SUBMISSION TO THE PRODUCTIVITY COMMISSION: Inquiry into Housing Supply Regulation

Enabling More Productive Housing Delivery through Regulatory Reform: Lessons from modern methods of construction, DfMA and digital compliance pathways

June 2026 — Submission by the Future Building Initiative, Faculty of Art, Design and Architecture, Monash University

Executive Summary

This submission focuses on how housing regulation can better support more productive forms of housing delivery. Drawing on *the Future Building Initiative*'s research into modern methods of construction (MMC), design for manufacture and assembly, industrialised building and digital construction, we argue that approval systems should not only be faster, but also better aligned with repeatable, system-based and digitally supported delivery models.

Key points are as follows:

- Current approval processes largely assess housing through project-by-project and site-based pathways. This creates a structural mismatch with more productive delivery approaches that rely on early coordination, design freeze, repeatability, offsite production, standardised components, digital evidence of compliance and nationally distributed supply chains.This is a structural mismatch, not an incidental compliance cost (Maxwell & Aitchison, 2018; Building 4.0 CRC, 2023a).
- The most burdensome approval steps for MMC projects are building approval for offsite-fabricated components, multi-jurisdiction compliance for nationally distributed manufacturers, certification uncertainty arising from limited certifier familiarity with MMC systems, and post-approval modification requirements that conflict with the economics of MMC (Soltani et al., 2025a; Building 4.0 CRC, 2021).
- Drawing on our research, this submission identifies approval-related barriers that disproportionately affect repeatable and system-based housing delivery. These include approval processes that are not well aligned with offsite-fabricated components, multi-jurisdiction compliance requirements, certification uncertainty for non-traditional systems, and post-approval modification requirements that can conflict with the timing and economics of MMC.
- International experience suggests that type approval and system certification frameworks can support more productive housing delivery by allowing proven systems to be assessed once and then applied across multiple projects, subject to appropriate site-specific checks. Such approaches can reduce duplicated assessment, improve regulatory certainty and support investment in scalable delivery capacity (Giusti Gestri, Soltani & Maxwell, 2025; Soltani et al., 2025b).
- The proposed reforms would not lower safety, quality, accessibility or performance standards. Rather, they would change when, where and how compliance is demonstrated, so that repeatable housing systems can be assessed consistently, supported by portable evidence, and applied across projects with appropriate project-specific and site-specific review.

- We recommend three priority reforms: a national type approval or system certification framework for repeatable housing delivery systems; approval pathways that align compliance assessment with specific points of design, manufacture and installation; and nationally consistent digital documentation requirements, including model-based compliance evidence and shared certification records.

1. About the Future Building Initiative

The *Future Building Initiative* at Monash University's Faculty of Art, Design and Architecture is a research group focused on the industrialisation of building, MMC, and the digital transformation of the construction sector. Our researchers have published extensively on MMC adoption in Australia and internationally, with a particular focus on the conditions under which more productive construction methods can be brought to scale.

This submission draws on our track record of industry and government applied research collaboration, evidenced through academic publications and recent conference research outputs, to address the inquiry's focus on regulatory barriers to more productive construction methods. A selection of our outputs includes:

Peer-reviewed publications

– Guisti Gestri, L., Soltani, S. & Maxwell, D. (2025). Cultural Dimension of Modern Methods of Construction (MMC): A Framework for Understanding Cross-National Adoption Patterns. In Proceedings of the ASA2025: 58th International Conference of the Architectural Science Association. The Architectural Science Association. [conference paper]

– Gutierrez-Bucheli, L., Muñoz, S., Couper, R. & Maxwell, D.W. (2026, in press). Mapping the landscape of productivity in construction research: An umbrella review of trends, gaps, and future directions. Engineering, Construction and Architectural Management. https://doi.org/10.1108/ECAM-12-2025-2007

– Gutierrez-Bucheli, L., Perera, S., Couper, R. & Maxwell, D.W. (2025). Practices and Challenges in Measuring and Monitoring Construction Productivity. In Proceedings of the CIB World Building Congress 2025. West Lafayette: Purdue University Press. [conference paper]

– Maxwell, D. & Aitchison, M. (2018). Prefab housing and the future of building: product to process. London: Lund Humphries.

