about two broad changes to planning for housing in Monash.

The application of the Residential Growth Zones and selected General Residential Zones (5, 6 and 7) are intended to provide additional opportunities for medium and higher density housing in and around activity centres in Monash. Whereas the introduction of additional Neighbourhood Residential Zones and the General Residential 3 and 4 zones are intended to protect the amenity of the lower density areas.

The former change will likely increase the potential for more diverse housing forms in locations likely to be attractive for medium and higher density housing.

The latter change, as discussed, will reduce the capacity for infill housing in these location. However such change will only have a limited impact, in any, on housing choice.

The only discernible impact on housing diversity and choice will be the limitations on medium density housing (development of more than 50 dwellings per hectare) that is likely to result from the strict application of the total open space and single consolidated open space requirements set out in the GRZ3 and 4 *if these are requirements are strictly adhered too.* It is understood that Council has discretion in the application of these standards as it is therefore possible medium density development could be approved.

On balance it has been assumed that reduction any the capacity for moderate density or medium density housing in areas that are currently zoned GRZ2 will be compensated for by an increases in capacity for these forms in alternative locations. Monitoring of housing supply over time is the only way to confirm if this assumption is correct.

7.3 Impacts on affordability

Given the surplus of capacity relative to demand at the suburb level, there is no reason to assume that the proposed zone changes will affect housing affordability as a result of a decrease in the potential capacity for new housing.

As alluded to above, the strict application of the proposed minimum open space standards *could* act as a barrier to medium density housing in areas where GRZ3 and GRZ4 are proposed. These forms of development are likely to provide smaller, lower cost and therefore more affordable dwellings. This change could restrict supply of this housing types however, if it can be supplied in alternative locations it is conceivable that the 'loss' of lower cost housing in some locations will be compensated for through the introduction of 'new' capacity for lower cost housing in alternative locations.

It is not possible to say definitively if the proposed zones will impact on housing affordability however no evidence was found to suggest there would be negative impacts. To understand the extent to which zone changes impact housing affordability, times series data monitoring housing markets would be required that considers the quantum of housing supply at various price points, controlling for external factors.

7.4 Impacts on development feasibility

The dynamics of development feasibility vary for different development types.

Small-scale infill development

In the case smaller infill development, the feasibility of development is sensitive to dwelling yield and the value of existing dwellings, based on their current 'utility'. If the proposed zones reduce the number of dwellings permissible on a given site (relative to the current zones) this changes will lower the value of the land as a development site. This value is commonly referred to as the residual land value (RLV). Where the RLV is sufficiently greater than the current value (the combined value of the land and dwelling) it would be reasonable to assume that the development would still take place. Given the large number of two and three dwelling developments in Monash it would appear reasonable to assume that, regardless of the zones changes, these forms of housing development will still take place in large numbers in future.

Medium and higher density development

Where higher densities are permissible development feasibility is sensitive to the interaction of land price, development yield and prices that can be achieved for medium and higher density dwellings. In some instances land can be designated for medium higher density development, yet it is not feasible to development because dwellings prices are too low, or the development yield in insufficient, or the land owner's price expectations are too high, or a combination of these factors. No specific analyses of these dynamic has been undertaken. Further feasibility testing would be needed to confirm whether or not the notional capacity for medium and higher density housing is feasibility in the current housing market or is likely to become feasible in future.

APPENDIX A: EXAMPLES OF RECENT DEVELOPMENT

The following aerials and street-view image show recent housing development projects that represent different development densities.

