Paul Grinyer Associates Ltd
Structural Engineers
& Party Wall Surveyors

Structural Feasibility Report

THE HUB, PIDDINGHOE AVENUE, PEACEHAVEN, BN10 8RH:
Feasibility report on possible replacement of existing roof coverings, adding solar PV, a revised roof structure arrangement, and possible additional storey.

Client

Peacehaven Town Council
Peacehaven Community House, Greenwich Way, Peacehaven, BN10 8BB

Ref: 25008
Date: 26th March 2025

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Contents

Instruction

Paul Grinyer Associates Ltd were instructed Mr George Dyson, Town Clerk, acting for and on behalf of the client, Peacehaven Town Council, to carry out a Preliminary Visual Inspection & Report on the feasibility of an alternative roof arrangement, whether the roof could accommodate a solar panel array arrangement and if it is possible to include an additional storey to the building.

Limitations

This report is intended for our client's own private and confidential use and for their legal and professional advisors. It should not be reproduced in whole or in part or relied upon by third parties for any use whatsoever, without our express written authority.

We have not inspected parts of the structure or property, which are covered, unexposed or inaccessible, and we are therefore unable to report that any such part of the property is free from defect.

Our inspection of the property was limited to viewing accessible areas within the existing building structure and externally from ground level only.

We also reviewed some available record drawing information for the building, the content of which was however limited and did not provide confirmation of the exact "as built" structural arrangement.

Inspection

An inspection was undertaken on 20th March 2025. The tenants met us at the property to provide access for the purpose of our inspection.

General description

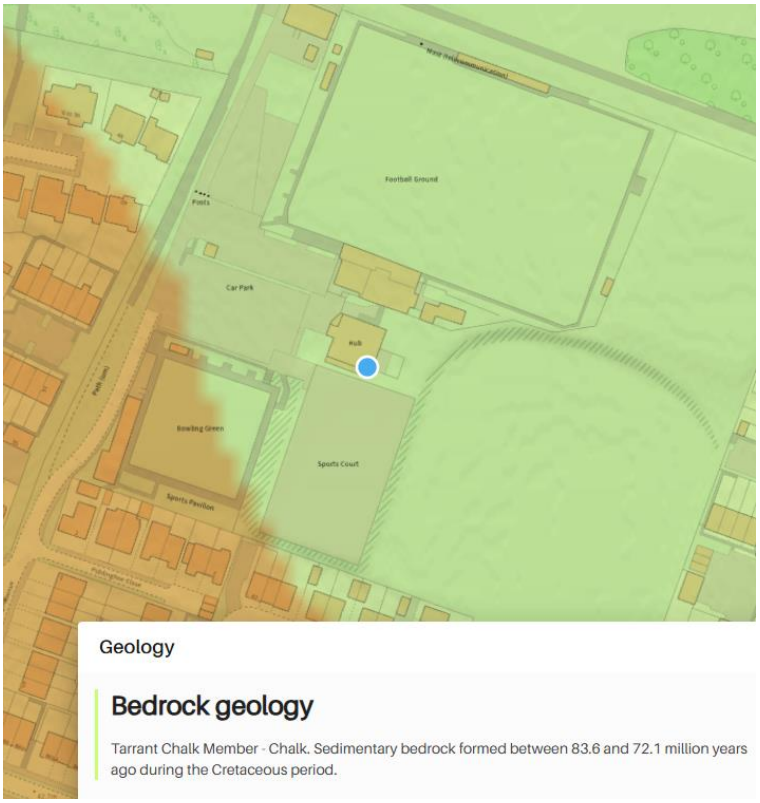
A single storey community building serving the adjacent leisure facilities, with changing rooms and an open plan multi use space.

The building is of load bearing masonry construction with a lightweight steel roof, hipped on all four sides, and was built in 1985, using materials and methods common to that era.

The front entrance of the building faces west.

Geology

Having reviewed the British Geological Survey map data for the area it is noted the property appears to be underlain by Tarrant Chalk Bedrock, with no overlaying superficial deposits. It is noted that an area of Head Deposits is present to the west, and within relatively close proximity to the building, and which may be present. An SGBP = 150kPA will be assumed for bearing onto the Chalk stratum.



