FINAL ENERGY RATING REPORT

FOR

MRS. A. & MR. P YERONDAIS

PROPOSED ALTERATION & EXTENSION

AT

141 CHARLES STREET
NORTHCOTE

21 JUNE 2019

Accreditation No. VIC/BDAV/10/3018

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Introduction

Energy Aspects has been engaged to undertake a house energy rating assessment of the proposed alteration and extension of residential dwelling located at 141 Charles Street, Northcote. The objective of this assessment is to demonstrate compliance with Regulation 233 of the Building Regulations 2018 and Building Commission Practice Note 2011-55 - Part B 9.2 & 9.3.2.

This report contains:

- Dwelling construction details and rating assumptions.
- Drawing construction references.
- Firstrate5 Version 5.2.10b energy rating of existing dwelling as constructed.
- Firstrate5 Version 5.2.10b energy rating of whole dwelling incorporating proposed extension.

Part 1: Existing Dwelling - Construction Details & Rating Assumptions

Construction and building elements details have been taken directly from the scaled floor plans, elevations and sections provide by the client. Additional rating assumptions have been obtained from the client with regard to specific construction elements, building fixtures and fitting not detailed on the plans.

Construction Details				
Drawing Details:	**Drawn by:** Interext Design Group		**Project No:** 2018950	
	Description	**Drawing No:**	**Revision**	**Date**
	Site Plan	ECP1	A	26/06/2018
	Ground Floor Plan	ECP1	A	26/06/2018

Floor Type & insulation	
Floor Type Details	**Added Insulation**
Ground floor: Framed timber floor construction.	No added insulation.

Wall Type & Insulation	
Wall type:	**Added Insulation**
Weatherboard external clad wall with plasterboard internal lining.	No added insulation.

Roof Type & Insulation	**Roof Type & Insulation**
Roof Type:	**Added Insulation**
Pitched roof clad with metal decking.	No added insulation.

Window & Glazed Door Details

1. Timber framed window & doors with **clear single glazing** to all windows and glazed doors.
Window Specification
Type - awning & casement ..... **Total Uw value 5.40, SHGC 0.56 NFRC**
Type - sliding, double hung & fixed ..... **Total Uw value 5.40, SHGC 0.63 NFRC**

Draught Proofing and weather stripping details	**Sealing Assumption**
1. Sealing of external hinged doors. (Doors fitted with draught proof seals)	Not Sealed
2. Sealing of internal service room door. (Doors fitted with draught proof seals)	Not Sealed
3. Opening window sashes are fitted with draught proof seals	Not Sealed
4. Exhaust fans self-closing and sealed when not in use.	Not Sealed

5. Exiting fire places assumed not sealed.	Not Sealed
6. Construction gaps between windows and door frames and the building fabric are sealed	Not Sealed

General assumptions
1. Overshadowing from existing adjoining dwellings has been incorporated into rating.
2. Window coverings - Holland blinds to all windows. (Regulation Mode)
3. Floor coverings as noted on floor plan.

Part 2: Proposed Extension - Construction Details & Rating Assumptions

The proposed extension construction and building elements details incorporate all of the above existing dwelling details in addition to the extension assumptions as listed below. These rating assumption have been taken directly from the scaled floor plans, elevations and sections provide by the client. Additional rating assumptions have been obtained from the client with regard to specific construction elements, building fixtures and fitting not detailed on the plans.

Construction Details

Drawing Details: **Drawn by:** Interext Design Group **Project No:** 2018950

Description	Drawing No:	Revision	Date
Site Plan & Demolition Plan	A1	A	5/06/2019
Ground & First Floor Plan	A2	A	5/06/2019
Elevations & Sections	A3	A	5/06/2019
Sections, Electrical & Roof Plan	A4	A	5/06/2019
Construction Details	A5	A	5/06/2019

Floor Type & insulation

Floor Type Details	Added Insulation
1. Existing ground floor - Framed timber floor. (Re-furbished ensuite, powder room & link/hall floor area)	**R 2.5** added insulation
2. Existing ground floor - Framed timber floor. (All other remaining existing floor area)	No added insulation
3. Extension ground floor – Concrete slab on ground.	**R 1.0** added insulation (In slab heating insulation)
4. Extension first floor - Framed timber floor	**R 4.0** added insulation to floor area exposed to outside environment.

Wall Type & Insulation

Wall Type Details	Added Insulation
1. Weatherboard external clad wall with plasterboard internal lining. (Existing bedrooms 1, WIR, library & entry walls)	No added insulation
2. Weatherboard external clad wall with plasterboard internal lining. (Refurbished ensuite, powder room & link/hall walls)	**R 2.5** bulk insulation
3. Brick veneer extension walls	**R 2.5** bulk insulation with permeable wrap
4. Lightweight clad extension walls	**R 2.5** bulk insulation with permeable wrap
5. Internal stud wall with plasterboard lining to both sides. (Internal laundry, bathroom & powder room walls)	**R 2.5** bulk insulation
6. Internal stud wall with plasterboard internal lining. (Internal walls adjacent to roof space)	**R 2.5** bulk insulation

Roof Type & Insulation	
Roof Type Details	**Added Insulation**
1. Pitched roof clad with metal decking. (Existing roof area)	**R 4.0** bulk insulation between ceiling joists
2. Pitched and flat-framed roof sections clad with metal decking. (Extension roof area)	**R 4.0** bulk insulation between ceiling joists with **R 1.3 Anticon®** blanket over battens.
3. Flat-framed roof section to underside of terrace. (Extension roof area)	**R 4.0** bulk insulation between ceiling joists with **Reflective foil** over battens.

