



FINAL REPORT

Cost and feasibility estimates for supplying new residential dwellings in New South Wales



*Prepared for
NSW Treasury*

16 August 2024

The Centre for International Economics is a private economic research agency that provides professional, independent and timely analysis of international and domestic events and policies.

The CIE's professional staff arrange, undertake and publish commissioned economic research and analysis for industry, corporations, governments, international agencies and individuals.

© Centre for International Economics 2024

This work is copyright. Individuals, agencies and corporations wishing to reproduce this material should contact the Centre for International Economics at one of the following addresses.

CANBERRA

Centre for International Economics
Ground Floor, 11 Lancaster Place
Canberra Airport ACT 2609

Telephone +61 2 6245 7800
Facsimile +61 2 6245 7888
Email cie@TheCIE.com.au
Website www.TheCIE.com.au

SYDNEY

Centre for International Economics
Level 7, 8 Spring Street
Sydney NSW 2000

Telephone +61 2 9250 0800
Email ciesyd@TheCIE.com.au
Website www.TheCIE.com.au

DISCLAIMER

While the CIE endeavours to provide reliable analysis and believes the material it presents is accurate, it will not be liable for any party acting on such information.

Contents

Executive summary	1
1 Introduction	7
Background to changing cost and feasibility conditions	7
2 Methodology overview	9
3 Cost and feasibility of infill development	13
Cost of apartments for Sydney over time	13
Comparison across local government areas	17
Comparison across major cities	21
Comparison against other estimates	24
Sensitivity analysis	25
4 Cost and feasibility of greenfield development	27
Results for Sydney over time	27
Comparison across greenfield markets of Sydney and the Hunter	29
Comparison across major cities of Australia	30
Comparison against other estimates	32
Sensitivity analysis	33
A Development cost methodologies	35
B Analysing feasibility	53
C Concordance of local government areas and greenfield markets	62
 BOXES, CHARTS AND TABLES	
1 Cost of delivering mid-rise infill apartments in Sydney	2
2 Cost and feasibility of mid-rise infill apartments, Sydney 2023	3
3 Cost and feasibility of mid-rise apartments, Sydney over time	3
4 Cost and feasibility of greenfield, Sydney over time	4
5 Midrise feasibility gap and the number of apartment approvals	5
6 Cost and feasibility of mid-rise apartments, comparison across cities	5
1.1 Trends in housing construction costs and prices, NSW	8
2.1 Data sources for development costs	9
2.2 Summary of data coverage of project	12
3.1 Cost and feasibility of mid-rise infill apartments, Sydney over time	13
3.2 Cost of mid-rise infill apartments, Sydney over time	14

3.3	Cost and feasibility of mid-rise infill apartments, Sydney 2023	15
3.4	Cost and feasibility of high-rise infill apartments, Sydney over time	15
3.5	Cost of high-rise infill apartments, Sydney over time	16
3.6	Cost and feasibility of high-rise infill apartments, Sydney 2023	17
3.7	Feasibility of mid-rise apartments by LGA	18
3.8	Feasibility of high-rise apartments by LGA	18
3.9	Apartment approvals by LGA	19
3.10	Feasibility gap and sales price for mid-rise apartments, by LGA	20
3.11	Feasibility gap and total cost for mid-rise apartments, by LGA	20
3.12	Midrise feasibility gap and the number of apartment approvals	21
3.13	Cost of mid-rise infill apartments, by major city, 2023	22
3.14	Cost and feasibility of mid-rise infill apartments, by any city, 2023	22
3.15	Cost of high-rise infill apartments, by major city, 2023	23
3.16	Cost and feasibility of high-rise infill apartments, by major city, 2023	23
3.17	Comparison of infill dwelling cost construction against other estimates	25
3.18	Sensitivity testing, mid-rise infill apartments, Sydney 2023	26
4.1	Cost stacks for greenfield houses, Sydney over time	28
4.2	Cost and feasibility of greenfield houses, Sydney over time	28
4.3	Cost and feasibility of greenfield houses, Sydney 2023	29
4.4	Cost stacks of greenfield houses across greenfield markets of Sydney	30
4.5	Cost and feasibility of greenfield houses by greenfield market of Sydney	30
4.6	Cost of greenfield houses, by major city in 2023	31
4.7	Cost and feasibility of greenfield houses across major cities of Australia	31
4.8	Comparison of greenfield development costs to Urbis (2010)	33
4.9	Sensitivity testing, greenfield houses, Sydney 2023	34
A.1	Average construction cost per m2 for a large apartment up to 10 Storeys	37
A.2	Input cost shares from ABS Multifactor Productivity publication	38
A.3	Value of agricultural land by greenfield market	40
A.4	Sale price of agricultural properties by greenfield market	40
A.5	Ratio of agricultural land sale price to value	41
A.6	Regression output for price of land acquisition for infill apartments	42
A.7	Land acquisition cost for infill apartments by height	45
A.8	Development timeframe components	49
A.9	Development application lodgement and assessment timeframes	50
A.10	Construction timeframes	50
B.1	Approach to estimating sale price of newly constructed dwellings	53
B.2	Greenfield sale price regression model outputs	54
B.3	Average lot size for greenfield properties	55
B.4	Comparison of UDIA and CIE-estimated lot sizes	56
B.5	Estimated greenfield sale prices based on regression modelling	56
B.6	Infill sale price regression model outputs	57

B.7	Estimated Sydney infill sale prices based on regression modelling	60
B.8	Comparison of UDIA and CIE new apartment sale prices	61
C.1	Greenfield market and LGA concordance	62
C.2	Greater Macarthur land release area map	63

Executive summary

The CIE has been commissioned by NSW Treasury to undertake a dwelling cost and feasibility study. This analysis seeks to understand how the cost and feasibility of residential dwelling construction:

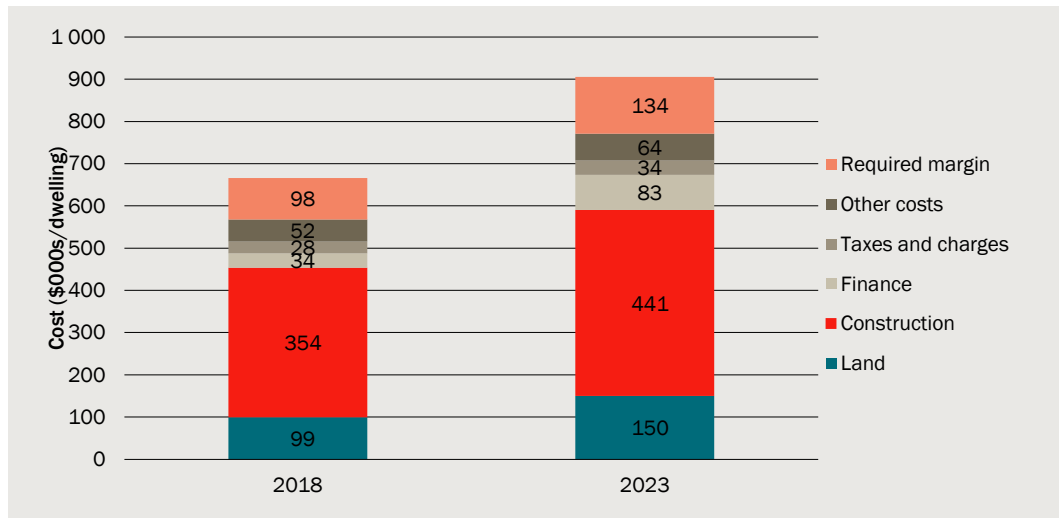
- Differs between greenfield housing and infill apartments
- Has changed over recent time
- Differs across regions of Sydney, and
- Differs across major cities of Australia.

Cost of delivering infill apartments

The costs of delivering new infill apartments have increased rapidly over recent years. The total cost of delivering a new mid-rise (4- to 9-storey) apartment in Sydney has increased from \$666 000 in 2018 to \$905 000 in 2023, which represents an average growth rate of more than 6 per cent. The key drivers of this increase have been the following cost components (chart 1):

- Construction costs are the largest cost component, and have increased by \$76 000 (29 per cent). Around one-fifth of the cost of building a mid-rise apartment is related to providing car parking spots, with many local government areas imposing minimum requirements for the number of car parking spots.
- The largest percentage cost increase was for financing, with the total cost of interest charges on land acquisition and construction costs increasing \$48 529 (142 per cent), reflecting significant increases in interest rates. Developers, especially new market entrants, pay a significantly higher interest rate than other businesses (~4 per cent higher).
- The costs of acquiring land increasing by 50 per cent, more costly construction, and more than doubling of financing costs.
- We assume that the profit margin developers require to go ahead with development have remained at 18 per cent, meaning this cost category has increased along with construction and other categories.

1 Cost of delivering mid-rise infill apartments in Sydney



Note: 'Mid-rise' apartments are defined in this study as those between 4- 9 storeys in height.

Source: CIE.

We have undertaken a range of other comparisons between costs of development across regions and types of dwellings. Key findings include the following:

- costs of developing high-rise apartments (10-40 storeys) are lower than mid-rise apartments by around \$45 000 per dwelling, mainly due to lower land costs, and
- costs of apartment development are more than \$150 000 higher per dwelling than in Melbourne or Brisbane, mainly driven by higher construction costs.

Feasibility of infill apartment development

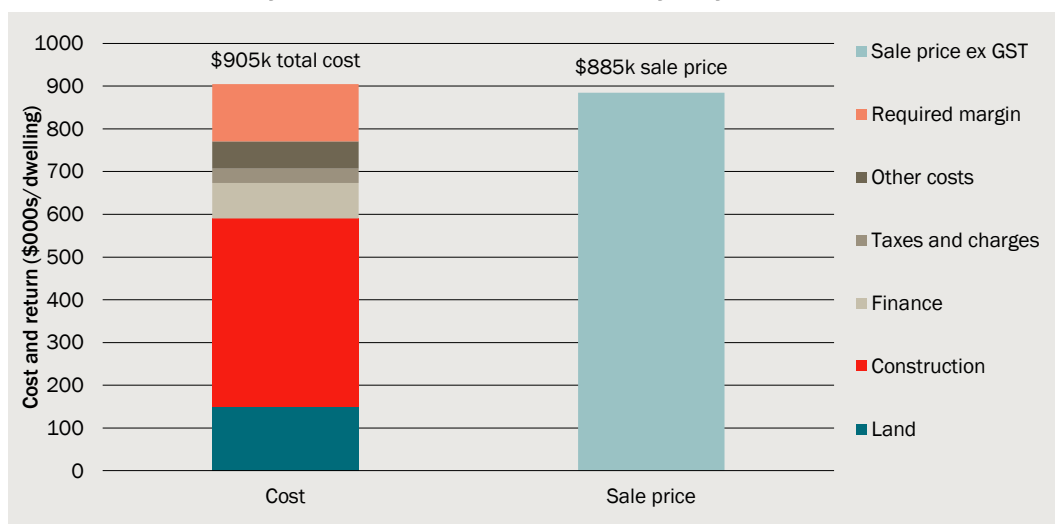
By comparing the cost of developing mid rise apartments to average sale prices, we estimate the profit rate. Note that this is on top of the 18 per cent margin that developers typically require. Where this rate is negative, it can be interpreted as a 'negative feasibility gap' and conversely when this rate is positive it is a 'positive feasibility gap'.

We estimate that in Sydney in 2023, the total cost of delivering a \$905 000 mid rise apartment exceeds the sale price of \$885 000. This means that there is a negative feasibility gap of 2 per cent. Another way to interpret this result is that developers are not able to recover their typical 18 per cent margin, and instead achieve a margin of only 16 per cent. This suggests that the average mid rise apartment is not currently feasible to develop.

The negative feasibility gap has only first emerged in 2023, with positive profit rates between 2018 and 2022 (chart 3). Sale prices have increased slowly for apartments, with 18 per cent growth slower than the growth rate of almost all cost categories.

If developers expect low feasibility to persist then it may impact on housing supply. However, land prices would be expected to adjust downward and sale prices to adjust upward in response to increases in costs of delivering new dwellings. Further, developers may more aggressively seek to minimise holding costs and planning risks (e.g. having options to purchase properties after development approval received).

2 Cost and feasibility of mid-rise infill apartments, Sydney 2023



Note: Construction includes parking, site preparation and demolition costs, taxes and charges includes local and state infrastructure contributions plus land tax and stamp duty, and other costs includes professional fees and sales and marketing. The sale price excludes GST.

Data source: CIE.

3 Cost and feasibility of mid-rise apartments, Sydney over time

Cost component	2018	2019	2020	2021	2022	2023	2018 vs 2023 difference	
	\$'000	\$'000	\$'000	\$'000	\$'000	\$'000	\$'000	Per cent
Construction	263	279	279	294	315	339	76	29
Parking	85	86	86	88	90	93	9	10
Site prep/Demolition	6	7	7	7	7	8	2	31
Professional fees	30	32	32	33	35	38	7	24
Land acquisition	99	103	110	120	133	150	50	51
State and other contrib.	11	11	11	11	11	12	1	7
Local gov't IC	10	12	10	12	10	11	1	11
Land tax and stamp duty	7	7	8	9	10	11	4	61
Financing costs	34	37	38	41	55	83	49	142
Sales and marketing	22	23	23	24	25	26	4	18
Required margin	98	104	105	111	120	134	36	36
Total cost	666	702	708	750	811	905	239	36
Sale price ex GST	748	771	773	830	858	885	137	18
Feasibility gap	81	70	65	80	46	- 20	- 102	- 125
	Per cent	Per cent	Per cent	Per cent	Per cent	Per cent	Per cent	
Feasibility gap (per cent)	12	10	9	11	6	-2	-14	

Note: State government and other contributions includes Sydney Water contributions (water and wastewater) and biodiversity charges.

Source: CIE.

The feasibility of greenfield house development has followed an opposite trend to infill developments, driven by substantial increases in sales prices from 2021 to 2023 (tables 3 4).¹

The biggest increase in greenfield costs has been financing costs, increasing by \$13 000 for greenfield. However, this increase is smaller than for apartments (\$49 000 for mid-rise apartments), owing to the shorter development timeframes for houses (20 vs 41 months).

4 Cost and feasibility of greenfield, Sydney over time

Cost component	2018	2019	2020	2021	2022	2023	2018 vs 2023 difference	
	\$'000	\$'000	\$'000	\$'000	\$'000	\$'000	\$'000	Per cent
Construction	279	281	321	298	322	347	67	24
Site prep/Demolition	50	53	53	55	59	63	11	20
Professional fees	37	38	42	40	43	46	9	23
Land acquisition	69	67	64	68	90	90	24	35
State and other contrib.	22	22	22	22	25	26	4	17
Local gov't IC	38	38	38	38	38	38	0	0
Land tax and stamp duty	4	4	3	4	5	5	1	39
Financing costs	11	11	11	11	17	24	13	125
Sales and marketing	18	17	18	21	24	24	8	46
Required margin	92	92	100	97	108	115	23	25
Total cost	621	621	671	654	732	780	159	26
Sale price ex GST	628	566	602	699	809	825	260	46
Feasibility gap	7	- 56	- 70	46	77	45	100	- 181
	Per cent	Per cent	Per cent	Per cent	Per cent	Per cent	Per cent	
Feasibility gap (per cent)	1	-9	-10	7	11	6	5	

Note: State government and other contributions includes Sydney Water contributions (water and wastewater) and biodiversity charges.

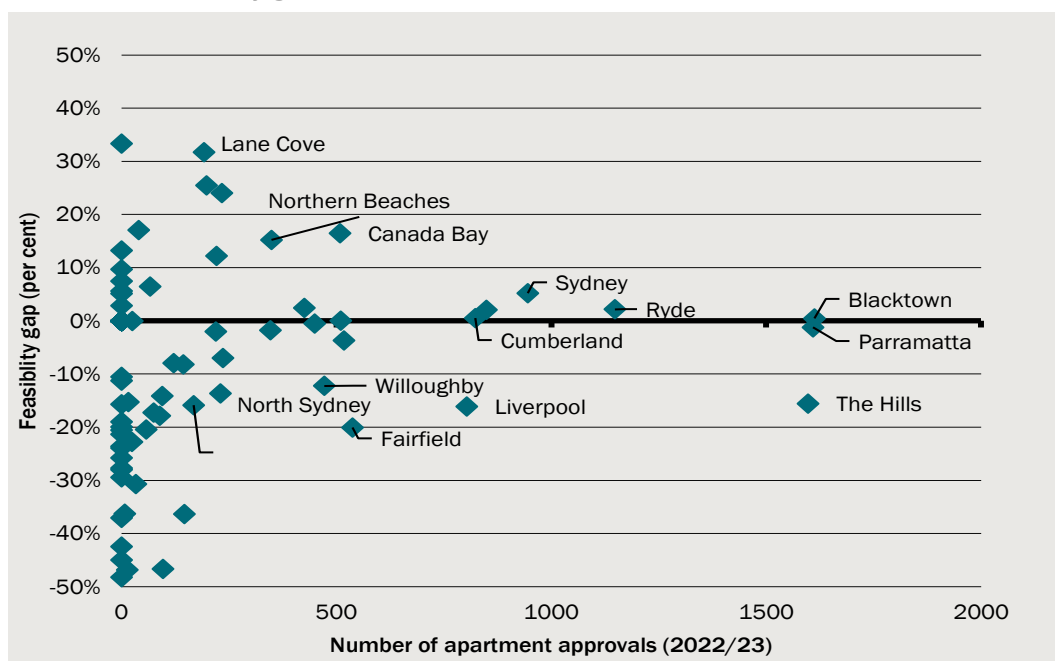
Source: CIE.

Variation in feasibility across Sydney

Feasibility differs significantly across Sydney and remain highly feasible in some locations (chart 5). While development is only marginally feasible in Blacktown, areas such as the City of Sydney, Canada Bay, and Northern Beaches have had significant numbers of apartment approvals recently and have a positive feasibility gap. This highlights the importance of ensuring development is permitted in well-located areas, since the feasibility of areas such as Liverpool, The Hills and Fairfield, where significant amounts of development have occurred in recent years, is expected to be lower.

¹ A key difference in the approach used for assessing infill and greenfield costs in this report is that for greenfield we estimate the opportunity cost of land based on agricultural land values, while for infill we estimate the cost developers have paid in recent years to of buying land and redevelop it into apartments. The agricultural value of land will not include a rezoning premium.

5 Midrise feasibility gap and the number of apartment approvals



Note: We have limited the y-axis to +/- 50 per cent, which removes outliers like Woollahra (high profit) and small regional LGAs with few approvals and negative profit. Note that this feasibility gap is the return above the 18 per cent developer profit that is built into our estimates of the cost of development.

Data source: CIE.

Comparison to other major cities

Our feasibility estimates across other major cities show substantial differences across markets, where:

- positive feasibility for greenfield developments appears to be unique to the Sydney market, where all other cities on average have negative feasibility below 9 per cent
- for mid-rise apartments, all cities on average have negative feasibility, with Sydney and Brisbane the most feasible at -2 per cent (table 6), and
- for high-rise apartments, on average Brisbane is the most feasible at 8 per cent, followed by Sydney at 4 per cent. Both Melbourne and Adelaide are marginally feasible at 0 per cent, while Perth is very unfeasible at -25 per cent.

A limitation of our estimates for other cities is that sale prices are based on median unit sale prices in each city from UDIA State of the Land.²

6 Cost and feasibility of mid-rise apartments, comparison across cities

Cost component	Adelaide	Brisbane	Melbourne	Perth	Sydney
	\$	\$	\$	\$	\$
Construction	271 000	310 250	279 688	266 750	339 125

² UDIA, 2014. State of the Land. Available at: https://udia.com.au/wp-content/uploads/2024/03/UDIA-State-of-the-Land-Report-2024_.pdf

Cost component	Adelaide	Brisbane	Melbourne	Perth	Sydney
	\$	\$	\$	\$	\$
Parking	74 521	85 314	76 910	73 352	93 254
Site prep/Demolition	4 275	7 974	3 810	4 120	8 417
Professional fees	25 706	28 267	31 777	27 120	37 558
Land acquisition	67 690	98 974	124 247	72 811	149 662
State and other contributions	11 097	11 097	11 097	11 097	12 068
Local gov't IC	10 800	10 800	10 800	10 800	11 175
Land tax and stamp duty	4 881	6 843	9 171	5 251	10 941
Financing costs	51 578	55 934	70 107	52 139	82 759
Sales and marketing	16 470	21 008	20 215	13 963	26 022
Required margin	93 879	110 781	111 169	94 219	134 093
Total cost	631 897	747 242	748 989	631 623	905 075
Sale price ex GST	560 023	714 327	687 351	474 779	884 816
Feasibility gap	- 71 873	- 32 916	- 61 638	- 156 844	- 20 260
	Per cent	Per cent	Per cent	Per cent	Per cent
Feasibility gap (per cent)	-11	-4	-8	-25	-2

Note: State government and other contributions includes Sydney Water contributions (water and wastewater) and biodiversity charges.

Source: CIE.

