



MASTER BUILDERS
GREEN LIVING

NCC 2022: 7 Star Glazing Solutions

(South-East Australia focused)

5th September 2024

Australian Glass Group

NCC 2022: 7 Star Glazing Solutions

1. NCC and its Demands on Windows
2. 7 Star Modelling Analysis
3. 7 Star compliant Glazing Solutions (SE Aus)
4. The Key Compliance factors around Windows

1. NCC and its Demand on Windows

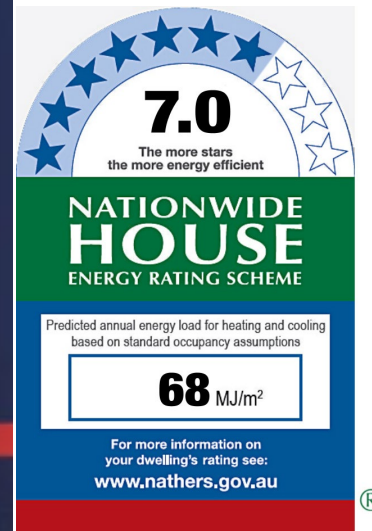
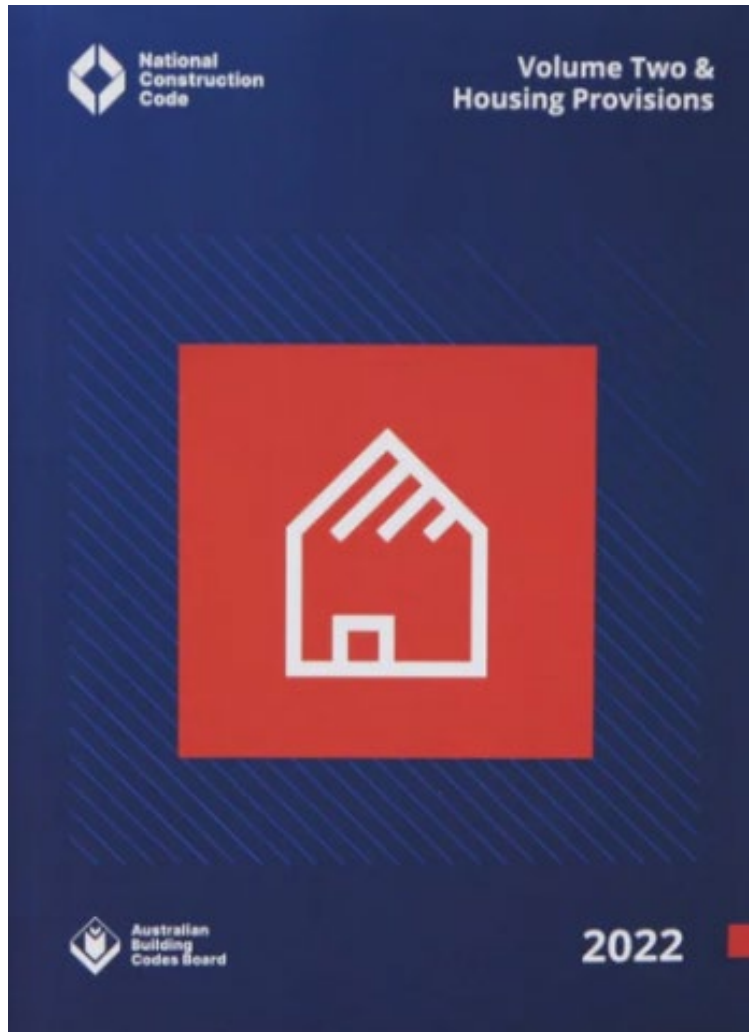


National
Construction
Code



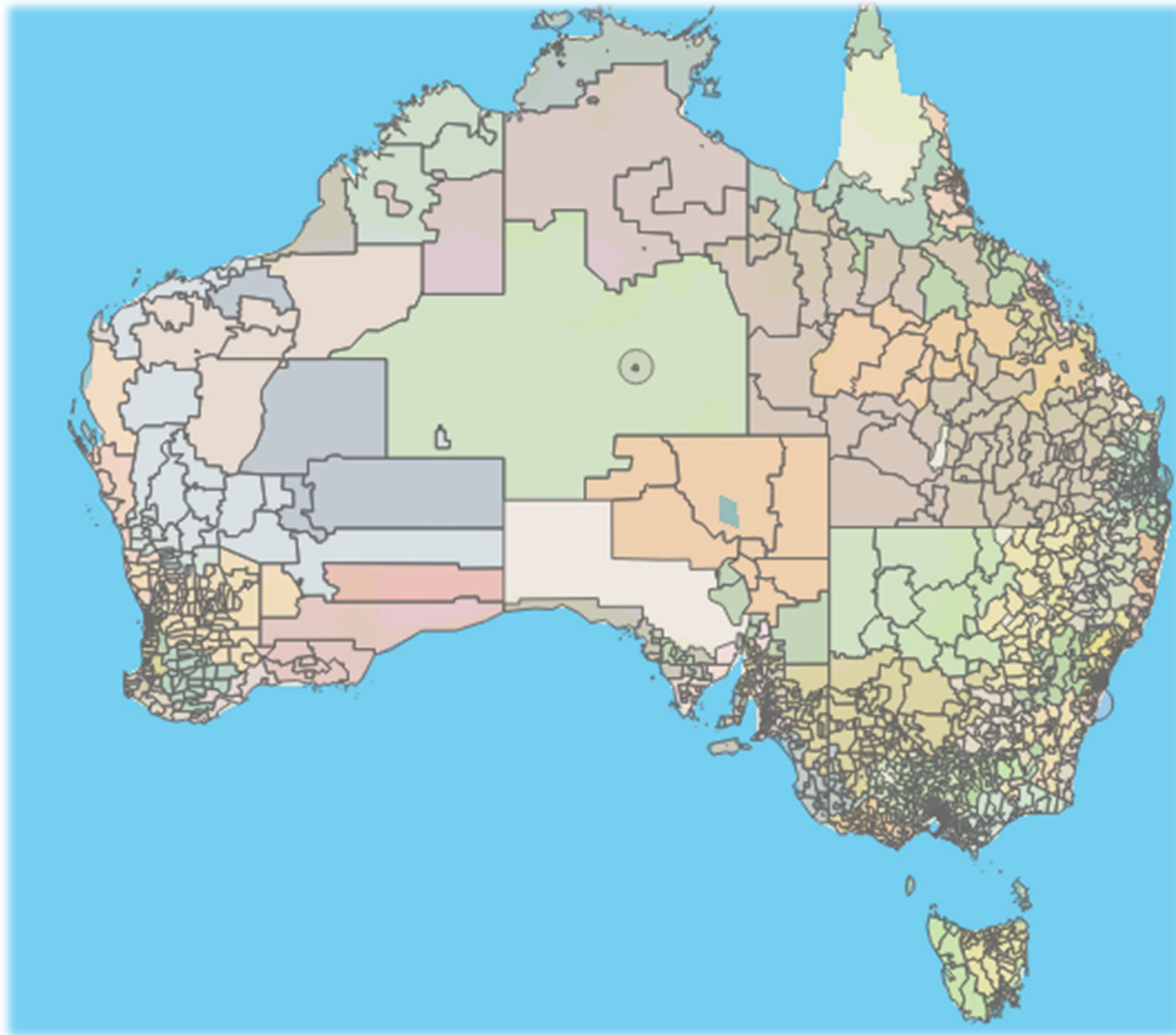
NCC

- Volume 1: BCA Class 2-9 (Commercial)
- Volume 2: BCA Class 1 & 10 (Residential)
- Volume 3: Plumbing Code (N/A)
- Performance based code
- Dictates the maximum MJ/m².annum



