c/o Mr Bart Milburn

Sent via email to bart milburn

16th July 2021

Dear Sirs,

re –<u>Structural Appraisal of Farm Buildings at Dunholme Farm, Haltwhistle</u>

M Design UK Ltd were requested by Anne Storey to undertake a structural appraisal of the farm buildings at Dunholme Farm in Haltwhistle. This was required to support a planning application which proposes to convert some of the buildings to a residential use. The first survey took place on 20th May 2021 and a further site visit took place on 14th June 2021.

Weather conditions during the survey were dry and bright and the survey was non-intrusive in nature.

As the survey is to consider whether the buildings are suitable to be converted to residential use the report has been written with this in mind. Buildings that are not to be incorporated into the proposed plans were not surveyed.

General:

The buildings are a collection of farm buildings that have been used for agricultural activity and storage of farm machinery. The buildings are varied in type, material and size so each one is described individually below. The proposed plans show five dwellings (Units 1-5) and a storage shed and this is how we have referenced the buildings.

<u>Unit 1</u>:

This unit is generally a brick built structure with a corrugated pitched roof covering. The roof is supported with steel trusses and purlins and an open steel frame structure has been added to the northern side of the structure and is being used a store for farm machinery.

The walls of this unit are generally straight although the condition of the brickwork is difficult to assess due to the render which has been applied. Looking at patches of missing render some of the bricks are weathered and have some frost damage but the condition is reasonable given the age of the building. Along the southern elevation the wall is not completely straight but this is not surprising given the length of the elevation. Some bricks are missing withing the western gable wall.

The walls have been increased in height by approximately a metre and this has been done in blockwork built up off the brick below.

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The steelwork both within the main building has some corrosion but this could be treated and locally repaired as required. Section sizes could also be reinforced to take any increased loading if that was to be the case.

The storage area to the northern side is constructed of structural steel frame with posts and purlins and has a concrete floor. This structure is substantial and could be converted with only minor works being required. There is some corrosion again within the frame but this could be treated locally as required.

Summary of Unit 1:

There is nothing structurally that would prevent the conversion to residential use subject to detailed design. We would recommend the following:

1. *Re-roofing*
2. *Re-pointing and localised repairs to masonry following removal of existing render*
3. *Treatment and / or localised repairs to steel structure subject to architectural proposals*
4. *New timbers to form sections of new floors and roof structure to suit proposals*
5. *Replace existing floors or incorporate within a new floor build up*
6. *Existing foundations (if applicable) are inspected and underpinned if required*
7. *Some localised sections of internal walls to be built in masonry to provide some restraint to the external walls*
8. *Holes in masonry in the western gable wall are filled and made good*
9. *Localised repairs to the structural frame on the northern side of the building*

Unit 2:

This unit is generally a brick built single structure with a tiled roof covering. The roof is a corrugated covering over timber trusses, purlins and rafters. A lean too barn is present on the south side of the main building and this is also of a combination of masonry with timber over.

The walls of this unit are generally straight although the condition of the individual bricks is difficult to assess due to the render which has been applied but the condition of the masonry is good.

The timbers do have evidence of insect attack and would require treatment and possibly localised repairs but due to the good ventilation within the building the condition is generally good.

The majority of tiled roof covering is in-situ although there are some missing and loose tiles.

Internally a concrete base is laid to falls and whilst uneven the condition is fair.

Summary of Unit 2:

There is nothing structurally that would prevent the conversion to residential use subject to detailed design. We would recommend the following:

1. *Re-roofing*
2. *Re-pointing and localised repairs to masonry following removal of existing render*
3. *Treatment of timbers to be maintained as part of the proposals and localised repairs if required*
4. *Replace existing ground floor or incorporate within a new floor build up*
5. *Existing foundations (if applicable) are inspected and underpinned if required*

Unit 3:

This unit is generally a brick built structure with a tiled roof covering and some metal roof cladding as well. Much of the structure is supported using steel circular section posts supporting the large trusses above.

