Australian Bureau of Statistics

FROM ADDRESS TO DWELLINGS: BUILDING A REGISTER OF DWELLINGS FOR AUSTRALIA

Opening Doors: data and analytics shedding light on housing challenges conference (23-24 June 2025)

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Introduction

This paper describes how the Australian Bureau of Statistics' (ABS) Address Register is evolving as foundational location infrastructure, from its beginnings supporting the mail-out of Census and household survey forms through to linking addresses and dwellings to people and business data across the ABS's integrated data ecosystem.

As part of this evolution the Address Register has shifted from being solely used to support ABS operations to providing direct value to organisations external to the ABS, particularly in the emergency management field. As new data is integrated with the register it has the potential to inform, at very disaggregated levels of geographies, on changes in the stock and usage of individual dwellings.

1. Operating Context

1.1 Address Register is a key component of ABS statistical infrastructure:

The ABS has developed a unique data capability with its Address Register, underpinning the production of data assets and official statistics on a coherent and consistent geographic base to inform government decision making, whilst reducing provider burden. The Address Register (established in 2015) is an up-to-date, comprehensive list of all known physical addresses within Australia. The Address Register serves as critical statistical infrastructure providing two key services:

- Address Point Dataset: high quality, comprehensive register of address locations (including address text, which is the actual address and alternative versions (aliases), and latitude/longitude co-ordinates) represented by unique Address Register Identifiers (ARIDs).
- Premise Dataset: attributes for each ARID, including Address Use, private dwelling structure, Special Dwelling type and dwelling relationship to Indigenous Community Place.

The Address Register is an example of the foundational layer of the Global Statistical Geospatial Framework (GSGF)[1], which facilitates consistent production and integration approaches of geo-statistical data and information. The global framework was based on Australia's Statistical Spatial Framework and developed by the joint United Nations Statistical Commission/UN-Global Geospatial Information Management Expert Group on Integration of Statistical and Geospatial Information. The Address Register provides a key component of the fundamental geospatial infrastructure and geocoding that is core to the ABS producing geospatially enabled statistics.

[1] The Global Statistical Geospatial Framework

Figure 1: The five Principles of the GSGF, The Global Statistical Geospatial Framework

The ABS enhances the Geocoded National Address File (GNAF)[2] to create the Address Register through quarterly maintenance activities that incorporate changes from GNAF list updates, enhance geolocation coordinates, and derive additional address characteristics such as address use and dwelling structure. There are also updates from Household Surveys and a national update from the Census every five years.

The Address Register is used to produce quarterly Address Register Common Frames, which serve as point-in-time snapshots of all addresses on the Register.

The Address Register enables efficient and coherent creation of some of Australia's national statistics by supporting the Census of Population and Housing and efficient Household Survey sample design and selection. These quarterly releases support the Census of Population and Housing throughout the entire statistical cycle, from assisting in planning and preparation, contributing to target enumeration strategies for remote areas and special dwellings, creation of a Mail Out frame[3], and post enumeration coding and quality assurance for outputs.

Additionally, the Address Register enables statistical and data asset production, forming the basis of indexes used in the ABS Address Coding services. Through the ABS Address Coding services, addresses can be used as keys in the data linkage of administrative data (see Appendix A). The Address Register's value in data integration is also evident in the attributes available for each address, such as address use and dwelling structure. Some of these key data linkage projects include the Person Level Integrated Data Asset (PLIDA)[4], the PLIDA Core Locations Module[5] and the Location Modular Product (LMP)[6].

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[2] Geocoded National Address File, Geoscape

[3] A frame is list of all of the units in the population from which samples can be selected; a list of addresses to which survey forms can be "Mailed Out".

[4] Person Level Integrated Data Asset (PLIDA) | Australian Bureau of Statistics. PLIDA was formerly known as the Multi-Agency Data Integration Project (MADIP).

[5] PLIDA Core Locations module | Australian Bureau of Statistics

[6] Location modular product | Australian Bureau of Statistics

Figure 2: ABS, Address Register visual Australia map

1.2 Using the ABS Address Register to assess dwelling vulnerability in disaster events and climate change: A Case Study in Place-Based Analysis

The Address Register is increasingly being used as foundational infrastructure to support place-based analysis across the Australian Public Service (APS). Most recently, it has played a critical role in assessing dwelling exposure and vulnerability in the context of emergency management of natural disasters, as well as supporting calculations of proximity to essential services during disaster events.

