Managing the impacts of State Significant Development

Final Report – Updated
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Prepared for Mid-Western Regional Council

pwc

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Executive Summary

Mid-Western Regional Council (MWRC) commissioned PwC to assess the impacts of additional population on services, infrastructure and housing as a result of State Significant Development (SSD) projects in the Mid-Western Region Local Government Area (MWR LGA). The headline findings are outlined below.

Growth impacts

- As of October 2023, 25 SSD projects as well as EnergyCo's transmission lines have been identified for development in and around the MWR. Together, these projects have a **peak workforce requirement of 7,010 workers in 2026**.
- Accounting for workers who may bring spouses and families, the **total additional population would be higher, peaking at 9,906 additional persons in 2026**. This is a **40% increase in population in three years**.
- ~5,000 of the additional population are assumed to be in temporary worker accommodation (TWA) arrangements. The remainder need to be housed in the MWR. This translates to a need for up to **1,515 additional dwellings** in 2026. By comparison, MWRC has processed 1630 housing approvals in past 10 years (163 a year). **The rental market is currently tight with only 74 properties vacant** across the LGA as of October 2023.

Service/infrastructure impacts

Growth will exacerbate existing constraints including:

- Water needs from TWAs and additional residential housing may demand, **on average, up to an additional 708 ML per year in 2026. TWAs may generate, on average, up to 456 ML of wastewater per year in 2026** (assuming ~5,000 people are housed in TWAs). The MWRC does not have the operational capacity to service this demand.
- Up to **7,428 additional tonnes of waste** is forecast to be produced in the peak construction year (2026) from additional residential housing and temporary worker accommodation.
- Increased demand on local road networks could **increase average road maintenance costs by ~55%, rising to $13,270 per km from $8,539.** The majority of this additional traffic demand would be generated by non-rate paying persons, creating a funding gap for maintenance.
- Up to an additional **5,085 ED presentations** could be expected in **2026,** a 35% increase and would necessitate **a doubling of the current emergency department capacity at Mudgee Hospital** if this activity were to be met within the Mid-Western Region.
- Up to an **additional 25 classrooms may be required** across primary and secondary schools at the peak construction period in 2026 due to workers who may bring families and children.

Collaboration opportunities

- Collaboration around these challenges could seed new industries for the region, in water and waste and the **development of enhanced waste water recycling capability** to provide sustainable source water for construction and industry. There are additional circular economy opportunities including exploring a potential upgrade of **existing recycling facilities to become a regional construction waste processing hub**.
- Beyond and in close proximity to the MWR LGA boundary, there are a significant number of projects which **need to be incorporated into infrastructure planning and coordination** to manage impacts on communities. These are not currently being considered by Energy Co.

Executive Summary

MWRC has sought analysis to understand the impacts of additional population on services, infrastructure and housing as a result of major projects in the region

Background and context

A number of state significant developments (SSD) are currently planned within and around the Mid-Western Regional Local Government Area (MWR LGA). The majority of these SSDs are related to the Central-West Orana Renewable Energy Zone (CWO REZ) and are central to the NSW Government's net zero transition to deliver clean, reliable and affordable energy for NSW.

This current and planned investment across a range of major projects in the MWR LGA will create significant opportunities for the region including, but not limited to, continuous demand for workers over the next decade. However, while the CWO REZ will deliver a range of benefits to NSW as a whole, the construction and delivery of these projects will create significant demand for workers over the next decade with flow-on impacts to housing, services and utilities in and around the MWR LGA.

Careful planning and proactive management is critical to ensure that this influx of investment leads to the best possible outcome for both the region and the NSW at large. NSW Energy Co has initiated a series of working groups as the basis for coordinated planning and action to mitigate negative impacts to regional communities. **This report is intended to promote alignment amongst state and local government and provide the basis for further collaborative planning and risk mitigation. It should be seen as a starting point for informing appropriate state and local agencies to align growth planning for services, manage community impacts across the delivery phases and to determine need for additional analysis.**

Purpose, scope and limitations of the report

This report provides a **point-in-time analysis** based on the best data available to assess cumulative impacts of additional population on services, infrastructure and housing as a result of major projects within and immediately surrounding the MWR LGA.

The analysis has three primary objectives:

1. To estimate the likely number of workers expected across the both construction and operational phase of planned major projects in the region and **determine the subsequent temporary and permanent increase to population within the MWR LGA**.
2. To **determine the impact of this additional population on housing, infrastructure and services**, including water, sewage, healthcare, schooling, childcare and emergency services.
3. To outline **strategies and potential investments required to mitigate the identified short-term impacts** on housing, infrastructure and services as well as identify a series of **longer-term economic development opportunities or legacy projects**.

Note: The analysis in this report is limited by available data. All findings are based on information received up to October 2023 and therefore may not reflect an up-to-date view of planned projects in and surrounding the region. The analysis in this report are directly underpinned by the outputs from the worker and population estimates. Worker and population estimates are reliant on several core assumptions around workforce composition and project timing and include: (a) 98% of the required workforce will come from outside of the MWR LGA, (b) of the total workforce required, 16% are assumed to be family households and 6% are assumed to be couple households meaning they will bring spouses and/or children, (c) peak construction workforce requirements are currently forecast for 2026 as indicated by project proponents.

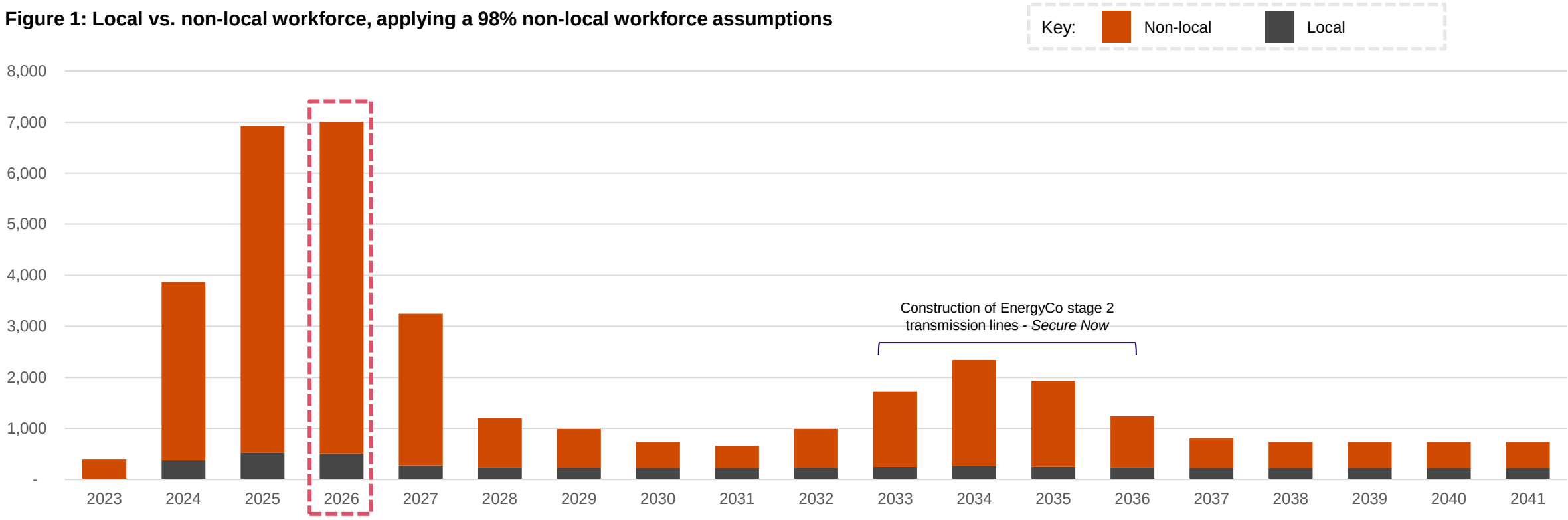
Executive Summary

Information provided by project proponents indicate a peak workforce need of 7,010 in 2026 with between 6,115 and 6,500 likely to come from outside of the MWR LGA

As of October 2023, 25 SSD projects as well as EnergyCo's transmission lines have been identified for development in and around the MWR LGA. Based on information provided by project proponents and MWRC, these projects could generate demand for up to 7,010 workers at the peak delivery period in 2026. This estimate assumes that 98% of the workforce for **new renewable projects** will come from outside the MWR LGA (core scenario).[1] This assumption reflects the low unemployment rate in the region (<2% unemployed).

Results: Peak workforce demand, core scenario

Figure 1: Local vs. non-local workforce, applying a 98% non-local workforce assumptions



Source: MWRC, Census 2021, PwC

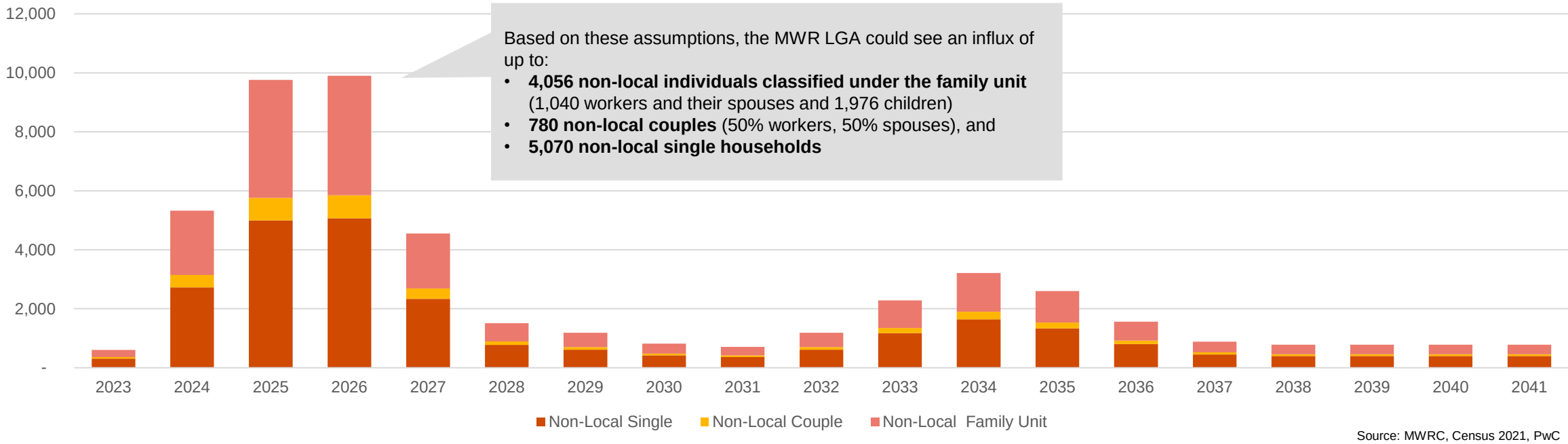
1. Note, the results presented in the body of this report include two mining related projects (Moolarben Coal and Bodwens Silver).Aa 98% local vs. 2 % non-local ratio has been applied to these projects to accurately reflect current industry employment concentrations for the region. This assumption is detailed in Appendix A.

Taking into account the likelihood that some workers may bring spouses and families, the total estimated additional population as a result of SSD projects in and around the MWR LGA will peak at 9,906 in 2026 comprising of 66% workers and 34% spouses and family

Of the total non-local workers required for the identified SSD projects, the modelling assumes that **78%** will be single person households, **16%** will be family households and **6%** will be couple households, resulting in further additional population in the region. These assumptions are grounded in comparative analysis of similar regions that have a high reliance on external workfroce.

Results: Total additional population, highlighting additional population generated by spouses and families[1]

Figure 2: Composition of total additional population to 2041, core scenario



Based on these assumptions, the MWR LGA could see an influx of up to:

- **4,056 non-local individuals classified under the family unit** (1,040 workers and their spouses and 1,976 children)
- **780 non-local couples** (50% workers, 50% spouses), and
- **5,070 non-local single households**

Source: MWRC, Census 2021, PwC

[1]Non-local couples are defined as workers and their spouse. Non-local family units consist of workers, their spouse and children (and comprising 1.9 children as per the regional NSW average).

While temporary, population increases of this magnitude will place increased demand and pressure on services, infrastructure and housing across the board

Service impacts have been assessed by determining the change in per capita service provision as a result of increased population to establish. This analysis is based on averages across the region. Housing and infrastructure impacts are based on the current level of operational capacity (e.g. sewage treatment capacity, provision of zoned land) as advised by MWRC.

Impact analysis summary

Service Area	Current state	Demand impact	Impact[1]	Detail
Housing	• 74 vacant properties across the LGA[2] • 1,630 housing approvals in past 10 years (163 a year)	• Up to **1,493 additional dwellings** in peak construction (2026) • 2023-2041 **median of 519 additional dwellings** per annum (p.a.)	**>75% increase**	Pages 32-34
Childcare	• **11** childcare centres with **720 approved childcare places** • **0.35 childcare places per child** (inner regional NSW average)	• Up to **59 additional childcare places in peak** construction period (2026) • 2023-2041 **median of new childcare places is 7** p.a.	**<25% increase**	Pages 35 -36
Schools (Primary and Secondary)	• **9** primary schools with **2294** students enrolled[3] • **16:1 average student to teacher ratio**	• Up to **26 additional primary school classes (751 students) in peak** construction period (2026) • 2023-2041 **average of 4 additional primary school classes** p.a.	**>25% <50% increase**	Pages 37-38
	• **4** secondary schools with **1852** students enrolled[3] • **11:1 average student to teacher ratio**	• Up to **30 additional secondary school classes (751 students) in peak** construction period (2026) • 2023-2041 **average of 4 additional secondary school classes** p.a.	**>25% <50% increase**	
GPs	• GPs within the LGA work **12.25 to 15.75 FTE** • Current **GP to patient ratio of 1:1,168**	• Up to **8 additional dedicated GP FTE in peak** construction period (2026) • 2023-2041 **median of 1 additional dedicated GP FTE** p.a.	**>50% increase**	Pages 39-40
Hospitals	• Mudgee Health Services has **8 ED bay spaces** • **2 nurses per shift** and **1 additional nurse for peak period** (10:30-19:00) • 14,583 total presentations in 2022	• Up to an additional **8 ED bays and 7 nurses may be required in peak construction period (2026)** [4] • Up to an additional **5,085 ED presentations** could be expected in **2026**	**>75% increase**	Pages 41- 42

1. Impact is calculated at peak demand 2. As at October 2023, As at October 2023, sourced from MWRC. 3.Count is for number of schools with 20 or more students only. Based on consultations, an assumption has been made that there is current capacity for an additional ~150 primary and secondary students. 4. Based on available data the old (2006) MoH methodology for projecting ED treatment spaces was utilised. This method could overestimate bays required.

Water supply and sewage systems will require significant upgrades to service the SSD workforce, whilst other services such as waste and roads may be able to adapt easier

Impact analysis summary

Service Area	Current rate of service	Service response	Impact[1]	Detail
Ambulance	• **11,186 responses in 2022** for Mudgee- Lithgow SA3 • **1 paramedic for 330 residents** (145 paramedics) Mudgee – Lithgow (SA3)	• Up to **30 additional paramedics in peak** construction period (2026) • 2023-2041 **median of 4 additional paramedics** • Up to **803 additional responses in peak** construction period (2026)	**<25% increase**	Pages 43-44
Water	• Current water supply systems across the LGA are at capacity and intended to grow with baseline population	• **Any additional growth in the region will require additional works** • Distribution infrastructure will need to be upgraded in consideration of surge capacity	**Forecasted to exceed current capacity**	Page 47
Sewage	• Mudgee and Gulgong STPs have remaining capacity for the baseline (DPE) population growth with consideration to planned upgrades.	• Up to **5000 additional residents** may be housed in dwellings in peak construction period (2026), producing up to **524 megaliters** • 2023-2041 **median of ~1,000 additional residents** in dwellings p.a. producing a median of **86 megaliters p.a.**	**Forecasted to exceed current capacity**	Page 48
Waste	• In 2022-23, **Mudgee Waste Facility collected a net waste total of 33,951 tonnes of waste** • Under baseline population projections (i.e. no additional demand generated by SSDs), the LGA has **40 years of solid waste land fill capacity**	• Up to **7,428 additional tonnes of domestic waste** is forecast to be produced in peak construction year (2026) from the residential and worker population. • Between 2023 and 2041, an **average of 2,007 additional tonnes of domestic waste** will be produced across from the residential and worker population.	**<25% increase**	Page 49
Roads	• 2,460 km of local road network • **$8,539** average maintenance cost per km of road in 2021-2022	• Comparing FY22 to FY26, the maintenance cost **increases by $4,731 (to $13,270)** per km of road	**>25% <50% increase**	Page 50
Police	• Consultation with the Orana-Mid Western Police District revealed a number of factors that may increase demand for policing service around traffic incidents, potential incidents occurring at TWAs and resource management across the entirety of the LGA.		**N/A**	Page 45-46

1. Impact is calculated at peak demand

A series of recommendations have been developed to mitigate the impacts for each service sector

Action item	Recommendation
Housing	• Establish an accommodation coordination team that manages and monitors housing stock and room availability. • Develop a campaign to promote and educate residents around infill medium-density development (including secondary dwellings) to encourage an increase in this housing typology coming to market. Financial incentives available to landowners should be included as part of the campaign. • Boost number of planning staff within the Council to accelerate speed of development approval process in line with increased demand. • Formalise requirements for proponents to provide temporary worker accommodation in appropriate locations. • Explore opportunities for sharing, re-use and/or repurposing of TWAs between projects and/or for legacy uses. • Review current staging and servicing of zoned land in the Mudgee and Gulgong Urban Release Strategy - including master planning of growth areas to assist in bringing land to market in a more timely manner and agility to respond potential peak accommodation requirements. • Build essential worker housing as part of master planned areas. • Explore policies to incentivise major master planned housing developments, including opportunities to fast track approvals.
Water	• Investigate the feasibility and funding options to upgrade the Mudgee and Gulgong Sewage Treatment Plants to provide waste water recycling capability for construction use and other ongoing uses post construction phase. • Review current water distribution infrastructure phasing and timing to align with accelerated release of land as required. • Work with NSW Government/energy project proponents to establish a clear requirement for all construction and TWA sites to provide on-site water supply systems (incl. source water independent of council allocation). • Work with NSW Government to audit existing water allocations and identify unused or underutilized allocations for potential transfer and/or sharing arrangements • Explore options to increase in water licenses/allocations for MWRC.
Sewage	• Determine a clear framework that requires energy project proponents to have onsite sewage processing in TWAs, including processes to manage sledge. • Explore options for Mudgee and Gulgong STP expansion including temporary expansion; proponent built; servicing in neighbouring LGAs.
Waste	• Improve communication channels with proponents around roles and responsibilities for waste collection and processing at TWAs. • Establish a regulatory framework setting benchmarks/quotas on REZ material and construction waste and TWA waste collection. (e.g. min % recyclables, construction clean fill reuse rules). • Consult with neighbouring councils to ensure regulatory framework is consistent around landfill obligations for TWAs/project sites. • Conduct a business case/costings on value-add opportunities for Council to upgrade recycling capabilities to improve recycling scope, capacity and quality.
Childcare	• Examine the feasibility of MWRC acting as a developer for a new childcare/multi-purpose centre in Gulgong following the build and lease model in Mudgee. • Conduct an audit of childcare service providers' opening hours capability and expansion potential to cater for extended working hours of construction/REZ workers. • Develop a platform for centralised communication of current childcare place availability in the region and ongoing demand monitoring. • Advocate for developers/energy proponents to build-in childcare capacity to new developments/TWAs.
Schools	• Identify under-utilised assets and classrooms, including detailed audit of capacity on a school-by-school basis • Advocate for the provision of additional temporary classrooms in peak construction years as required. • Partner with local schools to develop a teacher retention strategy around non-monetary incentives focused on mentoring and community engagement

The actions and recommendations also identify longer-term opportunities and legacy projects with many of these focused around utilities infrastructure

Action item	Recommendation
Hospitals	• Conduct an audit on medical equipment available within the region and advocate for a CT scan in Mudgee Hospital. • Work with NSW Health to explore potential 'virtual hospital' models, utilising telehealth to address and manage demand for low triage and GP activity. • NSW Government to work with SSD project proponents to establish protocols for helicopter access to worker/project sites. • Investigate contingencies to medical transfers to Dubbo Base Hospital. E.g. shell space at Mudgee Base Hospital, additional bed/staffing requirements. • Explore requirements to mandate that TWAs to provide onsite medical services. • NSW Health to work with project proponents to communicate clear protocols for emergency responses.
Primary Health Care	• Set minimum health care staffing requirements for TWA (e.g. prescribing nurses on-site, access to telehealth for all workers). • Advocate for permanent placement of GP/GPs in Gulgong • Collaboration between developers, project proponents and local pharmacies around medical supplies and ability to fill scripts. • Development and promotion of telehealth models of care in region, including development of virtual care facility.
Ambulance	• Liaise with local NSW Ambulance to communicate the road/traffic implications of the REZ projects. • Engage with SSD proponents to establish requirements/expectations for access to paramedics/ambulances on TWA sites. • Investigate options for temporary service delivery and increase paramedic provision during peak construction (such as temporary ambulance stations)
Police	• Facilitate educational workshops for SSD proponents around risk minimisation for TWAs including road safety concerns. • Communicate preference with energy proponents to establish ‘dry’/alcohol-fee TWA sites.
Local roads	• SSD proponents and developers to build temporary/’park and ride’ car parks on private land. • Education campaign aimed at residents, businesses community groups and energy proponents around traffic flow changes and associated safety protocols during peak construction years. • Consideration of additional funding options/special grant application to fund asset road maintenance program.
Performance tracking	• Resource capability to monitor the region’s population growth on a monthly basis. • Collaboration with NSW Government to audit existing water allocations to identify underutilised allocations for potential transfer/sharing arrangements. • Traffic modelling and ongoing traffic count • Review parking capacity and controls in peak years. • Improved centralised communication around current childcare placements in region. • Ongoing monitoring of school enrolments and capacity. • Monitoring of ED presentations and bed usage at Mudgee Hospital. • Audit of current clinics on capacity to absorb additional GPs, and identification of potential sites for additional GP clinics. • Monitor average incident rates – ambulance and police. • Scenario modelling of current ambulance/police vehicle fleet/staffing capacity.

Contents

MWRC has sought analysis to understand the impacts of additional population on services, infrastructure and housing as a result of major projects in the region

Background and context

The development of Renewable Energy Zones (REZ) is central to the NSW's governments vision to modernise the State's electricity system to deliver clean, reliable and affordable energy across NSW. Moderisation of the electricity system may also enable new industries, revive traditional industries with new sustainable fuels, and open diverse, high-quality job opportunities across our regional communities.

The State's first REZ is located in Central-West Orana region. Occupying approximately 20,000 square kms, the REZ overlaps with a significant proportion of the Mid-Western Regional Local Government Area (MWR LGA). As at September 2023, the REZ is hoped to contribute:

36 Projects
identified by council in or surrounding the MWR LGA*

$10 Billion
expected in private investment to the REZ region by 2030

~7000
additional construction and operation jobs supported at its peak*

This current and planned investment across a range of major projects in the MWR LGA (including those in the CWO REZ) will create significant opportunities for the region including, but not limited to, continuous demand for workers over the next decade. At the same time, this investment will take place in an already highly pressurised environment of service delivery, with acute housing and worker shortages currently being felt across regional NSW.

Careful planning and proactive management is critical to ensure that this influx of investment leads to the best possible outcome for both the region and the NSW at large.

* 36 Projects represents all projects identified by the MWRC that are in the LGA or surrounding as at October 2023. ~7000 jobs is conditional on select projects used in this report occurring as currently scheduled. These project are explicitly outlined in appendix A.

Purpose, scope and limitations of analysis

This report provides a **point-in-time analysis** based on the best data available to assess cumulative impacts of additional population on services, infrastructure and housing as a result of major projects within and immediately surrounding the MWR LGA.

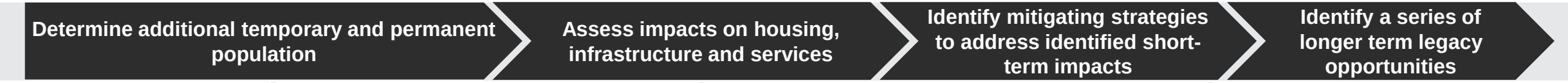
The analysis has three primary objectives:

1. To estimate the likely number of workers expected across the both construction and operational phase of planned major projects in the region and **determine the subsequent temporary and permanent increase to population within the MWR LGA**.
2. To **determine the impact of this additional population on housing, infrastructure and services**, including water, sewage, healthcare, schooling, childcare and emergency services.
3. To outline **strategies and potential investments required to mitigate the identified short-term impacts** on housing, infrastructure and services as well as identify a series of **longer-term economic development opportunities** and legacy projects.

This report is intended to promote alignment amongst state and local government and provide the basis for further collaborative planning and risk mitigation. It should be seen as a starting point for informing appropriate state and local agencies to align growth planning for services, manage community impacts across the delivery phases and to determine need for additional analysis.

A three-staged approach was used to develop this report, drawing on data and consultation from MWRC and NSW government agencies

Scope and approach of this report



1 Population Estimates

- An adjustable, point in time, estimate of the likely number of workers expected across the both construction and operational phase of planned SSDs in the region
- Will enable the ability to **determine the subsequent temporary and permanent increase to population within the MWR LGA**
- Provides the basis for determining potential increased demand on the region's housing stock, services and infrastructure

2 Impact Analysis

- **Determine the impact of this additional population on housing, infrastructure and services/utilities**, including water, sewage, healthcare, schooling, childcare and emergency services.
- Impacts are based on change in service provision ratios and/or operational capacities of council operated infrastructure.

3 Strategy

- Outline **strategies and potential investments required to mitigate the identified short-term impacts** on housing, infrastructure and services
- Identify a series of **longer-term economic development opportunities and legacy projects**.

Limitations

The analysis in this report is limited by available data and provides a points in time analysis. All findings are based on information received up to October 2023 and therefore may not reflect an up-to-date view of planned projects in and surrounding the MWR LGA. The analysis in this report are directly underpinned by the outputs from the worker and population estimates. Worker and population estimates are reliant on several core assumptions around workforce composition and project timing and include: (a) 98% of the required workforce will come from outside of the MWR LGA, (b) of the total workforce required, 16% are assumed to be family households and 6% are assumed to be couple households meaning they will bring spouses and/or children, (c) peak construction workforce requirements are currently forecast for 2026 as indicated by project proponents. In practice, start dates might be delayed and construction timelines extended due to supply chain constraints or access to finance, for example. The reliability of the estimates in this report are expected to increase as further and more detailed information becomes available to council.

Contents

Six steps were undertaken to estimate the likely additional population as a result of State Significant Development (SSD) projects in and surrounding the MWR LGA

The diagram below outlines the key steps used to estimate the required workforce needed to construct and operate SSD projects in the region and determine the subsequent increase in permanent and temporary population. The population estimates generated through this approach have been used as the basis for assessing impact on housing, infrastructure and services in the MWR LGA in Chapter 4. Further detail on the assumptions and results in each step are provided in subsequent pages.

Outline of approach

1 Confirm baseline population projection scenario

- Confirms the 'base case' population growth
- Utilises Department of Planning and Environment's (DPE) Common Planning Assumptions.

2 Confirm scope of employment generating projects

- Confirms which projects will be included to assess population impacts based on current available information.

3 Confirm number of anticipated workers

- Confirms the current estimate of number of workers required to construct and operate projects identified in Step 2
- Utilises information in the *2023 Mudgee and Gulgong Urban Release Strategy* (URS) and updated information provided by MWRC.

4 Confirm the source of workers

- Applies assumptions about the proportion of workers identified in Step 3 that will be sourced locally (i.e. from within the LGA) and non-local (i.e. outside the LGA) on a project-by-project basis
- Three scenarios have been developed reflecting the varying degrees to which the required workforce may be sourced locally.

5 Calculate population impacts

- Based on the assumptions in Step 4, applies a further set of assumptions to the non-local workforce component to determine the likely household structure of these workers, and therefore additional population beyond the worker estimate.

6 Conduct sensitivity testing

- Conducts a range of sensitivity tests around (i) potential increases or decreases in the number of projects (ii) different project delivery profiles.

Key data sources for these estimates include: the 2023 Mudgee and Gulgong Urban Release Strategy (URS), SSD project information provided by MWRC, DPE Common Planning Assumptions and ABS Census data

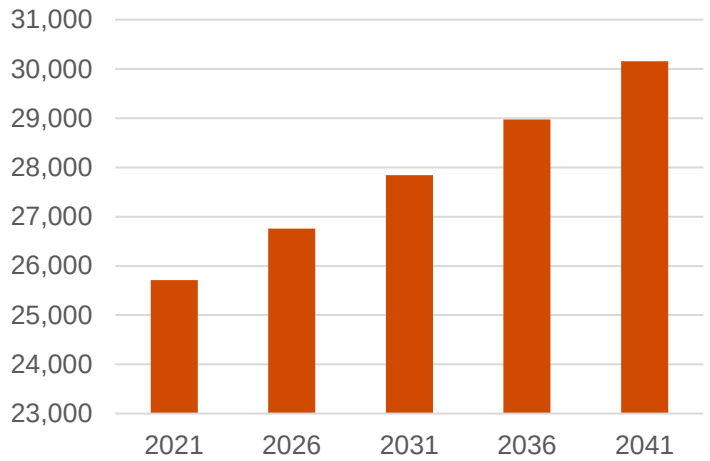
Current common planning assumptions estimate that the MWR LGA will grow from 25,713 persons in 2021 to 30,155 persons by 2041 (an increase of 4,442)

Step 1: Confirming baseline population growth and demographic characteristics

Baseline population growth

- Consistent with the 2023 Mudgee and Gulgong Urban Release Strategy (URS), NSW DPE population projections are used as the baseline population projections for the MWR LGA.
- Additional temporary and permanent population from SSDs is not already counted in this DPE baseline projection.
- Over the period 2021 to 2041, the MWR LGA is projected to grow by 4,442 people (0.8 per cent per year).

Figure 3. Population projections to 2041: MWR LGA

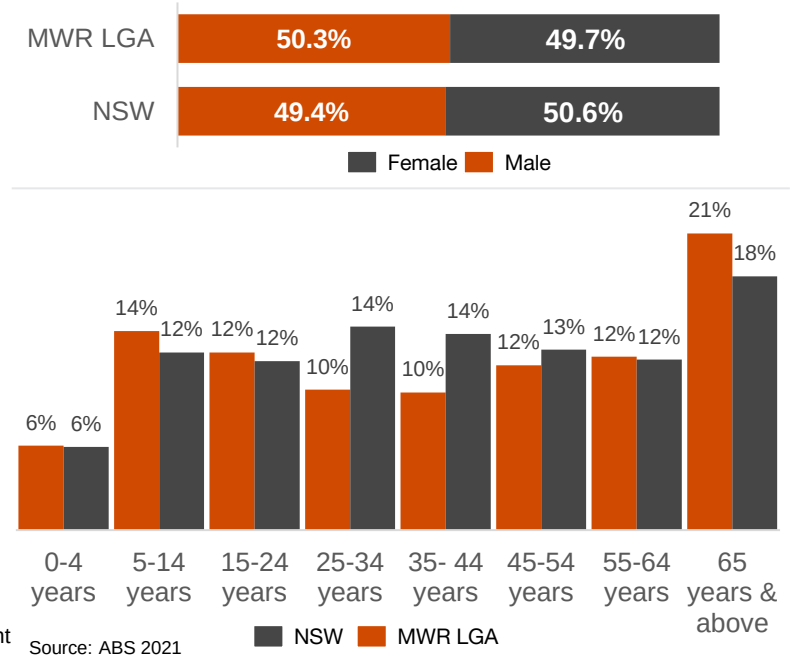


Source: NSW DPE

Key demographic characteristics

- The MWR LGA has a similar demographic gender spilt compared to the State, with 50.3% male and 49.7% of being female.
- The LGA has a slightly older existing population when compared to the overall State and with a lower proportion of population in primary working age (25-54).

Figure 4. Age and gender distribution of workers in MWR LGA



Source: ABS 2021

- The household size in MWR has remained consistent over the past decade and on par with the regional NSW average of 2.4.
- The proportion of family households within the LGA has increased since 2011 by 11%, accounting for 67% of total households in 2021. Other households, which includes visitor households and other non-classifiable households, has decreased by 18% since 2011.

Table 1. Household Size (2001-2011)

Area	2021	Change 2011-2021
MWR LGA	2.4	0%

Table 2. Household types (2011-2021)

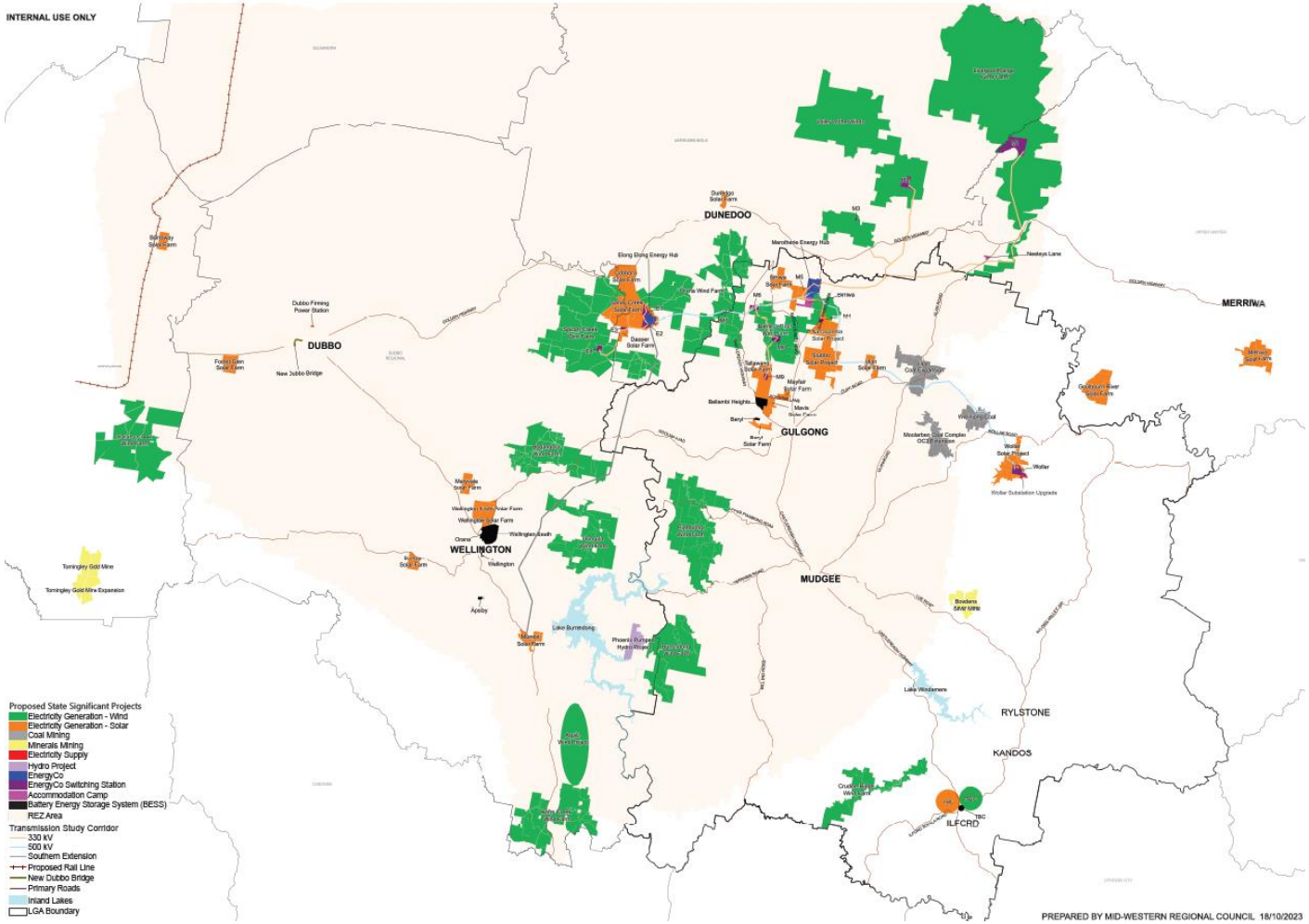
Household Type	MWR LGA	
	2021	Growth since 2011
Family	67%	11%
Lone Person	23%	8%
Group household	2%	6%
Other household	7%	-18%
Total	100%	7%

Source: ABS 2011, 2021

The model considers 25 SSD projects plus EnergyCo's transmission lines that are situated within and in close proximity to the MWR LGA

Steps 2 and 3: Confirming scope of employment generating projects and associated worker requirements

Figure 5. SSDs within and surrounding the MWR LGA



As of October 2023, a total of 36 SSD projects plus EnergyCo's transmission lines have been slated for development in and around MWR LGA. A total of 25 projects, as well as EnergyCo's transmission lines, have been included as 'in-scope' for the purpose of this analysis. Projects included in-scope were based on several criteria including whether the project is: (1) located (entirely or partially) within the MWR LGA; (2) within or approximately 40 minutes drive of Mudgee or Gulgong, (3) closer to Mudgee or Gulgong than any other significant centre or town in the region. The projects identified at this point in time vary in maturity. For "in-scope" projects, a maturity assessment and greater detail of these projects can be seen in the following slide and Appendix A.