1 Introduction

The CIE has been commissioned by NSW Treasury to undertake a dwelling cost and feasibility study. The objectives of this study are to understand:

- the contribution of individual housing cost components to increases in the cost of delivering a new dwelling to the market in Sydney
- changes in costs, sale prices and feasibility over time, across locations and dwelling types, and
- how the cost of supplying dwellings differs across parts of Sydney and between major Australian cities.

This report sets out the results from our analysis, with appendices providing detail on calculation approaches and assumptions.

Background to changing cost and feasibility conditions

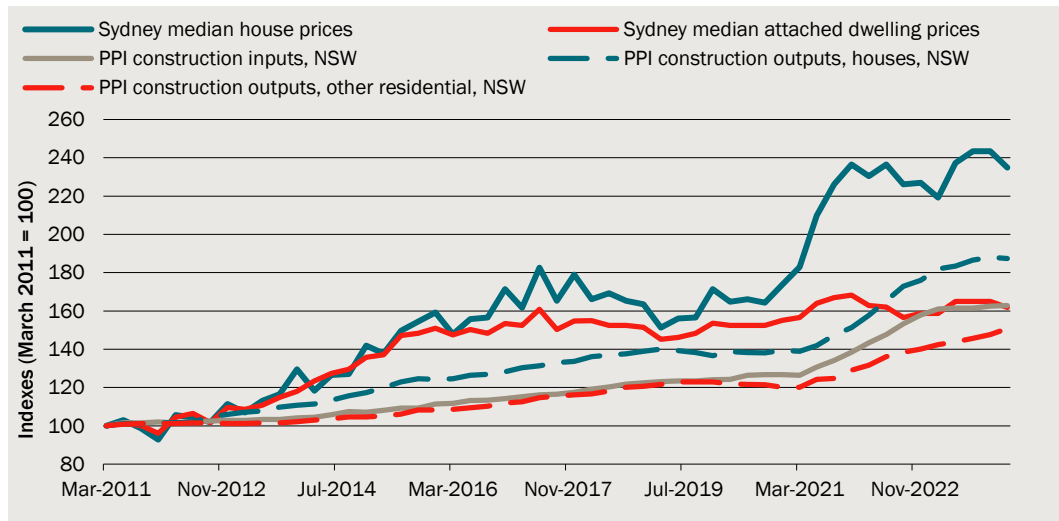
Costs of housing development have rapidly increased over the past 3 years (chart 1.1). This has been driven by increases in the price of inputs such as timber, cement and steel of more than 30 per cent since March 2020,³ along with shortages of skilled labour for construction occupations. The prices of housing construction inputs have increased by 31-35 per cent across the six major capital cities since March 2020. Over this period, increases in the price of newly constructed homes (excluding the value of land) in NSW have been faster for houses (35 per cent) than other residential building (24 per cent).

House prices have also risen substantially, particularly during 2021 (chart 1.1). In contrast, price growth for other residential dwellings (mainly apartments) has been modest. Our observation is that there have also been changes in the relative prices of different sized apartments, with larger apartments becoming relatively more attractive.

This study seeks to understand drivers of these changes, and compare costs and sale prices to understand the feasibility of new development.

³ The prices of timber, board and joinery, cement products and steel have increased by 38, 34 and 40 per cent, respectively, based on ABS, 2024, *Producer Price Indexes*, Input to the House construction index for NSW between March 2020 and March 2024.

1.1 Trends in housing construction costs and prices, NSW



Data source: ABS Producer Price Indexes, ABS Total Value of Dwellings, CIE.

2 Methodology overview

We have estimated costs of developing residential dwellings by estimating each cost component separately based on collating data from multiple sources. We have constructed separate estimates of each cost component, with splits by dwelling type, spatial areas, building heights and other dimensions where there are expected to be differences in costs and data is available.

The range of cost components, relevant data sources, and approaches used are shown in table 2.1, and further detail is provided in Appendix A.

2.1 Data sources for development costs

Cost category	Data source and approach
Construction, services, site preparation, contingency	<p>Dwelling construction costs are sourced from:</p> <ul style="list-style-type: none"> ▪ Riders Digest, for each major city, which is available for each year between 2018 and 2024, used for apartments. ▪ ABS <i>Building Activity, Australia</i> reports the average construction cost of dwellings by type, year and state, used for greenfield developments. <p>Apply floor area assumptions if needed, based on ABS <i>Building Activity, Australia</i> data.</p> <p>Parking construction costs are derived from Savills estimates and parking requirement estimates from Sydney LGA Development Control Plans. Parking costs have been separately estimated for apartments, but are not split out from other construction costs for houses.</p> <p>Civil construction works costs are derived from Savills Release the Pressure[®] estimates</p> <p>Demolition works costs are derived from RLB Riders Digest.</p>
Land acquisition cost – greenfield houses	We will estimate acquisition cost for greenfield areas based on the sale price of agricultural land in each greenfield region and in each year.
Land acquisition cost – Infill apartments	We estimate acquisition costs for infill apartments by first identifying when strata lots are first recorded in the land value records (managed by the Land Valuer General). Then we identify lots that have been dissolved to ‘create’ the new strata lot – by comparing nearby properties that were present in earlier versions of the land value dataset but no longer appear in the land values data. Sales data over the past 20 years is used to identify the sale price of ‘dissolved’ lots. We add stamp duty based on an average rate of 4 per cent.
Professional fees	Professional fees costs are derived from the Urbis National Dwelling Cost Study ^d . For greenfield developments it includes the professional fees associated with subdivision works, construction works and a development manager fee. For infill developments it includes the professional fees associated with construction works and a development manager.
State government infrastructure charges	<p>Currently, state infrastructure charges are set based on the Housing Productivity Contribution, which applies flat fees between \$6000 and \$12000, indexed to PPI, for new developments in Greater Sydney or surrounds, with an additional fee incurred in the Pyrmont Peninsula.</p> <p>This cost category includes an allowance for biodiversity contributions for greenfield houses, assumed to be \$2000 for 2021 and earlier years, and \$5000 for later years.</p>

Cost category	Data source and approach
	This category also includes the cost of Sydney Water contributions. Development Servicing Plan (DSP) areas do not map neatly to local government areas, so for simplicity we have assumed that the contribution per dwelling for Sydney infill development is \$1022, which is the contribution for the main drinking water region ('Greater Sydney') in Sydney and the main wastewater region (Malabar). For greenfield areas, we have matched the specific drinking water and wastewater contribution areas to greenfield regions (e.g. there is a Wilton wastewater area). ^a
Local government infrastructure charges, fees and other charges	Local council revenue from developer contributions was extracted from council annual financial statements between 2019-20 and 2022-23 Fys. ABS data on dwelling approvals by LGA was then used to estimate an average developer contribution per dwelling. For greenfield growth areas, local infrastructure charges were sourced directly from local contributions plans covering each growth area, using simple averages over rates for different dwelling types and densities.
Water utility costs	The contribution payable by each development is worked out using a method set by IPART. IPART's methodology generates a price payable by all development inside discrete Development Servicing Plan (DSP) areas. The price in a DSP recovers the cost of assets needed to serve development in that area. Effective from 1 December 2023, IPART has registered 14 wastewater infrastructure contribution prices and four drinking water prices to be levied by Sydney Water. These water and wastewater infrastructure contributions will be gradually reintroduced from 1 July 2024, with a gradual phase-in over several years.
Gas connection costs	Trubka, Newman and Bilsborough (2010) ^b estimate gas capital costs for greenfield development in Perth in 2007 dollars (\$3961), which we have escalated to March 2024 dollars using the Consumer Price Index for Sydney. We assume this rate is constant across greenfield regions and states/territories in the absence of more detailed data.
Holding costs – interest charges	Based on DPHI public data about development approval timeframes (e.g. NSW Planning Performance Dashboard), ABS data about construction timeframes, interest rate data from the RBA with a premium added to reflect higher rates paid by developers (often from non-bank finance). Total development duration is 1.7 years for houses and 3.4 years for houses and apartments, respectively, in Sydney in 2023. Interest rate in 2023 is 9.9 per cent.
Land tax	Land tax rates vary across jurisdictions, and typically involve different rates applying at various thresholds for unimproved land value. We have assumed a constant rate of 1.8 per cent of unimproved land value over time and across jurisdictions.
Stamp duty	We add stamp duty on land acquisition costs based on an average rate of 4 per cent.
Sales and marketing	Sales costs are estimated based on the cost per gross realisable value, averaged across estimates from Urbis ^c and Jenner and Tulip ^d .
Required margin	We assume that developers require an 18 per cent margin. This is at the lower end of the range of typical estimates for this margin, which fall between 17-20 per cent across different feasibility analyses.

^a Based on the Sydney Water (2023) report *Infrastructure contributions: How we apply IPART's pricing method to calculate prices*, and CIE inspection of infrastructure contribution regions on a mapping tool available from Sydney Water at:

<https://www.sydneywatertalk.com.au/infrastructure-contributions>

^b Available at: <https://www.crcsi.com.au/assets/Resources/b6e1625f-d90b-433d-945a-6afeff2e42f6.pdf>

^c See <https://www.nbnco.com.au/develop-or-plan-with-the-nbn/new-developments/government-policy-for-new-developments>

^d Urbis, 2011, *National Dwelling Cost Study*, available at: <https://treasury.gov.au/sites/default/files/2019-03/nhsc-residential-cost-analysis-urbis.pdf>

^d Jenner, K. and Tulip, P., 2020, *The apartment shortage*, RDP 2020-04, available at:

<https://www.rba.gov.au/publications/rdp/2020/pdf/rdp2020-04.pdf>

^e Savills 2024, *Release the Pressure*, available at: <https://www.propertycouncil.com.au/submissions/release-the-pressure-alleviating-taxes-and-charges-to-build-new-homes>

Source: CIE.

Estimates of feasibility of residential development typically rely on observed prices from sales data.⁴ A key challenge with using such data is accounting for differences in dwelling characteristics, which relies on having data available and appropriate analytical approaches. Typically, hedonic modelling can be used to control for differences in land size, the number of bedrooms, and other features.

We measure feasibility of greenfield houses and infill apartments for the typical dwellings that are built in each region, rather than for a comparable/representative dwelling. This allows us understand how feasibility differs spatially, across dwelling types and over time.

Sale prices are estimated by analysing NSW property sales data using linear regression models. These models estimate the sale price of infill apartments and greenfield houses overtime and by LGA/greenfield region. Samples for this estimation are trimmed at the LGA level to remove outliers. Sale prices in the property sale dataset exclude GST, and we remove GST based on a 10 per cent rate applied to the share of the price that reflects the building value (70 per cent), implying a 7 per cent rate as a proportion of sale prices.

Further detail about our approaches to estimating the value of completed dwellings are summarised in Appendix B.

For other major cities, we obtain high-level estimates of the sale price for recently constructed greenfield houses and infill apartments from the UDIA State of the Land report, and compare this to the average construction costs from the previous step of the analysis to determine feasibility. These estimates are less accurate and spatially detailed than the estimates for NSW, but provide a high-level indication of how feasibility compares between Sydney and other major cities.

Table 2.2 provides a summary of items in cost stacks, showing which are estimated over time, which are estimated over jurisdictions, and which are estimated over different apartment heights. We have indicated “N/A” where that cost item is not expected to vary along that dimension. For example, interest charges would not be expected to vary systematically across LGAs. We have made assumptions about cost components being constant across a dimension for some categories (indicated by a –).

Key points shown in this table include the following:

- Local government charges would be time-consuming to collate for major cities other than Sydney, unless data sources are available that already collate this data. We have assumed that local government charges are the same in other major cities as in Sydney.
- ABS data is available about completion and commencement timeframes by state, which will support estimating different development timeframes and holding costs across major cities. Other aspects of holding costs do not vary across major cities or spatially.

⁴ Other approaches are possible (e.g. expert valuations of a hypothetical reference property), but may lack independent verifiability.

2.2 Summary of data coverage of project

Item	Coverage across major cities	Coverage across NSW LGAs or greenfield markets	Coverage over time	Coverage over infill apartment heights
Construction costs	✓	✓	✓	✓
Land acquisition cost	~	✓	✓	✓
State government infrastructure charges	~	✓	✓	N/A
Local government infrastructure charges, fees and other charges	~	✓	✓	✓
Water utility costs	-	N/A	✓	N/A
Telecommunications costs	N/A	N/A	-	N/A
Development timeframes and associated costs (e.g. holding costs)	✓	✓	✓	✓
Development costs	-	-	-	-
Sale values	✓	✓	✓	✓

Note: ✓ indicates that data is available to support an estimate for a cost component across that dimension, - is where we will assume the cost will be assumed to be the same across that dimension, and N/A is where we do not expect the cost to systematically vary for that dimension.

Source: CIE.

3 Cost and feasibility of infill development

Cost of apartments for Sydney over time

Mid-rise apartments

Total costs for mid-rise⁵ apartments increased at an annual growth rate⁶ of 6 per cent between 2018 and 2023 (table 3.1).

Construction is the primary cost driver for apartments, comprising 37 per cent of total costs (chart 3.2). Land acquisition and parking are the next largest cost categories, comprising 17 and 10 per cent of total costs respectively. The largest growth in costs was experienced by financing costs, which increased by \$48 529 (142 per cent) over the period, comprising 9 per cent of total costs in 2023. Developers, especially new market entrants, pay a significantly higher interest rate than other businesses (~4 per cent higher). Consultation for this project suggested that the premium for developer finance is higher for new developers with less of a track record.

Parking costs are a significant cost element for apartments, comprising approximately a fifth of total construction costs. Our parking cost estimate is derived from a review of the parking requirements disclosed in a selection of Sydney councils' Development Control Plans, which average approximately 1.3 car spaces per apartment⁷. The cost of constructing a car space is derived from Savills (2024),⁸ estimated at \$75 000 in 2024.

Over this period, sale prices increased at a rate of 3 per cent, which led to an overall decrease in profit between 2018 and 2023. Development profit is sufficiently high to enable feasible development in all periods except 2023. The reduction in feasibility in 2023 is primarily driven by an increase in costs and a leveling out of sale prices.

3.1 Cost and feasibility of mid-rise infill apartments, Sydney over time

Cost component	2018	2019	2020	2021	2022	2023	2018 vs 2023 difference	
	\$'000	\$'000	\$'000	\$'000	\$'000	\$'000	\$'000	Per cent
Construction	263	279	279	294	315	339	76	29
Parking	85	86	86	88	90	93	9	10

⁵ Mid-rise is defined as apartment buildings from 4 to 10 storeys with a lift and high-rise is apartment buildings between 10 and 40 storeys

⁶ Calculated as a compound annual growth rate

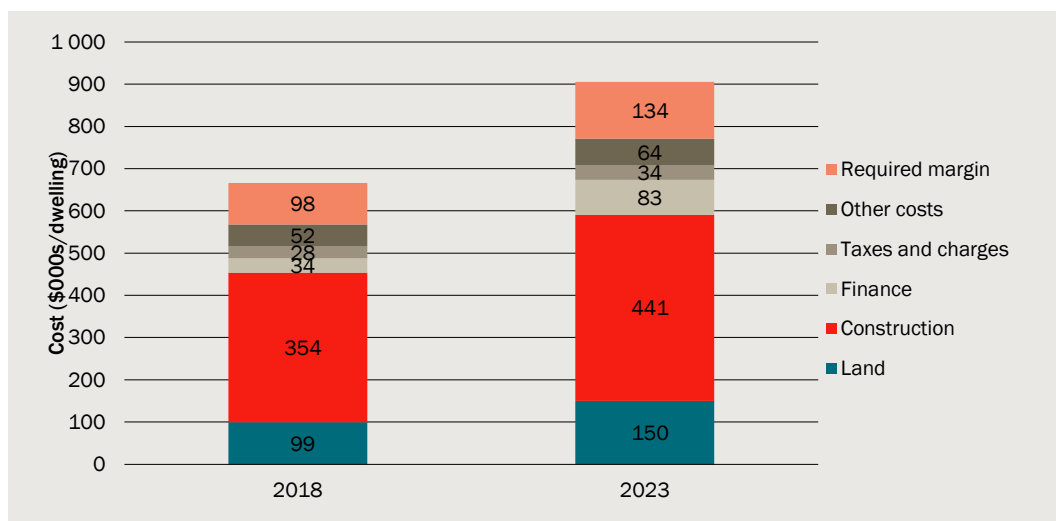
⁷ Further detail is provided in Appendix A

⁸ Savills 2024, *Release the Pressure*, available at: <https://www.propertycouncil.com.au/submissions/release-the-pressure-alleviating-taxes-and-charges-to-build-new-homes>

Cost component	2018	2019	2020	2021	2022	2023	2018 vs 2023 difference	
	\$'000	\$'000	\$'000	\$'000	\$'000	\$'000	\$'000	Per cent
Site prep/Demolition	6	7	7	7	7	8	2	31
Professional fees	30	32	32	33	35	38	7	24
Land acquisition	99	103	110	120	133	150	50	51
State and other contrib.	11	11	11	11	11	12	1	7
Local gov't IC	10	12	10	12	10	11	1	11
Land tax and stamp duty	7	7	8	9	10	11	4	61
Financing costs	34	37	38	41	55	83	49	142
Sales and marketing	22	23	23	24	25	26	4	18
Required margin	98	104	105	111	120	134	36	36
Total cost	666	702	708	750	811	905	239	36
Sale price ex GST	748	771	773	830	858	885	137	18
Feasibility gap	81	70	65	80	46	- 20	- 102	- 125
	Per cent	Per cent	Per cent	Per cent	Per cent	Per cent	Per cent	
Feasibility gap (per cent)	12	10	9	11	6	-2	-14	

Note: State government and other contributions includes Sydney Water contributions (water and wastewater) and biodiversity charges.
Source: CIE.

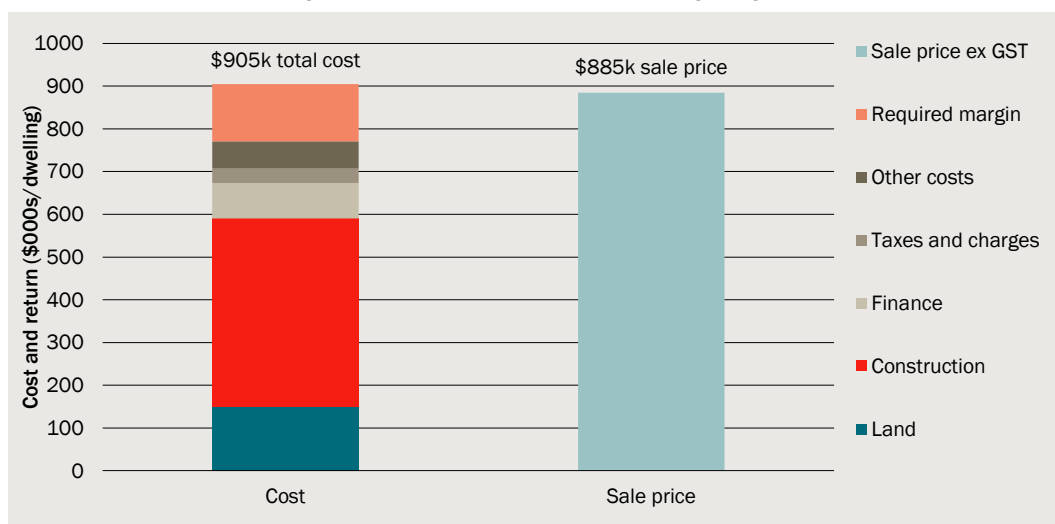
3.2 Cost of mid-rise infill apartments, Sydney over time



Note: Construction includes parking, site preparation and demolition costs, taxes and charges includes local and state infrastructure contributions plus land tax and stamp duty, and other costs includes professional fees and sales and marketing.

Source: CIE.

3.3 Cost and feasibility of mid-rise infill apartments, Sydney 2023



Note: Construction includes parking, site preparation and demolition costs, taxes and charges includes local and state infrastructure contributions plus land tax and stamp duty, and other costs includes professional fees and sales and marketing.

Data source: CIE.

High-rise apartments

Total costs for apartments between 10 and 40 stories increased at an annual growth rate⁹ of 6 per cent between 2018 and 2023 (table 3.4),

Construction is the primary cost driver for apartments, comprising 48 per cent of total costs in 2023. Required margin and parking are the next largest cost categories, comprising 15 per cent and 11 per cent of total costs respectively. Land acquisition costs are substantially lower than for apartments below 10 stories, comprising only 7 per cent of total costs. This is driven by these developments having more apartments per square meter of land. The largest growth in costs was experienced by financing costs, which increased by \$39 261 (130 per cent) over the period, comprising 8 per cent of total costs in 2023.

Over this period, sale prices increased at a rate of 3 per cent, which led to an overall decrease in profit between 2018 and 2023. Development profit is sufficiently high to enable feasible development in all periods. The reduction in feasibility in 2023 is primarily driven by an increase in costs and a leveling out of sale prices.