– Muñoz, S., Bunster, V., Gutierrez-Bucheli, L. & Maxwell, D. (2025). Material and waste reduction through industrialised building: A systematic and meta-analysis review. Energy and Buildings, 347, 116330. https://doi.org/10.1016/j.enbuild.2025.116330

– Soltani, S., Abbasnejad, B., Gu, N., Yu, R. & Maxwell, D. (2025a). A multi-faceted analysis of enablers and barriers of industrialised building: Global insights for the Australian context. Buildings, 15(2), 214. https://doi.org/10.3390/buildings15020214

– Soltani, S., Giusti Gestri, L., Weiss, K.H. & Maxwell, D.W. (2025b). Beyond Product Substitution: Comparative Lessons for Systemic MMC Adoption. Buildings, 15, 3374. https://doi.org/10.3390/buildings15193374

– Soltani, S., Maxwell, D. & Rashidi, A. (2023). The state of Industry 4.0 in the Australian construction industry: an examination of industry and academic point of view. Buildings, 13(9), 2324. https://doi.org/10.3390/buildings13092324

Building 4.0 Cooperative Research Centre project reports

(accessible through the Building 4.0 CRC website)

- Building 4.0 CRC (2021). Project #9: Implementing DfMA and Lean in Construction: Best Practice Guidelines through a Study of Building Services and Structure.
- Building 4.0 CRC (2021). Project #3: Projects to Platforms — Investigating New Forms of Collaboration (Scoping Study). Building 4.0 Cooperative Research Centre, Melbourne.
- Building 4.0 CRC (2022). Project #10: Product Platform for Volumetric Building (Scoping Study).
- Building 4.0 CRC (2022). Project #12: VR/AR Technologies in Vocational Education and Training (Scoping Study).
- Building 4.0 CRC (2023). Project #31: Demystifying Volumetric Construction: A Study of the Bathroom Pod.
- Building 4.0 CRC (2025). Project #53: Process Engineering and Design and Estimating Automation of Fleetwood's Product Platform.
- Building 4.0 CRC (2024). Project #38: Victorian Government Digital Build — Translating Theory into Practice.
- Building 4.0 CRC (2025). Project #95: The Homes NSW MMC Program.
- Building 4.0 CRC (2026). Project #102 – Skills and training implications of modern methods of construction: Across design, manufacture and assembly.
- Building 4.0 CRC (2026). Project #116: MMC Pathways for Youth Housing Delivery.

2. The regulatory barrier: a structural mismatch with more productive housing delivery

Australia's housing approval system is largely structured to function for traditional, sequential and site-based construction. A typical pathway assumes that a developer acquires land, obtains development approval, then building approval, proceeds with construction on site, and seeks final certification on completion. This sequence works most naturally for one-off projects where most construction activity occurs on the approved site after project-specific approvals are granted.

More productive housing delivery models do not always follow this sequence. Modern methods of construction, design for manufacture and assembly, prefabricated components, volumetric modular systems, bathroom pods, cross-laminated timber systems and other industrialised approaches rely on earlier coordination, repeatable design logic, offsite production, standardised components and supply chains that may operate across multiple jurisdictions (Maxwell & Aitchison, 2018; Building 4.0 CRC #09, 2021; Building 4.0 CRC #31, 2023). These approaches can support housing supply by reducing avoidable duplication, improving process certainty and enabling faster delivery (Muñoz et al., 2025; Gutierrez-Bucheli et al., 2026). However, their productivity benefits depend on approval systems that recognise platform repeatability, portability and system-level compliance (Gutierrez-Bucheli et al., 2026).

Current approval processes are not always well aligned with these delivery models. Significant parts of a building may be designed, procured, manufactured or scheduled before all project-specific approval conditions are finalised (Building 4.0 CRC #31, 2023; Building

4.0 CRC #10, 2022). Components may also be manufactured in one state and installed in another, with compliance assessed through different local or jurisdictional approval pathways (Building 4.0 CRC #03, 2021; Building 4.0 CRC #53, 2025). For example, a volumetric module manufactured in Victoria may be installed in a building in Queensland under a building approval issued by a Queensland certifier, using a construction system previously assessed in a Victorian context. This creates uncertainty about how far prior assessment, certification and compliance evidence can travel across projects and jurisdictions.