Window & Glazed Door Details

Remaining existing windows:

1. Timber framed window & doors with **clear single glazing** to all windows.

Window Specification

Type - awning & casement ..... **Total Uw value 5.40, SHGC 0.56 NFRC:** (Firstrate5 default window)

Type - double hung & fixed ..... **Total Uw value 5.40, SHGC 0.63 NFRC:** (Firstrate5 default window)

Extension windows & glazed doors:

1. Timber framed window with **double glazing** to library east facing window.

Window Specification

Type - Sliding & fixed ..... **Total Uw value 3.00, SHGC 0.56 NFRC:** (Firstrate5 default window)

2. Aluminium framed window with **glass bricks** to bedroom 1 ensuite & link west window.

Window Specification

Type - Fixed ..... **Total Uw value 5.10, SHGC 0.36 NFRC:** (Firstrate5 default window)

3. Aluminium framed window & doors with **double glazing** to all other windows & glazed doors.

Window Specification

Type: Double hung & sliding ..... **Total Uw value 3.3, SHGC 0.46 NFRC: WERS Code AVW-004-16**

Type: Awning ..... **Total Uw value 2.7, SHGC 0.38 NFRC: WERS Code AWS-035-064**

Type: Fixed ..... **Total Uw value 2.0, SHGC 0.51 NFRC: WERS Code AWS-050-05**

Type: Hinged door ..... **Total Uw value 4.2, SHGC 0.52 NFRC: WERS Code AWS-021-01**

Type: Sliding door ..... **Total Uw value 3.1, SHGC 0.46 NFRC: WERS Code AWS-025-056**

Note 1: Window and glazed door types selected within the Firstrate5 software provide the nearest practical equivalent Uw-Value & SHGC values to AWS Windows nominated for use in this development.

Note 2: Total System 'Uw-Values'

The glazed windows / doors supplied must have 'Uw-Values' equal to or less than the values stated in this report.

Total System 'SHGC Values'

The glazed windows / doors supplied must have 'SHGC Values' within ± 5% of the values stated in this report.

Draught Proofing and weather stripping details	Sealing Assumption	
1. Sealing of external hinged doors. (Doors fitted with draught proof seals)	Sealed	
2. Sealing of internal service room door. (Doors fitted with draught proof seals)		Not Sealed
3. Opening window sashes are fitted with draught proof seals (Extension windows only)	Sealed	
4. Exhaust fans self-closing and sealed when not in use.	Sealed	
5. Existing open fireplaces are sealed and not in use.	Sealed	
6. Construction gaps between windows and door frames and the building fabric are sealed. (Extension construction gaps and cracks only)	Sealed	

General assumptions
1. Overshadowing from existing adjoining dwellings has been incorporated into rating.
2. Window coverings - Holland blinds to all windows. (Regulation Mode)
3. Skylights assumed non-vented, double glazed clear
4. Floor coverings as noted on floor plan.

Star Rating Bands

The Firstrate5 software determines a star rating and energy consumption based on the dwelling construction, orientation and the prevailing weather condition in which the dwelling is located. Firstrate5 calculates the energy required to be added to or extracted from each zone (room) to maintain pre-determined comfort settings appropriate to the occupancy period of each zone. The energy consumption levels stated are for rating purposes only; they do not reflect actual consumption and should not be used for calculating heating and cooling system requirements. The score is shown as a star rating from 1 to 10 with the corrected floor area energy requirements shown in MJ/m^2 per annum. **This development is located in climate Zone 21**

Star Band Score for Climate Zone 21 – Melbourne										
Star Rating	**1 Star**	**2 Star**	**3 Star**	**4 Star**	**5 Star**	**6 Star**	**7 Star**	**8 Star**	**9 Star**	**10 Star**
MJ/m^2	**559**	**384**	**271**	**198**	**149**	**114**	**83**	**54**	**25**	**2**

Rating Results

The rating results show the level of thermal performance achieved by the existing dwelling and proposed dwelling with extension based on the construction details and rating assumptions listed above.

Dwelling Location	Star Rating	Energy Demand (MJ/m^2 per annum)		
		Total	Heating	Cooling
Existing dwelling as constructed	**0.0**	**753.5**	**663.7**	**89.8**
Proposed dwelling with extension	**4.3**	**182.6**	**148.5**	**34.1**

Floor area and volume calculation

For dwellings where the extension volume is greater than 50% of the original volume there is a requirement under Regulation 233 for the complete extended dwelling to meet the current 6 star standard. Regulation 233 also provides that the Relevant Building Surveyor (RBS) has discretionary power to consent to partial compliance in certain circumstances.

Existing dwelling volume			
Room Details	**Area (m^2)**	**Volume (m^3)**	
Complete existing dwelling	154.2	470.1	
Remaining existing dwelling after demolition	90.6	302.8	
New Work Volume & Refurbished existing volume			
	Area (m^2)	**Volume (m^3)**	**Volume as a Percentage of Existing Dwelling**
Ground & first floor extension	229.6	645.7	137.0%
Refurbished ensuite, powder room & link/hall floor area	19.8	66.2	

Required Star Rating Calculation

Calculation Formula: $$\frac{[(Ve - Vni) \times SRe] + [(Vn + Vni) \times SRn]}{(Ve + Vn)} = SRr$$

Where:
Ve = Remaining existing dwelling volume ..... 302.8m^3
Vni = Refurbished existing volume ..... 66.2m^3
Vn = New work volume ..... 645.7m^3
SRe = Existing house star rating ..... 0.0 stars
SRn = New work or extension star rating ..... 6.0 stars
SRr = Required minimum star rating ..... ? (Complete extended dwelling)

Note 1: The calculation formula is only provided to demonstrate the extension section of the dwelling meets the required standard.
Note 2: For the purposes of this formula the existing volume and new work volume has been calculated from the internal face of external walls and room floor to ceiling height. Roof, eave and veranda volume is not included.

Star Rating Calculation: $$\frac{[(302.8 - 66.2) \times 0.01] + [(645.7 + 66.2) \times 6.0]}{(302.8 + 645.7)} = \mathbf{4.50}$$ (Required star rating)

The proposed extension volume is greater than 50% of the original volume and has not met the requirements of Practice Note 2011-55, therefore Building Surveyor's discretion is sought.

The request for discretion and partial compliance is based on the following:

Existing dwelling section - Building Fabric Constraints:
1. Poor performing uninsulated external walls limit the potential of the dwelling to improve thermal performance.
2. All existing windows are single glazed without draft proof seals, the cost to remove and replace the windows would be cost prohibitive and unreasonable.
3. Sub floor clearance is limited limiting the possibility of installing floor insulation.
4. Overshadowing from neighbouring dwellings impact and affects solar access.

