RESEARCH PAPER: Meeting housing supply targets. How long does it take to build apartments in Australia?

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ABSTRACT

This paper explores the key stages in the apartment development process, and how long each stage takes for a variety of apartment building types. Planning approval time has long been argued to be excessive with delays linked to declining housing affordability and housing supply shortages. Since the COVID disruption to supply chains and labour markets, construction time has assumed greater prominence in the housing supply debate. However, at no time has the phase between planning approval and construction commencement been analysed. Understanding the contribution of each stage of the total project duration has ramifications for policy aimed at increasing housing supply and to meet the ambitions of the National Housing Accord.

This research is the first of its kind to identify and quantify the time frames associated with apartment development. Using a sample of 37 Melbourne apartment projects commenced and completed between 2012 and 2023, we examine the time taken for three key stages of the development process: planning approval, presales, and construction. Findings indicate that whether it be 'gentle density' low-rise, or inner city behemoths, apartment projects take around five years from inception to completion. This research contributes to the growing body of evidence that the Australian government's target of building 1.2m new homes in five years was unachievable from the start.

Introduction

In Australia, public debate about housing supply has increased in recent years reflecting sustained high housing costs, tight rental vacancy rates and high population growth. Supply chain disruption and labour shortages associated with the pandemic have dramatically intensified the debate around housing supply. Reflecting the intensity of the debate, the National Housing Accord, introduced by the federal government in 2023, commits the states, territories, local government, to deliver 1.2 million new homes over five years from mid-2024 (Australian Government, 2023).

With a focus on creating housing diversity, apartments are increasingly important in housing supply in Australia, despite the historic preference for low density detached homes. Apartment construction has equalled detached house building from the mid-2010s (Easthope *et al.*, 2023). Apartments increasing popularity is due to the relative affordable purchase cost compared to detached housing, although the cost of construction is generally higher (Rosewall and Shoory, 2017). Apartments provide access to sought after locations rich in employment and services, unlike greenfield housing which is increasingly spatially distant from sources of economic opportunity (Sarkar *et al.*, 2024) and existing infrastructure (Rosewall and Shoory, 2017).

However, apartment development is risky (Perera *et al.*, 2020, Rachmawati and Kim, 2022), with cubic subdivision of airspace inherently than land subdivision (Sharam *et al.*, 2015). Time is a critical factor for apartment projects, as projects are revenue negative until completion (Whipple, 1988), holding costs are significant, interest is capitalised (Bryant, 2012) and many risks cannot mitigated via staging as with land subdivision (Forlee, 2022). Apartment development projects have longer development timeframes with complex planning and building approvals processes; construction occurs in complex and dynamic urban environments (Basari, 2017); and larger projects require specialist project financing (Bryant, 2012). In Australia, apartment supply is highly reliant on demand from private landlords and therefore is sensitive to rising prices (Murray and Limb, 2022) and as a consequence supply is vulnerable to economic shocks (Rachmawati and Kim, 2022, Sharam, 2023).

Time, is a critical risk for apartment developers (Rosewall and Shoory, 2017, Rowley *et al.*, 2022). Whilst planning approval time is often cited as a key delay point, construction stage *time delays* risk (weather, force majeure, strikes) were rated as the number 1 risk by 20 Australian listed property development companies surveyed by Newell and Steglick (2015). *Approvals* risk rated the fifth most important risk. However, at no time has the phase between planning approval and construction commencement been analysed, nor has the differential impact of these factors on different sized apartment projects been studied. With national interest focused so squarely on apartment supply, it is extraordinary that so little is known about many aspects of it, particularly the process involved and the time each step takes. The purpose of this research is to identify the apartment development process and quantify how long each stage takes. This research is

important as it will inform policy makers who increasingly propose higher density solutions to address Australia's housing supply crisis. Further, by establishing apartment typologies, it identifies where delays occur in medium, large and very large projects. This research provides the first evidence of its type to demonstrate the time various apartment projects take to deliver new housing supply, and at which stages delays occur. It will help policy makers to better target reform in their efforts to achieve national housing supply and housing diversity targets.

Why is time important?

Planning approval time – lack of data

Housing supply shortages are regularly blamed on the planning system (what is required) and approval (how long it takes) (see for example UDIA, 2022). Protracted planning approval times attract much public criticism and has long been the subject of academic interest. Apartment developers are politically mobilised, through industry peak bodies to obtain relief from what they often describe as planning red tape (Gurran and Phibbs, 2013). For example, the Housing Industry Association (HIA) argues '*users of planning systems from all jurisdictions report excessive assessment and determination timeframes and gold plating of development requirements*' (Housing Industry Association, 2023 p.7).

However, establishing the time taken for approvals, and hence the risk of time delays '*cannot be measured with any confidence, particularly at the national level due to the lack of publicly available, consistent, timely data*' (Savery 2008[1]). The Productivity Commission (2021 p.20) agrees there is lack of robust data collection regarding planning approval times. An earlier Productivity Commission report (2004) cites two submissions one by the HIA (a single case study), and another by the Royal Australian Institute of Architects (a survey of members), noting it had been difficult to reconcile the findings of such research against data available from official sources. Member surveys such as that by the NSW UDIA (2022), The Urban Developer and NBN (Paris, 2023) have been a key source of understanding, but the samples used are problematic from a methodology perspective. Hurley *et al.* (2009) note that while the idea that third party appeals hold up medium density housing projects, analysis is compromised by the lack of city-wide evidence.

Market Risks

The property cycle is the key time-related market risk (Rosewall and Shoory, 2017) with sudden and sharp downturns often resulting in insolvencies (Sharam, 2023). Market conditions impact the progress of presales (see below).