FIGURE 15. UP TO 30 DWELLINGS PER HECTARE – 1 STOREY EXAMPLE

FIGURE 16. UP TO 30 DWELLINGS PER HECTARE – 2 STOREY EXAMPLE

FIGURE 17. 35 DWELLINGS PER HECTARE – 2 STOREY EXAMPLE

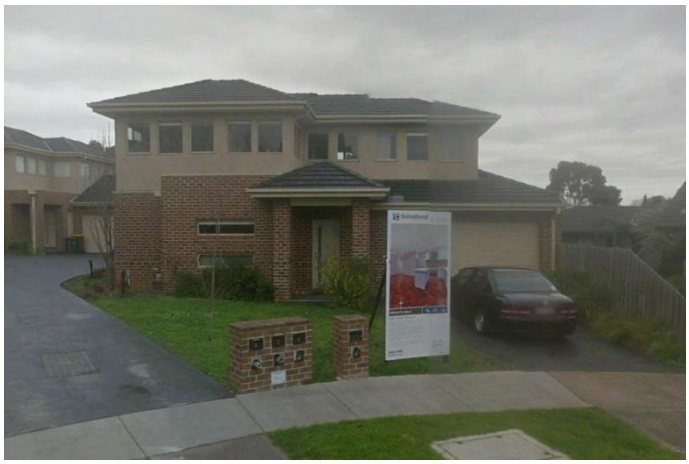


FIGURE 18. 40 DWELLINGS PER HECTARE – 2 STOREY EXAMPLE

FIGURE 19. 55 DWELLINGS PER HECTARE – 2 STOREY EXAMPLE

FIGURE 20. 55 DWELLINGS PER HECTARE – 2 STOREY EXAMPLE