British Geological Survey map extract

Historical Record Information

A visit to Peacehaven Town Council's offices was carried out in order to inspect and review historical record information held for the building, in order to try to confirm the form of construction of critical building elements, such as foundations, load bearing wall construction and roof structure arrangement.

Record information included copies of original building plans from Lewes District Council, detailing the original form of construction of the building.

The following information was obtained:

Roof

A profiled aluminium sheet covering of 0.55mm thickness with 50mm of bonded Polyurethane insulation. Roof sheeting under cloaked with finishing board (plasterboard / hardboard).

Metsec 232x70 ZED purlins at 1800mm spacing formed as a sleeved system and with appropriate anti-sag / lateral restraint bars.

Metsec proprietary metal lattice trusses, supported on padstones to the external walls and off of the top of a central blockwork pier.

Ceilings

To the changing rooms there were timber ceilings, formed in 50x150 timber joists at 400mm spacing, supported onto walls using proprietary joist hangers.

Walls

External walls of 7N, 130mm block inner leaf, 50mm cavity and 102mm brick outer leaf. Upper sections of external walls above window heads is timber clad above brickwork.

Internal compartment walls separating the hall area from the rest of the building were 200mm thick 7N block construction.

All other internal partition walls were 100mm thick, 3.5N block construction. All masonry laid in a Class iii) mortar.

A 450mm x 450mm, 7N blockwork, pier was formed in the centre of the building, below the apex, supporting the roof trusses.

Ground floor

The ground floor slab was formed with a 65mm screed over 25mm insulation, on a 150mm thick reinforced concrete ground bearing slab, which was formed on 25mm sand blinding on 150mm compacted hardcore.

Foundations

External walls had 600mm wide mass concrete strip foundations, with formation depth at 1000mm below ground level. The sides of the external wall foundations were clad with Claymaster void former.

The 200mm thick internal compartment wall was formed off of 600mm wide mass concrete strip foundations, with formation depth at 1000mm below ground level.

Blockwork walls supporting the ceilings over the changing rooms were built off of 500mm wide x 300mm deep reinforced concrete slab thickenings, cast homogeneously with the 150mm over-site slab. All other non-load bearing partitions built off of the 150mm thick slab.

The central blockwork pier had a 900mm x 900mm concrete pad foundations, with formation depth at 1000mm below ground level.

Observations

We visited the property in order to review its general form and to confirm the historical record information was accurate and a true representation of how the building was actually constructed.

Our inspection confirmed the roof construction was generally in accordance with the record information viewed. With a profiled metal deck roof, supported on ZED purlins, in turn supported by proprietary Metsec roof trusses.

The external walls were confirmed to be cavity brick & block construction, with concrete padstones under the bearings of the roof trusses. The thickness of the block inner leaf could not be confirmed, but is assumed to be 130mm, given the wall thickness measured approximately 280mm, in line with the historical record information drawings.

The internal compartment wall was 200mm thick, with internal partially load bearing and non-load bearing walls being 100mm thick blockwork.

Some localised cracking was noted to the blockwork walls internally, which is thought likely to be due to localised expansion and contraction from changes in temperature and moisture content and potentially a small amount of deflection of the roof structure causing movement to blockwork formed around the trusses. No significant external cracking was noted.

The ground floor was of concrete construction, though was largely covered with either floor tiles or carpet. It is assumed the ground floor structure of the building is formed as detailed on the historical record information, given the rest of the building form appears consistent with that same information. No significant movement, deformation of deflection of the ground floor slab was noted.

Foundations could not be viewed, for obvious reasons, being below ground level. It is assumed the foundations of the building are formed as detailed on the historical record information, given the rest of the building form appears consistent with that same information. No cracking or movement to the external walls, which might otherwise be indicative of foundation inadequacies, was noted.

Discussion

From our site inspection it appears The HUB has been constructed in accordance with the historical record drawings available, and is in sound structural condition, with no significant structural defects evident to it.