Our published research identifies this jurisdictional and procedural fragmentation as a significant barrier to industrialised building adoption in Australia. Soltani et al. (2025a) found that regulatory complexity and certification uncertainty consistently appear among the leading barriers to industrialised building adoption in the Australian context, alongside cultural resistance and supply chain immaturity (see also Soltani et al., 2025b; Gestri, Soltani & Maxwell, 2025). These barriers also interact. Regulatory uncertainty can suppress investment in more productive delivery capacity, which limits the supply of proven systems, reduces certifier familiarity, and further increases approval uncertainty (Building 4.0 CRC #09, 2021; Building 4.0 CRC #95, 2025).

The regulatory barrier is therefore not simply an additional compliance cost. It can constrain the broader productivity gains that repeatable, system-based and digitally supported housing delivery models are intended to create (Building 4.0 CRC, LHP#06, 2024; Gutierrez-Bucheli et al., 2026). Reform should focus not only on making approvals faster, but on ensuring that approval processes are better aligned with how more productive housing delivery systems actually work. Resolving this structural mismatch is not merely an administrative efficiency; it is a critical lever for housing affordability. Streamlining these approval pathways directly compresses construction timelines by up to 50%, reducing holding costs for builders. By eliminating these regulatory bottlenecks, the system can pass these time and capital savings directly down to the end consumer, allowing a more affordable supply of homes to hit the market faster.

3. The quantifiable cost of regulatory mismatch

The barriers described above are not abstract. There is quantifiable evidence of their cost to housing delivery, and of the productivity gains that regulatory reform could unlock.

The baseline cost burden

The Productivity Commission (2025)'s analysis estimates that regulation adds significantly to the cost of new housing delivery. For MMC, this baseline burden is compounded. Because repeatable, offsite-fabricated delivery models do not fit natively within traditional, site-based compliance pathways, the costs associated with project-by-project engineering reviews, repeated certification processes and multi-jurisdiction reassessment are incurred on every project, even where the underlying system has been previously assessed. The regulatory premium falls most heavily on precisely the delivery models that have the greatest potential to reduce construction costs and increase throughput.

The compounding penalty of approval delays

Data from the Australian Small Business and Family Enterprise Ombudsman (ASBFEO, 2026) highlights that 88% of builders experience planning approval timeframes exceeding eight weeks, with one in three facing delays exceeding six months. For traditional

construction, these delays generate holding costs. For MMC, they are structurally more damaging. The financial model for repeatable, factory-based delivery depends on predictable throughput and rapid deployment to offset the significant upfront capital costs of manufacturing infrastructure. Extended and uncertain approval timeframes disrupt factory scheduling, increase holding costs on fabricated components, and erode the cost and time advantages that make MMC competitive with traditional construction (Building 4.0 CRC #95, 2025).

The productivity gains that reform could unlock

The potential upside of resolving these barriers is substantial. Research shows that MMC can reduce construction costs by approximately 20% and reduce build times by 20% to 50%. These gains are not currently being realised at scale in Australia. As our research demonstrates, this is not primarily a technology or capability problem. The systems exist. The barrier is that localised, fragmented and project-specific approval processes continue to treat factory-built, repeatable modular systems as bespoke, site-built structures — requiring each project to re-demonstrate what has already been established (Building 4.0 CRC #95, 2025; Building 4.0 CRC #53, 2024).

Realising these productivity gains at scale requires the structural shift recommended in this submission: moving from localised, fragmented, project-by-project approvals toward national type approval and system certification frameworks that recognise repeatability, support compliance portability, and enable proven systems to be deployed efficiently across multiple projects and jurisdictions.

4. Responses to Information Requests

Information Request 1: Priority regulatory reforms

> **Information Request 1:** Which regulatory reforms should governments prioritise to get more homes built more quickly? What evidence (case studies and data) can you provide to support your answer?