The Address Register has been instrumental in enhancing emergency management capabilities. Address points from the Address Register underpin the ABS Experimental Modelled Address Point Populations (EMAPP), which are shared with the National Emergency Management Agency (NEMA) under a data sharing agreement. This dataset supports rapid estimation of populations within hazard footprints during emergencies**.**

EMAPP is integrated into the Disaster Impact Analysis Service, a geospatially enabled analytical and visualisation tool developed collaboratively by NEMA, Geoscience Australia, and the ABS. The Disaster Impact Analysis Service enables estimation of populations affected by disasters across non-standard geographies, such as flood extents or fire perimeters. The Address Register's granularity allows for precise identification of impacted dwellings, moving beyond aggregate-level analysis and enabling more targeted and effective disaster response and recovery planning.

Figure 3, which presents the Australian Population Grid (to which EMAPP contributes), illustrates the value of high-resolution population data in identifying communities at risk and informing resilience strategies. While the Mesh Block structure for Usual Resident Population facilitates integration with other ABS statistics published on the Australian Statistical Geography Standard, a grid-based approach based on the Address Register maintains confidentiality while enabling accurate intersection with extent data such as hazard footprints.

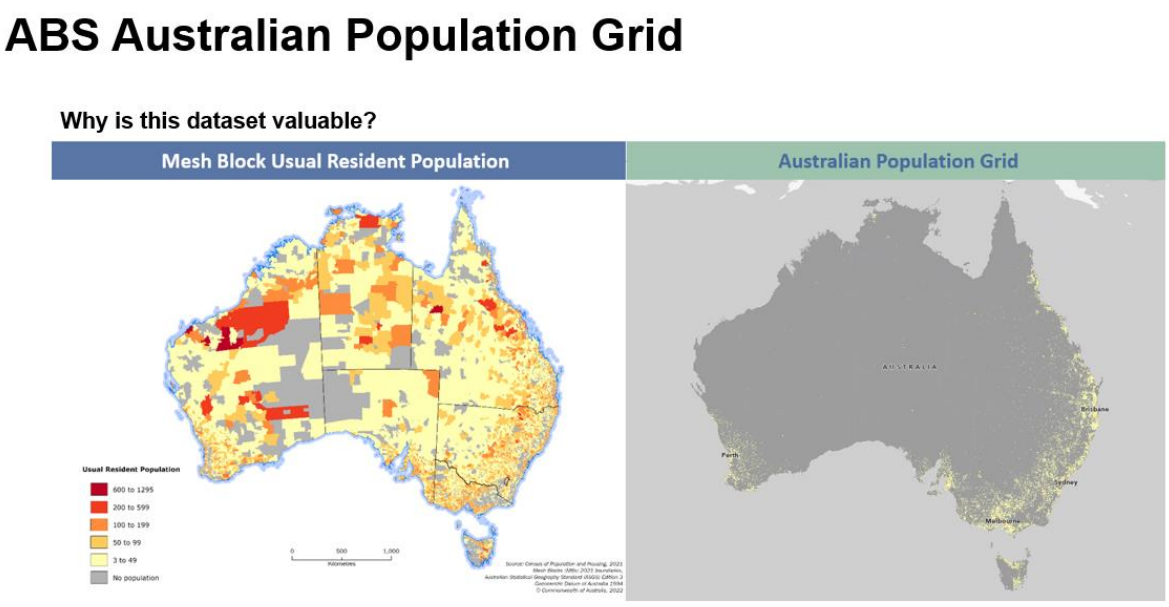

Figure 3: The Australian Population Grid is a geographic representation (1 km sq grid) of the Australian residential population.

1.3 Enhancing ABS products and operations

There is growing demand for location-based and small area data to meet evolving information needs and to support more efficient survey, Census, and data integration operations. This growth reflects a broader transformation in the data landscape—with location emerging as a core unit of analysis, alongside traditional person- and business-level perspectives.

There is increasing interest in developing data assets anchored in location, enabling the integration of person-level and dwelling-level administrative data. This represents a significant evolution from existing ABS data assets, where location has typically been a secondary attribute rather than a foundational element.

In parallel, there is rising interest in using administrative data to enhance location frames, improving the representativeness of household surveys while reducing operational costs. These developments highlight the need for a robust, consistent spatial reference point across datasets.