Existing dwelling section - Upgrades:
1. Roof insulation is to existing roof section upgraded to equal extension roof area.
2. Under floor insulation installed to re-furbished ensuite, powder room & hall floor area.
3. Existing fire places are to be sealed and not in use.
4. Existing exhaust fans are to be sealed.
5. Existing external door to be weather stripped and sealed.

Extended / renovated dwelling section:
1. High levels of wall, floor and roof insulation incorporated in extension.
2. Double glazing incorporated in all new windows and glazed door.
3. All draft proofing / weather stripping options have been applied.

Conclusion

This report demonstrates that:
1. All reasonable steps have been taken to maximise the renovated dwellings thermal performance.
2. The proposed extended dwelling, with a score of **4.3 stars**, has not met the required minimum rating of **4.50 stars**
3. This increase score has provided a reduction in consumption of 568.9 MJ/m^2 per annum.

Limitations

Changes to any of the specifications listed above may affect energy performance and invalidate the energy ratings detailed in this report.
Delete

Disclaimer

Information in this document is current at the time of writing. While all professional care has been undertaken in preparing the document, Energy Aspects Pty Ltd accepts no liability for loss or damages incurred as a result of reliance placed upon its content.

Notes

1. Reflective foil - only provides an insulating effect when the reflective side of the foil faces an air space, because it works by reducing radiant heat flow across this airspace. It is the existence of this airspace that provides an insulating effect. Any air-gap must be a minimum of 25mm to be effective. Air must not be allowed to leak from one side of the foil to the other - so gaps around penetrations must be taped and sealed.

2. Bulk insulation - cannot be compressed or it will not achieve it's R value. Ensure all gaps in bulk insulated walls are filled by insulation. Comply with the Energy Safe Victoria electrical safety alert in relation to the installation of bulk insulation around downlights etc.

3. Building Sealing - Gaps and cracks in buildings contribute significantly to heat gain and loss. Seals are to be provided to all: external doors & windows, exhaust fans, chimneys & flues, and roof lights. Foam backing rods, caulking, skirting, architraves and cornices all serve the purpose of sealing gaps.

4. Insulation and lights - No vented downlights have been allowed for. If downlights are to be installed, they must all be LED or CFL type (low heat generating) with compliant covers to ensure gaps in insulation are minimised and do not exceed 0.5% of the insulated ceiling area. Note downlight covers must be installed to manufacturer's recommendations and appropriate electrical codes.

For class 1 residences only either a water tank connected to all of the toilets or a solar hot water service is required. Whichever is decided this must be annotated on the plans. These are not required by the NCC for class 2 dwellings.

5. Heating / Cooling / Ventilation where relevant is to comply with the following BCA parts – and the contractor is to provide evidence of compliance:
3.12.5.1 – Insulation of services generally – central heating water pipework or heating and cooling ductwork
3.12.5.2 – Central heating water piping – must achieve minimum R values
3.12.5.3 – Heating and cooling ductwork – must achieve minimum R values and be installed to code
3.12.5.4 – Electric resistance space heating – sets maximum power loads and controller requirements

6. Lighting must comply with the following BCA part
3.12.5.5 – Artificial lighting – to comply lighting density for class 1, 2 & 4 residences is to be a maximum of 5W/m2 lamp power density throughout the inside of the residence, 4W/m2 for a veranda or balcony and 3W/m2 for a class 10 building (garages). Control devices can allow modification to this figure.

7. Water heaters must comply with the following BCA Part – and the contractor is to provide evidence of compliance:
3.12.5.6 Water heater in a hot water supply system

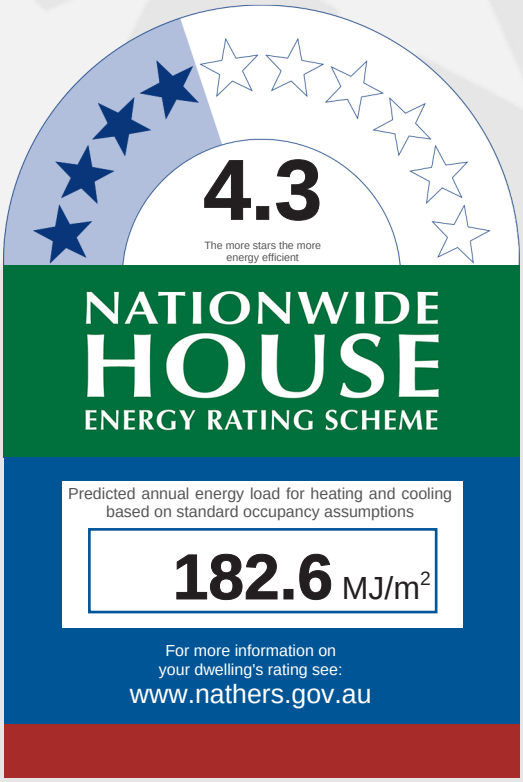
8. Swimming pool and spa heaters and pumps if included must comply with the following BCA Part – and the contractor is to provide evidence of compliance:
3.12.5.7 – Heating and pumping of a swimming pool or spa pool

Nationwide House Energy Rating Scheme* Certificate

Certificate Number: **BJV3TDPHG8** Date of Certificate: **22 Jun 2019** ★ Star rating: **4.3**

Assessor details

Accreditation number:	**VIC/BDAV/10/3018**
Name:	**Colin Dowell**
Organisation:	**Energy Aspects Pty Ltd**
Email:	**energyaspects@netspace.net.au**
Phone:	**0414246261**
Declaration of interest:	**Owner of or relation of owner of building**
Software:	**FirstRate5: 5.2.10b (3.13)**
AAO:	**BDAV**



Overview

Dwelling details

Address:	**141 Charles Street**		
Suburb:	**Northcote**		
State:	**VIC**	Postcode:	**3070**
Type:	**Alteration**	NCC Class:	**Class 1a**
Lot/DP number:	**-**	NatHERS climate zone:	**21**
Exposure:	**suburban**		

Key construction and insulation materials

(see following pages for details)

Construction:	Wall:	**Brick veneer & LW clad**
	Roof:	**Metal deck**
	Floor:	**SOG & framed timber floor**
Insulation:	Wall:	**R2.5 bulk + wrap**
	Roof:	**Exist - R4.0, Exten - R5.3**
	Floor:	**SOG - Nil, timber - R2.5**
Glazing:		**Timber & aluminium**
		Single & double glazed

Ceiling penetrations

(see following pages for details)

Sealed:	**5**
Unsealed:	**0**
TOTAL:**	**5**

Principal downlight type: **LED**

NOTE: This total is the maximum number of ceiling penetrations allowed to a ceiling (under a roof) for this certificate. **If this number is exceded in construction then this certificate IS NOT VALID and a new certificate is required. Loss of ceiling insulation for the penetrations listed has been taken into account with the rating.

