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CRAIG HILL ACOUSTICS

Acoustic Consultants

QLD & NSW

Aircraft Noise

LOT 1 GREY STREET

TWEED HEADS

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Lot 1 Grey Street, Tweed Heads

Reference No: igreyst111011/1

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Project	Lot 1 Grey Street, Tweed Heads. Qld
Authorised by	Damon Newall
Date of assessment	Tuesday, 11 October 2011
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1.0 EXECUTIVE SUMMARY

The proposed dwelling at Lot 1 Grey Street ,Tweed Heads , NSW of this report is to examine Aircraft and Road Traffic Noise Impact upon the above proposed residential development.

Aircraft: The proposed dwelling in the 30-35 ANEF zone.

Required to comply assessed under AS 2021 - 2000.

Roof/ceiling:	53-63 Rw (in selected areas table 4.1)
Windows:	45-53 Rw (in selected areas table 4.1)
Walls:	49-64 Rw (in selected areas table 4.1)
Door:	45 Rw (in selected areas table 4.1)

As compliance is not possible using normal construction methods the following is recommended as a practical upper level of acoustic insulation:

Roof/ceiling:	54Rw (2/10mm soundchek on resilient mounts/battens/ insulation) CSR 852
Windows:	Bedrooms 42 Rw (secondary / double glazed) Living areas 38Rw 10.38 laminated glass in tested frames Wet areas 30 Rw 6.38mm laminated glass in tested frames
Walls:	Brick veneer construction 60 Rw (CSR 924)
Door:	33 Rw (42mm solid core seals all sides.)

2.0 CRITERIA

The following report is based on based Australian Standards AS 2021 - 2000 Aircraft Noise Intrusion – Building Sitting and Construction and allows for Runway Extension 1 only.

Where:

ANEF Zone	Table 2.1: 30-35 ANEF zone
Existing Runway:	2042 meters
Extension 1:	2550 meters (extension 1 – 500m)

Building Site Acceptability Based on ANEF Zones

Table 2.1

Building Type	ANEF zone of site		
	Acceptable	**Conditionally acceptable**	**Unacceptable**
House, home unit, flat, caravan park	Less than 20 ANEF (Note 1)	20-25 ANEF (Note 2)	Greater than 25 ANEF
Hotel, motel, hostel	Less than 20 ANEF	25-30 ANEF	Greater than 30 ANEF
School University	Less than 20 ANEF (Note 1)	20-25 ANEF (Note 2)	Greater than 25 ANEF
Hospital, nursing home	Less than 20 ANEF (Note 1)	20-25 ANEF (Note 2)	Greater than 25 ANEF
Public building	Less than 20 ANEF (Note 1)	20-30 ANEF	Greater than 30 ANEF
Commercial building	Less than 20 ANEF (Note 1)	25-35 ANEF	Greater than 35 ANEF
Light industrial	Less than 20 ANEF	30-40 ANEF	Greater than 40 ANEF
Other industrial	Acceptable in all zones		

3.0 METHOD OF ASSESSMENT AIRCRAFT

Table 3.1

	Distances from runway metres
DS (side line)	0
DL (landing- close end)	1335
DT (take off -far end)	3885

Plane types use for assessment: A320 Boeing 737- 300/ 400 A300 Boeing 767
No long range flights > 8,000ks.

Exposure

767 arrivals	767 departures	737 arrivals	737 departures
95	86	92	85

Max Exposure: 95dB(A)

