

Latchets, Malmesbury

Structural Report

For

Mr G Mcatamney

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Clegg Associates Ltd

Bryer Ash Business Park,
Trowbridge, Wiltshire, BA14 8HE

T: 01225 541088
www.cleggassociates.co.uk

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Prepared By:

Connor Wordley
Project Engineer

Approved By:

Martin Stekkinger
Associate

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Executive Summary

Clegg Associates conducted a non-intrusive visual inspection of *Latchets*, a Grade II listed cottage in Malmesbury, including its small outbuilding, to assess the structural condition of both buildings and evaluate the feasibility of proposed conversion works.

Overall, the property and outbuilding were found to be in good structural condition, with no significant signs of cracking, movement, or member failure. The roof, which was reconstructed in the 1970s, and the main structural walls are stable and serviceable, though some minor maintenance, such as managing ivy growth, is recommended.

Key findings and recommendations include:

- **Foundations and Walls:** The foundations are consistent with the building's age and condition, and the stone walls are sound. No strengthening works are required.
- **Roof and Upper Structure:** The roof and purlins are generally in good condition, though further intrusive inspection is required to confirm the load-bearing status of certain exposed purlins slated for removal.
- **Ground Floor Proposal:** The partial removal of the internal buttressing wall is feasible, provided a replacement structural beam is installed. Complete removal is not advised without additional structural analysis.
- **First Floor Proposal:** Non-load-bearing stud walls may be safely removed. The addition of a dormer window is structurally viable with the installation of new valley beams, provided roof member capacities are verified.
- **Outbuilding Proposal:** Conversion to an office space is achievable. To increase headroom, raising the roof is preferable to lowering the floor, which could compromise the boundary wall stability.

In conclusion, the proposed alterations to both the main cottage and outbuilding are structurally feasible with appropriate design considerations and minor investigative works. The property is well-suited for the planned development and requires only localized adjustments to ensure safe and compliant modifications.

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1.0 Introduction

Clegg Associates have been employed to carry out a non-intrusive visual inspecting to the grade 2 listed building Latchets. The purpose of this report is to comment on the structural condition of the cottage and the small outbuilding, as well as to comment on the feasibility of the proposed conversion. Any remedial works that are required, will also be stated within this report.

2.0 General

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

This report letter is prepared for the sole use of you and your professional advisers. We accept responsibility to you alone for the stated purposes that the report will be prepared with the skill, care and diligence reasonably expected of a competent Chartered Engineer, but accept no responsibility whatsoever to any person other than you. Any other person relies on the report at his own risk.

3.0 Description

The Latchets is a Grade II listed building, situated in the town of Malmesbury. The building is a small cottage and is broadly rectangular on plan with a cruciform duo pitch roof, forming gable walls on each side of the building. The ones at the front and rear of the property being smallest. Attached to the main structure is a small entrance building which appeared to have been constructed more recently, but to match the existing structure. Both structures are formed of what appeared to be a solid stone wall with the roof above being stone tiles. The property is constructed of two floors, with the first floor being partially within the roof space. The roof on the structure appeared to be of relatively new construction.



Figure 1: Site plan of Latchets Malmesbury by Cubit Consulting

4.0 Observations

4.1 Inspection

Date of Inspection: 9th January 2023

Time of Inspection 10.00am

Weather Conditions Sunny, clear

Photographs of the visit have been attached in Appendix A.

4.2 External Observations

4.2.1 Foundations

Prior to Clegg Associates visit to the property, trial holes were dug close to the external wall of the structure. This was done to help assess the current foundations which may be impacted if additional structures are added to the building. Below is a location plan of the ground floor and the locations of the trial pit that was dug.