Net floor area (m^2)

Conditioned:	**286.2**
Unconditioned:	**19.7**
Garage:	**-**
TOTAL:	**305.9**

Annual thermal performance loads (MJ/m^2)

Heating:	**148.5**
Cooling:	**34.1**
TOTAL:	**182.6**

Window selection - default windows only

Note on allowable window values: Only a 5% tolerance to the nominated SHGC window values shown on page 2 can be used with this rating.

Note: Only a +/-5% SHGC tolerance is allowed with this rating.

NB: This tolerance ONLY applies to SHGC, the U-value can always be lower but not higher than the values stated on page 2.

If any of the windows selected are outside the 5% tolerance then this certificate is no longer valid and the dwelling will need to be rerated to confirm compliance.

Plan documents

Plan ref/date:	**Job No. 2018950**
Prepared by:	**Interext Design Group**

Scan to access this certificate online and confirm this is valid.

https://www.fr5.com.au/QRCodeLanding?PublicId=BJV3TDPHG8

* Nationwide House Energy Rating Scheme (NatHERS) is an initiative of the Australian, state and territory governments. For more details see www.nathers.gov.au

Building Features

Windows type and performance value

Window ID	Window type	U-value	SHGC
TIM-002-01 W	Timber B SG Clear	5.4	0.63
ALM-006-02 A	Aluminium B DG Argon Fill Tint-Clear	5.1	0.36
TIM-004-01 W	Timber B DG Air Fill Clear-Clear	3	0.56
AWS-067-09 A	RES SERIES 516 FIXED WINDOW DG 1_LightBridge_ClrS0_4-12-4	2.14	0.53
CAP-057-15 A	Capral 900 Sliding Door DG 638CPClr/12Ar/6	3.18	0.47
AWS-021-01 A	548 HD Al French Door DG 4/10/4	4.23	0.52
ANE-007-06 A	HS 2P22 SS A-Al Sashless Horizontal Slider DG 4Sn-14Ar-4	3.4	0.41
AWS-035-42 B	726 Thermal Heart Awning Window DG 638CPClr/12Ar/6	2.89	0.39

Windows schedule

Window ID	Window no.	Height (mm)	Width (mm)	Orientation	Zone name	Outdoor shade
TIM-002-01 W	Opening EW05	1920	600	WSW	Bedroom 1	No
TIM-002-01 W	Opening EW04	1920	1485	S	Bedroom 1	No
TIM-002-01 W	Opening EW03	1920	600	ESE	Bedroom 1	No
ALM-006-02 A	Opening W01 Glass Block	2690	1290	N	Bedroom 1 Ensuite	No
TIM-004-01 W	Opening W10	1150	1750	E	Library	No
AWS-067-09 A	Opening W09	2960	600	N	Library	No
AWS-067-09 A	Opening W08	2960	600	N	Library	No
TIM-002-01 W	Opening EW01	550	1070	S	Library	No
TIM-002-01 W	Opening EW02	1600	250	SE	Entry	No
TIM-002-01 W	Opening EW02	1600	250	SE	Entry	No
CAP-057-15 A	Opening W07	2960	3000	E	Hall/Link	No
ALM-006-02 A	Opening W02 Glass Block	2890	490	W	Hall/Link	No
AWS-021-01 A	Opening W03	2400	920	W	Laundry	No
CAP-057-15 A	Opening W06	2960	800	S	Kitchen/Living	No
CAP-057-15 A	Opening W06	2960	2130	S	Kitchen/Living	No
CAP-057-15 A	Opening W05	2960	7150	N	Kitchen/Living	No
ANE-007-06 A	Opening W04	1000	490	N	Kitchen/Living	No
ANE-007-06 A	Opening W16	1200	1800	N	Bedroom 2	No
ANE-007-06 A	Opening W17	1200	1800	N	Bedroom 3	No
ANE-007-06 A	Opening W	700	2400	E	Bedroom 4	No
ANE-007-06 A	Opening W15	450	3300	W	FF Bathroom	No
ANE-007-06 A	Opening W14	450	600	W	FF Powder Room	No

Building Features

AWS-035-42 B	Opening W22	700	1930	S	Stair/Passage/Void	No
AWS-067-09 A	Opening W18	700	1700	E	Stair/Passage/Void	No
AWS-067-09 A	Opening W21	700	1700	E	Stair/Passage/Void	No
AWS-035-42 B	Opening W20	700	1700	E	Stair/Passage/Void	No
AWS-067-09 A	Opening W13	1000	600	W	Stair/Passage/Void	No
AWS-067-09 A	Opening W12	2400	2245	S	Stair/Passage/Void	No
CAP-057-15 A	Opening W11	2400	1970	W	Stair/Passage/Void	No
ANE-007-06 A	Opening W23	700	3000	E	Kids Room	No

Roof windows and skylight type and performance value

ID	Window type	U-value	SHGC
DEFAULTS:DG-Generic-02 A	Clear Al DG DEFAULT ROOF WINDOW System 02	4.22	0.72
GEN-04-004a	DC: Double Clear	-	-

Roof window and skylight schedule

ID	Roof window/ skylight no.	Area (m^2)	Orientation	Zone name	Outdoor shade	Indoor shade/ diffuser
GEN-04-004a	Element 1	0.5	W	Bedroom 1 WIR	None	Yes
DEFAULTS:DG-Generic-02 A	Element 2	1.5	N	Kitchen/Living	None	None

