



Hon Nick Champion MP,
Minister for Trade and Investment, Minister for Housing and Urban Development and Minister for Planning
MinisterChampion@sa.gov.au

7 August 2023

Dear Hon Nick Champion MP,

The Australian Institute of Architects (Institute) is the peak body for the architectural profession in Australia. It is an independent, national member organisation with around 14,000 members across Australia and overseas.

The Institute exists to advance the interests of members, their professional standards and contemporary practice, and expand and advocate the value of architects and architecture to the sustainable growth of our communities, economy and culture.

The Institute actively works to maintain and improve the quality of our built environment by promoting better, responsible and environmental design.

Our members call on all sectors of the construction industry to deliver a 'people first' approach to housing that delivers occupants with:

- health and amenity
- physical comfort without excessive energy consumption and cost
- resilience to ongoing climate change
- adaptability to support future living needs resulting from health, aging and other factors.

The Institute acknowledges and supports the ABCB's, ASBEC, NABERS, Property Council and the GBCA strategies¹ for staged increments of energy and carbon reform through the building codes. We also are involved in the key formative industry groups facilitating the 2030/2050 transition and are commencing data capture across our projects to aid emissions reduction¹.

With our ability to work with builders and other consultants, we are positioning our sector's goals to meet global standards including seeking trajectory to the World Health Organisations minimum benchmarks for mould, dampness, and indoor health. We welcome involvement from the State Government and construction sector to foster new relationships to meet these standards also with particular focus on climate risk mitigation, which are mapped through the Enviro Data SA portal.

The Institute represents its members in voicing their desire to facilitate a smooth trajectory to NCC 2022, which we believe should be accomplished by the following considerations:

1. **WHY WE NEED CHANGE** - The NCC 2022 Liveable Housing and energy efficiency and condensation provisions are incremental steps in ensuring South Australian homes have a service life of at least 50 years. This is essential for providing a reliable supply of housing that is designed with consideration of our aging population and anticipated climate change. Design of a long-term service life is also

¹ Submission Library - Australian Institute of Architects (architecture.com.au)



essential to minimising carbon emissions associated with the construction and operation of buildings and will assist in South Australia reaching its stated carbon zero objectives.

- 2. COST CONSIDERATIONS** - The additional costs associated with implementing NCC 2022 have been much discussed. However, the estimates of additional costs vary widely. For example, the ACIL ALLEN Decision Regulation Impact Statement Report to the ABCB² estimates that the costs of achieving the energy related provisions as between \$400 and \$2,200 for Class 1 dwellings across all climate zones in South Australia and between \$650 and \$3,700 for Class 2 dwellings in climate zone 5. Figures for the Liveable Housing provisions are estimated to be under \$5,000³. These aggregated costs are significantly less than those provided by other organisations, which range from \$15,000 to \$30,000 per home.

Reduction of construction costs can also be achieved in other ways. For example, by reducing floor area through efficient design or by planning for an initial stage of construction with options for later expansion to meet changing household needs.

A standard bedroom of 12m² represents a cost of around \$20,900 to \$45,460 for a standard residential build⁴. Given that most projects home designs start at three bedrooms, the ability to reduce this to two bedrooms for first home buyers represents a significant saving. Savings in mortgage repayments on the lower initial cost will offset any additional costs in construction of an addition later.

The discussion of initial costs also presents a partial picture. The initial construction cost will be paid back over time in mortgage payments, which will be offset by savings in household energy bills and health care costs resulting from improved construction standards. Designing to address long term liveability and to eliminate condensation will also reduce costs for maintenance and modification over time.

Finally, the sale value for homes that are designed to a higher standard is likely to be greater, justifying an increase in the initial investment. This final consideration will be critical where homes become hazardous to human health due to poor environmental performance and are unable to be cost effectively upgraded. Such homes are likely to be worth land value only.

- 3. THE EXTENT OF CHANGE REQUIRED** - Designers are innovative and adaptable. Adopting a 'what can we do' as opposed to a 'what we don't want to change' approach will enable the sector to implement NCC 2022 in ways that are cost effective and soon become the new normal. We also need to consider current practices within the residential construction sector and how these support NCC 2022.

