Minutes

ARUP

Project title	ACT Urban Infill Study	Job number	602487/52
Meeting name and number	Inception Workshop 1/19	File reference	
Location	ACT Education Directorate	Time and date	2PM 4 September 2019
Purpose of meeting	Inception Workshop		

Present

Alex Konovalov, Education Directorate (EDU)
███████████, Arup
███████████, Arup
███████████ (phone), Arup
███████████ (phone)
Robert Gotts, Deputy Director General, System Policy and Reform, Education Directorate, EDU
David Jones, A/g Executive Branch Manager, Enrolments and Planning, EDU
Elizabeth Howell, Senior Director, Enrolments and Planning, EDU
Liz Klein, Enrolments and Planning, EDU
Hieu Nguyen, Schools Planning, EDU
Rodney Bray, Executive Branch Manager, Infrastructure and Capital Works, EDU
███████████ ANU School of Demography, ███████████
███████████ ANU School of Demography
███████████ ANU School of Demography, ███████████
Anne Moroney, Director, Planning and Urban Design Policy, Environment, Planning and Sustainable Development Directorate (EPSDD)
Rochelle Crow (EPSDD)

Apologies

Circulation   Those present

Action

1.1   Introductions, project vision and drivers

- Schools historically have had a reasonable amount of capacity however they are reaching a point where it's no longer possible to accommodate the

Prepared by   ███████████

Date of circulation

Date of next meeting

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Action

growing population for schools. Particularly considering government decisions on encouraging higher levels of urban infill, this project seeks to inform what appropriate school infrastructure is required to respond to a growing population.

- The main purpose is to create an evidence base on the change in school aged students with increased urban infill in Canberra.

- A number of key issues impacting schools planning was discussed:

    - The proportion of families choosing non-government education is declining and this is happening faster in the ACT than any other jurisdiction.

    - Providing greater housing choice in Canberra may enable downsizing for some households, freeing up housing that may be taken by families.

    - It takes three years to build a school from the time that funding is granted – this timeline is especially critical.

    - Providing strong demographic evidence to Treasury is important to secure funding for more school. Schools are currently filling at high rates and require expansion to cater for rapid growth.

- For EPSDD, the key drivers for Canberra are defined in the ACT Planning Strategy is to support Canberra be a more compact and efficient city.

- Currently, the EPSDD are undertaking three studies:

    - Understanding the capacity of physical infrastructure: Road infrastructure etc.

    - Analysing the capacity of social infrastructure focusing on town centres including exploring the impact on education requirements in the future, as well as sports and culture

    - Urban form assessment – transition from high-rise to low-density

- ANU working on a model that will be an analytical tool to allow for scenario testing and projections.

EPSDD to share the findings of these studies

1.2 Methodology discussion

- Arup presented the approach and methodology for the Urban Infill Study. The presentation is provided in attachment 1. Some key areas were discussed for consideration into approach to the study.

- Socio-economic background has an impact on school choice. Children from low socio-economic backgrounds are more likely to be enrolled in schools close to where they live. As families move 'up the ladder' they are more likely to want to send children to school elsewhere.

Arup and EDU to discuss how socio economic data may

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- Definition of infill and greenfield needs to align with existing classifications.

  - EPSDD noted that these definitions are within the ACT Planning Strategy 2018

- For the selection of 16 development sites:

  - EPSDD highlighted that 'access to services' will need further definition. EPSDD suggested to incorporate access to childcare provision

  - RG noted that workers compensation database would be able to provide spatial data on services to support access to services information.

- For semi-structured interviews:

  - Suggested interviewees: HIA, Government Architects, Catholic Education Officei

  - Questions to consider include: what types of families are buying different housing products? (no. of children, ages of children); what has been the impact of federal funding model on schools planning in other jurisdictions

- Additional scope items to explore future considerations for schools planning.

  - Arup noted that the Future of Schools publication (currently available) may be relevant.

inform approach and outputs

EPSDD to share definition and spatially identified areas

Arup to consider for definition of 'access to services'

Arup to consider for invites and questions for semi-structured interviews

Arup to share Future of Schools publication

1.3   Data

- Arup presented some initial thoughts on data to explore with workshop participants: What are the right data sets? What form are they in? What is the process to obtain them?

- AK noted that school enrolment data contains the unique identifier, school, address, year of schooling. RG notes that parental education and background are useful given the impact on behaviour (e.g.: school choice) and may be a useful data source.

- ANU currently undertaking child-density mapping with government and non-government schools.

- Arup noted that ACT Treasury housing price data should be spatially referenced in order to build an understanding of place.

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- Development application data was discussed including the need for completion or occupation certificates to understand what has been developed 'on the ground.' EPSDD will advise on contact details for this data.

EPSDD (Anne) to advise contact to obtain data

- EPSDD have also mapped DA activity in the Planning Strategy – this data set is publicly available. EPSDD are also mapping unrealised development yield in case studies.

Arup and EDU to discuss how migration data may inform approach and outputs

- Migration data (both internal and overseas) may be available.

- Place of employment is also another driver in school choice. There is interest to understand origin, destination and Journey to Work in the 16 sites.

Arup and EDU to discuss how JTW data may inform approach and outputs

1.4   Scope and programme

- The process for selection and definition of the 16 case studies was discussed.

Arup and EDU to review selection process and ensure program allows for confirmation from EDU

  - Will case studies be useful if spread across the whole of the ACT?

  - Suggestions included: Tuggeranong, Northbourne corridor, South Foreshore, Woden.

  - The rationale for selection of the 16 needs to be confirmed.

1.5   Risks, assumptions and dependencies

- Minister has a high level of interest, especially regarding enrolment pressures.

1.6   Other questions raised

- Who are excluded from accessing schools?

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Urban Infill Study

INCEPTION WORKSHOP

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1.INTRODUCTIONS

2. PROJECT VISION AND DRIVERS

3. DISCUSS METHODOLOGY

4. DATA

5. SCOPE OF THE STUDY

6. REVIEWING PROPOSED TIMELINE

7. RISKS, ASSUMPTIONS AND DEPENDENCIES

01.INTRODUCTIONS

Our team:

- data analysis
- social infrastructure planning
- experience working with ACT Government in Canberra

02. VISION AND DRIVERS

What are the drivers
for delivering this
work?

02. VISION AND DRIVERS

Urban Infill Study

What has come before this study?

What will this study inform?

03. OVERVIEW OF METHODOLOGY

Inception meeting notes, project plan, project probity plan

Working Paper 1

Working Paper 2

Working Paper 3

Draft and Final report

* Typologies workshop

Phase 1 | Phase 2 | Phase 3 | Phase 4

Academic research

Publications such as Grattan Inst. "What matters most"

Housing Choices Discussion Paper ACT Government

Assumptions in land use modelling

ABS research incl. household projections and household arrangements

INDICATORS OF FACTORS THAT INFLUENCE SCHOOL ENROLMENT

ABS Census Data Analysis to understand areas of growth, migration patterns and birth rates from 2011 - 2016

SELECTED GREENFIELD AND INFILL LOCATIONS

Review of household and housing typologies

Review of price data and location considerations

TYPOLOGIES

Selection of development sites

Analysis of change in school enrolment data by development site by typology

QUANTITIVE DATA

Semi-structured interviews real estate agents, developers and organisations

Desktop analysis on housing choice for families with school aged children

QUALITATIVE DATA

CORE PROBLEM STATEMENT

Explore global and Australian Drivers of Change

Case studies of infill neighbourhoods in other jurisdictions

Semi-structured interviews with other jurisdictions

Focus group discussions with Canberra residents

Working Paper 4

ADDITIONAL PROBLEM STATEMENT

03. OVERVIEW OF METHODOLOGY

	UNDERSTANDING AREAS OF GROWTH	SELECTING LOCATIONS	DEFINING AND AGREEING TYPOLOGIES	TESTING RECENT DEVELOPMENTS	ANALYSING SCHOOL ENROLMENT DATA BY DEVELOPMENT SITE BY YEAR
	ABS CENSUS DATA (SA2) SA2s exhibiting high growth from 2011-2016		1 2 3 / 4 5 6 / 7 8 9	**DEVELOPMENT APPLICATION ANALYSIS** 16 locations	**SCHOOL ENROLMENT BY DEVELOPMENT SITE BY YEAR**
Key questions	Where has growth in school aged students occured across Canberra?	What are the infill and greenfield locations where high growth in school aged children has occured? What are the household and housing typologies and housing tenure in these high growth areas?	What are the suite of development typologies that consider infill, greenfield, housing type, number of bedrooms, tenure, price, proximity to services to analyse change in school enrolment?	Where has recent development occured in selected locations? What product type has new development included?	For selected development sites, what is the quantum of change in school enrolment before and after development (and occupation) by typology?
Geography	Canberra - wide	Selected locations, in infill and greenfield areas	Selected locations, in infill and greenfield areas	Selected locations, in infill and greenfield areas - 16 development sites	Selected locations, in infill and greenfield areas - 16 development sites
Timeframes	2011 and 2016	2011 and 2016	2011 - 2019	2011 - 2019	2011 - 2019
Data sources	ABS Census at SA2 level	ABS Census at SA1 level Infill and Greenfield Definitions from CMTEDD	ACT Treasury Housing Price data realestate.com.au	ACT Development Application Data - georeferenced ACT Development Application Data - certificate of completion	ACT Education Directorate School Enrolment Data by year, by location
Output	Child density mapping and excel spreadsheet	Infill and greenfield area mapping and excel spreadsheet	Matrices of demographic and housing factors	Comparison table and descriptions of development typologies	Comparison table of development typologies and school enrolment

03. OVERVIEW OF METHODOLOGY

03. OVERVIEW OF METHODOLOGY

Key questions

What recent trends in housing and development have you seen? In particular with households with school aged children?

What factors influence choice of residential location for families with school aged children?

Data sources

Semi-structured interviews with:
- Property Council Australia
- Developers for example Kingston
- Real estate agents

Journal papers Discussion papers by Grattan Institute, ACT Government etc.

03. OVERVIEW OF METHODOLOGY – ADDITIONAL SCOPE

Key questions

What have been the experiences in school enrolment changes and planning for infill developments in other jurisdictions? What strategies have you adopted to respond to these changes?	What will influence housing choice for you in the future in Canberra?	What changes in school enrolment have been seen in infill neighbourhoods in other jurisdictions?	What are the drivers of change in Australian cities that will impact on planning for schools in the future? S – T – E – E – P

Data sources

Semi-structured interviews with Education Departments in NSW, VIC, QLD	Focus group discussion with Canberra residents	ABS Census Data School enrolment data	Arup Foresight and Innovation tools

04. DATA

- Summary of school enrolment data – what this looks like
- ACT Treasury Property Price Data – What kinds of relationships are you expecting to understand from price data?   georeferenced? Spatial scale?
- ACT Development Applications data/ Certificate of Completion? Noting lag in DA to delivery – Who is the contact?
- What other data?
- What other research papers?
- Undertaking interviews: any suggestions on participants?

04. DATA – work in progress
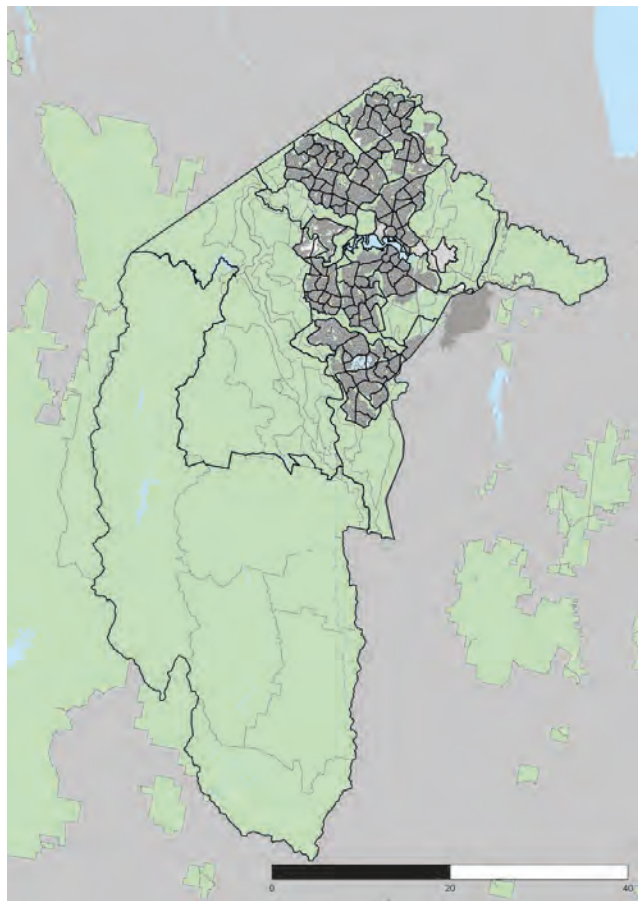
2016 CENSUS

Geography: ACT by SA2s

Population, by place of usual residence

AGEP	Age structure by single year
STUP	Full-time/part-time student status
TYPP	Type of educational institution attending
TYSTAP	Educational Institution: Attendee Status

Household and dwelling characteristics, by place of enumeration

BEDD	Number of bedrooms in dwelling
HHCD	Household composition according to 1-, 2- and 3-digit level
NPRD	Number of persons usually resident in dwelling
STRD	Dwelling structure
TENLLD	Tenure and landlord type

Summary | AGEP | STUP | TYPP | TYSTAP | BEDD | HHCD_1 | HHCD_2 | HHCD_3 | NPRD | STRD | TENLLD

04. DATA – work in progress
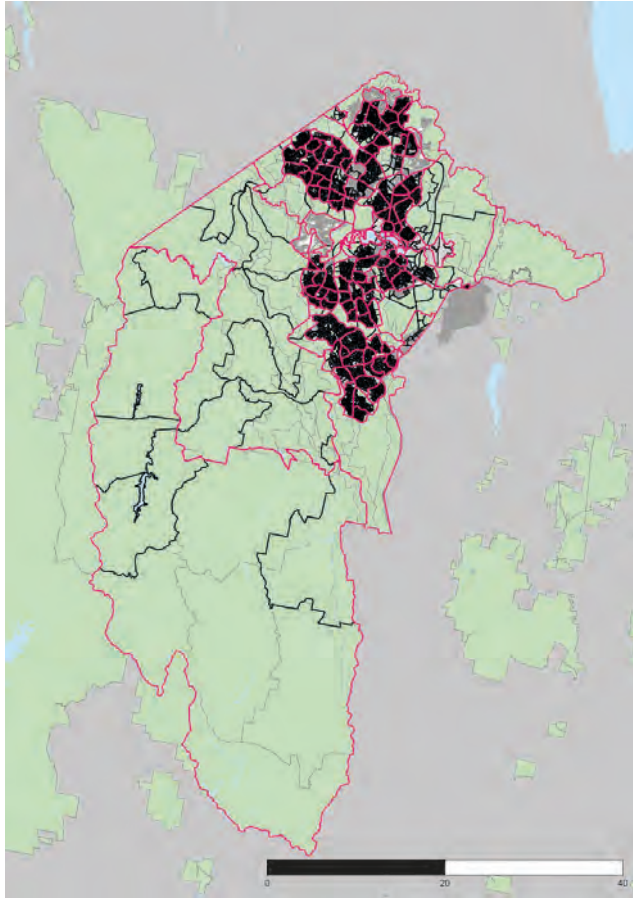
SA2s with meshblocks
Analysis – Development site and
school enrolment analysis
Source: ABS

04. DATA – work in progress

Infill vs greenfield classification: a starting point

Source:
- Planning Strategy
- City to Woden light rail business case? – base case

05. SCOPE OF THE STUDY

06. REVIEWING PROPOSED TIMELINE

Phase	Detailed Task	02-Sep-19	09-Sep-19	16-Sep-19	23-Sep-19	30-Sep-19	07-Oct-19	14-Oct-19	21-Oct-19	28-Oct-19	04-Nov-19	11-Nov-19	18-Nov-19	25-Nov-19	02-Dec-19	09-Dec-19	16-Dec-19	23-Dec-19
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Inception	Inception Meeting	■																
	Ongoing meetings with Directorate and ANU (includes 4 project meetings with the Directorate)			update on data (VC/phone)			check in (in person)					feedback on draft report (VC/		presentation on final report (VC/phone)				
Understanding demographic and property data in Canberra	Establishing data schema		░															
	Reviewing census data		░															
	Reviewing school enrolment data (initial)		░	░														
	Review of recent property price data		░	░														
	Review of development application data		░	░														
	Review of policy and strategy		░	░														
	Working Paper 1: Data schema; summary of policy and strategy review; child density mapping + data spreadsheet; infill and greenfield area mapping + data spreadsheet					■												
Aligning school enrolment data with property data	Workshop: Outlining a set of agreed development typologies and sharing outcomes of analysis						■											
	Data analysis: school enrolment data, development site review and in agreed typologies						░	░	░	░	░							
	Draft Report; Inputs from Working Paper 1, Matrices of demographic and housing factors; definition of typologies; school enrolment data analysis against typologies + data spreadsheets										■							
Understanding recent factors that influence school enrolment generation	Desktop review										░	░						
	Semi-structured interviews						■	░	░	░								
	Final Report										░	░	■					

07. RISKS, ASSUMPTIONS AND DEPENDENCIES

Availability of data   – at the right time, in the right form

Availability of interview participants

THANK YOU

06. REVIEWING PROPOSED TIMELINE

Phase	Detailed Task	02-Sep-19	09-Sep-19	16-Sep-19	23-Sep-19	30-Sep-19	07-Oct-19	14-Oct-19	21-Oct-19	28-Oct-19	04-Nov-19	11-Nov-19	18-Nov-19	25-Nov-19	02-Dec-19	09-Dec-19	16-Dec-19	23-Dec-19
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Inception	Inception Meeting																	
	Ongoing meetings with Directorate and ANU (includes 4 project meetings with the Directorate)			update on data (VC/phone)			check in (in person)					feedback on draft report (VC. presentation on final report (VC/phone)						
Understanding demographic and property data in Canberra	Establishing data schema																	
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	Draft Report; Inputs from Working Paper 1, Matrices of demographic and housing factors; definition of typologies; school enrolment data analysis against typologies + data spreadsheets																	
Understanding recent factors that influence school enrolment generation	Desktop review																	
	Semi-structured interviews																	
	Final Report																	

2. Data analysis approach

Following the inception workshop, and an initial review of the data, we have reflected on our proposed approach to clarify the methodology to meet the core problem statement of: If a brownfield development is taking place in an established area of Canberra – how many student aged children will this development generate?

The key shifts from the proposed approach is the purpose of the Workshop (from a 'typologies' focus to Development Site selection workshop), including multiple development applications within one Development Site (defined as one SA1), and considerations of how we might include additional attributes of socio-economic status, proximity to a range of services and place of employment into the data analysis.

We have documented the key questions, geographical scope, data inputs and data outputs for each Phase:
1 - Understanding of demographic and property data in Canberra
2 - Aligning school enrolment data with property data
3 - Understanding recent factors that influence school enrolment data

A series of diagrams showing the interrelationships between data and a data template example is shown in this section

2.1 UNDERSTANDING OF DEMOGRAPHIC AND PROPERTY DATA IN CANBERRA

The purpose of this phase is to firstly understand policy context for urban growth in Canberra and to provide a base understanding of school aged children growth, housing and household typologies and other attributes to input into the selection of Development Sites for further analysis in Phase 2.

There are eight components to this phase:
1. Reviewing existing documentation
2. Identifying areas of growth in school children (growth areas) -
3. Aligning growth areas with urban infill and greenfield classification
4. Agreeing a set of typologies with housing type and house size
5. Identifying typologies in growth areas
6. Identifying areas within close proximity to schools within growth areas
7. Mapping average house prices in growth areas from 2011
8. Mapping recent development applications

2.1 UNDERSTANDING OF DEMOGRAPHIC AND PROPERTY DATA IN CANBERRA

Key questions, geographic scale, timeframes, data sources and outputs

	Reviewing existing documentation	**Identifying areas of growth in school children (growth areas)**	**Aligning growth areas with urban infill and greenfield classification**
Key questions	What is the policy context for shaping new development across Canberra? What has been impacting housing choice in Canberra?	Where has growth in school aged children occurred across Canberra?	Are the growth areas in infill or greenfield classified areas?
Geography	Canberra wide	Canberra wide at ABS Census 2016 Geographies (SA2)	Growth areas
Timeframes	N/A	2010-2019	N/A
Data sources	ACT Planning Strategy 2018 ABS research including household projections and household arrangements What Matters Most – Grattan Institute ACT Housing Choices Discussion Paper	School enrolment census per year	School enrolment census – Infill / greenfield classification of suburbs
Outputs	Summary of review to be included in Draft Report.	Child density map depicting the top 30 growth areas by SA2 and excel spreadsheet	Child density map with infill and greenfield layer

2.1 UNDERSTANDING OF DEMOGRAPHIC AND PROPERTY DATA IN CANBERRA

Key questions, geographic scale, timeframes, data sources and outputs

	Agreeing a set of typologies across housing type and house size	**Identifying typologies across growth areas**	**Identifying areas within close proximity to schools within growth areas**
Key questions	What is the agreed categories of housing type and housing size to make up the typologies to use for analysis?	What proportion of housing is within each typology within the growth areas?	Where are the locations that are within close proximity to schools?
Geography	N/A	Growth areas	Growth areas
Timeframes	2016	2016	2016
Data sources	ABS Census	ABS Census at SA2 level	ACT schools location data – available from ACT MAPI
Outputs	Agreed set of typologies.	Typology map and excel spreadsheet	Schools location map

2.1 UNDERSTANDING OF DEMOGRAPHIC AND PROPERTY DATA IN CANBERRA

Key questions, geographic scale, timeframes, data sources and outputs

	Mapping median apartment and house prices in growth areas	**Mapping recent development applications**	**Mapping socio economic status**
Key questions	What is the median dwelling price in the growth areas?	Where have recent developments occurred within the growth areas?	What is the relative advantage and disadvantage across the growth areas?
Geography	Growth areas	Growth areas	Growth areas
Timeframes	2012 - 2019	2010-2019	2016
Data sources	ACT Treasury Median unit and house price at SA2	EPSDD Development application and Certificate of Completion	ABS Census SEIFA data at SA2 IHAD data
Outputs	Median dwelling price map.	Development application map – documenting year of DA and typology	SEIFA Map – Index of Relative Socio-Economic Advantage and Disadvantage Index of Education and Occupation IHAD map

2.2 ALIGNING SCHOOL ENROLMENT DATA WITH PROPERTY DATA
Key questions, geographic scale, timeframes, data sources and outputs

With the base analysis and mapping inputs, this core component of this phase was a workshop to select areas of growth for further study, and data analysis to understand the change in school aged students as a result of these developments

There are three components to this phase:
1.   Study area selection workshop – 25th Oct 2019
2.   Analysis of change in school aged student as a result of each development site
3.   Analysis and documentation of other key factors of the development sites

Note that at this stage of the study, the Development Application data, including Construction Certificate and details of dwelling typology is size is not yet available. Therefore component 2 and 3 has not been completed.

2.2 ALIGNING SCHOOL ENROLMENT DATA WITH PROPERTY DATA

Key questions, geographic scale, timeframes, data sources and outputs

Study area selection workshop

Urban Infill-Greenfield   **Socio-economic status**

Typologies   **Median house price**   **Proximity to schools**   **Development applications**

Workshop: site selection

Key questions	From the Top 30 Growth Areas, what SA2s (up to 16) best represent a spread of development typologies, price, proximity to school, socio-economic status, urban and infill classification?
Geography	Growth areas
Timeframes	2010-2019
Data sources	Multiple data sets
Outputs	Agreed set growth areas for further analysis and workshop notes The workshop notes are shown in the following pages.

ACT Urban Infill Study - Site Selection Workshop Summary

The purpose of the ACT Urban Infill Study is to explore recent changes in the types of housing across Canberra, in particular in infill development, and understand the impact on student aged children generation.

A number of factors are being explored as part of this study. These include: price; dwelling typology, location and proximity to services and socio-economic status.

This study will look into 16 'development site areas' for detailed analysis. A workshop to inform the selection of the 16 development site areas was undertaken on the 25th October 2019. Participants included those from the Education Directorate, ESPDD and ANU as well as members of the consultant team.

The criteria for selection included:

- High growth in school aged children
- Breadth of housing typologies
- High development activity
- Breadth in median house and apartment price
- Breadth in socio-economic status

13 suburbs (SA2s) were discussed as potential areas for further analysis. Following review of development activity data smaller geographic areas (SA1s) will be selected and agreed for further analysis. Multiple development site areas may be chosen within one suburb/SA2.

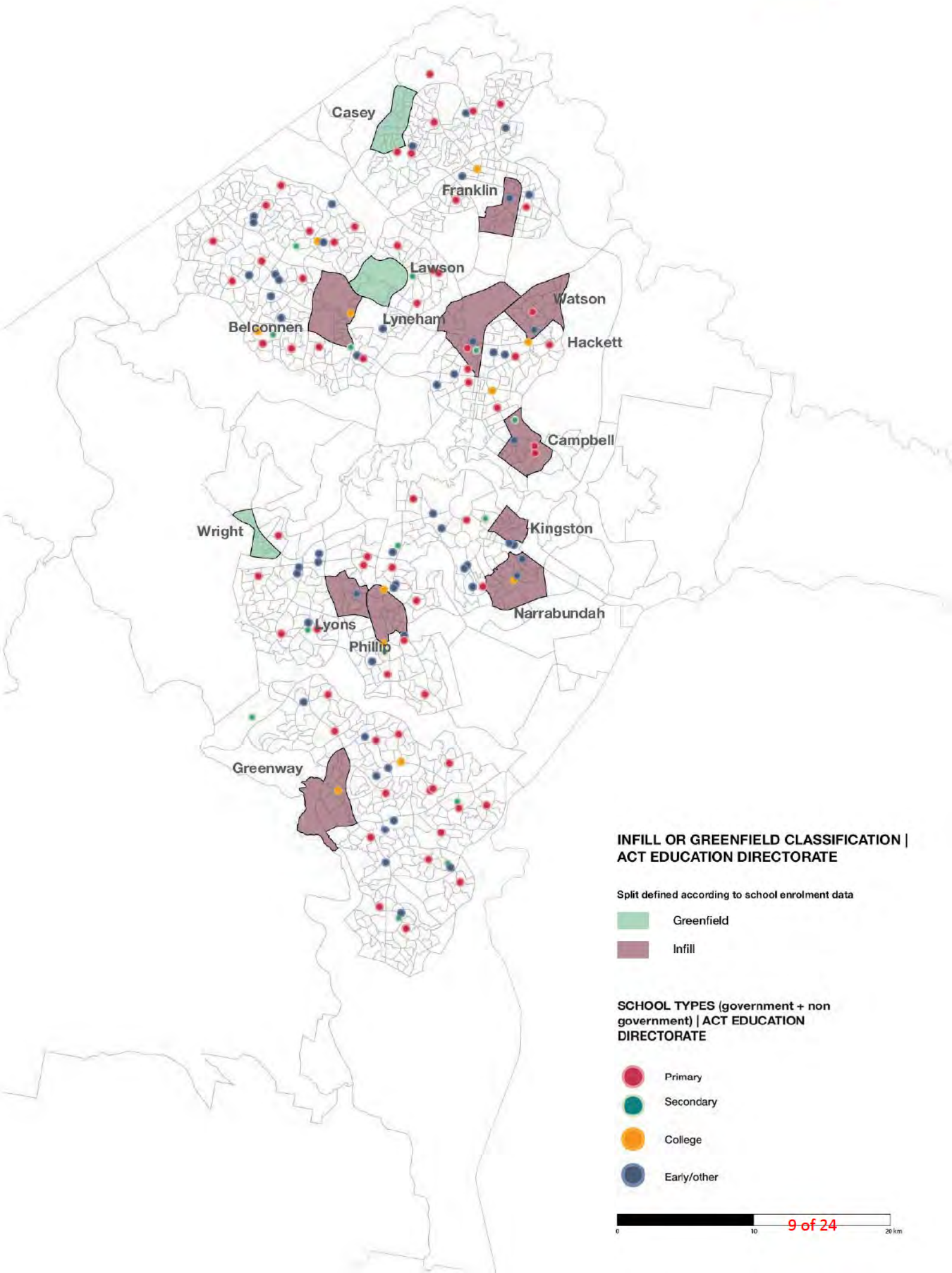| Selected SA2	School-age population growth from 2010-2019	Median unit price	Median house price	Development activity**	Dwelling typology mix	SEIFA Index of Relative Socio-economic Advantage and Disadvantage (IRSAD) distribution according to decile - number of SA1s per SA2 per decile									
						1	2	3	4	5	6	7	8	9	10
Belconnen	208	$388,900	$465,000	High		0	1	1	1	0	1	1	2	3	1
Campbell	151	$493,000	$980,000	High		0	0	0	0	0	0	0	0	1	7
Casey	1224	$346,000	$535,000	Low		0	0	0	0	0	0	1	2	3	9
Franklin	977	$372,000	$613,750	Low		0	0	0	0	0	1	1	4	8	7
Greenway*	70	$390,000	$512,500	High		0	0	0	0	0	0	0	2	2	1
Kingston	197	$455,000	$1,500,000	High		0	0	0	0	0	1	0	1	0	8
Lawson	200	$449,900	$725,000	High		0	0	0	0	0	0	0	1	0	1
Lyneham	218	$372,900	$750,000	High		0	0	0	0	0	2	2	5	2	2
Lyons	166	$482,903	$665,000	Low		0	0	0	1	0	0	2	2	1	0
Narrabundah	225	$432,500	$780,000	Low		0	0	2	0	0	1	4	2	3	5
Phillip	176	$370,000	$480,500	High		0	0	1	0	0	0	1	2	4	0
Watson	347	$359,900	$615,000	High		0	0	0	0	0	2	0	4	6	3
Wright	470	$325,000	$668,500	High		0	0	0	0	0	0	0	0	0	8

Legend

- Detached dwelling
- Semi-detached dwelling
- Apartments up to 3 storeys
- Apartments 4 storeys+

*Note that Greenway has been selected based on discussions throughout the workshop. There was an interest in including an area that had high proportions of semi-detached dwellings and apartments with lower growth in school-aged population.

** Classification of development activity is presented based on workshop discussion. Further detail on development activity is being provided by EPSDD.
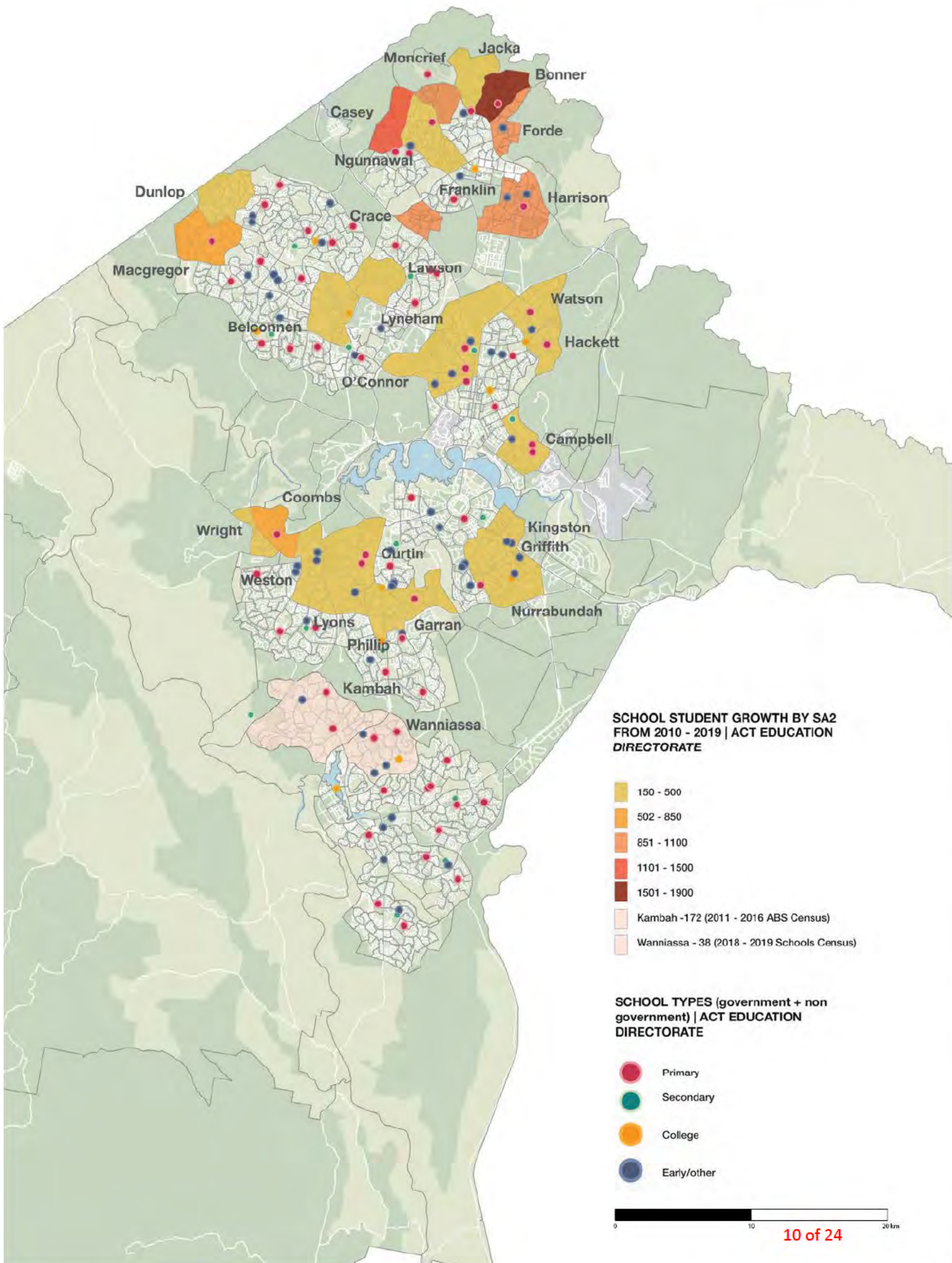
Casey

Franklin

Lawson

Belconnen

Lyneham

Watson

Hackett

Campbell

Wright

Kingston

Lyons

Phillip

Narrabundah

Greenway

**INFILL OR GREENFIELD CLASSIFICATION |
ACT EDUCATION DIRECTORATE**
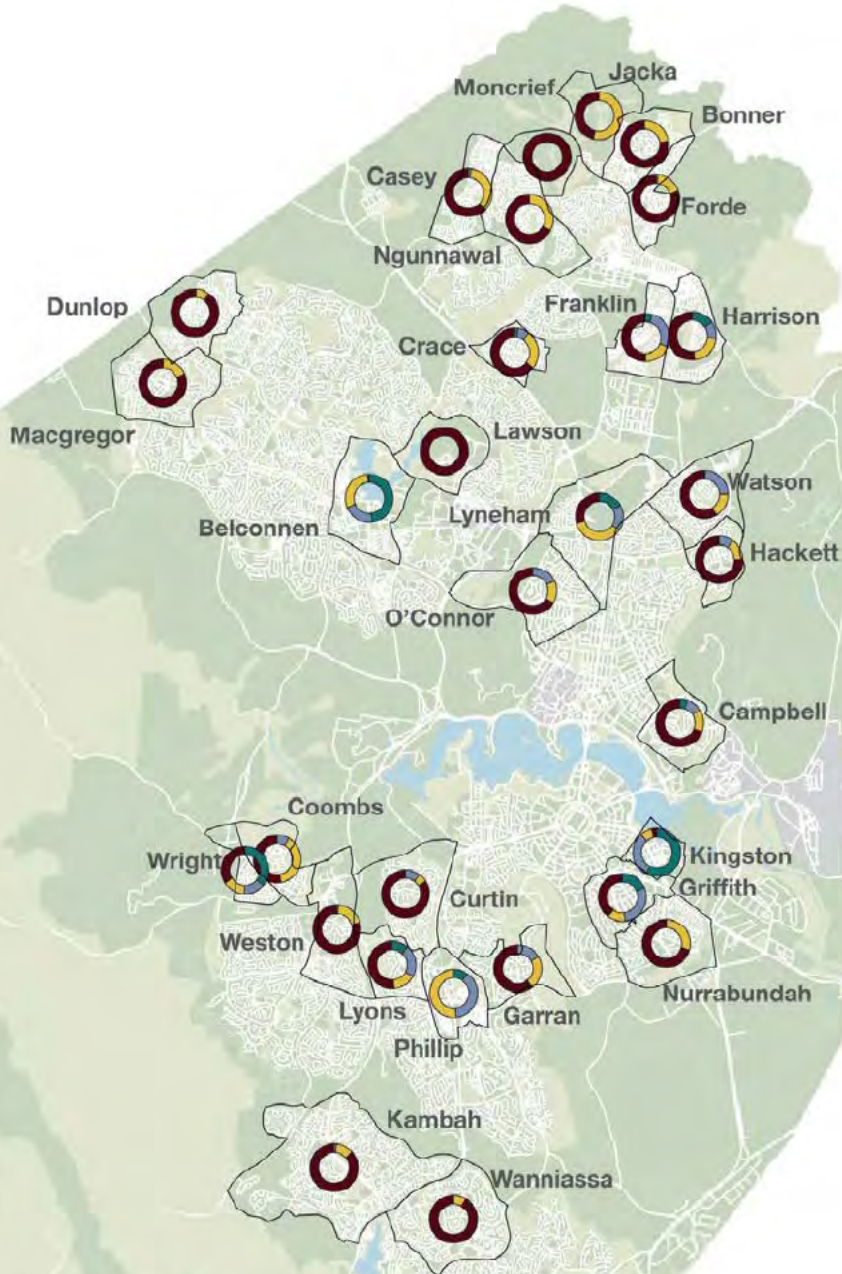
Split defined according to school enrolment data

Greenfield

Infill

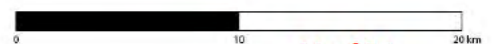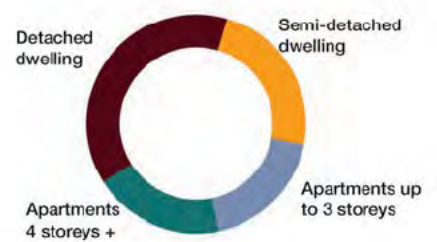**SCHOOL TYPES (government + non
government) | ACT EDUCATION
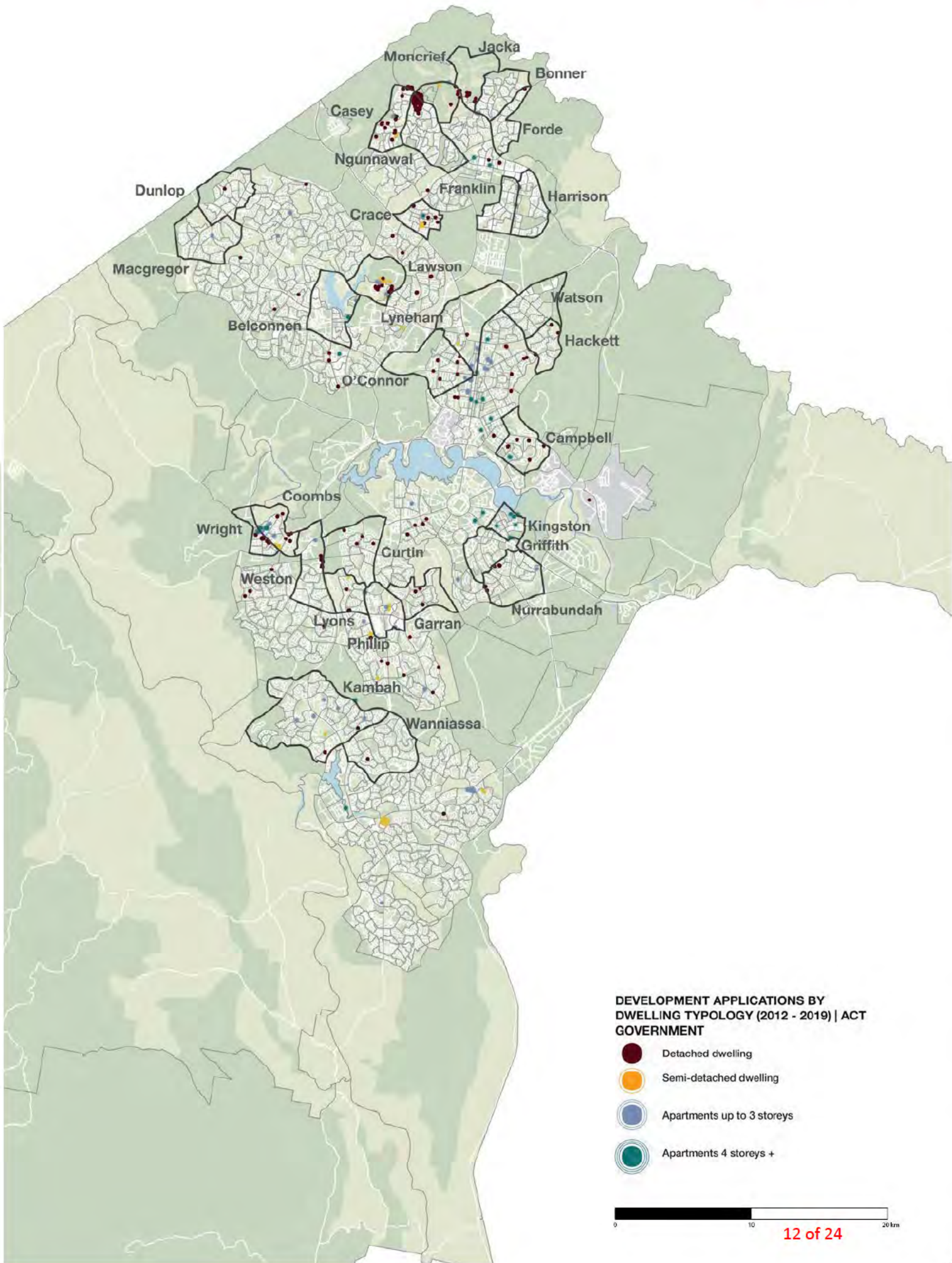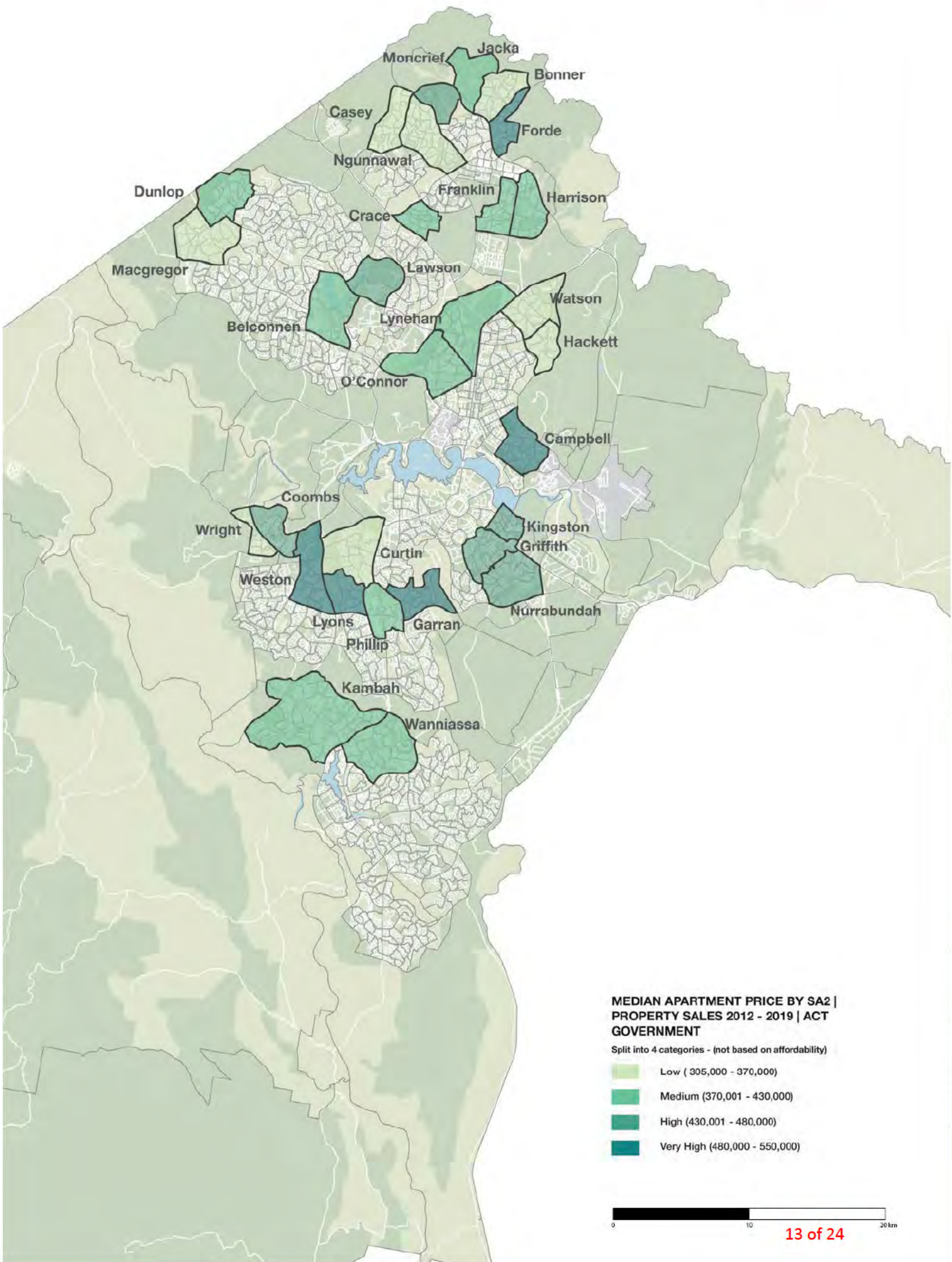DIRECTORATE**

Primary

Secondary

College

Early/other

0   10   20 km

SCHOOL STUDENT GROWTH BY SA2
FROM 2010 - 2019 | ACT EDUCATION
DIRECTORATE

- 150 - 500
- 502 - 850
- 851 - 1100
- 1101 - 1500
- 1501 - 1900
- Kambah -172 (2011 - 2016 ABS Census)
- Wanniassa - 38 (2018 - 2019 Schools Census)

SCHOOL TYPES (government + non
government) | ACT EDUCATION
DIRECTORATE

- Primary
- Secondary
- College
- Early/other

Moncrief
Jacka
Bonner
Casey
Forde
Ngunnawal
Franklin
Harrison
Crace
Dunlop
Lawson
Macgregor
Watson
Belconnen
Lyneham
Hackett
O'Connor
Campbell
Coombs
Wright
Kingston
Curtin
Griffith
Weston
Lyons
Garran
Nurrabundah
Phillip
Kambah
Wanniassa

DWELLING TYPOLOGY | ABS CENSUS 2016

Detached
dwelling

Semi-detached
dwelling

Apartments
4 storeys +

Apartments up
to 3 storeys

0   10   20 km

Moncrief
Jacka
Bonner
Casey
Forde
Ngunnawal
Dunlop
Franklin
Harrison
Crace
Macgregor
Lawson
Watson
Belconnen
Lyneham
Hackett
O'Connor
Campbell
Coombs
Wright
Kingston
Griffith
Curtin
Weston
Nurrabundah
Lyons
Garran
Phillip
Kambah
Wanniassa

DEVELOPMENT APPLICATIONS BY DWELLING TYPOLOGY (2012 - 2019) | ACT GOVERNMENT

● Detached dwelling

● Semi-detached dwelling

◉ Apartments up to 3 storeys

◉ Apartments 4 storeys +

0   10   20 km

MEDIAN APARTMENT PRICE BY SA2 |
PROPERTY SALES 2012 - 2019 | ACT
GOVERNMENT

Split into 4 categories - (not based on affordability)

Low (305,000 - 370,000)

Medium (370,001 - 430,000)

High (430,001 - 480,000)

Very High (480,000 - 550,000)

MEDIAN HOUSE PRICE BY SA2 |
PROPERTY SALES 2012 - 2019 | ACT
GOVERNMENT

Split into 4 categories - (not based on affordability)

Low (400,000 - 600,000)

Medium (600,001 - 900,000)

High (900,001 - 1,200,000)

Very High (1,200,001 - 1,500,000)

Jacka
Moncrief
Bonner
Casey
Forde
Ngunnawal
Franklin
Harrison
Dunlop
Crace
Macgregor
Lawson
Watson
Belconnen
Lyneham
Hackett
O'Connor
Campbell
Coombs
Wright
Kingston
Curtin
Griffith
Weston
Lyons
Garran
Nurrabundah
Phillip
Kambah
Wanniassa

SEIFA INDEX OF EDUCATION AND OCCUPATION BY SA2 | ABS CENSUS 2016

Split into 10 equal deciles - Index of Education and Occupation

1 — Areas with a Lower Average Socio-Economic Index
2
3
4
5
6
7
8
9
10 — Areas with a Higher Average Socio-Economic Index

0   10   20 km

SEIFA INDEX OF RELATIVE
SOCIO-ECONOMIC ADVANTAGE AND
DISADVANTAGE SA2 | ABS CENSUS 2016

Split into 10 equal deciles - Index of Relative Socio-Economic
Advantage and Disadvantage

1 — Areas with a Lower Average Socio-Economic Index
2
3
4
5
6
7
8
9
10 — Areas with a Higher Average Socio-Economic Index

0   10   20 km

2.2 ALIGNING SCHOOL ENROLMENT DATA WITH PROPERTY DATA

Key questions, geographic scale, timeframes, data sources and outputs

Development site selection

Key questions

Based on the selected SA2s, what
Development Sites exhibit the following:
- high levels of growth across the whole
timeframe?
- recent high development activity
- high development activity across the whole
timeframe?
- areas that exhibit a breadth of
characteristics?

Geography

Growth areas

Timeframes

2010-2019

Data sources

School enrolment data
- Geocoded student census information within selected Growth
Areas broken down into SA1s to determine areas of high
student growth

Analysis of aerial imagery
- Analysis of aerial imagery across the timeframe of 2010-2019
within the Growth Areas to determine areas of high
development activity

Colliers Development Pipeline data
- Geocoded development information (developments of 10+
dwellings only) from 2017-2019 to determine areas of recent
high development activity

Areas subject to discussion
- Inclusion of Growth Areas based on contrasting qualities to
other Growth Areas in order to provide a breadth of typologies

Outputs

Selected SA1s or "development sites" for
analysis

The following Development Sites have been
shortlisted based on the key questions. Note
that due to limitations of time and budget for
this study, not all Development Sites may be
included in this study:

80101100212 Belconnen
80101101803 Lawson
80101101804 Lawson
80104103611 Casey
80104103615 Casey
80105106103 Watson
80105106115 Watson
80106113101 Kingston
80106113106 Kingston
80109110912 Philip
80110113905 Wright
80110113906 Wright
80106106712 Narrabundah
80106106707 Narrabundah
80105105711 Lyneham
80105112402 Campbell
80105112401 Campbell
80107108005 Greenway
80107108011 Greenway

2.2 ALIGNING SCHOOL ENROLMENT DATA WITH PROPERTY DATA

Key questions, geographic scale, timeframes, data sources and outputs

	Analysing school enrolment change in Development Sites	Reviewing the attributes of each Development Site
Key questions	What change has occurred in school enrolment as a result of this development?	What are the attributes of this Development site across: – Population – Socio economic status – Student language spoken at home – Proximity to services such as public transport, community facilities, key employment areas – Proximity to school – Quality of nearest school by Naplan Result – Housing tenure – Median house and unit price for development typology – Future plans and character for the area
Geography	Development sites	
Timeframes	2010-2019	
Data sources	School enrolment data – Geocoded student enrolment details by class level and school including both government and non-government schools Analysis of aerial imagery Colliers development pipeline data (2017-2019)	
Outputs	See data template example overleaf Data schema attached to this document	See data template Data schema

DATA PREP

Sources

ABS Census 2011 to 2016

Age structure (1...100)

Number of bedrooms per dwelling (1...9)

Dwelling structure

Tenure and landlord type

Household composition

Full time/part time student status

Type of education institution attending

SEIFA IRSAD

SEIFA IEO

per year — 2011 / 2016

ABS Census Geography

SA2

SA1

Meshblock

per year — 2011 / 2016

Collated Census data per year using unique geography ID

2011 Census data by geography

2016 Census data by geography

Change in school age population (ages 5-17) per SA2 from 2011 to 2016

DEFINE INITIAL FILTER: TOP GROWTH AREAS BY SA2

Top 30 growth areas from 2010 to 2019 based on the student enrolment data per SA2

Top 30 areas of growth of student age population by SA2

Growth of school age population per year per SA2 from 2011 to 2016

FILTERED/NARROW SELECTION

Top 30 growth areas from 2010 to 2019 based on the student enrolment data per SA2

School locations

Top 30 growth areas from 2010 to 2019 based on the student enrolment data per SA2

Change in school age population per year per SA2 from 2010 to 2019

2016 Census data by selected SA2

Dwelling structure

Number of bedrooms per dwelling

Tenure

SEIFA IRSAD

SEIFA IEO

Property sales geocoded with price

Median unit price for selected SA2s

Median house price for selected SA2s

Development application by typology (approximate locations based on initial received data)

COMPILATION AND VISUALISATION FOR WORKSHOP

Mapping top 30 growth areas from 2010 to 2019 based on the student enrolment data

Student growth

Proximity to schools

Dwelling structure

SEIFA IRSAD

SEIFA IEO

Median unit price

Median house price

Development application by typology

Education Directorate / EPSDD

School enrolment

Enrolment per year 2010-2019 (not geocoded)

Enrolment per year 2018-2019 (Geocoded)

Property sales

Property sales 2012-2019 with price

Property sales 2012-2019 geocoded, no price

Development applications

Completion data

School locations

Collated school enrolment data per year using Student ID (SLK_REC_KEY)

joined by property ID

Property sales geocoded with price

Key (Property ID)

X,Y Coordinates

Site name

Concatenated address

Meshblock

SA1

SA2 (by name)

SA3

Land type (House or unit)

Selling price

Contract date

Area of block

Student enrolment per year

Student ID

School name and code

Network name and code

Sector name and code

AGEID

Year level and category

Gender

Birthdate

Indigenous status

Disability

International full fee paying

Start date and first enrolment date

Student language

Address

Greenfield or infill

School location

Highest level of parental education

Birth Country code

Geocoded address (2018-2019 only)

Assign Student ID to SA2 based on correponding suburb

Assign Student ID to SA2 based on stated SA2

Students not included per year

Blank Student ID

Blank Address

TOP 30 Areas of growth by SA2

Growth per year per SA2

Growth of school age population per year per SA2 from 2010 to 2019

Growth of school age population per year per SA2 from 2018 to 2019

Growth of school age population per year per SA2 from 2016 to 2019

Number of bedrooms per dwelling per SA2

1

2

3

4 or more

Dwelling structure by SA2

Detached dwelling

Semi-attached dwelling

Apartment, 1 to 3 storeys

Apartment, 4 or more storeys

Cross-referencing dwelling structure by number of bedrooms per dwelling to create 16 dwelling typologies

Dwelling typology by SA2

1 bedroom detached dwelling

1 bedroom semi-attached dwelling

1 bedroom apartment, 1 to 3 storeys

1 bedroom apartment, 4 or more storeys

2 bedroom detached dwelling

2 bedroom semi-attached dwelling

2 bedroom apartment, 1 to 3 storeys

2 bedroom apartment, 4 or more storeys

3 bedroom detached dwelling

3 bedroom semi-attached dwelling

3 bedroom apartment, 1 to 3 storeys

3 bedroom apartment, 4 or more storeys

4 or more bedroom detached dwelling

4 or more bedroom semi-attached dwelling

4 or more bedroom apartment, 1 to 3 storeys
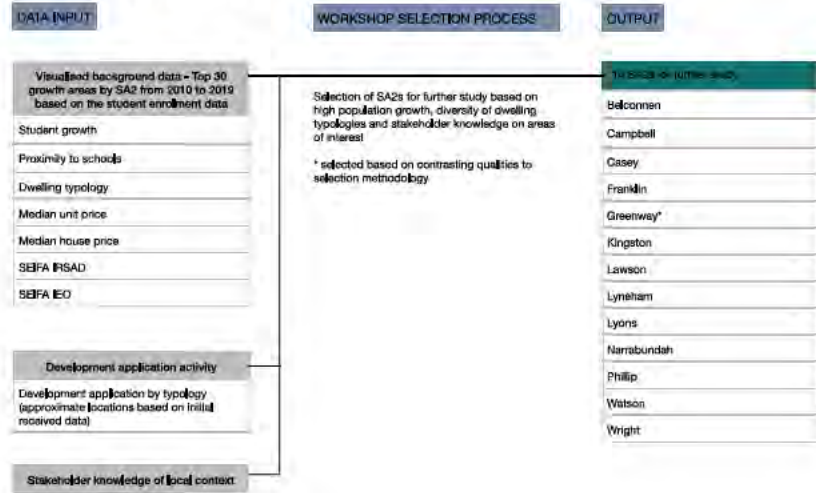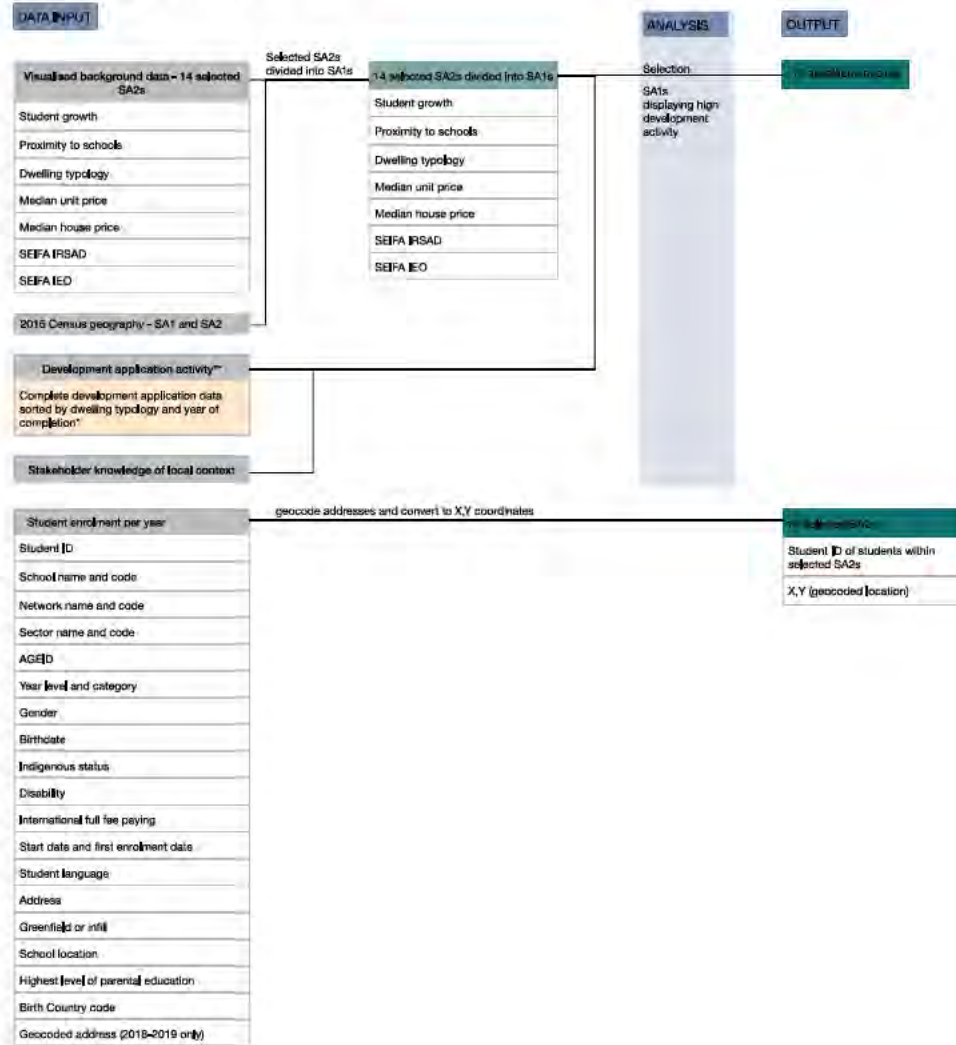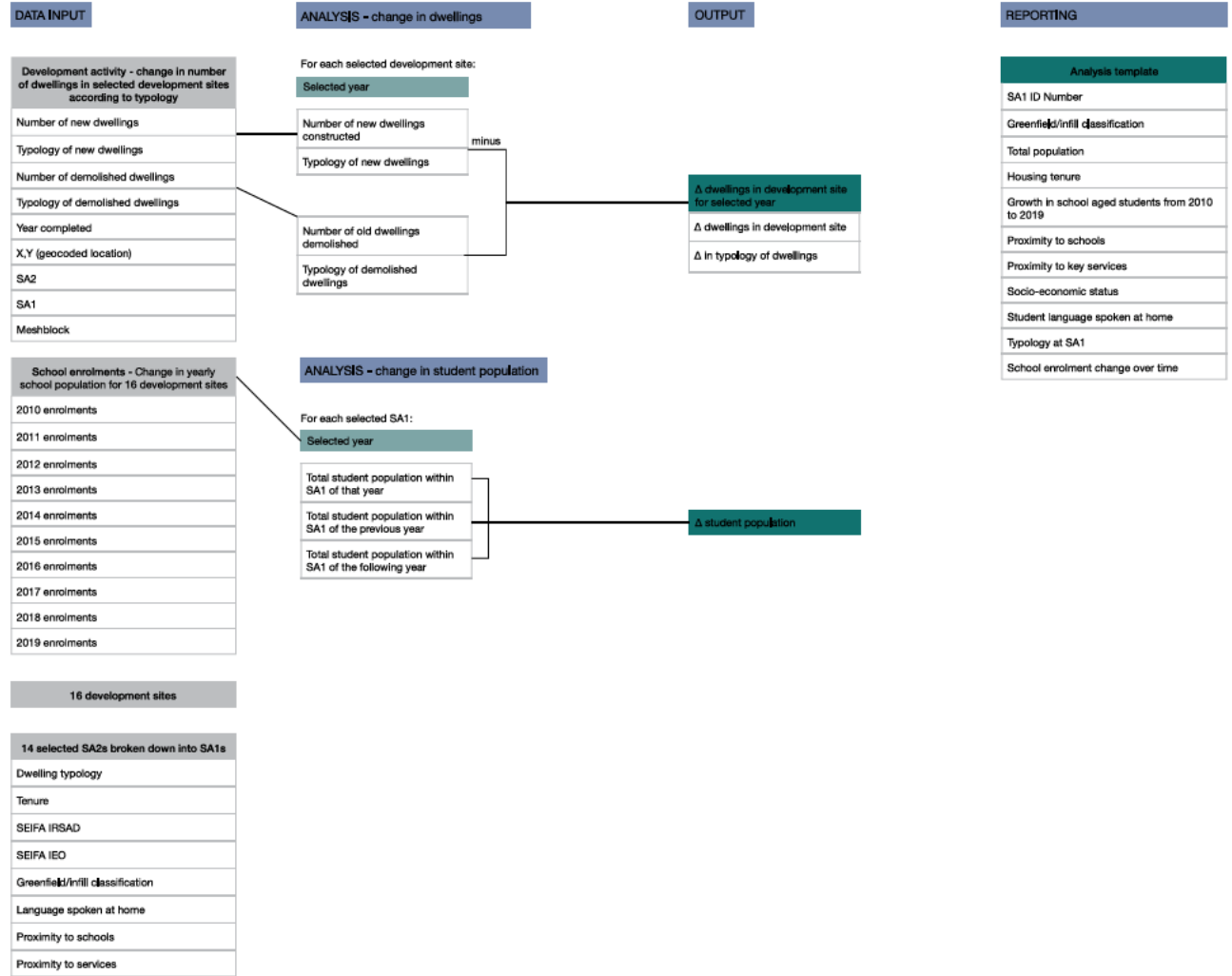
4 or more bedroom apartment, 4 or more storeys

Stage 2 - Workshop

Visualised background data – Top 30 growth areas by SA2 from 2010 to 2019 based on the student enrolment data

- Student growth
- Proximity to schools
- Dwelling typology
- Median unit price
- Median house price
- SEIFA IRSAD
- SEIFA IEO

Selection of SA2s for further study based on high population growth, diversity of dwelling typologies and stakeholder knowledge on areas of interest

* selected based on contrasting qualities to selection methodology

14 SA2s selected for further study

- Belconnen
- Campbell
- Casey
- Franklin
- Greenway*
- Kingston
- Lawson
- Lyneham
- Lyons
- Narrabundah
- Phillip
- Watson
- Wright

Development application activity

Development application by typology (approximate locations based on initial received data)

Stakeholder knowledge of local context

Stage 2.5 - Reiterate

Visualised background data – 14 selected SA2s

- Student growth
- Proximity to schools
- Dwelling typology
- Median unit price
- Median house price
- SEIFA IRSAD
- SEIFA IEO

Selected SA2s divided into SA1s

14 selected SA2s divided into SA1s

- Student growth
- Proximity to schools
- Dwelling typology
- Median unit price
- Median house price
- SEIFA IRSAD
- SEIFA IEO

Selection

SA1s displaying high development activity

Selected SA1s

2016 Census geography – SA1 and SA2

Development application activity**

Complete development application data sorted by dwelling typology and year of completion*

Stakeholder knowledge of local context

geocode addresses and convert to X,Y coordinates

Student enrolment per year

- Student ID
- School name and code
- Network name and code
- Sector name and code
- AGEID
- Year level and category
- Gender
- Birthdate
- Indigenous status
- Disability
- International full fee paying
- Start date and first enrolment date
- Student language
- Address
- Greenfield or infill
- School location
- Highest level of parental education
- Birth Country code
- Geocoded address (2018-2019 only)

Student in selected SA2s

- Student ID of students within selected SA2s
- X,Y (geocoded location)

Stage 2.5** - Preparation of development application data schema

Location	Area	Typology	Identifier
Block	Sqm	Storeys	Approval date
Unit		Description	Certificate no.
Street number			
Street name			
MB			
SA1			
SA2			

Dwelling typology (Census)

- Dominant dwelling typology per SA1
- Dominant dwelling typology per SA2

Additional data from previous intermediate output schemas

Complete DA data schema

- Number of new dwellings
- Typology of new dwellings
- Number of demolished dwellings
- Typology of demolished dwellings
- Year completed
- X,Y
- SA2
- SA1
- Meshblock

Stage 3 - Correlating DA completion with school enrolments

DATA INPUT

ANALYSIS – change in dwellings

OUTPUT

REPORTING

Development activity - change in number of dwellings in selected development sites according to typology

Number of new dwellings
Typology of new dwellings
Number of demolished dwellings
Typology of demolished dwellings
Year completed
X,Y (geocoded location)
SA2
SA1
Meshblock

For each selected development site:

Selected year

Number of new dwellings constructed
Typology of new dwellings

minus

Number of old dwellings demolished
Typology of demolished dwellings

Δ dwellings in development site for selected year

Δ dwellings in development site
Δ in typology of dwellings

Analysis template

SA1 ID Number
Greenfield/infill classification
Total population
Housing tenure
Growth in school aged students from 2010 to 2019
Proximity to schools
Proximity to key services
Socio-economic status
Student language spoken at home
Typology at SA1
School enrolment change over time

School enrolments - Change in yearly school population for 16 development sites

2010 enrolments
2011 enrolments
2012 enrolments
2013 enrolments
2014 enrolments
2015 enrolments
2016 enrolments
2017 enrolments
2018 enrolments
2019 enrolments

ANALYSIS – change in student population

For each selected SA1:

Selected year

Total student population within SA1 of that year
Total student population within SA1 of the previous year
Total student population within SA1 of the following year

Δ student population

16 development sites

14 selected SA2s broken down into SA1s

Dwelling typology
Tenure
SEIFA IRSAD
SEIFA IEO
Greenfield/infill classification
Language spoken at home
Proximity to schools
Proximity to services

Casey   Development Site [1]

DA1: Development name/address Total number of new dwellings: Typology: Month/2017:	DA3: Development name/address Total number of new dwellings: Typology: Month/2018:	DAx: Development name/address Total number of new dwellings: Typology: Month/2019:
DA2: Development name/address Total number of new dwellings: Typology: Month/2017:	DA4: Development name/address Total number of new dwellings: Typology: Month/2018:	DAx: Development name/address Total number of new dwellings: Typology: Month/2019:

Key facts

SA1 ID number:
80104103615

Greenfield/Infill classification:
Greenfield

Total population [Census 2016]:
419

Housing tenure [Census 2016]:
12% rented, 75% owned

Growth in school aged students from 2010 – 2019:
xxx

Proximity to schools
Primary:
Secondary:
College:

Proximity to key services:
[narrative description of transport, employment centres, retail centres, open space]

Socio-economic status:
[SEIFA decile]

Top three student languages spoken at home:
x,y,z

Median House Price:
$xxx

Median Apartment Price:
$xxx

Description

Narrative description of site...

Narrative of future plans for the area [based on planning strategy, known infrastructure investments]

2016   2017   2018   2019

Typology [at SA1]

4 bed
3 bed
2 bed
1 bed

Source: ABS Census 2016

Source: Development Application Details

Change from 2016 to 2019

4 bed
3 bed
2 bed
1 bed

Change from 2016 to 2019

School enrolment

Source: ACT Education Directorate Census

Primary
Secondary
College

Total

Total

Total

Total

2016   2017   2018   2019

Total

Change

2.3 UNDERSTANDING RECENT FACTORS THAT INFLUENCE SCHOOL ENROLMENT DATA

Key questions, geographic scale, timeframes, data sources and outputs

The purpose of this phase is to complement the quantitative data analysis with qualitative data with the property industry.

This phase includes reviewing the factors that have influenced housing location and choice for families with school aged children based on:
1. Desktop research on journal papers
2. Semi structured interviews with developers, real estate agents and organisations such as the PCA ACT Chapter.

Note that at this stage some semi-structured interviews have been undertaken.

2.3 UNDERSTANDING RECENT FACTORS THAT INFLUENCE SCHOOL ENROLMENT DATA

Key questions, geographic scale, timeframes, data sources and outputs

	Desktop review	**Semi structured interviews**
Key questions	What are the factors that influence housing choice in Australia, and particular Canberra?	What are the factors that influence housing choice for families from the perspectives of developers, real estate agents and organisations such as the PCA ACT Chapter?
Geography	Canberra, Australia	Canberra, Australia
Timeframes	N/A	
Data sources	Journal papers, government documents	Interviews: PCA, Government Architects, real estate agent, developer
Outputs	Summary of notes from desktop review for input into Draft Report	Summary of notes from interviews for input into Draft Report

3.2.2 PHASE 2: RESIDENTIAL SITE SELECTION

The analysis of the growth areas was presented in a workshop was held on 25th October 2019 with participants from ACT Education, ANU and EPSDD. The workshop was used to define areas of high growth and high development activity based on stakeholder knowledge. 13 areas of interest (SA2) were selected for further study and analysis. The 13 areas of interest are shown in the map adjacent.

The features of each of the 13 areas of interests (SA2) is presented in the following spreads.

Figure 10 Selected SA2s from Site Selection workshop

Source: Arup, data from ACTMAPi, data from ABS Census 2016

Figure 11 Summary of characteristics of selected SA2s

Selected SA2	School-age population growth from 2010-2019	Median unit price 2012-2019		Median house price 2012-2019		Existing or new residential suburb	Dwelling tenure in 2016	
Scale	at SA2	at SA2	ACT	at SA2	ACT	at SA2	at SA2	
Data source	ACT Education School Census Data	ACT Treasury Access Canberra sales data				School Census Data	ABS 2016 Census Data	
Belconnen	208	$388,900	$427,000	$465,000	$810,000	Existing	67.9%	29.2%
Campbell	151	$493,000	$427,000	$980,000	$810,000	Existing	30.0%	67.4%
Casey	1224	$346,000	$427,000	$535,000	$810,000	New	26.0%	72.3%
Franklin	977	$372,000	$427,000	$613,750	$810,000	Existing	42.1%	55.6%
Greenway*	70	$390,000	$427,000	$512,500	$810,000	Existing	49.9%	48.3%
Kingston	197	$455,000	$427,000	$1,500,000	$810,000	Existing	58.4%	30.2%
Lawson	200	$449,900	$427,000	$725,000	$810,000	New	31.6%	68.4%
Lyneham	218	$372,900	$427,000	$750,000	$810,000	Existing	53.8%	41.8%
Lyons	166	$482,903	$427,000	$665,000	$810,000	Existing	46.0%	49.3%
Narrabundah	225	$432,500	$427,000	$780,000	$810,000	Existing	41.8%	55.1%
Phillip	176	$370,000	$427,000	$480,500	$810,000	Existing	59.3%	38.1%
Watson	347	$359,900	$427,000	$615,000	$810,000	Existing	40.4%	57.2%
Wright	470	$325,000	$427,000	$668,500	$810,000	New	21.0%	76.5%

*Selected as a development area with different environmental factors to the other selected SA2s

Unit - refers to apartments and townhouses
House - refers to detached dwellings

Figure 12 Summary of characteristics of selected SA2s (continued)

SEIFA IRSAD distribution according to decile - number of SA1s per SA2 per decile in 2016											Dwelling typology at SA2 in 2016
Selected SA2	1	2	3	4	5	6	7	8	9	10	
Data source	ABS 2016 Census Data										ABS 2016 Census Data
Belconnen	0	1	1	1	0	1	1	2	3	1	
Campbell	0	0	0	0	0	0	0	0	1	7	
Casey	0	0	0	0	0	0	1	2	3	9	
Franklin	0	0	0	0	0	1	1	4	8	7	
Greenway*	0	0	0	0	0	0	0	2	2	1	
Kingston	0	0	0	0	0	1	0	1	0	8	
Lawson	0	0	0	0	0	0	0	1	0	1	
Lyneham	0	0	0	0	0	2	2	5	2	2	
Lyons	0	0	0	1	0	0	2	2	1	0	
Narrabundah	0	0	2	0	0	1	4	2	3	5	
Phillip	0	0	1	0	0	0	1	2	4	0	
Watson	0	0	0	0	0	2	0	4	6	3	
Wright	0	0	0	0	0	0	0	0	0	8	

Detached dwelling   Semi-detached dwelling
Apartments up to 3 storeys   Apartments 4+ storeys

3 of 7

From the 13 'areas of interest', 19 SA1s were selected to help identify the residential sites. The SA1s were selected based on the following:

1. High levels of growth across the whole timeframe

2. Recent high development activity

3. High development activity across the whole timeframe

4. A breadth of characteristics, i.e. socio-economic status

Further analysis was undertaken to inform the SA1 selection including:

» **School enrolment data** Geocoded school student census information within selected Growth Areas broken down into SA1s to determine areas of high school student growth

» **Analysis of aerial imagery** Analysis of aerial imagery across the timeframe of 2010-2019 within the Growth Areas to determine areas of high development activity

» **Colliers Development Pipeline data** Geocoded development information (developments of 10+ dwellings only) from 2017-2019 to determine areas of recent high development activity

The following SA1s were selected for further analysis:

8100212	Belconnen
8101803	Lawson
8101804	Lawson
8103611	Casey
8103615	Casey
8106103	Watson
8106115	Watson
8113101	Kingston
8113106	Kingston
8110912	Philip
8113905	Wright
8113906	Wright
8106712	Narrabundah
8106707	Narrabundah
8105711	Lyneham
8112402	Campbell
8112401	Campbell
8108005	Greenway
8108011	Greenway

Figure 13 Selected SA1s

Source: Arup, data from ACTMAPi, data from ABS Census 2016

From the 19 selected SA1s, analysis was undertaken on available development application data to select a range of residential sites for further in-depth analysis.

Development application data from EPSDD was reviewed, and ACT Education undertook analysis on Development Application and Construction Certificate data to inform the residential site selection. A total of 10 sites were selected from the selected SA1s. An additional five sites were selected from outside the 19 selected SA1s. These were considered as appropriate residential sites to inform the analysis.

It is noted that the supporting narrative and demographic information for these five sites were reviewed at an SA2 level.

The following residential sites were selected for in-depth analysis:

1. Magnolia Mews** - Narrabundah
2. Space The Residence** - Turner
3. Space2 The Residence** - Turner
4. Axis Apartments - Lyneham
5. Artique - Campbell
6. Allure* - Casey
7. Quayside - Kingston
8. Ambiente - Wright
9. Watermark - Greenway
10. Atelier - Kingston
11. Wayfarer* - Belconnen
12. Evolure - Lawson
13. The Quay - Greenway
14. Mizura Villas - Lawson
15. Idalia - Phillip

*Additional site

**Additional site from outside the timeframe of 2010-2019

Figure 14 Residential Site Locations

Source: Arup, data from ACTMAPi, data from ABS Census 2016, data from EPSDD Development application data

3.2.3 PHASE 3: RESIDENTIAL SITE ANALYSIS

With the base analysis and mapping inputs, the core component of this phase is data analysis to understand the change in school aged school students across years following the introduction of the new medium-high density developments.

In addition to the quantitative analysis, the following attributes for each site were reviewed:

» Population (at SA1/SA2);

» Socio economic status (at SA1/SA2);

» School student language spoken at home (at SA1/SA2);

» Proximity to services such as public transport, community facilities, key employment areas;

» Proximity to school;

» Housing tenure (at SA1/SA2); and

» Median house and unit price for development typology.

The residential site analysis has been undertaken as a limited sample analysis (including 15 residential sites). Observations are noted within the analysis, however clear correlations between the data were not able to be determined due to the limited sample size. This sample analysis provides a testing of an approach, and outlines suggestions for further analysis.

3.2.4 PHASE 4: PERSPECTIVES ON FACTORS THAT INFLUENCE SCHOOL ENROLMENT DATA

The purpose of this phase is to complement the quantitative data analysis with qualitative data collected from interviews with representatives within the property industry. This phase includes reviewing the factors that have influenced housing location and choice for families with school aged children based on:

1. Desktop research on journal papers; and

2. Semi structured interviews with developers, real estate agents and organisations such as the PCA ACT Chapter.

The results of this analysis are presented within Chapter 1 of this report.

3.2.5 PHASE 5: LEARNING FROM OTHER JURISDICTIONS

In addition to Phase 4, the purpose of this phase is to provide further context on the potential shift in school student populations by reviewing policy and planning, qualitative data anlysis data collected from interviews with representatives within the schools planning and a sample quantitative analysis of three case study sites (SA2). Three areas were selected for this review: Sydney; Brisbane and Newcastle.

3.3 OVERALL DATA SCHEMA

We have presented the data analysis and how each part of the analysis comes together in the data schema in Appendix 2.

ACT URBAN INFILL STUDY
29 th November 2019

Draft Report

DRAFT

ARUP

ARUP

URBAN INFILL STUDY | PURPOSE OF THE STUDY

Arup is working with the ACT Education Directorate to undertake a study to support enrolment forecasting and decision-making for schools planning. Specifically, the study seeks to inform an understanding of the likely number of student aged children an area may attract if urban infill (brownfield development) is taking place, based on recent development trends.

This study responds to the experience of many Australian jurisdictions that have or are encountering higher than expected growth in children in inner city areas, resulting in pressure on schools.