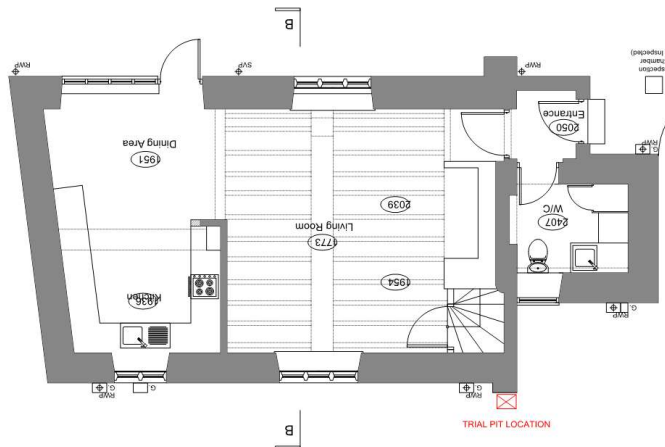


Figure 2: Ground floor plan showing trial pit location



Figure 3: Photo of widened wall footing at trial pit location

The trial hole was dug to reveal that the wall simply appeared to thicken and was not formed on a concrete footing. This is to be expected of a building of this age. The footing was measured to be 250mm below external ground level and protruding 100mm from the wall above. The exact depth of the footing could not be determined on site as the hole could not be dug much further. The exposed footing showed a depth of 100mm but appeared to extend further below ground. Below is a summary sketch of the foundations found on site.

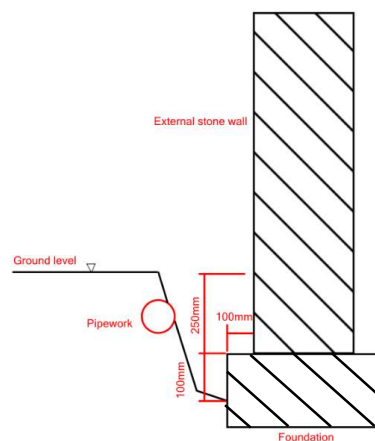


Figure 4: Sketch to illustrate foundation.

4.2.2 External Walls

The external walls appeared to be in a relatively good condition. The structure formed of stone and what is assumed to be a cement-based mortar showed no obvious signs of cracking or bowing of the wall. Some areas of the wall looked as though they had been repaired with a concrete-based mortar which may have been where cracks had previously appeared. It was noted that the rear face of the property had areas of ivy growing up the wall. Although not an immediate danger to the structure, the ivy should be kept trimmed and not allowed to overgrow substantially. In some cases, ivy can penetrate the mortar within walls and begin to loosen brick or stonework.



Figure 5: Photo of smaller front gable



Figure 6: Photo of single-story side structure

4.2.3 External Boundary Wall

To one side of the property, a dry-stone wall was inspected. This wall separates the property from the neighbouring school and was roughly 2.2m high. At the time of the inspection, the wall appeared to be in a good condition with no obvious signs of deflection or cracking.



Figure 7: Photo of boundary wall

4.2.4 External Roof

As previously stated, the roof comprises of multiple pitches which form the two side gables, as well as the smaller front and rear gables. The tiles all appeared to be in a good condition with no obvious signs of any that had fallen away or broken. Often in properties of this age, it is common to see slight deflections in the roof structure externally. However, the roof on this property showed no obvious signs of such and is considered to be in a good condition, with some areas showing signs of lichen. The roof structure was reconstructed within the 1970's which is likely the reasoning for its good condition.



Figure 8: Photo of gable end



Figure 9: Photo of front gable and roof structure

4.3 Internal Observations

4.3.1 Ground Floor

The living space area was one of the first areas which was inspected internally. This space was connected to an open plan style dining room area. The ceiling in this area, comprised timber joists which were exposed and supported on a timber oak beam which spanned from the hip end, a total length of 4930mm. The supports for this beam were exposed and differed at either end. One end showed a small steel beam end which had been blow torch cut. It was unclear how the timber beam above was supported on this steel beam. However, some pieces of timber appeared to be connected to the steel beam which may be what the oak beam above is sat on. The steel beam is then fixed to the steel beam lintel over the window opening.