The ABS is starting to link household composition information (e.g. number of people per household, age composition) derived from PLIDA to the Address Register. This information will be used to improve ABS household survey operations from sample selection through to household contact/follow-up and survey estimation. With societal changes, it is increasingly hard to achieve historical response rates for household surveys, a trend globally not just in Australia. This development is one way the ABS is ensuring our statistics remain of high quality and fit for purpose.

1.4 Harnessing the Address Register for New Uses: Insights from Case Studies

Case Study 1: Complementing the Census with an Administrative Data Snapshot

The Australian Bureau of Statistics has developed the Experimental Administrative Data Snapshot[7]—an innovative release that brings together population and housing data from a range of administrative sources. Central to this integration is the ABS Address Register, which functions as a foundational "residential dwelling spine" for linking diverse datasets to provide a more comprehensive view of housing in Australia.

By integrating the Address Register with data from PLIDA and electricity consumption data from distributors and networks, the ABS has generated detailed insights into housing occupancy and usage patterns.

The Administrative Data Snapshot enhances understanding of housing use in Australia by identifying patterns of vacancy and underutilisation. It supports more targeted policy and planning, improves Census efficiency, and demonstrates the value of integrated data for developing agile, cost-effective statistical systems.

Case study 2: Enhancing housing research with Integrated Data Assets

The National Insurance Dataset:

The ABS, in its capacity as a partner agency in the Australian Climate Service, is developing the National Insurance Dataset. The National Insurance Dataset is an initiative of the Hazards Insurance Partnership, a partnership between the insurance industry and Government, chaired by NEMA, aimed at addressing issues related to insurance affordability and coverage for households.

The dataset has been built using insurance premium and policy data, integrated using anonymised addresses in the secure ABS DataLab[8].

Analysts working with the National Insurance Dataset are examining the driving factors that contribute to household insurance affordability and non-insurance by integrating insurance policy information with household socio-economic characteristics from PLIDA. The Address Register is fundamental to the project. Anonymised Address Register IDs assigned through a geocoding process enable the safe linkage between insurance policies and household socio-economic characteristics, avoiding possible re-identification of individuals or households. The Address Register also provides the baseline count of residential dwellings for modelling insurance coverage rates across Australian communities.

The Wealth and Housing Asset Module (WHAM) pilot:

Currently, there is a lack of detailed and integrated data on housing and wealth available in Australia that can be used for research and policy. This presents significant potential to expand the use of administrative and ABS data sources to enhance the development of housing-related data assets and

[7] Administrative data snapshot of population and housing | Australian Bureau of Statistics
[8] DataLab | Australian Bureau of Statistics

support deeper housing research. An example of this is the Wealth and Housing Asset Module (WHAM) pilot, which will for the first time integrate key information on the wealth and asset holdings of Australians into the business (BLADE) and individual (PLIDA) integrated data assets. The pilot is a collaboration between the Treasury, Department of Social Services, Reserve Bank of Australia, Department of Industry, Science and Resources, Australian Tax Office, and the ABS. The Address Register is fundamental to this pilot as a core component of the ABS Location Spine which will be linked to new data assets, alongside the person and business spines. This represents a significant step to improve the availability of wealth data in Australia, enabling a range of new granular insights into important policy issues.

2. From Address Register to Dwelling Register

These developments have enhanced the Address Register to the extent it could now be seen as the beginnings of a Dwelling Register, with each address linked with dwelling structures and use. And with the changes to these structures and use updated over time. The ABS has identified the existing data limitations which constrain the Address Register from being considered and used as a Dwelling Register and is working through these. This section discusses these developments in more detail.

2.1 Current state

At its essence, the Address Register uses physical address as a proxy for a private dwelling. The critical piece of information which the Address Register adds to the GNAF is the address-use classification (e.g. flagging residential premises), which is assigned via predictive modelling and manual canvassing using administrative data and aerial imagery. This classification enables the Address Register to define the residential address stock. More information on the methods of updating can be viewed on the ABS Address Register Users' Guide[9].

The location and dwelling structure information on the Address Register can be drawn on directly as part of the Location spine to provide timely and high-quality insights into the composition and extent of Australia's dwelling stock over time through quarterly updates (see Appendix C for a detailed overview of Address Register characteristics and its quality).

For example, *Figures 4 and 5* show a map overlaid with address points in the statistical area (SA2)[10] of Rockbank – Cottrell in the west of Melbourne, Victoria as at the Nov 2019 and Nov 2024 Address Register frame releases. This region is one of the one of the fastest growing in the country[11].