Urban infill is already taking place in Canberra, particularly along the along the City and Gateway corridor, and policy and strategy including the ACT Planning Strategy has outlined a goal for at least 70 per cent of new development to take place in the established urban areas of Canberra. The ACT Education Directorate is undertaking this study now to support proactive planning for schools across Canberra to meet the changing needs and of its residents.

URBAN INFILL STUDY | THIS DRAFT REPORT

This Draft Report provides a summary of the work to date for the ACT Urban Infill Study and includes three core sections:

1. Context and drivers of change for the Study: A summary of the literature review and presentation of key findings of the review into trends in changing housing choices in cities and specific to Canberra. Findings from this review provide input into the approach to the analysis, including informing the set of factors to analysis for each area.

2. Approach and methodology for the analysis: An overview of the approach to each phase of the work, including a data schema, example of the final template output and notes and assumptions for the analysis.

3. Appendix: A set of tools and content that has informed the study including questions for semi-structured interviews, summary notes from semi-structured interviews.

1. Context and drivers of change

ARUP

1. CONTEXT AND DRIVERS OF CHANGE

A series of trends across social, technological, economic, environmental and political aspects are impacting the way that we can and choose to live and the infrastructure places need to provide to support productive and liveable places.

Globally, trends towards smaller and less conventional household units is continuing to gather pace. High values are being placed on access versus ownership and this is shifting an increase in the desirability of homes close to work, learning and play in 'infill development areas.'

Infill development can be defined as housing development sites within existing urban areas – either established areas, generally inner or middle suburbs or through regeneration of large pieces of formal industrial lands including public sites. In recent decades, densification of residential development in the inner areas of Australian cities has increased (Infrastructure Australia, 2018).

Environmental sustainability issues area also impacting the shift towards demands for housing in infill areas. Sprawling suburbs with a dominance of detached housing can result in more expensive infrastructure, potentially longer commutes, and higher transport and electricity costs.

Affordability of housing, considerations of household impacts on the environment and high values placed on access to work, learning and play is shifting the direction towards demanding more diverse housing stock, including smaller housing. The make-up of households is also shifting across Australia.

A review of ABS Census Data, planning policy and strategy, review of literature and journal articles on school enrolment forecasting and semi-structured interviews has been undertaken to highlight key trends in relation to Australia and Canberra. The key trends include:

- Increasing focus on inner city areas

- Delivering schools infrastructure alongside growth is challenging

- Apartments are accounting for an increasing share of the dwelling stock

- Some change is occuring, however, most families prefer larger homes

- Increasing cultural diversity may increase demand for medium and high density housing for families

- Low housing affordability is attracting families to smaller homes

- Greater diversity in housing stock potentially enables empty nesters to downsize, freeing up dwellings for families

These trends have informed a set of key factors that have been used to start to understand student yield from medium - high density developments.

1. CONTEXT AND DRIVERS OF CHANGE

INCREASING FOCUS ON INNER CITY AREAS

Canberra's Statement of Ambition (2016) outlines a pathway for Canberra to be a "compact and competitive city…and winning the global contest for investment and talent – opening and diversifying our knowledge-based economy – better metropolitan infrastructure – and integrated smart-city initiatives."

The ACT Planning Strategy 2018 includes compact and efficient and liveable and accessible as key themes. The Strategy also highlights an objective for 70% of all new housing will be built within the existing urban footprint. This results in diversity of homes (including smaller, and more dense housing forms), and access to appropriate infrastructure that will support the growing communities and the development of an efficient, sustainable and liveable city.

Urban structure and choices at a household level are recognised as holding significant opportunities to reduce impact on the environment, whilst maintaining productivity in economy and supporting a high quality of life.

"Household sizes across Australia have declined in the last 100 years." Despite changing household structure and composition, house sizes in Canberra remain some of the largest in the world (Housing Choices Discussion Paper 2017, p. 21).

DELIVERING SCHOOLS INFRASTRUCTURE ALONGSIDE GROWTH IS CHALLENGING

Over the past decade, countless neighbourhoods have been redeveloped and densified without the necessary supporting infrastructure being delivered (Infrastructure Australia, 2018). Meeting the housing needs of a growing population will require a significant shift across all Australian cities towards delivering infill development.

In Infrastructure Australia's most recent Infrastructure Audit, schools in fast-growing cities, particularly in inner areas, were identified as under stress.

The Audit (2019) highlighted that overcrowding can lead to poor student outcomes, for example a reduction in other spaces, such as playgrounds or art and music classrooms, to accommodate additional students, or can require building upgrades or changes.

The challenge of delivering school infrastructure was also highlighted within the Audit. The Report (2019) outlined

"one of the challenges with building or upgrading schools in established inner-city areas is the scarcity and high cost of available land... School infrastructure planning in established areas is generally more reactive to demand and capacity issues, and major development proposals…There can also be the added complexity of demographic changes within suburbs. For example, some parts of inner Sydney and Melbourne currently have a large number of school-aged children but many schools that previously existed in these areas were closed by governments in the 1990s and early 2000s due to a temporary lack of demand and an assumption that families would not reside in inner city areas."

The importance of rethinking projections informing school planning was also highlighted in the Audit as it states that

"in our fast-growing cities people are increasingly locating to inner city areas at all stages of life for a variety of reasons, including access to employment opportunities, moving closer to family, or access to education infrastructure. Within these cities, families are also increasingly living in higher-density areas and in smaller homes, including apartments. Additional school-aged children living in an area where they were not born can increase demand for school infrastructure that is not captured by projections."

In Canberra, articles (Canberra Times, 2014), have highlighted that urban infill has increased demand for schools in the inner north in Lyneham, Braddon and Civic; inner south and Woden and Phillip and Lyons. High density living and high birth rates in Belconnen and Bruce were linked to stress on schools like Aranda Primary School.

1. CONTEXT AND DRIVERS OF CHANGE

APARTMENTS ARE ACCOUNTING FOR AN INCREASING SHARE OF OUR DWELLING STOCK

The prevalence of apartment dwelling stock is in increasing in the ACT. In ACT at the 2016 Census, apartments made up 16% of all occupied dwellings. In Canberra in 2016, apartments made up just under 54% of all approved dwellings, and over 90% of approved apartments were four storeys or higher (ABS Building Approvals).

Across Australia, families with children make up a quarter of Australia's total apartment population. This number has increased by 56% between 2011 and 2016 (ABS, 2017). Australia wide, nine percent of all children aged 0 – 4 had an apartment as a home in 2016.

In a research paper titled "New methods for projecting enrolments within urban school districts" (Geoffrey Hutchinson Smith (2017)) it was found that families tend to prefer low-rise structures and ground-level units. In this research, an increase in the number of ground-floor units results in an increase in the number of children per unit.

SOME CHANGE IS OCCURING, HOWEVER, MOST FAMILIES STILL PREFER LARGER HOMES

Housing preferences differ across households. In a study by the Grattan Institute (2011), "in a world where they could have anything", middle-aged families with children highlighted the importance of inside space. The same study highlighted that lone-person households were less focussed on internal space, but maintained a preference for larger dwellings.

In Geoffrey Hutchinson Smith's research (2017), it was found that the more bedrooms, the more students per unit.

Discussions with built environment professionals as part of this study highlight that there has been recent turnover in suburbs in the inner city to welcome new families. This has been experienced in areas of Ainslie; O'Connor; Campbell; Lyneham. These discussions also noted that the shift the shift in housing choices for families towards higher density may take time for Canberrans to embrace as Canberra's brand is still associated with the 'Bush Capital', with the desire for the large, leafy block.

Through these discussions, development professionals also highlighted that although the shift was slow, some recent developments, for example in Gungahlin and Denman Prospect are showcasing changing preferences. These development show that families can be happily accommodated in houses with a smaller size footprint. Discussions also noted that these developments reflected broader social trends of people being time-poor and limited ability to maintain large private areas. Design and amenity aspects of neighbourhoods, like greenspaces integrated within a precinct, dwellings close to shops and services like public transport and schools were higlighted as key features to support these smaller private homes.

INCREASING CULTURAL DIVERSITY MAY INCREASE DEMAND FOR MEDIUM AND HIGHER DENSITY HOUSING FOR FAMILIES

From 2006 Census to 2011, there was an increase, from 17.2 per cent to 21 per cent, in the proportion of households where two or more languages are spoken. During the same time period, the proportion of people living in Canberra who were born in Australia dropped from 73 per cent in 2006 to 71.4 per cent in 2011.

Discussions with built environment professionals noted that some families with children from Asian backgrounds, in particular from China or South East Asia, had preferences for higher density housing.

1. CONTEXT AND DRIVERS OF CHANGE

LOW HOUSING AFFORDABILITY IS ATTRACTING FAMILIES TO SMALLER HOMES

In research on projecting school enrolments in urban districts (Geoffrey Hutchinson Smith, 2017) it was found that as rent increases, family size decreases. The research also highlighted that luxury apartments tend to not be occupied by families. In addition, it was found that as the number of students per unit tends to increase. This is linked to the conclusion about rent (luxury apartments or new apartments tend to ask for high rents; as they age and become cheaper, families move in).

Discussions with built environment professionals during this study also highlighted that affordability is a key issue across Canberra. This is reflected in Canberra showing lowest rental vacancy rates in the country, alongside the highest median rents in Australia. It was noted that Canberra also has the highest median wages, however those without the capacity to pay are vulnerable to housing stress.

Experience of development professionals highlights that some couples anticipating children or young families are buying into medium density (townhouses) as theIr first home.

GREATER DIVERSITY IN HOUSING STOCK POTENTIALLY PROVIDES EMPTY NESTERS TO DOWNSIZE, FREEING UP DWELLINGS FOR FAMILIES

The notion of household is shifting across Australia. The global population is ageing due to both an increase in life expectancy and a decrease in total fertility rates. In Canberra, the percentage of the ACT population aged 65 years and over is expected to rise from approximately 10 per cent in 2007 to 20 per cent in 2056 (ACT, 2010). The Property Council of Australia's ACT Division highlights in a submission to the Housing Choices Discussion Paper that there is an increasing need to cater for not only a growing, but an ageing population.

Ageing in cities presents a potential shift in households through an increase in lone person households as well as an increase in multi-generational households. Lone – person households are projected to make up 27% of all Australian households in 2041 (ABS, 2019). In the ACT, single person households were the fastest growing household type from 1991 to 2016. The ABS projects the number of people living with 'other related persons' in the family household to grow to 781,000 or more by 2036 in Australia (ABS, 2019). Other studies indicate that one in five Australians currently live in a multigenerational household, and the trend is on the rise (Lui & Easthope, 2012).

More diversity in housing stock provides increased opportunities for empty nesters or lone person households to downsize. This, in turn, frees up larger dwellings for young families potentially resulting in increased student yields from locations with little or no new development activity.

According to the ACT Governments Housing Choices Discussion Paper and Community Consultation Report (2018), 60% of surveyed residents "anticipate that they will move in the next decade in response to anticipated needs, and lifestyle changes." The Housing Choices project also highlighted that the Canberra "community has expressed a desire for more housing choice and flexible housing forms in their neighbourhoods and suburbs – not just single dwellings or high rise apartments…[including] smaller homes and townhouses, villas for larger families, and housing for those on lower incomes, as well as those ageing or with disabilities" (2018).

Some studies suggest that there are barriers, discouraging people from moving into a house to better suit their needs, including stamp duty or concerns. Concerns about apartments included small or lacking outdoor spaces, proximity of neighbours and the cost and nuisance of body corporates (Grattan Institute, 2011).

1. CONTEXT AND DRIVERS OF CHANGE

INFORMING THE ANALYSIS

The key trends in cities, housing, households and preferences have informed a set of key factors that have been used to start to understand student yield from medium - high density developments. The relationship between the key trends and the factors for analysis for this study are shown in the diagram adjacent.

GREATER DIVERSITY IN HOUSING STOCK POTENTIALLY ENABLES EMPTY NESTERS TO DOWNSIZE, FREEING UP DWELLINGS FOR FAMILIES

INCREASING FOCUS ON INNER CITY AREAS

APARTMENTS ARE ACCOUNTING FOR AN INCREASING SHARE OF DWELLING STOCK

DELIVERING SCHOOLS INFRASTRUCTURE ALONGSIDE GROWTH IS CHALLENGING

SOME CHANGE IS OCCURING, HOWEVER MOST FAMILIES STILL PREFER LARGER HOMES

INCREASING CULTURAL DIVERSITY MAY INCREASE DEMAND FOR MEDIUM AND HIGH DENSITY HOUSING FOR FAMILIES

LOW HOUSING AFFORDABILITY IS ATTRACTING FAMILIES TO SMALLER HOMES

Location (infill/greenfield)

Housing typology

Access to services

Cultural background

Socio - economic status

House/apartment price

2. Data analysis approach

Following the inception workshop, and an initial review of the data, we have reflected on our proposed approach to clarify the methodology to meet the core problem statement of: <u>If a brownfield development is taking place in an established area of Canberra – how many student aged children will this development generate?</u>

The key shifts from the proposed approach is the purpose of the Workshop (from a 'typologies' focus to Development Site selection workshop), including multiple development applications within one Development Site (defined as one SA1), and considerations of how we might include additional attributes of socio-economic status, proximity to a range of services and place of employment into the data analysis.

We have documented the key questions, geographical scope, data inputs and data outputs for each Phase:
1 - Understanding of demographic and property data in Canberra
2 - Aligning school enrolment data with property data
3 - Understanding recent factors that influence school enrolment data

A series of diagrams showing the interrelationships between data and a data template example is shown in this section

2.1 UNDERSTANDING OF DEMOGRAPHIC AND PROPERTY DATA IN CANBERRA

The purpose of this phase is to firstly understand policy context for urban growth in Canberra and to provide a base understanding of school aged children growth, housing and household typologies and other attributes to input into the selection of Development Sites for further analysis in Phase 2.

There are eight components to this phase:
1. Reviewing existing documentation
2. Identifying areas of growth in school children (growth areas) -
3. Aligning growth areas with urban infill and greenfield classification
4. Agreeing a set of typologies with housing type and house size
5. Identifying typologies in growth areas
6. Identifying areas within close proximity to schools within growth areas
7. Mapping average house prices in growth areas from 2011
8. Mapping recent development applications

2.1 UNDERSTANDING OF DEMOGRAPHIC AND PROPERTY DATA IN CANBERRA

Key questions, geographic scale, timeframes, data sources and outputs

	Reviewing existing documentation	**Identifying areas of growth in school children (growth areas)**	**Aligning growth areas with urban infill and greenfield classification**
Key questions	What is the policy context for shaping new development across Canberra? What has been impacting housing choice in Canberra?	Where has growth in school aged children occurred across Canberra?	Are the growth areas in infill or greenfield classified areas?
Geography	Canberra wide	Canberra wide at ABS Census 2016 Geographies (SA2)	Growth areas
Timeframes	N/A	2010-2019	N/A
Data sources	ACT Planning Strategy 2018 ABS research including household projections and household arrangements What Matters Most – Grattan Institute ACT Housing Choices Discussion Paper	School enrolment census per year	School enrolment census – Infill / greenfield classification of suburbs
Outputs	Summary of review to be included in Draft Report.	Child density map depicting the top 30 growth areas by SA2 and excel spreadsheet	Child density map with infill and greenfield layer

2.1 UNDERSTANDING OF DEMOGRAPHIC AND PROPERTY DATA IN CANBERRA

Key questions, geographic scale, timeframes, data sources and outputs

	Agreeing a set of typologies across housing type and house size	**Identifying typologies across growth areas**	**Identifying areas within close proximity to schools within growth areas**
Key questions	What is the agreed categories of housing type and housing size to make up the typologies to use for analysis?	What proportion of housing is within each typology within the growth areas?	Where are the locations that are within close proximity to schools?
Geography	N/A	Growth areas	Growth areas
Timeframes	2016	2016	2016
Data sources	ABS Census	ABS Census at SA2 level	ACT schools location data – available from ACT MAPI
Outputs	Agreed set of typologies.	Typology map and excel spreadsheet	Schools location map

2.1 UNDERSTANDING OF DEMOGRAPHIC AND PROPERTY DATA IN CANBERRA

Key questions, geographic scale, timeframes, data sources and outputs

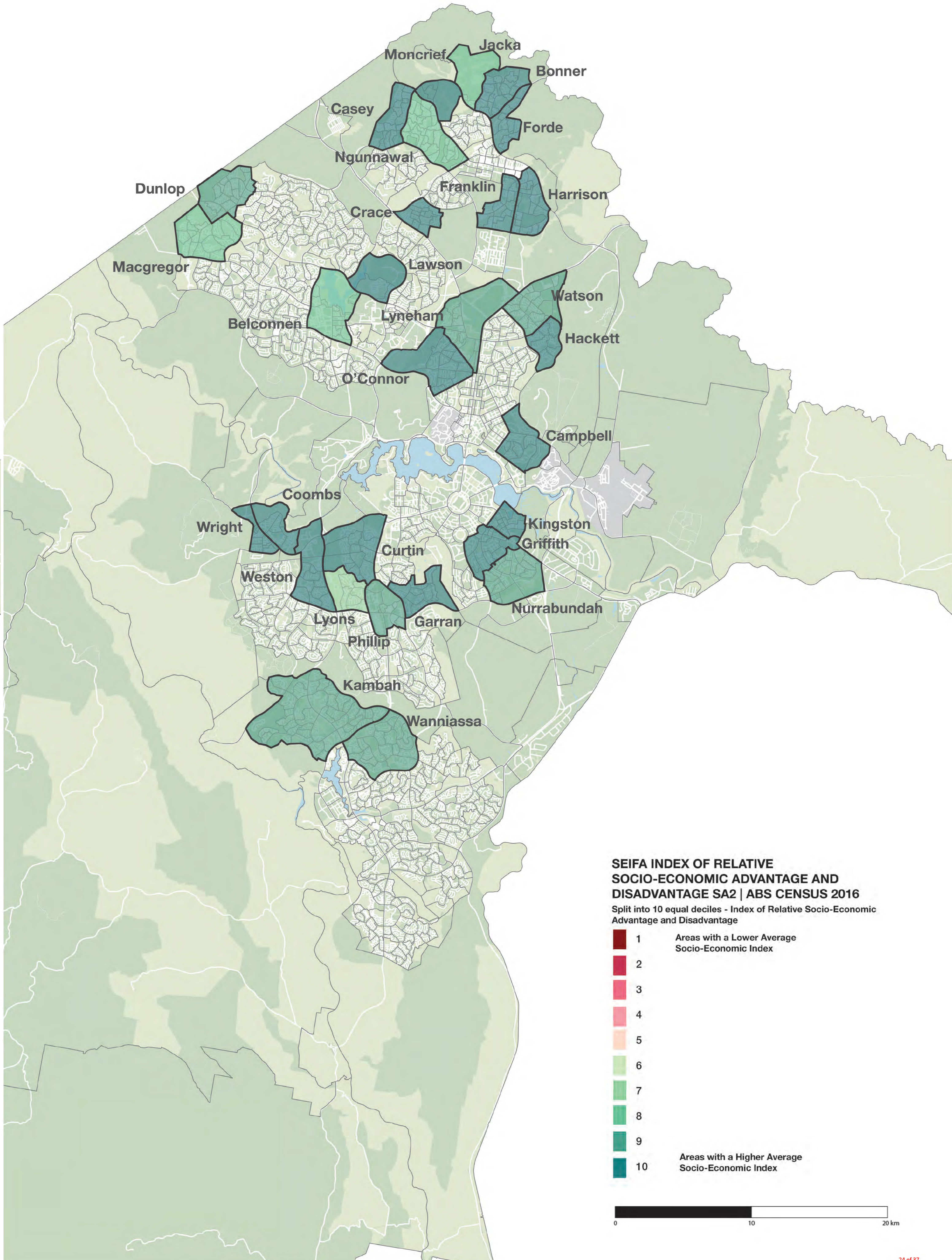|	**Mapping median apartment and house prices in growth areas**	**Mapping recent development applications**	**Mapping socio economic status**
Key questions	What is the median dwelling price in the growth areas?	Where have recent developments occurred within the growth areas?	What is the relative advantage and disadvantage across the growth areas?
Geography	Growth areas	Growth areas	Growth areas
Timeframes	2012 - 2019	2010-2019	2016
Data sources	ACT Treasury Median unit and house price at SA2	EPSDD Development application and Certificate of Completion	ABS Census SEIFA data at SA2 IHAD data
Outputs	Median dwelling price map.	Development application map – documenting year of DA and typology	SEIFA Map – Index of Relative Socio-Economic Advantage and Disadvantage Index of Education and Occupation IHAD map

2.2 ALIGNING SCHOOL ENROLMENT DATA WITH PROPERTY DATA

Key questions, geographic scale, timeframes, data sources and outputs

With the base analysis and mapping inputs, this core component of this phase was a workshop to select areas of growth for further study, and data analysis to understand the change in school aged students as a result of these developments

There are three components to this phase:
1. Study area selection workshop – 25th Oct 2019
2. Analysis of change in school aged student as a result of each development site
3. Analysis and documentation of other key factors of the development sites

Note that at this stage of the study, the Development Application data, including Construction Certificate and details of dwelling typology is size is not yet available. Therefore component 2 and 3 has not been completed.

2.2 ALIGNING SCHOOL ENROLMENT DATA WITH PROPERTY DATA

Key questions, geographic scale, timeframes, data sources and outputs

Study area selection workshop

Urban Infill-Greenfield

Socio-economic status

Typologies

Median house price

Proximity to schools

Development applications

DRAFT

Workshop: site selection

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |

Key questions

From the Top 30 Growth Areas, what SA2s (up to 16) best represent a spread of development typologies, price, proximity to school, socio-economic status, urban and infill classification?

Geography

Growth areas

Timeframes

2010-2019

Data sources

Multiple data sets

Outputs

Agreed set growth areas for further analysis and workshop notes
The workshop notes are shown in the following pages.

ACT Urban Infill Study - Site Selection Workshop Summary

The purpose of the ACT Urban Infill Study is to explore recent changes in the types of housing across Canberra, in particular in infill development, and understand the impact on student aged children generation.

A number of factors are being explored as part of this study. These include: price; dwelling typology, location and proximity to services and socio-economic status.

This study will look into 16 'development site areas' for detailed analysis. A workshop to inform the selection of the 16 development site areas was undertaken on the 25th October 2019. Participants included those from the Education Directorate, ESPDD and ANU as well as members of the consultant team.

The criteria for selection included:

- High growth in school aged children
- Breadth of housing typologies
- High development activity
- Breadth in median house and apartment price
- Breadth in socio-economic status

13 suburbs (SA2s) were discussed as potential areas for further analysis. Following review of development activity data smaller geographic areas (SA1s) will be selected and agreed for further analysis. Multiple development site areas may be chosen within one suburb/SA2.

Selected SA2	School-age population growth from 2010-2019	Median unit price	Median house price	Development activity**	Dwelling typology mix	SEIFA Index of Relative Socio-economic Advantage and Disadvantage (IRSAD) distribution according to decile - number of SA1s per SA2 per decile									
						1	2	3	4	5	6	7	8	9	10
Belconnen	208	$388,900	$465,000	High		0	1	1	1	0	1	1	2	3	1
Campbell	151	$493,000	$980,000	High		0	0	0	0	0	0	0	0	1	7
Casey	1224	$346,000	$535,000	Low		0	0	0	0	0	0	1	2	3	9
Franklin	977	$372,000	$613,750	Low		0	0	0	0	0	1	1	4	8	7
Greenway*	70	$390,000	$512,500	High		0	0	0	0	0	0	0	2	2	1
Kingston	197	$455,000	$1,500,000	High		0	0	0	0	0	1	0	1	0	8
Lawson	200	$449,900	$725,000	High		0	0	0	0	0	0	0	1	0	1
Lyneham	218	$372,900	$750,000	High		0	0	0	0	0	2	2	5	2	2
Lyons	166	$482,903	$665,000	Low		0	0	0	1	0	0	2	2	1	0
Narrabundah	225	$432,500	$780,000	Low		0	0	2	0	0	1	4	2	3	5
Phillip	176	$370,000	$480,500	High		0	0	1	0	0	0	1	2	4	0
Watson	347	$359,900	$615,000	High		0	0	0	0	0	2	0	4	6	3
Wright	470	$325,000	$668,500	High		0	0	0	0	0	0	0	0	0	8

Legend

- Detached dwelling
- Semi-detached dwelling
- Apartments up to 3 storeys
- Apartments 4 storeys+

*Note that Greenway has been selected based on discussions throughout the workshop. There was an interest in including an area that had high proportions of semi-detached dwellings and apartments with lower growth in school-aged population.

** Classification of development activity is presented based on workshop discussion. Further detail on development activity is being provided by EPSDD.

Casey

Franklin

Lawson

Belconnen

Lyneham

Watson

Hackett

Campbell

Wright

Kingston

Lyons

Phillip

Narrabundah

Greenway

**INFILL OR GREENFIELD CLASSIFICATION |
ACT EDUCATION DIRECTORATE**

Split defined according to school enrolment data

Greenfield

Infill

**SCHOOL TYPES (government + non
government) | ACT EDUCATION
DIRECTORATE**

Primary

Secondary

College

Early/other

0   10   20 km

SCHOOL STUDENT GROWTH BY SA2
FROM 2010 - 2019 | ACT EDUCATION
DIRECTORATE

- 150 - 500
- 502 - 850
- 851 - 1100
- 1101 - 1500
- 1501 - 1900
- Kambah -172 (2011 - 2016 ABS Census)
- Wanniassa - 38 (2018 - 2019 Schools Census)

SCHOOL TYPES (government + non
government) | ACT EDUCATION
DIRECTORATE

- Primary
- Secondary
- College
- Early/other

| 0 | 10 | 20 km |

Moncrief

Jacka

Bonner

Casey

Forde

Ngunnawal

Dunlop

Franklin

Harrison

Crace

Macgregor

Lawson

Watson

Belconnen

Lyneham

Hackett

O'Connor

Campbell

Coombs

Wright

Kingston

Curtin

Griffith

Weston

Lyons

Garran

Nurrabundah

Phillip

Kambah

Wanniassa

DWELLING TYPOLOGY | ABS CENSUS 2016

Detached dwelling

Semi-detached dwelling

Apartments 4 storeys +

Apartments up to 3 storeys

0   10   20 km

Moncrief

Jacka

Bonner

Casey

Forde

Ngunnawal

Franklin

Harrison

Dunlop

Crace

Macgregor

Lawson

Watson

Belconnen

Lyneham

Hackett

O'Connor

Campbell

Coombs

Wright

Kingston

Griffith

Weston

Curtin

Lyons

Nurrabundah

Garran

Phillip

Kambah

Wanniassa

DEVELOPMENT APPLICATIONS BY DWELLING TYPOLOGY (2012 - 2019) | ACT GOVERNMENT

- Detached dwelling
- Semi-detached dwelling
- Apartments up to 3 storeys
- Apartments 4 storeys +

0   10   20 km

**MEDIAN APARTMENT PRICE BY SA2 |
PROPERTY SALES 2012 - 2019 | ACT
GOVERNMENT**

Split into 4 categories - (not based on affordability)

Low (305,000 - 370,000)

Medium (370,001 - 430,000)

High (430,001 - 480,000)

Very High (480,000 - 550,000)

0   10   20 km

MEDIAN HOUSE PRICE BY SA2 |
PROPERTY SALES 2012 - 2019 | ACT
GOVERNMENT

Split into 4 categories - (not based on affordability)

Low (400,000 - 600,000)

Medium (600,001 - 900,000)

High (900,001 - 1,200,000)

Very High (1,200,001 - 1,500,000)

0   10   20 km

SEIFA INDEX OF EDUCATION AND OCCUPATION BY SA2 | ABS CENSUS 2016

Split into 10 equal deciles - Index of Education and Occupation

1	Areas with a Lower Average Socio-Economic Index
2	
3	
4	
5	
6	
7	
8	
9	
10	Areas with a Higher Average Socio-Economic Index

0   10   20 km

SEIFA INDEX OF RELATIVE SOCIO-ECONOMIC ADVANTAGE AND DISADVANTAGE SA2 | ABS CENSUS 2016

Split into 10 equal deciles - Index of Relative Socio-Economic Advantage and Disadvantage

1	Areas with a Lower Average Socio-Economic Index
2	
3	
4	
5	
6	
7	
8	
9	
10	Areas with a Higher Average Socio-Economic Index

0   10   20 km

2.2 ALIGNING SCHOOL ENROLMENT DATA WITH PROPERTY DATA

Key questions, geographic scale, timeframes, data sources and outputs

Development site selection

Key questions

Based on the selected SA2s, what Development Sites exhibit the following:
- high levels of growth across the whole timeframe?
- recent high development activity
- high development activity across the whole timeframe?
- areas that exhibit a breadth of characteristics?

Geography

Growth areas

Timeframes

2010-2019

Data sources

School enrolment data
- Geocoded student census information within selected Growth Areas broken down into SA1s to determine areas of high student growth

Analysis of aerial imagery
- Analysis of aerial imagery across the timeframe of 2010-2019 within the Growth Areas to determine areas of high development activity

Colliers Development Pipeline data
- Geocoded development information (developments of 10+ dwellings only) from 2017-2019 to determine areas of recent high development activity

Areas subject to discussion
- Inclusion of Growth Areas based on contrasting qualities to other Growth Areas in order to provide a breadth of typologies

Outputs

Selected SA1s or "development sites" for analysis

The following Development Sites have been shortlisted based on the key questions. Note that due to limitations of time and budget for this study, not all Development Sites may be included in this study:

80101100212 Belconnen
80101101803 Lawson
80101101804 Lawson
80104103611 Casey
80104103615 Casey
80105106103 Watson
80105106115 Watson
80106113101 Kingston
80106113106 Kingston
80109110912 Philip
80110113905 Wright
80110113906 Wright
80106106712 Narrabundah
80106106707 Narrabundah
80105105711 Lyneham
80105112402 Campbell
80105112401 Campbell
80107108005 Greenway
80107108011 Greenway

2.2 ALIGNING SCHOOL ENROLMENT DATA WITH PROPERTY DATA

Key questions, geographic scale, timeframes, data sources and outputs

	Analysing school enrolment change in Development Sites	Reviewing the attributes of each Development Site
Key questions	What change has occurred in school enrolment as a result of this development?	What are the attributes of this Development site across: - Population - Socio economic status - Student language spoken at home - Proximity to services such as public transport, community facilities, key employment areas - Proximity to school - Quality of nearest school by Naplan Result - Housing tenure - Median house and unit price for development typology - Future plans and character for the area
Geography	Development sites	
Timeframes	2010-2019	
Data sources	School enrolment data – Geocoded student enrolment details by class level and school including both government and non-government schools Analysis of aerial imagery Colliers development pipeline data (2017-2019)	
Outputs	See data template example overleaf Data schema attached to this document	See data template Data schema

Stage 1 - Initial selection of study areas

DATA PREP

Sources

ABS Census 2011 to 2016

- Age structure (1...100)
- Number of bedrooms per dwelling (1...9)
- Dwelling structure
- Tenure and landlord type
- Household composition
- Full time/part time student status
- Type of education institution attending
- SEIFA IRSAD
- SEIFA IEO

per year
- 2011
- 2016

Collated Census data per year using unique geography ID

- 2011 Census data by geography
- 2016 Census data by geography

ABS Census Geography

- SA2
- SA1
- Meshblock

per year
- 2011
- 2016

Change in school age population (ages 5-17) per SA2 from 2011 to 2016

DEFINE INITIAL FILTER: TOP GROWTH AREAS BY SA2

Top 30 areas of growth of student age population by SA2

Growth of school age popoulation per year per SA2 from 2011 to 2016

FILTERED/NARROW SELECTION

Top 30 growth areas from 2010 to 2019 based on the student enrolment data per SA2

School locations

Top 30 growth areas from 2010 to 2019 based on the student enrolment data per SA2

Change in school age population per year per SA2 from 2010 to 2019

2016 Census data by selected SA2
- Dwelling structure
- Number of bedrooms per dwelling
- Tenure
- SEIFA IRSAD
- SEIFA IEO

Property sales geocoded with price
- Median unit price for selected SA2s
- Median house price for selected SA2s

Development application by typology (approximate locations based on initial received data)

COMPILATION AND VISUALISATION FOR WORKSHOP

Mapping top 30 growth areas from 2010 to 2019 based on the student enrolment data
- Student growth
- Proximity to schools
- Dwelling structure
- SEIFA IRSAD
- SEIFA IEO
- Median unit price
- Median house price
- Development application by typology

Education Directorate / EPSDD

School enrolment
- Enrolment per year 2010-2019 (not geocoded)
- Enrolment per year 2018-2019 (Geocoded)

Property sales
- Property sales 2012-2019 with price
- Property sales 2012-2019 geocoded, no price

Development applications
- Completion data

School locations

Collated school enrolment data per year using Student ID (SLK_REC_KEY)

joined by property ID

Property sales geocoded with price
- Key (Property ID)
- X,Y Coordinates
- Site name
- Concatenated address
- Meshblock
- SA1
- SA2 (by name)
- SA3
- Land type (House or unit)
- Sellng price
- Contract date
- Area of block

Student enrolment per year
- Student ID
- School name and code
- Network name and code
- Sector name and code
- AGEID
- Year level and category
- Gender
- Birthdate
- Indigenous status
- Disability
- International full fee paying
- Start date and first enrolment date
- Student language
- Address
- Greenfield or infill
- School location
- Highest level of parental education
- Birth Country code
- Geocoded address (2018-2019 only)

Assign Student ID to SA2 based on corresponding suburb

Assign Student ID to SA2 based on stated SA2

Students not included per year
- Blank Student ID
- Blank Address

TOP 30 Areas of growth by SA2
- Growth per year per SA2
- Growth of school age population per year per SA2 from 2010 to 2019
- Growth of school age popoulation per year per SA2 from 2018 to 2019
- Growth of school age popoulation per year per SA2 from 2016 to 2019

Number of bedrooms per dwelling per SA2
- 1
- 2
- 3
- 4 or more

Dwelling structure by SA2
- Detached dwelling
- Semi-attached dwelling
- Apartment, 1 to 3 storeys
- Apartment, 4 ore more storeys

Cross-referencing dwelling structure by number of bedrooms per dwelling to create 16 dwelling typologies

Dwelling typology by SA2
- 1 bedroom detached dwelling
- 1 bedroom semi-attached dwelling
- 1 bedroom apartment, 1 to 3 storeys
- 1 bedroom apartment, 4 or more storeys
- 2 bedroom detached dwelling
- 2 bedroom semi-attached dwelling
- 2 bedroom apartment, 1 to 3 storeys
- 2 bedroom apartment, 4 or more storeys
- 3 bedroom detached dwelling
- 3 bedroom semi-attached dwelling
- 3 bedroom apartment, 1 to 3 storeys
- 3 bedroom apartment, 4 or more storeys
- 4 or more bedroom detached dwelling
- 4 or more bedroom semi-attached dwelling
- 4 or more bedroom apartment, 1 to 3 storeys
- 4 or more bedroom apartment, 4 or more storeys

Stage 2 - Workshop

DATA INPUT	WORKSHOP SELECTION PROCESS	OUTPUT

Visualised background data - Top 30 growth areas by SA2 from 2010 to 2019 based on the student enrolment data

Student growth
Proximity to schools
Dwelling typology
Median unit price
Median house price
SEIFA IRSAD
SEIFA IEO

Selection of SA2s for further study based on high population growth, diversity of dwelling typologies and stakeholder knowledge on areas of interest

* selected based on contrasting qualities to selection methodology

14 SA2s for further study

Belconnen
Campbell
Casey
Franklin
Greenway*
Kingston
Lawson
Lyneham
Lyons
Narrabundah
Phillip
Watson
Wright

Development application activity

Development application by typology (approximate locations based on initial received data)

Stakeholder knowledge of local context

Stage 2.5** - Preparation of development application data schema

DATA INPUT	ANALYSIS	OUTPUT DATA SCHEMA

Location	Area	Typology	Identifier
Block	Sqm	Storeys	Approval date
Unit		Description	Certificate no.
Street number			
Street name			
MB			
SA1			
SA2			

Dwelling typology (Census)

Dominant dwelling typology per SA1
Dominant dwelling typology per SA2

Additional data from previous intermediate output schemas

Completed DA Data schema

Number of new dwellings
Typology of new dwellings
Number of demolished dwellings
Typology of demolished dwellings
Year completed
X,Y
SA2
SA1
Meshblock

Stage 2.5 - Reiterate

DATA INPUT		ANALYSIS	OUTPUT

Visualised background data - 14 selected SA2s

Student growth
Proximity to schools
Dwelling typology
Median unit price
Median house price
SEIFA IRSAD
SEIFA IEO

Selected SA2s divided into SA1s

14 selected SA2s divided into SA1s

Student growth
Proximity to schools
Dwelling typology
Median unit price
Median house price
SEIFA IRSAD
SEIFA IEO

Selection

SA1s displaying high development activity

16 development sites

2016 Census geography - SA1 and SA2

Development application activity**

Complete development application data sorted by dwelling typology and year of completion*

Stakeholder knowledge of local context

Student enrolment per year

Student ID
School name and code
Network name and code
Sector name and code
AGEID
Year level and category
Gender
Birthdate
Indigenous status
Disability
International full fee paying
Start date and first enrolment date
Student language
Address
Greenfield or infill
School location
Highest level of parental education
Birth Country code
Geocoded address (2018-2019 only)

geocode addresses and convert to X,Y coordinates

14 Selected SA2s

Student ID of students within selected SA2s
X,Y (geocoded location)

Stage 3 - Correlating DA completion with school enrolments

Development activity - change in number of dwellings in selected development sites according to typology

Number of new dwellings
Typology of new dwellings
Number of demolished dwellings
Typology of demolished dwellings
Year completed
X,Y (geocoded location)
SA2
SA1
Meshblock

For each selected development site:

Selected year
Number of new dwellings constructed
Typology of new dwellings
Number of old dwellings demolished
Typology of demolished dwellings

minus

Δ dwellings in development site for selected year
Δ dwellings in development site
Δ in typology of dwellings

Analysis template

SA1 ID Number
Greenfield/infill classification
Total population
Housing tenure
Growth in school aged students from 2010 to 2019
Proximity to schools
Proximity to key services
Socio-economic status
Student language spoken at home
Typology at SA1
School enrolment change over time

School enrolments - Change in yearly school population for 16 development sites

2010 enrolments
2011 enrolments
2012 enrolments
2013 enrolments
2014 enrolments
2015 enrolments
2016 enrolments
2017 enrolments
2018 enrolments
2019 enrolments

For each selected SA1:

Selected year
Total student population within SA1 of that year
Total student population within SA1 of the previous year
Total student population within SA1 of the following year

Δ student population

16 development sites

14 selected SA2s broken down into SA1s

Dwelling typology
Tenure
SEIFA IRSAD
SEIFA IEO
Greenfield/infill classification
Language spoken at home
Proximity to schools
Proximity to services

Casey   Development Site [1]

Key facts

SA1 ID number:

80104103615

Greenfield/Infill classification:

Greenfield

Total population [Census 2016]:

419

Housing tenure [Census 2016]:

12% rented, 75% owned

Growth in school aged students
from 2010 - 2019:

xxx

Proximity to schools

Primary:

Secondary:

College:

Proximity to key services:

[narrative description of transport,
employment centres, retail
centres, open space]

Socio-economic status:

[SEIFA decile]

Top three student languages
spoken at home:

x,y,z

Median House Price:

$xxx

Median Apartment Price:

$xxx

Description

Narrative description of site...

Narrative of future plans for the
area [based on planning strategy,
known infrastructure investments]

DA1: Development name/address
Total number of new dwellings:
Typology:
Month/2017:

DA2: Development name/address
Total number of new dwellings:
Typology:
Month/2017:

DA3: Development name/address
Total number of new dwellings:
Typology:
Month/2018:

DA4: Development name/address
Total number of new dwellings:
Typology:
Month/2018:

DAx: Development name/address
Total number of new dwellings:
Typology:
Month/2019:

DAx: Development name/address
Total number of new dwellings:
Typology:
Month/2019:

2016   2017   2018   2019

Typology [at SA1]

Source: ABS Census 2016   Source: Development Application Details

Change from 2016 to 2019

Change from 2016 to 2019

School enrolment

Source: ACT Education Directorate Census

Primary

Secondary

College

Total   Total   Total   Total

2016   2017   2018   2019

Total

Change

2.3 UNDERSTANDING RECENT FACTORS THAT INFLUENCE SCHOOL ENROLMENT DATA

Key questions, geographic scale, timeframes, data sources and outputs

The purpose of this phase is to complement the quantitative data analysis with qualitative data with the property industry.

This phase includes reviewing the factors that have influenced housing location and choice for families with school aged children based on:

1. Desktop research on journal papers
2. Semi structured interviews with developers, real estate agents and organisations such as the PCA ACT Chapter.

Note that at this stage some semi-structured interviews have been undertaken.

2.3 UNDERSTANDING RECENT FACTORS THAT INFLUENCE SCHOOL ENROLMENT DATA

Key questions, geographic scale, timeframes, data sources and outputs

	Desktop review	Semi structured interviews
Key questions	What are the factors that influence housing choice in Australia, and particular Canberra?	What are the factors that influence housing choice for families from the perspectives of developers, real estate agents and organisations such as the PCA ACT Chapter?
Geography	Canberra, Australia	Canberra, Australia
Timeframes	N/A	
Data sources	Journal papers, government documents	Interviews: PCA, Government Architects, real estate agent, developer
Outputs	Summary of notes from desktop review for input into Draft Report	Summary of notes from interviews for input into Draft Report

Appendix

Semi-structured interview questions
Semi-structured interview notes

ARUP

SEMI-STRUCTURED INTERVIEW QUESTIONS

Have you seen any changes in families with children living in medium and high density housing (semi-detached dwellings and apartments) over the past 5 – 7 years?

Are there areas across Canberra that are experiencing more families with children in medium or high density housing? Can you provide examples?

[For developers] Are you designing a portion of your development to attract families with children?

[For real estate agents] Are families moving into medium and high density housing – or are these typically being occupied by households without children, who are wanting and can afford the space?

What kinds of housing features are families in medium-high density seeking?

- Internal: number of bedrooms, private outdoor space, parking, ground floor access…

- External: access to schools, transport public space…?

What are there typical family characteristics of those in/seeking medium and high density housing? – E.g. couples anticipating children, families with young children, families with one child/more than one child? Cultural and linguistic background?

- Do you think there are differences in housing features for different family characteristics? Can you provide examples?

Across Canberra, in an area where more housing diversity is available, are households downsizing, making room for bigger households, including families with children to move in?

What are the key attractors and barriers for families moving medium and high density housing?

What are the key attractors and barriers to families moving into inner suburbs/infill areas?

What key factors do you see impacting housing choice and location for families in the future?

Semi-structured interview

Catherine Townsend | ACT Government Architect

25th October 2019

There has been recent turnover in suburbs in the inner city to welcome new families. This has been experienced in areas of: Ainslie; O'Connor; Campbell; Lyneham.

Although there is some shift in housing choices for families towards higher density, this is slow. It is difficult to achieve change in one generation. The ideal for a large family home remains. Change will result from experience.

Shifts are starting to occur based on changing expectations and attitudes towards climate and environmental impact, sustainability and financial realities.

Priorities in design of developments are prioritizing car-based form, over community values. Apartments are generally designed for short term/student tenants, and not 'genuinely' designed for families.

There is a desire for government to influence developments with guidelines to influence amenity characteristics of developments including ceiling heights; cross ventilation. There is a desire for planning regulation to be open to 'allowing the messy stuff' to attract people and vibrancy to an area.

New developments currently under planning like West Basin are bring designed for all groups as a multi-generational area. The price point of these developments may attract wealthier families.

In the future across Canberra, the housing industry is likely to change significantly to provide greater housing choice.

Downsizing in Canberra remains a big challenge. The emotional elements of downsizing is barrier to moving and enabling larger households to move in. Genuine options and greater diversity for housing choice for older people will be crucial to supporting and encouraging people to downsize.

Semi-structured interview

30th October 2019

Observations of the Canberra market suggests that although there is a shift in housing choices for families towards higher density housing, this may be slow. The shift for families to move into high density will take time for Canberra to embrace. Canberra's brand is still associated with the 'Bush Capital', with the desire for the large, leafy block. For example, anecdotally although some developments would have provisions for 3 bedroom apartments in initial designs, following release to the market, and based on market demand some have shifted to 1 bedroom apartments.

In developments that are designed to be integrated within a precinct, with designs including access to greenspace, supermarkets etc, for example the Republic Development, more families are attracted to, and moving into these areas.

There is a shift occurring, however slow. Recent developments – e.g. Gungahlin are showcasing a shift. Blocks are relatively small, reflecting broader social trends of people being time-poor and limited ability to maintain large private areas and valuing communal high quality green space over private backyards.

Denman Prospect is an example that shows that families can be happily accommodated in houses with a smaller size footprint. The design and amenity aspects of the neighbourhood support these smaller private homes. Features like family dwellings in close proximity to shops.

Lightsview is a development in Adelaide providing housing options for smaller families. The development includes a mix of housing typologies and focuses on diversity in housing frontages. In order to attract families to the development, partnership with a private school was established early in the development. Village developments recent proposal at Weston reflects similar housing typologies in Lightsview.

Crace is designed as a walkable suburb with walking access to retail and active living elements integrated into the development including outdoor gyms and access to a nature reserve. The development is known as the happiest suburb.

Other examples of the breadth of housing typologies are outlined in the PCA's Demonstration Housing Project.

Overall, the medium density housing duplex, townhouses, multiplex dwellings are missing in the Canberra market. There is demand from young families coming in to the market for medium density housing in infill areas. The Canberra market is not meeting this demand as across Canberra, overall 60 – 70 % of all homes are single detached homes.

Downsizing or 'right sizing' for older people is challenging in Canberra as there is a desire to stay locally, within about five kilometers of where people have lived.

Affordability is a key issue across Canberra. This is reflected in Canberra showing lowest rental vacancy rates in the country, alongside the highest median rents in Australia. It is noted that Canberra also has the highest median wages, however those without the capacity to pay are vulnerable to housing stress.

Demand for community housing (those properties below market rates) is increasing.

As outlined in the submission from PCA to the Housing Choices Paper, there is a suggestion to review the residential zoning regulations to enable more housing options in infill areas. For example a granny flat or secondary dwelling on an existing site.

There are opportunities for changes in the planning system to deliberately attract families into infill areas. Examples include Vancouver. Family friendly guidelines were developed to respond to what makes neighbourhoods attractive. These guidelines included guidelines related to quotas for family friendly dwellings (related to the number of bedrooms), clear lines of sites to high quality green areas, child care centres located within developments.

Strategic planning alongside public transport corridors like Light Rail will be crucial to encouraging better place outcomes, including encouraging families to live in the corridors and have access to public transport.

More broadly, there is a shift in developers exploring social sustainability. The PCA's Social Sustainability Committee brings together the building community to explore the development of a toolkit for developers to support exploring different housing products that meet the needs of broad range of community.

THE IMPACT OF INTENSIFICATION IN EXISTING AND NEW RESIDENTIAL AREAS ON SCHOOL ENROLMENTS IN THE ACT

Final Report

17 AUGUST 2020

ARUP

Table of contents

COVER IMAGE:

Clockwise from top:

Images by

This report takes into account the particular instructions and requirements of our client. It is not intended for and should not be relied upon by any third party and no responsibility is undertaken to any third party.

JN 271517-00 ACT Urban Existing residential suburb Study		
Revision	Date	Description
C - Final	22 July 2020	ACT Residential Development and School Study
Prepared by	Checked by	Approved by

Tables and figures

Glossary

ACT Education - Australian Capital Territory Education Directorate

ABS - Australian Bureau of Statistics

ABS Census - Australian Bureau of Statistics Census

Brownfield or greyfield development - Redevelopment in established areas, delivering medium-density to high-density residential development in existing urban areas, as defined by Australia: State of Environment Report, 2016

Dwellings - A structure which is intended to have people live in it, as defined by the ABS Census Dictionary

Dwelling typology - A combination of Dwelling Structure, as defined by the ABS Census Dictionary as the classification of the structure of private dwellings enumerated in the Census according to separate (detached) dwellings, semi-detached dwellings, flats or apartments according to the number of storeys, caravans, houseboats, etc. and the number of bedrooms within a Dwelling, according to the ABS Census. For the purposes of this document, only four of the classification structures have been used: separate (detached) dwellings, semi-detached dwellings, flat or apartment in a one to three storey block and flat or apartment in a block of four or more storeys

EPSDD - Environment, Planning and Sustainable Development Directorate

Greenfield development - the release of undeveloped land located on the periphery of cities for the delivery of low-density housing, as defined by Australia: State of Environment Report, 2016

New residential suburb - Development in new areas or in areas without residential development or uses

Residential intensification or existing residential suburb - Development in established or existing urban areas

SA2 - Australian Statistical Geography Standard (ASGS) - Statistical Area 2

SA1 - Australian Statistical Geography Standard (ASGS) - Statistical Area 2

School student - A person enrolled in a school, recorded under a unique ID number in the ACT Education School Student Census

Site - A residential development site that has been included in this Study

Study area - The area that surrounds a Site, usually at an SA1 or SA2 level

Tenure - Refers to Tenure Type, defined by the ABS Census Dictionary as a description of whether a household rents or owns the dwelling in which they were enumerated on Census night, or whether the household occupies it under another arrangement. For the purposes of this study, two simplified tenure types were used: owned and rented.

IMAGE SOURCE;

Executive Summary

PURPOSE

Arup undertook a study with the ACT Education Directorate (ACT Education) to support enrolment forecasting and decision-making for schools planning. Specifically, this study will inform the approach to understanding the likely number of school-aged children that may result from medium to high density development in existing residential suburbs in urban areas, based on recent development trends.

This Study responds to the experience of many Australian jurisdictions that have or are encountering higher than expected growth in children in inner city areas, resulting in pressure on schools.

The ACT Planning Strategy (2018) has outlined a goal for at least 70 per cent of new residential development to take place in the established urban areas of Canberra. This type of development is currently taking place in Canberra, particularly along the City and Gateway Corridor. One of the broader ambitions of the ACT Planning Strategy (2018) is to encourage more compact development typologies. Greater demand for infrastructure and services is likely to result from increased existing residential suburb residential development. Findings from this study will support ACT Education in planning for schools proactively across Canberra and in addressing the changing needs of Canberra's population.

OVERALL APPROACH

This Study has been undertaken by Arup with Alpha Demographics with data provided by the ACT Education, Australian National University (ANU) Faculty of Demography and the ACT Environment, Planning and Sustainable Development Directorate (EPSDD) including:

» ACT Education School Student Census from 2010 to 2020;

» ABS Census from 2006 to 2016; and

» Development application data from 2005 to 2019.

CORE STUDY QUESTION

The core question for exploration in this Study is as follows:

"If a brownfield development is taking place in an established area of Canberra –how many school-aged children will this development generate?"

Our approach to address this problem statement was iterative – responsive to the data that was available, the knowledge of members of the team and stakeholders.

The analysis within the Study utilised the following key data sources:

» ACT Education School Student Census 2010 – 2020;

» ABS Census 2011 and 2016 for area wide characteristics and demographic trends including:

» Dwelling typologies - A combination of Dwelling Structure, as defined by the ABS Census Dictionary as the classification of the structure of private dwellings enumerated in the Census according to separate (detached) dwellings, semi-detached dwellings, flats or apartments according to the number of storeys, caravans, houseboats, etc. and the number of bedrooms within a Dwelling, according to the ABS Census. For the purposes of this document, only four of the classification structures have been used: separate (detached) dwellings, semi-detached dwellings, flat or apartment in a one to three storey block and flat or apartment in a block of four or more storeys;

» Socio-economic Index for Areas (SEIFA) Indexes of Relative Social Advantage and Disadvantage (IRSAD) and Education and Occupation (IEO);

» Experimental Index of Household Advantage and Disadvantage (IHAD);

» Tenure - Refers to Tenure Type, defined by the ABS Census Dictionary as a description of whether a household rents or owns the dwelling in which they were enumerated on Census night, or whether the household occupies it under another arrangement. For the purposes of this study, two simplified tenure types were used: owned and rented;

» Access Canberra sales data, cleaned by the ACT Treasury; and

» EPSDD Development Application data from 2005 to 2019, collated and summarised by ACT Education.

Additional data was referenced to gain context for the study, to capture broad trends across ACT and other cities, and to inform the set of factors for further analysis.

Workshops and collaborative teleconference/video conferences were held with Arup, Alpha Demographics and ACT Education and other key stakeholders to explore the best approach to the study – to gain the best outcome to respond to the problem statement with the data available and the study timeframe.

A sample of residential sites (15 in total) was selected by the Arup and ACT Education team to document the school student population change against multiple factors including typology (housing and number of bedrooms), tenure, median sales price, location (existing residential suburb and new residential suburb).

To complement the quantitative analysis. a series of semi-structured interviews were undertaken in ACT to understand shifting housing choices for households with children from the perspective of built environment practitioners: a representative of property council, developers and ACT Government Architect. The findings of the semi-structured interviews formed an into the contextual framing for this study.

SECONDARY STUDY QUESTION

A Secondary study question was explored:

How might the suburb or district level demographics of urban existing residential suburb areas change over time as a result of urban existing residential suburb developments?

It is recognised that other jurisdictions have been experiencing school student population change as a result of residential development in existing suburbs in urban areas. To provide additional perspective on the ACT focused analysis, we undertook a series of semi-structured interviews with those involved in schools planning in New South Wales and Queensland. In addition, high level case study analysis on three areas (one in Sydney, Newcastle and Brisbane) to document school student population change and dwelling typology change.

LEGEND ○ WORKSHOP   ● ARUP/ ACT Education COLLABORATIVE SESSION   ◉ SEMI-STRUCTURED INTERVIEW

ENGAGEMENT STREAM

ANALYSIS STREAM

PHASE 1

UNDERSTANDING DEMOGRAPHIC AND PROPERTY DATA IN CANBERRA

PHASE 2

RESIDENTIAL SITE SELECTION

PHASE 3

DEVELOPMENT SITE SAMPLE ANALYSIS

PHASE 4

PERSPECTIVES ON FACTORS THAT MAY INFLUENCE SCHOOL ENROLMENT DATA

PHASE 5

LEARNING FROM OTHER JURISDICTIONS

_Reviewing relevant data, policy and research to understand the policy context for shaping new development across Canberra and the factors that may be impacting housing choice in Canberra

_Collating and presenting data on each factor for analysis across growth areas in Canberra to inform residential site selection

_Workshop to inform areas of interest for residential site selection

_Reviewing available data and range of potential residential sites to select 15 residential sites

_Collecting property and school population data at residential site

_Collating characteristic data at SA1 level

_Undertaking analysis to extract key findings and any trends

_Undertaking semi-structured interviews with built environment professionals

_Consolidating findings into contextual analysis

_Undertaking semi-structured interviews with schools planners and strategic planners for Sydney, Newcastle and Brisbane

_Undertaking case study analysis to document change in dwelling typologies and school population in three sites across Sydney, Newcastle and Brisbane

KEY FINDINGS

The key findings that have emerged from this Study across the contextual analysis, residential site analysis and semi-structured interviews are summarised below.

1. **Multiple forces are shifting housing preferences for households with children, but school student populations emerge in developments no matter what the typology is**

Affordability, migration, cultural diversity, increasing density, urban renewal, policy shifts, greater desire to access amenity and more apartment and semi-detached dwelling stock were all noted within the literature and discussions with built environment professionals as broader trends affecting housing preferences for households with children. It was noted that these trends are interdependent and complex. This study did not conclude for each factor or quality of housing a specific yield of school students, however, planning for school infrastructure should be informed by a holistic understanding of the impacts these factors can have at different scales.

The results of the sample development site analysis showed high variation in the school aged student population across the development sites across all factor within each typology (size, number of bedrooms, apartment/townhouse mix and median price). While there was high variation, each site yielded a population of school students at least once within the Study period.

In addition, discussions during semi-structured interviews suggested that in recent years there has not been widespread change that has resulted in a higher rate of families with school students living in medium to high density dwellings. Discussions with built environment professionals also suggested that the desire for families to have larger detached dwellings families broadly remains. Cultural diversity of the community, desire for access to amenity and services and affordability were suggested as influences that may result in shifts in the future.

The development site analysis demonstrated that when dwellings are delivered, they will yield some school-aged students on site, no matter what the typology is. While housing preferences are changing due to a number of factors, the ambition of the ACT Government to deliver 70% of new development within existing residential areas means that more compact typologies will be delivered. This will lead to some increase in residential density. The sample development site analysis demonstrates many ways that residential intensification can play out in terms of a yield in school-aged students; however, the commonality across the sites is that they all yielded a school-aged student population.

2. **Medium-high density dwellings are accounting for an increasing share of dwelling stock**

Medium-high density dwellings, which include semi-attached dwellings and apartments, are accounting for an increasing share of dwelling stock across ACT and other cities in Australia.

Research into Canberran's housing preferences outlined in the ACT Planning Strategy (ACT Government, 2018) note that there is higher demand for medium density housing, such as townhouses. The ACT Housing Attitudes and Intentions Survey 2016 (Winton Sustainable Research Strategies, 2016) undertaken on behalf of the ACT Government found that household preferences for dwelling types closely align with dwelling supply.

Discussions with the education departments from NSW suggested that data showed that the proportion of school students living in medium – high density dwellings was not increasing across Sydney, however the number of medium-high density dwellings had increased significantly in some areas, resulting in a total increase in school students in some areas. This is seen in the case study of Wentworth Point in Greater Sydney, where we observed an increase of 286% in medium- to high-density dwellings between 2006 to 2016, and an increase of 95% in the school student aged population within the same time period.

3. Medium and high density developments yield school aged children at greater magnitudes, within shorter time frames

It was found that overall, medium and high-density developments yielded school aged children. Intensification of existing urban areas brings higher volumes of dwellings, leading them to experience growth in local population, including families with school aged students in short amounts of time. The data shows that the magnitude of new dwellings, and the rate of new dwellings into an area from higher density development will generate school aged children, and thus demand for school infrastructure within short amounts of time.

Overall although the yield of student aged children per dwelling remains steady; it is the total amount dwellings being introduced and rate of development that greatly drives the quicker rate student growth that is experienced in infill development as well quantum of students.

4. Smaller residential developments had a higher proportion of school aged children per dwelling

In our sample analysis, developments with between 12 to 50 dwellings displayed a higher ratio of occupation of school student populations than development sites with a higher number dwellings. For example, Magnolia Mews (Site 1) has 32 dwellings and had a ratio of occupation of school student population of 31% at its peak. Artique (Site 5) in Campbell has 12 dwellings, one of the smallest developments in the study. This site had a median rate of occupation of school student population of 33%. Similarly, Allure (Site 6) had a ratio of occupation of school student population of 25%.

This is compared to Axis Apartments (Site 4), the largest development within the sample study, with a total of 349 dwellings, and a median ratio of occupation of school student population of 8%. Wayfarer (Site 11), with 331 dwellings had a median ratio of occupation of school student population of 2%.

5. Development sites with different proportions of multi-bedroom units

yield differently sized school student populations

From the semi-structured interviews, we heard that multi-bedroom apartments are recognised as more 'family friendly'. Similarly, research by Hutchinson Smith (2017) found that the more bedrooms, the more school students per unit. Our sample study highlighted that Allure (Site 6) had 100% of multi-bedroom units and did display one of the highest median ratios of student occupation at 25%. It is noted that this site also consists of townhouses only. There were other sites within the Study that had high proportions of multi-bedroom units displayed lower than 10% of median student occupation.

6. Affordability was recognised as a factor that may influence families with school students to live in medium to high density dwellings

A trend discussed in the semi-structured interviews being seen across Canberra, Sydney and Brisbane is families moving into medium to high density developments in existing residential suburb areas to gain access to amenity and services at a more affordable price point than detached dwellings. In our sample study however, there was no clear relationship across all 15 sites between median sales price and school aged school aged student population. However, sites with a median dwelling price within the range of $400,000 to $550,000 tended to have higher ratios of occupation.

The sites with three highest median sales prices did exhibit the low ratios of student occupation (Space (Site 1): 3%; Space (Site 2): 7%; Atelier (Site 10): 4%), however, some sites that had the lowest median sales price (Wayfarer (Site 11)) also had low median ratio of student occupation (2%). Artique (Site 5) and Allure (Site 6) had median sales prices higher than the ACT median for units and displayed the highest median ratio of student occupation (33% and 25% respectively).

7. Lag in school student population from development opening

Five of the sites had immediate uptake following the completion of the development: Axis (Site 4) in Lyneham, Atelier (Site 10) in Kingston, Ambiente (Site 8) in Wright, The

Quay (Site 13) in Greenway and Mizura Villas (Site 14) in Lawson. Some development sites had a period of one year following the completion of the development before a school student population was observed. For example, Artique (Site 5) was completed in 2011, but only had one student in 2013, followed by four students in total in 2014. Quayside (Site 7) was completed in 2014 but students were first recorded within this site in 2016; there were five students in 2016. School student populations at these sites did not necessarily increase year-on-year following the completion of the development. It is noted that as Magnolia Mews, Space and Space2 were developments opened before 2010, no data was available to analyse school enrolment data at this site from opening.

8. The proportion of English speaking school student households differed across the residential sites

Language spoken at home is collected as part of the School Student Census and was analysed at SA1 level to provide an indication of cultural diversity of an area. The proportion of school student households speaking English at home by SA1 in 2019 was reviewed against the ratio of student occupation at sites in the same year. The review highlights that there is not a clear relationship between proportion of households speaking English at home in the SA1 to ratio of student occupation in the residential site, however, there was alignment across some residential sites. For example, for Evolure (Site 12), its corresponding SA1s has one of the lowest proportions of English speaking households at 44%. Site 12 also has the highest ratio of occupation across all sites at that year, at 23%. In addition, at Atelier's (Site 10) low ratio of student occupation in 2019 showed high proportions (more than 80%) of student households speaking English at home in the same year.

9. Primary school aged children were the largest group within the sites' school student population

Across all the residential sites, primary school children tend to be the largest group within the sites' school student populations. The older residential sites such as Magnolia Mews (Site 1) and Space2 (Site 3) had some years within the study period wherein high school and college-age children were the largest groups.

10. Sites with more even IHAD quartile distribution were showed higher median student ratios of occupation

Overall, school student population at a residential site did not appear to be strongly correlated with the relative advantage and disadvantage in their surrounding areas.

However, it was observed that sites in areas with more even IHAD quartile distribution had higher median ratios of student occupation. For example, Artique (Site 5) has the highest median ratio of occupation at 33% and its SA1's IHAD distribution is almost even across the four quartiles.

This is also observed in Magnolia Mews (Site 1) (13%) and Evolure (Site 12) (15%). Though sites within areas of higher advantage also present with high median ratios of occupation, such as Allure at 25%, Watermark (Site 9) at 15% and The Quay (Site 13) at 12%.

11. Some lessons may be gained from other jurisdictions, however city features are context specific

Canberra appears to be ahead of the curve in correlating schools planning and housing development. Interviews with school planning professionals in Newcastle, Sydney and Brisbane have provided valuable insight into pinch-points being faced by planning departments. There is common recognition across the different jurisdictions that schools planning is impacted by housing development and demographic shifts. The interviews highlighted that in Sydney, the rate at which households with children are moving into apartments is not necessarily increasing, but that there is just more medium- to high-density development.

Demographic shifts have also played a role in increasing numbers of families moving into medium- and high-density development, such as overseas migration and gentrification. Schools planning professionals highlighted that competitiveness for popular schools is exacerbating pressure that is already there and emphasised that schools planning should follow where people want to live, not where they want their children to go to school. All interviews emphasised the importance of data consistency between housing forecasts and schools planning, though admitted that there are discrepancies at both local and state levels.

LIMITATIONS OF THIS STUDY

Some limitations to the analysis emerged throughout the Study across availability of data, quality and consistency of data. For example, it was found that some student addresses were not encoded correctly and were missing a complete street address. These incomplete entries represented a very small portion of the dataset; overall, the data was comprehensive and provided a strong foundation for the analysis.

In addition, working with a large dataset, (approximately 70,000 students per year for 10 years), it was found that georeferencing this data was challenging to maintain a level of precision across all years.

We also found that gaining a comprehensive set of development application data across ACT with relevant fields of dwelling typologies, and demolition data proved to be challenging within the timeframe of the Study. Review and analysis of this data was undertaken by ACT Education and provided for this Study.

Further limitations of the Study are outlined in this report.

FURTHER ANALYSIS

Areas for analysis were identified through this Study to support a further understanding of housing choices for households with school aged children. These are summarised below.

1.   This sample analysis provides a testing of an approach with 15 residential sites. An expansion of the sample size is suggested

The residential site analysis has been undertaken as a limited sample analysis (including 15 residential sites). Observations are noted within the analysis, however clear correlations between the data were not able to be determined due to the limited sample size. This sample analysis provides a testing of an approach, and an expansion of the sample size is suggested.

2.   Fine grain analysis is suggested to correlate of student address to individual dwelling attributes

Analysis within this Study documented the overall development site typology and the total student population at each development site address. Further analysis is suggested to understand the attributes of individual dwellings school age students may be occupying to understand if households with school aged children in these developments are occupying the multi-bedroom dwellings within these development sites only. If so, these families may be occupying a small proportion of the overall dwellings, however they may make up a significant proportion of the multi-bedroom dwellings within a development site.

3.   Longitudinal dwelling studies of families with children to understand movement patterns and dwelling preferences

Analysis within this Study documented the overall development site typology and the total student population at each development site address for each year of the Study period. Additional analysis is suggested to understand the movement patterns of families with school aged children.

For example, further analysis is suggested to understand if families move into new medium to high density dwellings with younger, non-school-age children or young couples are moving into these new developments before starting a family and stay when children enter the school system, and or if households had recently moved into the development when ready for school.

Additional analysis may also be undertaken on the movement of students throughout the school cohorts. From our sample analysis, we observed that for older developments, there were peaks and troughs of total school student populations, and this population increased in age throughout the years. This may suggest that school students who are living in these developments are growing up, getting older and moving up and out of the school system. It is suggested that further analysis using the unique student IDs be undertaken to confirm if this trend is occurring.

4.   Correlation of student addresses to tenure to understand if this factor impacts student generation

The tenure of each individual school student at the development site was not included in the School Census data provided. It is suggested that further analysis be undertaken to understand housing tenure of families with school age students.

5.   Further analysis of lag in student population in new developments

Further analysis may contribute to understanding whether the 'lag' in school student population in new developments is related to households waiting for available rental stock to open on the market from these relatively new developments.

Median sales price was reviewed for each development site. Additional analysis may be undertaken to understand if there are lags in school student population in less affordable areas due to households with school students waiting for available rental stock to open on the market from these relatively new developments.

6.   Understanding wider school student population shifts and broader trends at SA1s

In the analysis of school student population at a site, for some sites we saw an increase correspond to increased student population growth at SA1s. Further analysis is suggested to determine if these two increases may be linked to new developments being delivered in the immediate surrounding area, or if student populations are moving into existing dwelling stock.

Further analysis is suggested to understand broader trends that may be impacting the initial high occupation in Watermark, and similarly with The Quay site including higher supply of affordable housing options alongside Gungahlin as a key employment centre; and relationship with other new developments in Lake Tuggeranong.

7.   Deeper understanding of settlement patterns and schools population

Classification of existing residential suburbs and new residential suburbs have been informed by ACT Education data. Further classification of areas aligned with ABS settlement definitions is suggested to be undertaken as part of further analysis.

1. Introduction

1.1 PURPOSE OF THE STUDY

Arup undertook a study with the ACT Education Directorate (ACT Education) to support enrolment forecasting and decision-making for schools planning. Specifically, this study will inform the approach to understanding the likely number of school-aged children that may result from medium to high density development in existing residential suburbs in urban areas, based on recent development trends.

This Study responds to the experience of many Australian jurisdictions that have or are encountering higher than expected growth in children in inner city areas, resulting in pressure on schools.

The ACT Planning Strategy (2018) has outlined a goal for at least 70 per cent of new residential development to take place in the established urban areas of Canberra. This type of development is currently taking place in Canberra, particularly along the City and Gateway Corridor. One of the broader ambitions of the ACT Planning Strategy (2018) is to encourage more compact development typologies. Greater demand for infrastructure and services is likely to result from increased existing residential suburb residential development. Findings from this study will support ACT Education in planning for schools proactively across Canberra and in addressing the changing needs of Canberra's population.

The Study was undertaken by Arup with Alpha Demographics with data provided by the ACT Education, Australian National University (ANU) and the ACT Environment, Planning and Sustainable Development Directorate (EPSDD).

1.2 REPORT STRUCTURE

This Final Draft Report provides a summary of the work to date for the ACT Urban Existing residential suburb Study and includes the following sections:

1. **Executive summary**

2. **Introduction:** An outline of the purpose of this Study, an outline of the contents of this report, a summary of the data sources used, and limitations of the study

3. **Context and drivers of change:** A summary of the literature review and presentation of key findings of the review into trends in changing housing choices in cities and specific to Canberra. This review provides input into the approach to the analysis, including informing the set of factors to analyse for each area;

4. **Approach to the analysis:** An overview of the approach to each phase of the work, including a data schema to document data sources and assumptions and summary of the outputs from the analysis to inform the selection of Residential sites;

5. **Outputs of the analysis - Residential sites analysis and overall findings:** Overall analysis of the 15 residential sites and findings including suggestions for further analysis;

6. **Learning from other jurisdictions:** A summary of the experiences gathered from a selection of practitioners in schools planning in Sydney, Newcastle and Brisbane and a high level summary of the school student and dwelling typology change across three selected areas in Sydney, Newcastle and Brisbane;

7. **Appendix 1:** Site by site presentation of the residential site analysis;

8. **Appendix 2:** A set of tools and content that has informed the study including an outline data schema; and

9. **Appendix 3**: Detailed case study analysis.

1.3 DATA SOURCES AND LIMITATIONS

This Study provides a sample analysis of recent residential sites, and their corresponding change in school student population. This Study also seeks to identify any relationship with the set of key factors that may influence school population in medium to high density dwellings including: existing residential suburb or green field location; dwelling typology; median sales price; and amenity.

The analysis within this report is based on data collected from a variety of sources, namely:

» ACT Education School Census from 2010 to 2020;

» Australian Bureau of Statistics (ABS) Census from 2006 to 2016; and

» Development application data from 2005 to 2019.

Spatial analysis of the data formed a key component of the approach. This provided the ability to align data sets by location, down to the specific location of residential site and school student address. Residential site data and school student population data was also able to be contextualised with ABS Census data by identifying the relevant SA1 area.

Some limitations to the analysis emerged throughout the Study. Limitations are summarised as follows:

» Data from ACT Education School Census included detailed and comprehensive information for each unique student ID that served as the foundation for our analysis. Student addresses in the data from 2010-2017 and 2020 were not georeferenced; however, included enough detail in order to geocode the addresses amd create a georeferenced dataset. In order to determine the growth of a school student population at each site and its corresponding SA1 and SA2, data was geocoded and assigned to a relevant ABS Census geography by creating latitude and longitude coordinates for each student's address, then inputting these coordinates into GIS software overlaid on top of ABS Census geography (SA1s). Following this overlay, each unique student ID was matched to an SA1 using GIS software;

» Some unique Student IDs did not include complete student addresses. The most complete detail was provided through the Home Suburb. This may have impacted the SA1 selection process as the addresses would be georeferenced to a general suburb location; however, this was not the case for majority of the data, and the overall dataset was comprehensive enough to conduct the analysis;

» Within the dataset provided, it was found that a small proportion of students did not have a unique ID number or address. Students without unique ID numbers and without addresses were not included in this Study. In addition, students outside of the ACT were not included in this Study. It is noted that those not included in the Study represented a small proportion of the overall dataset;

» Gaining a comprehensive set of development application data across ACT with relevant fields of dwelling typologies, and demolition data proved to be challenging within the timeframe of the Study. It was found that data including data on a development as constructed vs. as approved was not easily available in the form required for sites across ACT from 2010 - 2019. Review and analysis of this data was undertaken by ACT Education and provided for this Study;

» The Development Site Selection workshop included only a selection of development application data only across the high growth areas. Selection of areas of interest was informed by workshop participant knowledge;

» In response to challenges in gaining a comprehensive development application data set, a sample residential site analysis approach was undertaken. Data for 15 sitess were reviewed, collected and summarised by ACT Education, including a review of development sites at completion to confirm final development form including dwelling typologies and make up;

» School enrolment data was reviewed at the residential site address only. Specific housing typologies within a development were not able to be correlated to school student populations from the data available, e.g. we were unable to confirm if families with school age students were residing in a 3-bedroom apartment or 1-bedroom apartment within a development site;

» School enrolment data was reviewed at the development site across each year from 2010 - 2020. Analysis of the movement of school student population was not undertaken to determine how and if families with school age children were moving throughout their school years to other addresses. It is suggested that this analysis forms part of further study including analysis of movement to other dwelling typologies; and

» School enrolment data in 2020 was not reviewed at an SA1 level and is integrated in-to the study only at the development site and at the SA2.

2. Context and Drivers of Change

A summary of the long term trends that are impacting housing choice for families with school students is presented below. Each trend includes a key question to guide the Study's analysis. Data to inform this summary has been sourced from research, ABS data, journal articles, relevant publications in ACT and Australia as well as thoughts and perspectives collected from semi-structured interviews with development professionals in the ACT. It is noted that these discussions invited qualitative opinions from informed professionals, however these comments are not always supported by quantitative evidence.

2.1 CITIES

2.1.1 INCREASING FOCUS ON PLANNING FOR INNER CITY AREAS

There is a shift in government policy towards a more compact residential typology for inner urban areas. Canberra's Statement of Ambition (2016) outlines a pathway for Canberra to be a "compact and competitive city…and winning the global contest for investment and talent – opening and diversifying our knowledge-based economy – better metropolitan infrastructure – and integrated smart-city initiatives."

The ACT Planning Strategy (ACT Government, 2018) includes "compact and efficient" and "liveable and accessible" as key themes. It also highlights an objective for at least 70% of all new housing to be built within the existing urban footprint. This aims to encourage greater diversity of housing choice (including smaller, and more dense housing forms), enable access to appropriate infrastructure that will support growing communities and the development of an efficient, sustainable and liveable city.

The focus on existing residential suburb development in inner city areas recognises the significant opportunity to reduce a city's impact on the environment, whilst maintaining productivity in economy and supporting a high quality of life. Smaller, compact private homes in exisiting communities can reduce overall consumption, reduce reliance on cars through being able to walk or cycle to services and encourage more intensive use of existing infrastructure.

Key question for analysis: Are school aged populations increasing in existing residential suburb areas? Are school aged populations increasing in medium to high density dwellings? What factors might encourage growth?

2.1.2 DELIVERING SCHOOLS INFRASTRUCTURE ALONGSIDE GROWTH IS CHALLENGING

Over the past decade, countless neighbourhoods have been redeveloped and densified without the alignment and delivery of the necessary supporting infrastructure (Infrastructure Australia, 2018). Meeting the housing needs of a growing population will require a significant shift across all Australian cities to deliver a diverse range of housing typologies as well as the necessary infrastructure and services.

Infrastructure Australia's most recent Infrastructure Audit in 2019 identified that schools in fast-growing cities, particularly in inner areas, were under stress due to increasing demand and pressure.

The Audit (Infrastructure Australia, 2019) highlighted that overcrowding can lead to poor school student outcomes. For example, it can result in a reduction in other spaces, such as playgrounds or art and music classrooms, to accommodate additional school students, or can require building upgrades or changes. The challenge of delivering school infrastructure was also highlighted within the Audit as it outlined:

> *"One of the challenges with building or upgrading schools in established inner-city areas is the scarcity and high cost of available land... School infrastructure planning in established areas is generally more reactive to demand and capacity issues, and major development proposals...There can also be the added complexity of demographic changes within suburbs. For example, some parts of inner Sydney and Melbourne currently have a large number of school-aged children but many schools that previously existed in these areas were closed by governments in the 1990s and early 2000s due to a temporary lack of demand and an assumption that families would not reside in inner city areas." -Infrastructure Audit 2019 (Infrastructure Australia, 2019)*

The importance of rethinking projections for informing school planning was also highlighted in the Audit (Infrastructure Australia, 2019) as it states that:

"In our fast-growing cities people are increasingly locating to inner city areas at all stages of life for a variety of reasons, including access to employment opportunities, moving closer to family, or access to education infrastructure. Within these cities, families are also increasingly living in higher-density areas and in smaller homes, including apartments. Additional school-aged children living in an area where they were not born can increase demand for school infrastructure that is not captured by projections."

In the ACT, the increasing focus on directing new development into inner city or established areas will have knock-on effects on the necessary infrastructure to support the growing population. Schools planning in the ACT is responding to natural population increases, interstate and overseas migration patterns as well as shifting preferences for public schools. There was an increase in students attending public schools of more than 26% from 2010 to 2019 (ACT Government, 2019).

Key question for analysis: Are school student populations increasing in existing residential suburb areas? Does the proximity of services and amenities impact the choice of housing for families?

2.2 HOUSING

2.2.1 APARTMENTS ARE ACCOUNTING FOR AN INCREASING SHARE OF DWELLING STOCK

Research into Canberran's housing preferences outlined in the ACT Planning Strategy (ACT Government, 2018) note that there is higher demand for medium density housing, such as townhouses. The 'ACT Housing Attitudes and Intentions Survey 2016 (Winton Sustainable Research Strategies, 2016) undertaken on behalf of the ACT Government found that household preferences for dwelling types closely align with dwelling supply.

In Australia, nine percent of all children aged 0 – 4 had an apartment as a home in 2016 (ABS, 2017). In the ACT, seven percent of children in the same age group lived in apartments in 2016. Compared to other states, in NSW, 16.5% of children aged 0-4 lived in apartments in 2016; Queensland had a lower proportion of five percent (ibid).

In a research paper titled "New methods for projecting enrolments within urban school districts" (Hutchinson Smith, 2017), it was found that families tend to prefer low-rise structures and ground-level units. The research also found that an increase in the number of ground-floor units results in an increase in the number of children per unit.

Research undertaken by ACT Government notes that within Canberra Central District, only one third of the 1,500 households interviewed considered apartment living an 'unattractive' option and just 15% thought townhouse living an unattractive option. The study highlights the amenity benefits of living in central areas form an important consideration for households in higher density living.

The prevalence of apartment dwelling stock is also increasing in the ACT. According to the 2016 Census, apartments made up 16% of all occupied dwellings. According to ABS Building Approvals in 2016, apartments made up just under 54% of all approved dwellings, and over 90% of approved apartments were in buildings four storeys or higher (ABS, 2017).

Key question for analysis: Are school student populations increasing in medium to high density dwelling typologies? What are the characteristics of dwelling typologies that exhibit larger school student populations?

2.2.2 SOME CHANGE IS OCCURRING, HOWEVER, MOST FAMILIES STILL PREFER LARGER HOMES

Housing preferences differ across households. The number of bedrooms, safety and security and proximity to services were rated as prioritised attributes for housing ahead of particular dwelling structure (Grattan Institute, 2011). In the same study, it was

noted that middle-aged households with children highlighted the importance of inside space. Multi-bedroom dwellings within medium to high density developments may be attractive to families. Research into school enrolment trends (Hutchinson Smith, 2017) found that the more bedrooms, the more school students per dwelling.