FIGURE 21. 85 DWELLINGS PER HECTARE – 2 STOREY EXAMPLE

FIGURE 22. 105 DWELLINGS PER HECTARE – 2 STOREY EXAMPLE

FIGURE 23. 155 DWELLINGS PER HECTARE – 4 STOREY EXAMPLE

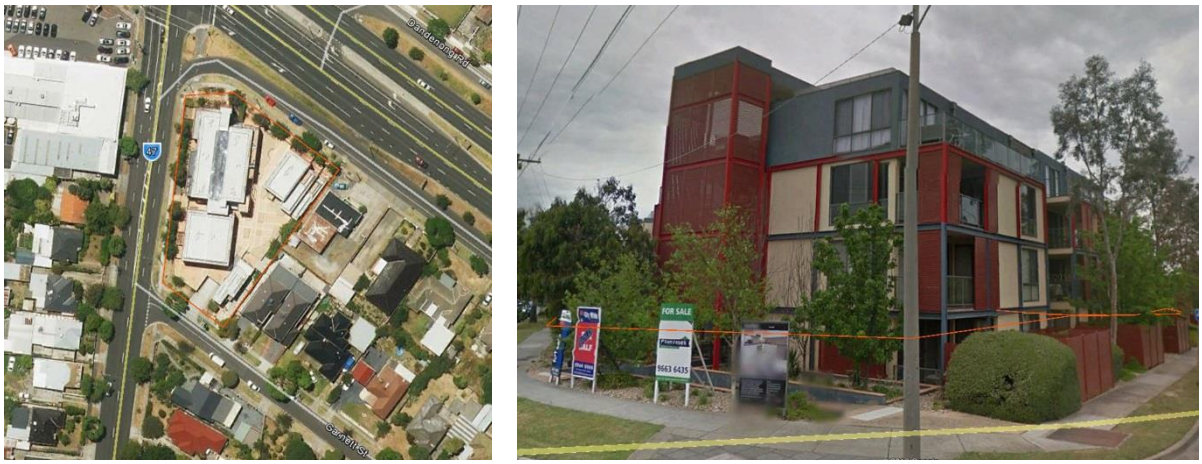


FIGURE 24. 160 DWELLINGS PER HECTARE – 3 STOREY EXAMPLE

FIGURE 25. 165 DWELLINGS PER HECTARE – 3 STOREY EXAMPLE

FIGURE 26. 185 DWELLINGS PER HECTARE – 3 STOREY EXAMPLE

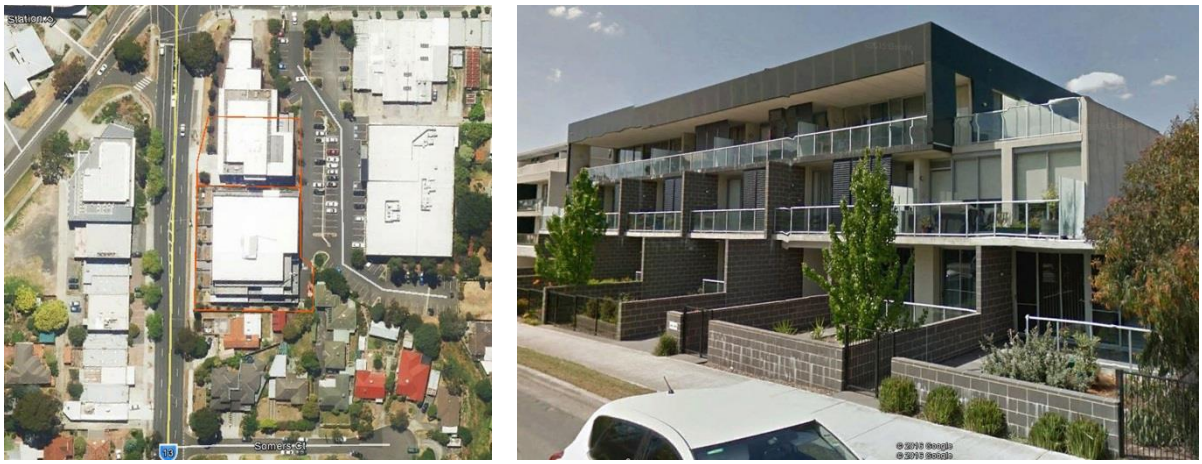