3.4 Cost and feasibility of high-rise infill apartments, Sydney over time

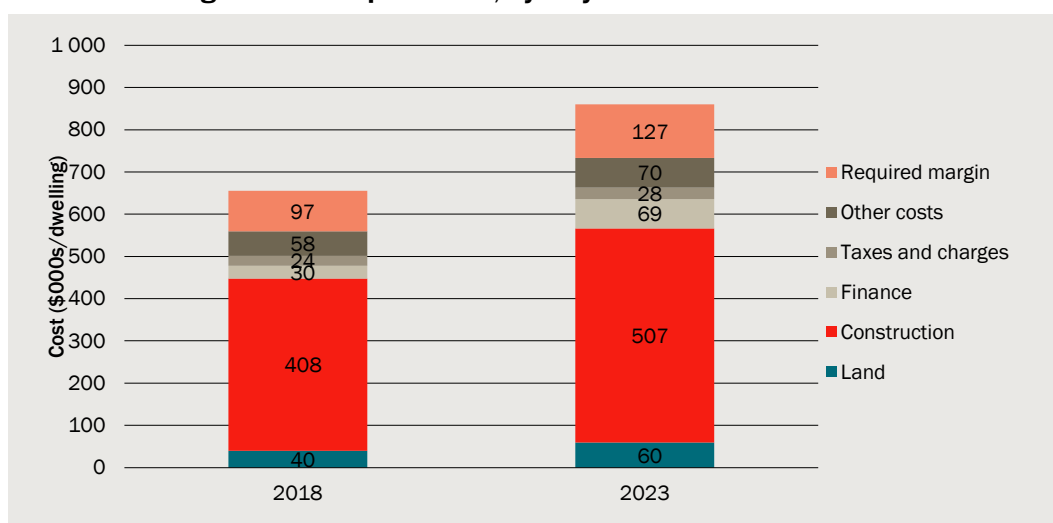
Cost component	2018	2019	2020	2021	2022	2023	2018 vs 2023 difference	
	\$'000	\$'000	\$'000	\$'000	\$'000	\$'000	\$'000	Per cent
Construction	321	339	339	356	381	410	89	28
Parking	85	86	86	88	90	93	9	10
Site prep/Demolition	3	3	3	3	3	3	1	31

⁹ Calculated as a compound annual growth rate

Cost component	2018	2019	2020	2021	2022	2023	2018 vs 2023 difference	
	\$'000	\$'000	\$'000	\$'000	\$'000	\$'000	\$'000	Per cent
Professional fees	35	37	37	39	41	44	8	24
Land acquisition	40	41	44	48	53	60	20	51
State and other contrib.	11	11	11	11	11	12	1	7
Local gov't IC	10	12	10	12	10	11	1	11
Land tax and stamp duty	3	3	3	3	4	4	2	61
Financing costs	30	33	33	35	47	69	39	131
Sales and marketing	22	23	23	25	26	26	4	18
Required margin	97	102	102	107	115	127	31	32
Total cost	656	690	691	727	781	860	205	31
Sale price ex GST	760	783	785	842	870	897	137	18
Feasibility gap	104	93	94	115	89	37	- 68	- 65
	Per cent	Per cent	Per cent	Per cent	Per cent	Per cent	Per cent	
Feasibility gap (per cent)	16	14	14	16	11	4	-12	

Note: State government and other contributions includes Sydney Water contributions (water and wastewater) and biodiversity charges.
Source: CIE.

3.5 Cost of high-rise infill apartments, Sydney over time

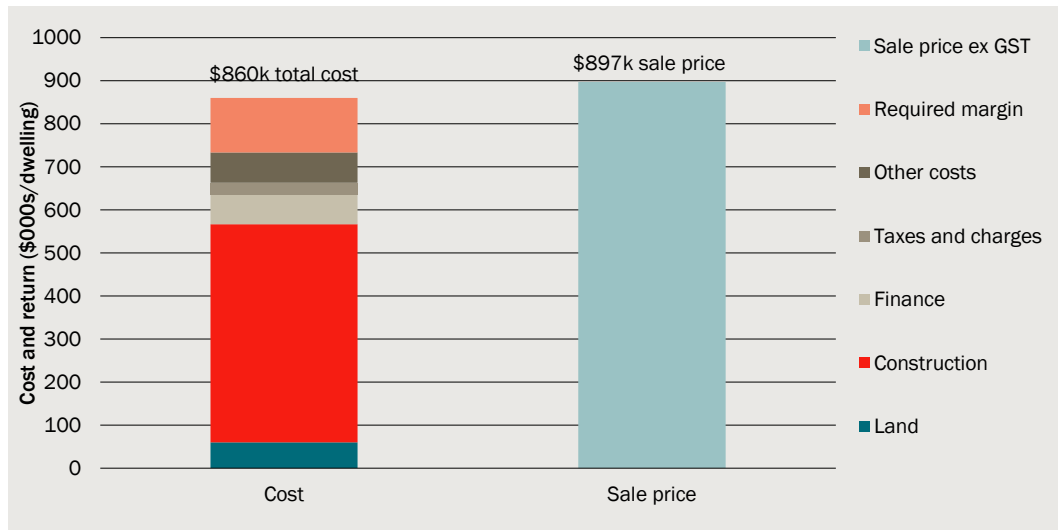


Note: Construction includes parking, site preparation and demolition costs, taxes and charges includes local and state infrastructure contributions plus land tax and stamp duty, and other costs includes professional fees and sales and marketing.

Source: CIE.

The feasibility gap from infill apartment development in Sydney in 2023 is -2 per cent for mid-rise apartments and 4 per cent for high-rise apartments. The higher profit from developing taller apartments (chart 3.6 compared to chart 3.3) mainly comes from lower land acquisition costs due to less land being required per apartment, and slightly higher sale prices for apartments in taller buildings.

3.6 Cost and feasibility of high-rise infill apartments, Sydney 2023



Note: Construction includes parking, site preparation and demolition costs, taxes and charges includes local and state infrastructure contributions plus land tax and stamp duty, and other costs includes professional fees and sales and marketing.

Data source: CIE.

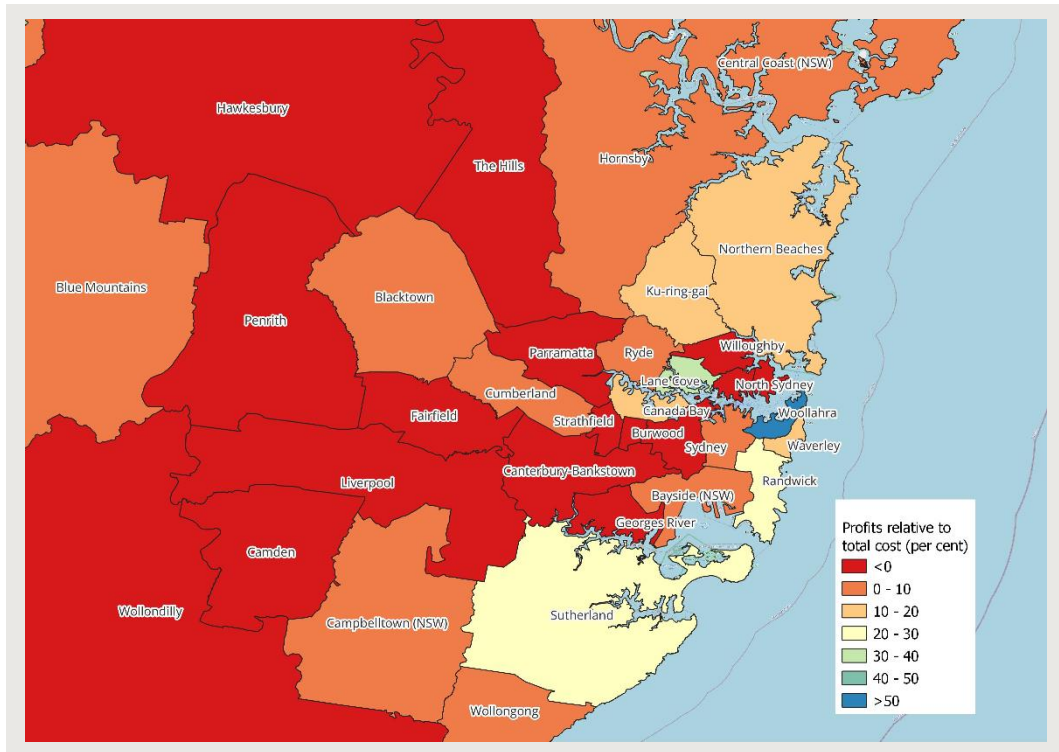
Comparison across local government areas

In general, our main results indicate that apartments generally increase in feasibility as they get closer to the city. Both overall costs and sale prices increase as you approach the city, but sale prices increase more rapidly than costs until reaching these high-price suburbs.

An exception to this pattern is North Sydney and Mosman, which each have poor feasibility results. Reasons for this are primarily due to modelling limitations, including:

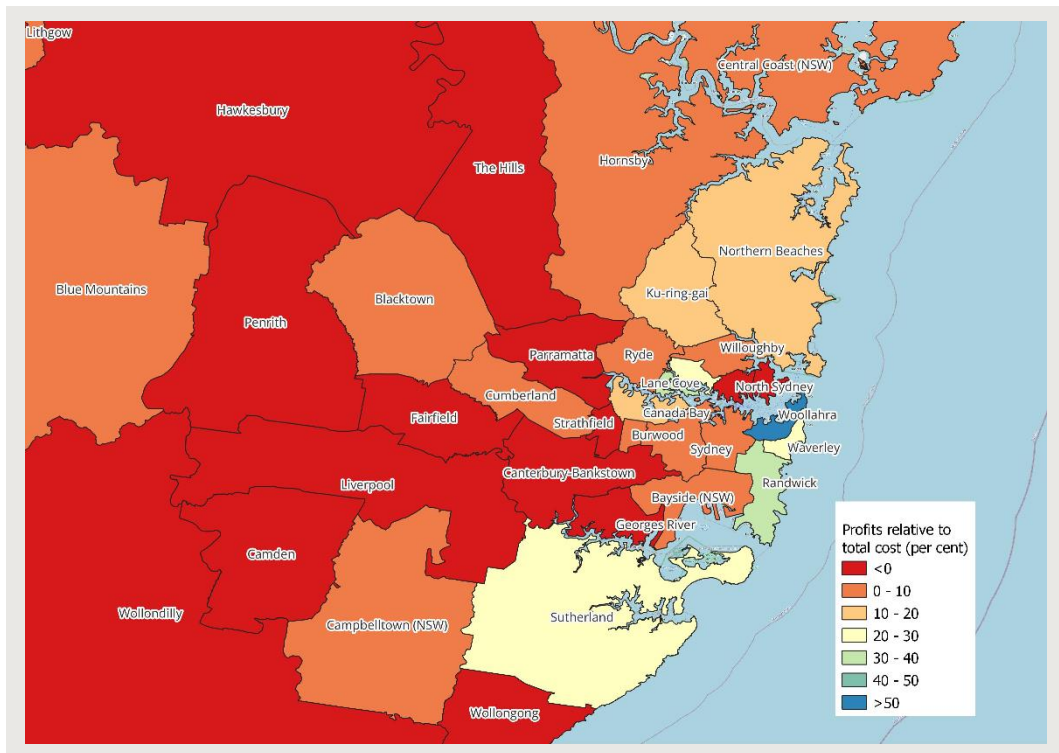
- The top and bottom 5 per cent of sale prices in each LGA were trimmed, which may have excluded real instances of high sales.
- Costs are very high for these areas, even compared to other LGAs in which high quality or luxury apartments are being constructed. This may be due to the inability to filter out townhouses from the LGA cost modifiers.

3.7 Feasibility of mid-rise apartments by LGA



Data source: CIE.

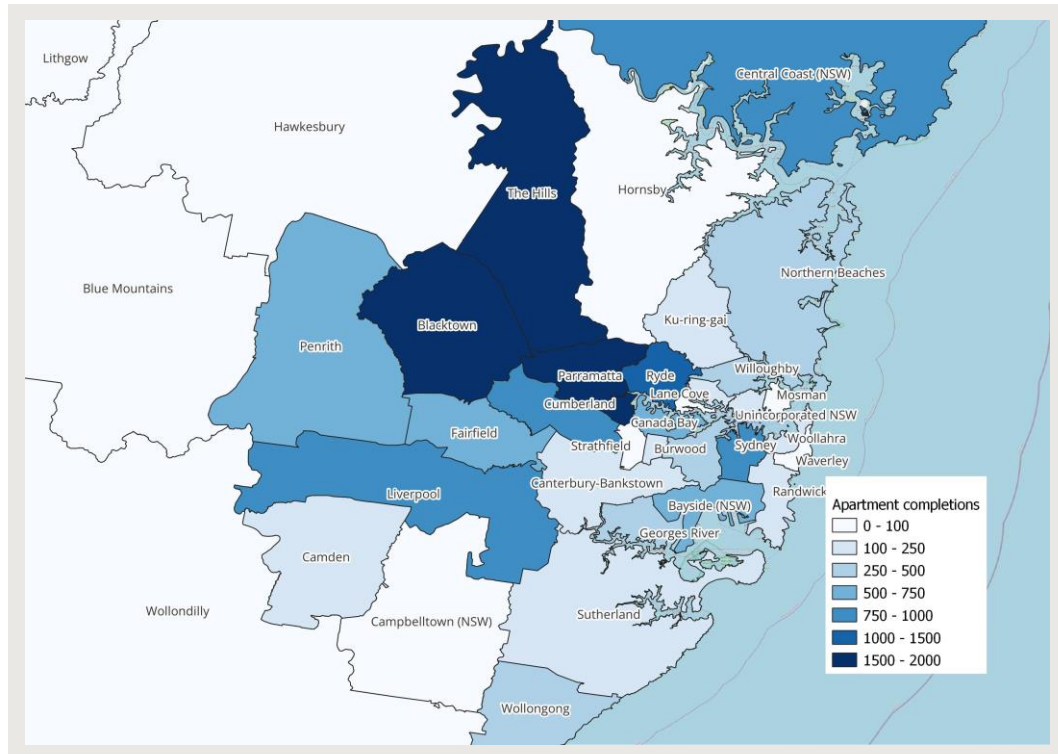
3.8 Feasibility of high-rise apartments by LGA



Data source: CIE.

Map 3.9 shows the distribution of apartment approvals across Sydney. Comparing this to the maps of development feasibility, we can see that the areas with the highest difference between sale price and costs are often not where development is occurring. The areas with the largest number of new apartments are in Parramatta, Blacktown and The Hills, with few in Hunters Hill, Woollahra or Randwick.

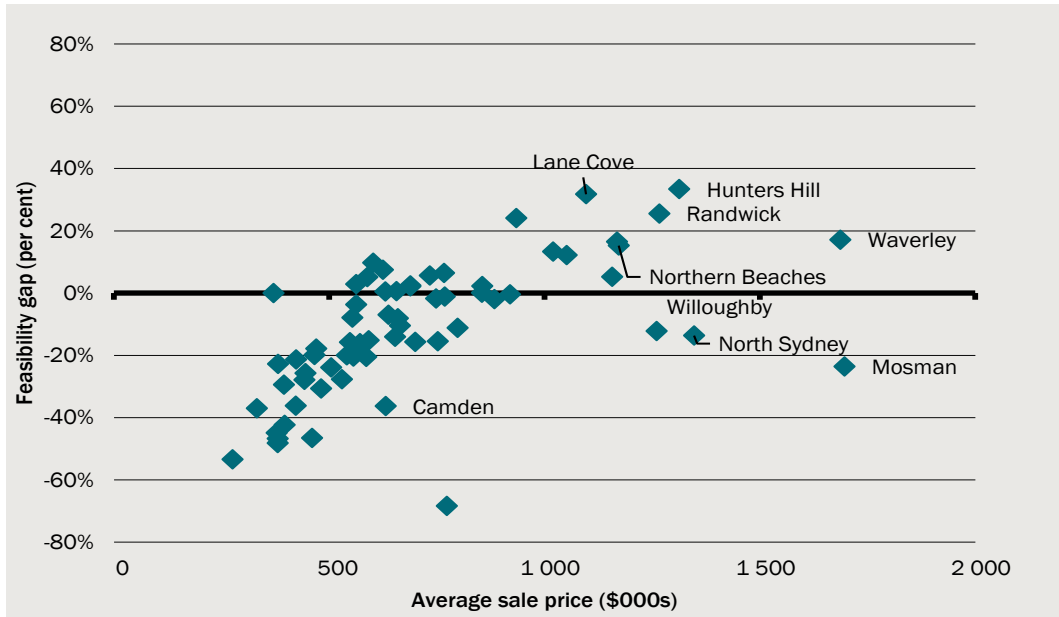
3.9 Apartment approvals by LGA



Data source: CIE.

The profit from mid-rise apartment development is highly correlated with sale price (chart 3.10), but high value LGAs tend to have much higher costs (3.11).

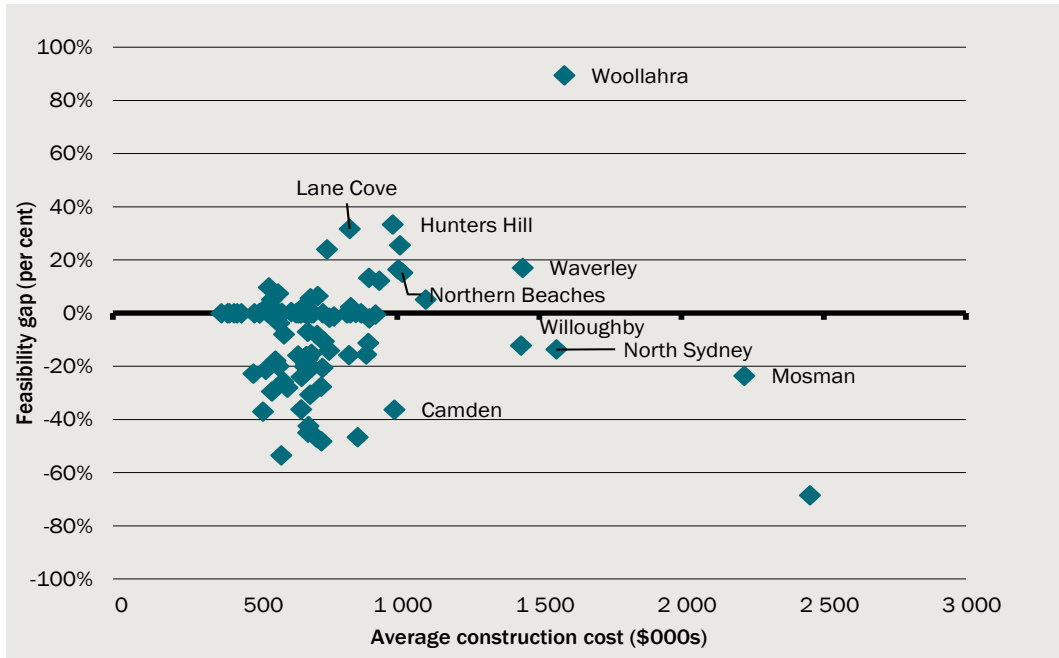
3.10 Feasibility gap and sales price for mid-rise apartments, by LGA



Note: We have limited the x-axis to \$2 million, which Woollahra (sale value of \$3m on average). Note that this feasibility gap is the return above the 18 per cent developer profit that is built into our estimates of the cost of development.

Data source: CIE.

3.11 Feasibility gap and total cost for mid-rise apartments, by LGA



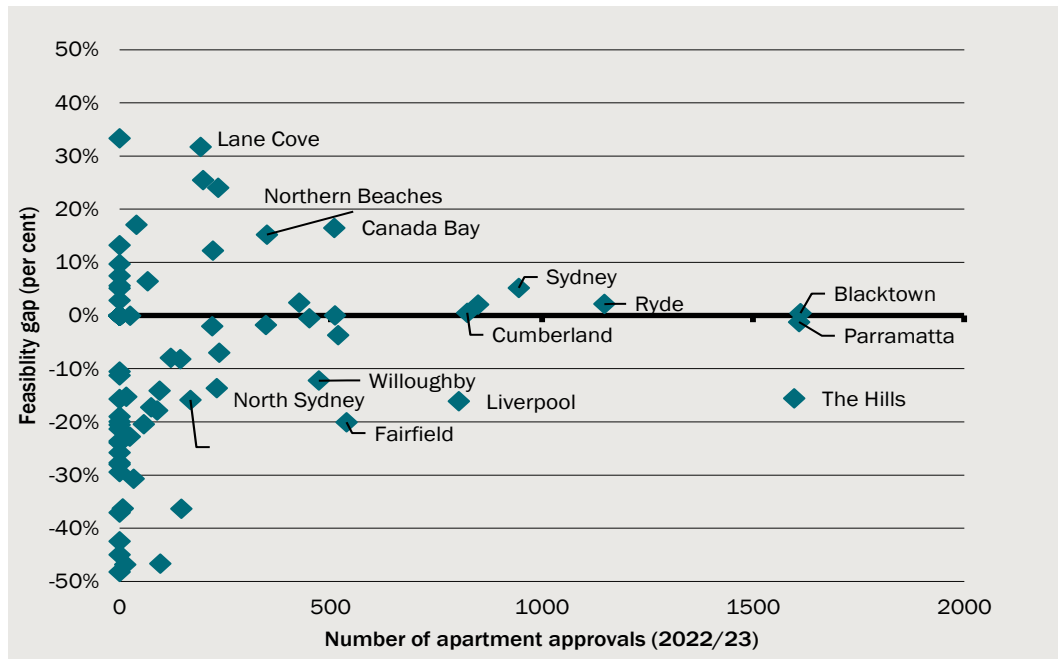
Note: Note that this feasibility gap is the return above the 18 per cent developer profit that is built into our estimates of the cost of development.