Source: MWRC

The projects listed “in-scope” are included in the tables below

Steps 2 and 3: Confirming scope of employment generating projects and associated worker requirements

Table 3. SSDs within the MWR LGA

Project	Estimated Workforce		Timeframe (targeted)	
	Construction	Operation	Construction	Operation
Bowdens Silver Mine	320	228	2024 ,18 months	2026 to 2045
Moolarben Coal	250	0	2025, 36 moths	2028, to 2038
Ulan Coal	0	931	2021	2021, to 2035
Mayfair Solar	150	2	2025, 12 months	2026 to 2046
Narragamba Solar	400	10	2025, 36 months	2028 to 2053
Wollar Solar Project	400	5	2023, 12-18 months	2024 to 2050
Stubbo Solar Project	507	10	2024, 24 months	2026 to 2050
Tallawang Solar Farm	430	27	2024, 34 months	TBD
Birriwa Solar Farm	800	15	2024, 36 months	2027, to 2057
Mavis Solar	150	5	2025, 12 months	2026 to 2065
Barneys Reef Wind Farm	340	10	2024, 28 months	2026, to TBD
Burrendong Wind Farm	250	15	2023, 30 months	TBD
Piambong Wind Farm	400	15	2026, 30 months	2028, to 2058
Orana Wind Farm	580	27	2026, TBD	2028, to TBD
Liverpool Range Wind Farm	800	47	2024, 36 months	2027, to 2052
TBA	300	15	2026, 15 months	2028 to 2058
Bellambi Heights Battery	100	3	2024, 12-18 months	TBD
Beryl Battery	40	1	2025, 12 months	2026 to 2051

Key: Included in current projections Not included in current projections

Source: MWRC

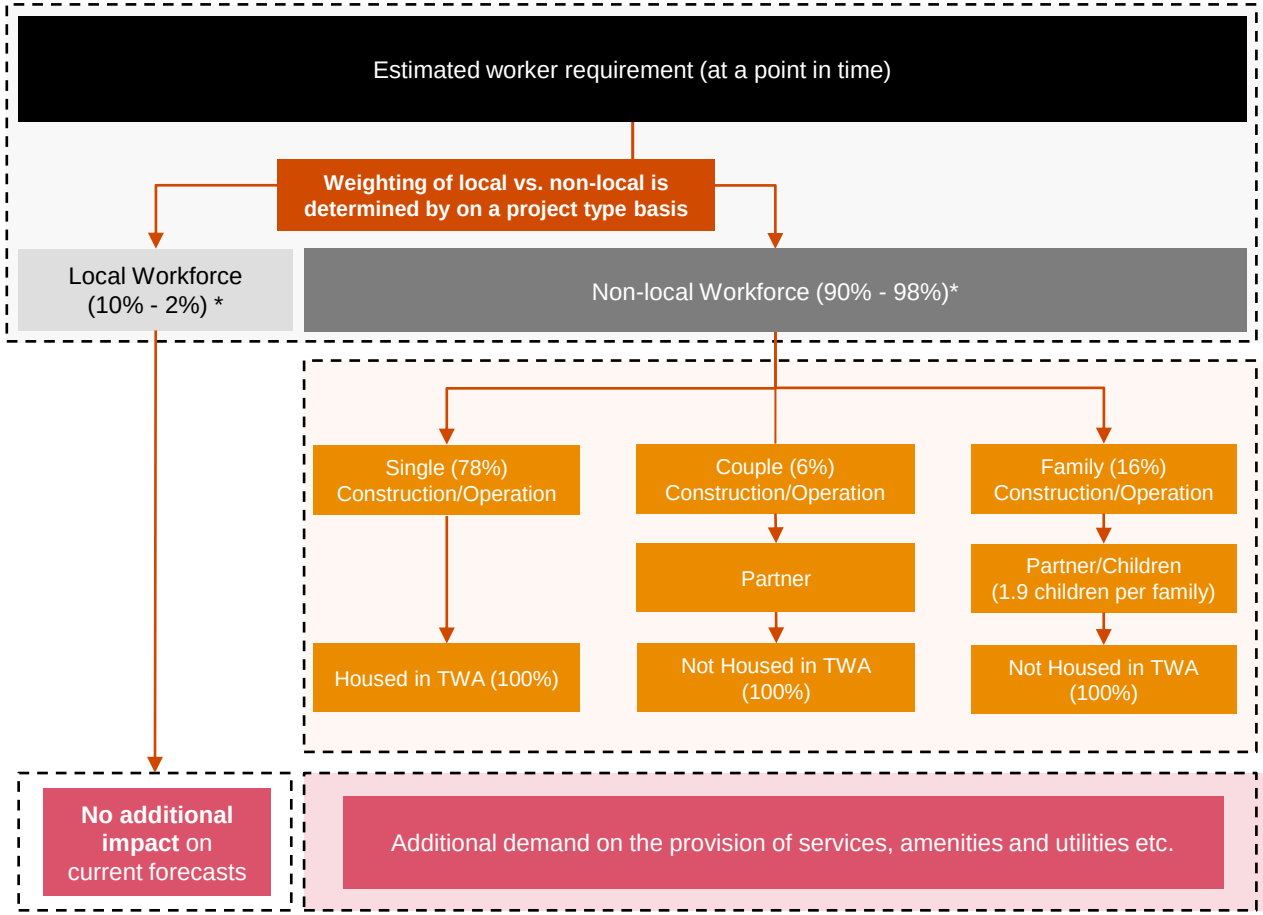
Table 4. SSDs surrounding the MWR LGA

Project	Estimated Workforce		Timeframe (targeted)	
	Construction	Operation	Construction	Operation
Cobbora Solar Farm	700	8	2024, 36 months	2027, to TBD
Dunedoo Solar Farm	125	3	2022, 12 months	2023, to 2053
Dapper Solar Farm	350	20	2025, 18-24 months	2027, to 2057
Wellington Solar Farm	200	3	2019, 48 months	2023, to 2053
Wellington North Solar Farm	400	4	2023, 24 months	2025, to 2055
Sandy Creek Solar Farm	700	15	2025, 24 months	2027, to 2057
Goulburn River Solar Farm	350	10	2023, 36 months	2026, to 2061
Pinecrest Solar*	175	7	2025, 18 months	2027, to TBC
Merriwa Solar Farm*	500	20	TBC	TBC
Valley of the Winds	400	50	2023, 42 months	2027, to TBD
Spicers Creek Wind Farm	250	12	TBD, 30 months	TBD, 30 years
Uungula Wind Farm	262	12	2023, 36 months	TBC
Apsley battery*	50	TBC	TBC, 12 to 18 months	TBC, 30 years
Orana Battery storage*	100-150	TBC	TBC, 12 to 18 months	TBC
Wellington South BESS*	100	30	2023, 12 to 18 months	2024, TBC
Phoenix pumped hydro	500	50	2026, 50 months	2030, to 2080
Central-West Orana REZ	1800	98	2024, 36 months	2027, to TBD
Central-West Orana REZ (Secure Now)*	1250	49	2033, 12 months	2035 to TBD
Related Projects to Secure Now**	1080	37	2032, 60 months	2037 to TBD

Source: MWRC

The majority or workers are likely to come from outside the MWR LGA and some workers may bring spouses and families, generating additional population beyond worker requirements

Steps 4 and 5: worker and population assumptions



Overview of assumptions (further detail in Appendix A)

- Current labour market conditions and specific skills needs for the majority of in-scope projects mean it is likely that a very high proportion of the workforce will need to be sourced from outside of the MWR LGA (either nationally or internationally).
- Given this, it has been necessary to make assumptions about the ratio of local to non-local workforce. The assumption of the split of local vs. non-local workforce has been made on the type of project (e.g. mining, solar, wind, transmission line, substation). This has been done to improve certainty in the model forecasts as additional information becomes available.
- Primarily, a range of 10%-2% local vs. 90% - 98% non-local is applied to the project types. Appendix A details the exact local vs. non-local composition for each project type.

- While many workers are likely to be accommodated in temporary worker accommodation (TWA), some workers may bring families which will generate additional demand for housing and services in the MWR LGA.
- To determine additional impacts on housing and services, it is necessary to estimate the proportion of non-local workers that are likely to bring family or spouses (i.e. couple and family households)
- Based on demographic analysis of compariative regions that rely on external workforces (including Karatha, East Pilbara and Mount Isa) the modelling assumes that 78% of the non-local workforce will be single persons, 16% will be family households and 6% will be couple households (further detail can be found at page 66-68).
- It has been assumed that family households have an average 1.9 children which is based on the regional NSW average.

- The estimated worker count will be used to inform the gap between current and future capacity in housing and utilities and services. This analysis is documented in Chapter 4.

**Note, mining projects are assumed to have 95% local vs. 5% non-local as current information states they are utilising their existing workforce. This may change with future mining projects.*

Given the limitations of a point-in-time analysis, two types of sensitivity tests have been developed to account for the uncertainty around project timing and completion

Step 6: sensitivity testing

Sensitivity Test 1: project/worker volume[1]

There are currently 36 known projects within and surrounding the MWR LGA. The results presented in the next chapter have assumed 25 of these projects will be constructed and become operational directly impacting the LGA as described in page 13.

A sensitivity test has been developed to account for the possibility of some of these 25 identified projects not commencing. This has been presented as a **'reduced' scenario**. SSDs have been randomly selected to not be included under this scenario (with further detail provided at Appendix B).

Additionally, a sensitivity test that includes all 36 known projects has been run to illustrate the impacts of additional projects and/or a higher worker requirements on the results presented in this report. This has been presented as a **'plus' scenario**. Results are provided at page 28.

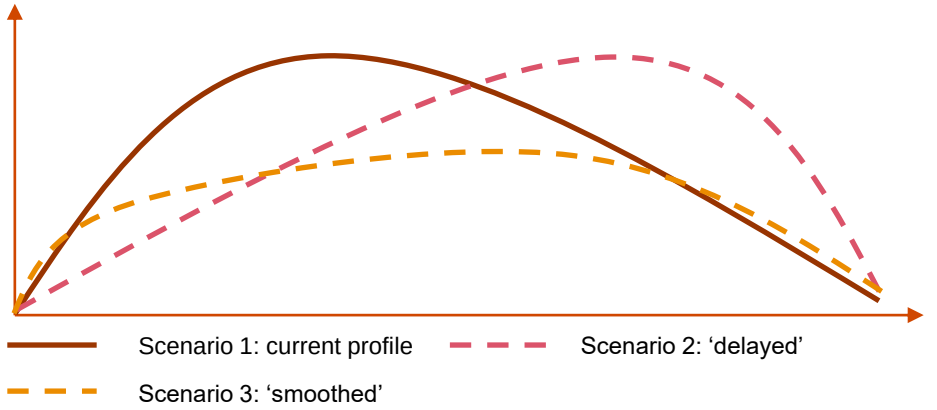
Sensitivity Test 2: project timing

Under The Energy Corporation of NSW' (EnergyCo's) NSW Network Infrastructure Strategy, the "deliver now" stage will see the completion of the NSW Central West Orana REZ transmission line, a key piece of enabling infrastructure for other renewable energy projects within the region.

The Network Infrastructure Strategy proposes that the transmission lines under the "deliver now,"" for the Central-West Orana will be completed by 2027/2028. To provide a variation of timing of projects, the modelling explores an additional scenario where the completion of this line is delayed by 2 years. Accordingly, all renewable projects in the model are assumed to also delay by 2 years. This scenario is reflected indicatively in the figure below with results provided for the core scenario on page 25 and 26. Note that mining projects and other projects that do not rely on the transmission line are not subject to this variation.

Additionally, a hypothetical smoothed scenario has been run where projects' construction time lengths have been increased by 50%, and randomly selected projects have been delayed so that there is limited cross over in construction phase of like projects. This has been presented as a 'smoothed' scenario. Results are provided at page 25.

Figure 6. Indicative timing scenarios



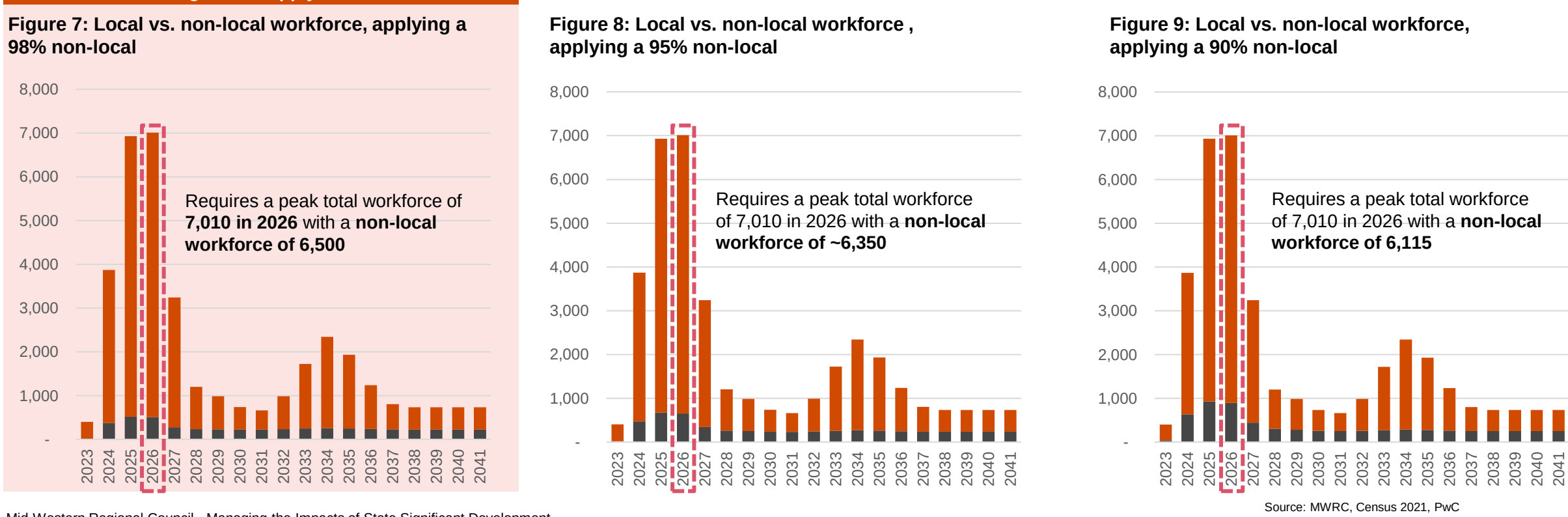
1. Note, currently the model considers each worker unique to each project. Appendix B provides some preliminary estimates to account for worker mobility which could be informed with greater access to data in the future.

Results indicate a peak workforce of 7,010 in 2026 with between 6,115 and 6,500 likely to come from outside of the MWR LGA when considered across a range of scenarios

Building on the assumptions outlined on page 19, the charts below show the construction and operational worker requirement based on information provided by project proponents and MWRC. Three scenarios are presented, with each scenario applying a different ratio of local vs. non-local workforce sourcing for **new renewable projects**. The results presented on the following pages and throughout this report relate to the core scenario which assumes that 98% of the workforce requirement will be non-local for **new renewable projects**.[1] This assumption reflects the low unemployment rate in the region (<2% unemployed).

Results: Peak workforce demand

Core Scenario
The following results apply this scenario.



Source: MWRC, Census 2021, PwC

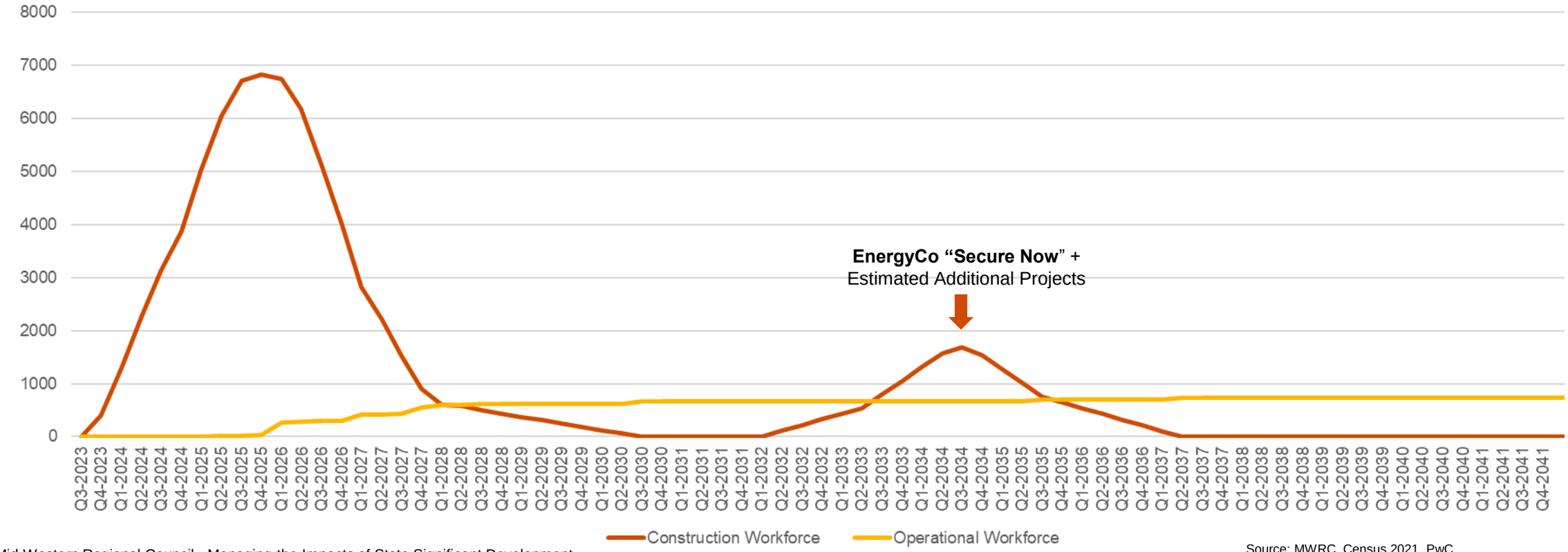
1. Note, the results presented in the body of this report include two mining related projects (Moolarben Coal and Bodwens Silver). A 98% local vs. 2 % local ratio has been applied to these projects to accurately reflect current industry employment concentrations for the region. This assumption is detailed in Appendix A.

The construction workforce is estimated to peak in 2025 at 6,823 workers. The operational workforce will stabilise around CY 2028 providing ~ 660 going jobs, and ~ 430 renewable jobs on an ongoing basis.

Breaking down the total worker composition by construction workers and ongoing operational workers highlights a peak construction workforce of 6,823 in Q4 2025. The operational workforce will stabilise by Q3 2030 at around 660 jobs before peaking in 2037 at 735 jobs. Bodwens Silver Mine will contribute around 220 of these ongoing jobs with the remaining ~430 in the renewables sector. This trend is reflective of the greater longevity and decreased intensity of labour required to operate renewables.

Results: Total workers, by construction or operational work

Figure 10: Composition of total workforce required to 2041, core scenario



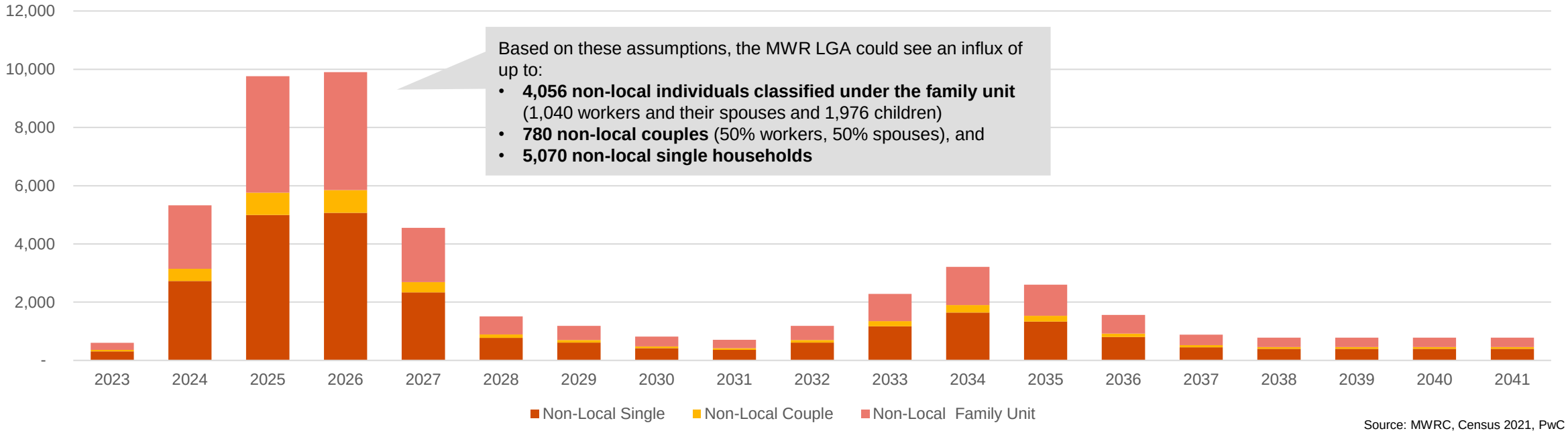
Source: MWRC, Census 2021, PwC

Taking into account the likelihood that some workers bring spouses and families, the total estimated additional population as a result of major projects in and around the MWR LGA will peak at 9,906 in 2026 comprising of 66% workers, and 34% spouses and family

As outlined on page 19, the modelling used to determine the total population increase assumes that some workers will bring their families and spouses to the region. Of the total non-local workers required for in-scope projects, the modelling assumes that **78%** will be single person households, **16%** will be family households and **6%** will be couple households. Non-local couples are defined as workers and their spouse. Non-local family units consist of workers, their spouse and children (and comprising 1.9 children as per the regional NSW average). With these considerations and assumptions, the total additional population could peak up to ~9,900 in 2026.

Results: Total additional population, highlighting additional population generated by spouses and families

Figure 11: Composition of total additional population to 2041, core scenario



Based on these assumptions, the MWR LGA could see an influx of up to:

- **4,056 non-local individuals classified under the family unit** (1,040 workers and their spouses and 1,976 children)
- **780 non-local couples** (50% workers, 50% spouses), and
- **5,070 non-local single households**

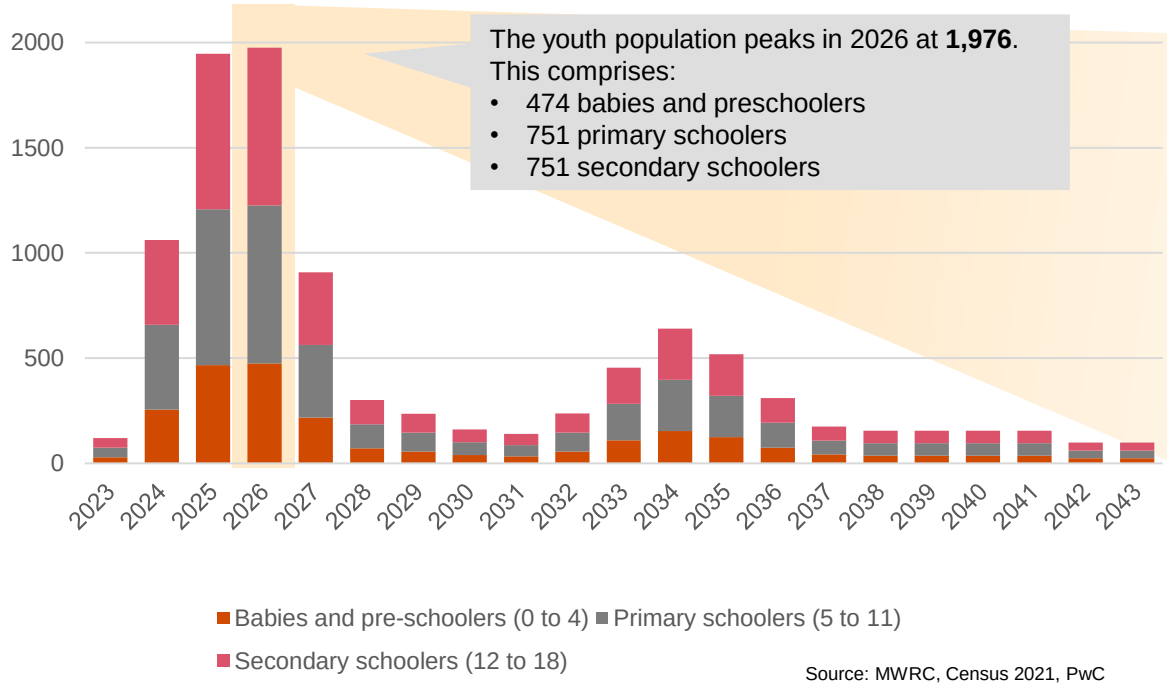
Source: MWRC, Census 2021, PwC

With the possibility of families moving to the region, there is the potential for a peak of an additional 1,976 childcare and school aged children to be located within the MWR LGA in 2026

For the purposes of the impact assessment, in particular for schools and childcare facilities, the regional NSW demographic profile has been overlayed over the family unit projections to develop an example demographic profile of the potential additional youth population as a result of worker families moving to the region. This example shows the potential growth in different age bands. It is important to note that this example does not allow for any change in relative growth rates between and within these age bands over this period.

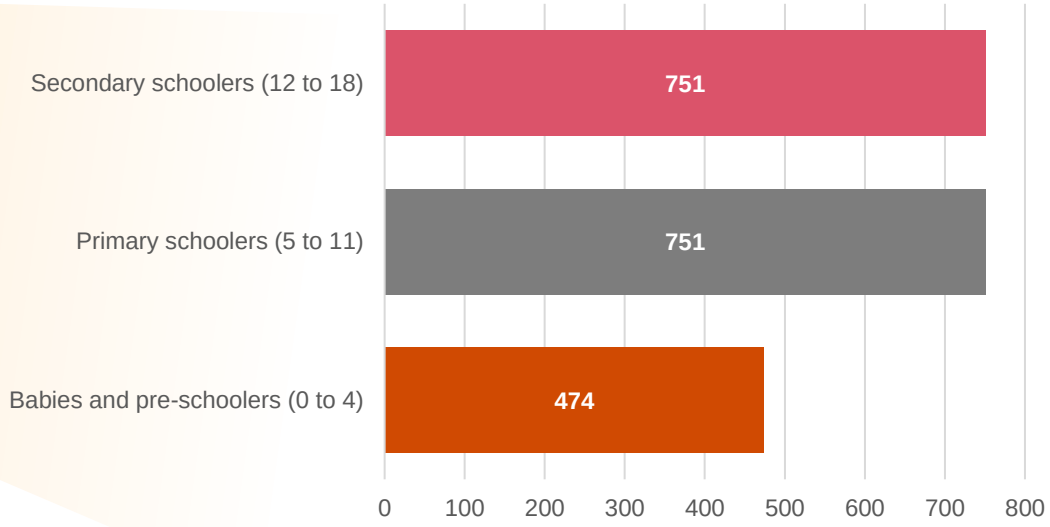
Results: Additional childcare and school aged children

Figure 12. Projection of Additional Children Age Structure to 2041, core scenario



Source: MWRC, Census 2021, PwC

Figure 13. Projection of Peak Children Age Structure (2026), core scenario

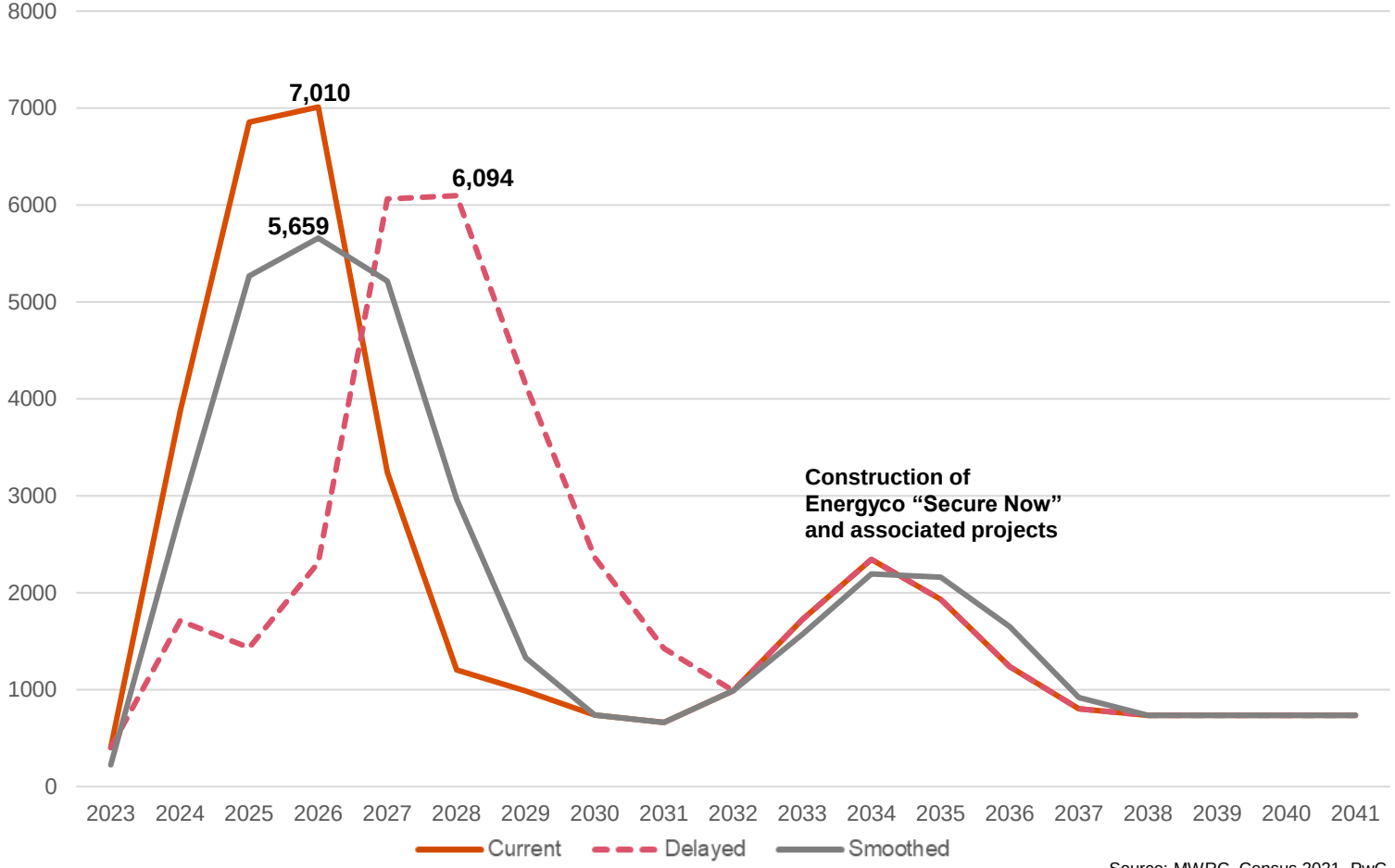


Source: MWRC, Census 2021, PwC

A delayed scenario pushes the workforce peak back to 2028, with assumed flow on population impacts also pushing out to this period. Likewise, a 'smoothed' scenario spreads peak workforce over a ~4 year period (2025 -2029)

Results: project timing sensitivity

Figure 14: Worker requirements – 'current', 'delayed' and 'smoothed' scenarios



Source: MWRC, Census 2021, PwC

The chart to the left illustrates three timing scenarios of the total workforce requirements outlined in the preceding pages.

The **current scenario** assumes all projects in the MWR LGA and surrounding projects are constructed and delivered on time leading to a jump in the REZ workforce to 3,869 and 6,721 by the end of 2024, 2025 respectively.

The **delayed scenario** involves delaying the REZ projects that are due to be delivered in 2024-2027 and shifts them 2 years into the future, shifting the peak to 2028. The 'Deliver Now' transmission lines from EnergyCo construction timeline has been extended by 2 years, and the 'Secure Now' transmission line (2032-2034) remains on schedule, assuming there is some efficiencies gained from constructing the first ('Deliver Now') transmission lines. This timeline amendment results in minimal change to the peak workforce.