As shown in *Figure 4*, the dwelling stock in the area in November 2019 was almost entirely free-standing houses, with 60% of address points either vacant or under construction, with a handful of single-storey townhouses around Rockbank centre.

As shown in *Figure 5*, In November 2024, the dwelling stock has increased almost four-fold from 3,221 to 12,489 dwellings, including 548 townhouses, of which most are two or more storeys. While the number of properties under construction has fallen 70% from 10.2% to 1.5% of total address points, vacant

[9] ABS Address Register, Users' Guide | Australian Bureau of Statistics
[10] Statistical Area Level 2 | Australian Bureau of Statistics
[11] Fastest growing local government areas (LGAs) | Centre for Population – Melton, VIC.

addresses have grown by 23%, and only a small fraction (0.46%) of these were also vacant in 2019. This suggests that while development in this area is slowing, it has by no means come to a halt.[12]

This brief example shows how the Address Register can be used to understand how the extent and composition of dwelling stock in specific areas is changing over time, right down to the level of individual addresses.

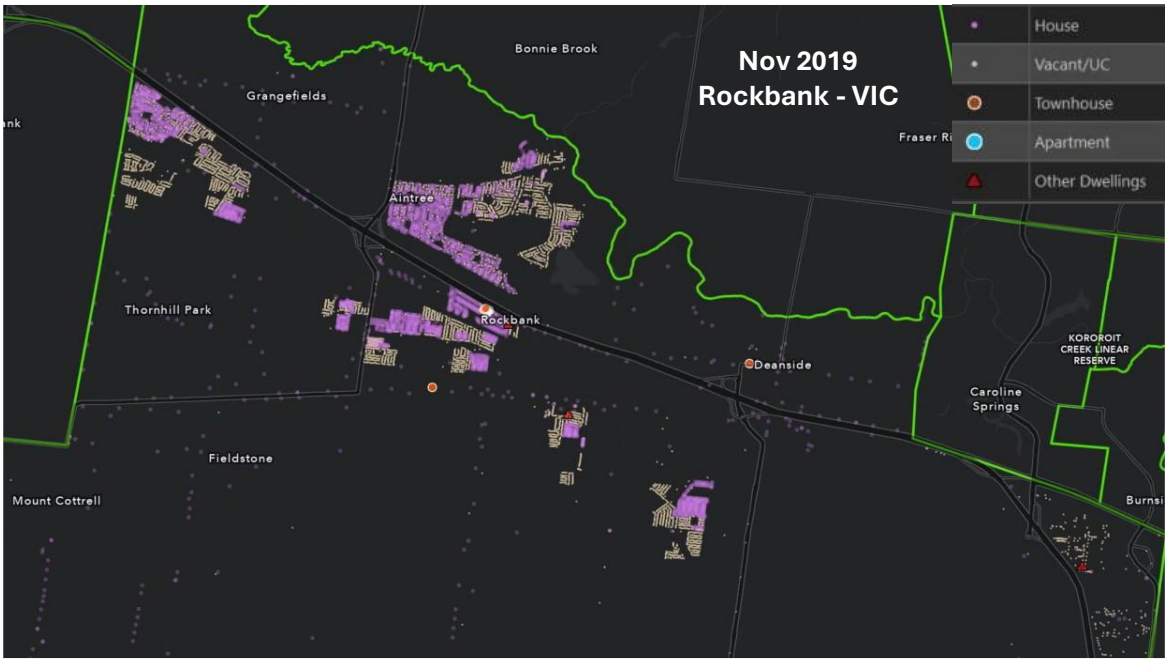

Figure 4: November 2019 - address points in the statistical area (SA2) of Rockbank – VIC.

Figure 5: November 2024 - address points in the statistical area (SA2) of Rockbank – VIC.

[12] Note, Figures 4 and 5 have been developed based on research methodology and are intended for illustrative purposes only and are not representative of official statistics.

2.2 Transforming the Address Register into a Dwelling Register for Location-based Asset Integration

When using a residential address as a proxy for a private dwelling, the difference between a dwelling and an address is subtle but comes with challenges – and how we overcome these challenges greatly depends on how these data are used.

ABS has matured its methodology when it comes to using information from the Address Register as a residential survey frame (see Appendix B for more detail on the design).

Using the Address Register to form a baseline to provide a count of residential dwellings is a new area of research in the ABS. Conceptual and methodological decisions need to be made to define the scope of private dwellings from the Address Register that is aligned with official ABS statistics on dwelling stock, including the Estimated Dwelling Stock[13] and the Census. In addition, once the private dwelling classification indicator on the Address Register has been scoped and refined, the conceptual relationship of private dwelling to other location units would need to be articulated as part of the ABS Location Spine.