Figure 10: Photo of first floor joists and main timber beam



Figure 11: Photo of timber beam steel end connection

How this connection is working, was not clear on site and further opening up works would be needed to confirm the exact nature of the support. The oak timber beam was measured to be approximately 300mm wide and appeared to deflect slightly over its length but would not be deemed excessive. The other end of the oak beam, which sat upon the opposing window, had been opened up slightly, to reveal what looked like a concrete lintel.



Figure 12: Photo of timber beam on concrete lintel

The joists above were measured to be 95mm wide and 75mm wide at 450mm spacing. These floor joists appeared to have a small deflection on them but are only spanning 2200mm at the worst location. At one end these joists were supported upon the chimney breast as well as the timber trimmers which formed the staircase. At the other, shorter span, they were supported on the only masonry buttressing wall found at ground floor. This wall was measured to be 2600 mm long and 100 mm wide. This area of wall also supported the timber beam trimmer which supports part of the first floor.



Figure 13: Photo of kitchen partition wall



Figure 14: Photo of kitchen partition wall

Internally, within the lounge and dining room area, the perimeter walls, although plaster boarded, did not shown any obvious signs of cracking, and appeared to be in a good condition. These walls were measured to be 600mm thick.

Within the dining room area, a section of the floor had been exposed to show that it was 120mm thick and formed with concrete. There appeared to be no signs of steel within the ground bearing slab. The ground beneath the slab could be seen and was 390mm deep and comprising a soft clayey material.



Figure 15: Photo of ground bearing slab



Figure 16: Photo of ground bearing slab

4.3.2 First Floor

The first-floor area of the property was formed partially within the roof structure which created a sloped ceiling in some areas, including the master bedroom, bedroom and stairway. Areas of the roof structure were also exposed within the first floor area, including what appeared to be main timber rafter members and purlins. The main rafters were measured to be 195mm by 75mm and the purlins, 265mm by 72mm. The purlins were formed over the top of storage opening within the master bedroom and continued along the opposite side of the building.



Figure 17: Photo of exposed purlin at first floor



Figure 18: Photo of exposed purlin at first floor above staircase

These purlins form the main support of the roof structure as well as tying the rafters together. They appeared to be in a good condition with no signs of rot or excessive deflections.

Valley beams which formed the front and rear gables were also exposed and measured to be 195mm by 75mm. Once again these appeared to be in a good condition.



Figure 19: Photo of exposed valley beam

4.3.3 Roof Structure

After gaining access to the roof structure above the first floor, the roof members could be measured and assessed. Only part of the internal roof structure could be seen due to a water tank which blocked the view of the opposite end of the structure.

The roof comprised 95 mm by 47 mm rafters, spaced at 350 mm. These were tied at ceiling level by the ceiling timbers. A larger tie beams could also be seen which ties the structure as the front and rear gable, where the valley beams sit. These valley beams were supported on another purlin which spans between principal trusses. These trusses were simply collar tied, identical to the rest of the structure, but were much larger, measuring 195mm by 75mm. These are assumed to be the painted brown rafters which can be seen at first floor level.



Figure 20: Photo of principle truss and purlin within loft



Figure 21: Photo of principle truss, purlin and valley beam within loft

In general, the roof appeared to be constructed more recently than the structure below. The ceiling ties, rafters, principal trusses and purlins all appeared to be in a good condition and showed no signs of rot or obvious deflections. However, as stated previously only one end of the roof structure could be assessed as there was no access to the opposite end.

4.3.4 Outbuilding

The outbuilding is a small shed-like structure which is located beside the main property. The building uses construction which is very similar to that of the main building, with thick structural stone walls, timber rafters and stone tiles. The walls were measured to be 400mm thick and the interior floor space to be 4.62m². The eaves timber was measured to be 170mm by 45mm and appeared to simply be butted together at the apex on a ridge board. This could not be confirmed as the interior roof structure was boarded out. The door height was 1500mm above ground level. The dry-stone boundary wall backs onto this structure. The foundation on this building were not inspected on site but it is assumed that, due to the small amount of loading, the wall either thickens below ground or simply continues at 400 mm.