The ABS (2016) highlights that there is no single standard measure of housing suitability. However, the Canadian National Occupancy Standard is widely used in Australia and internationally. The Standard notes the following:

» There should be no more than two persons per bedroom;

» Children less than five years of age of different sexes may reasonably share a bedroom;

» Children less than 18 years of age and of the same sex may reasonably share a bedroom;

» Single household members 18 years and over should have a separate bedroom, as should parents or couples; and

» A lone person household may reasonably occupy a bed sitter.

Interviews with housing professionals in the ACT as part of this Study highlight that they have observed recent turnover in suburbs in the inner city to welcome new families. This has been noticed in areas of Ainslie, O'Connor, Campbell, and Lyneham. Discussions also noted that the shift in housing choices for families towards higher density may take time for Canberrans to embrace, as Canberra's brand is still associated with the "Bush Capital" with the desire for the large, leafy block.

Although it was noted that the shift towards higher density dwellings has been slow, the interviewees indicated that some recent developments, such as in Gungahlin and Denman

Prospect, may showcase changing preferences. Observations of these developments suggest that families can be accommodated in dwellings with a smaller size footprint.

Discussions also noted that these developments reflected broader social trends of people being time-poor and having a limited ability to maintain large private areas.

Design and amenity aspects of neighbourhoods, like green spaces integrated within a precinct, dwellings close to shops and services like public transport and schools were highlighted as key features to support medium to high density homes.

2.2.3 LOW HOUSING AFFORDABILITY IS ATTRACTING HOUSEHOLDS TO SMALLER DWELLINGS

Research on projecting school enrolments in urban districts (Hutchinson Smith, 2017) found that luxury apartments tend to not be occupied by households with children. The research also found that as rent increases, family size decreases. The research also highlighted as the developments age, the number of school students per dwelling tends to increase. This may be associated with a "life cycle" of a neighbourhood; luxury apartments or new apartments tend to ask for high rents and as they age and become cheaper, families move in.

ACT residents pay the "equal highest median weekly rent of $380...and the second-highest monthly mortgage repayment in Australia ($2,058)" (ABS, 2017).

Semi-structured interviews highlighted that affordability is a key issue across Canberra. Canberra has the lowest rental vacancy rates in the country at 1.7% in December 2019, compared to National rate of 2.5% (Property Observer, 2020). At the same time, Canberra also has recorded the highest median rents in Australia at an average of $560 per week - higher than Sydney for the first time in 11 years (All Homes, 2019). It was noted that Canberra also has the highest median wages, however, those without the capacity to pay may be vulnerable to housing stress.

According to the discussions within the interviews, anecdotal evidence suggests some couples anticipating children or young families may be more prepared to buy into medium density, usually townhouses, as their first home in order to access housing that is more affordable.

Key question for analysis: Do developments with lower median sales prices host higher school student populations?

2.2.4 GREATER DIVERSITY IN HOUSING STOCK

Households are shifting across Australia. The OECD population is ageing due to both an increase in life expectancy and a decrease in total fertility rates. In Canberra, the percentage of the ACT population aged 65 years and over is expected to rise from approximately 11 per cent in 2017 to 15 per cent in 2058, a total increase of 125 per cent (ACT Government, 2019). The Property Council of Australia's ACT Division highlights in its submission to the Housing Choices Discussion Paper that there is an increasing need to cater for not only a growing, but an ageing population (Property Council of Australia, 2018).

Ageing in cities presents a potential shift in households and housing needs through a potential increase in lone person households as well as an increase in multi-generational households. Lone – person households are projected to make up 27% of all Australian households in 2041 (ABS, 2019). In the ACT, single person households were the fastest growing household type from 1991 to 2016.

Alongside this trend, the ABS projects the number of people living with 'other related persons' in the family household to grow to 781,000 or more by 2036 in Australia (ABS, 2019). Other studies indicate that one in five Australians currently live in a multi-generational household, and the trend is on the rise (Christina Ho, Edgar Liu, Hazel Easthope, 2012).

More diversity in housing stock provides increased opportunities for empty nesters or lone person households to downsize or 'right size'. This may in turn, free up larger dwellings for families with school-aged children, potentially resulting in increased school student yields from locations with little or no new development activity.

According to the ACT Government's Housing Choices Discussion Paper and Community Consultation Report (2018), 60% of surveyed residents "anticipate that they will move in the next decade in response to anticipated needs, and lifestyle changes." The Housing Choices project also highlighted that the Canberra "community has expressed a desire for more housing choice and flexible housing forms in their neighbourhoods and suburbs – not just single dwellings or high rise apartments… [including] smaller homes and townhouses, villas for larger families, and housing for those on lower incomes, as well as those ageing or with disabilities" (ACT Government, 2018).

Some studies suggest that there are barriers that discourage people from moving into a dwelling to better suit their needs, such as stamp duty or other concerns about apartments like small or lacking outdoor spaces, proximity of neighbours and the cost and nuisance of body corporates (Grattan Institute, 2011).

Key question for analysis: Has a greater diversity of dwelling stock enabled families to move into housing that has been 'freed up' from downsizers/right sizers?

2.3 PEOPLE

2.3.1 INCREASING CULTURAL DIVERSITY IN POPULATIONS

According to the ABS (McLennan, 2012), in the ACT, there was an increase in the proportion of households where two or more languages are spoken from 17.2 per cent in 2006 to 21 per cent in 2011. During the same time period, the proportion of people living in the ACT who were born in Australia dropped from 73 per cent to 71.4 per cent.

The proportion of households that speak English at home decreased from 77.8 per cent in 2011 to 72.7 per cent in 2016. At the same time, the proportion of the population that was born overseas increased from 24.1 per cent in 2011 to 26.4 per cent in 2016; the top five countries of birth were England (3.2%), China (2.9%), India (2.6%), New Zealand (1.2%) and the Philippines (1.0%) (ABS, 2017).

In New South Wales, the proportion of households that speak English also decreased between 2011 to 2016, from 72.5 per cent to 68.5 per cent. In Queensland, the proportion also decreased from 84.8 per cent to 81.2 per cent in the same time period (ABS, 2017). The proportion of the population born overseas also increased for both states. In New South Wales, it increased from 24.3 per cent in 2011 to 27.6 in 2016. In Queensland, the proportion increased from 20.5 per cent in 2011 to 21.6 per cent in 2016 (ABS, 2017).

Across Australia, more than half of apartment residents – 56%, compared to 33% of all Australian residents – are migrants. Of these, the biggest group (26% of apartment residents) are migrants born in Asia (Liu E. and Easthope H., 2012). Discussions in semi-structured interviews suggested anecdotally that people not born in Australia may be more willing to raise children in higher density housing.

Key question for analysis: Are higher school student populations found in areas with residents with cultural diverse backgrounds?

2.4 SUMMARY

The key trends in cities, housing, households and preferences have informed a set of key factors that have been used to start to understand school student yield from medium - high density developments. The trends provide valuable context for the analysis of the relationship between different aspects of existing residential suburb development, such as its location, typology, access to services, price and different aspects of the residents within existing residential suburb developments, such as their cultural background and socio-economic status. The diagram adjacent demonstrates the many connections across factors that can impact housing development and housing choice, which can ultimately impact school student population changes.

Figure 1 Relationship between key trends and factors for analysis

Source: Arup

3. Methodology

3.1 APPROACH TO DATA ANALYSIS

Our approach to data analysis has been iterative, responding to the data available to meet the core problem statement: If a brownfield development is taking place in an established area of Canberra – how many school-aged children will this development generate?

At a strategic level, the data analysis seeks to idenfity the impacts of cumulative residential intensification and the subsequent demand generated by households with school-aged children moving into medium- to high-density developments for schools.

We have undertaken a sample analysis of medium- to high-density residential sites (a total of 15) across Canberra to document the change in the school student population before development and after, utilising school enrolment data, property data and ABS Census data.

We undertook the following analysis to inform the range of factors to analyse, and to select the residential sites to undertake a detailed 'sample' analysis:

» Phase 1: Understanding demographic and property data in Canberra;

» Phase 2: Residential site selection;

» Phase 3: Residential site sample analysis; and

» Phase 4: Perspectives on factors that may influence school enrolment data.

The analysis within the study utilised the following key data sources:

» ACT Education School Census 2010 – 2020;

» ABS Census 2011 and 2016 for area wide characteristics and demographic trends including: Dwelling typologies; SEIFA Index; Tenure;

» EPSDD Development Application data from 2005 to 2019; and

» Access Canberra Property Exchange Data from 2012 to 2019, provided by ACT Treasury.

Research, journal articles and data were referenced to gain context for the study, to capture broad trends across ACT and other cities, and to inform the set of factors for further analysis.

Two workshops were held to gain insight and direction from ACT Education, ANU and ACT EPSDD. The purpose of the workshops were as follows:

» Inception Workshop: Set the direction for the analysis, identify any key points of analysis, risks and opportunities; and

» Residential Site Selection Workshop: Review the factors of influence across the areas of high school student growth and discuss school student growth, housing and household typologies and other attributes for further analysis in each Residential site. The participants of the workshop collectively selected the 13 areas (SA2) of interest to guide the Residential Site selection.

Collaborative teleconference/video conferences were held with Arup, Alpha Demographics and ACT Education to explore the best approach to the study and gain the best outcome to respond to the problem statement with the data available and the study timeframe.

The approach to the analysis for the Study was first suggested as a 'sample area' analysis to capture multiple recent developments within a study area (SA1) over time and the corresponding school student population change. It was found that a comprehensive database of recent developments with the detail of housing typologies, and demolition data was not available within the study timeframe. A shift in approach was taken to focus on a sample of residential sites to document the school student population change analysed against multiple factors including typology (dwelling structure and number of bedrooms), tenure, median sales price, location (existing and new residential suburbs).

A total of 15 residential sites were selected by Arup and the ACT Education team to cover a range of characteristics. Site by site analysis was undertaken to capture the defined factors. Yearly school student populations were collated for each residential site based on the residential site address and spatial analysis of ACT Education school census data. Further analysis was undertaken to summarise any trends in the key factors and school student population.

To complement the quantitative analysis, a series of semi-structured interviews were conducted in ACT to understand shifting housing choices for households with children from the perspective of built environment practitioners: a representative of property council, developers and ACT Government Architect. The findings of the semi-structured interviews formed an into the contextual framing for this Study.

Additional Problem Statement

An Additional Problem Statement was presented for the Study as follows:

How might the suburb or district level demographics of urban existing residential suburb areas change over time as a result of urban existing residential suburb developments?

It is recognised that other jurisdictions have been experiencing school student population change as a result of residential development in existing suburbs in urban areas. To provide additional perspective on the ACT focused analysis, we undertook a series of semi-structured interviews with those involved in schools planning in New South Wales and Queensland. In addition, high level case study analysis on three areas (one in Sydney, Newcastle and Brisbane) to document school student population change and dwelling typology change.

3.2 DETAILED APPROACH

A detailed description of the Study approach is presented in the section overleaf.

Phase 1 - Understanding demographic and property data in Canberra

	1.1 REVIEW EXISTING DOCUMENTATION	1.2 IDENTIFYING AREAS OF GROWTH IN SCHOOL CHILDREN (GROWTH AREAS)	1.3 ALIGNING GROWTH AREAS WITH URBAN EXISTING RESIDENTIAL SUBURB AND NEW RESIDENTIAL SUBURB CLASSIFICATION	1.4 AGREEING A SET OF TYPOLOGIES ACROSS HOUSING STRUCTURE AND NUMBER OF BEDROOMS
KEY QUESTIONS	What is the policy context for shaping new development across Canberra? What has been impacting housing choice in Canberra?	Where has growth in school aged children occurred across Canberra?	Are the growth areas in existing residential suburb or new residential suburb classified areas?	What are the agreed categories of housing structure and number of bedrooms to make up the typologies to use for analysis?
GEOGRAPHY	Canberra-wide	Canberra wide at ABS Census 2016 Geographies (SA2)	Growth areas	N/A
TIMEFRAME	N/A	2010-2019	N/A	2016, change measured from 2011 to 2016
DATA SOURCES	» Relevant ACT strategies » Grattan Institute » ABS research	School enrolment census data per year	Classification of existing residential suburb and new residential suburb according to suburb, provided by ACT Education and EPSDD	ABS Census
OUTPUT	Summary provided in first section of Final Draft Report	Child density map showing top 30 areas of growth of school age school students per SA2, including data schema	Existing residential suburb and new residential suburb layer on child density map	Agreed set of 16 typologies

Phase 1 - Understanding demographic and property data in Canberra

	1.5 IDENTIFYING AREAS OF GROWTH IN SCHOOL CHILDREN (GROWTH AREAS)	1.6 IDENTIFYING AREAS WITHIN CLOSE PROXIMITY TO SCHOOLS WITHIN GROWTH AREAS	1.7 MAPPING MEDIAN APARTMENT AND HOUSE PRICES IN GROWTH AREAS	1.8 MAPPING RECENT DEVELOPMENT APPLICATIONS
KEY QUESTIONS	What proportion of housing is within each typology within the growth areas?	Where are the locations that are within close proximity to schools?	What is the median dwelling price in the growth areas?	Where have recent developments occurred within the growth areas?
GEOGRAPHY	Top 30 growth areas by SA2	Top 30 growth areas by SA2	Top 30 growth areas by SA2	Top 30 growth areas by SA2
TIMEFRAME	2016, change measured from 2011 to 2016	2019	2012-2019	2010-2019
DATA SOURCES	ABS Census at SA2	ACT school locations from ACT MAPI	ACT Treasury, median dwelling prices per SA2 by unit and house from 2012-2019	EPSDD Development applications, ACT Education Compiled development data
OUTPUT	Typology map and excel spreadsheet	School locations map	Median dwelling price map and spreadsheet by unit and house from 2012 - 2019	Development application map - documenting year of DA and typology

	Phase 1 - Understanding demographic and property data in Canberra	*Phase 2 - Residential site Selection*	*Phase 3 - Residential site Analysis*
	1.9 MAPPING SOCIOECONOMIC STATUS 	**2.1 RESIDENTIAL SITE SELECTION**	**3.1 ANALYSING SCHOOL ENROLMENT CHANGE IN RESIDENTIAL SITES**
KEY QUESTIONS	What is the relative advantage and disadvantage across the growth areas?	What are the areas of interest that: show high school student growth, showcase a breadth of medium - high density typologies and represent a breadth of areas across ACT?	What change has occurred in school enrolment in the time that the residential site has opened?
GEOGRAPHY	Top 30 growth areas by SA2	» Selection of 13 areas (SA2) of interest with workshop participants on 25 October 2019 » Selection of 16 SA1 with ACT Education » Selection of residential sites with ACT Education	Residential sites
TIMEFRAME	2016	2005 - 2017	2005 - 2020
DATA SOURCES	ABS Census - Socio-Economic Indexes for Areas (SEIFA) Index of Relative Socio-economic Advantage and Disadvantage (IRSAD)	Workshop participants, EPSDD Development Application Data and ACT Education Compiled development data	School enrolment data, Analysis of aerial imagery, Colliers development pipeline data (2017-2019), ACT Education Compiled development data
OUTPUT	SEIFA Map	13 Areas of Interest, 19 SA1, 15 residential sites	Data schema and analysis

Phase 3 - Residential site Analysis

Phase 4 - Factors that influence school enrolment

	3.2 REVIEWING THE ATTRIBUTES OF EACH RESIDENTIAL SITE	**4.1 PERSPECTIVES ON FACTORS THAT INFLUENCE SCHOOL ENROLMENT DATA**
KEY QUESTIONS	What are the attributes of each Residential site?	
GEOGRAPHY	Residential sites	In addition to the quantitative analysis, we undertook a series of semi-structured interviews with built environment professionals across the ACT from Property Council of Australia, Government Architects Office and prominent property developers to gain perspectives on factors that may have influenced school enrolment data
TIMEFRAME	2016 Census Data	
DATA SOURCES	ABS Census 2016, median house/unit price	
OUTPUT	Data schema and analysis	

3.2.1 PHASE 1: UNDERSTANDING DEMOGRAPHIC AND PROPERTY DATA IN CANBERRA

The purpose of Phase 1 was to understand the policy context for urban growth in Canberra and to provide a base understanding of school aged children growth, housing and household typologies and other attributes to input into the selection of Residential sites for further analysis.

There were eight components to this phase:

1. Reviewing existing documentation;

2. Identifying areas of high growth in school children (growth areas);

3. Aligning growth areas with urban existing residential suburb and new residential suburb classification;

4. Agreeing a set of typologies with housing type and house size;

5. Determining dwelling typology make up in growth areas;

6. Identifying areas within close proximity to schools within growth areas;

7. Mapping average house prices in growth areas from 2011; and

8. Mapping recent development applications.

Figure 2 School locations in the ACT

Source: Arup, data from ACTMAPi

Figure 3 School student Growth by SA2 from 2010 - 2019

Source: Arup, data from ACT Education School Student Census

Figure 4 Existing residential suburb and new residential suburb classification

Source: Arup, data from ACTMAPi, classification from ACT Education School Student Census

Figure 5 Dwelling typology

Source: Arup, data from ABS Census 2016

Figure 6 Median House Price by SA2

Source: Arup, data from ACTMAPi, price data from Access Canberra property sales data, cleaned by ACT Treasury

Figure 7 Median Unit Price by SA2

Source: Arup, data from ACTMAPi, price data from Access Canberra property sales data, cleaned by ACT Treasury

Figure 8 SEIFA Index of relative socio-economic advantage and disadvantage

Source: Arup, data from ACTMAPi, data from ABS Census 2016

Figure 9 SEIFA Index of education and occupation

Source: Arup, data from ACTMAPi, data from ABS Census 2016

3.2.2 PHASE 2: RESIDENTIAL SITE SELECTION

The analysis of the growth areas was presented in a workshop was held on 25th October 2019 with participants from ACT Education, ANU and EPSDD. The workshop was used to define areas of high growth and high development activity based on stakeholder knowledge. 13 areas of interest (SA2) were selected for further study and analysis. The 13 areas of interest are shown in the map adjacent.

The features of each of the 13 areas of interests (SA2) is presented in the following spreads.

Figure 10 Selected SA2s from Site Selection workshop

Source: Arup, data from ACTMAPi, data from ABS Census 2016

Figure 11 Summary of characteristics of selected SA2s

Selected SA2	School-age population growth from 2010-2019	Median unit price 2012-2019		Median house price 2012-2019		Existing or new residential suburb	Dwelling tenure in 2016	
Scale	at SA2	at SA2	ACT	at SA2	ACT	at SA2	at SA2	
Data source	ACT Education School Census Data	ACT Treasury Access Canberra sales data				School Census Data	ABS 2016 Census Data	
Belconnen	208	$388,900	$427,000	$465,000	$810,000	Existing	67.9%	29.2%
Campbell	151	$493,000	$427,000	$980,000	$810,000	Existing	30.0%	67.4%
Casey	1224	$346,000	$427,000	$535,000	$810,000	New	26.0%	72.3%
Franklin	977	$372,000	$427,000	$613,750	$810,000	Existing	42.1%	55.6%
Greenway*	70	$390,000	$427,000	$512,500	$810,000	Existing	49.9%	48.3%
Kingston	197	$455,000	$427,000	$1,500,000	$810,000	Existing	58.4%	30.2%
Lawson	200	$449,900	$427,000	$725,000	$810,000	New	31.6%	68.4%
Lyneham	218	$372,900	$427,000	$750,000	$810,000	Existing	53.8%	41.8%
Lyons	166	$482,903	$427,000	$665,000	$810,000	Existing	46.0%	49.3%
Narrabundah	225	$432,500	$427,000	$780,000	$810,000	Existing	41.8%	55.1%
Phillip	176	$370,000	$427,000	$480,500	$810,000	Existing	59.3%	38.1%
Watson	347	$359,900	$427,000	$615,000	$810,000	Existing	40.4%	57.2%
Wright	470	$325,000	$427,000	$668,500	$810,000	New	21.0%	76.5%

*Selected as a development area with different environmental factors to the other selected SA2s

Unit - refers to apartments and townhouses
House - refers to detached dwellings

Figure 12 Summary of characteristics of selected SA2s (continued)

SEIFA IRSAD distribution according to decile - number of SA1s per SA2 per decile in 2016											Dwelling typology at SA2 in 2016
Selected SA2	1	2	3	4	5	6	7	8	9	10	
Data source	ABS 2016 Census Data										ABS 2016 Census Data
Belconnen	0	1	1	1	0	1	1	2	3	1	
Campbell	0	0	0	0	0	0	0	0	1	7	
Casey	0	0	0	0	0	0	1	2	3	9	
Franklin	0	0	0	0	0	1	1	4	8	7	
Greenway*	0	0	0	0	0	0	0	2	2	1	
Kingston	0	0	0	0	0	1	0	1	0	8	
Lawson	0	0	0	0	0	0	0	1	0	1	
Lyneham	0	0	0	0	0	2	2	5	2	2	
Lyons	0	0	0	1	0	0	2	2	1	0	
Narrabundah	0	0	2	0	0	1	4	2	3	5	
Phillip	0	0	1	0	0	0	1	2	4	0	
Watson	0	0	0	0	0	2	0	4	6	3	
Wright	0	0	0	0	0	0	0	0	0	8	

■ Detached dwelling ■ Semi-detached dwelling
■ Apartments up to 3 storeys ■ Apartments 4+ storeys

From the 13 'areas of interest', 19 SA1s were selected to help identify the residential sites. The SA1s were selected based on the following:

1. High levels of growth across the whole timeframe

2. Recent high development activity

3. High development activity across the whole timeframe

4. A breadth of characteristics, i.e. socio-economic status

Further analysis was undertaken to inform the SA1 selection including:

» **School enrolment data** Geocoded school student census information within selected Growth Areas broken down into SA1s to determine areas of high school student growth

» **Analysis of aerial imagery** Analysis of aerial imagery across the timeframe of 2010-2019 within the Growth Areas to determine areas of high development activity

» **Colliers Development Pipeline data** Geocoded development information (developments of 10+ dwellings only) from 2017-2019 to determine areas of recent high development activity

The following SA1s were selected for further analysis:

8100212 Belconnen
8101803 Lawson
8101804 Lawson
8103611 Casey
8103615 Casey
8106103 Watson
8106115 Watson
8113101 Kingston
8113106 Kingston
8110912 Philip
8113905 Wright
8113906 Wright
8106712 Narrabundah
8106707 Narrabundah
8105711 Lyneham
8112402 Campbell
8112401 Campbell
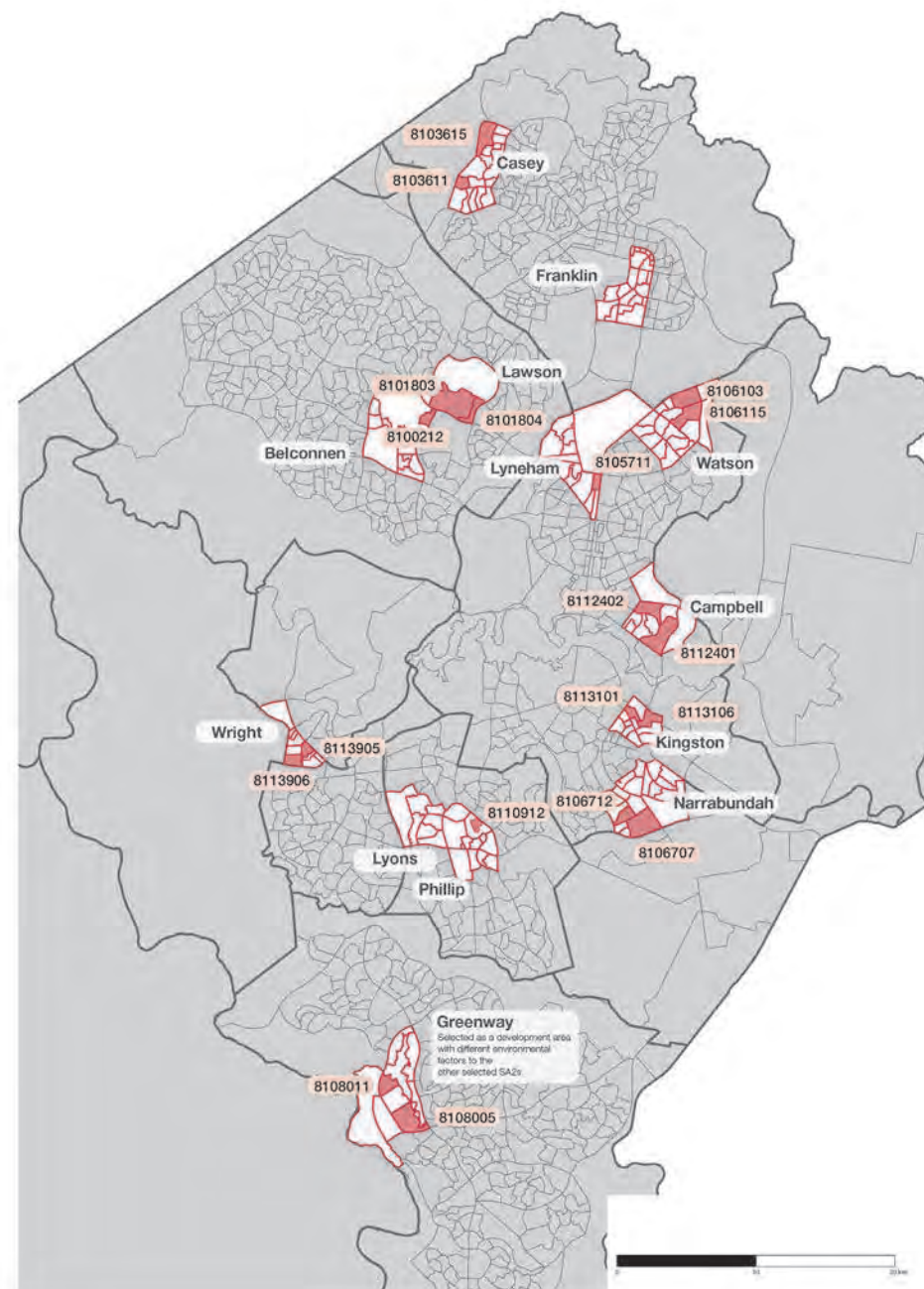8108005 Greenway
8108011 Greenway

Figure 13 Selected SA1s

Source: Arup, data from ACTMAPi, data from ABS Census 2016

From the 19 selected SA1s, analysis was undertaken on available development application data to select a range of residential sites for further in-depth analysis.

Development application data from EPSDD was reviewed, and ACT Education undertook analysis on Development Application and Construction Certificate data to inform the residential site selection. A total of 10 sites were selected from the selected SA1s. An additional five sites were selected from outside the 19 selected SA1s. These were considered as appropriate residential sites to inform the analysis.

It is noted that the supporting narrative and demographic information for these five sites were reviewed at an SA2 level.

The following residential sites were selected for in-depth analysis:

1. Magnolia Mews** - Narrabundah
2. Space The Residence** - Turner
3. Space2 The Residence** - Turner
4. Axis Apartments - Lyneham
5. Artique - Campbell
6. Allure* - Casey
7. Quayside - Kingston
8. Ambiente - Wright
9. Watermark - Greenway
10. Atelier - Kingston
11. Wayfarer* - Belconnen
12. Evolure - Lawson
13. The Quay - Greenway
14. Mizura Villas - Lawson
15. Idalia - Phillip

*Additional site

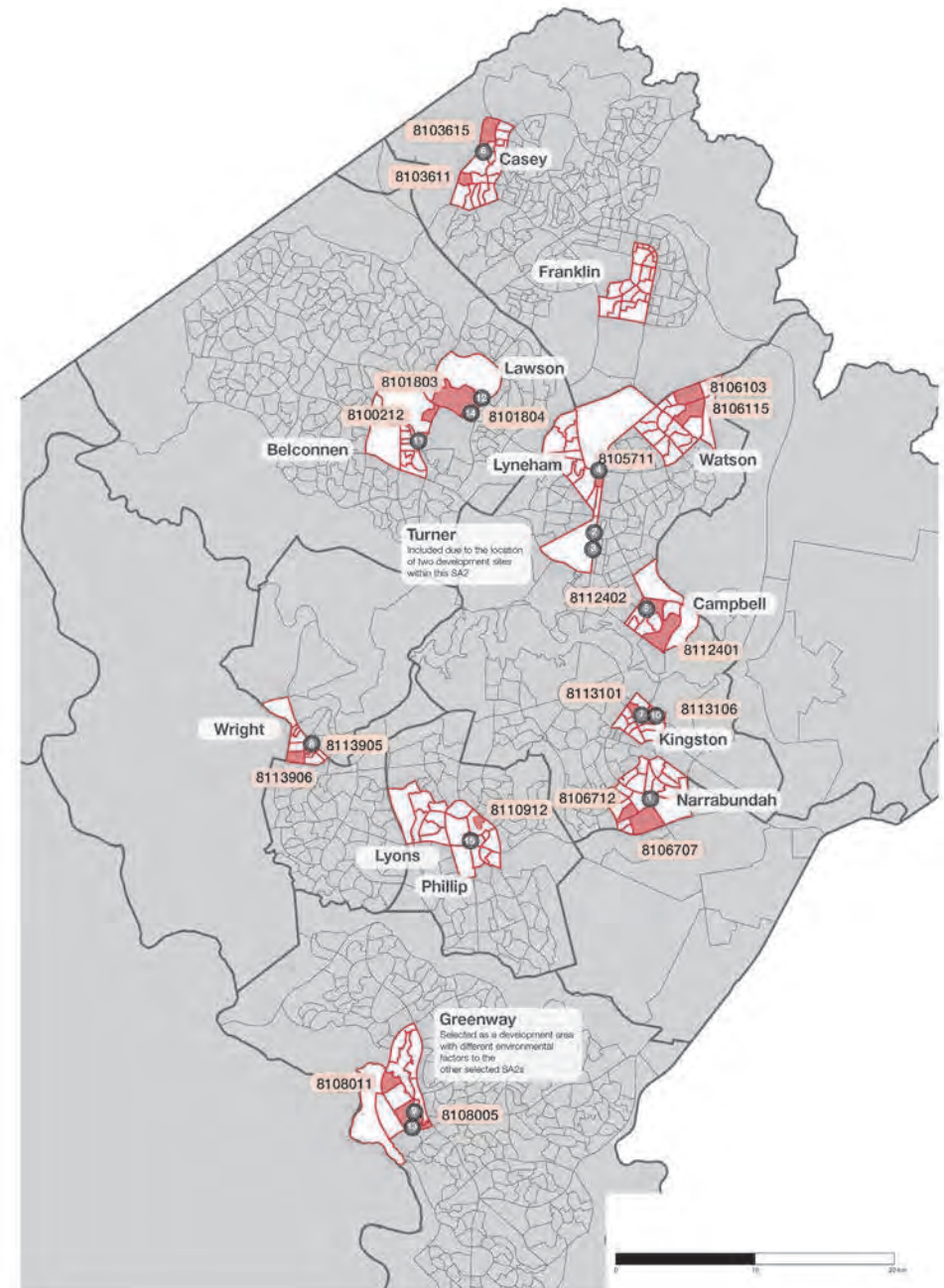**Additional site from outside the timeframe of 2010-2019

Figure 14 Residential Site Locations

Source: Arup, data from ACTMAPi, data from ABS Census 2016, data from EPSDD Development application data

3.2.3 PHASE 3: RESIDENTIAL SITE ANALYSIS

With the base analysis and mapping inputs, the core component of this phase is data analysis to understand the change in school aged school students across years following the introduction of the new medium-high density developments.

In addition to the quantitative analysis, the following attributes for each site were reviewed:

» Population (at SA1/SA2);

» Socio economic status (at SA1/SA2);

» School student language spoken at home (at SA1/SA2);

» Proximity to services such as public transport, community facilities, key employment areas;

» Proximity to school;

» Housing tenure (at SA1/SA2); and

» Median house and unit price for development typology.

The residential site analysis has been undertaken as a limited sample analysis (including 15 residential sites). Observations are noted within the analysis, however clear correlations between the data were not able to be determined due to the limited sample size. This sample analysis provides a testing of an approach, and outlines suggestions for further analysis.

3.2.4 PHASE 4: PERSPECTIVES ON FACTORS THAT INFLUENCE SCHOOL ENROLMENT DATA

The purpose of this phase is to complement the quantitative data analysis with qualitative data collected from interviews with representatives within the property industry. This phase includes reviewing the factors that have influenced housing location and choice for families with school aged children based on:

1. Desktop research on journal papers; and

2. Semi structured interviews with developers, real estate agents and organisations such as the PCA ACT Chapter.

The results of this analysis are presented within Chapter 1 of this report.

3.2.5 PHASE 5: LEARNING FROM OTHER JURISDICTIONS

In addition to Phase 4, the purpose of this phase is to provide further context on the potential shift in school student populations by reviewing policy and planning, qualitative data anlysis data collected from interviews with representatives within the schools planning and a sample quantitative analysis of three case study sites (SA2). Three areas were selected for this review: Sydney; Brisbane and Newcastle.

4.4 OVERALL DATA SCHEMA

We have presented the data analysis and how each part of the analysis comes together in the data schema in Appendix 2.

4. Residential Sites Analysis and Overall Findings

4.1 STRUCTURE AND ASSUMPTIONS

The findings of the report are structured accordingly:

1.   Summary of residential sites;

2.   Observations on residential sites; and

3.   Analysis on the relationship of school student population generation to key factors.

The analysis of residential sites is accompanied by supporting narrative and demographic data in order to place the site within its immediate context. This includes:

»   Dwelling typologies in 2011 and 2016 according to the ABS Census;

»   Housing tenure split in 2016 according to the ABS Census;

»   School student population at SA1 and SA2 level according to the School student Census;

»   Median dwelling price at site and SA1 level;

»   Language spoken at home according to the School Student Census; and

»   Socio-economic status: SEIFA-IEO and IHAD quartiles at SA1 level in 2016 according to the ABS Census.

For four sites that fell beyond the original 19 SA1 list, the supporting narrative and demographic data was analysed at an SA2 level, with the exception of socio-economic status.

An overall 'ratio of occupation' of school students at each residential site has been formulated and presented based on the proportion of school students at each site to the total number of dwellings at site. This ratio allows for an overall summary of the school student populations at each site.

It is noted that there are a number of factors that may influence the presence of school student aged children in different dwelling typologies.

An overall summary of the residential site analysis is shown overleaf.

Figure 15 Overall site analysis summary

Site	Suburb	District	Year of completion	Dwelling structure	Number of dwellings	Bedroom mix (%)				School student population per year (total)											Median ratio of school student occupation
						1	2	3	4	'10	'11	'12	'13	'14	'15	'16	'17	'18	'19	'20	
Data source	Development application data	Development application data	Certificate of Occupancy (COO)	Development application data collected by EPSDD and collated and summarised by ACT Education						ACT Education School Student Census Data											Calculation
1 Magnolia Mews	Narrabundah	CCS	2005	Apartments and townhouses	32	6%	63%	31%	0%	2	7	9	4	3	4	2	4	10	10	8	13%
2 Space	Turner	CCN	2006-7	Apartments and townhouses	90	4%	86%	10%	0%	2	1	2	1	8	3	3	1	5	5	4	3%
3 Space2	Turner	CCN	2007-8	Apartments and townhouses	74	9%	69%	22%	0%	2	3	5	9	5	4	3	8	7	7	8	7%
4 Axis	Lyneham	CCN	2011	Apartments and townhouses	349	75%	19%	6%	0%	0	0	4	10	18	19	27	34	46	33	54	8%
5 Artique	Campbell	CCN	2011	Apartments 1-3 storeys	12	50%	33%	17%	0%	0	0	0	1	4	5	4	4	5	6	6	33%
6 Allure	Casey	GUN	2012	Townhouses	10	0%	0%	90%	10%	0	0	0	0	1	2	2	3	6	4	4	25%
7 Quayside	Kingston	CCS	2014	Apartments 4+ storeys	100	79%	15%	6%	0%	0	0	0	0	0	0	5	4	4	7	5	5%
8 Ambiente	Wright	MOL	2016	Apartments and townhouses	175	27%	65%	7%	1%	0	0	0	0	0	0	2	7	14	17	28	9%
9 Watermark	Greenway	TUG	2016	Apartments and townhouses	95	43%	27%	27%	2%	0	0	0	0	0	0	0	12	16	15	13	15%
10 Atelier	Kingston	CCS	2016	Apartments 4+ storeys	73	38%	55%	7%	0%	0	0	0	0	0	0	0	1	3	3	5	4%
11 Wayfarer	Belconnen	BEL	2016	Apartments 4+ storeys	331	49%	44%	7%	0%	0	0	0	0	0	0	0	0	7	9	3	2%
12 Evolure	Lawson	BEL	2017	Apartments and townhouses	48	31%	31%	27%	10%	0	0	0	0	0	0	0	0	7	11	7	15%
13 The Quay	Greenway	TUG	2017	Apartments 4+ storeys	73	14%	73%	14%	0%	0	0	0	0	0	0	0	0	9	10	7	12%
14 Mizura Villas	Lawson	BEL	2017	Townhouses	59	8%	53%	39%	0%	0	0	0	0	0	0	0	0	4	6	6	10%
15 Idalia	Phillip	WOD	2017	Apartments 1-3 storeys	99	26%	74%	0%	0%	0	0	0	0	0	0	0	0	0	2	3	2%
									Total	6	11	17	35	39	37	48	78	143	145	161	

Existing residential suburb ■ New residential suburb

| Notes | | Year of completion is based on Certificate of Occupancy, not occupancy itself. | Private non-detached dwellings are assumed. | Number of bedrooms are dedicated. Data for study rooms is not provided. | Both public and non-public enrolments are included. Median ratio of occupation is 9% across the study period. |

Below median   At median   Above median

Figure 15 Overall site analysis summary (continued)

Site	Tenure at SA1		Median price at site									Language spoken at home			Socio-economic status at SA1	
	Rented	Owned	2012	2013	2014	2015	2016	2017	2018	2019	Overall	First	Second	Third	IEO	IHAD
Data Source	ABS Census 2016		ACT Treasury Access Canberra sales data from 2012-2019									ACT Education School Student Census Data			ABS Census 2016	
1 Magnolia Mews	41.8%	55.1%	$668,000	$601,000	$-	$-	$470,000	$790,500	$580,000	$-	$549,000	English 83%	Indo-Aryan 3%	French 2%	10	4
2 Space	63.0%	34.1%	$-	$655,000	$603,000	$562,500	$600,000	$735,000	$891,000	$738,000	$645,000	English 69%	Chinese 7%	Indo-Aryan 4%	10	3
3 Space2	63.0%	34.1%	$-	$635,000	$810,000	$640,000	$683,000	$705,500	$782,500	$675,000	$671,000	English 69%	Chinese 7%	Indo-Aryan 4%	10	3
4 Axis Apartments	75.0%	23.0%	$417,900	$449,800	$415,500	$390,000	$390,000	$415,000	$397,500	$415,000	$415,000	English 52%	Indo-Aryan 9%	Chinese 6%	10	3
5 Artique	48.0%	48.0%	$469,000	$-	$-	$-	$-	$560,000	$-	$-	$514,500	English 91%	Chinese 3%	Greek 1%	10	4
6 Allure	26.0%	73.3%	$502,500	$485,000	$530,000	$510,000	$499,250	$582,500	$570,000	$-	$508,500	English 79%	Indo-Aryan 7%	Chinese 3%	10	4
7 Quayside	61.0%	39.0%	$-	$-	$430,450	$440,000	$767,030	$425,000	$460,000	$415,000	$427,725	English 77%	Japanese 4%	Indo-Aryan 3%	10	3
8 Ambiente	28.0%	72.0%	See note									English 69%	Indo-Aryan 13%	Pacific Austronesian 3%	10	4
9 Watermark	21.0%	79.0%	$-	$-	$-	$-	$391,500	$422,000	$395,000	$420,000	$407,500	English 65%	Indo-Aryan 11%	Dravidian 9%	9	4
10** Atelier	58.4%	40.2%	$-	$-	$-	$-	$590,578	$489,900	$799,900	$-	$590,578	English 88%	Middle Eastern 3%	Iberian 2%	9	-
11** Wayfarer	67.9%	29.2%	$-	$-	$-	$-	$-	$390,000	$415,450	$402,500	$393,000	English 54%	Indo-Aryan 9%	Southeast Asian Austronesian 6%	10	-
12 Evolure	62.5%	37.5%	$-	$-	$-	$-	$-	$374,900	$489,008	$575,000	$489,008	English 38%	Indo-Aryan 14%	Dravidian 13%	9	4
13 The Quay	21.0%	79.0%	See note									English 65%	Indo-Aryan 11%	Dravidian 9%	9	4
14 Mizura Villas	18.4%	57.9%	$-	$-	$-	$-	$-	$-	$529,000	$-	$529,000	English 51%	Chinese 15%	Indo-Aryan 12%	10	4
15 Idalia	66.0%	32.0%	$-	$-	$-	$-	$-	$-	$434,900	$-	$434,900	English 39%	Southeast Asian Austronesian 16%	Chinese 11%	10	3
Notes **no information at SA1; SA2-level data was used			NB There was a lack of data for Ambiente and The Quay due to data gaps for new residential suburb transactions, particularly multi-unit sites from Access Canberra. ▢ Lowest price ▢ Highest price									Categorised according to narrow groups 2-digit classification in the ABS Australian Standard Classification of Languages			IEO - Index of Education and Occupation IHAD - Experimental Index of Household Advantage and Disadvantage	

4.2 SUMMARY OF RESIDENTIAL SITES

4.2.1 AGE OF RESIDENTIAL SITE

Majority of the residential sites were delivered between 2016-2017. Sites 1-7 were delivered between 2005-2014, with developments completed in 2005, around 2006-2008, 2011, 2012 and 2014. Magnolia Mews (Site 1) is the oldest development, completed in 2005. Idalia (Site 15) is the newest development, completed in December 2017.

It is noted that school student population data is documented for 2010 - 2020 only.

Figure 16 Year of completion based on Certificate of Occupancy of residential site

Pre-2010	2011	2012	2013	2014	2015	2016	2017
Site 1	Site 4	Site 6		Site 7		Site 8	Site 12
Site 2	Site 5					Site 9	Site 13
Site 3						Site 10	Site 14
						Site 11	Site 15

Source: Development application data from EPSDD, Collated by ACT Education

4.2.2 DWELLING TYPOLOGY

The residential sites vary in terms of dwelling typology. Using the 16 dwelling typologies from the ABS Census, the residential sites are categorised according to the dwelling structure and number of bedrooms. Due to the availability of detailed data on the residential sites, this analysis categorises the dwelling typologies based on the separate structure and number of bedrooms.

Across the 15 residential sites, there were four types of dwelling structure: semi-attached or townhouses, apartments of up to three storeys, apartments of four or more storeys and a combination of apartments and townhouses. Seven of the residential sites were comprised only of apartments, two were only townhouses and six were a combination of apartments and townhouses. A total of 13 residential sites had some form of apartments or residential flat buildings within their sites.

Three had residential flat buildings of up to three storeys; the rest were four or more storeys, with the greatest number of storeys at 26 storeys, 22 of which are occupiable (Wayfarer (Site 11)). This is a notable outlier from the rest of the sites; the second tallest site is Axis (Site 4), whose built form goes up to 11 storeys. The developments with only townhouses had heights of up to three storeys. Combination sites were more likely to have a range of heights depending on the structure: townhouses are usually lower in height than residential flat buildings containing apartments.

Figure 17 Proportion of residential site comprised of multi-bedroom dwellings

0-10%	11-20%	21-30%	31-40%	41-50%	51-60%	61-70%	71-80%	81-90%	91-100%
		Site 7 – 21%		Site 5 – 50%	Site 11 – 51%	Site 10 – 62%	Site 8 – 73%		Site 3 – 91%
		Site 4 – 25%			Site 9 – 57%	Site 12 – 69%	Site 13 – 73%		Site 14 – 92%
							Site 15 – 74%		Site 1 – 94%
									Site 2 – 96%
									Site 6 - 100%

Source: Development application data from EPSDD, Collated by ACT Education

In terms of total number dwellings, the residential sites range from 12 to 349 dwellings. The median development size by number of dwellings is 74. Allure (Site 6) and Artique (Site 5) are the smallest developments with 12 dwellings and Axis (Site 4) is the largest development with 349 dwellings. Most residential sites have between 51-100 dwellings.

Of the 15 residential sites, 12 are comprised of mostly multi-bedroom dwellings; that is more than 50% of the residential site is made up of multi-bedroom (at least 2 bedrooms) dwellings, as summarised in Figure 17 on the previous page. Artique (Site 5) is comprised of exactly 50% multi-bedroom dwellings and 50% 1-bedroom dwellings. Axis and Quayside (Sites 4 and 7) have the lowest proportion of multi-bedroom dwellings, at 25% and 21%, respectively. Only one site, Allure (Site 6) is comprised of 100% multi-bedroom dwellings, a mix of 3- and 4- bedroom dwellings.

The residential sites exhibit a range of number of bedrooms per dwelling. Most residential sites, 11 of 15, have up to 3-bedroom dwellings. One residential site, Idalia (Site 15) has up to 2-bedroom dwellings. Four sites, Allure (Site 6), Ambiente (Site 8), Watermark (Site 9), Evolure (Site 12) have up to 4-bedroom dwellings. Three of these sites were delivered between 2016 and 2017. Idalia, the only site with only 1- and 2-bedroom dwellings, was completed in late 2017. It appears there is a range of housing typologies being delivered; however there is little medium-density development that is solely focused on multi-bedroom dwellings.

The ABS references the Canadian National Occupancy Standard to indicate housing suitability. It is recognised that there is no single standard measure for housing suitability, however, the Standards seek to be an objective measure of shelter 'need' (within Canada and other countries such as Australia), and the adequacy of a given dwelling accommodation for its occupying household.. Canada's National Occupancy Standards that apply to households with children highlights that units with three bedrooms or more are suitable, with units with two bedrooms or two bedrooms with study or other additional room is possibly suitable. The analysis in Figure 17 presents the proportions of residential sites that are 'possibly suitable' and 'suitable' for households with children.

Further analysis is suggested to understand if these standards reflect the lifestyles and choices of families in ACT.

4.2.3 EXISTING RESIDENTIAL SUBURB AND NEW RESIDENTIAL SUBURB CLASSIFICATION

Of the 15 residential sites, 11 were classified as residential intensification or existing residential suburb sites and the remaining four were classified as new residential suburb sites. Only one new residential suburb site was delivered in the first half of the study period: Allure (Site 6) in Casey, delivered in 2012. It is also the smallest residential site in the study, with 10 dwellings and the only development without single-bedroom dwellings. The other three new residential suburb sites, Ambiente (Site 8), Evolure (Site 12) and Mizura Villas (Site 14), were all delivered between 2016-2017. These sites have more than 50% multi-bedroom dwellings. Two of the sites are comprised of a mix of apartments and townhouses, Ambiente (Site 8) and Evolure (Site 12), while the other two are townhouses only.

4.2.4 HOUSING TENURE

Housing tenure was collected at an SA1 or SA2 level from ABS Census. The specific tenure of each school student recorded at each residential site was not included in the data and in the analysis.

Overall, across the 15 residential sites it was observed that new residential suburb sites are located in areas that tend to have higher home ownership rates and existing residential suburb sites are located in areas that tend to have higher rates of rented dwellings. Of the four new residential suburb sites, three had higher rates of home ownership.

There were a few exceptions observed across the sites: Artique (Site 5) in Campbell was located in an area with almost even split of tenure; Magnolia Mews (Site 1), Watermark (Site 9) and The Quay (Site 13) in Greenway were located in an area with majority of dwelling stock owned. Evolure (Site 12), in Lawson was located in an area with higher proportion of renters, despite being a new residential suburb site.

4.2.5 MEDIAN PRICE

The overall ACT median unit price is $427,000 and the overall median ACT house price is $810,000. The median prices at site ranged from $393,000 to $671,000. Two sites, Ambiente (Site 8) and The Quay (Site 13) had no sales data across the study period.

Figure 18 Median price summary

Site	SA1/SA2 median	Site median	ACT overall median	ACT unit median	ACT house median
8 Ambiente*	$-	$-	$500,000	$427,000	$810,000
13 The Quay*	$359,000	$-	$500,000	$427,000	$810,000
11 Wayfarer	$401,000	$393,000	$500,000	$427,000	$810,000
9 Watermark	$359,000	$407,500	$500,000	$427,000	$810,000
4 Axis Apartments	$372,900	$415,000	$500,000	$427,000	$810,000
7 Quayside	$635,000	$427,725	$500,000	$427,000	$810,000
15 Idalia	$384,950	$434,900	$500,000	$427,000	$810,000
12 Evolure	$449,950	$489,008	$500,000	$427,000	$810,000
6 Allure	$390,000	$508,500	$500,000	$427,000	$810,000
5 Artique	$325,000	$514,500	$500,000	$427,000	$810,000
14 Mizura Villas	$449,000	$529,000	$500,000	$427,000	$810,000
1 Magnolia Mews	$451,250	$549,000	$500,000	$427,000	$810,000
10 Atelier	$562,500	$590,578	$500,000	$427,000	$810,000
2 Space	$478,000	$645,000	$500,000	$427,000	$810,000
3 Space2	$478,000	$671,000	$500,000	$427,000	$810,000

*Price data unavailable due to data gaps in dataset from Access Canberra

Source: Access Canberra price data from 2012-2019, cleaned by ACT Treasury

4.2.6 SOCIO-ECONOMIC STATUS

Socio-economic status was measured across the 15 sites using Socio-Economic Indexes for Areas – Index of Education and Occupation (SEIFA-IEO) and the Experimental Index of Household Advantage and Disadvantage (IHAD). All 15 sites had a SEIFA-IEO index of 9-10, signaling a highly educated population within the surrounding areas of the sites. Seven of the sites had majority of the households in the corresponding SA1 or SA2 in the fourth IHAD quartile. Another six of the sites had majority of the households in the corresponding SA1 or SA2 in the third quartile. Evolure (Site 12), had one-third of the households within the corresponding SA1 within the second, third and fourth quartiles. Wayfarer (Site 11) does not have an IHAD index for 2016.

Figure 19 Socio-economic data at SA1

Site	SEIFA-IEO	IHAD-1	IHAD-2	IHAD-3	IHAD-4
1	10	20.6	20	20.6	38.7
2	10	19.1	15.1	34	31.7
3	10	19.1	15.1	34	31.7
4	10	11.4	22.3	41.1	25.2
5	10	19.4	25.3	27.4	27.8
6	10	4.9	18.26	26.71	50.13
7	10	3.2	15.7	41.1	40
8	10	3.9	22.1	24.9	49.2
9	9	4.8	23.8	33.3	38.1
10*	9	-	-	-	-
11*	10	-	-	-	-
12	9	0	33.3	33.3	33.3
13	9	4.8	23.8	33.3	38.1
14	10	9.7	29	0	61.3
15	10	2.9	26.8	47	23.3

*No data available from ABS Census
Source: ABS Census 2016

4.2.7 LANGUAGE SPOKEN AT HOME

Languages spoken at home were collated according to the 2-digit narrow group classification in the ABS Australian Standard Classification of Languages. Across the 15 residential sites, all corresponding SA1s and SA2s had English as their top language. 13 of the Sites were located in areas wherein 50% of school student households spoke English at home. Evolure (Site 12) and Idalia (Site 15) were the only Sites that presented otherwise; 38% of households in the area surrounding Evolure (Site 12) and 39% of households in the area surrounding Idalia (Site 15) spoke English at home. Aside from English, Indo-Aryan (languages such as Bengali, Gujarati, Hindi, etc.) and Chinese (such as Cantonese, Mandarin) were the two most common non-English languages spoken at home, appearing as the 2nd most common in 12 parent SA1s and SA2s, and 3rd common in 7 parent SA1s and SA2s.

There appeared to be greater diversity in languages spoken at home in sites delivered after 2014. Among Sites 8-15, the second most prevalent language in all Sites represented more than 10% in seven of the Sites. With Sites 1-7, the second most prevalent language represented a proportion of between 3-9%.

Figure 20 School student languages at site respective SA1s

Site	Languages spoken at home		
	First	**Second**	**Third**
1 Magnolia Mews	English 83%	Indo-Aryan 3%	French 2%
2 Space	English 69%	Chinese 7%	Indo-Aryan 4%
3 Space2	English 69%	Chinese 7%	Indo-Aryan 4%
4 Axis Apartments	English 52%	Indo-Aryan 9%	Chinese 6%
5 Artique	English 91%	Chinese 3%	Greek 1%
6 Allure	English 79%	Indo-Aryan 7%	Chinese 3%
7 Quayside	English 77%	Japanese 4%	Indo-Aryan 3%
8 Ambiente	English 69%	Indo-Aryan 13%	Pacific Austronesian 3%
9 Watermark	English 65%	Indo-Aryan 11%	Dravidian 9%
10** Atelier	English 88%	Middle Eastern 3%	Iberian 2%
11** Wayfarer	English 54%	Indo-Aryan 9%	Southeast Asian Austronesian 6%
12 Evolure	English 38%	Indo-Aryan 14%	Dravidian 13%
13 The Quay	English 65%	Indo-Aryan 11%	Dravidian 9%
14 Mizura Villas	English 51%	Chinese 15%	Indo-Aryan 12%
15 Idalia	English 39%	Southeast Asian Austronesian 16%	Chinese 11%

Source: ACT Education School Student Census 2010-2019

4.3 FINDINGS

A summary of the high level observations across the 15 residential sites are noted below and further discussed in this section:

» Overall, the analysis showed that medium and high density developments yield school aged children at greater magnitudes, within shorter time frames;

» Multiple forces are shifting housing preferences for households with children. Based on the school student population at the residential sites, there does not appear to be a clear relationship between one specific dwelling typology – both dwelling structure and bedroom mix – to the school student population. All sites, no matter what the dwelling typology, generated a population of school students;

» There appeared to be some relationship between smaller developments and higher median school student occupation ratio, however some residential sites with higher number of dwellings still exhibited high median school student occupation ratio;

» The analysis of the 15 residential sites showed high variation in school age school student populations across developments with different proportions of multi-bedroom units;

» More sites with higher ratios of occupation were within the median dwelling price range of $400,000 to $550,000. Sites with a higher median dwelling price had lower ratios of occupation;

» It was found that younger student aged populations were observed in the residential sites with a lower proportion of older student aged populations (high school or college) wthin the residential sites' school student population;

» There appeared to be some lag from residential site completion before school aged populations were observed;

» Older developments (before 2010) showed fluctuation in school aged school student population. Further finer grain analysis is suggested understand if families with school students may be choosing to stay in sites or if they are seeking to move to response to other factors;

» Newer residential sites showed lower proportions of students households speaking English at home than older residential sites;

» Developments in more established areas showed a more even distribution of household advantage and disadvantage in the wider area;

» Across the 15 residential sites we observed a change in the proportion of school student population from a residential site compared to the school student population in the SA1 and SA2 over time. In most cases, this showed that the school student population in the surrounding area was increasing; and

» For the new residential suburb sites delivered within 2016-2017, increase in school student population at the residential site was also reflected in their corresponding SA1s.

Overall, across the analysis of the 15 residential sites, it was found that multiple factors may influence school student populations over the time of the Study. From the analysis, it showed that there is no singular factor that determines a yield of a school student population, as there was not a clear relationship between any one factor and school student population. The sample of residential sites differed across qualities of typology, price and location.

A summary of the school student population for each year for each residential site is presented in Figure 21.

4.3.1 OVERALL INCREASE IN MAGNITUDE IN SCHOOL AGED CHILDREN

It was found that overall, medium and high-density developments yielded school aged children. Total school student aged children increased after development completion, in some developments for example Axis Apartments showed that from 2011, there was a total growth of student aged students of 54 to 2019. For Ambiente site, there was a total growth of student aged students from 0 in 2015 to 28 in 2019.

The data shows that the magnitude of new dwellings, and the rate of new dwellings into an area from higher density development will generate school aged children, and thus demand for school infrastructure within short amounts of time.

Figure 21 Total school student population yearly, by residential site

Source: ACT Education School Student Census 2010-2019

TOTAL STUDENT POPULATION PER YEAR

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
1. Magnolia Mews	2	7	9	4	3	4	2	4	10	10	8
2. Space The Residence	2	1	2	1	8	3	3	1	5	5	4
3. Space2 The Residence	2	3	5	9	5	4	3	8	7	7	8
4. Axis Apartments	0	0	4	10	18	19	27	34	46	33	54
5. Artique	0	0	0	1	4	5	4	4	5	6	6
6. Allure	0	0	0	0	1	2	2	3	6	4	4
7. Quayside	0	0	0	0	0	0	5	4	4	7	5
8. Ambiente	0	0	0	0	0	0	2	7	14	17	28
9. Watermark	0	0	0	0	0	0	0	12	16	15	13
10. Atelier Apartments	0	0	0	0	0	0	0	1	3	3	5
11. Wayfarer	0	0	0	0	0	0	0	0	7	9	3
12. Evolure	0	0	0	0	0	0	0	0	7	11	7
13. The Quay	0	0	0	0	0	0	0	0	9	10	7
14. Mizura Villas	0	0	0	0	0	0	0	0	4	6	6
15. Idalia	0	0	0	0	0	0	0	0	0	2	3

Figure 22 Median School student Ratio of Occupation for all Residential sites

4.3.2 DWELLING STRUCTURE AND BEDROOM MIX

From the residential site analysis across 15 sites, there were some relationships observed, however it was found that the overall structure of the development did not have a discernible impact on the school student population as shown in Figure 22 and 23. All sites, no matter the particular typology, generated a school student population. Most of the residential sites were a mix of apartments and townhouses and some that were apartments or townhouses only.

Sites with higher median school student population ratio of occupation (10% or more: seven sites within the Study) tended to have townhouses as the sole or partial dwelling structure. This was the case in five of the seven sites. Features of townhouses, often referred to as the 'missing middle' of residential development have features that may be attractive to families with children including typically larger than units in size, rear and sometime front courtyard plots. Further analysis is required to confirm if families with school age students are residing in the townhouse components of combination sites.

For residential sites with apartments 1 - 3 storeys (Site 5, Artique and Site 15, Idalia), the median school student ratio of occupation differed significantly 33% and 2% respectively. It is noted that Site 15 Idalia was recently developed (2018) and this may have influenced the low ratio at this site.

The proportion of multi-bedroom dwellings did not have a clear correlation with the school student population. The analysis showed that some sites with a larger proportion of multi-bedroom dwellings yielded a larger school student population. The Allure development (Site 6) had 100% of multi-bedroom units and displayed one of the highest median ratios of school student occupation: 25%.

Figure 23 Median School student Ratio of Occupation and proportion of multi-unit dwellings
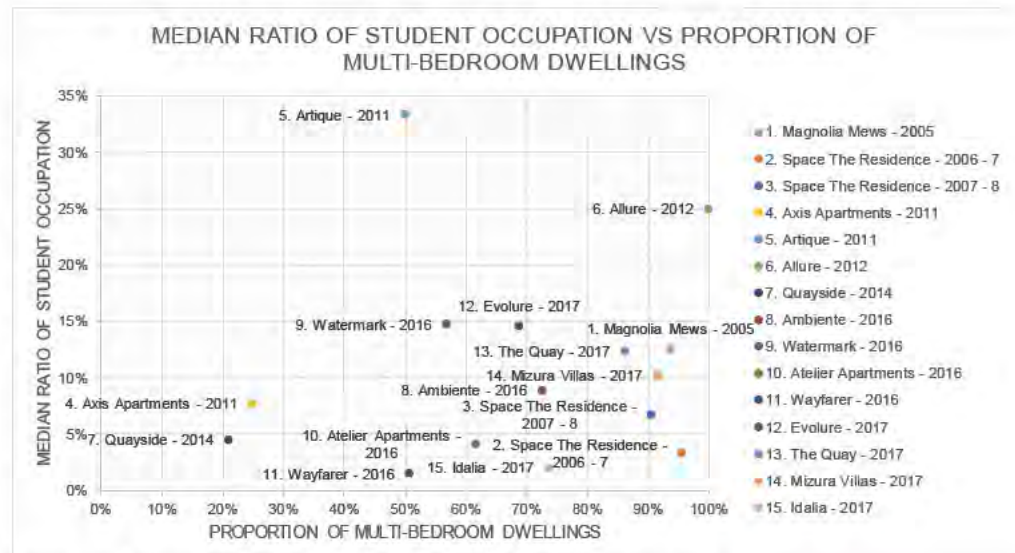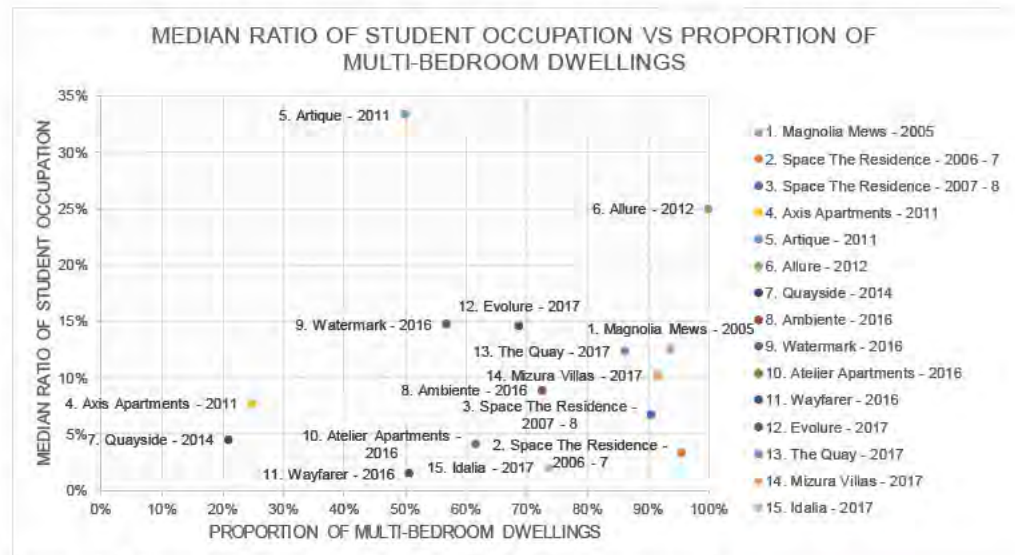
Source: ACT Education School Student Census 2010-2019; manual calculation

4-bedroom dwellings were only observed to have been delivered in four residential sites, three of which were delivered between 2016 and 2017. These are: Ambiente (Site 8), which is comprised of 48 1-bedroom, 113 2-bedroom, 12 3-bedroom and two 4-bedroom dwellings; Watermark (Site 9), which is comprised of 41 1-bedroom, 26 2-bedroom, 26 3-bedroom and two 4-bedroom dwellings; and Evolure (Site 12), which is split into 15 1-bedroom, 15 2-bedroom, 13 3-bedroom and five 4-bedroom dwellings. These three developments have both apartments and townhouses. Allure (Site 6) is the fourth site to have 4-bedroom dwellings; it is a townhouse-only development with nine 3-bedroom and one 4-bedroom dwelling.

However, other sites that had high proportions of multi-bedroom units displayed less than 10% of median school student occupation. For example, Atelier (Site 10), 62% of the dwellings are multi-bedroom dwellings, a total of 45 out of 73 dwellings. This site only yielded five school students at its peak.

Another example is Space The Residence (Site 2), which is comprised of 96% multi-bedroom dwellings; however, its median ratio of school student occupation is 3%. In Mizura Villas (Site 14), only 5 out of 59 dwellings are 1-bedrooms. The residential site is comprised of units and townhouses, with 92% of the development being multi-bedroom dwellings. From 2017 to 2020, the median ratio of school student occupation remained at 7-10% of all dwellings, and up to 11% of all multi-bedroom dwellings.

This may be linked to the higher median dwelling prices. More, larger dwellings that are more expensive may price out households with children or households looking to have children. All of the sites mentioned in the previous paragraph, Atelier (Site 10), Space (Site 2) and Mizura Villas (Site 14) are above the ACT median price for all dwellings and for units. The median dwelling prices at the three sites are also above the SA1/SA2 median prices. This suggests that there may be cheaper dwellings elsewhere in the surrounding area that may be attracting households with children. Further analysis is suggested to review the relationship between affordability and desireability of small homes with greater access to shared spaces for families with school students.

Further analysis is suggested for finer-grain analysis of specific development typology school age school students may be occupying to understand if families with school student aged children in these developments occupying the multi-bedroom dwellings within these residential sites only. If so, these families may be occupying a small proportion of the overall dwellings, however they may make up a significant proportion of the multi-bedroom dwellings within a residential site.

Sites with a greater or even share of 1-bedroom dwellings can also attract families. For example, Artique (Site 5) is made up of 50% 1-bedroom and 50% multi-bedrrom. This site has the highest median ratio of occupation across the study, at 33%.

Another example is Axis (Site 4), which is made up of 349 dwellings (a mix of low-rise residential flat buildings and townhouses). Of the total, 262 (75%) are one-bedroom dwellings and 87 multi-bedroom dwellings. It has a ratio of occupation of all dwellings of up to 15% in some years. Axis is also interesting as the school student population within the site represents a significant proportion of the school student population within the SA1 (on average 36% of the SA1, up to 60% of the SA1's population in 2018), suggesting that the school student population of the area was mostly concentrated in that residential site.

4.3.3 NUMBER OF DWELLINGS IN A SITE

The number of dwellings in a site, which ranged from 12 to 349, attracted families with school aged school students at differing rates.

Small developments, between 10 to 50 dwellings, appeared to have a higher ratio of occupation of school student populations. These sites are Sites 1, 5, 6 and 12. Magnolia Mews (Site 1) had a ratio of occupation of 31% at its peak. Artique (Site 5) in Campbell has 12 dwellings, one of the smallest developments in the study. Artique has an even split of one- to multi-bedroom dwellings, (50% 1-bedroom, 33% 2-bedroom and 17% 3-bedroom). While it was observed that older developments have fluctuating school student population, Artique has had a fairly consistent school student population of 4-6 school students, which yields a ratio of occupation of about 33-50%. It has 50% multi-bedroom dwellings. At its peak, this site had six school students within the total 12 dwellings. Allure (Site 6) is the smallest development in terms of number of dwellings, with a 100% ratio of occupation at its peak. Evolure (Site 12) had a slightly lower ratio of occupation, more similar to Site 1, at 33% at its peak.

Some larger developments classified as existing residential suburb development attracted high school student populations. Axis (Site 4) is the largest site by number of dwellings at 349. It attracted a median school student population of 27 school students in the development within the study period. The ratio of occupation for the whole development was 15% at its peak. The school student population at this residential site is one of the largest; considering school student count only, Site 4 had 54 school students in 2020.

For other existing residential suburb sites, Watermark (Site 9) has 57% multi-bedroom dwellings, a total of 54 out of 95, including two 4-bedroom dwellings. In the first year following development completion, the site had a school student population of 12. While the population remained around this number for the duration of the study period, its immediate occupation by families with school students is notable and is the second largest increase in a site's school student population and the largest immediate increase following development completion. Watermark (Site 9) had a median ratio of school student occupation of 15%.

Further analysis is suggested to understand broader trends that may be impacting the initial high occupation in Watermark, similarly observed in The Quay (Site 13). These trends may include: higher supply of affordable housing options alongside Gungahlin as a key employment centre and relationship with other new developments in Lake Tuggeranong.

Wayfarer (Site 11) has over 300 apartments, and an almost even split of one- to multi-bedroom dwellings (48% and 52%, respectively). This site displayed low school student populations. At most, the site had nine school students and a ratio of occupation of about 3%. Wayfarer is a 22-storey residential flat building. The site characteristics suggest that the target market for this site may be targeted towards investors, rather than households with children. Within the SA1 of Wayfarer (Site 11), there were also a higher proportion of renters to owners, 67.9% to 29.2%, respectively. It is also noted that Wayfarer was developed recently and this may impact low student population ratio.

While larger developments, such as Axis and Watermark (Sites 4 and 9), might yield more school students in number, sites with a comparatively smaller number of school students like Artique (Site 5), have a higher ratio of occupation and a more consistent population over the Study period.

Figure 24 Median School student population vs total dwelling numbers for all Residential sites

Source: Calculation of data from ACT Education School Student Census and development application data

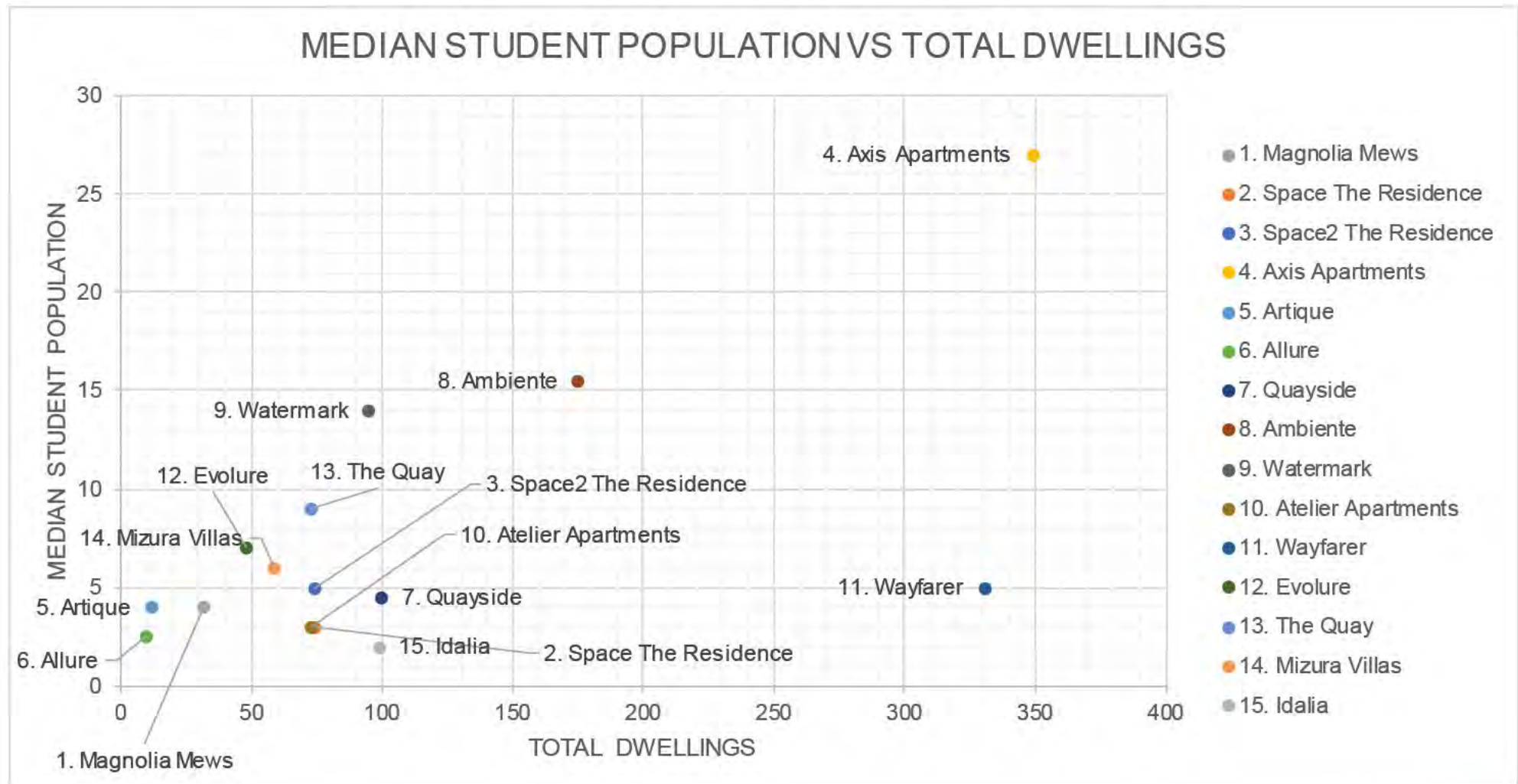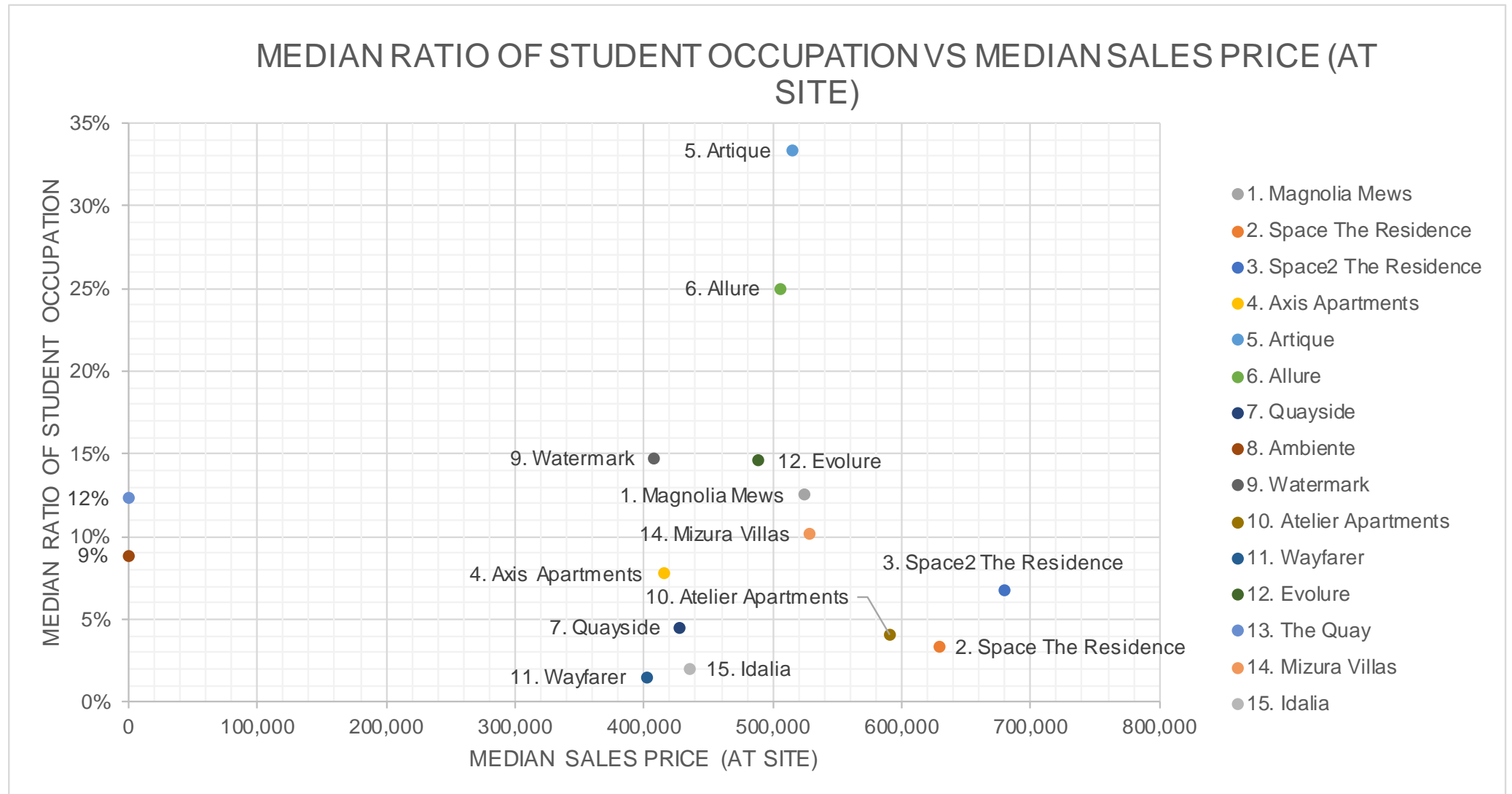MEDIAN STUDENT POPULATION VS TOTAL DWELLINGS

Figure 25 Median Ratio of School student Occupation and Median Sales Price (At Site)

Source: Access Canberra price data from 2012-2019, cleaned by ACT Treasury

MEDIAN RATIO OF STUDENT OCCUPATION VS MEDIAN SALES PRICE (AT SITE)

4.3.4 MEDIAN DWELLING PRICE

High purchase price generally reflects sites with desireable locations as well as larger dwellings (both in bedroom size and total floorplate) and high quality external and internal design. The Study shows that sites behave differently when considering price. For some sites, higher dwelling prices may be unattractive or unaccessible for households with children. Some sites appeared to be agnostic to price increases, but this may be due to other factors relating to tenure and dwelling typology.

While the sites appear to behave differently in relation to price, the scatter plot in Figure 25 shows that there is an indicative "sweet spot" between a median dwelling price of $400,000 to $550,000 wherein nine of the sites are. While the median ratios of occupation at these sites vary, six are above the overall median ratio of occupation, Watermark (Site 9), Evolure (Site 12), Allure (Site 6), Artique (Site 5), Magnolia Mews (Site 1) and Mizura Villas (Site 14). Sites with a median dwelling price higher than $550,000, Atelier, Space and Space 2 (Sites 2,3 and 10) are the most expensive sites in the Study, and have lower ratios of occupation.

One example of a site with a lower median price and a higher ratio of occupation is Allure (Site 6). The median price at site for Allure (Site 6) is consistently below the SA2 and ACT median price for houses. Across the study period, the median price per year has not deviated significantly from the overall median price of $508,500 and the site has shown a consistent school student population that has grown over the study period. Allure is a new residential suburb site; it's corresponding SA1 has 73.3% owned dwellings.

On the other hand, Space2 (Site 3) had the highest median sales price across the study period at $679,000, above the SA2 median and the ACT unit median. The site's median price has remained consistently above these medians over the study period, with a low of $635,000 in 2013 and a high of $810,000 in 2014. It is noted that Space2 townhouses have large interior floor area, and this may explain the high median sales price. The site had its highest school student population in 2013, with 9 school students and a ratio of occupation of 12%. The site's school student population also decreased to 5 in 2014. This may suggest a movement of families with school students prior to 2014 related to the increase in price. Space2 is located in Turner, where there is a higher proportion of rented to owned dwellings. Further study on the impact of median rental prices for sites situated in areas with a higher proportion of rented dwellings is suggested.

Wayfarer (Site 11), had the lowest median sales price across the study period at $402,000, below the ACT unit median price. At the time of development completion, the site's median price was $390,000. The initial school student population at site was 7, higher than most first-year school student populations at site. However, it is noted that the ratio of occupation at Wayfarer is low (median ratio of school student occupation of 2%). Wayfarer is the second largest residential site, with 331 dwellings.

Some sites appear to be agnostic to price increases; specifically, some sites continue to exhibit growth even at or immediately following a year with the highest median price across the study period.

For example, Magnolia Mews (Site 1) had a median sales price high at 2017 with $790,500; from 2017 to 2018, the school student population at site grew from four to 10. In Axis (Site 4), the highest median sales price was $449,800 in 2013; between 2013 to 2014, the school student population increased from 10 to 18. In Atelier (Site 10), the highest median price was $799,900 in 2019; the school student population increased from three to five from 2019 to 2020. It is noted that these sites, except for Magnolia Mews (Site 1), have lower median ratios of occupation. This may suggest that there are households with children willing to buy into a more expensive residential development.