Based on our research into modern methods of construction, industrialised building, design for manufacture and assembly, and digital construction (Soltani et al., 2025a; Soltani et al., 2025b; Maxwell & Aitchison, 2018; Building 4.0 CRC #09, 2021; Building 4.0 CRC #31, 2023; Building 4.0 CRC #38, 2025), we identify three priority reforms. Each addresses a structural barrier to more productive housing delivery and would support the contribution of repeatable, system-based and digitally enabled construction methods to housing supply.

Reform 1: Establish a national type approval or system certification framework for repeatable housing delivery systems

A major priority reform would be the establishment of a national type approval or system certification framework for repeatable housing delivery systems, including MMC, DfMA, prefabricated and industrialised building systems. Such a framework would enable proven systems to be assessed once against relevant performance standards and then used across Australian jurisdictions without repeated full re-certification for each project.

This would directly address the multi-jurisdiction compliance barrier identified across our research programme (Building 4.0 CRC #03, 2021; Building 4.0 CRC #09, 2021; Building 4.0 CRC #10, 2022; Building 4.0 CRC #53, 2025), reduce duplicated approval costs and timeframes, and create the regulatory certainty needed to attract sustained investment in scalable housing delivery capacity (Gestri, Soltani & Maxwell, 2025). To be effective, the framework would need to have recognised authority across state and territory building approval systems, while still allowing appropriate project-specific and site-specific checks.

This reform would not reduce performance standards. It would change how compliance is demonstrated: from repeated per-project assessment of the same system to a rigorous system-level assessment, followed by site-specific checks for planning, infrastructure, access, environmental and local risk conditions. Safety, structural, fire, accessibility and other performance requirements would remain in place.

Reform 2: Develop approval pathways aligned with the actual points of design, manufacture and installation

Current approval processes should be adapted so that compliance can be assessed at the point where relevant construction decisions are actually made. For repeatable and offsite-fabricated systems, this means enabling certification of components, assemblies or systems at the point and time of design or manufacture, rather than relying primarily on retrospective documentation at the point of site installation.

This would remove a key timing mismatch that creates unnecessary cost and uncertainty for volumetric modular, prefabricated panel and other industrialised systems (Building 4.0 CRC #31, 2023; Building 4.0 CRC #10, 2022). It would require nationally consistent protocols for offsite inspection, certification, evidence transfer and site installation checks (Building 4.0 CRC #09, 2021; Building 4.0 CRC #95, 2025), all supported by digitally enabled systems and documentation (see reform 3). These are significant but technically achievable reforms, consistent with international practice in jurisdictions where system certification frameworks are established (Soltani et al., 2025b).

The intent is not to lower standards, but to shift the point at which compliance is verified so that regulatory processes better reflect how more productive construction methods are delivered in practice.

Reform 3: Develop nationally consistent digital documentation requirements and portable compliance records

Our research in digital construction points to a further reform opportunity: nationally consistent digital documentation requirements for repeatable housing delivery systems (Building 4.0 CRC #38, 2024, Building 4.0 CRC #53, 2025). This should include digital twins, model-based evidence of compliance, standardised data templates, structured product and system information, automated factory-gate compliance tracking, and shared certification records that can travel with approved systems across projects and jurisdictions.

Digital compliance records that are structured, portable and machine-readable would reduce the documentation burden at each project stage, support certifier assessment of less familiar systems, and enable regulators to build a stronger evidence base on the performance of repeatable housing delivery systems over time (Soltani, Maxwell & Rashidi, 2023; Building 4.0 CRC #38, 2024; Gutierrez-Bucheli et al., 2026). As an example, regulators could use this

evidence base to conduct automated clash detection, automated code checking, and thermal performance simulation.

This reform is complementary to a type approval or system certification framework. These would reduce duplicated administrative burden, improve regulatory certainty and make it easier for proven construction systems to be deployed across multiple housing projects without compromising safety or quality.

Information Request 2: Most onerous, time-consuming and costly approval steps

> **Information Request 2:** Which steps of the housing regulatory approvals process are the most onerous, time consuming and costly? Why? How could the burden be reduced without compromising regulatory objectives?