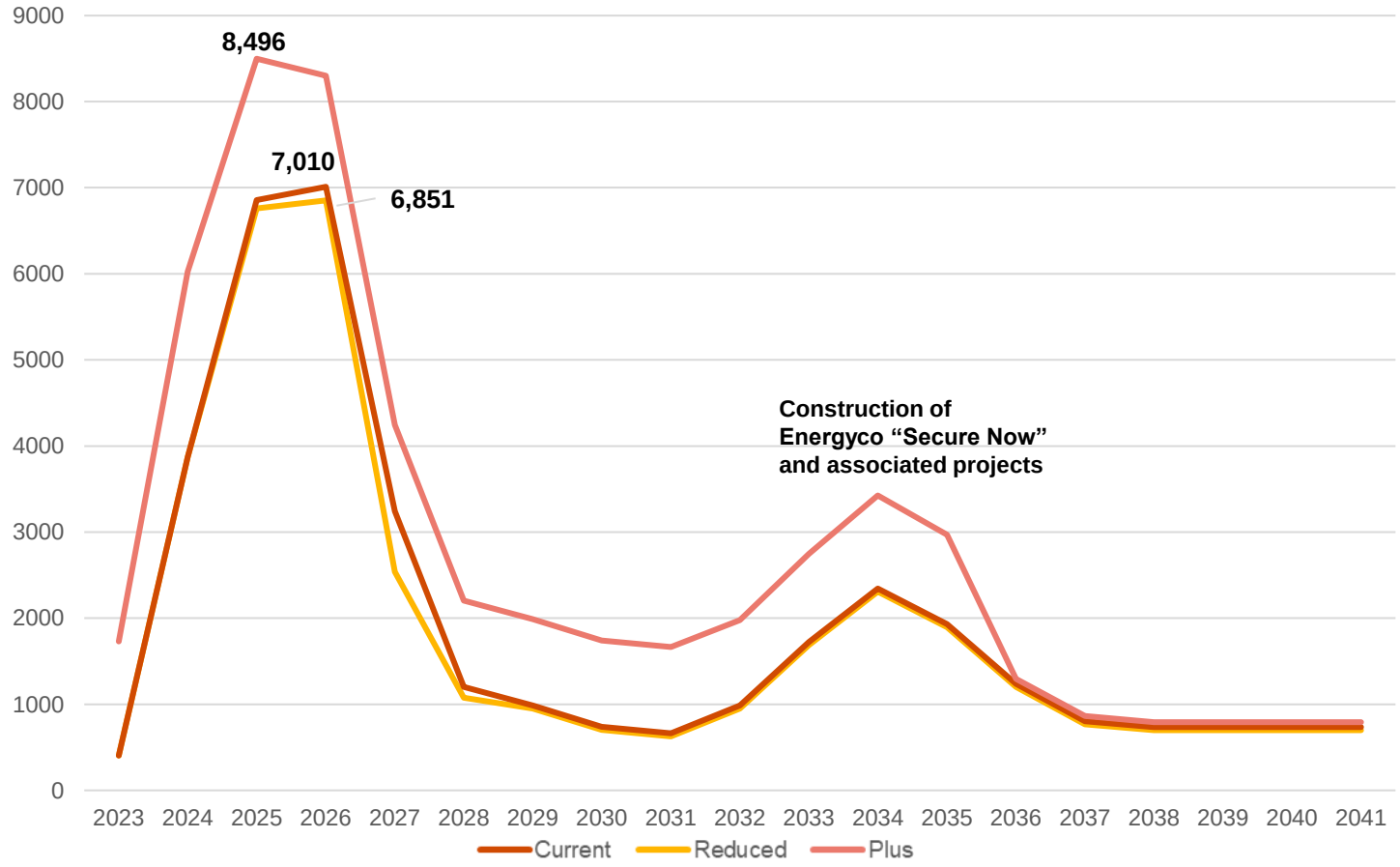
A hypothetical **smoothed scenario**, which aims to minimise like projects (e.g. solar, wind) that have the same start time, both reduces the peak to 5,659 and results in 5 years (2024-2028) where the workforce is above 2,750 workers.

Note: Additional sensitivity analysis that speculate worker mobility is included in appendix B (see pages 75-76).

A 20% increase project and worker requirements would push peak workforce to almost 8,500, while a reduction in projects based on a high-level viability assessment could result in ~150 less workers at peak

Results: project / worker volume sensitivity

Figure 15: Total worker requirements – 'current', 'reduced' and 'plus' project scenarios



The chart to the left indicates the results of a sensitivity test to estimate the impacts on worker requirements in light of a reduced and increased number of projects proceeding when compared to in-scope projects under the core scenario. These scenarios are:

- **Current**: in-scope projects as outlined on page 18.
- **Reduced**: only select projects that are associated with EnergyCo and/or assessed as highly likely to proceed (see appendix A for further detail on projects not included in this scenario).
- **Plus**: all identified projects included.

Considering the reduced estimate, additional workers required would peak in **Q1 2026 at 6,851**. On the other hand, the plus estimate sees a peak of **8,496 total workers in the same quarter** (Q1 2026).

In the medium term, from 2037, as a result of longer term operational jobs there would be:

- ~ 790 operational workers required under the plus scenario
- ~ 700 operational workers would be required under the reduced scenario

This compares to the current scenario which estimates ~ 735 operational jobs on an ongoing basis.

Source: MWRC, Census 2021, PwC

Note: Additional sensitivity analysis that speculate worker mobility is included in appendix X.

Contents

The impact analysis provides a high level assessment of the impact that increased population will have on services, housing and infrastructure with intention of aligning growth planning and mitigation across levels of government

Purpose of Impact Analysis

This analysis quantifies, at a high level, the impact that the additional surge in worker population will have on:

- demand for housing
- demand for social and other services provided by local and/or state government, and
- operational and/or maintenance impacts on council operated infrastructure assets including sewage, water, waste management and local roads

The impact analysis is intended to promote alignment amongst state and local government and provide the basis for further collaborative planning and risk mitigation. It should be seen as a starting point for informing appropriate state and local agencies to align growth planning for services, manage community impacts across the delivery phases and to determine need for additional analysis.

Interpreting the results of the impact analysis

The impact analysis is directly underpinned by the outputs from the worker and population estimates outlined in the preceding chapter. The worker and population estimates are reliant on several core assumptions around workforce composition and project timing and workforce need:

- 98% of the required workforce will come from outside of the MWR LGA
- Of the total workforce, 16% will be family households and 6% will be couple households meaning they will bring spouses and/or children.
- Peak construction workforce is 2026, reflecting the project timing and worker needs as communicated by proponents.

The starting point for understanding the impacts on housing, services and infrastructure has largely been determined by either:

- Determining the current ratios of service provision relative to the current population (e.g. number of GPs per 1,000 people), and/or
- Understanding the current level of operational capacity (e.g. sewage treatment capacity).

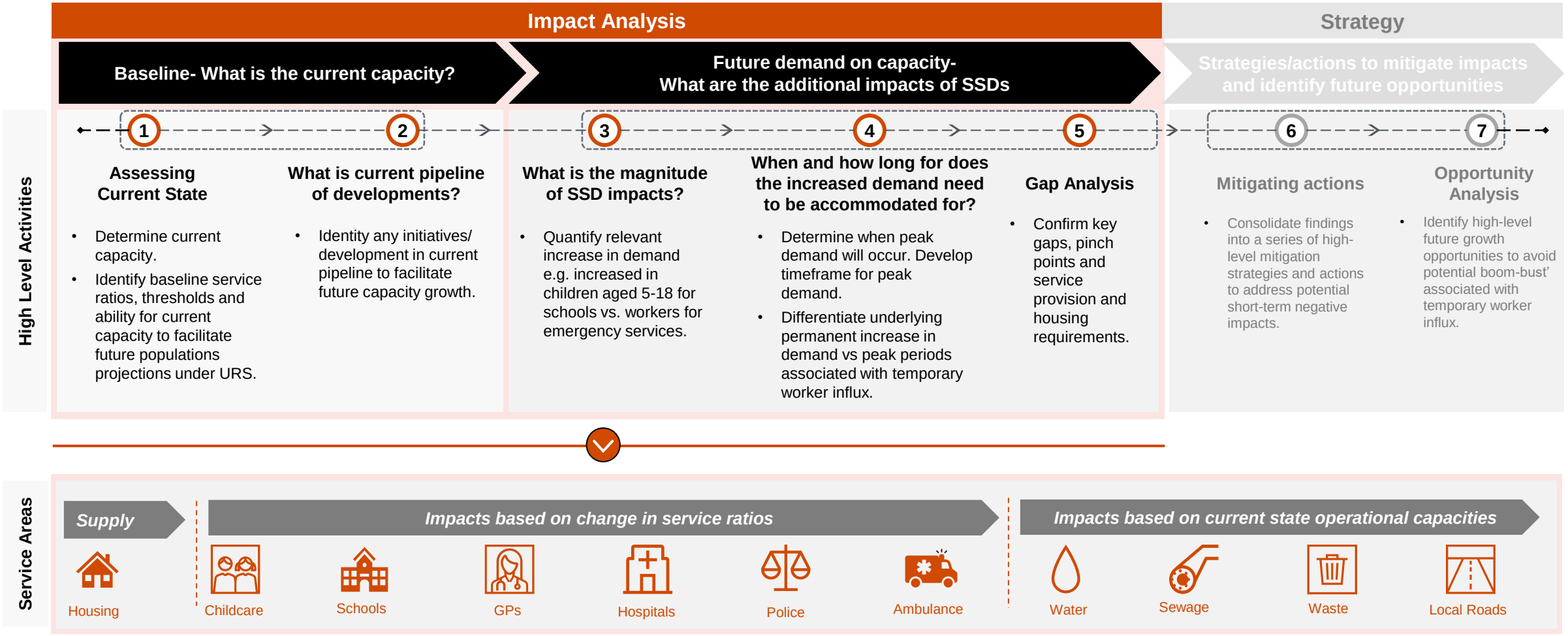
In determining impacts on rates of service provision the approach has broadly covered the following three steps:

1. Determine the current ratio of service provision
2. Establish the service gap resulting from increased population and economic migration
3. Size of the response needed over the next 20 years to meet the service gap

Note: Importantly, this analysis does not consider whether the current rates of service provision are adequate. That is, it takes current levels of service as a given and the impact is determined by the investment or service response required to return to current service levels, rather than an optimal service level.

A standardised framework has been developed to assess impacts of increased population on housing, services and utilities, however differing approaches have been used to benchmark current 'supply'

Impact Analysis Framework



Availability of housing underpins the ability for the LGA to ultimately attract and retain the workforce. As a direct flow on, childcare, hospital and ambulance services are likely to experience service pressures.

The summary results of the impact analysis below is directly underpinned by the outputs from the worker and population forecasts, which estimate a peak of ~9,900 additional persons (incl. workers, families and spouses) in 2026.

Service Area	Current state	Demand impact	Impact[1]	Factors impacting ability to meet demand	Detail
Housing	• 74 vacant properties across the LGA[2] • 1,630 housing approvals in past 10 years (163 a year)	• Up to **1,493 additional dwellings** in peak construction (2026) • 2023-2041 **median of 519 additional dwellings** per annum (p.a.)	**>75% increase**	• Availability of zoned land • Rate and speed of zoning, approvals and servicing • Ability to provide mixed and varied dwelling types • Ability to preserve local short-term lease / rental market for visitor economy	Pages 32-34
Childcare	• **11** childcare centres with **720 approved childcare places** • **0.35 childcare places per child** (inner regional NSW average)	• Up to **59 additional childcare places in peak** construction period (2026) • 2023-2041 **median of new childcare places is 7** p.a.	**<25% increase**	• Qualified workforce (currently experiencing national shortage) • Buildings/land to house certified childcare centres • Approval processes for additional childcare services • The depth/breadth of childcare service provider market in the region • Available and suitable housing for childcare workers to live	Pages 35 -36
Schools (Primary and Secondary)	• **9** primary schools with **2294** students enrolled[3] • **16:1 average student to teacher ratio** • **4** secondary schools with **1852** students enrolled[3] • **11:1 average student to teacher ratio**	• Up to **26 additional primary school classes (751 students) in peak** construction period (2026) • 2023-2041 **average of 4 additional primary school classes** p.a. • Up to **30 additional secondary school classes (751 students) in peak** construction period (2026) • 2023-2041 **average of 4 additional secondary school classes** p.a.	**>25% <50% increase** **>25% <50% increase**	• The MySchools data indicates that schools in the MWR LGA have a lower teacher to student ratio compared to the maximum allowable. This suggests that there may be existing capacity within the school system to absorb the additional demand generated by children of worker families. This additional capacity, however, is dependent on physical space in existing classrooms • Supply of additional new classrooms • Supply / ability to attract additional teachers to the MWR LGA • Available and suitable housing for teachers to live	Pages 37-38
General Practitioner (GP)	• GPs within the LGA work **12.25 to 15.75 full time equivalent (FTE)** • Current **GP to patient ratio of 1:1,168**	• Up to **8 additional dedicated GP FTE in peak** construction period (2026) • 2023-2041 **median of 1 additional dedicated GP FTE** p.a.	**>50% increase**	• Supply / ability to attract additional GPs to the MWR LGA • Increased utilisation of alternative healthcare delivery models, such as telehealth, to offset peak demand • Available and suitable housing for GPs to live • Prescribing nurses and access to prescription medication	Pages 39-40
Hospitals	• Mudgee Health Services has **8 emergency department (ED) bay spaces** • **2 nurses per shift** and **1 additional nurse for peak period** (10:30-19:00) • 14,583 total presentations in 2022	• Up to an additional **8 ED bays and 7 nurses may be required in peak construction period (2026)** [4] • Up to an additional **5,085 ED presentations** could be expected in **2026**	**>75% increase**	• Ability to better use current ED layout and setup • Triaging and transferring of patients between rural hospitals • Ambulance direct deliveries to other hospitals based on patient needs i.e. Dubbo Base Hospital • Increased utilisation of alternative healthcare delivery models, such as telehealth, for lesser triage category presentations	Pages 41- 42

1. Impact is calculated at peak demand 2. As at October 2023, sourced from MWRC. 3.Count is for number of schools with 20 or more students only. Based on consultations, an assumption has been made that there is current capacity for ana additional ~150 primary and secondary students. 4. Based on available data the old (2006) MoH methodology for projecting ED treatment spaces was utilised. This method could overestimate bays required.

Water supply and sewage systems will require significant upgrades to service the SSD workforce, whilst other services such as waste and roads may be able to adapt easier

The summary results of the impact analysis below is directly underpinned by the outputs from the worker and population forecasts, which estimate a peak of ~9,900 additional persons (incl. workers, families and spouses) in 2026.

Service Area	Current rate of service	Service response	Impact[1]	Factors impacting ability to meet demand	Detail
Ambulance	• **11,186 responses in 2022** for Mudgee- Lithgow SA3 • **1 paramedic for 330 residents** (145 paramedics) Mudgee – Lithgow (SA3)	• Up to **30 additional paramedics in peak** construction period (2026) • 2023-2041 **median of 4 additional paramedics** • Up to **803 additional responses in peak** construction period (2026)	**<25% increase**	• The incoming worker profile is assumed to be a younger and healthier cohort, however an increased risk of traffic vehicle accidents may cause and increase in responses • Proximity of ambulance services to major construction sites • Supply / ability to attract additional paramedics • Supply of ambulance vehicles	Pages 43-44
Water	• Current water supply systems across the LGA are at capacity and intended to grow with baseline population	• **Any additional growth in the region will require additional works** • Distribution infrastructure will need to be upgraded in consideration of surge capacity	**Forecasted to exceed current capacity**	• Water licenses are at near-full allocation • Ability to access and viability of ground water reserves	Page 47
Sewage	• Mudgee and Gulgong STPs have remaining capacity for the baseline (DPE) population growth with consideration to planned upgrades.	• Up to **5000 additional residents** may be housed in dwellings in peak construction period (2026), producing up to **524 megaliters (ML)** • 2023-2041 median of **~1,000 additional** residents in dwellings p.a. producing a median of **86 ML p.a.**	**Forecasted to exceed current capacity**	• Current processing facility is at capacity and would require expansion • Ability to distribute population across regional centres within the LGA	Page 48
Waste	• In 2022-23, **Mudgee Waste Facility collected a net waste total of 33,951 tonnes of waste** • Under baseline population projections (i.e. no additional demand generated by SSDs), the LGA has **40 years of solid waste land fill capacity**	• Up to **7,428 additional tonnes of domestic waste** is forecast to be produced in peak construction year (2026) from the residential and worker population. • Between 2023 and 2041, an **average of 2,007 additional tonnes of domestic waste** will be produced across from the residential and worker population.	**<25% increase**	• There is limited capacity for existing waste facilities to absorb construction waste, and other waste types generated over the construction phase of SSDs necessitating a need for proponent to source arrangements on a project-by project basis.	Page 49
Roads	• 2,460 km of local road network • **$8,539** average maintenance cost per km of road in 2021-2022	• Comparing FY22 to FY26, the maintenance cost **increases by $4,731 (to $13,270)** per km of road	**>25% <50% increase**	• Availability of equipment, workforce and budget to upkeep roads from increased heavy freight and equipment	Page 50
Police	• Consultation with the Orana-Mid Western Police District revealed a number of factors that may increase demand for policing service around traffic incidents, potential incidents occurring at TWAs and resource management across the entirety of the LGA.		**N/A**	• Active management of police resources • Prevention and education activities	Page 45-46

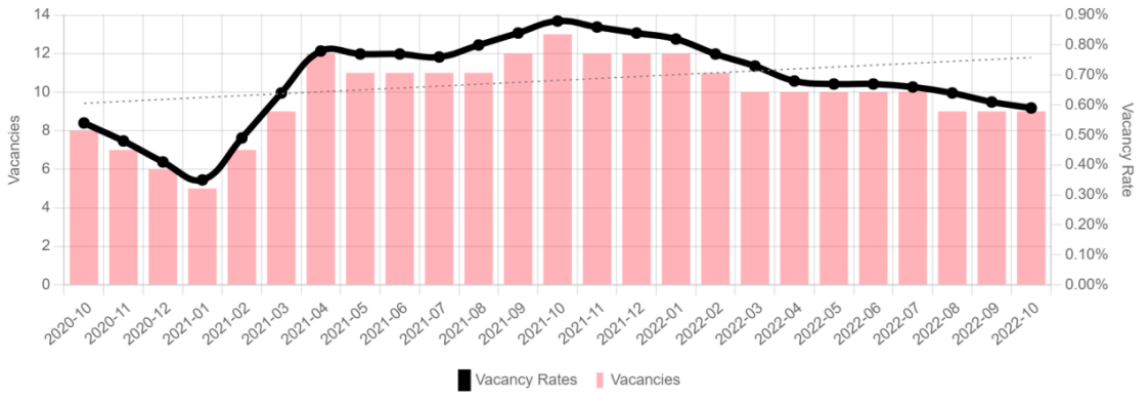
1. Impact is calculated at peak demand

The MWR LGA rental and housing markets are characterised by extremely low vacancy rates and growing house prices

Assessing Current State

- The housing market in the MWR LGA has historically been tight with a <1% vacancy rate. Only 68 rental properties were available as at the end of 2022 across the LGA.
- Changes to overarching macroeconomic conditions have seen an easing of this tightness in 2023. As at September 2023, 75 properties in Mudgee and 5 properties in Gulgong were available—nonetheless this still reflects a vacancy rate close to 1%.
- Overall the tight rental market reflects, in part, an increased prevalence of short-term rental market listings (i.e. Airbnb listings). As at October 2023, there are 266 Airbnb listings within the LGA, 244 of which are located in Mudgee.[1]
- The low vacancy rate has also impacted the affordability of rentals. Currently, the median rent for houses in the LGA is $510 per week.

Figure 16: Mid-Western Regional Vacancy Rates (houses), 2020-2022



Source: URS (2023), Mid-Western Housing Delivery Plan, Domain Quarterly House Price report

Current Supply Pipeline

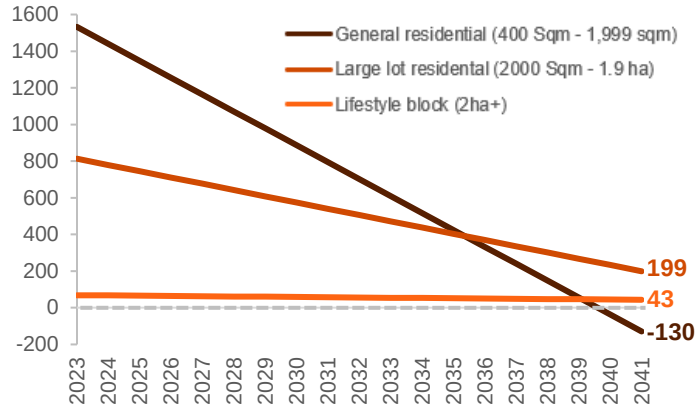
Figure 17 highlights the housing supply for baseline population growth in Mudgee (excluding SSDs), assuming lots are serviced and zoned in a timely manner. Given a buffer (5 years of demand), the Mudgee and Gulgong Urban Release Strategy finds that currently Mudgee has land supply to ensure:

- General residential land to around 2037. Demand will exceed supply by 130 lots in 2041.
- Large lot residential land to around 2041 (199 spare lots).
- Lifestyle block land to beyond 2041 (43 spare lots).

Figure 18 highlights the housing supply for baseline population growth in Gulgong (excluding SSDs), assuming lots are serviced and zoned in a timely manner. Given a buffer (5 years of demand), the URS finds that currently Gulgong has land supply to ensure:

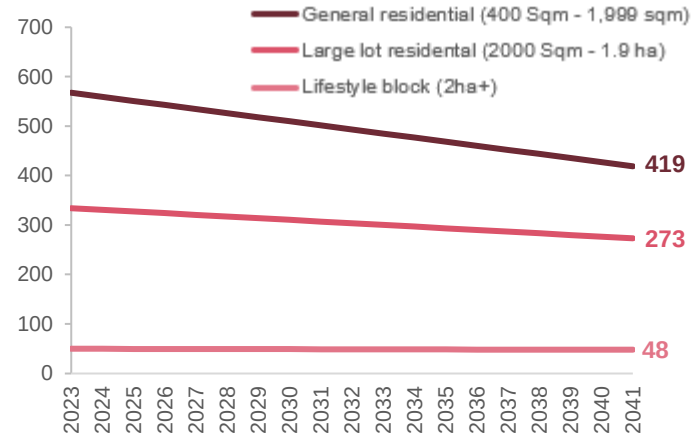
- General residential land to beyond 2041 (419 spare lots).
- Large lot residential land to beyond 2041 (273 spare lots).
- Lifestyle block land to beyond 2041 (48 spare lots).

Figure 17: Theoretical spare housing supply by lot type to 2041, Mudgee[2]



Source: Mudgee Gulgong Urban Release Strategy (2023)

Figure 18: Theoretical spare housing capacity by lot type to 2041, Gulgong[2]



Source: Mudgee Gulgong Urban Release Strategy (2023)

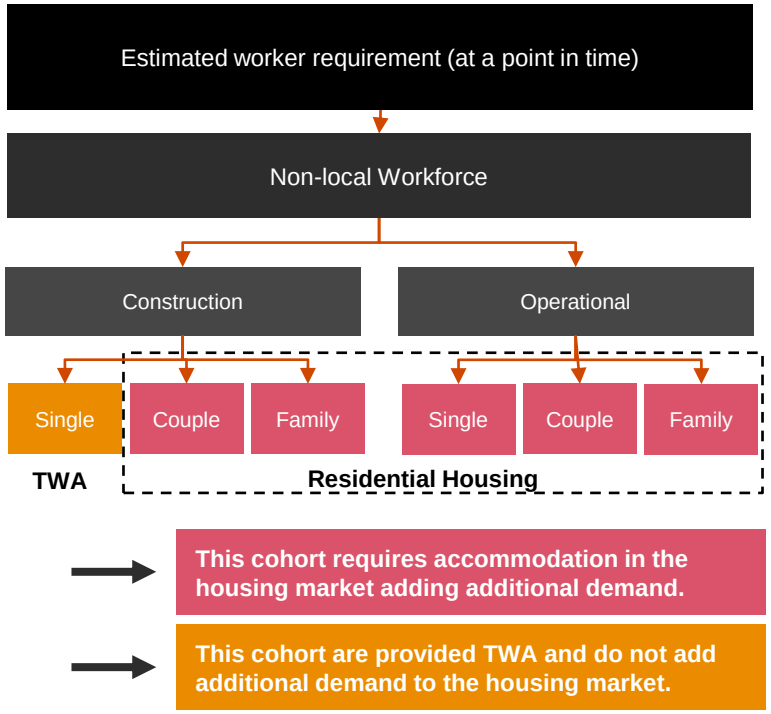
1. Source: MWRC

2. As outlined in the 2023 Urban Release Strategy, theoretical supply is dependent on council's ability to approve ~ 166 dwellings compared to the current rate of 60 dwellings per annum. Additionally, the Urban Release Strategy may underestimate demand of lifestyle blocks due to limited availability of data. As a result, theoretical supply could be overestimated.

The current and planned supply of housing will likely be unable to accommodate a sharp increase to the local population of up to an additional ~1,500 dwellings at peak demand in 2026

Revised Implied Dwelling Demand

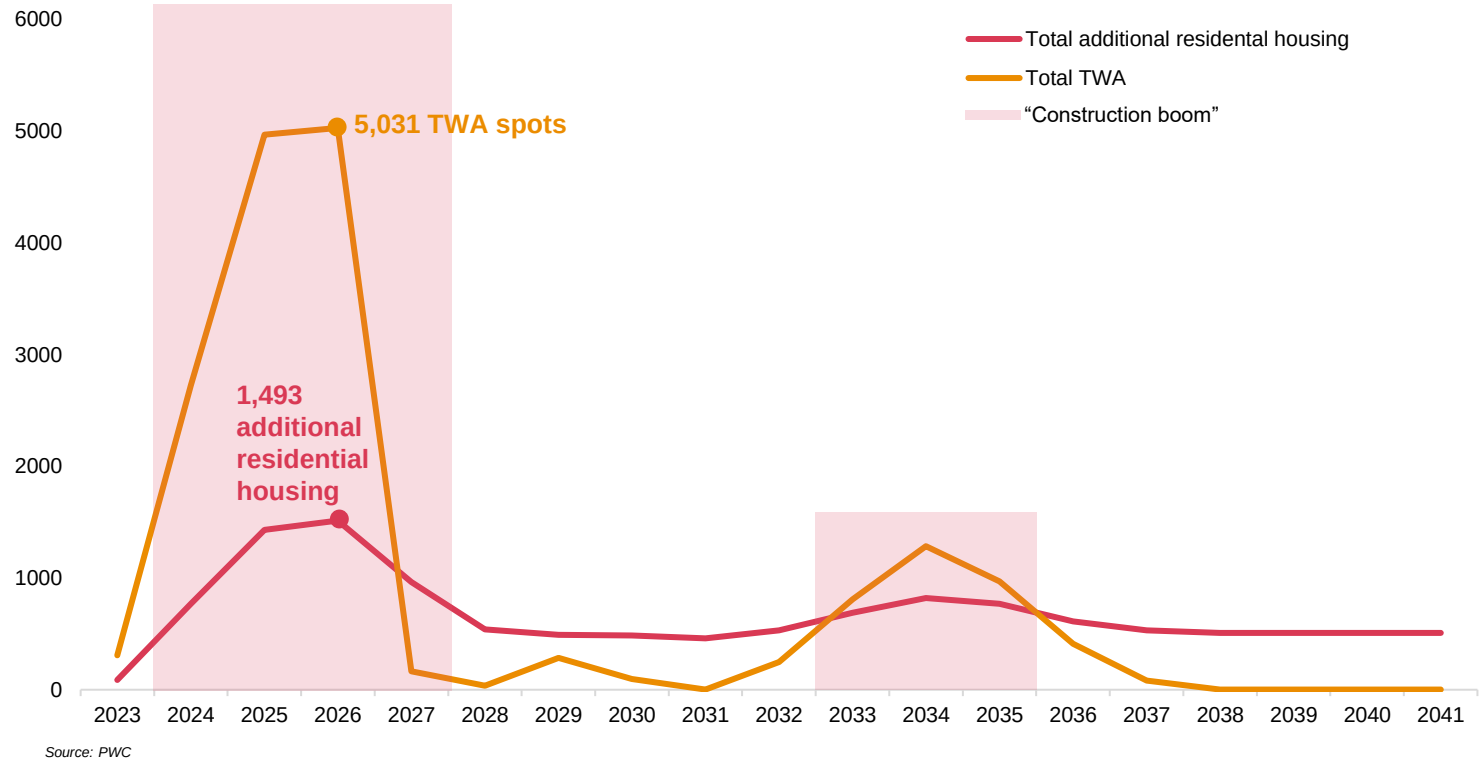
The housing needs of the incoming workforce associated with SSD projects in the MWR LGA are derived from a worker profile which allocates a worker as either a single, couple or family. Profiles are tied to housing type (i.e. market housing or temporary worker accommodation - TWA).[1] This method is depicted in the graphic below.



1. These housing assumptions differ form the 2023 Mudgee and Gulgong Urban Release Strategy (URS) by providing housing based on a worker profile. The URS allocated residential housing based on composition of the nonlocal workforce. The URS states that 100% operational and 10% of the construction nonlocal workforce will be provided residential housing.

Demand for Residential Housing and TWA

Figure 19: Housing demand by characteristics per year



Source: PWC

01 — At the peak, up to **~ 5,000 TWA spots** may be needed in 2026 for single construction workers.

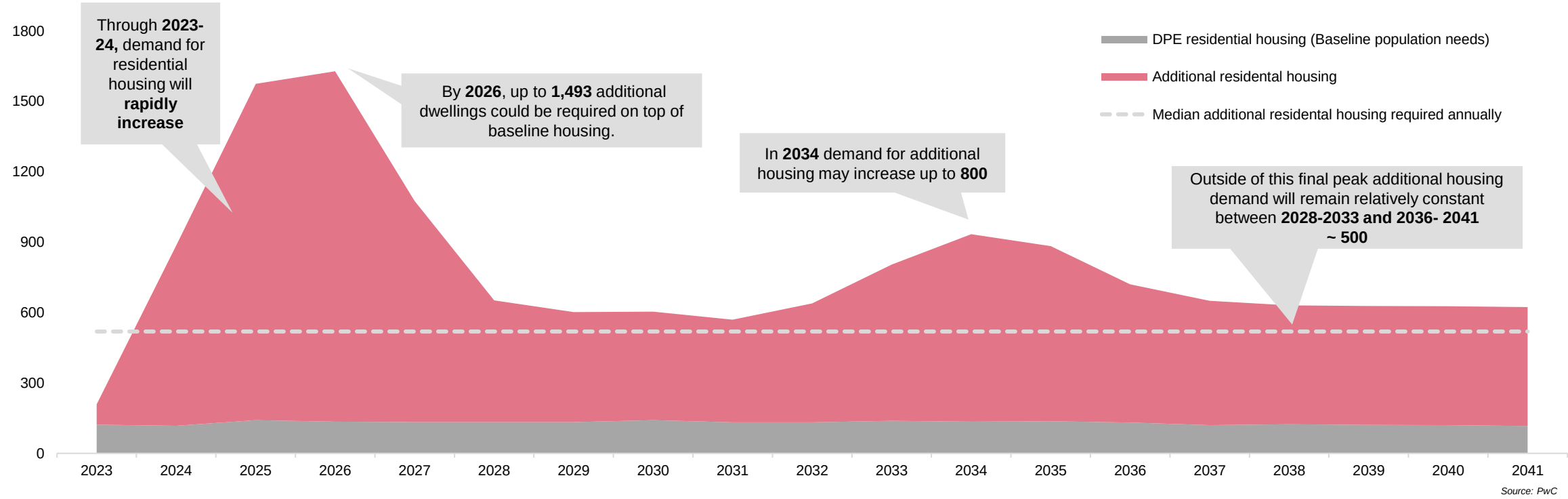
02 — Driven by the increased number of operational workers, demand for additional housing will peak in 2026 with **up to 58 single operational workers, 391 couples and 1,044 families** requiring additional residential housing.

Based on the current rate of DA approvals and supply of land, the housing market in the MWR LGA may not be able to meet the rapid increase in demand for residential housing by 2026

Implications for MWR LGA

The figure below highlights additional residential dwellings required over and above baseline population projections. This is based on the assumption that all couple and/or family households moving to the region will not be provided accommodation in TWA—these figures may vary should the proportion of workers bring families and/or couples be higher or lower. From 2023 to 2041 the median additional dwellings required annually is **519**. In practice, the rate of supply will vary based on the housing market conditions, speed of approvals and supply of labour and materials. Additionally, the timing of the housing demand is dependent on projects proceeding on schedule and maintaining the expected completion date.

Figure 20: Additional residential housing demanded by SSD workforce (and dependents)

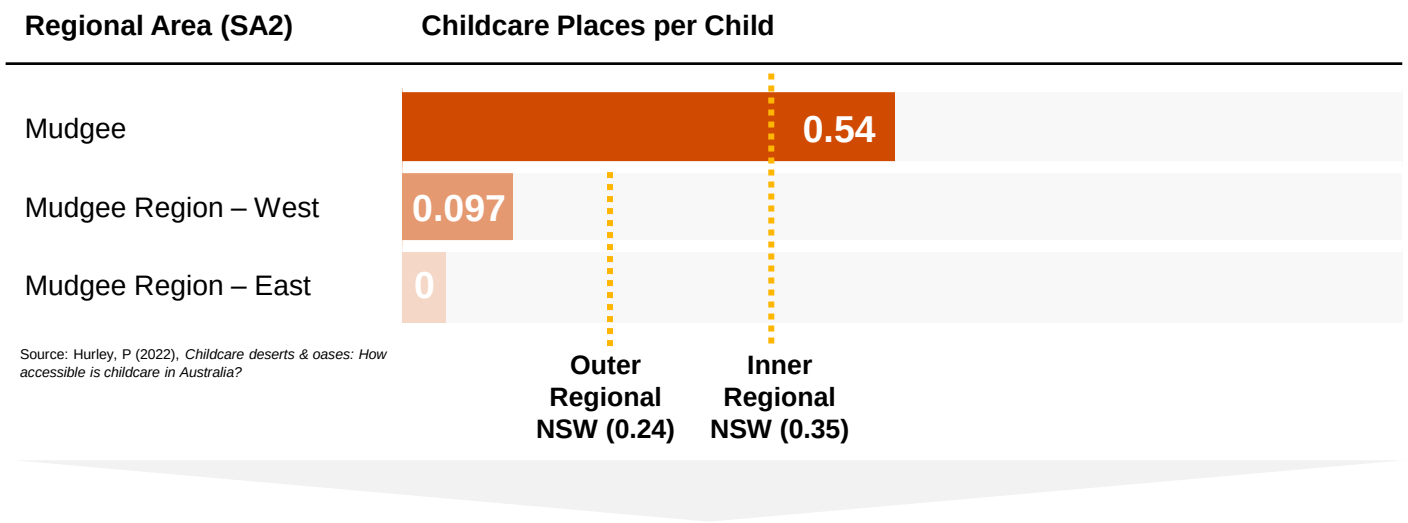


Mudgee town centre has a higher rate of childcare places to children compared to the Inner regional NSW average, however additional demand will place pressure on existing services

Assessing Current State

The current national median of childcare places per child is 0.38. The 2022 report, '*Childcare deserts & oases: How accessible is childcare in Australia?'*, provides a best practice benchmark where a region is considered to have a critical shortage of early childhood education places if there is less than **0.33** childcare places per child.[1]

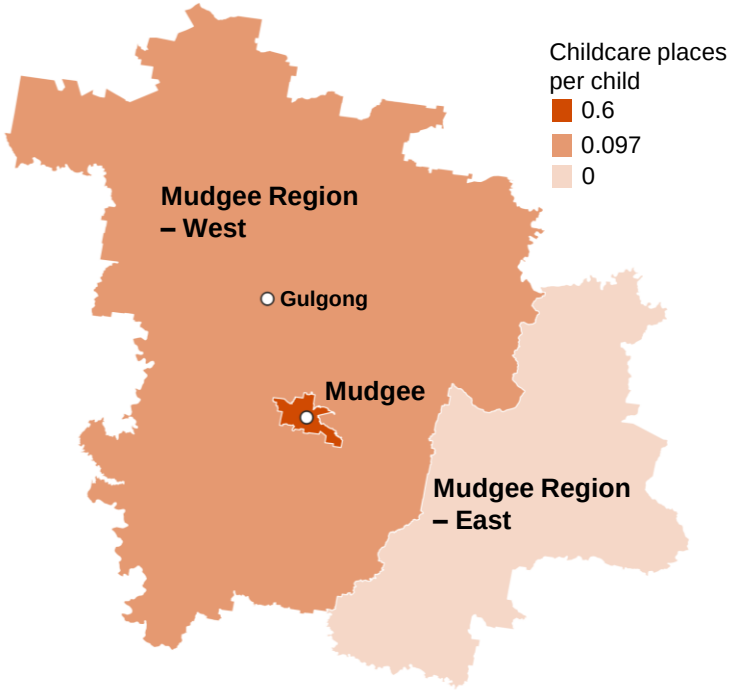
In inner regional NSW (which covers Mudgee), the median **childcare places per child is 0.35**.[1] Outer regional NSW (where Mudgee Region – West and Mudgee Region – East are situated) has a lower **childcare places per child of 0.24.**[1]



Source: Hurley, P (2022), *Childcare deserts & oases: How accessible is childcare in Australia?*

Using the minimum threshold of 0.33, both the inner regional and national childcare places per child are above this rate. For the purpose of this impact analysis, it is assumed that future supply of childcare services will aim to achieve either the inner or national rates . This assumption is made so additional childcare places will need to be created in order to facilitate any increase the relevant population (0-4 years).