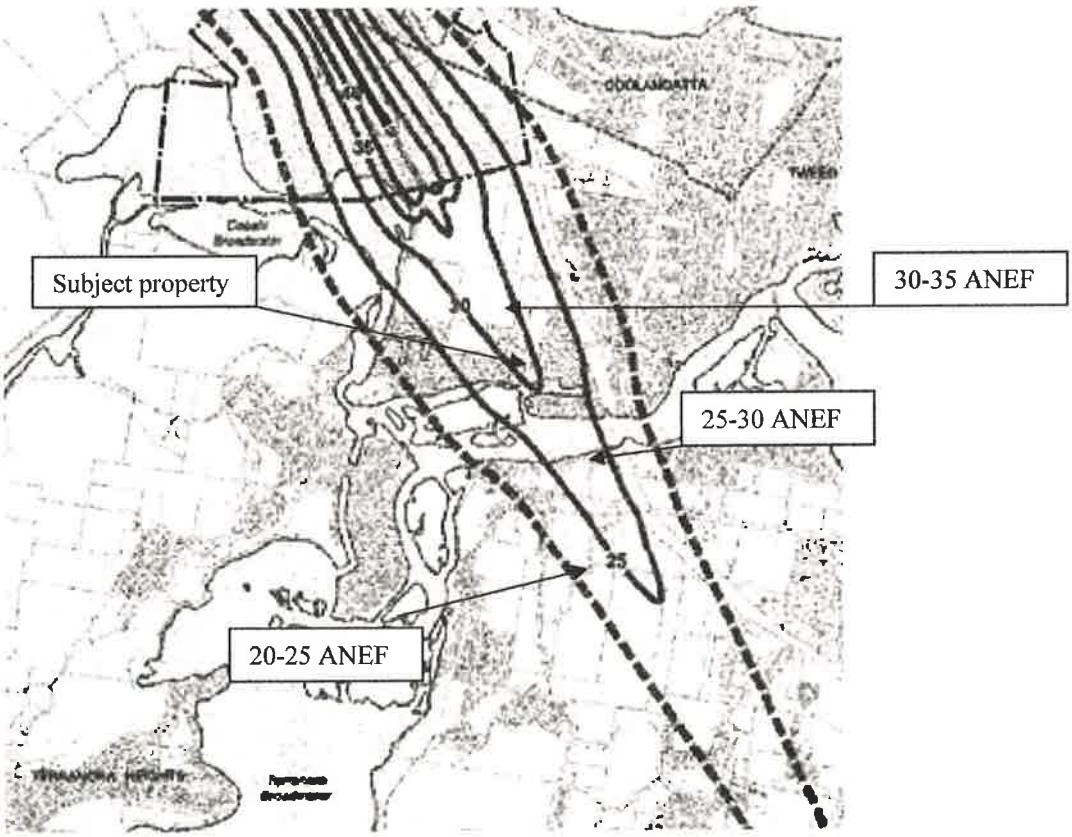


Table 3.2

	Indoor levels dB(A)		
	Bedrooms,	Dedicated, lounges	Other Habitable Spaces
Max Exposure Required indoor levels Reduction Required	50	55	60

- Distances have been estimated only and have yet to be verified.

ASA 2021-2000 (Appendix F)

Max exposure ANR

Item 3.3.2: Determines the aircraft noise attenuation required for each component ANAc.

$ANAc = ANR + 10 \log_{10} [(Sc/Sf) \times (3/h \times 8TN)] - Kc$

ANAc: Attenuation required for building components dB(A)

ANR : Noise reduction determined Clause 3.2

Sc/Sf: Area ratio of components

h: Ceiling height 2.4 m

T: Internal reverberation time of the room in seconds (0.5 seconds optimum.)

N: Number of components

Kc: Orientation affects for individual components.

STC/Rw: ANAc + 5

Example

Table 3.3

	Floor area Ratios		
Component	Size	Square meters	Ratio Sc/Sf
Roof/Ceiling	4.14x3.74	15.50	1.00
Walls	3.74x2.40-2.16	6.80	0.44
Windows	1.20x1.80	2.16	0.14

4.0 Rw REQUIREMENTS FOR BUILDING COMPONANTS

As aircraft noise has the greatest impact on the dwelling the following components will be assessed for aircraft noise only.

Table 4.1

Rw requirements for building components

Room	Roof/Ceiling	Window	Wall	Opening sizes
Bed 1	63	53	62	3/18.06
Bed 2	63	52	61	12.18
Bed 3	63	53	64	12.18
Study	58	48	58	21.18
Media (dedicated lounge)	63	54	59	12.18
Living/ kitchen	58	52	58	2/21.09 21.34
Es	53	48	49	21.09
bath	53	48	51	09.15
Wc	53	48	53	09.06
Laundry	53	50	53	21.16
Entry	58	45	50	20.10 (door)

- If window sizes differ from above, Rw ratings for componants will need to be reassessed.

Roof/ceiling: 53-63 Rw (in selected areas table 4.1)
Windows: 45-53 Rw (in selected areas table 4.1)
Walls: 49-64 Rw (in selected areas table 4.1)
Door: 45 Rw (in selected areas table 4.1)

5.0 CONCLUSIONS

The above results have been based on AS 2021-2000

The noise exposure for the dwelling has been assessed for impact in the 30-35 ANEF zone as accepted by council.