Data source: CIE.

Many apartment approvals in 2022/23 are occurring in areas where we estimate profits are not above the 18 per cent margin that developers expect (chart 3.12). Most areas with significant numbers of approvals have a positive return, although The Hills, Liverpool and Parramatta are notable exceptions. Note that profits are higher from high-rise

development, and that we cannot distinguish between the number of approvals be apartment height from the approvals data available.

3.12 Midrise feasibility gap and the number of apartment approvals



Note: We have limited the y-axis to +/- 50 per cent, which removes outliers like Woollahra (high profit) and small regional LGAs with few approvals and negative feasibility. Note that this feasibility gap is the return above the 18 per cent developer profit that is built into our estimates of the cost of development.

Data source: CIE.

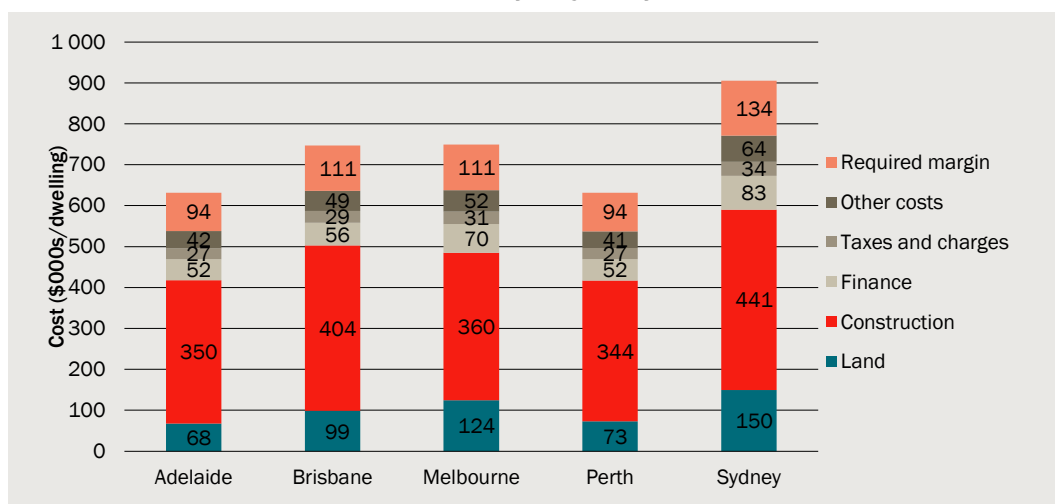
Comparison across major cities

Mid-rise apartments

Sydney has the highest total costs across all major cities in 2023 for mid-rise apartments (chart 3.13 and table 3.14), as well as the highest costs for each cost component. Sydney sales prices are substantially higher than all other cities, which results in Sydney having the highest level of development profit. It is followed by Brisbane, which has the second highest total cost and sales prices.

No cities are feasible to develop mid-rise apartments. Sydney and Brisbane are marginally infeasible, with a feasibility gap of -2 per cent. Perth has the largest feasibility gap of -25 per cent.

3.13 Cost of mid-rise infill apartments, by major city, 2023



Note: Construction includes parking, site preparation and demolition costs, taxes and charges includes local and state infrastructure contributions plus land tax and stamp duty, and other costs includes professional fees and sales and marketing.

Source: CIE.

3.14 Cost and feasibility of mid-rise infill apartments, by any city, 2023

Cost component	Adelaide	Brisbane	Melbourne	Perth	Sydney
	\$	\$	\$	\$	\$
Construction	271 000	310 250	279 688	266 750	339 125
Parking	74 521	85 314	76 910	73 352	93 254
Site prep/Demolition	4 275	7 974	3 810	4 120	8 417
Professional fees	25 706	28 267	31 777	27 120	37 558
Land acquisition	67 690	98 974	124 247	72 811	149 662
State and other contributions	11 097	11 097	11 097	11 097	12 068
Local gov't IC	10 800	10 800	10 800	10 800	11 175
Land tax and stamp duty	4 881	6 843	9 171	5 251	10 941
Financing costs	51 578	55 934	70 107	52 139	82 759
Sales and marketing	16 470	21 008	20 215	13 963	26 022
Required margin	93 879	110 781	111 169	94 219	134 093
Total cost	631 897	747 242	748 989	631 623	905 075
Sale price ex GST	560 023	714 327	687 351	474 779	884 816
Feasibility gap	- 71 873	- 32 916	- 61 638	- 156 844	- 20 260
	Per cent	Per cent	Per cent	Per cent	Per cent
Feasibility gap (per cent)	-11	-4	-8	-25	-2

Note: State government and other contributions includes Sydney Water contributions (water and wastewater) and biodiversity charges.

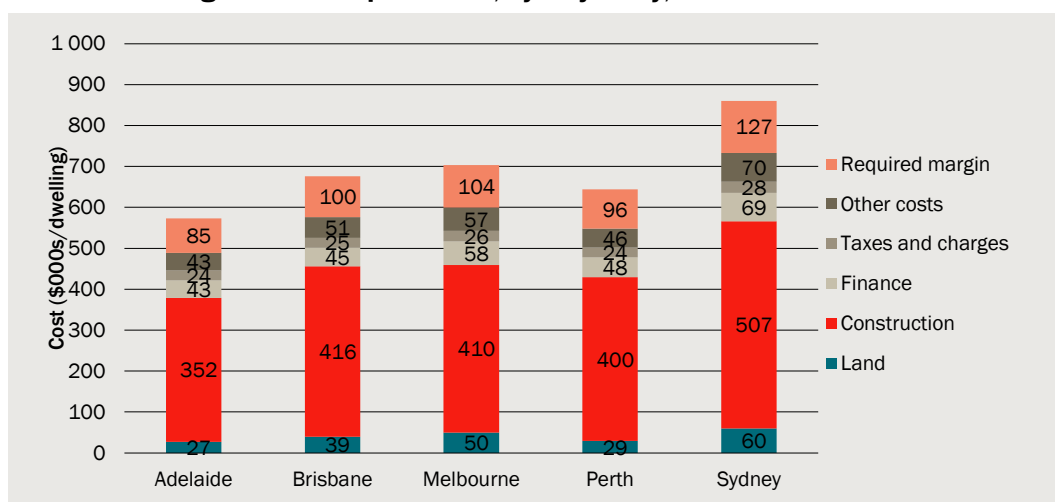
Source: CIE.

High-rise apartments

Sydney has the highest total costs across all major cities in 2023 for high-rise apartments (chart 3.15 and table 3.16). Sydney sales prices are substantially higher than all other cities, however Brisbane has the highest development profit at 8 per cent. Development is

marginally feasible in Melbourne and Adelaide, while Perth is highly unfeasible with a development profit of -25 per cent.

3.15 Cost of high-rise infill apartments, by major city, 2023



Note: Construction includes parking, site preparation and demolition costs, taxes and charges includes local and state infrastructure contributions plus land tax and stamp duty, and other costs includes professional fees and sales and marketing.

Source: CIE.

3.16 Cost and feasibility of high-rise infill apartments, by major city, 2023

Cost component	Adelaide	Brisbane	Melbourne	Perth	Sydney
	\$	\$	\$	\$	\$
Construction	285 469	336 563	332 406	324 938	409 969
Parking	64 935	76 557	75 611	73 912	93 254
Site prep/Demolition	1 705	3 180	1 519	1 643	3 356
Professional fees	26 069	29 522	36 359	31 805	43 712
Land acquisition	26 990	39 464	49 541	29 032	59 674
State and other contributions	11 097	11 097	11 097	11 097	12 068
Local gov't IC	10 800	10 800	10 800	10 800	11 175
Land tax and stamp duty	1 946	2 728	3 657	2 094	4 363
Financing costs	42 740	45 217	57 943	48 241	69 141
Sales and marketing	16 696	21 296	20 492	14 155	26 379
Required margin	84 915	99 923	104 208	96 041	127 208
Total cost	573 360	676 345	703 632	643 756	860 299
Sale price ex GST	567 701	724 119	696 773	481 288	896 945
Feasibility gap	- 5 660	47 774	- 6 859	- 162 468	36 646
	Per cent	Per cent	Per cent	Per cent	Per cent
Feasibility gap (per cent)	-1%	7%	-1%	-25%	4

Note: State government and other contributions includes Sydney Water contributions (water and wastewater) and biodiversity charges.

Source: CIE.

Comparison against other estimates

Multiple studies have estimated the cost of developing infill apartments in Sydney, including:

- Urbis – National Dwelling Cost Study¹⁰
- Jenner and Tulip – The Apartment Shortage¹¹
- UDIA – Making TODS Work¹²
- Savills – Release the Pressure¹³

Overall, the CIE estimate is marginally higher than the estimates reported by Urbis and Jenner and Tulip¹⁴ and substantially lower than the UDIA estimate. Key methodological drivers are:

- The Urbis estimate was calculated using 2011 prices. The real cost of construction has increased over the past 12 years which would drive higher construction costs for the CIE estimate. The reference development was a 50 dwelling infill development in Mascot.
- Jenner and Tulip use average costs across Sydney for the construction cost estimates. The cost of construction financing is lower in Jenner and Tulip, reflecting the increase in interest rates between 2018 and 2023.
- The UDIA estimate is almost double the other estimates. A key driver is the category ‘other costs’, which includes financing, legal services, project managers and marketing. The estimate is for a building up to 6 storeys, with on-site parking and 50 dwellings at 95 sqm, delivered in the North Shore of Sydney or Tuggerah. Regional specific land acquisition estimates were not provided in the report and would be expected to vary. Higher costs for the North Shore reflects the findings from the CIE estimate, as costs vary based on observed costs per LGA.

¹⁰ Urbis, 2011, *National Dwelling Cost Study*, available at:

<https://treasury.gov.au/sites/default/files/2019-03/nhsc-residential-cost-analysis-urbis.pdf>

¹¹ Jenner, K. and Tulip, P., 2020, *The apartment shortage*, RDP 2020-04, available at:

<https://www.rba.gov.au/publications/rdp/2020/pdf/rdp2020-04.pdf>

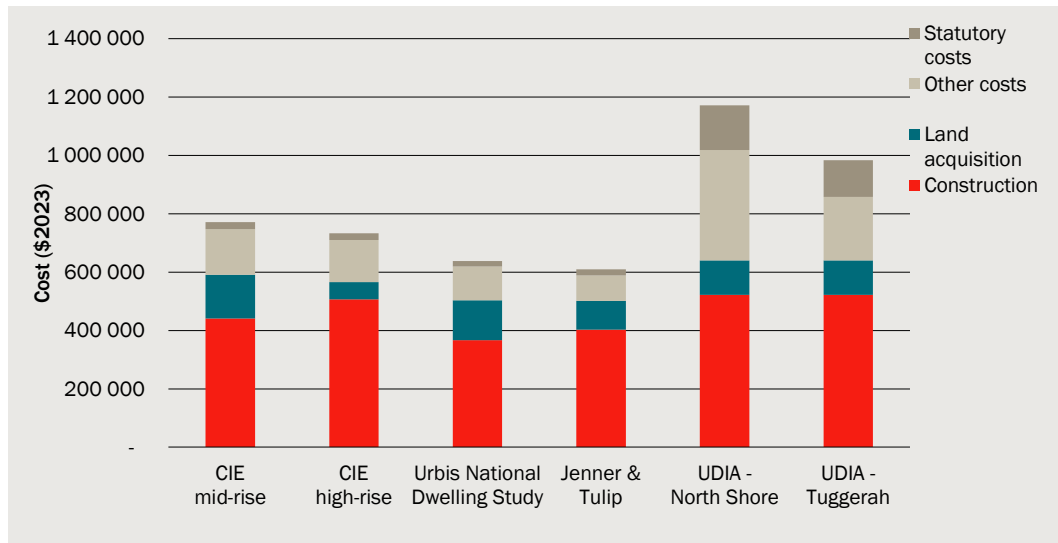
¹² UDIA, 2024, *Making TODS work*, available at: <https://www.udiansw.com.au/wp-content/uploads/2024/06/Making-TODs-Work-June-2024.pdf>

¹³ Savills 2024, *Release the Pressure*, available at:

<https://www.propertycouncil.com.au/submissions/release-the-pressure-alleviating-taxes-and-charges-to-build-new-homes>

¹⁴ We have scaled all estimates to 2023 dollars using the Sydney CPI series

3.17 Comparison of infill dwelling cost construction against other estimates



Note: 2023 dollars scaled using Sydney CPI
Data source: CIE.

The Savills study does not report total costs of construction, however it does include a feasibility assessment of infield development in the Eastern Harbour, Central River and Western Parkland cities based on a benchmark internal rate of return (IRR). Using a benchmark IRR of 18 per cent, Savills estimate the following feasibilities for infill development:

- Eastern Harbour City IRR is 1.7 per cent below the threshold return
- Central River City IRR is 2.5 per cent below the threshold return, and
- Western Parkland City IRR is 2.8 per cent below the threshold return.

The CIE estimates suggest that development would be feasible in Sydney as there is a development margin of 18 per cent and profit of between 6 to 8 per cent.

Sensitivity analysis

We have tested the sensitivity of costs to a range of key inputs:

- The cost and feasibility of apartment construction varies somewhat with variations to financing cost assumptions. Removing a 3.8 per cent premium for developers on top of the variable rates obtained by medium-sized businesses has a positive 4 per cent impact on profits from developing infill apartments (chart 4.23). Extending the construction period has the largest impact on financing costs out of the alternatives we have tested, with an extra year of construction reducing the profit rate by 4 per cent for mid-rise and 5 per cent for high-rise.
- Jenner and Tulip (2020) estimate the opportunity cost of land for apartments based on the value of detached dwellings, instead of measuring the land acquisition cost. If we use this approach, escalating their estimates of the value of detached dwellings using the Protrack House Price Index, it significantly reduces profit margins for apartments. Note that apartments are likely to be built on land with relatively low

preexisting uses, such as cheaper detached houses than average, industrial land, or vacant lots.

- Increasing construction costs by 20 per cent would reduce the feasibility gap by 9-12 per cent, since construction costs are roughly half of the cost of developing infill apartments.
- Using UDIA's estimates of median apartment sale prices (rather than our estimates based on analysis of property sale data) reduces feasibility gap by the most out of any alternative cases tested (13 per cent).

3.18 Sensitivity testing, mid-rise infill apartments, Sydney 2023

Case	Total cost	Sale price ex GST		Feasibility gap	Difference in feasibility gap relative to central case
	\$	\$	\$	Per cent	Per cent
Mid-rise apartments					
Central	905 075	884 816	- 20 260	-2	
No premium for developer interest rates	865 528	884 816	19 287	2	4
Extra year added to construction	947 576	884 816	- 62 760	-7	-4
Reduction in construction by 0.5 years	885 226	884 816	- 411	0	2
Extra year added to pre-construction development period	921 321	884 816	- 36 505	-4	-2
Value of detached houses as land acquisition cost	985 295	884 816	- 100 479	-10	-8
20% increase to construction costs	993 832	884 816	- 109 017	-11	-9
UDIA estimates of median apartment sale prices	902 888	767 818	- 135 070	-15	-13
High-rise apartments					
Central	857 895	896 945	39 050	5	
No premium for developer interest rates	825 977	896 945	70 968	9	4
Extra year added to construction	896 951	896 945	- 6	0	-5
Reduction in construction by 0.5 years	843 209	896 945	53 736	6	2
Extra year added to pre-construction development period	866 777	896 945	30 168	3	-1
Value of detached houses as land acquisition cost	892 637	896 945	4 308	0	-4
20% increase to construction costs	967 252	896 945	- 70 307	-7	-12
UDIA estimates of median apartment sale prices	857 756	767 818	- 89 938	-10	-15

Source: CIE.

4 *Cost and feasibility of greenfield development*

Results for Sydney over time

The cost of greenfield houses have increased over time (chart 4.1 and table 4.2), at an annual growth rate¹⁵ of 5 per cent.

The largest cost components are construction of the building, acquisition of land based on the sale price of agricultural properties, site preparation and required margin. Land acquisition costs are \$90 206 per dwelling, which is based on the cost of acquiring land with a rural zoning (e.g. RU1, RU2, RU3). This cost of land acquisition is more reflective of the opportunity cost of land for agricultural uses, rather than the financial cost of acquiring land,¹⁶ which varies very significantly depending on timing of acquisition.

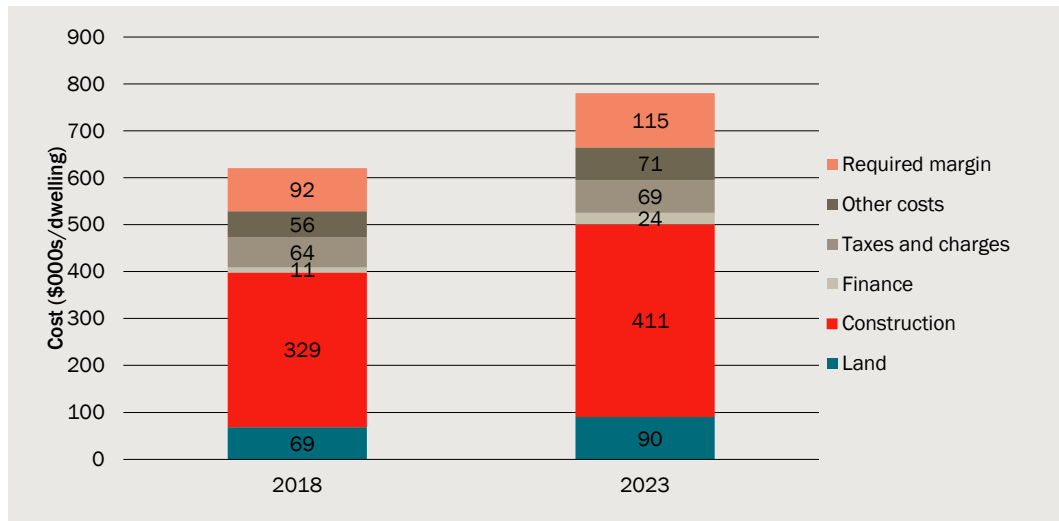
The higher growth rate in the cost stack was for financing costs, increasing by \$13 009 (116 per cent). Financing costs are driven by increases in the cost of financing in 2022 and 2023, however overall it only comprises 3 per cent of total costs. All other cost categories increased with a similar growth path over the period, increasing between 17 per cent for state government and other contributions to 35 per cent for stamp duty and land tax.

Over the period from 2018 to 2023, the positive feasibility gap increased from 1 per cent to 6 per cent. Between 2018 and 2020, the positive feasibility gap decreased, however this trend reversed substantially in 2021-2022, increasing the positive feasibility gap to 11 per cent, from a low of -10 per cent. Fluctuations in the feasibility gap have been driven primarily by volatility in sale prices.

¹⁵ Calculated as an annual compound growth rate

¹⁶ Our estimate of land acquisition costs is based on acquiring agricultural land rather than residentially-zoned land. The value of residentially-zoned land in greenfield areas would incorporate rezoning premia, while agricultural land is less likely to have such premia (although if the land is expected to be rezoned in the future there may be some residual premium).

4.1 Cost stacks for greenfield houses, Sydney over time



Note: Construction includes parking, site preparation and demolition costs, taxes and charges includes local and state infrastructure contributions plus land tax and stamp duty, and other costs includes professional fees and sales and marketing.

Data source: CIE.

