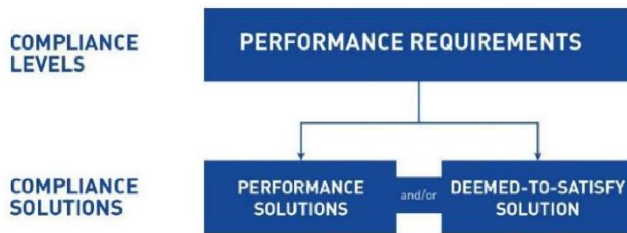


Client Seminar – Changes to BCA Affecting Project Cost and Risk – Presentation Summary

As part of the updated 2019 issue of the National Construction Code (NCC), significant changes were made to Section J. This information sheet follows the joint presentation by Umow Lai, WT Partnership and EPM Projects on 12 September 2019. It is provided to help you better understand the changes and the potential implications for your projects particularly in the areas of cost, time and risk, and how to proactively manage this.

Understanding NCC and Section



The NCC is a **mandatory** performance-based code which contains performance requirements for the construction of buildings. Performance requirements can be achieved via two pathways – Performance Solutions or Deemed-to-Satisfy (DtS) Solutions. DtS is prescriptive with no opportunity for flexibility, however

by adhering to DtS the Performance Requirements are met. Performance Solutions provide flexibility, however more detailed analysis is required to verify compliance with the Performance Requirements. Section J is the energy efficiency part of the NCC with a focus on building fabric and services. Building fabric requirements of Section J are climate specific (8 climate zones) and there is a higher relevance to spaces which are artificially heated or cooled – referred to as *condition space*.

2019 – Big Picture Changes

<ul style="list-style-type: none"> • New Verification Methods 	<ul style="list-style-type: none"> • Thermal Bridging must be calculated
<ul style="list-style-type: none"> • Thermal Comfort Performance Requirements 	<ul style="list-style-type: none"> • Walls and Glazing Performance Must be Considered together
<ul style="list-style-type: none"> • Minimum requirement on Spandrel 	<ul style="list-style-type: none"> • Significant changes to mechanical and electrical requirements

New Verification Methods

Overview: In addition to JV3, new verification methods have been included – JV1 NABERS and JV2 Green Star. Each verification method involves modelling using dynamic energy simulation software. To meet the NABERS verification requirements a commitment agreement of 5.5 must be established, noting this is only applicable for office projects. To meet the Green Star verification requirements the project must be registered for a **certified** Green Star assessment and modelling undertaken (modelling is not a mandatory requirement in Green Star).

Project Risk: There is little to no project risk with this change as verification methods are an optional pathway and not a mandatory requirement. The additional verification methods essentially recognise that if a project is already undertaking a NABERS commitment agreement or Green Star energy modelling, the project will achieve NCC compliance. One notable point is JV3 modelling is likely to have less benefit than it previously did and may not be worth pursuing.

Cost implication: No cost implication

Advice: Consider how appropriate a JV3 assessment might be and ask for an optional fee, rather than having it included in the lump sum. If you are undertaking Green Star or a NABERS commitment agreement definitely utilise this advantage in order to achieve Section J compliance

Thermal Comfort Performance Requirements

Overview: With each verification method (modelled solutions), in addition to energy efficiency requirements via dynamic energy simulation, the project is required to demonstrate a minimum level of thermal comfort. Comfort is measure by $PMV \pm 1.0$, which is a statistical measure of the likely percentage of people satisfied. It factors in occupant behaviour, building fabric performance and mechanical design.

Project Risk: There is only a risk to the project here if this requirement is overlooked. $PMV \pm 1.0$ is not difficult to achieve in air-conditioned spaces. Alternative methods of heating and cooling may present more of a challenge.

Cost implication: Additional consulting costs will be required to undertake this modelling. Having said that the same dynamic energy model can be used and altered to produce the thermal comfort outcomes and therefore an entirely new model is not required.