External wall type

Type	Insulation	Wall wrap
1 : FR5 - Weatherboard		No
2 : FR5 - Weatherboard	Glass fibre batt: R2.5 (R2.5)	No
3 : FR5 - 75mm Expanded Polystyrene Clad	Glass fibre batt: R2.5 (R2.5)	No
4 : FR5 - Brick Cavity	Polystyrene expanded (k = 0.039) (R0.2)	No
5 : FR5 - Brick Veneer	Glass fibre batt: R2.5 (R2.5)	No
6 : Metal Clad Wall	Glass fibre batt: R2.5 (R2.5)	No

External wall schedule

Wall type	Area (m^2)	Orientation	Zone name	Fixed shade	Eaves
1 : FR5 - Weatherboard	6	E	Bedroom 1	Yes	Yes
1 : FR5 - Weatherboard	15.1	W	Bedroom 1	No	Yes
1 : FR5 - Weatherboard	2.6	S	Bedroom 1	Yes	Yes

Building Features

1 : FR5 - Weatherboard	2.3	WSW	Bedroom 1	Yes	Yes
1 : FR5 - Weatherboard	5.2	S	Bedroom 1	No	Yes
1 : FR5 - Weatherboard	2.3	ESE	Bedroom 1	Yes	Yes
1 : FR5 - Weatherboard	2.7	S	Bedroom 1	Yes	Yes
1 : FR5 - Weatherboard	4.5	W	Bedroom 1 WIR	No	Yes
2 : FR5 - Weatherboard	5.1	W	Bedroom 1 WIR	No	Yes
1 : FR5 - Weatherboard	4.6	W	Bedroom 1 WIR	No	Yes
2 : FR5 - Weatherboard	7.7	N	Bedroom 1 Ensuite	Yes	No
2 : FR5 - Weatherboard	12	W	Bedroom 1 Ensuite	No	Yes
2 : FR5 - Weatherboard	4	N	GF Powder Room	Yes	No
2 : FR5 - Weatherboard	13.8	E	Library	No	Yes
3 : FR5 - 75mm Expanded Polystyrene Clad	4.5	N	Library	Yes	Yes
4 : FR5 - Brick Cavity	4.5	N	Library	Yes	Yes
3 : FR5 - 75mm Expanded Polystyrene Clad	4.5	N	Library	Yes	Yes
1 : FR5 - Weatherboard	6.7	S	Library	Yes	Yes
1 : FR5 - Weatherboard	4.2	S	Library	Yes	Yes
1 : FR5 - Weatherboard	3	S	Entry	Yes	Yes
1 : FR5 - Weatherboard	7	SE	Entry	Yes	Yes
1 : FR5 - Weatherboard	3.1	E	Entry	Yes	Yes
5 : FR5 - Brick Veneer	13.9	E	Hall/Link	Yes	Yes
5 : FR5 - Brick Veneer	3	W	Hall/Link	Yes	Yes
5 : FR5 - Brick Veneer	10.6	S	Laundry	Yes	No
5 : FR5 - Brick Veneer	5.3	W	Laundry	No	No
5 : FR5 - Brick Veneer	4.8	W	Pantry	No	No
5 : FR5 - Brick Veneer	3.2	S	Kitchen/Living	Yes	Yes
5 : FR5 - Brick Veneer	8.8	S	Kitchen/Living	Yes	No
5 : FR5 - Brick Veneer	34	E	Kitchen/Living	No	No
5 : FR5 - Brick Veneer	27.4	N	Kitchen/Living	No	Yes
5 : FR5 - Brick Veneer	15.6	W	Kitchen/Living	No	No
5 : FR5 - Brick Veneer	7.4	W	Kitchen/Living	No	No
6 : Metal Clad Wall	10.9	N	Bedroom 2	No	No
6 : Metal Clad Wall	11.9	W	Bedroom 2	No	No
6 : Metal Clad Wall	11.9	E	Bedroom 3	No	No
6 : Metal Clad Wall	10.9	N	Bedroom 3	No	No
6 : Metal Clad Wall	10.5	E	Bedroom 4	No	No

Building Features

6 : Metal Clad Wall	11.1	W	FF Bathroom	No	No
6 : Metal Clad Wall	2.5	W	FF Powder Room	No	No
6 : Metal Clad Wall	7.3	S	Stair/Passage/Void	Yes	No
6 : Metal Clad Wall	15.4	E	Stair/Passage/Void	No	No
6 : Metal Clad Wall	3	W	Stair/Passage/Void	No	No
6 : Metal Clad Wall	6.5	S	Stair/Passage/Void	Yes	No
6 : Metal Clad Wall	8.9	W	Stair/Passage/Void	Yes	No
6 : Metal Clad Wall	11.5	E	Kids Room	Yes	No
6 : Metal Clad Wall	5.2	W	Kids Room	Yes	No

Internal wall type

Type	Area (m^2)	Insulation
1 : FR5 - Internal Plasterboard Stud Wall	186.8	
2 : FR5 - Internal Plasterboard Stud Wall	55.3	Glass fibre batt: R2.5 (R2.5)
3 : FR5 - Brick Veneer	4.5	Glass fibre batt: R2.5 (R2.5)

Floors

Location	Construction	Area (m^2)	Sub floor ventilation	Added insulation	Covering
Bedroom 1	FR5 - Timber	18.2	Enclosed Disconnected	R0.0	Carpet
Bedroom 1 WIR	FR5 - Timber	16.1	Enclosed Disconnected	R0.0	Carpet
Bedroom 1 Ensuite	FR5 - Timber	9.7	Enclosed Disconnected	R2.5	Tiles
Bedroom 1 Ensuite	FR5 - Timber	0.6	Enclosed Disconnected	R0.0	Tiles
GF Powder Room	FR5 - Timber	1.7	Enclosed Disconnected	R2.5	Tiles
GF Powder Room	FR5 - Timber	1.2	Enclosed Disconnected	R2.5	Tiles
Library	FR5 - Timber	18.5	Enclosed Disconnected	R0.0	Carpet
Entry	FR5 - Timber	11.6	Enclosed Disconnected	R0.0	Timber
Hall/Link	FR5 - Timber	7	Enclosed Disconnected	R2.5	Timber
Laundry	FR5 - CSOG: Slab on Ground	1.3	Enclosed	R1.0	Tiles
Laundry	FR5 - CSOG: Slab on Ground	5.1	Enclosed	R1.0	Tiles

