



National
Trust

Wentworth Castle Gardens Gun Room Roof Condition Survey



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Introduction

The Gun Room is Grade II* listed (NHLE 1151066) and thought to date from 1732 or earlier. It is a single-storey brick-built building with sandstone dressings and a hipped slate roof. The principal elevation faces west and is provided with a venetian bay window. An open-sided, slate roofed veranda was added to the southern and eastern sides in the 19th century.

The Gun Room is currently vacant and is recorded as such on the Historic England 'Heritage at Risk' register, having fallen out of use and into disrepair. It is believed to have formerly been a banqueting house and/or bath house, prior to being converted into a gun room in the late 19th century.

It is understood that a series of external repairs were undertaken in 2007, instructed by the Wentworth Castle Gardens Trust. As part of these works, it is understood that the roof was partially repaired and the ceiling in the main room supported with scaffolding. No works are known to have been carried out on the roof or ceiling since.

The National Trust, tenant of Wentworth Castle Gardens since 2019, is committed to bringing the building back into use as part of the property's visitor journey and has recently completed repair works to the roof and supporting timber posts of the veranda.

In February 2025 a holding repair scheme commenced to patch holes in the main roof coverings and keep the building weathertight whilst a full restoration project develops. Following commencement of these works, the extent of decay and deterioration uncovered to the roof and ceiling structure necessitated a pause and engagement with the Local Authority Conservation Officer and Historic England. During this time, all slates were removed from the south elevation, with a temporary plastic sheet provided to weather the roof in the interim.

This report has been prepared following this engagement to record the condition of the fabric uncovered and propose a scheme of suitable repair.

Roof Condition Assessment & Recommendations

The Gun Room has a shallow, hipped roof formed with a traditional oak structure, covered in slate. Lead flashings are provided to the ridge, hips and valleys and on three sides at eaves level, forming an apron capping the stone cornice present on the north, west and south elevations. A half round gutter is provided to the east elevation, discharging directly onto the veranda roof below.

The below images show general views of the roof prior to the 2025 holding repair scheme commencing. Loose slates can be seen along the eaves of the south and east facing roof slopes and in isolated areas of the west and north slopes. In addition, flashings provided to the hips and chimney have slipped and become loose through loss of pointing in the brickwork.

Generally, the roof is poorly detailed with no ventilation provided to the roof void and several factors contributing to water ingress. This together with a lack of maintenance has resulted in significant water ingress and damp related issues including wet rot and insect attack. Upon opening up, moisture content of 25-27% was recorded in the accessible timbers.



West facing roof pitch



North facing roof pitch



East facing roof pitch



South facing roof pitch

Images of the roof prior to commencement of the repair scheme

Roof Coverings

The roof slopes to the north, west and south facing slopes comprise good quality Welsh slate, with samples measured at 7-8mm thick and 270 x 520mm in width and length. The east facing pitch has been covered with a thinner replacement, possibly Spanish slate, around 4-5mm in thickness. The head lap provided to the slates is 75mm. Whilst this may have been appropriate when the roof was originally constructed, it is likely to be insufficient to cope with the more frequent, heavier driven downpours resulting from climate change. Potentially linked to this, a large proportion of the battens lower down the roof slopes are decayed and failing, resulting in further water ingress. In addition, a bitumen underfelt is provided, however this has perished and fallen away in places, no longer providing a secondary barrier to rainwater penetration.



Severely decayed wall plate ends to the southwest corner



Decayed rafter and roof laths and perished underfelt to southeast corner

Detailing and defects observed upon opening up the slate coverings

Lead flashings to the ridge, hips and stone cornice are poorly detailed. Sheets are generally longer than recommended in current standards and are simply lapped, allowing driven or standing water to penetrate the joints between sheets, affecting both the roof structure and wall heads. Underside corrosion was noted to the apron flashings to the stone cornice.

Laps provided to the slate coverings are also inadequate, providing further opportunity for water ingress. Flashings have been secured in place with clout nails and screws fixed directly through the lead sheet. On the hips the lead has torn around the fixings and left gaps at the head of the sheet as well as openings around the fixings. The valleys could not be fully investigated as part of the survey, however it is envisaged that similar detailing issues exist, which is supported by partial loss of the ceiling beneath the valley on the northwest corner of the building.

It is recommended that the roof coverings are removed and replaced with improved detailing. The higher quality Welsh slate roof coverings should be retained for reuse where possible. The new detailing should include counter battening to provide ventilation to the roof void and larger head laps to the slates. All leadwork should be replaced with new, appropriately sized sheets jointed and secured to LSTA approved details.