Replacement Roofing

There is a proposal that would see the existing roof system replaced, removing the existing profiled metal roof, bonded insulation, and under cloaking, and installing a new insulated composite metal sheet roof. The exact form has not been confirmed at this stage, but it is assumed it will comprise a profiled steel liner sheet, insulation, and outer profiled sheet. It is assumed the metal sheets in the system will be around 0.7mm thickness, and around 100mm high performance insulation. Calculations below will assess the structure's capacity, based on a percentage load change.

Existing loads – Steel purlin structure

Dead Loads	kN/m^2
Steel frame to roof	0.75
Steel purlins @ 1.8m centres	0.10
Outer covering, liner sheet & insulation	0.30
Services	0.10
	1.25

Imposed Loads	kN/m^2
From BS6399 for roof areas exceeding A = 200m^2	0.60

Total existing loads = 1.25 + 0.6 = 1.85kN/m^2

Proposed loads – Steel purlin structure

Dead Loads	kN/m^2
Steel frame to roof	0.75
Steel purlins @ 1.8m centres	0.10
Outer covering, liner sheet & insulation (system to be confirmed)	0.30
Services	0.10
	1.25

Imposed Loads	kN/m^2
From BS6399 for roof areas exceeding A = 200m^2	0.60

Total existing loads = 1.25 + 0.6 = 1.85kN/m^2

Load Comparison (steel purlins)

Dead + Imposed Loads	
Existing roof load	1.85kN/m^2
Proposed roof load	1.85kN/m^2 (subject to confirming roof system)

THE EXISTING AND PROPOSED ROOF LOADS ARE LIKELY THE SAME OR VERY SIMILAR AND THE STRUCTURE WILL THEREFORE BE CAPABLE OF SUPPORTING A NEW ROOF SYSTEM OF SIMILAR FORM, SUBJECT TO CONFIRMING THE LOADS OF ANY REPLACEMENT SYSTEM ARE SIMILAR.

Addition on PV Cells to roof

There is a proposal that may see the need for the existing roof to accommodate additional loads from a Photovoltaic Cell array. The exact form and system is yet to be confirmed but generic loads will be considered for typical systems. It is likely only the east, south and west elevations will be subject to additional loads as PV Cells would not likely be added to the north roof slope.

Proposed additional loads

Additional Dead Loads	kN/m^2
Typical direct fixed PV Cell array system (12.0kg/m^2)	0.12
	0.12

Increase in load = (0.12 / 1.85) x 100 = 6.5%

Dead Loads only	
Existing roof load	1.25kN/m^2
Proposed PV Cell load	0.12 kN/m^2

Increase in load = (0.12 / 1.25) x 100 = 10.0%

PERCENTAGE LOAD INCREASES ARE 15%, THEREFORE CONSIDER OK, SUBJECT TO CONFIRMING THE LOADS OF ANY REPLACEMENT ROOF SYSTEM IS SIMILAR TO THE EXISTING.

Alternative roof structure configuration

There is a potential proposal that would see the existing hipped roof structure removed and replaced with a duo-pitched roof with a single ridge line running east to west and roof slopes running from north to south.

The exact arrangement and form of the roof has yet to be determined, but on the basis it would be a lightweight steel framed structure, with a composite profiled steel sheet roof covering, the following will review likely loads to the north & south external walls and the internal compartment wall to support the revised roof arrangement.

Proposed loads – Internal Compartment Wall

Dead Loads	kN/m
Steel frame to roof 0.75 x 16.5m / 2	6.20
Steel purlins @ 1.8m centres 0.1 x 16.5m / 2	0.83
Outer covering, liner sheet & insulation 0.3 x 16.5m / 2	2.48
Services 0.1 x 16.5m / 2	0.83
PV Array 0.12 x 16.5m / 4	1.00
Blockwork wall (200mm thick) 3.0 x 5.3m (to ridge)	15.9
	27.24

Imposed Loads	kN/m
From BS6399 for roof areas exceeding A = 200m^2 0.6 x 16.5m / 2	4.95

Total proposed load = 27.24 + 4.95 = 32.2kN/m

Existing foundation is 600mm wide.