Figure 22: Photo of small outbuilding



Figure 23: Photo of internal area within small outbuilding

5.0 Proposed and Existing Plans and Alterations

Below are a set of plan drawings, created by Atelier Ochre Architecture, which show the existing and proposed layout changes of the structure.

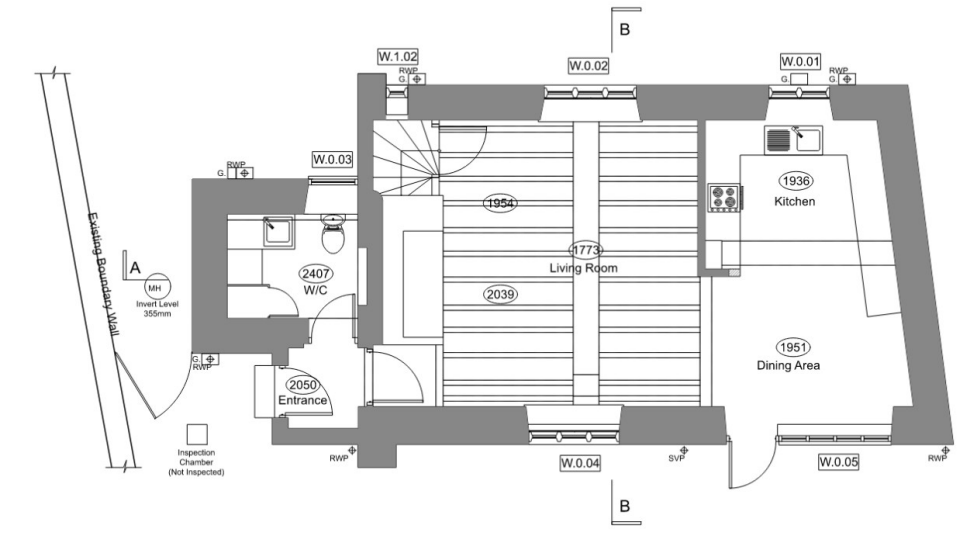


Figure 24: Existing main structure ground floor plan produced by Cubit Consulting