Simple lap detail and underside corrosion on the apron flashing to the stone cornice



Extent of cover from hip flashings together with tear from mechanical fixing through the top of the sheet

Detailing issues with the lead flashings

Roof Structure

The roof structure comprises two intersecting primary trusses running perpendicular to one another. A girder truss runs north to south, forming the ridge, and a king post truss runs west to east. Hip rafters are supported by dragon beam ties in each corner and together with the primary trusses support a series of purlins upon which the common rafters are fixed. Eaves sprockets run from the wall plates onto the stone cornice to continue the pitch of the roof beyond the line of the wall plates.

There is evidence of water ingress on all sides of the roof, with associated decay and wood boring insect activity noted on the oak roof components at lower levels, including to sprockets, wall plates, dragon beams, purlins, hip rafter ends and common rafters. The volume of frass and number of flight holes observed suggests that the environment within the roof void has supported insect activity for a long period of time. The size of flight holes noted during the survey varies, from 1-2mm to 4-5mm. The larger flight holes suggest the presence of deathwatch beetle.



General view from northwest corner of roof void looking diagonally across at the back of the east and south facing roof pitches prior to opening up



View of roof structure through the south roof slope following removal of roof coverings

General arrangement of roof structure



Insect activity and water staining to the hip rafter and purlin on the northwest corner



Flight holes in the dragon beam tie to the southeast corner

Typical examples of decay and insect activity observed

On the south elevation the central principal rafter to the girder truss, one half of the purlin and seven common rafters have been replaced with softwood timbers, possibly during the 2007 repair scheme. The new timbers are smaller in section than the originals and the connection detail between the new principal rafter and purlins is of poor quality. A short length of 50 x 50mm softwood is stitched into the side of the rafter to receive the end of the original purlin, which has been notched with less than 1/3 the depth of the purlin supported.

It is recommended that a structural assessment is undertaken following the removal of all roof coverings to ascertain the extent of timber replacement required. It is anticipated that around a third of the timbers require splice repairs or replacement.



Replacement rafters and purlin provided to the west end of the south elevation and detail of



Connection detail between the original purlin and new principal rafter

Softwood rafters and purlin introduced to the south elevation

Chimney

The chimney provided to the north roof slope is uncapped, with pointing in poor condition and flashings displaced. It is recommended that a stone cap is introduced on stone pedestals to prevent water ingress and maintain ventilation through the stack. The stack should also be repointed and flashing re-fixed or replaced as necessary.



General view of chimney

Stone cornice

The sandstone cornice has been subject to significant moisture resulting in vegetation growth in some areas and the loss of detail. One cornice stone has tipped forward out of position at some stage and has been repointed in this position.

In addition to the provision of adequate flashings, it is recommended that where loose material is present on the face of the stonework this is lightly brushed away to promote air movement and assist in drying the stone. Consideration should also be given to replacing the iron cramps with stainless steel equivalents to ensure long term stability in the cornice.



Ongoing delamination to the cornice on the north elevation



Loss of detail observed on the west elevation



Water staining and vegetation growth on the west elevation



Displaced cornice stone and dead ivy growth beneath the lead apron

Images of stone cornice

Rainwater Goods

Round profiled cast iron rainwater goods provided to the east elevation are clear of debris and standing water and there is no evidence of staining indicating they are not performing, though it was not raining immediately prior to or during the survey.

Rainwater goods are not provided to the other elevations. Considering the impact of climate change and the low-level damp issues noted within the building, it is recommended that a gutter is provided. The precise detailing will need to be carefully considered to ensure the aesthetic of the building is not significantly harmed.



View of the gutter from the north side



View of gutter from the south side

Ceiling Condition Assessment & Recommendations

Ceiling

Internally, the Gun Room includes a main ground-floor room, Room G1, with a lower-ground-floor room, Room G2, to the east.

Room G1 is the principal room in the building and features a venetian window to the west elevation and opposing apses in the south and north ends of the room. A central scaffold has been installed to support the flat section of the main ceiling. Where unsupported, including to the decorative cornice and arched bay window, sections of the plasterwork have fallen away. The debris on the floor shows that the plaster had a good key with the lath, however the laths themselves have failed due to extensive insect attack and decay.



View of ceiling and supporting scaffold structure in G1



Central section of ceiling lost in the bay window



Section of cornice that has fallen away in G1



Laths still attached to a section of plaster fallen. Small insect flight holes present and the laths are brittle and friable.