Foundation bearing pressure = 32.2 / 0.6m = 54.0kN/m^2 < less than 150kN/m^2 for bearing onto Chalk

Proposed loads – External Cavity Wall

Dead Loads	kN/m
Steel frame to roof 0.75 x 16.5m / 4	3.10
Steel purlins @ 1.8m centres 0.1 x 16.5m / 4	0.42
Outer covering, liner sheet & insulation 0.3 x 16.5m / 4	1.24
Services 0.1 x 16.5m / 4	0.42
PV Array 0.12 x 16.5m / 4	0.50
Cavity wall (200mm thick) 4.2 x 3.3m (to eaves)	13.90
	19.60

Imposed Loads	kN/m
From BS6399 for roof areas exceeding A = 200m^2 0.6 x 16.5m / 4	2.48

Total proposed load = 19.60 + 2.48 = 22.1kN/m

Existing foundation is 600mm wide.

Foundation bearing pressure = 22.1 / 0.6m = 37.0kN/m^2 < less than 150kN/m^2 for bearing onto Chalk

BASED ON THE ABOVE SIMPLIFIED LOAD ASSESSMENT CALCULATIONS THE EXISTING INTERNAL COMPARTMENT WALL AND EXTERNAL CAVITY WALLS, ALONG WITH THEIR RESPECTIVE FOUNDATIONS, WILL BE CAPABLE OF SUPPORTING AN ALTERNATIVE ROOF CONFIGURATION WITH A CENTRAL RIDGE AND NORTH AND SOUTH ROOF SLOPES, IF FORMED USING A STEEL FRAMED CONSTRUCTION AND WITH SIMILAR ROOF COVERINGS TO THE EXISTING ARRANGEMENT

Additional storey to building

In addition to the above proposals, we have been asked to consider the implications of adding another storey to the existing HUB Building.

There are a number of considerations in that regard, particularly with respect to the capacity of the foundations but also, perhaps more onerously, with respect to the requirements within Building Regulations Approved Document A – Structure, for Disproportionate collapse.

It is not clear at this stage what the use proposals are for the building, but as it is currently used for a community space, changing rooms, toilets etc, it is assumed that any additional storey would need to be capable of also being a multi-use space.

We will explore, in simplistic terms, the likely feasibility of adding a further storey to the building, based on the above calculations and on the assumption that this would also require the roof re-configuration work, with a shallow pitch and the ridge height remaining similar.

Proposed loads – Internal Compartment Wall

Dead Loads	kN/m
Steel & timber floor 1.0 x 16.5m / 2	8.25
Lightweight partitions 0.5 x 16.5m / 2	4.13
	12.38

Imposed Loads	kN/m
From BS6399 for use as Classrooms or Offices 3.0 x 16.5m / 2	24.75

Total additional load for proposed additional storey = 12.38 + 24.75 = 37.13kN/m

Additional Foundation bearing pressure = 37.13 / 0.6m = 61.9kN/m^2

Total Foundation bearing pressure = 54.0 + 61.9 = 115.9kN/m^2 < less than 150kN/m^2 for bearing onto Chalk

Proposed loads – Internal Compartment Wall

Dead Loads	kN/m
Steel & timber floor 1.0 x 16.5m / 4	4.13
Lightweight partitions 0.5 x 16.5m / 4	2.07
Additional external wall construction (lightweight) 1.0kN/m2 x 2.0m	2.00
	8.20

Imposed Loads	kN/m
From BS6399 for use as Classrooms or Offices 3.0 x 16.5m / 4	12.38

Total additional load for proposed additional storey = 8.20 + 12.38 = 20.58kN/m

Additional Foundation bearing pressure = 20.58 / 0.6m = 34.3kN/m^2

Total Foundation bearing pressure = 37.0 + 34.3 = 71.3kN/m^2 < less than 150kN/m^2 for bearing onto Chalk

Based on the above simplified load assessment calculations the existing internal compartment wall and external cavity walls, along with their respective foundations, should be capable of supporting an additional storey with an alternative roof configuration with a central ridge and north and south roof slopes and additional external wall construction, if formed using a steel framed construction and with similar roof coverings to the existing arrangement. There will be a requirement to confirm the bearing stratum at bottom of foundation level is that of the expected chalk

Disproportionate collapse

It is necessary to consider disproportionate collapse and the potential implications and changes to the building classification under section A3 of AD-A.