NCC 2022 – Volume 2 Residential Changes

- NatHERS Star banding - out of 10
- The more Stars, the more Energy Efficient
- Moving to 7 Star minimum (new builds)...
- Reducing a home's maximum MJ/m².annum
- Different MJ/m².annum... per Climate



NCC 2022 – Volume 2 Residential Changes

- NatHERS Star banding - out of 10
- The more Stars, the more Energy Efficient
- Moving to 7 Star minimum (new builds)
- Reducing a home's maximum MJ/m².annum
- 69 NatHERS Climates + updated Climate files

Example: Melbourne – NatHERS Climate Zone 21

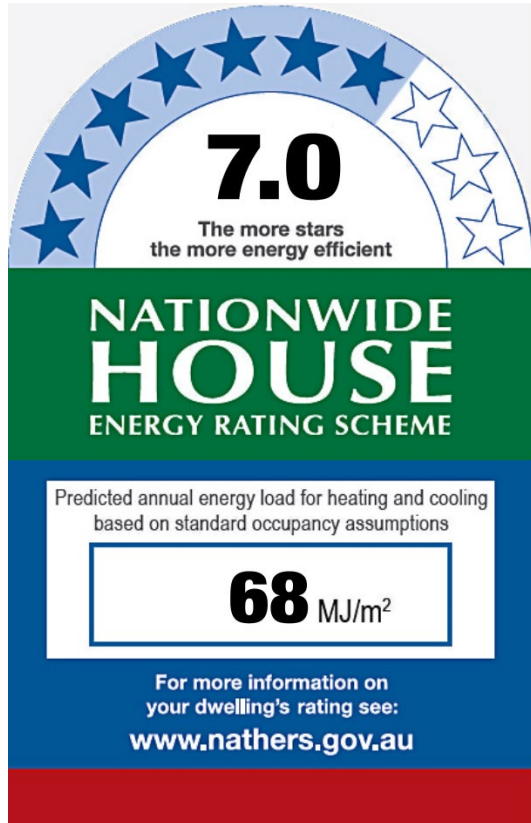
Climate zone	State code	5.0 stars	5.5 stars	6.0 stars	6.5 stars	7.0 stars	7.5 stars	8.0 stars	8.5 stars	9.0 stars	9.5 stars	10.0 stars
20	WAGGA	172	147	127	111	96	80	65	51	37	24	14
21	MELBOURNE	107	93	81	71	62	52	44	34	25	18	11
22	East Sale	172	150	131	115	100	84	69	54	40	27	15
23	LAUNCESTON	191	167	145	128	111	94	77	60	44	30	19
24	CANBERRA	223	190	161	141	122	103	84	66	47	31	18
25	Cabramurra ACT	475	419	366	331	298	265	231	199	168	142	119
26	HOBART	196	173	152	134	117	99	81	64	47	33	21
27	Mildura	136	118	103	91	79	67	55	43	32	22	14
28	WEST SYDNEY	113	93	79	70	60	51	41	33	23	15	9

Example: Melbourne – NatHERS Climate Zone 21

Climate zone	State code	5.0 stars	5.5 stars	6.0 stars	6.5 stars	7.0 stars	7.5 stars	8.0 stars	8.5 stars	9.0 stars	9.5 stars	10.0 stars
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22	East Sale	172	150	131	115	100	84	69	54	40	27	15
23	LAUNCESTON	191	167	145	128	111	94	77	60	44	30	19
24	CANBERRA	223	190	161	141	122	103	84	66	47	31	18
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(Thermal Comfort)

+ Water Efficiency
+ Energy Efficiency

= **BASIX**
Building Sustainability Index

Note: NSW - BASIX

- NSW use BASIX for Residential builds
- But can use NatHERS for Thermal Comfort
- And have adopted the same 7 Star minimum
- Result: more Energy Efficient built homes

Energy Efficiency...
- how can Glazing help?

**Up to 40% of a Home's heating energy
can be lost and up to 87% of its heat
gained through its glazing.**

**“Heat moves from where it’s HOT to
where it’s NOT”**

There are 2 types of Heat...



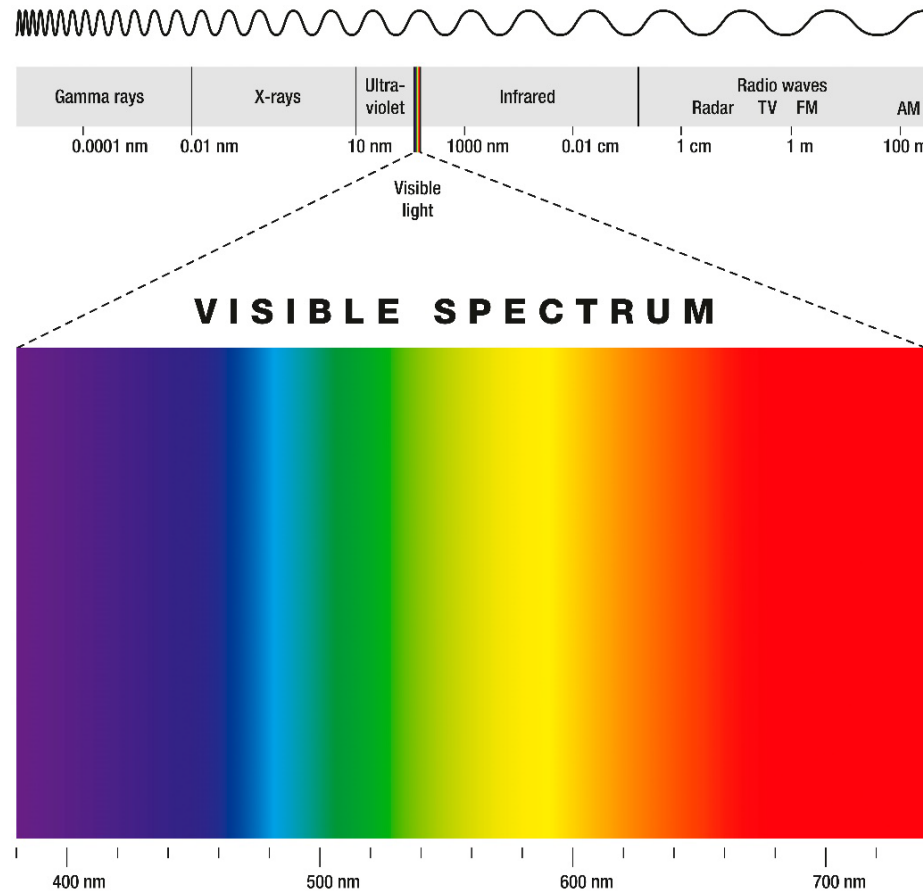
Type #1 Heat

- Sun / Solar Heat / Passive Heat
- Solar Control
- Solar Heat Gain Coefficient (SHGC)
- One-way direction →