Internal views of the ceiling and cornice in G1

The ceiling structures comprise a series of primary beams, approx. 230 x 230mm in section, spanning between the walls and suspended from the roof trusses, with secondary joists approximately 80 x 80mm spanning the beams and receiving the lath and plaster ceilings. A series of struts and shaped joists form the apses. The secondary joists and laths show significant insect activity, with section loss and total failure evident in many areas.



Significant cross sectional loss to the ceiling joists above G1



Ceiling joists have lost their connection to the wall on the south elevation in G1

Views of the G1 ceiling structure from the roof void



View of the west and north walls and plain ceiling in G2



View of the ceiling structure to the upper ceiling in G2

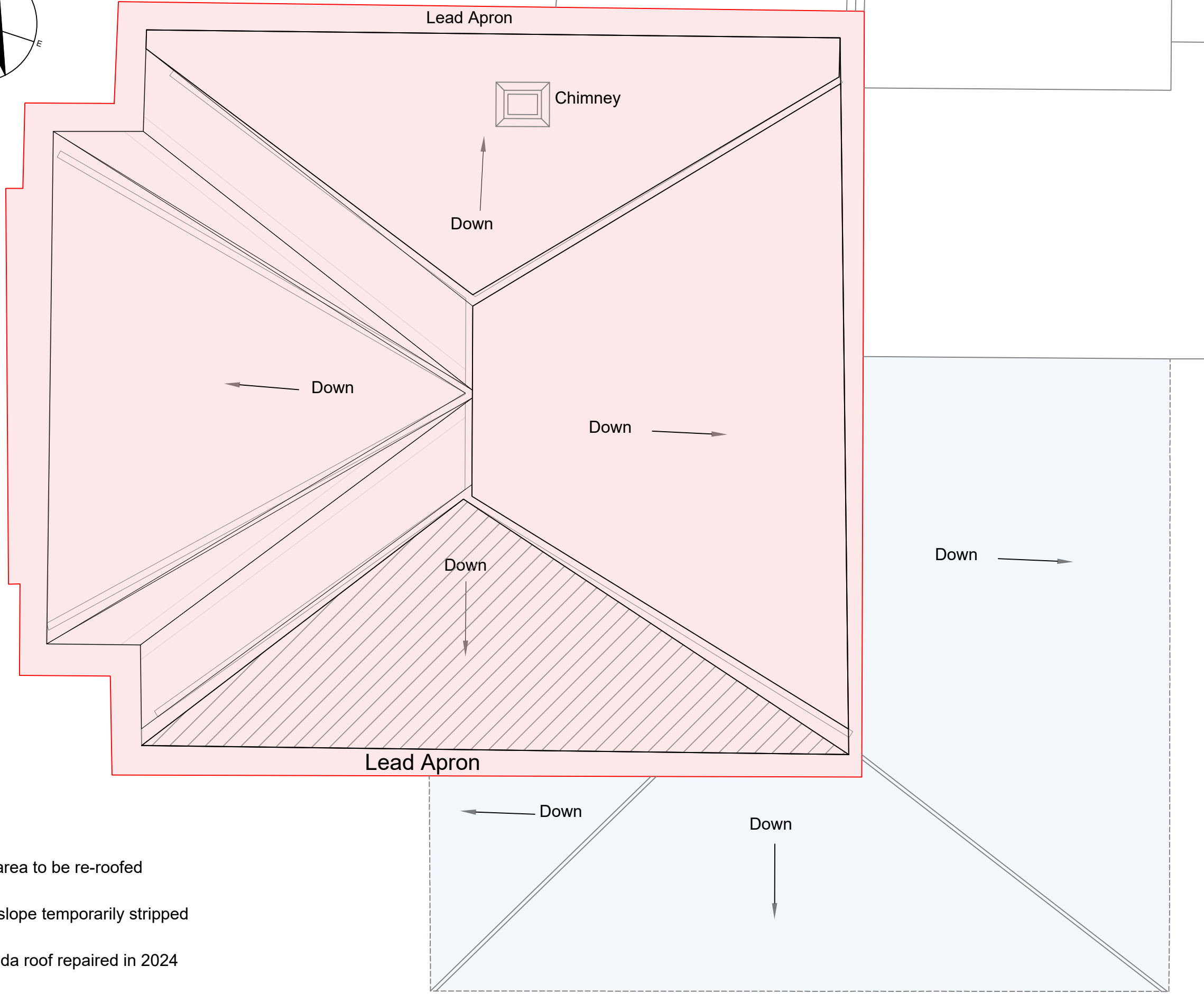
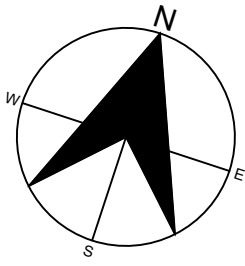
View of the ceilings in G2 from above and beneath

There are two ceilings provided within Room G2, from within the room a plain ceiling is seen with three loft hatches spaced evenly along the centre line. This aligns with the top of the window openings and is an obvious later addition. Assessment of the ceiling structure from above confirms that the original ceiling remains at the higher level, with the more recent ceiling visible through the hatch. As with G1, the upper ceiling structure shows evidence of insect attack. The lower ceiling structure cannot be safely accessed.