Figure 21: Childcare access by SA2 for the MWR LGA area



Source: Hurley, P (2022), *Childcare deserts & oases: How accessible is childcare in Australia?*

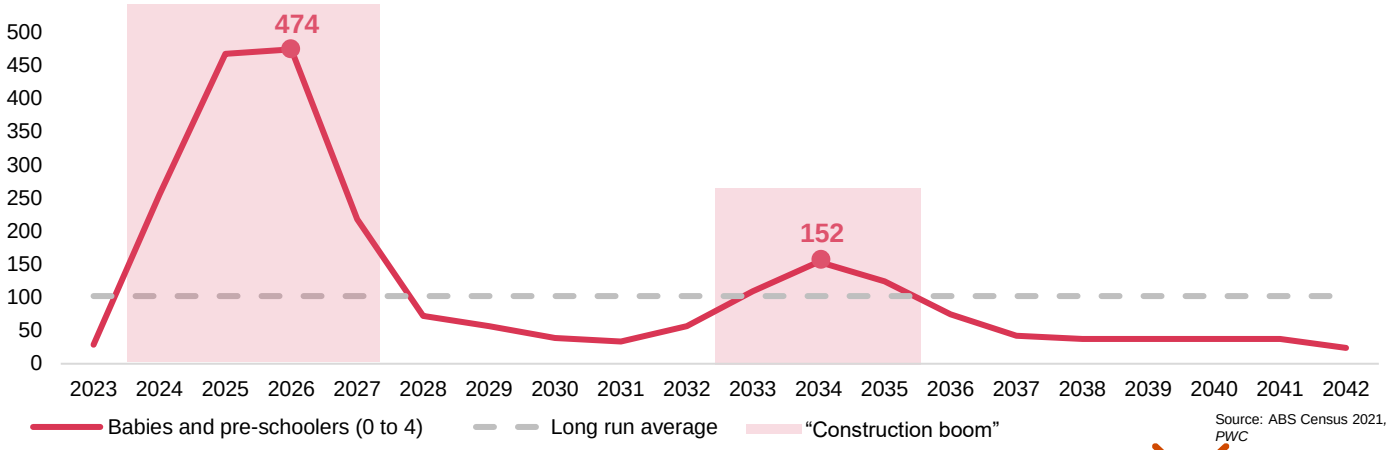
In aggregate, the LGA has **720** approved childcare centre based places across **11 child care centres**.[2] As depicted in the graphic above, these places are concentrated in and around Mudgee. In recognition of this, the Commonwealth's Department of Education has identified Mudgee Region - West as a priority area for new early childhood education and care services under the Community Child Care Fund limited supply grant program.[3]

1. Hurley, P (2022), *Childcare deserts & oases: How accessible is childcare in Australia?; 2. ACECQA National Register ,3*. Australian Government Department of Education (2023); *Priority areas for limited supply grant, 3.*

The increased demand driven by the influx of workers and their families, may require up to 59 additional childcare places in 2026 on top of baseline population projections

Demand for Childcare services

Figure 22: Additional babies and pre-schoolers due to SSDs



Source: ABS Census 2021, *PWC*

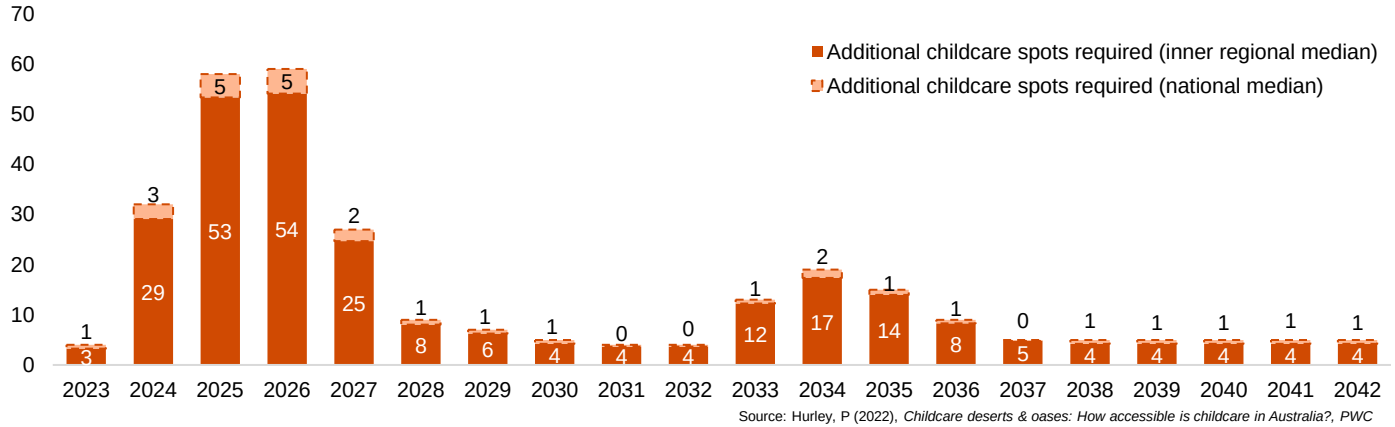
01 Currently, there is limited capacity for childcare services in the LGA outside of Mudgee. Any additional children requiring childcare will necessitate extra places to be created.

02 There are two expected peaks which align with the initial construction boom (2026) and second boom associated with "Secure Now" transition line (2034). Up to an additional **474 babies and preschoolers** may be in the region in **2026**, and up to an additional **152 babies and pre-schoolers** will be in the region in **2034.**

03 Demand for childcare services will vary significantly depending on actual workers attracted. Above existing population projections and outside of the two peaks (2026 and 2034), the yearly long run average is **102 additional children and babies**.

Implications for MWR LGA

Figure 23: Additional childcare places required to reach geographical medians



Source: Hurley, P (2022), *Childcare deserts & oases: How accessible is childcare in Australia?, PWC*

Figure 23 highlights the number of additional childcare places needed to maintain either the inner regional or national median childcare ratio. **One childcare place represents access to 3 days of care a week.** Aligned to NSW state averages, it is assumed that 32.6% of additional babies and preschoolers may need care.[1] Under these assumptions:

If no additional childcare places are provided, the childcare places per child for the LGA will fall to

⇩ 0.32

To keep aligned to the **inner regional median** up to

54

additional childcare places are required at the peak in 2026

To keep aligned to the **national median** up to

59

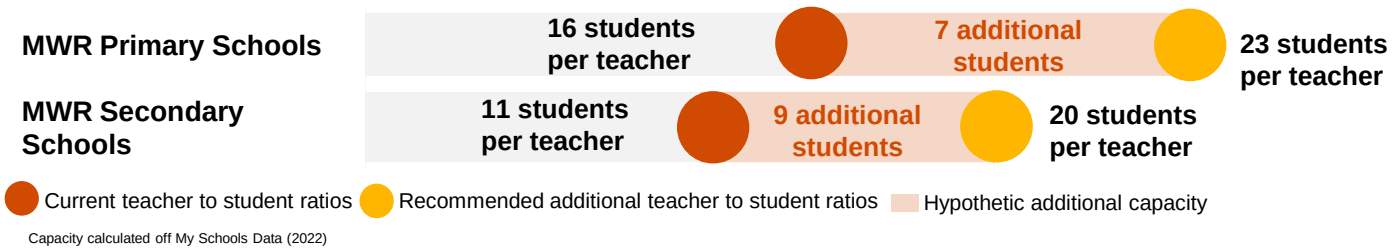
additional childcare places are required at the peak in 2026

1. Child Care Subsidy data report – December quarter 2022 – NSW average families using Centre based day care

Schools in Mid-Western Region are below maximum student to teacher ratio indicating there may be spare capacity within the school system to absorb additional demand

Assessing Current State

NSW Treasury guidelines recommend that there are **23 students per teacher** in NSW **primary schools** and **20 students per teacher** in NSW **secondary schools.**[1] Any additional students per teacher is considered to be overcrowding and warrants scope for additional classroom capacity.



Based on My Schools teacher and student data, primary and secondary schools in the MWR LGA have a current student to teacher ratio of 16:1 and 11:1 respectively. This suggests that there may be additional capacity within the existing school network to absorb additional students. Using NSW Treasury's guidelines, **primary school classes could have up to an additional 7 students per classroom**. Similarly, **secondary school classes could have up to an additional 9 students per classroom**. In practice, the main constraint to this additional capacity is physical classroom space. Due to the limited availability of data pertaining to physical classroom size, this impact analysis assumes that classrooms currently have spare capacity in line with the analysis above. There is the potential for this additional capacity to be leveraged through to newly constructed classrooms. [2]

1. NSW Treasury (2018), Cost-Benefit Analysis Framework for School Investment , p.6 2. These calculations assume that all classes are homogenous (i.e. no distinction between science labs, workshops and classrooms) and are based on a ratio of 1 teacher per class. In practice, this assumption better reflects primary schools where classrooms have a dedicated teacher rather than secondary schools where teachers are allocated based on discipline. Moreover, the analysis assumes capacity is distributed evenly across schools, where in practice some schools maybe at capacity and others not.

Figure 24: Primary, Secondary and Catholic Schools across the MWR LGA

School Type	Number of Schools[2]	Student Enrolment	Teacher FTE	Student to Teacher Ratio
Primary	3	1,523	96.3	15.8
Secondary	2	1,006	93.8	10.7
Catholic	2	1,192	77.9	15.3
Total	**7**[2]	**3,721**	**268**	**13.9**

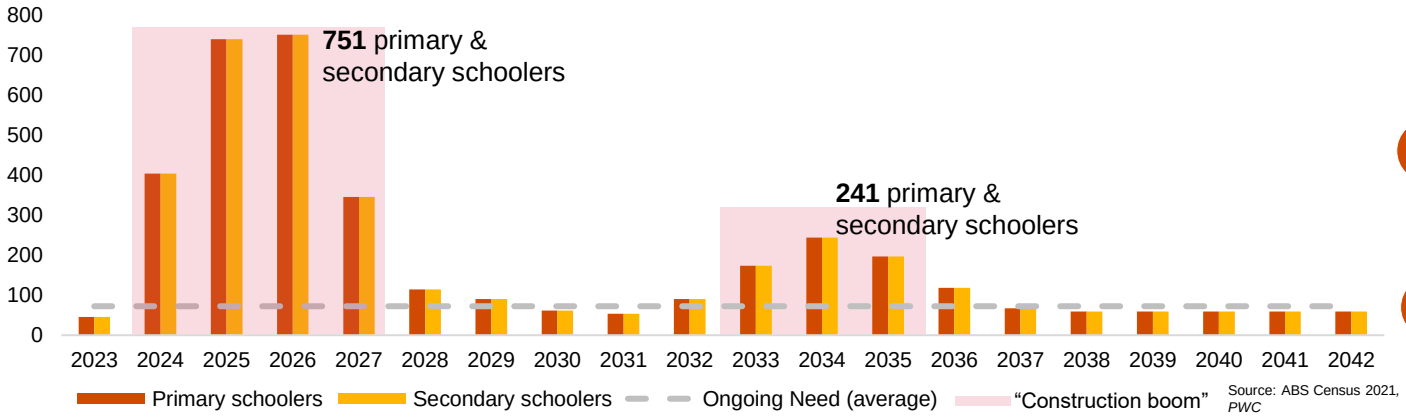
Source: *My Schools Data (2022)*

2. Note, schools geographically located below Mudgee Town Centre have been removed from this count as it is assumed that due to the fact that the majority of SSDs are located closest to Gulgong and Mudgee these catchments will receive the vast majority of additional school aged children.

The potential increase in school age children moving to the region will see a need to expand the number of available classroom during the peak construction period

Demand for Primary and Secondary Schools

Figure 25: Additional primary and secondary schoolers due to SSDs



Source: ABS Census 2021, *PWC*

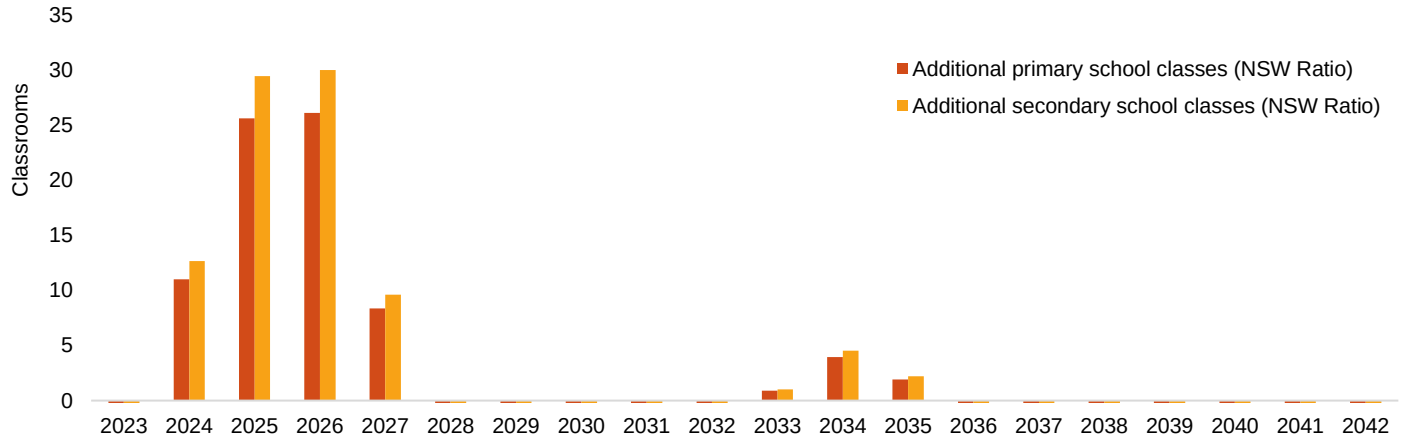
01 Estimated primary and secondary schoolers are based on regional NSW demographics.[1] Families with children in final years of schooling are less likely to move relative to families with children in earlier years of school.[2] As a result, the estimates to the left likely overestimate the amount of secondary school students that will come to the LGA.

02 There are two expected peaks which align with the initial construction boom (2026) and second boom associated with "Secure Now" (2034). At its peak, in 2026 there could be an additional **751** primary and **751** secondary goers over and above existing population projections.

03 Demand for schooling will vary significantly depending on actual families attracted. Above existing population projections and outside of the two peaks (2026 and 2034), there could be an additional **~70 primary and secondary goers annually** (ongoing need).

Implications for MWR

Figure 26: Additional classrooms required due to SSDs



Source: ABS Census 2021, My Schools, *PwC analysis*

The figure to the left highlights the additional number of primary and secondary classrooms that may be needed. Based from consultation with the local school system, it is assumed that the system is currently not at capacity. From these consultation a conservative estimate is made that on average the schools system has 10% additional capacity across all classes. This has been applied to the modelling by assuming that there is additional capacity for ~ 150 primary and 150 secondary school students in the current MWR school system.[3]

Outside of the peak "construction boom" periods **No Additional** classrooms may be required.

To keep aligned to the **NSW Treasury ratio** up to

Primary: 26 and

Secondary: 30

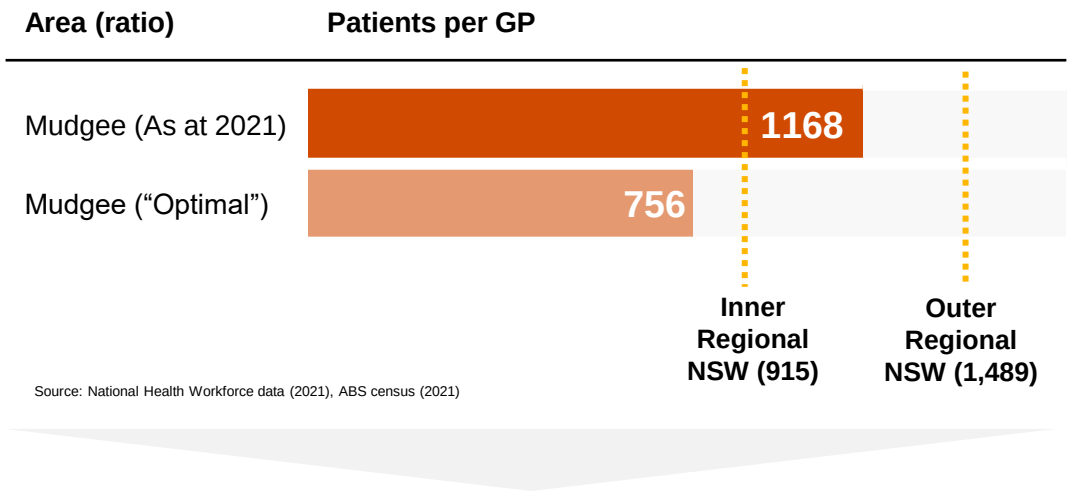
additional class rooms could be required

1. ABS Census 2021 2. Mobility of students in NSW government schools, 2016 NSW Government 3. It is important to note that this is average additional capacity. For example, it is recognised that Mudgee Public is currently at capacity whilst St Mathew's has additional capacity on the margin.

The MWR LGA is currently at capacity for GP services, however increased use of alternative service delivery methods, such as telehealth, may provide additional capacity

Assessing Current State

For inner regional NSW (includes Mudgee) and outer regional NSW (includes Gulgong and remainder of the MWRC LGA) the average number of patients per GP is **915** and **1,489** respectively.



Source: National Health Workforce data (2021), ABS census (2021)

Given that the current patient to GP ratio for the MWR LGA sits within the inner and outer regional NSW averages, for the purpose of this impact analysis, it is assumed that GP services within the LGA are at capacity. This assumption is made so that any increase in demand will require additional GPs so that the current ratio is maintained. Further, analysis undertaken by MWRC suggests that to meet current demand for GP services based on the existing population an optimal rate of service provision would be 756 patients per GP[1].

Regional NSW (both inner and outer) experience greater barriers to accessing a GP compared to urban and metropolitan areas

- There is a city/country divide in being able to access GPs. As at 2021, in Sydney the ratio of doctors to patients is **1:300**. In comparison, outer regional NSW has an average patient per GP ratio of **1,489.** Inner regional NSW has a comparatively stronger average of **1 GP per 915** patients.

MWR LGA currently experiences comparable GP to patient ratios as regional NSW

- Currently, the MWR LGA has a GP to patient ratio of **1:1,168** which falls within NSW's inner and outer regional averages. GPs within the LGA work 12.25 to 15.75 FTE.[2]
- Mid-Western Regional Council's 2022 *Health Services Proposal*, provides an "optimal" staffing number for GPs. This optimal staffing includes an additional **10 GPs in Mudgee** and **2 GPs in Gulgong**. This addition reflects the amount of GPs required to enable wait times for apppointments to be reduced to a 48 hour turn around period. In consideration of this "optimal" staffing, as at 2021, the MWR would have a GP to patient ratio of **1:756**.
- It is important to note that there are a number of local GPs currently in a pre-retirement phase with several expected to retire in 2024/25.

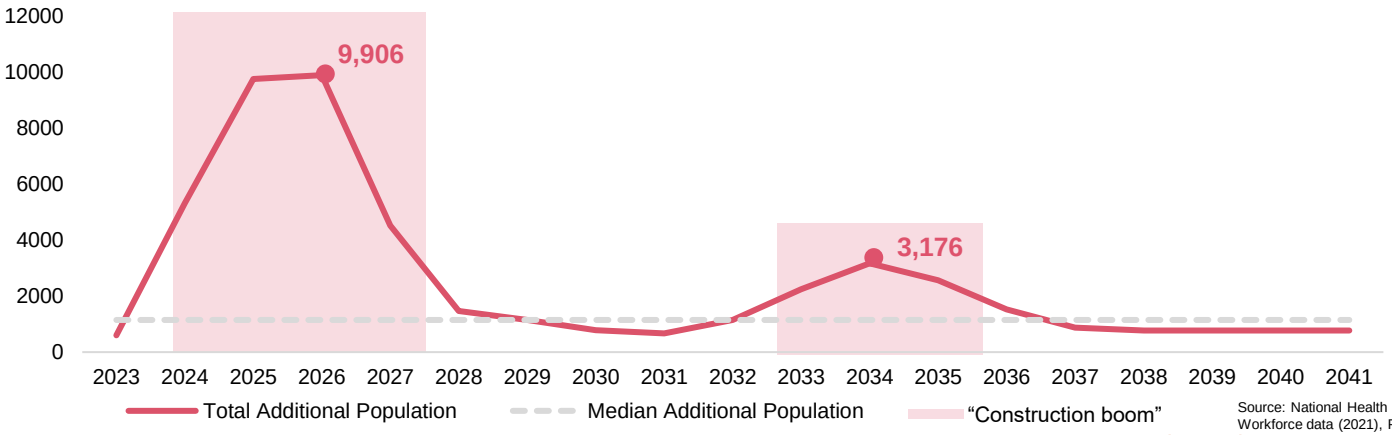
MWR is at capacity for the provision of GPs services. However, emerging patterns in how patients access GPs may generate additional capacity through enhanced flexibility in service delivery.

- NSW, as a whole, experienced a **35% increase in the use of telehealth appointments** to access GP services from 2020-21 to 2021-22.[2] This may translate into MWR residents accessing geographically diverse GPs via telehealth.

Up to 8 additional GPs would be required to maintain current service ratios to meet additional demand generated by a sharp increase in population to the region

Demand for GPs

Figure 27: Total Additional population due to SSDs



Source: National Health Workforce data (2021), PWC

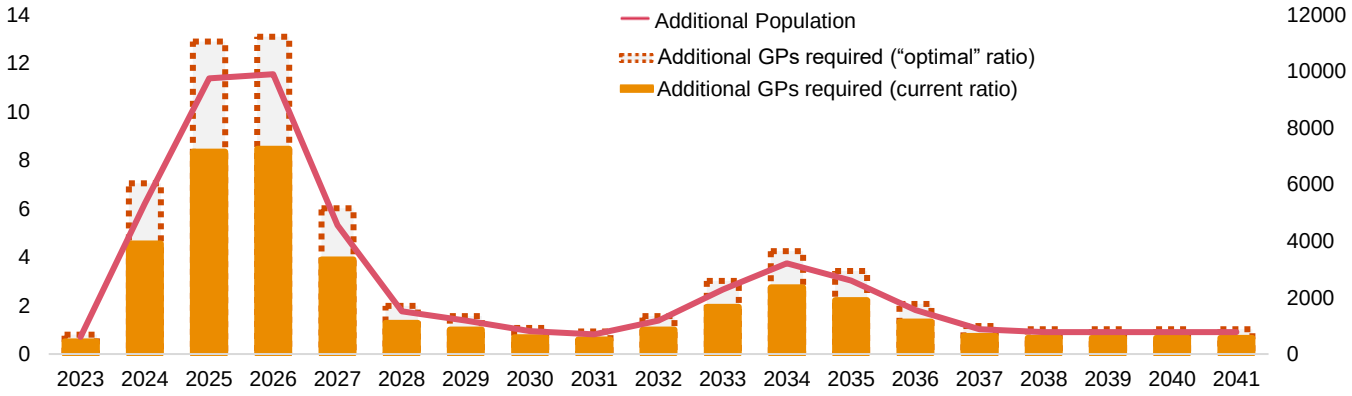
01 It is assumed that the additional population are as likely to use GPs services within the LGA as the existing population. Therefore any addition to the population will require more GPs to maintain the current GP to patient ratio.

02 There are two expected peaks which align with the initial construction boom (2026) and second boom associated with EnergyCo's "Secure Now" (2034). An additional population of **9,906 individuals** will be in the region in **2026**, and an additional population of **3,176 individuals** will be in the region in **2034.**

03 Demand for GPs services will vary significantly according to total additional population. The long-run annual additional median population is ~ **1,200** throughout the forecast period (2023-2041).

Implications for MWR

Figure 28: Additional GPs required



Source: National Health Workforce data (2021), PWC

The figure to the left highlights the number of additional GPs that may be needed to maintain either the current or optimal GP to patient ratio. These projections assume that the additional population are as likely to access local MWR GPs as current residents. Under this assumption:

If there are no additional GPs, the GP to patient ratio will rise up to **1:1,619**

To keep aligned to the **current ratio** up to **8** additional GPs may be required

To keep aligned to the **"optimal" ratio up to** **13** additional GPs may be required

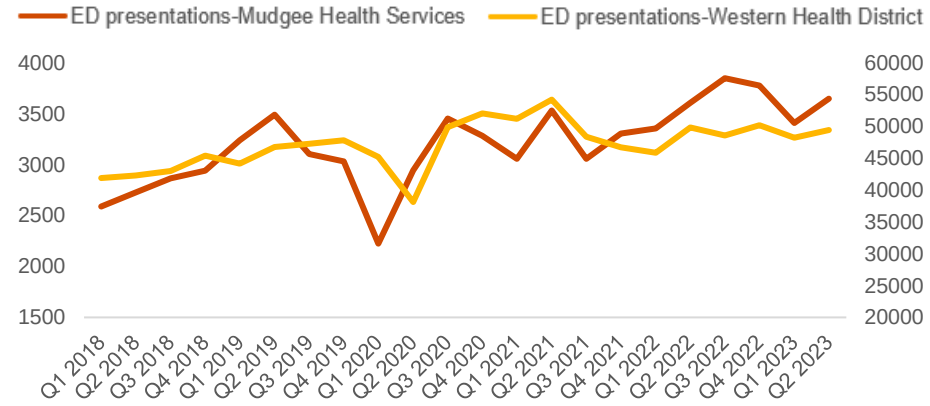
Historically, Mudgee Health Services has been able to adapt to growing demand. Limited physical space for the ED to expand may restrict its ability to facilitate a substantial increase to the population.

Assessing Current State

MWR LGA has one major hospital, Mudgee Health Services. The hospital underwent a $70.7 million redevelopment which was completed in 2020. The hospital provides 31 beds for palliative care, emergency department (ED), pediatrics and birthing, as well as a range of additional services. The secondary medical centre, Gulgong Multi Purpose Service, also has emergency and inpatient facilities, though are limited in their capabilities.[1] This impact assessment focuses on additional demand on ED activity as it is expected that this will be the activity stream that will likely see the sharpest increase.

The number of emergency department (ED) presentations have increased from 2,567 in Jan-Apr 2017 to 3,647 in 2023 Apr-Jun. This absolute increase is consistent across the Western Health District [2].Presentation rates per 1,000 population have grown at a greater rate for MWR compared to the WNSWLHD— from roughly 461 presentations per 1,000 people in 2017 to **569 presentations per 1,000 people in 2022** (~23% increase).[3]

Figure 29: Number of ED presentations by quarter, Mudgee Health Services and Western NSW Health District, 2018-2023



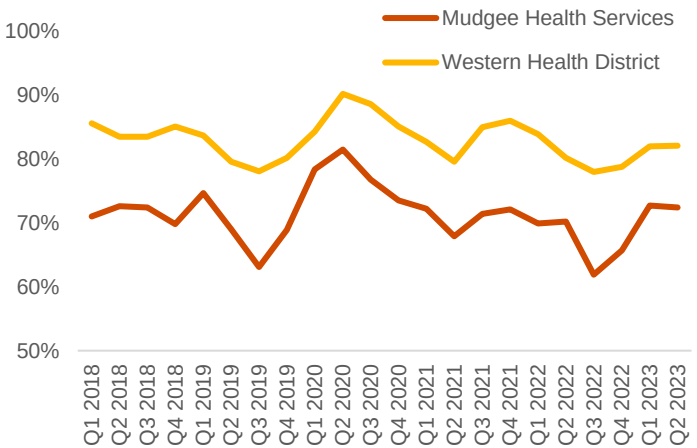
Source: Bureau of Health Information NSW

Currently, Mudgee Health Services **has 8 total ED bay spaces accompanied by 2 registered nurses for each shift** (morning, midday and night) and an additional nurse working peak period 10:30-19:00.

ED performance is benchmarked against time to be seen and quality targets. As highlighted in figures below, despite the recent increase in Mudgee's ED activity, **the ED infrastructure has handled the increased demand relatively well**. Timely access to treatment has remained constant with~70% of patients starting treatment on time and only a limited drop off in the quality of service provided has been seen in spite of increased demand.

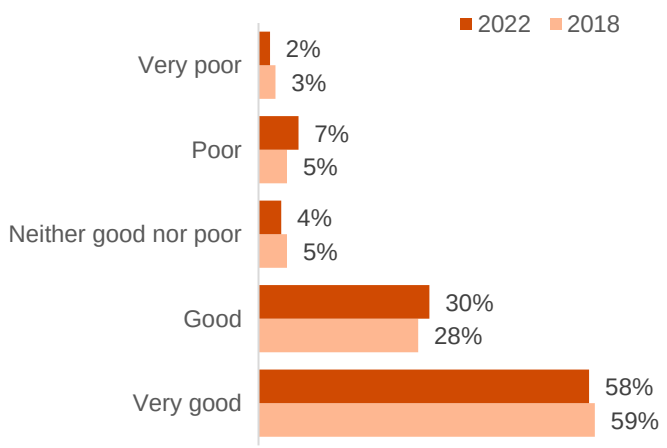
Whilst the hospital has historically been able to adapt to meet demand, consultations have highlighted the potential future constraint of physical space. Currently, the hospital is looking at how to better use the existing ED spaces, including the interview room, to improve efficiency. However, there is no available additional spaces that could be used if the ED is to increase in size. **A further increase in presentations could impede the ability to maintain current levels of service provision an d quality.**

Figure 30: Percentage of patients start treatment on time for Mudgee Health Services and Western Health district, 2018 to 2023



Source: Bureau of Health Information NSW

Figure 31: Overall how would you rate the care you received while in ED? (For Mudgee Health Services, 2018 and 2022)



Source: Bureau of Health Information NSW

1. The medical centre provides: 24-hour emergency care, Inpatient beds including general medicine, rehabilitation and palliative care, aged care facilities and medical imaging services. A 2014 upgrade to the MPS, namely provided four new sub-acute beds. 2. Australian Institute of Health and Welfare (2022), 3. The Western Health district increased from 632 to 696 presentations per 1000 population between 2018 and 2022.

A surge in population will have flow on effect to the region's hospital system, increasing emergency presentations and placing increased demand on existing bed and staffing capacity

Impact of external workforce on ED presentations

The rate of ED presentation differs based on age. Data shows the highest rates of ED presentation are for the 0-4 and 75+ year age groups [1].

Given that the likely age of the incoming population will be a lower risk cohort (the median age of construction workers nationally is 38**), the future demand, from the additional population, has been 'risk-adjusted' to highlight the higher rate of presentations by 0-4 year olds but relative constant rate by the remaining population.[2]**

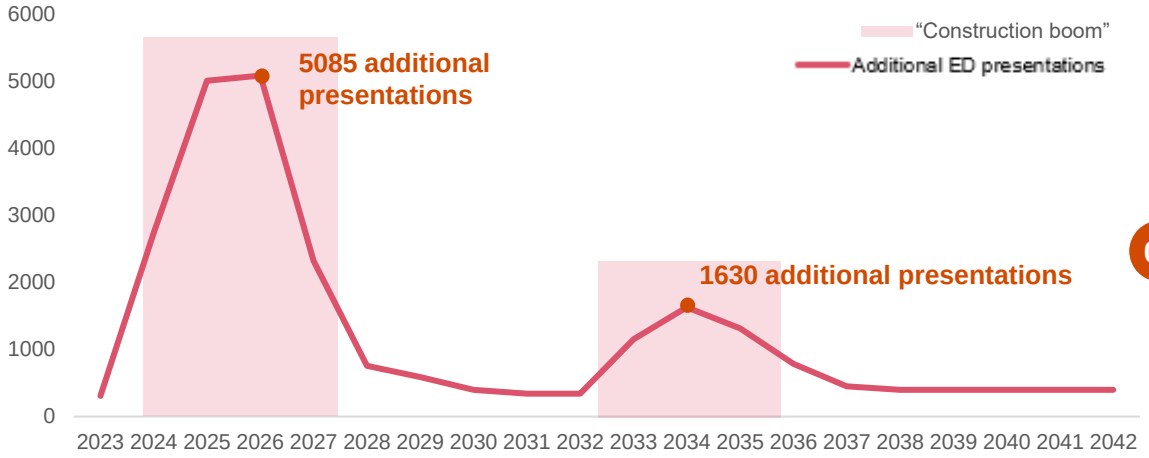
Limitations

Due to limited availability of ED data, this impact analysis utilises a superseded NSW Ministry of Health (MoH) methodology for projecting ED treatment spaces. As a result, the forecasted ED bays should be seen as an indictive estimate.

It is important to note the practical impact of triaging and transferring of patients between rural hospitals. Given the proximity of Mudgee to other major hospitals (e.g. Dubbo Base Hospital), patients may initially present in Mudgee but then may be transferred to other hospitals to receive treatment. In practice this could lessen the direct demand on MWR's health system.

Demand for Hospital care

Figure 32: Total Additional ED presentations, 2023 to 2041



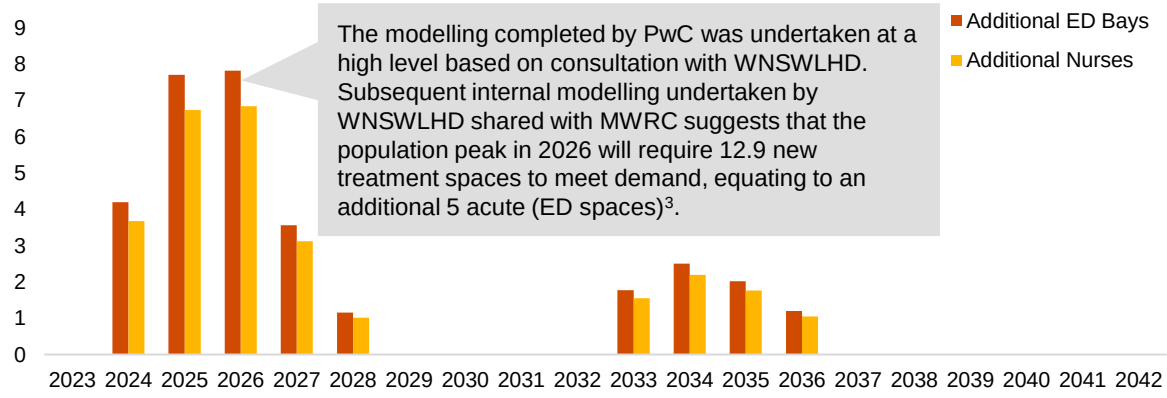
Source: PwC

01 In aggregate, ED presentations for the hospital have varied from **11,902 to 14,583 between 2019-22**. It is important to note that this is not a unique per person count. This means that the same individual can present to ED multiple times over the course of a year and each individual presentation is counted.