[1] Senate Select Committee on Housing Affordability in Australia, 2008. *A good house is hard to find: Housing affordability in Australia.* Canberra: P.O. Australia..

Construction Risk

There is an extensive literature on construction risk, with time a critical consideration. The construction phase is high risk, particularly until the building is 'out of the ground' owing to the lack of certainty about geological conditions (Lam and Siwingwa, 2017, Karkush *et al.*, 2021). Other construction risk factors that impinge on time include weather (Iqbal *et al.*, 2015, Lam and Siwingwa, 2017), environmental considerations (Newell and Steglick, 2015), labour issues (including industrial issues, poor productivity, lack of skills, poor communication) (San Santoso *et al.*, 2003, Othman *et al.*, 2011), material quality and supply chain issues (San Santoso *et al.*, 2003, Chan, 2017, Ekanayake *et al.*, 2020). Boom periods increase competition for labour and material supply (Hillebrandt, 2000, Hasib and Al-Kilidar, 2021). Poor project planning and outdated processes often contribute to delays (Mitropoulos and Nichita, 2009, Othman *et al.*, 2011, Othman *et al.*, 2012, Memari *et al.*, 2014, Al Nasseri and Aulin, 2016) (Mitropoulos and Nichita, 2009, Othman *et al.*, 2011, Othman *et al.*, 2012, Memari *et al.*, 2014). Redesign for constructability may be necessary once the builder is contracted (Gruneberg, 2023). Cost pressure often results in poor design that impacts construction time (Iqbal *et al.*, 2015) and the need for rework (O'Brien *et al.*, 2002). Congested urban areas and limited on site space create logistical challenges (Tommelein and Zouein, 1993, Sadeghpour *et al.*, 2004, Kumar and Cheng, 2015, Zhang *et al.*, 2022).

While time is a well-known risk for development, we know very little about how long the total development process takes in Australia, hence the degree to which time is a risk and if policy intervention is required. This research quantifies how long each main stage in the apartment development process takes to better understand the impact of time delays in the apartment supply process and identify areas for policy reform.

Apartment Development Process

To appreciate the impact of time on apartment development, the apartment development process must first be understood. Apartment development is a largely linear process that begins with project initiation and proceeds through several well-established stages, resulting in new apartments being completed and ready for use. These stages are illustrated below in Figure 1. Although characterised in a sequential process, this is an oversimplification of the multitude of sub-steps and complex risk management that occur *within* each stage. The milestones indicated are critical stop/go decision making points, at which time the project may or may not proceed (to construction[2]).

[2] Project finance terms generally include tri-partite and other agreements to ensure construction is completed once commenced.

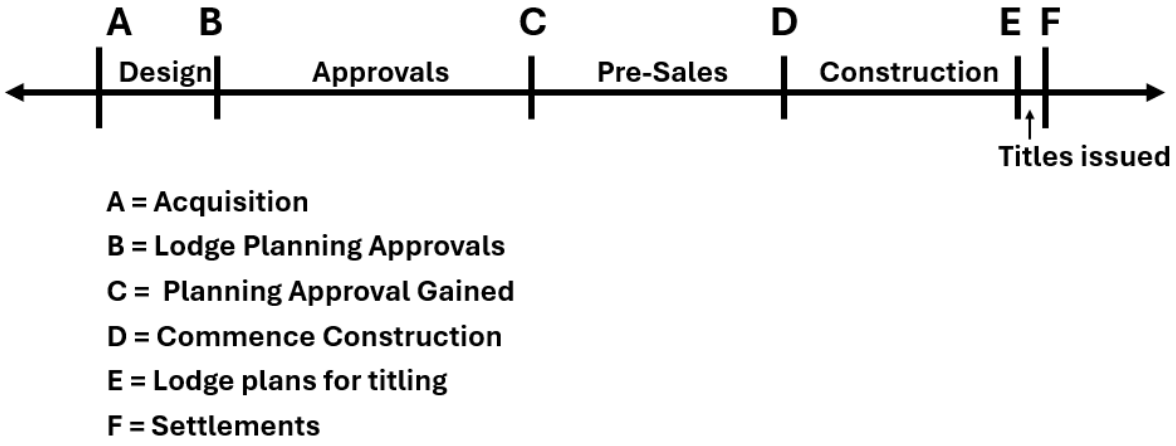


Figure 1 Apartment Development Timeline – Stages and Milestones. Source adapted from Bryant (2013)

Acquisition

Prior to acquisition (milestone A), a developer will likely investigate and evaluate the feasibility of many sites. This is indicated by the open-ended arrow prior to A. Given significant costs do not generally start accruing until site acquisition, the project start is generally accepted as A, acknowledging there is a process to get to this point.

The site acquisition price is determined by residual valuation methodology i.e. the forecast gross sale price less all costs (including interest) and a profit margin (Schmits, 2000). This process first assumes the size and nature of the planned development (i.e. how many apartments and of what configuration). Given no design work has commenced at this stage, this is often an estimate based on the developer's knowledge of the applicable planning regulations. Gross sale price is estimated through analysis of market demand and competition from other projects. This also informs the developer's understanding of the market appetite for the proposed apartments and to establish a forecast absorption rate (i.e. how long the pre-sales stage is likely to take) (Schmits, 2000). Costs are forecast based on the prevailing construction, consultant, marketing, statutory, holding and other known costs likely to be expended over the project timeline. The profit margin adopted is typically sufficient to show a 15-25 per cent internal rate of return on the project (Rowley *et al.*, 2022). Interest is calculated on all costs over the forecast project timeline and is generally capitalised.

Site acquisition therefore locks in the yield, sale price, cost and time assumptions in the feasibility analysis (Schmits, 2000) with weak demand, increased costs or time delays being major risks to project profitability.