Advice: Be sure to include this in your brief if you intend to pursue a verification method e.g. JV3. Be sure to also include this in your mechanical brief as the mechanical design will play a role in achieving compliance. Like everything start the work on this early, even with some high level advice.

Walls and Glazing Performance Must be considered together

Overview: In previous editions of the NCC, wall performance was calculated separately to glazing performance. NCC 2019 now requires the whole façade (walls + windows) performance to be assessed together. There has also been increased stringency to the minimum performance requirements which will require closer attention of glass to façade ratios and could result in a higher glazing specification.

Project Risk: Glass to façade ratio is the key item here. It will be difficult for entirely glazed facades to achieve compliance - if this not well understood from the outset of the design process, then there is a risk the design will be found to be non-compliant. Obviously the later in the process that this is discovered the greater the cost and time impact on your project.

Cost implication: This will vary from project to project and rationalising the glass to façade ratio will help to minimise any cost uplift. High level analysis indicates a façade with:

- 30% glazing may incur an increase to the cost of a façade of approximately 9% (or 1.2% – 1.5% increase in overall cost).
- 60% glazing may incur an increase to the cost of a façade of approximately 18% (or 2.2% – 3% increase in overall cost)

Advice: Discuss glass to façade ratios with your designers as early as possible – make it one of the first conversations you have with your architect. Also consider the use of external shading devices to help achieve a clearer glazing specification. Engage someone early to undertake preliminary NCC façade calculations so that you can have informed discussions.

Minimum requirements on Spandrel

Overview: In addition to the minimum performance required for facades (window + wall) there are additional minimum performance requirements for spandrels. Therefore, you need to ensure that both requirements are met through the design. It is possible to meet the façade requirements and still not achieve the spandrel requirements

Project Risk: There is a risk that this requirement may be overlooked due to it being an additional requirement to the window-wall requirements. If it's not considered as part of early window-wall calculations it may cause issues down the track, including increased cost, delay and adverse impacts on design.

Cost implication: Umow Lai has recently modelled two scenarios, one with a fairly typical current spandrel detail, the second with what might be required for NCC 2019 compliance. The difference was in the order of circa \$50/m²

Advice: Make sure that this requirement is not overlooked by the architect, façade engineer and sustainability consultant. Be sure that the spandrel calculations are included as part of the scope for window-wall calculations; again your project manager should be on top of this at the time of briefing and appointing consultants.

Thermal Bridging must be calculated

Overview: An Australian/New Zealand Standard has now been referenced as the methodology to assess thermal bridging via structure in walls, roof and floor where applicable. The impact of thermal bridging can have a significant impact on the building fabric performance. When thermal bridging is considered many current standard wall/roof/floor types would be non-compliant, regardless of how much additional insulation is added.

Project Risk: There could be considerable risk to the project if the impact of thermal bridging is not understood and appropriately dealt with as part of the design. When thermal bridging is factored in it is possible that no amount of additional insulation will achieve compliance. These requirements are likely to impact standard construction detailing and therefore more scrutiny is required.

Cost implication: It is difficult to quantify; however your wall and roof build-ups are likely to increase and there is a material cost implication. Like all these changes, getting advice from qualified and experienced practitioners and working smartly through the process should minimise enable effective cost management and avoid surprises. That said the level of analysis that is required could be considerable and you should make provision for the necessary consultant costs.

Advice: Have the conversation early and work with someone who has experience in thermal bridging analysis. Bring them into the conversation with the architect so that detailing can be discussed early and the appropriate allocation of wall and roof thickness can be made. With some smart design it's possible to minimise the impact of thermal bridging without significant impact to the project.

The most effective way to minimise the impact to any future project is to seek expert advice early.

Disclaimer – Any cost advice contained herein is high level based on assumptions. As each project is different this information is general in nature only and should not be relied on in any specific circumstance.