Enquiries: Alex Yip
Project No: 47332

To: Harry Nicholas - Hayball

From: Alex Yip/Paul O'Brien Date: 16 June 2021

Subject: 1-12 Bills Street, Hawthorn
Design Development NatHERS Analysis

This memo is to confirm the results of the preliminary NatHERS assessment for the class 2 apartment development proposed at 1 – 12 Bill Street, Hawthorn VIC 3122. At this stage of the design, we have assessed a total of 175 thermally unique apartment models. The assessment is based on the DD progress issue received on 19/02/2021 from Hayball.

Targets

The apartments were reviewed with the aim to achieve:

- A 5 star minimum energy rating per individual dwelling and 6 Star average energy rating across the development for NCC 2019 compliance.
- A 5.5 star minimum energy rating per dwelling and a 6.5 star average energy rating across the development as per conditional requirement 15B.0 of the Green Star Design & As Built v1.2.
- A 6 star minimum energy rating per dwelling and a 7 star average energy rating across the development as per the DHHS project requirements.
- NCC 2019 average heating load limit per annum of 109 MJ/m^2 and average cooling load limit per annum of 26 MJ/m^2 applying to NatHERs 6 star.
- NCC 2019 worst performing heating load limit per annum of 147 MJ/m^2 and worst performing cooling load limit per annum of 37 MJ/m^2 applying to NatHERs 6 star.
- Better Apartment Design Standard (BADS) NatHERS maximum cooling load per annum of 21 MJ/m^2.

Design Target

Based on the design brief, the project is targeting a thermal performance that meets NCC 2019 requirements and is required to attain a 7 Star average rating energy across the development with no individual dwelling achieving less than 6 star.

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29/6/2021

Proposed Glazing & Building Constructions

The assessment is based on the following building fabric assumptions. The proposed building fabric has been assumed to extend to naturally ventilated corridors.

Type	Assumption	Total system R-Value
External Walls	Brick veneer construction with **added R_m2.7** thermal insulation.	3.24
Walls between apartment and corridors	Light weight construction with added **R_m2.0 thermal insulation**	2.25
Roof and where exposed above	200mm suspended ceiling concrete slab construction with added **R_m4.0 thermal insulation.** Light coloured (0.2) roofing assumed for roof.	4.87
Ground Floor	200mm concrete slab construction No insulation required, except for C_LG202 which requires added **R_m2.0 thermal insulation underneath slab.**	-
Floor above Unconditioned Spaces or exposed to external climatic conditions	200mm concrete slab construction with added **R_m2.0 thermal insulation**	2.18
Glazing to apartments *(Refer to Appendix 1 for glazing locations)*	Whole of Window Properties, i.e. combined glass and frame: **U-Value = 3.0 W/m²K** and **Solar Heat Gain Coefficient = 0.27**	-

NatHERS Results:

Based on the assumptions listed previously, the results of the ratings for the development are as follows:

Building A	Energy Rating (MJ/m^2)	Star Rating
Best Rating (A_G03)	33.4	8.8
Worst Rating (A_LG01)	121.6	6.1
Estimated average rating	70.0	7.6

Building B + C	Energy Rating (MJ/m^2)	Star Rating
Best Rating (C_101)	44.5	8.4
Worst Rating (C_206)	119.7	6.2
Estimated average rating	81.1	7.3

Building E+F+G	Energy Rating (MJ/m^2)	Star Rating
Best Rating (G_106)	42.6	8.5
Worst Rating (F_506)	124.3	6.0
Estimated average rating	79.7	7.3

In summary:

- The above result **meets** the required targets for NCC 2019 compliance for class 2 developments.
- The above result **meets** 5.5 Star individual energy rating and 6.5 Star average energy rating across the development as per conditional requirement 15B.0 of the Green Star Design & As built v1.3 Guidelines.
- The above result **meets** 6 Star individual energy rating and the 7.0 Star average energy rating across the development required by the DHHS project requirements.
- The above result **meets** the NCC 2019 heating and cooling load limits.
- The above result **meets** the BADS requirement of the NatHERS maximum cooling load per annum.