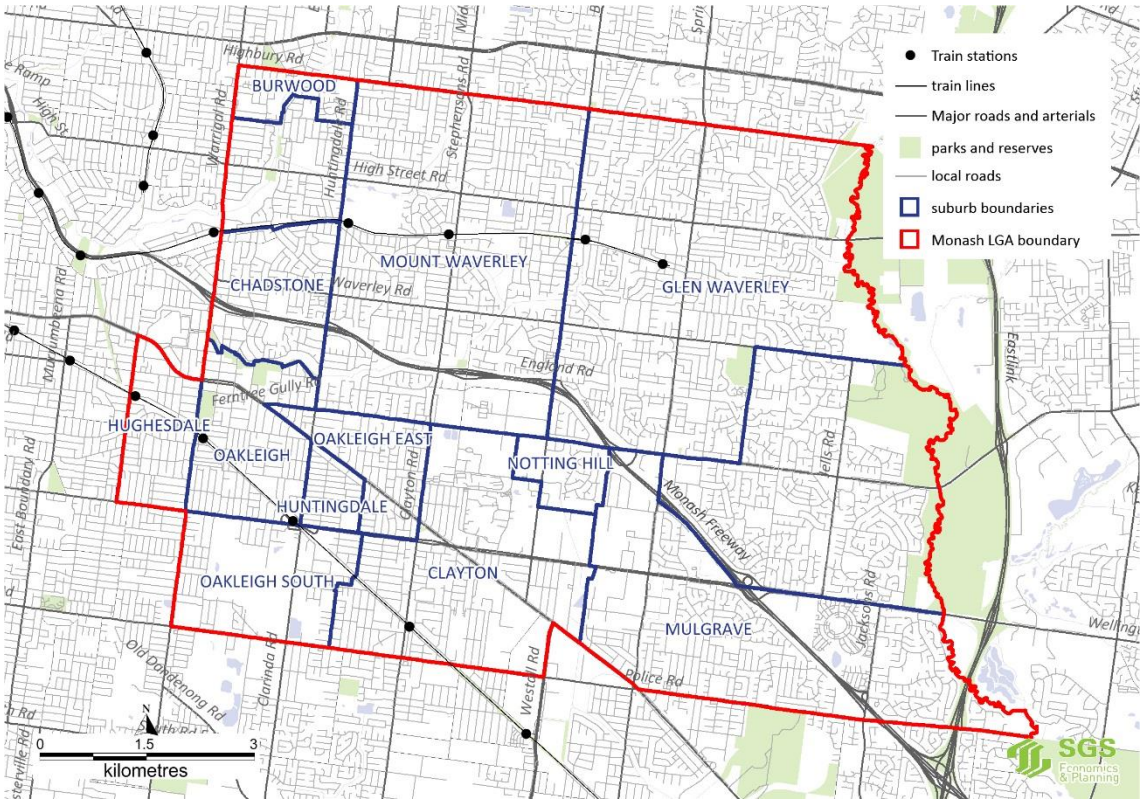
FIGURE 27. 270 DWELLINGS PER HECTARE – 5 STOREY EXAMPLE

APPENDIX B: MAPPING

Constraints mapping

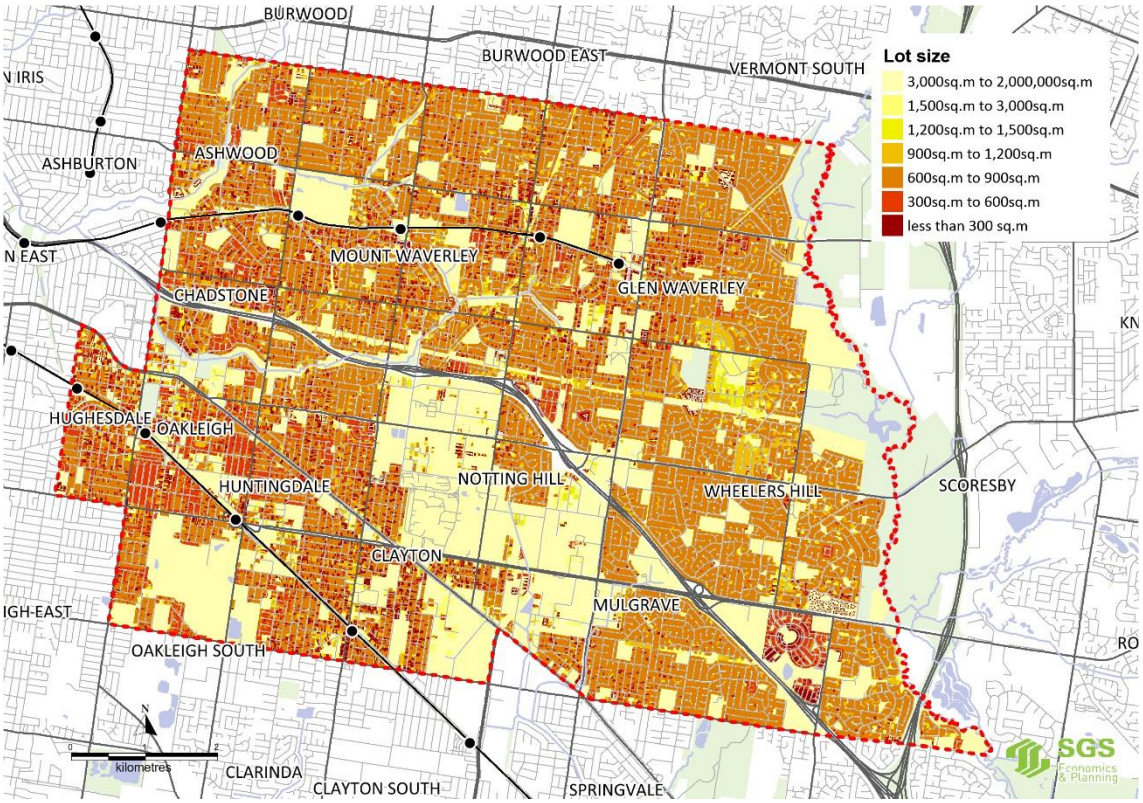
The following series of maps show land parcels that were excluded from available land analysis.

FIGURE 28. CITY OF MONASH



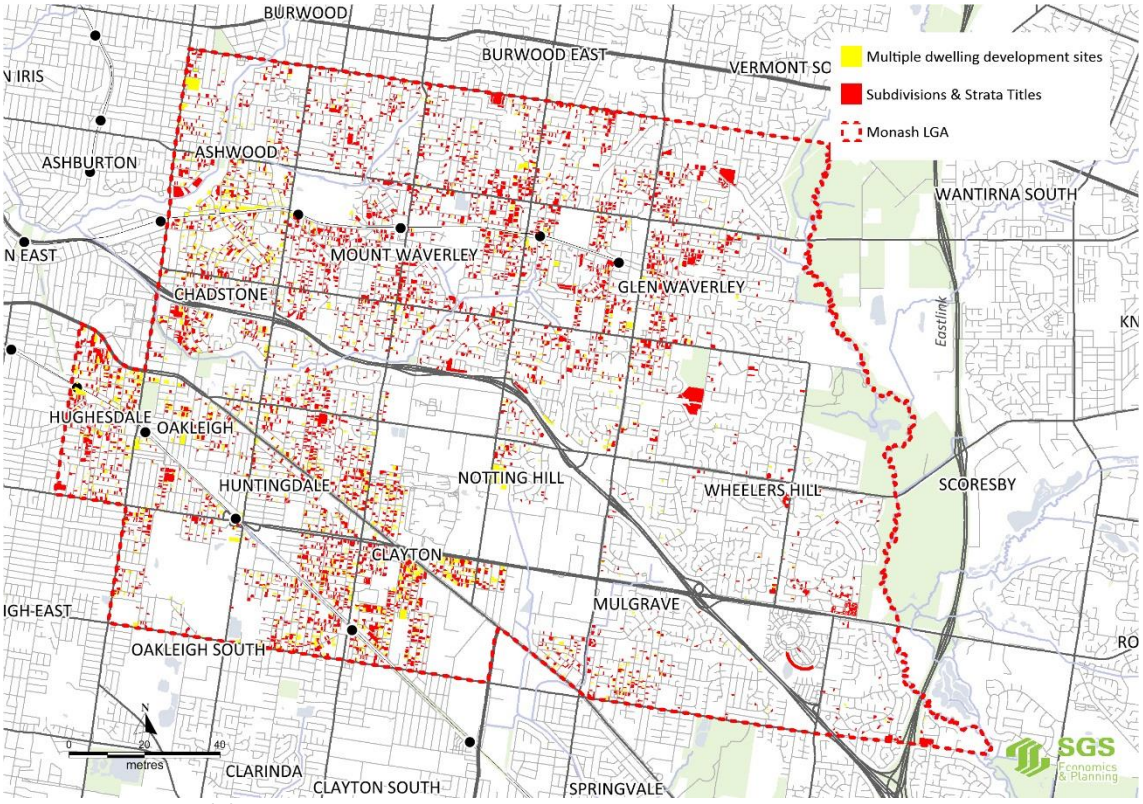
Source: SGS Economics and Planning, 2016