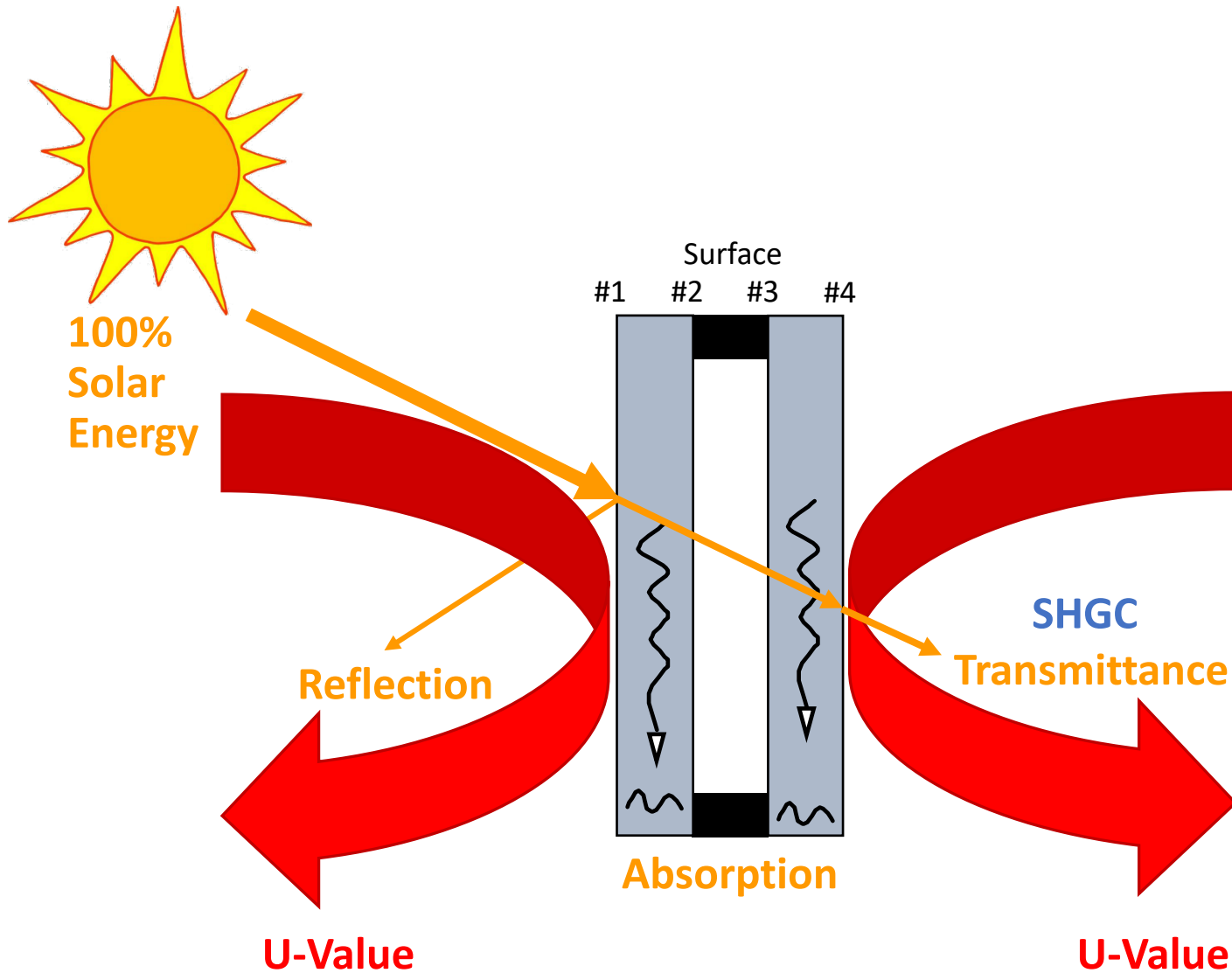
Type #2 Heat

- All other Heat
- Insulation
- U-Value
- Two-way direction ↔



Electromagnetic Radiation Wavelengths

- The Sun: UV, Visible Light, Infrared Radiation (Type #1 heat) short and slightly longer wavelengths
- Type #2 heat: long wavelengths



SHGC and U-Value

- SHGC / Solar Control / Type #1 Heat
- U-Value / Insulation / Type #2 Heat



SHGC and U-Value

- Lower the SHGC the better it is at stopping Type #1 Heat from entering inside
- Lower the SHGC, lower the VLT – be careful of very low VLT
- Lower the U-Value the better it is at stopping Type #2 Heat from conducting (out and in)

NatHERS/BASIX SHGC and U-Value

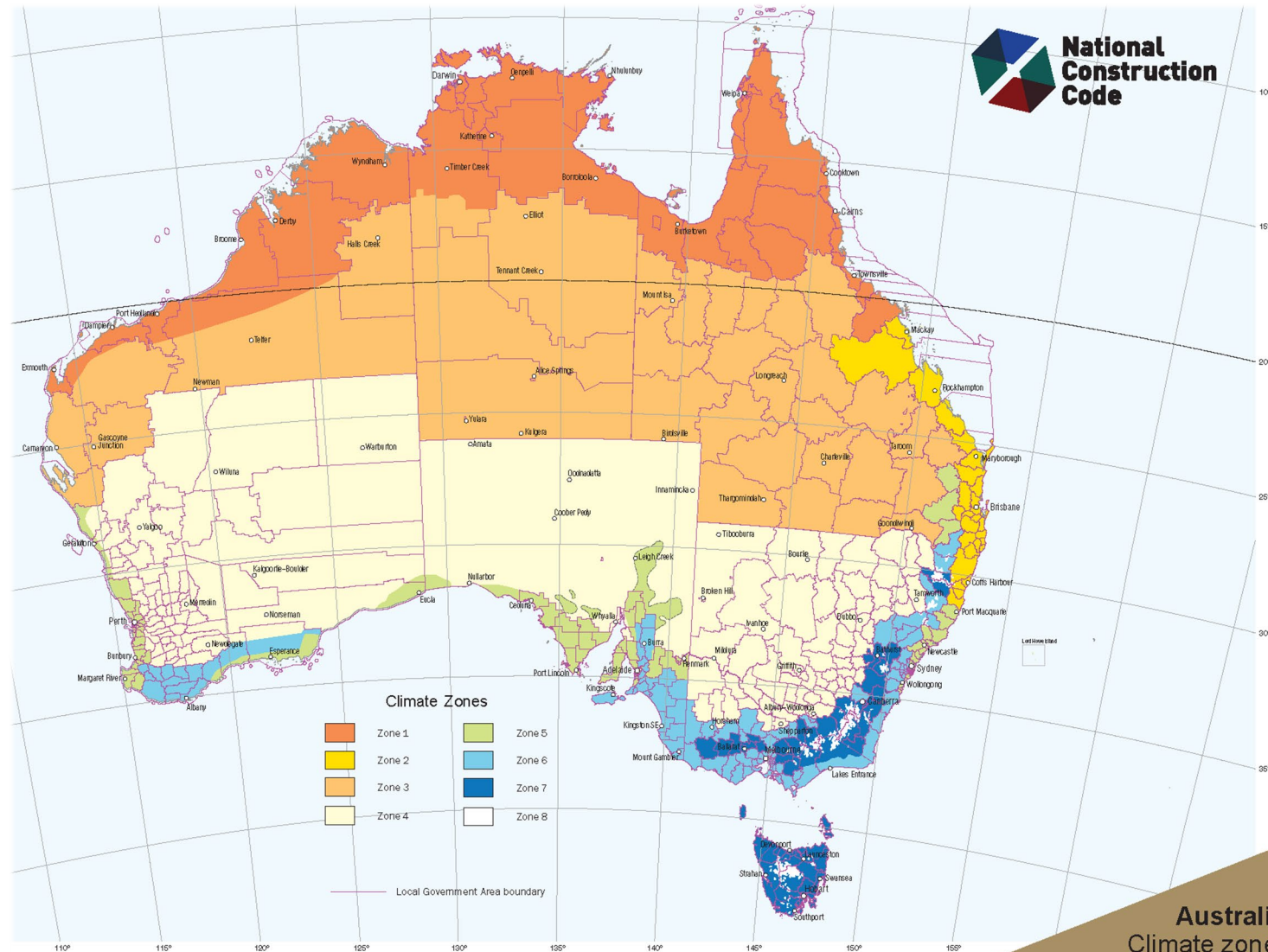
- U-Value = Same or Lower
- SHGC = within a capped Tolerance (note Commercial = Same or Lower)
- +/- 5% or 10%
- eg. 0.50 SHGC +/- 10%
= 0.45 – 0.55 SHGC range