Building Features

Pantry	FR5 - CSOG: Slab on Ground	4.9	Enclosed	R1.0	Tiles
Pantry	FR5 - CSOG: Slab on Ground	0.8	Enclosed	R1.0	Tiles
Kitchen/Living	FR5 - CSOG: Slab on Ground	6.7	Enclosed	R1.0	Tiles
Kitchen/Living	FR5 - CSOG: Slab on Ground	3.9	Enclosed	R1.0	Tiles
Kitchen/Living	FR5 - CSOG: Slab on Ground	78.2	Enclosed	R1.0	Tiles
Kitchen/Living	FR5 - CSOG: Slab on Ground	2.7	Enclosed	R1.0	Tiles
Kitchen/Living	FR5 - CSOG: Slab on Ground	0.6	Enclosed	R1.0	Tiles
Bedroom 2	FR5 - Timber	10.7	Elevated	R4.0	Carpet
Bedroom 2	FR5 - Timber	5.7	Enclosed	R0.0	Carpet
Bedroom 3	FR5 - Timber	10.7	Elevated	R4.0	Carpet
Bedroom 3	FR5 - Timber	5.8	Enclosed	R0.0	Carpet
Bedroom 4	FR5 - Timber	13.3	Enclosed	R0.0	Carpet
FF Bathroom	FR5 - Timber	11.3	Enclosed	R0.0	Tiles
FF Powder Room	FR5 - Timber	2	Enclosed	R0.0	Tiles
Stair/Passage/Void	FR5 - Timber	0.4	Elevated	R4.0	Carpet
Stair/Passage/Void	FR5 - Timber	44.4	Enclosed	R0.0	Carpet
Kids Room	FR5 - Timber	3.7	Elevated	R4.0	Carpet
Kids Room	FR5 - Timber	0.9	Elevated	R4.0	Carpet
Kids Room	FR5 - Timber	10.1	Enclosed	R0.0	Carpet

Ceiling type

Location	Material	Added insulation	Roof space above
Bedroom 1	Plasterboard	R4.0	Yes
Bedroom 1 WIR	Plasterboard	R4.0	Yes
Bedroom 1 Ensuite	FR5 - Timber	R0.0	No
Bedroom 1 Ensuite	Plasterboard	R4.0	Yes
Bedroom 1 Ensuite	FR5 - Timber	R0.0	No
GF Powder Room	FR5 - Timber	R0.0	No
GF Powder Room	FR5 - Timber	R0.0	No
GF Powder Room	Plasterboard	R4.0	Yes
Library	Plasterboard	R4.0	Yes
Entry	Plasterboard	R4.0	Yes
Hall/Link	FR5 - Timber	R4.0	No
Hall/Link	FR5 - Timber	R4.0	No
Hall/Link	FR5 - Timber	R0.0	No

Building Features

Laundry	FR5 - Timber	R0.0	No
Laundry	Plasterboard	R4.0	No
Pantry	FR5 - Timber	R0.0	No
Pantry	FR5 - Timber	R0.0	No
Pantry	FR5 - Timber	R0.0	No
Pantry	FR5 - Timber	R0.0	No
Pantry	FR5 - Timber	R0.0	No
Pantry	Plasterboard	R0.0	No
Kitchen/Living	FR5 - Timber	R4.0	No
Kitchen/Living	FR5 - Timber	R0.0	No
Kitchen/Living	FR5 - Timber	R0.0	No
Kitchen/Living	Plasterboard	R5.3	No
Kitchen/Living	Plasterboard	R4.0	No
Kitchen/Living	FR5 - Timber	R4.0	No
Kitchen/Living	FR5 - Timber	R0.0	No
Kitchen/Living	FR5 - Timber	R4.0	No
Kitchen/Living	FR5 - Timber	R0.0	No
Kitchen/Living	FR5 - Timber	R0.0	No
Kitchen/Living	FR5 - Timber	R0.0	No
Kitchen/Living	FR5 - Timber	R4.0	No
Kitchen/Living	FR5 - Timber	R0.0	No
Kitchen/Living	FR5 - Timber	R4.0	No
Kitchen/Living	FR5 - Timber	R0.0	No
Kitchen/Living	FR5 - Timber	R0.0	No
Kitchen/Living	Plasterboard	R5.3	No
Kitchen/Living	FR5 - Timber	R0.0	No
Bedroom 2	Plasterboard	R5.3	No
Bedroom 2	Plasterboard	R5.3	No
Bedroom 3	Plasterboard	R5.3	No
Bedroom 3	Plasterboard	R5.3	No
Bedroom 4	Plasterboard	R5.3	No
FF Bathroom	Plasterboard	R5.3	No
FF Powder Room	Plasterboard	R5.3	No
Stair/Passage/Void	Plasterboard	R5.3	No
Kids Room	Plasterboard	R5.3	No

Building Features

Kids Room	Plasterboard	R5.3	No
Kids Room	Plasterboard	R5.3	No

Ceiling penetrations

Location	Number	Type	Width (mm)	Length (mm)	Seal/ unsealed
Bedroom 1 Ensuite	1	Exhaust Fans	250	250	Sealed
GF Powder Room	1	Exhaust Fans	250	250	Sealed
Kitchen/Living	1	Exhaust Fans	250	250	Sealed
FF Bathroom	1	Exhaust Fans	250	250	Sealed
FF Powder Room	1	Exhaust Fans	250	250	Sealed

Ceiling fans

Location	Number	Diameter (mm)
Bedroom 1	1	900
Library	1	900
Stair/Passage/Void	1	900

Roof type

Material	Added insulation	Roof colour
Cont:Attic-Continuous	0.0	dark
Framed:Flat - Flat Framed (Metal Deck)	0.0	dark
Ceil: Ceiling	0.0	medium

Additional information

Explanatory notes

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A NatHERS House Energy Rating is a comprehensive, dynamic computer modelling evaluation of the floorplans, elevations and specifications to predict an energy load of a home. Not all of us use our homes in the same way, so ratings are generated using standard assumptions. This means homes can be compared across the country.