It is recommended that a specialist conservation report is commissioned to identify an appropriate remediation strategy to retain as much of the original fabric as possible, however a new ceiling structure is required. This will need to be executed from above and should be co-ordinated with the roofing work to ensure adequate access. Given the nature of these works, a fully covered scaffold should be provided.

Appendix A

Drawings



- Roof area to be re-roofed
- Roof slope temporarily stripped
- Veranda roof repaired in 2024

The dimensions in this drawing are believed to be accurate at the scale identified below to a reasonable tolerance, unless stated otherwise, providing the drawing has been reproduced using a correctly calibrated plotting device. Photocopies and subsequent reproductions must not be scaled.

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Revision	By	Date	Details

Notes

Key

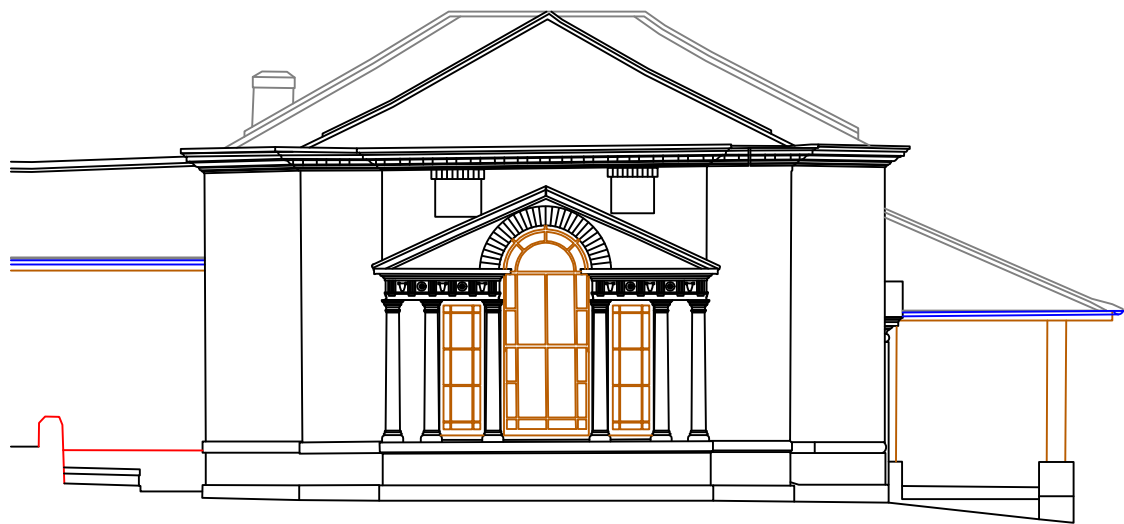


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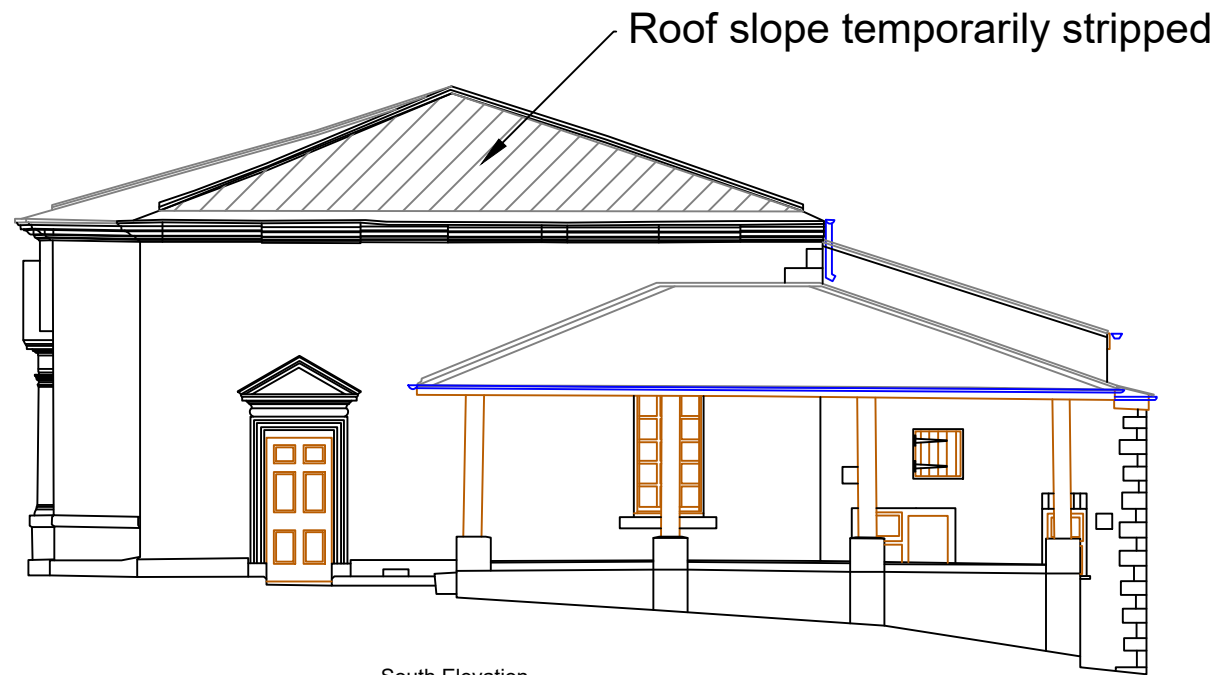
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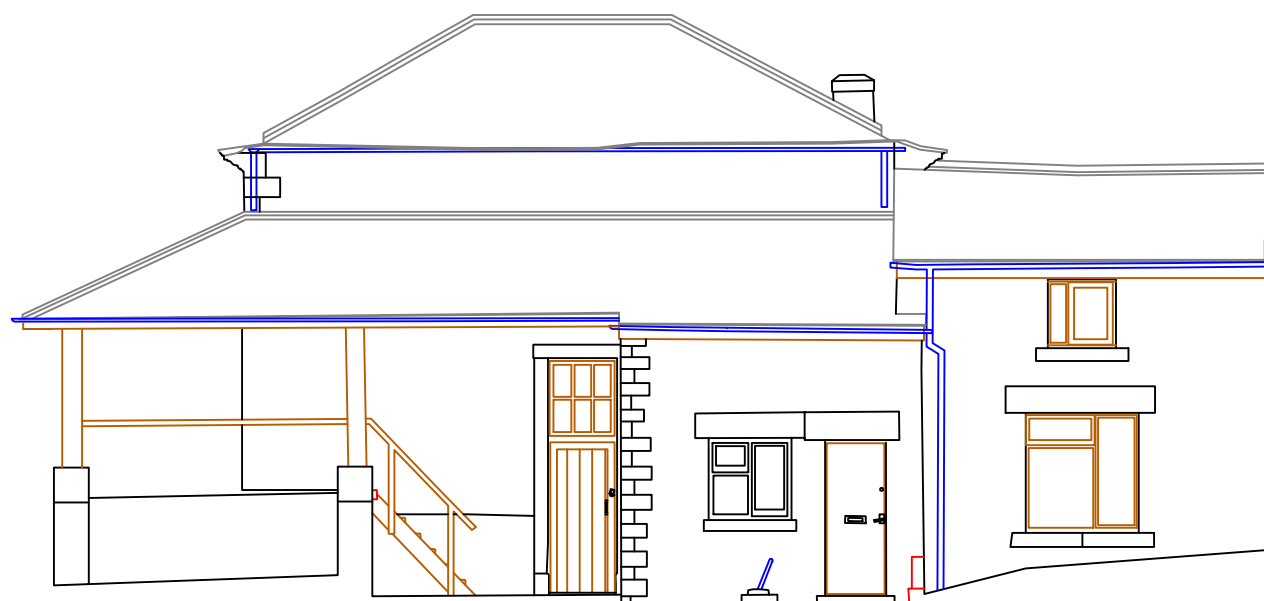
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Drawn By David Rankine	Date 24 March 2025
Scale @ A3 1:50	Property Reference -
Drawing No WCG_GRR Surv_01	Revision 0