Tenure may also play a role in the desirability and willingness to pay a higher price for dwellings. Both Atelier (Site 10) and Axis (Site 4) are located in areas with a higher proportion of rented to owned dwellings. While these two sites have lower median ratios of occupation, there are still populations of school-aged students on these sites, which indicates that households with children are willing to pay a higher sales price or access these dwellings by renting rather than homeownership.

The previously mentioned sites are all existing residential suburb sites; however, new residential suburb sites do not necessarily behave conversely. Allure (Site 6) had its highest median sales price at $589,500 in 2017; the school student population at site grew from three to six between 2017 and 2018. Evolure (Site 12) had its highest median price in 2019 at $575,000; the school student population from 2019 to 2020 decreased from 11 to seven. Some existing residential suburb sites exhibit a decrease in population following the peak of median prices. Space2 (Site 3) and Quayside (Site 7) went from a school student population of five to four following the peak of the site's respective median prices.

4.3.5 YOUNGER CHILDREN WERE THE LARGEST GROUP WITHIN THE SITES' SCHOOL STUDENT POPULATION

Across all the residential sites, primary school children tend to be the largest group within the sites' school student populations. The older residential sites such as Magnolia Mews (Site 1) and Space2 (Site 3) had some years within the study period wherein secondary and college-age children were the largest groups. The increase in these groups coincided with a decrease in primary-age school students, while the overall site population remained consistent; these may have been the same school students ageing and progressing into the next school cohort.

Figure 26 School student population at Site 1 and Site 3

Year	Primary	Secondary	College	Total	Primary	Secondary	College	Total
	Magnolia Mews (Site 1)				**Space2 (Site 3)**			
2010	0	2	0	2	2	0	0	2
2011	1	4	2	7	2	0	1	3
2012	1	2	6	9	1	1	3	5
2013	0	2	2	4	6	1	2	9
2014	1	1	1	3	3	1	1	5
2015	1	2	1	4	2	1	1	4
2016	0	1	1	2	2	1	0	3
2017	3	0	1	4	7	1	0	8
2018	6	2	2	10	5	2	0	7
2019	6	3	1	10	4	3	0	7
2020	2	4	2	8	2	6	0	8

Source: ACT Education School Student Census 2010-2019

4.3.6 UPTAKE IN DEVELOPMENTS FOLLOWING COMPLETION

Five of the sites had immediate uptake following the completion of the development: Axis (Site 4) in Lyneham, Atelier (Site 10) in Kingston, Ambiente (Site 8) in Wright, The Quay (Site 13) in Greenway and Mizura Villas (Site 14) in Lawson. It is noted that as Magnolia Mews, Space and Space2 (Sites 1, 2 and 3) were completed before 2010, and therefore no data was available to analyse school enrolment data at this site from opening.

For some residential sites, there appeared to be a period of one year following the completion of the development before families with school-aged children moved in. For example, Artique (Site 5) was completed in 2011, but only had one school student in 2013, followed by four school students in total in 2014. Quayside (Site 7) was completed in 2014 but school students were first recorded within this site in 2016; there were five school students in 2016. School student populations at these sites did not increase year-on-year following the completion of the development.

While residential sites may have some immediate population, populations also pick up a year after the development has been delivered. Further analysis is suggested to be undertaken to understand if this lag is related to families with school-age children not being immediately attracted to new developments, or if families move into new medium to high density dwellings with younger, non-school-age children or young couples are moving into these new developments before starting a family.

Reporting methods for both development processes and school student census may impact the presentation of lag in update of developments following completion. It takes time between issue of the building certificate of occupation and households (with or without children) moving in as owners or tenants. In addition, changing or updating the student's home address is captured annually in February during the Education Census.

The tenure of each individual school student at the residential site was not included in the School Census data provided. Further analysis is suggested to understand the impact of housing tenure on school population and to understand if this 'lag' in school student population may also be linked to higher proportions of renters in existing residential suburb areas, where most of the residential sites are located. For example, Wayfarer (Site 9) in Belconnen was completed in 2016. There was a school student population of seven at the site in 2018. In Belconnen, there is a higher proportion of rented dwellings to owned dwellings, 67.90% and 29.2% respectively. For Idalia (Site 15) in Phillip, there was a school student population of two in 2019; the development was completed in 2017. The SA1 in which Site 15 is located in has a proportion of 66% rented dwellings and 32% owned dwellings. Further analysis is suggested to understand if families with school aged school students are waiting for available rental stock to open on the market from these relatively new developments.

Median dwelling price may also play a role, as discussed in the previous section. Additional analysis may be undertaken to understand if there are lags in school student population in less affordable areas due to families with school aged school students waiting for available rental stock to open on the market from these relatively new developments.

4.3.7 POPULATION GROWTH PATTERNS AT NEW RESIDENTIAL SUBURB SITES AND THEIR SA1S

In the previous section, it was observed that newer developments tended to yield sharper increases in school student population growth. For the new residential suburb sites delivered within 2016-2017, this increase in population growth was also reflected in their corresponding SA1s. Further analysis is suggested to determine if this may be related to other, new developments being delivered in the immediate surrounding area and or if sharp increases in are related to new residential suburb areas having a low base and or families moving in with infants to a larger dwelling for the long term.

4.3.8 OLDER DEVELOPMENTS SHOWED FLUCTUATION IN SCHOOL AGED SCHOOL STUDENT POPULATION

For Sites 1-7, which were completed between 2005-2014, it was observed that the school student populations at site fluctuate across the study period, showing a rise and fall over the years. For Sites 8-15, completed between 2016-2017, the school student population at most of the sites increased quickly after the development was completed.

From our sample analysis, we observed that for older developments, there were peaks and troughs of total school student populations, and the school student population increased in age throughout the years. This may suggest that children who are living in these developments are growing up, getting older and moving up and out of the school system. It is suggested that further analysis of school student IDs be undertaken to confirm if this trend is occurring.

Magnolia Mews (Site 1), in Narrabundah, is the oldest residential site in the study, completed in 2005. The levels of school student population in the site increase early in the study period and then reduce between 2013 to 2017 before picking up in 2018. There was a decrease in college age school students from 2011 to 2013, and the subsequent increase from four school students to ten from 2017 to 2018. The decrease in college age school students followed by an increase in primary age school students is the key differentiator from other residential sites.

This is also seen in Space2 (Site 3); from 2012 to 2016, there is a decreasing population of college school students, followed by an increase in primary school students in the following year. From 2017 onwards, primary school student population decreases, while secondary school student population increases, and the overall school student population increases only by one in a four-year period.

It is suggested that finer-grain analysis of data to correlate student address to individual dwelling attributes, longitudinal dwelling studies of households with children is undertaken to inform if families move into new medium to high density dwellings with younger, non-school-age children; young couples are moving into these new developments before starting a family and stay when children enter the school system, and or if families had recently moved into the development when ready for school.

Figure 27 School student population at Site 1 and Site 3

Year	Primary	Secondary	College	Total	Primary	Secondary	College	Total
	Magnolia Mews (Site 1)				Space2 (Site 3)			
2010	0	2	0	2	2	0	0	2
2011	1	4	2	7	2	0	1	3
2012	1	2	6	9	1	1	3	5
2013	0	2	2	4	6	1	2	9
2014	1	1	1	3	3	1	1	5
2015	1	2	1	4	2	1	1	4
2016	0	1	1	2	2	1	0	3
2017	3	0	1	4	7	1	0	8
2018	6	2	2	10	5	2	0	7
2019	6	3	1	10	4	3	0	7
2020	2	4	2	8	2	6	0	8

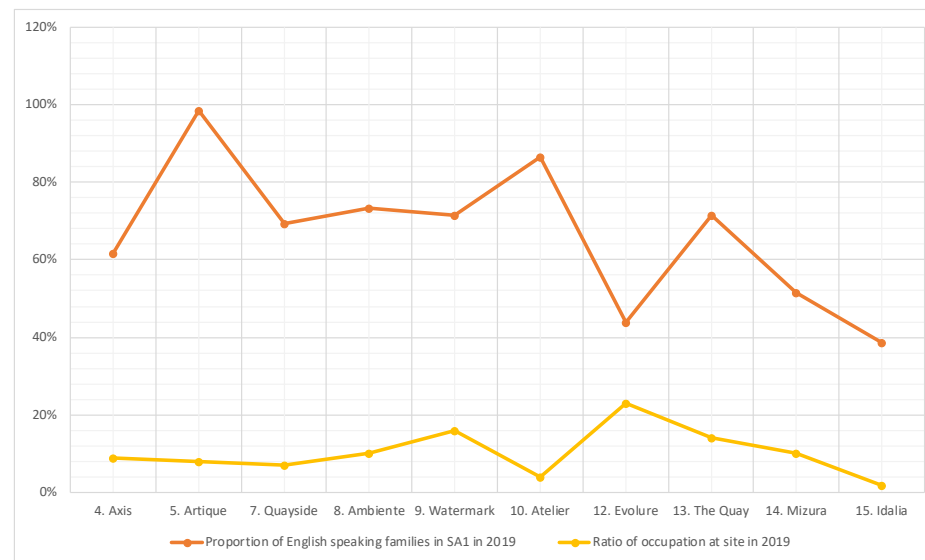Source: ACT Education School Student Census 2010-2019

4.3.9 LANGUAGE SPOKEN AT STUDENT HOME

Language spoken at home is recognised as one of the core set of cultural and language indicators outlined in the ABS Standards for Statistics on Cultural and Language Diversity (1999). Language spoken at home is collected as part of the School Student Census and was analysed at SA1 level to provide an indication of cultural diversity of an area. Further analysis is suggested to review other measures to gain a deeper view on cultural diversity and relationship to housing for families with school students.

English is the most commonly spoken language at home across all residential sites' corresponding SA1s across all the years. The proportion of English speaking households differed across the 15 residential sites with the lowest proportion at the SA1 hosting Idalia (39%), and the highest at nearly 100% in the SA1 hosting Artique.

The proportion of school student households speaking English at home by SA1 in 2019 was reviewed against the ratio of student occupation at sites in the same year as shown in Figure 26. The review highlights that there is not a clear relationship between proportion of households speaking English at home in the SA1 to ratio of student occupation in the residential site, however, there was alignment across some residential sites. For example, for Evolure (Site 12), its corresponding SA1s has one of the lowest proportions of English speaking households at 44%. Site 12 also has the highest ratio of occupation across all sites at that year, at 23%. Within Evolure's SA1, across the whole study period, the second and third most common languages spoken at home were Tamil and Hindi, respectively. In addition, at Atelier's low ratio of student occupation in 2019 showed high proportions (more than 80%) of student households speaking English at home in the same year.

Figure 28 Proportion of languages spoken at home and ratio of occupation in 2019

Source: ACT Education School Student Census 2010-2019

There were other sites however that did not follow this relationship. For example the SA1 hosting Mizura (Site 14) and the SA1 of Ambiente (Site 8) whic had similar ratio of occupations at the site levels, but differences in proportion of English speaking student households (55% and 75% respectively).

In another example Idalia (Site 15) has the lowest ratio of occupation across all the sites in 2019, its corresponding SA1 (8110912) also has the lowest proportion of English speaking households across all the sites, at 39%. Interestingly, the SA1 of Idalia (Site 15) located in the existing residential suburb area of Phillip had a total school student population of 45 in 2019, and 16 different languages spoken at home. 17 school students were recorded as English speaking; the next highest count is three, which is the count for Hindi, Tagalog, French, Indonesian and Filipino.

A review of the residential sites suggests that SA1s hosting newer residential sites built-in 2017 - Evolure (Site 12), The Quay (Site 13), Mizura (Site 14) and Idalia (Site 15) had lower proportions of English speaking student households less than 75%, compared to SA1s hosting older residential sites within our sample.

Further analysis of additional indicators to explore cultural diversity and relationship to housing characteristics is suggested.

4.3.10 OLDER SITES LOCATED IN AREAS WITH EVEN DISTRIBUTION OF HOUSEHOLD ADVANTAGE

Within most of the sites' corresponding SA1s, the fourth IHAD quartile is most prevalently represented. The exceptions are Space (Site 2), Space2 (Site 3), Axis (Site 4) and Idalia (Site 15), wherein most households are represented in the 3rd IHAD Quartile.

The corresponding of SA1s of some older sites, Sites 1-5, appear to have a more even distribution of household advantage and disadvantage. After Artique (Site 5), which was delivered in 2011, almost all sites' corresponding SA1s have more than 90% of households within the 2nd, 3rd and 4th Quartiles, with the exception of Evolure (Site 12). The households within its corresponding SA1 are equally represented within the 2nd, 3rd and 4th Quartiles. Most of these sites are located in new residential suburb areas, except for Watermark (Site 9) and The Quay (Site 13). It was previously observed that new residential suburb areas tend to have higher rates of home ownership; the higher expenses associated with home ownership may only attract more advantaged households to an area. This may impact on the types of households that may be able to access housing in one area over another.
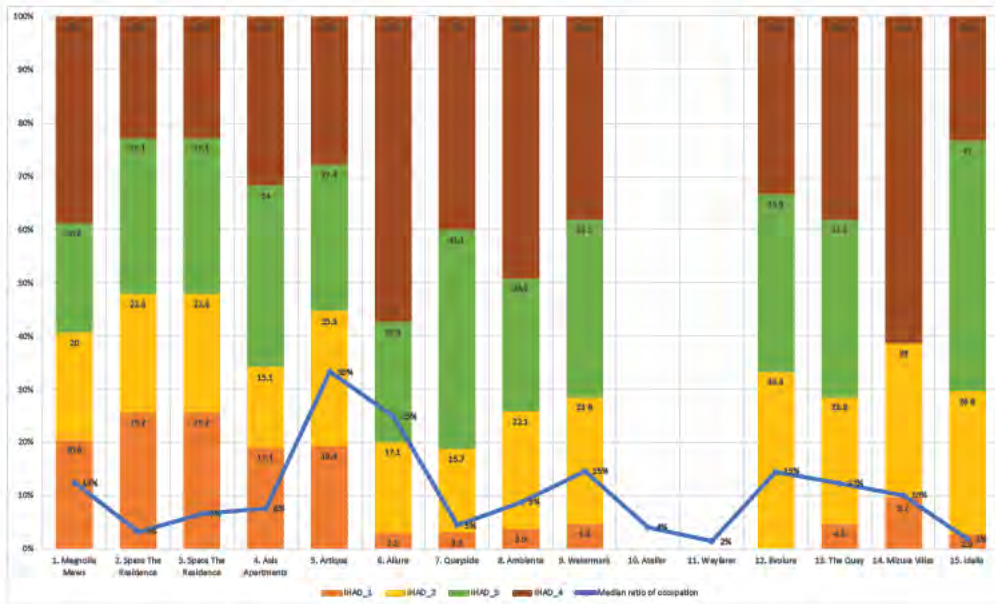
The SA1 that Evolure (Site 12) is located in, a new residential suburb, has a higher proportion of rented dwellings. While no households are counted in the 1st IHAD Quartile, its more even distribution across the other three Quartiles is similar to the distribution of households in Sites 1-5. More even distribution of IHAD Quartiles for households in older, more established locations with higher proportions of rented dwellings may suggest a relationship between age of development and its surrounding area, tenure and household advantage. Further study is suggested to explore the relationship between shifts in tenure and household advantage and housing preferences.

The school student population at site did not appear to be strongly correlated with the relative advantage and disadvantage in certain areas; however, it was observed that sites in areas with more even IHAD quartile distribution tended to have higher median ratios of occupation across the whole study period. Artique (Site 5) has the highest median ratio of occupation at 33% and its SA1's IHAD distribution is almost even across the four quartiles. This is also observed in Magnolia Mews (Site 1) (13%) and Evolure (Site 12) (15%). Though sites within areas of higher advantage also present with high median ratios of occupation, such as Allure at 25%, Watermark (Site 9) at 15% and The Quay (Site 13) at 12%.

4.3.11 THE SITE WITHIN ITS WIDER CONTEXT

Across the 15 residential sites there was an observed change in the proportion of school student population from a residential site compared to the school student population in the SA1 and SA2 over time as shown in Figure 30. For example, Watermark (Site 9) represented 75% of the school student population within its SA1 in 2017, and then dropped to 44% and then 21% in 2018 and 2019, respectively. There was an overall increase in the school student population within its SA1. The Quay (Site 13) is located in the same SA1. In 2018, the site's school student population represented 25% of the school student population within the SA1. In 2019, this proportion fell to 14% and the school student population grew from 36 to 71 within the SA1 in the same time.

From 2018 to 2019, the proportion of the two sites' SA1 to the SA2 (Greenway) school student population increased from 20 to 35%. This may suggest that more families with school students are moving into the immediate surrounding area. Further analysis is suggested to understand if the increase in population across the SA1 and SA2 was associated with additional new medium to high density dwellings or within existing dwellings.

Figure 29 Proportion of households in each SA1 within IHAD Quartiles in 2016

Source: Experimental Index of Household Advantage and Disadvantage, ABS Census 2016;
ACT Education School Student Census

Figure 30 Residential site, SA1 and SA2 school student population

Site	'10	'11	'12	'13	'14	'15	'16	'17	'18	'19	'20
1 Magnolia Mews	2	7	9	4	3	4	2	4	10	10	8
SA1	School student population at SA1 not collected										
SA2	947	947	1010	1039	1067	1046	1087	1130	1140	1173	1134
2 Space	2	1	2	1	8	3	3	1	5	5	4
SA1	School student population at SA1 not collected										
SA2	252	232	257	266	298	289	286	295	307	301	316
3 Space2	2	3	5	9	5	4	3	8	7	7	8
SA1	School student population at SA1 not collected										
SA2	252	232	257	266	298	289	286	295	307	301	316
4 Axis	0	0	4	10	18	19	27	34	46	33	54
SA1	44	36	32	52	53	56	62	75	77	92	
SA2	443	428	482	484	498	536	565	619	681	662	648
Site to SA1	0%	0%	13%	19%	34%	34%	44%	45%	60%	36%	
SA1 to SA2	10%	8%	7%	11%	11%	10%	11%	12%	11%	14%	
5 Artique	0	0	0	1	4	5	4	4	5	6	6
SA1	41	48	74	54	58	67	65	63	82	72	
SA2	460	459	520	565	597	616	599	579	645	611	590
Site to SA1	0%	0%	0%	2%	7%	7%	6%	6%	6%	8%	
SA1 to SA2	9%	10%	14%	10%	10%	11%	11%	11%	13%	12%	
6 Allure	0	0	0	0	1	2	2	3	6	4	4
SA1	School student population at SA1 not collected										
SA2	16	99	286	382	557	739	901	1076	1188	1240	1186
7 Quayside	0	0	0	0	0	0	5	4	4	7	5
SA1	24	30	23	21	39	44	55	45	24	24	
SA2	202	231	222	214	267	272	313	321	374	399	430
Site to SA1	0%	0%	0%	0%	0%	0%	9%	9%	17%	29%	
SA1 to SA2	12%	13%	10%	10%	15%	16%	18%	14%	6%	6%	
8 Ambiente	0	0	0	0	0	0	2	7	14	17	28
SA1	0	0	0	0	4	7	9	13	40	46	
SA2	0	0	3	26	76	185	241	367	437	470	443
Site to SA1	0%	0%	0%	0%	0%	0%	22%	54%	35%	37%	
SA1 to SA2	0%	0%	0%	0%	5%	4%	4%	4%	9%	10%	

Site	'10	'11	'12	'13	'14	'15	'16	'17	'18	'19	'20
9 Watermark	0	0	0	0	0	0	0	12	16	15	13
SA1	0	0	1	3	6	3	4	16	36	71	
SA2	133	129	144	149	143	142	146	153	184	203	192
Site to SA1	0%	0%	0%	0%	0%	0%	0%	75%	44%	21%	
SA1 to SA2	0%	0%	1%	2%	4%	2%	3%	10%	20%	35%	
10 Atelier	0	0	0	0	0	0	0	1	3	3	5
SA1	12	14	11	13	51	26	25	25	27	23	
SA2	202	231	222	214	267	272	313	321	374	399	430
Site to SA1	0%	0%	0%	0%	0%	0%	0%	4%	11%	13%	
SA1 to SA2	6%	6%	5%	6%	19%	10%	8%	8%	7%	6%	
11 Wayfarer	0	0	0	0	0	0	0	0	7	9	3
SA1	School student population at SA1 not collected										
SA2	218	218	252	250	272	304	338	339	392	427	389
12 Evolure	0	0	0	0	0	0	0	0	7	11	7
SA1	0	0	0	0	0	0	2	23	55	74	
SA2	0	0	0	0	0	0	8	69	135	200	195
Site to SA1	0%	0%	0%	0%	0%	0%	0%	0%	13%	15%	
SA1 to SA2	0%	0%	0%	0%	0%	0%	25%	33%	41%	37%	
13 The Quay	0	0	0	0	0	0	0	0	9	10	7
SA1	0	0	1	3	6	3	4	16	36	71	
SA2	133	129	144	149	143	142	146	153	184	203	192
Site to SA1	0%	0%	0%	0%	0%	0%	0%	0%	25%	14%	
SA1 to SA2	0%	0%	1%	2%	4%	2%	3%	10%	20%	35%	
14 Mizura Villas	0	0	0	0	0	0	0	0	4	6	6
SA1	0	0	0	0	0	0	6	43	80	125	
SA2	0	0	0	0	0	0	8	69	135	200	195
Site to SA1	0%	0%	0%	0%	0%	0%	0%	0%	5%	5%	
SA1 to SA2	0%	0%	0%	0%	0%	0%	75%	62%	59%	63%	
15 Idalia	0	0	0	0	0	0	0	0	0	2	3
SA1	2	3	2	9	21	14	24	29	36	45	
SA2	125	121	150	147	175	194	245	276	305	302	299
Site to SA1	0%	0%	0%	0%	0%	0%	0%	0%	0%	4%	
SA1 to SA2	2%	2%	1%	6%	12%	7%	10%	11%	12%	15%	

5. Learning from other jurisdictions

5.1 PURPOSE AND APPROACH TO ANALYSIS

The purpose of this analysis was to capture and share lessons from other jurisdictions that have experienced pressure on schools from residential intensification in existing residential suburbs, including any policy or planning actions processes for influencing schools planning and document experiences of any differences in what is outlined in policy versus what happens on the ground. The analysis of other jurisdictions complements the main analysis by documenting key trends or factors of influence that other jurisdictions are considering for input into school enrolment forecasts. The analysis is split into three phases:

» A high level background review on urban existing residential suburb policy shifts in Sydney, Newcastle and Brisbane;

» A high level analysis on typology and enrolment change. Specific locations were identified through during semi-structured interviews, pinpointing areas that have experienced high population growth, school enrolment change or and high development activity; and

» Summary of the insights from semi-structured interviews with key members of education departments and or planning departments in NSW and QLD to understand their experiences in school enrolment changes and planning for existing residential suburb developments.

5.1.1 APPROACH AND LIMITATIONS

A summary of the approach and data used for the high level analysis on the three 'case study' sites is as follows:

» Data for school enrolments was limited to publicly available data on government school enrolments. For New South Wales, this data was available within the time period 2004-2018. For Queensland, this data was available within the time period 2015-2019;

» Non-government school enrolments are not publicly available;

» Specialised school enrolments are not publicly available;

» Only the total number of students is publicly available. Supporting detailed information such as student addresses, breakdown of enrolment across academic categories, etc. is not publicly available;

» Data was collected and analysed using the Australian Statistical Geography Standard (ASGS), specifically using the SA2 and SA1 levels. This standard was introduced at the 2011 ABS Census. This portion of the Study covers a time period of 2006-2016. Data from 2006 was collected using the State Suburb (SSC) geography, which cover an approximately similar areas for the SA2s used in 2011 and 2016. The SA2s of South Brisbane and Homebush Bay – Silverwater (parent SA2 for Wentworth Point) are consistent with the SSC boundaries of South Brisbane and Homebush Bay, Silverwater and Newington, respectively. The suburbs of Lambton, New Lambton and New Lambton Heights were used for the New Lambton case study. The SSC boundaries have a slight overlap with the adjacent SA2s of Lambton – New Lambton;

» Only stated dwellings have been counted in this analysis. Counts within the "not stated" and "not applicable" categories have not been included;

» School-age student population for each SA2 was estimated using the population within the ages 5-18. This is an estimate of the age groups within the school system; and

» Sales data for the three case studies is not publicly available. This analysis has relied on publicly available weekly median rent and mortgage repayments per SA1 or SA2 in 2016.

5.2 URBAN EXISTING RESIDENTIAL SUBURB POLICY SHIFTS AND SCHOOLS PLANNING

Alongside ACT, other states such as Queensland and New South Wales (NSW) have recognised the complex landscape of planning for growth and infrastructure.

5.2.1 NEW SOUTH WALES

In NSW, there has been recent shifts in policy and governance to support closer alignment between land use and infrastructure decision to support students, families and communities.

There is wide recognition that schools planning must be coordinated with employment hubs, housing, transportation to support cities and communities. Across multiple portfolios in State Government, a number of benefits have been outlined. Identifying demand for and planning for schools alongside other initiatives to support a compact city, has the potential to improve active travel outcomes – more students walking and cycling to schools, reducing the need for school busing and carer driving – delivering outcomes across health and wellbeing and the transport and city network.

The Greater Sydney Commission's (2017) A Metropolis of Three Cities (the Plan) is the Sydney's strategic urban plan. It outlines strategies for infrastructure and supporting housing and employment across Sydney as well as strategies for implementation and collaboration. The Plan seeks to push for urban regeneration and urban renewal to respond to the increased population projects through growth in renewal corridors, through medium density existing residential suburb development. There is recognition that development in land release areas will support housing supply, and supports more intense development around centres – namely medium to higher density housing.

The Plan makes clear reference to the need for infrastructure planning while supporting housing supply (Greater Sydney Commission, 2017). The Growth Infrastructure Compact programme seeks to better align infrastructure planning and delivery in high growth areas. The approach seeks to review and maximise existing infrastructure, and align planning for new infrastructure across agency programs and priorities. This approach also seeks to understand the multiple benefits that could be gained from an investment in infrastructure like community spaces or schools, to support prioritisation and funding (Greater Sydney Commission, 2017).

The Plan explicitly references NSW Department of Education school student planning estimates by districts, and recognizes the role of School Infrastructure NSW, to undertake school community planning, and the delivery of education infrastructure program via the School Assets Strategic Plan Summary (2017).

The School Assets Strategic Plan Summary (NSW Department of Education, 2017) outlines the need for schools planning across NSW to 2031. The Plan seeks to 'leverage existing assets and partnerships to reduce the financial burden on government of a 'business as usual 'approach'. In this way, school assets are increasingly seen as shared social infrastructure – common grounds to improve the provision of public open space and green space, shared school facilities for community meeting and gathering as well as space for after and before school care. Planning across government (planning departments and education and schools infrastructure planning) recognises the need for schools to be delivered as 'community hubs' – in addition to providing space for learning in formal school hours and classrooms, schools contribute to open and green space network and community halls and meeting spaces – if the governance arrangements enable open and public access.

Schools forecasting is informed by central population growth projections from the Department of Planning, Infrastructure and Environment. It is understood that the Department of Education undertakes a series of analysis to complement this projection data to inform schools planning. One study is a high level audit of the condition of and general school needs of schools by cluster - this included high level quantitative and qualitative assessment of student pop and classroom provisions, size of playgrounds and learning facilities. Other model analysis has been undertaken in the Hunter Region including Newcastle to gain a very high level understanding of capital costs associated with meeting growth demand. Student population changes were modelled based on baseline forecasts against a development scenario of the new residential suburb growth happened.

Growth of Newcastle has been guided by strategic planning that seeks to be contained along renewal corridors alongside commercial areas, with one quarter of residential growth (2016 – 2041) planned to be located in 1% of the City of Newcastle's land area (forecast id, 2018). These plans and investments have seen a shift in the city. New residential and commercial developments and building refurbishments in Newcastle's CBD and inner-city suburbs attracting more people to the CBD. Additional population growth has been supported with light rail and upgrades to public spaces.

The breadth of housing opportunities is noted in the City of Newcastle's Demographics and Social Strategy 2016 – 2019. This Strategy notes that areas of significant recent growth in new residential suburb areas are made up of predominantly family households. Growth in medium density and higher density dwellings has been occurring, however this Strategy do not make any specific link to families with children living in medium to high density dwelling typologies.

5.2.2 QUEENSLAND

Previous planning for Brisbane outlined by the Queensland South East Queensland Regional Plan outlines a plan for 80 percent of new dwellings to be delivered in existing residential suburbs in urban areas (Queensland Government, 2005). Existing residential suburb development has been related to pressures on schools infrastructure in Brisbane (ABC, 2018). Over the past 10 years, around 5,000 additional students have joined Queensland state schools in and around the Brisbane CBD. This growth will continue with more than 3,000 additional students expected to move into inner Brisbane in the next 5 years (Queensland Education Department, 2020).

A number of approaches are in place to support planning for schools. The Queensland Government Statistical Office prepares school-age population projections based on the most recent Queensland population projections, which inform the demand mapping meetings, and an interactive projected school-aged persons map. Data and mapping are publicly available from the QGSO webpage.

The Queensland School Planning Commission is a Ministerial Advisory Committee tasked in 2012 with improving processes for the planning of Queensland schools in consultation with key sectorial stakeholders. Demand mapping is undertaken by the Committee in Council areas that are undergoing significant population growth. The Committee supports mapping and planning across stakeholders – including government and non government schools and local councils.

In schools that are nearing enrolment capacity, policies to more strictly apply school catchment areas have been defined. Schools are required to implement a School Enrolment Management Plan when enrolments reach 80% of the school's student enrolment capacity.

5.3 CASE STUDIES

The following areas were considered for this analysis: New Lambton (Newcastle), Wentworth Point (Greater Sydney) and South Brisbane (Brisbane). These areas were identified in the semi-structured interviews. The areas were selected for the following reasons:

» New Lambton was identified in the interviews with schools planning professionals as an area of interest due to the popularity of the local public school – New Lambton Public School. New Lambton is located in Newcastle, in the Hunter Region of New South Wales, approximately 6km west of the Newcastle Central Business District. The area is mostly residential, adjacent to large swathes of environmentally sensitive land and reserves. Within the SA2 Lambton-New Lambton, there are four public schools, New Lambton Public, New Lambton South Public, Lambton Public and Lambton High school, two non-government schools, St. John's Primary and St. Therese's Primary and one specialised school, John Hunter Hospital School.

» Wentworth Point in central Sydney was selected for high levels of population growth and development activity, particularly in high-density dwelling development. Wentworth Point is also a Priority Precinct, designated by the NSW Department of Planning and the Environment. This designation "provide[s] a planned approach to growth in Sydney, with new homes and jobs located close to public transport, shops and services, while retaining and enhancing a community's character" (NSW DPIE 2017). In Homebush Bay – Silverwater, there are four schools in total. Newington Public School and Wentworth Point Public School are the two government schools within the SA2. Other schools include SEDA College, a specialised school for Years 11 and 12 focusing on sports and Margaret Jurd College, a special education school.

» South Brisbane is in the Inner City area of Brisbane. From 2008, the inner city area of Brisbane underwent significant change and development, with renewed focus on new housing and jobs near high capacity public transport as well as lifestyle and amenity factors. Two schools located in the adjacent area are Brisbane State High School and West End State School. Interviews with schools planning professionals in Queensland highlighted that access to the schools' respective catchments was becoming increasingly competitive, coinciding with expansions for both schools.

A map of the three case study areas is shown on the following spread.

Figure 31 Map of three case studies

SOUTH BRISBANE

NEW LAMBTON

WENTWORTH POINT

5.3.1 TOTAL SCHOOL STUDENT CHANGE

School student population for the three areas was evaluated by using the population of each SA2 or group of suburbs within the ages of 5-18. Lambton – New Lambton had, overall, the largest school student population residing within the SA2; however, the school student population within this area also had the lowest level of growth between 2006, 2011 and 2016, both in terms of count of persons and proportion of growth, within the study period.

The school student population within Homebush Bay – Silverwater grew by 34% from 2006 to 2011 and then by 45% from 2011 to 2016, with an overall growth of 95% or 1034 persons. In South Brisbane, the school student population grew by 18% between 2006 to 2011, 33% between 2011 to 2016 and by 51% percent or 322 persons overall.

The total populations at each SA2 also followed similar patterns of growth. Lambton – New Lambton had an overall growth from 2006 to 2016 of 6%, Homebush Bay – Silverwater had an overall growth of 104% and South Brisbane had an overall growth of 53%. Over the study period, the school student population at each SA2 continued to represented a consistent proportion of the total population, only increasing or decreasing by 1% in the cases of Lambton – New Lambton and Homebush Bay – Silverwater. In the case of South Brisbane, the school student population represented 10% of the total population across the whole study period.

These patterns suggest that the population of school student children grows at a similar rate to the total population. The interviews suggested the proportion of families with children occupying new medium-to-high density dwellings were not necessarily increasing, however the volume and rate at which these dwellings were bring delivered in these high growth areas was rapidly increasing, and so too was the number of families and school aged children.

Figure 32 School student population change at SA2, 2006, 2011, 2016

SA2	2006	2011	2016	change from 06-11 (+/-)	change (%)	change from 11-16 (+/-)	change (%)	overall	overall (%)
Lambton – New Lambton									
Total school student population	2842	2851	3031	9	0%	180	6%	189	7%
Total population	16190	17006	17231	816	5%	225	1%	1041	6%
Proportion of school student aged population to total population	18%	17%	18%	-	-	-	-	-	-
Homebush Bay - Silverwater									
Total school student population	1090	1460	2124	370	34%	664	45%	1034	95%
Total population	9738	12083	19906	2345	24%	7823	65%	10168	104%
Proportion of school student aged population to total population	11%	12%	11%	-	-	-	-	-	-
South Brisbane									
Total school student population	631	747	953	116	18%	206	28%	322	51%
Total population	6217	7569	9498	1352	22%	1929	25%	3281	53%
Proportion of school student aged population to total population	10%	10%	10%	-	-	-	-	-	-

70 Source: ABS Census 2006; 2011; 2016

5.3.2 TOTAL DWELLING CHANGE

The dominant dwelling typology in each study area differs. For Lambton – New Lambton, the most prevalent dwelling structure is detached dwellings, which represent more than 80% of the dwellings in the SA2 across all the years within the study period. Between 2006 to 2016, the largest growth in terms of dwelling count and proportion of change was observed in semi-attached dwellings, which increased by 75% or 360 dwellings. Apartments decreased by at least 40% over the study period.

For Homebush Bay – Silverwater, the most common dwelling structure is apartments in buildings of four or more storeys. Apartments of up to three storeys increased by 4%; all other typologies increased by more than 250%. The highest growth in terms of count of dwellings was observed in apartments in buildings of four or more storeys, with an overall increase of 3,480 dwellings or 379%. Semi-attached dwellings had the highest growth in terms of proportion of growth, increasing by 526% or 463 dwellings between 2006 to 2016.

Homebush Bay – Silverwater is within or adjacent to several priority precincts, a designation used by the NSW Department of Planning and Environment to denote accelerated planning, investment and renewal in certain areas, which aim to guide and align growth with the provision of necessary infrastructure and services (NSW DPIE, 2020) . As part of the UAP, Wentworth Point was rezoned to accommodate high density residential, commercial and recreational uses across two separate neighbourhoods (NSW DPIE, 2014) . The UAP Finalisation Report estimated that there would be 2,300 new dwellings within the precinct, as well as a new school – Wentworth Point Public School (NSW DPIE, 2014) .

In South Brisbane, all dwelling typologies increased over the study period. Over the study period, there is a clear shift from detached dwellings towards medium to high-density dwellings, in particular high-density. Detached dwellings, semi-attached dwellings and apartments in buildings of up to three storeys all decreased over the study period. Detached and semi-attached dwellings decreased by at least 70%. Conversely, apartments in buildings of four or more storeys increased by 134% or 1,145 dwellings.

South Brisbane Riverside was identified in the Brisbane CityShape 2026 plan, a 20-year strategic plan for Brisbane, as an area for major urban renewal (Brisbane City Council, 2005) . Under a Brisbane City Council initiative, the South Brisbane Riverside Neighbourhood Plan identified the process through which the area would be transformed into an area with more housing, more variety of housing options, greater access to public transport and jobs (Brisbane City Council, 2009) . Development in the area was planned to focus on higher densities; between 2006 to 2011, apartments in buildings of up to four or more stories increased by 70% and then by 134% to 2016.

Figure 33 Total change in dwelling structure in selected SA2s from 2006 to 2016

SA2	2006	2011	2016	change 06-11	% change	change 11-16	% change	change 06-16	% change
Lambton - New Lambton									
Total detached	5010	5118	5097	108	2%	-21	0%	87	2%
Total semi-attached	482	653	842	171	35%	189	29%	360	75%
Total apartments, in buildings of up to three storeys	702	582	417	-120	-17%	-165	-28%	-285	-41%
Total apartments, in buildings of four or more storeys	7	14	4	7	100%	-10	-71%	-3	-43%
Total	6201	6367	6360	166	3%	-7	0%	159	3%
Homebush Bay - Silverwater									
Total detached	250	256	896	6	2%	640	250%	646	258%
Total semi-attached	88	58	551	-30	-34%	493	850%	463	526%
Total apartments, in buildings of up to three storeys	378	339	395	-39	-10%	56	17%	17	4%
Total apartments, in buildings of four or more storeys	919	1379	4399	460	50%	3020	219%	3480	379%
Total	1635	2032	6241	397	24%	4209	207%	4606	282%
South Brisbane									
Total detached	809	1201	220	392	48%	-981	-82%	-589	-73%
Total semi-attached	314	135	74	-179	-57%	-61	-45%	-240	-76%
Total apartments, in buildings of up to three storeys	422	885	387	463	110%	-498	-56%	-35	-8%
Total apartments, in buildings of four or more storeys	853	1446	1998	593	70%	552	38%	1145	134%
Total	2398	3667	2679	1269	53%	-988	-27%	281	12%

Source: ABS Census 2006; 2011; 2016

5.3.3 TOTAL CHANGE IN MEDIUM TO HIGH DENSITY DWELLINGS

Medium to high-density dwellings (all dwellings except for detached dwellings) increased in all the SA2s over the study period. The growth in Lambton – New Lambton was lowest over the study period, at 6%; the proportion of medium to high-density dwelling types to the total number of dwellings remained consistent over the study period at 19-20%.

For Homebush Bay – Silverwater, medium to high-density dwellings increased by 28% from 2006 to 2011 and by 201% from 2011 to 2016, with an overall increase of 286% or 3,960 dwellings. The proportion of medium to high-density dwellings to total dwellings has remained high at around 85-87% over the Study period. The large increase as well as the high proportion of medium- to high-density dwellings over the Study period suggests that majority of the change in the area has been in these dwelling types. However, there was an overall increase of 258% in detached dwellings in the SA2 over the whole Study period. While majority of the change is in medium- to high-density dwellings, there was an overall substantial increase in the total dwellings.

In South Brisbane, there was an overall increase of medium to high-density dwellings of 55% from 2006 to 2016, with all of this change occurring between 2006 to 2011; there was no proportional change between 2011 to 2016, though there was a decrease of seven dwellings in that period. The proportion of medium to high density-dwellings to total dwellings in the SA2 increased from 66% in 2006 to 2011 and to 92% from 2011 to 2016. This suggests that while the number of medium- to high-density dwellings did not increase in the second half of the Study period, there was a decrease South Brisbane decreased from 1201 to 220, a decrease of 82%.

Figure 34 Total change in medium- to high-density dwellings from 2006 to 2016 in selected SA2s

SA2	2006	2011	2016	change 06-11	% change	change 11-16	% change	change 06-16	% change
Lambton - New Lambton									
Total medium to high density dwellings	895	992	984	97	11%	-8	-1%	89	10%
Total dwellings	6201	6367	6360	166	3%	-7	0%	159	3%
Proportion to total number of dwellings	19%	20%	20%						
Homebush Bay - Silverwater									
Total medium to high density dwellings	1385	1776	5345	391	28%	3569	201%	3960	286%
Total dwellings	1635	2032	6241	397	24%	4209	207%	4606	282%
Proportion to total number of dwellings	85%	87%	86%						
South Brisbane									
Total medium to high density dwellings	1589	2466	2459	877	55%	-7	0%	870	55%
Total dwellings	2398	3667	2679	1269	53%	-988	-27%	281	12%
Proportion to total number of dwellings	66%	67%	92%						

Source: ABS Census 2006; 2011; 2016

5.3.4 TOTAL CHANGE IN TOTAL SUITABLE MEDIUM TO HIGH-DENSITY DWELLINGS

As highlighted previously in this Study, standards such as the Canadian Housing Standard have determined that dwellings with two bedrooms or two bedrooms with study or other additional room are considered possibly suitable for families with children. The Standard also determined that dwellings with more than three bedrooms are considered suitable for families with children. The ABS also utilises this Standard when determining the suitability of dwellings for their households. We have undertaken analysis on dwellings that are considered 'possibly suitable' or 'suitable', that is dwellings that have two bedrooms or more, or multi-bedroom medium to high density dwellings (suitable medium to high density dwellings) for this Study.

In Lambton – New Lambton, there was an overall increase in suitable medium to high density dwellings across the Study period of 10%, or 89 dwellings. This growth is mostly in semi-attached dwellings, which increased by between 76% to 121% over the Study period. All apartment typologies decreased over the Study period. Four-bedroom semi-attached dwellings saw the largest increase over the Study period. Suitable medium to high density dwellings represent between 75-79% of all medium- to high-density dwelling development, but a small proportion of total number of dwellings, between 14% to 16% over the Study period. This suggests that despite an increase in some typologies of medium- to high-density dwelling development over the Study period, the area is still dominated by detached dwellings.

In Homebush Bay – Silverwater, the total number of suitable medium to high density dwellings increased by 300% over the Study period. All typologies in this group observed an overall loss from 2006 to 2016, except for 4-bedroom apartments in buildings of up to three storeys. The largest increase in terms of dwelling count was observed in 2-bedroom apartments in buildings of four or more storeys, which increased by 2,063 dwellings or 432% from 2006 to 2016. Suitable medium to high density dwellings comprised between 61% to 65% of all dwellings over the Study period and between 72% to 75% of medium- to high-density dwellings.

In South Brisbane, there was an increase in medium- to high-density dwellings, particularly in apartments. However, there are significantly more 1- and 2-bedroom apartments in buildings of four or more storeys; in 2016, these typologies represented 86% of apartments in buildings of four or more storeys. 3- and 4-bedroom apartments saw an overall increase of 23% and 3000%, respectively, however the increase is only 45 and 30 dwellings, respectively.

From 2006 to 2011, the number of suitable medium to high density dwellings, specifically apartments in buildings of up to three storeys represented a more significant proportion than other typologies. In 2011, 2- to 4-bedroom apartments in buildings of up to three storeys represented 98% of the total typology. This decreased to a proportion of 69% in 2016; there was a decrease in 2- to 4-bedroom apartments in buildings of up to three storeys of almost 200%.

Suitable medium to high density dwellings in South Brisbane represent a similar proportion of total dwellings to Homebush Bay – Silverwater, between 57% to 64% over the Study period; suitable medium to high density dwellings represented 70% to 91% of all medium- to high-density dwellings. This proportion decreases over the Study period from 91% in 2006 to 85% in 2011 and finally to 70% in 2016. Given that most new dwellings in that area over that time period were medium- to high-density (92% in 2016), this suggests a shift towards 1-bedroom medium- to high-density dwellings.

Figure 35 Total change in medium-high density dwellings by number of bedrooms in each SA2 from 2006-2016 (continued overleaf)   Source: ABS Census 2006; 2011; 2016

	2006	2011	2016	change 06-11	% change	change 11-16	% change	change 06-16	% change
Lambton - New Lambton									
Semi-attached dwellings									
1 bedrooms	49	69	79	20	41%	10	14%	30	61%
2 bedrooms	285	364	503	79	28%	139	38%	218	76%
3 bedrooms	134	205	229	71	53%	24	12%	95	71%
4+ bedrooms	14	15	31	1	7%	16	107%	17	121%
Flat or apartments in one to three storey blocks									
1 bedrooms	247	178	200	-69	-28%	22	12%	-47	-19%
2 bedrooms	333	326	185	-7	-2%	-141	-43%	-148	-44%
3 bedrooms	110	75	25	-35	-32%	-50	-67%	-85	-77%
4+ bedrooms	12	3	7	-9	-75%	4	133%	-5	-42%
Flat or apartments in blocks of four or more storeys									
1 bedrooms	0	10	0	10	1000%	-10	-100%	0	0%
2 bedrooms	7	4	4	-3	-43%	0	0%	-3	-43%
3 bedrooms	0	0	0	0	0%			0	0%
4+ bedrooms	0	0	0	0	0%			0	0%
Total MHDD	1191	1249	1263	58	5%	14	1%	72	6%
Total suitable medium to high density dwellings	895	992	984	97	11%	-8	-1%	89	10%
Proportion to total dwellings	14%	15%	16%						
Proportion to medium to high density dwellings	75%	79%	78%						

	2006	2011	2016	change 06-11	% change	change 11-16	% change	change 06-16	% change
Homebush Bay - Silverwater									
Semi-attached dwellings									
1 bedrooms	34	7	0	-27	-79%	-7	-100%	-34	-100%
2 bedrooms	39	8	41	-31	-79%	33	413%	2	5%
3 bedrooms	15	34	431	19	127%	397	1168%	416	2773%
4+ bedrooms	0	9	79	9	900%	70	778%	79	7900%
Flat or apartments in one to three storey blocks									
1 bedrooms	139	130	18	-9	-6%	-112	-86%	-121	-87%
2 bedrooms	178	171	272	-7	-4%	101	59%	94	53%
3 bedrooms	54	32	105	-22	-41%	73	228%	51	94%
4+ bedrooms	7	6	0	-1	-14%	-6	-100%	-7	-100%
Flat or apartments in blocks of four or more storeys									
1 bedrooms	213	318	1330	105	49%	1012	318%	1117	524%
2 bedrooms	478	757	2541	279	58%	1784	236%	2063	432%
3 bedrooms	213	280	503	67	31%	223	80%	290	136%
4+ bedrooms	15	24	25	9	300%	1	4%	10	67%
Total MHDD	1385	1776	5345	391	28%	3569	201%	3960	286%
Total suitable medium to high density dwellings	999	1321	3997	322	32%	2676	203%	2998	300%
Proportion to total dwellings	61%	65%	64%						
Proportion to medium to high density dwellings	72%	74%	75%						

Figure 35 Total change in medium-high density dwellings by number of bedrooms in each SA2 from 2006-2016 (continued from previous)

	2006	2011	2016	change 06-11	% change	change 11-16	% change	change 06-16	% change
South Brisbane									
Semi-attached dwellings									
1 bedrooms	0	0	10	0	0%	10	1000%	10	1000%
2 bedrooms	14	5	20	-9	-64%	15	300%	6	43%
3 bedrooms	268	104	33	-164	-61%	-71	-68%	-235	-88%
4+ bedrooms	32	26	11	-6	900%	-15	-58%	-21	-66%
Flat or apartments in one to three storey blocks									
1 bedrooms	11	10	119	-1	-9%	109	1090%	108	982%
2 bedrooms	284	597	189	313	110%	-408	-68%	-95	-33%
3 bedrooms	120	263	72	143	119%	-191	-73%	-48	-40%
4+ bedrooms	7	15	7	8	114%	-8	-53%	0	0%
Flat or apartments in blocks of four or more storeys									
1 bedrooms	134	355	612	221	165%	257	72%	478	357%
2 bedrooms	520	867	1112	347	67%	245	28%	592	114%
3 bedrooms	199	221	244	22	11%	23	10%	45	23%
4+ bedrooms	0	3	30	3	300%	27	900%	30	3000%
Total MHDD	1589	2466	2459	877	55%	-7	0%	870	55%
Total Suitable medium to high density dwellings	1444	2101	1718	657	45%	-383	-18%	274	19%
Proportion to total dwellings	60%	57%	64%						
Proportion to medium to high density dwellings	91%	85%	70%						

5.3.5 CHANGES IN SUITABLE MEDIUM TO HIGH DENSITY DWELLINGS AND SCHOOL STUDENT POPULATION

High level analysis was undertaken on the three case study sites to explore any observations in student age children and the total suitable medium to high density dwellings within an SA2. The change in total suitable medium to high density dwellings was reviewed against the proportion of school students to the total population across the SA2.

The total of student population in the case studies showed a high magnitude of change in school aged children numbers in Homebush Bay and South Brisbane from 2006 - 2016. In this time period Homebush Bay had a total increase in school aged students of 1034, and for South Brisbane nearly 190 students.

Across all three case studies, the proportion of school student-aged children remained fairly consistent from 2006 to 2016, with a fluctuation of 1% for New Lambton and Homebush Bay - Silverwater. The proportion of suitable medium- to high-density dwellings to total dwellings was consistent for New Lambton. Total dwellings in New Lambton grew by 3% from 2006 to 2016; suitable medium- to high-density dwellings grew by 10% in the same time period.

The proportion of suitable medium- to high-density dwellings to total dwellings in Homebush Bay - Silverwater fluctated by at most 4% from 2006 to 2016; the total number of suitable dwellings grew by 300% in the same period. In South Brisbane, the total number of suitable medium- to high-density dwellings grew by 19%; the proportion of these dwellings to total dwellings changed slightly by 4% over the study period. The proportion of school student-aged population to the total population in South Brisbane was 10% for each year in 2006, 2011 and 2016.

The overall increase of suitable medium- to high-density dwellings in all SA2s and the consistent proportion of school student-aged population to total population supports the insight from the interviews. While the "rate" at which households with children were moving into medium- to high-density dwellings is not necessarily increasing, there is a

greater intensity of dwellings into these areas, and an increasing amount of households with children within these areas.

For Homebush Bay - Silverwater, where there has been an increase of at least 100% across all the metrics presented so far and where medium- to high-density dwellings have represented more than half of all dwellings from 2006 to 2016, it is apparent that households with children are accepting of medium- to high-density dwellings. Insights from interviews and research into the schools in the local area support that these schools are under pressure from the magnitude of the new population moving into the area.

Figure 36 Proportion of school student population to suitable medium to high density dwellings from 2006-2016 (continued overleaf)

	2006	2011	2016	change 06-11	% change	change 11-16	% change	change 06-16	% change
Lambton - New Lambton									
Total suitable medium to high density dwellings	895	992	984	97	11%	-8	-1%	89	10%
Total dwellings	6201	6367	6360	166	3%	-7	0%	159	3%
Total population 5-18 years old	2842	2851	3031	9	0%	180	6%	189	7%
Total population	16190	17006	17231	816	5%	225	1%	1041	6%
Proportion of suitable medium to high density dwellings to total dwellings	14%	16%	15%	-	-	-	-	-	-
Proportion of school student population to total population	18%	17%	18%	-	-	-	-	-	-

Source: ABS Census 2006; 2011; 2016

Figure 36 Proportion of school student population to suitable medium to high density dwellings from 2006-2016 (continued overleaf)

	2006	2011	2016	change 06-11	% change	change 11-16	% change	change 06-16	% change		2006	2011	2016	change 06-11	% change	change 11-16	% change	change 06-16	% change
Homebush Bay - Silverwater										**South Brisbane**									
Total suitable medium to high density dwellings	999	1321	3997	322	32%	2676	203%	2998	300%	Total suitable medium to high density dwellings	1444	2101	1718	657	45%	-383	-18%	274	19%
Total dwellings	1635	2032	6241	397	24%	4209	207%	4606	282%	Total dwellings	2398	3667	2679	1269	53%	-988	-27%	281	12%
Total population 5-18 years old	1090	1460	2124	370	34%	664	45%	1034	95%	Total population 5-18 years old	2842	2851	3031	9	0%	180	6%	189	7%
Total population	9738	12083	19906	2345	24%	7823	65%	10168	104%	Total population	16190	17006	17231	816	5%	225	1%	1041	6%
Proportion of suitable medium to high density dwellings to total dwellings	61%	65%	64%	-	-	-	-	-	-	Proportion of suitable medium to high density dwellings to total dwellings	60%	57%	64%	-	-	-	-	-	-
Proportion of school student population to total population	10%	12%	11%	-	-	-	-	-	-	Proportion of school student population to total population	10%	10%	10%	-	-	-	-	-	-

Source: ABS Census 2006; 2011; 2016

5.3.6 SHIFTS IN SCHOOL STUDENT POPULATION AND DWELLING TYPOLOGY

Another way to look at the changes in school student population and the shifts in dwelling typology is the number of school students per 100 dwellings in each SA2.

In Lambton - New Lambton, the number of school students per 100 dwellings remained fairly consistent across the study period. This is similar to proportion of suitable dwellings to all dwellings, as well as the proportion of the school student population to the total population. Suitable medium- to high-density dwellings occupy a small proportion of all dwellings across the study period.

In Homebush Bay - Silverwater, in 2016, there were higher proportions of suitable medium to high density dwellings but the number of students per 100 dwellings decreased. In 2006, the proportion of apartments (all storeys) and semi attached dwellings was 66%, there were 72 school students per 100 dwellings. In 2016, when the proportion of all apartments was just over 90%, the number of school students per 100 dwellings dropped to 34. While this decrease is quite significant, so is the increase in the total number of dwellings, particularly suitable medium- to high-density dwellings, which increased by 203% from 2011 to 2016. The total population also increased by 65% in the same time period. This supports the insight that while the rate of households with children moving into apartments and other suitable dwellings may not be increasing, but there is a significant increase in the number of these dwellings, coinciding with an increase in the population.

South Brisbane presented a slightly different outcome. In contrast to Homebush Bay - Silverwater, there was increase in school students per 100 dwellings from 2011 to 2016. There was also a significant increase in the proportion of suitable medium- to high-density dwellings to total dwellings, even as the total dwellings decreased. The proportion of the school student population to total population remained consistent. More apartments were delivered, likely replacing other typologies, and more school students were recorded in the area. This suggests that the school students in the area are residing in these dwellings. This also may suggest that in this area, the rate of households with children residing in these dwellings may be increasing.

Figure 37 School students per 100 dwellings per SA2

Source: ABS Census 2006; 2011; 2016

5.3.7 TENURE AND PRICE

In Lambton – New Lambton, there is a higher proportion of owned dwellings than rented dwellings. This proportion is consistent across the Study period and only changes slightly by 1% from 2006 to 2011.

In Homebush Bay – Silverwater, there is a more even split of tenure, with fluctuating proportions over the Study period. Earlier in the Study period, there were more owned dwellings than rented dwellings in the SA2; however, this proportion shifted later in the Study period. In 2016, 40% of dwellings were owned, 43% were rented. When also considering dwelling typology, the data suggests that most dwellings in Homebush Bay – Silverwater are rented multi-bedroom medium- to high-density dwellings, specifically in buildings of four or more storeys.

In South Brisbane, there have been more rented than owned dwellings over the whole Study period. While the proportion of owned dwellings has only changed slightly over the Study period, increasing by 3% from 2006 to 2011 and then decreasing again by 3% in the following half of the Study period, the proportion of rented dwellings increased by 10% from 2006 to 2011.

The overall increase in the number of dwellings in the SA2 suggests that half of households accessing housing in the area do so through renting. The overall increase in Suitable medium to high density dwellings also suggests that most households accessing in area may be accessing Suitable medium to high density dwellings as a result of a shift in the types of development being delivered. The proportion of school student-age children in the SA2 has not increased over the Study period, remaining at 10%.

Figure 38 Tenure at each SA2 from 2006-2016

SA2	2006	2011	2016
Lambton - New Lambton			
Owned	62%	61%	61%
Rented	26%	26%	26%
Homebush Bay - Silverwater			
Owned	52%	49%	40%
Rented	44%	36%	43%
South Brisbane			
Owned	23%	26%	23%
Rented	41%	51%	51%

Source: ABS Census 2006; 2011; 2016

In terms of price, sales data was not available in the same form as sales data from Access Canberra. The median weekly rent and monthly mortgage repayments at the SA2 level was reviewed. This data is supplemented by suburb level rent and price data from RealEstate.com.

In Lambton – New Lambton, both the weekly rent and monthly mortgage repayments are the lowest of the three case studies, with the highest values for both observed in 2016 at $350-$374 weekly rent and $,2000-$2,199 monthly mortgage repayment. In 2020, the weekly rent for units was consistent with the median weekly rent for 2016. The weekly rent for houses was slightly higher at $480.

Detached dwellings are the dominant housing typology in this SA2 and more bedrooms in a dwelling are more common. The higher rent price for houses, which are likely detached multi-bedroom dwellings, may suggest that more people are paying a higher rent price overall as these dwellings are more prevalent in the area.

Homebush Bay – Silverwater had the highest price data among the three case studies. The median monthly mortgage repayment did not change from 2006 to 2016, remaining at $3,000-$3,999 throughout the whole study period. This was well above the state median in 2016, $1,986. The median weekly rent in the SA2 increased from 2006 to 2011 but did not change to 2016; according to suburb level data on Wentworth Point, the rent for a unit in 2020 is $520 and $560 for a house. This suggests that the rent in the area has continued to increase since 2016. While in 2016, Homebush Bay – Silverwater had a slightly higher proportion of renters, there were slightly more owned dwellings. The high mortgage repayments may indicate the presence of a more affluent population in the area. This may have shifted towards a more mobile population that is accessing housing in the area by renting.

South Brisbane's median weekly rent prices are similar to those of Homebush Bay – Silverwater. The weekly rent and house prices in 2020 in the suburb also show a similar increase to Wentworth Point. Between 2006 to 2011, the median monthly mortgage repayments increased from $1,600-$1,999 to $3,000-$3,999 and then decreased to $2,000-$2,199 in 2016. The decrease in mortgage repayments suggests a decrease in the price of dwellings in the area; however, the decrease in the proportion of owned dwellings in the same time period as well as the lack of change in the median weekly rent price from 2011 to 2016 suggest that people moving into the area are still choosing to access it by renting rather than purchasing and owning a dwelling.

Figure 38 Median price at each SA2 from 2006-2016

SA2	2006	2011	2016	2016	2020 – suburb level weekly rent and price	
Lambton - New Lambton				NSW Median	House	Unit
Weekly rent	$200-$224	$300-$324	$350-$374	$380	$480	$360
Monthly mortgage / price at suburb level	$1600-$1999	$2000-$2199	$2000-$2199	$1,986	$725,000	$440,000
Homebush Bay - Silverwater				NSW Median	House	Unit
Weekly rent	$350-$449	$450-$549	$450-$549	$380	$560	$520
Monthly mortgage / price at suburb level	$3000-$3999	$3000-$3999	$3000-$3999	$1,986	$755,000	$672,944
South Brisbane				NSW Median	House	Unit
Weekly rent	$350-$449	$450-$549	$450-$549	$380	$500	$480
Monthly mortgage / price at suburb level	$1600-$1999	$3000-$3999	$2000-$2199	$1,986	No data	$480,000

Source: ABS Census 2006; 2011; 2016;RealEstate.com Suburb Profiles

5.3.8 CULTURAL DIVERSITY - LANGUAGE SPOKEN AT HOME

In Lambton – New Lambton, majority of households that speak English at home. However, while this proportion has remained high over the study period, the proportion of English-speaking households has decreased from 90% to 2006 to 85% in 2016. This has not been accompanied by a subsequent increase in the proportion of other languages spoken at home; the proportion of second- and third-highest languages were much lower.

New Lambton Public School reported that in 2018, of the 637 students enrolled, 86 students (14%) were from a non-English speaking background (New Lambton Public School 2019) . Lambton Public School reported in the same year that of 392 students enrolled, 38 students (10%) were from a non-English speaking background (New Lambton Public School 2019) . . The higher proportion of language and cultural groups in the school enrolments suggests that students from outside of the immediate local area may be enrolled in the school.

In Homebush Bay – Silverwater, both Newington and Wentworth Point Public Schools indicated in their 2018 Annual Reports that they catered to a diverse community, with over 50 language and cultural groups represented in their respective student bodies (Newington Public School 2018; Wentworth Point Public School 2019). This is also reflected in the wider population. At an SA2 level, the proportion of households speaking English is less than half of the households. The second and third most common language spoken at home across the whole study period are Chinese and Korean, accounting for between 9 to 16% of households.

Korean and Chinese were also identified in the 2018 Newington Public School Annual Report as two most common cultural and language groups in their student body aside from English (Newington Public School 2010) . 77% of the student body identified as from a language other than English (Newington Public School 2019) .

In South Brisbane, approximately half the population speak English at home. This proportion decreased from 55% in 2011 to 49% in 2016. The decrease in English as the main language spoken at home was also accompanied by a subsequent increase in the proportion of households that speak Chinese, which increased from 7% in 2011 to 11% in 2016. Indo-Aryan, Southeast Asian Austronesian and Korean also appeared as top languages spoken at home over the Study period. According to the 2018 West End State School Annual Report, 44% of students speak a language other than English (West End State School 2019) .

Figure 40 Top three languages spoken at home in each SA2 from 2006-2016

SA2	2006	2011	2016
Lambton - New Lambton			
English	90%	88%	85%
South Slavic	2%	1%	1%
Chinese	1%		1%
Indo-Aryan		1%	
Homebush Bay - Silverwater			
English	33%	38%	32%
Chinese	11%	11%	16%
Korean	9%	10%	11%
South Brisbane			
English	54%	55%	49%
Chinese	5%	7%	11%
Indo-Aryan			3%
Southeast Asian Austronesian		2%	
Korean	2%		

Source: ABS Census 2006; 2011; 2016

5.4 INSIGHTS FROM SCHOOLS PLANNING IN NSW AND QLD

Discussions with schools planning professionals across Sydney, Newcastle and Brisbane provided the following insights into schools planning.

1.   Multiple trends impacting housing for families with school students

We heard that multiple trends are shifting the way that families with children are living in cities. Overall, we heard that there is a diversity of housing typologies and households in Sydney, Newcastle and Brisbane – including trends showing families in smaller homes as well as families taking up larger homes, in multi-generational households.

Overall in Sydney, there has been significantly higher population growth, driving the demand for more dwellings and diversity of dwelling types. High housing price growth alongside minimal income growth impacted housing affordability and influenced the types of housing that families with children may live in.

Alongside housing affordability, the desire for access to services was noted as a high influence on households shifting to existing residential suburb areas and higher density dwellings with greater accessibility to public transport and walkability to services such as shops, community facilities such as parks. Some participants suggested that inner ring areas were desireable as carers were looking to reduce commute time and time spent on upkeep of homes to focus on spending more time with family.

Cultural diversity was cited as an influence on families with children living in medium to higher density living. It was suggested that families from Europe or Asia may be familiar with family living in smaller homes or apartment living.

Cultural diversity was also cited as an influence on multi-generational households. There were experiences of areas with high increase multi-generational households in Sydney that generated high school student generation that was not forecasted.

Across both jurisdictions interview participants suggested that there is diversity in the housing that families with children and school age students live in, with the desire for families in detached dwellings remaining.

2.   Higher student populations in areas of higher density

Experiences in Sydney suggested that high population growth was shifting more dwellings (of higher density) into existing residential suburb areas. In these areas schools planners saw higher student populations, however the rate of students within higher density dwellings was not increasing. As an example, overall, in an area about 5 children per 100 residents were observed to be entering a government school, with other children going to a non-government school. Schools planners in NSW noted that they had not seen this rate increase, but noted that significantly more school students are being generated from these areas as there are more dwellings in overall.

3.   Population projections and enrolment forecasts informing schools planning

In NSW, multiple approaches and analysis inform schools planning. Schools planning has shifted recently to work closer with the NSW State Government Common Planning Assumptions and population projections provided by the Department of Planning, Industry and Environment (NSW DPIE). We heard from practitioners in schools planning that this has resulted in greater alignment across data sets across the state. Prior to these different methodologies were applied on apportioning projections across the states and to school catchments.

In addition to the NSW wide projections, Schools Planning in NSW undertakes additional analysis. This includes undertaking analysis to understand 'what's happening on the ground' with trends influencing school populations. In NSW, Medicare data is reviewed to understand new births, and 'bottom up' potential changes in school population – especially to inform Kindergarten cohorts.

We heard that some Local Government Areas (LGAs) undertook their own population projections, for example City of Sydney undertakes work with ID planning to produce population forecasts. Experience suggests that these forecasts do not align with NSW DPIE projections, and usually exceed the forecasts of NSW DPIE.

There were some challenges identified in the current planning process including the following:

»   Population projections are supplied at Local Government Level. This creates some challenges in distributing this population across Local Government Areas (LGAs) as there may be some high concentrations of school populations within LGAs for example in areas of high density near train station in Chatswood – and further work is required to understand this distribution to inform school planning; and

»   There are no housing forecasts for Newcastle, and similarly with regions outside the Sydney Metropolitan Area. Analysis by schools planning needs to be undertaken to apply population projections from the NSW Government and determine forecast student populations and assign them to schools.

4.   Shifts in schools planning

We heard from schools planning practitioners that schools planning had previously been influenced strongly by individual school demand. It was recognised that the popularity of a school could be influenced by a well regarded principal or particular curriculum, and that these factors did not provide long term, strategic planning for schools infrastructure.

Experience in NSW highlighted that this type of schools planning had attributed demand to schools that have had demand in the past, however this did not always align with actual demand.

5.   Planning with non government schools

The movement between government and non government schools by students requires understanding to inform schools planning. In general, NSW schools planners highlighted that a majority of primary aged school students attend a local primary school, and then in secondary school there is an increase in school students going to private schools. It was observed that in some areas there has been a return to public schools for all school cohorts. One example is Coffs Harbour, where public school enrolment percentages are high. From in Years 11 to 12, there has been increased enrolment in government schools. This is similar to the experience in the ACT, wherein primary school students attend public schools, followed by an increase in private high school attendance and then a return to public schools for college. Unlike the ACT, NSW does not have a state or metropolitan area-wide college system.

In Brisbane, planners noted that private school providers were engaged in planning. It was noted that state school providers are being pushed out into the suburbs whereas the inner core has more private schools.

6.   Family friendly housing products

In Brisbane, we heard that housing product is shifting towards targeting households with children. It has been observed that competition for the school catchment within the South Brisbane area where there is a lot of investor and owner stock is now targeting these households moving in. Observations suggest that these households are renting 2 bedroom apartments across these areas. These areas have high access to amenity and access to transport and very close to the city centre.

At the development supply level, Brisbane City Council has observed trends towards households with children living in townhouses rather than high rise apartments. The Council observed that submissions for developments would change during the application process in order to include dwellings that would be suitable for households with children. The changes would include an increase in bedroom sizes and the overall number of three-bedroom dwellings.

6. Further Analysis

6.1 RECOMMENDATIONS FOR FURTHER ANALYSIS

Areas for analysis were identified through this Study to support a further understanding of housing choices for families with student age children. These are summarised below.

1. Expanded sample size

The residential site analysis has been undertaken as a limited sample analysis (including 15 residential sites). Observations are noted within the analysis, however clear correlations between the data were not able to be determined due to the limited sample size. This sample analysis provides a testing of an approach, and an expansion of the sample size is suggested. A larger sample size would also allow regression analysis to be performed on each factor and reveal whether there are strong statistical correlations between influencing factors and student aged population.

2. Study and compare sites with detached dwelling development

This study focused on the characteristics of medium-to-high density developments in order to better develop an understanding of the school planning implications as the state shifts to compact development. A comparison of the preferences of households of families with children between detached dwellings and medium-to-high density dwelling typologies was not undertaken.

Further analysis which compares the rate of school aged children per dwelling between detached and semi-detached/attached dwellings would provide quantifiable evidence toward differences or similarities. This would help ground the findings of this study by providing relatable comparisons across other typologies in order to achieve a more holistic understanding of generation of school aged children as well as housing preference. It will also help to highlight the need for schools planning to respond to the changing nature and focus of urban development.

3. Correlation of student address to individual dwelling attributes

Analysis within this Study documented the overall development site typology and the total student population at each development site address. Further analysis is suggested to understand the individual dwelling attributes school age students may be occupying to understand if families with student aged children in these developments occupying the multi-bedroom dwellings within these development sites only. If so, these families may be occupying a small proportion of the overall dwellings, however they may make up a significant proportion of the multi-bedroom dwellings within a development site.

4. Longitudinal dwelling studies of families with children

Analysis within this Study documented the overall development site typology and the total student population at each development site address for each year of the Study period. Additional analysis is suggested to understand the movement patterns of families with school aged children. For example, further analysis is suggested to understand if families move into new medium to high density dwellings with younger, non-school-age children or young couples are moving into these new developments before starting a family and stay when children enter the school system, and or if families had recently moved into the development when ready for school.

Additional analysis may also be undertaken on the movement of students throughout the school cohorts. From our sample analysis, we observed that for older developments, there were peaks and troughs of total student populations, and the student population increased in age throughout the years. This may suggest that children who are living in these developments are growing up, getting older and moving up and out of the school system. It is suggested that further analysis of student IDs be undertaken to confirm if this trend is occurring.

5. Correlation of student addresses to tenure

The tenure of each individual student at the development site was not included in the School Census data provided. It is suggested that further analysis be undertaken to

understand housing tenure of families with school age students.

6.   Further analysis of lag in student population in new developments

Further analysis may contribute to an understanding of 'lag' in student population in new developments is related to families with school students waiting for available rental stock to open on the market from these relatively new developments.

Median sales price was reviewed for each development site. Additional analysis may be undertaken to understand if there are lags in student population in less affordable areas due to families with school students waiting for available rental stock to open on the market from these relatively new developments.

7.   Understanding wider student population shifts and broader trends at SA1s

In the analysis of student population at a site and the SA1, for some sites we saw increased student population at sites correspond to increased student population growth at SA1s. Further analysis is suggested to determine if this may be related to other, new developments being delivered in the immediate surrounding area, or if student populations are moving into existing dwelling stock.

Further analysis is suggested to understand broader trends that may be impacting the initial high occupation in Watermark, and similarly with The Quay site including higher supply of affordable housing options alongside Gungahlin as a key employment centre; and relationship with other new developments in Lake Tuggeranong.

8.   Deeper understanding of settlement patterns and schools population

Classification of existing residential suburb and new residential suburb suburbs have been informed by ACT Education data. Further classification of areas aligned with ABS settlement definitions is suggested to be undertaken as part of further analysis.

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Appendix 1 - Development sites

ACT URBAN INFILL STUDY

SITE SUMMARY DATA SOURCES

SITE ADDRESS
Source: Development application data from
EPSDD, collated by ACT Education

Key information

SA1 Number	ABS Census 2016
Classification	ACT Education School Student Census
Total population at SA1	ABS Census 2016
Median ratio of occupation	Calculation using data from ACT Education School Student Census
Housing tenure at SA1/ SA2	ABS Census 2016 ABS Geography differs according to availabilty of data and limitations of Study, i.e. contextual information for Sites 1-3, 6 and 11 have been reviewed at an SA2 level
SEIFA-IEO at SA1	ABS Census 2016
IHAD Quartile at SA1	ABS Census 2016; This information has been reviewed at an SA1 level as the IHAD Index is only published at an SA1 level.

Languages spoken at home at SA1/SA2	ACT Education School Student Census 2010-2019; ABS Geography differs according to availabilty of data and limitations of Study, i.e. contextual information for Sites 1-3, 6 and 11 have been reviewed at an SA2 level
Median price at site	Access Canberra sales data 2012-2019
Median price at SA1/ SA2	Access Canberra sales data 2012-2019; ABS Geography differs according to availabilty of data and limitations of Study, i.e. contextual information for Sites 1-3, 6 and 11 have been reviewed at an SA2 level
Schools of residents	
Primary	ACT Education School Student Census
Secondary	ACT Education School Student Census
College	ACT Education School Student Census

Change in dwelling typology (count)

Legend: 1-bedroom, 2-bedroom, 3-bedroom, 4 or more

Development application data from EPSDD, collated by ACT Education

ABS Census 2011-2016

School enrolment at site

Legend: Primary, Secondary, College, Student population

ACT Education School Student Census 2010-2020

Watson

Campbell

Narrabundah

Kingston

Franklin

Casey

Lawson

Lyneham

Turner
Included due to the location
of two development sites
within this SA2

Belconnen

Greenway
Selected as a development area
with different environmental
factors to the
other selected SA2s

Lyons

Phillip

Wright

ACT URBAN INFILL STUDY

1 - MAGNOLIA MEWS

25 Jerrabomberra Avenue, 50 Lumeah Street

Completed in 2005, Magnolia Mews is a 32-dwelling development comprised of a mix of apartments and town houses within six row-blocks. The town houses range in size from 94-157 sqm and the apartments range in size from 70-116 sqm. The development has a communal barbecue area, a swimming pool and a vegetable garden.

Magnolia Mews is located in Narrabundah, across from the Narrabundah College with access to multiple sporting grounds such as the Jerrabomberra Sports Ground and the Boomanulla Oval. The site is located in a primarily residential area with proximity to hotels and other short-stay accommodation. The closest access to retail and services is in the Fyshwick Town Centre.

Magnolia Mews is one of the smaller dwellings amongst the development sites. The site attracted a median ratio of school student occupation of 13%, higher than the overall median school student occupation of all sites. The highest school student occupation for the site across the Study period was 31%.

As seen through other older development sites, the site observed to experience some lifecycle effect, as some years within the study period high school and college-age children were the largest groups. The increase in these groups coincided with a decrease in primary-age students, while the overall site population remained consistent; these may have been the same school students ageing and progressing into the next school cohort.

Key information

SA1 Number	8106717	
Classification	Infill	
Total population at SA1	383	
Median ratio of occupation	13%	
Housing tenure at SA2	O - 55.1%	R - 41.8%
SEIFA-IEO at SA1	10	
IHAD Quartile at SA1	4th - 39%	
Languages spoken at home at SA2	English (83%) Indo-Aryan (3%), French (2%)	
Median price at site	$549,000	
Median price at SA2	Unit - $451,250	
	House - $810,000	
Schools of residents		
Primary	Narrabundah Early Childhood School Telopea Park School Red Hill Primary School	
Secondary	Telopea Park School The Woden School Black Mountain School	
College	Narrabundah College Gungahlin College	

Change in dwelling typology (count)

School enrolment at site

ACT URBAN INFILL STUDY

2 - SPACE

Lyneham

Turner

Included due to the location of two development sites within this SA2

155 Northbourne Avenue, 24 Forbes Street

Space is the first half of a staged development, completed around 2006-2007. Space features apartments of sizes between 117 to 250 sqm in two residential flat buildings, facing onto Northbourne Avenue and Forbes Street.

Among the development sites, Space and Space2 are located closest to the city centre of Canberra, directly on the Canberra Light Rail alignment. Space and Space2 are located in close proximity to Haig Park. Turner Primary School and Turner School are located within a 500m radius from the site. The closest access to retail is in O'Connor, Braddon and the city centre.

Space had one of the highest median sales price across the development sites in the Study period, approximately $200,000 over the median unit price at the SA2. Space also exhibited a low median ratio of student occupation, at 3%.

Space displayed low student population in secondary and college age cohorts across the years, however in one year, 2017 there was only one secondary student within the whole development.

Across the SA2 from 2011 - 2016, there was a reduction in number of detached dwellings, and increase in Apartments of 1 - 3 storeys and Semi-Attached dwellings. From 2011 to 2016, there was an overall increase in student population at SA2.

Key information

SA1 Number	8105712	
Classification	Infill	
Total population at SA1	338	
Median ratio of occupation	3%	
Housing tenure	O - 34.1%	R - 63%
SEIFA-IEO	10	
IHAD Quartile	3rd - 34%	
Languages spoken at home at SA2	English (69%), Chinese (7%), Indo-Aryan (4%)	
Median price at site	$645,000	
Median price at SA2	Unit - $478,000	
	House - $1,185,000	
Schools of residents		
Primary	Turner Primary School Rosary Primary School Yarralumla Primary School	
Secondary	Lyneham High School	
College		

Change in dwelling typology (count)

School enrolment at site

ACT URBAN INFILL STUDY

3 - SPACE2 THE RESIDENCE

Lyneham

Turner
Included due to the location
of two development sites
within this SA2

165 Northbourne Avenue,
32 and 36 Forbes Street

Space2 is the second half of the overall Space development. Space2 is comprised of both apartments - in a residential flat building facing Northbourne Avenue - and town houses facing Forbes Street.

Among the development sites, Space and Space2 are located closest to the city centre of Canberra, directly on the Canberra Light Rail alignment. Space and Space2 are located in close proximity to Haig Park. Turner Primary School and Turner School are located within a 500m radius from the site. The closest access to retail is in O'Connor, Braddon and the city centre.

Space 2 hosted higher median ratio of student occupation than Space 1. The development site also has more consistent student population of secondary and college students throughout the years of the Study period.

The dwelling typology of Space 2 differs through the higher proportion of 3 bedroom dwellings 25% in Space 2 and less than 1% in Space 1.

Key information

SA1 Number	8105712	
Classification	Infill	
Total population at SA1	338	
Median ratio of occupation	7%	
Housing tenure at SA2	O - 34.1%	R - 63%
SEIFA-IEO at SA2	10	
IHAD Quartile at SA1	3rd - 34%	
Languages spoken at home at SA2	English (69%), Chinese (7%), Indo-Aryan (4%)	
Median price at site	$671,000	
Median price at SA2	Unit - $478,000	
	House - $1,185,000	
Schools of residents		
Primary	Turner Primary School Cranleigh School Canberra Grammar School North Ainslie Primary	
Secondary	Lyneham High School	
College	Dickson College	

Change in dwelling typology (count)

School enrolment at site

ACT URBAN INFILL STUDY

4 - AXIS APARTMENTS

Lyneham

1 Mouat Street

Axis Apartments was completed in 2011. It is comprised of 349 apartments and is the largest among the development sites in terms of number of dwellings. The 349 dwellings are distributed over three residential flat buildings. The site has both apartments and town houses.

Axis is adjacent to Southwell Park, as well as a number of sports fields that serve active recreational and sports uses. The nearest retail centre is the Dickson Centre, which is undergoing renewal and revitalisation. The site is located in close proximity to mass transit, particularly the Dickson Interchange Light Rail Station. The site is also located nearby the Lyneham High School and Brindabella Christian College.

Axis showed a consistent increase in student population throughout the years of the study period up until 2018, with a drop in student population in 2019 then increase again in 2020. At its peak, Axis hosted 55 students, however due to the large number of dwellings, the median ratio of occupation below median, at 8%.

The dwelling typologies at its parent SA1 showed significant change, with increase in Apartments 4+ storeys. This change in typology is likely to be associated with Axis development.

Key information

SA1 Number	8105711	
Classification	Infill	
Total population at SA1	858	
Median ratio of occupation	8%	
Housing tenure at SA1	O - 23%	R - 75%
SEIFA-IEO at SA1	10	
IHAD Quartile at SA1	4th - 31%	
Languages spoken at home at SA1	English (52%), Indo-Aryan (9%), Chinese (6%)	
Median price at site	$415,000	
Median price at SA1	Unit - $372,900	
	House - $825,000	
Schools of residents		
Primary	Lyneham Primary School Kaleen Primary School Turner School Majura Primary School Miles Franklin Primary School Canberra Girls Grammar School North Ainslie Primary Brindabella Christian College Islamic School of Canberra St Joseph's Primary School	
Secondary	Lyneham High School Merici College Melrose High School	
College	Dickson College Gungahlin College Radford College St Mary MacKillop College University of Canberra Senior Secondary College Lake Ginninderra	

Change in dwelling typology (count)

School enrolment at site

ACT URBAN INFILL STUDY

5 - ARTIQUE

39-43 Blamey Crescent

Artique is a development site in Campbell, completed in 2011. It is comprised of two residential flat buildings with basement parking.