02 There are two expected peaks which align with the initial construction boom (2026) and second boom associated with "Secure Now" (2034). Up to an additional **5,085 ED presentations** could be expected in **2026**, and an up to **an additional 1,630 ED** presentations in **2034.**

Implications for MWR

Figure 33: Additional Beds and Nurses required



Source: PwC, (2006) MoH methodology

The figure to the left highlights additional nurses and ED bays that may be required over and above baseline population projections. This figure is derived by using NSW MoH methodology. It should be noted that this method applies differing number of presentations to trigger the need for an additional bay. As a result, some years require no additional beds as this trigger is not met.

Up to an additional **8** ED bays may be required in 2025/26

Up to an additional **7** nurses may be required in 2025/26

PwC 1. Public Health Information Development Unit (PHIDU). Age-related rates of Emergency Department presentation. Adelaide: PHIDU, Torrens University Australia, March 2023. 2. An annual ED presentations per 1,000 persons by age group of 525 for the 0-4 yr. old population. The remaining population has a rate of 280 annual ED presentations per 1,000 persons. 3. Note these subsequent projections are based on an updated internal formula that was unable to be shared with PwC at the time of completing this report. These projection do not incorporate consultation with clinicians/stakeholders, and do not factor in any related impacts on primary care or addition of primary care brought in by the SSD projects.

The increased workers in the region may place upward pressure on existing ambulance services during the peak of workforce demand

Assessing Current State

In inner regional NSW (which covers Mudgee), the average ratio of ambulance paramedics to population is **1:470**.[1] Outer regional NSW (where Mudgee Region – West and Mudgee Region – East lie) has a paramedics to population of **1:267.**[1] Mudgee – Lithgow sits within these two averages with **1 paramedic for 330 residents.**

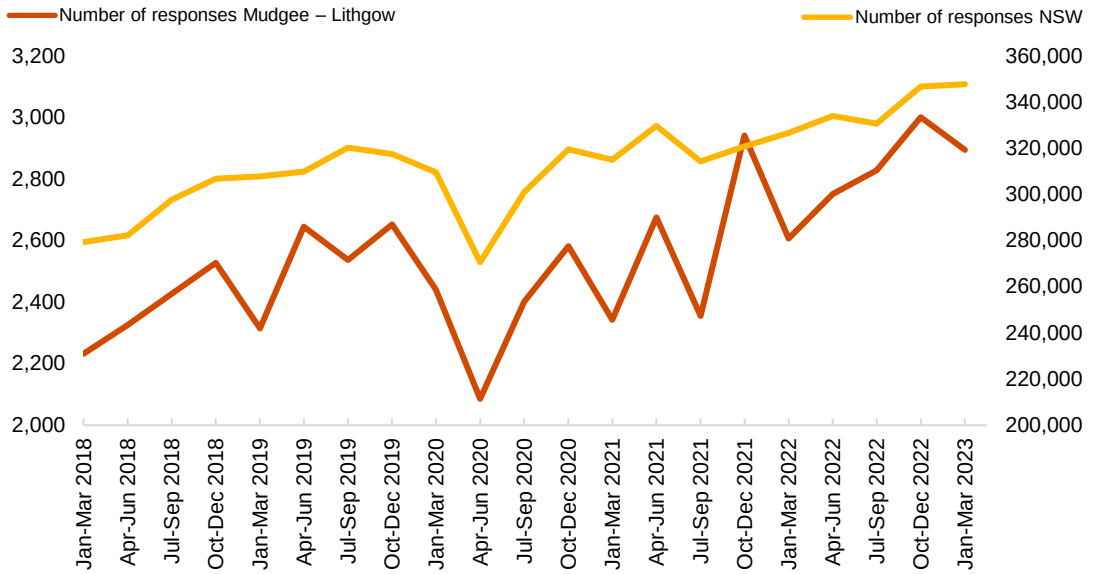
Regional Area	Ambulance paramedics to population
Mudgee – Lithgow (SA3)	**1:330**
Inner Regional NSW	1:470
Outer Regional NSW	1:267

Source: ABS Census (2021), Health Workforce data (2021)
1.NSW ambulance data is reported at an SA3 level. For consistency of data information is presented at this level rather than LGA.

The current ratio of paramedics to population for Mudgee – Lithgow (SA3) is within the bounds of inner and outer regional averages. Accordingly, it is assumed that this current ratio is an appropriate benchmark to be maintained given population growth. Therefore, to avoid future supply shortfalls, additional paramedics at the ratio of 1 paramedic to 330 residents will be required to facilitate any increase in the population.

The ability for paramedics to effectively service the community is dependent on their ability to respond to emergency calls in a timely manner. In addition, it is noted that some ambulance staff staffed to region may not live locally and may result in limitations on local road knowledge which in turn could impeded response times. Any increase in population and corresponding paramedics requires additional ambulance vehicles to ensure the community can be efficiently serviced. The **NSW ambulance vehicles to NSW paramedic ratio is 0.305.**[2]

Figure 34: Number of Ambulance Responses for Mudgee-Lithgow and NSW, 2018-2023



Source: Bureau of Health Information

The number of responses has been steadily increasing for both NSW and Mudgee-Lithgow from 2018. In the first quarter of 2023 (Jan-March), Mudgee-Lithgow reported **2,894 responses,** an 11% (288 responses) increase from the same quarter in 2022. **The median responses per 1,000 population per annum for Mudgee-Lithgow SA3 is 212**. This is higher than the NSW average of 156 per 1,000 population per annum.

Given that the SA3 rate is significantly higher than the NSW average and that the incoming population will be relatively young and fit, future additional demand will be 'risk-adjusted' to reflect the potential lower incidents of call outs.

1 National Health Workforce data p.5; 2. NSW Ambulance Year-in-Review 2021-22, p.4.

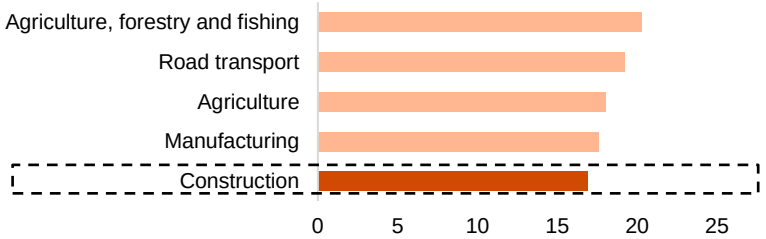
While the construction workforce represents a younger demographic than the region, the size and scale of the population increase will require additional paramedics and vehicle fleet to maintain the current state

Impact of external workforce on paramedics

A core determinant in the rate of utilisation of emergency ambulances is age. For example, studies using demonstrated Ambulance Victoria data show an significant increase in utilisation by patients aged 65+ years with 60-64 year olds twice as likely to utilise ambulances as 35-39 year olds. [1]

Further, consultation with proponents has highlighted the increased importance of workplace health and safety in constructions sites. As highlighted in figure 33, the **incident rate per 1,000 employees for the construction industry is 16.9**, less than that of agriculture or manufacturing, for example.

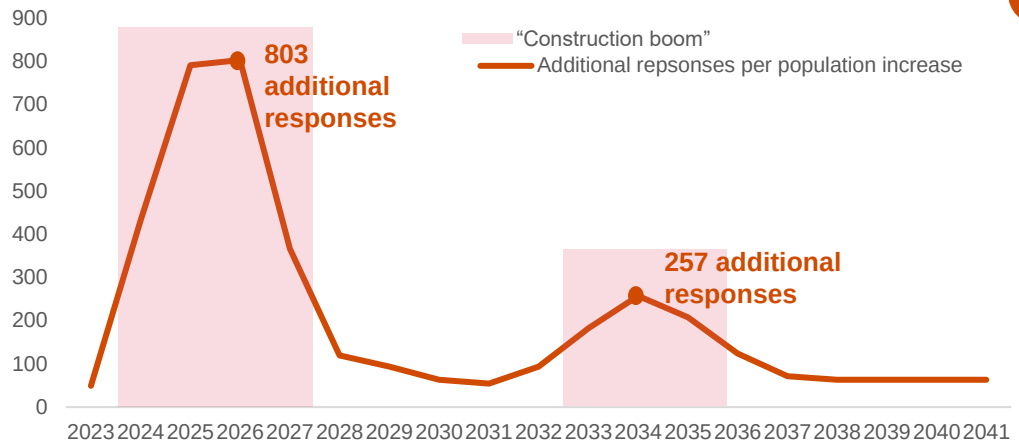
Figure 33: Rate of serious injury claims per 1,000 employees industry, 2020-21[2]



Given that the likely age of the incoming population will be a lower risk cohort (the median age of construction workers nationally is 38) and increased safety of the construction industry, this impact analysis assumes that on average the additional population will utilise ambulances at a lower rate than the existing residents of Mudgee-Lithgow. **Therefore, future demand, from the additional population, has been 'risk-adjusted' to reflect the potential lower incidents of call outs.**

Demand for Ambulance Services

Figure 35: Additional responses by workforce and dependants

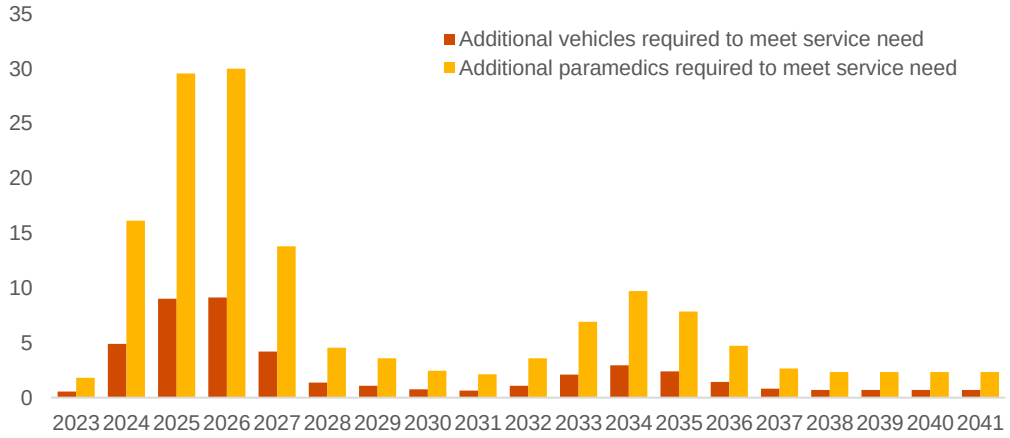


01

Applying a risk adjusted ratio, additional responses by paramedics are likely to spike in **2026** with up to **803 additional responses**. For reference, Mudgee- Lithgow SA3 saw **11,186 responses** in 2022 alone.

Demand for Paramedics and Ambulance Vehicles

Figure 36: Additional paramedic and ambulance vehicles



The figure to the left highlights additional paramedics and ambulance vehicles that may be required over and above baseline population projections. This figure is derived from population ratios whilst demand for additional responses is derived from risk-adjusted growth rates. As a result, estimates for paramedics and vehicles represent a 'worst-case scenario' and may be overstated.

Up to an additional **30** paramedics may be required

Up to an additional **9** ambulance vehicles may be required

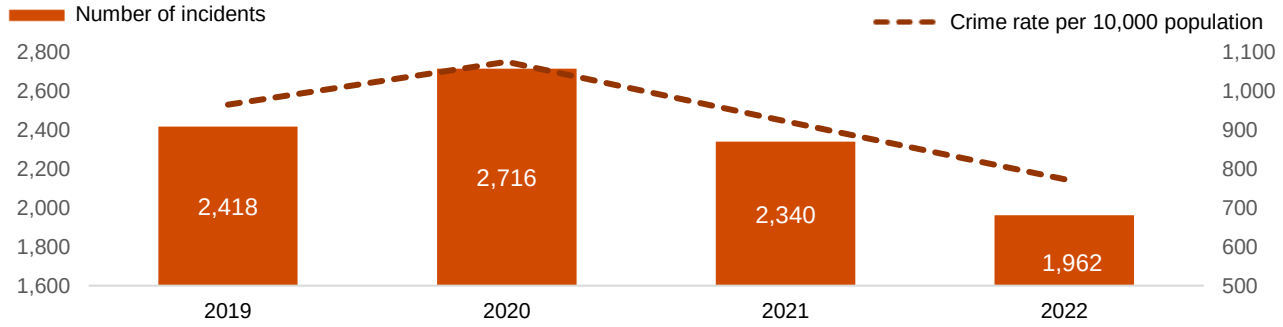
1. Increasing utilisation of emergency ambulances, as a result of the younger age group moving to the area discounted rate of 81 responses per 1,000 population per annum has been applied to the additional population2. Australian workers' compensation statistics 2020-2021, ABS Census 2021

The increased presence of workers moving into the region for major project delivery will place upward pressure on existing police services across multiple fronts

Assessing Current State

Mid-Western Regional LGA is situated within the Orana-Mid Western Police District (PD). As of 2021-22, the Orana-Mid Western PD had 238 police officers and 26 administrative staff. Mudgee and Dubbo Police Stations are the two 24-hour police stations in the region, meaning they are safeguarded by a First Response Agreement's minimum response level and are required to be staffed at all times. Other stations within the PD are staffed on a needs basis, with officers often on call to respond to incidents and on rotation across the PD according to service need.

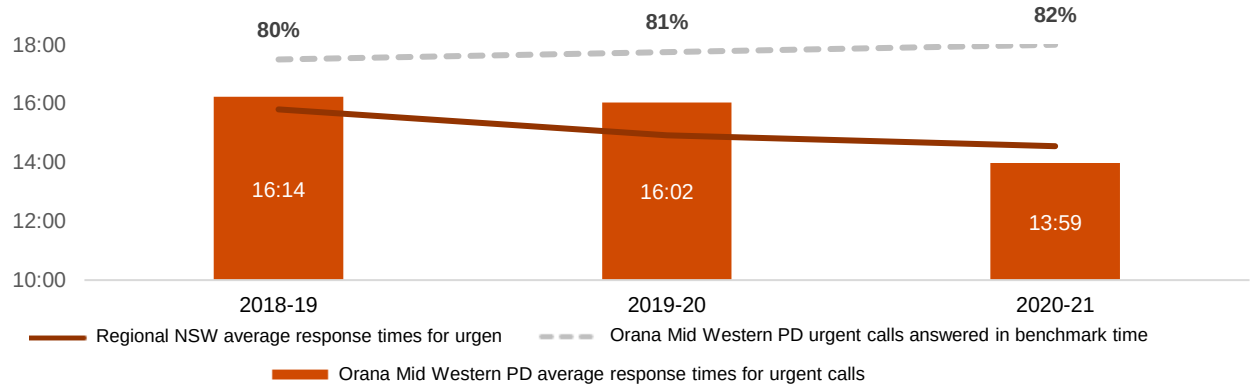
Figure 37: Rate and number of crimes in MWR LGA, 2019-2022[1]



The total number of crimes committed in the MWR LGA has steadily decreased since 2020 to 1,962 in 2022. This 28% decrease in crimes committed since 2020 is also reflected in the relative crime rate that has also decreased to **773 crimes committed per 10,000 population in 2022.**

Responding to crime comprises just one of the many roles and responsibilities of the Police District. Other activities include monitoring and promoting road safety, maintaining social order, performing and coordinating emergency responses and other general community related services and activities. Therefore, decreased rates of crime does not necessarily correlate with lower levels of resource demand.

Figure 38: Response time for Orana Mid Western PD, 2018-19 to 2020-21[2]



Orana-Mid Western PD response times have improved between 2019-20 and 2020-21, dropping below the Western PD average of **14 minutes and 33 seconds**. As of 2020-21 **82% of urgent calls are answered in benchmark time (under 12 minutes).** With the numbers of workers coming to the region as the construction period peaks, increased pressure will be placed on maintaining this ongoing improvement in response times, especially as resources are likely to come from within the Orana-Mid Western PD as opposed to additional staffing requirements.

Source: *1. BOCSAR; 2. NSW Police Force, Statistics relating to average response times for urgent calls; 3*

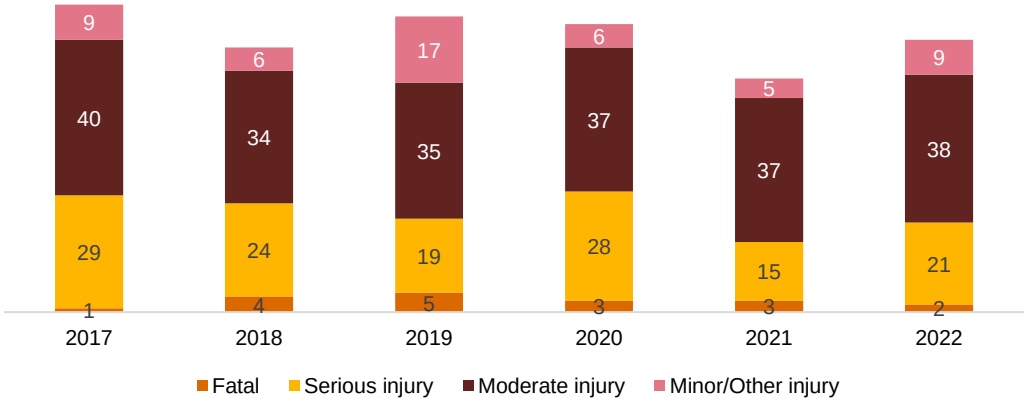
The increased presence of workers moving into the region presents multiple challenges to police service delivery including responding to increased traffic and TWA related incidents

Impact of external workforce on police service delivery

Consultation with the Orana-Mid Western Police District revealed a number of factors that may impact demand for policing services:

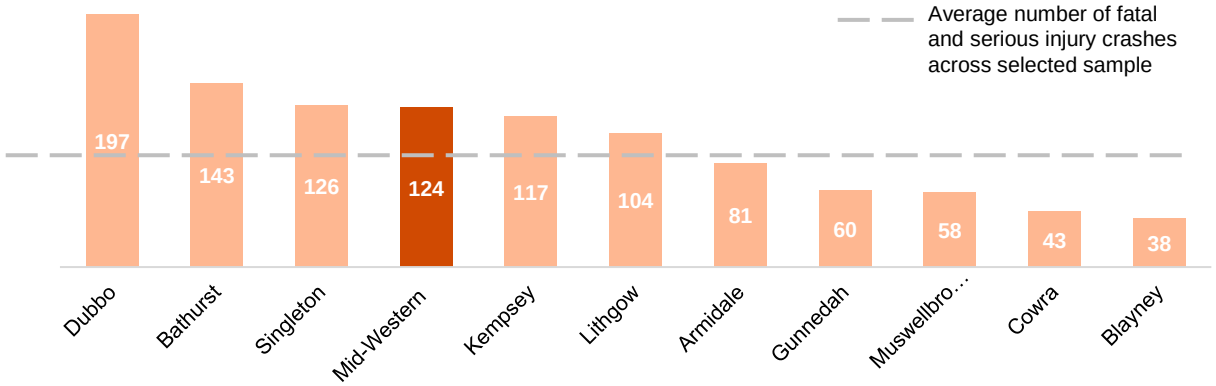
- **Increase in volume of cars and trucks on major roads into the region:** With a surge in freight and people traveling into the region along the two major entry/exit points - the Golden Highway and Great Western Highway, there is an expectation of an increased number of traffic incidents that police will need to respond to on these major roads. With large volumes of heavy industrial freight coming from the Port of Newcastle, this will likely affect road conditions at various points while DIDO workers will be travelling early morning/late afternoon, increasing risk of traffic/crashes.
- This expected increase comes on top of an already high incident rate. TfNSW crash data for the period **2018-2022 shows there were 348 casualty crashes across the Mid-Western Regional Council area resulting in 450 casualties**. When fatal and serious injury crashes are combined in the period 2018-2022, Mid-Western had 124 casualties in the LGA.
- **Animal strikes are a real risk in country areas**, especially with the high potential for livestock, native animals such as kangaroos, wombats, emus, and feral animals such as pigs and deer to enter the roadway. According to data compiled by NRMA Insurance for NSW in 2019, Mudgee was in the top five worst areas for animal strikes (also included was Dubbo, Armidale, Goulburn and Muswellbrook).
- **Management of Temporary Worker Accommodation:** Police may need to liaise with project proponents to manage the risk of potential incidents occurring at workers camps. Stakeholder consultation highlighted potential increases in drunk and disorderly behaviour, assaults and mental health related incidents as potential increased risk at workers accommodation.
- **Managing resources across the LGA:** With a significant pipeline of major projects, the pressure of managing the confluence of demand across multiple project sites/workers camps will place pressure on existing resource capability.

Figure 39: Number of traffic incidents in the MWR LGA, 2017-2022



Source: Transport for NSW (2023), *Road users by local government area of crash*

Figure 40: Number of fatal and serious injury crashes across select regional LGAs, 2018-2022 [1]



Source: Transport for NSW (2023), *Road users by local government area of crash*

Additional population from SSDs will trigger the need for MWR to develop additional water supply systems sooner than expected

MWRC has distinct roles and responsibilities as it relates to the provision of potable (and/or other water) for personal use and consumption between additional **residential housing** and **TWAs**. It is assumed that council will be responsible for the provision of and the major infrastructure needed to supply water for personal use and consumption for additional residential housing. For the purposes of this analysis it has been assumed that responsibility for supply of water for personal use and consumption at TWAs will rest with proponents, though acknowledging a need to work with council.

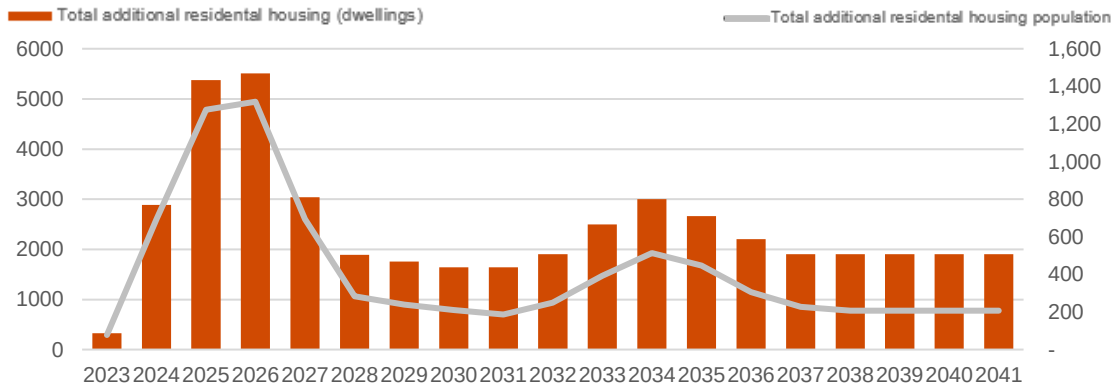
Residential Housing

MWRC has 3 water supply systems that include distribution systems and three water treatment plants. These are:

1. **Mudgee** that sources raw water from the Cudgegong River and Burrundulla bore field
2. **Gulgong** that sources raw water from Cudgegong River, and
3. **Rylstone** that sources water from the Council owned Rylstone dam.

- **Water systems are currently at capacity for baseline population growth.**
- The systems, in particular the distribution systems required to service approved lots, **will require additional works to increase capacity in response to any additional residential population. The geographical location of lots is critical in the ability of MWRC to supply lots.**
- It is important to note, water systems need to be upgraded to accommodate surge capacity rather than average water usage.

Figure 41: Total additional demand for residential lots and associated residential population (above baseline) , 2023 to 2041



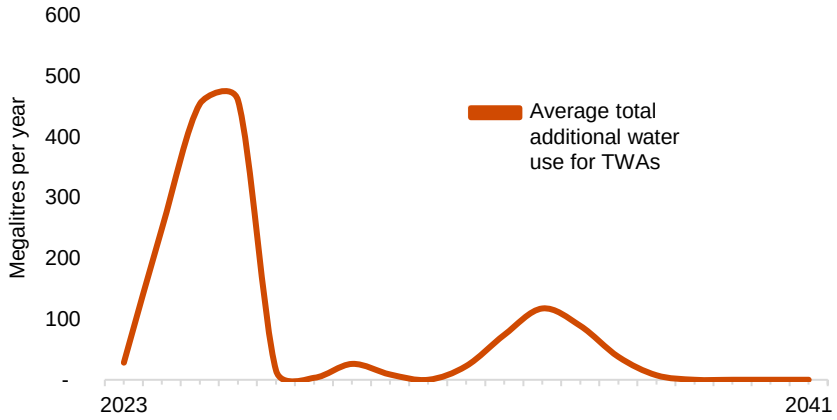
TWA

For the purposes of this analysis TWAs will need to rely on trading water licenses or access groundwater reservoirs to provide water for personal use.

- TWAs are assumed to source water for personal use independent of council.
- Consultations with council have highlighted that river water licensees (Cudgegong River) are near full allocation. As a result, TWAs will be required to either acquire water licenses on the secondary market or acquire groundwater licenses.
- Groundwater has been largely untested. The viability of groundwater as a stable source of raw water has not been tested. This additional testing would be at the cost of the proponent.

Total demand should refer to potential peak or surge water usage. In the absence of this data, an indicative estimate has been developed in consultation with council so that **the range of average water usage per person per month for a TWA is 7609 L[1]**

Figure 42: Total demand for water by TWA, 2023 to 2041



Based on TWA population presented on page 33 (forecasts a peak of ~5,000 individuals living in TWAs in 2026), additional water use for TWAs may demand--as a conservative estimate—**up to 459 ML per annum in 2026** (~ 1.25 ML a day additional demand).

1. Consultations with council indicated that on average 250 L of water would be used per person per day in TWAs. This figure includes TWAs with laundries and commercial kitchens.

Existing capacity of the MWR's sewage treatment plants (STP) may be insufficient to cope with short-term demand increases generated by SSDs

MWRC has distinct roles and responsibilities in the provision of wastewater treatment, facilities, and reticulation for additional **residential housing** and TWAs. It is assumed that council will be responsible for wastewater treatment capacity and reticulation to site for additional residential housing. For the purposes of this analysis it has been assumed that TWAs will be responsible for their own wastewater treatment capacity and/or their ability to cart waste to treatment facilities. This analysis only focuses on domestic production. It is assumed **an average of 200–300L of wastewater is produced per person per day for both additional residential housing and TWAs.**[1]

Residential Housing

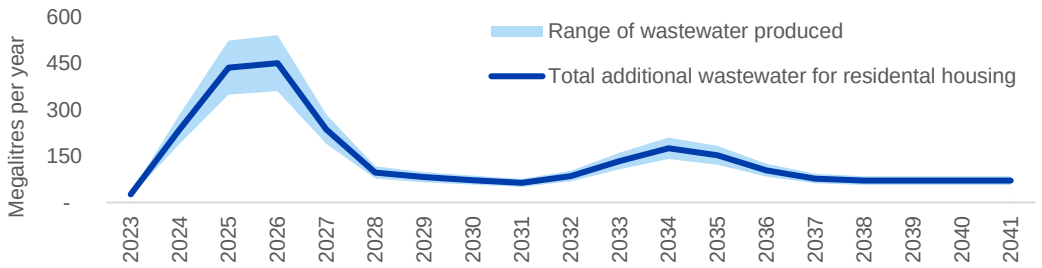
Additional residential housing is assumed to be concentrated around Mudgee and Gulgong. Both centres have a sewage treatment plant (STP):

1. **Mudgee** designed to service an estimated residential population of 14,000 and a non-residential of 2,000.
2. **Gulgong** designed to service an estimated population of 4,450.

Given baseline population growth, Mudgee STP is projected to exceed its capacity by 2036. Gulgong will have spare capacity beyond 2041.

- With a current population of 11,680, Mudgee STP has a current spare capacity of ~2300 people.
- Gulgong will have addition capacity for ~ 1000 additional people even by 2041

Figure 43: Wastewater production and total population for residential dwellings[1]



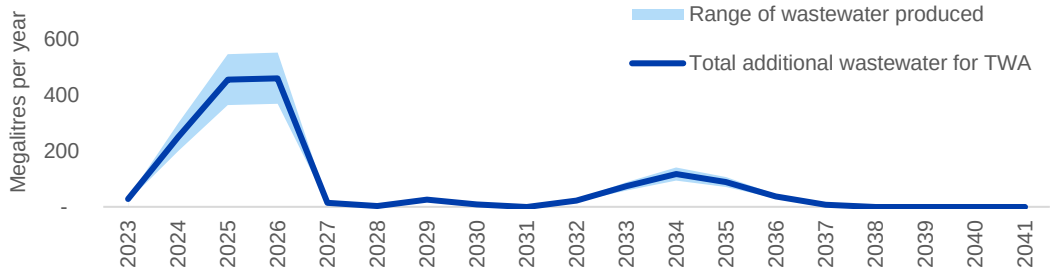
- Wastewater production in Figure 43 is derived from housing demand as presented on slide 33. At a peak in 2026, up to ~ 4,900 additional individuals may reside in residential dwellings.
- Combined, Mudgee and Gulgong TWPs have capacity for an additional ~3,300 people. Assuming that an additional total population of **~5000** live in residential housing in 2026 based on demand model projections, currently **there is not sufficient capacity**.
- Outside of this peak, ~ 1000 additional individuals may live in residential housing producing ~75 ML per year of wastewater.

TWA

TWAs will need to rely on developing their own wastewater treatment capacity and/or carting waste to appropriate facilities.

- Given that TWAs will predominately be located significant distances from urban centres in the LGA, they will not be able to connect to existing and expanding sewage systems.
- Mudgee STP does have the capability to receive and treat waste. Currently, has approval to receive 20KL of sewage waste for processing, however, this allocation is already at capacity. Additional capacity would require upgrades and modifications

Figure 44: Wastewater production and total population for TWAs[1]

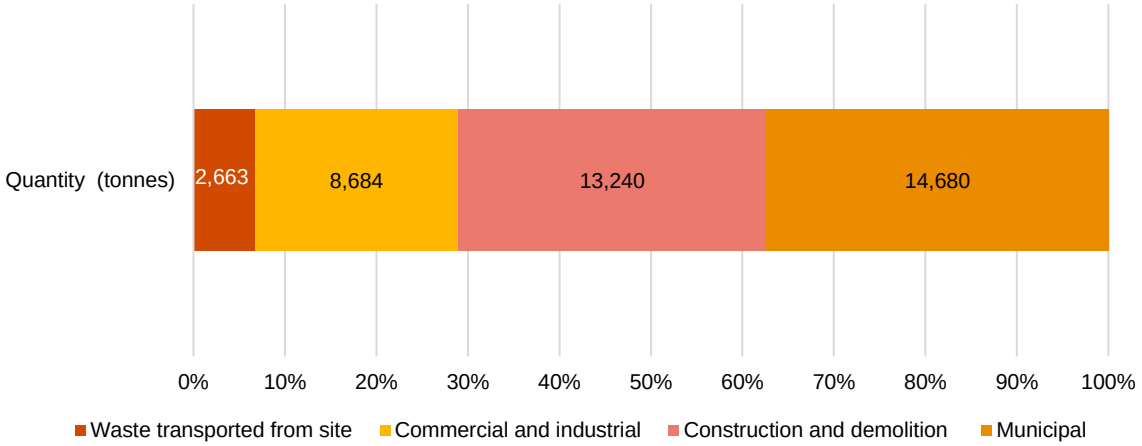


- Wastewater production in Figure 44 is derived from TWA demand as presented on slide 33. At a peak in 2026, up to ~ 5,000 additional individuals may reside in TWAs.
- Additional wastewater produced by TWAs may produce, **on average, up to 459 ML per year in 2026 with an upper range of 551ML and lower of 367 ML**.
- Wastewater production by TWAs will vary significantly aligned to the construction schedule. For example, demand by TWAs drops from 459ML in 2026 to 18ML in 2027 as a majority of construction will be completed.

Additional waste from projected residential dwellings and TWA requirements will place pressure on existing waste management facilities during the peak

Assessing Current State

Figure 45: Type of solid waste collected by Mudgee Waste Facility, 2022-23



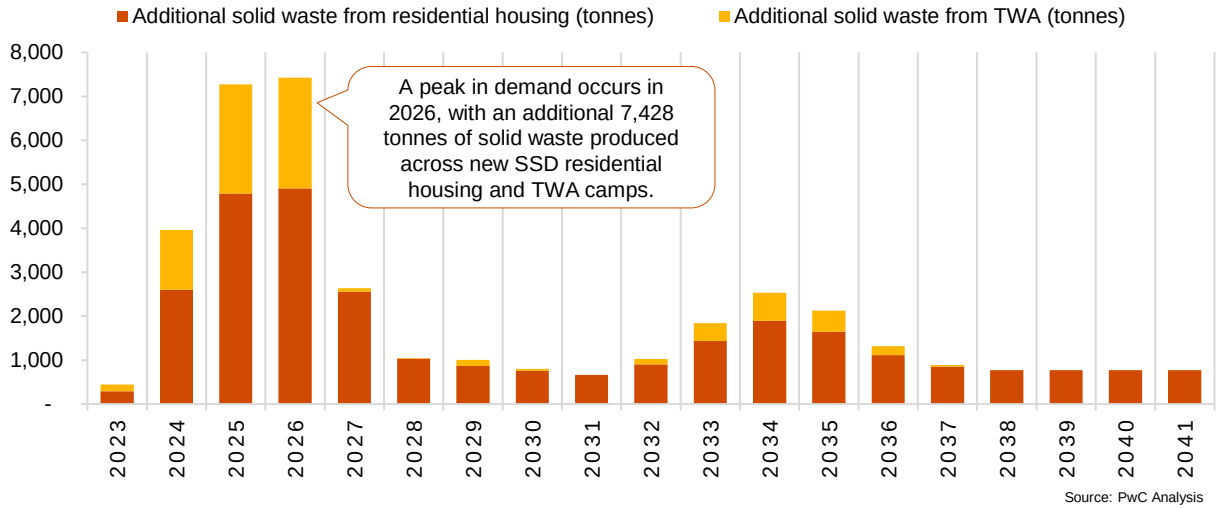
Source: NSW EPA (2023), Annual Waste Report: Mudgee Waste Facility

01 In 2022-23, Mudgee Waste Facility (the only landfill facility in the LGA) collected a net waste total of 33,951 tonnes of waste. On current baseline population projections (i.e. no additional demand generated by SSDs), the region has 40 years of solid waste land fill capacity based on existing and new supply that will come into market. This includes the new landfill cell currently under construction. MWRC has curb side collection in Mudgee, Gulgong, Kandos and Rylstone while more rural parts of the LGA have service centres for waste collection.