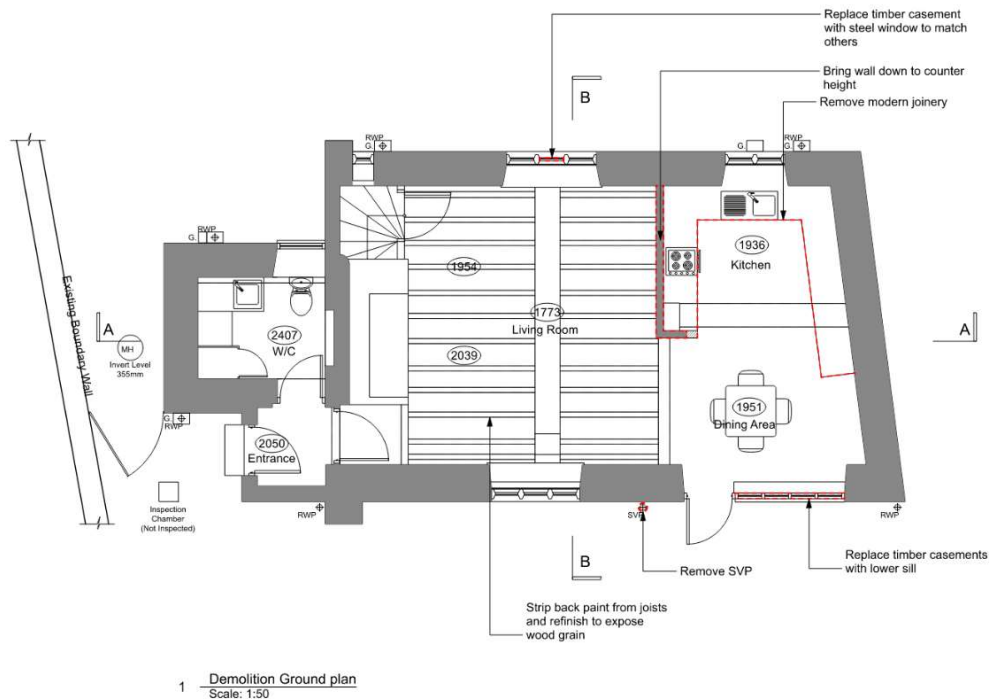


Figure 25: Proposed main structure ground floor plan produced by Cubit Consulting