² P 164-167 - ACIL Allen, National Construction Code 2022 Decision Regulation Impact Statement for a proposal to increase residential building energy efficiency requirements. 2022.

³ P21 - Donald Cant Watts Corke , Accessible Housing: Estimated Cost Impact of Proposed Changes to NCC AUSTRALIAN BUILDING CODES BOARD Report Revision V2.2 – 23 December 2020

⁴ Price range Q1 2023, [Rider Levett Bucknall](#).



For example, most project homes are designed to suit a flat site, so the cost of site preparation for the majority of builds already involves leveling the site. This is particularly true of large housing developments, where site leveling and retaining walls are constructed prior to allotments being sold. Therefore, achieving stepless entry from the garage should be achievable within existing cost structures, even where the transition from the footpath to the front door is not possible due to the terrain. Stepless access from the garage OR the primary entry is allowed in the Liveable Housing provisions.

Similarly, it is highly unlikely that a standard project home will not have a toilet located on the entry level. NCC 2022 also requires a hobless/step free shower but does not mandate that it must be located on the entry level. Therefore, most house designs will substantially meet the requirements already. The changes required by NCC2022 will be limited to providing sufficient circulation around one toilet, a hobless/step free entry to one shower and wall reinforcement for future grab rails.

Finally, it is possible to improve the energy efficiency of homes by locating the windows to suit the house orientation and shading them from direct sun exposure during summer. This can reduce the requirements for increased insulation, thermal breaks and double glazing, minimising the cost increase associated with NCC 2022.

4. **TRAINING COSTS** - The NCC 2022 Liveable Housing and energy efficiency and condensation provisions have been developed and tested through a process of extensive research and consultation. This process has included development of a range of resources and education programs exist to support the transition to NCC 2022. These have been prepared by industry bodies as well as the ABCB to educate those involved in design and construction.

There is also financial support available through the CITB for training of people employed in the construction sector. This provides the opportunity to increase the skills and capacity within the construction sector in South Australia.

5. **LIVEABLE HOUSING DESIGN** - LHD includes features that enable cost effective adaptation of homes to suit occupants' changing needs. These may include short term reduction of mobility due to illness or injury, families with young children, age-related changes, as well as requirements of people with long-term low-level disabilities. They are not intended to address the needs of people with significant disability or restricted to providing benefit to people within an assumed demographic within the community but will enable most people to enjoy a good quality of life in their homes for longer.

It is reasonable to expect that households across South Australia will benefit from these features, regardless of location, household type or income. It can also be expected that changes of occupants and ownership, as well as the needs of visitors such as older family members, will lead to these features being utilised over the life of a home.

This will reduce the financial and social impacts inherent in having to move home to live independently, which people may be forced to do if their existing homes are not suited to cost effective adaptation. It will also reduce the need for assisted housing and health care services.



Modification of standard home designs will be required to meet the Liveable Housing provisions. However, the cost of this design work will be amortised over multiple dwellings, making the cost per dwelling marginal. In the case of project home designs, it is also true that key elements, such as bathrooms, are repeated across multiple home 'models', further decreasing the cost impact per dwelling of modifying these elements. In the case of custom homes, there is no reason that designing to meet the new standard will have any cost impact.

- 6. ENERGY EFFICIENCY AND CONDENSATION MITIGATION** - Housing that provides 'health' and 'amenity' should be the minimum standard regardless of building typology, site topography, geographic location or elevation above the ground plane. The ABCB consultation for both included extensive industry consultation and research over a number of years and moves Australia closer to meeting best practice standards for housing. The United Nations sustainable development goals note to '*not leave anyone behind*'.

The Institute has prepared a detailed assessment for the progressive implementation of NCC 2022 and future regulatory measures. This document, titled **SA Chapter Science and Health Targets in South Australia's Residential Sector**, is included as an Appendix. It provides a trajectory for implementation and summarises the significant body of research that supports this recommendation.