Artique is located in close proximity to bus stops. The site is also adjacent to open space - Georgie Cross Park, Anzac Park, Reid Park, Legacy Park as well as the Australian War Memorial. Canberra Grammar School is located within a 500m radius from the site. The closest access to retail is approximately 800m to the east, further within Campbell. The site is also located directly adjacent to the Campbell Child Care Centre.

Artique has the highest median ratio of student occupation of all sites at 33%. The site is also was one of the smallest sites within the study at a total of 12 dwellings.

Key information

SA1 Number	8112401	
Classification	Infill	
Total population at SA1	564	
Median ratio of occupation	33%	
Housing tenure at SA1	O - 48%	R - 48%
SEIFA-IEO at SA1	10	
IHAD Quartile at SA1	4th - 28%	
Languages spoken at home at SA1	English (91%), Chinese (3%), Greek (1%)	
Median price at site	$514,500	
Median price at SA1	Unit - $325,000	
	House - $977,500	
Schools of residents		
Primary	Campbell Primary School North Ainslie Primary School	
Secondary	Campbell High School	
College	Dickson College	

Change in dwelling typology (count)

School enrolment at site

ACT URBAN INFILL STUDY

6 - ALLURE

50 Victoria Owen Circuit

Allure is located in the greenfield area of Casey, at 50 Victoria Owen Circuit. Allure has 10 dwellings in total and consists of two row-blocks of town houses with basements and garages. The development was completed in 2012. It is comprised of nine 3-bedroom town houses and one 4-bedroom town house. The dwellings feature a separate study and two bathrooms.

The site is located in a residential area. The closest access to public transport is located on Plimsoll Drive, approximately 400m from the site. Springbank Rise Park is located approximately 1.1km from the site; the site is also directly adjacent to the Kinleyside nature reserve. The closest access to retail is in Casey Market Town, around 1.5km from the site.

Allure had one of the highest median ratio of occupation within the study, after Axis site. The site has a small number of dwellings (10) and consists of only multi-bedroom dwellings (3 or 4 bedrooms). Since development, Allure had a one to two year 'lag' in seeing student populations within the development site.

Key information

SA1 Number	8103617	
Classification	Greenfield	
Total population at SA1	382	
Median ratio of occupation	25%	
Housing tenure at SA2	O - 73.3%	R - 22%
SEIFA-IEO at SA2	10	
IHAD Quartile at SA1	4th - 58%	
Languages spoken at home at SA2	English (79%), Indo-Aryan (13%), Chinese (3%)	
Median price at site	$508,500	
Median price at SA2	Unit - $390,000	
	House - $550,000	
Schools of residents		
Primary	Gold Creek Primary School Mount Rogers Primary School Evatt Primary School Neville Bonner Primary School	
Secondary	Gold Creek High School	
College	Gungahlin College	

Change in dwelling typology (count)

School enrolment at site

ACT URBAN INFILL STUDY

7 - QUAYSIDE

50 Eastlake Parade

Quayside was completed in 2007 and is made up of a single residential flat building. The building has ground-floor commercial uses. The site is close to the civic heart of Canberra as well as other cultural attractions such as the National Library of Australia, Questacon and Old Parliament House. The site is located in a mixed-use residential on the Kingston foreshore; the adjacent area has retail, restaurants and market areas.

The site is located adjacent to Bowen Park, Norgrove Park, Telopea Park and the Jerrabomberra Wetlands Nature Reserve.

Quayside has a low median ratio of student occupation (5%). This is lower than the study median.

The development has a high proportion of 1-bedroom apartments - 79%. At the SA1, there was high change fluctuation in the student population, after a peak at 2016, there was steep drop in student population in 2018. This was not reflected in the at a site level.

The SA1 also saw large change in dwelling typology. From 2011, there was approximately 75 apartments 4+ storeys, in 2016, there was more than 150. This may be attributed to the Quayside development site.

Key information

SA1 Number	8113101	
Classification	Infill	
Total population at SA1	377	
Median ratio of occupation	5%	
Housing tenure at SA1	O - 39%	R - 61%
SEIFA-IEO at SA1	10	
IHAD Quartile at SA1	3rd - 41.1%	
Languages spoken at home at SA1	English (77%), Japanese (4%), Indo-Aryan (3%)	
Median price at site	$427,725	
Median price at SA1	Unit - $635,000	
	House - N/A	
Schools of residents		
Primary	Forrest Primary School Redhill Primary School Narrabundah Early Childhood School Orana Steiner School Yarralumla Primary School	
Secondary	Telopea Park School Canberra Grammar School	
College	Narrabundah College	

Change in dwelling typology (count)

School enrolment at site

ACT URBAN INFILL STUDY

8 - AMBIENTE

61-65 John Gorton Drive, 2 Peter Cullen Way, 58-62 Max Jacobs Avenue

Ambiente is located in the greenfield suburb of Wright. It is a mixed-typology development, with 175 dwellings in total spread over three residential flat buildings and two row-blocks of town houses. It is located next to Link Park, and adjacent to a number of other open spaces: Wright Children's Playground, Coombs Oval, the Coombs Children's Playground and Stromlo Forest Park.

There are several bus stops along John Gorton Drive. Large-format retail, in the form of a grocery store is located on the other side of John Gorton Drive. Charlest Weston Primary School is also located across John Gorton Drive.

Over the study period, Ambiente hosted a median ratio of student occupation of 9%.

The site showed a consistent growth of its school student population, aligned with the growth at the SA1 level.

Key information

SA1 Number	8113905	
Classification	Greenfield	
Total population at SA1	395	
Median ratio of occupation	9%	
Housing tenure at SA1	O - 72%	R - 28%
SEIFA-IEO at SA1	10	
IHAD Quartile at SA1	4th - 49%	
Languages spoken at home at SA1	English (69%), Indo-Aryan (13%), Pacific Austronesian (3%)	
Median price at site	no sales data for site	
Median price at SA1	no sales data for units	
	House - $826,500	
Schools of residents		
Primary	Charles Weston Primary School Chapman Primary School Curtin Primary School Orana Steiner School Islamic School of Canberra	
Secondary	Mount Stromlo High School St Edmunds College	
College	Canberra College St Clare's College Dickson College	

Change in dwelling typology (count)

School enrolment at site

ACT URBAN INFILL STUDY

9 - WATERMARK

Greenway
Selected as a development area with different environmental factors to the other selected SA2s

1 Limburg Way

Watermark is a mixed-typology development in Greenway, comprised of five integrated blocks of both residential flat buildings and town houses. It is located within a larger mixed-use and residential area, in close proximity to retail, restaurants and services. It is also located close to the Greenway Waterfront, as well as other open spaces such as the Limburg Way Playground and the Tuggeranong Oval.

Watermark displayed a median ratio of school student occupation above the median of the sites within the Study.

Growth in student population at the SA1 behaved similarly to the growth of the school student population at the site level.

Key information

SA1 Number	8108005
Classification	Infill
Total population at SA1	132
Median ratio of occupation	15%
Housing tenure at SA1	O - 79% R - 21%
SEIFA-IEO at SA1	9
IHAD Quartile at SA1	4th - 38.1%
Languages spoken at home at SA1	English (65%), Indo-Aryan (11%), Dravidian (9%)
Median price at site	$407,500
Median price at SA1	Unit - $359,000
	No sales data for houses

Schools of residents

Primary	Wanniassa School Isabella Plains Early Childhood School Namadgi School Caroline Chisholm School Garran Primary School Holy Family Primary School Monash Primary School Wanniassa Hills Primary School St Thomas The Apostle Primary School
Secondary	Wanniassa School St Mary MacKillop College Trinity Christian School Lanyon College St Clares College
College	Lake Tuggeranong College Canberra College St Mary MacKillop College Trinity Christian School Erindale College

Change in dwelling typology (count)

School enrolment at site

ACT URBAN INFILL STUDY

10 - ATELIER

1 Kerridge Street, 46 Honeysett View

Atelier is located on the Kingston Foreshore. The site is close to the civic heart of Canberra as well as other cultural attractions such as the National Library of Australia, Questacon and Old Parliament House. The site is located in a mixed-use residential area on the Kingston foreshore; the adjacent area has retail, restaurants and market areas.

The site is located adjacent to Bowen Park, Norgrove Park, Telopea Park and the Jerrabomberra Wetlands Nature Reserve. Just outside of Kingston is the main Canberra Railway Station, which has regional and interstate connections.

Atelier hosted a low median ratio of school student occupation (4%). A higher proportion of older school students were observed at this site, including only college-level school students at first year a school student population was recorded on site.

Key information

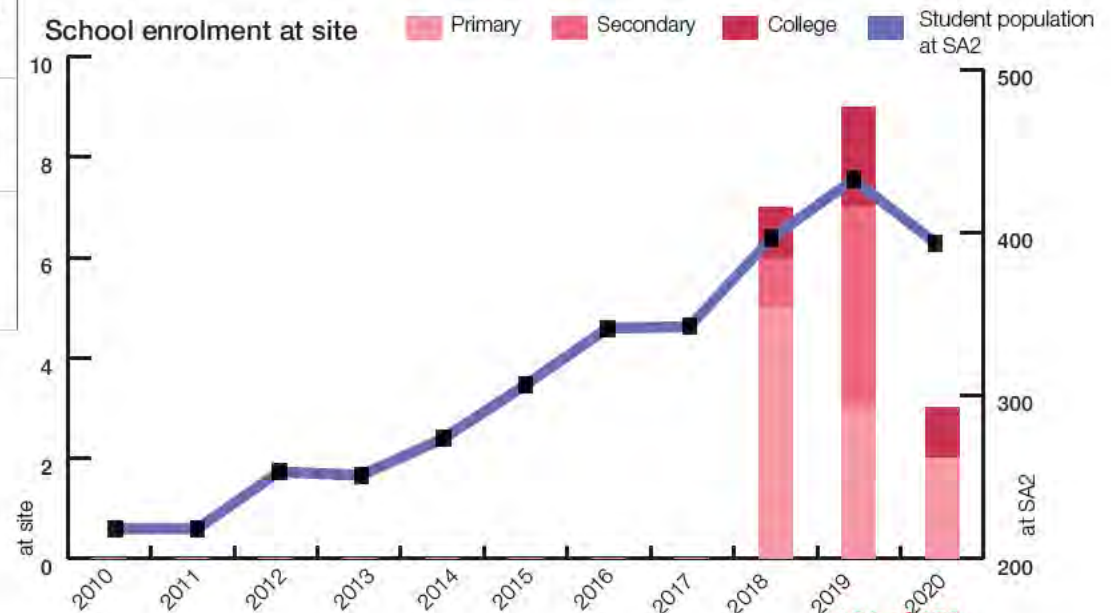| SA1 Number	8113106	
Classification	Infill	
Total population at SA1*	-	
Median ratio of occupation	4%	
Housing tenure at SA2**	O - 40%	R - 58%
SEIFA-IEO at SA2**	10	
IHAD Quartile at SA1*	-	
Languages spoken at home at SA1	English (88%), Middle-Eastern Semitic (3%), Iberian Romance (2%)	
Median price at site	$590,578	
Median price at SA2	Unit - $562,600	
	No sales data for houses	
Schools of residents		
Primary	Forrest Primary School Redhill Primary School Telopea Park School	
Secondary	Telopea Park School	
College	Narrabundah College	

*no population recorded for this SA1 in the ABS Census in 2016; this dataset is only recorded at SA1

**no population recorded for the SA1 in the ABS Census in 2016; SA2 used
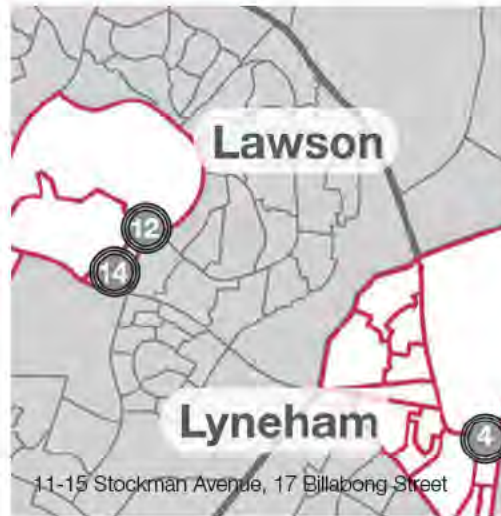
Change in dwelling typology (count)

School enrolment at site

ACT URBAN INFILL STUDY

11 - WAYFARER

Belconnen

120 Eastern Valley Way

At the time of its completion in 2017, Wayfarer was the tallest residential building in Canberra. The development also features a sky lounge and a rooftop pool, as well as four commercial units on the ground floor.

Wayfarer is located within the Belconnen Town Centre, with access to retail, restaurants and services. It is located in close proximity to the Canberra International Sports & Aquatic Centre, John Knight Memorial Park, Eastern Valley Oval, Lake Ginnindera and the University of Canberra. Wayfarer is also located just south to Lake Ginninderra College.

Wayfarer showed the lowest median ratio of occupation across the Study. The development site is also one of the largest in the Study, hosting a total of 329 dwellings.

Key information

SA1 Number	8100215	
Classification	Infill	
Total population at SA1*	-	
Median ratio of occupation	2%	
Housing tenure at SA2**	O - 29.2%	R - 67.9%
SEIFA-IEO at SA2**	9	
IHAD Quartile at SA1*	-	
Languages spoken at home at SA2	English (54%), Indo-Aryan (9%), Southeast Asian Austronesian (6%)	
Median price at site	$393,000	
Median price at SA1	Unit - $401,000	
	House - $465,000	
Schools of residents		
Primary	Macquarie Primary School Latham Primary School Evatt Primary School Radford College	
Secondary	Daramalan College Canberra High School Canberra Grammar School	
College	Dickson College University of Canberra Senior Secondary College Lake Ginninderra	

*no population recorded for this SA1 in the ABS Census in 2016; this dataset is only recorded at SA1

**no population recorded for the SA1 in the ABS Census in 2016; SA2 used

Change in dwelling typology (count)

School enrolment at site

ACT URBAN INFILL STUDY

12 - EVOLURE

Lawson

Lyneham

11-15 Stockman Avenue, 17 Billabong Street

Evolure provides a balance of town houses and apartments that similar to other multi-unit large block developments in Lawson, with its 48 dwellings spread over a three-storey residential flat building and row-blocks of town houses. The closest open space is Lawson Park, which also has a playground.
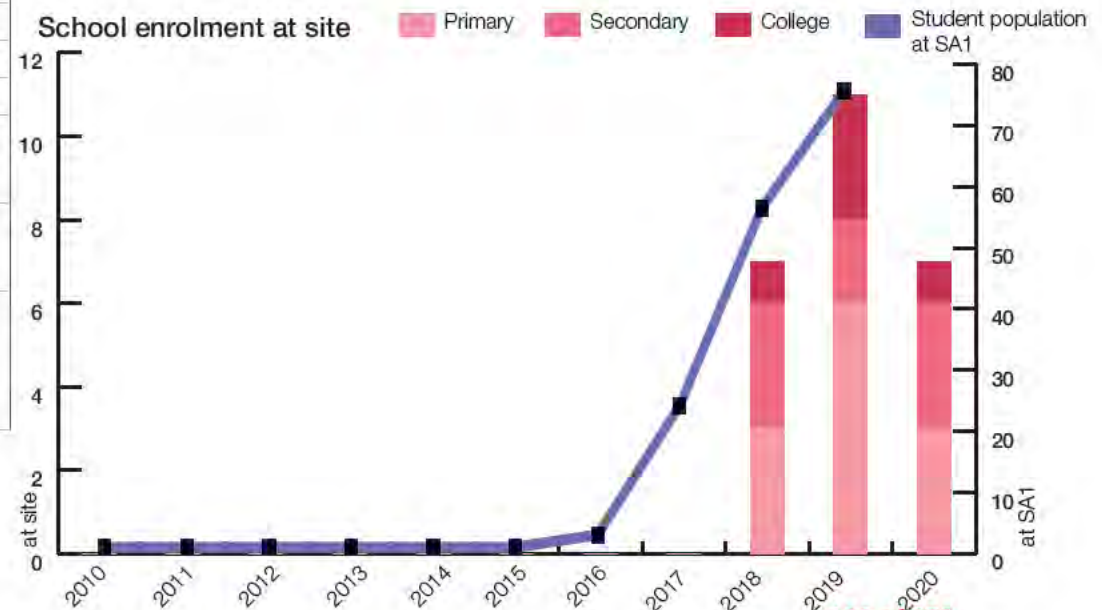
Evolure is located to the north of the University of Canberra and the University of Canberra Hospital. The closest access to retail is in Kaleen or in the Belconnen and Bruce Town Centres; however, there is a cafe within Lawson.

The median occupation of Evolure was 12%. Evolure presents a different dwelling typology than that of the SA1 in 2011 and 2016. Across Census periods, there was high shift in dwelling typology - from 2011, to 2016 there was reduction in detached dwellings, and no apartments across the SA1.

Growth in school student population at the SA1 followed growth in the school student population at development site.

Key information

SA1 Number	8101804	
Classification	Greenfield	
Total population at SA1	44	
Median ratio of occupation	12%	
Housing tenure at SA1	O - 38%	R - 63%
SEIFA-IEO at SA1	9	
IHAD Quartile at SA1	2nd, 3rd, 4th - 33.3%	
Languages spoken at home at SA1	English (38%), Indo-Aryan (14%), Dravidian (13%)	
Median price at site	$489,008	
Median price at SA2	Unit - $449,950	
	House - $629,900	
Schools of residents		
Primary	Maribyrnong Primary School Brindabella Christian College Kaleen Primary School	
Secondary	University Of Canberra High School Kaleen Gungahlin College	
College	University of Canberra Senior Secondary College Lake Ginninderra Narrabundah College Daramalan College	

Change in dwelling typology (count)

Legend: 1-bedroom, 2-bedroom, 3-bedroom, 4 or more

School enrolment at site

Legend: Primary, Secondary, College, Student population at SA1

ACT URBAN INFILL STUDY

13 - THE QUAY

Greenway
Selected as a development area with different environmental factors to the other selected SA2s

15-17 Limburg Way

The site is relatively new, established in 2017, with school student populations from 2018 onwards. The increase in school student population at the site aligns with the growth at SA1.

The Quay is an apartment-only development site, with 73 dwellings located within residential flat buildings. The Quay is located within the Tuggeranong Town Centre, and so is in close proximity to retail, restaurants and services.

It is also located close to the Greenway Waterfront, as well as other open spaces such as the Limburg Way Playground and the Tuggeranong Oval. The Town Centre also has a Hockey Park, Rowing Club, Basketball Stadium, the Lakeside Leisure Centre and the Tuggeranong Town Park beach.

The Quay had a median ratio of school student occupation at 12%, higher than the overall Study median.

The SA1 that the Quay is located in was formed in 2016, hence, dwelling typologies from 2011 are not presented.

Key information

SA1 Number	8108005	
Classification	Infill	
Total population at SA1	132	
Median ratio of occupation	12%	
Housing tenure at SA1	O - 79%	R - 21%
SEIFA-IEO at SA1	9	
IHAD Quartile at SA1	4th - 38.1%	
Languages spoken at home	English (65%), Indo-Aryan (11%), Dravidian (9%)	
Median price at site	no sales data at site	
Median price at SA1	Unit - $359,000	
	no sales data for houses	
Schools of residents		
Primary	Wanniassa School Wanniassa Hills Primary School Bonython Primary School Isabella Plains Early Childhood School Monash Primary School Namadgi School Sacred Heart Primary School Canberra Girls Grammar School Trinity Christian School	
Secondary	Wanniassa School St Clares College	
College	Lake Tuggeranong College Erindale College	

Change in dwelling typology (count)

School enrolment at site

ACT URBAN INFILL STUDY

14 - MIZURA VILLAS

23 Wanderlight Avenue

Mizura Villas is a development site of town houses located on the southern of Lawson. There are two parks in Lawson, one of which has a playground. There is a cafe in Lawson and the closest access to retail and services is in the Belconnen and Bruce Town Centres. Mizura Villas is located just north of the University of Canberra, which also has open spaces for active recreation, and the University of Canberra Hospital.
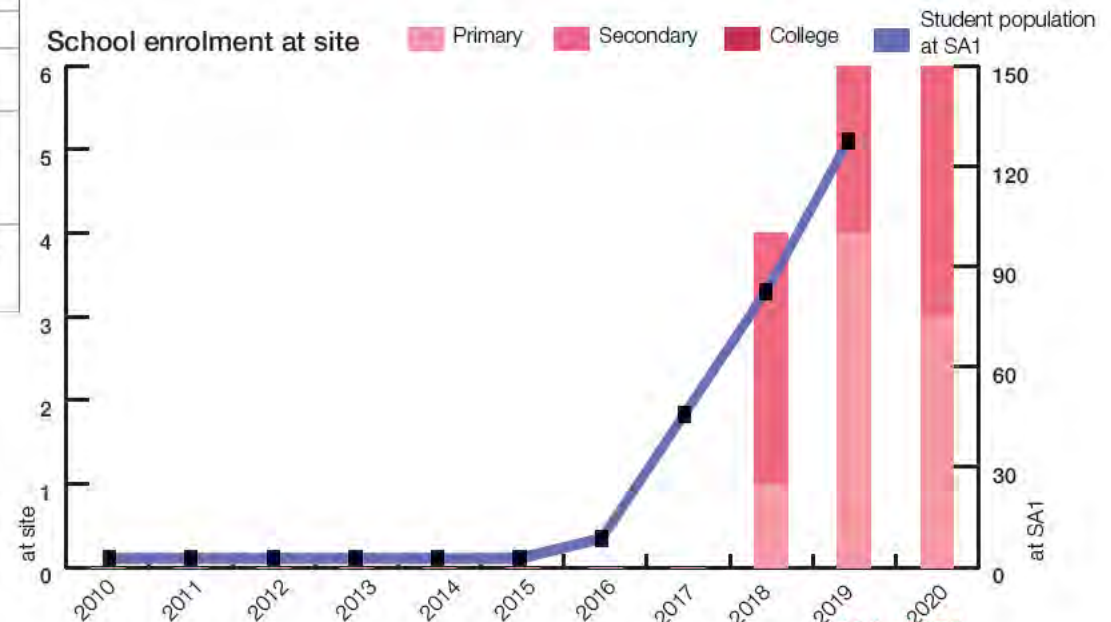
The SA1 that is located in was formed in 2016, hence, dwelling typologies from 2011 are not presented.

The site is relatively new, established in 2017, with school student populations from 2018 onwards. The increase in school student population at the site align with the growth at the SA1 level.

Key information

SA1 Number	8101803	
Classification	Greenfield	
Total population at SA1	102	
Median ratio of occupation	10%	
Housing tenure at SA1	O - 58%	R - 18%
SEIFA-IEO at SA1	10	
IHAD Quartile at SA1	4th - 61.3%	
Languages spoken at home at SA1	English (51%), Chinese (15%), Indo-Aryan (12%)	
Median price at site	$529,000	
Median price at SA2	Unit - $449,000	
	House - $780,000	
Schools of residents		
Primary	Maribyrnong Primary School St Joseph's Primary School	
Secondary	University Of Canberra High School Kaleen St. Clare's College Canberra High School	
College	University of Canberra Senior Secondary College Lake Ginninderra	

Change in dwelling typology (count)

School enrolment at site

ACT URBAN INFILL STUDY

15 - IDALIA

Lyons

Phillip

1 Surprize Place

Idalia is one development within Woden Green, a residential estate developed as part of the Woden Town Centre. When completed, Woden Green will have 1500 dwellings. Idalia is comprised of three residential flat buildings that surround an internal courtyard. One-bedroom dwellings ranged in size from 50 to 61 sqm and two-bedroom dwellings ranged in size from 70 to 81 sqm.
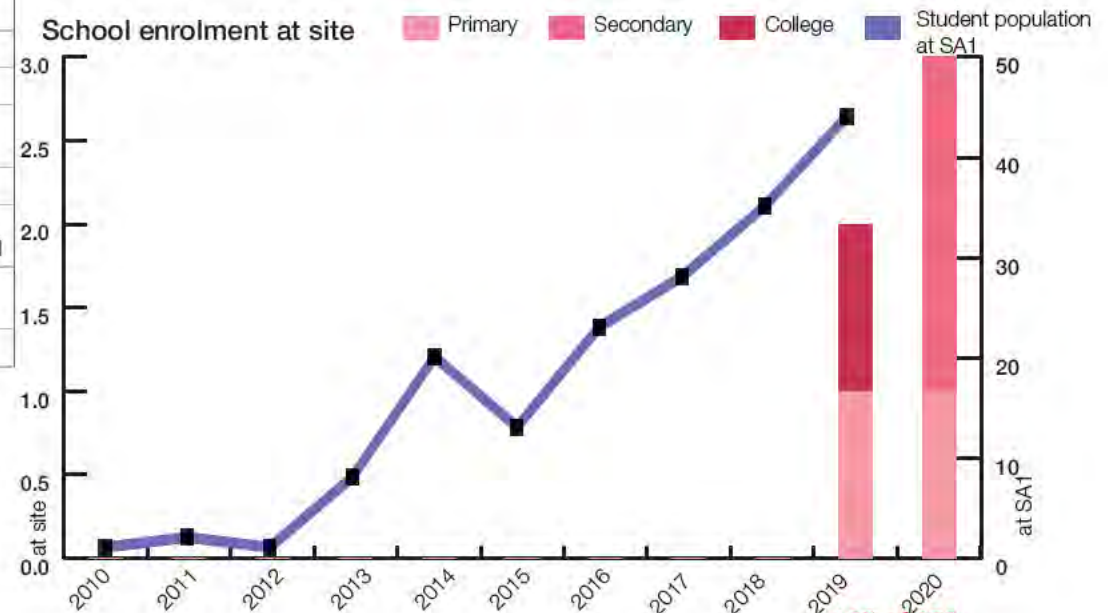
Idalia is close to public transport, mainly buses. The Woden Town Centre has the Woden Bus Interchange. The Town Centre also has retail, restaurants and services. In terms of open spaces, there is the Woden Park and the Phillip District Playing fields, as well as a golf course and the Phillip Swimming & Ice Skating Centre.

Idalia site showed one of the smallest median ratio of school student occupation, showing only a peak of 3 students within the 99 dwellings of the apartment.

The SA1 that Idalia is located in was formed in 2016, hence, dwelling typologies from 2011 are not presented.

The site is relatively new, established in 2017, with school student populations from 2019 onwards.

Key information

SA1 Number	8110912	
Classification	Infill	
Total population at SA1	607	
Median ratio of occupation	2%	
Housing tenure at SA1	O - 32%	R - 66%
SEIFA-IEO at SA1	10	
IHAD Quartile at SA1	3rd - 47%	
Languages spoken at home at SA1	English (39%), Southeast Asian Austronesian (16%), Chinese (11%)	
Median price at site	$434,900	
Median price at SA1	Unit - $384,950	
	No sales data for houses	
Schools of residents		
Primary	Garran Primary School Mawson Primary School	
Secondary	Alfred Deakin High School	
College	Canberra College	

Change in dwelling typology (count)

School enrolment at site

Appendix 2 - Data schema

Stage 1 - Initial selection of study areas

Stage 2 - Workshop

Visualised background data - Top 30 growth areas by SA2 from 2010 to 2019 based on the student enrolment data

Student growth

Proximity to schools

Dwelling typology

Median unit price

Median house price

SEIFA IRSAD

SEIFA IEO

Development application activity

Development application by typology (approximate locations based on initial received data)

Stakeholder knowledge of local context

WORKSHOP SELECTION PROCESS

Selection of SA2s for further study based on high population growth, diversity of dwelling typologies and stakeholder knowledge on areas of interest.

* selected based on contrasting qualities to selection methodology

OUTPUT

14 SA2s for further study

Belconnen

Campbell

Casey

Franklin

Greenway*

Kingston

Lawson

Lyneham

Lyons

Narrabundah

Phillip

Watson

Wright

Stage 2.5 - Reiterate

DATA INPUT

Visualised background data - 14 selected SA2s

Student growth

Proximity to schools

Dwelling typology

Median unit price

Median house price

SEIFA IRSAD

SEIFA IEO

2016 Census geography - SA1 and SA2

Selected SA2s divided into SA1s

14 selected SA2s divided into SA1s

Student growth

Proximity to schools

Dwelling typology

Median unit price

Median house price

SEIFA IRSAD

SEIFA IEO

SELECTION

SA1s displaying high development activity

SA1s displaying high student population growth

SA1s of interest based on stakeholder knowledge of local context

Development activity

Development application data categorised according to type of development

Categories of interest:
Multi-unit development
Townhouses

OUTPUT

14 development DAs

DA Number

Block key

Project status date

Location

Number of units

Number of storeys

Dwelling typology

Typology of demolished

Satellite image of site

Top three languages spoken at home

Population data that applies selected area

Student population per year at SA1

Population growth per year at SA1

Proximity to schools

Proximity to key services

Dwelling typology for 2011 and 2016 at SA1

Housing tenure for 2011 and 2016 at SA1

Median unit price at SA1

Median house price at SA1

SEIFA IRSAD

SEIFA IEO

Stage 3 - Correlating DA completion with school enrolments

DATA INPUT

14 development sites

DA Number
Block key
Project status date
Location
Number of units
Number of storeys
Dwelling typology
Typology of demolished
Satellite image of site
Top three languages spoken at home

Breakdown

Development activity – change in number of dwellings in selected development sites

Number of new dwellings
Typology of new dwellings
Number of demolished dwellings
Typology of demolished dwellings
Year completed
X,Y (geocoded location)
Relevant SA1
Relevant SA2

School enrolments – Change in yearly school population for 14 development sites

2010 enrolments
2011 enrolments
2012 enrolments
2013 enrolments
2014 enrolments
2015 enrolments
2016 enrolments
2017 enrolments
2018 enrolments
2019 enrolments

Relevant SA1s that contain selected sites

Student population per year at SA1
Population growth per year at SA1
Proximity to schools
Proximity to key services
Dwelling typology for 2011 and 2016 at SA1
Housing tenure for 2011 and 2016 at SA1
Median unit price at SA1
Median house price at SA1
SEIFA IRSAD
SEIFA IEO

ANALYSIS - change in dwellings

For each selected development application

Year of completed construction

Number of new dwellings constructed
Typology of new dwellings

Number of old dwellings demolished
Typology of demolished dwellings

ANALYSIS - change in student population

For each selected site:

All years

Total student population within the selected address
Total student population within SA1 that contains selected address
Total student population within SA2 that contains selected address

INITIAL OUTPUT

Δ dwellings in development site for selected year
Λ dwellings in development site
Δ in typology of dwellings

Δ student population each year
Δ in selected address
Δ in selected SA1
Δ in selected SA2

Breakdown of student population

Primary
Secondary
College

REPORTING

Analysis template

SA1 ID Number
SA2 Name
Greenfield/Infill classification (ACTEDD)
Total population (Census 2016)
Housing tenure (Census 2016)
Growth in school aged students from 2010 to 2019 according to school levels (ACTEDD)
  at selected address
  at SA1
  at SA2
Proximity to schools (School location)
Proximity to key services (Narrative)
Socio-economic status (SEIFA, IHAD)
Student language spoken at home (ACTEDD)
Dwelling typology at SA1 (Census 2011-2016)
School enrolment change over time at selected address (ACTEDD)
School enrolment change over time at relevant SA1 (ACTEDD)
School enrolment change over time at relevant SA2 (ACTEDD)

Appendix 3 - Other jurisdictions

ACT Education Directorate

ACT Urban Infill Study

Appendix C - Other jurisdictions

Final Draft | 5 August 2020

Job number   271517-00

ARUP

Document verification

ARUP

Job title	ACT Urban Infill Study			Job number	
				271517-00	
Document title	Appendix C - Other jurisdictions			**File reference**	
Document ref					

Revision	Date	Filename	Report.docx		
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		Filename			
		Description			
			Prepared by	**Checked by**	**Approved by**
		Name			
		Signature			

Issue Document verification with document ✓

Contents

1 New Lambton

New Lambton was identified in the interviews with schools planning professionals as an area of interest due to the popularity of the local public school – New Lambton Public School. New Lambton is located in Newcastle, in the Hunter Region of New South Wales, approximately 6km west of the Newcastle Central Business District. The area is largely residential, adjacent to large swathes of environmentally sensitive land and reserves.

1.1 School provision

Within the SA2 Lambton-New Lambton, there are four public schools, New Lambton Public, New Lambton South Public, Lambton Public and Lambton High school, two non-government schools, St. John's Primary and St. Therese's Primary and one specialised school, John Hunter Hospital School. Enrolment numbers have remained fairly consistent from 2004 to 2015; the highest increase was for New Lambton Public School in 2011; its enrolment for that year was 9% higher than the previous year. Enrolment for the schools is summarised in the table below.

Table 1 Enrolment in schools in Lambton-New Lambton from 2004 to 2018

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
2738 - New Lambton Public School	580	574	598	578	581	584	585	600	603	592	610	623	592	601	646
% change		-1%	4%	-3%	1%	1%	0%	3%	1%	-2%	3%	2%	-5%	2%	7%
3798 - New Lambton South Public School	317	327	320	311	320	344	346	378	393	413	431	460	453	453	462
% change		3%	-2%	-3%	3%	8%	1%	9%	4%	5%	4%	7%	-2%	0%	2%
2366 - Lambton Public School	314	311	317	328	311	296	324	345	366	373	372	378	386	396	397
% change		-1%	2%	3%	-5%	-5%	9%	6%	6%	2%	0%	2%	2%	3%	0%
8482 – Lambton High School	1140	1123	1100	1107	1067	1054	1065	1029	1047	1059	1080	1095	1101	1116	1127
% change		-1%	-2%	1%	-4%	-1%	1%	-3%	2%	1%	2%	1%	1%	1%	1%
5558 - John Hunter Hospital School	Specialised														
1685 - St. John's Primary School	Non-government														
2118 - St. Therese's Primary School	Non-goverment														

Source: NSW Department of Education, NSW government school enrolments by head count (2004-2018)

1.2   Age groups and population growth

The median age in Lambton-New Lambton is 39. In 2016, there slightly more people older than the median age (8,777) than there were younger (8,457). Within the study period of 2006-2016, the largest growth by count of persons was observed in the age group 65-69, while the largest loss by count of persons was observed in the age group 75-79. These two groups were also the largest gain and loss, respectively, in terms of proportion of change.

Between 2011 to 2016, the largest increase by count of persons was in the age group 10-14, with an increase of 181 persons which represented a change of 19%. Similar to the overall study, the largest increase in terms of proportion of change between 2011 to 2016 was observed in the age group 75-79. The biggest loss in terms of count of persons was observed in the age group 35-39, which recorded an overall loss of 186 persons. The largest proportional loss was observed in the age group 80-84 years.

In 2016, the larger age groups in the population were either very young or of school-age (ages 0-14) or closer to the median age (age groups 30-59).

Table 2 Five year age groups in Lambton - New Lambton from 2006 to 2016

Age	2006	2011	2016	change from 06-11 (+/-)	change (%)	change from 11-16 (+/-)	change (%)	Change from 06-16 (+/-)	Change from 06-16 (%)
	SA2 Lambton – New Lambton								
0-4 years	1084	1179	1114	95	9%	-65	-6%	30	3%
5-9 years	970	1160	1103	190	20%	-57	-5%	133	14%
10-14 years	1039	948	1129	-91	-9%	181	19%	90	9%
15-19 years	1043	979	995	-64	-6%	16	2%	-48	-5%
20-24 years	1036	1127	1044	91	9%	-83	-7%	8	1%
25-29 years	857	993	969	136	16%	-24	-2%	112	13%
30-34 years	1110	993	1036	-117	-11%	43	4%	-74	-7%
35-39 years	1172	1253	1067	81	7%	-186	-15%	-105	-9%
40-44 years	1242	1270	1255	28	2%	-15	-1%	13	1%
45-49 years	1190	1205	1251	15	1%	46	4%	61	5%
50-54 years	1072	1145	1194	73	7%	49	4%	122	11%
55-59 years	894	989	1154	95	11%	165	17%	260	29%
60-64 years	717	876	970	159	22%	94	11%	253	35%
65-69 years	564	723	836	159	28%	113	16%	272	48%
70-74 years	563	556	705	-7	-1%	149	27%	142	25%

75-79 years	622	556	485	-66	-11%	-71	-13%	-137	-22%
80-84 years	563	555	410	-8	-1%	-145	-26%	-153	-27%
85 years +	461	509	517	48	10%	8	2%	56	12%
Total	16190	17006	17231	816	5%	225	1%	1041	6%

Source: ABS Census 2006; 2011; 2016

1.3 Dwelling typology, tenure and price

The dwelling typology in Lambton – New Lambton is dominated by detached dwellings, which represent more than 80% of dwellings in the SA2 across all the years within the study period. Between 2011 and 2016, the largest growth in terms of dwelling count and proportion of change was observed in semi-attached dwellings, which increased by 360 dwellings or 75%. Both apartment typologies displayed a significant decrease between 2011 and 2016 of at least 40%.

Figure 1 Change in dwelling structure in Lambton – New Lambton from 2006 to 2016

Source: ABS Census 2006; 2011; 2016

Considering the detailed dwelling typology, the largest increase by count of dwellings from 2006 to 2016 was observed in 4-bedroom or more detached dwellings (an increase of 258 dwellings) and 2-bedroom semi-attached dwellings (an increase of 218 dwellings).

The increase in 1-bedroom semi-attached dwellings is notable considering there were no dwellings recorded in this typology in 2011. The significant increase in this particular type of semi-attached dwelling may point towards a shift in preference that is concentrated in a small area of the SA2.

Figure 2 Detailed dwelling typology in Lambton - New Lambton from 2006 to 2016

Source: ABS Census 2006; 2011; 2016

In terms of tenure, Lambton – New Lambton has a larger proportion of owned dwellings than rented dwellings across the whole study period.

Table 3 Tenure in Lambton - New Lambton from 2006 to 2016

Tenure	2006	2011	2016
	At SA2		
Owned	62%	61%	61%
Rented	26%	26%	26%

Source: ABS Census 2006; 2011; 2016

Median monthly mortgage repayments in New Lambton increased from 2006 to 2011 and remained at the same level to 2016. The median monthly mortgage repayment is higher than the NSW median in 2016. The median weekly rent price is slightly lower than the NSW median. It has continuously increased over the study period, with an increase of about $100 from 2006 to 2011 and a further increase of about $50 to 2016.

Table 4 Median housing price data for Lambton - New Lambton

Median price	2006	2011	2016	2016

	At SA2			NSW Median
Median monthly mortgage repayments	$1600-$1999	$2000-$2199	$2000-$2199	$1986
Median weekly rent	$200-$224	$300-$324	$350-$374	$380

Source: ABS Census 2006; 2011; 2016

Considering typology, tenure and price, the area of Lambton – New Lambton is dominated by multiple-bedroom detached-dwellings that are most likely owned with a weekly mortgage that is lower than the state median. Semi-attached dwellings are becoming more prevalent in the area and apartments in buildings of up to three storeys are also emerging, however apartments in larger buildings are still few and far between.

1.4   Cultural diversity – language spoken at home

In Lambton – New Lambton, majority of households that speak English at home. However, while this proportion has remained high over the study period, the proportion of English-speaking households has decreased from 90% to 2006 to 85% in 2016.

New Lambton Public School reported that in 2018, of the 637 students enrolled, 86 students (14%) were from a non-English speaking background[1]. Lambton Public School reported in the same year that of 392 students enrolled, 38 students (10%) were from a non-English speaking background[2]. The higher proportion of language and cultural groups in the school enrolments suggests that students from outside of the immediate local area may be enrolled in the school.

Table 5 Languages spoken at home in Lambton - New Lambton from 2006 to 2016

Language spoken at home	2006	2011	2016
	At SA2 Lambton – New Lambton		
English	90%	88%	85.00%
South Slavic	2%	1%	1.00%
Chinese	1%		1.00%
Indo-Aryan		1%	
African			

Source: ABS Census 2006; 2011; 2016

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[1] New Lambton Public School 2019, *2018 New Lambton Public School Annual Report,* 31 May, https://s3-ap-southeast-2.amazonaws.com/doe-nsw-schools/annual-report/2018/2738/2018_New_Lambton_Public_School_Annual_Report.pdf.

[2] Lambton Public School 2019, *2018 Lambton Public School Annual Report,* 30 May, https://s3-ap-southeast-2.amazonaws.com/doe-nsw-schools/annual-report/2018/2366/2018_Lambton_Public_School_Annual_Report.pdf.

2 Wentworth Point

Wentworth Point in central Sydney was selected for high levels of population growth and development activity, particularly in high-density dwelling development. Its parent SA2 is Homebush Bay – Silverwater. Wentworth Point is also a Priority Precinct, designated by the NSW Department of Planning and the Environment. This designation "provide[s] a planned approach to growth in Sydney, with new homes and jobs located close to public transport, shops and services, while retaining and enhancing a community's character" (NSW Department of Planning and the Environment, 2017). Between 2012-2013, it was also part of the Urban Activation Precinct (UAP) program, which aimed to support the planning and delivery of more housing and jobs, integrated with public transport and other existing and planned infrastructure[3].

2.1 School provision

In Homebush Bay – Silverwater, there are four schools in total. Newington Public School and Wentworth Point Public School are the two government schools within the SA2. Other schools include SEDA College, a specialised school for Years 11 and 12 focusing on sports and Margaret Jurd College, a special education school. Newington Public School opened in 2002, repurposed from buildings built for the Athletes' Village for the Sydney 2000 Olympic and Paralympic Games[4]. The school has been challenged by high demand in the local area; since from 2008 to 2017, 20 demountable classrooms were setup in the school's oval to accommodate additional students[5]. The school has experienced consistent growth from 2004 to 2017; between 2010 to 2015, each year saw an increase of at least 10% in enrolments.

Table 6 Enrolments for Newington Public School from 2011 to 2018

4627 - Newington Public School	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
	229	270	307	332	358	386	420	473	539	638	738	814	889	943	897
% change		18%	14%	8%	8%	8%	9%	13%	14%	18%	16%	10%	9%	6%	-5%
4662 - Wentworth Point Public School		0	0	0	0	0	0	0	0	0	0	0	0	0	160
% change															16000%
15906 - Margaret Jurd College	Specialised														

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[3] NSW Department of Planning, Industry & Environment 2012, *Urban Activation Precincts,* 13 June, https://www.planning.nsw.gov.au/-/media/Files/DPE/Circulars/planning-circular-urban-activation-precincts-2012-06-13.pdf?la=en.

[4] NSW Department of Education – School Infrastructure, *Newington Public School,* https://www.schoolinfrastructure.nsw.gov.au/schools/4/4627.html.

[5] Caines, K 2017, "Newington Public School gets double storey demountables while parents wait for new Wentworth Point project which hits delay", *Inner West Courier,* 27 February, https://www.dailytelegraph.com.au/newslocal/inner-west/newington-public-school-gets-doublestorey-demountables-while-parents-wait-for-new-wentworth-point-project-which-hits-delay/news-story/3f9d0780b9d6e615d77b04a675ffa293.

Source: NSW Department of Education, NSW government school enrolments by head count (2004-2018)

2.2   Age groups and population growth

The median age in Homebush Bay – Silverwater was 33 in 2011 and 2016. In 2011, there were 12,083 persons counted in the SA2; the population grew by 24% to 19,906 in 2016. Between 2006 to 2016, the population grew by 104%. All age groups grew between 2006 to 2016. At the SA2 level, the group that grew the most in terms of count of persons was the age group 30-34 years old. In terms of proportion of change, the age group 70-74 years old grew by 290%.

The area has seen consistent growth across the whole time period, with the exception of the age group 20-24 years old, which recorded a loss of 85 persons or 9% between 2006 and 2011. In terms of school-aged children, those within the age groups 0-19 years old, the population at an SA2 level has essentially doubled between 2006 and 2016.

The demand for schools in the local area has also increased, as identified in the previous section. Newington Public School enrolments grew by more than 10% each year between 2010 to 2015 and the school has had provisional demountable classrooms in place since 2008.

Table 7 Homebush Bay - Silverwater 5-year age groups from 2006 to 2016

Age	2006	2011	2016	change from 06-11 (+/-	change (%)	change from 11-16 (+/-)	change (%)	overall	overall (%)
0-4 years	622	884	1398	262	42%	514	58%	776	125%
5-9 years	459	598	950	139	30%	352	59%	491	107%
10-14 years	332	522	664	190	57%	142	27%	332	100%
15-19 years	420	454	697	34	8%	243	54%	277	66%
20-24 years	900	815	1482	-85	-9%	667	82%	582	65%
25-29 years	1300	1558	2571	258	20%	1013	65%	1271	98%
30-34 years	1312	1574	3199	262	20%	1625	103%	1887	144%
35-39 years	1066	1337	2306	271	25%	969	72%	1240	116%
40-44 years	779	1119	1658	340	44%	539	48%	879	113%
45-49 years	634	835	1275	201	32%	440	53%	641	101%
50-54 years	474	751	1037	277	58%	286	38%	563	119%
55-59 years	472	609	899	137	29%	290	48%	427	90%
60-64 years	266	439	768	173	65%	329	75%	502	189%
65-69 years	140	269	475	129	92%	206	77%	335	239%
70-74 years	70	155	273	85	121%	118	76%	203	290%

75-79 years	54	76	145	22	41%	69	91%	91	169%
80-84 years	30	51	66	21	70%	15	29%	36	120%
85 years +	27	39	61	12	44%	22	56%	34	126%
Total	9738	12083	19906	2345	24%	7823	65%	10168	104%

Source: ABS Census 2006; 2011; 2016

The data suggests that the area as a whole is growing rapidly. Homebush Bay – Silverwater is within or adjacent to a number of priority precincts, a designation used by the NSW Department of Planning & Environment to denote accelerated planning, investment and renewal in certain areas, which aim to guide and align growth with the provision of necessary infrastructure and services[6]. As part of the UAP, Wentworth Point was rezoned to accommodate high density residential, commercial and recreational uses across two separate neighbourhoods[7]. The UAP Finalisation Report estimated that there would be 2,300 new dwellings within the precinct, as well as a new school – Wentworth Point Public School[8].

2.3 Dwelling typology, tenure and price

The most common dwelling structure in Homebush Bay – Silverwater is apartments in buildings over four storeys. At the SA2 level, there is a clear shift away from detached dwellings towards high-density dwellings. As seen in Figure 3, the increase of dwellings between 2011 and 2016 is significant. Between 2011 and 2016, there were 4209 new dwellings counted, an increase of 207%. When considering the detailed dwelling typology, 1- and 2-bedroom apartments in buildings over four storeys are the most prevalent dwelling typologies in Homebush Bay – Silverwater in 2016.

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[6] NSW Department of Planning, Industry & Environment 2020, *Greater Parramatta Growth Area,* 1 May, https://www.planning.nsw.gov.au/Plans-for-your-area/Priority-Growth-Areas-and-Precincts/Greater-Parramatta-Growth-Area.

[7] NSW Department of Planning, Industry & Environment 2014, *Wentworth Point Urban Activation Precinct Finalisation Report*, https://www.planning.nsw.gov.au/-/media/Files/DPE/Reports/wentworth-point-urban-activation-precinct-finalisation-report-2014.pdf.

[8] Ibid.

Figure 3 Change in dwelling structure in Homebush Bay - Silverwater from 2006 to 2016

Source: ABS Census 2006; 2011; 2016

Figure 4 Detailed dwelling typology in Homebush Bay - Silverwater from 2006 to 2016

Source: ABS Census 2006; 2011; 2016

The dominance of apartments in buildings of four or more storeys is consistent with the ambitions described in the UAP Finalisation Report for the area to accommodate high density residential development. Prior to the UAP designation, the area of Wentworth Point was primarily used for maritime purposes. Following the UAP process, the area was rezoned to accommodate residential, commercial, retail and recreation uses[9]. The growth across all age groups in the SA2 suggest an acceptance of high-density housing for all age groups, even for families and households with children.

In terms of tenure, Homebush Bay – Silverwater has a slightly higher proportion of rented versus owned dwellings. In 2006, there were slightly more owned dwellings than rented dwellings in the SA2. The proportion of rented dwellings decreased in 2011 before increasing in 2016 to 43%. The proportion of owned dwellings has decreased since 2006, from 52% to 40%.

Table 8 Tenure in Homebush Bay - Silverwater from 2006 to 2016

Tenure	2006	2011	2016
	SA2 Homebush Bay - Silverwater		
Owned	52%	49%	40%
Rented	44%	36%	43%

Source: ABS Census 2006; 2011; 2016

Between 2006 to 2016, the median monthly mortgage repayments have remained at $3000-$3999; this mortgage repayment is the highest across all the case studies. Median weekly rent increased from $350-$449 in 2006 to $450-$549 in 2011 and remained at this level in 2016.

Table 9 Median housing price data for Homebush Bay - Silverwater from 2006 to 2016

Median price	2006	2011	2016	2016
	At SA2			NSW Median
Median monthly mortgage repayments	$3000-$3999	$3000-$3999	$3000-$3999	$1986
Median weekly rent	$350-$449	$450-$549	$450-$549	$380

Source: ABS Census 2006; 2011; 2016

Considering dwelling typology, tenure and price, the area of Wentworth Point is clearly dominated by high-density residential development, particularly 1- and 2-bedroom apartments in buildings of four or more storeys. The dwellings in Wentworth Point are mostly rented at a weekly rent that is higher than the state median. The population has exhibited quite significant growth as a result of across all age groups as a result of planned renewal and targeted public investment. Insights from the interviews suggested that while the rate of the households with children moving into apartments was not increasing, the rate at which apartments were being built was increasing and households with children were accessing these apartments as housing.

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[9] Ibid.

The development of high-rise apartments in Wentworth Point has also been supported by the addition of retail and commercial uses; however, anecdotal insights from interviews and the experience of Newington Public School suggest that this growth has placed pressure on the infrastructure necessary for supporting communities.

The development of Wentworth Point Public School, which opened in 2018, was also part of the UAP process. However, there is still pressure on schools in the wider Sydney Olympic Park area, particularly for high schools. In 2017, the Sydney Olympic Park Authority was in talks with the Department of Education to provide a new high school in the area for the growing population and to take pressure off Concord High School, which had more than 1100 students in 2017[10]. Parents residing in and around Newington, Wentworth Point, Rhodes and Liberty Grove had expressed concern that Concord High School was "too far" for their children to attend and that the increased residential development had not been supported by the necessary infrastructure[11].

2.4   Cultural diversity – language spoken at home

Both Newington and Wentworth Point Public Schools indicated in their 2018 Annual Reports that they catered to a diverse community, with over 50 language and cultural groups represented in their respective student bodies. This is also reflected in the wider population. At an SA2 level, the proportion of households speaking English is less than half of the households. The second and third most common language spoken at home across the whole study period are Chinese and Korean, accounting for between 9 to 16% of households.

Korean and Chinese were also identified in the 2018 Newington Public School Annual Report as two most common cultural and language groups in their student body aside from English[12]. 77% of the student body identified as from a language other than English; the school offers English as Additional Language or Dialect (EAL/D) programmes and also distributes communication materials in the top three language groups, Korean, Chinese and Arabic[13].

The cultural diversity that the data on language spoken at home supports insights from the interviews that migrant households, particularly from East Asian backgrounds, may be more inclined or accepting of high-density dwellings or apartments. The interviews also indicated that migrants arrive at "prime breeding age," before having a family and may select housing based on access to transport, jobs and services.

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[10] Caines K 2017, "Educaiton Department in talks over new high school at Sydney Olympic Park to cope with growth", *Inner West Courier,* 8 May, https://www.dailytelegraph.com.au/newslocal/inner-west/education-department-in-talks-over-new-high-school-at-sydney-olympic-park-to-cope-with-growth/news-story/05c1108aeec5a746ec4fec2592bba475.

[11] Ibid.

[12] Newington Public School 2019, *2018 Newington Public School Annual Report*, 31 May, https://s3-ap-southeast-2.amazonaws.com/doe-nsw-schools/annual-report/2018/4627/2018_Newington_Public_School_Annual_Report.pdf.

[13] Ibid.

Table 10 Languages spoken at home in Homebush Bay - Silverwater from 2006 to 2016

Language spoken at home	2006	2011	2016
	At SA2 Homebush Bay – Silverwater		
English	33%	38%	32%
Chinese	11%	11%	16%
Korean	9%	10%	11%

Source: ABS Census 2006; 2011; 2016

3   South Brisbane

3.1   School provision

South Brisbane is in the inner-city area of Brisbane. From 2008, the inner-city area of Brisbane underwent significant change and development, with renewed focus on new housing and jobs near high capacity public transport as well as lifestyle and amenity factors. Two schools located in the adjacent area are Brisbane State High School and West End State School. Brisbane State High School is Queensland's and Australia's largest state secondary school with over 3000 students in 2018[14]; the Queensland Government Department of Education states that this is the maximum enrolment capacity[15]. Interviews with schools planning professionals in Queensland highlighted that access to the schools' respective catchments was becoming increasingly competitive, coinciding with expansions for both schools.

Enrolments in both West End State and Brisbane State High Schools have grown over the period from 2015 to 2019. The greatest increase was for the West End State School, whose enrolments grew by 12% from 2016 to 2017.

Table 11 Enrolments in schools in South Brisbane from 2015 to 2019

	2015	2016	2017	2018	2019
0212 - West End State School	783	854	960	1021	1129
% change		9%	12%	6%	11%
2003 - Brisbane State High School	2951	3149	3137	3156	3184
% change		7%	0%	1%	1%

Source: Queensland Education Department, State school enrolments by school and year level – February census

3.2   Age groups and population growth

The median age in South Brisbane was 30 in 2011 and 2016. At the beginning of the study period, there were 6217 people residing in the SA2. This grew by 22% to 7569 in 2011 and a further 25% to 9498 in 2016. Overall, the population in the SA2 grew by 53%. The cohort 25-29 years old grew the most over the whole study period, with an overall growth of 682 persons or 91%. All age groups increased over the Study period, except for the cohort within 80-84 years old; this suggests an overall growth of population in the SA2.

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[14] Department of Education, Queensland Government 2018, *Brisbane State High School,* 16 October, https://education.qld.gov.au/parents-and-carers/enrolment/management-plans/brisbane-state-high-school.

[15] Ibid.

Table 12 South Brisbane 5-year age groups from 2006 to 2016

Age	2006	2011	2016	change from 06-11 (+/-	change (%)	change from 11-16 (+/-)	change (%)	overall	overall (%)
0-4 years	256	332	442	76	30%	110	33%	186	73%
5-9 years	131	134	193	3	2%	59	44%	62	47%
10-14 years	225	213	380	-12	-5%	167	78%	155	69%
15-19 years	384	602	595	218	57%	-7	-1%	211	55%
20-24 years	970	1089	1505	119	12%	416	38%	535	55%
25-29 years	751	1057	1433	306	41%	376	36%	682	91%
30-34 years	597	772	1078	175	29%	306	40%	481	81%
35-39 years	451	586	716	135	30%	130	22%	265	59%
40-44 years	413	464	633	51	12%	169	36%	220	53%
45-49 years	389	424	534	35	9%	110	26%	145	37%
50-54 years	370	393	412	23	6%	19	5%	42	11%
55-59 years	372	383	416	11	3%	33	9%	44	12%
60-64 years	288	335	333	47	16%	-2	-1%	45	16%
65-69 years	199	247	278	48	24%	31	13%	79	40%
70-74 years	124	197	198	73	59%	1	1%	74	60%
75-79 years	128	127	151	-1	-1%	24	19%	23	18%
80-84 years	103	103	93	0	0%	-10	-10%	-10	-10%
85 years +	68	110	111	42	62%	1	1%	43	63%
Total	6217	7569	9498	1352	22%	1929	25%	3281	53%

Source: ABS Census 2006; 2011; 2016

3.3 Dwelling typology, tenure and price

The most common dwelling structure in South Brisbane is apartments in buildings over four storeys. At the SA2 level, there is a clear shift away from detached dwellings towards high-density dwellings. From 2011 to 2016, detached dwellings decreased by 981 dwellings or 82%. In that same time period, all dwelling structure types except for apartments in buildings of four or more storeys decreased; apartments in buildings of four or more storeys increased by 552 dwellings or 38%.

Figure 5 Change in dwelling structure in Homebush Bay - Silverwater from 2006 to 2016

Source: ABS Census 2006; 2011; 2016

When considering the detailed dwelling typology, 1- and 2-bedroom apartments in buildings over four storeys were the most prevalent dwelling typologies in South Brisbane in 2016. All bedroom mixes in apartments in buildings of four or more storeys increased over the whole study period. There was an increase of 109 1-bedroom apartments in buildings of up to three storeys, but a decrease in all other bedroom mixes within that dwelling structure type.

Figure 6 Detailed dwelling typology in South Brisbane from 2006 to 2016

Source: ABS Census 2006; 2011; 2016

South Brisbane Riverside was identified in the Brisbane CityShape 2026 plan, a 20-year strategic plan for Brisbane, as an area for major urban renewal (Brisbane City Council 2005)[16]. Under a Brisbane City Council initiative, the *South Brisbane Riverside Neighbourhood Plan* identified the process through which the area would be transformed into an area with more housing, more variety of housing options, greater access to public transport and jobs (Brisbane City Council 2009)[17]. Development in the area was planned to focus on higher densities; between 2006 to 2011, apartments in buildings of up to four or more stories increased by 70% and then by 38% to 2016. Overall, this dwelling structure increased by 134%.

In terms of tenure, South Brisbane has more rented than owned dwellings over the whole study period. The proportion of owned dwellings increased slightly between 2006 to 2011 and then decreased again to 2016. Rented dwellings increased from 41% of all dwellings in 2006 to 51% in 2011 and 2016.

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[16] Brisbane City Council 2005, *Brisbane CityShape 2026,* https://www.brisbane.qld.gov.au/sites/default/files/About_planning_and_building_cityshape2026_full.pdf.

[17] Brisbane City Council 2009, *South Brisbane Riverside Neighbourhood Plan,* https://www.brisbane.qld.gov.au/planning-and-building/planning-guidelines-and-tools/neighbourhood-planning-and-urban-renewal/neighbourhood-plans-and-other-local-planning-projects/neighbourhood-plans-adopted-in-2011.

Table 13 Tenure in South Brisbane from 2006 to 2016

Tenure	2006	2011	2016
	At SA2		
Owned	23%	26%	23%
Rented	41%	51%	51%

Source: ABS Census 2006; 2011; 2016

The median monthly mortgage repayment and median weekly rent price in South Brisbane are higher than the QLD medians. Between 2006 to 2011, the monthly mortgage repayment increased by almost $1400, from $1600-$1999 to $3000-$3999. The median then decreased to $2000-$2199 in 2016. Median weekly rent has also increased, but not as steeply as the mortgage repayments. Between 2006 to 2011, the median weekly rent increased from $350-$449 to $450-$549; it remained at this level in 2016.

Table 14 Median housing price data for Lambton - New Lambton and New Lambton (suburb)

Median price	2006	2011	2016	2016
	At SA2			QLD Median
Median monthly mortgage repayments	$1600-$1999	$3000-$3999	$2000-$2199	$1733
Median weekly rent	$350-$449	$450-$549	$450-$549	$330

Source: ABS Census 2006; 2011; 2016

3.4 Cultural diversity – language spoken at home

In South Brisbane, approximately half the population speak English at home. This proportion decreased from 55% in 2011 to 49% in 2016. The decrease in English as the main language spoken at home was also accompanied by a subsequent increase in the proportion of households that speak Chinese, which increased from 7% in 2011 to 11% in 2016. Indo-Aryan, Southeast Asian Austronesian and Korean also appeared as top languages spoken at home over the Study period. According to the 2018 West End State School Annual Report, 44% of students speak a language other than English (West End State School 2019)[18].

Table 15 Languages spoken at home in South Brisbane from 2006 to 2016

Language spoken at home	2006	2011	2016
	At SA2 South Brisbane		
English	54%	55%	49%
Chinese	5%	7%	11%
Indo-Aryan			3%
Southeast Asian Austronesian		2%	

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[18] West End State School 2019, *2018 West End State School Annual Report,* https://westendss.eq.edu.au/supportandresources/formsanddocuments/annualreports/annual-report-2018.pdf.

Korean	2%		

Source: ABS Census 2006; 2011; 2016

**THE COMPACT CITY AND
SCHOOL CHILDREN IN THE ACT**

Final Report

2 SEPTEMBER 2020

ARUP

COVER IMAGE:

Clockwise from top:

Images by

This report takes into account the particular instructions and requirements of our client.
It is not intended for and should not be relied upon by any third party and no responsibility is undertaken to any third party.

JN 271517-00 ACT Urban Existing residential suburb Study		
Revision	Date	Description
E - Final	2 September 2020	Final Report
Prepared by	Checked by	Approved by

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Tables and figures

Glossary

ACT Education - Australian Capital Territory Education Directorate

ABS - Australian Bureau of Statistics

ABS Census - Australian Bureau of Statistics Census

Brownfield or greyfield development - Redevelopment in established areas, delivering medium-density to high-density residential development in existing urban areas, as defined by Australia: State of Environment Report, 2016

Dwellings - A structure which is intended to have people live in it, as defined by the ABS Census Dictionary

Dwelling typology - A combination of Dwelling Structure, as defined by the ABS Census Dictionary as the classification of the structure of private dwellings enumerated in the Census according to separate (detached) dwellings, semi-detached dwellings, flats or apartments according to the number of storeys, caravans, houseboats, etc. and the number of bedrooms within a Dwelling, according to the ABS Census. For the purposes of this document, only four of the classification structures have been used: separate (detached) dwellings, semi-detached dwellings, flat or apartment in a one to three storey block and flat or apartment in a block of four or more storeys

EPSDD - Environment, Planning and Sustainable Development Directorate

Greenfield development - the release of undeveloped land located on the periphery of cities for the delivery of low-density housing, as defined by Australia: State of Environment Report, 2016

New residential suburb - Development in new areas or in areas without residential development or uses

Residential intensification or existing residential suburb - Development in established or existing urban areas

SA2 - Australian Statistical Geography Standard (ASGS) - Statistical Area 2

SA1 - Australian Statistical Geography Standard (ASGS) - Statistical Area 2

School student - A person enrolled in a school, recorded under a unique ID number in the ACT Education School Student Census

Site - A residential development site that has been included in this Study

Study area - The area that surrounds a Site, usually at an SA1 or SA2 level

Tenure - Refers to Tenure Type, defined by the ABS Census Dictionary as a description of whether a household rents or owns the dwelling in which they were enumerated on Census night, or whether the household occupies it under another arrangement. For the purposes of this study, two simplified tenure types were used: owned and rented.

IMAGE SOURCE;

Executive Summary

PURPOSE

Arup undertook a study with the ACT Education Directorate (ACT Education) to support enrolment forecasting and decision-making for schools planning. Specifically, this study will inform the approach to understanding the likely number of school-aged children that may result from medium to high density development in existing residential suburbs in urban areas, based on recent development trends.

This Study responds to the experience of many Australian jurisdictions that have or are encountering higher than expected growth in children in inner city areas, resulting in pressure on schools.

The ACT Planning Strategy (2018) has outlined a goal for at least 70 per cent of new residential development to take place in the established urban areas of Canberra. This type of development is currently taking place in Canberra, particularly along the City and Gateway Corridor. One of the broader ambitions of the ACT Planning Strategy (2018) is to encourage more compact development typologies. Greater demand for infrastructure and services is likely to result from increased existing residential suburb residential development. Findings from this study will support ACT Education in planning for schools proactively across Canberra and in addressing the changing needs of Canberra's population.

OVERALL APPROACH

This Study has been undertaken by Arup with Alpha Demographics with data provided by the ACT Education, Australian National University (ANU) Faculty of Demography and the ACT Environment, Planning and Sustainable Development Directorate (EPSDD) including:

» ACT Education School Student Census from 2010 to 2020;

» ABS Census from 2006 to 2016; and

» Development application data from 2005 to 2019.

CORE STUDY QUESTION

The core question for exploration in this Study is as follows:

"If a brownfield development is taking place in an established area of Canberra –how many school-aged children will this development generate?"

Our approach to address this problem statement was iterative – responsive to the data that was available, the knowledge of members of the team and stakeholders.

The analysis within the Study utilised the following key data sources:

» ACT Education School Student Census 2010 – 2020;

» ABS Census 2011 and 2016 for area wide characteristics and demographic trends including:

» Dwelling typologies - A combination of Dwelling Structure, as defined by the ABS Census Dictionary as the classification of the structure of private dwellings enumerated in the Census according to separate (detached) dwellings, semi-detached dwellings, flats or apartments according to the number of storeys, caravans, houseboats, etc. and the number of bedrooms within a Dwelling, according to the ABS Census. For the purposes of this document, only four of the classification structures have been used: separate (detached) dwellings, semi-detached dwellings, flat or apartment in a one to three storey block and flat or apartment in a block of four or more storeys;

» Socio-economic Index for Areas (SEIFA) Indexes of Relative Social Advantage and Disadvantage (IRSAD) and Education and Occupation (IEO);

» Experimental Index of Household Advantage and Disadvantage (IHAD);

» Tenure - Refers to Tenure Type, defined by the ABS Census Dictionary as a description of whether a household rents or owns the dwelling in which they were enumerated on Census night, or whether the household occupies it under another arrangement. For the purposes of this study, two simplified tenure types were used: owned and rented;

» Access Canberra sales data, cleaned by the ACT Treasury; and

» EPSDD Development Application data from 2005 to 2019, collated and summarised by ACT Education.

Additional data was referenced to gain context for the study, to capture broad trends across ACT and other cities, and to inform the set of factors for further analysis.

Workshops and collaborative teleconference/video conferences were held with Arup, Alpha Demographics and ACT Education and other key stakeholders to explore the best approach to the study – to gain the best outcome to respond to the problem statement with the data available and the study timeframe.

A sample of residential sites (15 in total) was selected by the Arup and ACT Education team to document the school student population change against multiple factors including typology (housing and number of bedrooms), tenure, median sales price, location (existing residential suburb and new residential suburb).

To complement the quantitative analysis. a series of semi-structured interviews were undertaken in ACT to understand shifting housing choices for households with children from the perspective of built environment practitioners: a representative of property council, developers and ACT Government Architect. The findings of the semi-structured interviews formed an into the contextual framing for this study.

SECONDARY STUDY QUESTION

A Secondary study question was explored:

How might the suburb or district level demographics of urban existing residential suburb areas change over time as a result of urban existing residential suburb developments?

It is recognised that other jurisdictions have been experiencing school student population change as a result of residential development in existing suburbs in urban areas. To provide additional perspective on the ACT focused analysis, we undertook a series of semi-structured interviews with those involved in schools planning in New South Wales and Queensland. In addition, high level case study analysis on three areas (one in Sydney, Newcastle and Brisbane) to document school student population change and dwelling typology change.

LEGEND ○ WORKSHOP ● ARUP/ ACT Education COLLABORATIVE SESSION ◌ SEMI-STRUCTURED INTERVIEW

ENGAGEMENT STREAM

ANALYSIS STREAM

PHASE 1

UNDERSTANDING DEMOGRAPHIC AND PROPERTY DATA IN CANBERRA

PHASE 2

RESIDENTIAL SITE SELECTION

PHASE 3

DEVELOPMENT SITE SAMPLE ANALYSIS

PHASE 4

PERSPECTIVES ON FACTORS THAT MAY INFLUENCE SCHOOL ENROLMENT DATA

PHASE 5

LEARNING FROM OTHER JURISDICTIONS

_Reviewing relevant data, policy and research to understand the policy context for shaping new development across Canberra and the factors that may be impacting housing choice in Canberra

_Collating and presenting data on each factor for analysis across growth areas in Canberra to inform residential site selection

_Workshop to inform areas of interest for residential site selection

_Reviewing available data and range of potential residential sites to select 15 residential sites

_Collecting property and school population data at residential site

_Collating characteristic data at SA1 level

_Undertaking analysis to extract key findings and any trends

_Undertaking semi-structured interviews with built environment professionals

_Consolidating findings into contextual analysis

_Undertaking semi-structured interviews with schools planners and strategic planners for Sydney, Newcastle and Brisbane

_Undertaking case study analysis to document change in dwelling typologies and school population in three sites across Sydney, Newcastle and Brisbane

KEY FINDINGS

The key findings that have emerged from this Study across the contextual analysis, residential site analysis and semi-structured interviews are summarised below.

1. **Multiple forces are shifting housing preferences for households with children, but school student populations emerge in developments no matter what the typology is**

Affordability, migration, cultural diversity, increasing density, urban renewal, policy shifts, greater desire to access amenity and more apartment and semi-detached dwelling stock were all noted within the literature and discussions with built environment professionals as broader trends affecting housing preferences for households with children. It was noted that these trends are interdependent and complex. This study did not conclude for each factor or quality of housing a specific yield of school students, however, planning for school infrastructure should be informed by a holistic understanding of the impacts these factors can have at different scales.

The results of the sample development site analysis showed high variation in the school aged student population across the development sites across all factor within each typology (size, number of bedrooms, apartment/townhouse mix and median price). While there was high variation, each site yielded a population of school students at least once within the Study period.

In addition, discussions during semi-structured interviews suggested that in recent years there has not been widespread change that has resulted in a higher rate of families with school students living in medium to high density dwellings. Discussions with built environment professionals also suggested that the desire for families to have larger detached dwellings families broadly remains. Cultural diversity of the community, desire for access to amenity and services and affordability were suggested as influences that may result in shifts in the future.

The development site analysis demonstrated that when dwellings are delivered, they will yield some school-aged students on site, no matter what the typology is. While housing preferences are changing due to a number of factors, the ambition of the ACT Government to deliver 70% of new development within existing residential areas means that more compact typologies will be delivered. This will lead to some increase in residential density. The sample development site analysis demonstrates many ways that residential intensification can play out in terms of a yield in school-aged students; however, the commonality across the sites is that they all yielded a school-aged student population.

2. **Medium-high density dwellings are accounting for an increasing share of dwelling stock**

Medium-high density dwellings, which include semi-attached dwellings and apartments, are accounting for an increasing share of dwelling stock across ACT and other cities in Australia.

Research into Canberran's housing preferences outlined in the ACT Planning Strategy (ACT Government, 2018) note that there is higher demand for medium density housing, such as townhouses. The ACT Housing Attitudes and Intentions Survey 2016 (Winton Sustainable Research Strategies, 2016) undertaken on behalf of the ACT Government found that household preferences for dwelling types closely align with dwelling supply. In the 2011 ABS Census for Population and Housing, the split of dwelling structure in the ACT was: 73% separate houses, 15% semi-detached, townhouses or medium-density dwellings, and 12% units or apartments, or high-density dwellings. In 2016, 65% of dwellings in the ACT were houses, 18% were medium-density dwellings and 17% were high-density dwellings.

Discussions with the education departments from NSW suggested that data showed that the proportion of school students living in medium – high density dwellings was not increasing across Sydney, however the number of medium-high density dwellings had increased significantly in some areas, resulting in a total increase in school students in some areas. This is seen in the case study of Wentworth Point in Greater Sydney, where we observed an increase of 286% in medium- to high-density dwellings between 2006 to 2016, and an increase of 95% in the school student aged population within the same time period.

3. Medium and high density developments yield school aged children at greater magnitudes, within shorter time frames

It was found that overall, medium and high-density developments yielded school aged children. Intensification of existing urban areas brings higher volumes of dwellings, leading them to experience growth in local population, including families with school aged students in short amounts of time. The data shows that the magnitude of new dwellings, and the rate of new dwellings into an area from higher density development will generate school aged children, and thus demand for school infrastructure within short amounts of time.

Overall although the yield of student aged children per dwelling remains steady; it is the total amount dwellings being introduced and rate of development that greatly drives the quicker rate student growth that is experienced in infill development as well quantum of students.

4. Smaller residential developments had a higher proportion of school aged children per dwelling

In our sample analysis, developments with between 12 to 50 dwellings displayed a higher ratio of occupation of school student populations than development sites with a higher number dwellings. For example, Magnolia Mews (Site 1) has 32 dwellings and had a ratio of occupation of school student population of 31% at its peak. Artique (Site 5) in Campbell has 12 dwellings, one of the smallest developments in the study.

This site had a median rate of occupation of school student population of 33%. Similarly, Allure (Site 6) had a ratio of occupation of school student population of 25%.

This is compared to Axis Apartments (Site 4), the largest development within the sample study, with a total of 349 dwellings, and a median ratio of occupation of school student population of 8%. Wayfarer (Site 11), with 331 dwellings had a median ratio of occupation of school student population of 2%.

5. Development sites with different proportions of multi-bedroom dwelling yield differently sized school student populations

From the semi-structured interviews, we heard that multi-bedroom apartments are recognised as more 'family friendly'. Similarly, research by Hutchinson Smith (2017) found that the more bedrooms, the more school students per dwelling. Our sample study highlighted that Allure (Site 6) had 100% multi-bedroom dwellings and did display one of the highest median ratios of student occupation at 25%. It is noted that this site also consists of townhouses only. Conversely, there were other sites within the Study that had high proportions of multi-bedroom units and townhouses and had a median student occupation of less than 10%.

6. Affordability was recognised as a factor that may influence families with school students to live in medium to high density dwellings

A trend discussed in the semi-structured interviews being seen across Canberra, Sydney and Brisbane is families moving into medium to high density developments in existing residential suburb areas to gain access to amenity and services at a more affordable price point than detached dwellings. In our sample study however, there was no clear relationship across all 15 sites between median sales price and school aged school aged student population. However, sites with a median dwelling price within the range of $400,000 to $550,000 tended to have higher ratios of occupation.

The sites with three highest median sales prices did exhibit the low ratios of student occupation (Space (Site 1): 3%; Space (Site 2): 7%; Atelier (Site 10): 4%), however, some sites that had the lowest median sales price (Wayfarer (Site 11)) also had low median ratio of student occupation (2%). Artique (Site 5) and Allure (Site 6) had median sales prices higher than the ACT median for units and displayed the highest median ratio of student occupation (33% and 25% respectively).

7.   Lag in school student population from development opening

Five of the sites had immediate uptake following the completion of the development: Axis (Site 4) in Lyneham, Atelier (Site 10) in Kingston, Ambiente (Site 8) in Wright, The Quay (Site 13) in Greenway and Mizura Villas (Site 14) in Lawson. Some development sites had a period of one year following the completion of the development before a school student population was observed. For example, Artique (Site 5) was completed in 2011, but only had one student in 2013, followed by four students in total in 2014. Quayside (Site 7) was completed in 2014 but students were first recorded within this site in 2016; there were five students in 2016. School student populations at these sites did not necessarily increase year-on-year following the completion of the development. It is noted that as Magnolia Mews, Space and Space2 were developments opened before 2010, no data was available to analyse school enrolment data at this site from opening.

8.   The proportion of English speaking school student households differed across the residential sites

Language spoken at home is collected as part of the School Student Census and was analysed at SA1 level to provide an indication of cultural diversity of an area. The proportion of school student households speaking English at home by SA1 in 2019 was reviewed against the ratio of student occupation at sites in the same year.

The Study highlights that there is not a clear relationship between proportion of households speaking English at home in the SA1 to ratio of student occupation in the residential site, however, there was alignment across some residential sites. For example, for Evolure (Site 12), its corresponding SA1s has one of the lowest proportions of English speaking households at 44%. Site 12 also has the highest ratio of occupation across all sites at that year, at 23%. In addition, at Atelier's (Site 10) low ratio of student occupation in 2019 showed high proportions (more than 80%) of student households speaking English at home in the same year.

9.   Primary school aged children were the largest group within the sites' school student population

Across all the residential sites, primary school children tend to be the largest group within the sites' school student populations. The older residential sites such as Magnolia Mews (Site 1) and Space2 (Site 3) had some years within the study period wherein high school and college-age children were the largest groups. This may be related to the age of the developments - both sites are among the oldest developments in the Study with a completion date before the study period of 2010-2020 - as well as to the higher proportion of multi-bedroom dwellings in both sites.

10.   Sites with a more even distribution of advantage and disadvantage showed higher median student ratios of occupation

Overall, school student population at a residential site did not appear to be strongly correlated with the relative advantage and disadvantage in their surrounding areas. The Experimental Index for Household Advantage and Disdvantage (IHAD) was used to measure this at an SA1 or SA2 level. The IHAD index distributes households within an SA1 to a quartile (1 being the most disadvantaged, 4 being the most advantaged) that corresponds with that household's level of advantage or disadvantage.

Higher median ratios of student occupation were observed in sites located in areas with more even distribution across the four IHAD quartiles, e.g. almost equal or equal proportions of households in each IHAD quartile.

For example, Artique (Site 5) has the highest median ratio of occupation at 33% and its SA1's IHAD distribution is almost exactly 25% across the four quartiles.

This is also observed in Magnolia Mews (Site 1) (13%) and Evolure (Site 12) (15%). Though sites within areas of higher advantage also present with high median ratios of occupation, such as Allure at 25%, Watermark (Site 9) at 15% and The Quay (Site 13) at 12%.

11. **Some lessons may be gained from other jurisdictions, however city features are context specific**

Canberra appears to be ahead of the curve in correlating schools planning and housing development. Interviews with school planning professionals in Newcastle, Sydney and Brisbane have provided valuable insight into pinch-points being faced by planning departments. There is common recognition across the different jurisdictions that schools planning is impacted by housing development and demographic shifts. The interviews highlighted that in Sydney, the rate at which households with children are moving into apartments is not necessarily increasing, but that there is just more medium- to high-density development.

Demographic shifts have also played a role in increasing numbers of families moving into medium- and high-density development, such as overseas migration and gentrification. In 2006 16% of all (occupied) ACT apartments had occupants who had migrated to Australia within the previous five years. In the 2016 the corresponding figure was 28%. Schools planning professionals highlighted that competitiveness for popular schools is exacerbating pressure that is already there and emphasised that schools planning should follow where people have chosen to live, not where they want their children to go to school. All interviews emphasised the importance of data consistency between housing forecasts and schools planning, though admitted that there are discrepancies at both local and state levels.

LIMITATIONS OF THIS STUDY

Some limitations to the analysis emerged throughout the Study across availability of data, quality and consistency of data. For example, it was found that some student addresses were not encoded correctly and were missing a complete street address. These incomplete entries represented a very small portion of the dataset; overall, the data was comprehensive and provided a strong foundation for the analysis.

In addition, working with a large dataset, (approximately 70,000 students per year for 10 years), it was found that georeferencing this data was challenging to maintain a level of precision across all years.

We also found that gaining a comprehensive set of development application data across ACT with relevant fields of dwelling typologies, and demolition data proved to be challenging within the timeframe of the Study. Review and analysis of this data was undertaken by ACT Education and provided for this Study.

Further limitations of the Study are outlined in this report.