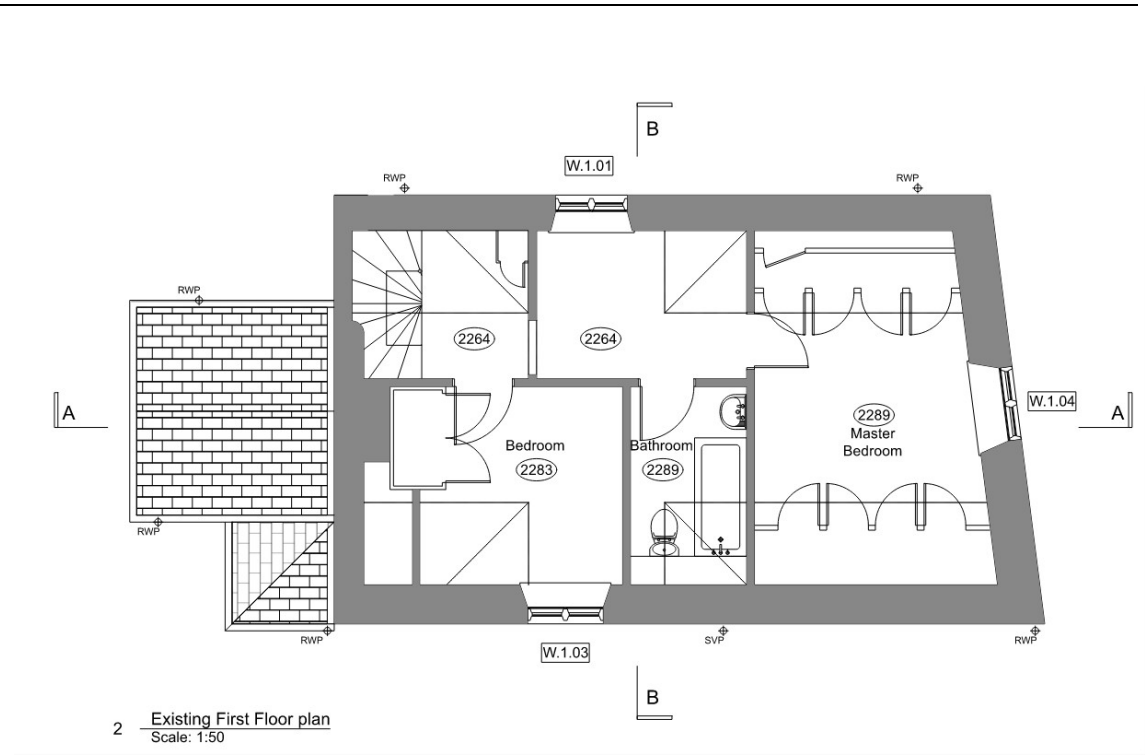


Figure 26: Existing main structure first floor plan produced by Cubit Consulting

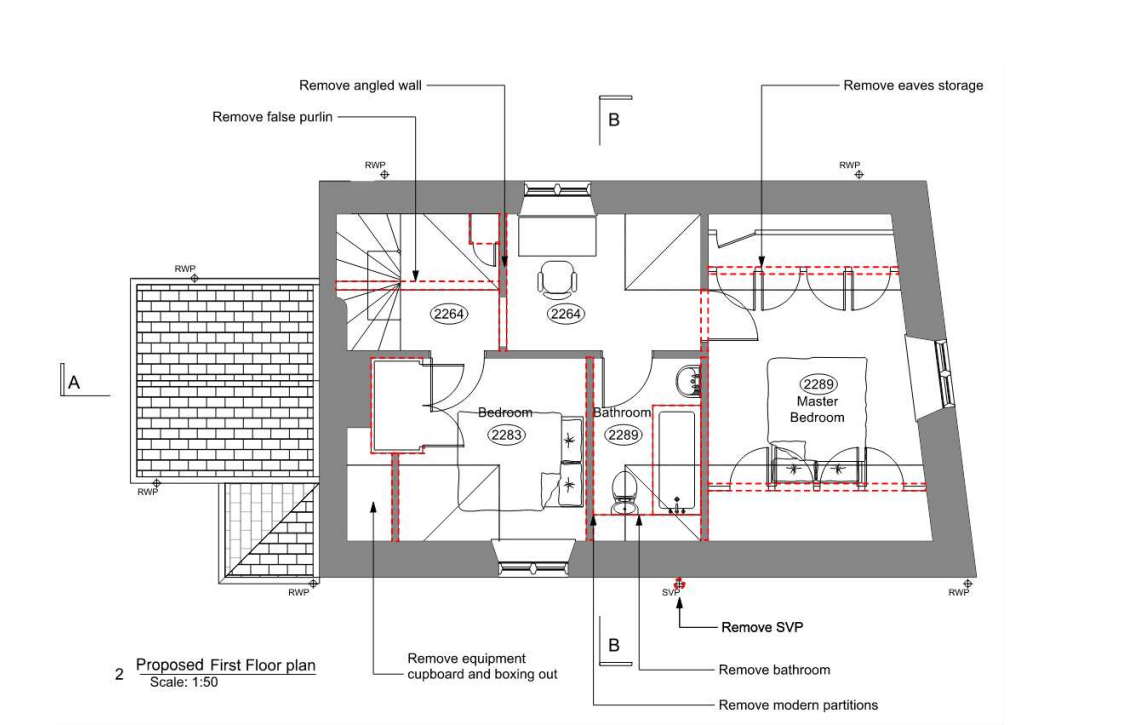


Figure 27: Proposed main structure first floor plan produced by Cubit Consulting

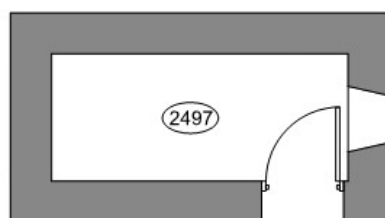


Figure 30: Existing outbuilding ground floor plan produced by Cubit Consulting

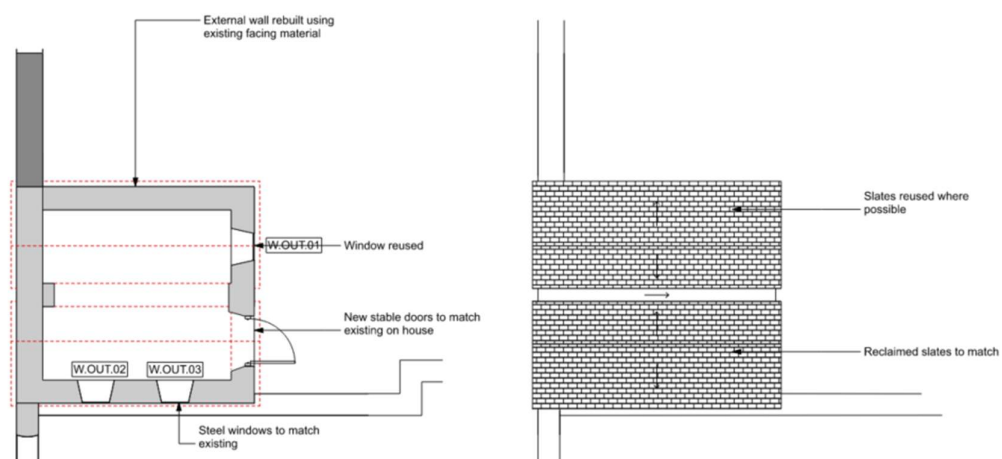


Figure 31: Proposed outbuilding first floor plan produced by Cubit Consulting

6.0 Discussion

6.1 Ground Floor Proposal

The main structural change at ground floor is to remove a part of the buttressing wall which separates the kitchen area from the living space. This wall supports the timber floor joist above, as well as the timber trimmer at the other end of the wall. To compensate for this, the wall, should it be taken down to a lower level, will need to be replaced with a structural beam. This may be in steel and clad in timber or a large timber beam may also work. It is recommended that this wall is not removed entirely. This is due to the fact that it is the only buttressing wall along the entire length of wall. Removing it completely may cause the external wall to bow and/or crack. An analysis can be done to confirm this. A post or frame may be designed to compensate for this.

6.2 First Floor Proposal

At first floor, a number of timber partitions are proposed to be removed. These appear to be non load bearing and can be removed as part of the renovation. It is also proposed for a number of the exposed roof purlins to be removed. It was unclear on site if these were visual or part of the roofs structure. Therefore, a deeper inspection would be required, which would include removing the plasterboard to the rafters and inspecting if these are sat upon the exposed purlins. If found to be non-load bearing, then they may be removed. A new dormer window is also proposed. The existing ceiling joists will remain in place and new valley beams will be required to support the dormer timber walls. This will be supported off the existing roof timbers and is deemed acceptable from a loading perspective.

6.3 Outbuilding Proposal