Design and Approvals

Once the site is secured, a consultant team is assembled and design work commenced to determine the optimum yield and configuration of the site. This is generally an iterative process with the feasibility of multiple concepts being tested to determine the most advantageous design. Once the preferred concept has been determined, consultants prepare the extensive project information and expert reports required to lodge the required planning permit (milestone B).

Apartment development requires a planning permit and potentially re-zoning of the site. Planning permits are typically assessed by the local government, and considerable opposition to increasing density means approvals may be subject to local political campaigns. Both the initial approval process and appeal process can be lengthy, escalating the holding costs for the developer.

The time required to assess applications relates to the completeness of the application, what is in the scope of regulation, the complexity of the development proposal, as well as the capacity of the local authority. A shortage of planners, for example, which reduces capacity to process applications, has long been an issue for councils (Fallding and Williams, 2023). Any additional information requests by the local authority will put the application on hold until the information is supplied potentially resulting in lengthy time delays. The planning approval process also includes secondary approvals provided by a range of other agencies (such as public water and/or road authorities, private energy companies, state and or federal environmental agencies) which are outside the control of local authorities, and which add to the approval time. Notably, not all these requirements are known to the developer at the time of acquisition, and any such approval time delay is likely to reduce the project's profitability and thus likelihood of proceeding past Milestone C.

Approval by the local authority is a major milestone in any project. It is a key go/stop decision making point. If the permit conditions and market conditions are satisfactory and the developer's expectations for project profit maintained, then the project may proceed. If there is downturn in the housing market or if or other external factors have changed (e.g. taxation) or if the permit conditions render the project unviable, the developer has several options including: sell the site with an approval, redesign the concept and seek an amended approval, or hold the site until market conditions improve.

Pre Sales

Several activities occur during the time between planning approval and construction commencement including detailed market supply and demand analysis, appointment of consultants, finalising and documenting the building design, construction tender and negotiation, obtaining the building permit, and obtaining finance approval and meeting all the financiers' loan conditions. The most onerous of these is obtaining project finance and satisfying the financiers' conditions for the release of funds for construction.

Developers generally contribute equity to a project, for example for site acquisition, design and permits, with debt financing used to fund most project costs, including construction. Whilst the debt financier may provide in principle approval early in the project, release of funds is subject to reassessment of the feasibility assumptions and compliance with its loan conditions. One condition that has major implication for timing is the requirement to obtain a quota of 'off-the-plan sales'(presales) (Johnston and Reid, 2013). Presales establish market acceptance and demand for the proposed product, and the associated settlements cover the debt (sometimes to the value of 100% or more of the total project funding) thus reducing development risk (Bryant, 2012). Financiers will independently vet the presales to ensure the buyer is capable of settlement and may impose restrictions on the number of foreign buyers as these contracts may be hard to enforce, thereby increasing the challenge in obtaining the requisite number of sales.

In general, a significant amount of effort, expenditure and time is required to find the requisite number of buyers that are suitable to the financier (Sharam *et al.*, 2015, Ganguli, 2022) with the degree of difficulty in obtaining presales largely dependent on the property cycle (Rowley *et al.*, 2022). Boom conditions offer the opportunity for rapid capital appreciation and therefore increases investor activity. Conversely busts results in investor flight. It is common practice for developers to obtain registration of interests from potential buyers prior to formal presale campaign launch which is why some projects may achieve relatively short pre-sale periods. Projects may sell out in a day or take years to achieve. Slowness of sales may reflect poor product offering, strong competition, or general poor economic conditions. If the offer of finance is withdrawn, or if the developer can't obtain the level of presales required, the development may be held up as the developer looks for alternative financing.

In the time period of our case studies, pre-sales slowed as a result of a shift in the property cycle (towards the end of 2017) but also because of increasing consumer awareness of defects risk, new restrictions on foreign investment and tighter capital export restrictions imposed by the Chinese Government (Ganguli, 2022).

The pre-sales campaign and other activities that occur between planning approval and construction start generally run concurrently. Building permits certify the building

documentation is code compliant (Victorian Building Authority, 2024). The size and complexity of the building will impact the time it takes to ensure the design and documentation will satisfy the building surveyor (Better Regulation Victoria, 2019). The task of obtaining certification has increased dramatically in recent years reflecting concern with the increasing prevalence of building defects (Bell, 2017). However, building permit/construction certification *time* is not subject to the same public campaigning by developers/peak bodies although the scope of regulation is the subject of much advocacy. This likely arises because the permit system is largely privatised with developers responsible for engaging building inspectors (Better Regulation Victoria, 2019). There appears to be no public data on how long it takes to obtain a building permit/construction certification. Once design is advanced, the developer will (typically) tender the construction. Delays can then occur if the builder requires any re-design. Re-design can trigger the need for planning permit amendment.

Construction

The commencement of construction signals that a building permit has been approved, pre-sale quotas have been met and financiers are willing to proceed. This is a key milestone in any construction project (see Milestone D). Construction is typically tendered with design and construct contracts incentivising the head contractor to deliver the project within budget and on time.

Issuing of Titles and Settlements

Upon completion of construction (Milestone E), the building must be certified as compliant with the National Construction Code and plans of subdivision lodged with the state government for so individual lot titles can be created to enable settlement of presale contracts (Milestone F). Traditionally, this has been a relatively short process (matter of weeks) and not subject to delay. However, the HIA has complained titling in Victoria, has become unreasonably delayed (HIA, 2023). Any delay to the settlement process at this stage of the project has significant impact on the project profitability, with interest charged daily on the total project debt eroding developer profits.