Substitution tolerance ranges		
SHGC*	SHGC lower limit	SHGC upper limit
0.50	0.45	0.55

2.7 Star Modelling Analysis

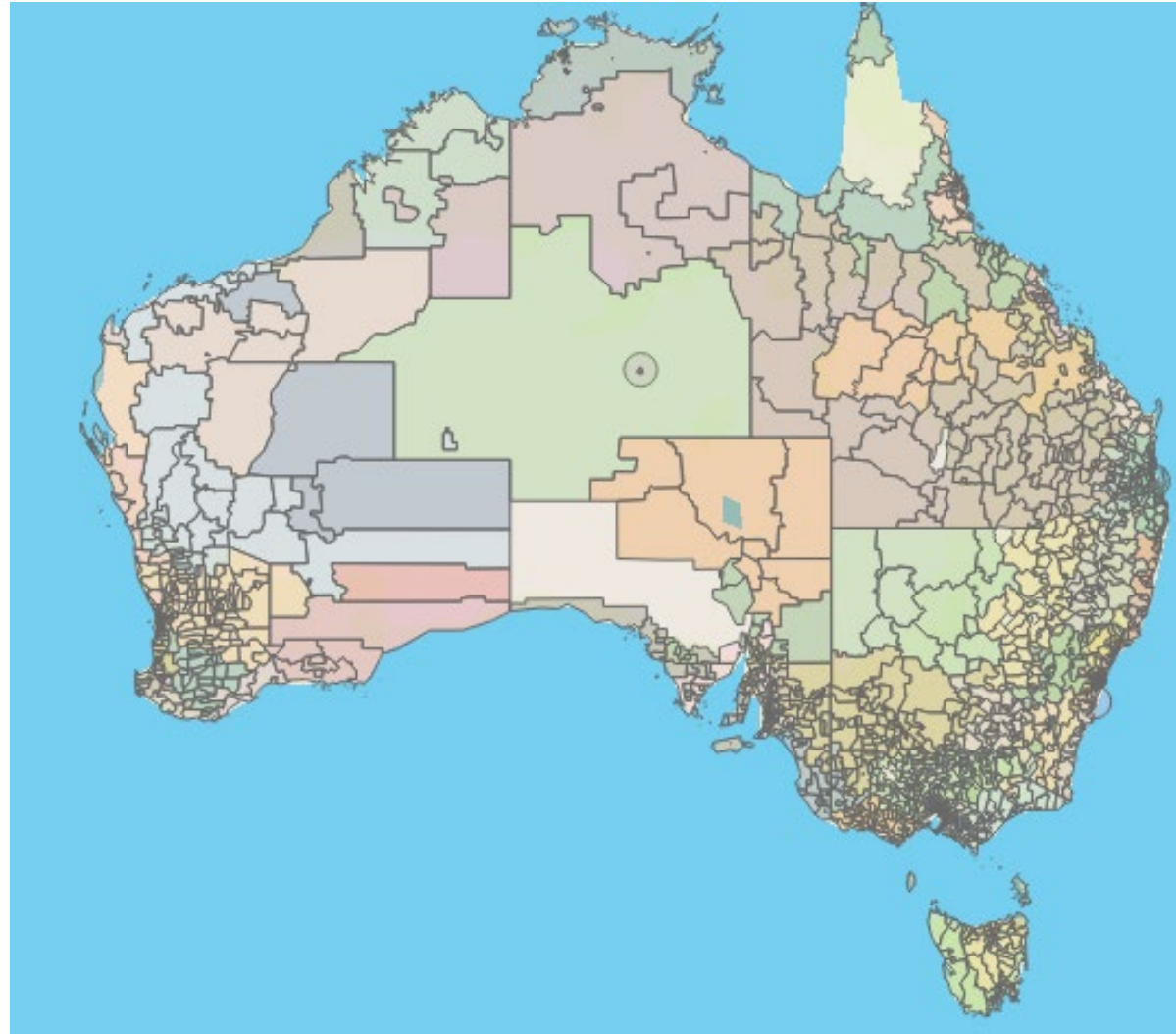
a) Climate

ABCB Climate Zone Map – 8 Zones



Australia
Climate zone map

NatHERS Climate Zone Map – 69 Zones



Climates Modeled

	<u>6 Stars</u>	<u>to</u>	<u>7 Stars</u>	
				Improvement
• East Sydney (Climate Zone 17)	39	-	30	= 23%
• West Sydney (Climate Zone 28)	79	-	60	= 24%
• Melbourne (Climate Zone 21)	81	-	62	= 23%
• Canberra & Hobart (Climate Zones 24 & 26)	161 152	- -	122 117	= 24% = 23%

Climates Modeled

Heating and Cooling Energy Use:

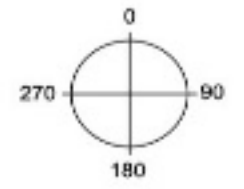
- **East Sydney**
(SHGC) Warm Temperate (Cooling Climate)
25% for Heating | 75% for Cooling
- **West Sydney**
(U-Value) Mild Temperate (Heating Climate)
65% for Heating | 35% for Cooling
- **Melbourne**
(U-Value) Mild Temperate (Heating Climate)
80% for Heating | 20% for Cooling
- **Canberra & Hobart**
(U-Value) Cool Temperate (Heating Climate)
98% for Heating | 2% for Cooling

b) House Types

1. Single Story Detached

- 214m² footprint
- 31m² Glazing Area
- 4 Bedrooms
- Internal Garage
- Separate Living & Dining