Please see attached summary listing the rating of each of the sample apartments modelled using the building fabric listed above (Appendix 1).

We note the design team is required to review the above building fabric assumptions and ensure architectural documentation captures the building fabric thermal requirements to achieve the above NatHERS ratings.

Please contact us if you have any queries.

Kind regards,

Alex Yip
Sustainability Engineer
for **Stantec Australia**

Appendix 1 - NatHERS summary results

Building A

CLIMATE ZONE
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AVERAGE ENERGY INTENSITY (MJ/m²)	AVERAGE STAR RATING	MINIMUM STAR RATING
70.0	7.6	6.1

Level	Apt No.	Apt Type	Area (m²)	Cooling - MJ/m²	Heating - MJ/m²	Energy Rating - MJ/m²	Star Rating
Lower Ground	A_LG01	A_LG01	63.5	2.00	119.60	121.6	6.1
Ground	A_G01	A_G01	57.5	5.40	63.70	69.1	7.7
	A_G02	A_G02	57.2	6.10	42.70	48.8	8.3
	A_G03	A_G03	40.8	6.30	27.10	33.4	8.8
	A_G04	A_G04	42.5	6.50	42.40	48.9	8.3
	A_G05	A_G05	63.4	3.90	76.20	80.1	7.3
	A_G06	A_G06	42.0	6.60	55.60	62.2	7.9
	A_G07	A_G07	82.8	5.20	82.70	87.9	7.1
Level 1	A_101	A_101	71.4	6.50	87.20	93.7	6.9
	A_102	A_102	42.5	10.10	23.60	33.7	8.8
	A_103	A_103	43.2	9.90	85.70	95.6	6.9
	A_104	A_104	45.2	10.20	73.60	83.8	7.2
	A_105	A_105	42.4	10.90	72.20	83.1	7.2
	A_106	A_106	38.3	12.40	32.90	45.3	8.4
	A_107	A_107	38.3	10.20	39.30	49.5	8.3
	A_108	A_108	79.8	5.20	46.60	51.8	8.2
	A_109	A_109	79.8	6.70	30.60	37.3	8.7
Level02	A_201	A_201	71.4	5.20	66.80	72.0	7.6
	A_202	A_202	42.5	12.40	26.90	39.3	8.6
	A_203	A_203	43.2	9.90	84.40	94.3	6.9
	A_204	A_204	45.2	9.30	82.80	92.1	7.1
	A_205	A_205	42.4	10.70	72.60	83.3	7.2
	A_206	A_206	38.3	13.50	38.20	51.7	8.2
	A_207	A_207	38.3	12.10	43.40	55.5	8.1
	A_208	A_208	79.8	6.20	56.10	62.3	7.9
	A_209	A_209	84.4	7.20	39.90	47.1	8.4
Level03	A_301	A_301	49.2	9.30	89.30	98.6	6.8
	A_302	A_302	38.3	12.90	43.20	56.1	8.1
	A_303	A_303	38.3	10.10	51.70	61.8	7.9
	A_304	A_304	79.8	8.70	86.20	94.9	6.9
	A_305	A_305	79.8	8.30	84.30	92.6	6.9
Level04	A_401	A_401	19.2	12.10	108.50	120.6	6.1
	A_402	A_402	38.3	16.00	85.70	101.7	6.7
	A_403	A_403	38.3	13.90	82.90	96.8	6.8
	A_404	A_404	79.8	8.30	84.20	92.5	6.9
	A_405	A_405	79.8	7.90	87.00	94.9	6.9

Building B + C

CLIMATE ZONE
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AVERAGE ENERGY INTENSITY (MJ/m^2)	AVERAGE STAR RATING	MINIMUM STAR RATING
81.1	7.3	6.2

