

## Analysis of cost impacts on the changes to section H1 of the Building Code

Performed by YourQS Ltd on behalf of EBOSS with support from NZ Certified Builders with design input from Designgroup Stapleton Elliott.

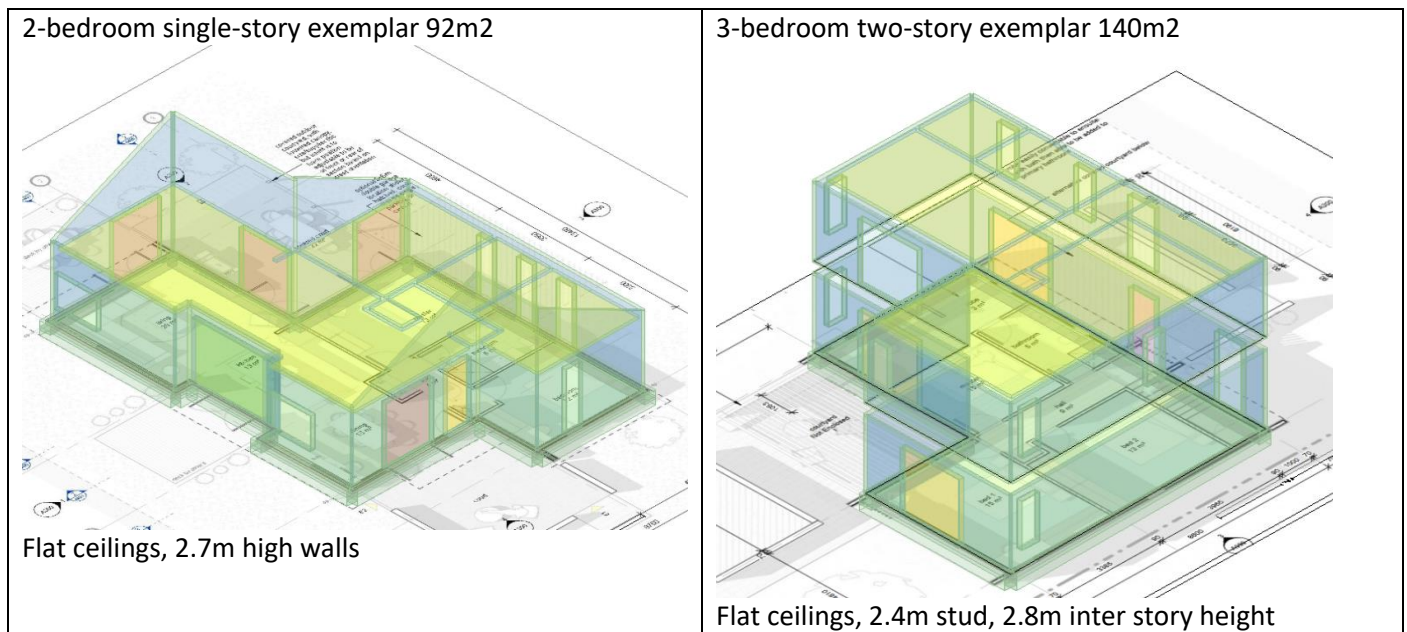
### Background

With construction costs coming under media focus over recent times the cost impact of the 2023 changes to the H1 section of the building code EBOSS and YourQS decided to do an exercise comparing the costs of a residential home under various design scenarios.

- Base Case – using a specification typical of a design before the 2023 H1 increases
- Schedule Method – compliance with post 2023 standard using the schedule method
- Calculation Method – using the calculation method to achieve compliance

### Methodology

1. Model two standard plan houses currently under development for NZ Certified Builders using the YourQS software system.



2. The areas calculated from the model for the two designs are:

(m <sup>2</sup> )	2 Bed	3 Bed
Slab	92.0	70.14
Roof	92.0	70.14
Walls	91.8	152.9
Glazing	34.4	29.39

3. Input the building measures into the BRANZ H1 Schedule method. Try R rates to identify a pass for each scenario.
4. Clone the models and adjust change the component settings to reflect the pass settings for each scenario
5. Cost each scenario using the YourQS 3D Visual Costing™ system

## Scenarios

These are the scenarios considered in this exercise:

Typology	No	Scenario	Notes
2 Bed	1	Pre 2023	Typical design pre2023
	2	Schedule	Schedule method
	3	Better	Higher performing home
	4	max Slab	Maximising the slab
	5	max Walls	Maximising the walls
	6	max Windows	Maximising the windows
	7	Just Pass	Minimum settings to pass aiming for lowest cost
3 Bed 2 Story	8	Pre 2023	Typical design pre2023
	9	Schedule	Schedule method
	10	Just Pass	Minimum settings to pass aiming for lowest cost

The selections to achieve a pass and resulting heat loss for each scenario are:

2-bedroom single-story	1	2	3	4	5	6	7
	Pre 2023	Schedule	Better	max Slab	max Walls	max Windows	Just Pass
Slab	1.30	1.50	2.24	2.71	1.30	1.50	1.88
Roof	3.35	6.60	6.60	3.70	3.35	4.47	3.70
Walls	1.84	2.09	2.09	2.09	3.39	2.09	2.09
Glazing	0.33	0.46	0.46	0.37	0.46	0.46	0.46
<b>Heat Loss</b>	<b>252.22</b>	<b>193.87</b>	<b>173.61</b>	<b>195.58</b>	<b>199.99</b>	<b>200.52</b>	<b>192.4</b>