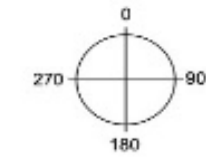
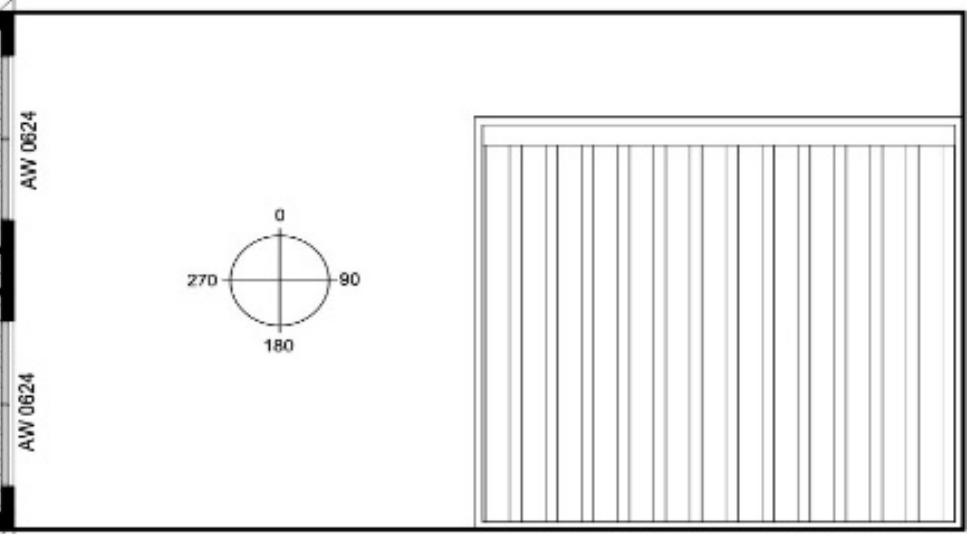
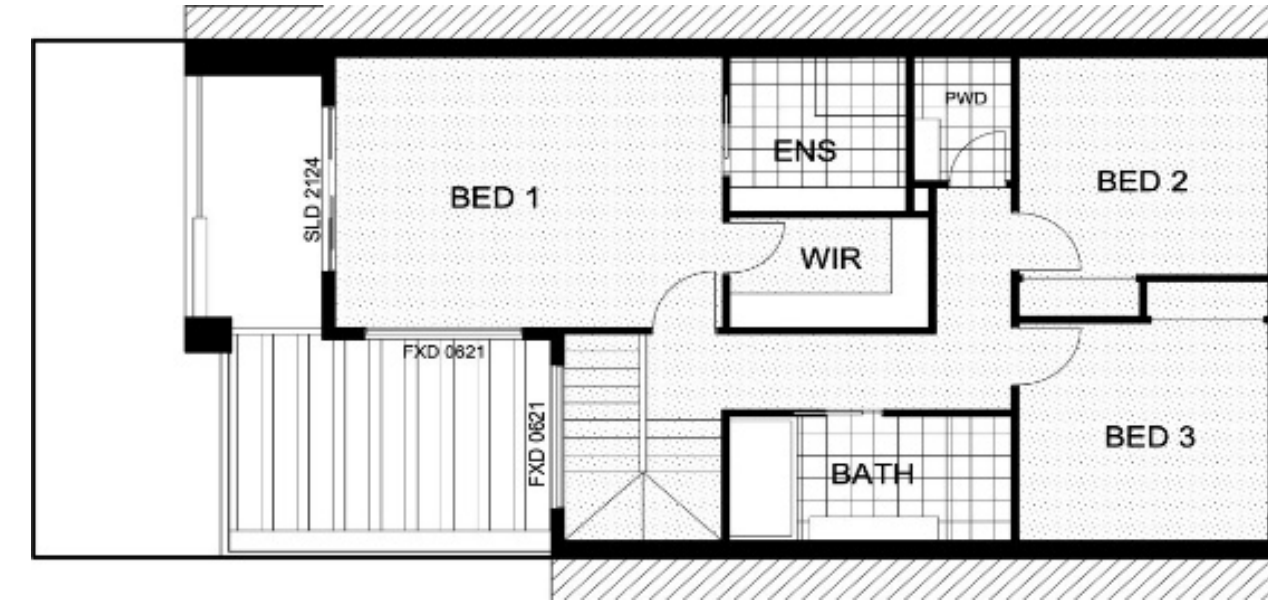
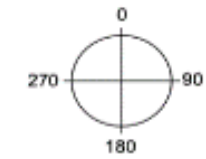
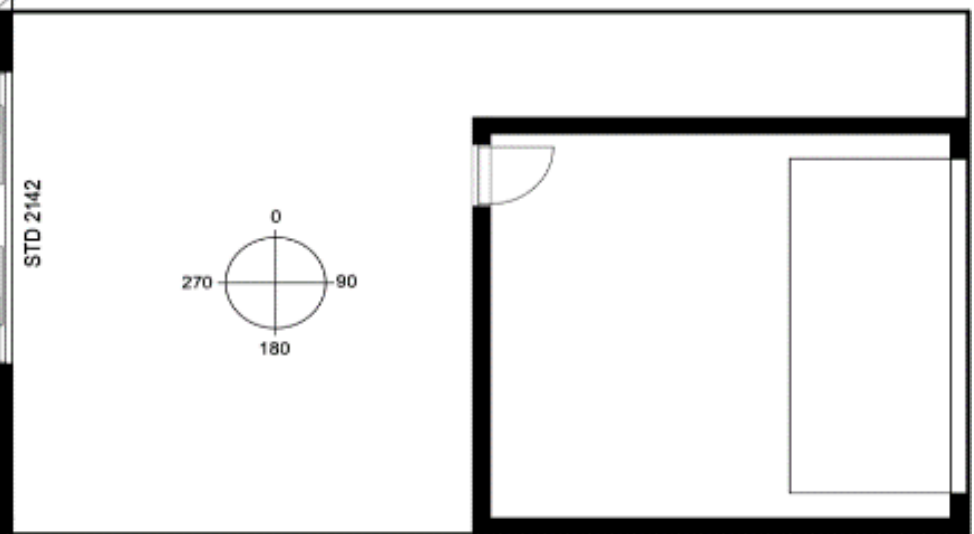
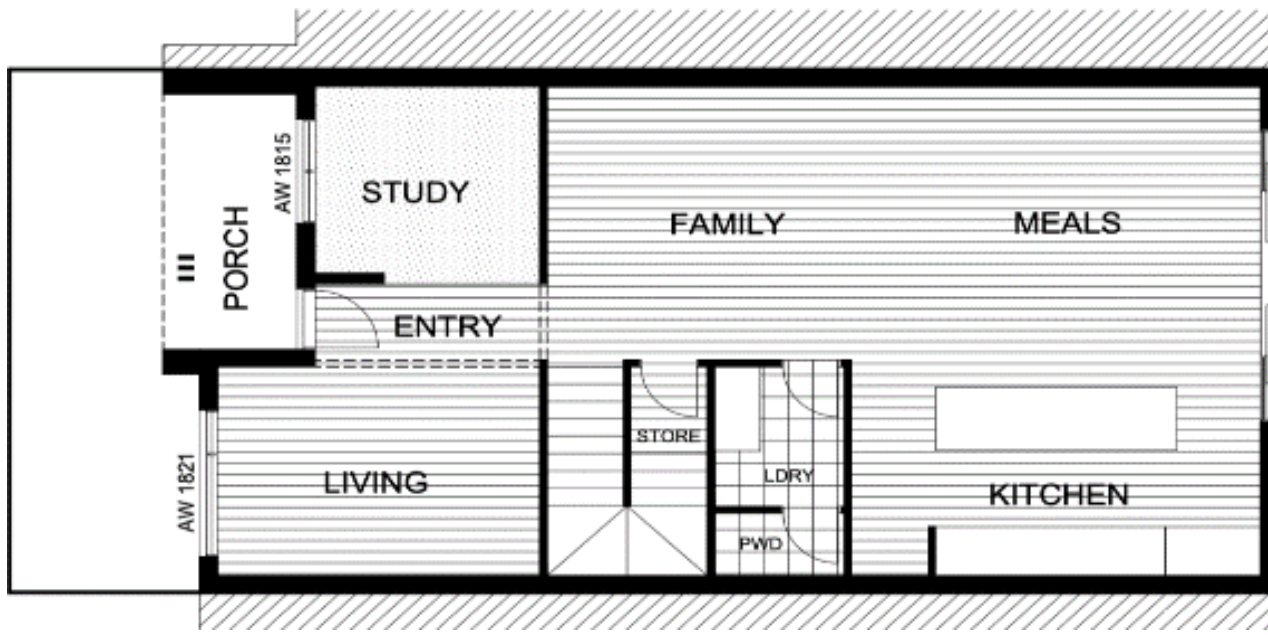