The timber appears in reasonable condition due again to the ventilation offered but it likely the timber trusses would need some localised reinforcement to allow an insulated roof covering to be installed as the roof has sagged due to the slender timberwork present. Some of the tiles are missing or loose but generally the roof is complete.

The steelwork is corroded in places and would require localised repairs. The sections could be incorporated into the proposals but that they should not be relied upon for structural integrity and that this should come from the localised sections of new masonry.

A foundation has been installed to the masonry walls and there is some localised damage to the masonry directly above sections of the foundation. The areas of the foundation with some damage would require some underpinning subject to the architectural proposals here.

Summary of Unit 3:

This unit will require some work structurally but again there is nothing structurally that would prevent the conversion to residential use subject to detailed design. We would recommend the following:

1. *Re-roofing*
2. *Re-pointing and localised repairs to masonry following removal of existing render*
3. *Treatment and / or localised repairs to timber roof structure and possible reinforcement of key structural timberwork.*
4. *New timbers to form new floors to suit proposals*
5. *Replace existing concrete floor or incorporate within a new floor build up*
6. *Existing foundations (if applicable) are inspected and underpinned if required*
7. *Some localised sections of internal walls to be built in masonry to provide some restraint to the external walls*

Units 4 & 5:

This structure is completely different and is a more modern steel portal frame agricultural unit with metal cladding to the roof and walls. The lower portion of the walls are constructed with concrete blocks and the floor of the unit is solid concrete, again laid to falls to facilitate cleaning out.

Again, the structure is robust and the steel frame is in good condition as are the purlins above them. To adapt a portal frame additional steel members would be required but this can be done quite easily and would just require a structural survey of and subsequent detailed design.

The existing roof covering and structure can be used with some minor sections being cut out to achieve the proposed design profile. Window openings can be created within the cladding too and this will just require some lightweight steel framing installing within the existing structure.

The concrete floor could be incorporated into a new floor structure as the condition is good.

Summary of Units 4 & 5:

This structure is robust and of modern construction and as such there is nothing structurally that would prevent the conversion to residential use subject to detailed design. We would recommend the following:

1. *The portal frame is sound and structurally capable of conversion. Further secondary steelwork may be required to support the proposal cladding / insulation / window & door openings etc*
2. *The existing concrete floor to be built up as part of the new floor construction incorporating insulation / dpm etc – All as per architect details*

Storage Unit:

This unit is generally a brick built structure with a lightweight corrugated pitched roof covering. The roof is supported on timber purlins and trusses which are reasonable in condition but slender in profile. The unit is open to the north and south sides.

The masonry is solid at the lower sections of the side walls but then above this there are masonry piers with cladding in between. Timber rails have been installed between the piers to provide some support and fixing locations for the existing cladding.

The masonry piers are slender and not effectively braced at eaves level so additional restraint would need to be incorporated to improve the stability here. This is particularly relevant as there is a lean too shed on the western side of this building. This would be removed as part of the proposals and this would therefore lead to additional wind loading to the main structure.

The floor is brickwork and is generally level.

Summary of Storage Unit:

This unit is not to be converted for residential usage but to be continued as a storage unit. It therefore would not need to be brought up to the same standards as the other units.. We would recommend the following:

1. *Additional restraint is provided to the structure and particularly the slender masonry piers; this could be by the introduction of a lightweight steel frame internally that is tied back to the other structural elements.*
2. *New cladding installed to the roof and side walls.*
3. *North and South ends to be infilled with masonry and / or cladding, again tied back to the lightweight steel frame on new foundations*

Summary:

Generally we are satisfied that the units are suitable for conversion as per the comments above. As has been seen each unit is different and as such the works required differ also. There are other general works that would be required across all the building such as repair or replacing guttering and drainage systems.

Detailed structural design and calculation will be required at each unit at the detailed design stage.

Provided the above recommendations are used as a base for the proposed scheme we are satisfied that the works can be done and the existing buildings maintained, improved or adapted as required.

We trust the above is clear but if you have any queries please do not hesitate to contact us on the details below.

Yours faithfully,

[redacted]

Marc J Haley
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Director & Chartered Engineer