FIGURE 6. DISTRIBUTION OF LOT SIZES



Source: SGS Economics and Planning, 2016

FIGURE 7. STRATA AND MULTIPLE DWELLING DEVELOPMENTS



Source: SGS Economics and Planning, 2016

APPENDIX C: ADDITIONAL TABLES FROM HDD ANALYSIS

TABLE 34. DWELLING SUPPLY (2004 TO 2012) BY PRE-JUNE 13 2014 ZONES

Previous zones	Total Area (ha)	Dwellings (2012)	Av. density (net dph)	Change '04-'12
R1Z	4339	66209	15	4248
R2Z	3	206	71	33
MUZ	5	163	30	75
B1Z and B2Z	122	317	3	191
CDZ	5	87	16	No change
Total	4342	66415	15	4281

Source: Housing and Development Data, 2012 and previous planning zones (supplied by DEWLP)

TABLE 3. DWELLING SUPPLY (2004 TO 2012) BY POST-JUNE 13 2014 ZONES

Current Planning Zones (DEWLP)	Total Area (ha)	Dwellings (2012)	Av. density (net dph)	Change '04-'12
GRZ2	4286	65304	15	4221
NRZ1	53	905	17	27
RGZ2	3	206	71	33
MUZ	5	163	30	75
C1Z	122	317	3	191
CDZ	5	87	16	No change
Total	4342	66415	15	4281

Source: Housing and Development Data, 2012 and current planning zones (supplied by DEWLP)

TABLE 4. DWELLING SUPPLY (2004 TO 2012) BY CITY OF MONASH PROPOSED ZONES

Monash Council Proposed Residential Codes	Total Area (ha)	Dwellings (2012)	Av. density (net dph)	Change '04-'12
NRZ1	53	905	17	27
NRZ2	102	1169	11	17
NRZ3	188	2929	16	262
NRZ4	996	13091	13	204
GRZ3	691	12780	18	709
GRZ4	2092	30947	15	2451
GRZ5	14	185	13	21
GRZ6	97	2141	22	390
GRZ7	16	254	16	3
GRZ8	4	40	10	34
RGZ3	79	1828	23	160
RGZ4	11	146	14	3
MUZ	5	163	30	75
C1Z	122	317	3	191
CDZ	5	87	16	No change
Total	4342	66415	15	4281

Source: Housing and Development Data, 2012 and Proposed Residential Zones (supplied by City of Monash)

Contact us

CANBERRA

Level 1, 55 Woolley Street
Dickson ACT 2602

+61 2 6262 7603
sgsact@sgsep.com.au

HOBART

Unit 2, 5 King Street
Bellerive TAS 7018

+61 (0)439 941 934
sgstas@sgsep.com.au

MELBOURNE

Level 5, 171 La Trobe Street
Melbourne VIC 3000

+61 3 8616 0331
sgsvic@sgsep.com.au

SYDNEY

209/50 Holt Street
Surry Hills NSW 2010

+61 2 8307 0121
sgsnsw@sgsep.com.au

SGS Economics & Planning