The proposal of the small outbuilding is to convert this into an office space by adding an extension and knocking one of the external walls down. Structurally, the only comment on this proposal is that the new footings for the outbuilding extension should not impact on the boundary wall which resides beside it. To prevent this, it would be recommended that the structure be constructed on a raft slab. One issue that will occur is the head room that the building provides. To include the required headroom for access and use, the floor would either need to be lowered or the roof would need to be raised. However, it is recommended that the floor is not lowered as doing this would require the footings of the existing building to be lowered, which in turn, could compromise the structural capability of the boundary wall. Therefore, it is suggested that if the head room within the structure needs to be increased, that the roof be raised and additional stonework be provided.

7.0 Conclusions & Recommendations

To conclude this report, it is suggested from the current plans, that the structure is suitable for the proposed development.

The ground floor proposals, including the removal to part of the buttressing wall also seems acceptable, with a new beam over required to support the joists and floor loads. The building showed no signs of cracking and therefore the walls all appeared to be in a satisfactory condition and require no strengthening works.

At first floor, the timber stud walls may be removed and are not deemed to be part of the building structural stability. Exposed timber purlins which have been noted to be removed will need further intrusive inspections to assess if they are load bearing. If found to be only visual, then they may be removed without compromising the roofs structure. The new dormer window may be introduced onto the existing roof structure, providing this does not impact the existing ceiling joist layout. This will also require confirmation of the existing exposed purlins to confirm if they can be removed. New valley beams will be required to support the dormer walls.

The final proposed alteration is the outbuilding. The proposed alterations, structurally appear suitable and would likely be formed on a raft slab. However, to form gain any additional headroom within the structure, the roof would either need to be raised or the floor lowered. Lowering the floor, would not be recommended as doing so would require underpinning to the existing structure which may impact on the boundary wall which surrounds the structure.

A final comment on the whole structure, is that the building appears to be in a good condition, with no obvious signs of cracking or failure of members.

7.0 Appendix A - Photos