Improvements in the thermal efficiency of houses is essential to meet net zero carbon goals, as well as to provide occupants with homes that are energy efficient and comfortable throughout the year. Heating and cooling currently represents 50% of household energy use, with those experiencing financial strain, and renters who have limited ability to modify their homes, frequently living in uncomfortable conditions which can generate or exacerbate poor health and wellbeing. Conversely, thermally efficient homes have been demonstrated to provide significant health, wellbeing and social benefits⁵.

The most cost-effective time to improve energy efficiency and condensation mitigation is during the design of a building. Energy efficiency can be achieved through passive design principles such as orientation, seasonal shading of glazing and minimisation of the external envelope of a building, as well as improved insulation, air tightness and other construction decisions.

By comparison, retrofitting to improve energy efficiency and condensation mitigation is expensive and may not be effective depending on the initial construction. Ongoing concessions and delays in the implementation of NCC 2022 will increase the future burden on , the wider community and government.

- 7. IMPACT ON STANDARDISED DESIGN** - The housing sector, like all facets of the construction sector, is required to adopt regulatory change over time. This should be considered as a standard part of the business model for construction businesses. The housing sector also accommodates changes due to

⁵ Sustainability Victoria and University of Technology Sydney, The Victorian Healthy Homes Program Research findings prepared for Sustainability Victoria 2022



evolving stylistic trends, household demographics, material and technical developments and economic conditions.

Costs associated with development of new housing models and construction of display homes is already built into the cost of project homes. Where existing display homes are substantially compliant with NCC 2022, they could be retained, and buyers made aware of the minor alterations to made when their homes. Where more significant change is required, the implementation time frame provided by the South Australian government has provided 18 months to transition to meet NCC 2022.

We note that some members of the HIA and MBASA are already meeting the standards required by NCC 2022. We encourage the HIA and MBASA to harness and share the knowledge they have gained through this experience to assist in the transition to the NCC 2022 Liveable Housing and energy efficiency and condensation provisions.

- 8. MODIFICATION TO EXISTING HOMES** – Where work is undertaken to existing homes there may be challenges meeting NCC 2022. This will be dependent on the existing design and construction of each home and will vary widely.

The Institute recommends that where works to existing homes include modification to 50% or more of the floor area of an existing home, that compliance with NCC 2022 be required. Exemptions could be provided for achieving stepless entry, minimum door and circulation widths and compliant wet areas where these areas are not subject to any work. Any additions to existing homes should comply with NCC 2022 energy efficiency and condensation requirements, with any new toilet and shower facilities to comply with the NCC 2022 Liveable Housing provisions.

Given the challenges in modifying existing homes to meet the new requirements, the Institute also strongly opposes exempting homes that have planning rules consent but not building rules consent prior to 1 October 2024 from being exempt from complying with NCC 2022. This will significantly increase the future burden on householders, the community and government resulting from their poor performance.

- 9. SUPPLY CHAIN CONSIDERATIONS** - Uncertainty in the implementation of NCC 2022 represents a risk to the supply chain. Material supply and manufacturing businesses who need to modify their processes and products in response to NCC 2022 need to have certainty that there will be sufficient demand to justify this investment. We note that there has already been significant investment by suppliers in preparation for the proposed 1 October 2024 implementation date for NCC 2022. This initiative has been taken to address concerns that the supply chain will not be able to meet demand and to maximise their capacity to support the transition.

The transition to NCC 2022 will result in increased and consistent demand for products that are not currently used in high volumes. This will assist in making these products cost competitive. This includes products such as 870 wide doors, slab and floor insulation and double glazing, thermally broken windows.



10. **DIFFICULT SITES** –Design for narrow and non-rectilinear sites needs to be carefully considered and may make compliance with NCC 2022 more challenging projects but is achievable with good design. However, the ACIL ALLEN Decision Regulation Impact Statement Report shows that under 6% of sites in South Australia are ‘difficult’⁶. Achieving NCC 2022 compliance will therefore impact a very limited number of new homes. Buyers with concerns regarding affordability will have multiple other options to consider. Therefore, the Institute does not believe that there is a need for concessions for these sites.