All calculations have been made using an Internal Reverberation Time of 0.5 sec as would be expected in a carpeted, furnished room with curtains.

Tiled or similar surfaces should be kept to a minimum. Where higher reverberation times result from reflective surfaces to floors the introduction of soft furnishings and rugs can be used to reduce reverberation times.

As the above is designed as closed system alternative ventilation may need to be provided.

Roof/ceiling:	53-63 Rw (in selected areas table 4.1)
Windows:	45-53 Rw (in selected areas table 4.1)
Walls:	49-64 Rw (in selected areas table 4.1)
Door:	45 Rw (in selected areas table 4.1)

Check with manufacturers for the latest tested systems.

Report based on:

Plans: Included

Where chosen systems / components are less than stipulated in table 4.1 higher indoor levels would be expected.

APPENDIX A – EXAMPLES

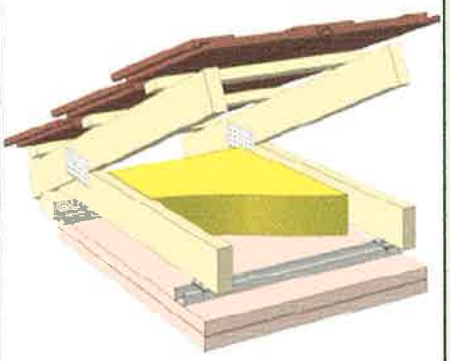
ROOF CEILINGS

Roof/ceiling: 54 Rw (CSR 852)

The insulation used should be laid tight to the under side of the roofing around the perimeter of the buildings to the under side of the roof minimising leakage from soffit area. Penetrations to ceilings as skylights or down lights to be avoided unless treated.

Roof/Ceiling Systems

RISF = Resistance to Incipient Spread of Fire

SYSTEM SPECIFICATION	TYPICAL LAYOUT (CSR 858 shown)	ACOUSTIC OPINION
• A pitched tiled roof with or without 350g/m² sarking. OR A steel sheet roof with minimum Bradford Anticon 55 insulation over battens. • Ceiling Joists or Trusses. • RONDO Furring Channel clipped to Gyprock® Resilient Mounts. • Cavity infill as per system table. • Ceiling lining as per system table, fixed to furring channel.		PKA-056

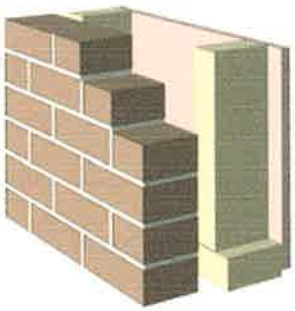
FRL Report/Opinion	SYSTEM N°	CEILING LININGS	CAVITY INFILL (Refer to Section A)	Steel Roofing with Anticon	Tiled Roofing without Sarking	Tiled Roofing with Sarking
				R_w / R_w+C_{tr}		
- / - / -	CSR 851	• 1 x 10mm GYPROCK SOUNDCHEK plasterboard.	(a) 165 Gold Batts™ 3.0	45/39	45/39	46/40
			(b) 215 Gold Batts™ 4.0	45/40	46/40	48/41
			(c) 120 Soundscreen™ 3.0 batts	45/39	45/39	46/40
- / - / -	CSR 852	• 2 x 10mm GYPROCK SOUNDCHEK plasterboard.	(a) 165 Gold Batts™ 3.0	51/45	51/45	52/46
			(b) 215 Gold Batts™ 4.0	51/46	52/46	54/47
			(c) 120 Soundscreen™ 3.0 batts	51/45	51/45	52/46
- / - / -	CSR 853	• 1 x 13mm GYPROCK SOUNDCHEK plasterboard.	(a) 165 Gold Batts™ 3.0	46/41	46/41	48/42
			(b) 215 Gold Batts™ 4.0	47/43	47/42	49/44
			(c) 120 Soundscreen™ 3.0 batts	46/41	46/41	48/42
60/60/60 +RISF 30 minutes FCO 1373	CSR 856	• 1 x 16mm GYPROCK FYRCHEK plasterboard.	(a) 165 Gold Batts™ 3.0	43/38	43/38	45/39
			(b) 215 Gold Batts™ 4.0	44/39	44/39	46/40
			(c) 120 Soundscreen™ 3.0 batts	43/38	43/38	45/39
60/60/60 +RISF 60 minutes FCO 964	CSR 857	• 1 x 13mm GYPROCK FYRCHEK plasterboard (against frame). • 1 x 16mm GYPROCK FYRCHEK plasterboard.	(a) 165 Gold Batts™ 3.0	48/43	48/43	50/44
			(b) 215 Gold Batts™ 4.0	49/44	49/44	51/45
			(c) 120 Soundscreen™ 3.0 batts	48/43	48/43	50/44
90/90/90 +RISF 60 minutes FCO 1373	CSR 858	• 2 x 16mm GYPROCK FYRCHEK plasterboard.	(a) 165 Gold Batts™ 3.0	49/44	49/44	51/45
			(b) 215 Gold Batts™ 4.0	50/45	50/45	52/46
			(c) 120 Soundscreen™ 3.0 batts	49/44	49/44	51/45
120/120/120 +RISF 60 minutes FCO 1373	CSR 859	• 3 x 16mm GYPROCK FYRCHEK plasterboard.	(a) 165 Gold Batts™ 3.0	52/47	52/47	54/48
			(b) 215 Gold Batts™ 4.0	53/48	53/48	55/49
			(c) 120 Soundscreen™ 3.0 batts	52/47	52/47	54/48