DOUBLE STOREY TOWNHOUSE

2. Double Story Semi-Detached

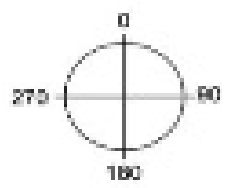
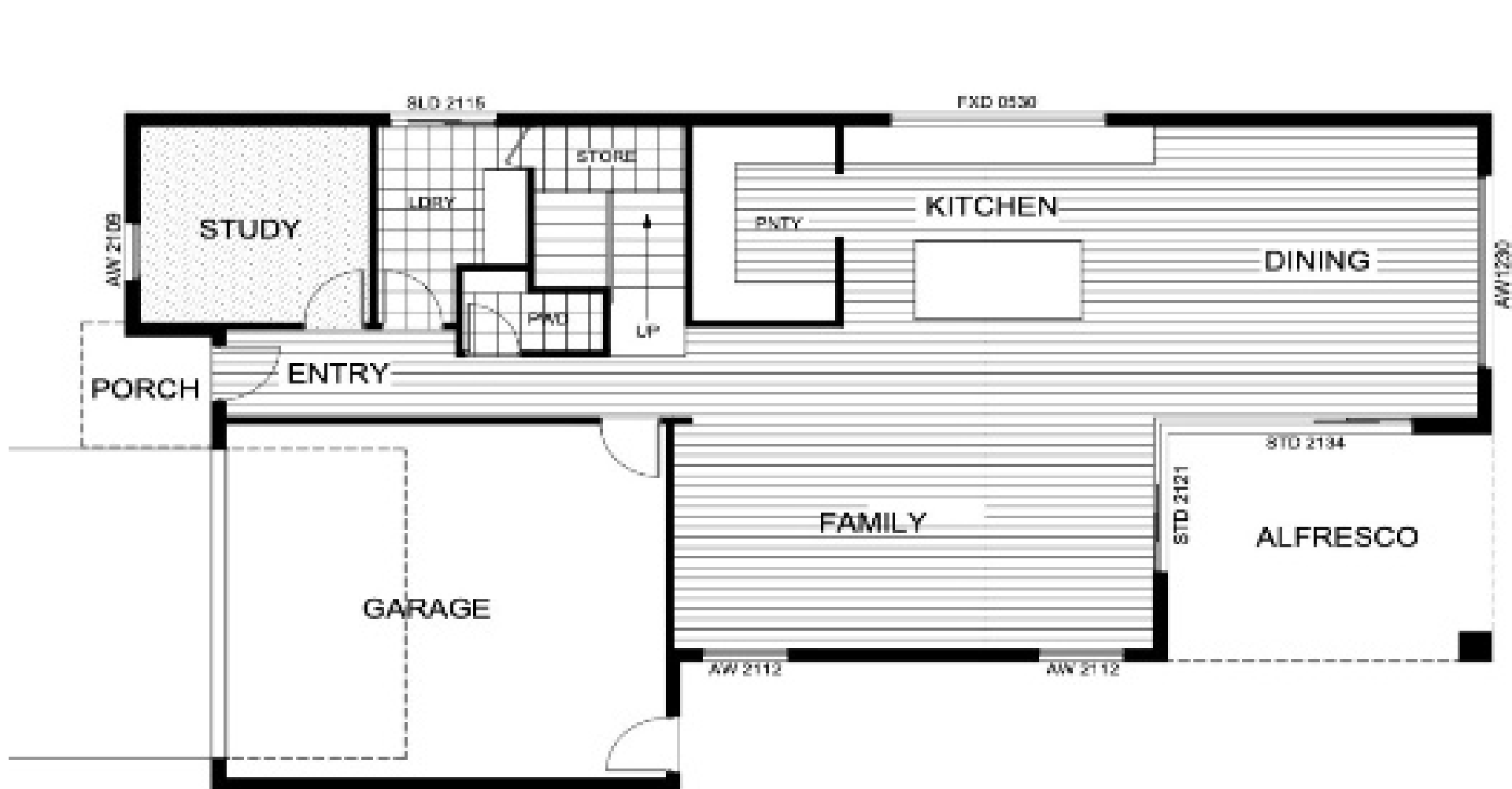
- 154m² footprint
- 29m² Glazing Area
- 3 Bedrooms + Study
- External Garage
- Separate Living & Dining