02 A new landfill cell is under construction and is expected to be live in 2024 with additional life cycle capacity to 2031-32 based on existing population projections. With additional SSD workforce in the region, the effective life of this new landfill cell will be reduced and additional resources and trucks may be needed to meet increased demand for waste collection.

Measuring increased demand due to State Significant Development (SSD)

Figure 46: Average additional solid waste (tonnes) produced by additional residential and TWA residents 2023-41 [2]



Source: PwC Analysis

With further uplift in market housing and TWA required to meet the demand of the state significant development, there will be additional demand generated for solid waste collection in the MWR LGA. This is captured in the above graph, which sees 2024-2026 as the peak years aligning with the surge in construction workers on the SSD.

The key assumptions here are:

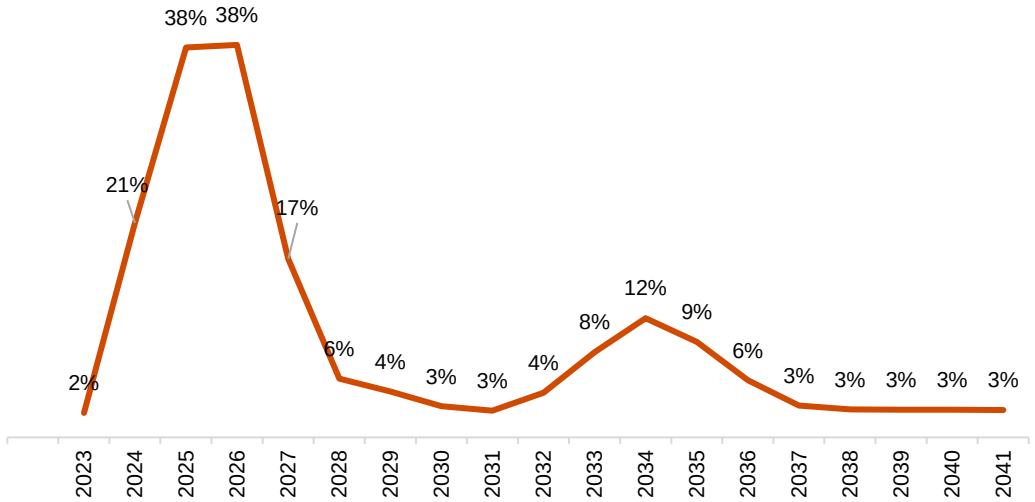
- Additional population in residential households will peak in 2026 at ~ 4,900 individuals
- Average waste per additional residential household member is 1 tonne annually.
- Average waste per additional TWA worker is 0.5 tonnes annually.
- **Construction waste has not been included** on the assumption that this will be resolved by SSD proponents as part of their project plans.

A surge in population during the peak construction years may place increased demand on local road use and freight flow – driving up road asset maintenance costs

Assessing Current State

- With a surge in population and workforce tied to SSD in the LGA, there can be an expectation that traffic growth and road use will increase commensurate with the rate of population growth year-on-year (pictured below).
- Mid-Western Regional Council manages and maintains 2,460 km of local road network.
- In 2021-22, Mid-Western Regional Council spent $21,007,000 to maintain road assets to a 'satisfactory standard' for road users. [2] This equates to an asset maintenance cost of $8,539 per kilometre of road.

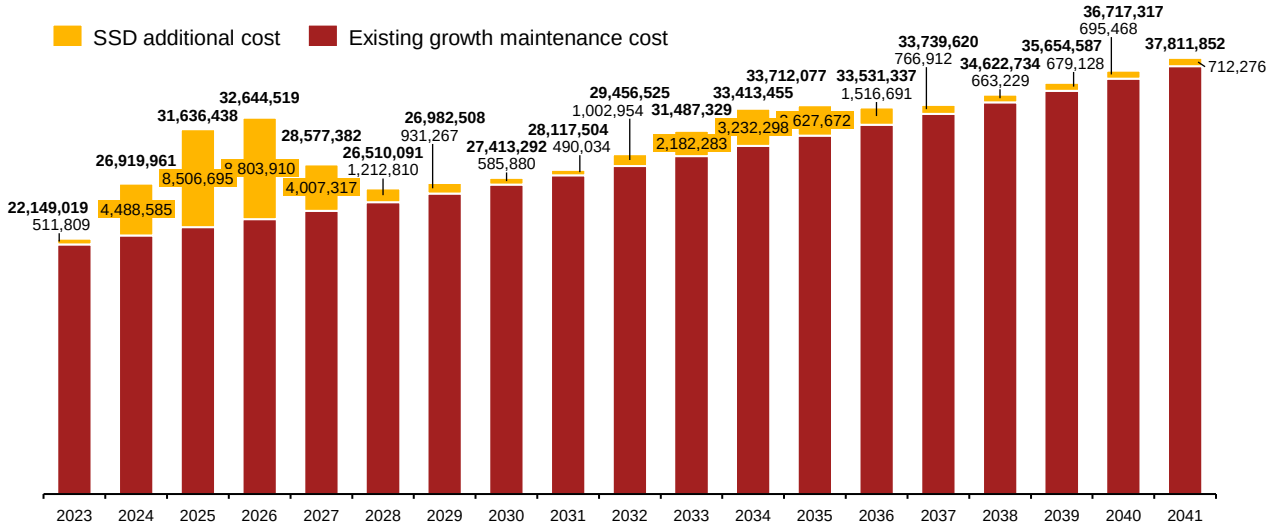
Figure 47: Rate of additional population growth attributable to SSD projects



Measuring increased demand due to State Significant Development (SSD)

- In applying the population growth rate as a proxy for increased road usage, the additional SSD-related costs are calculated in the graph below by multiplying by the per kilometre road maintenance cost.
- Like other service delivery areas, the greatest jump comes in the peak construction years of 2025-2027 whereby the workforce surges. There is again a smaller peak in the period 2033-2035 as the second wave of SSD flows through to increased worker movement and freight flows. An escalation rate of 3 per cent per annum is applied.
- Additional road maintenance costs may be incurred due to the heavy flow of freight and capital equipment into the region during construction years.

Figure 48: Capital cost of road maintenance attributable to SSD population growth



1. TfNSW (2022), *Guide for Estimating the Problem Cost*, p.38; 2. Mid-Western Regional Council (2022), Annual Financial Statements, p.124

Contents

With clear impacts to services, housing and infrastructure a range of mitigating strategies have been developed to inform ongoing planning and management of community impacts

Purpose

This section outlines recommendations to help address and/or mitigate the impacts on services, housing and infrastructure due to a rapid increase in population from SSD projects occurring in the region.

In addition, opportunities for collaboration and legacy projects are identified where investment helps to both mitigate impacts and seed new industries for the region. These are particularly focused on water security and waste and circular economy opportunities.

Recommendations are aligned to service areas and the levers available to government stakeholders. The intent of these recommendations are to inform ongoing collaborative planning with relevant government and non-government stakeholders. They should be seen as a starting point for informing appropriate state and local agencies to align growth planning for services, manage community impacts across the delivery phases and to determine need for additional analysis. For each recommendation the relevant stakeholders who may need to be engaged in the delivery of the recommendation have been listed.

How the recommendations were developed

The recommendations on the following pages are based on an understanding of the nature of increased demand on services and the levers available to address this increased demand. They have been developed in consultation with MWRC. Three main steps were used to develop the recommendations:

1. Confirm key gaps and pinch points
This involved reviewing the magnitude and direction of impact and the key drivers of supply and demand for each service area; mapping gaps by service area and operational capability; and confirming the response required to maintain current service provision.

2. Identified levers
This involved identifying key stakeholders and the levers available as well as an understanding of the factors impacting the ability to meet demand (for example resources such as land, staff, regulatory requirements, etc.). Examples of levers include regulatory control, financial incentives, information and guidance, monitoring and evaluation, direct service provision, direct capital investment.

3. Identification of mitigation and/or response measures
This involved workshopping potential measures to soften the impacts of prolonged increase in demand by service area (for example through demand management, resourcing sharing, staging and provision of information to improve decision-making) as well as identifying potential capital and/or operating responses that may be needed to meet potential increases in demand.

The recommendations are summarised on the following pages.

Mitigating strategies for the region

Service Area	Category	Recommendation	Key Stakeholders	Rationale
Housing	Governance	• Establish an accommodation coordination team that manages and monitors housing stock and room availability. • Develop a campaign to promote and educate residents around infill medium-density development (including secondary dwellings) to encourage an increase in this housing typology coming to market. Financial incentives available to landowners should be included as part of the campaign. • Explore policies to incentivise major master planned housing developments, including opportunities to fast track approvals.	Regional NSW, Mid-Western Regional Council, Dubbo Regional Council, Warrumbungle Shire Council	Provide more accommodation options across the region within existing and new-to-market housing stock.
	People and skills	• Boost number of planning staff within the Council to accelerate speed of development approval process in line with potential increased development application activity associated with need for increased housing.	Mid-Western Regional Council, NSW DPE	Improve the speed of the planning process, reducing the time spent between DA application and build.
	Land use	• Formalise requirements for proponents to provide temporary worker accommodation in appropriate locations. • Explore opportunities for sharing, re-use and/or repurposing of TWAs between projects and/or for legacy uses. • Review current staging and servicing of zoned land in the Mudgee and Gulgong Urban Release Strategy, including master planning of growth areas to assist in bringing land to market in a more timely manner and agility to respond potential peak accommodation requirements. • Build essential worker housing as part of master planned areas.	Mid-Western Regional Council, REZ project proponents, EnergyCo, land developers, NSW DPE	Establishing clear frameworks for temporary worker accommodation and maximise sustainability of worker accommodation. Master planned land to get to market faster than fragmented land ownership.
Water	Infrastructure	• Investigate the feasibility and funding options to upgrade the Mudgee STP to provide waste water recycling capability for construction use and other ongoing uses post construction phase.	Mid-Western Regional Council, REZ Energy proponents, EnergyCo	Maximise the sustainability of REZ projects and unlock circular economy opportunities for the MWR LGA.
	Land use	• Review current water distribution infrastructure phasing and timing to align with accelerated release of land as required.	Mid-Western Regional Council, landholders, water agencies	Ensure land release is synced with staged upgrade of water distribution infrastructure.
	Governance	• Work with NSW Government/energy project proponents to establish a clear requirement for all construction and TWA sites to provide on-site water supply systems (incl. source water independent of council allocation). • Work with NSW Government to audit existing water allocations and identify unused or underutilized allocations for potential transfer and/or sharing arrangements. • Explore options to increase in water licenses/allocations for MWRC to provide water.	Mid-Western Regional Council, NSW DPE, EnergyCo, SSD proponents	Clear line of responsibility / accountability for energy project proponents to deliver water to worker accommodation camps.

Mitigating strategies for the region

Service Area	Category	Recommendation	Key Stakeholders	Rationale
Sewage	Governance	• Determine a clear framework that requires energy project proponents to have onsite sewage processing in TWAs, including processes to manage sledge.	SSD proponents, EnergyCo, Mid-Western Regional Council	Ensure functionality of the TWAs as local council sewage system does not have the capacity to absorb TWAs demand increase.
	Infrastructure	• Explore options for Mudgee and Gulgong STP expansion including temporary expansion; proponent built; servicing in neighbouring LGAs.	Mid-Western Regional Council, SSD proponents, EnergyCo	Determine the best pathway to accommodate increase in sewage demand.
Waste	Governance	• Improve communication channels with proponents around roles and responsibilities for waste collection and processing at TWAs.	Mid-Western Regional Council, SSD proponents, EnergyCo, waste operators/sub-contractors.	Avoid operational issues that have arisen at landfill/waste processing sites.
	Regulation	• Establish a regulatory framework setting benchmarks/quotas on REZ material and construction waste and TWA waste collection (e.g. min % recyclables, construction clean fill reuse rules, etc.). • Consult with neighbouring councils to ensure regulatory framework is consistent around landfill obligations for TWAs/project sites.	Mid-Western Regional Council, EnergyCo, neighbouring councils, SSD proponents	Reduce solid waste and single-use materials throughout construction, bolstering project sustainability and local character. Build collaboration with neighbouring councils to support sustainable delivery of the REZ.
	Infrastructure	• Conduct a business case/costings on value-add opportunities for Council to upgrade recycling capabilities to improve recycling scope, capacity and quality.	Mid-Western Regional Council, waste operators/sub-contractors, EnergyCo	Build a stronger circular economy and unlock new opportunities for value-add industry in the local economy.

Mitigating strategies for the region

Service Area	Category	Recommendation	Key Stakeholders	Rationale
Childcare	Infrastructure	• Examine the feasibility of MWRC acting as a developer for a new childcare/multi-purpose centre in Gulgong following the build and lease model in Mudgee.	Mid-Western Regional Council, childcare operators	Meet additional demand for childcare outside of Mudgee and in close proximity to project sites. Build in flexibility for additional uses post construction phase.
	Services	• Conduct an audit of childcare service providers' opening hours and expansion potential to cater for extended working hours of construction/REZ workers. • Develop a platform for centralised communication of current childcare place availability in the region and ongoing demand monitoring.	NSW Department of Education, ACECQA, Childcare operators, SSD proponents	Cater for additional demand generated by 12-hour shift workers on REZ development.
	Land use	• Advocate for developers/energy proponents to build-in childcare capacity to new developments/TWAs.	SSD proponents, land developers	Accommodate demand generated by families moving into the region.
Schools	Infrastructure	• Identify under-utilised assets and classrooms, including detailed audit of capacity on a school-by-school basis • Advocate for the provision of additional temporary classrooms in peak construction years as required.	SINSW, local schools network, NSW Department of Education	Maximise existing infrastructure utility in the local schools network and cater for demand surge in peak construction years.
	People and skills	• Partner with local schools to develop a teacher retention strategy around non-monetary incentives focused on mentoring and community engagement	Local schools network, NSW Department of Education, NSW Teachers Federation	Compliment NSW Government initiatives to retain teachers in the region long-term.

Mitigating strategies for the region

Service Area	Category	Recommendation	Key Stakeholders	Rationale
Hospitals	Infrastructure	• Conduct an audit on medical equipment available within the region and advocate for a CT scan in Mudgee Hospital. • Work with NSW Health to explore potential 'virtual hospital' models, utilising telehealth to address and manage demand for low triage and GP activity	Western NSW LHD, NSW Health	Boost the breadth and quality of health services within the region (currently no CT scan/limited access to X-ray and MRIs in the LHD). Virtual care infrastructure can provide legacy use beyond construction.
	Land use/services	• NSW Government to work with SSD project proponents to establish protocols for helicopter access to worker/project sites.	SSD proponents, Western NSW LHD, Aviation Authorities	Ensure efficient medical access to project and workers sites given their remoteness within the LGA.
	Governance	• Investigate contingencies to medical transfers to Dubbo Base Hospital (e.g. shell space at Mudgee Base Hospital and additional bed/staffing requirements) • Explore requirements to mandate that TWAs to provide onsite medical services. • NSW Health to work with project proponents to communicate clear protocols for emergency responses	Mid-Western Regional Council; NSW Health, Western NSW LHD	Large truck movements along major highway to Dubbo will have an impact on medical transfers. TWAs to have adequate health services accessible to workers.
Primary Health Care	Governance / services	• Set minimum health care staffing requirements for TWA (e.g. prescribing nurses on-site, access to telehealth for all workers).	Mid-Western Regional Council, SSD proponents, Western NSW LHD, NSW DPE	Adequate provisioning of health care at worker accommodation.
	People and skills	• Advocate for permanent placement of GP/GPs in Gulgong	Mid-Western Regional Council, NSW Health, GP advocacy groups	Currently, there is limited full time access to a GP in Gulgong and it is in close proximity to new REZ developments.
	Services	• Collaboration between developers, project proponents and local pharmacies around medical supplies and ability to fill scripts. • Development and promotion of telehealth models of care in region, including development of virtual care facility.	SSD proponents, local pharmacies, pharmacy advocacy bodies; NSW Health Western NSW LHD	Ensure local pharmacies can meet the demand that the TWAs will generate for medicines on top of fulfilling current state obligations. Delivery of efficient and accessible health care, especially to rural and remote areas of the LGA.

Mitigating strategies for the region

Service Area	Category	Recommendation	Primary advocate/s	Rationale
 Ambulance	Governance	• Liaise with local NSW Ambulance to communicate the road/traffic implications of the REZ projects. • Engage with SSD proponents to establish requirements/expectations for access to paramedics/ambulances on TWA sites.	Mid-Western Regional Council, NSW Ambulance, SSD proponents, EnergyCo	Address information asymmetry with FIFO/DIDO paramedics to reduce response time blowout. Set clear expectations for TWAs around onsite paramedic/ambulance access.
	Services	• Investigate options for temporary service delivery and increase paramedic provision during peak construction (such as temporary ambulance stations).	NSW Ambulance, SSD proponents, EnergyCo	Account for surge in incident rate during the height of REZ construction window.
 Police	Governance	• Facilitate educational workshops for SSD proponents around risk minimisation for TWAs including road safety concerns. • Communicate preference with energy proponents to establish 'dry'/alcohol-fee TWA sites.	NSW Police, SSD proponents	Raise awareness and encourage preventative behaviour adoption to avoid incident rates tied to crime, mental health and driver fatigue of workers residing in TWAs.
 Local roads	Infrastructure	• Advocate for SSD proponents and developers to build temporary/'park and ride' car parks on private land.	SSD proponents, Mid-Western Regional Council	Prevent existing car parks and on-street parking from being oversubscribed by surge in project workforce.
	Governance	• Education campaign aimed at residents, businesses community groups and energy proponents around traffic flow changes and associated safety protocols during peak construction years.	Mid-Western Regional Council, EnergyCo, SSD proponents	Raise awareness and understanding around traffic changes/impacts during REZ construction.
	Infrastructure	• Seek additional funding options/special grant application to fund asset road maintenance program.	Mid-Western Regional Council, TfNSW, local road crew operators, EnergyCo	Sufficiently fund the road asset maintenance program due to increase in traffic flow/freight capacity.

Ongoing monitoring framework

Consultation with key stakeholders highlighted the need for a series of 'performance tracking' strategies tied to establishing a monitoring framework to capture the ongoing SSD development impact on the Mid-Western Regional Council, and to see how measures introduced are going in minimising the specified impacts.

Service Area	Indicator	Measure
Housing	• Population growth • DA applications • Dwelling completions	• NSW CPA population growth • ABS population growth • ABS Land parcel counts and new dwelling approvals • ABS Building approvals – Number of dwelling units approved.
Water	• TWA consumption per worker • Consumption per residential house	• Estimated water usage by TWAs • Estimated increased water required by residential dwellings
Sewage	• TWA generation per worker • Waste water per residential house	• Estimated increased sewage generation by TWA and residential dwellings
Waste	• Waste processing capacity	• SSD project type generation per MW (e.g. solar, wind etc) • Waste per residential house
Childcare	• Number of available childcare places	• Estimated additional 0-5 y/o population • Estimated demand for childcare places
Schools (Primary and Secondary)	• Class size • Number of teachers • Staff to student ratio	• Estimated additional 5-12 y/o population • Estimated additional 12-18 y/o population • SINSW 'Eagle eye' forecasts
Hospitals	• ED beds to average annual ED presentations • Current staffing (Nurses)	• Number of ED presentations – AIHW/BH NSW data • Change in average annual ED presentations (risk-adjusted)
GPs	• Number of GPs • GP to population ratio	• Estimated increase in population • Change in number of GPs to population
Ambulance	• Change in average ambulance call outs (risk-adjusted)	• Ambulance response time and incident rate
Police	• Change in incident rates – crimes, road incidents, domestic and family violence callouts	• Incident rate and response time statistics – BOCSAR/TfNSW
Local roads	• Traffic modelling and ongoing traffic count – private car and freight usage • Parking capacity	• TfNSW Freight Data Hub/Traffic Volume Viewer

Contents

A

Demand Analysis – Detailed Assumptions

Additional assumptions and limitations

Non-local Workforce inter-LGA commute vs DIDO/FIFO

The model does not distinguish between daily commuters from outside the LGA vs DIDO/FIFO workers. All additional people in the workforce (i.e. non-locals) are assumed to require additional housing, services and utilities. While this might lead to an overestimate of housing and other services required, the assumption will minimise the detrimental impacts on tourism caused by underestimates.

Ramping up of Workforce

This model does provide consideration to the gradual ramping up and down of the workforce. With respect to the specific project's peak construction workforce and construction duration, the peak construction workforce ramps up on a quarterly basis so that the overall trend line is indicative of a standard bell curve.

Construction of Transmission Lines

Energy Corporation of NSW (EnergyCo) will develop transition lines under three stages (deliver now, secure now and plan for the future). The required workforce is only publicly available for the first stage, deliver now. Workforce numbers have been estimated for the final two stages based on the ratio of network capacity added compared to the known workforce for deliver now. Timing of the final two stages is aligned to that proposed in the Network Infrastructure Strategy NSW.

Movement of families

It should be noted that if there are not sufficent existing services (e.g. schools,or for other factors) families might self-select not to move to the region as a family unit or even entirely. This model does not explicitly consider that situation.

Mobility of workers

This model considers each worker to be unique to the project. In practice this mean that there is no mobility of workers between like projects e.g. concreting, ditching between solar projects. As a result, the output of the model might overestimate the unique worker count.

Input data

Construction start dates and programs for the projects are subject to change. The model will need to continue to be developed and updated as new information becomes available as projects move closer to construction and delivery.

As of October 2023, 36 SSD projects have been identified for development in and around the MWR LGA

Project	Estimated Workforce		Timeframe (targeted)	
	Construction	Operation	Construction	Operation
Bowdens Silver Mine	320	228	2024 ,18 months	2026 to 2045
Moolarben Coal	250	0	2025, 36 moths	2028, to 2038
Ulan Coal	0	931	2021	2021, to 2035
Mayfair Solar	150	2	2025, 12 months	2026 to 2046
Narragamba Solar	400	10	2025, 36 months	2028 to 2053
Wollar Solar Project	400	5	2023, 12-18 months	2024 to 2050
Stubbo Solar Project	507	10	2024, 24 months	2026 to 2050
Tallawang Solar Farm	430	27	2024, 34 months	TBD
Birriwa Solar Farm	800	15	2024, 36 months	2027, to 2057
Mavis Solar	150	5	2025, 12 months	2026 to 2065
Barneys Reef Wind Farm	340	10	2024, 28 months	2026, to TBD
Burrendong Wind Farm	250	15	2023, 30 months	TBD
Piambong Wind Farm	400	15	2026, 30 months	2028, to 2058
Orana Wind Farm	580	27	2026, TBD	2028, to TBD
Liverpool Range Wind Farm	800	47	2024, 36 months	2027, to 2052
TBA	300	15	2026, 15 months	2028 to 2058
Bellambi Heights Battery	100	3	2024, 12-18 months	TBD
Beryl Battery	40	1	2025, 12 months	2026 to 2051

Project	Estimated Workforce		Timeframe (targeted)	
	Construction	Operation	Construction	Operation
Cobbora Solar Farm	700	8	2024, 36 months	2027, to TBD
Dunedoo Solar Farm	125	3	2022, 12 months	2023, to 2053
Dapper Solar Farm	350	20	2025, 18-24 months	2027, to 2057
Wellington Solar Farm	200	3	2019, 48 months	2023, to 2053
Wellington North Solar Farm	400	4	2023, 24 months	2025, to 2055
Sandy Creek Solar Farm	700	15	2025, 24 months	2027, to 2057
Goulburn River Solar Farm	350	10	2023, 36 months	2026, to 2061
Pinecrest Solar*	175	7	2025, 18 months	2027, to TBC
Merriwa Solar Farm*	500	20	TBC	TBC
Valley of the Winds	400	50	2023, 42 months	2027, to TBD
Spicers Creek Wind Farm	250	12	TBD, 30 months	TBD, 30 years
Uungula Wind Farm	262	12	2023, 36 months	TBC
Apsley battery*	50	TBC	TBC, 12 to 18 months	TBC, 30 years
Orana Battery storage*	100-150	TBC	TBC, 12 to 18 months	TBC
Wellington South BESS*	100	30	2023, 12 to 18 months	2024, TBC
Phoenix pumped hydro	500	50	2026, 50 months	2030, to 2080
Central-West Orana REZ	1800	98	2024, 36 months	2027, to TBD
Central-West Orana REZ (Secure Now)*	1250	49	2033, 12 months	2035 to TBD
Related Projects to Secure Now**	1080	37	2032, 60 months	2037 to TBD

Key: Included in current projections | Not included in current projections

*Worker numbers not currently available, estimated ustilising like project requirements.
**Related project to secure now refers to the mix of wind, solar and battery projects needed to meet the 1.5 GW increase in transmission line capacity. This estimate is derived from current projects and workforce requirements

Source: MWRC

Project information and assumptions (within MWR LGA) as at Oct 2023

Project Type	Workforce Origin		Project	Estimated Workforce		Timeframe (targeted)		Included in Reduced Scenario
	Local	Non-local		Construction	Operation	Construction	Operation	
Mining 	**98%**	**2%**	**Bowdens Silver Mine**	320	228	2024 ,18 months	2026 to 2045	Y
			Moolarben Coal	250	0	TBD	TBD, 2038	Y
			Ulan Coal	0	931	TBD	TBD, 2035	N
Solar 	**2%**	**98%**	**Mayfair Solar**	150	2	2025, 12 months	2026 to 2046	N
			Narragamba Solar	400	10	2025, 36 months	2028 to 2053	Y
			Wollar Solar Project	400	5	2023, 12-18 months	2024 to 2050	Y
			Stubbo Solar Project	507	10	2024, 24 months	2026 to 2050	Y
			Tallawang Solar Farm	430	27	TBD, 34 months	TBD	Y
			Birriwa Solar Farm	800	15	2024, 36 months	2027, to 2057	Y
			Mavis Solar	150	5	2025, 12 months	2026 to 2065	N
Wind 	**2%**	**98%**	**Barneys Reef Wind Farm**	340	10	2024, 28 months	2026, to TBD	Y
			Burrendong Wind Farm	250	15	TBD, 30 months	TBD	Y
			Piambong Wind Farm	400	15	2026, 30 months	2028, to 2058	N
			Orana Wind Farm	580	27	2026, TBD	2028, to TBD	Y
			Liverpool Range Wind Farm	800	47	2024, 36 months	2027, to 2052	Y
Battery 	**2%**	**98%**	**TBA**	300	15	2026, 15 months	2028 to 2058	N
			Bellambi Heights Battery	100	TBD	TBD, 12-18 months	TBD	Y
			Beryl Battery	40	1	2025, 12 months	2026 to 2051	N
Supply 	**2%**	**98%**	**Central-West Orana REZ**	1500	98	2024, 36 months	2027, to TBD	Y
			Central-West Orana REZ - Secure Now	798	49	2033, 12 months	2035 to TBD	Y
			Related Projects to Secure Now*	1080	37	2032, 60 months	2037 to TBD	Y

*Related project to secure now refers to the mix of wind, solar and battery projects needed to meet the 1.5 GW increase in transmission line capacity. This estimate is derived from current projects and workforce requirements

Project information and assumptions (surrounding MWR LGA) as at Oct 2023

Project Type	Workforce Origin		Project	Estimated Workforce		Timeframe (targeted)		Distance to:		Included in Reduced Scenario
	Local	Non-Local		Construction	Operation	Construction	Operation	Mudgee	Gulgong	
Solar	**2%**	**98%**	**Cobbora Solar Farm**	700	8	2024, 36 months	2027, to TBD	55 min	35 min	Y
			Sandy Creek Solar Farm	700	15	2024, 24 months	2026, to 2061	1hr	40 min	Y
			Dunedoo Solar Farm	125	3	2022, 12 months	2023, to 2053	>1hr	40 min	Y
			Dapper Solar Farm	350	20	2025, 18-24 months	2027, to 2057	1hr	40 min	Y
			Wellington North Solar Farm	400	4	2023, 24 months	2025, to 2055	1hr	45 min	Y
			Goulburn River Solar Farm	350	10	2023, 36 months	2026, to 2061	~1 hr	~ 1 hr	Y
			Pinecrest Solar*	175	7	2025, 18 months	2027, to TBC	~ 1 hr 20min	~2hr	N
			Merriwa Solar Farm*	500	20	TBC	TBC	~1hr	~1hr 30min	N
Wind	**2%**	**98%**	**Valley of the Winds**	400	50	2023, 42 months	2027, to TBD	>1hr	45 min	Y
			Spicers Creek Wind Farm	250	12	TBD, 30 months	TBD, 30 years	50 min	35 min	Y
			Uungula Wind Farm	262	12	2023, 36 months	TBC	~1hr 30min	~1 hr	Y
Battery	**2%**	**98%**	**Apsley battery***	50	TBC	TBC, 12 to 18 months	TBC, 30 years	~1hr 10min	~1 hr	Y
			Orana Battery storage*	100-150	TBC	TBC, 12 to 18 months	TBC	1hr	50 min	N
			Wellington South BESS*	100	30	2023, 12 to 18 months	2024, TBC	~1hr	~50 min	N
Other	**2%**	**98%**	**Phoenix pumped hydro**	500	50	2026, 50 months	2030, to 2080	1hr	>1hr	Y

Estimating the proportion of workers that may bring families and/or spouses

To determine additional impacts on housing and services, it is necessary to estimate the proportion of non-local workers that are likely to bring family or spouses (i.e. couple and family households). The approach to this is documented in the slides following.

Comparative approach to deriving a family ratio

In order to derive an appropriate ratio to inform the family/couple/ single spilt of the additional population two approaches were utilised:

1. **Persons usually resident in a dwelling**
2. **Social Family Status and Parental Indicator**

The first method was compared against the second method to provide a level of quality assurance.

Ultimately the first method was used in the model as **housing availability in the MWR LGA is the largest constraint in enabling a REZ workforce. For model 1, usual residents has been used to infer a preferred dwelling size.**

The following slides provide additional detail that underpinned the ratio selection.

Method 1 – Persons usually resident in a dwelling

0 Filter raw 2021 census data

Variable Filters: **INGP Indigenous** i.e. Non-Indigenous, **NPRD Number of Persons Usually Resident in Dwellings** i.e. people who usually reside in an occupied private dwelling

Location Filters: **LGA**: East Pilbara

Assumptions: To better reflect mobile workforce requirements, and distinguish from residential population, Indigenous status has been factored into the 'persons usually resident' filter.

1 Determine demographics of mobile workforce in East Pilbara.

2 Apply Usually Resident Assumptions

Single		Couple	Family
NPRD = one person	**Visitor** NPRD = Not applicable	NPRD = two persons	NPRD = three or more persons

Method 2 – Social Family Status and Parental Indicator

0 Filter raw 2021 census data

Variable Filters: **Sex, OCCP Level 2 Target Occupations, AGE5P 20-64 age group** i.e. working age population, **MDCP Social Marital Status** i.e. Married, De Facto, Not Married, N/A, **FPIP Parent Indicator** i.e. Male parent, female parent N/A

Location Filters: **LGA:** Gladstone, Mount Isa, Western Downs, East Pilbara, Leonora, Laverton

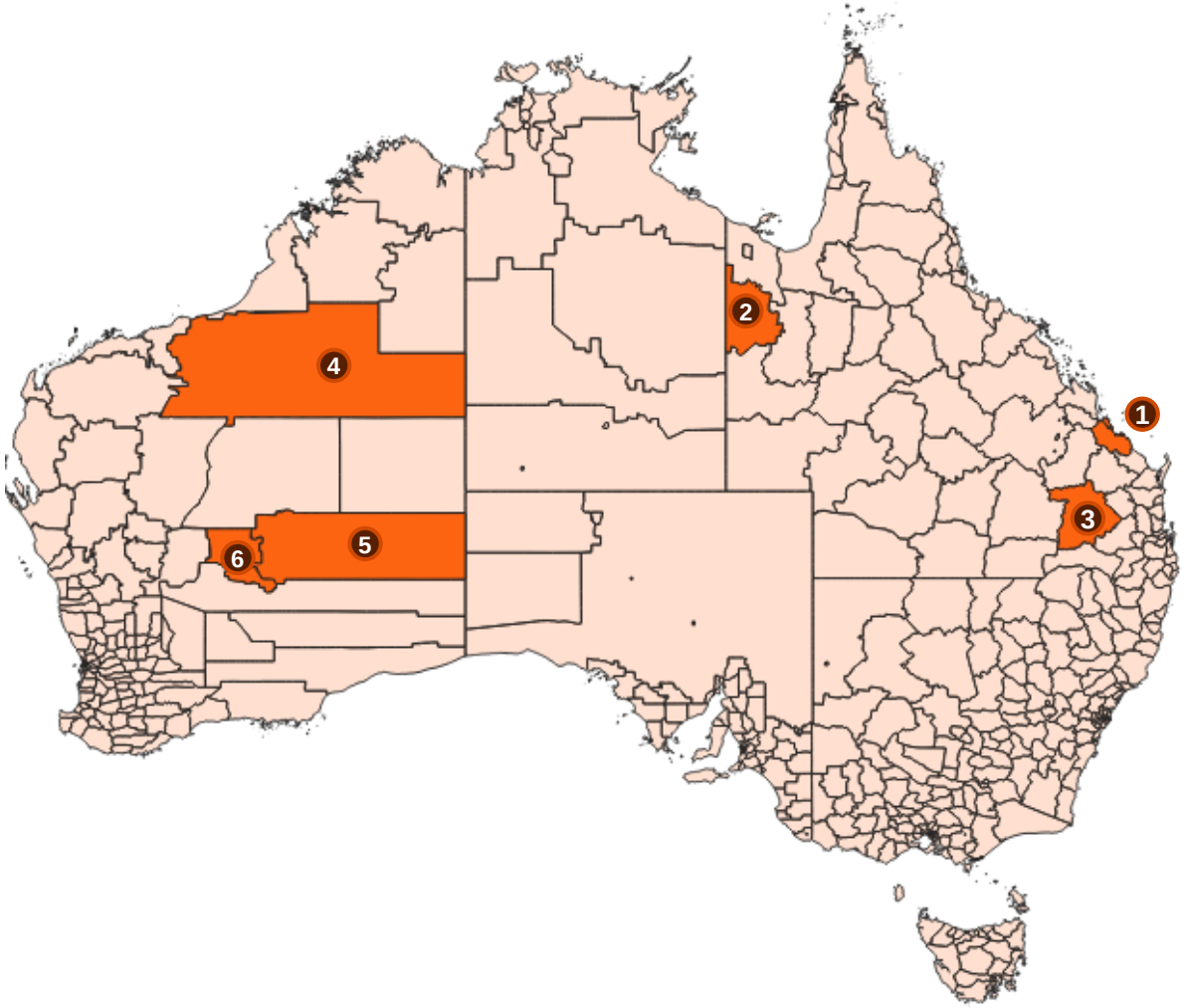
Assumptions: All male workforce, no single parents.

1 Determine possible combinations from MDCP and FPIP variables that derive workers who have a 'family structure' as singles, visitors, couples and families.