- **Check with manufacturers for the latest tested systems.**

EXTERNAL WALLS

Walls: 60 Rw

Timber Frame External Wall Systems

SYSTEM SPECIFICATION	TYPICAL LAYOUT (CSR 920a shown)	ACOUSTIC OPINION
• Fire rated masonry veneer wall. • Timber studs at 600mm maximum centres with 40mm minimum gap to masonry. • Cavity insulation as per system table. • Lining material as per system table. NOTES: To achieve stated acoustic performance masonry must be a minimum of 90mm thick and 170kg/m². *ACR = Axial Capacity Reduction. (refer to Table C3).		PKA-055

FRL Report/Opinion	SYSTEM N°	WALL LININGS		
60/60/60 (from outside only) FAR 2303	CSR 924	*Internal Side* • 1 x 10mm GYPROCK SOUNDCHEK plasterboard. *External Side* • Masonry veneer wall with FRL 60/60/60.	STUD DEPTH mm	90
			CAVITY INFILL (Refer to Section 'A')	Rw / Rw+Ctr
			(a) Nil	53/46
			(b) 75 Gold Batts™ 1.5	60/**53**
			(c) 88 Soundscreen™ 2.5 batts	61/**54**
			WALL THICKNESS mm	250

Brick veneer construction 60 Rw (CSR 924)

- **Check with manufacturers for the latest tested systems.**

WINDOWS

Windows: 42Rw

Window Manufacturers for double and secondary glazing.