FURTHER ANALYSIS

Areas for analysis were identified through this Study to support a further understanding of housing choices for households with school aged children. These are summarised below.

1. This sample analysis provides a testing of an approach with 15 residential sites. An expansion of the sample size is suggested

The residential site analysis has been undertaken as a limited sample analysis (including 15 residential sites). Observations are noted within the analysis, however clear correlations between the data were not able to be determined due to the limited sample size. This sample analysis provides a testing of an approach, and an expansion of the sample size is suggested.

2. Fine grain analysis is suggested to correlate student addresses to individual dwelling attributes

Analysis within this Study documented the overall development site typology and the total student population at each development site address. Further analysis is suggested to understand the attributes of dwellings that individual school age students may be occupying to understand if households with school aged children in these developments are occupying the multi-bedroom dwellings within these development sites only. If so, these families may be occupying a small proportion of the overall dwellings, however they may make up a significant proportion of the multi-bedroom dwellings within a development site.

3. Longitudinal dwelling studies of families with children to understand movement patterns and dwelling preferences

Analysis within this Study documented the overall development site typology and the total student population at each development site address for each year of the Study period. Additional analysis is suggested to understand the movement patterns of families with school aged children.

For example, further analysis is suggested to understand if families move into new medium to high density dwellings with younger, non-school-age children or young couples are moving into these new developments before starting a family and stay when children enter the school system, and or if households had recently moved into the development when ready for school.

Additional analysis may also be undertaken on the movement of students throughout the school cohorts. From our sample analysis, we observed that for older developments, there were peaks and troughs of total school student populations, and this population increased in age throughout the years. This may suggest that school students who are living in these developments are growing up, getting older and moving up and out of the school system. It is suggested that further analysis using the unique student IDs be undertaken to confirm if this trend is occurring.

4. Correlation of student addresses to tenure to understand if this factor impacts student generation

The tenure of each individual school student at the development site was not included in the School Census data provided. It is suggested that further analysis be undertaken to understand housing tenure of families with school age students.

5. Further analysis of lag in student population in new developments

Further analysis may contribute to understanding whether the 'lag' in school student population in new developments is related to households waiting for available rental stock to open on the market from these relatively new developments. In particular, median sales price may be a relevant factor for less affordable areas.

Median sales price was reviewed for each development site. Additional analysis may be undertaken to understand if there are lags in school student population in less affordable areas due to households with school students waiting for available rental stock to open on the market from these relatively new developments.

6. Understanding wider school student population shifts and broader trends at SA1s

In the analysis of school student population at a site, for some sites we saw an increase corresponding to increased student population growth at SA1s. Further analysis is suggested to determine if these two increases may be linked to new developments being delivered in the immediate surrounding area, or if student populations are moving into existing dwelling stock.

Further analysis is suggested to understand broader trends that may be impacting the initial high occupation in Watermark, and similarly with The Quay site including higher supply of affordable housing options alongside Gungahlin as a key employment centre; and relationship with other new developments in Lake Tuggeranong.

7. Deeper understanding of settlement patterns and schools population

Classification of existing residential suburbs and new residential suburbs have been informed by ACT Education data. Further classification of areas aligned with ABS settlement definitions is suggested to be undertaken as part of further analysis.

1. Introduction

1.1 PURPOSE OF THE STUDY

Arup undertook a study with the ACT Education Directorate (ACT Education) to support enrolment forecasting and decision-making for schools planning. Specifically, this study will inform the approach to understanding the likely number of school-aged children that may result from medium to high density development in existing residential suburbs in urban areas, based on recent development trends.

This Study responds to the experience of many Australian jurisdictions that have or are encountering higher than expected growth in children in inner city areas, resulting in pressure on schools.

The ACT Planning Strategy (2018) has outlined a goal for at least 70 per cent of new residential development to take place in the established urban areas of Canberra. This type of development is currently taking place in Canberra, particularly along the City and Gateway Corridor. One of the broader ambitions of the ACT Planning Strategy (2018) is to encourage more compact development typologies. Greater demand for infrastructure and services is likely to result from increased existing residential suburb residential development. Findings from this study will support ACT Education in planning for schools proactively across Canberra and in addressing the changing needs of Canberra's population.

The Study was undertaken by Arup with Alpha Demographics with data provided by the ACT Education, Australian National University (ANU) and the ACT Environment, Planning and Sustainable Development Directorate (EPSDD).

1.2 REPORT STRUCTURE

This Final Draft Report provides a summary of the work to date for the ACT Urban Existing residential suburb Study and includes the following sections:

1. **Executive summary**

2. **Introduction:** An outline of the purpose of this Study, an outline of the contents of this report, a summary of the data sources used, and limitations of the study

3. **Context and drivers of change:** A summary of the literature review and presentation of key findings of the review into trends in changing housing choices in cities and specific to Canberra. This review provides input into the approach to the analysis, including informing the set of factors to analyse for each area;

4. **Approach to the analysis:** An overview of the approach to each phase of the work, including a data schema to document data sources and assumptions and summary of the outputs from the analysis to inform the selection of Residential sites;

5. **Outputs of the analysis - Residential sites analysis and overall findings:** Overall analysis of the 15 residential sites and findings including suggestions for further analysis;

6. **Learning from other jurisdictions:** A summary of the experiences gathered from a selection of practitioners in schools planning in Sydney, Newcastle and Brisbane and a high level summary of the school student and dwelling typology change across three selected areas in Sydney, Newcastle and Brisbane;

7. **Appendix 1:** Site by site presentation of the residential site analysis;

8. **Appendix 2:** A set of tools and content that has informed the study including an outline data schema; and

9. **Appendix 3**: Detailed case study analysis.

1.3 DATA SOURCES AND LIMITATIONS

This Study provides a sample analysis of recent residential sites, and their corresponding change in school student population. This Study also seeks to identify any relationship with the set of key factors that may influence school population in medium to high density dwellings including: existing residential suburb or green field location; dwelling typology; median sales price; and amenity.

The analysis within this report is based on data collected from a variety of sources, namely:

» ACT Education School Census from 2010 to 2020;

» Australian Bureau of Statistics (ABS) Census from 2006 to 2016; and

» Development application data from 2005 to 2019.

Spatial analysis of the data formed a key component of the approach. This provided the ability to align data sets by location, down to the specific location of residential site and school student address. Residential site data and school student population data was also able to be contextualised with ABS Census data by identifying the relevant SA1 area.

Some limitations to the analysis emerged throughout the Study. Limitations are summarised as follows:

» Data from ACT Education School Census included detailed and comprehensive information for each unique student ID that served as the foundation for our analysis. Student addresses in the data from 2010-2017 and 2020 were not georeferenced; however, included enough detail in order to geocode the addresses amd create a georeferenced dataset. In order to determine the growth of a school student population at each site and its corresponding SA1 and SA2, data was geocoded and assigned to a relevant ABS Census geography by creating latitude and longitude coordinates for each student's address, then inputting these coordinates into GIS software overlaid on top of ABS Census geography (SA1s). Following this overlay, each unique student ID was matched to an SA1 using GIS software;

» Some unique Student IDs did not include complete student addresses. The most complete detail was provided through the Home Suburb. This may have impacted the SA1 selection process as the addresses would be georeferenced to a general suburb location; however, this was not the case for majority of the data, and the overall dataset was comprehensive enough to conduct the analysis;

» Within the dataset provided, it was found that a small proportion of students did not have a unique ID number or address. Students without unique ID numbers and without addresses were not included in this Study. In addition, students outside of the ACT were not included in this Study. It is noted that those not included in the Study represented a small proportion of the overall dataset;

» Gaining a comprehensive set of development application data across ACT with relevant fields of dwelling typologies, and demolition data proved to be challenging within the timeframe of the Study. It was found that data including data on a development as constructed vs. as approved was not easily available in the form required for sites across ACT from 2010 - 2019. Review and analysis of this data was undertaken by ACT Education and provided for this Study;

» The Development Site Selection workshop included only a selection of development application data only across the high growth areas. Selection of areas of interest was informed by workshop participant knowledge;

» In response to challenges in gaining a comprehensive development application data set, a sample residential site analysis approach was undertaken. Data for 15 sitess were reviewed, collected and summarised by ACT Education, including a review of development sites at completion to confirm final development form including dwelling typologies and make up;

» School enrolment data was reviewed at the residential site address only. Specific housing typologies within a development were not able to be correlated to school student populations from the data available, e.g. we were unable to confirm if families with school age students were residing in a 3-bedroom apartment or 1-bedroom apartment within a development site;

» School enrolment data was reviewed at the development site across each year from 2010 - 2020. Analysis of the movement of school student population was not undertaken to determine how and if families with school age children were moving throughout their school years to other addresses. It is suggested that this analysis forms part of further study including analysis of movement to other dwelling typologies; and

» School enrolment data in 2020 was not reviewed at an SA1 level and is integrated in-to the study only at the development site and at the SA2.

2. Context and Drivers of Change

A summary of the long term trends that are impacting housing choice for families with school students is presented below. Each trend includes a key question to guide the Study's analysis. Data to inform this summary has been sourced from research, ABS data, journal articles, relevant publications in ACT and Australia as well as thoughts and perspectives collected from semi-structured interviews with development professionals in the ACT. It is noted that these discussions invited qualitative opinions from informed professionals, however these comments are not always supported by quantitative evidence.

2.1 CITIES

2.1.1 INCREASING FOCUS ON PLANNING FOR INNER CITY AREAS

There is a shift in government policy towards a more compact residential typology for inner urban areas. Canberra's Statement of Ambition (2016) outlines a pathway for Canberra to be a "compact and competitive city…and winning the global contest for investment and talent – opening and diversifying our knowledge-based economy – better metropolitan infrastructure – and integrated smart-city initiatives."

The ACT Planning Strategy (ACT Government, 2018) includes "compact and efficient" and "liveable and accessible" as key themes. It also highlights an objective for at least 70% of all new housing to be built within the existing urban footprint. This aims to encourage greater diversity of housing choice (including smaller, and more dense housing forms), enable access to appropriate infrastructure that will support growing communities and the development of an efficient, sustainable and liveable city.

The focus on existing residential suburb development in inner city areas recognises the significant opportunity to reduce a city's impact on the environment, whilst maintaining productivity in economy and supporting a high quality of life. Smaller, compact private homes in exisiting communities can reduce overall consumption, reduce reliance on cars through being able to walk or cycle to services and encourage more intensive use of existing infrastructure.

Key question for analysis: Are school aged populations increasing in existing residential suburb areas? Are school aged populations increasing in medium to high density dwellings? What factors might encourage growth?

2.1.2 DELIVERING SCHOOLS INFRASTRUCTURE ALONGSIDE GROWTH IS CHALLENGING

Over the past decade, countless neighbourhoods have been redeveloped and densified without the alignment and delivery of the necessary supporting infrastructure (Infrastructure Australia, 2018). Meeting the housing needs of a growing population will require a significant shift across all Australian cities to deliver a diverse range of housing typologies as well as the necessary infrastructure and services.

Infrastructure Australia's most recent Infrastructure Audit in 2019 identified that schools in fast-growing cities, particularly in inner areas, were under stress due to increasing demand and pressure.

The Audit (Infrastructure Australia, 2019) highlighted that overcrowding can lead to poor school student outcomes. For example, it can result in a reduction in other spaces, such as playgrounds or art and music classrooms, to accommodate additional school students, or can require building upgrades or changes. The challenge of delivering school infrastructure was also highlighted within the Audit as it outlined:

> *"One of the challenges with building or upgrading schools in established inner-city areas is the scarcity and high cost of available land... School infrastructure planning in established areas is generally more reactive to demand and capacity issues, and major development proposals…There can also be the added complexity of demographic changes within suburbs. For example, some parts of inner Sydney and Melbourne currently have a large number of school-aged children but many schools that previously existed in these areas were closed by governments in the 1990s and early 2000s due to a temporary lack of demand and an assumption that families would not reside in inner city areas." -Infrastructure Audit 2019 (Infrastructure Australia, 2019)*

The importance of rethinking projections for informing school planning was also highlighted in the Audit (Infrastructure Australia, 2019) as it states that:

> *"In our fast-growing cities people are increasingly locating to inner city areas at all stages of life for a variety of reasons, including access to employment opportunities, moving closer to family, or access to education infrastructure. Within these cities, families are also increasingly living in higher-density areas and in smaller homes, including apartments. Additional school-aged children living in an area where they were not born can increase demand for school infrastructure that is not captured by projections."*

In the ACT, the increasing focus on directing new development into inner city or established areas will have knock-on effects on the necessary infrastructure to support the growing population. Schools planning in the ACT is responding to natural population increases, interstate and overseas migration patterns as well as shifting preferences for public schools. There was an increase in students attending public schools of more than 26% from 2010 to 2019 (ACT Government, 2019).

Key question for analysis: Are school student populations increasing in existing residential suburb areas? Does the proximity of services and amenities impact the choice of housing for families?

2.2 HOUSING

2.2.1 APARTMENTS ARE ACCOUNTING FOR AN INCREASING SHARE OF DWELLING STOCK

Research into Canberran's housing preferences outlined in the ACT Planning Strategy (ACT Government, 2018) note that there is higher demand for medium density housing, such as townhouses. The 'ACT Housing Attitudes and Intentions Survey 2016 (Winton Sustainable Research Strategies, 2016) undertaken on behalf of the ACT Government found that household preferences for dwelling types closely align with dwelling supply.

In Australia, nine percent of all children aged 0 – 4 had an apartment as a home in 2016 (ABS, 2017). In the ACT, seven percent of children in the same age group lived in apartments in 2016. Compared to other states, in NSW, 16.5% of children aged 0-4 lived in apartments in 2016; Queensland had a lower proportion of five percent (ibid).

In a research paper titled "New methods for projecting enrolments within urban school districts" (Hutchinson Smith, 2017), it was found that families tend to prefer low-rise structures and ground-level units. The research also found that an increase in the number of ground-floor units results in an increase in the number of children per unit.

Research undertaken by ACT Government notes that within Canberra Central District, only one third of the 1,500 households interviewed considered apartment living an 'unattractive' option and just 15% thought townhouse living an unattractive option. The study highlights the amenity benefits of living in central areas form an important consideration for households in higher density living.

The prevalence of apartment dwelling stock is also increasing in the ACT. According to the 2016 Census, apartments made up 16% of all occupied dwellings. According to ABS Building Approvals in 2016, apartments made up just under 54% of all approved dwellings, and over 90% of approved apartments were in buildings four storeys or higher (ABS, 2017).

Key question for analysis: Are school student populations increasing in medium to high density dwelling typologies? What are the characteristics of dwelling typologies that exhibit larger school student populations?

2.2.2 SOME CHANGE IS OCCURRING, HOWEVER, MOST FAMILIES STILL PREFER LARGER HOMES

Housing preferences differ across households. The number of bedrooms, safety and security and proximity to services were rated as prioritised attributes for housing ahead of particular dwelling structure (Grattan Institute, 2011). In the same study, it was

noted that middle-aged households with children highlighted the importance of inside space. Multi-bedroom dwellings within medium to high density developments may be attractive to families. Research into school enrolment trends (Hutchinson Smith, 2017) found that the more bedrooms, the more school students per dwelling.

The ABS (2016) highlights that there is no single standard measure of housing suitability. However, the Canadian National Occupancy Standard is widely used in Australia and internationally. The Standard notes the following:

» There should be no more than two persons per bedroom;

» Children less than five years of age of different sexes may reasonably share a bedroom;

» Children less than 18 years of age and of the same sex may reasonably share a bedroom;

» Single household members 18 years and over should have a separate bedroom, as should parents or couples; and

» A lone person household may reasonably occupy a bed sitter.

Interviews with housing professionals in the ACT as part of this Study highlight that they have observed recent turnover in suburbs in the inner city to welcome new families. This has been noticed in areas of Ainslie, O'Connor, Campbell, and Lyneham. Discussions also noted that the shift in housing choices for families towards higher density may take time for Canberrans to embrace, as Canberra's brand is still associated with the "Bush Capital" with the desire for the large, leafy block.

Although it was noted that the shift towards higher density dwellings has been slow, the interviewees indicated that some recent developments, such as in Gungahlin and Denman Prospect, may showcase changing preferences. Observations of these developments suggest that families can be accommodated in dwellings with a smaller size footprint.

Discussions also noted that these developments reflected broader social trends of people being time-poor and having a limited ability to maintain large private areas. Design and amenity aspects of neighbourhoods, like green spaces integrated within a precinct, dwellings close to shops and services like public transport and schools were highlighted as key features to support medium to high density homes.

Key questions for analysis: Are school student age populations increasing in medium to high density dwellings? What qualities of medium to high density dwellings show high school student aged populations?

2.2.3 LOW HOUSING AFFORDABILITY IS ATTRACTING HOUSEHOLDS TO SMALLER DWELLINGS

Research on projecting school enrolments in urban districts (Hutchinson Smith, 2017) found that luxury apartments tend to not be occupied by households with children. The research also found that as rent increases, family size decreases. The research also highlighted as the developments age, the number of school students per dwelling tends to increase. This may be associated with a "life cycle" of a neighbourhood; luxury apartments or new apartments tend to ask for high rents and as they age and become cheaper, families move in.

ACT residents pay the "equal highest median weekly rent of $380...and the second-highest monthly mortgage repayment in Australia ($2,058)" (ABS, 2017).

Semi-structured interviews highlighted that affordability is a key issue across Canberra. Canberra has the lowest rental vacancy rates in the country at 1.7% in December 2019, compared to National rate of 2.5% (Property Observer, 2020). At the same time, Canberra also has recorded the highest median rents in Australia at an average of $560 per week - higher than Sydney for the first time in 11 years (All Homes, 2019). It was noted that Canberra also has the highest median wages, however, those without the capacity to pay may be vulnerable to housing stress.

According to the discussions within the interviews, anecdotal evidence suggests some couples anticipating children or young families may be more prepared to buy into medium density, usually townhouses, as their first home in order to access housing that is more affordable.

Key question for analysis: Do developments with lower median sales prices host higher school student populations?

2.2.4 GREATER DIVERSITY IN HOUSING STOCK

Households are shifting across Australia. The OECD population is ageing due to both an increase in life expectancy and a decrease in total fertility rates. In Canberra, the percentage of the ACT population aged 65 years and over is expected to rise from approximately 11 per cent in 2017 to 15 per cent in 2058, a total increase of 125 per cent (ACT Government, 2019). The Property Council of Australia's ACT Division highlights in its submission to the Housing Choices Discussion Paper that there is an increasing need to cater for not only a growing, but an ageing population (Property Council of Australia, 2018).

Ageing in cities presents a potential shift in households and housing needs through a potential increase in lone person households as well as an increase in multi-generational households. Lone – person households are projected to make up 27% of all Australian households in 2041 (ABS, 2019). In the ACT, single person households were the fastest growing household type from 1991 to 2016.

Alongside this trend, the ABS projects the number of people living with 'other related persons' in the family household to grow to 781,000 or more by 2036 in Australia (ABS, 2019). Other studies indicate that one in five Australians currently live in a multi-generational household, and the trend is on the rise (Christina Ho, Edgar Liu, Hazel Easthope, 2012).

More diversity in housing stock provides increased opportunities for empty nesters or lone person households to downsize or 'right size'. This may in turn, free up larger dwellings for families with school-aged children, potentially resulting in increased school student yields from locations with little or no new development activity.

According to the ACT Government's Housing Choices Discussion Paper and Community Consultation Report (2018), 60% of surveyed residents "anticipate that they will move in the next decade in response to anticipated needs, and lifestyle changes." The Housing Choices project also highlighted that the Canberra "community has expressed a desire for more housing choice and flexible housing forms in their neighbourhoods and suburbs – not just single dwellings or high rise apartments… [including] smaller homes and townhouses, villas for larger families, and housing for those on lower incomes, as well as those ageing or with disabilities" (ACT Government, 2018).

Some studies suggest that there are barriers that discourage people from moving into a dwelling to better suit their needs, such as stamp duty or other concerns about apartments like small or lacking outdoor spaces, proximity of neighbours and the cost and nuisance of body corporates (Grattan Institute, 2011).

Key question for analysis: Has a greater diversity of dwelling stock enabled families to move into housing that has been 'freed up' from downsizers/right sizers?

2.3 PEOPLE

2.3.1 INCREASING CULTURAL DIVERSITY IN POPULATIONS

According to the ABS (McLennan, 2012), in the ACT, there was an increase in the proportion of households where two or more languages are spoken from 17.2 per cent in 2006 to 21 per cent in 2011. During the same time period, the proportion of people living in the ACT who were born in Australia dropped from 73 per cent to 71.4 per cent.

The proportion of households that speak English at home decreased from 77.8 per cent in 2011 to 72.7 per cent in 2016. At the same time, the proportion of the population that was born overseas increased from 24.1 per cent in 2011 to 26.4 per cent in 2016; the top five countries of birth were England (3.2%), China (2.9%), India (2.6%), New Zealand (1.2%) and the Philippines (1.0%) (ABS, 2017).

In New South Wales, the proportion of households that speak English also decreased between 2011 to 2016, from 72.5 per cent to 68.5 per cent. In Queensland, the proportion also decreased from 84.8 per cent to 81.2 per cent in the same time period (ABS, 2017). The proportion of the population born overseas also increased for both states. In New South Wales, it increased from 24.3 per cent in 2011 to 27.6 in 2016. In Queensland, the proportion increased from 20.5 per cent in 2011 to 21.6 per cent in 2016 (ABS, 2017).

Across Australia, more than half of apartment residents – 56%, compared to 33% of all Australian residents – are migrants. Of these, the biggest group (26% of apartment residents) are migrants born in Asia (Liu E. and Easthope H., 2012). Discussions in semi-structured interviews suggested anecdotally that people not born in Australia may be more willing to raise children in higher density housing.

Key question for analysis: Are higher school student populations found in areas with residents with cultural diverse backgrounds?

2.4 SUMMARY

The key trends in cities, housing, households and preferences have informed a set of key factors that have been used to start to understand school student yield from medium - high density developments. The trends provide valuable context for the analysis of the relationship between different aspects of existing residential suburb development, such as its location, typology, access to services, price and different aspects of the residents within existing residential suburb developments, such as their cultural background and socio-economic status. The diagram adjacent demonstrates the many connections across factors that can impact housing development and housing choice, which can ultimately impact school student population changes.
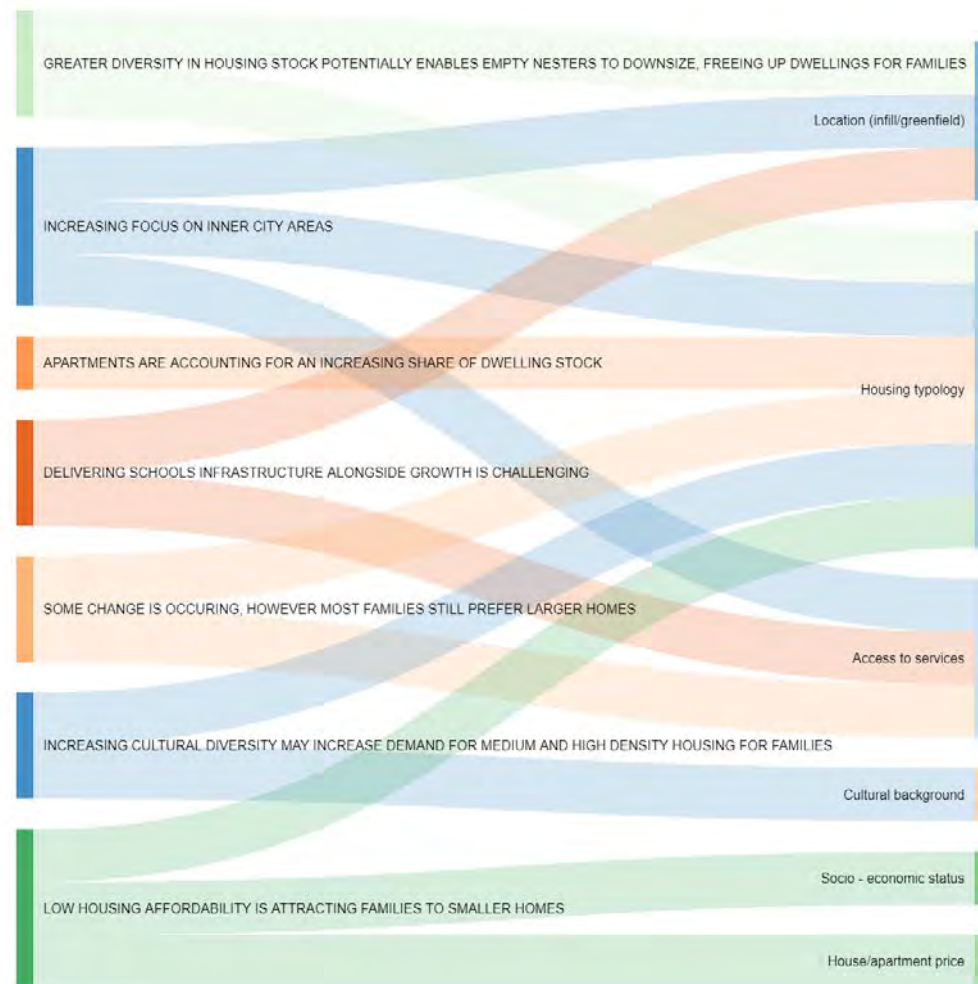

Figure 1 Relationship between key trends and factors for analysis

Source: Arup

3. Methodology

3.1 APPROACH TO DATA ANALYSIS

Our approach to data analysis has been iterative, responding to the data available to meet the core problem statement: If a brownfield development is taking place in an established area of Canberra – how many school-aged children will this development generate?

At a strategic level, the data analysis seeks to idenfity the impacts of cumulative residential intensification and the subsequent demand generated by households with school-aged children moving into medium- to high-density developments for schools.

We have undertaken a sample analysis of medium- to high-density residential sites (a total of 15) across Canberra to document the change in the school student population before development and after, utilising school enrolment data, property data and ABS Census data.

We undertook the following analysis to inform the range of factors to analyse, and to select the residential sites to undertake a detailed 'sample' analysis:

» Phase 1: Understanding demographic and property data in Canberra;

» Phase 2: Residential site selection;

» Phase 3: Residential site sample analysis; and

» Phase 4: Perspectives on factors that may influence school enrolment data.

The analysis within the study utilised the following key data sources:

» ACT Education School Census 2010 – 2020;

» ABS Census 2011 and 2016 for area wide characteristics and demographic trends including: Dwelling typologies; SEIFA Index; Tenure;

» EPSDD Development Application data from 2005 to 2019; and

» Access Canberra Property Exchange Data from 2012 to 2019, provided by ACT Treasury.

Research, journal articles and data were referenced to gain context for the study, to capture broad trends across ACT and other cities, and to inform the set of factors for further analysis.

Two workshops were held to gain insight and direction from ACT Education, ANU and ACT EPSDD. The purpose of the workshops were as follows:

» Inception Workshop: Set the direction for the analysis, identify any key points of analysis, risks and opportunities; and

» Residential Site Selection Workshop: Review the factors of influence across the areas of high school student growth and discuss school student growth, housing and household typologies and other attributes for further analysis in each Residential site. The participants of the workshop collectively selected the 13 areas (SA2) of interest to guide the Residential Site selection.

Collaborative teleconference/video conferences were held with Arup, Alpha Demographics and ACT Education to explore the best approach to the study and gain the best outcome to respond to the problem statement with the data available and the study timeframe.

The approach to the analysis for the Study was first suggested as a 'sample area' analysis to capture multiple recent developments within a study area (SA1) over time and the corresponding school student population change. It was found that a comprehensive database of recent developments with the detail of housing typologies, and demolition data was not available within the study timeframe. A shift in approach was taken to focus on a sample of residential sites to document the school student population change analysed against multiple factors including typology (dwelling structure and number of bedrooms), tenure, median sales price, location (existing and new residential suburbs).

A total of 15 residential sites were selected by Arup and the ACT Education team to cover a range of characteristics. Site by site analysis was undertaken to capture the defined factors. Yearly school student populations were collated for each residential site based on the residential site address and spatial analysis of ACT Education school census data. Further analysis was undertaken to summarise any trends in the key factors and school student population.

To complement the quantitative analysis, a series of semi-structured interviews were conducted in ACT to understand shifting housing choices for households with children from the perspective of built environment practitioners: a representative of property council, developers and ACT Government Architect. The findings of the semi-structured interviews formed an into the contextual framing for this Study.

Additional Problem Statement

An Additional Problem Statement was presented for the Study as follows:

How might the suburb or district level demographics of urban existing residential suburb areas change over time as a result of urban existing residential suburb developments?

It is recognised that other jurisdictions have been experiencing school student population change as a result of residential development in existing suburbs in urban areas. To provide additional perspective on the ACT focused analysis, we undertook a series of semi-structured interviews with those involved in schools planning in New South Wales and Queensland. In addition, high level case study analysis on three areas (one in Sydney, Newcastle and Brisbane) to document school student population change and dwelling typology change.

3.2 DETAILED APPROACH

A detailed description of the Study approach is presented in the section overleaf.

Phase 1 - Understanding demographic and property data in Canberra

	1.1 REVIEW EXISTING DOCUMENTATION	1.2 IDENTIFYING AREAS OF GROWTH IN SCHOOL CHILDREN (GROWTH AREAS)	1.3 ALIGNING GROWTH AREAS WITH URBAN EXISTING RESIDENTIAL SUBURB AND NEW RESIDENTIAL SUBURB CLASSIFICATION	1.4 AGREEING A SET OF TYPOLOGIES ACROSS HOUSING STRUCTURE AND NUMBER OF BEDROOMS
KEY QUESTIONS	What is the policy context for shaping new development across Canberra? What has been impacting housing choice in Canberra?	Where has growth in school aged children occurred across Canberra?	Are the growth areas in existing residential suburb or new residential suburb classified areas?	What are the agreed categories of housing structure and number of bedrooms to make up the typologies to use for analysis?
GEOGRAPHY	Canberra-wide	Canberra wide at ABS Census 2016 Geographies (SA2)	Growth areas	N/A
TIMEFRAME	N/A	2010-2019	N/A	2016, change measured from 2011 to 2016
DATA SOURCES	» Relevant ACT strategies » Grattan Institute » ABS research	School enrolment census data per year	Classification of existing residential suburb and new residential suburb according to suburb, provided by ACT Education and EPSDD	ABS Census
OUTPUT	Summary provided in first section of Final Draft Report	Child density map showing top 30 areas of growth of school age school students per SA2, including data schema	Existing residential suburb and new residential suburb layer on child density map	Agreed set of 16 typologies

Phase 1 - Understanding demographic and property data in Canberra

	1.5 IDENTIFYING AREAS OF GROWTH IN SCHOOL CHILDREN (GROWTH AREAS)	1.6 IDENTIFYING AREAS WITHIN CLOSE PROXIMITY TO SCHOOLS WITHIN GROWTH AREAS	1.7 MAPPING MEDIAN APARTMENT AND HOUSE PRICES IN GROWTH AREAS	1.8 MAPPING RECENT DEVELOPMENT APPLICATIONS
KEY QUESTIONS	What proportion of housing is within each typology within the growth areas?	Where are the locations that are within close proximity to schools?	What is the median dwelling price in the growth areas?	Where have recent developments occurred within the growth areas?
GEOGRAPHY	Top 30 growth areas by SA2	Top 30 growth areas by SA2	Top 30 growth areas by SA2	Top 30 growth areas by SA2
TIMEFRAME	2016, change measured from 2011 to 2016	2019	2012-2019	2010-2019
DATA SOURCES	ABS Census at SA2	ACT school locations from ACT MAPI	ACT Treasury, median dwelling prices per SA2 by unit and house from 2012-2019	EPSDD Development applications, ACT Education Compiled development data
OUTPUT	Typology map and excel spreadsheet	School locations map	Median dwelling price map and spreadsheet by unit and house from 2012 - 2019	Development application map - documenting year of DA and typology

	Phase 1 - Understanding demographic and property data in Canberra	*Phase 2 - Residential site Selection*	*Phase 3 - Residential site Analysis*
	1.9 MAPPING SOCIOECONOMIC STATUS	**2.1 RESIDENTIAL SITE SELECTION**	**3.1 ANALYSING SCHOOL ENROLMENT CHANGE IN RESIDENTIAL SITES**
KEY QUESTIONS	What is the relative advantage and disadvantage across the growth areas?	What are the areas of interest that: show high school student growth, showcase a breadth of medium - high density typologies and represent a breadth of areas across ACT?	What change has occurred in school enrolment in the time that the residential site has opened?
GEOGRAPHY	Top 30 growth areas by SA2	» Selection of 13 areas (SA2) of interest with workshop participants on 25 October 2019 » Selection of 16 SA1 with ACT Education » Selection of residential sites with ACT Education	Residential sites
TIMEFRAME	2016	2005 - 2017	2005 - 2020
DATA SOURCES	ABS Census - Socio-Economic Indexes for Areas (SEIFA) Index of Relative Socio-economic Advantage and Disadvantage (IRSAD)	Workshop participants, EPSDD Development Application Data and ACT Education Compiled development data	School enrolment data, Analysis of aerial imagery, Colliers development pipeline data (2017-2019), ACT Education Compiled development data
OUTPUT	SEIFA Map	13 Areas of Interest, 19 SA1, 15 residential sites	Data schema and analysis

Phase 3 - Residential site Analysis   *Phase 4 - Factors that influence school enrolment*

	3.2 REVIEWING THE ATTRIBUTES OF EACH RESIDENTIAL SITE	**4.1 PERSPECTIVES ON FACTORS THAT INFLUENCE SCHOOL ENROLMENT DATA**
KEY QUESTIONS	What are the attributes of each Residential site?	
GEOGRAPHY	Residential sites	In addition to the quantitative analysis, we undertook a series of semi-structured interviews with built environment professionals across the ACT from Property Council of Australia, Government Architects Office and prominent property developers to gain perspectives on factors that may have influenced school enrolment data
TIMEFRAME	2016 Census Data	
DATA SOURCES	ABS Census 2016, median house/unit price	
OUTPUT	Data schema and analysis	

**3.2.1 PHASE 1: UNDERSTANDING DEMOGRAPHIC
AND PROPERTY DATA IN CANBERRA**

The purpose of Phase 1 was to understand the policy context for urban growth in Canberra and to provide a base understanding of school aged children growth, housing and household typologies and other attributes to input into the selection of Residential sites for further analysis.

There were eight components to this phase:

1. Reviewing existing documentation;

2. Identifying areas of high growth in school children (growth areas);

3. Aligning growth areas with urban existing residential suburb and new residential suburb classification;

4. Agreeing a set of typologies with housing type and house size;

5. Determining dwelling typology make up in growth areas;

6. Identifying areas within close proximity to schools within growth areas;

7. Mapping average house prices in growth areas from 2011; and

8. Mapping recent development applications.

Figure 2 School locations in the ACT

Source: Arup, data from ACTMAPi

Figure 3 School student Growth by SA2 from 2010 - 2019

Source: Arup, data from ACT Education School Student Census

Figure 4 Existing residential suburb and new residential suburb classification

Source: Arup, data from ACTMAPi, classification from ACT Education School Student Census

Figure 5 Dwelling typology

Source: Arup, data from ABS Census 2016

Figure 6 Median House Price by SA2

Source: Arup, data from ACTMAPi, price data from Access Canberra property sales data, cleaned by ACT Treasury

Figure 7 Median Unit Price by SA2

Source: Arup, data from ACTMAPi, price data from Access Canberra property sales data, cleaned by ACT Treasury

Figure 8 SEIFA Index of relative socio-economic advantage and disadvantage

Source: Arup, data from ACTMAPi, data from ABS Census 2016

Figure 9 SEIFA Index of education and occupation

Source: Arup, data from ACTMAPi, data from ABS Census 2016

3.2.2 PHASE 2: RESIDENTIAL SITE SELECTION

The analysis of the growth areas was presented in a workshop was held on 25th October 2019 with participants from ACT Education, ANU and EPSDD. The workshop was used to define areas of high growth and high development activity based on stakeholder knowledge. 13 areas of interest (SA2) were selected for further study and analysis. The 13 areas of interest are shown in the map adjacent.

The features of each of the 13 areas of interests (SA2) is presented in the following spreads.

Figure 10 Selected SA2s from Site Selection workshop

Source: Arup, data from ACTMAPi, data from ABS Census 2016

Figure 11 Summary of characteristics of selected SA2s

Selected SA2	School-age population growth from 2010-2019		Median unit price 2012-2019		Median house price 2012-2019		Existing or new residential suburb	Dwelling tenure in 2016	
Scale	at SA2		at SA2	ACT	at SA2	ACT	at SA2	at SA2	
Data source	ACT Education School Census Data		ACT Treasury Access Canberra sales data				School Census Data	ABS 2016 Census Data	
Belconnen	208		$388,900	$427,000	$465,000	$810,000	Existing	67.9%	29.2%
Campbell	151		$493,000	$427,000	$980,000	$810,000	Existing	30.0%	67.4%
Casey	1224		$346,000	$427,000	$535,000	$810,000	New	26.0%	72.3%
Franklin	977		$372,000	$427,000	$613,750	$810,000	Existing	42.1%	55.6%
Greenway*	70		$390,000	$427,000	$512,500	$810,000	Existing	49.9%	48.3%
Kingston	197		$455,000	$427,000	$1,500,000	$810,000	Existing	58.4%	30.2%
Lawson	200		$449,900	$427,000	$725,000	$810,000	New	31.6%	68.4%
Lyneham	218		$372,900	$427,000	$750,000	$810,000	Existing	53.8%	41.8%
Lyons	166		$482,903	$427,000	$665,000	$810,000	Existing	46.0%	49.3%
Narrabundah	225		$432,500	$427,000	$780,000	$810,000	Existing	41.8%	55.1%
Phillip	176		$370,000	$427,000	$480,500	$810,000	Existing	59.3%	38.1%
Watson	347		$359,900	$427,000	$615,000	$810,000	Existing	40.4%	57.2%
Wright	470		$325,000	$427,000	$668,500	$810,000	New	21.0%	76.5%

*Selected as a development area with different environmental factors to the other selected SA2s

Unit - refers to apartments and townhouses
House - refers to detached dwellings

Figure 12 Summary of characteristics of selected SA2s (continued)

SEIFA IRSAD distribution according to decile - number of SA1s per SA2 per decile in 2016											Dwelling typology at SA2 in 2016
Selected SA2	1	2	3	4	5	6	7	8	9	10	
Data source	ABS 2016 Census Data										ABS 2016 Census Data
Belconnen	0	1	1	1	0	1	1	2	3	1	
Campbell	0	0	0	0	0	0	0	0	1	7	
Casey	0	0	0	0	0	0	1	2	3	9	
Franklin	0	0	0	0	0	1	1	4	8	7	
Greenway*	0	0	0	0	0	0	0	2	2	1	
Kingston	0	0	0	0	0	1	0	1	0	8	
Lawson	0	0	0	0	0	0	0	1	0	1	
Lyneham	0	0	0	0	0	2	2	5	2	2	
Lyons	0	0	0	1	0	0	2	2	1	0	
Narrabundah	0	0	2	0	0	1	4	2	3	5	
Phillip	0	0	1	0	0	0	1	2	4	0	
Watson	0	0	0	0	0	2	0	4	6	3	
Wright	0	0	0	0	0	0	0	0	0	8	

Legend:
- Detached dwelling
- Semi-detached dwelling
- Apartments up to 3 storeys
- Apartments 4+ storeys

From the 13 'areas of interest', 19 SA1s were selected to help identify the residential sites. The SA1s were selected based on the following:

1. High levels of growth across the whole timeframe

2. Recent high development activity

3. High development activity across the whole timeframe

4. A breadth of characteristics, i.e. socio-economic status

Further analysis was undertaken to inform the SA1 selection including:

» **School enrolment data** Geocoded school student census information within selected Growth Areas broken down into SA1s to determine areas of high school student growth

» **Analysis of aerial imagery** Analysis of aerial imagery across the timeframe of 2010-2019 within the Growth Areas to determine areas of high development activity

» **Colliers Development Pipeline data** Geocoded development information (developments of 10+ dwellings only) from 2017-2019 to determine areas of recent high development activity

The following SA1s were selected for further analysis:

8100212 Belconnen
8101803 Lawson
8101804 Lawson
8103611 Casey
8103615 Casey
8106103 Watson
8106115 Watson
8113101 Kingston
8113106 Kingston
8110912 Philip
8113905 Wright
8113906 Wright
8106712 Narrabundah
8106707 Narrabundah
8105711 Lyneham
8112402 Campbell
8112401 Campbell
8108005 Greenway
8108011 Greenway

Figure 13 Selected SA1s

Source: Arup, data from ACTMAPi, data from ABS Census 2016

From the 19 selected SA1s, analysis was undertaken on available development application data to select a range of residential sites for further in-depth analysis.

Development application data from EPSDD was reviewed, and ACT Education undertook analysis on Development Application and Construction Certificate data to inform the residential site selection. A total of 10 sites were selected from the selected SA1s. An additional five sites were selected from outside the 19 selected SA1s. These were considered as appropriate residential sites to inform the analysis.

It is noted that the supporting narrative and demographic information for these five sites were reviewed at an SA2 level.

The following residential sites were selected for in-depth analysis:

1. Magnolia Mews** - Narrabundah
2. Space The Residence** - Turner
3. Space2 The Residence** - Turner
4. Axis Apartments - Lyneham
5. Artique - Campbell
6. Allure* - Casey
7. Quayside - Kingston
8. Ambiente - Wright
9. Watermark - Greenway
10. Atelier - Kingston
11. Wayfarer* - Belconnen
12. Evolure - Lawson
13. The Quay - Greenway
14. Mizura Villas - Lawson
15. Idalia - Phillip

*Additional site

**Additional site from outside the timeframe of 2010-2019

Figure 14 Residential Site Locations

Source: Arup, data from ACTMAPi, data from ABS Census 2016, data from EPSDD Development application data

3.2.3 PHASE 3: RESIDENTIAL SITE ANALYSIS

With the base analysis and mapping inputs, the core component of this phase is data analysis to understand the change in school aged school students across years following the introduction of the new medium-high density developments.

In addition to the quantitative analysis, the following attributes for each site were reviewed:

» Population (at SA1/SA2);

» Socio economic status (at SA1/SA2);

» School student language spoken at home (at SA1/SA2);

» Proximity to services such as public transport, community facilities, key employment areas;

» Proximity to school;

» Housing tenure (at SA1/SA2); and

» Median house and unit price for development typology.

The residential site analysis has been undertaken as a limited sample analysis (including 15 residential sites). Observations are noted within the analysis, however clear correlations between the data were not able to be determined due to the limited sample size. This sample analysis provides a testing of an approach, and outlines suggestions for further analysis.

3.2.4 PHASE 4: PERSPECTIVES ON FACTORS THAT INFLUENCE SCHOOL ENROLMENT DATA

The purpose of this phase is to complement the quantitative data analysis with qualitative data collected from interviews with representatives within the property industry. This phase includes reviewing the factors that have influenced housing location and choice for families with school aged children based on:

1. Desktop research on journal papers; and

2. Semi structured interviews with developers, real estate agents and organisations such as the PCA ACT Chapter.

The results of this analysis are presented within Chapter 1 of this report.

3.2.5 PHASE 5: LEARNING FROM OTHER JURISDICTIONS

In addition to Phase 4, the purpose of this phase is to provide further context on the potential shift in school student populations by reviewing policy and planning, qualitative data anlysis data collected from interviews with representatives within the schools planning and a sample quantitative analysis of three case study sites (SA2). Three areas were selected for this review: Sydney; Brisbane and Newcastle.

3.3 OVERALL DATA SCHEMA

We have presented the data analysis and how each part of the analysis comes together in the data schema in Appendix 2.

4. Residential Sites Analysis and Overall Findings

4.1 STRUCTURE AND ASSUMPTIONS

The findings of the report are structured accordingly:

1. Summary of residential sites;

2. Observations on residential sites; and

3. Analysis on the relationship of school student population generation to key factors.

The analysis of residential sites is accompanied by supporting narrative and demographic data in order to place the site within its immediate context. This includes:

» Dwelling typologies in 2011 and 2016 according to the ABS Census;

» Housing tenure split in 2016 according to the ABS Census;

» School student population at SA1 and SA2 level according to the School student Census;

» Median dwelling price at site and SA1 level;

» Language spoken at home according to the School Student Census; and

» Socio-economic status: SEIFA-IEO and IHAD quartiles at SA1 level in 2016 according to the ABS Census.

For four sites that fell beyond the original 19 SA1 list, the supporting narrative and demographic data was analysed at an SA2 level, with the exception of socio-economic status.

An overall 'ratio of occupation' of school students at each residential site has been formulated and presented based on the proportion of school students at each site to the total number of dwellings at site. This ratio allows for an overall summary of the school student populations at each site.

It is noted that there are a number of factors that may influence the presence of school student aged children in different dwelling typologies.

An overall summary of the residential site analysis is shown overleaf.

Figure 15 Overall site analysis summary

Site	Suburb	District	Year of completion	Dwelling structure	Number of dwellings	Bedroom mix (%) 1	2	3	4	School student population per year (total) '10	'11	'12	'13	'14	'15	'16	'17	'18	'19	'20	Median ratio of school student occupation
Data source	Development application data	Development application data	Certificate of Occupancy (COO)	Development application data collected by EPSDD and collated and summarised by ACT Education						ACT Education School Student Census Data											Calculation
1 Magnolia Mews	Narrabundah	CCS	2005	Apartments and townhouses	32	6%	63%	31%	0%	2	7	9	4	3	4	2	4	10	10	8	13%
2 Space	Turner	CCN	2006-7	Apartments	90	4%	86%	10%	0%	2	1	2	1	8	3	3	1	5	5	4	3%
3 Space2	Turner	CCN	2007-8	Apartments and townhouses	74	9%	69%	22%	0%	2	3	5	9	5	4	3	8	7	7	8	7%
4 Axis	Lyneham	CCN	2011	Apartments and townhouses	349	75%	19%	6%	0%	0	0	4	10	18	19	27	34	46	33	54	8%
5 Artique	Campbell	CCN	2011	Apartments 1-3 storeys	12	50%	33%	17%	0%	0	0	0	1	4	5	4	4	5	6	6	33%
6 Allure	Casey	GUN	2012	Townhouses	10	0%	0%	90%	10%	0	0	0	0	1	2	2	3	6	4	4	25%
7 Quayside	Kingston	CCS	2014	Apartments 4+ storeys	100	79%	15%	6%	0%	0	0	0	0	0	0	5	4	4	7	5	5%
8 Ambiente	Wright	MOL	2016	Apartments and townhouses	175	27%	65%	7%	1%	0	0	0	0	0	0	2	7	14	17	28	9%
9 Watermark	Greenway	TUG	2016	Apartments and townhouses	95	43%	27%	27%	2%	0	0	0	0	0	0	0	12	16	15	13	15%
10 Atelier	Kingston	CCS	2016	Apartments 4+ storeys	73	38%	55%	7%	0%	0	0	0	0	0	0	0	1	3	3	5	4%
11 Wayfarer	Belconnen	BEL	2016	Apartments 4+ storeys	331	49%	44%	7%	0%	0	0	0	0	0	0	0	0	7	9	3	2%
12 Evolure	Lawson	BEL	2017	Apartments and townhouses	48	31%	31%	27%	10%	0	0	0	0	0	0	0	0	7	11	7	15%
13 The Quay	Greenway	TUG	2017	Apartments 4+ storeys	73	14%	73%	14%	0%	0	0	0	0	0	0	0	0	9	10	7	12%
14 Mizura Villas	Lawson	BEL	2017	Townhouses	59	8%	53%	39%	0%	0	0	0	0	0	0	0	0	4	6	6	10%
15 Idalia	Phillip	WOD	2017	Apartments 1-3 storeys	99	26%	74%	0%	0%	0	0	0	0	0	0	0	0	0	2	3	2%
Existing residential suburb New residential suburb									Total	6	11	17	35	39	37	48	78	143	145	161	
Notes		Year of completion is based on Certificate of Occupancy, not occupancy itself.		Private non-detached dwelliings are assumed.		Number of bedrooms are dedicated. Data for study rooms is not provided.				Both public and non-public enrolments are included. Median ratio of occupation is 9% across the study period.											

Below median   At median   Above median

Figure 15 Overall site analysis summary (continued)

Site	Tenure at SA1		Median price at site									Language spoken at home			Socio-economic status at SA1	
	Rented	Owned	2012	2013	2014	2015	2016	2017	2018	2019	Overall	First	Second	Third	IEO	IHAD
Data Source	ABS Census 2016		ACT Treasury Access Canberra sales data from 2012-2019									ACT Education School Student Census Data			ABS Census 2016	
1 Magnolia Mews	41.8%	55.1%	$668,000	$601,000	$-	$-	$470,000	$790,500	$580,000	$-	$549,000	English 83%	Indo-Aryan 3%	French 2%	10	4
2 Space	63.0%	34.1%	$-	$655,000	$603,000	$562,500	$600,000	$735,000	$891,000	$738,000	$645,000	English 69%	Chinese 7%	Indo-Aryan 4%	10	3
3 Space2	63.0%	34.1%	$-	$635,000	$810,000	$640,000	$683,000	$705,500	$782,500	$675,000	$671,000	English 69%	Chinese 7%	Indo-Aryan 4%	10	3
4 Axis Apartments	75.0%	23.0%	$417,900	$449,800	$415,500	$390,000	$390,000	$415,000	$397,500	$415,000	$415,000	English 52%	Indo-Aryan 9%	Chinese 6%	10	3
5 Artique	48.0%	48.0%	$469,000	$-	$-	$-	$-	$560,000	$-	$-	$514,500	English 91%	Chinese 3%	Greek 1%	10	4
6 Allure	26.0%	73.3%	$502,500	$485,000	$530,000	$510,000	$499,250	$582,500	$570,000	$-	$508,500	English 79%	Indo-Aryan 7%	Chinese 3%	10	4
7 Quayside	61.0%	39.0%	$-	$-	$430,450	$440,000	$767,030	$425,000	$460,000	$415,000	$427,725	English 77%	Japanese 4%	Indo-Aryan 3%	10	3
8 Ambiente	28.0%	72.0%	See note									English 69%	Indo-Aryan 13%	Pacific Austronesian 3%	10	4
9 Watermark	21.0%	79.0%	$-	$-	$-	$-	$391,500	$422,000	$395,000	$420,000	$407,500	English 65%	Indo-Aryan 11%	Dravidian 9%	9	4
10** Atelier	58.4%	40.2%	$-	$-	$-	$-	$590,578	$489,900	$799,900	$590,578	English 88%	Middle Eastern 3%	Iberian 2%	9	-
11** Wayfarer	67.9%	29.2%	$-	$-	$-	$-	$-	$390,000	$415,450	$402,500	$393,000	English 54%	Indo-Aryan 9%	Southeast Asian Austronesian 6%	10	-
12 Evolure	62.5%	37.5%	$-	$-	$-	$-	$-	$374,900	$489,008	$575,000	$489,008	English 38%	Indo-Aryan 14%	Dravidian 13%	9	4
13 The Quay	21.0%	79.0%	See note									English 65%	Indo-Aryan 11%	Dravidian 9%	9	4
14 Mizura Villas	18.4%	57.9%	$-	$-	$-	$-	$-	$-	$529,000	$-	$529,000	English 51%	Chinese 15%	Indo-Aryan 12%	10	4
15 Idalia	66.0%	32.0%	$-	$-	$-	$-	$-	$-	$434,900	$-	$434,900	English 39%	Southeast Asian Austronesian 16%	Chinese 11%	10	3

Notes			NB There was a lack of data for Ambiente and The Quay due to data gaps for new residential suburb transactions, particularly multi-unit sites from Access Canberra.									Categorised according to narrow groups 2-digit classification in the ABS Australian Standard Classification of Languages			IEO - Index of Education and Occupation	
**no information at SA1; SA2-level data was used			Lowest price / Highest price												IHAD - Experimental Index of Household Advantage and Disadvantage	

4.2 SUMMARY OF RESIDENTIAL SITES

4.2.1 AGE OF RESIDENTIAL SITE

Majority of the residential sites were delivered between 2016-2017. Sites 1-7 were delivered between 2005-2014, with developments completed in 2005, around 2006-2008, 2011, 2012 and 2014. Magnolia Mews (Site 1) is the oldest development, completed in 2005. Idalia (Site 15) is the newest development, completed in December 2017.

It is noted that school student population data is documented for 2010 - 2020 only.

Figure 16 Year of completion based on Certificate of Occupancy of residential site

Pre-2010	2011	2012	2013	2014	2015	2016	2017
Site 1	Site 4	Site 6		Site 7		Site 8	Site 12
Site 2	Site 5					Site 9	Site 13
Site 3						Site 10	Site 14
						Site 11	Site 15

Source: Development application data from EPSDD, Collated by ACT Education

4.2.2 DWELLING TYPOLOGY

The residential sites vary in terms of dwelling typology. Using the 16 dwelling typologies from the ABS Census, the residential sites are categorised according to the dwelling structure and number of bedrooms. Due to the availability of detailed data on the residential sites, this analysis categorises the dwelling typologies based on the separate structure and number of bedrooms.

Across the 15 residential sites, there were four types of dwelling structure: semi-attached or townhouses, apartments of up to three storeys, apartments of four or more storeys and a combination of apartments and townhouses. Seven of the residential sites were comprised only of apartments, two were only townhouses and six were a combination of apartments and townhouses. A total of 13 residential sites had some form of apartments or residential flat buildings within their sites.

Three had residential flat buildings of up to three storeys; the rest were four or more storeys, with the greatest number of storeys at 26 storeys, 22 of which are occupiable (Wayfarer (Site 11)). This is a notable outlier from the rest of the sites; the second tallest site is Axis (Site 4), whose built form goes up to 11 storeys. The developments with only townhouses had heights of up to three storeys. Combination sites were more likely to have a range of heights depending on the structure: townhouses are usually lower in height than residential flat buildings containing apartments.

Figure 17 Proportion of residential site comprised of multi-bedroom dwellings

0-10%	11-20%	21-30%	31-40%	41-50%	51-60%	61-70%	71-80%	81-90%	91-100%
		Site 7 – 21%		Site 5 – 50%	Site 11 – 51%	Site 10 – 62%	Site 8 – 73%		Site 3 – 91%
		Site 4 – 25%			Site 9 – 57%	Site 12 – 69%	Site 13 – 73%		Site 14 – 92%
							Site 15 – 74%		Site 1 – 94%
									Site 2 – 96%
									Site 6 - 100%

Source: Development application data from EPSDD, Collated by ACT Education

In terms of total number dwellings, the residential sites range from 12 to 349 dwellings. The median development size by number of dwellings is 74. Allure (Site 6) and Artique (Site 5) are the smallest developments with 12 dwellings and Axis (Site 4) is the largest development with 349 dwellings. Most residential sites have between 51-100 dwellings.

Of the 15 residential sites, 12 are comprised of mostly multi-bedroom dwellings; that is more than 50% of the residential site is made up of multi-bedroom (at least 2 bedrooms) dwellings, as summarised in Figure 17 on the previous page. Artique (Site 5) is comprised of exactly 50% multi-bedroom dwellings and 50% 1-bedroom dwellings. Axis and Quayside (Sites 4 and 7) have the lowest proportion of multi-bedroom dwellings, at 25% and 21%, respectively. Only one site, Allure (Site 6) is comprised of 100% multi-bedroom dwellings, a mix of 3- and 4- bedroom dwellings.

The residential sites exhibit a range of number of bedrooms per dwelling. Most residential sites, 11 of 15, have up to 3-bedroom dwellings. One residential site, Idalia (Site 15) has up to 2-bedroom dwellings. Four sites, Allure (Site 6), Ambiente (Site 8), Watermark (Site 9), Evolure (Site 12) have up to 4-bedroom dwellings. Three of these sites were delivered between 2016 and 2017. Idalia, the only site with only 1- and 2-bedroom dwellings, was completed in late 2017. It appears there is a range of housing typologies being delivered; however there is little medium-density development that is solely focused on multi-bedroom dwellings.

The ABS references the Canadian National Occupancy Standard to indicate housing suitability. It is recognised that there is no single standard measure for housing suitability, however, the Standards seek to be an objective measure of shelter 'need' (within Canada and other countries such as Australia), and the adequacy of a given dwelling accommodation for its occupying household.. Canada's National Occupancy Standards that apply to households with children highlights that units with three bedrooms or more are suitable, with units with two bedrooms or two bedrooms with study or other additional room is possibly suitable. The analysis in Figure 17 presents the proportions of residential sites that are 'possibly suitable' and 'suitable' for households with children.

Further analysis is suggested to understand if these standards reflect the lifestyles and choices of families in ACT.

4.2.3 EXISTING RESIDENTIAL SUBURB AND NEW RESIDENTIAL SUBURB CLASSIFICATION

Of the 15 residential sites, 11 were classified as residential intensification or existing residential suburb sites and the remaining four were classified as new residential suburb sites. Only one new residential suburb site was delivered in the first half of the study period: Allure (Site 6) in Casey, delivered in 2012. It is also the smallest residential site in the study, with 10 dwellings and the only development without single-bedroom dwellings. The other three new residential suburb sites, Ambiente (Site 8), Evolure (Site 12) and Mizura Villas (Site 14), were all delivered between 2016-2017. These sites have more than 50% multi-bedroom dwellings. Two of the sites are comprised of a mix of apartments and townhouses, Ambiente (Site 8) and Evolure (Site 12), while the other two are townhouses only.

4.2.4 HOUSING TENURE

Housing tenure was collected at an SA1 or SA2 level from ABS Census. The specific tenure of each school student recorded at each residential site was not included in the data and in the analysis.

Overall, across the 15 residential sites it was observed that new residential suburb sites are located in areas that tend to have higher home ownership rates and existing residential suburb sites are located in areas that tend to have higher rates of rented dwellings. Of the four new residential suburb sites, three had higher rates of home ownership.

There were a few exceptions observed across the sites: Artique (Site 5) in Campbell was located in an area with almost even split of tenure; Magnolia Mews (Site 1), Watermark (Site 9) and The Quay (Site 13) in Greenway were located in an area with majority of dwelling stock owned. Evolure (Site 12), in Lawson was located in an area with higher proportion of renters, despite being a new residential suburb site.

4.2.5 MEDIAN PRICE

The overall ACT median unit price is $427,000 and the overall median ACT house price is $810,000. The median prices at site ranged from $393,000 to $671,000. Two sites, Ambiente (Site 8) and The Quay (Site 13) had no sales data across the study period.

Figure 18 Median price summary

Site	SA1/SA2 median	Site median	ACT overall median	ACT unit median	ACT house median
8 Ambiente*	$-	$-	$500,000	$427,000	$810,000
13 The Quay*	$359,000	$-	$500,000	$427,000	$810,000
11 Wayfarer	$401,000	$393,000	$500,000	$427,000	$810,000
9 Watermark	$359,000	$407,500	$500,000	$427,000	$810,000
4 Axis Apartments	$372,900	$415,000	$500,000	$427,000	$810,000
7 Quayside	$635,000	$427,725	$500,000	$427,000	$810,000
15 Idalia	$384,950	$434,900	$500,000	$427,000	$810,000
12 Evolure	$449,950	$489,008	$500,000	$427,000	$810,000
6 Allure	$390,000	$508,500	$500,000	$427,000	$810,000
5 Artique	$325,000	$514,500	$500,000	$427,000	$810,000
14 Mizura Villas	$449,000	$529,000	$500,000	$427,000	$810,000
1 Magnolia Mews	$451,250	$549,000	$500,000	$427,000	$810,000
10 Atelier	$562,500	$590,578	$500,000	$427,000	$810,000
2 Space	$478,000	$645,000	$500,000	$427,000	$810,000
3 Space2	$478,000	$671,000	$500,000	$427,000	$810,000

*Price data unavailable due to data gaps in dataset from Access Canberra

Source: Access Canberra price data from 2012-2019, cleaned by ACT Treasury

4.2.6 SOCIO-ECONOMIC STATUS

Socio-economic status was measured across the 15 sites using Socio-Economic Indexes for Areas – Index of Education and Occupation (SEIFA-IEO) and the Experimental Index of Household Advantage and Disadvantage (IHAD). All 15 sites had a SEIFA-IEO index of 9-10, signaling a highly educated population within the surrounding areas of the sites. Seven of the sites had majority of the households in the corresponding SA1 or SA2 in the fourth IHAD quartile. Another six of the sites had majority of the households in the corresponding SA1 or SA2 in the third quartile. Evolure (Site 12), had one-third of the households within the corresponding SA1 within the second, third and fourth quartiles. Wayfarer (Site 11) does not have an IHAD index for 2016.

Figure 19 Socio-economic data at SA1

Site	SEIFA-IEO	IHAD-1	IHAD-2	IHAD-3	IHAD-4
1	10	20.6	20	20.6	38.7
2	10	19.1	15.1	34	31.7
3	10	19.1	15.1	34	31.7
4	10	11.4	22.3	41.1	25.2
5	10	19.4	25.3	27.4	27.8
6	10	4.9	18.26	26.71	50.13
7	10	3.2	15.7	41.1	40
8	10	3.9	22.1	24.9	49.2
9	9	4.8	23.8	33.3	38.1
10*	9	-	-	-	-
11*	10	-	-	-	-
12	9	0	33.3	33.3	33.3
13	9	4.8	23.8	33.3	38.1
14	10	9.7	29	0	61.3
15	10	2.9	26.8	47	23.3

*No data available from ABS Census
Source: ABS Census 2016

4.2.7 LANGUAGE SPOKEN AT HOME

Languages spoken at home were collated according to the 2-digit narrow group classification in the ABS Australian Standard Classification of Languages. Across the 15 residential sites, all corresponding SA1s and SA2s had English as their top language. 13 of the Sites were located in areas wherein 50% of school student households spoke English at home. Evolure (Site 12) and Idalia (Site 15) were the only Sites that presented otherwise; 38% of households in the area surrounding Evolure (Site 12) and 39% of households in the area surrounding Idalia (Site 15) spoke English at home. Aside from English, Indo-Aryan (languages such as Bengali, Gujarati, Hindi, etc.) and Chinese (such as Cantonese, Mandarin) were the two most common non-English languages spoken at home, appearing as the 2nd most common in 12 parent SA1s and SA2s, and 3rd common in 7 parent SA1s and SA2s.

There appeared to be greater diversity in languages spoken at home in sites delivered after 2014. Among Sites 8-15, the second most prevalent language in all Sites represented more than 10% in seven of the Sites. With Sites 1-7, the second most prevalent language represented a proportion of between 3-9%.

Figure 20 School student languages at site respective SA1s

Site	Languages spoken at home		
	First	Second	Third
1 Magnolia Mews	English 83%	Indo-Aryan 3%	French 2%
2 Space	English 69%	Chinese 7%	Indo-Aryan 4%
3 Space2	English 69%	Chinese 7%	Indo-Aryan 4%
4 Axis Apartments	English 52%	Indo-Aryan 9%	Chinese 6%
5 Artique	English 91%	Chinese 3%	Greek 1%
6 Allure	English 79%	Indo-Aryan 7%	Chinese 3%
7 Quayside	English 77%	Japanese 4%	Indo-Aryan 3%
8 Ambiente	English 69%	Indo-Aryan 13%	Pacific Austronesian 3%
9 Watermark	English 65%	Indo-Aryan 11%	Dravidian 9%
10** Atelier	English 88%	Middle Eastern 3%	Iberian 2%
11** Wayfarer	English 54%	Indo-Aryan 9%	Southeast Asian Austronesian 6%
12 Evolure	English 38%	Indo-Aryan 14%	Dravidian 13%
13 The Quay	English 65%	Indo-Aryan 11%	Dravidian 9%
14 Mizura Villas	English 51%	Chinese 15%	Indo-Aryan 12%
15 Idalia	English 39%	Southeast Asian Austronesian 16%	Chinese 11%

Source: ACT Education School Student Census 2010-2019

4.3 FINDINGS

A summary of the high level observations across the 15 residential sites are noted below and further discussed in this section:

» Overall, the analysis showed that medium and high density developments yield school aged children at greater magnitudes, within shorter time frames;

» Multiple forces are shifting housing preferences for households with children. Based on the school student population at the residential sites, there does not appear to be a clear relationship between one specific dwelling typology – both dwelling structure and bedroom mix – to the school student population. All sites, no matter what the dwelling typology, generated a population of school students;

» There appeared to be some relationship between smaller developments and higher median school student occupation ratio, however some residential sites with higher number of dwellings still exhibited high median school student occupation ratio;

» The analysis of the 15 residential sites showed high variation in school age school student populations across developments with different proportions of multi-bedroom units;

» More sites with higher ratios of occupation were within the median dwelling price range of $400,000 to $550,000. Sites with a higher median dwelling price had lower ratios of occupation;

» It was found that younger student aged populations were observed in the residential sites with a lower proportion of older student aged populations (high school or college) wthin the residential sites' school student population;

» There appeared to be some lag from residential site completion before school aged populations were observed;

» Older developments (before 2010) showed fluctuation in school aged school student population. Further finer grain analysis is suggested understand if families with school students may be choosing to stay in sites or if they are seeking to move to response to other factors;

» Newer residential sites showed lower proportions of students households speaking English at home than older residential sites;

» Developments in more established areas showed a more even distribution of household advantage and disadvantage in the wider area;

» Across the 15 residential sites we observed a change in the proportion of school student population from a residential site compared to the school student population in the SA1 and SA2 over time. In most cases, this showed that the school student population in the surrounding area was increasing; and

» For the new residential suburb sites delivered within 2016-2017, increase in school student population at the residential site was also reflected in their corresponding SA1s.

Overall, across the analysis of the 15 residential sites, it was found that multiple factors may influence school student populations over the time of the Study. From the analysis, it showed that there is no singular factor that determines a yield of a school student population, as there was not a clear relationship between any one factor and school student population. The sample of residential sites differed across qualities of typology, price and location.

A summary of the school student population for each year for each residential site is presented in Figure 21.

4.3.1 OVERALL INCREASE IN MAGNITUDE IN SCHOOL AGED CHILDREN

It was found that overall, medium and high-density developments yielded school aged children. Total school student aged children increased after development completion, in some developments for example Axis Apartments showed that from 2011, there was a total growth of student aged students of 54 to 2019. For Ambiente site, there was a total growth of student aged students from 0 in 2015 to 28 in 2019.

The data shows that the magnitude of new dwellings, and the rate of new dwellings into an area from higher density development will generate school aged children, and thus demand for school infrastructure within short amounts of time.

Figure 21 Total school student population yearly, by residential site

Source: ACT Education School Student Census 2010-2019

TOTAL STUDENT POPULATION PER YEAR

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
1. Magnolia Mews	2	7	9	4	3	4	2	4	10	10	8
2. Space The Residence	2	1	2	1	8	3	3	1	5	5	4
3. Space2 The Residence	2	3	5	9	5	4	3	8	7	7	8
4. Axis Apartments	0	0	4	10	18	19	27	34	46	33	54
5. Artique	0	0	0	1	4	5	4	4	5	6	6
6. Allure	0	0	0	0	1	2	2	3	6	4	4
7. Quayside	0	0	0	0	0	0	5	4	4	7	5
8. Ambiente	0	0	0	0	0	0	2	7	14	17	28
9. Watermark	0	0	0	0	0	0	0	12	16	15	13
10. Atelier Apartments	0	0	0	0	0	0	0	1	3	3	5
11. Wayfarer	0	0	0	0	0	0	0	0	7	9	3
12. Evolure	0	0	0	0	0	0	0	0	7	11	7
13. The Quay	0	0	0	0	0	0	0	0	9	10	7
14. Mizura Villas	0	0	0	0	0	0	0	0	4	6	6
15. Idalia	0	0	0	0	0	0	0	0	0	2	3

Figure 22 Median School student Ratio of Occupation for all Residential sites

Figure 23 Median School student Ratio of Occupation and proportion of multi-unit dwellings

Source: ACT Education School Student Census 2010-2019; manual calculation

4.3.2 DWELLING STRUCTURE AND BEDROOM MIX

From the residential site analysis across 15 sites, there were some relationships observed, however it was found that the overall structure of the development did not have a discernible impact on the school student population as shown in Figure 22 and 23. All sites, no matter the particular typology, generated a school student population. Most of the residential sites were a mix of apartments and townhouses and some that were apartments or townhouses only.

Sites with higher median school student population ratio of occupation (10% or more: seven sites within the Study) tended to have townhouses as the sole or partial dwelling structure. This was the case in five of the seven sites. Features of townhouses, often referred to as the 'missing middle' of residential development have features that may be attractive to families with children including typically larger than units in size, rear and sometime front courtyard plots. Further analysis is required to confirm if families with school age students are residing in the townhouse components of combination sites.

For residential sites with apartments 1 - 3 storeys (Site 5, Artique and Site 15, Idalia), the median school student ratio of occupation differed significantly 33% and 2% respectively. It is noted that Site 15 Idalia was recently developed (2018) and this may have influenced the low ratio at this site.

The proportion of multi-bedroom dwellings did not have a clear correlation with the school student population. The analysis showed that some sites with a larger proportion of multi-bedroom dwellings yielded a larger school student population. The Allure development (Site 6) had 100% of multi-bedroom units and displayed one of the highest median ratios of school student occupation: 25%.

4-bedroom dwellings were only observed to have been delivered in four residential sites, three of which were delivered between 2016 and 2017. These are: Ambiente (Site 8), which is comprised of 48 1-bedroom, 113 2-bedroom, 12 3-bedroom and two 4-bedroom dwellings; Watermark (Site 9), which is comprised of 41 1-bedroom, 26 2-bedroom, 26 3-bedroom and two 4-bedroom dwellings; and Evolure (Site 12), which is split into 15 1-bedroom, 15 2-bedroom, 13 3-bedroom and five 4-bedroom dwellings. These three developments have both apartments and townhouses. Allure (Site 6) is the fourth site to have 4-bedroom dwellings; it is a townhouse-only development with nine 3-bedroom and one 4-bedroom dwelling.

However, other sites that had high proportions of multi-bedroom units displayed less than 10% of median school student occupation. For example, Atelier (Site 10), 62% of the dwellings are multi-bedroom dwellings, a total of 45 out of 73 dwellings. This site only yielded five school students at its peak.

Another example is Space The Residence (Site 2), which is comprised of 96% multi-bedroom dwellings; however, its median ratio of school student occupation is 3%. In Mizura Villas (Site 14), only 5 out of 59 dwellings are 1-bedrooms. The residential site is comprised of units and townhouses, with 92% of the development being multi-bedroom dwellings. From 2017 to 2020, the median ratio of school student occupation remained at 7-10% of all dwellings, and up to 11% of all multi-bedroom dwellings.

This may be linked to the higher median dwelling prices. More, larger dwellings that are more expensive may price out households with children or households looking to have children. All of the sites mentioned in the previous paragraph, Atelier (Site 10), Space (Site 2) and Mizura Villas (Site 14) are above the ACT median price for all dwellings and for units. The median dwelling prices at the three sites are also above the SA1/SA2 median prices. This suggests that there may be cheaper dwellings elsewhere in the surrounding area that may be attracting households with children. Further analysis is suggested to review the relationship between affordability and desireability of small homes with greater access to shared spaces for families with school students.

Further analysis is suggested for finer-grain analysis of specific development typology school age school students may be occupying to understand if families with school student aged children in these developments occupying the multi-bedroom dwellings within these residential sites only. If so, these families may be occupying a small proportion of the overall dwellings, however they may make up a significant proportion of the multi-bedroom dwellings within a residential site.

Sites with a greater or even share of 1-bedroom dwellings can also attract families. For example, Artique (Site 5) is made up of 50% 1-bedroom and 50% multi-bedrrom. This site has the highest median ratio of occupation across the study, at 33%.

Another example is Axis (Site 4), which is made up of 349 dwellings (a mix of low-rise residential flat buildings and townhouses). Of the total, 262 (75%) are one-bedroom dwellings and 87 multi-bedroom dwellings. It has a ratio of occupation of all dwellings of up to 15% in some years. Axis is also interesting as the school student population within the site represents a significant proportion of the school student population within the SA1 (on average 36% of the SA1, up to 60% of the SA1's population in 2018), suggesting that the school student population of the area was mostly concentrated in that residential site.

4.3.3 NUMBER OF DWELLINGS IN A SITE

The number of dwellings in a site, which ranged from 12 to 349, attracted families with school aged school students at differing rates.

Small developments, between 10 to 50 dwellings, appeared to have a higher ratio of occupation of school student populations. These sites are Sites 1, 5, 6 and 12. Magnolia Mews (Site 1) had a ratio of occupation of 31% at its peak. Artique (Site 5) in Campbell has 12 dwellings, one of the smallest developments in the study. Artique has an even split of one- to multi-bedroom dwellings, (50% 1-bedroom, 33% 2-bedroom and 17% 3-bedroom). While it was observed that older developments have fluctuating school student population, Artique has had a fairly consistent school student population of 4-6 school students, which yields a ratio of occupation of about 33-50%. It has 50% multi-bedroom dwellings. At its peak, this site had six school students within the total 12 dwellings. Allure (Site 6) is the smallest development in terms of number of dwellings, with a 100% ratio of occupation at its peak. Evolure (Site 12) had a slightly lower ratio of occupation, more similar to Site 1, at 33% at its peak.

Some larger developments classified as existing residential suburb development attracted high school student populations. Axis (Site 4) is the largest site by number of dwellings at 349. It attracted a median school student population of 27 school students in the development within the study period. The ratio of occupation for the whole development was 15% at its peak. The school student population at this residential site is one of the largest; considering school student count only, Site 4 had 54 school students in 2020.

For other existing residential suburb sites, Watermark (Site 9) has 57% multi-bedroom dwellings, a total of 54 out of 95, including two 4-bedroom dwellings. In the first year following development completion, the site had a school student population of 12. While the population remained around this number for the duration of the study period, its immediate occupation by families with school students is notable and is the second largest increase in a site's school student population and the largest immediate increase following development completion. Watermark (Site 9) had a median ratio of school student occupation of 15%.

Further analysis is suggested to understand broader trends that may be impacting the initial high occupation in Watermark, similarly observed in The Quay (Site 13). These trends may include: higher supply of affordable housing options alongside Gungahlin as a key employment centre and relationship with other new developments in Lake Tuggeranong.

Wayfarer (Site 11) has over 300 apartments, and an almost even split of one- to multi-bedroom dwellings (48% and 52%, respectively). This site displayed low school student populations. At most, the site had nine school students and a ratio of occupation of about 3%. Wayfarer is a 22-storey residential flat building. The site characteristics suggest that the target market for this site may be targeted towards investors, rather than households with children. Within the SA1 of Wayfarer (Site 11), there were also a higher proportion of renters to owners, 67.9% to 29.2%, respectively. It is also noted that Wayfarer was developed recently and this may impact low student population ratio.

While larger developments, such as Axis and Watermark (Sites 4 and 9), might yield more school students in number, sites with a comparatively smaller number of school students like Artique (Site 5), have a higher ratio of occupation and a more consistent population over the Study period.

Figure 24 Median School student population vs total dwelling numbers for all Residential sites

MEDIAN STUDENT POPULATION VS TOTAL DWELLINGS

Figure 25 Median Ratio of School student Occupation and Median Sales Price (At Site)

Source: Access Canberra price data from 2012-2019, cleaned by ACT Treasury

MEDIAN RATIO OF STUDENT OCCUPATION VS MEDIAN SALES PRICE (AT SITE)

4.3.4 MEDIAN DWELLING PRICE

High purchase price generally reflects sites with desireable locations as well as larger dwellings (both in bedroom size and total floorplate) and high quality external and internal design. The Study shows that sites behave differently when considering price. For some sites, higher dwelling prices may be unattractive or unaccessible for households with children. Some sites appeared to be agnostic to price increases, but this may be due to other factors relating to tenure and dwelling typology.

While the sites appear to behave differently in relation to price, the scatter plot in Figure 25 shows that there is an indicative "sweet spot" between a median dwelling price of $400,000 to $550,000 wherein nine of the sites are. While the median ratios of occupation at these sites vary, six are above the overall median ratio of occupation, Watermark (Site 9), Evolure (Site 12), Allure (Site 6), Artique (Site 5), Magnolia Mews (Site 1) and Mizura Villas (Site 14). Sites with a median dwelling price higher than $550,000, Atelier, Space and Space 2 (Sites 2,3 and 10) are the most expensive sites in the Study, and have lower ratios of occupation.

One example of a site with a lower median price and a higher ratio of occupation is Allure (Site 6). The median price at site for Allure (Site 6) is consistently below the SA2 and ACT median price for houses. Across the study period, the median price per year has not deviated significantly from the overall median price of $508,500 and the site has shown a consistent school student population that has grown over the study period. Allure is a new residential suburb site; it's corresponding SA1 has 73.3% owned dwellings.

On the other hand, Space2 (Site 3) had the highest median sales price across the study period at $679,000, above the SA2 median and the ACT unit median. The site's median price has remained consistently above these medians over the study period, with a low of $635,000 in 2013 and a high of $810,000 in 2014. It is noted that Space2 townhouses have large interior floor area, and this may explain the high median sales price. The site had its highest school student population in 2013, with 9 school students and a ratio of occupation of 12%. The site's school student population also decreased to 5 in 2014. This may suggest a movement of families with school students prior to 2014 related to the increase in price. Space2 is located in Turner, where there is a higher proportion of rented to owned dwellings. Further study on the impact of median rental prices for sites situated in areas with a higher proportion of rented dwellings is suggested.

Wayfarer (Site 11), had the lowest median sales price across the study period at $402,000, below the ACT unit median price. At the time of development completion, the site's median price was $390,000. The initial school student population at site was 7, higher than most first-year school student populations at site. However, it is noted that the ratio of occupation at Wayfarer is low (median ratio of school student occupation of 2%). Wayfarer is the second largest residential site, with 331 dwellings.

Some sites appear to be agnostic to price increases; specifically, some sites continue to exhibit growth even at or immediately following a year with the highest median price across the study period.

For example, Magnolia Mews (Site 1) had a median sales price high at 2017 with $790,500; from 2017 to 2018, the school student population at site grew from four to 10. In Axis (Site 4), the highest median sales price was $449,800 in 2013; between 2013 to 2014, the school student population increased from 10 to 18. In Atelier (Site 10), the highest median price was $799,900 in 2019; the school student population increased from three to five from 2019 to 2020. It is noted that these sites, except for Magnolia Mews (Site 1), have lower median ratios of occupation. This may suggest that there are households with children willing to buy into a more expensive residential development.

Tenure may also play a role in the desirability and willingness to pay a higher price for dwellings. Both Atelier (Site 10) and Axis (Site 4) are located in areas with a higher proportion of rented to owned dwellings. While these two sites have lower median ratios of occupation, there are still populations of school-aged students on these sites, which indicates that households with children are willing to pay a higher sales price or access these dwellings by renting rather than homeownership.

The previously mentioned sites are all existing residential suburb sites; however, new residential suburb sites do not necessarily behave conversely. Allure (Site 6) had its highest median sales price at $589,500 in 2017; the school student population at site grew from three to six between 2017 and 2018. Evolure (Site 12) had its highest median price in 2019 at $575,000; the school student population from 2019 to 2020 decreased from 11 to seven. Some existing residential suburb sites exhibit a decrease in population following the peak of median prices. Space2 (Site 3) and Quayside (Site 7) went from a school student population of five to four following the peak of the site's respective median prices.