Settlement of presales then occur in accordance with the conditions in the contract of sale, often two weeks after receiving notice of titles having been issued. Buyers who default at settlement may need to be pursued for breach of contract, a lengthy and expensive legal process. This is the end of the development process. Any unsold apartments will remain on the market unless deliberately held back to prevent downward pressure on prices if economic conditions have deteriorated during the presales and construction period (Ganguli, 2022), or if the developer is holding stock as a rental investment. This is indicated in Figure 1 by the open-ended arrow after Milestone F.

Methodology and Data

The purpose of this paper is to quantify how long each stage in the apartment development process takes. However, there is no publicly available database that records the timing of key stages within the development process.

Increasingly, property data and analytic services, such as CoreLogic and Cordell Connect are sources of some data on apartment developments. These services amass data from many sources. Planning application data is scraped from council websites, and approvals may require manual follow up. The terms 'Under Construction', 'Approved but not Commenced', and 'Pre-Approval' often appear in research using these sources but the terms are not explained so it is unclear exactly what they refer to, or the exact source of information used (see for example JLL, 2022, NSW UDIA, 2022). Indeed, most industry research regarding apartment development avoids providing a thorough explanation of their methodology. Databases, such as the Victorian Planning Permit Activity Reporting System (PPARS) provides public data on average and median planning approval times, but projects cannot be disaggregated according to the number of levels (making it difficult to accurately identify apartments projects). Overall, assessments of planning time provide averages or medians, and rarely disaggregate the data to provide insight into the impact of project size, although differences between cities are often presented. Construction tender and start dates are recorded by construction data firm, Cordell Construction, but completion dates are not recorded. Presale data is not available until after settlements have occurred, reflected in the 'Contract Date' of State Revenue Office sales data.

To resolve this problem this study utilizes administrative data from urban.com.au (henceforth "Urban"), a specialist online platform where property developers advertise their off-the-plan apartment projects for sale. Users are incentivised for to update their projects as evidence of the project progress. Nevertheless, this does not always occur. Construction completion date was not reliably entered by users. Urban was able to infer dates in some cases where there was missing data. In other cases, the researchers used RP Data (another property data platform) to obtain settlement and/or strata plan registration, recognising these milestones occur within weeks of occupancy permits being granted and titles being issued. First settlements therefore are a close proxy for construction completion.

Apartment projects were defined, following the ABS categorisation, as four stories and over. Of the 155 Melbourne apartment projects listed on Urban, 37 were completed and satisfied our need for milestone dates. These projects obtained planning permits between December 2012 and October 2018 and were completed between November 2015 and July 2023. This period takes in an apartment boom (up until late 2017) and subsequent cooling, and the pandemic (2020-2022) which slowed both sales and construction.

The apartment development milestones were captured:

- Planning Application submission
- Planning Approval
- Construction start
- Construction completion

The sample was stratified by building typology (Table 1). Typology is important as it provides some indication of the type of technology used, the time and complexity involved, the capital commitment, and the planning and building approval task. The typology adopted is consistent with ABS Buildings Approval data.

Table 1 Type and number of apartment projects

Type	Building Typology	No.	Ave No. levels	Ave. No. Apts
T3	Medium projects having 4-8 levels	19	6	45
T2	Large projects having 9-19 levels	7	11	143
T1	Very large projects having > 20 levels	11	55	547
	Total	37		

In two cases, projects involved multiple buildings (both with three buildings). Building height therefore is not the only indicator of the size of a project and hence the time it may take. For this study, these projects were categorized by the highest tower in the complex.

Findings and Discussion

Findings for each building typology are discussed separately below, starting with the medium (4-8 level) T3 apartment buildings, then the large (9-19 level) T2 apartment buildings, ending with the very large (> 20 level) apartment buildings.

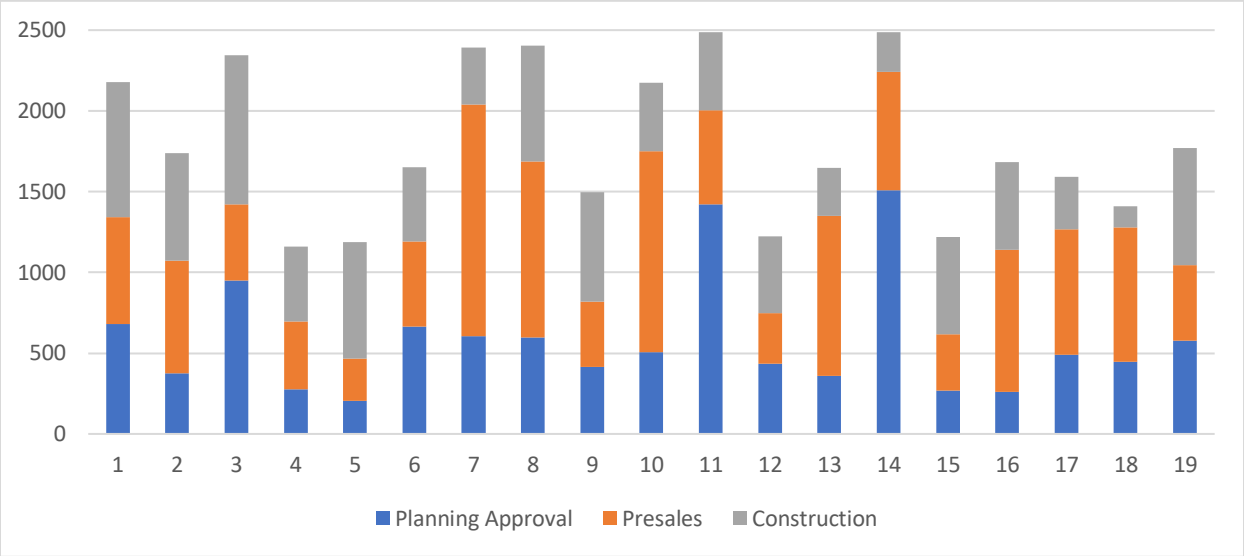
T3 Medium Projects (4-8 levels)

Nineteen (19) projects, or just over half the sample set were T3 medium projects. The average building height was six (6) levels and the average number of apartments per building was 45 (range 18 to 117).