Other factors that make cost management and compliance challenging include sites in bush fire areas, or regional/remote locations, poor orientation and sloping topography. However, concessions in these cases can have significant adverse impacts. For example, poor performance of homes in remote areas, where access to local health care is limited can lead to chronic health issues and further entrench cycles of disadvantage more commonly experienced in outer metropolitan and regional/remote areas.

SPECIAL CONDITIONS – RAPID RESPONSE HOUSING

We recommend that post-disaster housing reconstruction carefully considered to ensure that long term issues are not created. The same criteria should be applied to key worker housing in regional and remote areas, which may be considered as a short-term requirement but end up being required as long-term housing stock.

For example, existing houses affected by the River Murray flooding are highly likely to have future mould and condensation issues unless the existing building fabric is fully dried out prior to restoration. Typically, a hygrothermal assessment would be required to determine the condition of the existing fabric, its moisture content and then proposed construction for rectification.

In addition to condensation and mould issues resulting from inadequate drying time, the Murray River region is expected to experience the worst possible bushfire conditions during the 2023/24 summer period due to the predicted super El Nino. It can be assumed that with increasing heat risk, buildings will become more closed during seasons where they would usually be ventilated and ‘aired out’ with fresh air, increasing continuous energy demand and need for protection using constructions with good decremental delay⁷ barriers.

Where rapid and flexible responses are required, the Institute supports off-site construction (prefabricated) systems for rapid rectification of communities, including provisions for bypassing planning queues providing:

1. Prefabricated timber/steel framed houses under 150 sqm with inclusion of:
 - i. Thermal breaks
 - ii. Class 4 membrane
 - iii. Thermally broken double glazing

⁶ P90 - - ACIL Allen, National Construction Code 2022 Decision Regulation Impact Statement for a proposal to increase residential building energy efficiency requirements. 2022.

⁷ 2050 Materials: example materials <https://blog.2050-materials.com/unlock-the-secrets-of-decrement-delay-and-enhance-your-buildings-thermal-performance-with-dynamic-de7b625c12f>



- iv. Adequate seasonal shading - 100% Summer, 50% Autumn and Spring variable, 10% variable Winter.
- v. Including focus on flood resistance such as using raised insulated floors
- vi. Mandated mechanical ventilation with continuous fresh air supply to control condensation and prevent mould.

We believe that the construction sector is already skilled for this rapid disaster response typology and the government should support healthy outcomes. We can build on existing pre-fabrication knowledge to increase capacity in this area.

Where prefabricated construction is utilised, modules should be developed to meet LDH requirements. Prefabrication, by its nature, produces standardised modules, with investment in designing to meet LHD requirements amortised over multiple units. Existing prefabricated modules that are not constructed to meet NCC 2022 should be phased out prior to October 2024 or reserved for temporary accommodation purposes only.

To address the requirements for elevated construction in the Murry River and other flood prone areas, concessions should be provided to permit access to the living level from a level car parking space via a straight stair that meets the Liveable Housing Design Guidelines Silver standard. This concession should be available to all new homes where a raised floor level is required.

Where Structural Insulated Panels and other closed cell products are to be used for either rapid construction and prefabrication or as external insulation, the building needs to comply with the ABCB Condensation provisions and provide a hygrothermal assessment that denotes the mechanical heating and cooling specification for indoors. This analysis should form part of mandatory disclosure to the owner and occupant to provide consumer confidence that condensation will not be an issue.

ADDITIONAL CONSIDERATIONS – TESTING OF COMPLETED HOMES

The Institute is aware that NatHERs assessments are not submitted with the majority of housing approvals in SA. This leaves in the order of 70% of applications being assessed on a deemed to satisfy basis, where the ability of a proposed home to meet the required star rating is determined based on previous designs, which may also be underperforming.

In addition, homes are not assessed once constructed to test whether they have achieved the required performance levels. Research by the University of Adelaide⁸ shows that many existing homes perform well below the current 6-star rating requirement. This issue would be addressed by random auditing of new houses post construction to test their actual performance in relation to the NCC 2022 requirements.