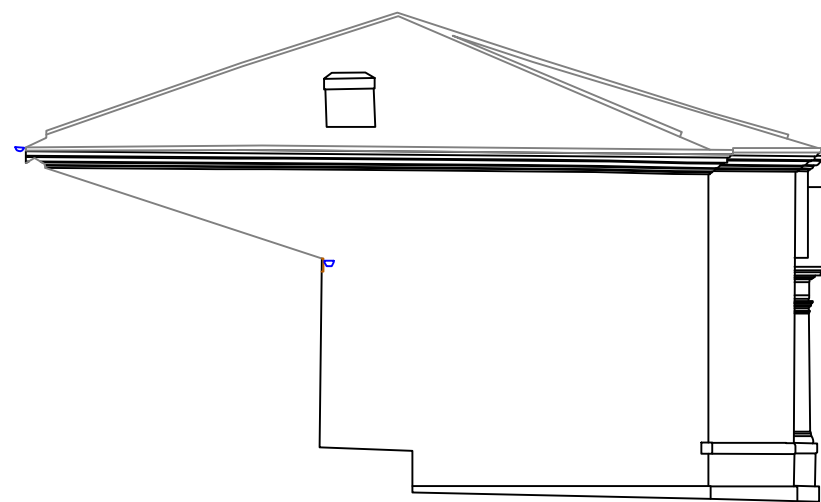
West Elevation



South Elevation



East Elevation



North Elevation

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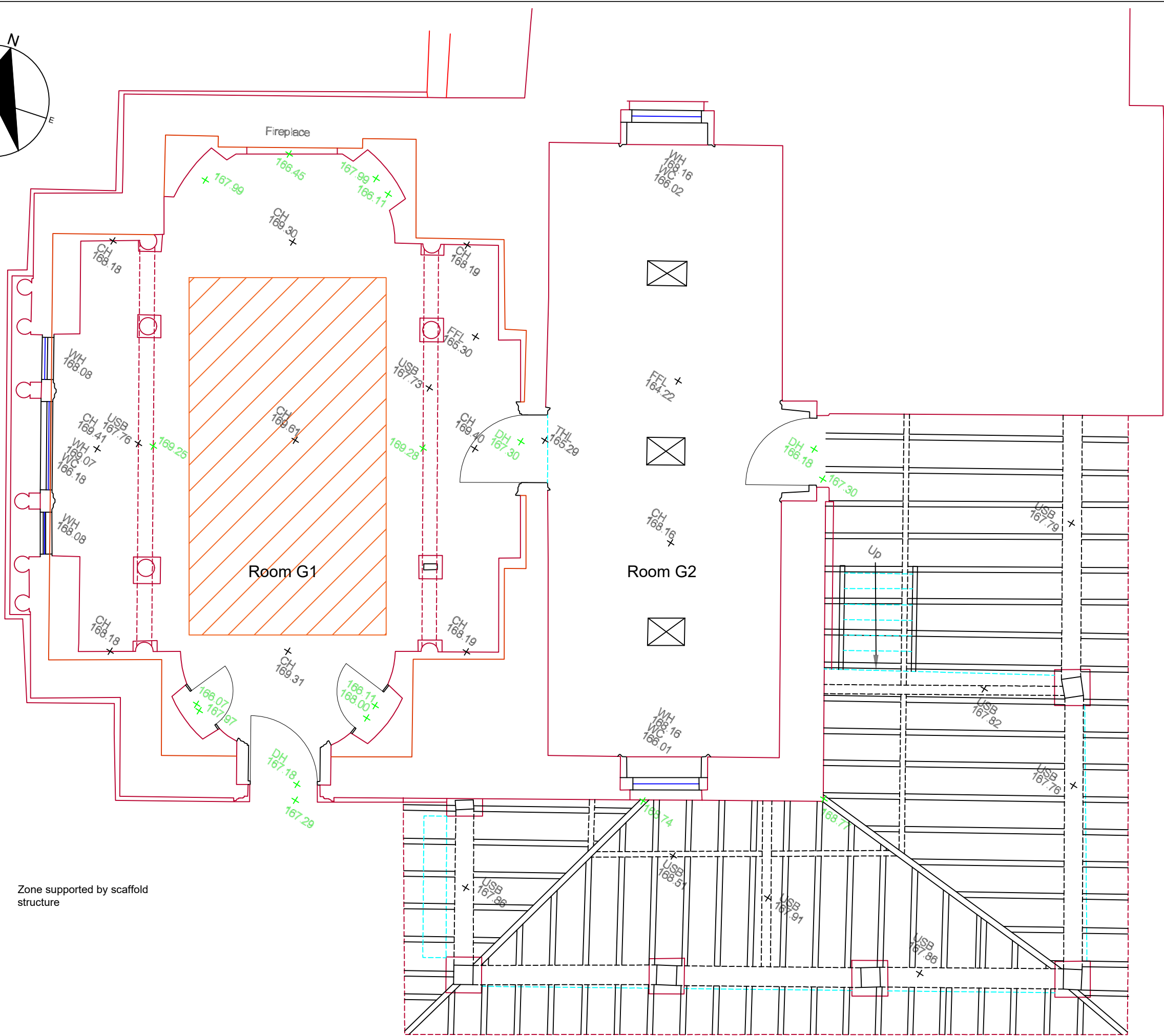
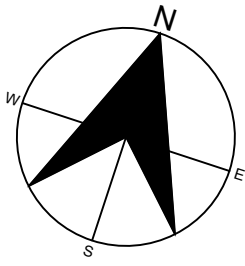
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Project Title Gun Room Roof & Ceiling Survey		Drawing Title Elevations	
Drawn By David Rankine		Date 24 March 2025	
Scale @ A3 1:100		Property Reference -	
Drawing No WCG_GRR Surv_02			Revision 0