Currently, the building is a single storey, mixed use property, which has been used in the past as a nursery, which falls under the category of a single storey educational building, in accordance with AD-A: Table 11. In this instance the building will fall under Class 2a (lower risk group), and is assumed to have been designed as such, requiring minimal additional structural requirements to achieve compliance.

If the building were extended to include an additional storey, even if only one floor were used as a nursery and having the potential for use as a two storey educational facility, the building structure will change building consequence class in accordance with AD-A: Table 11, falling into Class 2b (higher risk group). It is highly unlikely the building has been designed to comply with this building consequence class, which requires significant structural redundancy, load sharing, alternative load paths, and assessment / resistance to blast loads.

It is considered highly unlikely the existing structure could be altered or strengthened to be able to comply with the requirements of AD-A: A3 for Class 2b, given the form and arrangement of the existing structure. This would preclude its use as a nursery or any form of educational facility and it would need to be classified for perhaps office space or similar use only, which may compromise its ongoing use as a community hub.

Summary

Replacement Roofing

The existing roof and wider building structure can accommodate a replacement roofing system, provided it is similar in form and load to the existing arrangement, subject to confirming loadings for any proposed system.

Addition on PV Cells to roof

The existing roof and wider building structure can accommodate a replacement roofing system + a Photovoltaic Cell array, provided the roofing system is similar in form and load to the existing arrangement, subject to confirming loadings for any proposed system.

Alternative roof structure configuration

The existing building structure and its foundations will be capable of supporting an alternative roof configuration, with a central ridge over the internal compartment wall to the hall area, and a duo pitched roof with north and south facing slopes. This could also accommodate a Photovoltaic Cell array on the roof slopes as required.

Additional storey to building

It is considered unlikely that the existing building can be strengthened or altered to allow for an additional storey height and maintain compliance with the requirements of the Building Regulations Approved Document A: A3 Disproportionate Collapse and still retain multi use functionality.

The building foundations and structure are likely to be adequate, subject to confirmation of the actual ground conditions at foundation level being that of Chalk and not Head deposits, as may be the case. If the foundations of the building are formed on Head deposits the internal compartment wall foundations would become overloaded and require a design which would need to limit said loads and require additional new foundations to be formed through the existing ground floor slab arrangement and to a depth of at least 1.0m below external ground level to match the depth of the existing foundations of the building. This may not be economically viable but would require a suitable scheme to be outlined and costed by a Quantity Surveyor for comparison of cost options.

There are a number of considerations in that regard, particularly with respect to the capacity of the foundations but also, perhaps more onerously, with respect to the requirements within Building Regulations Approved Document A – Structure, for Disproportionate collapse.

Conclusions

Paul Grinyer Associates Ltd were instructed Mr George Dyson, Town Clerk, acting for and on behalf of the client, Peacehaven Town Council, to carry out a Preliminary Visual Inspection & Report on the feasibility of an alternative roof arrangement, whether the roof could accommodate a solar panel array arrangement and if it is possible to include an additional storey to the building.

We have reviewed the various options for altering the existing structure and provided confirmation on what will and will not be possible, subject to further review of scheme designs, proposed roofing specifications, and loads and design loads from any solar PV array being considered.

An additional storey height to the building is considered unlikely to be possible, for the reasons outlined above.

Prepared by: **Eur Ing PAUL GRINYER CEng MIStructE CBuildE FCABE MRPSA MPTS**

For and on behalf of Paul Grinyer Associates Ltd

Appendices - Photographs

Photo 1 – The HUB	Photo 2 – Internal view of roof (Hall)
	