3-bedroom two-story	8	9	10
	Pre 2023	Schedule	Just Pass
Slab	1.30	1.50	1.50
Roof	3.35	6.60	3.35
Walls	1.84	2.09	1.84
Glazing	0.33	0.46	0.33
<b>Heat Loss</b>	<b>247.03</b>	<b>194.42</b>	<b>239.84</b>

Using these construction system choices and resulting R values:

Windows	R
Non-thermally broken Std Glass	0.33
Non-thermally broken High Performing Glass	0.37
Thermally broken High Performing Glass	0.46
<b>Floors</b>	
Conc 50mm EPS under, 400x300 ring foundation	1.3
Raft Edge Ins	1.5
Raft EPS 100mm under	1.88
Raft EPS 50mm under Edge Ins	2.2
Raft XPS 75mm under Edge Ins	2.71
<b>Ceiling batts</b>	
R3.2	3.35
R3.6	3.7
R4.5	4.47
R5	4.89
R3.2x2	6.61
<b>Wall batts</b>	
R1.8 90mm frames	1.84
R2.2 90mm frames	2.09
R4.0 140mm frames	3.39

## Resulting Costs

Each scenario was costed using by YourQS using their 3D Visual Costing system. The determines the labour times, materials, and subcontractors and applies a typical cost rate and mark-up for a small-medium residential builder.

### 2-bedroom single-story

Component	01 Pre23	02 Post23 Shed	03 Better	04 max Slab	05 max Walls	06 max Wind	07 H1 Just
Slab	\$37,726	\$39,872	\$42,806	\$42,928	\$37,726	\$39,872	\$29,162
Roof	\$1,861	\$3,514	\$3,514	\$1,861	\$1,861	\$2,711	\$1,861
Walls	\$24,803	\$24,813	\$24,425	\$24,425	\$31,180	\$24,425	\$24,425
Glazing	\$28,719	\$36,327	\$36,327	\$31,756	\$36,327	\$36,327	\$36,327
<b>Total</b>	<b>\$93,109</b>	<b>\$104,526</b>	<b>\$107,072</b>	<b>\$100,970</b>	<b>\$107,094</b>	<b>\$103,335</b>	<b>\$91,776</b>

<b>Variance vs Pre 23</b>	<b>\$11,417</b>	<b>\$13,962</b>	<b>\$7,860</b>	<b>\$13,985</b>	<b>\$10,225</b>	<b>-\$1,334</b>
<b>Variance vs Schedule Method</b>		<b>\$2,546</b>	<b>-\$3,556</b>	<b>\$2,568</b>	<b>-\$1,191</b>	<b>-\$12,750</b>

### 3-bedroom two-story

Component	08 3B Pre 2023	09 3B Sched	10 3B Just
Slab	\$29,374	\$31,553	\$31,553
Roof	\$1,519	\$2,849	\$1,519
Walls	\$35,077	\$34,674	\$35,077
Glazing	\$27,756	\$35,259	\$27,756
<b>Total</b>	<b>\$93,726</b>	<b>\$104,334</b>	<b>\$95,905</b>

<b>Variance vs Pre 23</b>	<b>\$10,609</b>	<b>\$2,179</b>
<b>Variance vs Schedule Method</b>		<b>-\$8,430</b>

The slabs were not engineered so actual results may vary depending on design.

These costs include a builder's mark-up of 20% (16.7% margin) and GST.

## NZ Certified Builders Member Survey

NZCB did a survey of their members and asked them to provide feedback on recent builds. The survey was anecdotal and asked the builders to select from cost ranges then averaged so provides a broad indication of their views. The results of this survey were consistent with our theoretical results above.

Average square metres*	213 sqm
Average total build cost	\$748,613
Average extra costs due to H1	\$18,125
Average extra H1 costs per sqm	\$85 per sqm
Average extra H1 costs as percentage of total cost	2.4%

\*This result excludes two outlier projects that were build values over \$6m.

## Conclusion

That the introduction of the higher H1 standards increased the build cost of the 2-bedroom single-story exemplar by \$13,962 when using the schedule method but also a building with a markedly reduced heat loss. Careful selection of the system components and using the calculation method allows this cost premium to be reduced or potentially eliminated.

The 3-bedroom two-story home performed better thermally as there is reduced roof to wall area ratio meaning lower R values systems could be used to achieve a pass with the calculation method. The cost premium on meeting H1 via the schedule method was \$10,609, dropping to \$2,179 with optimum calculation method settings to achieve a minimum pass.

The component systems used were generic designs, it is possible that specific proprietary systems could exceed the performance of these providing the designer with further options to optimise their designs.

## About YourQS

YourQS assist builders and designers understand the cost of residential building projects using their innovative in-house developed 3D based estimating system. Based in Onehunga Auckland, their team of 11 work with 300 plus builders nationwide helping them prepare estimates for their clients as well as working with architects and designers estimating early-stage concept design costs. Since starting in 2018 they have completed over 3,200 renovation and new build projects. They recently started providing the same services to clients in Australia.

Their technology won the 2024 NZ Institute of Building Technology award.

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