Level	Apt No.	Apt Type	Area (m^2)	Cooling - MJ/m^2	Heating - MJ/m^2	Energy Rating - MJ/m^2	Star Rating
Lower Ground 2	C_LG201	C_LG201	48.8	5.40	45.60	51.0	8.2
	C_LG202	C_LG202	69.8	6.50	103.20	109.7	6.4
	C_LG203	C_LG203	79.8	1.10	80.00	81.1	7.3
Lower Ground 1	B_LG01	B_LG01	39.9	4.00	107.00	111.0	6.4
	B_LG02	B_LG02	44.6	7.80	85.00	92.8	6.9
	C_LG101	C_LG101	53.9	10.50	44.40	54.9	8.1
	C_LG102	C_LG102	53.9	12.70	71.10	83.8	7.2
	C_LG103	C_LG103	47.0	7.80	84.70	92.5	6.9
	C_LG104	C_LG104	55.9	3.90	86.20	90.1	7.0
	C_LG105	C_LG105	63.8	8.80	91.30	100.1	6.7
	C_LG106	C_LG106	78.4	7.20	50.00	57.2	8.0
Ground	B_G01	B_G01	39.9	10.70	38.90	49.6	8.3
	B_G02	B_G02	39.9	11.40	66.70	78.1	7.4
	B_G03	B_G03	59.6	2.00	116.50	118.5	6.2
	B_G04	B_G04	53.9	4.90	74.10	79.0	7.4
	B_G05	B_G05	57.0	2.00	113.80	115.8	6.3
	B_G06	B_G06	82.2	6.50	73.80	80.3	7.3
	C_G01	C_G01	53.9	8.10	36.50	44.6	8.4
	C_G02	C_G02	53.9	14.50	55.00	69.5	7.7
	C_G03	C_G03	39.9	9.40	58.80	68.2	7.7
	C_G04	C_G04	39.9	8.40	41.00	49.4	8.3
	C_G05	C_G05	39.9	8.60	51.50	60.1	7.9
	C_G06	C_G06	39.9	9.50	49.40	58.9	7.9
	C_G07	C_G07	53.6	10.90	75.30	86.2	7.1
	C_G08	C_G08	78.4	6.90	51.70	58.6	7.9
Level01	B_101	B_101	39.9	11.00	70.50	81.5	7.3
	B_102	B_102	39.9	11.20	65.90	77.1	7.4
	B_103	B_103	59.6	7.30	59.70	67.0	7.7
	B_104	B_104	53.9	11.30	48.70	60.0	7.9
	B_105	B_105	84.1	4.40	63.50	67.9	7.7
	B_106	B_106	82.2	7.00	77.20	84.2	7.2
	C_101	C_101	53.9	8.90	35.60	44.5	8.4
	C_102	C_102	53.9	14.40	57.00	71.4	7.6
	C_103	C_103	39.9	10.10	58.00	68.1	7.7
	C_104	C_104	39.9	9.60	41.10	50.7	8.2
	C_105	C_105	39.9	9.20	49.00	58.2	7.9
	C_106	C_106	53.9	6.60	46.70	53.3	8.2
	C_107	C_107	53.9	8.30	53.20	61.5	7.9

	C_108	C_108	78.4	6.80	59.90	66.7	8.1
Level02	B_201	B_201	39.9	8.80	49.50	58.3	7.9
	B_202	B_202	39.9	9.40	79.30	88.7	7.1
	B_203	B_203	59.6	6.30	79.00	85.3	7.2
	B_204	B_204	53.9	8.90	62.10	71.0	7.6
	B_205	B_205	84.1	6.80	54.50	61.3	7.9
	B_206	B_206	82.2	6.20	86.00	92.2	6.9
	C_201	C_201	53.9	8.50	84.90	93.4	6.9
	C_202	C_202	53.9	13.90	100.00	113.9	6.3
	C_203	C_203	39.9	11.90	97.60	109.5	6.4
	C_204	C_204	39.9	9.60	98.70	108.3	6.4
	C_205	C_205	39.9	11.00	89.80	100.8	6.7
	C_206	C_206	98.0	7.60	112.10	119.7	6.2
Level03	B_301	B_301	39.9	11.20	84.80	96.0	6.2
	B_302	B_302	39.9	11.90	104.10	116.0	6.3
	B_303	B_303	59.6	8.40	106.30	114.7	6.3
	B_304	B_304	53.9	12.10	96.40	108.5	6.4
	B_305	B_305	84.1	10.10	74.80	84.9	7.2
	B_306	B_306	82.2	8.00	97.80	105.8	6.6