On average it took 1,802 days[3] (4.93 years) for T3 projects to complete (ranging 1,161 to 2,488 days). While planning approval was rarely obtained in less than two years with an average of 581 days (205 to 1,508 days) the presales/building permit stage was mostly longer, often much longer at an average of 691 days (ranging 260 to 1,434 days). Construction time averaged 530 days (ranging 130 to 934 days).

Figure 2 Number of days from planning approval to completion T3 Medium Projects (4-8 levels)

[3] Calendar days.



Three of the projects that completed in less than the average time (T3-4, T3-12, and T3-15) were architect-led boutique type developments with under 26 dwellings, likely to have been targeted at owner occupiers (Easthope *et al.*, 2023). Project T3-5 was also among the fastest, although with 117 dwellings cannot be regarded as boutique, however it shared a design focus and careful pitch to buyers seeking quality. Its size explains its relatively longer construction phase. The boutique nature of smaller projects will generally have made the presale campaigns easier/shorter. Project T3-12 is a model that does not undertake any formal marketing, relying on a waiting list (Sharam, 2019). Anecdotally, this project experienced difficulties with design and construction relating to the proximity of the adjacent railway infrastructure.

In 61% of cases the presale phase took longer than the planning permit. The average planning approval time is skewed by two cases (T3-11 and T3-14) whose permits took 1,422 and 1,508 days respectively. The average planning approval time for T3, excluding these two projects was 471 days (1.29 years). The reasons for lengthy planning approval times are many. Project T3-11 was developed by a sustainability consultancy whose ambition was to achieve a carbon neutral building and a high energy rating. This level of innovation was likely to have complicated the planning permit process. Project T3-14 involved adaption of an historic building, so again not a typical development scenario. What is interesting in these two cases is the subsequent lower than average construction time. Project T3-14 only took 247 days to build. Potentially this project was able to reduce construction time through having fully resolved design prior to construction start.

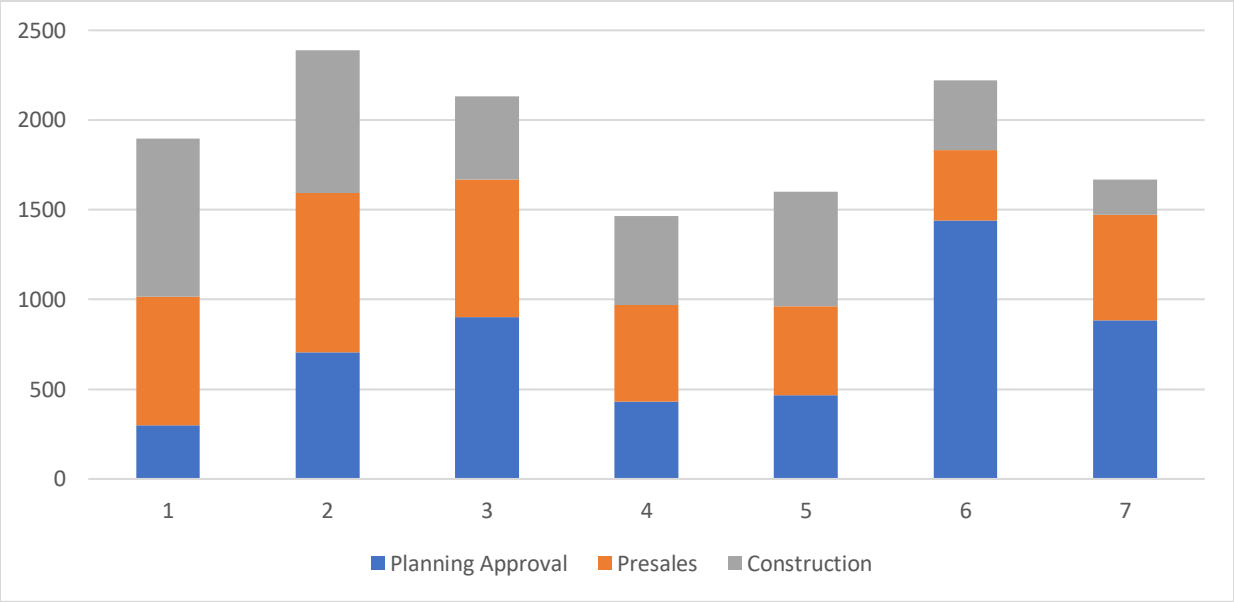
Project T3-18 had a short construction time of 130 days. Given this was a 31 apartment project over 6 levels, and the presale period was long, the design may have been fully resolved prior to construction, enabling an efficient construction period.

T2 Large Projects (9-19 levels)

Seven (7) projects, or 19% of the sample set were T2 large projects. The average building height was twelve (12) levels and the average number of apartments per building was 143 (range 52 to 322).

On average it took 1,910 days (5.22 years) for T2 projects to complete (ranging1,465 to 2,389 days). Planning approvals look two years to obtain at an average of 732 days (ranging 300 to 1,440 days). The presales stage took one year and nine months, averaging 626 days (ranging 393 to 887 days). Construction was completed in one and a half years, averaging 551 days (ranging198 to 881 days).

Figure 3 Number of days from planning approval to completion T2 Large Projects (9-19 levels)



Project T2-6 took 1,440 days (3.83 years) to obtain approval well above the next highest of 883 days (2.41 years) for Project T2-7. As could be expected due to project size, T2 projects generally took longer to achieve pre-sales than T3 projects and was a relatively consistent proportion of the project time, except for project T2-6. As larger projects they may have benefited from greater investment in marketing.