4.3.5 YOUNGER CHILDREN WERE THE LARGEST GROUP WITHIN THE SITES' SCHOOL STUDENT POPULATION

Across all the residential sites, primary school children tend to be the largest group within the sites' school student populations. The older residential sites such as Magnolia Mews (Site 1) and Space2 (Site 3) had some years within the study period wherein secondary and college-age children were the largest groups. The increase in these groups coincided with a decrease in primary-age school students, while the overall site population remained consistent; these may have been the same school students ageing and progressing into the next school cohort.

Figure 26 School student population at Site 1 and Site 3

Year	Primary	Secondary	College	Total	Primary	Secondary	College	Total
	Magnolia Mews (Site 1)				Space2 (Site 3)			
2010	0	2	0	2	2	0	0	2
2011	1	4	2	7	2	0	1	3
2012	1	2	6	9	1	1	3	5
2013	0	2	2	4	6	1	2	9
2014	1	1	1	3	3	1	1	5
2015	1	2	1	4	2	1	1	4
2016	0	1	1	2	2	1	0	3
2017	3	0	1	4	7	1	0	8
2018	6	2	2	10	5	2	0	7
2019	6	3	1	10	4	3	0	7
2020	2	4	2	8	2	6	0	8

Source: ACT Education School Student Census 2010-2019

4.3.6 UPTAKE IN DEVELOPMENTS FOLLOWING COMPLETION

Five of the sites had immediate uptake following the completion of the development: Axis (Site 4) in Lyneham, Atelier (Site 10) in Kingston, Ambiente (Site 8) in Wright, The Quay (Site 13) in Greenway and Mizura Villas (Site 14) in Lawson. It is noted that as Magnolia Mews, Space and Space2 (Sites 1, 2 and 3) were completed before 2010, and therefore no data was available to analyse school enrolment data at this site from opening.

For some residential sites, there appeared to be a period of one year following the completion of the development before families with school-aged children moved in. For example, Artique (Site 5) was completed in 2011, but only had one school student in 2013, followed by four school students in total in 2014. Quayside (Site 7) was completed in 2014 but school students were first recorded within this site in 2016; there were five school students in 2016. School student populations at these sites did not increase year-on-year following the completion of the development.

While residential sites may have some immediate population, populations also pick up a year after the development has been delivered. Further analysis is suggested to be undertaken to understand if this lag is related to families with school-age children not being immediately attracted to new developments, or if families move into new medium to high density dwellings with younger, non-school-age children or young couples are moving into these new developments before starting a family.

Reporting methods for both development processes and school student census may impact the presentation of lag in update of developments following completion. It takes time between issue of the building certificate of occupation and households (with or without children) moving in as owners or tenants. In addition, changing or updating the student's home address is captured annually in February during the Education Census.

The tenure of each individual school student at the residential site was not included in the School Census data provided. Further analysis is suggested to understand the impact of housing tenure on school population and to understand if this 'lag' in school student population may also be linked to higher proportions of renters in existing residential suburb areas, where most of the residential sites are located. For example, Wayfarer (Site 9) in Belconnen was completed in 2016. There was a school student population of seven at the site in 2018. In Belconnen, there is a higher proportion of rented dwellings to owned dwellings, 67.90% and 29.2% respectively. For Idalia (Site 15) in Phillip, there was a school student population of two in 2019; the development was completed in 2017. The SA1 in which Site 15 is located in has a proportion of 66% rented dwellings and 32% owned dwellings. Further analysis is suggested to understand if families with school aged school students are waiting for available rental stock to open on the market from these relatively new developments.

Median dwelling price may also play a role, as discussed in the previous section. Additional analysis may be undertaken to understand if there are lags in school student population in less affordable areas due to families with school aged school students waiting for available rental stock to open on the market from these relatively new developments.

4.3.7 POPULATION GROWTH PATTERNS AT NEW RESIDENTIAL SUBURB SITES AND THEIR SA1S

In the previous section, it was observed that newer developments tended to yield sharper increases in school student population growth. For the new residential suburb sites delivered within 2016-2017, this increase in population growth was also reflected in their corresponding SA1s. Further analysis is suggested to determine if this may be related to other, new developments being delivered in the immediate surrounding area and or if sharp increases in are related to new residential suburb areas having a low base and or families moving in with infants to a larger dwelling for the long term.

4.3.8 OLDER DEVELOPMENTS SHOWED FLUCTUATION IN SCHOOL AGED SCHOOL STUDENT POPULATION

For Sites 1-7, which were completed between 2005-2014, it was observed that the school student populations at site fluctuate across the study period, showing a rise and fall over the years. For Sites 8-15, completed between 2016-2017, the school student population at most of the sites increased quickly after the development was completed.

From our sample analysis, we observed that for older developments, there were peaks and troughs of total school student populations, and the school student population increased in age throughout the years. This may suggest that children who are living in these developments are growing up, getting older and moving up and out of the school system. It is suggested that further analysis of school student IDs be undertaken to confirm if this trend is occurring.

Magnolia Mews (Site 1), in Narrabundah, is the oldest residential site in the study, completed in 2005. The levels of school student population in the site increase early in the study period and then reduce between 2013 to 2017 before picking up in 2018. There was a decrease in college age school students from 2011 to 2013, and the subsequent increase from four school students to ten from 2017 to 2018. The decrease in college age school students followed by an increase in primary age school students is the key differentiator from other residential sites.

This is also seen in Space2 (Site 3); from 2012 to 2016, there is a decreasing population of college school students, followed by an increase in primary school students in the following year. From 2017 onwards, primary school student population decreases, while secondary school student population increases, and the overall school student population increases only by one in a four-year period.

It is suggested that finer-grain analysis of data to correlate student address to individual dwelling attributes, longitudinal dwelling studies of households with children is undertaken to inform if families move into new medium to high density dwellings with younger, non-school-age children; young couples are moving into these new developments before starting a family and stay when children enter the school system, and or if families had recently moved into the development when ready for school.

Figure 27 School student population at Site 1 and Site 3

Year	Primary	Secondary	College	Total	Primary	Secondary	College	Total
	Magnolia Mews (Site 1)				Space2 (Site 3)			
2010	0	2	0	2	2	0	0	2
2011	1	4	2	7	2	0	1	3
2012	1	2	6	9	1	1	3	5
2013	0	2	2	4	6	1	2	9
2014	1	1	1	3	3	1	1	5
2015	1	2	1	4	2	1	1	4
2016	0	1	1	2	2	1	0	3
2017	3	0	1	4	7	1	0	8
2018	6	2	2	10	5	2	0	7
2019	6	3	1	10	4	3	0	7
2020	2	4	2	8	2	6	0	8

Source: ACT Education School Student Census 2010-2019

4.3.9 LANGUAGE SPOKEN AT STUDENT HOME

Language spoken at home is recognised as one of the core set of cultural and language indicators outlined in the ABS Standards for Statistics on Cultural and Language Diversity (1999). Language spoken at home is collected as part of the School Student Census and was analysed at SA1 level to provide an indication of cultural diversity of an area. Further analysis is suggested to review other measures to gain a deeper view on cultural diversity and relationship to housing for families with school students.

English is the most commonly spoken language at home across all residential sites' corresponding SA1s across all the years. The proportion of English speaking households differed across the 15 residential sites with the lowest proportion at the SA1 hosting Idalia (39%), and the highest at nearly 100% in the SA1 hosting Artique.

The proportion of school student households speaking English at home by SA1 in 2019 was reviewed against the ratio of student occupation at sites in the same year as shown in Figure 26. The review highlights that there is not a clear relationship between proportion of households speaking English at home in the SA1 to ratio of student occupation in the residential site, however, there was alignment across some residential sites. For example, for Evolure (Site 12), its corresponding SA1s has one of the lowest proportions of English speaking households at 44%. Site 12 also has the highest ratio of occupation across all sites at that year, at 23%. Within Evolure's SA1, across the whole study period, the second and third most common languages spoken at home were Tamil and Hindi, respectively. In addition, at Atelier's low ratio of student occupation in 2019 showed high proportions (more than 80%) of student households speaking English at home in the same year.

Figure 28 Proportion of languages spoken at home and ratio of occupation in 2019

Source: ACT Education School Student Census 2010-2019

There were other sites however that did not follow this relationship. For example the SA1 hosting Mizura (Site 14) and the SA1 of Ambiente (Site 8) whic had similar ratio of occupations at the site levels, but differences in proportion of English speaking student households (55% and 75% respectively).

In another example Idalia (Site 15) has the lowest ratio of occupation across all the sites in 2019, its corresponding SA1 (8110912) also has the lowest proportion of English speaking households across all the sites, at 39%. Interestingly, the SA1 of Idalia (Site 15) located in the existing residential suburb area of Phillip had a total school student population of 45 in 2019, and 16 different languages spoken at home. 17 school students were recorded as English speaking; the next highest count is three, which is the count for Hindi, Tagalog, French, Indonesian and Filipino.

A review of the residential sites suggests that SA1s hosting newer residential sites built-in 2017 - Evolure (Site 12), The Quay (Site 13), Mizura (Site 14) and Idalia (Site 15) had lower proportions of English speaking student households less than 75%, compared to SA1s hosting older residential sites within our sample.

Further analysis of additional indicators to explore cultural diversity and relationship to housing characteristics is suggested.

4.3.10 OLDER SITES LOCATED IN AREAS WITH EVEN DISTRIBUTION OF HOUSEHOLD ADVANTAGE

Within most of the sites' corresponding SA1s, the fourth IHAD quartile is most prevalently represented. The exceptions are Space (Site 2), Space2 (Site 3), Axis (Site 4) and Idalia (Site 15), wherein most households are represented in the 3rd IHAD Quartile.

The corresponding of SA1s of some older sites, Sites 1-5, appear to have a more even distribution of household advantage and disadvantage. After Artique (Site 5), which was delivered in 2011, almost all sites' corresponding SA1s have more than 90% of households within the 2nd, 3rd and 4th Quartiles, with the exception of Evolure (Site 12). The households within its corresponding SA1 are equally represented within the 2nd, 3rd and 4th Quartiles. Most of these sites are located in new residential suburb areas, except for Watermark (Site 9) and The Quay (Site 13). It was previously observed that new residential suburb areas tend to have higher rates of home ownership; the higher expenses associated with home ownership may only attract more advantaged households to an area. This may impact on the types of households that may be able to access housing in one area over another.

The SA1 that Evolure (Site 12) is located in, a new residential suburb, has a higher proportion of rented dwellings. While no households are counted in the 1st IHAD Quartile, its more even distribution across the other three Quartiles is similar to the distribution of households in Sites 1-5. More even distribution of IHAD Quartiles for households in older, more established locations with higher proportions of rented dwellings may suggest a relationship between age of development and its surrounding area, tenure and household advantage. Further study is suggested to explore the relationship between shifts in tenure and household advantage and housing preferences.

The school student population at site did not appear to be strongly correlated with the relative advantage and disadvantage in certain areas; however, it was observed that sites in areas with more even IHAD quartile distribution tended to have higher median ratios of occupation across the whole study period. Artique (Site 5) has the highest median ratio of occupation at 33% and its SA1's IHAD distribution is almost even across the four quartiles. This is also observed in Magnolia Mews (Site 1) (13%) and Evolure (Site 12) (15%). Though sites within areas of higher advantage also present with high median ratios of occupation, such as Allure at 25%, Watermark (Site 9) at 15% and The Quay (Site 13) at 12%.

Figure 29 Proportion of households in each SA1 within IHAD Quartiles in 2016

Source: Experimental Index of Household Advantage and Disadvantage, ABS Census 2016; ACT Education School Student Census

4.3.11 THE SITE WITHIN ITS WIDER CONTEXT

Across the 15 residential sites there was an observed change in the proportion of school student population from a residential site compared to the school student population in the SA1 and SA2 over time as shown in Figure 30. For example, Watermark (Site 9) represented 75% of the school student population within its SA1 in 2017, and then dropped to 44% and then 21% in 2018 and 2019, respectively. There was an overall increase in the school student population within its SA1. The Quay (Site 13) is located in the same SA1. In 2018, the site's school student population represented 25% of the school student population within the SA1. In 2019, this proportion fell to 14% and the school student population grew from 36 to 71 within the SA1 in the same time.

From 2018 to 2019, the proportion of the two sites' SA1 to the SA2 (Greenway) school student population increased from 20 to 35%. This may suggest that more families with school students are moving into the immediate surrounding area. Further analysis is suggested to understand if the increase in population across the SA1 and SA2 was associated with additional new medium to high density dwellings or within existing dwellings.

Figure 30 Residential site, SA1 and SA2 school student population

Site	'10	'11	'12	'13	'14	'15	'16	'17	'18	'19	'20
1 Magnolia Mews	2	7	9	4	3	4	2	4	10	10	8
SA1	School student population at SA1 not collected										
SA2	947	947	1010	1039	1067	1046	1087	1130	1140	1173	1134
2 Space	2	1	2	1	8	3	3	1	5	5	4
SA1	School student population at SA1 not collected										
SA2	252	232	257	266	298	289	286	295	307	301	316
3 Space2	2	3	5	9	5	4	3	8	7	7	8
SA1	School student population at SA1 not collected										
SA2	252	232	257	266	298	289	286	295	307	301	316
4 Axis	0	0	4	10	18	19	27	34	46	33	54
SA1	44	36	32	52	53	56	62	75	77	92	
SA2	443	428	482	484	498	536	565	619	681	662	648
Site to SA1	0%	0%	13%	19%	34%	34%	44%	45%	60%	36%	
SA1 to SA2	10%	8%	7%	11%	11%	10%	11%	12%	11%	14%	
5 Artique	0	0	0	1	4	5	4	4	5	6	6
SA1	41	48	74	54	58	67	65	63	82	72	
SA2	460	459	520	565	597	616	599	579	645	611	590
Site to SA1	0%	0%	0%	2%	7%	7%	6%	6%	6%	8%	
SA1 to SA2	9%	10%	14%	10%	10%	11%	11%	11%	13%	12%	
6 Allure	0	0	0	0	1	2	2	3	6	4	4
SA1	School student population at SA1 not collected										
SA2	16	99	286	382	557	739	901	1076	1188	1240	1186
7 Quayside	0	0	0	0	0	0	5	4	4	7	5
SA1	24	30	23	21	39	44	55	45	24	24	
SA2	202	231	222	214	267	272	313	321	374	399	430
Site to SA1	0%	0%	0%	0%	0%	0%	9%	9%	17%	29%	
SA1 to SA2	12%	13%	10%	10%	15%	16%	18%	14%	6%	6%	
8 Ambiente	0	0	0	0	0	0	2	7	14	17	28
SA1	0	0	0	0	4	7	9	13	40	46	
SA2	0	0	3	26	76	185	241	367	437	470	443
Site to SA1	0%	0%	0%	0%	0%	0%	22%	54%	35%	37%	
SA1 to SA2	0%	0%	0%	0%	5%	4%	4%	4%	9%	10%	

Site	'10	'11	'12	'13	'14	'15	'16	'17	'18	'19	'20
9 Watermark	0	0	0	0	0	0	0	12	16	15	13
SA1	0	0	1	3	6	3	4	16	36	71	
SA2	133	129	144	149	143	142	146	153	184	203	192
Site to SA1	0%	0%	0%	0%	0%	0%	0%	75%	44%	21%	
SA1 to SA2	0%	0%	1%	2%	4%	2%	3%	10%	20%	35%	
10 Atelier	0	0	0	0	0	0	0	1	3	3	5
SA1	12	14	11	13	51	26	25	25	27	23	
SA2	202	231	222	214	267	272	313	321	374	399	430
Site to SA1	0%	0%	0%	0%	0%	0%	0%	4%	11%	13%	
SA1 to SA2	6%	6%	5%	6%	19%	10%	8%	8%	7%	6%	
11 Wayfarer	0	0	0	0	0	0	0	0	7	9	3
SA1	School student population at SA1 not collected										
SA2	218	218	252	250	272	304	338	339	392	427	389
12 Evolure	0	0	0	0	0	0	0	0	7	11	7
SA1	0	0	0	0	0	0	2	23	55	74	
SA2	0	0	0	0	0	0	8	69	135	200	195
Site to SA1	0%	0%	0%	0%	0%	0%	0%	0%	13%	15%	
SA1 to SA2	0%	0%	0%	0%	0%	0%	25%	33%	41%	37%	
13 The Quay	0	0	0	0	0	0	0	0	9	10	7
SA1	0	0	1	3	6	3	4	16	36	71	
SA2	133	129	144	149	143	142	146	153	184	203	192
Site to SA1	0%	0%	0%	0%	0%	0%	0%	0%	25%	14%	
SA1 to SA2	0%	0%	1%	2%	4%	2%	3%	10%	20%	35%	
14 Mizura Villas	0	0	0	0	0	0	0	0	4	6	6
SA1	0	0	0	0	0	0	6	43	80	125	
SA2	0	0	0	0	0	0	8	69	135	200	195
Site to SA1	0%	0%	0%	0%	0%	0%	0%	0%	5%	5%	
SA1 to SA2	0%	0%	0%	0%	0%	0%	75%	62%	59%	63%	
15 Idalia	0	0	0	0	0	0	0	0	0	2	3
SA1	2	3	2	9	21	14	24	29	36	45	
SA2	125	121	150	147	175	194	245	276	305	302	299
Site to SA1	0%	0%	0%	0%	0%	0%	0%	0%	0%	4%	
SA1 to SA2	2%	2%	1%	6%	12%	7%	10%	11%	12%	15%	

5. Learning from other jurisdictions

5.1 PURPOSE AND APPROACH TO ANALYSIS

The purpose of this analysis was to capture and share lessons from other jurisdictions that have experienced pressure on schools from residential intensification in existing residential suburbs, including any policy or planning actions processes for influencing schools planning and document experiences of any differences in what is outlined in policy versus what happens on the ground. The analysis of other jurisdictions complements the main analysis by documenting key trends or factors of influence that other jurisdictions are considering for input into school enrolment forecasts. The analysis is split into three phases:

» A high level background review on urban existing residential suburb policy shifts in Sydney, Newcastle and Brisbane;

» A high level analysis on typology and enrolment change. Specific locations were identified through during semi-structured interviews, pinpointing areas that have experienced high population growth, school enrolment change or and high development activity; and

» Summary of the insights from semi-structured interviews with key members of education departments and or planning departments in NSW and QLD to understand their experiences in school enrolment changes and planning for existing residential suburb developments.

5.1.1 APPROACH AND LIMITATIONS

A summary of the approach and data used for the high level analysis on the three 'case study' sites is as follows:

» Data for school enrolments was limited to publicly available data on government school enrolments. For New South Wales, this data was available within the time period 2004-2018. For Queensland, this data was available within the time period 2015-2019;

» Non-government school enrolments are not publicly available;

» Specialised school enrolments are not publicly available;

» Only the total number of students is publicly available. Supporting detailed information such as student addresses, breakdown of enrolment across academic categories, etc. is not publicly available;

» Data was collected and analysed using the Australian Statistical Geography Standard (ASGS), specifically using the SA2 and SA1 levels. This standard was introduced at the 2011 ABS Census. This portion of the Study covers a time period of 2006-2016. Data from 2006 was collected using the State Suburb (SSC) geography, which cover an approximately similar areas for the SA2s used in 2011 and 2016. The SA2s of South Brisbane and Homebush Bay – Silverwater (parent SA2 for Wentworth Point) are consistent with the SSC boundaries of South Brisbane and Homebush Bay, Silverwater and Newington, respectively. The suburbs of Lambton, New Lambton and New Lambton Heights were used for the New Lambton case study. The SSC boundaries have a slight overlap with the adjacent SA2s of Lambton – New Lambton;

» Only stated dwellings have been counted in this analysis. Counts within the "not stated" and "not applicable" categories have not been included;

» School-age student population for each SA2 was estimated using the population within the ages 5-18. This is an estimate of the age groups within the school system; and

» Sales data for the three case studies is not publicly available. This analysis has relied on publicly available weekly median rent and mortgage repayments per SA1 or SA2 in 2016.

5.2 URBAN EXISTING RESIDENTIAL SUBURB POLICY SHIFTS AND SCHOOLS PLANNING

Alongside ACT, other states such as Queensland and New South Wales (NSW) have recognised the complex landscape of planning for growth and infrastructure.

5.2.1 NEW SOUTH WALES

In NSW, there has been recent shifts in policy and governance to support closer alignment between land use and infrastructure decision to support students, families and communities.

There is wide recognition that schools planning must be coordinated with employment hubs, housing, transportation to support cities and communities. Across multiple portfolios in State Government, a number of benefits have been outlined. Identifying demand for and planning for schools alongside other initiatives to support a compact city, has the potential to improve active travel outcomes – more students walking and cycling to schools, reducing the need for school busing and carer driving – delivering outcomes across health and wellbeing and the transport and city network.

The Greater Sydney Commission's (2017) A Metropolis of Three Cities (the Plan) is the Sydney's strategic urban plan. It outlines strategies for infrastructure and supporting housing and employment across Sydney as well as strategies for implementation and collaboration. The Plan seeks to push for urban regeneration and urban renewal to respond to the increased population projects through growth in renewal corridors, through medium density existing residential suburb development. There is recognition that development in land release areas will support housing supply, and supports more intense development around centres – namely medium to higher density housing.

The Plan makes clear reference to the need for infrastructure planning while supporting housing supply (Greater Sydney Commission, 2017). The Growth Infrastructure Compact programme seeks to better align infrastructure planning and delivery in high growth areas. The approach seeks to review and maximise existing infrastructure, and align planning for new infrastructure across agency programs and priorities. This approach also seeks to understand the multiple benefits that could be gained from an investment in infrastructure like community spaces or schools, to support prioritisation and funding (Greater Sydney Commission, 2017).

The Plan explicitly references NSW Department of Education school student planning estimates by districts, and recognizes the role of School Infrastructure NSW, to undertake school community planning, and the delivery of education infrastructure program via the School Assets Strategic Plan Summary (2017).

The School Assets Strategic Plan Summary (NSW Department of Education, 2017) outlines the need for schools planning across NSW to 2031. The Plan seeks to 'leverage existing assets and partnerships to reduce the financial burden on government of a 'business as usual 'approach'. In this way, school assets are increasingly seen as shared social infrastructure – common grounds to improve the provision of public open space and green space, shared school facilities for community meeting and gathering as well as space for after and before school care. Planning across government (planning departments and education and schools infrastructure planning) recognises the need for schools to be delivered as 'community hubs' – in addition to providing space for learning in formal school hours and classrooms, schools contribute to open and green space network and community halls and meeting spaces – if the governance arrangements enable open and public access.

Schools forecasting is informed by central population growth projections from the Department of Planning, Infrastructure and Environment. It is understood that the Department of Education undertakes a series of analysis to complement this projection data to inform schools planning. One study is a high level audit of the condition of and general school needs of schools by cluster - this included high level quantitative and qualitative assessment of student pop and classroom provisions, size of playgrounds and learning facilities. Other model analysis has been undertaken in the Hunter Region including Newcastle to gain a very high level understanding of capital costs associated with meeting growth demand. Student population changes were modelled based on baseline forecasts against a development scenario of the new residential suburb growth happened.

Growth of Newcastle has been guided by strategic planning that seeks to be contained along renewal corridors alongside commercial areas, with one quarter of residential growth (2016 – 2041) planned to be located in 1% of the City of Newcastle's land area (forecast id, 2018). These plans and investments have seen a shift in the city. New residential and commercial developments and building refurbishments in Newcastle's CBD and inner-city suburbs attracting more people to the CBD. Additional population growth has been supported with light rail and upgrades to public spaces.

The breadth of housing opportunities is noted in the City of Newcastle's Demographics and Social Strategy 2016 – 2019. This Strategy notes that areas of significant recent growth in new residential suburb areas are made up of predominantly family households. Growth in medium density and higher density dwellings has been occurring, however this Strategy do not make any specific link to families with children living in medium to high density dwelling typologies.

5.2.2 QUEENSLAND

Previous planning for Brisbane outlined by the Queensland South East Queensland Regional Plan outlines a plan for 80 percent of new dwellings to be delivered in existing residential suburbs in urban areas (Queensland Government, 2005). Existing residential suburb development has been related to pressures on schools infrastructure in Brisbane (ABC, 2018). Over the past 10 years, around 5,000 additional students have joined Queensland state schools in and around the Brisbane CBD. This growth will continue with more than 3,000 additional students expected to move into inner Brisbane in the next 5 years (Queensland Education Department, 2020).

A number of approaches are in place to support planning for schools. The Queensland Government Statistical Office prepares school-age population projections based on the most recent Queensland population projections, which inform the demand mapping meetings, and an interactive projected school-aged persons map. Data and mapping are publicly available from the QGSO webpage.

The Queensland School Planning Commission is a Ministerial Advisory Committee tasked in 2012 with improving processes for the planning of Queensland schools in consultation with key sectorial stakeholders. Demand mapping is undertaken by the Committee in Council areas that are undergoing significant population growth. The Committee supports mapping and planning across stakeholders – including government and non government schools and local councils.

In schools that are nearing enrolment capacity, policies to more strictly apply school catchment areas have been defined. Schools are required to implement a School Enrolment Management Plan when enrolments reach 80% of the school's student enrolment capacity.

5.3 CASE STUDIES

The following areas were considered for this analysis: New Lambton (Newcastle), Wentworth Point (Greater Sydney) and South Brisbane (Brisbane). These areas were identified in the semi-structured interviews. The areas were selected for the following reasons:

» New Lambton was identified in the interviews with schools planning professionals as an area of interest due to the popularity of the local public school – New Lambton Public School. New Lambton is located in Newcastle, in the Hunter Region of New South Wales, approximately 6km west of the Newcastle Central Business District. The area is mostly residential, adjacent to large swathes of environmentally sensitive land and reserves. Within the SA2 Lambton-New Lambton, there are four public schools, New Lambton Public, New Lambton South Public, Lambton Public and Lambton High school, two non-government schools, St. John's Primary and St. Therese's Primary and one specialised school, John Hunter Hospital School.

» Wentworth Point in central Sydney was selected for high levels of population growth and development activity, particularly in high-density dwelling development. Wentworth Point is also a Priority Precinct, designated by the NSW Department of Planning and the Environment. This designation "provide[s] a planned approach to growth in Sydney, with new homes and jobs located close to public transport, shops and services, while retaining and enhancing a community's character" (NSW DPIE 2017). In Homebush Bay – Silverwater, there are four schools in total. Newington Public School and Wentworth Point Public School are the two government schools within the SA2. Other schools include SEDA College, a specialised school for Years 11 and 12 focusing on sports and Margaret Jurd College, a special education school.

» South Brisbane is in the Inner City area of Brisbane. From 2008, the inner city area of Brisbane underwent significant change and development, with renewed focus on new housing and jobs near high capacity public transport as well as lifestyle and amenity factors. Two schools located in the adjacent area are Brisbane State High School and West End State School. Interviews with schools planning professionals in Queensland highlighted that access to the schools' respective catchments was becoming increasingly competitive, coinciding with expansions for both schools.

A map of the three case study areas is shown on the following spread.

Figure 31 Map of three case studies

SOUTH BRISBANE

NEW LAMBTON

WENTWORTH POINT

THE COMPACT CITY AND SCHOOL CHILDREN IN THE ACT

5.3.1 TOTAL SCHOOL STUDENT CHANGE

School student population for the three areas was evaluated by using the population of each SA2 or group of suburbs within the ages of 5-18. Lambton – New Lambton had, overall, the largest school student population residing within the SA2; however, the school student population within this area also had the lowest level of growth between 2006, 2011 and 2016, both in terms of count of persons and proportion of growth, within the study period.

The school student population within Homebush Bay – Silverwater grew by 34% from 2006 to 2011 and then by 45% from 2011 to 2016, with an overall growth of 95% or 1034 persons. In South Brisbane, the school student population grew by 18% between 2006 to 2011, 33% between 2011 to 2016 and by 51% percent or 322 persons overall.

The total populations at each SA2 also followed similar patterns of growth. Lambton – New Lambton had an overall growth from 2006 to 2016 of 6%, Homebush Bay – Silverwater had an overall growth of 104% and South Brisbane had an overall growth of 53%. Over the study period, the school student population at each SA2 continued to represented a consistent proportion of the total population, only increasing or decreasing by 1% in the cases of Lambton – New Lambton and Homebush Bay – Silverwater. In the case of South Brisbane, the school student population represented 10% of the total population across the whole study period.

These patterns suggest that the population of school student children grows at a similar rate to the total population. The interviews suggested the proportion of families with children occupying new medium-to-high density dwellings were not necessarily increasing, however the volume and rate at which these dwellings were bring delivered in these high growth areas was rapidly increasing, and so too was the number of families and school aged children.

Figure 32 School student population change at SA2, 2006, 2011, 2016

SA2	2006	2011	2016	change from 06-11 (+/-)	change (%)	change from 11-16 (+/-)	change (%)	overall	overall (%)
Lambton – New Lambton									
Total school student population	2842	2851	3031	9	0%	180	6%	189	7%
Total population	16190	17006	17231	816	5%	225	1%	1041	6%
Proportion of school student aged population to total population	18%	17%	18%	-	-	-	-	-	-
Homebush Bay - Silverwater									
Total school student population	1090	1460	2124	370	34%	664	45%	1034	95%
Total population	9738	12083	19906	2345	24%	7823	65%	10168	104%
Proportion of school student aged population to total population	11%	12%	11%	-	-	-	-	-	-
South Brisbane									
Total school student population	631	747	953	116	18%	206	28%	322	51%
Total population	6217	7569	9498	1352	22%	1929	25%	3281	53%
Proportion of school student aged population to total population	10%	10%	10%	-	-	-	-	-	-

5.3.2 TOTAL DWELLING CHANGE

The dominant dwelling typology in each study area differs. For Lambton – New Lambton, the most prevalent dwelling structure is detached dwellings, which represent more than 80% of the dwellings in the SA2 across all the years within the study period. Between 2006 to 2016, the largest growth in terms of dwelling count and proportion of change was observed in semi-attached dwellings, which increased by 75% or 360 dwellings. Apartments decreased by at least 40% over the study period.

For Homebush Bay – Silverwater, the most common dwelling structure is apartments in buildings of four or more storeys. Apartments of up to three storeys increased by 4%; all other typologies increased by more than 250%. The highest growth in terms of count of dwellings was observed in apartments in buildings of four or more storeys, with an overall increase of 3,480 dwellings or 379%. Semi-attached dwellings had the highest growth in terms of proportion of growth, increasing by 526% or 463 dwellings between 2006 to 2016.

Homebush Bay – Silverwater is within or adjacent to several priority precincts, a designation used by the NSW Department of Planning and Environment to denote accelerated planning, investment and renewal in certain areas, which aim to guide and align growth with the provision of necessary infrastructure and services (NSW DPIE, 2020) . As part of the UAP, Wentworth Point was rezoned to accommodate high density residential, commercial and recreational uses across two separate neighbourhoods (NSW DPIE, 2014) . The UAP Finalisation Report estimated that there would be 2,300 new dwellings within the precinct, as well as a new school – Wentworth Point Public School (NSW DPIE, 2014) .

In South Brisbane, all dwelling typologies increased over the study period. Over the study period, there is a clear shift from detached dwellings towards medium to high-density dwellings, in particular high-density. Detached dwellings, semi-attached dwellings and apartments in buildings of up to three storeys all decreased over the study period. Detached and semi-attached dwellings decreased by at least 70%. Conversely, apartments in buildings of four or more storeys increased by 134% or 1,145 dwellings.

South Brisbane Riverside was identified in the Brisbane CityShape 2026 plan, a 20-year strategic plan for Brisbane, as an area for major urban renewal (Brisbane City Council, 2005) . Under a Brisbane City Council initiative, the South Brisbane Riverside Neighbourhood Plan identified the process through which the area would be transformed into an area with more housing, more variety of housing options, greater access to public transport and jobs (Brisbane City Council, 2009) . Development in the area was planned to focus on higher densities; between 2006 to 2011, apartments in buildings of up to four or more stories increased by 70% and then by 134% to 2016.

Figure 33 Total change in dwelling structure in selected SA2s from 2006 to 2016

SA2	2006	2011	2016	change 06-11	% change	change 11-16	% change	change 06-16	% change
Lambton - New Lambton									
Total detached	5010	5118	5097	108	2%	-21	0%	87	2%
Total semi-attached	482	653	842	171	35%	189	29%	360	75%
Total apartments, in buildings of up to three storeys	702	582	417	-120	-17%	-165	-28%	-285	-41%
Total apartments, in buildings of four or more storeys	7	14	4	7	100%	-10	-71%	-3	-43%
Total	6201	6367	6360	166	3%	-7	0%	159	3%
Homebush Bay - Silverwater									
Total detached	250	256	896	6	2%	640	250%	646	258%
Total semi-attached	88	58	551	-30	-34%	493	850%	463	526%
Total apartments, in buildings of up to three storeys	378	339	395	-39	-10%	56	17%	17	4%
Total apartments, in buildings of four or more storeys	919	1379	4399	460	50%	3020	219%	3480	379%
Total	1635	2032	6241	397	24%	4209	207%	4606	282%
South Brisbane									
Total detached	809	1201	220	392	48%	-981	-82%	-589	-73%
Total semi-attached	314	135	74	-179	-57%	-61	-45%	-240	-76%
Total apartments, in buildings of up to three storeys	422	885	387	463	110%	-498	-56%	-35	-8%
Total apartments, in buildings of four or more storeys	853	1446	1998	593	70%	552	38%	1145	134%
Total	2398	3667	2679	1269	53%	-988	-27%	281	12%

Source: ABS Census 2006; 2011; 2016

5.3.3 TOTAL CHANGE IN MEDIUM TO HIGH DENSITY DWELLINGS

Medium to high-density dwellings (all dwellings except for detached dwellings) increased in all the SA2s over the study period. The growth in Lambton – New Lambton was lowest over the study period, at 6%; the proportion of medium to high-density dwelling types to the total number of dwellings remained consistent over the study period at 19-20%.

For Homebush Bay – Silverwater, medium to high-density dwellings increased by 28% from 2006 to 2011 and by 201% from 2011 to 2016, with an overall increase of 286% or 3,960 dwellings. The proportion of medium to high-density dwellings to total dwellings has remained high at around 85-87% over the Study period. The large increase as well as the high proportion of medium- to high-density dwellings over the Study period suggests that majority of the change in the area has been in these dwelling types. However, there was an overall increase of 258% in detached dwellings in the SA2 over the whole Study period. While majority of the change is in medium- to high-density dwellings, there was an overall substantial increase in the total dwellings.

In South Brisbane, there was an overall increase of medium to high-density dwellings of 55% from 2006 to 2016, with all of this change occurring between 2006 to 2011; there was no proportional change between 2011 to 2016, though there was a decrease of seven dwellings in that period. The proportion of medium to high density-dwellings to total dwellings in the SA2 increased from 66% in 2006 to 2011 and to 92% from 2011 to 2016. This suggests that while the number of medium- to high-density dwellings did not increase in the second half of the Study period, there was a decrease South Brisbane decreased from 1201 to 220, a decrease of 82%.

Figure 34 Total change in medium- to high-density dwellings from 2006 to 2016 in selected SA2s

SA2	2006	2011	2016	change 06-11	% change	change 11-16	% change	change 06-16	% change
Lambton - New Lambton									
Total medium to high density dwellings	895	992	984	97	11%	-8	-1%	89	10%
Total dwellings	6201	6367	6360	166	3%	-7	0%	159	3%
Proportion to total number of dwellings	19%	20%	20%						
Homebush Bay - Silverwater									
Total medium to high density dwellings	1385	1776	5345	391	28%	3569	201%	3960	286%
Total dwellings	1635	2032	6241	397	24%	4209	207%	4606	282%
Proportion to total number of dwellings	85%	87%	86%						
South Brisbane									
Total medium to high density dwellings	1589	2466	2459	877	55%	-7	0%	870	55%
Total dwellings	2398	3667	2679	1269	53%	-988	-27%	281	12%
Proportion to total number of dwellings	66%	67%	92%						

Source: ABS Census 2006; 2011; 2016

5.3.4 TOTAL CHANGE IN TOTAL SUITABLE MEDIUM TO HIGH-DENSITY DWELLINGS

As highlighted previously in this Study, standards such as the Canadian Housing Standard have determined that dwellings with two bedrooms or two bedrooms with study or other additional room are considered possibly suitable for families with children. The Standard also determined that dwellings with more than three bedrooms are considered suitable for families with children. The ABS also utilises this Standard when determining the suitability of dwellings for their households. We have undertaken analysis on dwellings that are considered 'possibly suitable' or 'suitable', that is dwellings that have two bedrooms or more, or multi-bedroom medium to high density dwellings (suitable medium to high density dwellings) for this Study.

In Lambton – New Lambton, there was an overall increase in suitable medium to high density dwellings across the Study period of 10%, or 89 dwellings. This growth is mostly in semi-attached dwellings, which increased by between 76% to 121% over the Study period. All apartment typologies decreased over the Study period. Four-bedroom semi-attached dwellings saw the largest increase over the Study period. Suitable medium to high density dwellings represent between 75-79% of all medium- to high-density dwelling development, but a small proportion of total number of dwellings, between 14% to 16% over the Study period. This suggests that despite an increase in some typologies of medium- to high-density dwelling development over the Study period, the area is still dominated by detached dwellings.

In Homebush Bay – Silverwater, the total number of suitable medium to high density dwellings increased by 300% over the Study period. All typologies in this group observed an overall loss from 2006 to 2016, except for 4-bedroom apartments in buildings of up to three storeys. The largest increase in terms of dwelling count was observed in 2-bedroom apartments in buildings of four or more storeys, which increased by 2,063 dwellings or 432% from 2006 to 2016. Suitable medium to high density dwellings comprised between 61% to 65% of all dwellings over the Study period and between 72% to 75% of medium- to high-density dwellings.

In South Brisbane, there was an increase in medium- to high-density dwellings, particularly in apartments. However, there are significantly more 1- and 2-bedroom apartments in buildings of four or more storeys; in 2016, these typologies represented 86% of apartments in buildings of four or more storeys. 3- and 4-bedroom apartments saw an overall increase of 23% and 3000%, respectively, however the increase is only 45 and 30 dwellings, respectively.

From 2006 to 2011, the number of suitable medium to high density dwellings, specifically apartments in buildings of up to three storeys represented a more significant proportion than other typologies. In 2011, 2- to 4-bedroom apartments in buildings of up to three storeys represented 98% of the total typology. This decreased to a proportion of 69% in 2016; there was a decrease in 2- to 4-bedroom apartments in buildings of up to three storeys of almost 200%.

Suitable medium to high density dwellings in South Brisbane represent a similar proportion of total dwellings to Homebush Bay – Silverwater, between 57% to 64% over the Study period; suitable medium to high density dwellings represented 70% to 91% of all medium- to high-density dwellings. This proportion decreases over the Study period from 91% in 2006 to 85% in 2011 and finally to 70% in 2016. Given that most new dwellings in that area over that time period were medium- to high-density (92% in 2016), this suggests a shift towards 1-bedroom medium- to high-density dwellings.

Figure 35 Total change in medium-high density dwellings by number of bedrooms in each SA2 from 2006-2016 (continued overleaf)   Source: ABS Census 2006; 2011; 2016

	2006	2011	2016	change 06-11	% change	change 11-16	% change	change 06-16	% change
Lambton - New Lambton									
Semi-attached dwellings									
1 bedrooms	49	69	79	20	41%	10	14%	30	61%
2 bedrooms	285	364	503	79	28%	139	38%	218	76%
3 bedrooms	134	205	229	71	53%	24	12%	95	71%
4+ bedrooms	14	15	31	1	7%	16	107%	17	121%
Flat or apartments in one to three storey blocks									
1 bedrooms	247	178	200	-69	-28%	22	12%	-47	-19%
2 bedrooms	333	326	185	-7	-2%	-141	-43%	-148	-44%
3 bedrooms	110	75	25	-35	-32%	-50	-67%	-85	-77%
4+ bedrooms	12	3	7	-9	-75%	4	133%	-5	-42%
Flat or apartments in blocks of four or more storeys									
1 bedrooms	0	10	0	10	1000%	-10	-100%	0	0%
2 bedrooms	7	4	4	-3	-43%	0	0%	-3	-43%
3 bedrooms	0	0	0	0	0%			0	0%
4+ bedrooms	0	0	0	0	0%			0	0%
Total MHDD	1191	1249	1263	58	5%	14	1%	72	6%
Total suitable medium to high density dwellings	895	992	984	97	11%	-8	-1%	89	10%
Proportion to total dwellings	14%	15%	16%						
Proportion to medium to high density dwellings	75%	79%	78%						

	2006	2011	2016	change 06-11	% change	change 11-16	% change	change 06-16	% change
Homebush Bay - Silverwater									
Semi-attached dwellings									
1 bedrooms	34	7	0	-27	-79%	-7	-100%	-34	-100%
2 bedrooms	39	8	41	-31	-79%	33	413%	2	5%
3 bedrooms	15	34	431	19	127%	397	1168%	416	2773%
4+ bedrooms	0	9	79	9	900%	70	778%	79	7900%
Flat or apartments in one to three storey blocks									
1 bedrooms	139	130	18	-9	-6%	-112	-86%	-121	-87%
2 bedrooms	178	171	272	-7	-4%	101	59%	94	53%
3 bedrooms	54	32	105	-22	-41%	73	228%	51	94%
4+ bedrooms	7	6	0	-1	-14%	-6	-100%	-7	-100%
Flat or apartments in blocks of four or more storeys									
1 bedrooms	213	318	1330	105	49%	1012	318%	1117	524%
2 bedrooms	478	757	2541	279	58%	1784	236%	2063	432%
3 bedrooms	213	280	503	67	31%	223	80%	290	136%
4+ bedrooms	15	24	25	9	300%	1	4%	10	67%
Total MHDD	1385	1776	5345	391	28%	3569	201%	3960	286%
Total suitable medium to high density dwellings	999	1321	3997	322	32%	2676	203%	2998	300%
Proportion to total dwellings	61%	65%	64%						
Proportion to medium to high density dwellings	72%	74%	75%						

Figure 35 Total change in medium-high density dwellings by number of bedrooms in each SA2 from 2006-2016 (continued from previous)

	2006	2011	2016	change 06-11	% change	change 11-16	% change	change 06-16	% change
South Brisbane									
Semi-attached dwellings									
1 bedrooms	0	0	10	0	0%	10	1000%	10	1000%
2 bedrooms	14	5	20	-9	-64%	15	300%	6	43%
3 bedrooms	268	104	33	-164	-61%	-71	-68%	-235	-88%
4+ bedrooms	32	26	11	-6	900%	-15	-58%	-21	-66%
Flat or apartments in one to three storey blocks									
1 bedrooms	11	10	119	-1	-9%	109	1090%	108	982%
2 bedrooms	284	597	189	313	110%	-408	-68%	-95	-33%
3 bedrooms	120	263	72	143	119%	-191	-73%	-48	-40%
4+ bedrooms	7	15	7	8	114%	-8	-53%	0	0%
Flat or apartments in blocks of four or more storeys									
1 bedrooms	134	355	612	221	165%	257	72%	478	357%
2 bedrooms	520	867	1112	347	67%	245	28%	592	114%
3 bedrooms	199	221	244	22	11%	23	10%	45	23%
4+ bedrooms	0	3	30	3	300%	27	900%	30	3000%
Total MHDD	1589	2466	2459	877	55%	-7	0%	870	55%
Total Suitable medium to high density dwellings	1444	2101	1718	657	45%	-383	-18%	274	19%
Proportion to total dwellings	60%	57%	64%						
Proportion to medium to high density dwellings	91%	85%	70%						

5.3.5 CHANGES IN SUITABLE MEDIUM TO HIGH DENSITY DWELLINGS AND SCHOOL STUDENT POPULATION

High level analysis was undertaken on the three case study sites to explore any observations in student age children and the total suitable medium to high density dwellings within an SA2. The change in total suitable medium to high density dwellings was reviewed against the proportion of school students to the total population across the SA2.

The total of student population in the case studies showed a high magnitude of change in school aged children numbers in Homebush Bay and South Brisbane from 2006 - 2016. In this time period Homebush Bay had a total increase in school aged students of 1034, and for South Brisbane nearly 190 students.

Across all three case studies, the proportion of school student-aged children remained fairly consistent from 2006 to 2016, with a fluctuation of 1% for New Lambton and Homebush Bay - Silverwater. The proportion of suitable medium- to high-density dwellings to total dwellings was consistent for New Lambton. Total dwellings in New Lambton grew by 3% from 2006 to 2016; suitable medium- to high-density dwellings grew by 10% in the same time period.

The proportion of suitable medium- to high-density dwellings to total dwellings in Homebush Bay - Silverwater fluctated by at most 4% from 2006 to 2016; the total number of suitable dwellings grew by 300% in the same period. In South Brisbane, the total number of suitable medium- to high-density dwellings grew by 19%; the proportion of these dwellings to total dwellings changed slightly by 4% over the study period. The proportion of school student-aged population to the total population in South Brisbane was 10% for each year in 2006, 2011 and 2016.

The overall increase of suitable medium- to high-density dwellings in all SA2s and the consistent proportion of school student-aged population to total population supports the insight from the interviews.

While the "rate" at which households with children were moving into medium- to high-density dwellings is not necessarily increasing, there is a greater intensity of dwellings into these areas, and an increasing amount of households with children within these areas.

For Homebush Bay - Silverwater, where there has been an increase of at least 100% across all the metrics presented so far and where medium- to high-density dwellings have represented more than half of all dwellings from 2006 to 2016, it is apparent that households with children are accepting of medium- to high-density dwellings. Insights from interviews and research into the schools in the local area support that these schools are under pressure from the magnitude of the new population moving into the area.

Figure 36 Proportion of school student population to suitable medium to high density dwellings from 2006-2016 (continued overleaf)

	2006	2011	2016	change 06-11	% change	change 11-16	% change	change 06-16	% change
Lambton - New Lambton									
Total suitable medium to high density dwellings	895	992	984	97	11%	-8	-1%	89	10%
Total dwellings	6201	6367	6360	166	3%	-7	0%	159	3%
Total population 5-18 years old	2842	2851	3031	9	0%	180	6%	189	7%
Total population	16190	17006	17231	816	5%	225	1%	1041	6%
Proportion of suitable medium to high density dwellings to total dwellings	14%	16%	15%	-	-	-	-	-	-
Proportion of school student population to total population	18%	17%	18%	-	-	-	-	-	-

Source: ABS Census 2006; 2011; 2016

Figure 36 Proportion of school student population to suitable medium to high density dwellings from 2006-2016

	2006	2011	2016	change 06-11	% change	change 11-16	% change	change 06-16	% change		2006	2011	2016	change 06-11	% change	change 11-16	% change	change 06-16	% change
Homebush Bay - Silverwater										**South Brisbane**									
Total suitable medium to high density dwellings	999	1321	3997	322	32%	2676	203%	2998	300%	Total suitable medium to high density dwellings	1444	2101	1718	657	45%	-383	-18%	274	19%
Total dwellings	1635	2032	6241	397	24%	4209	207%	4606	282%	Total dwellings	2398	3667	2679	1269	53%	-988	-27%	281	12%
Total population 5-18 years old	1090	1460	2124	370	34%	664	45%	1034	95%	Total population 5-18 years old	2842	2851	3031	9	0%	180	6%	189	7%
Total population	9738	12083	19906	2345	24%	7823	65%	10168	104%	Total population	16190	17006	17231	816	5%	225	1%	1041	6%
Proportion of suitable medium to high density dwellings to total dwellings	61%	65%	64%	-	-	-	-	-	-	Proportion of suitable medium to high density dwellings to total dwellings	60%	57%	64%	-	-	-	-	-	-
Proportion of school student population to total population	10%	12%	11%	-	-	-	-	-	-	Proportion of school student population to total population	10%	10%	10%	-	-	-	-	-	-

Source: ABS Census 2006; 2011; 2016

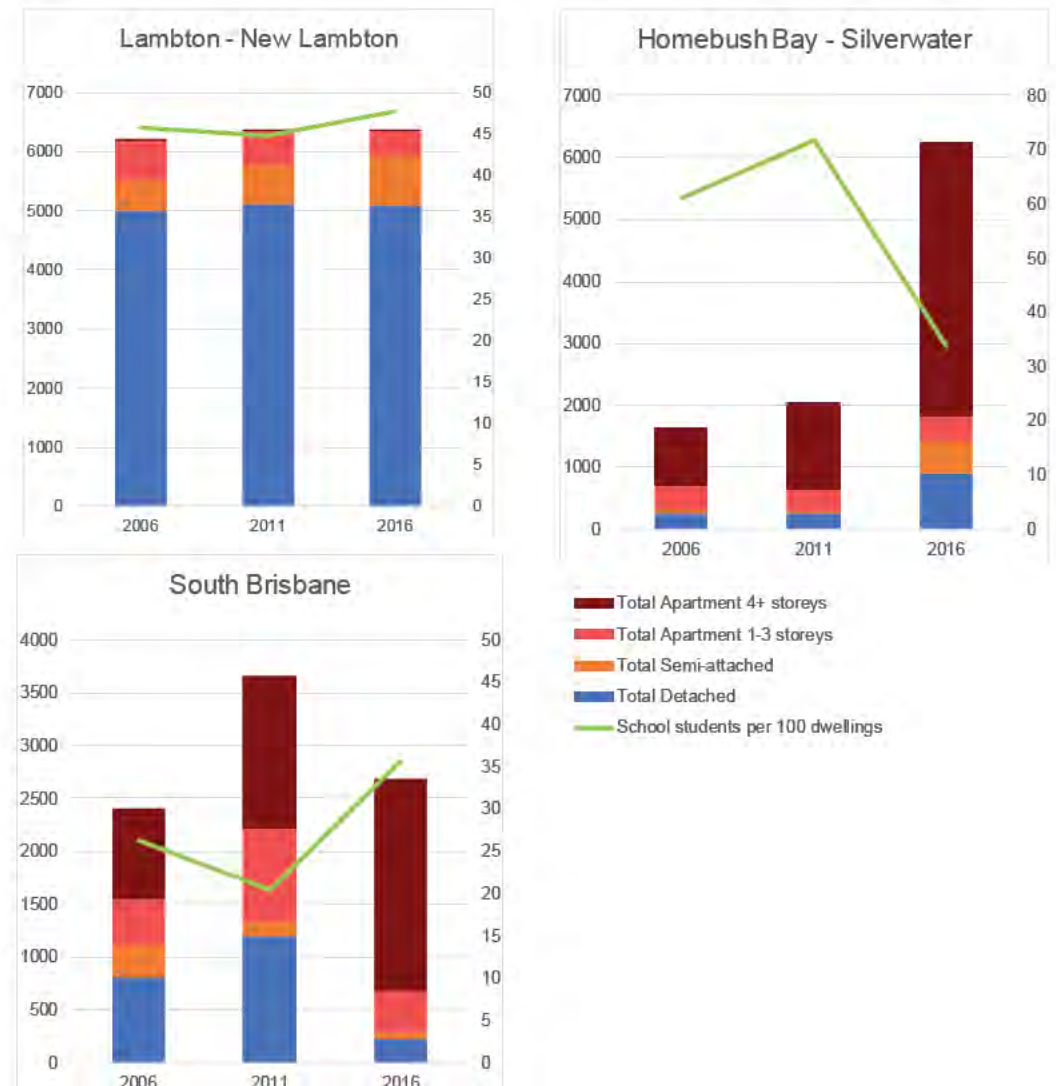## 5.3.6 SHIFTS IN SCHOOL STUDENT POPULATION AND DWELLING TYPOLOGY

Another way to look at the changes in school student population and the shifts in dwelling typology is the number of school students per 100 dwellings in each SA2.

In Lambton - New Lambton, the number of school students per 100 dwellings remained fairly consistent across the study period. This is similar to proportion of suitable dwellings to all dwellings, as well as the proportion of the school student population to the total population. Suitable medium- to high-density dwellings occupy a small proportion of all dwellings across the study period.

In Homebush Bay - Silverwater, in 2016, there were higher proportions of suitable medium to high density dwellings but the number of students per 100 dwellings decreased. In 2006, the proportion of apartments (all storeys) and semi attached dwellings was 66%, there were 72 school students per 100 dwellings. In 2016, when the proportion of all apartments was just over 90%, the number of school students per 100 dwellings dropped to 34. While this decrease is quite significant, so is the increase in the total number of dwellings, particularly suitable medium- to high-density dwellings, which increased by 203% from 2011 to 2016. The total population also increased by 65% in the same time period. This supports the insight that while the rate of households with children moving into apartments and other suitable dwellings may not be increasing, but there is a significant increase in the number of these dwellings, coinciding with an increase in the population.

South Brisbane presented a slightly different outcome. In contrast to Homebush Bay - Silverwater, there was increase in school students per 100 dwellings from 2011 to 2016. There was also a significant increase in the proportion of suitable medium- to high-density dwellings to total dwellings, even as the total dwellings decreased. The proportion of the school student population to total population remained consistent. More apartments were delivered, likely replacing other typologies, and more school students were recorded in the area. This suggests that the school students in the area are residing in these dwellings. This also may suggest that in this area, the rate of households with children residing in these dwellings may be increasing.

Figure 37 School students per 100 dwellings per SA2

Source: ABS Census 2006; 2011; 2016

5.3.7 TENURE AND PRICE

In Lambton – New Lambton, there is a higher proportion of owned dwellings than rented dwellings. This proportion is consistent across the Study period and only changes slightly by 1% from 2006 to 2011.

In Homebush Bay – Silverwater, there is a more even split of tenure, with fluctuating proportions over the Study period. Earlier in the Study period, there were more owned dwellings than rented dwellings in the SA2; however, this proportion shifted later in the Study period. In 2016, 40% of dwellings were owned, 43% were rented. When also considering dwelling typology, the data suggests that most dwellings in Homebush Bay – Silverwater are rented multi-bedroom medium- to high-density dwellings, specifically in buildings of four or more storeys.

In South Brisbane, there have been more rented than owned dwellings over the whole Study period. While the proportion of owned dwellings has only changed slightly over the Study period, increasing by 3% from 2006 to 2011 and then decreasing again by 3% in the following half of the Study period, the proportion of rented dwellings increased by 10% from 2006 to 2011.

The overall increase in the number of dwellings in the SA2 suggests that half of households accessing housing in the area do so through renting. The overall increase in Suitable medium to high density dwellings also suggests that most households accessing in area may be accessing Suitable medium to high density dwellings as a result of a shift in the types of development being delivered. The proportion of school student-age children in the SA2 has not increased over the Study period, remaining at 10%.

Figure 38 Tenure at each SA2 from 2006-2016

SA2	2006	2011	2016
Lambton - New Lambton			
Owned	62%	61%	61%
Rented	26%	26%	26%
Homebush Bay - Silverwater			
Owned	52%	49%	40%
Rented	44%	36%	43%
South Brisbane			
Owned	23%	26%	23%
Rented	41%	51%	51%

Source: ABS Census 2006; 2011; 2016

In terms of price, sales data was not available in the same form as sales data from Access Canberra. The median weekly rent and monthly mortgage repayments at the SA2 level was reviewed. This data is supplemented by suburb level rent and price data from RealEstate.com.

In Lambton – New Lambton, both the weekly rent and monthly mortgage repayments are the lowest of the three case studies, with the highest values for both observed in 2016 at $350-$374 weekly rent and $,2000-$2,199 monthly mortgage repayment. In 2020, the weekly rent for units was consistent with the median weekly rent for 2016. The weekly rent for houses was slightly higher at $480.

Detached dwellings are the dominant housing typology in this SA2 and more bedrooms in a dwelling are more common. The higher rent price for houses, which are likely detached multi-bedroom dwellings, may suggest that more people are paying a higher rent price overall as these dwellings are more prevalent in the area.

Homebush Bay – Silverwater had the highest price data among the three case studies. The median monthly mortgage repayment did not change from 2006 to 2016, remaining at $3,000-$3,999 throughout the whole study period. This was well above the state median in 2016, $1,986. The median weekly rent in the SA2 increased from 2006 to 2011 but did not change to 2016; according to suburb level data on Wentworth Point, the rent for a unit in 2020 is $520 and $560 for a house. This suggests that the rent in the area has continued to increase since 2016. While in 2016, Homebush Bay – Silverwater had a slightly higher proportion of renters, there were slightly more owned dwellings. The high mortgage repayments may indicate the presence of a more affluent population in the area. This may have shifted towards a more mobile population that is accessing housing in the area by renting.

South Brisbane's median weekly rent prices are similar to those of Homebush Bay – Silverwater. The weekly rent and house prices in 2020 in the suburb also show a similar increase to Wentworth Point. Between 2006 to 2011, the median monthly mortgage repayments increased from $1,600-$1,999 to $3,000-$3,999 and then decreased to $2,000-$2,199 in 2016. The decrease in mortgage repayments suggests a decrease in the price of dwellings in the area; however, the decrease in the proportion of owned dwellings in the same time period as well as the lack of change in the median weekly rent price from 2011 to 2016 suggest that people moving into the area are still choosing to access it by renting rather than purchasing and owning a dwelling.

Figure 38 Median price at each SA2 from 2006-2016

SA2	2006	2011	2016	2016	2020 – suburb level weekly rent and price	
Lambton - New Lambton				NSW Median	House	Unit
Weekly rent	$200-$224	$300-$324	$350-$374	$380	$480	$360
Monthly mortgage / price at suburb level	$1600-$1999	$2000-$2199	$2000-$2199	$1,986	$725,000	$440,000
Homebush Bay - Silverwater				NSW Median	House	Unit
Weekly rent	$350-$449	$450-$549	$450-$549	$380	$560	$520
Monthly mortgage / price at suburb level	$3000-$3999	$3000-$3999	$3000-$3999	$1,986	$755,000	$672,944
South Brisbane				NSW Median	House	Unit
Weekly rent	$350-$449	$450-$549	$450-$549	$380	$500	$480
Monthly mortgage / price at suburb level	$1600-$1999	$3000-$3999	$2000-$2199	$1,986	No data	$480,000

Source: ABS Census 2006; 2011; 2016;RealEstate.com Suburb Profiles

5.3.8 CULTURAL DIVERSITY - LANGUAGE SPOKEN AT HOME

In Lambton – New Lambton, majority of households that speak English at home. However, while this proportion has remained high over the study period, the proportion of English-speaking households has decreased from 90% to 2006 to 85% in 2016. This has not been accompanied by a subsequent increase in the proportion of other languages spoken at home; the proportion of second- and third-highest languages were much lower.

New Lambton Public School reported that in 2018, of the 637 students enrolled, 86 students (14%) were from a non-English speaking background (New Lambton Public School 2019) . Lambton Public School reported in the same year that of 392 students enrolled, 38 students (10%) were from a non-English speaking background (New Lambton Public School 2019) . . The higher proportion of language and cultural groups in the school enrolments suggests that students from outside of the immediate local area may be enrolled in the school.

In Homebush Bay – Silverwater, both Newington and Wentworth Point Public Schools indicated in their 2018 Annual Reports that they catered to a diverse community, with over 50 language and cultural groups represented in their respective student bodies (Newington Public School 2018; Wentworth Point Public School 2019). This is also reflected in the wider population. At an SA2 level, the proportion of households speaking English is less than half of the households. The second and third most common language spoken at home across the whole study period are Chinese and Korean, accounting for between 9 to 16% of households.

Korean and Chinese were also identified in the 2018 Newington Public School Annual Report as two most common cultural and language groups in their student body aside from English (Newington Public School 2010) . 77% of the student body identified as from a language other than English (Newington Public School 2019) .

In South Brisbane, approximately half the population speak English at home. This proportion decreased from 55% in 2011 to 49% in 2016. The decrease in English as the main language spoken at home was also accompanied by a subsequent increase in the proportion of households that speak Chinese, which increased from 7% in 2011 to 11% in 2016. Indo-Aryan, Southeast Asian Austronesian and Korean also appeared as top languages spoken at home over the Study period. According to the 2018 West End State School Annual Report, 44% of students speak a language other than English (West End State School 2019) .

Figure 40 Top three languages spoken at home in each SA2 from 2006-2016

SA2	2006	2011	2016
Lambton - New Lambton			
English	90%	88%	85%
South Slavic	2%	1%	1%
Chinese	1%		1%
Indo-Aryan		1%	
Homebush Bay - Silverwater			
English	33%	38%	32%
Chinese	11%	11%	16%
Korean	9%	10%	11%
South Brisbane			
English	54%	55%	49%
Chinese	5%	7%	11%
Indo-Aryan			3%
Southeast Asian Austronesian		2%	
Korean	2%		

Source: ABS Census 2006; 2011; 2016

5.4 INSIGHTS FROM SCHOOLS PLANNING IN NSW AND QLD

Discussions with schools planning professionals across Sydney, Newcastle and Brisbane provided the following insights into schools planning.

1. Multiple trends impacting housing for families with school students

We heard that multiple trends are shifting the way that families with children are living in cities. Overall, we heard that there is a diversity of housing typologies and households in Sydney, Newcastle and Brisbane – including trends showing families in smaller homes as well as families taking up larger homes, in multi-generational households.

Overall in Sydney, there has been significantly higher population growth, driving the demand for more dwellings and diversity of dwelling types. High housing price growth alongside minimal income growth impacted housing affordability and influenced the types of housing that families with children may live in.

Alongside housing affordability, the desire for access to services was noted as a high influence on households shifting to existing residential suburb areas and higher density dwellings with greater accessibility to public transport and walkability to services such as shops, community facilities such as parks. Some participants suggested that inner ring areas were desireable as carers were looking to reduce commute time and time spent on upkeep of homes to focus on spending more time with family.

Cultural diversity was cited as an influence on families with children living in medium to higher density living. It was suggested that families from Europe or Asia may be familiar with family living in smaller homes or apartment living.

Cultural diversity was also cited as an influence on multi-generational households. There were experiences of areas with high increase multi-generational households in Sydney that generated high school student generation that was not forecasted.

Across both jurisdictions interview participants suggested that there is diversity in the housing that families with children and school age students live in, with the desire for families in detached dwellings remaining.

2. Higher student populations in areas of higher density

Experiences in Sydney suggested that high population growth was shifting more dwellings (of higher density) into existing residential suburb areas. In these areas schools planners saw higher student populations, however the rate of students within higher density dwellings was not increasing. As an example, overall, in an area about 5 children per 100 residents were observed to be entering a government school, with other children going to a non-government school. Schools planners in NSW noted that they had not seen this rate increase, but noted that significantly more school students are being generated from these areas as there are more dwellings in overall.

3. Population projections and enrolment forecasts informing schools planning

In NSW, multiple approaches and analysis inform schools planning. Schools planning has shifted recently to work closer with the NSW State Government Common Planning Assumptions and population projections provided by the Department of Planning, Industry and Environment (NSW DPIE). We heard from practitioners in schools planning that this has resulted in greater alignment across data sets across the state. Prior to these different methodologies were applied on apportioning projections across the states and to school catchments.

In addition to the NSW wide projections, Schools Planning in NSW undertakes additional analysis. This includes undertaking analysis to understand 'what's happening on the ground' with trends influencing school populations. In NSW, Medicare data is reviewed to understand new births, and 'bottom up' potential changes in school population – especially to inform Kindergarten cohorts.

We heard that some Local Government Areas (LGAs) undertook their own population projections, for example City of Sydney undertakes work with ID planning to produce population forecasts. Experience suggests that these forecasts do not align with NSW DPIE projections, and usually exceed the forecasts of NSW DPIE.

There were some challenges identified in the current planning process including the following:

» Population projections are supplied at Local Government Level. This creates some challenges in distributing this population across Local Government Areas (LGAs) as there may be some high concentrations of school populations within LGAs for example in areas of high density near train station in Chatswood – and further work is required to understand this distribution to inform school planning; and

» There are no housing forecasts for Newcastle, and similarly with regions outside the Sydney Metropolitan Area. Analysis by schools planning needs to be undertaken to apply population projections from the NSW Government and determine forecast student populations and assign them to schools.

4. Shifts in schools planning

We heard from schools planning practitioners that schools planning had previously been influenced strongly by individual school demand. It was recognised that the popularity of a school could be influenced by a well regarded principal or particular curriculum, and that these factors did not provide long term, strategic planning for schools infrastructure.

Experience in NSW highlighted that this type of schools planning had attributed demand to schools that have had demand in the past, however this did not always align with actual demand.

5. Planning with non government schools

The movement between government and non government schools by students requires understanding to inform schools planning. In general, NSW schools planners highlighted that a majority of primary aged school students attend a local primary school, and then in secondary school there is an increase in school students going to private schools. It was observed that in some areas there has been a return to public schools for all school cohorts. One example is Coffs Harbour, where public school enrolment percentages are high. From in Years 11 to 12, there has been increased enrolment in government schools. This is similar to the experience in the ACT, wherein primary school students attend public schools, followed by an increase in private high school attendance and then a return to public schools for college. Unlike the ACT, NSW does not have a state or metropolitan area-wide college system.

In Brisbane, planners noted that private school providers were engaged in planning. It was noted that state school providers are being pushed out into the suburbs whereas the inner core has more private schools.

6. Family friendly housing products

In Brisbane, we heard that housing product is shifting towards targeting households with children. It has been observed that competition for the school catchment within the South Brisbane area where there is a lot of investor and owner stock is now targeting these households moving in. Observations suggest that these households are renting 2 bedroom apartments across these areas. These areas have high access to amenity and access to transport and very close to the city centre.

At the development supply level, Brisbane City Council has observed trends towards households with children living in townhouses rather than high rise apartments. The Council observed that submissions for developments would change during the application process in order to include dwellings that would be suitable for households with children. The changes would include an increase in bedroom sizes and the overall number of three-bedroom dwellings.

6. Further Analysis

6.1 RECOMMENDATIONS FOR FURTHER ANALYSIS

Areas for analysis were identified through this Study to support a further understanding of housing choices for families with student age children. These are summarised below.

1.   Expanded sample size

The residential site analysis has been undertaken as a limited sample analysis (including 15 residential sites). Observations are noted within the analysis, however clear correlations between the data were not able to be determined due to the limited sample size. This sample analysis provides a testing of an approach, and an expansion of the sample size is suggested. A larger sample size would also allow regression analysis to be performed on each factor and reveal whether there are strong statistical correlations between influencing factors and student aged population.

2.   Study and compare sites with detached dwelling development

This study focused on the characteristics of medium-to-high density developments in order to better develop an understanding of the school planning implications as the state shifts to compact development. A comparison of the preferences of households of families with children between detached dwellings and medium-to-high density dwelling typologies was not undertaken.

Further analysis which compares the rate of school aged children per dwelling between detached and semi-detached/attached dwellings would provide quantifiable evidence toward differences or similarities. This would help ground the findings of this study by providing relatable comparisons across other typologies in order to achieve a more holistic understanding of generation of school aged children as well as housing preference. It will also help to highlight the need for schools planning to respond to the changing nature and focus of urban development.

3.   Correlation of student address to individual dwelling attributes

Analysis within this Study documented the overall development site typology and the total student population at each development site address. Further analysis is suggested to understand the attributes of the individual dwellings that school age students are occupying to understand if families with student aged children in these developments occupying the multi-bedroom dwellings within these development sites only. If so, these families may be occupying a small proportion of the overall dwellings, however they may make up a significant proportion of the multi-bedroom dwellings within a development site.

4.   Longitudinal dwelling studies of families with children

Analysis within this Study documented the overall development site typology and the total student population at each development site address for each year of the Study period. Additional analysis is suggested to understand the movement patterns of families with school aged children. For example, further analysis is suggested to understand if families move into new medium to high density dwellings with younger, non-school-age children or young couples are moving into these new developments before starting a family and stay when children enter the school system, and or if families had recently moved into the development when ready for school.

Additional analysis may also be undertaken on the movement of students throughout the school cohorts. From our sample analysis, we observed that for older developments, there were peaks and troughs of total student populations, and the student population increased in age throughout the years. This may suggest that children who are living in these developments are growing up, getting older and moving up and out of the school system. It is suggested that further analysis of student IDs be undertaken to confirm if this trend is occurring.

5.   Correlation of student addresses to tenure

The tenure of each individual student at the development site was not included in the School Census data provided. It is suggested that further analysis be undertaken to understand housing tenure of families with school age students.

6.   Further analysis of lag in student population in new developments

Further analysis may contribute to an understanding of 'lag' in student population in new developments is related to families with school students waiting for available rental stock to open on the market from these relatively new developments. In particular, median sales price may be a relevant factor for less affordable areas.

Median sales price was reviewed for each development site. Additional analysis may be undertaken to understand if there are lags in student population in less affordable areas due to families with school students waiting for available rental stock to open on the market from these relatively new developments.

7.   Understanding wider student population shifts and broader trends at SA1s

In the analysis of school student population at a site, for some sites we saw an increase corresponding to increased student population growth at SA1s. Further analysis is suggested to determine if this may be related to other, new developments being delivered in the immediate surrounding area, or if student populations are moving into existing dwelling stock.

Further analysis is suggested to understand broader trends that may be impacting the initial high occupation in Watermark, and similarly with The Quay site including higher supply of affordable housing options alongside Gungahlin as a key employment centre; and relationship with other new developments in Lake Tuggeranong.

8.   Deeper understanding of settlement patterns and schools population

Classification of existing residential suburb and new residential suburb suburbs have been informed by ACT Education data. Further classification of areas aligned with ABS settlement definitions is suggested to be undertaken as part of further analysis.
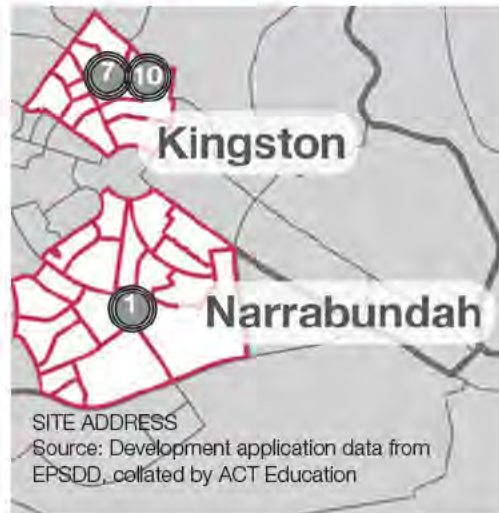
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Appendix 1 - Development sites

SITE SUMMARY DATA SOURCES

SITE ADDRESS
Source: Development application data from
EPSDD, collated by ACT Education

Key information

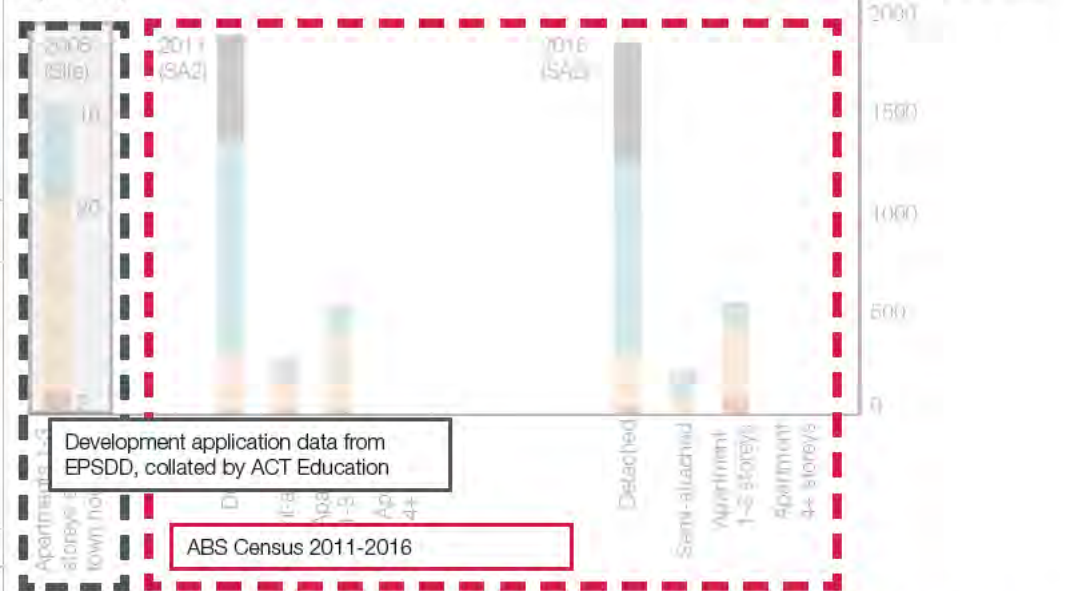|	
SA1 Number	ABS Census 2016
Classification	ACT Education School Student Census
Total population at SA1	ABS Census 2016
Median ratio of occupation	Calculation using data from ACT Education School Student Census
Housing tenure at SA1/ SA2	ABS Census 2016 ABS Geography differs according to availabilty of data and limitations of Study, i.e. contextual information for Sites 1-3, 6 and 11 have been reviewed at an SA2 level
SEIFA-IEO at SA1	ABS Census 2016
IHAD Quartile at SA1	ABS Census 2016; This information has been reviewed at an SA1 level as the IHAD Index is only published at an SA1 level.

Languages spoken at home at SA1/SA2	ACT Education School Student Census 2010-2019; ABS Geography differs according to availabilty of data and limitations of Study, i.e. contextual information for Sites 1-3, 6 and 11 have been reviewed at an SA2 level
Median price at site	Access Canberra sales data 2012-2019
Median price at SA1/ SA2	Access Canberra sales data 2012-2019; ABS Geography differs according to availabilty of data and limitations of Study, i.e. contextual information for Sites 1-3, 6 and 11 have been reviewed at an SA2 level
Schools of residents	
Primary	ACT Education School Student Census
Secondary	ACT Education School Student Census
College	ACT Education School Student Census

Change in dwelling typology (count)

1-bedroom   2-bedroom   3-bedroom   4 or more

Development application data from EPSDD, collated by ACT Education

ABS Census 2011-2016

School enrolment at site

Primary   Secondary   College   Student population

ACT Education School Student Census 2010-2020

Watson

Campbell

Kingston

Narrabundah

Franklin

Casey

Lawson

Lyneham

Turner
Included due to the location
of two development sites
within this SA2

Belconnen

Phillip

Lyons

Greenway
Selected as a development area
with different environmental
factors to the
other selected SA2s

Wright

1 - MAGNOLIA MEWS

25 Jerrabomberra Avenue, 50 Lumeah Street

Completed in 2005, Magnolia Mews is a 32-dwelling development comprised of a mix of apartments and town houses within six row-blocks. The town houses range in size from 94-157 sqm and the apartments range in size from 70-116 sqm. The development has a communal barbecue area, a swimming pool and a vegetable garden.

Magnolia Mews is located in Narrabundah, across from the Narrabundah College with access to multiple sporting grounds such as the Jerrabomberra Sports Ground and the Boomanulla Oval. The site is located in a primarily residential area with proximity to hotels and other short-stay accommodation. The closest access to retail and services is in the Fyshwick Town Centre.

Magnolia Mews is one of the smaller dwellings amongst the development sites. The site attracted a median ratio of school student occupation of 13%, higher than the overall median school student occupation of all sites. The highest school student occupation for the site across the Study period was 31%.

As seen through other older development sites, the site observed to experience some lifecycle effect, as some years within the study period high school and college-age children were the largest groups. The increase in these groups coincided with a decrease in primary-age students, while the overall site population remained consistent; these may have been the same school students ageing and progressing into the next school cohort.

Key information

SA1 Number	8106717	
Classification	Infill	
Total population at SA1	383	
Median ratio of occupation	13%	
Housing tenure at SA2	O - 55.1%	R - 41.8%
SEIFA-IEO at SA1	10	
IHAD Quartile at SA1	4th - 39%	
Languages spoken at home at SA2	English (83%) Indo-Aryan (3%), French (2%)	
Median price at site	$549,000	
Median price at SA2	Unit - $451,250	
	House - $810,000	
Schools of residents		
Primary	Narrabundah Early Childhood School Telopea Park School Red Hill Primary School	
Secondary	Telopea Park School The Woden School Black Mountain School	
College	Narrabundah College Gungahlin College	

Change in dwelling typology (count)

School enrolment at site

2 - SPACE

Lyneham

Turner
Included due to the location of two development sites within this SA2

155 Northbourne Avenue, 24 Forbes Street

Space is the first half of a staged development, completed around 2006-2007. Space features apartments of sizes between 117 to 250 sqm in two residential flat buildings, facing onto Northbourne Avenue and Forbes Street.

Among the development sites, Space and Space2 are located closest to the city centre of Canberra, directly on the Canberra Light Rail alignment. Space and Space2 are located in close proximity to Haig Park. Turner Primary School and Turner School are located within a 500m radius from the site. The closest access to retail is in O'Connor, Braddon and the city centre.

Space had one of the highest median sales price across the development sites in the Study period, approximately $200,000 over the median unit price at the SA2. Space also exhibited a low median ratio of student occupation, at 3%.

Space displayed low student population in secondary and college age cohorts across the years, however in one year, 2017 there was only one secondary student within the whole development.

Across the SA2 from 2011 - 2016, there was a reduction in number of detached dwellings, and increase in Apartments of 1 - 3 storeys and Semi-Attached dwellings. From 2011 to 2016, there was an overall increase in student population at SA2.

Key information

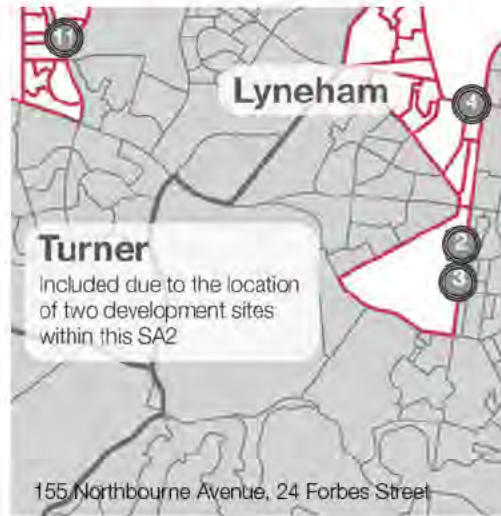| SA1 Number	8105712	
Classification	Infill	
Total population at SA1	338	
Median ratio of occupation	3%	
Housing tenure	O - 34.1%	R - 63%
SEIFA-IEO	10	
IHAD Quartile	3rd - 34%	
Languages spoken at home at SA2	English (69%), Chinese (7%), Indo-Aryan (4%)	
Median price at site	$645,000	
Median price at SA2	Unit - $478,000	
	House - $1,185,000	
Schools of residents		
Primary	Turner Primary School Rosary Primary School Yarralumla Primary School	
Secondary	Lyneham High School	
College		

Change in dwelling typology (count)

School enrolment at site

3 - SPACE2 THE RESIDENCE

Lyneham

Turner

Included due to the location of two development sites within this SA2

165 Northbourne Avenue, 32 and 36 Forbes Street

Space2 is the second half of the overall Space development. Space2 is comprised of both apartments - in a residential flat building facing Northbourne Avenue - and town houses facing Forbes Street.