The actual energy consumption of your home may vary significantly from the predicted energy load figures in this report depending on issues such as the size of your household and your personal preferences, e.g. in terms of heating or cooling.

While the figures are an indicative guide to energy use, they can be used as a reliable guide for comparative purposes between different house designs and for demonstrating that the design meets the required regulatory compliance.

Homes that are energy efficient use less energy, are warmer in winter, cooler in summer and cost less to run. The higher the star rating the more energy efficient.

This NatHERS House Energy Rating report was carefully prepared by your assessor on the basis of comprehensive modelling using standard procedures to rate your home using an underlying engine developed by the Australian Commonwealth Scientific and Industrial Research Organisation (CSIRO).

All information relating to energy loads presented in this report is based on a range of standard assumptions in order to allow for comparisons with reports prepared for other homes and to demonstrate minimum regulatory compliance. The standard assumptions include figures for occupancy, indoor air temperature and are based on a unique climate file for your region.

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Contact

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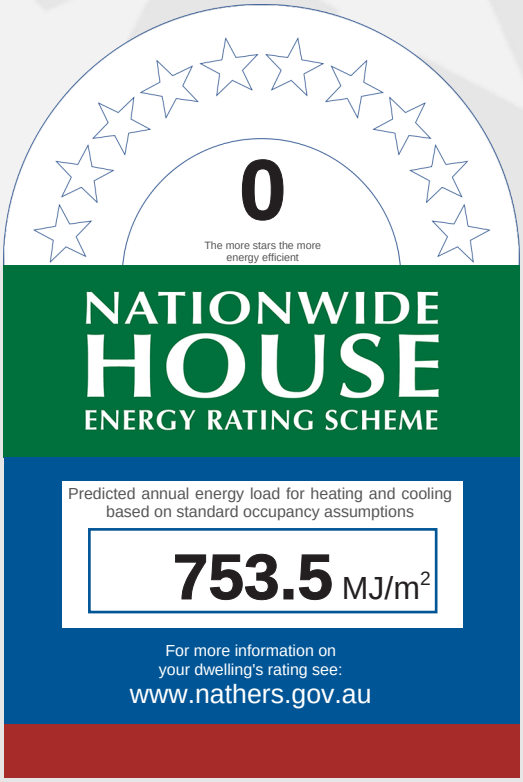
For more information on energy efficient design and insulation visit www.yourhome.gov.au

Nationwide House Energy Rating Scheme* Certificate

Certificate Number: **4Z5WBA6YVS** Date of Certificate: **22 Jun 2019** ★ Star rating: **0**

Assessor details

Accreditation number:	**VIC/BDAV/10/3018**
Name:	**Colin Dowell**
Organisation:	**Energy Aspects Pty Ltd**
Email:	**energyaspects@netspace.net.au**
Phone:	**0414246261**
Declaration of interest:	**Owner of or relation of owner of building**
Software:	**FirstRate5: 5.2.10b (3.13)**
AAO:	**BDAV**



Overview

Dwelling details

Address:	**141 Charles Street**		
Suburb:	**Northcote**		
State:	**VIC**	Postcode:	**3070**
Type:	**Existing Home**	NCC Class:	**Class 1a**
Lot/DP number:	**-**	NatHERS climate zone:	**21**
Exposure:	**suburban**		

Key construction and insulation materials

(see following pages for details)

Construction:	Wall:	**LW clad**
	Roof:	**Metal deck**
	Floor:	**Framed timber floor**
Insulation:	Wall:	**Nil**
	Roof:	**Nil**
	Floor:	**Nil**
Glazing:		**Timber framed**
		Single glazed

Ceiling penetrations

(see following pages for details)

Sealed:	**0**
Unsealed:	**6**
TOTAL:**	**6**

Principal downlight type: **LED**

NOTE: This total is the maximum number of ceiling penetrations allowed to a ceiling (under a roof) for this certificate. **If this number is exceded in construction then this certificate IS NOT VALID and a new certificate is required. Loss of ceiling insulation for the penetrations listed has been taken into account with the rating.

Net floor area (m^2)

Conditioned:	**138.8**
Unconditioned:	**6.5**
Garage:	**-**
TOTAL:	**145.3**

Annual thermal performance loads (MJ/m^2)

Heating:	**663.7**
Cooling:	**89.8**
TOTAL:	**753.5**

Window selection - default windows only

Note on allowable window values: Only a 5% tolerance to the nominated SHGC window values shown on page 2 can be used with this rating.

Note: Only a +/-5% SHGC tolerance is allowed with this rating.

NB: This tolerance ONLY applies to SHGC, the U-value can always be lower but not higher than the values stated on page 2.

If any of the windows selected are outside the 5% tolerance then this certificate is no longer valid and the dwelling will need to be rerated to confirm compliance.

Plan documents

Plan ref/date:	**Job No. 2018950**
Prepared by:	**Interext Design Group**

Scan to access this certificate online and confirm this is valid.

https://www.fr5.com.au/QRCodeLanding?PublicId=4Z5WBA6YVS

* Nationwide House Energy Rating Scheme (NatHERS) is an initiative of the Australian, state and territory governments. For more details see www.nathers.gov.au