For repeatable and system-based housing delivery models, including MMC, design for manufacture and assembly (DfMA), prefabricated components and volumetric modular systems, our research identifies four approval-related burdens as particularly significant (Soltani et al., 2025a; Building 4.0 CRC #09, 2021; Building 4.0 CRC #31, 2023).

Building approval for offsite-fabricated components

Current building approval processes commonly assess construction compliance at the point of installation on-site. For offsite-fabricated systems, however, critical compliance decisions, including structural design, fire performance, thermal performance and accessibility, are often made and locked in during the design and fabrication process, well before installation (Building 4.0 CRC #31, 2023; Building 4.0 CRC #10, 2022). This creates a mismatch between when compliance is substantively determined and when it is formally assessed. The result is additional documentation, holding costs and uncertainty for projects that rely on early coordination, fabrication certainty and repeatable delivery.

Multi-jurisdiction compliance for nationally distributed supply chains

Manufacturers and suppliers producing volumetric modules, prefabricated panels or other repeatable building systems for projects across multiple states must often navigate different compliance and approval expectations in each jurisdiction (Building 4.0 CRC #03, 2021; Building 4.0 CRC #53, 2025). There is currently no nationally consistent approval pathway through which a proven system, once assessed, can be used across jurisdictions without repeated reassessment or re-certification (Soltani et al., 2025b; Giusti Gestri, Soltani & Maxwell, 2025). This creates a cost and uncertainty barrier for manufacturers seeking to operate at a national scale, which is the scale at which repeatable and industrialised delivery models can become more competitive with traditional construction. This regulatory fragmentation also has workforce implications, as certifiers, inspectors and production staff must be trained across multiple, inconsistent jurisdictional requirements rather than a single national standard (Building 4.0 CRC #102, 2026).

Certification uncertainty arising from limited familiarity with non-traditional systems

Certifiers and building surveyors have extensive experience assessing traditional construction methods. However, system-based and industrialised approaches, including

volumetric modular construction, engineered timber systems, hybrid structural systems or novel cladding assemblies, may fall outside the standard pathways familiar to many assessors (Building 4.0 CRC #09, 2021). We note that the technical standards themselves are out of scope for this inquiry. However, the approval process burden that arises from certifier unfamiliarity, including additional time, documentation and uncertainty in demonstrating compliance, is within scope. The issue is not the standard itself, but the process through which compliance is demonstrated for systems that certifiers encounter less frequently.

Post-approval modification requirements that conflict with offsite fabrication schedules

Traditional approval processes assume that construction has not commenced before approval conditions are finalised. In more industrialised delivery models, however, design, procurement, manufacturing and logistics may need to be substantially advanced before all project-specific approval conditions are resolved (Building 4.0 CRC #31, 2023; Building 4.0 CRC #95, 2025; Building 4.0 CRC #116, 2026). Requirements to modify fabricated or procured components after this point can be costly and can undermine the time and cost advantages that repeatable and offsite delivery models are intended to create.

These issues relate to approval process burden, not the underlying performance standards. Reducing the burden would mean changing when, where and how compliance is demonstrated, so that proven systems can be assessed consistently and then applied across projects with appropriate project-specific and site-specific checks (Gutierrez-Bucheli et al., 2026). This would support more productive housing delivery without lowering safety, quality, accessibility or performance requirements.

Information Request 3: Recent reforms to approvals and their effectiveness

Information Request 3: Which recent reforms to approvals (for example, fast-track pathways, coordination bodies, AI-assistance) have been the most and least effective in increasing new housing supply?

Our comparative research on modern methods of construction, industrialised building and digital construction across national contexts provides evidence on which regulatory reform approaches have been more effective in removing barriers to productive construction methods internationally (Soltani et al., 2025b; Gestri, Soltani & Maxwell, 2025; Building 4.0 CRC #38, 2024). The key lesson is that reforms are most effective when they reduce duplicated assessment, improve compliance certainty and support repeatable delivery across multiple projects.