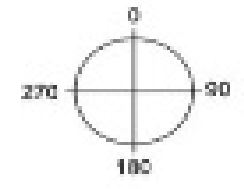
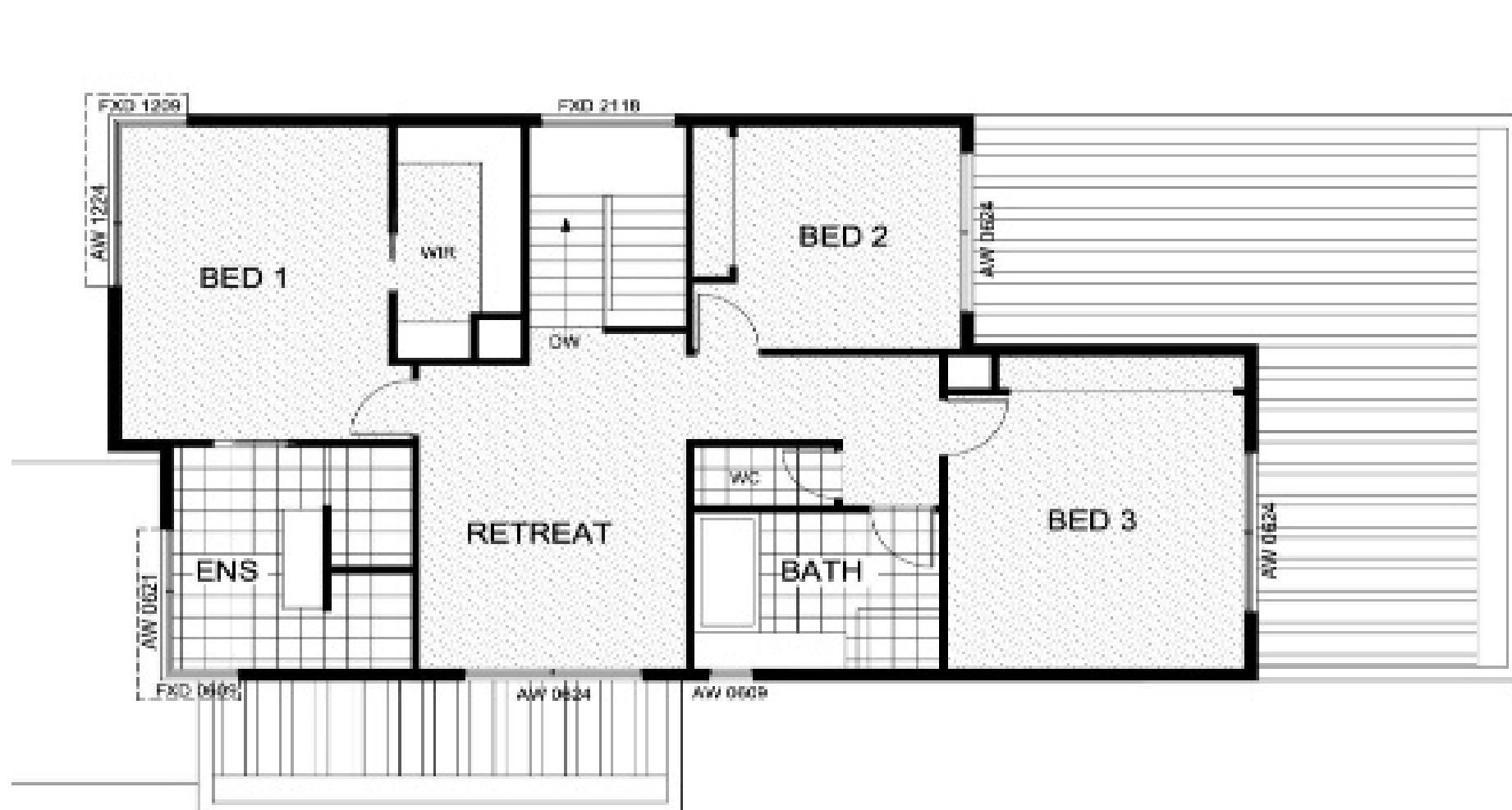




3. Double Story Detached

- 266m² footprint
- 41m² Glazing Area
- 3 Bedrooms +Study +Rumpus
- Internal Garage
- Open Plan Living/Dinning



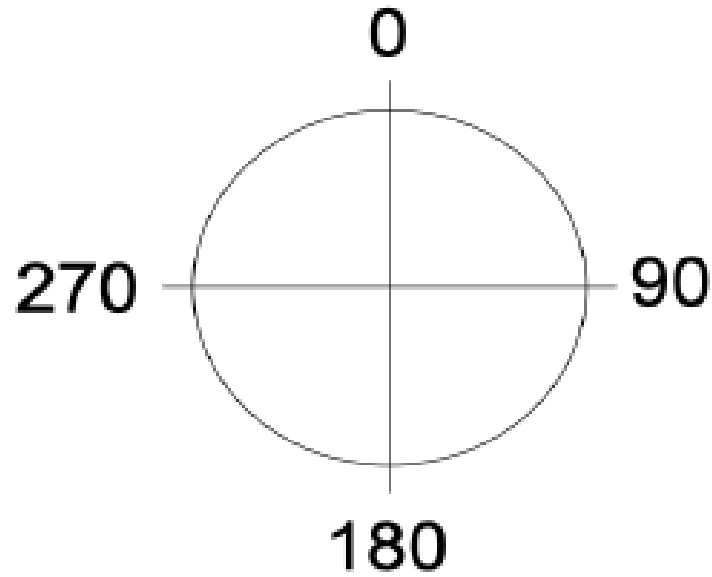


c) Fabric Parameters



Fixed Fabric Parameters

- R5.0 Ceilings/Roof
- R2.5 External Walls
- R2.5 Internal Garage Walls
- Waffle Slab
- Std Aluminium Windows



Fixed Fabric Parameters

- Averaged over all Orientations
- Common Fence/Neighbour Shading factors
- Common length Eaves
- Non Rated IC Recessed Downlights



Fixed Fabric Parameters




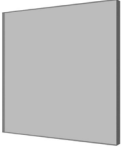



- Medium 05 Colours for walls, roof, internal floor & window frames
- Pitched Tiled Roof for 1 SS
- Flat Metal Roof for 2 & 3 DS

3. 7 Star Glazing Solutions

Analysis Results

Key:

SG = Single Glazed
 DGU = Double Glazed Unit
 Higher Performing Frame examples =
 Thermally Broken Aluminum,
 Timber, uPVC

	#1 Single Story Detached	#2 Double Story Townhouse	#3 Double Story Detached
			
East Sydney (Postcode 2000)	 + Regular SG Aluminum Frames	 + Regular SG Aluminum Frames	
West Sydney (Postcode 2750)	 + Regular DGU Aluminum Frames	 + Regular DGU Aluminum Frames	

Analysis Results

Key:

SG = Single Glazed
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#1 Single Story Detached



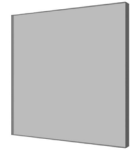
#2 Double Story Townhouse



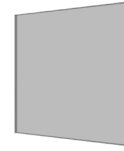
#3 Double Story Detached



East Sydney
 (Postcode 2000)



+ Regular SG Aluminum Frames



+ Regular SG Aluminum Frames

West Sydney
 (Postcode 2750)



+ Regular DGU Aluminum Frames



+ Regular DGU Aluminum Frames

Melbourne
 (Postcode 3000)



+ Regular DGU Aluminum Frames



+ Regular DGU Aluminum Frames

Analysis Results

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#1 Single Story Detached



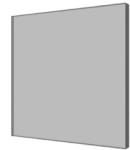
#2 Double Story Townhouse



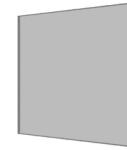
#3 Double Story Detached



East Sydney
 (Postcode 2000)



+ Regular SG Aluminum Frames



+ Regular SG Aluminum Frames

West Sydney
 (Postcode 2750)



+ Regular DGU Aluminum Frames



+ Regular DGU Aluminum Frames

Melbourne
 (Postcode 3000)



+ Regular DGU Aluminum Frames



+ Regular DGU Aluminum Frames

Canberra & Hobart
 (Postcodes 2600 & 7000)



+ Regular DGU Aluminum Frames




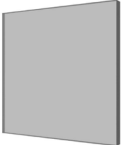
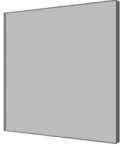