Building E + F + G

CLIMATE ZONE
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AVERAGE ENERGY INTENSITY (MJ/m²)	AVERAGE STAR RATING	MINIMUM STAR RATING
79.7	7.3	6.0

Level	Apt No.	Apt Type	Area (m²)	Cooling - MJ/m²	Heating - MJ/m²	Energy Rating - MJ/m²	Star Rating
Lower Ground	F_LG01	F_LG01	47.5	2.00	112.90	114.9	6.3
	F_LG02	F_LG02	71.8	1.20	121.90	123.1	6.8
	F_LG03	F_LG03	62.1	2.50	98.30	100.8	6.7
	F_LG04	F_LG04	51.8	3.10	93.10	96.2	6.8
Ground	E_G01	E_G01	65.7	4.80	48.40	53.2	7.2
	E_G02	E_G02	65.7	8.50	75.30	83.8	6.5
	E_G03	E_G03	58.8	8.10	86.00	94.1	6.2
	F_G01	F_G01	47.5	7.30	67.50	74.8	7.5
	F_G02	F_G02	54.4	6.70	55.10	61.8	7.9
	F_G03	F_G03	54.4	6.60	56.40	63.0	7.9
	F_G04	F_G04	65.8	7.00	68.90	75.9	7.4
Level01	G_101	G_101	53.9	9.40	74.90	84.3	6.3
	G_102	G_102	53.9	10.50	83.10	93.6	6.2
	G_103	G_103	53.9	8.90	82.80	91.7	6.2
	G_104	G_104	39.9	9.60	68.10	77.7	6.7
	G_105	G_105	39.9	9.80	41.50	51.3	7.9
	G_106	G_106	39.9	10.20	32.40	42.6	8.5
	G_107	G_107	84.7	6.70	55.60	62.3	7.9
	G_108	G_108	38.4	7.80	50.50	58.3	7.9
	G_109	G_109	62.2	7.50	51.10	58.6	7.9
	G_110	G_110	62.2	9.30	45.70	55.0	8.1
	G_111	G_110	62.2	9.30	45.70	55.0	8.1
	F_101	F_101	53.9	4.10	103.20	107.3	6.4
	F_102	F_102	53.9	12.10	85.20	97.3	6.1
	F_103	F_103	79.8	2.90	99.10	102.0	5.4
	F_104	F_104	53.9	7.60	74.60	82.2	6.4
	F_105	F_105	39.9	5.60	92.00	97.6	5.8
	F_106	F_106	47.5	7.00	62.20	69.2	7.7
	F_107	F_107	54.4	6.80	57.90	64.7	7.8
	F_108	F_108	54.4	6.60	59.30	65.9	7.8
	F_109	F_109	65.8	8.00	67.20	75.2	7.4
	F_110	F_110	46.3	11.70	54.00	65.7	7.5
	E_101	E_101	67.7	10.10	80.60	90.7	7.0
	E_102	E_102	65.7	3.70	65.90	69.6	7.7
	E_103	E_103	67.7	13.10	66.70	79.8	7.3
Level02	G_201	G_201	53.9	13.10	41.20	54.3	8.1
	G_202	G_202	53.9	14.70	51.70	66.4	7.8
	G_203	G_203	53.9	13.20	56.40	69.6	7.7