Single		Couple	Family
MDCP = Not Married FPIP = Not Applicable	**Visitor** MDCP = Not Applicable FPIP = Not Applicable	MDCP = Married in a de facto marriage FPIP = Not Applicable MDCP =Married in a registered marriage FPIP = Not Applicable	MDCP = Married in a de facto marriage FPIP = Male parent MDCP = Married in a registered marriage FPIP = Male parent

2 Sum across occupations and ages to output the total household type in each geographic region

A sample of LGAs were identified based on their similarity to the MWR region (e.g. population, proximity to major cities, industry growth) to provide an indicative range of single/couple/family ratios using the 2nd method

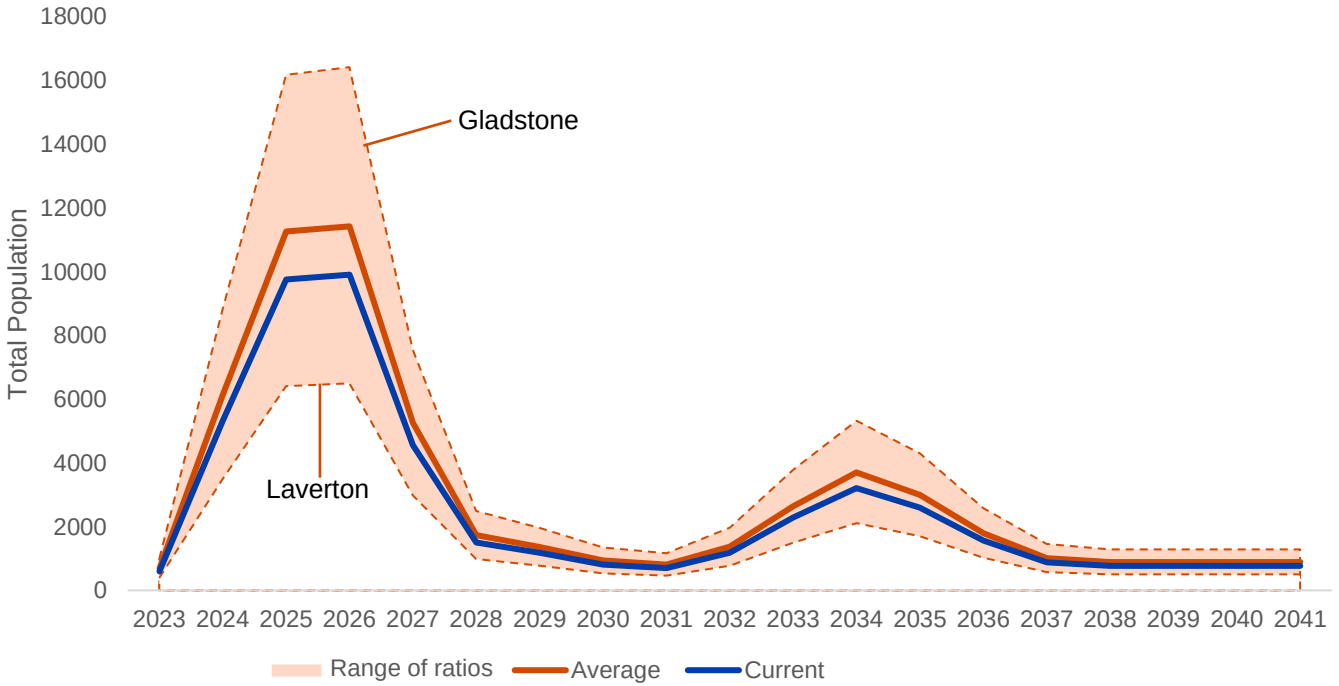


Worker composition as at 2021 (utilising method 2)

LGA	Single %	Couple%	Family%
1. Gladstone (QLD)	**31%** (1823)	**25%** (1444)	**44%** (2604)
2. Mount Isa (QLD)	**39%** (855)	**23%** (500)	**39%** (865)
3. Western Downs (QLD)	**44%** (1023)	**21%** (496)	**35%** (817)
4. East Pilbara (WA)	**91%** (4356)	**3%** (138)	**6%** (273)
5. Laverton (WA)	**100%** (808)	**0%** (0)	**0%** (0)
6. Leonora (WA)	**93%** (639)	**2%** (13)	**5%** (35)
Average	**66%**	**12%**	**22%**

Given the baseline scenario (all projects occur as currently scheduled), there would be a range of 2,015 to 6,500 singles, 0 to 1,625 couples and 0 to 2,860 families, when single/couple/family ratios from comparable areas are applied

Total population impact on the MWR LGA, with lower and upper cases, as well as average of comparable areas, 2023-2042



The additional population is the additional non-local workforce required plus any dependents that they bring i.e. spouses and or children. The maximum additional population occurs in 2024

- Under the **current ratio** the maximum additional population is **9906**
- Under the **average ratio** the maximum additional population is **11,427**
- Under the **Gladstone ratio** the maximum additional population is **16,419**
- Under the **Laverton ratio** the maximum additional population is **6,500**

Peak count of nonlocal workforce by work profile for baseline scenario[1]

Ratio Applied (Singles%/Couples%/Family%)	**Nonlocal Singles**	**Nonlocal Couples**	**Nonlocal Family**
Gladstone (**31/25/44**)	2,015	1,625	2,860
Mount Isa (**39/22/39**)	2,537	1,390	2,537
Western Downs (**44/21/35**)	2,860	1,365	2,275
East Pilbara (**91/3/6**)	5,915	195	390
Laverton (**100/0/0**)	6,500	0	0
Leonora (**93/2/5**)	6,045	130	325
Average (**66/12/22**)	4,290	780	1,430
Selected Ratio (78/6/16)[2]	**5,070**	**390**	**1,040**

1 Note the peak occurs in 2026 for all counts
2 Current is based on the previous method

B

Demand Analysis – Detailed Scenario Results

Under the sensitivity analysis there are 9 possible varying forecasts

Sensitivity Analysis Outcomes

Given the limitations of a point-in-time analysis, two types of sensitivity tests have been developed to account for the uncertainty around project timing and completion.

There are two key forms of sensitivity analysis applied to the model

1. **Sensitivity Test 1: project/worker volume**
2. **Sensitivity Test 2: project timing**

As depicted in the graphic to the right, 9 potential results are possible. Detailed results of these 9 scenarios are provided on the following page.

It should be noted that these scenarios are largely hypothetical as they are intended to test the sensitivity of the model. As more data becomes available these scenarios may change to more accurately reflect construction of the REZ.

Note, the two outputs on slides 72 to 74 are:

- **Total workers required:** Total local and non-local workers required to facilitate the construction and operation induced by identified SSDs.
- **Total additional population:** Additional population from non-local workers i.e. non-local singles, non-local couples and non-local family units.

Peak workforce and additional population under different scenarios

	Reduced	Current	Plus
Current timing	Workforce: **6,851** (2026) Population: **9,669** (2026)	Workforce: **7,010** (2026) Population: **9,906** (2026)	Workforce: **8,496** (2025) Population: **10,751** (2025)
2 year delay	Workforce: **5,967** (2027) Population: **8,589** (2027)	Workforce: **6,094** (2028) Population: **8,778** (2028)	Workforce: **7,264** (2028) Population: **9,178** (2028)
Smoothed	Workforce: **5,504** (2026) Population: **7,777** (2026)	Workforce: **5,659** (2026) Population: **8,009** (2026)	Workforce: **7,089** (2025) Population: **8,650** (2025)

Project volume and timing variations (within MWR LGA)

Project	Estimated Workforce		Timeframe (**Targeted**)		Timeframe (**Delayed**)		Timeframe (**Smoothed**)		Included in Reduced Scenario
	Construction	Operation	Construction	Operation	Construction	Operation	Construction	Operation	
Bowdens Silver Mine	320	228	2024 ,18 months	2026 to 2045	No change	No change	No change	No change	Y
Moolarben Coal	250	0	TBD	TBD, 2038	No change	No change	No change	No change	Y
Mayfair Solar	150	2	2025, 12 months	2026 to 2046	**2027, 12 months**	**2028 to 2048**	*2027, 22 months*	2029 to 249	N
Narragamba Solar	400	10	2025, 36 months	2028 to 2053	**2027, 36 months**	**2030 to 2055**	*2026, 40 months*	*2029 to 2054*	Y
Wollar Solar Project	400	5	2023, 12-18 months	2024 to 2050	No change	No change	*2024, 20 months*	*2026 to 2052*	Y
Stubbo Solar Project	507	10	2023, 24 months	2026 to 2050	No change	No change	2023, *32 months*	*2027 to 2051*	Y
Tallawang Solar Farm	430	27	TBD, 34 months	TBD	**2026, 34 months**	**2029 to TBD**	No change	No change	Y
Birriwa Solar Farm	800	15	2024, 36 months	2027 to 2057	**2026, 36 months**	**2029 to 2059**	*2025*, 36 months	2028, to 2058	Y
Mavis Solar	150	5	2025, 12 months	2026 to 2065	**2027, 12 months**	**2028 to 2067**	*2025, 18 months*	*2027 to 2068*	N
Barneys Reef Wind Farm	340	10	2024, 28 months	2026 to TBD	**2026, 28 months**	**2028 to TBD**	*2024, 30 months*	*2026 to TBD*	Y
Burrendong Wind Farm	250	15	TBD, 30 months	TBD	TBD, 30 months	TBD	No change	No change	Y
Piambong Wind Farm	400	15	2026, 30 months	2028 to 2058	**2028, 30 months**	**2030 to 2060**	*2027, 30 months*	*2029 to 2058*	N
Orana Wind Farm	580	27	2026, TBD	2028 to TBD	**2028, TBD**	**2030 to TBD**	No change	No change	Y
Liverpool Range Wind Farm	800	47	2024, 36 months	2027 to 2052	**2026, 36 months**	**2029 to 2055**	No change	No change	Y
TBA	300	15	2026, 15 months	2028 to 2058	**2028, 15 months**	**2030 to 2060**	*2027, 24 months*	*2029 to 2059*	N
Bellambi Heights Battery	100	TBD	TBD, 12-18 months	No change	No change	No change	No change	No change	Y
Beryl Battery	40	1	2025, 12 months	2026 to 2051	**2027, 12 months**	**2028 to 2053**	*2025, 20 months*	*2027 to 2052*	N
Central-West Orana REZ	1500	98	2024, 36 months	2027 to TBD	**2024, 60 months**	**2029 to TBD**	No change	No change	Y
Central-West Orana REZ - Secure Now	798	49	2033, 12 months	2035 to TBD	**2033, 12 months**	**2035 to TBD**	No change	No change	Y

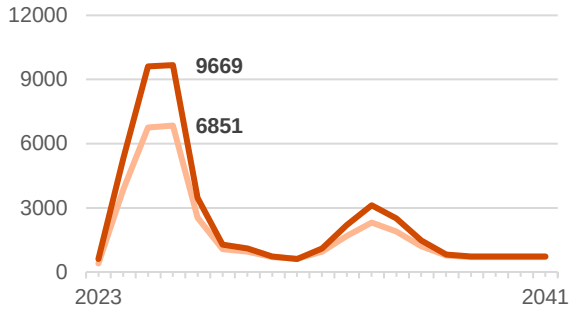
Project volume and timing variations (surrounding MWR LGA)

Project	Estimated Workforce		Timeframe (**Targeted**)		Timeframe (**Delayed +2 yrs**)		Timeframe (**Smoothed**)		Included in Reduced Scenario
	Construction	Operation	Construction	Operation	Construction	Operation	Construction	Operation	
Cobbora Solar Farm	700	8	2024, 36 months	2027 to TBD	**2026, 36 months**	**2029 to TBD**	*2025*, 36 months	*2028 to TBD*	Y
Sandy Creek Solar Farm	700	15	2024, 24 months	2026 to 2061	**2026, 24 months**	**2028 to 2063**	*2026, 24 months*	*2028 to 2063*	Y
Dunedoo Solar Farm	125	3	2024, 12 months	2025 to 2055	**2026, 12 months**	**2027 to 2057**	*2026, 18 months*	*2028 to 2058*	Y
Dapper Solar Farm	350	20	2025, 18-24 months	2027 to 2057	**2027, 18-24 months**	**2029 to 2059**	*2026, 24 months*	*2028 to 2058*	Y
Goulburn River Solar Farm	350	10	2023, 24 months	2026 to 2061	**2025, 36 months**	**2028 to 2063**	No change	No change	Y
Valley of the Winds	400	50	2023, 42 months	2027 to TBD	**2025, 42 months**	**2029 to TBD**	*2024*, 42 months	*2028 to TBD*	Y
Spicers Creek Wind Farm	250	12	TBD, 30 months	TBD, 30 years	**2027, 30 months**	**2030 to 2060**	*2026, 42 months*	*2030 to 2060*	Y
Phoenix pumped hydro	500	50	2026, 50 months	2030 to 2080	**2028, 50 months**	**2032 to 2082**	*2027*, 50 months	*2031 to 2081*	Y

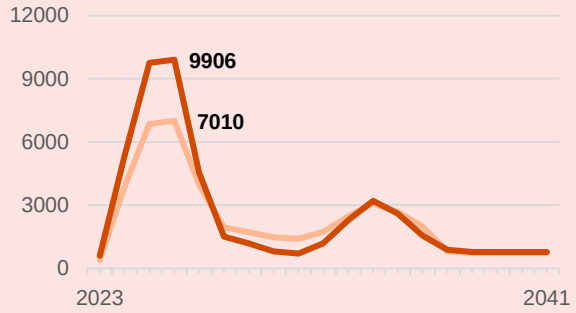
Total workforce and total additional population across scenarios

Total additional population **Total workers**

Scenario: Current Timing, Reduced

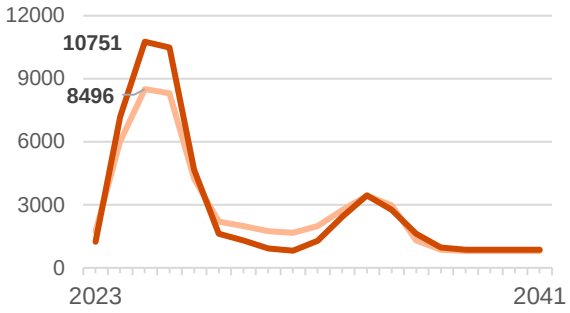


Scenario: Current Timing, Current

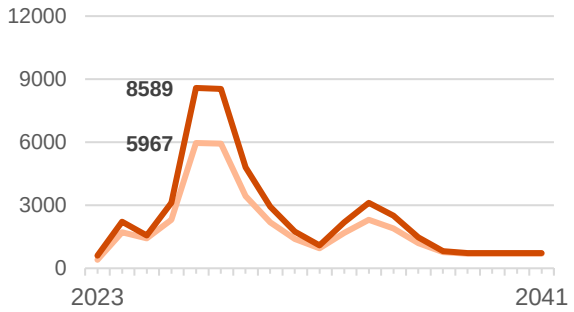


Results apply this scenario

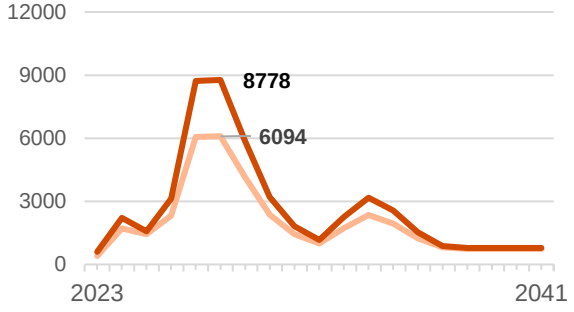
Scenario: Current Timing, Plus



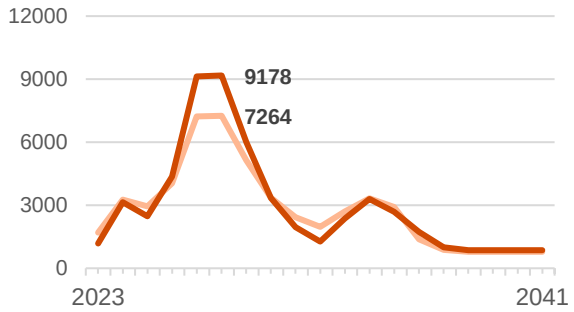
Scenario: 2 Year Delay, Reduced



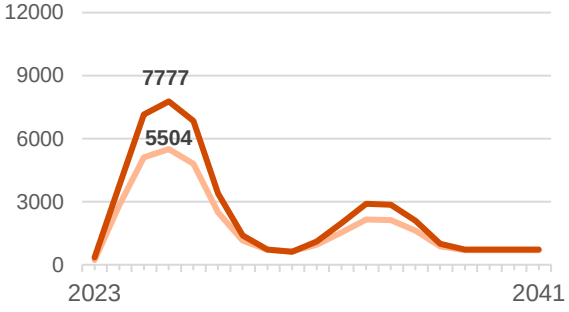
Scenario: 2 Year Delay, Current



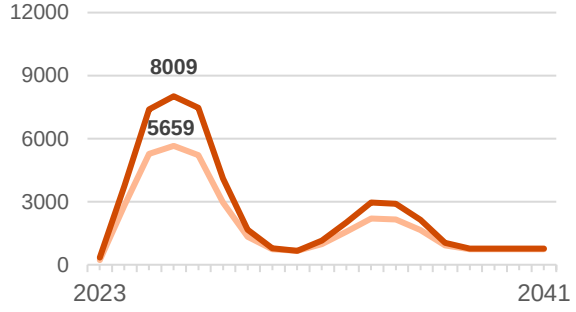
Scenario: 2 Year Delay, Plus



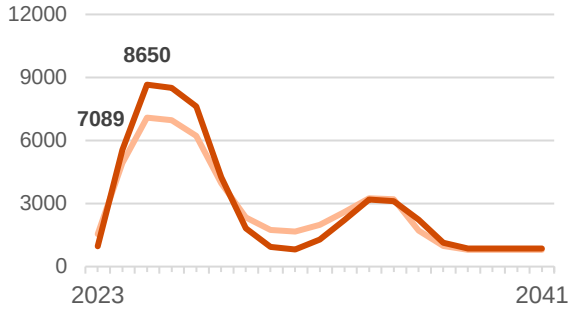
Scenario: Smoothed, Reduced



Scenario: Smoothed, Current



Scenario: Smoothed, Plus



Peak workforce timing and magnitude vary based on the particular scenario.

The **Current Timing, Plus** produces the highest peak (2025, 10,751 additional population and 8,496 total workers). The **Smoothed, Reduced** produces the smallest peak (2026, 7,777 additional population and 5,504 total workers).

The table below summaries the forecast data under the nine scenarios providing the maximum value for each calendar year. (1/2)

Scenario: Current timing, Reduced																			
Year	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**	**2034**	**2035**	**2036**	**2037**	**2038**	**2039**	**2040**	**2041**
Total workers required	403	3869	6759	6851	2537	1077	951	701	627	952	1686	2307	1896	1201	768	699	699	699	699
Total additional population	602	5325	9618	9669	3466	1285	1097	724	613	1099	2195	3122	2509	1471	824	721	721	721	721
Scenario: Current timing, Current																			
Year	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**	**2034**	**2035**	**2036**	**2037**	**2038**	**2039**	**2040**	**2041**
Total workers required	**403**	**3869**	**6854**	**7010**	**3243**	**1202**	**987**	**737**	**663**	**988**	**1722**	**2343**	**1932**	**1237**	**804**	**735**	**735**	**735**	**735**
Total additional population	**602**	**5325**	**9760**	**9906**	**4520**	**1472**	**1151**	**778**	**667**	**1152**	**2249**	**3176**	**2562**	**1524**	**878**	**775**	**775**	**775**	**775**
Scenario: Current timing, Plus																			
Year	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**	**2034**	**2035**	**2036**	**2037**	**2038**	**2039**	**2040**	**2041**
Total workers required	1731	6026	8496	8299	4245	2204	1989	1739	1665	1978	2745	3426	2969	1296	863	794	794	794	794
Total additional population	1237	7199	10751	10483	4669	1621	1300	926	816	1283	2429	3446	2763	1612	966	863	863	863	863
Scenario: Delay, Reduced																			
Year	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**	**2034**	**2035**	**2036**	**2037**	**2038**	**2039**	**2040**	**2041**
Total workers required	403	1710	1434	2309	5967	5933	3440	2182	1391	952	1686	2307	1896	1201	768	699	699	699	699
Total additional population	602	2214	1569	3125	8589	8538	4815	2936	1754	1099	2195	3122	2509	1471	824	721	721	721	721
Scenario: Delay, Current																			
Year	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**	**2034**	**2035**	**2036**	**2037**	**2038**	**2039**	**2040**	**2041**
Total workers required	403	1710	1434	2309	6062	6094	4146	2362	1427	988	1722	2343	1932	1237	804	735	735	735	735
Total additional population	602	2214	1569	3125	8731	8778	5869	3205	1808	1152	2249	3176	2562	1524	878	775	775	775	775
Scenario: Delay, Plus																			
Year	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**	**2034**	**2035**	**2036**	**2037**	**2038**	**2039**	**2040**	**2041**
Total workers required	1697	3277	2947	4043	7232	7264	5148	3364	2429	1978	2712	3333	2922	1376	883	794	794	794	794
Total additional population	1187	3146	2481	4367	9130	9178	6018	3353	1957	1283	2379	3307	2693	1732	996	863	863	863	863

Results apply this scenario

The table below summaries the forecast data under the nine scenarios providing the maximum value for each calendar year. (2/2)

Scenario: Smoothed, Reduced																			
Year	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**	**2034**	**2035**	**2036**	**2037**	**2038**	**2039**	**2040**	**2041**
Total workers required	225	2817	5108	5504	4803	2482	1149	701	627	952	1535	2158	2123	1615	882	699	699	699	699
Total additional population	336	3754	7152	7777	6850	3384	1393	724	613	1099	1969	2900	2848	2089	994	721	721	721	721
Scenario: Smoothed, Current																			
Year	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**	**2034**	**2035**	**2036**	**2037**	**2038**	**2039**	**2040**	**2041**
Total workers required	225	2817	5268	5659	5214	2963	1329	737	663	988	1571	2194	2159	1651	918	735	735	735	735
Total additional population	336	3754	7391	8009	7464	4102	1662	778	667	1152	2023	2954	2901	2143	1048	775	775	775	775
Scenario: Smoothed, Plus																			
Year	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**	**2034**	**2035**	**2036**	**2037**	**2038**	**2039**	**2040**	**2041**
Total workers required	1544	4915	7089	6968	6216	3965	2331	1739	1665	1978	2594	3251	3196	1710	977	794	794	794	794
Total additional population	958	5539	8650	8495	7613	4251	1810	926	816	1283	2203	3184	3102	2231	1136	863	863	863	863

Currently, the model assumes each worker associated with a project's peak workforce is unique. In practice it is likely that a worker will be engaged on multiple projects. Sensitivity analysis has been undertaken to illustrate this scenario.

Substitution of workers between projects

Consultation with proponents has highlighted that workers may be able to move between projects given similar construction phases and requirements. For example, concreting for multiple solar projects. Further, consultation highlighted that individual proponents are likely to select for a non-exhaustive pool of subcontractors for construction of SSDs. For example, ACEN might use the same subcontractors, and hence workers, across their 4 projects. The figure to the right highlights the proponent landscape detailing which proponents are responsible for which projects.

Given this mobility, it is likely that the model in its' current state estimates the highest likely additional workforce. However, at this point in time, effective modelling of this worker mobility is limited by data availability. In light of this limitation, this model proposes 3 hypothetical sensitive analysis scenario to account for worker mobility:

1. **20% worker mobility:** 20% of the total construction workers are assumed to move between multiple projects
2. **30% worker mobility:** 30% of the total construction workers are assumed to move between multiple projects
3. **40% worker mobility:** 40% of the total construction workers are assumed to move between multiple projects

These scenario are illustrated on the following slide overleaf.

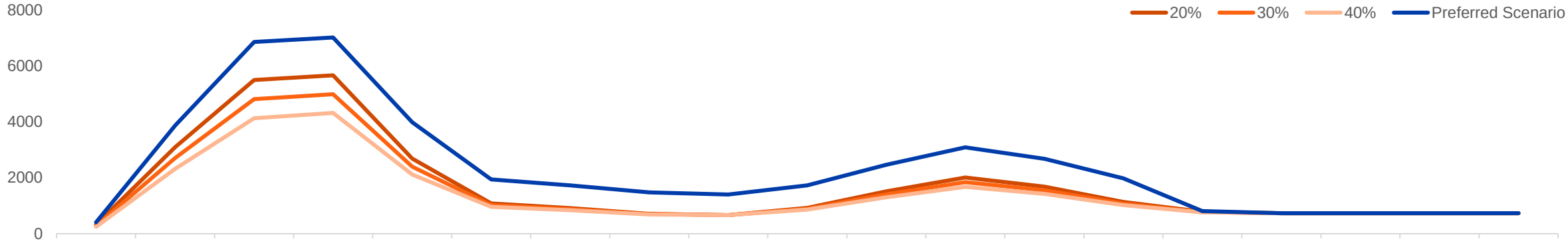
Proponent Landscape

ACEN Australia				EnergyCo	
Narragamba Solar	Stubbo Solar	Birriwa Solar	Phoenix pumped hydro project	Transmission Lines	Wollar Substation
Lightsource BP		**RES Australia Pty Ltd**		**ACE Energy**	
Sandy Creek Solar Farm	Goulburn River Solar Farm	Tallawang Solar	Barneys Reef Wind	Apsley battery	Wellington South BESS
All other Proponents[1]					
Mayfair Solar	Burrendong Wind	Piambong Wind	Orana Wind	Liverpool Range Wind	TBA
Bellambi Heights Battery	Beryl Battery	Beryl Solar	Wollar Solar	Mavis Solar	Ulan Solar
Orana Battery storage	Crudine Ridge Wind	Cobbora Solar Farm	Merriwa Solar Farm	Dapper Solar	Pinecrest Solar

1. There are 19 other proponents in total as at September 2023
Source: MWRC

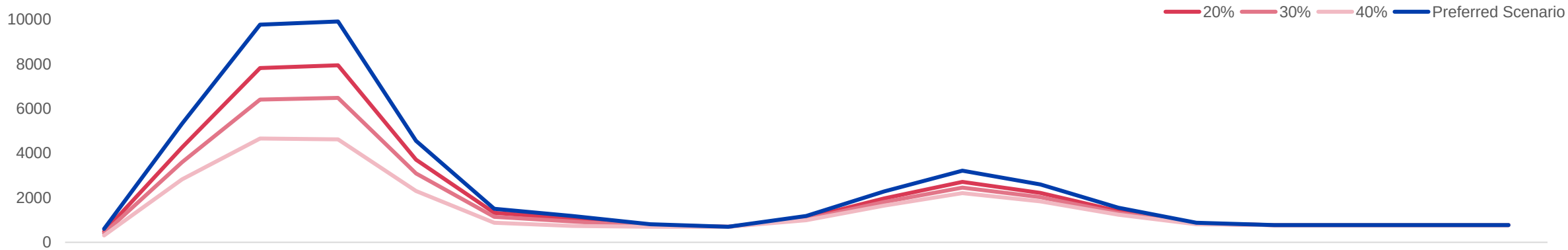
Total workforce and total additional population across 20%/30%/40% project substitution rates

Total Additional Workforce for SSDs, baseline and 20%/30%/40% substitution between multiple projects during construction



	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041
20%	322	3096	5490	5663	3419	1821	1652	1452	1403	1663	2251	2747	2418	1870	783	735	735	735	735
30%	269	2621	4511	4667	3004	1699	1562	1422	1403	1631	2145	2579	2291	1816	773	735	735	735	735
40%	207	2074	3354	3403	2475	1524	1428	1403	1403	1598	2038	2411	2165	1762	762	735	735	735	735

Total Additional Population for SSDs, baseline and 20%/30%/40% substitution between multiple projects



	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041
20%	481	4261	7818	7942	3712	1325	1073	774	701	1089	1967	2708	2217	1398	846	775	775	775	775
30%	402	3597	6405	6479	3092	1143	938	729	701	1041	1809	2457	2027	1318	831	775	775	775	775
40%	309	2825	4655	4616	2302	882	738	701	701	992	1649	2206	1839	1237	815	775	775	775	775

C

Impact Analysis – Sensitivity Testing

The table below summarises the peak impact values under the different timing and volume variations.

	Timing Variation	**Results in report apply this scenario (current, current)**	**Current**		**2 year Delay**			**Smoothed**		
	Volume Variation		Reduced	Plus	Reduced	Current	Plus	Reduced	Current	Plus
Housing	Total Residential Dwellings	**1,493** - 2026	**1,454** -2026 (-39) ↓	**1,614** – 2025 (121) ↑	**1,306** -2028 (-187) ↓	**1,340** -2028 (-185) ↓	**1,468** -2028 (-25) ↓	**1,154** -2026 (-339) ↓	**1,191** -2026 (-302) ↓	**1,314** -2026 (-179) ↓
	Total TWA	**5,031** -2026	**4,914** – 2026 (-117) ↓	**5,452** – 2025 (421) ↑	**4,352** – 2028 (- 679) ↓	**4,443** – 2028 (-588) ↓	**4,576** -2028 (-455) ↓	**3,949** – 2026 (-1,082) ↓	**4,067** – 2026 (-964) ↓	**4,379** – 2026 (-652) ↓
Childcare	Total Children (0-4)	**474** - 2026	**460** – 2026 (-14) ↓	**515** – 2025 (41) ↑	**411** – 2028 (-65) ↓	**420** – 2028 (-54) ↓	**439** – 2028 (-33) ↓	**372** – 2026 (-102) ↓	**383** – 2026 (-91) ↓	**414** – 2026 (-60) ↓
	Number of Childcare Places	**54**[1]- 2026	**53** -2026 (-1) ↓	**59** -2025 (5) ↑	**47** -2028 (-7) ↓	**48** -2028 (-6) ↓	**50** -2028 (-4) ↓	**42** -2026 (-12) ↓	**44** -2026 (-10) ↓	**47** -2026 (-7) ↓
Schools	Total Children (4-18)	**1,502** – 2026	**1,466** – 2026 (-36) ↓	**1,630** – 2025 (128) ↑	**1,307** – 2028 (-195) ↓	**1,331** – 2028 (-171) ↓	**1,391** – 2028 (-111) ↓	**1,179** – 2026 (-323) ↓	**1,214** – 2026 (-288) ↓	**1,311** – 2026 (-191) ↓
	Number of Additional Primary Classrooms	**26** -2025/26	**25** -2026 (-1) ↓	**29** -2025 (3) ↑	**22** -2028 (-4) ↓	**22** -2028 (-4) ↓	**24** -2028 (-2) ↓	**19** -2026 (-7) ↓	**20** -2026 (-6) ↓	**22** -2026 (-4) ↓
	Number of Additional Secondary Classrooms	**30** - 2026	**29** -2026 (-1) ↓	**33** -2025 (3) ↑	**25** -2028 (-5) ↓	**26** -2028 (-4) ↓	**27** -2028 (-3) ↓	**22** -2026 (-8) ↓	**23** -2026 (-7) ↓	**25** -2026 (-5) ↓
GPs	Additional GPs (Current Ratio)	**8** - 2026	**8** -2025/26 (0) –	**9** -2025/26 (1) ↑	**7** -2027/28 (-1) ↓	**8** -2027/28 (0) –	**8** -2027/28 (0) –	**7** -2025/26 (-1) ↓	**7** - 2025/26 (-1) ↓	**7** -2025/26 (-1) ↓
Hospital	Additional ED Presentations	**5,085** -2026	**4,963** – 2026 (-122) ↓	**5,518** – 2025 (433) ↑	**4,408** – 2028 (-677) ↓	**4,506** – 2028 (-579) ↓	**4,711** – 2028 (-374) ↓	**3,992** – 2026 (-1,093) ↓	**4,111** – 2026 (-974) ↓	**4,400** – 2026 (-685) ↓
	Additional ED Bays	**8** – 2025/26	**8** -2025/26 (0) –	**8** -2025 (0) –	**7** -2027/8 (-1) ↓	**7** -2027/8 (-1) ↓	**7** -2027/8 (-1) ↓	**6** -2025/26 (-2) ↓	**6** -2025/26 (-2) ↓	**7** -2025/26 (-1) ↓
	Additional Nurses	**7** – 2025/26	**7** -2025/26 (0) –	**7** -2025 (0) –	**6** -2027/28 (-1) ↓	**6** -2027/28 (-1) ↓	**6** -2027/28 (-1) ↓	**5**-2025/26 (-2) ↓	**6** -2025/26 (-1) ↓	**6** -2025/26 (-1) ↓
Ambulance	Additional Responses	**803** – 2026	**784** – 2026 (-19) ↓	**871** – 2025 (68) ↑	**696** – 2028 (-107) ↓	**711** – 2028 (-92) ↓	**744** – 2028 (-59) ↓	**630** – 2026 (-173) ↓	**649** – 2026 (-154) ↓	**701** – 2026 (-102) ↓
	Additional Paramedics	**30** – 2026	**29** -2025/26 (-1) ↓	**33** -2025 (3) ↑	**26** -2027/8 (-4) ↓	**27** -2027/8 (-3) ↓	**28** -2027/8 (-2) ↓	**24** -2025/26 (-6) ↓	**24** -2025/26 (-6) ↓	**26** -2025/26 (-4) ↓
	Additional Ambulance Vehicles	**9** - 2026	**8** -2025/26 (-1) ↓	**9** -2025 (0) ↑	**8** -2027/28 (-1) ↓	**8** -2027/28 (-1) ↓	**9** -2028 (0) ↓	**7** -2025/26 (-2) ↓	**7** -2025/26 (-2) ↓	**7** -2025/26 (-2) ↓

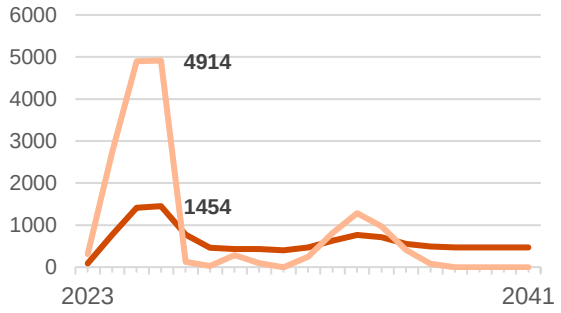
1. Inner Regional Median

Under the sensitivity analysis the peak additional residential housing varies from 1,154 to 1,605 and total TWA varies from 3,949 to 5,265

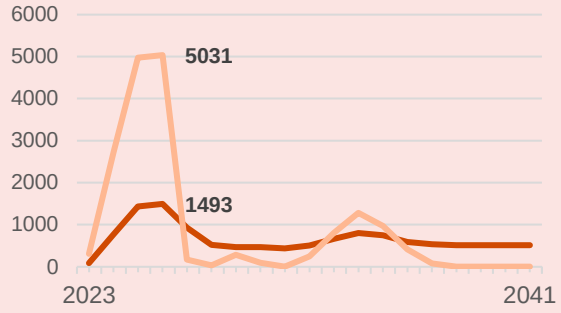
Total Additional Residential Housing and TWA for various timing sensitivities

TWA Residential housing

Scenario: Current Timing, Reduced

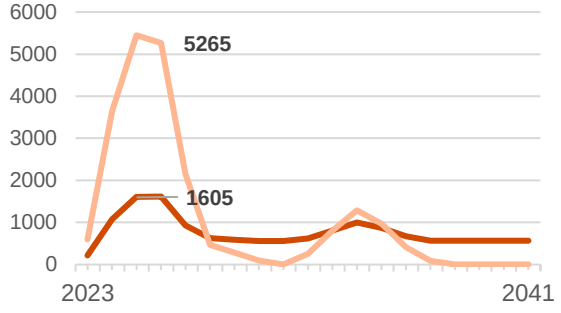


Scenario: Current Timing, Current

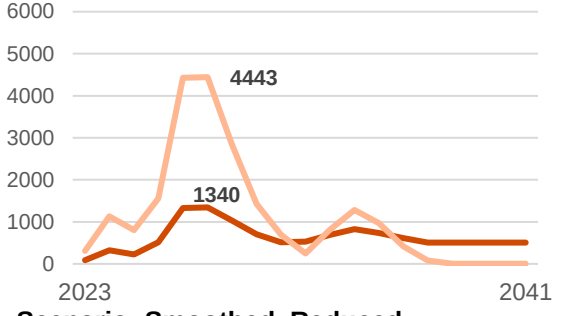


Results apply this scenario

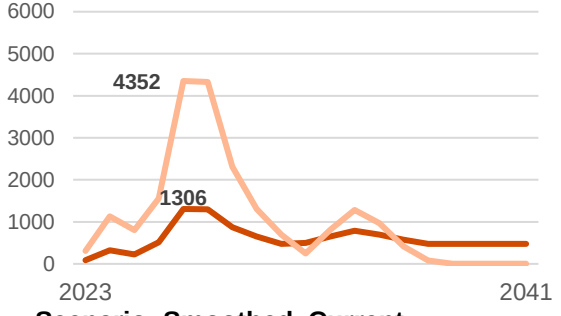
Scenario: Current Timing, Plus



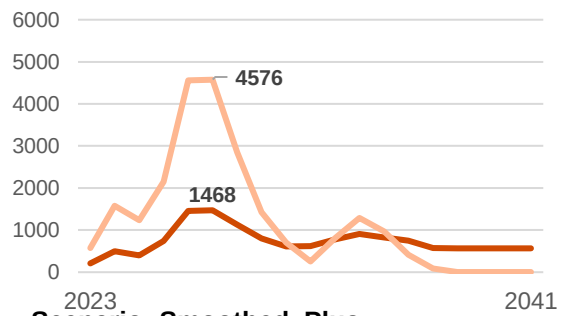
Scenario: 2 Year Delay, Reduced



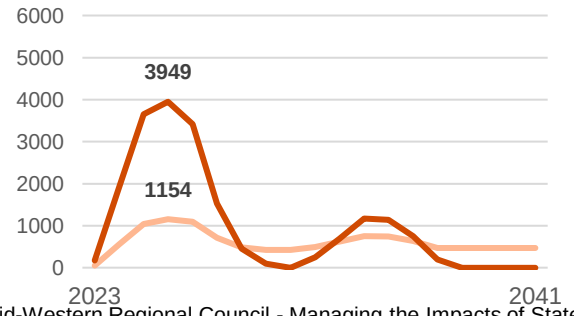
Scenario: 2 Year Delay, Current



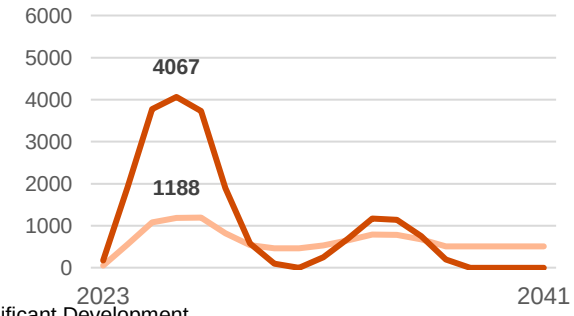
Scenario: 2 Year Delay, Plus



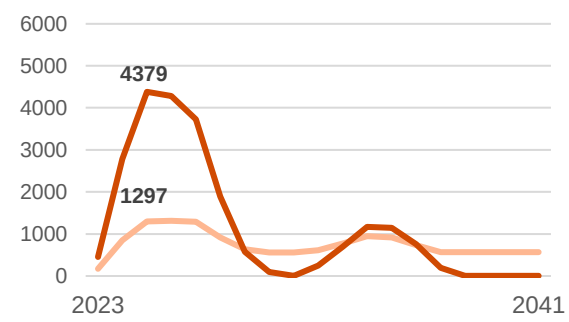
Scenario: Smoothed, Reduced



Scenario: Smoothed, Current



Scenario: Smoothed, Plus



Peak residential housing and TWA vary based on the particular scenario.