+ Regular DGU Aluminum Frames

Analysis Results

Key:





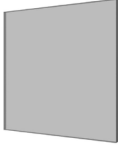










SG = Single Glazed
 DGU = Double Glazed Unit
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 Thermally Broken Aluminum,
 Timber, uPVC

	#1 Single Story Detached 	#2 Double Story Townhouse 	#3 Double Story Detached 
East Sydney (Postcode 2000)	 + Regular SG Aluminum Frames	 + Regular SG Aluminum Frames	 LowE
West Sydney (Postcode 2750)	 + Regular DGU Aluminum Frames	 + Regular DGU Aluminum Frames	 + Higher Performing DGU Frames
Melbourne (Postcode 3000)	 + Regular DGU Aluminum Frames	 + Regular DGU Aluminum Frames	 + Higher Performing DGU Frames
Canberra & Hobart (Postcodes 2600 & 7000)	 + Regular DGU Aluminum Frames	 + Regular DGU Aluminum Frames	 + Higher Performing DGU Frames

Analysis Results

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Melbourne (Postcode 3000)	 + Regular DGU Aluminum Frames	 + Regular DGU Aluminum Frames	 + Higher Performing DGU Frames
Canberra & Hobart (Postcodes 2600 & 7000)	 + Regular DGU Aluminum Frames	 + Regular DGU Aluminum Frames	 + Higher Performing DGU Frames

Ways to “Avoid Glazing Improvements” for 7 Stars

1. States & Territories delaying the adoption of NCC 2022
2. Adding advanced Roof/Ceiling/Wall Insulation
3. Maximising Orientation (North, East, West, South)
4. Additional External Shading
5. Smaller rooms (m² footprint & m³ volume)
6. Avoid open plan living (eg. separate Lounge)
7. Colours - Frames, Cladding, Roofs
8. Smaller Glazing
9. Less Glazing...

Ways to “Avoid Glazing Improvements”

VS. High Performing Glazing:

1. States & Territories delaying the adoption of NCC 2022
 2. Adding advanced ceiling, ceiling/Wall Insulation
 3. Maximising Orientation (North, East, West, South)
 4. Additional External Shading
 5. Smaller rooms (m² footprint & m³ volume)
 6. Avoided people lounge (3 separate Lounge)
 7. Colours - Frames Glazing, Roofs
 8. Smaller Glazing
 9. Less Glazing...
- **Energy Efficiency**
 - **Less Energy Demand**
 - **Less Operating Embodied Carbon**
 - **Less Costs in Energy Bills**
 - **Maximise View and Visible Light**
 - **Improved Human Comfort, Health and Wellbeing**

4. The Key Compliance factors around Windows

**Compliant Performance Data
(U-Value and SHGC)**

Glass Only Data (Centre of Glass)

VS

Total System Data (Whole of Window)

**Compliant Performance Data
(U-Value and SHGC)**

Glass Only Data (Centre of Glass)

VS


Total System Data (Whole of Window)

(the Language that the NCC uses)



Certified Total System Performance Data

- AFRC protocols for DTS NatHERS/BASIX
- Window Energy Rating Scheme (WERS)
- Independent comparison tool of certified Total System performance
- werslink.com.au
- Confirmed compliance pathway (DTS)



Residential Commercial

Window ID Starts with

Frame Description Keyword Search

U-Value Min Max

please provide a number from 0 to 7 to filter your search, or leave blank

SHGCw

SHGC	%-	0.45	%+	0.55
------	----	------	----	------

please provide an SGHC number from 0 - 1 along with a % range, or leave blank



Certified Total System Performance Data

- AFRC protocols
- Window Energy Rating Scheme (WERS)
- Independent comparison tool of certified Total System performance
- werslink.com.au
- Confirmed compliance pathway (DTS)

Filter Manufacturer and Fabricator by State

<input type="checkbox"/>	State	
<input type="checkbox"/>	Manufacturers	<input type="checkbox"/> <input type="checkbox"/> Shamrock Joinery & Associates
<input type="checkbox"/>	Fabricators	
<input type="checkbox"/>	Glass Supplier	<input type="checkbox"/> <input type="checkbox"/> AGG
<input type="checkbox"/>	Frame Type	<input type="checkbox"/> <input type="checkbox"/> Window
<input type="checkbox"/>	Glass Type	<input type="checkbox"/> <input type="checkbox"/> Low-E
<input type="checkbox"/>	Glass Specification	<input type="checkbox"/> <input type="checkbox"/> DG
<input type="checkbox"/>	Operating Type	<input type="checkbox"/> <input type="checkbox"/> Fixed Window
<input type="checkbox"/>	Frame Material	<input type="checkbox"/> <input type="checkbox"/> Timber



Certified Total System Performance Data

- AFRC protocols
- Window Energy Rating Scheme (WERS)
- Independent comparison tool of certified Total System performance
- werslink.com.au
- Confirmed compliance pathway (DTS)

Residential Search

Close Search Filters Download CSV

Table View Graph View Favourites Job

★	Window ID	Manufacturer	Frame Description	Glass	Glass Supplier	Uw	SHGC
☆	SHM-001-016	Shamrock Joinery & Associates	Fixed	AGG PLUS Clr 4/12/4 - ALU	AGG	1.5	0.54
☆	SHM-001-017	Shamrock Joinery & Associates	Fixed	AGG PLUS Clr 5/12/5 - ALU	AGG	1.5	0.51
☆	SHM-001-018	Shamrock Joinery & Associates	Fixed	AGG PLUS Clr 6/12/6 - ALU	AGG	1.5	0.50
☆	SHM-001-019	Shamrock Joinery & Associates	Fixed	AGG PLUS Clr 8/12/8 - ALU	AGG	1.5	0.47
☆	SHM-001-020	Shamrock Joinery & Associates	Fixed	AGG PLUS Gy 4/12/4 - ALU	AGG	1.5	0.38
☆	SHM-001-021	Shamrock Joinery & Associates	Fixed	AGG PLUS Clr lam 6.38/12/4 -	AGG	1.5	0.51



Certified Total System Performance Data

- Direct link to NatHERS/BASIX software
 - FirstRate5
 - Accurate
 - BERS
 - Hero
- NatHERS default frames or Custom₅₂



AS Standards Compliance

- What thickness and sizes to use
- Testings and compliance
- Safety
- If referenced in the NCC...
- ...Mandatory

Key Glass and Glazing related AS Standards

- **AS 1288** - The installation of glass into buildings
- **AS 2208** - Grade A Safety Glass
- **AS 4055 / 1170.2** - Wind Loads: Residential/Commercial
- **AS 2047** - Windows and external glazed doors used in buildings
- **AS 4666** - The manufacturing of Insulated Glass Units (IGU)



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GREEN LIVING

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AGG NSW

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Girraween, NSW
P: (02) 9896 0566
F: (02) 9896 0190

AGG VIC

81-83 Rushdale St
Knoxfield, VIC
P: (03) 9730 7400
F: (03) 9730 7488

AGG TAS

39 South Arm Rd
Rokeby, TAS
P: (03) 6247 1625
F: (03) 6247 6843