Winsulation: Phone: 61 7 3356 5133

Magnetite: Phone: (07) 5502 6489

Trend Windows: Phone 13 72 74

JH Williams: Phone: 02 6672 1313

Bradnams Phone 1800 946369

EXTERNAL DOORS

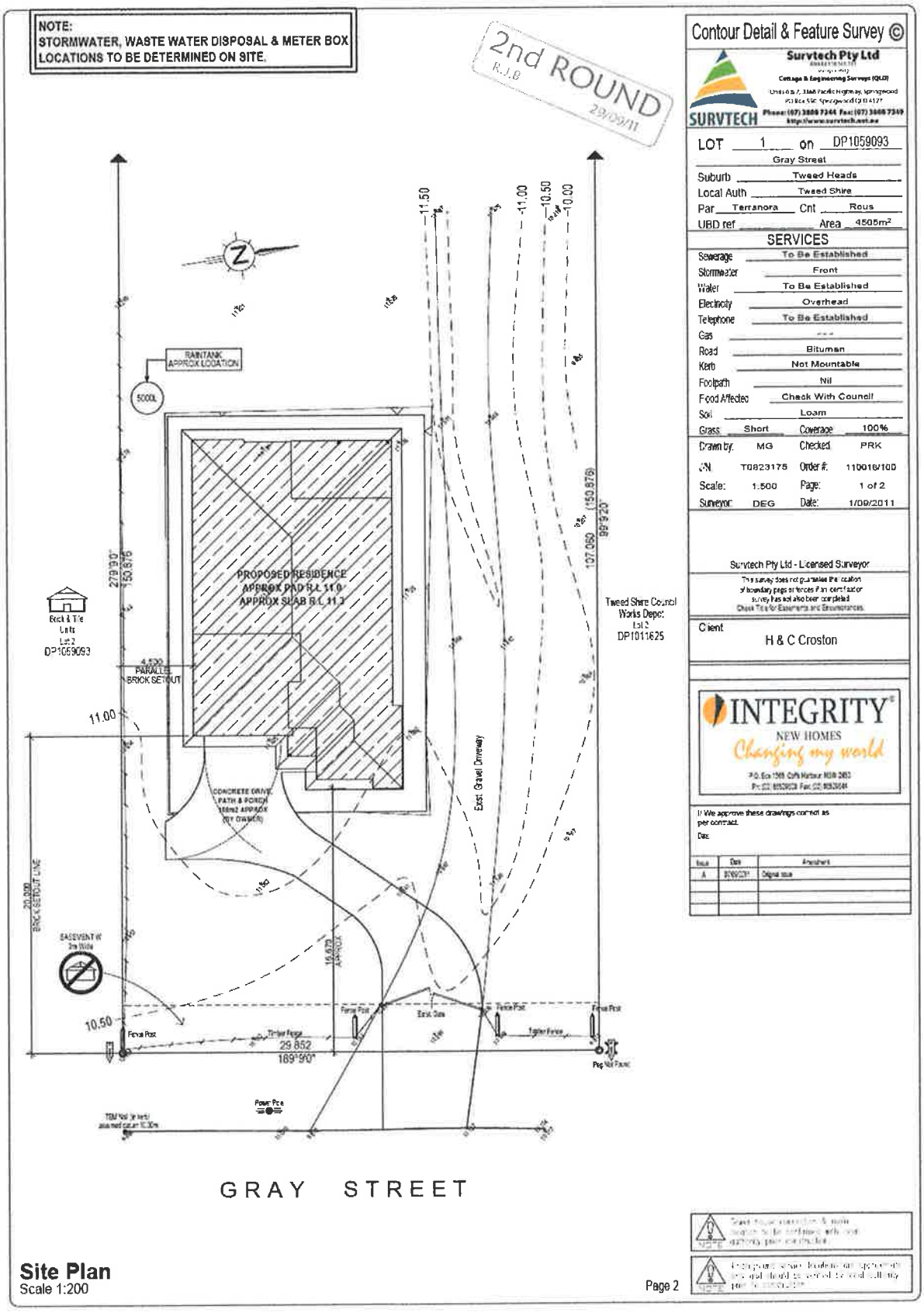
Door: 33 Rw (in selected areas table 4.1)