Moving forward the Institute supports mandatory whole of home performance disclosure through the planning application process using SAPPAs. We also call on the state government to work with the local Regional Climate Partnerships to apply risk factors for climate change (heat and flood risk) and noise

⁸ Science Direct & University of Adelaide. Daniel, Lyrian. Baker, Emma. Williamson, Terry. (2019) Cold Housing in mild-climate countries: A study of indoor environmental quality and comfort preferences in homes, Adelaide, Australia.



abatement. Early predictive energy analysis is already available in Adelaide through the AdaptWest [My Cool Home](#) website and could identify key areas for builders to work on pricing well in advance of construction timelines.

Should implementation of NCC 2022 be further delayed or exempt, we recommend that from October 1st 2024, all new buildings be required to undertake a hygrothermal condensation assessment to inform consumer behaviour and manage the risk to owners and the community

Without a mandated audit process, there is a risk that homes will not be constructed to meet NCC 2022 and anticipated energy savings, health benefits and adaptability will not be realised. This will not allow South Australia to adequately prepare for climate change or the needs of our aging population.

LONG TERM CONSIDERATIONS

Delays in implementing NCC2022 will place South Australia at risk of a future health and housing crisis. Significant housing projects are currently being undertaken or are proposed in areas that have considerable diurnal and seasonal shifts in temperature, wind pressure and humidity such as the Adelaide Hills, Mount Barker and areas to the south of Adelaide. These areas, and other located in NatHERS climate zone 59, are some of the most at risk communities to condensation and subsequently mould.

Any argument to not implement slab insulation, thermal breaks and appropriate mitigation, will result in a century long community of stranded assets that are not 'fully' fit for climate adaptation retrofit. The Institute cites research both internationally and nationally confirming that the implementation of both the 7-Star and condensation requirements should be done **prior** to new home construction.

The World Health Organisation notes that:

"The technical causes of failure to control water damage, dampness or moisture are often closely connected to the climate. The prevailing temperature, humidity, rain and wind conditions regulate much of the principles and practices of construction, such as the foundation, insulation, structure of the building envelope and ventilation system. Indoor humidity is also physically connected to the outdoor climatic conditions. Therefore, the problems of building moisture and dampness, microbial contamination, repair and control vary with the climatic zone. Nevertheless, regardless of the climate, the prevention and control of moisture problems and their subsequent effects should be addressed in the early phases of building construction and in sustained maintenance of a building."

There were 2000 new dwellings under construction during the first quarter of 2023 in South Australia⁹. In the time between the proposed 1 Oct 2023 implementation and the agreed 1 October 2024 implementation date for South Australia, it can be expected that 8000 new dwellings will be under construction. This may be a conservative figure considering the incentives that exist for new home construction and the commitment of the state and federal governments to increasing housing supply.

⁹ Australian Bureau of Statistics (March 2023), [Building Activity, Australia](#), ABS Website, accessed 4 August 2023.



If NCC 2022 is delayed or partially implemented, the result will be a heightened risk to the community, health sector and infrastructure, and associated costs to government. There will also be an increased risk that homes will be unsafe to occupy during power outages, leading to a need for emergency accommodation during these events as well as during natural disasters such as fires and floods.

It will also create a growing cohort of home-owners who are unable to realise the value of their homes due to their inability to provide healthy, comfortable living conditions. In the worst cases occupants will need to be re-housed, placing pressure on housing availability.

CONCLUSION – Change is confronting for many people. However, change is an integral part of life. The changes proposed in the NCC 2022 have been well considered and will provide a benefit to South Australians for generations to come.

The Institute believes that the implementation time proposed by the South Australian government is sufficient to enable a smooth and well managed transition for the design and construction of new homes. We also support carefully considered exemptions for works to existing houses.

We believe that the costs of not committing to the current implementation timeline will far exceed those of proceeding as proposed and that these costs will include long term health, environmental, social and liveability impacts in addition to economic ones. We commend the government for the careful consideration of the transition to NCC 2022 and will continue to support the 1 October 2024 implementation date.

Kind Regards,

Chris Morley
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Australian Institute of Architects

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APPENDIX.

SA Chapter Science and Health Targets in South Australia's Residential Sector

This document is provided as an separate attachment.