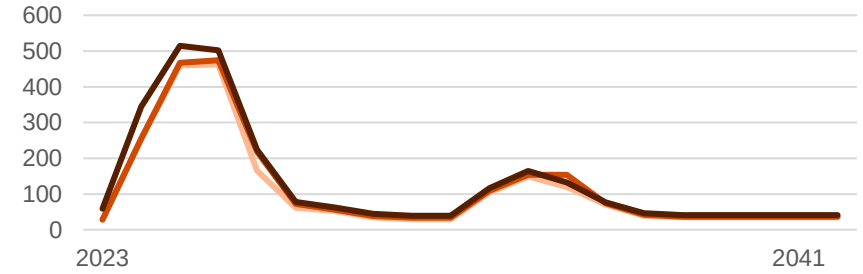
The **Current Timing, Plus** produces the highest peak in 2025, with 5,265 individuals requiring TWAs, and 1,605 residential dwellings may be required. The **Smoothed, Reduced** produces the smallest peak in 2026 with 3,949 individuals requiring TWAs, and 1,154 residential dwellings may be required.

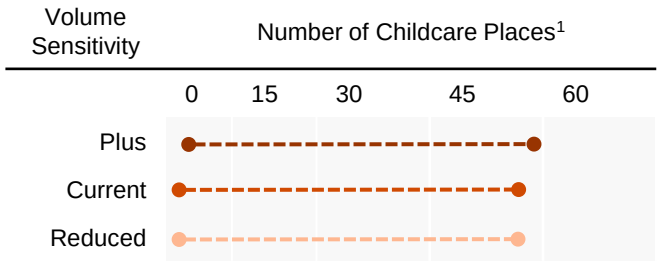
Under the sensitivity analysis, the peak additional children (aged 0 - 4 years) varies from 372 to 515, and may require up to 42 to 59 additional childcare places.

Total Additional Children (aged 0-4 years) for various timing sensitivities

Plus Current Reduced

Current Timing

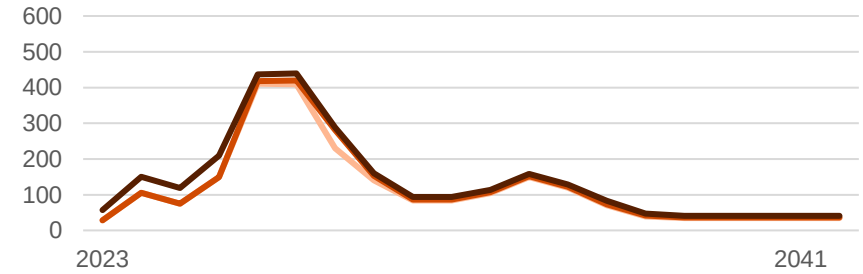


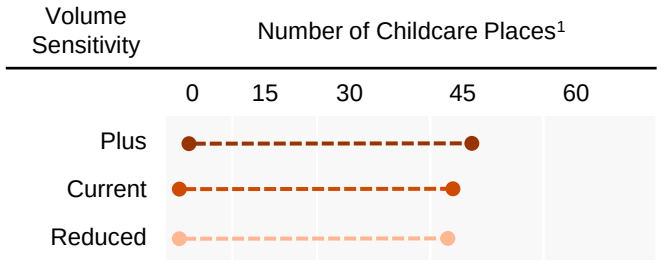


The Plus volume variation produces the highest peak in 2025 with 515 additional children that may require up to 59 addition childcare places.

The **Reduced** variation peaks in 2026 with 460 additional children and up to 53 additional childcare places.

Delayed

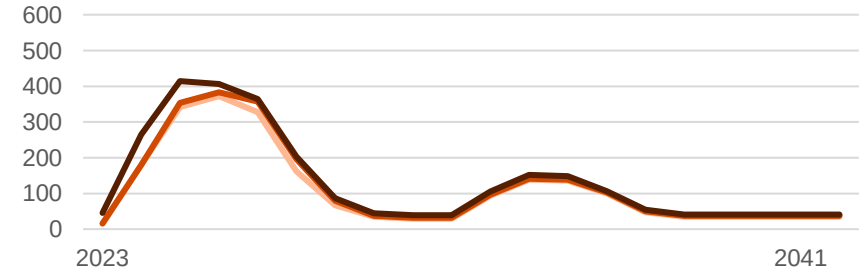


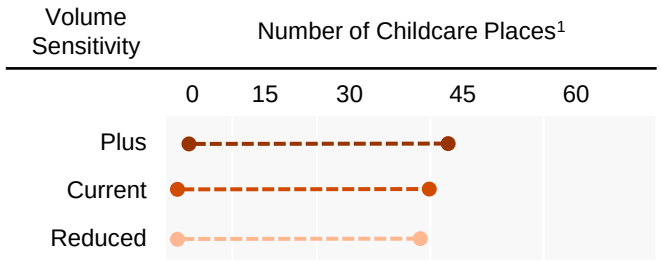


The Plus volume variation produces the highest peak in 2028 with 439 additional children that may require up to 50 addition childcare places.

The **Current** volume produces a peak also in 2028, with 420 additional children and up to 48 additional childcare places. The **Reduced** variation also peaks in 2028 with 411 additional children and up to 47 additional childcare places.

Smoothed





The Plus volume variation produces the highest peak in 2026 with 414 additional children that may require up to 47 addition childcare places.

The **Current** timing, current volume produces a peak also in 2026, with 383 additional children and up to 44 additional childcare places. The **Reduced** variation also peaks in 2026 with 372 additional children and up to 42 additional childcare places.

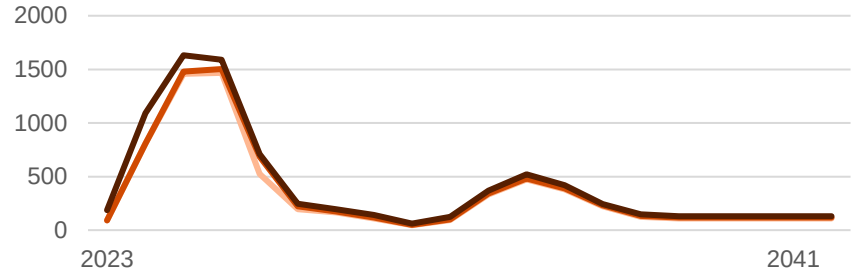
1. Number of child care places reflect the number of places aligned to the inner regional average. More childcare places would be required to meet the national median.

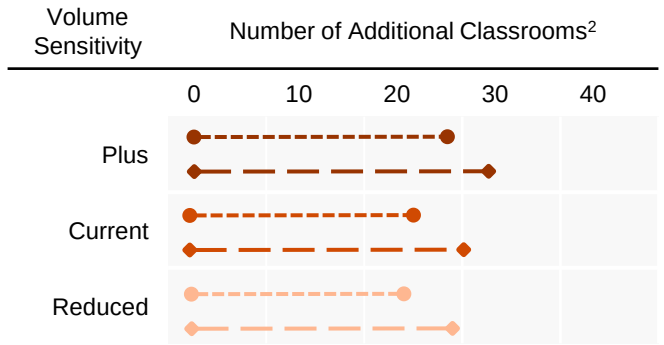
Under the sensitivity analysis, the peak additional children (aged 4 – 18 years) varies from 1,179 to 1,630, and may require up to 19 to 29 primary classes and 22 to 33 secondary classes.

Total Additional School Age Children (aged 5 - 18 years) for various timing sensitivities[1]

Plus | Current | Reduced | Primary Classrooms | Secondary Classrooms

Current Timing

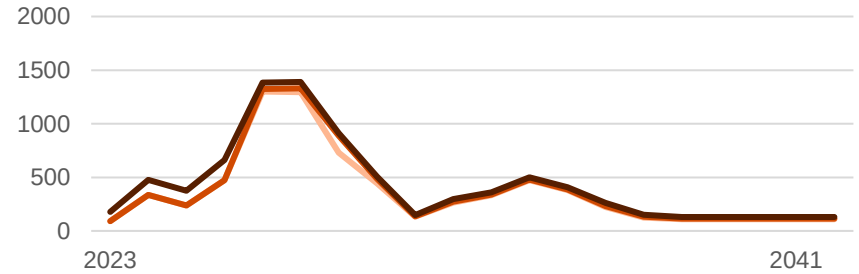


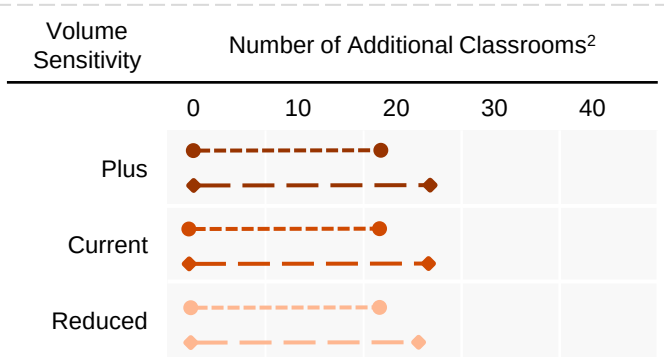


The Plus volume variation produces the highest peak in 2025 with 1,630 additional school age children who may require up to 29 primary and 33 secondary classrooms.

The **Reduced** variation peaks in 2026 with 1,466 additional school age children who may require up to 25 primary and 29 secondary classrooms.

Delayed

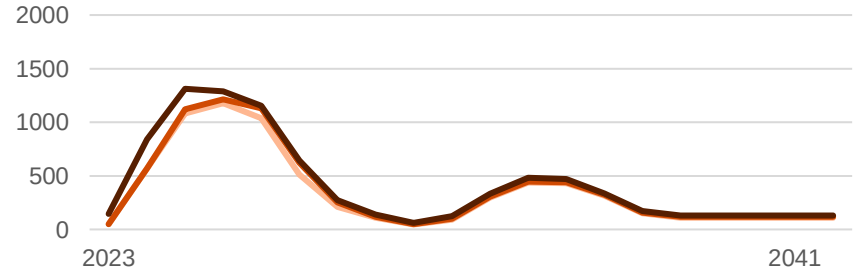


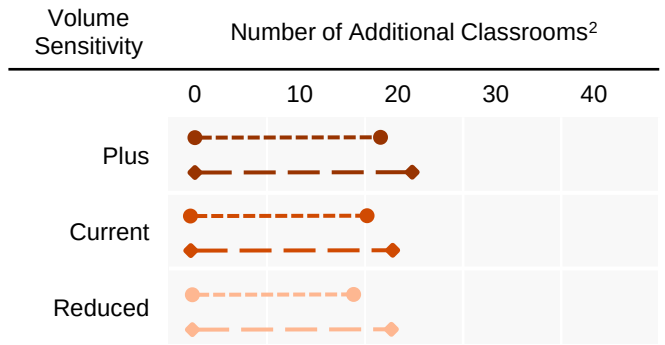


The Plus volume variation produces the highest peak in 2028 with 1,397 additional school age children who may require up to 24 primary and 27 secondary classrooms.

The **Reduced** variation peaks in 2028 with 1,307 additional school age children who may require up to 22 primary and 25 secondary classrooms. Similarly, the **Current** variation peaks in 2028 with 1,336 students and up to 24 primary and 27 secondary classrooms.

Smoothed





The Plus volume variation produces the highest peak in 2025 with 1,311 additional school age children who may require up to 22 primary and 25 secondary classrooms.

The **Reduced** variation peaks in 2026 with 1,179 additional school age children who may require up to 19 primary and 22 secondary classrooms. Similarly, the **Current** variation peaks in 2026 with 1,214 students and up to 20 primary and 23 secondary classrooms.

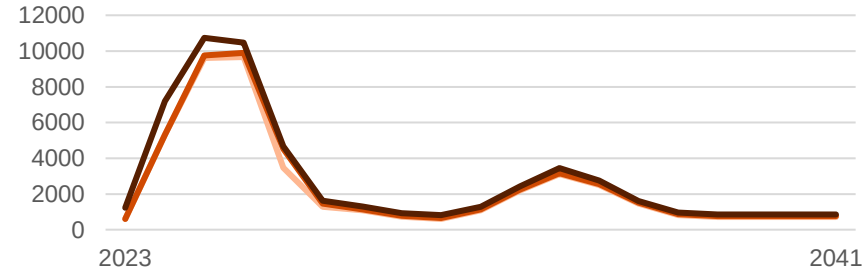
1. Based on ABS data for regional NSW, the demographic spilt between primary schoolers and higher schoolers is 50/50. Therefore if there are a total of 1000 additional school age children (5-18) , 500 would be primary schoolers and 500 would be high schoolers
2. Assumes no current spare capacity

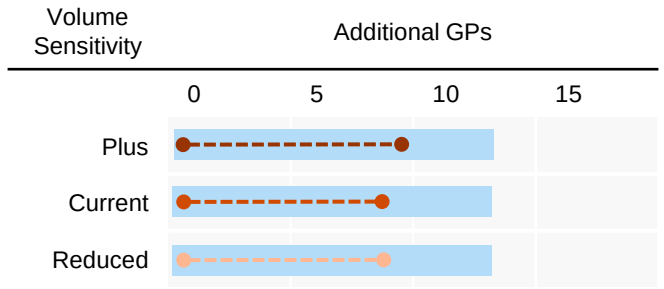
Under the sensitivity analysis, the peak additional GPs vary from 7 to 8 when applying the current ratio, and 11 to 14 when applying the optimal ratio.

Total Additional population for various timing sensitivities

Plus Current Reduced "Optimal" ratio for additional GPs

Current Timing

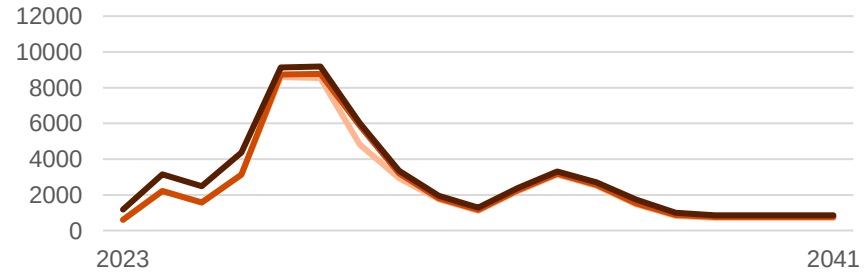


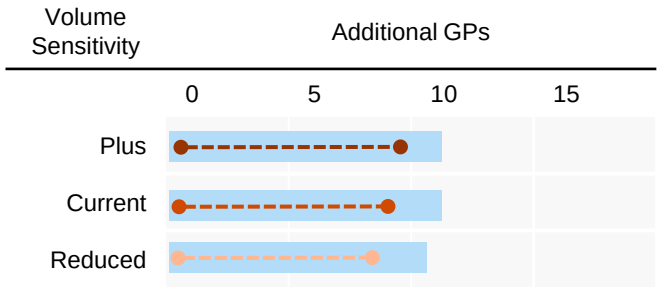


The Plus volume variation produces the highest peak with up to 9- 14 additional GPs (current ratio – optimal ratio) in both 2025 and 2026.

The **Reduced** variation peaks in both 2025 and 2026 with up to 8 - 13 additional GPs (current ratio – optimal ratio). The **Current** project volume ratio provides the same additional GPs as the reduced variations (8-13).

Delayed

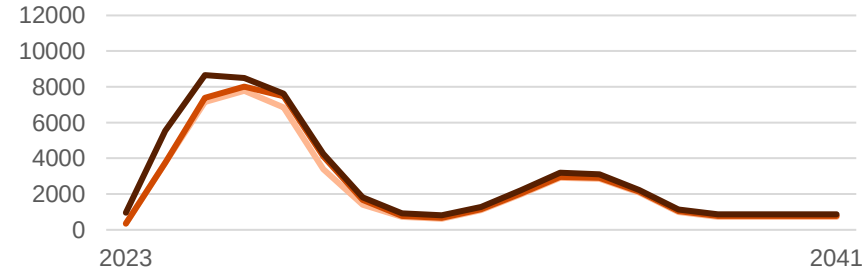


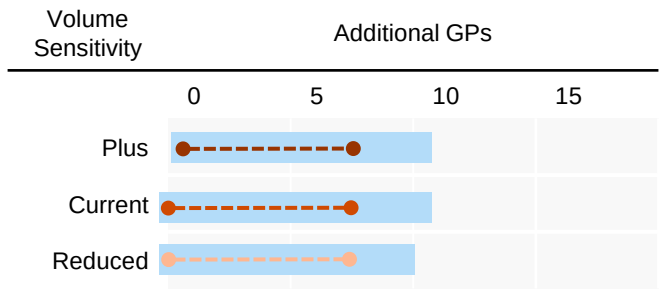


The Plus volume variation produces the highest peak with up to 8- 12 additional GPs (current ratio – optimal ratio) in both 2027 and 2028.

The **Reduced** variation peaks in both 2027 and 2028 with up to 7 - 11 additional GPs (current ratio – optimal ratio). The **Current** project volume ratio provides the same additional GPs as the plus variations (8-12).

Smoothed





The Plus volume variation produces the highest peak with up to 7 - 11 additional GPs (current ratio – optimal ratio) in both 2025 and 2026.

The **Reduced** variation peaks in 2026 with up to 7 - 10 additional GPs (current ratio – optimal ratio). The **Current** project volume ratio provides the same additional GPs as the plus variations (7-11) but only in 2026.

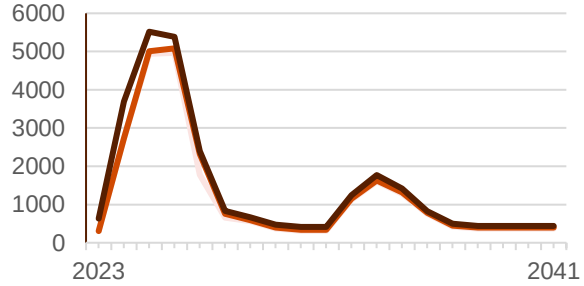
1. Based on ABS data for regional NSW, the demographic spilt between primary schoolers and higher schoolers is 50/50. Therefore if there are a total of 1000 additional school age children (5-18) , 500 would be primary schoolers and 500 would be high schoolers
2. Assumes no current spare capacity

Under the sensitivity analysis, the peak additional: presentations vary from 3,992 to 5,518, ED Bays vary from 6 to 8 and nurses vary from 3 to 4.

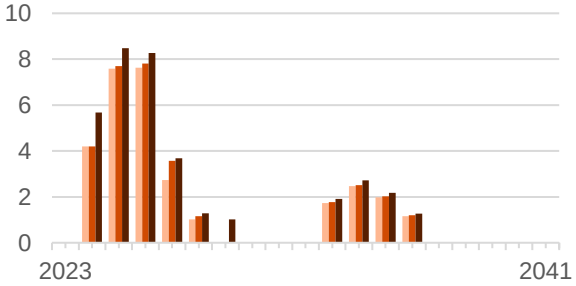
Total Additional ED Presentations, Bays and Nurses for various timing sensitivities

Plus Current Reduced

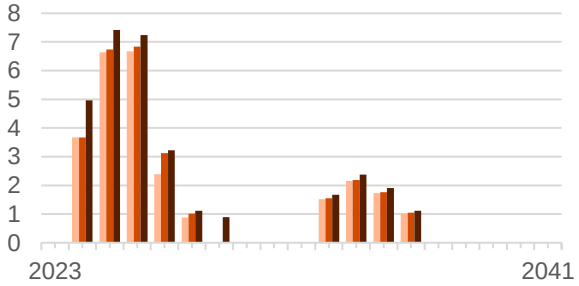
Current Timing – Presentations



Current Timing – ED Bays



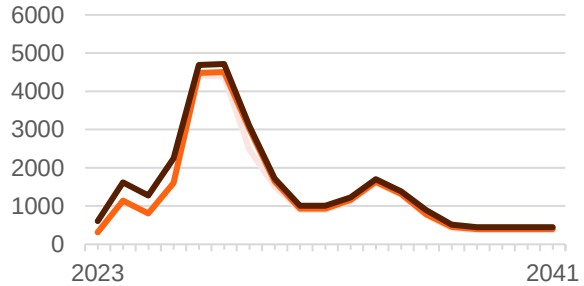
Current Timing – Nurses



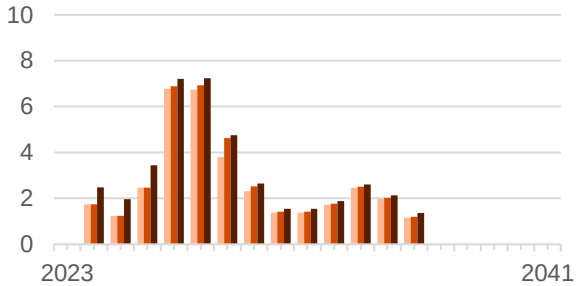
Peak Demand Under Current Timing

Volume variation	Presentations (YYYY)	ED Bays (YYYY)	Nurses (YYYY)
Plus	5,518 (2025)	8 (2025)	7 (2025)
Current	5,085 (2026)	8 (2025/26)	7 (2025/26)
Reduce	4,963 (2026)	8 (2025/26)	7 (2025/26)

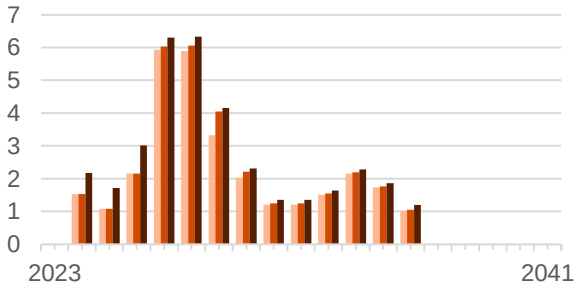
Delayed Timing – Presentations



Delay Timing – ED Bays



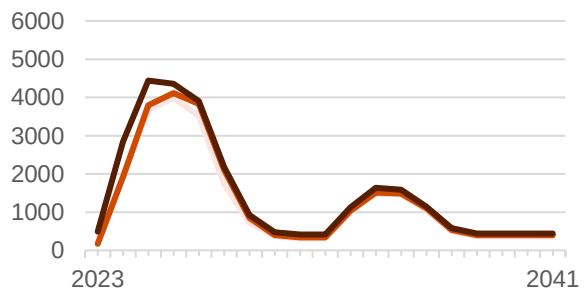
Delay Timing – Nurses



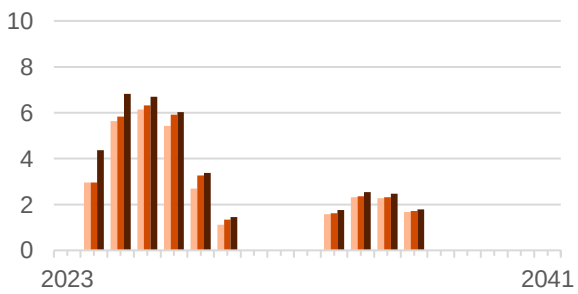
Peak Demand Under Delayed Timing

Volume variation	Presentations (YYYY)	ED Bays (YYYY)	Nurses (YYYY)
Plus	4,711 (2028)	7 (2027/28)	6 (2027/28)
Current	4,506 (2028)	7 (2027/28)	6 (2027/28)
Reduce	4,408 (2028)	7 (2027/28)	6 (2027/28)

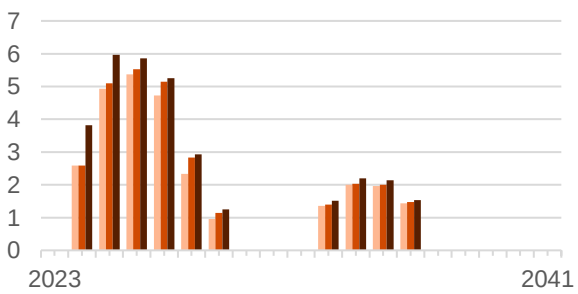
Smoothed Timing – Presentations



Smoothed Timing – ED Bays



Smoothed Timing – Nurses



Peak Demand Under Smoothed Timing

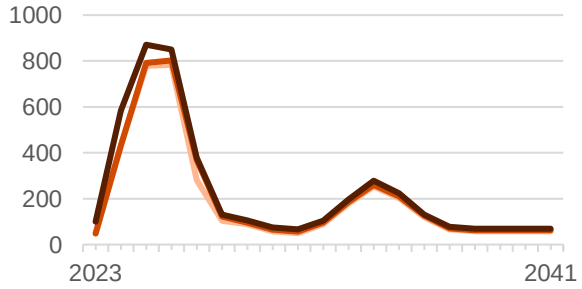
Volume variation	Presentations (YYYY)	ED Bays (YYYY)	Nurses (YYYY)
Plus	4,400 (2025)	7 (2025/26)	6 (2025/26)
Current	4,111 (2026)	6 (2025/26)	5 (2025/26)
Reduce	3,992 (2026)	6 (2025/26)	6 (2025/26)

Under the sensitivity analysis, the peak additional: responses vary from 630 to 871, paramedics vary from 24 to 33 and ambulances vary from 7 to 9.

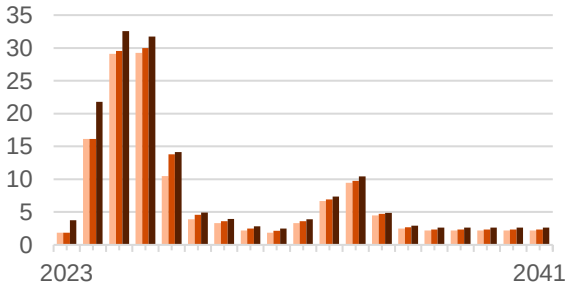
Total Additional Responses, Paramedics and Ambulance Vehicles for various timing sensitivities

Plus Current Reduced

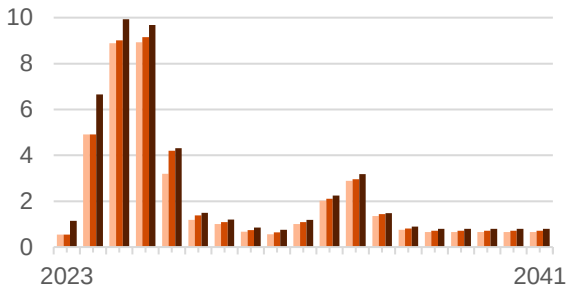
Current Timing – Responses



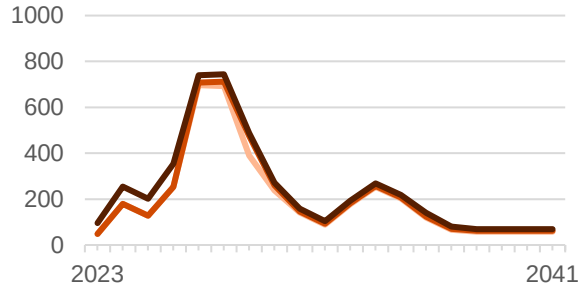
Current Timing – Paramedics



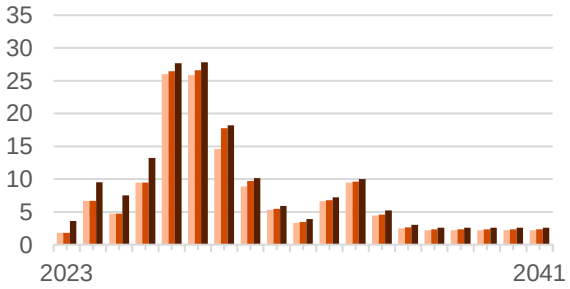
Current Timing – Ambulance Vehicles



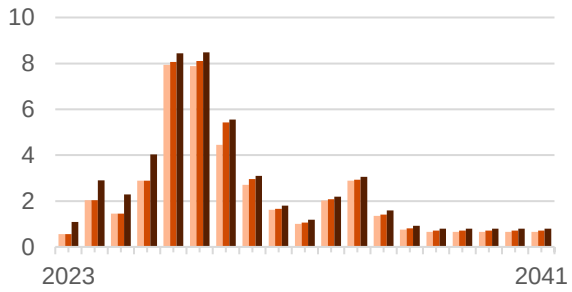
Delayed Timing – Responses



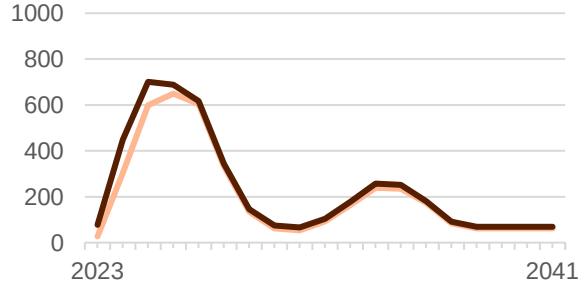
Delay Timing – Paramedics



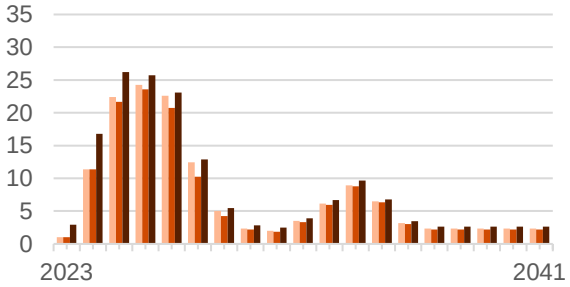
Current Timing – Ambulance Vehicles



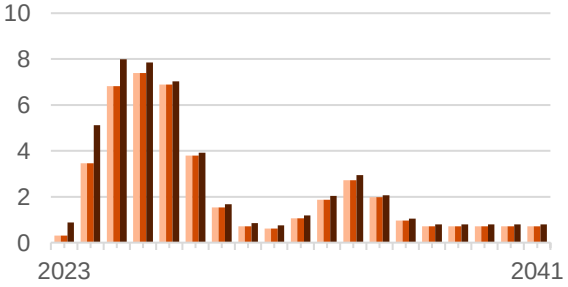
Smoothed Timing – Responses



Smoothed Timing – Paramedics



Current Timing – Ambulance Vehicles



Peak Demand Under Current Timing

Volume variation	Responses (YYYY)	Paramedics (YYYY)	Ambulances (YYYY)
Plus	871 (2025)	33 (2025)	9 (2025)
Current	803 (2026)	30 (2025/26)	9 (2025/26)
Reduce	784 (2026)	29 (2025/26)	8 (2025/26)

Peak Demand Under Delayed Timing

Volume variation	Responses (YYYY)	Paramedics (YYYY)	Ambulances (YYYY)
Plus	747 (2028)	28 (2028)	9 (2028)
Current	714 (2027)	27 (2027/28)	8 (2027/28)
Reduce	699 (2027)	26 (2027/28)	8 (2027/28)

Peak Demand Under Smoothed Timing

Volume variation	Responses (YYYY)	Paramedics (YYYY)	Ambulances (YYYY)
Plus	701 (2025)	26 (2025/26)	8 (2025/26)
Current	649 (2026)	24 (2026)	7 (2026)
Reduce	630 (2026)	24 (2026)	7 (2026)