These challenges are explored further in Section 3, which outlines the steps required to transition from the current to a preferred future state.

With investment, the challenges outlined in Section 3 could be effectively addressed. However, this represents a new approach to using the Address Register. As such, its implementation would require careful planning and a staged rollout, alongside alignment with official statistics and other foundational geospatial data.

3. Steps to get from current to future state

3.1 Align Address Register residential address scope with official dwelling statistics

The ABS Address Register is a list of addresses, built from administrative data that was originally collected for various other purposes. To use this data to create an accurate baseline of private dwellings, several challenges need to be addressed. These include overcoming coverage gaps in this administrative data and ensuring that changes in the time series data reflect real-life changes in the number of dwellings, rather than fluctuations caused by data processing or other reasons.

ABS housing statistics, including ABS Estimated Dwelling Stock and Building and Construction statistics, provide essential benchmarks to guide method development and improve alignment between real-world dwelling changes and address-level estimates.

Uplift the quality by addressing coverage weaknesses:

- To transition from using the Address Register for supporting Census and Household surveys to more accurately represent private dwellings, we must address coverage gaps in remote areas

[13] Estimated dwelling stock | Australian Bureau of Statistics

(see Appendix C for more information for why these coverage gaps exist). The Address Register team has conducted research into new methods and identified additional data sources to enhance coverage in remote and rural areas.

- Over-coverage, particularly in high-growth urban areas, is of a greater concern. To address this, new deduplication and address aliasing procedures[14] are being developed. Additional data sources such as ABS Building Approvals[15] data and occupancy certificates could be further utilised.
- The information from the 2026 Census will also be utilised to improve coverage of the ABS Address Register, particularly in remote and rural areas.
- Dwelling structure imputation and classification processes are being updated to support the use of the Address Register as a source of dwelling stock information.

Develop a method to scope Address Register residential addresses to more accurately reflect changes to dwelling stock over time

A method is needed to refine the scope of residential addresses in the Address Register to better reflect changes in the private dwelling stock over time.

- The **Address Register**, built primarily from administrative data, often lags actual dwelling stock trends due to misaligned reference periods. *Figures 7* and *8* illustrate the divergence over time between the ABS's official Estimated Dwelling Stock[16] and the corresponding counts derived from the Address Register. This divergence reflects structural over-coverage in the register, which is intentional: the Address Register is designed to be a comprehensive list of potential dwelling locations, from which a subset is confirmed through high-quality surveys such as the Census.
- For **statistical estimation and time series analysis**, historical data must be retrospectively adjusted to reflect improvements in processing and auxiliary data coverage. This helps reduce artificial volatility caused by administrative update timing (*Figures 9*).
- **New developments** pose a particular challenge. Recently constructed dwellings may be inconsistently represented or delayed in administrative sources. Enhancing models that track the transition from vacant land to completed buildings—using data such as ABS Building Approvals—can improve timeliness and accuracy.
- While early research is promising, a **formal method** is required to define which addresses represent actual private dwellings. This would complement the existing residential flag used for survey frame scoping.

[14] Techniques comparing address text elements in conjunction with location data to identify likely duplicate addresses based on identified patterns, for example "3 Smith Street" and "3-5 Smith Street".
[15] Building Approvals, Australia | Australian Bureau of Statistics
[16] ABS, Estimated Dwelling Stock

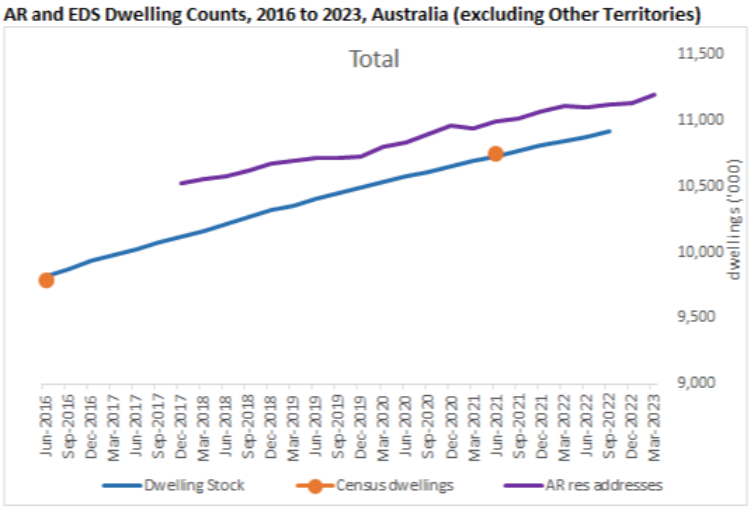

Figure 7 - Structural over-coverage in the Address Register over time: Comparison with Estimated Dwelling Stock and Census dwelling count.