Photo 3 – Truss bearing on external wall	**Photo 4 – Original roof plan (1985)**

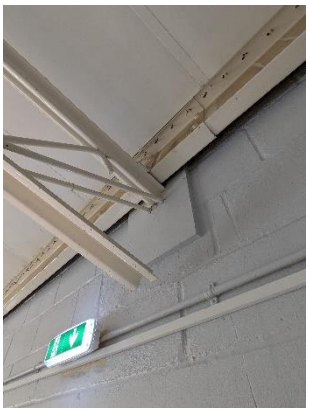
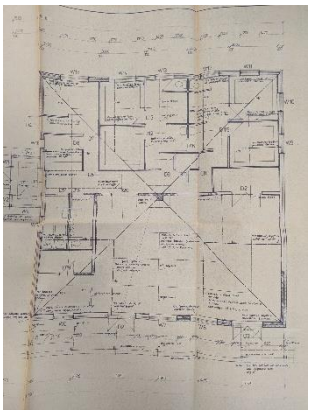

	

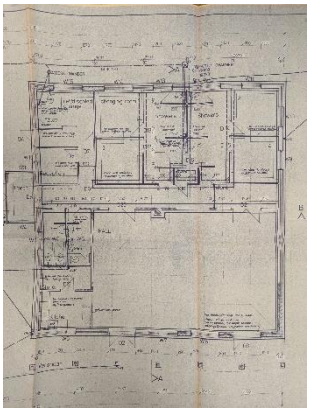
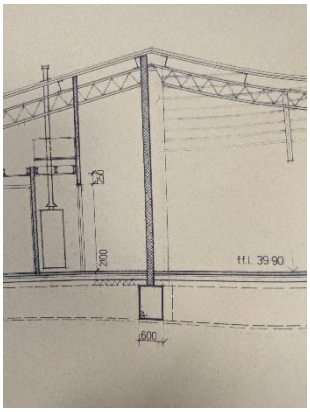
Photo 5 – Original foundation plan (1985)	**Photo 6 – Original section (1985)**
	

Photo 7 - Original section (1985)	Photo 8 – Slab thickening (1985)

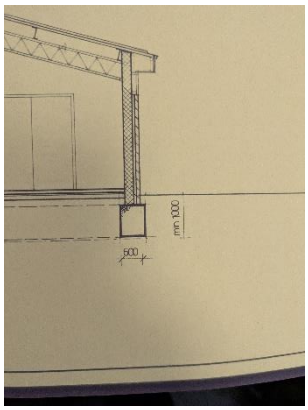
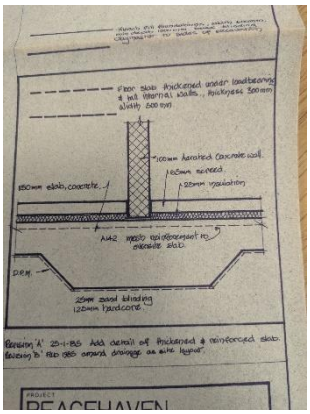

	

Photo 9 – External wall section (1985)	Photo 10 – Internal wall section (1985)

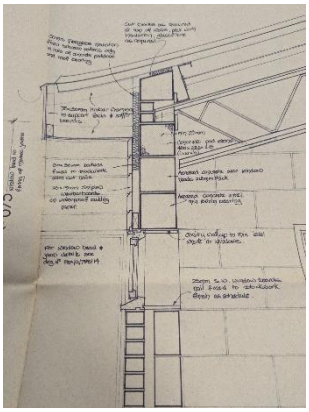
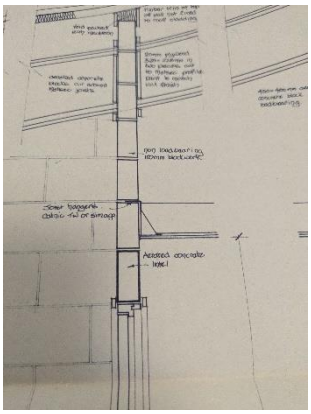
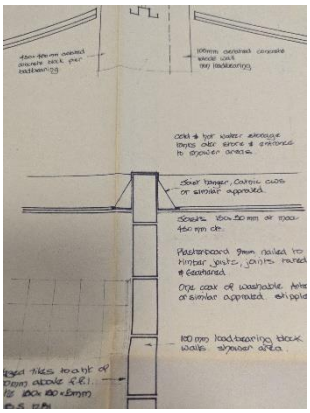

	

Photo 11 – Changing room wall section (1985)	Photo 12
	NOT USED