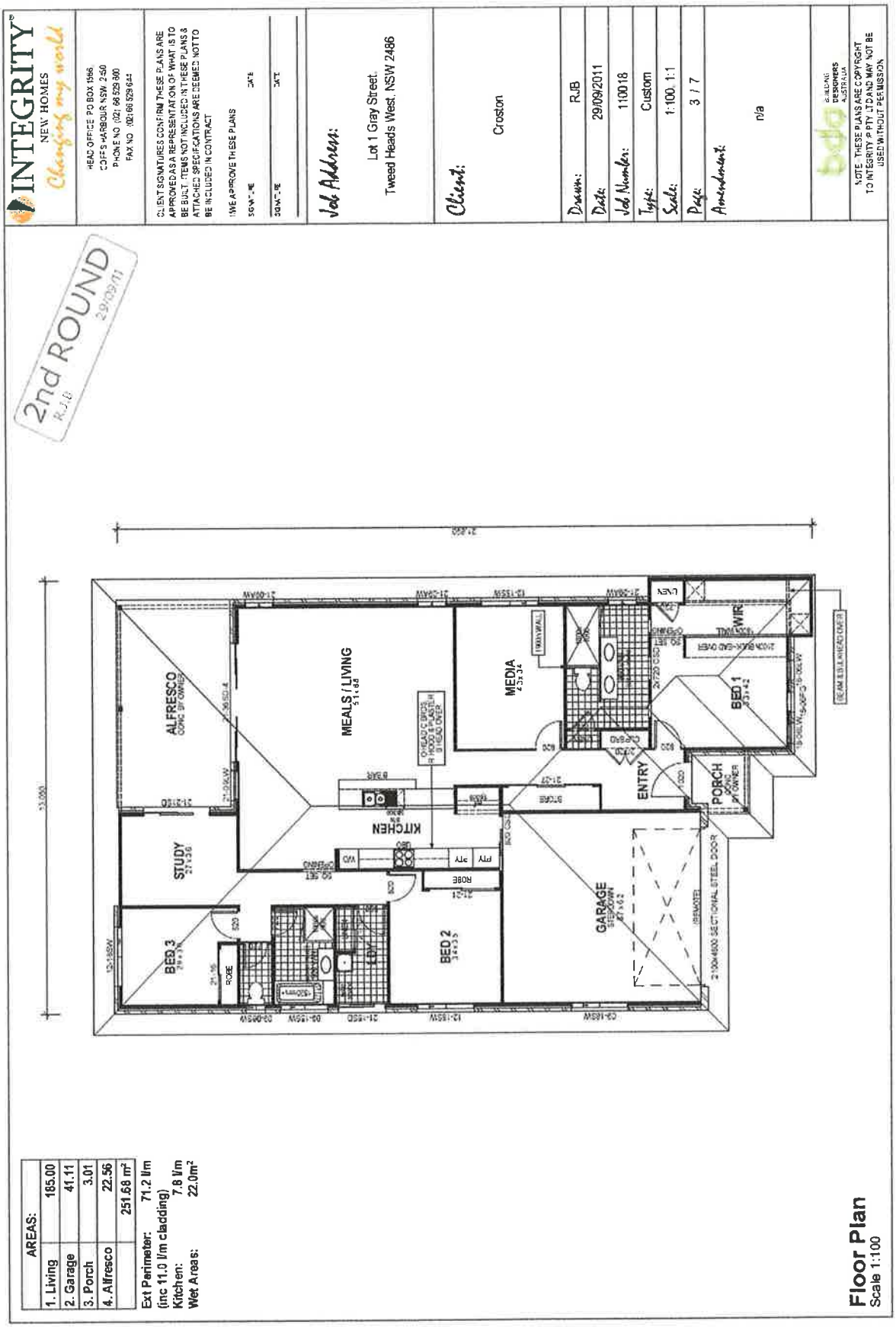
External doors – solid core 42 mm thick with soft seals to sides and top with a drop seal to the bottom.(AS 2021 Table E4 Item 4)... 30-33 STC
Internal Bedrooms: Required 10 STC
Hollow core with minimum clearance to all sides (AS 2021 Table E1. Item 1)... 15 STC

- Glass to door or side lights to be 6.38 mm laminated glass.
- Solid core doors to garage.
- 42mm Solid core doors to house entry with soft seals to all sides.
- Solid core door to garage / house entry

- **Check with manufacturers for the latest tested systems.**

APPENDIX B - PLANS





NOTE:
THESE DRAWINGS ARE A PICTORIAL INDICATION ONLY
SOME VARIATION MAY OCCUR ON SITE.

2nd ROUND
R.J.B
29/09/11

Front Elevation
Scale 1:100

AJ = ARTICULATION JOINT

Right Elevation
Scale 1:100

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FAX NO (02) 66 529 644

CLIENT SIGNATURES CONFIRM THESE PLANS ARE APPROVED AS A REPRESENTATION OF WHAT IS TO BE BUILT. ITEMS NOT INCLUDED IN THESE PLANS & ATTACHED SPECIFICATIONS ARE DEEMED NOT TO BE INCLUDED IN CONTRACT

I/WE APPROVE THESE PLANS

SIGNATURE DATE

SIGNATURE DATE

Job Address:

Lot 1 Gray Street,
Tweed Heads West, NSW 2486

Client:

Croston

Drawn:	RJB
Date:	29/09/2011
Job Number:	110018
Type:	Custom
Scale:	1:100
Page:	4 / 7

Amendment:

n/a

bda BUILDING DESIGNERS AUSTRALIA

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NOTE:
THESE DRAWINGS ARE A PICTORIAL INDICATION ONLY
SOME VARIATION MAY occur ON SITE.

2nd ROUND
R.J.B
29/09/11

Rear Elevation
Scale 1:100

(AJ) = ARTICULATION JOINT

Left Elevation
Scale 1:100

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