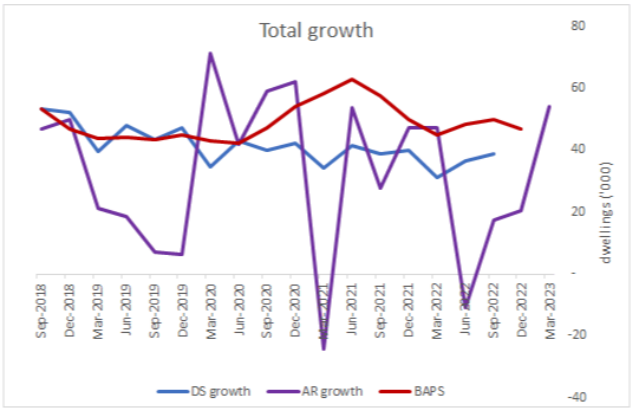

Figure 8: Comparison between survey-based figures from the Estimated Dwelling Stock (EDS) time series and Address Register figures. Note the higher level of volatility in Adress Register updates compared to ABS Building Approvals and the EDS.

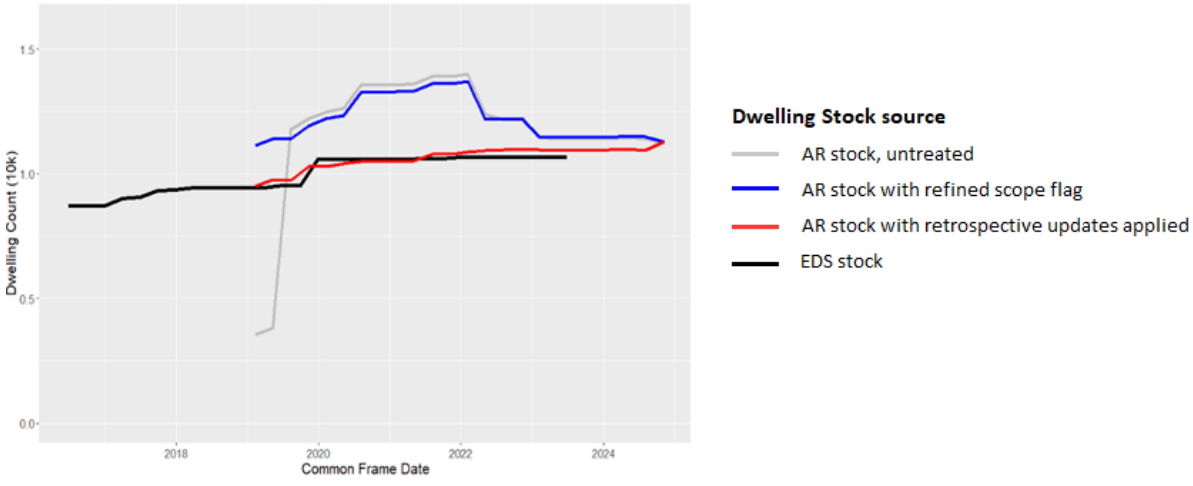

Figure 9: Example of smoothed Address Register figures in Carlton, VIC with refined scope flag and with retrospective quality improvements applied, compared to EDS.

Timeliness Issues:

There is a trade-off between timeliness and accuracy. Consideration must be given to the timing of release of AR-based Dwelling Stock statistics as compared to traditional snapshots.

- Quarterly snapshots: The Address Register produces snapshots (as survey frames) quarterly, so it is feasible to generate corresponding dwelling stock statistics on a quarterly basis also.
- Ongoing updates: Administrative records are continuously updated, meaning the quality and completeness of the private dwelling flag improves as time passes between the reference date and the snapshot derivation.
- Reference period: due to the variety of administrative data sources used to produce Address Register outputs and their different update schedules, some lag between time of production and reference period should be expected. This is analogous to the time lag due to editing and data processing for a traditional survey and will depend on the complexity of methods and data used, in light of the above coverage and accuracy challenges.