Meanwhile, the construction time varied considerably. Project T2-6 (107 dwellings over 12 levels) took 388 days to build compared with Project T2-1 with 322 dwellings over 18 levels that took 881 days to build. Arguably the additional height and dwellings should not have taken almost three times as long. The website for Project 6's builder suggests this firm seeks full design resolution prior to construction commencement, which could contribute to the short construction time.

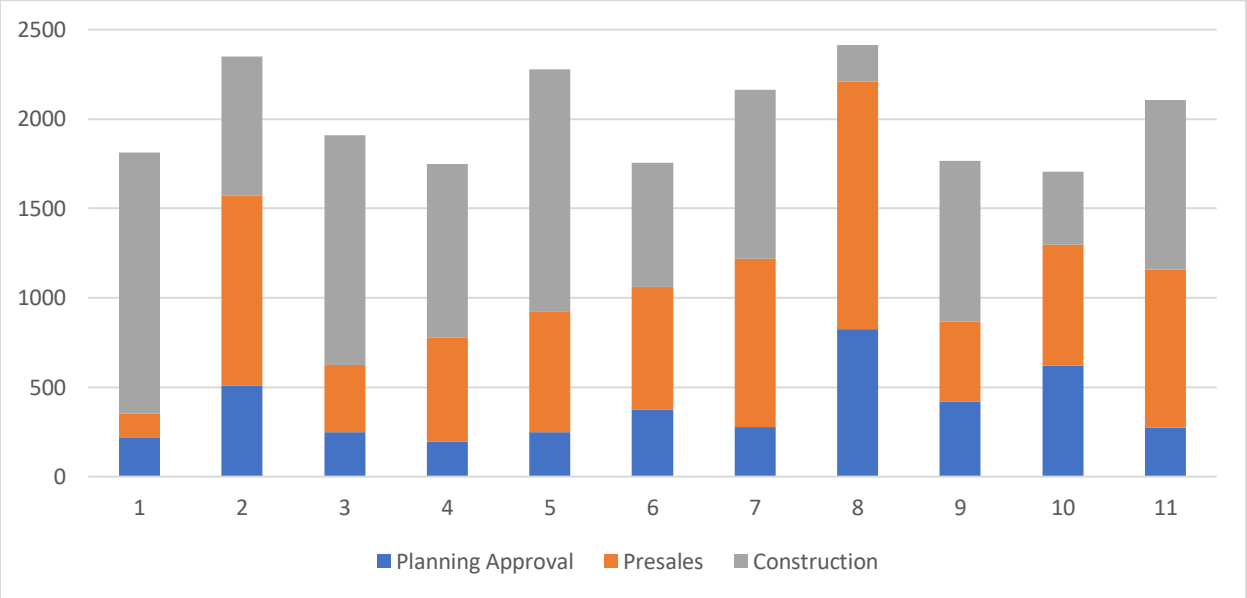
Project T2-7 was comprised of three buildings (4, 8, 15 levels) which creates difficulty for placing it within one of the three typologies. In total it contained 183 dwellings. It had a short construction time, given its size, of 198 days. It is possible this is a data error, although its suburban location may have eased the construction management task and associated delays.

T1 Very Large Projects (>20 levels)

Eleven (11) projects, or 30% of the sample set were T1 very large projects. The average building height was 56 levels (range 20 to 92 levels) and the average number of apartments per building was 548 (range 117 to 1142).

On average it took 2,007 days (5.48 years) for T1 projects to complete (ranging 1,705 to 2,414 days). Planning approval was obtained in a little over one year at an average of 392 days (ranging 152 to 824 days), and presales were obtained in under two years at an average of 710 days (ranging 137 to 1,386 days). Construction time averaged two and a half years at 903 days (ranging 204 to 1,462 days).

Figure 4 Number of days from planning approval to completion Very Large projects T1 (> 20 levels)



A remarkable feature of the T1 projects generally is the short planning approval times (except for project T1-8). The majority (64%) of the projects achieved planning approval within one year. All but one of the T1 projects were within the Melbourne CBD planning zone with planning approval fast-tracked by the Victorian Government).

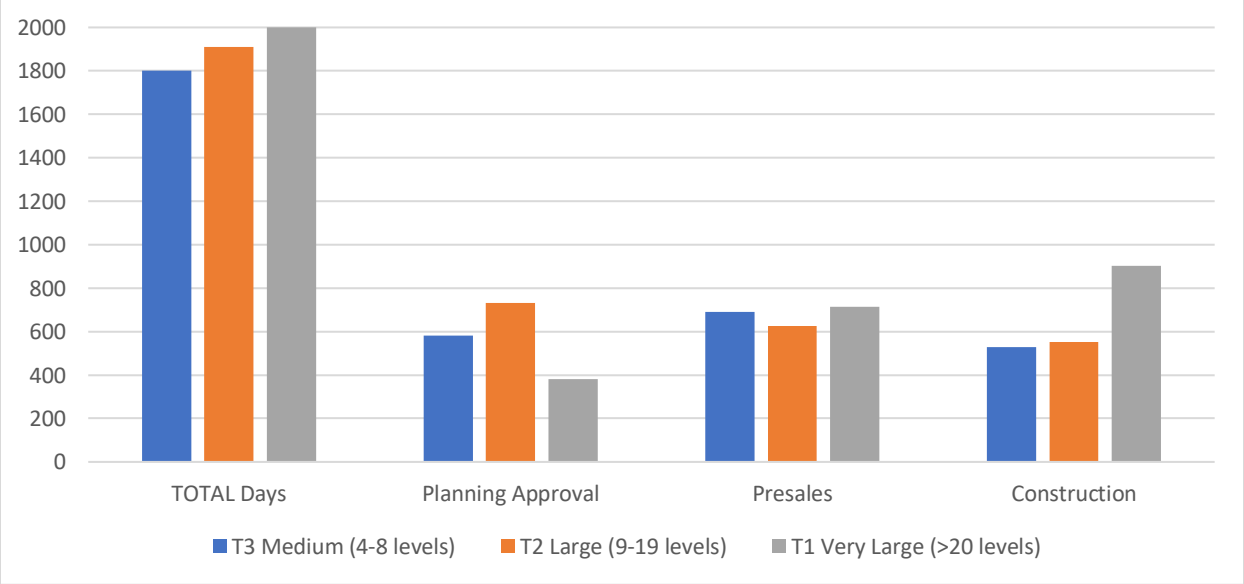
Presale time for these very large projects was predictably long, except for Project T1-1. This is likely to be a data error, as Project T1-1 incorporated staged settlements, an unusual feature for an apartment tower which may have impacted the data.