4.2 Cost and feasibility of greenfield houses, Sydney over time

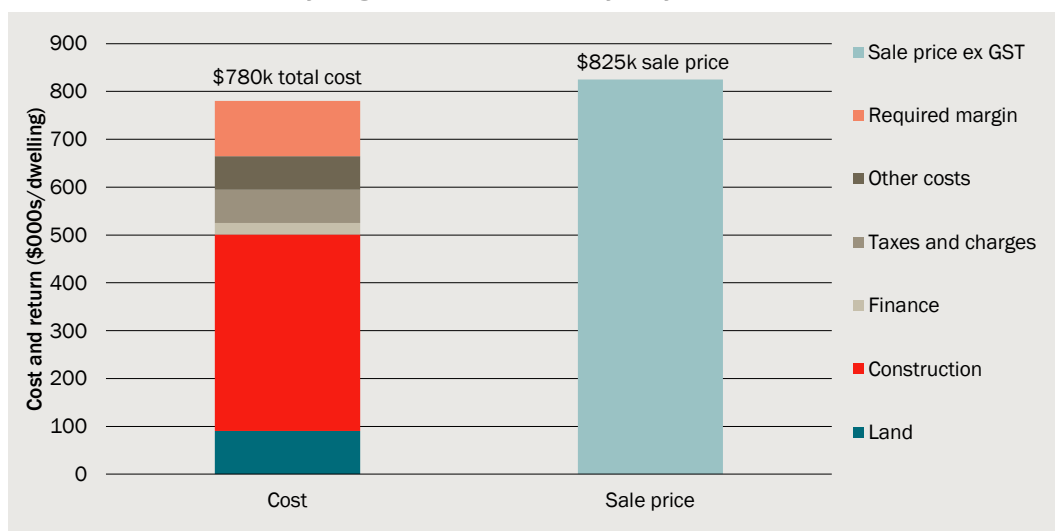
Cost component	2018	2019	2020	2021	2022	2023	2018 vs 2023 difference	
	\$'000	\$'000	\$'000	\$'000	\$'000	\$'000	\$'000	Per cent
Construction	279	281	321	298	322	347	67	24
Site prep/Demolition	50	53	53	55	59	63	11	20
Professional fees	37	38	42	40	43	46	9	23
Land acquisition	69	67	64	68	90	90	24	35
State and other contrib.	22	22	22	22	25	26	4	17
Local gov't IC	38	38	38	38	38	38	0	0
Land tax and stamp duty	4	4	3	4	5	5	1	39
Financing costs	11	11	11	11	17	24	13	125
Sales and marketing	18	17	18	21	24	24	8	46
Required margin	92	92	100	97	108	115	23	25
Total cost	621	621	671	654	732	780	159	26
Sale price ex GST	628	566	602	699	809	825	260	46
Feasibility gap	7	- 56	- 70	46	77	45	100	- 181
	Per cent	Per cent	Per cent	Per cent	Per cent	Per cent	Per cent	Per cent
Feasibility gap (per cent)	1	-9	-10	7	11	6	5	

Note: State government and other contributions includes Sydney Water contributions (water and wastewater) and biodiversity charges.

Source: CIE.

Greenfield housing development has a significant positive feasibility gap in 2023 of gap \$45 000 (6 per cent), reflecting that the financial return from development outweighs the cost (chart 4.3).

4.3 Cost and feasibility of greenfield houses, Sydney 2023



Note: Construction includes parking, site preparation and demolition costs, taxes and charges includes local and state infrastructure contributions plus land tax and stamp duty, and other costs includes professional fees and sales and marketing.

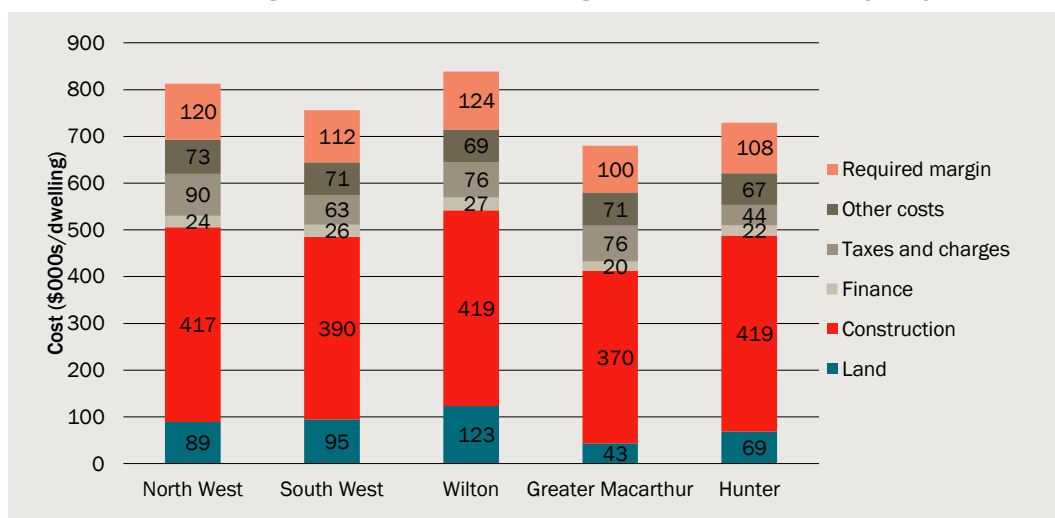
Data source: CIE.

Comparison across greenfield markets of Sydney and the Hunter

Across Sydney’s major greenfield markets there is little variation in construction costs, site prep and professional fees (table 4.5 and 4.4). There is substantial variation across the following cost categories:

- Land acquisition – where costs in Wilton are 185 per cent higher than Greater Macarthur
- State government infrastructure charges and biodiversity – costs in Wilton are 91 per cent higher than Hunter
- Local government infrastructure charges – costs in North West are 200 per cent higher than Hunter, and
- Feasibility across Sydney’s greenfield markets varies substantially, with a low of -8 per cent in Wilton and a high of 25 per cent in Greater Macarthur. All markets apart from Wilton and Hunter have a positive feasibility gap.

4.4 Cost stacks of greenfield houses across greenfield markets of Sydney



Note: Construction includes parking, site preparation and demolition costs, taxes and charges includes local and state infrastructure contributions plus land tax and stamp duty, and other costs includes professional fees and sales and marketing.

Source: CIE.

4.5 Cost and feasibility of greenfield houses by greenfield market of Sydney

Cost component	North West	South West	Wilton	Greater Macarthur	Hunter	Sydney average
	\$	\$	\$	\$	\$	\$
Construction	352 233	329 982	354 055	312 425	354 270	347 304
Site prep/Demolition	64 369	60 302	64 702	57 094	64 741	63 468
Professional fees	46 234	46 234	46 234	46 234	46 234	46 234
Land acquisition	89 147	94 699	123 197	43 249	68 601	90 206
State and other contributions	25 108	27 568	39 104	33 764	20 467	25 964
Local gov't IC	60 000	30 000	30 000	40 000	20 000	38 367
Land tax and stamp duty	4 836	5 306	6 636	2 415	3 698	4 896
Financing costs	24 130	26 076	27 328	19 861	21 778	24 258
Sales and marketing	26 889	24 317	22 620	24 986	21 237	24 268
Required margin	119 890	111 630	124 426	99 908	107 962	115 325
Total cost	812 835	756 114	838 302	679 936	728 986	780 289
Sale price ex GST	914 290	826 820	769 136	849 572	722 104	825 160
Feasibility gap	101 455	70 706	- 69 165	169 636	- 6 882	44 872
	Per cent	Per cent	Per cent	Per cent	Per cent	Per cent
Feasibility gap (per cent)	12	9	-8	25	-1	6

Note: State government and other contributions includes Sydney Water contributions (water and wastewater) and biodiversity charges.

Source: CIE.

Comparison across major cities of Australia

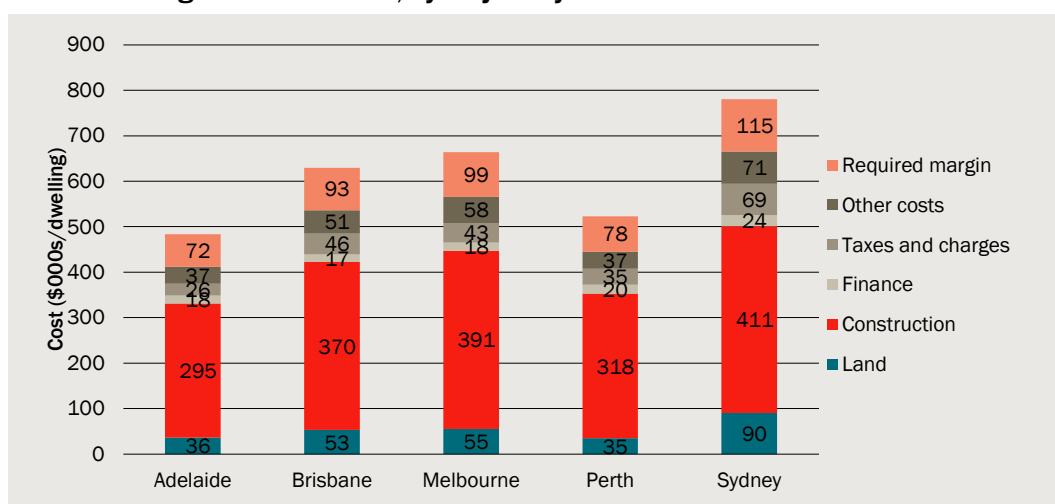
A key limitation is that we have not quantified local government infrastructure charges in other major cities. Despite this exclusion, the positive feasibility gap is lower in all other

major cities compared to Sydney (table 4.7). Land acquisition costs were higher for Sydney compared to other cities, while construction costs were lower as a share of total costs in Sydney (chart 4.6). Variation in construction costs across capital cities can be driven by:

- Labour costs – The cost of labour can vary depending on the location and the demand for workers, with some areas experiencing higher wages due to labour shortages.
- Building materials – Construction materials prices can fluctuate across cities, based on local supply and demand.

Sydney is the only feasible city, with a positive feasibility gap of 6 per cent. High sales prices in Sydney have driven the feasibility estimates.

4.6 Cost of greenfield houses, by major city in 2023



Note: Construction includes parking, site preparation and demolition costs, taxes and charges includes local and state infrastructure contributions plus land tax and stamp duty, and other costs includes professional fees and sales and marketing.

Source: CIE.

4.7 Cost and feasibility of greenfield houses across major cities of Australia

Cost component	Adelaide	Brisbane	Melbourne	Perth	Sydney
	\$	\$	\$	\$	\$
Construction	249 150	312 632	330 954	269 045	347 304
Parking	0	0	0	0	0
Site prep/Demolition	45 531	57 132	60 480	49 166	63 468
Professional fees	24 638	34 239	39 796	24 829	46 234
Land acquisition	36 466	52 694	55 464	34 529	90 206
State and other contributions	17 933	17 933	17 933	17 933	25 964
Local gov't IC	6 000	25 000	21 750	15 000	38 367
Land tax and stamp duty	2 039	2 812	2 980	1 963	4 896
Financing costs	17 542	16 812	18 325	19 934	24 258
Sales and marketing	12 478	16 860	17 801	12 622	24 268
Required margin	71 874	93 466	98 583	77 832	115 325
Total cost	483 651	629 579	664 066	522 854	780 289

Cost component	Adelaide	Brisbane	Melbourne	Perth	Sydney
	\$	\$	\$	\$	\$
Sale price ex GST	424 267	573 286	605 282	429 189	825 160
Feasibility gap	- 59 384	- 56 292	- 58 784	- 93 665	44 872
	Per cent	Per cent	Per cent	Per cent	Per cent
Feasibility gap (per cent)	-12	-9	-9	-18	6

Note: State government and other contributions includes Sydney Water contributions (water and wastewater) and biodiversity charges.
Source: CIE.

Comparison against other estimates

The costs of developing greenfield houses has been estimated multiple times over the past decade, including:

- The Urbis National Dwelling Cost study (2011)¹⁷
- The Savills Release the Pressure Report (2024)¹⁸

The total construction cost for a greenfield development is \$60 000 lower (8 per cent) for the CIE estimate compared with the Urbis estimate (chart 4.8). Key differences between the CIE and Urbis estimates are:

- Construction costs are substantially higher for the CIE estimate, reflecting the real increases in costs over the decade
- Land acquisition costs are lower for the CIE estimate due to the methodological approach of using the opportunity cost of agricultural land instead of rezoned land, and
- Interest rates were similar across both studies, at approximately 9.5 per cent.

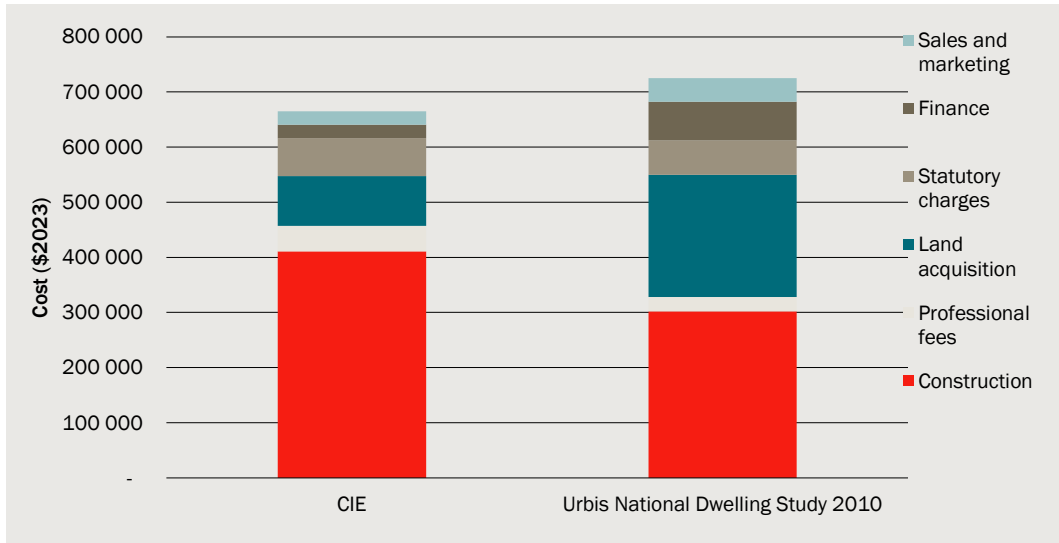
¹⁷ Urbis, 2011, *National Dwelling Cost Study*, available at:

<https://treasury.gov.au/sites/default/files/2019-03/nhsc-residential-cost-analysis-urbis.pdf>

¹⁸ Savills 2024, *Release the Pressure*, available at:

<https://www.propertycouncil.com.au/submissions/release-the-pressure-alleviating-taxes-and-charges-to-build-new-homes>

4.8 Comparison of greenfield development costs to Urbis (2010)



Note: \$2023 adjusted using Sydney CPI
 Data source: CIE, Urbis National Dwelling Cost Study.

The Savills (2024)¹⁹ study does not report total costs of construction, however it does include a feasibility assessment of greenfield development based on a benchmark internal rate of return (IRR). Using a benchmark IRR of 15 per cent, Savills estimate that greenfield developments in the Western Parkland Cities would be marginally feasible with an estimated IRR of 15 per cent while developments in the Central River City would not be feasible with an IRR of ~13 per cent. The CIE estimate suggests development would be feasible as there is a development profit of 6 per cent, inclusive of an 18 per cent developer margin.

Sensitivity analysis

The cost and feasibility of apartment construction varies somewhat with variations to financing cost assumptions. Extending the construction period has the largest impact on financing costs out of the alternatives we have tested, with an extra year of construction reducing the profit rate by 4 per cent for greenfield dwellings.

Increasing construction costs by 20 per cent would reduce the positive feasibility gap by 11 per cent, since construction costs are roughly half of the cost of delivering greenfield dwellings.

¹⁹ Savills 2024, *Release the Pressure*, available at: <https://www.propertycouncil.com.au/submissions/release-the-pressure-alleviating-taxes-and-charges-to-build-new-homes>

4.9 Sensitivity testing, greenfield houses, Sydney 2023

Case	Total cost	Sale price ex GST	Feasibility gap	Difference in feasibility gap relative to central case
	\$	\$	\$ Per cent	Per cent
Greenfield house				
Central	780 289	825 160	44 872 6	
No premium for developer interest rates	769 243	825 160	55 917 7	2
Extra year added to construction	809 563	825 160	15 598 2	-4
Reduction in construction by 0.5 years	766 627	825 160	58 534 8	2
Extra year added to pre-construction development period	788 619	825 160	36 542 5	-1
20% increase to construction costs	873 130	825 160	- 47 970 -5	-11

A Development cost methodologies

Cost of dwelling construction

Housing construction costs

Greenfield housing construction costs are based on the ABS value of construction work cost series²⁰. The cost series estimates the average value of building work when completed as reported in the building activity survey. This may be an actual value for completed work or an anticipated value for work yet to be completed and should represent the final contract price or market value of the job when completed. This data excludes land, demolition and landscaping but includes site preparation costs associated with building activity. As construction costs are based on the total anticipated or actual cost of construction, it would therefore include contingency.

As the cost series reports the average value of construction across all house types in all areas of NSW, we have included a spatial adjustment to make the estimate more representative of greenfield development. The spatial adjustment is based on the relativity of the value of construction for each LGA containing greenfield development, weighted by the number of building approvals per LGA. The spatial adjustment for NSW was applied to all other jurisdictions.

Site preparation

The cost for civil construction works to redevelop greenfield land into residential lots is based on the estimates provided in the Release the Pressure report by Savills²¹. Civil cost estimates are provided for 2018 (\$50 000) and 2024 (\$70 000) for greenfield development in the Central River City. The Urbis²² study estimates a cost of \$42 748 (\$2010) per dwelling for a 50 lot subdivision in Kellyville, Sydney. Inflating this cost to 2024 dollars would result in a range of \$60 873 to \$78 913 using CPI and PPI housing construction respectively. The Savills estimate has been chosen as it is the most current estimate of costs.

²⁰ See <https://www.abs.gov.au/statistics/industry/building-and-construction/building-activity-australia/latest-release>

²¹ See <https://www.propertycouncil.com.au/submissions/release-the-pressure-alleviating-taxes-and-charges-to-build-new-homes>

²² Urbis, 2011, *National Dwelling Cost Study*, available at: <https://treasury.gov.au/sites/default/files/2019-03/nhsc-residential-cost-analysis-urbis.pdf>

Apartment construction costs

Apartment construction costs are based on estimates from Rider Levett Bucknall's (RLB) Riders Digest²³. RLB produces an annual overview of cost ranges for construction across Australian capital cities. Within the residential sector, they provide construction cost estimates of dollars per sqm and dollars per unit/building for the following building types:

- Custom built single & double storey dwellings for medium quality
- Walk-up units 85-120m² and townhouses 90-120m² for medium quality
- Multi-story units for medium to luxury quality for two unit sizes, 60-70m² and 90-120 m², for the following building heights:
 - Up to 10 storeys with a lift
 - Between 10 and 20 storeys
 - Between 20 and 40 storeys, and
 - Between 40 and 80 storeys

For this study, we classified two building types, below 10 storeys with a lift and between 10 and 40 storeys.

Car parking is excluded for the RLB unit construction cost estimates. The construction costs contain items normally contained in a building contract and specifically exclude:

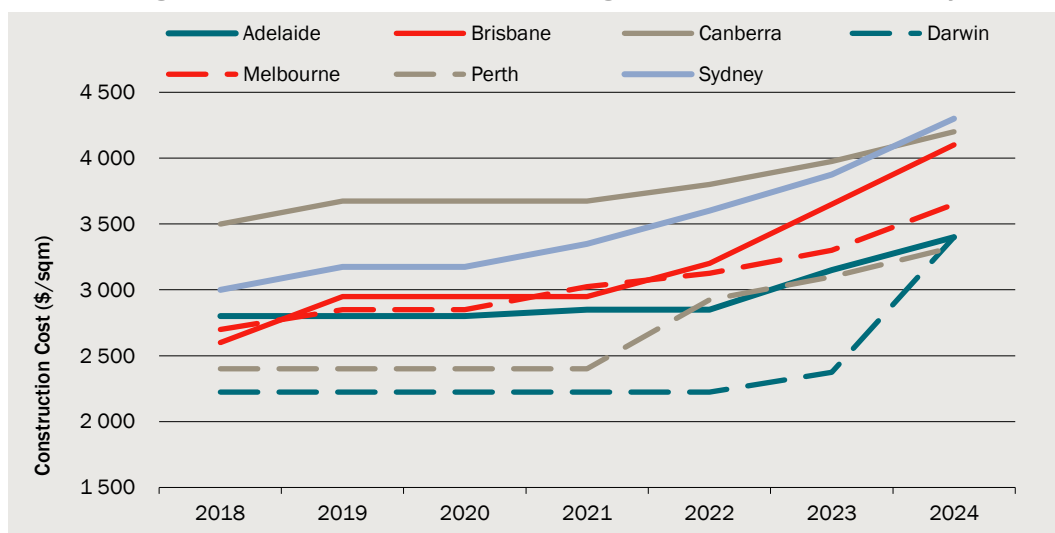
- GST
- Land costs
- Legal and professional fees
- Loose furniture and fittings
- Site works and drainage
- Telstra and private telephone systems (PABX), and
- Tenancy works.

We assume that contingency is included in the Riders Digest benchmarks since they are based on the price if tenders were raised in each city, which would include contingency where appropriate.

There are large differences between capital cities in terms of the levels of construction costs as well as the growth in construction costs. For example using large apartments up to 10 storeys with a lift, Sydney has overtaken Canberra to have the highest construction cost for apartments across all capital cities (chart A.1). The cost of construction has increased heterogeneously across capital cities, Sydney has experienced constant growth from 2020 while Perth has experienced high growth rates from 2021 and Melbourne and Darwin have experienced high growth from 2023 to 2024.