3.2 Develop standards and concepts to enable effective integration of the Address Register into the Location spine

The Address Register is a core capability within the ABS's foundational geospatial infrastructure, enabling the integration of statistical and administrative data through address-level referencing. As the ABS continues to develop the Location Spine as part of its broader location infrastructure, the Address Register plays a critical and enabling role.

To make full use of the Address Register within the Location Spine, investment into two key areas is required:

- ***Enhancing Geospatial Metadata****:* Improving the geospatial metadata associated with the Address Register is essential to enable meaningful linkage between address-level data and other forms of location-based data that are not inherently address-referenced. This enhancement is critical for achieving full interoperability with other spatial referencing systems.
- ***Establishing Common Standards and Frameworks:*** Developing consistent standards and conceptual frameworks is necessary to support the use of the Address Register as a temporal spine—facilitating the connection of address-level data across time and enabling longitudinal analysis.

4. Conclusion

This paper has outlined the significant opportunities in developing the ABS Address Register as both a dwelling register to support ABS statistical needs and as a foundational asset for meeting growing data demand for housing and land use data.

To realise this potential, a roadmap of potential enhancements is being developed. This roadmap will address the qualitative, methodological, and conceptual challenges identified in this paper and guide the Address Register's progression toward producing coherent housing stock statistics and integrated housing data assets. See Appendix D for an illustrative example of potential analytical data items within an integrated housing data asset.

With continued investment, the Address Register will:

- Underpin efficient and consistent production of household and dwelling statistics;
- Provide a common infrastructure for linking data to location across government;
- Uplift the creation of high-quality national data assets; and
- Enable emerging and unmet data needs through location-based integration.

By enhancing geospatial metadata and establishing common standards, the Address Register can play a critical role in the Location spine for Australia's data ecosystem—enabling more timely, integrated, and policy-relevant insights to support better decision-making across government.

Appendix

A. Importance of Coding Addresses and Validating Addresses at Point-of-Entry

The ABS codes all provider addresses (from administrative and survey data) to link the address text to a geocoded location (latitude/longitude). This allows for the creation of statistics and place-based analysis at the smallest geographic units defined by the Australian Statistical Geography Standard (ASGS).

Address Coding involves finding the exact geographic location for an address using specialized software with algorithms designed to match addresses with varying degrees of uncertainty. This process is crucial for all addresses used in administrative data and during the Census.

The Address Register plays a crucial role in the ABS by creating and maintaining the Address Register Identifiers (ARIDs), which are linked to validated, high quality structured address text. These addresses are not only mail-ready but also come with corresponding geolocation coordinates.

B. Using Address register as residential survey frame

- The Address Register serves as the foundational frame for enumerating dwellings in household surveys, including the Census. For the Census, it provides the residential address frame used to locate dwellings and deliver participation instructions—such as mailing an online access code to households.
- During enumeration, dwellings are identified based on Census responses or imputed from the address frame. Individuals are then linked to the dwelling where they stayed on Census night.
- By design, the initial residential frame includes a degree of intentional over-coverage. This means it may contain residential addresses where a dwelling is not yet completed but is expected to be within a few months (e.g. under construction). This approach accounts for the time lag between when the frame is drawn and when enumeration occurs.
- Operational activities during enumeration help validate these addresses and reduce over-coverage in the final statistical outputs. This ensures that the final dwelling counts more accurately reflect the actual housing stock at the time of the Census.

C. Overview of Address Register Quality and Structure

The quality assurance of addresses on the Address Register ensures they are high in coverage and quality, including the corresponding geolocation coordinates for each address.

The Address Register complies with the ABS Quality Framework, maintaining high standards in coverage, timeliness, and accuracy.

The Address Register includes comprehensive details about each address, such as:

- **Address text**: The actual address and alternative versions (aliases).
- **Geocode**: Latitude and longitude coordinates.
- **Address use**: Classification (e.g., residential).
- **Dwelling characteristics**: Information about the type of dwelling (e.g., separate house, semi-detached).
- **Complex establishments**: retirement villages, nursing homes, mining camps etc. (will provide link to on the ABS website for full list)

These characteristics ensure the register is highly relevant for various applications, including census operations, emergency services, and place-based and housing policy analysis.

Coverage

The Address Register aims to cover all known physical addresses within Australia, excluding Other Territories.