 Zone supported by scaffold structure

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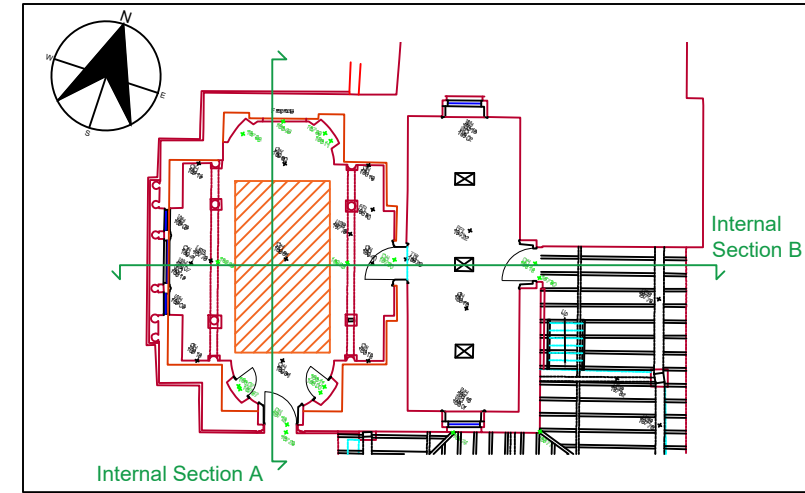
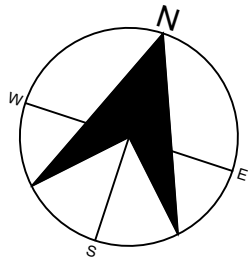
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Project Title Gun Room Roof & Ceiling Survey	Drawing Title Existing Floor Plan
Drawn By David Rankine	Date 24 March 2025
Scale @ A3 1:50	Property Reference -
Drawing No WCG_GRR Surv_04	Revision 0