As could be expected, these very large T1 projects took substantially longer to build compared to T2 and T3 projects. The construction for Project T1-8 was short (204 days), particularly when considering it has 592 dwellings over 52 levels. However, the presales time was long (1,368 days or 3.8 years). This may be indicative of the benefit of taking time to fully resolve design prior to construction starting. The developer (ASX listed entity) and builder (a global construction company) are both long standing firms with deep experience of high-rise residential development and construction.

Comparison of Typologies

Comparison of the three building typologies reveals some interesting and unexpected findings as illustrated in Figure 5 below. The total project time increases with the size of the project, as expected: 1,802 days for T3, 1,910 days for T2 and 2,007 days for T1 (or 4.94, 5.23 and 5.48 years respectively). However, given the vast difference between a four level and a 92 level building, the total project delivery time difference (from lodging of planning application to project completion) between the project types would be expected to be far greater than six months.

Figure 5 Average Project Stage Times All Projects



This finding that modestly sized projects (T3) take almost five years to deliver, virtually the same time as a very large apartment tower (T1) is a wake-up call for planners, regulators and policy makers. Smaller projects are generally considered lower risk than larger projects, given the smaller scale of construction, lower investment requirement, and fewer sales needed. Smaller projects are favoured by owner occupiers (Easthope *et al.*, 2023) and groups opposing 'inappropriate' development, making them attractive for policy makers seeking to increase density while navigating the political consequences of changing the urban form. Yet this research suggests smaller apartment projects are disproportionately time consuming compared to larger

projects. The reason for this long delivery time frame for T3 projects is cumulative with planning approval, presale and construction times all longer than expected in comparison to much larger building typologies.

Planning approval

The comparatively lower planning approval time for T1 than T2 and T3 is an important finding and is consistent with Ong et al. (2017) and Ganguli (2022) who suggest '*the role of planning controls is more nuanced than traditionally thought*' (Ong *et al.* (2017 p.49). Here, the time-efficiency achieved by the State Government's fast track approval process (which excludes third party objections) is clearly demonstrated.

Another explanation for the relatively favourable speed of planning approval for T1 projects relates to the nature of the developer. These developers are substantial companies, experienced in apartment development (Dowling, 2005). They are likely to have design and project management professionals on staff and engage top planning consultancy firms whose experience can expediate permits. This experience carries through the entire development process and likely contributes to the comparatively compressed project time frame for the very large T1 projects.

Presales

The relatively consistent time for the pre-sales stage for each typology is also surprising. This is unexpected given T3 projects typically have a low number of dwellings, compared to T1 projects. Intuitively, this should mean T1 projects take considerably longer to presell than T3 (or T2) projects. One explanation for this unexpected finding is the considerable time and resources involved in the presale stage (Sharam *et al.*, 2015). Smaller T3 projects may find it disproportionately more difficult to find buyers than larger T1 projects, as large projects have substantial marketing budgets and utilise a range of sales channels including establishing international offices and engaging professional project marketers (Ganguli 2022).

Larger developments financed using corporate resources (rather than project finance) may preclude an externally imposed need for presales. Smaller developers (T3) may find it difficult to access project financing, due to factors such as lack of track record, insufficient capital backing or project scale (Bryant, 2012), hence a high level of presales may be necessary to convince financiers to take on the risk of lending on these projects.

Construction

The long construction time for T3 projects is also unexpected. The results indicate T3 projects take almost the same time to build as T2 projects, that on average are three times the size. T1 projects predictably take longer to build due to their size. While the bespoke nature of most T3 product means the building efficiencies gained through tower construction are not available, the lengthy construction period is nevertheless concerning.

Another reason for T3 projects taking so long may relate to builder size (tier). In general, builders specialise in a typology. Whilst there is a lot of T3 work, smaller builders are generally only capable of carrying out a small number of projects at any given time. So, in periods of high demand, it may be difficult to obtain the services of an experienced builder. Builders themselves are wary of developers who have a poor (or no) reputation thus tendering may be more time consuming for smaller and/or inexperience developers. The relative lack of experience and/or knowledge of the construction process of small developers when dealing with small-scale builders may be another contributing factor for time delays.