Among the development sites, Space and Space2 are located closest to the city centre of Canberra, directly on the Canberra Light Rail alignment. Space and Space2 are located in close proximity to Haig Park. Turner Primary School and Turner School are located within a 500m radius from the site. The closest access to retail is in O'Connor, Braddon and the city centre.

Space 2 hosted higher median ratio of student occupation than Space 1. The development site also has more consistent student population of secondary and college students throughout the years of the Study period.

The dwelling typology of Space 2 differs through the higher proportion of 3 bedroom dwellings 25% in Space 2 and less than 1% in Space 1.

Key information

SA1 Number	8105712	
Classification	Infill	
Total population at SA1	338	
Median ratio of occupation	7%	
Housing tenure at SA2	O - 34.1%	R - 63%
SEIFA-IEO at SA2	10	
IHAD Quartile at SA1	3rd - 34%	
Languages spoken at home at SA2	English (69%), Chinese (7%), Indo-Aryan (4%)	
Median price at site	$671,000	
Median price at SA2	Unit - $478,000	
	House - $1,185,000	
Schools of residents		
Primary	Turner Primary School Cranleigh School Canberra Grammar School North Ainslie Primary	
Secondary	Lyneham High School	
College	Dickson College	

Change in dwelling typology (count)

School enrolment at site

4 - AXIS APARTMENTS

Lyneham

1 Mouat Street

Axis Apartments was completed in 2011. It is comprised of 349 apartments and is the largest among the development sites in terms of number of dwellings. The 349 dwellings are distributed over three residential flat buildings. The site has both apartments and town houses.

Axis is adjacent to Southwell Park, as well as a number of sports fields that serve active recreational and sports uses. The nearest retail centre is the Dickson Centre, which is undergoing renewal and revitalisation. The site is located in close proximity to mass transit, particularly the Dickson Interchange Light Rail Station. The site is also located nearby the Lyneham High School and Brindabella Christian College.

Axis showed a consistent increase in student population throughout the years of the study period up until 2018, with a drop in student population in 2019 then increase again in 2020. At its peak, Axis hosted 55 students, however due to the large number of dwellings, the median ratio of occupation below median, at 8%.

The dwelling typologies at its parent SA1 showed significant change, with increase in Apartments 4+ storeys. This change in typology is likely to be associated with Axis development.

Key information

SA1 Number	8105711	
Classification	Infill	
Total population at SA1	858	
Median ratio of occupation	8%	
Housing tenure at SA1	O - 23%	R - 75%
SEIFA-IEO at SA1	10	
IHAD Quartile at SA1	4th - 31%	
Languages spoken at home at SA1	English (52%), Indo-Aryan (9%), Chinese (6%)	
Median price at site	$415,000	
Median price at SA1	Unit - $372,900	
	House - $825,000	
Schools of residents		
Primary	Lyneham Primary School Kaleen Primary School Turner School Majura Primary School Miles Franklin Primary School Canberra Girls Grammar School North Ainslie Primary Brindabella Christian College Islamic School of Canberra St Joseph's Primary School	
Secondary	Lyneham High School Merici College Melrose High School	
College	Dickson College Gungahlin College Radford College St Mary MacKillop College University of Canberra Senior Secondary College Lake Ginninderra	

Change in dwelling typology (count)

School enrolment at site

5 - ARTIQUE

39-43 Blamey Crescent

Artique is a development site in Campbell, completed in 2011. It is comprised of two residential flat buildings with basement parking.

Artique is located in close proximity to bus stops. The site is also adjacent to open space - Georgie Cross Park, Anzac Park, Reid Park, Legacy Park as well as the Australian War Memorial. Canberra Grammar School is located within a 500m radius from the site. The closest access to retail is approximately 800m to the east, further within Campbell. The site is also located directly adjacent to the Campbell Child Care Centre.

Artique has the highest median ratio of student occupation of all sites at 33%. The site is also was one of the smallest sites within the study at a total of 12 dwellings.

Key information

SA1 Number	8112401	
Classification	Infill	
Total population at SA1	564	
Median ratio of occupation	33%	
Housing tenure at SA1	O - 48%	R - 48%
SEIFA-IEO at SA1	10	
IHAD Quartile at SA1	4th - 28%	
Languages spoken at home at SA1	English (91%), Chinese (3%), Greek (1%)	
Median price at site	$514,500	
Median price at SA1	Unit - $325,000	
	House - $977,500	
Schools of residents		
Primary	Campbell Primary School North Ainslie Primary School	
Secondary	Campbell High School	
College	Dickson College	

Change in dwelling typology (count)

School enrolment at site

6 - ALLURE

50 Victoria Owen Circuit

Allure had one of the highest median ratio of occupation within the study, after Axis site. The site has a small number of dwellings (10) and consists of only multi-bedroom dwellings (3 or 4 bedrooms). Since development, Allure had a one to two year 'lag' in seeing student populations within the development site.

Key information

SA1 Number	8103617	
Classification	Greenfield	
Total population at SA1	382	
Median ratio of occupation	25%	
Housing tenure at SA2	O - 73.3%	R - 22%
SEIFA-IEO at SA2	10	
IHAD Quartile at SA1	4th - 58%	
Languages spoken at home at SA2	English (79%), Indo-Aryan (13%), Chinese (3%)	
Median price at site	$508,500	
Median price at SA2	Unit - $390,000	
	House - $550,000	
Schools of residents		
Primary	Gold Creek Primary School Mount Rogers Primary School Evatt Primary School Neville Bonner Primary School	
Secondary	Gold Creek High School	
College	Gungahlin College	

Allure is located in the greenfield area of Casey, at 50 Victoria Owen Circuit. Allure has 10 dwellings in total and consists of two row-blocks of town houses with basements and garages. The development was completed in 2012. It is comprised of nine 3-bedroom town houses and one 4-bedroom town house. The dwellings feature a separate study and two bathrooms.

The site is located in a residential area. The closest access to public transport is located on Plimsoll Drive, approximately 400m from the site. Springbank Rise Park is located approximately 1.1km from the site; the site is also directly adjacent to the Kinleyside nature reserve. The closest access to retail is in Casey Market Town, around 1.5km from the site.

Change in dwelling typology (count)
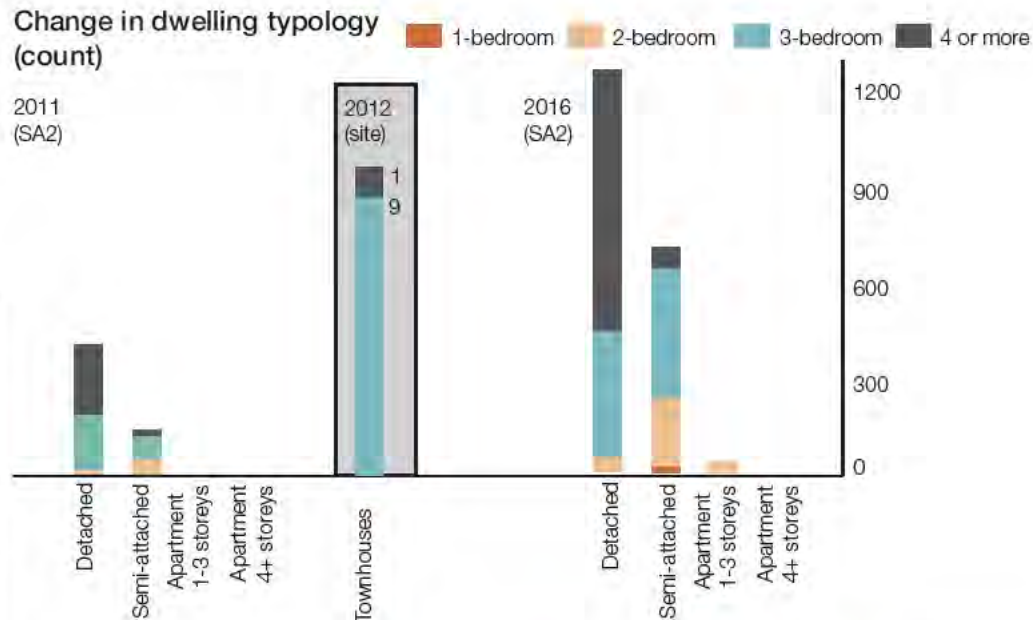
School enrolment at site

7 - QUAYSIDE

Kingston

Narrabundah

50 Eastlake Parade

Quayside was completed in 2007 and is made up of a single residential flat building. The building has ground-floor commercial uses. The site is close to the civic heart of Canberra as well as other cultural attractions such as the National Library of Australia, Questacon and Old Parliament House. The site is located in a mixed-use residential on the Kingston foreshore; the adjacent area has retail, restaurants and market areas.

The site is located adjacent to Bowen Park, Norgrove Park, Telopea Park and the Jerrabomberra Wetlands Nature Reserve.

Quayside has a low median ratio of student occupation (5%). This is lower than the study median.

The development has a high proportion of 1-bedroom apartments - 79%. At the SA1, there was high change fluctuation in the student population, after a peak at 2016, there was steep drop in student population in 2018. This was not reflected in the at a site level.

The SA1 also saw large change in dwelling typology. From 2011, there was approximately 75 apartments 4+ storeys, in 2016, there was more than 150. This may be attributed to the Quayside development site.

Key information

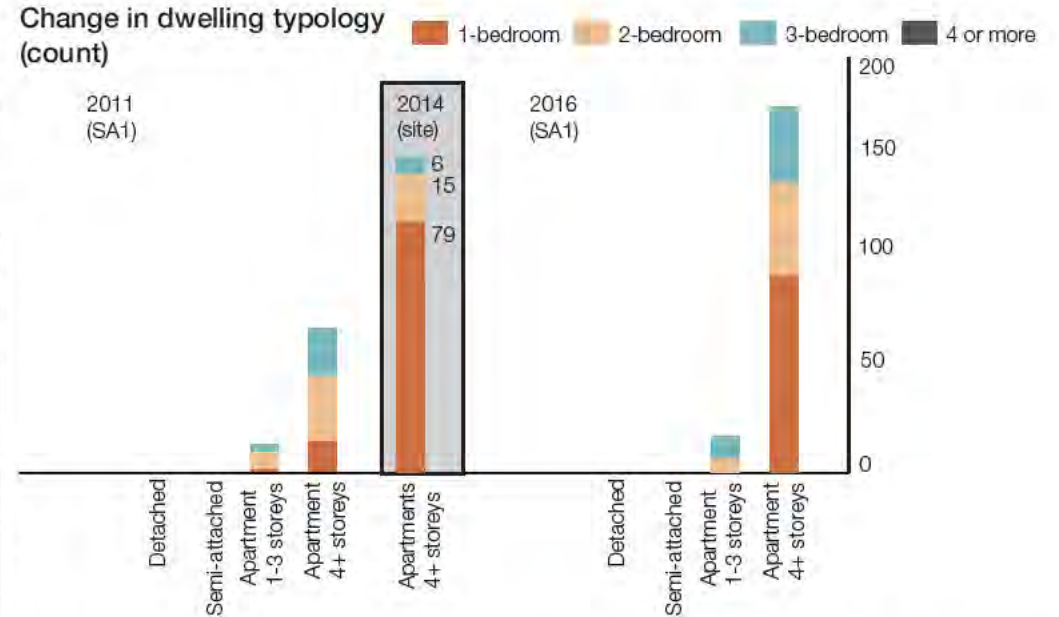|		
SA1 Number	8113101	
Classification	Infill	
Total population at SA1	377	
Median ratio of occupation	5%	
Housing tenure at SA1	O - 39%	R - 61%
SEIFA-IEO at SA1	10	
IHAD Quartile at SA1	3rd - 41.1%	
Languages spoken at home at SA1	English (77%), Japanese (4%), Indo-Aryan (3%)	
Median price at site	$427,725	
Median price at SA1	Unit - $635,000	
	House - N/A	
Schools of residents		
Primary	Forrest Primary School Redhill Primary School Narrabundah Early Childhood School Orana Steiner School Yarralumla Primary School	
Secondary	Telopea Park School Canberra Grammar School	
College	Narrabundah College	

Change in dwelling typology (count)

School enrolment at site

8 - AMBIENTE

Wright

61-65 John Gorton Drive, 2 Peter Cullen Way,
58-62 Max Jacobs Avenue

Ambiente is located in the greenfield suburb of Wright. It is a mixed-typology development, with 175 dwellings in total spread over three residential flat buildings and two row-blocks of town houses. It is located next to Link Park, and adjacent to a number of other open spaces: Wright Children's Playground, Coombs Oval, the Coombs Children's Playground and Stromlo Forest Park.

There are several bus stops along John Gorton Drive. Large-format retail, in the form of a grocery store is located on the other side of John Gorton Drive. Charlest Weston Primary School is also located across John Gorton Drive.

Over the study period, Ambiente hosted a median ratio of student occupation of 9%.

The site showed a consistent growth of its school student population, aligned with the growth at the SA1 level.

Key information

SA1 Number	8113905	
Classification	Greenfield	
Total population at SA1	395	
Median ratio of occupation	9%	
Housing tenure at SA1	O - 72%	R - 28%
SEIFA-IEO at SA1	10	
IHAD Quartile at SA1	4th - 49%	
Languages spoken at home at SA1	English (69%), Indo-Aryan (13%), Pacific Austronesian (3%)	
Median price at site	no sales data for site	
Median price at SA1	no sales data for units	
	House - $826,500	
Schools of residents		
Primary	Charles Weston Primary School Chapman Primary School Curtin Primary School Orana Steiner School Islamic School of Canberra	
Secondary	Mount Stromlo High School St Edmunds College	
College	Canberra College St Clare's College Dickson College	

Change in dwelling typology (count)

School enrolment at site

9 - WATERMARK

Greenway
Selected as a development area with different environmental factors to the other selected SA2s

1 Limburg Way

Watermark is a mixed-typology development in Greenway, comprised of five integrated blocks of both residential flat buildings and town houses. It is located within a larger mixed-use and residential area, in close proximity to retail, restaurants and services. It is also located close to the Greenway Waterfront, as well as other open spaces such as the Limburg Way Playground and the Tuggeranong Oval.
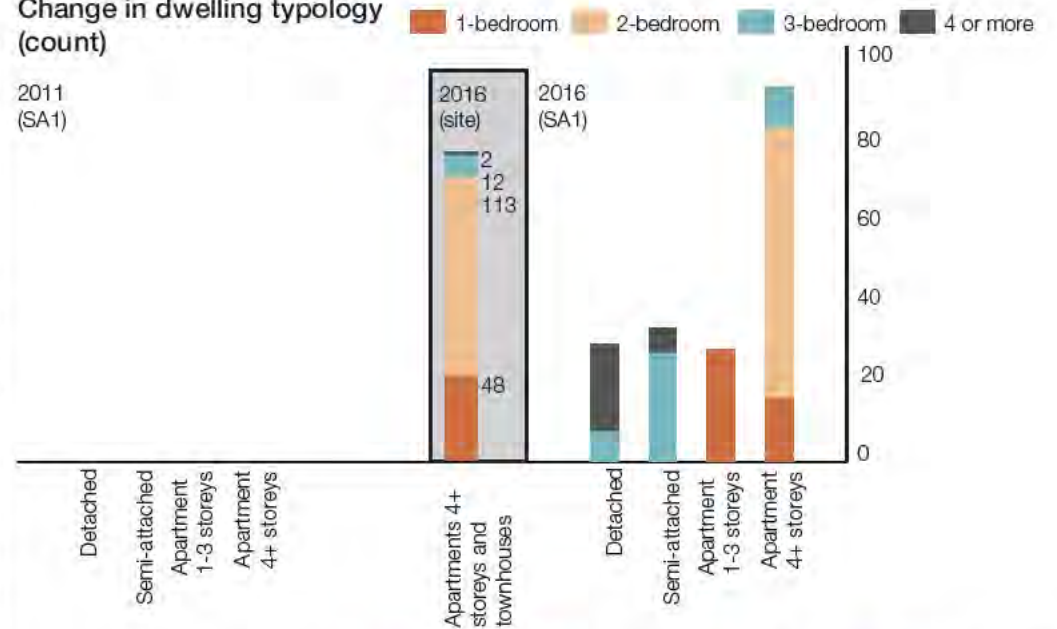
Watermark displayed a median ratio of school student occupation above the median of the sites within the Study.

Growth in student population at the SA1 behaved similarly to the growth of the school student population at the site level.

Key information

SA1 Number	8108005	
Classification	Infill	
Total population at SA1	132	
Median ratio of occupation	15%	
Housing tenure at SA1	O - 79%	R - 21%
SEIFA-IEO at SA1	9	
IHAD Quartile at SA1	4th - 38.1%	
Languages spoken at home at SA1	English (65%), Indo-Aryan (11%), Dravidian (9%)	
Median price at site	$407,500	
Median price at SA1	Unit - $359,000	
	No sales data for houses	

Schools of residents

Primary	Wanniassa School Isabella Plains Early Childhood School Namadgi School Caroline Chisholm School Garran Primary School Holy Family Primary School Monash Primary School Wanniassa Hills Primary School St Thomas The Apostle Primary School
Secondary	Wanniassa School St Mary MacKillop College Trinity Christian School Lanyon College St Clares College
College	Lake Tuggeranong College Canberra College St Mary MacKillop College Trinity Christian School Erindale College

Change in dwelling typology (count)

School enrolment at site

10 - ATELIER

1 Kerridge Street, 46 Honeysett View

Atelier is located on the Kingston Foreshore. The site is close to the civic heart of Canberra as well as other cultural attractions such as the National Library of Australia, Questacon and Old Parliament House. The site is located in a mixed-use residential area on the Kingston foreshore; the adjacent area has retail, restaurants and market areas.

The site is located adjacent to Bowen Park, Norgrove Park, Telopea Park and the Jerrabomberra Wetlands Nature Reserve. Just outside of Kingston is the main Canberra Railway Station, which has regional and interstate connections.

Atelier hosted a low median ratio of school student occupation (4%). A higher proportion of older school students were observed at this site, including only college-level school students at first year a school student population was recorded on site.

Key information

SA1 Number	8113106	
Classification	Infill	
Total population at SA1*	-	
Median ratio of occupation	4%	
Housing tenure at SA2**	O - 40%	R - 58%
SEIFA-IEO at SA2**	10	
IHAD Quartile at SA1*	-	
Languages spoken at home at SA1	English (88%), Middle-Eastern Semitic (3%), Iberian Romance (2%)	
Median price at site	$590,578	
Median price at SA2	Unit - $562,600	
	No sales data for houses	
Schools of residents		
Primary	Forrest Primary School Redhill Primary School Telopea Park School	
Secondary	Telopea Park School	
College	Narrabundah College	

*no population recorded for this SA1 in the ABS Census in 2016; this dataset is only recorded at SA1

**no population recorded for the SA1 in the ABS Census in 2016; SA2 used

Change in dwelling typology (count)

School enrolment at site

11 - WAYFARER

Belconnen

120 Eastern Valley Way

At the time of its completion in 2017, Wayfarer was the tallest residential building in Canberra. The development also features a sky lounge and a rooftop pool, as well as four commercial units on the ground floor.

Wayfarer is located within the Belconnen Town Centre, with access to retail, restaurants and services. It is located in close proximity to the Canberra International Sports & Aquatic Centre, John Knight Memorial Park, Eastern Valley Oval, Lake Ginnindera and the University of Canberra. Wayfarer is also located just south to Lake Ginninderra College.

Wayfarer showed the lowest median ratio of occupation across the Study. The development site is also one of the largest in the Study, hosting a total of 329 dwellings.

Key information

SA1 Number	8100215	
Classification	Infill	
Total population at SA1*	-	
Median ratio of occupation	2%	
Housing tenure at SA2**	O - 29.2%	R - 67.9%
SEIFA-IEO at SA2**	9	
IHAD Quartile at SA1*	-	
Languages spoken at home at SA2	English (54%), Indo-Aryan (9%), Southeast Asian Austronesian (6%)	
Median price at site	$393,000	
Median price at SA1	Unit - $401,000	
	House - $465,000	
Schools of residents		
Primary	Macquarie Primary School Latham Primary School Evatt Primary School Radford College	
Secondary	Daramalan College Canberra High School Canberra Grammar School	
College	Dickson College University of Canberra Senior Secondary College Lake Ginninderra	

*no population recorded for this SA1 in the ABS Census in 2016; this dataset is only recorded at SA1

**no population recorded for the SA1 in the ABS Census in 2016; SA2 used

Change in dwelling typology (count)

School enrolment at site

12 - EVOLURE

Lawson

Lyneham

11-15 Stockman Avenue, 17 Billabong Street

Evolure provides a balance of town houses and apartments that similar to other multi-unit large block developments in Lawson, with its 48 dwellings spread over a three-storey residential flat building and row-blocks of town houses. The closest open space is Lawson Park, which also has a playground.

Evolure is located to the north of the University of Canberra and the University of Canberra Hospital. The closest access to retail is in Kaleen or in the Belconnen and Bruce Town Centres; however, there is a cafe within Lawson.

The median occupation of Evolure was 12%. Evolure presents a different dwelling typology than that of the SA1 in 2011 and 2016. Across Census periods, there was high shift in dwelling typology - from 2011, to 2016 there was reduction in detached dwellings, and no apartments across the SA1.
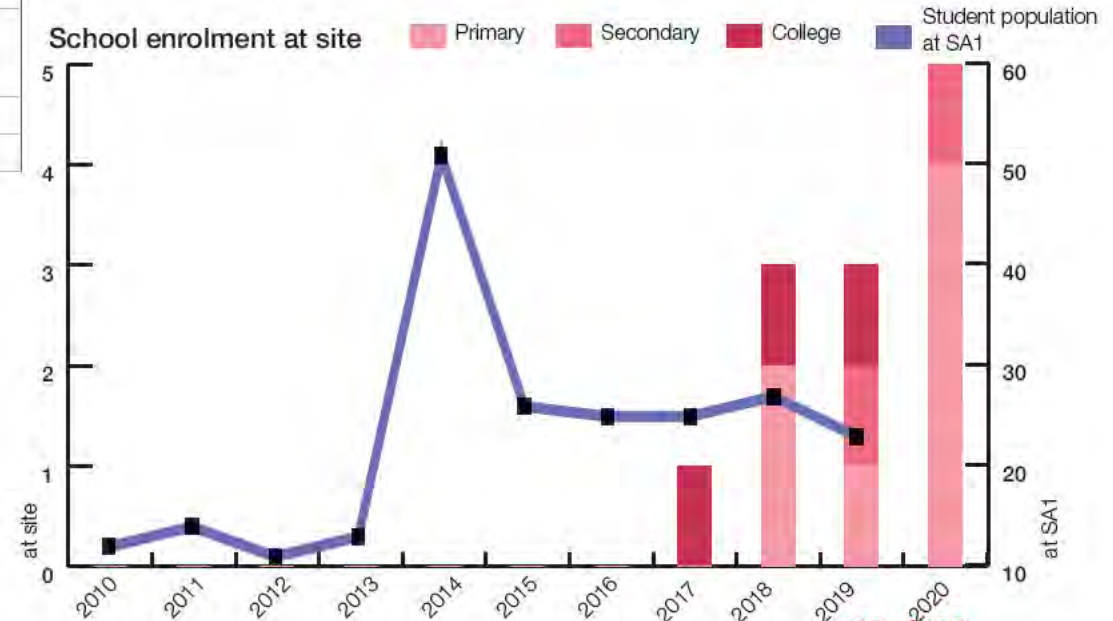
Growth in school student population at the SA1 followed growth in the school student population at development site.

Key information

SA1 Number	8101804	
Classification	Greenfield	
Total population at SA1	44	
Median ratio of occupation	12%	
Housing tenure at SA1	O - 38%	R - 63%
SEIFA-IEO at SA1	9	
IHAD Quartile at SA1	2nd, 3rd, 4th - 33.3%	
Languages spoken at home at SA1	English (38%), Indo-Aryan (14%), Dravidian (13%)	
Median price at site	$489,008	
Median price at SA2	Unit - $449,950	
	House - $629,900	
Schools of residents		
Primary	Maribyrnong Primary School Brindabella Christian College Kaleen Primary School	
Secondary	University Of Canberra High School Kaleen Gungahlin College	
College	University of Canberra Senior Secondary College Lake Ginninderra Narrabundah College Daramalan College	

Change in dwelling typology (count)

Legend: 1-bedroom · 2-bedroom · 3-bedroom · 4 or more

2011 (SA1)

2016 (SA1)

2017 (site)

5
13
15
15

School enrolment at site

Legend: Primary · Secondary · College · Student population at SA1

13 - THE QUAY

Greenway
Selected as a development area with different environmental factors to the other selected SA2s

15-17 Limburg Way

The site is relatively new, established in 2017, with school student populations from 2018 onwards. The increase in school student population at the site aligns with the growth at SA1.

Key information

SA1 Number	8108005	
Classification	Infill	
Total population at SA1	132	
Median ratio of occupation	12%	
Housing tenure at SA1	O - 79%	R - 21%
SEIFA-IEO at SA1	9	
IHAD Quartile at SA1	4th - 38.1%	
Languages spoken at home	English (65%), Indo-Aryan (11%), Dravidian (9%)	
Median price at site	no sales data at site	
Median price at SA1	Unit - $359,000	
	no sales data for houses	
Schools of residents		
Primary	Wanniassa School Wanniassa Hills Primary School Bonython Primary School Isabella Plains Early Childhood School Monash Primary School Namadgi School Sacred Heart Primary School Canberra Girls Grammar School Trinity Christian School	
Secondary	Wanniassa School St Clares College	
College	Lake Tuggeranong College Erindale College	

The Quay is an apartment-only development site, with 73 dwellings located within residential flat buildings. The Quay is located within the Tuggeranong Town Centre, and so is in close proximity to retail, restaurants and services.

It is also located close to the Greenway Waterfront, as well as other open spaces such as the Limburg Way Playground and the Tuggeranong Oval. The Town Centre also has a Hockey Park, Rowing Club, Basketball Stadium, the Lakeside Leisure Centre and the Tuggeranong Town Park beach.

The Quay had a median ratio of school student occupation at 12%, higher than the overall Study median.

The SA1 that the Quay is located in was formed in 2016, hence, dwelling typologies from 2011 are not presented.

Change in dwelling typology (count)

Legend: 1-bedroom, 2-bedroom, 3-bedroom, 4 or more

2011 (SA1)   2016 (SA1)   2017 (site)

School enrolment at site

Legend: Primary, Secondary, College, Student population at SA1

14 - MIZURA VILLAS

23 Wanderlight Avenue

Mizura Villas is a development site of town houses located on the southern of Lawson. There are two parks in Lawson, one of which has a playground. There is a cafe in Lawson and the closest access to retail and services is in the Belconnen and Bruce Town Centres. Mizura Villas is located just north of the University of Canberra, which also has open spaces for active recreation, and the University of Canberra Hospital.

The SA1 that is located in was formed in 2016, hence, dwelling typologies from 2011 are not presented.

The site is relatively new, established in 2017, with school student populations from 2018 onwards. The increase in school student population at the site align with the growth at the SA1 level.

Key information

SA1 Number	8101803	
Classification	Greenfield	
Total population at SA1	102	
Median ratio of occupation	10%	
Housing tenure at SA1	O - 58%	R - 18%
SEIFA-IEO at SA1	10	
IHAD Quartile at SA1	4th - 61.3%	
Languages spoken at home at SA1	English (51%), Chinese (15%), Indo-Aryan (12%)	
Median price at site	$529,000	
Median price at SA2	Unit - $449,000	
	House - $780,000	
Schools of residents		
Primary	Maribyrnong Primary School St Joseph's Primary School	
Secondary	University Of Canberra High School Kaleen St. Clare's College Canberra High School	
College	University of Canberra Senior Secondary College Lake Ginninderra	

Change in dwelling typology (count)

School enrolment at site

15 - IDALIA

Lyons

Phillip

1 Surprize Place

Idalia is one development within Woden Green, a residential estate developed as part of the Woden Town Centre. When completed, Woden Green will have 1500 dwellings. Idalia is comprised of three residential flat buildings that surround an internal courtyard. One-bedroom dwellings ranged in size from 50 to 61 sqm and two-bedroom dwellings ranged in size from 70 to 81 sqm.

Idalia is close to public transport, mainly buses. The Woden Town Centre has the Woden Bus Interchange. The Town Centre also has retail, restaurants and services. In terms of open spaces, there is the Woden Park and the Phillip District Playing fields, as well as a golf course and the Phillip Swimming & Ice Skating Centre.

Idalia site showed one of the smallest median ratio of school student occupation, showing only a peak of 3 students within the 99 dwellings of the apartment.

The SA1 that Idalia is located in was formed in 2016, hence, dwelling typologies from 2011 are not presented.

The site is relatively new, established in 2017, with school student populations from 2019 onwards.

Key information

SA1 Number	8110912	
Classification	Infill	
Total population at SA1	607	
Median ratio of occupation	2%	
Housing tenure at SA1	O - 32%	R - 66%
SEIFA-IEO at SA1	10	
IHAD Quartile at SA1	3rd - 47%	
Languages spoken at home at SA1	English (39%), Southeast Asian Austronesian (16%), Chinese (11%)	
Median price at site	$434,900	
Median price at SA1	Unit - $384,950	
	No sales data for houses	
Schools of residents		
Primary	Garran Primary School Mawson Primary School	
Secondary	Alfred Deakin High School	
College	Canberra College	

Change in dwelling typology (count)

School enrolment at site

Appendix 2 - Data schema

Stage 1 - Initial selection of study areas

Sources:

ABS Census 2011 to 2016
- Age structure (1...100)
- Number of bedrooms per dwelling (1...9)
- Dwelling structure
- Tenure and landlord type
- Household composition
- Full time/part time student status
- Type of education institution attending
- SEIFA IRSAD
- SEIFA IEO

per year — 2011 / 2016

Collated Census data per year using unique geography ID

2011 Census data by geography

2016 Census data by geography

ABS Census Geography
- SA2
- SA1
- Meshblock

per year — 2011 / 2016

Education Directorate / EPSDD
- School enrolment
- Enrolment per year 2010-2019 (not geocoded)
- Enrolment per year 2018-2019 (Geocoded)
- Property sales
- Property sales 2012-2019 with price
- Property sales 2012-2019 geocoded, no price
- Development applications
- Completion data
- School locations

Collated school enrolment data per year using Student ID (SLK_REC_KEY)

joined by property ID

Property sales geocoded with price
- Key (Property ID)
- X,Y Coordinates
- Site name
- Concatenated address
- Meshblock
- SA1
- SA2 (by name)
- SA3
- Land type (House or unit)
- Selling price
- Contract date
- Area of block

Student enrolment per year
- Student ID
- School name and code
- Network name and code
- Sector name and code
- AGEID
- Year level and category
- Gender
- Birthdate
- Indigenous status
- Disability
- International full fee paying
- Start date and first enrolment date
- Student language
- Address
- Greenfield or infill
- School location
- Highest level of parental education
- Birth Country code
- Geocoded address (2018-2019 only)

Assign Student ID to SA2 based on corresponding suburb

Assign Student ID to SA2 based on stated SA2

Students not included per year
- Blank Student ID
- Blank Address

DEFINE INITIAL FILTER: TOP-GROWTH AREAS BY SA2

Change in school age population (ages 5-17) per SA2 from 2011 to 2016

Top 30 areas of growth of student age population by SA2

Growth of school age population per year per SA2 from 2011 to 2016

TOP 30 Areas of growth by SA2

Growth per year per SA2

Growth of school age population per year per SA2 from 2010 to 2019

Growth of school age population per year per SA2 from 2018 to 2019

Growth of school age population per year per SA2 from 2018 to 2019

FILTERED/NARROW SELECTION

Top 30 growth areas from 2010 to 2019 based on the student enrolment data per SA2.

School footprint

Top 30 growth areas from 2010 to 2019 based on the student enrolment data per SA2

Change in school age population per year per SA2 from 2010 to 2019

2016 Census data by selected SA2
- Dwelling structure
- Number of bedrooms per dwelling
- Tenure
- SEIFA IRSAD
- SEIFA IEO

Property sales geocoded with price
- Median unit price for selected SA2s
- Median house price for selected SA2s

Development application by typology (represents locations based on initial received data)

Number of bedrooms per dwelling per SA2
- 1
- 2
- 3
- 4 or more

Dwelling structure by SA2
- Detached dwelling
- Semi-attached dwelling
- Apartment, 1 to 3 storeys
- Apartment, 4 or more storeys

Cross-referencing dwelling structure by number of bedrooms per dwelling to create 16 dwelling typologies

Dwelling typology by SA2
- 1 bedroom detached dwelling
- 1 bedroom semi-attached dwelling
- 1 bedroom apartment, 1 to 3 storeys
- 1 bedroom apartment, 4 or more storeys
- 2 bedroom detached dwelling
- 2 bedroom semi-attached dwelling
- 2 bedroom apartment, 1 to 3 storeys
- 2 bedroom apartment, 4 or more storeys
- 3 bedroom detached dwelling
- 3 bedroom semi-attached dwelling
- 3 bedroom apartment, 1 to 3 storeys
- 3 bedroom apartment, 4 or more storeys
- 4 or more bedroom detached dwelling
- 4 or more bedroom semi-attached dwelling
- 4 or more bedroom apartment, 1 to 3 storeys
- 4 or more bedroom apartment, 4 or more storeys

COMPILATION AND VISUALISATION FOR WORKSHOP

Mapping the 30 growth areas from 2010 to 2019 based on the student enrolment data
- Student growth
- Proximity to schools
- Dwelling structure
- SEIFA IRSAD
- SEIFA IEO
- Median unit price
- Median house price
- Development application by typology

Stage 2 - Workshop

DATA INPUT

Visualised background data - Top 30 growth areas by SA2 from 2010 to 2019 based on the student enrolment data

Student growth

Proximity to schools

Dwelling typology

Median unit price

Median house price

SEIFA IRSAD

SEIFA IEO

Development application activity

Development application by typology (approximate locations based on initial received data)

Stakeholder knowledge of local context

WORKSHOP SELECTION PROCESS

Selection of SA2s for further study based on high population growth, diversity of dwelling typologies and stakeholder knowledge on areas of interest.

* selected based on contrasting qualities to selection methodology

OUTPUT

14 SA2s for further study

Belconnen

Campbell

Casey

Franklin

Greenway*

Kingston

Lawson

Lyneham

Lyons

Narrabundah

Phillip

Watson

Wright

Stage 2.5 - Reiterate

DATA INPUT

Visualised background data - 14 selected SA2s

Student growth

Proximity to schools

Dwelling typology

Median unit price

Median house price

SEIFA IRSAD

SEIFA IEO

2016 Census geography - SA1 and SA2

Selected SA2s divided into SA1s

14 selected SA2s divided into SA1s

Student growth

Proximity to schools

Dwelling typology

Median unit price

Median house price

SEIFA IRSAD

SEIFA IEO

SELECTION

SA1s displaying high development activity

SA1s displaying high student population growth

SA1s of interest based on stakeholder knowledge of local context

Development activity

Development application data categorised according to type of development

Categories of interest:
Multi-unit development
Townhouses

OUTPUT

14 development data

DA Number

Block key

Project status date

Location

Number of units

Number of storeys

Dwelling typology

Typology of demolished

Satellite image of site

Top three languages spoken at home

Focused data that and within selected area

Student population per year at SA1

Population growth per year at SA1

Proximity to schools

Proximity to key services

Dwelling typology for 2011 and 2016 at SA1

Housing tenure for 2011 and 2016 at SA1

Median unit price at SA1

Median house price at SA1

SEIFA IRSAD

SEIFA IEO

Stage 3 - Correlating DA completion with school enrolments

Appendix 3 - Other jurisdictions

Contents

1   New Lambton

New Lambton was identified in the interviews with schools planning professionals as an area of interest due to the popularity of the local public school – New Lambton Public School. New Lambton is located in Newcastle, in the Hunter Region of New South Wales, approximately 6km west of the Newcastle Central Business District. The area is largely residential, adjacent to large swathes of environmentally sensitive land and reserves.

1.1   School provision

Within the SA2 Lambton-New Lambton, there are four public schools, New Lambton Public, New Lambton South Public, Lambton Public and Lambton High school, two non-government schools, St. John's Primary and St. Therese's Primary and one specialised school, John Hunter Hospital School. Enrolment numbers have remained fairly consistent from 2004 to 2015; the highest increase was for New Lambton Public School in 2011; its enrolment for that year was 9% higher than the previous year. Enrolment for the schools is summarised in the table below.

Table 1 Enrolment in schools in Lambton-New Lambton from 2004 to 2018

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
2738 - New Lambton Public School	580	574	598	578	581	584	585	600	603	592	610	623	592	601	646
% change		-1%	4%	-3%	1%	1%	0%	3%	1%	-2%	3%	2%	-5%	2%	7%
3798 - New Lambton South Public School	317	327	320	311	320	344	346	378	393	413	431	460	453	453	462
% change		3%	-2%	-3%	3%	8%	1%	9%	4%	5%	4%	7%	-2%	0%	2%
2366 - Lambton Public School	314	311	317	328	311	296	324	345	366	373	372	378	386	396	397
% change		-1%	2%	3%	-5%	-5%	9%	6%	6%	2%	0%	2%	2%	3%	0%
8482 – Lambton High School	1140	1123	1100	1107	1067	1054	1065	1029	1047	1059	1080	1095	1101	1116	1127
% change		-1%	-2%	1%	-4%	-1%	1%	-3%	2%	1%	2%	1%	1%	1%	1%
5558 - John Hunter Hospital School	Specialised														
1685 - St. John's Primary School	Non-government														
2118 - St. Therese's Primary School	Non-goverment														

Source: NSW Department of Education, NSW government school enrolments by head count (2004-2018)

1.2 Age groups and population growth

The median age in Lambton-New Lambton is 39. In 2016, there slightly more people older than the median age (8,777) than there were younger (8,457). Within the study period of 2006-2016, the largest growth by count of persons was observed in the age group 65-69, while the largest loss by count of persons was observed in the age group 75-79. These two groups were also the largest gain and loss, respectively, in terms of proportion of change.

Between 2011 to 2016, the largest increase by count of persons was in the age group 10-14, with an increase of 181 persons which represented a change of 19%. Similar to the overall study, the largest increase in terms of proportion of change between 2011 to 2016 was observed in the age group 75-79. The biggest loss in terms of count of persons was observed in the age group 35-39, which recorded an overall loss of 186 persons. The largest proportional loss was observed in the age group 80-84 years.

In 2016, the larger age groups in the population were either very young or of school-age (ages 0-14) or closer to the median age (age groups 30-59).

Table 2 Five year age groups in Lambton - New Lambton from 2006 to 2016

Age	2006	2011	2016	change from 06-11 (+/-)	change (%)	change from 11-16 (+/-)	change (%)	Change from 06-16 (+/-)	Change from 06-16 (%)
	SA2 Lambton – New Lambton								
0-4 years	1084	1179	1114	95	9%	-65	-6%	30	3%
5-9 years	970	1160	1103	190	20%	-57	-5%	133	14%
10-14 years	1039	948	1129	-91	-9%	181	19%	90	9%
15-19 years	1043	979	995	-64	-6%	16	2%	-48	-5%
20-24 years	1036	1127	1044	91	9%	-83	-7%	8	1%
25-29 years	857	993	969	136	16%	-24	-2%	112	13%
30-34 years	1110	993	1036	-117	-11%	43	4%	-74	-7%
35-39 years	1172	1253	1067	81	7%	-186	-15%	-105	-9%
40-44 years	1242	1270	1255	28	2%	-15	-1%	13	1%
45-49 years	1190	1205	1251	15	1%	46	4%	61	5%
50-54 years	1072	1145	1194	73	7%	49	4%	122	11%
55-59 years	894	989	1154	95	11%	165	17%	260	29%
60-64 years	717	876	970	159	22%	94	11%	253	35%
65-69 years	564	723	836	159	28%	113	16%	272	48%
70-74 years	563	556	705	-7	-1%	149	27%	142	25%

75-79 years	622	556	485	-66	-11%	-71	-13%	-137	-22%
80-84 years	563	555	410	-8	-1%	-145	-26%	-153	-27%
85 years +	461	509	517	48	10%	8	2%	56	12%
Total	16190	17006	17231	816	5%	225	1%	1041	6%

Source: ABS Census 2006; 2011; 2016

1.3   Dwelling typology, tenure and price

The dwelling typology in Lambton – New Lambton is dominated by detached dwellings, which represent more than 80% of dwellings in the SA2 across all the years within the study period. Between 2011 and 2016, the largest growth in terms of dwelling count and proportion of change was observed in semi-attached dwellings, which increased by 360 dwellings or 75%. Both apartment typologies displayed a significant decrease between 2011 and 2016 of at least 40%.
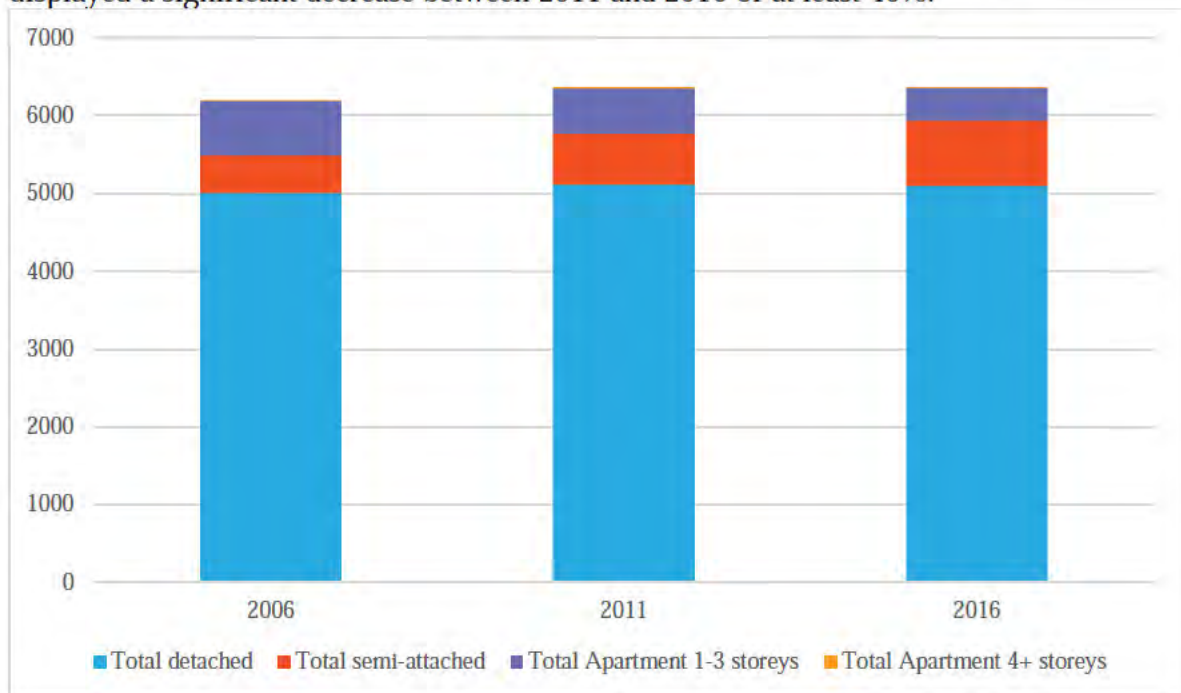

Figure 1 Change in dwelling structure in Lambton – New Lambton from 2006 to 2016

Source: ABS Census 2006; 2011; 2016

Considering the detailed dwelling typology, the largest increase by count of dwellings from 2006 to 2016 was observed in 4-bedroom or more detached dwellings (an increase of 258 dwellings) and 2-bedroom semi-attached dwellings (an increase of 218 dwellings).

The increase in 1-bedroom semi-attached dwellings is notable considering there were no dwellings recorded in this typology in 2011. The significant increase in this particular type of semi-attached dwelling may point towards a shift in preference that is concentrated in a small area of the SA2.
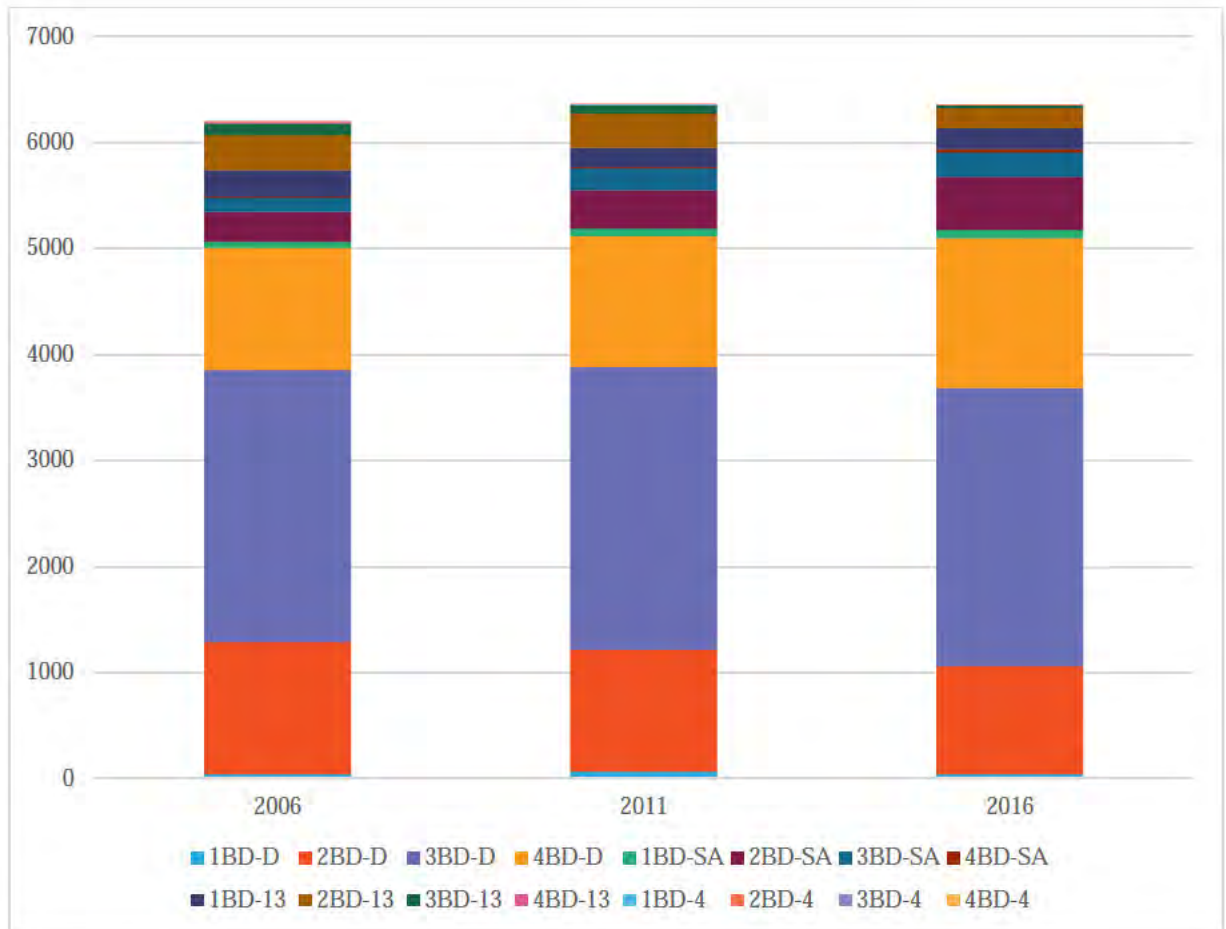
Figure 2 Detailed dwelling typology in Lambton - New Lambton from 2006 to 2016

Source: ABS Census 2006; 2011; 2016

In terms of tenure, Lambton – New Lambton has a larger proportion of owned dwellings than rented dwellings across the whole study period.

Table 3 Tenure in Lambton - New Lambton from 2006 to 2016

Tenure	2006	2011	2016
	At SA2		
Owned	62%	61%	61%
Rented	26%	26%	26%

Source: ABS Census 2006; 2011; 2016

Median monthly mortgage repayments in New Lambton increased from 2006 to 2011 and remained at the same level to 2016. The median monthly mortgage repayment is higher than the NSW median in 2016. The median weekly rent price is slightly lower than the NSW median. It has continuously increased over the study period, with an increase of about $100 from 2006 to 2011 and a further increase of about $50 to 2016.

Table 4 Median housing price data for Lambton - New Lambton

Median price	2006	2011	2016	2016

	At SA2			NSW Median
Median monthly mortgage repayments	$1600-$1999	$2000-$2199	$2000-$2199	$1986
Median weekly rent	$200-$224	$300-$324	$350-$374	$380

Source: ABS Census 2006; 2011; 2016

Considering typology, tenure and price, the area of Lambton – New Lambton is dominated by multiple-bedroom detached-dwellings that are most likely owned with a weekly mortgage that is lower than the state median. Semi-attached dwellings are becoming more prevalent in the area and apartments in buildings of up to three storeys are also emerging, however apartments in larger buildings are still few and far between.

1.4 Cultural diversity – language spoken at home

In Lambton – New Lambton, majority of households that speak English at home. However, while this proportion has remained high over the study period, the proportion of English-speaking households has decreased from 90% to 2006 to 85% in 2016.

New Lambton Public School reported that in 2018, of the 637 students enrolled, 86 students (14%) were from a non-English speaking background[1]. Lambton Public School reported in the same year that of 392 students enrolled, 38 students (10%) were from a non-English speaking background[2]. The higher proportion of language and cultural groups in the school enrolments suggests that students from outside of the immediate local area may be enrolled in the school.

Table 5 Languages spoken at home in Lambton - New Lambton from 2006 to 2016

Language spoken at home	2006	2011	2016
	At SA2 Lambton – New Lambton		
English	90%	88%	85.00%
South Slavic	2%	1%	1.00%
Chinese	1%		1.00%
Indo-Aryan		1%	
African			

Source: ABS Census 2006; 2011; 2016

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[1] New Lambton Public School 2019, *2018 New Lambton Public School Annual Report,* 31 May, https://s3-ap-southeast-2.amazonaws.com/doe-nsw-schools/annual-report/2018/2738/2018_New_Lambton_Public_School_Annual_Report.pdf.

[2] Lambton Public School 2019, *2018 Lambton Public School Annual Report,* 30 May, https://s3-ap-southeast-2.amazonaws.com/doe-nsw-schools/annual-report/2018/2366/2018_Lambton_Public_School_Annual_Report.pdf.

2 Wentworth Point

Wentworth Point in central Sydney was selected for high levels of population growth and development activity, particularly in high-density dwelling development. Its parent SA2 is Homebush Bay – Silverwater. Wentworth Point is also a Priority Precinct, designated by the NSW Department of Planning and the Environment. This designation "provide[s] a planned approach to growth in Sydney, with new homes and jobs located close to public transport, shops and services, while retaining and enhancing a community's character" (NSW Department of Planning and the Environment, 2017). Between 2012-2013, it was also part of the Urban Activation Precinct (UAP) program, which aimed to support the planning and delivery of more housing and jobs, integrated with public transport and other existing and planned infrastructure[3].

2.1 School provision

In Homebush Bay – Silverwater, there are four schools in total. Newington Public School and Wentworth Point Public School are the two government schools within the SA2. Other schools include SEDA College, a specialised school for Years 11 and 12 focusing on sports and Margaret Jurd College, a special education school. Newington Public School opened in 2002, repurposed from buildings built for the Athletes' Village for the Sydney 2000 Olympic and Paralympic Games[4]. The school has been challenged by high demand in the local area; since from 2008 to 2017, 20 demountable classrooms were setup in the school's oval to accommodate additional students[5]. The school has experienced consistent growth from 2004 to 2017; between 2010 to 2015, each year saw an increase of at least 10% in enrolments.

Table 6 Enrolments for Newington Public School from 2011 to 2018

4627 - Newington Public School	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
	229	270	307	332	358	386	420	473	539	638	738	814	889	943	897
% change		18%	14%	8%	8%	8%	9%	13%	14%	18%	16%	10%	9%	6%	-5%
4662 - Wentworth Point Public School		0	0	0	0	0	0	0	0	0	0	0	0	0	160
% change															16000%
15906 - Margaret Jurd College	Specialised														

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[3] NSW Department of Planning, Industry & Environment 2012, *Urban Activation Precincts,* 13 June, https://www.planning.nsw.gov.au/-/media/Files/DPE/Circulars/planning-circular-urban-activation-precincts-2012-06-13.pdf?la=en.

[4] NSW Department of Education – School Infrastructure, *Newington Public School,* https://www.schoolinfrastructure.nsw.gov.au/schools/4/4627.html.

[5] Caines, K 2017, "Newington Public School gets double storey demountables while parents wait for new Wentworth Point project which hits delay", *Inner West Courier,* 27 February, https://www.dailytelegraph.com.au/newslocal/inner-west/newington-public-school-gets-doublestorey-demountables-while-parents-wait-for-new-wentworth-point-project-which-hits-delay/news-story/3f9d0780b9d6e615d77b04a675ffa293.

Source: NSW Department of Education, NSW government school enrolments by head count (2004-2018)

2.2   Age groups and population growth

The median age in Homebush Bay – Silverwater was 33 in 2011 and 2016. In 2011, there were 12,083 persons counted in the SA2; the population grew by 24% to 19,906 in 2016. Between 2006 to 2016, the population grew by 104%. All age groups grew between 2006 to 2016. At the SA2 level, the group that grew the most in terms of count of persons was the age group 30-34 years old. In terms of proportion of change, the age group 70-74 years old grew by 290%.

The area has seen consistent growth across the whole time period, with the exception of the age group 20-24 years old, which recorded a loss of 85 persons or 9% between 2006 and 2011. In terms of school-aged children, those within the age groups 0-19 years old, the population at an SA2 level has essentially doubled between 2006 and 2016.

The demand for schools in the local area has also increased, as identified in the previous section. Newington Public School enrolments grew by more than 10% each year between 2010 to 2015 and the school has had provisional demountable classrooms in place since 2008.

Table 7 Homebush Bay - Silverwater 5-year age groups from 2006 to 2016

Age	2006	2011	2016	change from 06-11 (+/-	change (%)	change from 11-16 (+/-)	change (%)	overall	overall (%)
0-4 years	622	884	1398	262	42%	514	58%	776	125%
5-9 years	459	598	950	139	30%	352	59%	491	107%
10-14 years	332	522	664	190	57%	142	27%	332	100%
15-19 years	420	454	697	34	8%	243	54%	277	66%
20-24 years	900	815	1482	-85	-9%	667	82%	582	65%
25-29 years	1300	1558	2571	258	20%	1013	65%	1271	98%
30-34 years	1312	1574	3199	262	20%	1625	103%	1887	144%
35-39 years	1066	1337	2306	271	25%	969	72%	1240	116%
40-44 years	779	1119	1658	340	44%	539	48%	879	113%
45-49 years	634	835	1275	201	32%	440	53%	641	101%
50-54 years	474	751	1037	277	58%	286	38%	563	119%
55-59 years	472	609	899	137	29%	290	48%	427	90%
60-64 years	266	439	768	173	65%	329	75%	502	189%
65-69 years	140	269	475	129	92%	206	77%	335	239%
70-74 years	70	155	273	85	121%	118	76%	203	290%

75-79 years	54	76	145	22	41%	69	91%	91	169%
80-84 years	30	51	66	21	70%	15	29%	36	120%
85 years +	27	39	61	12	44%	22	56%	34	126%
Total	9738	12083	19906	2345	24%	7823	65%	10168	104%

Source: ABS Census 2006; 2011; 2016

The data suggests that the area as a whole is growing rapidly. Homebush Bay – Silverwater is within or adjacent to a number of priority precincts, a designation used by the NSW Department of Planning & Environment to denote accelerated planning, investment and renewal in certain areas, which aim to guide and align growth with the provision of necessary infrastructure and services[6]. As part of the UAP, Wentworth Point was rezoned to accommodate high density residential, commercial and recreational uses across two separate neighbourhoods[7]. The UAP Finalisation Report estimated that there would be 2,300 new dwellings within the precinct, as well as a new school – Wentworth Point Public School[8].

2.3 Dwelling typology, tenure and price

The most common dwelling structure in Homebush Bay – Silverwater is apartments in buildings over four storeys. At the SA2 level, there is a clear shift away from detached dwellings towards high-density dwellings. As seen in Figure 3, the increase of dwellings between 2011 and 2016 is significant. Between 2011 and 2016, there were 4209 new dwellings counted, an increase of 207%. When considering the detailed dwelling typology, 1- and 2-bedroom apartments in buildings over four storeys are the most prevalent dwelling typologies in Homebush Bay – Silverwater in 2016.

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[6] NSW Department of Planning, Industry & Environment 2020, *Greater Parramatta Growth Area,* 1 May, https://www.planning.nsw.gov.au/Plans-for-your-area/Priority-Growth-Areas-and-Precincts/Greater-Parramatta-Growth-Area.

[7] NSW Department of Planning, Industry & Environment 2014, *Wentworth Point Urban Activation Precinct Finalisation Report*, https://www.planning.nsw.gov.au/-/media/Files/DPE/Reports/wentworth-point-urban-activation-precinct-finalisation-report-2014.pdf.
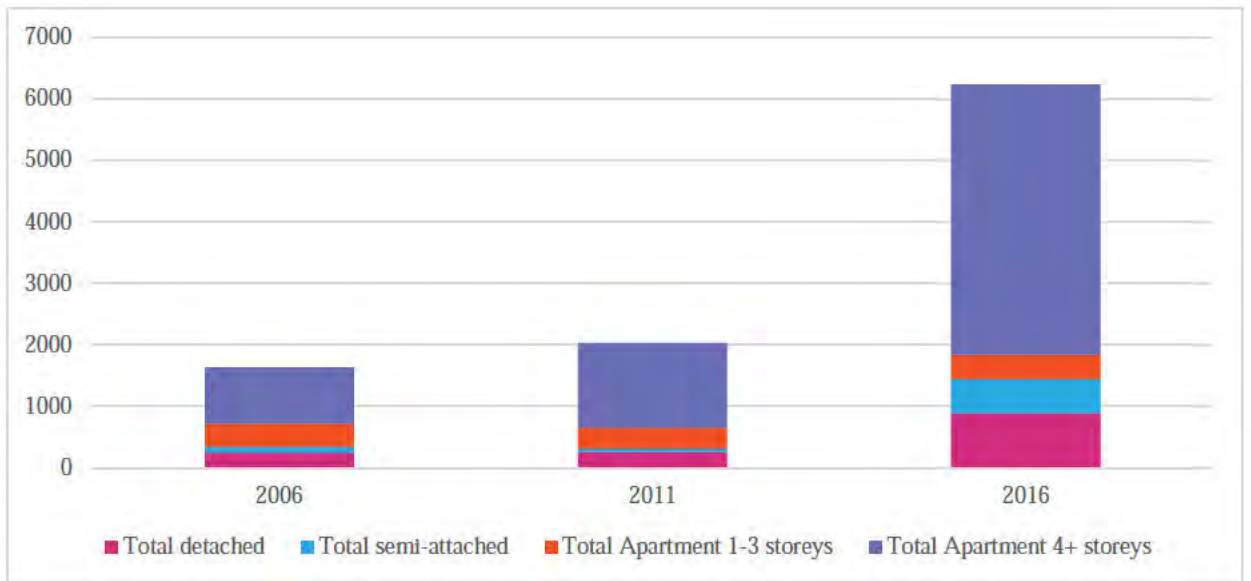
[8] Ibid.

Figure 3 Change in dwelling structure in Homebush Bay - Silverwater from 2006 to 2016
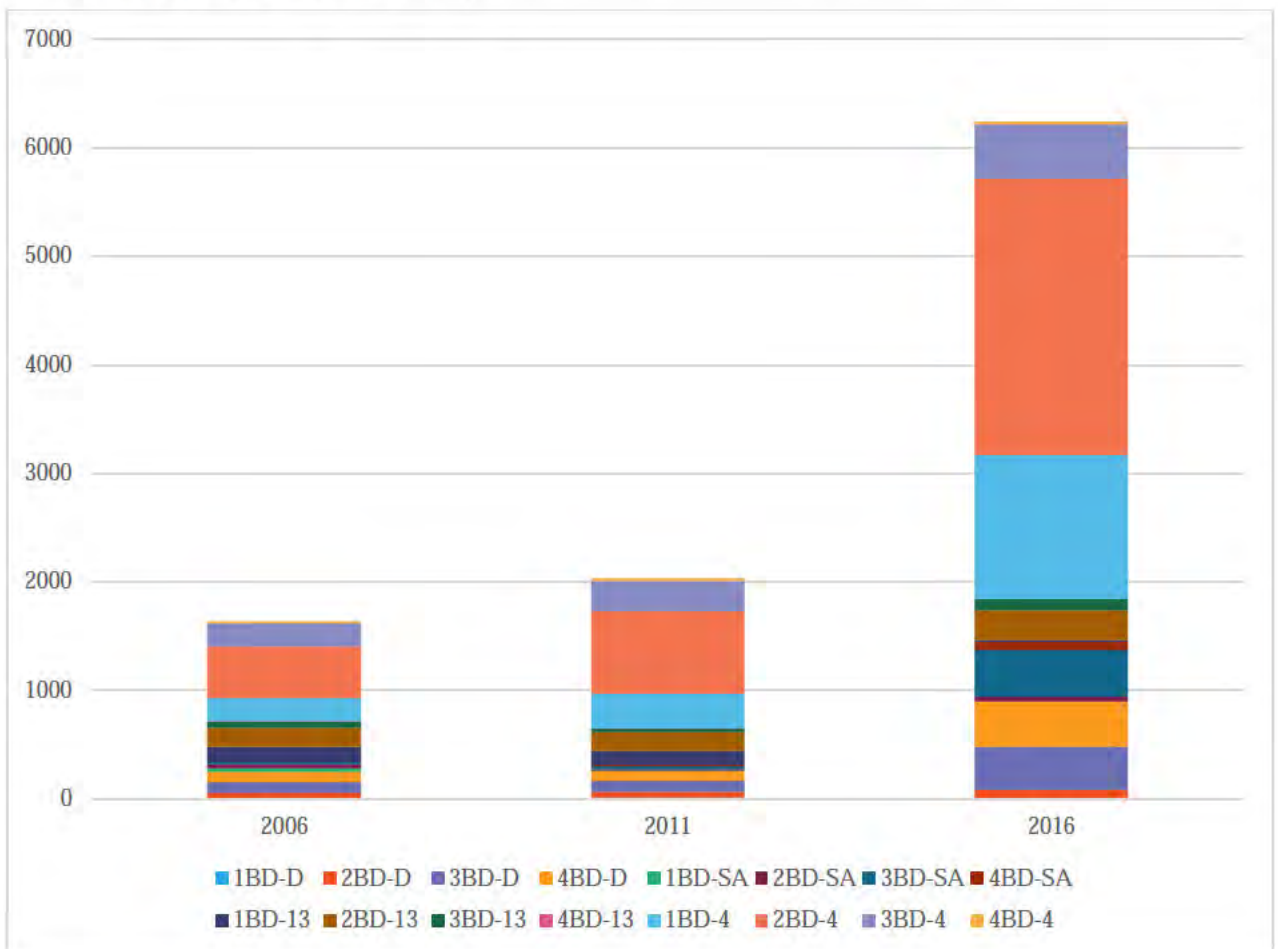
Source: ABS Census 2006; 2011; 2016

Figure 4 Detailed dwelling typology in Homebush Bay - Silverwater from 2006 to 2016

Source: ABS Census 2006; 2011; 2016

The dominance of apartments in buildings of four or more storeys is consistent with the ambitions described in the UAP Finalisation Report for the area to accommodate high density residential development. Prior to the UAP designation, the area of Wentworth Point was primarily used for maritime purposes. Following the UAP process, the area was rezoned to accommodate residential, commercial, retail and recreation uses[9]. The growth across all age groups in the SA2 suggest an acceptance of high-density housing for all age groups, even for families and households with children.

In terms of tenure, Homebush Bay – Silverwater has a slightly higher proportion of rented versus owned dwellings. In 2006, there were slightly more owned dwellings than rented dwellings in the SA2. The proportion of rented dwellings decreased in 2011 before increasing in 2016 to 43%. The proportion of owned dwellings has decreased since 2006, from 52% to 40%.

Table 8 Tenure in Homebush Bay - Silverwater from 2006 to 2016

Tenure	2006	2011	2016
	SA2 Homebush Bay - Silverwater		
Owned	52%	49%	40%
Rented	44%	36%	43%

Source: ABS Census 2006; 2011; 2016

Between 2006 to 2016, the median monthly mortgage repayments have remained at $3000-$3999; this mortgage repayment is the highest across all the case studies. Median weekly rent increased from $350-$449 in 2006 to $450-$549 in 2011 and remained at this level in 2016.

Table 9 Median housing price data for Homebush Bay - Silverwater from 2006 to 2016

Median price	2006	2011	2016	2016
	At SA2			NSW Median
Median monthly mortgage repayments	$3000-$3999	$3000-$3999	$3000-$3999	$1986
Median weekly rent	$350-$449	$450-$549	$450-$549	$380

Source: ABS Census 2006; 2011; 2016

Considering dwelling typology, tenure and price, the area of Wentworth Point is clearly dominated by high-density residential development, particularly 1- and 2-bedroom apartments in buildings of four or more storeys. The dwellings in Wentworth Point are mostly rented at a weekly rent that is higher than the state median. The population has exhibited quite significant growth as a result of across all age groups as a result of planned renewal and targeted public investment. Insights from the interviews suggested that while the rate of the households with children moving into apartments was not increasing, the rate at which apartments were being built was increasing and households with children were accessing these apartments as housing.

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[9] Ibid.

The development of high-rise apartments in Wentworth Point has also been supported by the addition of retail and commercial uses; however, anecdotal insights from interviews and the experience of Newington Public School suggest that this growth has placed pressure on the infrastructure necessary for supporting communities.

The development of Wentworth Point Public School, which opened in 2018, was also part of the UAP process. However, there is still pressure on schools in the wider Sydney Olympic Park area, particularly for high schools. In 2017, the Sydney Olympic Park Authority was in talks with the Department of Education to provide a new high school in the area for the growing population and to take pressure off Concord High School, which had more than 1100 students in 2017[10]. Parents residing in and around Newington, Wentworth Point, Rhodes and Liberty Grove had expressed concern that Concord High School was "too far" for their children to attend and that the increased residential development had not been supported by the necessary infrastructure[11].

2.4   Cultural diversity – language spoken at home

Both Newington and Wentworth Point Public Schools indicated in their 2018 Annual Reports that they catered to a diverse community, with over 50 language and cultural groups represented in their respective student bodies. This is also reflected in the wider population. At an SA2 level, the proportion of households speaking English is less than half of the households. The second and third most common language spoken at home across the whole study period are Chinese and Korean, accounting for between 9 to 16% of households.

Korean and Chinese were also identified in the 2018 Newington Public School Annual Report as two most common cultural and language groups in their student body aside from English[12]. 77% of the student body identified as from a language other than English; the school offers English as Additional Language or Dialect (EAL/D) programmes and also distributes communication materials in the top three language groups, Korean, Chinese and Arabic[13].

The cultural diversity that the data on language spoken at home supports insights from the interviews that migrant households, particularly from East Asian backgrounds, may be more inclined or accepting of high-density dwellings or apartments. The interviews also indicated that migrants arrive at "prime breeding age," before having a family and may select housing based on access to transport, jobs and services.

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[10] Caines K 2017, "Educaiton Department in talks over new high school at Sydney Olympic Park to cope with growth", *Inner West Courier,* 8 May, https://www.dailytelegraph.com.au/newslocal/inner-west/education-department-in-talks-over-new-high-school-at-sydney-olympic-park-to-cope-with-growth/news-story/05c1108aeec5a746ec4fec2592bba475.

[11] Ibid.

[12] Newington Public School 2019, *2018 Newington Public School Annual Report*, 31 May, https://s3-ap-southeast-2.amazonaws.com/doe-nsw-schools/annual-report/2018/4627/2018_Newington_Public_School_Annual_Report.pdf.

[13] Ibid.

Table 10 Languages spoken at home in Homebush Bay - Silverwater from 2006 to 2016

Language spoken at home	2006	2011	2016
	At SA2 Homebush Bay – Silverwater		
English	33%	38%	32%
Chinese	11%	11%	16%
Korean	9%	10%	11%

Source: ABS Census 2006; 2011; 2016

3   South Brisbane

3.1   School provision

South Brisbane is in the inner-city area of Brisbane. From 2008, the inner-city area of Brisbane underwent significant change and development, with renewed focus on new housing and jobs near high capacity public transport as well as lifestyle and amenity factors. Two schools located in the adjacent area are Brisbane State High School and West End State School. Brisbane State High School is Queensland's and Australia's largest state secondary school with over 3000 students in 2018[14]; the Queensland Government Department of Education states that this is the maximum enrolment capacity[15]. Interviews with schools planning professionals in Queensland highlighted that access to the schools' respective catchments was becoming increasingly competitive, coinciding with expansions for both schools.

Enrolments in both West End State and Brisbane State High Schools have grown over the period from 2015 to 2019. The greatest increase was for the West End State School, whose enrolments grew by 12% from 2016 to 2017.

Table 11 Enrolments in schools in South Brisbane from 2015 to 2019

	2015	2016	2017	2018	2019
0212 - West End State School	783	854	960	1021	1129
% change		9%	12%	6%	11%
2003 - Brisbane State High School	2951	3149	3137	3156	3184
% change		7%	0%	1%	1%

Source: Queensland Education Department, State school enrolments by school and year level – February census

3.2   Age groups and population growth

The median age in South Brisbane was 30 in 2011 and 2016. At the beginning of the study period, there were 6217 people residing in the SA2. This grew by 22% to 7569 in 2011 and a further 25% to 9498 in 2016. Overall, the population in the SA2 grew by 53%. The cohort 25-29 years old grew the most over the whole study period, with an overall growth of 682 persons or 91%. All age groups increased over the Study period, except for the cohort within 80-84 years old; this suggests an overall growth of population in the SA2.

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[14] Department of Education, Queensland Government 2018, *Brisbane State High School,* 16 October, https://education.qld.gov.au/parents-and-carers/enrolment/management-plans/brisbane-state-high-school.
[15] Ibid.

Table 12 South Brisbane 5-year age groups from 2006 to 2016

Age	2006	2011	2016	change from 06-11 (+/-	change (%)	change from 11-16 (+/-)	change (%)	overall	overall (%)
0-4 years	256	332	442	76	30%	110	33%	186	73%
5-9 years	131	134	193	3	2%	59	44%	62	47%
10-14 years	225	213	380	-12	-5%	167	78%	155	69%
15-19 years	384	602	595	218	57%	-7	-1%	211	55%
20-24 years	970	1089	1505	119	12%	416	38%	535	55%
25-29 years	751	1057	1433	306	41%	376	36%	682	91%
30-34 years	597	772	1078	175	29%	306	40%	481	81%
35-39 years	451	586	716	135	30%	130	22%	265	59%
40-44 years	413	464	633	51	12%	169	36%	220	53%
45-49 years	389	424	534	35	9%	110	26%	145	37%
50-54 years	370	393	412	23	6%	19	5%	42	11%
55-59 years	372	383	416	11	3%	33	9%	44	12%
60-64 years	288	335	333	47	16%	-2	-1%	45	16%
65-69 years	199	247	278	48	24%	31	13%	79	40%
70-74 years	124	197	198	73	59%	1	1%	74	60%
75-79 years	128	127	151	-1	-1%	24	19%	23	18%
80-84 years	103	103	93	0	0%	-10	-10%	-10	-10%
85 years +	68	110	111	42	62%	1	1%	43	63%
Total	6217	7569	9498	1352	22%	1929	25%	3281	53%

Source: ABS Census 2006; 2011; 2016

3.3 Dwelling typology, tenure and price

The most common dwelling structure in South Brisbane is apartments in buildings over four storeys. At the SA2 level, there is a clear shift away from detached dwellings towards high-density dwellings. From 2011 to 2016, detached dwellings decreased by 981 dwellings or 82%. In that same time period, all dwelling structure types except for apartments in buildings of four or more storeys decreased; apartments in buildings of four or more storeys increased by 552 dwellings or 38%.

Figure 5 Change in dwelling structure in Homebush Bay - Silverwater from 2006 to 2016

Source: ABS Census 2006; 2011; 2016

When considering the detailed dwelling typology, 1- and 2-bedroom apartments in buildings over four storeys were the most prevalent dwelling typologies in South Brisbane in 2016. All bedroom mixes in apartments in buildings of four or more storeys increased over the whole study period. There was an increase of 109 1-bedroom apartments in buildings of up to three storeys, but a decrease in all other bedroom mixes within that dwelling structure type.
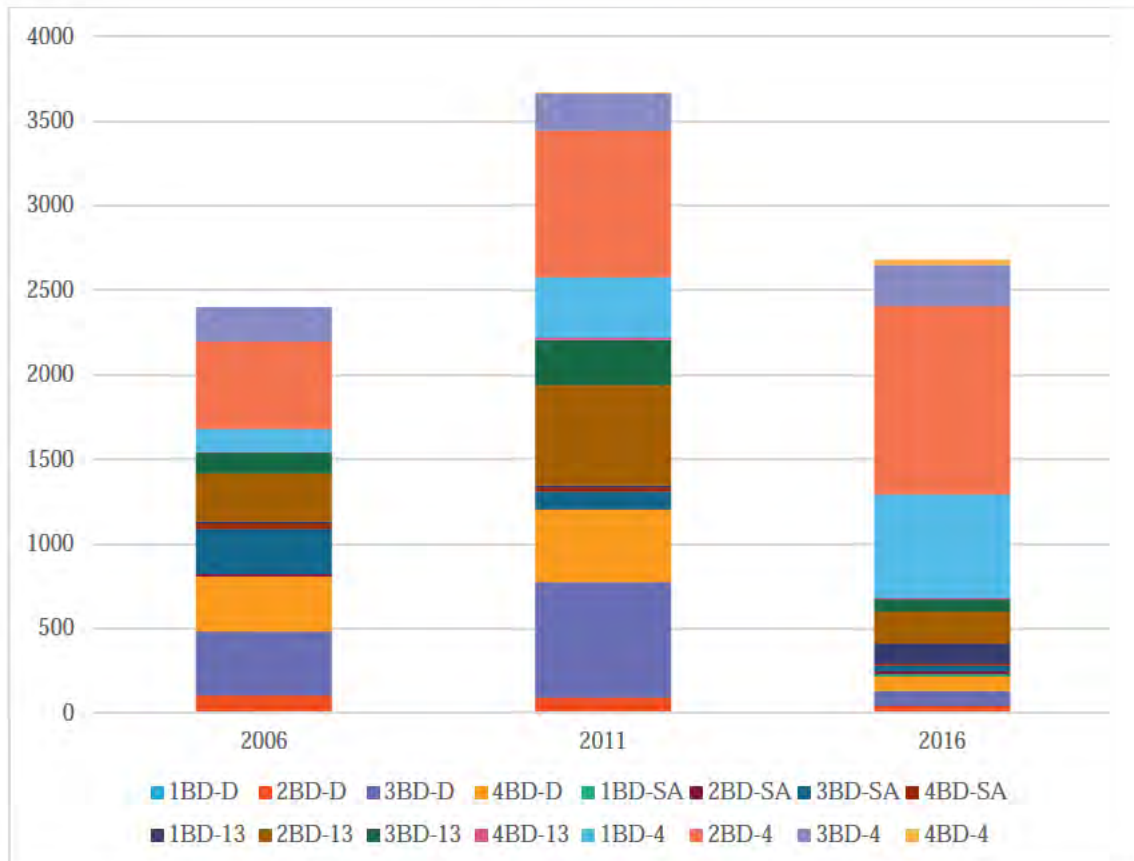
Figure 6 Detailed dwelling typology in South Brisbane from 2006 to 2016

Source: ABS Census 2006; 2011; 2016

South Brisbane Riverside was identified in the Brisbane CityShape 2026 plan, a 20-year strategic plan for Brisbane, as an area for major urban renewal (Brisbane City Council 2005)[16]. Under a Brisbane City Council initiative, the *South Brisbane Riverside Neighbourhood Plan* identified the process through which the area would be transformed into an area with more housing, more variety of housing options, greater access to public transport and jobs (Brisbane City Council 2009)[17]. Development in the area was planned to focus on higher densities; between 2006 to 2011, apartments in buildings of up to four or more stories increased by 70% and then by 38% to 2016. Overall, this dwelling structure increased by 134%.

In terms of tenure, South Brisbane has more rented than owned dwellings over the whole study period. The proportion of owned dwellings increased slightly between 2006 to 2011 and then decreased again to 2016. Rented dwellings increased from 41% of all dwellings in 2006 to 51% in 2011 and 2016.

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[16] Brisbane City Council 2005, *Brisbane CityShape 2026*, https://www.brisbane.qld.gov.au/sites/default/files/About_planning_and_building_cityshape2026_full.pdf.
[17] Brisbane City Council 2009, *South Brisbane Riverside Neighbourhood Plan*, https://www.brisbane.qld.gov.au/planning-and-building/planning-guidelines-and-tools/neighbourhood-planning-and-urban-renewal/neighbourhood-plans-and-other-local-planning-projects/neighbourhood-plans-adopted-in-2011.

Table 13 Tenure in South Brisbane from 2006 to 2016

Tenure	2006	2011	2016
	At SA2		
Owned	23%	26%	23%
Rented	41%	51%	51%

Source: ABS Census 2006; 2011; 2016

The median monthly mortgage repayment and median weekly rent price in South Brisbane are higher than the QLD medians. Between 2006 to 2011, the monthly mortgage repayment increased by almost $1400, from $1600-$1999 to $3000-$3999. The median then decreased to $2000-$2199 in 2016. Median weekly rent has also increased, but not as steeply as the mortgage repayments. Between 2006 to 2011, the median weekly rent increased from $350-$449 to $450-$549; it remained at this level in 2016.

Table 14 Median housing price data for Lambton - New Lambton and New Lambton (suburb)

Median price	2006	2011	2016	2016
	At SA2			QLD Median
Median monthly mortgage repayments	$1600-$1999	$3000-$3999	$2000-$2199	$1733
Median weekly rent	$350-$449	$450-$549	$450-$549	$330

Source: ABS Census 2006; 2011; 2016

3.4   Cultural diversity – language spoken at home

In South Brisbane, approximately half the population speak English at home. This proportion decreased from 55% in 2011 to 49% in 2016. The decrease in English as the main language spoken at home was also accompanied by a subsequent increase in the proportion of households that speak Chinese, which increased from 7% in 2011 to 11% in 2016. Indo-Aryan, Southeast Asian Austronesian and Korean also appeared as top languages spoken at home over the Study period. According to the 2018 West End State School Annual Report, 44% of students speak a language other than English (West End State School 2019)[18].

Table 15 Languages spoken at home in South Brisbane from 2006 to 2016

Language spoken at home	2006	2011	2016
	At SA2 South Brisbane		
English	54%	55%	49%
Chinese	5%	7%	11%
Indo-Aryan			3%
Southeast Asian Austronesian		2%	

[18] West End State School 2019, *2018 West End State School Annual Report,* https://westendss.eq.edu.au/supportandresources/formsanddocuments/annualreports/annual-report-2018.pdf.

Korean	2%		

Source: ABS Census 2006; 2011; 2016