²³ See <https://www.rlb.com/oceania/insight/australia-riders-digest-2024/>

A.1 Average construction cost per m2 for a large apartment up to 10 Storeys



Data source: CIE, Rider Levett Bucknell Riders Digest 2018-2024

Parking costs

Across Sydney LGAs, Local Government Development Control Plans (DCP) stipulate the provision of on-site parking for new developments. Parking requirements can either be enforced as maximum or minimum, generally depending on the location within the LGA and proximity to Public Transport networks.

For DCPs with a minimum requirement, the number of required parking spaces increases with the number of bedrooms for an apartment, where typically a 2 bedroom apartment would require 1 parking space and a 3 bedroom apartment would require 1.4 spaces. In addition, visitor spaces are required, typically at a rate of one visitor space per 5 apartments.

We reviewed the DCPs for the City of Sydney, Cumberland, Blacktown, Liverpool, Ryde, Hills, Ashfield, Marrickville, Bankstown, North Sydney and Canada Bay and estimated an average number of parking spaces required for each apartment type (from Studio to 3 or more beds), weighted by approvals for each LGA.

To estimate the number of spaces for the typical infill apartment, we weighted the parking requirements by the number of each apartment type sold in the Greater Sydney Region according to Domain sale data. This resulted in an average number of parking spaces required of 1.28, which we have rounded to 1.3 for our analysis.

The cost of constructing parking spaces was derived from Savills²⁴ estimates. Savills estimate the cost of a parking space was \$65 000 in 2018 and \$75 000 in 2024. We assume a cost growth path equal to the cost growth path of apartment construction from

²⁴ Savills 2024, *Release the Pressure*, available at: <https://www.propertycouncil.com.au/submissions/release-the-pressure-alleviating-taxes-and-charges-to-build-new-homes>

RLB. Parking costs of other capital cities were based on the relativity of construction costs provided by RLB.

Demolition costs

Demolition costs were based on the average of the high and low RLB estimates for demolition of the following building types:

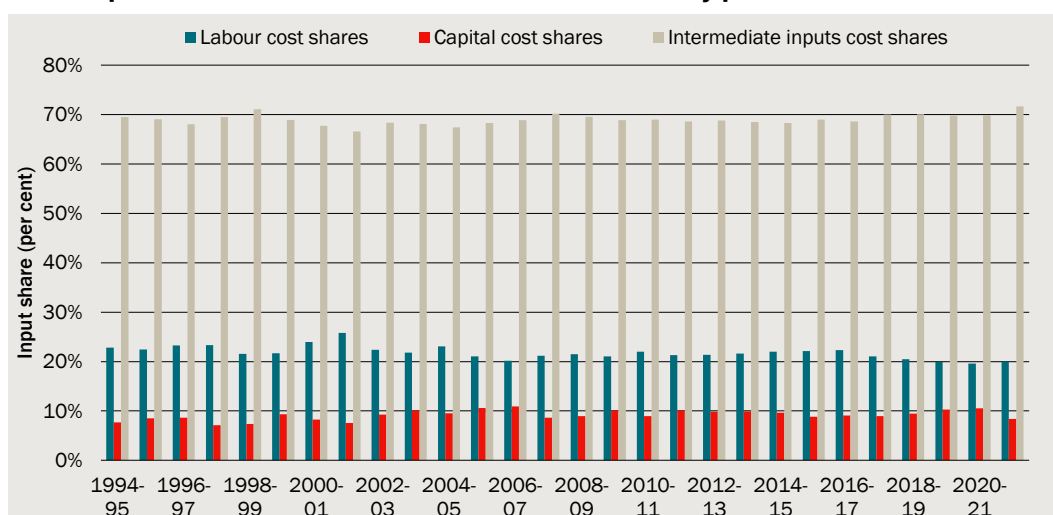
- Single storey framed house with timber cladding and tiled roof
- Single/double storey brick house with tiled roof
- Single storey factory/warehouse with reinforced concrete ground slab, timber or steel framed walls
- Two storey office building with reinforced concrete frame masonry cladding and metal roof

Split of labour and non-labour

The split of construction costs between labour, capital, and intermediate inputs are not available from any of the sources identified in the sections above.

Estimates of input cost shares are available from the ABS *Estimates of Industry Multifactor Productivity, Australia* publication, which are Australia-wide and apply to the entire construction sector (no split between residential and commercial). These are shown in chart A.2, and have varied little over time. The share of labour cost inputs has fallen somewhat, being substituted for somewhat higher capital inputs and intermediate inputs.

A.2 Input cost shares from ABS Multifactor Productivity publication



Data source: ABS, *Estimates of Industry Multifactor Productivity, Australia*, 5260.0.55.002, CIE.

Land acquisition costs

Our objective is to estimate the average land acquisition cost for greenfield housing developments and for infill apartments. The cost to acquire land will depend on:

- the value of alternative uses, and
- the expected return from potential development of the site.

The factors determining these values are relatively distinct for greenfield and infill development.

Greenfield houses

Greenfield development refers to development in previously undeveloped areas. In Sydney, this has typically involved development of land used for agriculture. The value of alternative uses is typically assumed to be the value of agricultural land in these areas.

Some land acquired for greenfield development will be transacted at a price significantly above its value as agricultural land, which reflects the expected return from potential development.

The plausible range for land acquired for greenfield development is between:

- the value of agricultural land, and
- the value of land such that development is exactly feasible (i.e. the residual land value).

For each greenfield land market in NSW, we have undertaken modelling to estimate two values:

- 1 the typical sale price per m² across all agricultural properties (including land and improvements) for each greenfield market in each year, and
- 2 the sale prices per m² for agricultural (and other) land that was subsequently developed, which will likely reflecting some rezoning premium.

Our estimates of the first of these values yields more reasonable outputs, and so we rely on these estimates to calculate the cost of land acquisition. Modelling estimating the typical sale price for agricultural properties is described in the section below.

Land value and sale price of agricultural properties in greenfield areas

We have estimated land values and sale prices of agricultural properties in greenfield areas, which are any lots with a rural zoning (i.e. RU1-7) in a greenfield area. We estimate values and sale prices using linear regression models that include indicator variables for each combination of year and greenfield market. The estimation sample for each regression has the top and bottom 5 per cent of observations (whether value per square-metre or sale price per square metre) removed.

Table presents estimated land values per square-metre by Greenfield market, and an average across Sydney greenfield areas (including Hunter). The value grew significantly between 2020 and 2022.

This value is orders of magnitude higher than the value of agricultural land across NSW, which for the coastal region of NSW was \$1.54 per square-metre in 2023.²⁵ The price of rural-zoned land is much higher in areas adjacent to Sydney likely because of the higher accessibility to other businesses, consumers, and infrastructure. However, it may also reflect some expectation of potential rezoning and development profit that might result.

A.3 Value of agricultural land by greenfield market

Greenfield market	2018	2019	2020	2021	2022	2023
	\$/sqm	\$/sqm	\$/sqm	\$/sqm	\$/sqm	\$/sqm
North West	149.0	136.3	141.1	160.0	194.7	192.0
South West	134.6	135.9	133.4	150.8	192.8	194.6
Wilton	112.5	98.4	96.4	118.9	156.3	159.5
Greater Macarthur	81.2	80.3	80.1	81.9	97.3	94.1
Hunter	56.1	57.9	59.5	70.8	84.1	85.1
Sydney average	112.2	107.5	108.9	124.4	153.6	153.3

Note: The average for Sydney is an average weighted by the number of house approvals in each market in 2022/23 (based on a concordance of greenfield markets to local government areas, shown in table C.1).

Source: CIE.

The sale price of agricultural lots in these areas has increased by around 50 per cent between 2018 and 2023 (table A.4). Estimates are not available for Greater Macarthur in most years due to a lack of sales of rural-zoned sites.

A.4 Sale price of agricultural properties by greenfield market

Greenfield market	2018	2019	2020	2021	2022	2023
	\$/sqm	\$/sqm	\$/sqm	\$/sqm	\$/sqm	\$/sqm
North West	208.8	192.8	212.9	235.3	296.7	319.1
South West	257.4	237.0	366.5	247.0	340.5	440.8
Wilton	196.8	185.9	191.9	244.8	282.0	215.4
Greater Macarthur	0.0	0.0	0.0	72.5	113.9	0.0
Hunter	135.9	147.9	143.8	158.0	169.5	172.1
Sydney average	184.1	176.5	212.0	205.8	257.1	275.7

Note: The average for Sydney is an average weighted by the number of house approvals in each market in 2022/23 (based on a concordance of greenfield markets to local government areas, shown in table C.1).

Source: CIE.

Sale prices are 72.6 per cent higher on average (across all years and markets) than land values. This will reflect the added value of buildings on each property, but likely also reflects some rezoning premium. Additionally, sale prices are more volatile across years and markets than land values, since there is a relatively smaller sample of sales for

²⁵ This is the underlying land value reported by ABARES in their Farmland Price Indicator dashboard (converted from \$/hectare to \$/m²). The dashboard is available at: <https://www.agriculture.gov.au/abares/data/farmland-price-indicator#abares-farmland-price-dashboard--previous-findings>

estimation. In contrast, land values are highly stable, with every rural-zoned site receiving a land valuation in each year.

A.5 Ratio of agricultural land sale price to value

Greenfield market	2018	2019	2020	2021	2022	2023	Average
	Per cent	Per cent	Per cent	Per cent	Per cent	Per cent	Per cent
North West	140.2	141.4	150.8	147.0	152.4	166.2	149.7
South West	191.3	174.4	274.7	163.9	176.6	226.5	201.2
Wilton	174.9	189.0	199.0	205.8	180.4	135.1	180.7
Greater Macarthur	0.0	0.0	0.0	88.4	117.1	0.0	34.3
Hunter	242.3	255.4	241.7	223.2	201.6	202.2	227.7
Sydney average	164.1	164.2	194.7	165.4	167.4	179.8	172.6

Note: The average for Sydney is an average weighted by the number of house approvals in each market in 2022/23 (based on a concordance of greenfield markets to local government areas, shown in table C.1).

Source: CIE.

To estimate the cost of land acquisition (including interest payments) in cost stacks, we require estimates of the sale price of land that is developed, which includes the value of buildings that are demolished. To estimate land costs including the value of buildings, we estimate land value (using table A.9) and add 70 per cent to this value to account for the value of buildings. This assumption is based on the results from table A.11, but does not vary over time or across markets to avoid adding spurious variation in land acquisition costs.

We expect that the sale price for agricultural lots includes more rezoning premium than the land value, particularly given sale prices are more than twice as high as values by 2023. Hence, a 70 per cent loading for building value on top of land value is considered to be on the high side as an estimate for the value of agricultural land plus buildings.

Extrapolating estimates to other major cities of Australia

We estimate land acquisition costs for other states based on the relative price of serviced greenfield lots in each state, which is obtained from the UDIA State of the Land report.

Infill apartments

Infill development may occur on lots previously used for low or mid-rise residential, commercial or industrial uses.

We have undertaken the following process to estimate land acquisition costs:

- Identify strata-titled properties that first appeared in the land value dataset in a recent year (i.e. the set of ‘new’ developments),
- Estimate the height of each strata-titled property, and filter out strata-titled properties that are townhouses rather than apartments,
 - This is a function of land size and the number of dwellings on each lot, and has been validated with spot-checks of particular dwellings using Google Maps and height information from publicly available development approvals.

- Identify the properties that were acquired prior to each of these developments (i.e. the set of ‘redeveloped properties’),
 - We have used GIS mapping to identify properties that were previously at the same location as new developments.
- Identify any sales of redeveloped properties, and estimate a regression model using a trimmed sample of sales (excluding top and bottom 5 per cent of prices) to predict sale price by LGA and sale year.

The regression model outputs are shown in table A.6.

A.6 Regression output for price of land acquisition for infill apartments

Variable	Coefficient	Standard error	t-statistic	P-value	Lower bound 95% confidence interval	Upper bound 95% confidence interval
Armidale	372	302	1.23	0.219	-221	964
Ballina	120	265	0.45	0.652	-400	640
Bathurst	-354	416	-0.85	0.395	-1169	461
Bayside (NSW)	1679	230	7.31	0	1229	2130
Bega Valley	-255	319	-0.8	0.424	-879	370
Bellingen	-85	803	-0.11	0.916	-1659	1490
Blacktown	822	227	3.62	0	377	1267
Bland	-558	1562	-0.36	0.721	-3620	2503
Blue Mountains	-144	337	-0.43	0.668	-804	516
Burwood	1774	244	7.27	0	1296	2253
Byron	380	242	1.57	0.116	-93	853
Cabonne	-162	1562	-0.1	0.917	-3224	2899
Camden	1262	270	4.68	0	733	1790
Campbelltown (NSW)	48	259	0.19	0.852	-459	556
Canada Bay	2131	231	9.21	0	1678	2584
Canterbury-Bankstown	350	225	1.55	0.12	-92	791
Central Coast (NSW)	220	226	0.97	0.331	-224	663
Cessnock	-102	262	-0.39	0.697	-616	411
City of Parramatta	556	223	2.49	0.013	119	994
City of Sydney	3633	238	15.26	0	3167	4100
Clarence Valley	90	309	0.29	0.771	-516	697
Coffs Harbour	203	248	0.82	0.414	-283	688
Cootamundra-Gundagai	-1000	1562	-0.64	0.522	-4062	2062
Cowra	-200	1115	-0.18	0.858	-2386	1985
Cumberland	396	223	1.77	0.076	-42	834
Dubbo	-38	588	-0.06	0.948	-1191	1115
Dungog	-82	1562	-0.05	0.958	-3144	2980
Eurobodalla	-81	282	-0.29	0.774	-635	473
Fairfield	848	294	2.89	0.004	273	1424

Variable	Coefficient	Standard error	t-statistic	P-value	Lower bound 95% confidence interval	Upper bound 95% confidence interval
Federation	-352	443	-0.79	0.427	-1221	517
Georges River	683	229	2.98	0.003	233	1132
Glen Innes Severn	-168	1562	-0.11	0.914	-3230	2893
Goulburn Mulwaree	126	340	0.37	0.711	-540	791
Greater Hume	-191	919	-0.21	0.835	-1992	1610
Griffith	-370	623	-0.59	0.553	-1592	853
Gunnedah	-286	623	-0.46	0.646	-1508	936
Hawkesbury	-128	329	-0.39	0.697	-773	517
Hilltops	-690	1115	-0.62	0.536	-2876	1495
Hornsby	65	231	0.28	0.777	-387	518
Hunters Hill	1261	331	3.8	0	611	1911
Inner West	2567	234	10.96	0	2108	3027
Inverell	-372	1562	-0.24	0.812	-3434	2689
Kempsey	109	514	0.21	0.832	-899	1117
Kiama	395	299	1.32	0.188	-192	981
Ku-ring-gai	798	230	3.47	0.001	347	1249
Kyogle	-439	668	-0.66	0.511	-1747	870
Lake Macquarie	-60	233	-0.26	0.796	-518	397
Lane Cove	427	233	1.83	0.067	-31	885
Leeton	-32	803	-0.04	0.969	-1606	1543
Lismore	-58	360	-0.16	0.872	-763	647
Lithgow	-128	668	-0.19	0.848	-1437	1180
Liverpool	370	231	1.6	0.109	-82	822
Maitland	1854	240	7.71	0	1383	2325
Mid-Western	-214	919	-0.23	0.816	-2016	1587
Mid-Coast	71	263	0.27	0.788	-445	586
Moree Plains	-468	1115	-0.42	0.675	-2654	1717
Mosman	3506	305	11.5	0	2908	4103
Murray River	-238	919	-0.26	0.796	-2039	1564
Muswellbrook	77	389	0.2	0.843	-685	838
Nambucca Valley	1581	668	2.37	0.018	272	2890
Narrabri	-446	919	-0.49	0.627	-2247	1355
Newcastle	211	225	0.94	0.348	-229	651
North Sydney	2870	241	11.9	0	2398	3343
Northern Beaches	1490	235	6.35	0	1030	1951
Oberon	-251	1562	-0.16	0.872	-3313	2810
Orange	-311	535	-0.58	0.561	-1360	738
Parkes	-202	588	-0.34	0.731	-1355	951
Penrith	-56	224	-0.25	0.801	-495	382
Port Macquarie-Hastings	1432	234	6.12	0	973	1890

Variable	Coefficient	Standard error	t-statistic	P-value	Lower bound 95% confidence interval	Upper bound 95% confidence interval
Port Stephens	142	292	0.49	0.626	-431	716
Queanbeyan-Palerang	132	284	0.46	0.642	-425	688
Randwick	2565	233	11.03	0	2109	3021
Richmond Valley	135	364	0.37	0.711	-579	848
Ryde	1119	226	4.96	0	676	1562
Shellharbour	340	233	1.46	0.144	-117	797
Shoalhaven	1108	242	4.59	0	635	1582
Singleton	10	514	0.02	0.984	-998	1018
Snowy Monaro	1002	286	3.51	0	442	1562
Strathfield	809	239	3.39	0.001	342	1277
Sutherland	564	222	2.54	0.011	130	998
Tamworth	279	311	0.9	0.37	-331	889
The Hills	1291	239	5.4	0	822	1759
Tweed	686	251	2.73	0.006	194	1178
Upper Hunter	-392	919	-0.43	0.67	-2193	1410
Uralla7	-513	1115	-0.46	0.646	-2699	1673
Wagga Wagga	114	424	0.27	0.788	-717	946
Warrumbungle	-107	1562	-0.07	0.945	-3169	2954
Waverley	3737	238	15.68	0	3269	4204
Wentworth	-155	1562	-0.1	0.921	-3217	2907
Willoughby	1696	277	6.12	0	1152	2239
Wingecarribee	-216	306	-0.7	0.482	-816	385
Wollondilly	1546	342	4.51	0	874	2217
Wollongong	433	225	1.92	0.055	-9	874
Woollahra	3530	253	13.93	0	3033	4026
Year	79	21	3.75	0	38	120
Year ^ 2	-5	2	-2.55	0.011	-9	-1
Year ^ 3	0	0	3.73	0	0	0
Year ^ 4	0	0	3.33	0.001	0	0
Constant	59	225	0.26	0.794	-382	500

Note: LGAs without sufficient sample size to enable coefficient estimation are automatically omitted from regression output.

Source: CIE.

We estimated based on the land value dataset and our estimate of apartment height for each property that land area per apartment 44.3 m² for apartments mid-rise and 17.7 m² for apartments of 10-40 storeys. These assumptions are used in table A.8 to convert estimates of the unit cost per m², which don't differ by apartment height, into estimates of the total cost of land acquisition per dwelling. This differs by apartment height because less land is required per dwelling for taller apartment blocks.