	G_204	G_204	39.9	10.40	34.30	44.7	8.4
	G_205	G_205	39.9	10.40	34.30	44.7	8.4
	G_206	G_206	39.9	10.40	34.20	44.6	8.4
	G_207	G_207	90.0	7.00	57.80	64.8	7.8
	G_208	G_208	38.4	7.50	65.70	73.2	7.6
	G_209	G_209	38.4	10.10	81.60	91.7	6.9
	G_210	G_210	62.2	9.10	48.20	57.3	8.0
	G_211	G_211	46.3	9.70	54.20	63.9	7.9
	F_202	F_202	53.9	15.20	55.90	71.1	7.6
	F_203	F_203	79.8	6.10	54.40	60.5	7.9
	F_204	F_204	53.9	10.70	43.10	53.8	8.1
	F_205	F_205	39.9	7.70	53.20	60.9	7.9
	F_206	F_206	38.4	10.70	103.20	113.9	6.3
	F_207	F_207	54.4	7.80	74.50	82.3	7.3
	F_208	F_208	56.5	10.60	80.30	90.9	7.0
	F_209	F_209	64.5	10.10	85.00	95.1	6.9
	F_210	F_210	54.4	14.70	36.20	50.9	8.2
	E_201	E_201	67.7	12.20	105.70	117.9	6.2
	E_202	E_202	65.7	12.00	58.80	70.8	7.6
	E_203	E_203	67.7	15.10	97.50	112.6	6.4
Level03	G_301	G_301	53.9	10.20	56.20	66.4	7.8
	G_302	G_302	53.9	11.50	64.60	76.1	7.4
	G_303	G_303	53.9	10.00	65.80	75.8	7.4
	G_304	G_304	39.9	8.60	48.50	57.1	8.0
	G_305	G_305	39.9	8.70	48.50	57.2	8.0
	G_306	G_306	39.9	8.70	48.30	57.0	8.0
	G_307	G_307	39.9	8.90	83.20	92.1	6.9
	G_308	G_308	39.9	10.00	88.70	98.7	6.8
	G_309	G_309	45.8	11.50	106.20	117.7	6.2
	F_301	F_301	53.9	6.60	49.90	56.5	8.1
	F_302	F_302	53.9	11.80	61.10	72.9	7.6
	F_303	F_303	79.8	4.90	59.90	64.8	7.8
	F_304	F_304	53.9	8.80	58.40	67.2	7.8
	F_305	F_305	81.0	5.50	93.20	98.7	6.8
	F_306	F_306	69.4	8.60	90.90	99.5	6.8
Level04	G_401	G_401	53.9	9.10	57.20	66.3	7.8
	G_402	G_402	53.9	11.40	66.30	77.7	7.4
	G_403	G_403	53.9	10.10	67.20	77.3	7.4
	G_404	G_404	39.9	9.00	49.00	58.0	7.9
	G_405	G_405	39.9	9.00	48.80	57.8	8.0
	G_406	G_406	39.9	9.00	48.80	57.8	8.0
	G_407	G_407	39.9	8.90	89.80	98.7	6.9
	G_408	G_408	39.9	10.30	85.00	95.3	6.8
	G_409	G_409	45.8	12.20	103.40	115.6	6.3
	F_401	F_401	53.9	6.60	50.80	57.4	8.0

	F_402	F_402	53.9	11.10	66.80	77.9	7.4
	F_403	F_403	84.4	5.00	54.10	59.1	7.9
	F_404	F_404	53.9	9.10	58.10	67.2	7.7
	F_405	F_405	81.0	5.80	90.90	96.7	6.8
	F_406	F_406	69.2	7.80	99.80	107.6	6.5
Level05	G_501	G_501	53.9	9.10	58.40	67.5	7.7
	G_502	G_502	53.9	12.10	67.50	79.6	7.4
	G_503	G_503	53.9	10.10	68.00	78.1	7.4
	G_504	G_504	39.9	8.90	49.50	58.4	7.9
	G_505	G_505	39.9	9.50	60.30	69.8	7.7
	G_506	G_506	39.9	8.90	49.50	58.4	7.9
	G_507	G_507	39.9	8.90	84.50	93.4	6.9
	G_508	G_508	39.9	10.30	85.00	95.3	6.9
	G_509	G_509	45.8	12.60	99.30	111.9	6.4
	F_501	F_501	53.9	8.40	86.50	94.9	6.9
	F_502	F_502	53.9	13.70	88.90	102.6	6.7
	F_503	F_503	79.8	7.90	77.60	85.5	7.2
	F_504	F_504	53.9	11.20	82.10	93.3	6.9
	F_505	F_505	81.0	8.60	113.00	121.6	6.1
	F_506	F_506	69.2	7.60	116.7	124.3	6.0