Accuracy

The quality and coverage of residential addresses in the Address Register are assessed through both periodic and ongoing processes:

- Every five years, a comprehensive quality review is conducted using information from the Census.
- In the intercensal years, ongoing quality assessment is performed by calculating and aggregating a proxy index for each address called the Quality Score (QS). This incorporates the quality, completeness and recency of available administrative data and aerial imagery associated with that address, as well as the reliability and recency of the last canvassing event (e.g. from Census feedback, manual desktop canvassing, or modelled).

Urban vs. Remote Coverage

- **Urban and Semi-Urban Areas**: Approximately 87% of Australian households are enumerated via mail-out using the Address Register. In these areas, the Register demonstrates high precision in classifying residential addresses, as confirmed by both survey feedback and QS metrics. This strong coverage directly supports the quality of resulting statistics (see Figure 4).
- **Rural and Remote Areas**: The remaining households are mostly in sparsely populated areas where address data is limited—GNAF coverage is minimal, administrative records are scarce, and recent aerial imagery is often unavailable. In these areas, Census forms are also **hand-delivered** ("drop-off"), and the Address Register is used as a **support tool** rather than the

primary enumeration frame. As a result, integrating Census information into the Register is more complex and less efficient, weakening the feedback loop.

Challenges and Mitigation

- **Coverage Gaps**: Remote communities and low-density rural areas often lack reliable address data. To address this, the Address Register maintains a supplementary set of ABS-created addresses with geolocation coordinates.
- **Targeted Improvements for 2026 Census**: Ahead of the next Census, targeted updates are underway in remote areas. These include:
    - Incorporating supplementary address data from state housing authorities.
    - Using high-resolution satellite imagery on demand.
    - Leveraging field intelligence from previous Censuses and expert input.

These efforts aim to improve the accuracy and completeness of the Address Register in the most challenging regions.

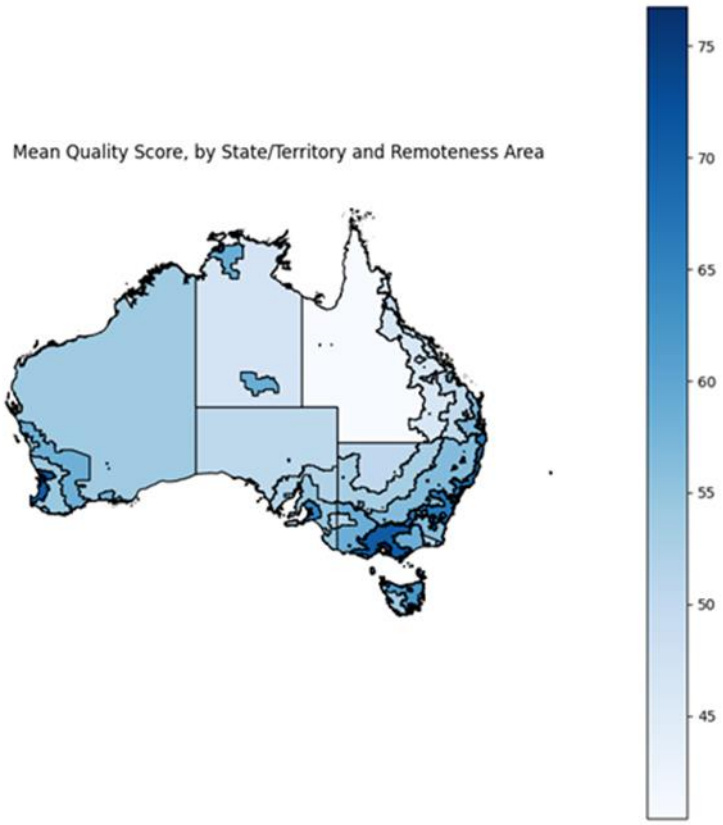

Figure 10: Quality Score across Australia. Note, higher quality addresses in areas of higher population density and closer proximity to urban areas.

Timeliness

The Address Register is updated regularly to maintain its accuracy and relevance:

- **Frequency of updates**: Quarterly updates are applied to approximately 15 million addresses, including new addresses and changes in use (e.g., conversions from a house to an apartment building). Significant updates occur to around 200,000 addresses each quarter.
- **Length of time series**: The register quarterly snapshots are available starting April 2017.

Regular updates ensure that the register reflects the most current address information and associated characteristics.

D. Concept - Analytical content in Housing Data Asset

- A robust dwelling register would provide a strong foundation for linking diverse administrative datasets, enabling a wide range of analyses within a Housing Data Asset. Below is an illustration of potential analytical data items.

www.abs.gov.au