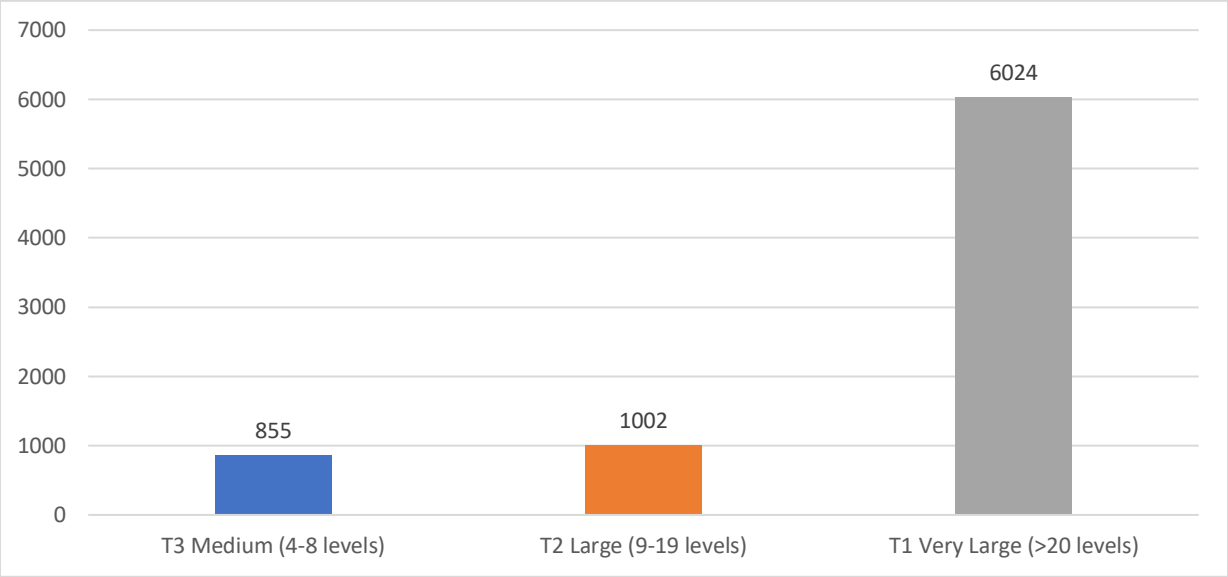
Development requires extensive documentation relating to finance, permits and tenders, with considerable management skill needed for execution of projects. Many smaller developers will be less experienced, less likely to have formal development/project management experience and have fewer resources. This is likely to be a factor in delays, with concurrent activities not occurring and/or lack of resources limiting multi-tasking.

The study period includes the COVID lockdown periods in Melbourne which saw site work severely curtailed rather than stopped as construction was deemed an essential service. Social distancing requirements meant fewer people on site at any one time. Delays also resulted from supply chain disruptions. Presales were also affected by stay-at-home measures which limited visits to marketing suites to online appointments. Some, although not all of the projects, in the sample were affected. Thus, we could assume the project duration of some of the projects would normally have been shorter. Summary

This research highlights the long project delivery times of T3 medium density projects compared to very large T1 projects. The 37 cases exhibit wide variations, and we have provided possible explanations to account for some differences. Only in-depth case studies could provide causation. However, we hypothesise that larger projects are time efficient as they draw on a depth of experience and resources rarely available to T3 project proponents.

Very large projects are also supported by rapid approval frameworks aimed at fast tracking housing supply, a policy which appears to have been successful in Melbourne. As indicated in Figure 6 below, very large T1 projects are also supply-efficient, with the eleven T1 projects in this data set, suppling six times the new apartments of the smaller T2 or T3 projects over the study period.

Figure 6 Apartment Supply: All Size Projects (Number of Apartments)



This has implications for policy measures aimed at increasing the efficiency of the housing supply pipeline whilst providing housing diversity. Further, certainty around timing is critical for the success of projects and reduction of time risk would likely encourage development (Rowley *et al.*, 2022).

Given the increasing importance of medium density for housing supply and urban consolidation, we suggest policy attention needs to turn to supporting the T3 and T2 approval process, as well as capacity building and business improvement practices of small developers, builders and local authorities.

Conclusions

In Australia, housing supply has attracted increasing policy attention, with the National Housing Accord setting ambitious targets for new supply. Concurrently, the supply of apartments has assumed greater importance. With national interest focused so squarely on supply, it is extraordinary that so little is known about most aspects of apartment development. In part, this gap reflects lack of public data. By quantifying the time for planning approval, presales and construction, this research provides rare public insight into the constraints in achieving housing supply targets. Understanding the multi-step process, stage duration and common hold-ups provides the opportunity to recalibrate policy towards significant constraints rather being reactive to the claims of stakeholders .

Evidence is provided that despite the size of the project, a new apartment building takes approximately five years to deliver. The 37 projects in this study indicate that planning approval, so often the target of criticism, can be achieved quickly for very large projects (1.08 years), but

takes longer for smaller projects (1.6 to 2 years) in Melbourne, Australia. Moreover, in most cases our evidence indicates other key stages are equally significant, with the presale and construction phases adding significant delays, particularly for smaller projects.

One issue is the apparent lack of efficiency in medium density supply. This is partly about scale and replicability, and partly an issue of capability. Policy to achieve housing targets largely seeks to reduce planning constraints (what can be built) and pressure under-resourced local authorities to reduce approval time. These measures do not address the issues of proponent capability or the economics of small-scale production.

These findings are limited by the lack of publicly available data. Further research may include in depth case studies to gather further data, identify common time delays and risk mitigation strategies.

Limitations to this research include the small sample of projects due to limited data availability and the impact of the pandemic affecting project duration. Analysis of findings is not overlaid by consideration of property market conditions during the study period December 2012 to July 2023. This would impact presale times as buyers are reactive to market conditions. Construction times are also impacted by competitive labour markets during boom conditions. The financial consequences of time delays for developers, although not addressed here, is of critical interest as project profitability a key factor in incentivising apartment development and would be a logical extension of this research. Further research via detailed case studies, or access to data for more projects would advance this research and provide further evidence to inform policy makers on reform focused on fast tracking diverse housing supply.

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[1] Cases which experienced very significant delays, which may provide insight may have been excluded using this method. However, the sample provides a benchmark.

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