Building Features

Windows type and performance value

Window ID	Window type	U-value	SHGC
TIM-002-01 W	Timber B SG Clear	5.4	0.63

Windows schedule

Window ID	Window no.	Height (mm)	Width (mm)	Orientation	Zone name	Outdoor shade
TIM-002-01 W	Opening EW05	1920	600	WSW	Bedroom 2	No
TIM-002-01 W	Opening EW04	1920	1485	S	Bedroom 2	No
TIM-002-01 W	Opening EW03	1920	600	ESE	Bedroom 2	No
TIM-002-01 W	Opening EW06	1160	1460	W	Bedroom 3	No
TIM-002-01 W	Opening EW07	1130	500	W	Dining Room	No
TIM-002-01 W	Opening EW07	1130	500	W	Dining Room	No
TIM-002-01 W	Opening EW07	1130	1440	W	Dining Room	No
TIM-002-01 W	Opening EW15	1150	1750	E	Bedroom 1	No
TIM-002-01 W	Opening EW01	550	1070	S	Bedroom 1	No
TIM-002-01 W	Opening EW02	1600	250	SE	Entry	No
TIM-002-01 W	Opening EW02	1600	250	SE	Entry	No
TIM-002-01 W	Opening EW14	1130	500	E	Lounge Room	No
TIM-002-01 W	Opening EW14	1130	500	E	Lounge Room	No
TIM-002-01 W	Opening EW14	1130	1440	E	Lounge Room	No
TIM-002-01 W	Opening EW08	400	1800	W	Bathroom	No
TIM-002-01 W	Opening EW10	1175	1885	E	Bedroom 4	No
TIM-002-01 W	Opening EW09	1175	955	N	Bedroom 4	No
TIM-002-01 W	Opening EW11	2020	1800	N	Kitchen/Meals	No
TIM-002-01 W	Opening EW12	2020	1815	N	Kitchen/Meals	No
TIM-002-01 W	Opening EW13	1000	1300	N	Kitchen/Meals	No

Roof windows and skylight type and performance value

ID	Window type	U-value	SHGC

Roof window and skylight schedule

ID	Roof window/ skylight no.	Area (m^2)	Orientation	Zone name	Outdoor shade	Indoor shade/ diffuser

External wall type

Building Features

Type	Insulation	Wall wrap
1 : FR5 - Weatherboard		No

External wall schedule

Wall type	Area (m^2)	Orientation	Zone name	Fixed shade	Eaves
1 : FR5 - Weatherboard	5.9	E	Bedroom 2	Yes	Yes
1 : FR5 - Weatherboard	15.2	W	Bedroom 2	No	Yes
1 : FR5 - Weatherboard	2.7	S	Bedroom 2	Yes	Yes
1 : FR5 - Weatherboard	2.4	WSW	Bedroom 2	Yes	Yes
1 : FR5 - Weatherboard	5.1	S	Bedroom 2	No	Yes
1 : FR5 - Weatherboard	2.4	ESE	Bedroom 2	Yes	Yes
1 : FR5 - Weatherboard	2.7	S	Bedroom 2	Yes	Yes
1 : FR5 - Weatherboard	14.2	W	Bedroom 3	No	Yes
1 : FR5 - Weatherboard	12	W	Dining Room	No	Yes
1 : FR5 - Weatherboard	15.3	E	Bedroom 1	No	Yes
1 : FR5 - Weatherboard	6.7	S	Bedroom 1	Yes	Yes
1 : FR5 - Weatherboard	4.2	S	Bedroom 1	Yes	Yes
1 : FR5 - Weatherboard	3	S	Entry	Yes	Yes
1 : FR5 - Weatherboard	7.1	SE	Entry	Yes	Yes
1 : FR5 - Weatherboard	3	E	Entry	Yes	Yes
1 : FR5 - Weatherboard	12.3	E	Lounge Room	No	Yes
1 : FR5 - Weatherboard	6.1	W	Bathroom	No	No
1 : FR5 - Weatherboard	6.9	E	Bedroom 4	Yes	No
1 : FR5 - Weatherboard	7.2	N	Bedroom 4	No	No
1 : FR5 - Weatherboard	10.2	W	Bedroom 4	No	No
1 : FR5 - Weatherboard	9.8	E	Kitchen/Meals	No	Yes
1 : FR5 - Weatherboard	15.8	N	Kitchen/Meals	Yes	Yes

Internal wall type

Type	Area (m^2)	Insulation
1 : FR5 - Internal Plasterboard Stud Wall	143.9	

Floors

Location	Construction	Area (m^2)	Sub floor ventilation	Added insulation	Covering
Bedroom 2	FR5 - Timber	18.3	Enclosed	R0.0	Timber

Building Features

			Disconnected		(Mountain ash)
Bedroom 3	FR5 - Timber	16.1	Enclosed Disconnected	R0.0	Timber (Mountain ash)
Dining Room	FR5 - Timber	13.6	Enclosed Disconnected	R0.0	Timber (Mountain ash)
Bedroom 1	FR5 - Timber	18.3	Enclosed Disconnected	R0.0	Timber (Mountain ash)
Entry	FR5 - Timber	11.7	Enclosed Disconnected	R0.0	Timber (Mountain ash)
Lounge Room	FR5 - Timber	20.6	Enclosed Disconnected	R0.0	Timber (Mountain ash)
Bathroom	FR5 - Timber	6.5	Enclosed Disconnected	R0.0	Tiles
Bedroom 4	FR5 - Timber	12.6	Enclosed Disconnected	R0.0	Timber (Mountain ash)
Kitchen/Meals	FR5 - Timber	27.6	Enclosed Disconnected	R0.0	Tiles

Ceiling type

Location	Material	Added insulation	Roof space above
Bedroom 2	Plasterboard	R0.0	Yes
Bedroom 3	Plasterboard	R0.0	Yes
Dining Room	Plasterboard	R0.0	Yes
Bedroom 1	Plasterboard	R0.0	Yes
Entry	Plasterboard	R0.0	Yes
Lounge Room	Plasterboard	R0.0	Yes
Bathroom	Plasterboard	R0.0	Yes
Bedroom 4	Plasterboard	R0.0	Yes
Kitchen/Meals	Plasterboard	R0.0	Yes

Ceiling penetrations

Location	Number	Type	Width (mm)	Length (mm)	Seal/ unsealed
Bedroom 2	1	Chimneys	150	700	Unsealed
Bedroom 3	1	Chimneys	150	700	Unsealed

Building Features

Bedroom 1	1	Chimneys	150	700	Unsealed
Lounge Room	1	Chimneys	150	700	Unsealed
Bathroom	1	Exhaust Fans	250	250	Unsealed
Kitchen/Meals	1	Exhaust Fans	250	250	Unsealed

Ceiling fans

Location	Number	Diameter (mm)
Bedroom 2	1	900
Bedroom 3	1	900
Dining Room	1	900
Bedroom 1	1	900
Lounge Room	1	900
Bedroom 4	1	900
Kitchen/Meals	1	900

Roof type

Material	Added insulation	Roof colour
Cont:Attic-Continuous	0.0	medium

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