A.7 Land acquisition cost for infill apartments by height

Region name	Price of redeveloped land		
	Unit cost per m2 of land area	Cost per apartment mid rise	Cost per apartment 10-40 storeys
	\$/m2	\$/dwelling	\$/dwelling
Sydney	2204	97635	38930
Melbourne	1635	72447	28887
Brisbane	1303	57711	23011
Adelaide	891	39469	15738
Perth	958	42456	16928
Darwin	0	0	0
Canberra	2062	91338	36419
Sydney	2279	100941	40248
Albury	#N/A	#N/A	#N/A
Armidale	1956	86661	34554
Ballina	1727	76495	30501
Balranald	#N/A	#N/A	#N/A
Bathurst	1296	57409	22890
Bayside (NSW)	3147	139408	55586
Bega Valley	1386	61397	24481
Bellingen	1541	68259	27217
Berrigan	2366	104833	41800
Blacktown	1109	49151	19598
Bland	1486	65850	26256
Blayney	#N/A	#N/A	#N/A
Blue Mountains	3233	143240	57114
Bogan	#N/A	#N/A	#N/A
Bourke	#N/A	#N/A	#N/A
Brewarrina	#N/A	#N/A	#N/A
Broken Hill	#N/A	#N/A	#N/A
Burwood	1964	87001	34690
Byron	1470	65130	25969
Cabonne	2767	122570	48872
Camden	1662	73620	29354
Campbelltown (NSW)	3558	157632	62852
Canada Bay	1936	85780	34203
Canterbury-Bankstown	1818	80533	32111
Carrathool	#N/A	#N/A	#N/A
Central Coast (NSW)	1525	67554	26936
Central Darling	#N/A	#N/A	#N/A
Cessnock	2124	94113	37526
Clarence Valley	1802	79845	31836
Cobar	#N/A	#N/A	#N/A

Region name	Price of redeveloped land		
	Unit cost per m2 of land area	Cost per apartment mid rise	Cost per apartment 10-40 storeys
	\$/m2	\$/dwelling	\$/dwelling
Coffs Harbour	707	31338	12495
Coolamon	1436	63598	25358
Coonamble	#N/A	#N/A	#N/A
Cootamundra-Gundagai	1978	87648	34948
Cowra	1583	70132	27963
Cumberland	1543	68362	27258
Dubbo	1544	68407	27276
Dungog	2390	105899	42225
Edward River	#N/A	#N/A	#N/A
Eurobodalla	1297	57469	22915
Fairfield	2239	99212	39559
Federation	1464	64879	25869
Forbes	#N/A	#N/A	#N/A
Georges River	1732	76748	30602
Gilgandra	#N/A	#N/A	#N/A
Glen Innes Severn	1444	63976	25509
Goulburn Mulwaree	1281	56769	22635
Greater Hume	1357	60135	23977
Griffith	1501	66514	26521
Gunnedah	989	43831	17477
Gwydir	#N/A	#N/A	#N/A
Hawkesbury	1677	74310	29629
Hay	#N/A	#N/A	#N/A
Hilltops	2766	122536	48859
Hornsby	3955	175231	69870
Hunters Hill	1279	56658	22591
Inner West	1717	76084	30337
Inverell	1977	87589	34924
Junee	#N/A	#N/A	#N/A
Kempsey	2344	103849	41407
Kiama	1218	53976	21522
Ku-ring-gai	1563	69234	27606
Kyogle	2007	88902	35448
Lachlan	#N/A	#N/A	#N/A
Lake Macquarie	1589	70399	28070
Lane Cove	1565	69331	27644
Leeton	1501	66504	26517
Lismore	1955	86588	34525
Lithgow	3306	146460	58398

Region name	Price of redeveloped land		
	Unit cost per m2 of land area	Cost per apartment mid rise	Cost per apartment 10-40 storeys
	\$/m2	\$/dwelling	\$/dwelling
Liverpool	1423	63032	25133
Liverpool Plains	1682	74529	29717
Lockhart	#N/A	#N/A	#N/A
Maitland	1192	52787	21048
Mid-Coast	1401	62085	24755
Mid-Western	4810	213086	84963
Moree Plains	1688	74769	29812
Mosman	3057	135437	54002
Murray River	1212	53677	21403
Murrumbidgee	#N/A	#N/A	#N/A
Muswellbrook	1810	80184	31972
Nambucca Valley	4231	187442	74738
Narrabri	2975	131789	52548
Narrandera	#N/A	#N/A	#N/A
Narromine	#N/A	#N/A	#N/A
Newcastle	1389	61546	24540
North Sydney	1335	59132	23578
Northern Beaches	1434	63515	25325
Oberon	1567	69402	27672
Orange	2921	129418	51603
Parkes	1748	77418	30869
Parramatta	4926	218225	87012
Penrith	1738	76993	30699
Port Macquarie-Hastings	3953	175143	69835
Port Stephens	1740	77103	30743
Queanbeyan-Palerang	2637	116815	46577
Randwick	1928	85395	34049
Richmond Valley	2627	116375	46402
Ryde	1627	72082	28741
Shellharbour	2530	112082	44690
Shoalhaven	2355	104311	41592
Singleton	2131	94421	37648
Snowy Monaro	1872	82921	33063
Snowy Valleys	#N/A	#N/A	#N/A
Strathfield	2793	123728	49334
Sutherland	2243	99359	39617
Sydney	1700	75313	30030
Tamworth	1261	55875	22279
Temora	1151	50992	20332

Region name	Price of redeveloped land		
	Unit cost per m2 of land area	Cost per apartment mid rise	Cost per apartment 10-40 storeys
	\$/m2	\$/dwelling	\$/dwelling
Tenterfield	1722	76278	30414
The Hills	1520	67338	26850
Tweed	5020	222392	88674
Upper Hunter	1477	65418	26084
Upper Lachlan	#N/A	#N/A	#N/A
Uralla	3162	140071	55850
Wagga Wagga	1422	62977	25111
Walcha	#N/A	#N/A	#N/A
Walgett	#N/A	#N/A	#N/A
Warren	#N/A	#N/A	#N/A
Warrumbungle	3025	134021	53438
Waverley	2012	89130	35539
Weddin	#N/A	#N/A	#N/A
Wentworth	4832	214045	85346
Willoughby	1618	71674	28578
Wingecarribee	1690	74860	29849
Wollondilly	1613	71473	28498
Wollongong	1618	71680	28581
Woollahra	1618	71674	28578
Yass Valley	#N/A	#N/A	#N/A

Note: Values listed as '#N/A' have insufficient sales of lots redeveloped into apartments to enable estimation of their land acquisition cost.

Source: CIE.

Holding costs

There are a range of costs incurred during the time between commencement and completion of development. We estimate the largest two types of holding costs, which are

- interest payments associated with loans, and
- land tax,

Other costs such as council rates and utility charges may apply but have not been quantified due to time constraints for this analysis, their relatively smaller magnitude, and the extent of variation across areas (which makes estimation more time consuming).

Development timeframes

There are two timeframes that matter for holding costs, shown in table A.8.

A.8 Development timeframe components

Stage	Description	Data source
Land finance period	The time from settlement of the purchase of land for development until completion of dwellings, during which time the costs of land acquisition need to be funded, Design and planning activities occur before land settlement, and	Based on average DA lodgement plus assessment time from the NSW DPHI council league tables, plus 6 months for DA preparation and presales based on Savills (2024).
Construction finance period	Building approval to commencement and then completion of construction	ABS <i>Building Activity, Australia</i>

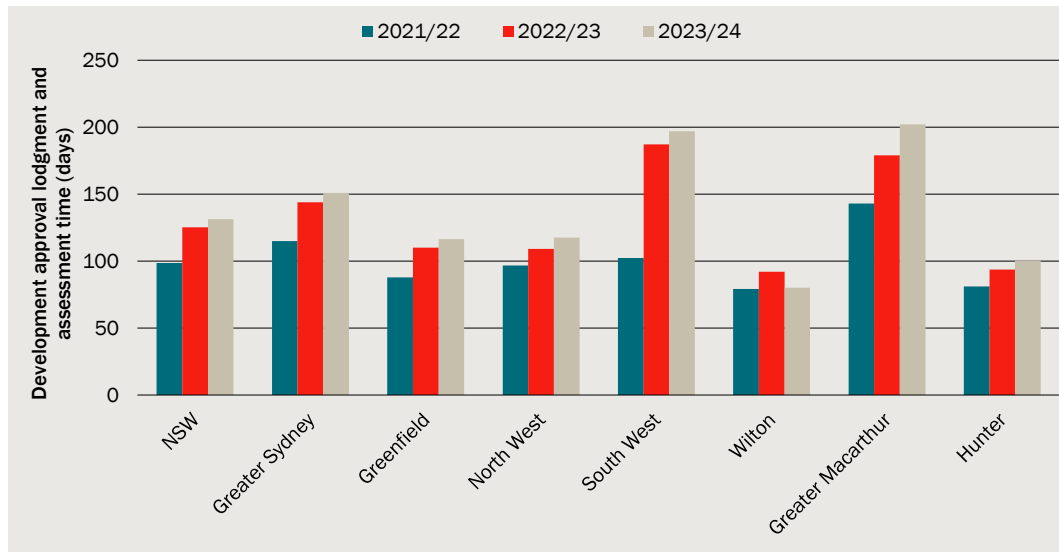
Source: CIE.

Data from the council league table dashboard published by NSW DPHI, with weighted averages taken by CIE, is shown in chart A.9. Data for earlier years was available in a different format and not through the dashboard, and so we have assumed timeframes for lodgement and assessment were constant for 2021/22 and earlier years. We have converted these financial year estimates to calendar years based by aligning 2022/23 to 2023, 2023/24 to 2024 and so on. Data is not available separately for houses and apartments.

To estimate the duration of land finance, as mentioned above, we add 6 months to the duration of development application lodgement and assessment to account for development approvals and presales. Adding 6 months to the values shown in chart A.9 implies an overall land finance period of around 1 year in 2023, which is broadly comparable to the duration of land financing in the typical timelines presented by Savills (2024).²⁶

²⁶ The typical infill and greenfield timelines provided by Savills (2024) (figure 21 and 23 respectively at <https://www.propertycouncil.com.au/submissions/release-the-pressure-alleviating-taxes-and-charges-to-build-new-homes>) are 10 months and 9 months respectively. However, they also report extended timelines that are significantly longer (24 and 18 months respectively).

A.9 Development application lodgement and assessment timeframes

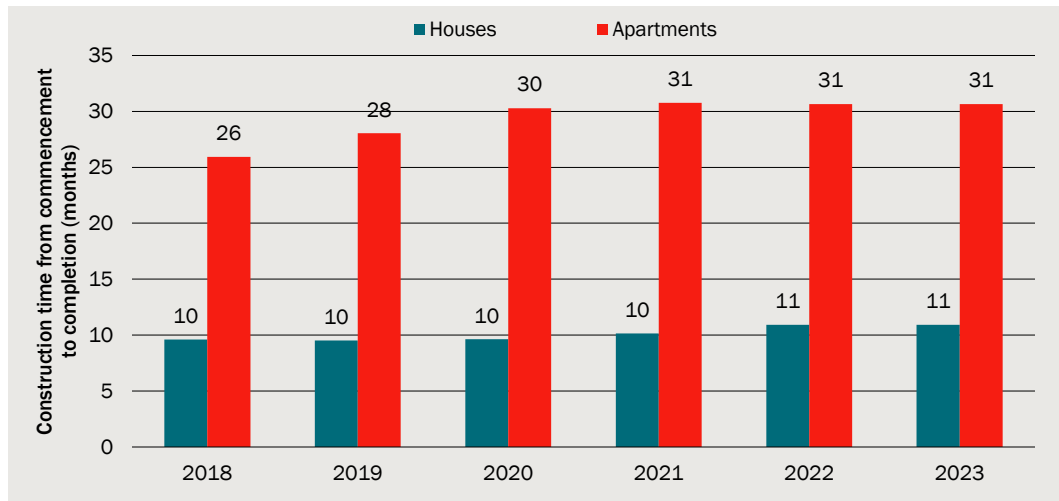


Note: Average development time (in days) for each area is an average across LGAs in that region weighted by the number of applications in 2023/24 for each LGA.

Data source: Council development application timeframe league tables, CIE.

ABS data showing the time from commencement to completion for houses and apartments is shown in chart A.10. Combining these times with development application and lodgement timeframes implies an overall development timeframe of 1.7 years for houses and 3.4 years for apartments in Sydney in 2023.

A.10 Construction timeframes



Data source: ABS Building Activity, Australia.

Interest costs

Estimating interest charges has relied on the following assumptions, which have been informed by a consultation with a development finance professional and :

- Interest rates are assumed to be equal to the sum of:

- The average interest rate on medium business variable rate loans, based on the average rates for new loans funded in each year, and²⁷
- A premium of 3.8 per cent to reflect the higher rates charged on developer finance,²⁸
- The loan to cost ratio, which is the share of construction costs that are financed by debt rather than equity/presale deposits, is assumed to be 80 per cent,
 - We assume that 60 per cent of land finance costs are financed by debt from the time of settlement to the completion of construction.
- The loan to value ratio, which is the share of land acquisition costs that are financed by debt rather than equity/presale deposits, is assumed to be 60 per cent.
 - We assume that 80 per cent of construction costs are financed by debt from the time of commencement until the completion of construction, but we reduce interest payments by 50 per cent to reflect that construction costs are paid gradually as milestones are reached rather than upfront.

Interest costs are calculated by estimating the compound interest paid over the land finance and construction finance periods.

Land tax assumptions

We calculate land tax during the land finance period based on the land value (land acquisition cost minus the value of building) per dwelling multiplied by an annual land tax rate of 1.4 per cent. Land tax rates are non-linear with respect to the value of property owned. In 2023, a general rate of 1.6 per cent applied above a threshold of \$1.075 million and a premium rate of 2 per cent applied above \$6.571 million. The value of land used to determine the applicable rates depends on the total value of property owned, not on the value of each individual lot.

For simplicity, we have assumed that developers pay an average land tax rate of 1.8 per cent, which is the midpoint of the general and premium rates.

Extrapolating holding costs to other major cities

Assumptions underpinning holding cost calculations differ slightly across states, as follows:

- Land acquisition and construction costs differ across states, and hence interest payments and land tax totals will differ.

²⁷ Data about this rate is available from the Reserve Bank of Australia in the *Business lending rates – F7* table, available at: <https://www.rba.gov.au/statistics/tables/xls/f07hist.xlsx?v=2024-07-23-23-26-06>. The specific series we used is named ‘Lending rates; Business finance; New loans funded in the month; Medium business; Variable-rate’.

²⁸ This premium of 3.8 per cent has been chosen to target an overall rate of 10 per cent in 2023, which is an average across three classes of debt finance used by developers (senior, stretch senior and mezzanine finance).

- The rate of land tax is assumed to be the same (2 per cent) across jurisdictions, for simplicity. Rates do differ, but in a non-linear fashion, and to avoid a false impression of accuracy we use a constant rate.
- Construction cost timeframes differ based on the data published by ABS in the *Building Activity, Australia* publication.

We have obtained development approval timeframes for Melbourne (139.9 days)²⁹ only, and these are very similar to times in Sydney (131.2 days). We have assumed that the time from development commencement to commencement of construction is the same across major cities.

²⁹ This is based on the number of processing days to a final outcome, on average across standard and VicSmart applications, which is available at: <https://www.planning.vic.gov.au/guides-and-resources/council-resources/planning-permit-activity-reporting>

B Analysing feasibility

Adjusting construction costs to account for differences across LGAs

We adjust estimates of construction costs from the previous stage by an index of relative construction cost across Sydney. This is based on the cost per recent building approval in each LGA. This results in estimates of the cost of building greenfield houses and infill apartments that are specific to the characteristics of recent dwellings built in each area.

Note that the cost per building approval can be separately estimated for each financial year. However, this value is volatile for each LGA, and we instead take an average value across the four most recent financial years of data available.

Estimates of sale prices

An overview of our approach is shown in table B.1.

B.1 Approach to estimating sale price of newly constructed dwellings

Type of dwelling	Data source and approach
Greenfield houses	<p>We identify recent sales of greenfield houses in the land value dataset by including only properties that we believe are sales of dwellings, not land, in greenfield areas, which involves applying the following filters:</p> <ul style="list-style-type: none"> ▪ Including only properties that are located in greenfield areas. Greenfield areas were identified based on zone codes and population densities. ▪ Excluding sales of very large lots (>5000m²), ▪ Excluding strata properties, ▪ Including only properties which the NSW Valuer-General land value dataset identifies as being a 'residence' or having this data missing (this filter mostly excludes properties identified in that dataset as being vacant land, commercial properties, or farms) <p>Estimating a regression model on this subset of properties with explanatory variables being:</p> <ul style="list-style-type: none"> ▪ the year of sale, ▪ the greenfield region of the sale (e.g. Greater Macarthur, Wilton, etc.), ▪ the land area and land area-squared of the property, ▪ an indicator variable for whether the dwelling was sold within 2-years of the lot first receiving a land value (i.e. the 'redevelopment year'), which is intended to capture properties that are vacant land rather than buildings despite the application of other filters above. We estimate that properties sold within 2-years of the first land valuation are around \$270 000 cheaper than properties than sales at least 2 years after the first valuation. <p>The sample for this regression excludes the top and bottom 1 per cent of sale prices (which somewhat decreases price estimates relative to a model estimated on an untrimmed sample).</p>

Type of dwelling	Data source and approach
	The coefficients from this model are used to estimate the sale price of dwellings in each year and in each greenfield area.
Infill apartments	<p>We have identified properties that are redeveloped into new apartments, and estimated the average sale price by LGA and year using regression modelling.</p> <p>We identify new apartments based on new strata-titled properties that appear in the Valuer-General's property dataset, with the year of redevelopment being the first year that a land valuation is available for a property. We undertake GIS analysis to identify the properties that were redeveloped to deliver new apartments based on identifying properties that overlap their property boundary with new apartments. We estimate the height of each new apartment based on the number of dwellings per square-metre of land, and use this to exclude apartments and townhouses under four storeys.</p>

Source: CIE.

Greenfield houses

Table B.2 presents the regression modelling output from the greenfield property sale price modelling. The dependent variable for this regression model is the sale price of a property on a given year.

B.2 Greenfield sale price regression model outputs

Variable	Coef.	Std. Err.	t	P>t
2018	Omitted			
2019	-82921.79	4551.588	-18.22	0.000
2020	-24561.81	4020.496	-6.11	0.000
2021	120741.7	4108.608	29.39	0.000
2022	269649.3	4883.633	55.21	0.000
2023	294061.9	4641.678	63.35	0.000
2024	266380.4	5943.229	44.82	0.000
Greater Macarthur	Omitted			
Hunter	-336445.3	5908.754	-56.94	0.000
North West	92089.31	5120.993	17.98	0.000
South West	-39731.29	5150.931	-7.71	0.000
Wilton	-218856.5	7112.332	-30.77	0.000
Sold within 2 years of first valuation	-270558	2391.775	-113.12	0.000
Land area	517.1135	11.13839	46.43	0.000
Land area squared	-0.1115283	0.0036005	-30.98	0.000
Constant	612316.2	7273.823	84.18	0.000

Note: 'Omitted' means that the specified level of the year or region variable is the base level. E.g. Greater Macarthur is the base level for the greenfield region.

Source: CIE.

Identifying whether a sale occurred in a greenfield area was done by classifying travel zones into greenfield and infill. Criteria for whether a travel zone was designated greenfield include:

- The most prevalent zonings within the travel zone,
 - Rural zone codes were allocated to greenfield, and

- SP2 zone codes (special purpose) were allocated to greenfield if the next largest zone code within the travel zone was RU1-RU6.
- Population density:
 - After testing, the threshold for greenfield population density was set as under 1630 residents per hectare.

To estimate the sale price of dwellings for each area and year, we apply estimates of average lot size for each region to the area and area-squared coefficient estimates from the price model. Average lot size for each greenfield region is based on a regression model estimated on the same sample of properties as the price regression model (detailed above), and results are reported in table B.2. Estimated property areas in this sample are broadly similar to the average lots sizes published in the UDIA State of the Land report (chart B.3).

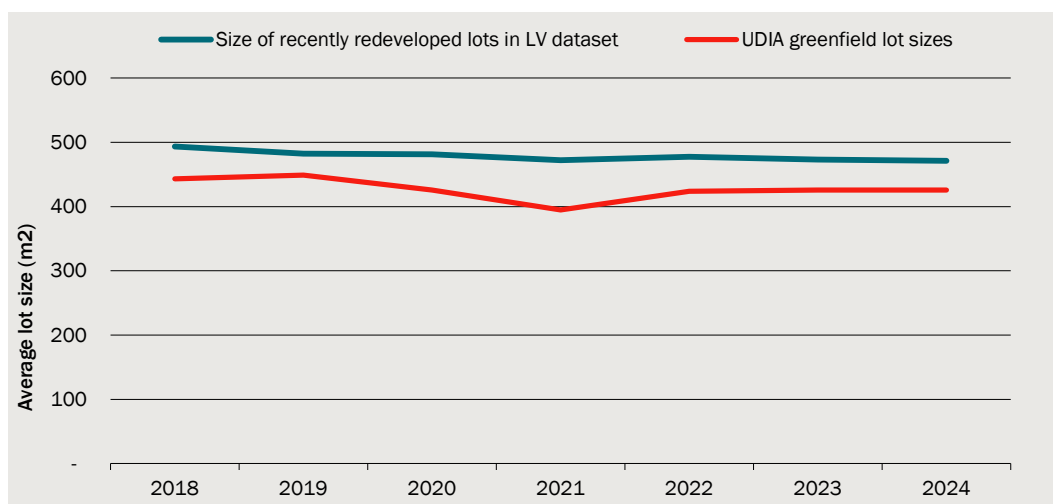
B.3 Average lot size for greenfield properties

area_m2	Coef.	Std. Err.	t	P>t
2018	Omitted			
2019	-10.9053	4.672711	-2.33	0.02
2020	-11.884	4.185942	-2.84	0.005
2021	-21.0381	4.2616	-4.94	0
2022	-15.8849	4.968592	-3.2	0.001
2023	-19.9774	4.7465	-4.21	0
2024	-21.9695	6.021398	-3.65	0
Greater Macarthur	Omitted			
Hunter	278.7731	5.80632	48.01	0
North West	3.978467	5.376432	0.74	0.459
South West	21.83941	5.405375	4.04	0
Wilton	251.9685	7.22704	34.86	0
Constant	389.6406	5.918539	65.83	0

Note: 'Omitted' means that the specified level of the year or region variable is the base level. E.g. Greater Macarthur is the base level for the greenfield region.

Source: CIE.

B.4 Comparison of UDIA and CIE-estimated lot sizes



Data source: UDIA, Valuer-Generals Land Value dataset, CIE.

Estimate sale prices for greenfield houses based on the regression coefficients above are shown in table B.5.