More effective: Type approval and system certification frameworks

Among the reform approaches observed across international contexts, type approval and system certification frameworks have shown considerable promise. These frameworks allow a proven building system, once assessed against relevant performance standards, to be applied across multiple projects without repeating the full approval process each time. International examples include UK agreement-style product certification and third-party assurance schemes, as well as industrialised building certification approaches used in parts of Europe. These approaches can reduce per-project approval costs, increase confidence

among certifiers and support investment in scalable delivery capacity, while maintaining performance standards.

Australia does not currently have an equivalent national pathway for repeatable housing delivery systems. Our research indicates that the absence of such a pathway is frequently identified by Australian MMC and industrialised building practitioners as a significant regulatory gap (Soltani et al., 2025a; Building 4.0 CRC #09, 2021; Building 4.0 CRC #31, 2023). Without a nationally recognised assessment pathway, manufacturers and project teams must continue to re-demonstrate compliance across projects and jurisdictions, even where the underlying system has already been tested or assessed (Building 4.0 CRC #03, 2021; Building 4.0 CRC #53, 2025).

Moderately effective: Fast-track pathways for specific dwelling types

Several state governments have introduced fast-track approval pathways for standardised, prefabricated or priority housing designs. These pathways can reduce approval time for individual projects and may support faster delivery where project conditions are relatively simple (Building 4.0 CRC #95, 2025; Building 4.0 CRC #116, 2026). However, they are only partial reforms if they do not also address the broader productivity conditions required for repeatable housing delivery. In particular, they do not necessarily resolve multi-jurisdiction compliance, system-level certification, portable compliance evidence, or the timing mismatch between offsite fabrication and project-specific approvals (Building 4.0 CRC #10, 2022; Building 4.0 CRC #31, 2023).

Less effective: Coordination bodies without decision-making authority

Our research on barriers to industrialised building adoption suggests that coordination bodies and working groups provide limited practical benefit where they do not have authority to make or recognise binding compliance decisions (Soltani et al., 2025a; Gutierrez-Bucheli et al., 2026). Coordination is useful, but it does not, by itself, resolve regulatory fragmentation. Where the core problem is uncertainty about whether a system assessed in one project or jurisdiction can be accepted in another, convening stakeholders without creating a recognised approval pathway tends not to remove the underlying barrier (Building 4.0 CRC #09, 2021; Building 4.0 CRC #03, 2021).

The implication for housing supply reform is that approval reform should be assessed not only by whether it speeds up individual applications, but also by whether it enables repeatability, compliance portability and scalable delivery capacity across projects and jurisdictions (Gutierrez-Bucheli et al., 2026; Building 4.0 CRC #38, 2024).

4. Summary of recommendations

We recommends the Productivity Commission give consideration to the following reforms in its interim and final reports:

- **Establish a national type approval or system certification framework for repeatable housing delivery systems**, including MMC, DfMA, prefabricated and industrialised building systems. This would enable proven systems to be assessed once and then used across Australian jurisdictions without repeated full re-certification, subject to appropriate project-specific and site-specific checks.

- **Develop approval pathways that align compliance certification with the actual points of design, manufacture and installation.** For offsite-fabricated and system-based approaches, this would enable components, assemblies or systems to be certified at the point of manufacture, with appropriate checks at installation and for site-specific conditions.
- **Develop nationally consistent digital documentation requirements and portable compliance records** for repeatable housing delivery systems. This should include model-based compliance evidence, standardised data templates, structured product and system information, and certification records that can travel across projects and jurisdictions.
- **Evaluate recent state and territory reforms not only by approval speed, but also by their effect on construction productivity, repeatability and scalable delivery capacity.** In particular, reforms should be assessed for whether they support system-based and digitally enabled delivery models, rather than only streamlining approvals for traditional project-by-project construction.

In each case, the objective is to change when, where and how compliance is demonstrated, not to reduce safety, quality, accessibility or performance standards. Repeatable housing systems should be able to be assessed consistently and then applied across projects with appropriate project-specific and site-specific review.

The Future Building Initiative welcomes the opportunity to provide further evidence to the inquiry and is available to engage with the Commission's public hearings process.

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