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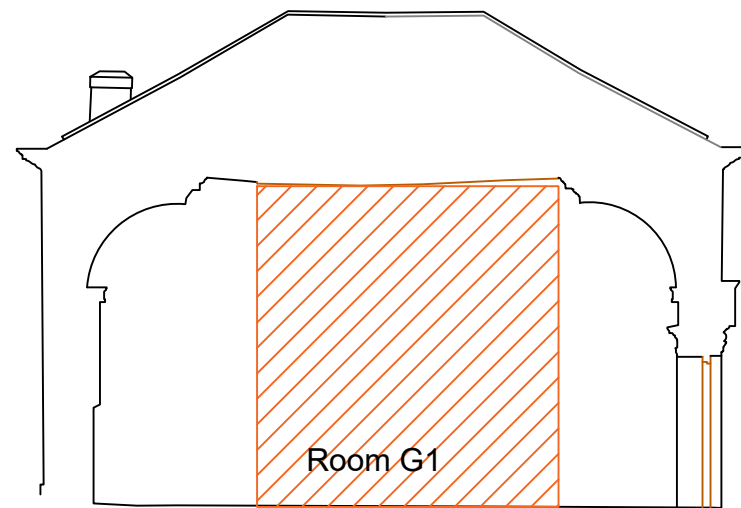
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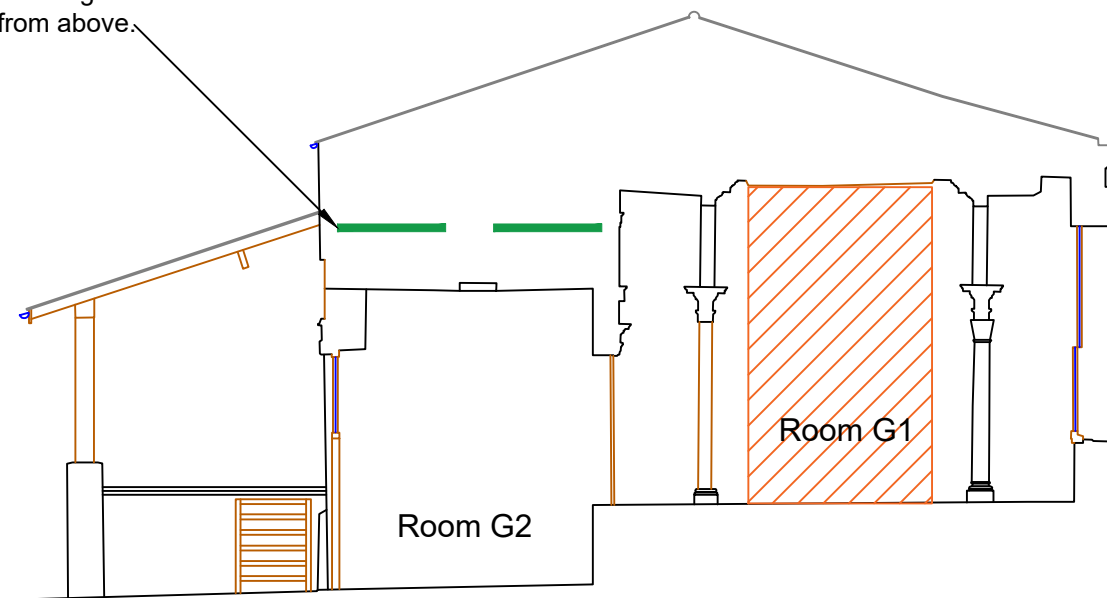
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Project Title Gun Room Roof & Ceiling Survey		Drawing Title Internal Sections	
Drawn By David Rankine		Date 24 March 2025	
Scale @ A3 1:100		Property Reference -	
Drawing No WCG_GRR Surv_05			Revision 0




Internal Section A

Approximate line of original ceiling observed from above.



Internal Section B

 Zone supported by scaffold structure

Appendix B

Cost Estimate

National Trust

The Gun Room, Wentworth Castle Gardens Budget Cost Estimate

Phase 1 - Roof Repairs and Ceiling Stabilisation

Rev: A
Date: 28 March 2025

Item	Description	Measure	Unit	Rate (£)	Cost (£)
Part 1.00	General & Prep Works				£3,500
1.01	Decant and removal of all items stored in the building	1	item	2,500.00	£2,500
1.02	Clearance of debris	40	m2	25.00	£1,000
Part 2.00	External Works				£71,350
2.01	Scaffold including full building cover	1	item	20,000.00	£20,000
2.02	De-veg and descale sandstone cornice, remove and rebed displaced stone	1	item	1,500.00	£1,500
2.03	Replace iron cramps with stainless steel, refix and repoint cornice stones	41	m	50.00	£2,050
2.04	Repoint and cap the chimney stack	1	item	500.00	£500
2.05	Splice repair / replace rotten and decayed timbers.	1	item	15,000.00	£15,000
2.06	Replace lead apron to cornice	41	m	250.00	£10,250
2.07	Felt, batten and slate roof including 50% new (reclaimed) and 50% reused. All new valleys, hips and ridges	98	m2	225.00	£22,050
Part 3.00	Internal Works				£54,000
3.01	Alteration and removal of scaffold internally to facilitate the works	1	item	8,000.00	£8,000
3.02	Provision of supporting structure above ceiling level	1	Item	10,000.00	£10,000
3.02	Conservation & repair of ceiling plasterwork. (Decoration at a later stage)	40	m2	900.00	£36,000
A	Works Sub Total				£128,850
Part 4.00	Prelims & Contingencies				£56,694
4.01	Preliminaries	20%			£25,770
4.02	Client contingencies	20%			£30,924
B	Works Total				£185,544
Part 5.00	Professional Fees & Surveys				£64,799
5.01	Architect	15%			£27,832
5.02	Structural Engineer	8%			£14,844
5.03	Quantity Surveyor	8%			£14,844
5.04	Preliminary Ecological Assessment & Bat Surveys	1	item	1,500.00	£1,500
5.05	Asbestos Survey	1	item	500.00	£500
5.06	Plaster survey	1	item	5,280.00	£5,280
Part 6.00	Value Added Tax				£0
6.01	The proposed works are VAT exempt.	0%			£0
C	TOTAL PROJECT COSTS				£250,343