G.C.Robertson & Associates Ltd
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DOCUMENT ISSUE REGISTER

JOB TITLE :	ALTERATIONS (SOLAR PANELS TO BARN), WHITE HOUSE FARM, ATHELINGTON ROAD, SOUTHOLT, IP23 7TN	JOB No.	23/12061
		SHEET NO.	1 of 1

ISSUE DATE	DAY	12	19
	MONTH	05	06
	YEAR	23	23

TITLE	SIZE	NUMBER	REVISIONS	
CALCULATIONS				
DESIGN SHEETS 1, 2 & 3			✓	✓
A1			✓	
A1A, A2, A3				✓

ISSUE DISTRIBUTION			
CLIENT	MR HENRY & DR. GRANT	1	1
		E	E
ARCH/DESIGN		1	1
ARCH TECH	KATHY THURMAN	E	E
MAIN CONTRACTOR			
QUANTITY SURVEYOR			
CHECKING AUTHORITY			

P=PRELIMINARY T=TENDER B=BUILDING REGS. I=INFORMATION W=WORKING R=REQUESTED C=COMMENT D=DISTRIBUTION E=E-MAILED

Design Information

Design Sheet 1 of 3

Engineer	J. K. DAVIS
Job No	23/12061
Date	MAY 2023
Contract	ALTERATIONS SWIMMING POOL WHITE HOUSE FARM ATHELINGTON ROAD SOUTHOLT IP23 7TN
Architect/ Designer	GREENSCAPE ENERGY
Principal Designer	GREENSCAPE ENERGY

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Client	MR. HENRY & DR. SHEILA GRANT

Job Brief	ASSESSMENT OF ADEQUACY OF ROOF STRUCTURE FOR INCREASED LOADING FROM SOLAR PANELS
Intended Use of Structure	DWELLING
Loading Conditions	DOMESTIC
Subsoil Conditions	N/A
Specialist Design Requirements (Including Temporary Works)	TEMPORARY WORKS
Fire Resistance Requirements	PROVIDE BEAM CASING TO STEEL BEAMS TO GIVE ½ HOUR FIRE RESISTANCE
Party Wall Etc., Act	-
Building Regs Required	-
Workplace Health & Welfare Regulations 1992 to be considered	-

British Standards etc. Applicable	**Loadings**	**BS 6399**	✓	**Masonry**	**BS 5628**	
	Steelwork	**BS 449**				
	Concrete	**BS 8110**				
	Timber	**BS 5268**	✓			

Notes: -

All dimensions referred to in these calculations are for design purposes only and should not be used for ordering/fabricating materials. Contractor to undertake site measurements for fabrication as necessary.

G. C. Robertson & Associates Ltd *Consulting Civil & Structural Engineers*	Job No: 23/12061	Design Sheet 2 of 3

CDM DESIGN CONSIDERATIONS: This design has been considered under CDM 2015 in order to eliminate and reduce hazards so far as is reasonably practicable and to provide information regarding residual risks.

	Area of Hazard	Assessed Yes/No/N/a	Method of Hazard Elimination/Reduction	Residual Risk	
				Risk	Significance
a	Access to work area	YES	ENSURE RESIDENTS ISOLATED FROM WORK AREA	L	
b	Demolition				
c	Services	YES	ENSURE ALL EXISTING SERVICES LOCATED ON SITE BEFORE START OF WORKS	L	
d	Installation	YES	PROVIDE SUITABLE MECHANICAL MEANS MOVING/LIFTING SOLAR PANELS	L	
e	Excavation				
f	Sequence of operation				
g	Falls from height	YES	PROVIDE SUITABLE HIGH LEVEL SCAFFOLDING ACCESS AND SUITABLE EDGE PROTECTION	L	
h	Post-tensioning / pre-tensioning				
i	Materials				
j	Hotworks				
k	Future Maintenance				
l	Final demolition				
m					

Residual risk information is to be transferred to applicable drawings

Does this project require a separate Full Risk Assessment	YES	NO
Further notes:-		

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CALCULATION SHEET

CONTRACT:- ALTERATIONS, SWIMMING POOL WHITE HOUSE FARM SOUTHOLT

DATE:- APRIL 2023

Designed by:- JAD

Checked by:-

SHEET No:- 23/12061/A1A

output

Joists over swimming pool

span = 5.95m

Load = 0.75 kN/m² (LL) + 0.18 kN/m (Deck + Plasterboard) + 0.24 + 0.11* (Solar Panels)

= 1.28 kN/m² w = 1.28 × 0.4 = 0.52 kN/m

$I_{req} = \frac{5}{384} \times \frac{0.52 \times 5950^3}{0.003 \times 8800} = 54.0 \times 10^6$

* SEE JUSTIFICATION SHEET A2

75×220 $I_{prov} = 66.5 \times 10^6$

$M = \frac{0.52 \times 5.95^2}{8} = 2.30$ kNm

$\sigma_{bc} = \frac{2.30 \times 10^6 \times 6}{75 \times 220^2} = 3.8$ N/mm²

75×220 @400 OK

Beam B1 span = 3.65m

$w = 1.28 \times \left(\frac{5.95 + 0.4}{2}\right) + 0.2 = 4.26$ kN/m

$I_{req} = \frac{5}{384} \times \frac{4.26 \times 3650^3}{0.003 \times 5800 \times 1.14} = 136 \times 10^6$ mm⁴

$I_{prov} = 133 \times 10^6$ mm⁴ (considered OK)

$M = \frac{4.26 \times 3.65^2}{8} = 7.09$ kNm

2No

$\sigma_{bc} = \frac{7.09 \times 10^6 \times 6}{150 \times 220^2} = 5.85$ N/mm²

75×220 C16 OK

$\sigma_{max} = 5.3 \times 1.25 = 6.6$ N/m

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CALCULATION SHEET

CONTRACT:- ..... Designed by:- .....