B.5 Estimated greenfield sale prices based on regression modelling

Greenfield region	2018	2019	2020	2021	2022	2023	2024
	\$	\$	\$	\$	\$	\$	\$
North West	873 243	791 736	840 569	972 342	1 133 579	1 158 412	1 130 534
South West	749 716	668 511	716 920	848 246	1 009 960	1 034 903	1 007 061
Wilton	677 447	600 138	643 087	768 643	936 511	962 870	935 480
Greater Macarthur	779 307	697 732	746 659	878 532	1 039 663	1 064 471	1 036 586
Hunter	572 305	495 449	537 762	662 646	831 231	857 755	830 418
Sydney	739 521	659 702	706 168	835 441	999 345	1 024 792	997 111

Source: CIE.

Infill apartments

To estimate the sale price of newly constructed infill apartments we used the same identification process described in Appendix A to estimate land acquisition costs to find properties which have been redeveloped into apartments.

- Once the recently redeveloped apartments are identified, we estimate building heights based on the number of lots on the property, the size of the property and the average size of apartments in Sydney.
 - Buildings under 4 floors are excluded to ensure we are not picking up townhouses.
 - Buildings between 4 and 9 floors are labelled as mid-rise, and buildings between 10 and 40 floors are labelled as high-rise.
 - Buildings over 40 floors have been excluded.
- We drop any sales data for each property before the year of redevelopment.

- We label any sale which occurs within two years of redevelopment as sales of new apartments.
- We trimmed the top and bottom 5 per cent of sales prices for each LGA separately.
 - This ensures that LGAs with very high average prices aren't trimmed too heavily.
 - After trimming we were left with approximately 125 000 observations.

We regressed sale price on sale year interacted with the new building identifier, type of building (mid vs high rise) and LGA.

- We weighted the regression based on the proportion of the number of lots in each building relative to the number of sales from that building.
 - This avoids both over-representing buildings with many sales of a few lots, and under-representing buildings with many lots but few sales.

Regression outputs are shown below.

B.6 Infill sale price regression model outputs

Variable	Coefficient	Standard error	t-statistic	P-value	Lower bound 95% confidence interval	Upper bound 95% confidence interval
Year for new apartments						
2014	-259402.2	17318.58	-14.98	0	-293346.4	-225458.1
2015	-213885.2	17448.64	-12.26	0	-248084.2	-179686.2
2016	-200714.4	17764.68	-11.3	0	-235532.9	-165895.9
2017	-149884.4	17317.35	-8.66	0	-183826.2	-115942.7
2018	-150425.1	17573.73	-8.56	0	-184869.3	-115980.9
2019	-125371.7	18152.17	-6.91	0	-160949.6	-89793.72
2020	-123927	17497.02	-7.08	0	-158220.8	-89633.1
2021	-62262.27	17663.5	-3.52	0	-96882.43	-27642.1
2022	-32970.17	18477.87	-1.78	0.074	-69186.49	3246.14
2023	-4078.795	18513.03	-0.22	0.826	-40364.01	32206.42
2024	0	(omitted)				
Year for apartments which are not new builds						
2014	0	(empty)				
2015	0	(empty)				
2016	-205161.7	19177.53	-10.7	0	-242749.3	-167574
2017	-179968.8	18252.84	-9.86	0	-215744	-144193.5
2018	-189381.8	18328.53	-10.33	0	-225305.4	-153458.2
2019	-201704.2	17692.33	-11.4	0	-236380.9	-167027.6
2020	-195453	17719.09	-11.03	0	-230182.1	-160723.9
2021	-145288	17558.73	-8.27	0	-179702.8	-110873.1
2022	-108202.8	17509.89	-6.18	0	-142521.9	-73883.75
2023	-123363.3	17385.21	-7.1	0	-157438	-89288.59
2024	-111208.3	17631.65	-6.31	0	-145766	-76650.58

Variable	Coefficient	Standard error	t-statistic	P-value	Lower bound 95% confidence interval	Upper bound 95% confidence interval
LGA						
Armidale	11134.43	34047.69	0.33	0.744	-55598.45	77867.32
Ballina	429565.1	37703.75	11.39	0	355666.4	503463.8
Bathurst	26592.92	37643.09	0.71	0.48	-47186.91	100372.7
Bayside (NSW)	519784.5	32979.85	15.76	0	455144.6	584424.5
Bega Valley	195402	36323.51	5.38	0	124208.5	266595.5
Bellingen	147446.4	47084.34	3.13	0.002	55161.86	239730.9
Berrigan	-97497.05	34680.15	-2.81	0.005	-165469.6	-29524.54
Blacktown	279386.4	32955.14	8.48	0	214794.9	343977.9
Bland	-110075.9	71894.18	-1.53	0.126	-250987.2	30835.51
Blayney	99579.47	33125.03	3.01	0.003	34654.97	164504
Blue Mountains	275774.3	35877.82	7.69	0	205454.4	346094.2
Burwood	550651.9	33405.62	16.48	0	485177.5	616126.4
Byron	695481	48197.47	14.43	0	601014.8	789947.3
Cabonne	-145488.3	32934.09	-4.42	0	-210038.6	-80938.05
Camden	280263.8	33867.21	8.28	0	213884.7	346643
Campbelltown (NSW)	235307.8	33158.43	7.1	0	170317.8	300297.7
Canada Bay	856529.9	35161.47	24.36	0	787614	925445.7
Canterbury-Bankstown	329397.3	32966.58	9.99	0	264783.4	394011.3
Central Coast (NSW)	362833.8	33665.24	10.78	0	296850.5	428817.1
Cessnock	15598.96	33438.32	0.47	0.641	-49939.57	81137.49
Parramatta	428525.6	32962.34	13	0	363920	493131.3
Sydney	843885.3	33495.88	25.19	0	778234	909536.7
Clarence Valley	81634.37	36266.06	2.25	0.024	10553.5	152715.2
Coffs Harbour	199866.2	33820.64	5.91	0	133578.3	266154.1
Cootamundra-Gundagai	-84768.14	42834.16	-1.98	0.048	-168722.4	-813.9007
Cowra	-184434.3	33177.67	-5.56	0	-249462	-119406.7
Cumberland	306973.8	33011.96	9.3	0	242270.9	371676.7
Dubbo	10351.61	33553.45	0.31	0.758	-55412.59	76115.81
Dungog	-66794.71	34043.64	-1.96	0.05	-133519.7	-69.74943
Edward River	-111159.1	32983.5	-3.37	0.001	-175806.2	-46512.02
Eurobodalla	257006	38157.12	6.74	0	182218.7	331793.3
Fairfield	202714.6	33328.2	6.08	0	137391.9	268037.3
Federation	-88716.04	38121.8	-2.33	0.02	-163434.1	-13997.96
Georges River	427632	33142.07	12.9	0	362674.1	492589.9
Glen Innes Severn	-119559.5	33307.26	-3.59	0	-184841.2	-54277.87
Goulburn Mulwaree	70516.65	33487.19	2.11	0.035	4882.33	136151
Greater Hume	-87232.69	34561.4	-2.52	0.012	-154972.5	-19492.92
Griffith	284044.1	140517.4	2.02	0.043	8632.417	559455.8
Gunnedah	177580.2	111773.6	1.59	0.112	-41494.24	396654.7

Variable	Coefficient	Standard error	t-statistic	P-value	Lower bound 95% confidence interval	Upper bound 95% confidence interval
Hawkesbury	252960.4	36136.23	7	0	182134	323786.8
Hilltops	-75420.53	33125.03	-2.28	0.023	-140345	-10496.03
Hornsby	450292	33189.36	13.57	0	385241.4	515342.6
Hunters Hill	1043756	71153.9	14.67	0	904296	1183217
Inner West	619074.4	33428.24	18.52	0	553555.6	684593.2
Inverell	87222.11	37868.24	2.3	0.021	13001	161443.2
Kempsey	223605.3	50158.52	4.46	0	125295.4	321915.1
Kiama	484234.1	39801.98	12.17	0	406222.9	562245.3
Ku-ring-gai	764209.4	34043.47	22.45	0	697484.7	830934
Kyogle	-75360.54	39043.51	-1.93	0.054	-151885.2	1164.08
Lake Macquarie	215050.7	33408.52	6.44	0	149570.6	280530.9
Lane Cove	809770.1	34738.93	23.31	0	741682.4	877857.8
Leeton	-109635	39701.57	-2.76	0.006	-187449.4	-31820.54
Lismore	92613.71	37602.95	2.46	0.014	18912.56	166314.9
Lithgow	-20068.43	34030.83	-0.59	0.555	-86768.28	46631.42
Liverpool	235653	32975.22	7.15	0	171022.1	300283.9
Maitland	69118.55	33425.48	2.07	0.039	3605.176	134631.9
Mid-Western	421653.7	121351.4	3.47	0.001	183807	659500.5
Mid-Coast	118578.5	35703.1	3.32	0.001	48601.01	188556
Moree Plains	-88394.06	52508.46	-1.68	0.092	-191309.8	14521.64
Mosman	1468722	68939.72	21.3	0	1333601	1603843
Murray River	112414	43382.39	2.59	0.01	27385.23	197442.7
Muswellbrook	-32390.33	34203.53	-0.95	0.344	-99428.67	34648.01
Nambucca Valley	3882.742	54776.08	0.07	0.943	-103477.5	111242.9
Narrabri	1363974	230081.6	5.93	0	913017.7	1814930
Newcastle	307199.8	33235.7	9.24	0	242058.4	372341.2
North Sydney	1086917	37188.18	29.23	0	1014029	1159805
Northern Beaches	897526.3	37476.07	23.95	0	824073.9	970978.8
Oberon	-104763	38829.69	-2.7	0.007	-180868.6	-28657.52
Orange	631477.3	376494.7	1.68	0.093	-106446	1369401
Parkes	-76921.44	36660.43	-2.1	0.036	-148775.3	-5067.617
Penrith	226859.6	32946.27	6.89	0	162285.5	291433.7
Port Macquarie-Hastings	136281.3	33264.85	4.1	0	71082.76	201479.9
Port Stephens	205521.3	41628	4.94	0	123931.1	287111.5
Queanbeyan-Palerang	107613.8	34371.59	3.13	0.002	40246.01	174981.5
Randwick	1000427	41686.46	24	0	918722.1	1082132
Richmond Valley	118957.7	39420.3	3.02	0.003	41694.54	196220.8
Ryde	547557.3	33074.14	16.56	0	482732.6	612382.1
Shellharbour	229688.8	33125.64	6.93	0	164763.1	294614.5
Shoalhaven	187622.4	33981.57	5.52	0	121019.1	254225.7

Variable	Coefficient	Standard error	t-statistic	P-value	Lower bound 95% confidence interval	Upper bound 95% confidence interval
Singleton	37497.21	34235.61	1.1	0.273	-29604	104598.4
Snowy Monaro	330535.9	48242.52	6.85	0	235981.4	425090.4
Strathfield	376441.3	33230.09	11.33	0	311310.8	441571.7
Sutherland	635401	33447.13	19	0	569845.2	700956.8
Tamworth	28646.5	34775.52	0.82	0.41	-39512.94	96805.94
Temora	12370.15	35886.92	0.34	0.73	-57967.6	82707.91
The Hills	432264.4	33164.51	13.03	0	367262.6	497266.3
Tweed	324147.1	34999.47	9.26	0	255548.7	392745.4
Upper Hunter	-62328.51	37612.14	-1.66	0.097	-136047.7	11390.66
Uralla	-34446.75	39164.04	-0.88	0.379	-111207.6	42314.11
Wagga Wagga	249093.4	80236.27	3.1	0.002	91831.68	406355.1
Warrumbungle	-55420.53	33125.03	-1.67	0.094	-120345	9503.965
Waverley	1462043	45625.43	32.04	0	1372618	1551468
Wentworth	-240010.2	33002	-7.27	0	-304693.6	-175326.8
Willoughby	992507	40917.47	24.26	0	912309.5	1072705
Wingecarribee	414028.9	43605.37	9.49	0	328563.1	499494.6
Wollondilly	162611.8	36324.33	4.48	0	91416.72	233806.9
Wollongong	363741.8	33213.78	10.95	0	298643.3	428840.2
Woollahra	2916217	103075.3	28.29	0	2714191	3118243
Yass Valley	127821.3	41099.83	3.11	0.002	47266.32	208376.3
Building type						
Mid-rise	-120734.5	2840.501	-42.5	0	-126301.8	-115167.1
High-rise	-107780.7	4045.463	-26.64	0	-115709.7	-99851.66
Constant						
Constant	520873.5	37002.12	14.08	0	448350	593397

Note: There are no observations of sales of new buildings in 2014 or 2015. This is because we don't have property data going back far enough to identify which sales are of new buildings. New apartments in 2024 are omitted to avoid collinearity.

Source: The CIE

To get an average sale price for Sydney apartments we took an average of the regression estimates for each LGA in greater Sydney, weighted by number of approvals.

The resulting sale prices are consistently above the UDIA median new unit sale between 2018 and 2023 but follow a very similar trend. Note that as we are comparing the average of a right-tailed distribution to a median, this is to be expected to a certain extent. The comparison can be seen in chart B.8

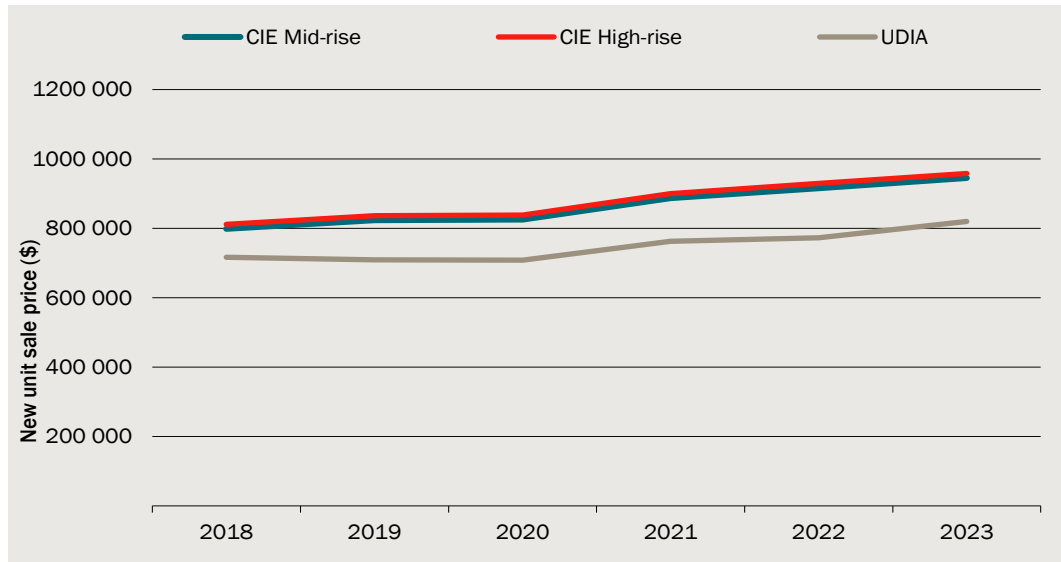
B.7 Estimated Sydney infill sale prices based on regression modelling

	2018	2019	2020	2021	2022	2023
	\$	\$	\$	\$	\$	\$
CIE Mid-rise	798 602	823 656	825 100	886 765	916 057	944 949

	2018	2019	2020	2021	2022	2023
	\$	\$	\$	\$	\$	\$
CIE High-rise	811 556	836 610	838 054	899 719	929 011	957 902

Source: CIE.

B.8 Comparison of UDIA and CIE new apartment sale prices



Note: CIE estimates are averages while UDIA is measuring a median.

Data source: CIE and UDIA.

C Concordance of local government areas and greenfield markets

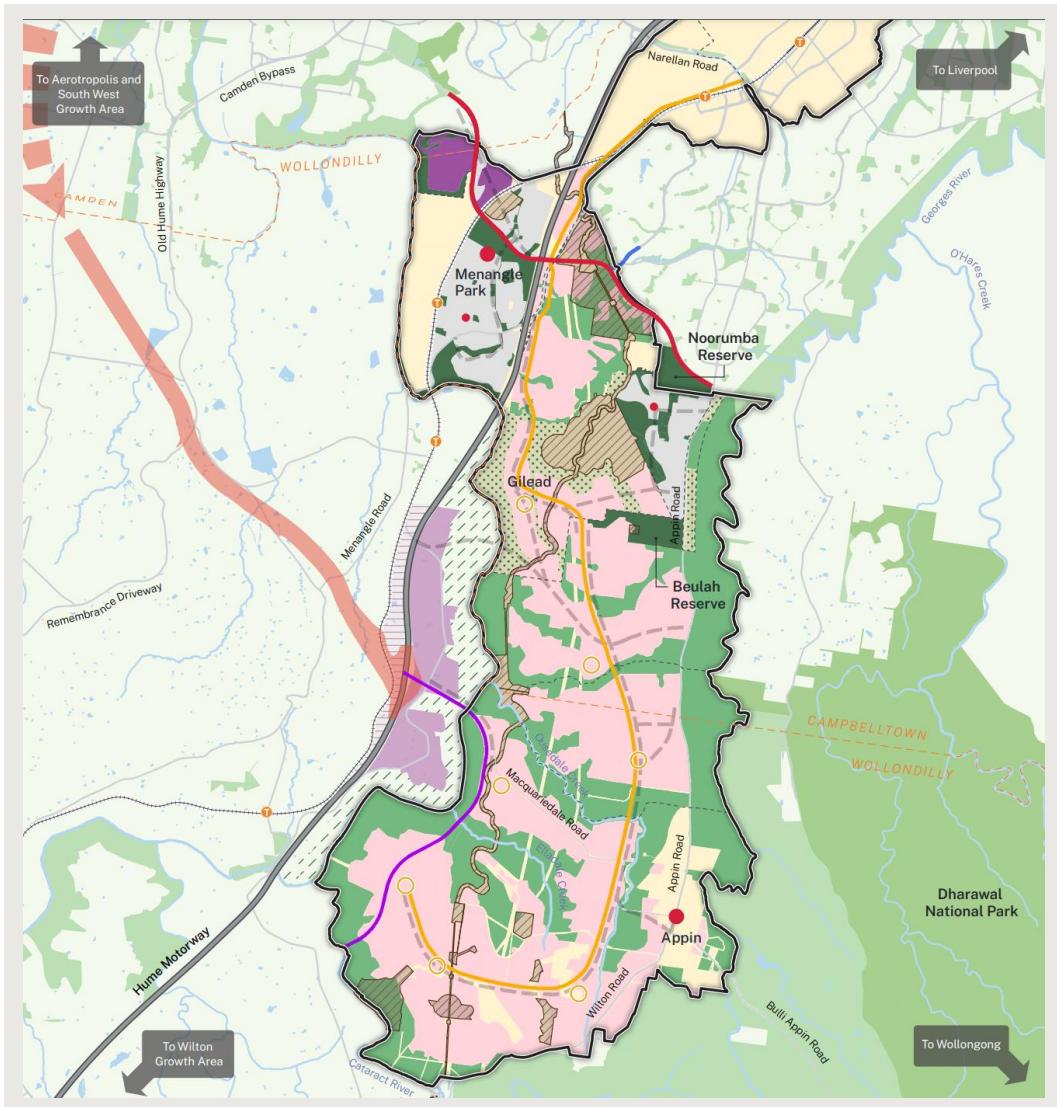
We have used a one-to-one concordance between greenfield markets and LGAs, shown in table C.1. Some LGAs cover multiple greenfield markets, such as Wollondilly covering almost all of Wilton and a small portion of Greater Macarthur (see map C.2).

C.1 Greenfield market and LGA concordance

LGA	Greenfield market
Blacktown	North West
Camden	South West
Campbelltown (NSW)	Greater Macarthur
Cessnock	Hunter
Dungog	Hunter
Hornsby	North West
Lake Macquarie	Hunter
Liverpool	South West
Maitland	Hunter
Mid-Coast	Hunter
Muswellbrook	Hunter
Newcastle	Hunter
Port Stephens	Hunter
Singleton	Hunter
The Hills	North West
Upper Hunter	Hunter
Wollondilly	Wilton

Source: CIE based on the North West Priority Growth Area land use and infrastructure implementation plan (p.12, available at: <https://www.planning.nsw.gov.au/sites/default/files/2023-04/north-west-priority-growth-area-land-use-and-infrastructure-implementation-plan.pdf>), the South West Growth Area structure plan (<https://www.planning.nsw.gov.au/sites/default/files/2023-04/guide-to-south-west-growth-area-structure-plan-map.pdf>), the Greater Macarthur structure plan (available at: <https://www.planning.nsw.gov.au/sites/default/files/2023-03/greater-macarthur-structure-plan-land-release-area-map.pdf>) and the Hunter Regional Plan (available at: <https://www.planning.nsw.gov.au/plans-for-your-area/regional-plans/hunter-regional-plan-2041>)

C.2 Greater Macarthur land release area map



Data source: Greater Macarthur structure plan, available at: <https://www.planning.nsw.gov.au/sites/default/files/2023-03/greater-macarthur-structure-plan-land-release-area-map.pdf>



THE CENTRE FOR INTERNATIONAL ECONOMICS
www.TheCIE.com.au