..... Checked by:- .....

DATE:- ..... SHEET No:- 23 | 12061/A2

output

Individual weights of Panels

Panel (1.692 × 1.134 m) 30 mm thick each panel 21.2 kg

Fixings 18 kg/18 1.0 kg

22.2 kg

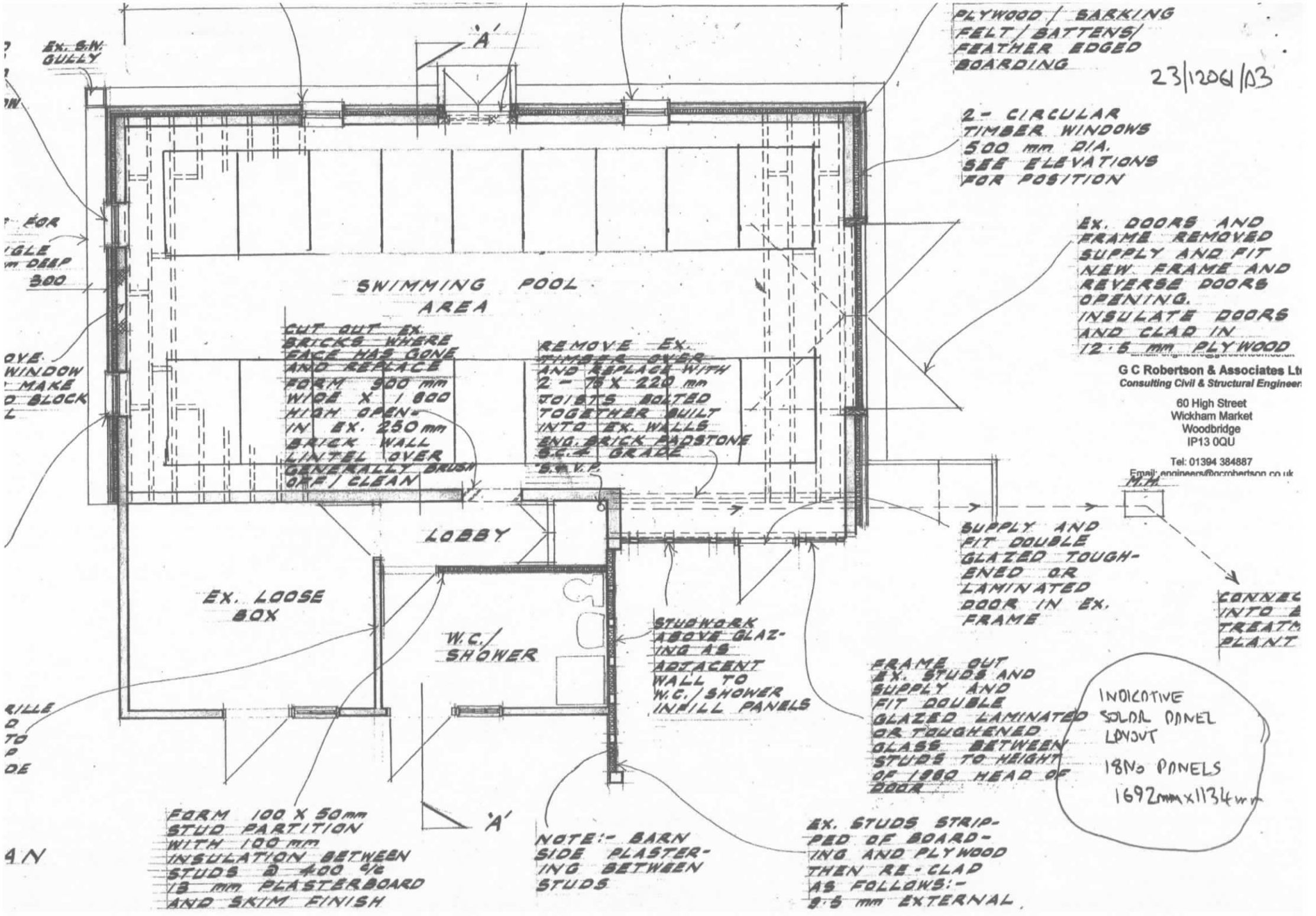
$$\text{Wt m}^2 = \frac{22.2 \times 9.81}{1000 \times 1.692 \times 1.134}$$

$$= 0.11 \text{ kN/m}^2$$

∴ Average load on roof

$$= \frac{0.11 \times 1692 \times 1.134 \times 18}{5.75 \times 10.9} = 0.061 \text{ kN/m}^2$$

⇒ Sheet A1 considered OK



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