Proposed Residential Development
Upper Woodhead Farm
Woodhead Lane
Hoyland
Barnsley
S74 9SY

Ref: 11.59
Date: March 2012

Structural Appraisal

The following report is a structural appraisal of the condition of the existing barns at Upper Woodhead Farm that will form part of a detailed planning application for residential use to identify any major structural defects and consider whether they are suitable for conversion without the need for significant structural works.

For the purposes of this assessment the farmhouse has been excluded. The plan below identifies the buildings as referred to in this assessment.



Fig 1. Key to existing barns.

The site is located within open countryside facing in an easterly direction on a natural gradient of approximately 1 in 10. The surrounding land has been open cast mined for stone and coal within the last 10 years and has now been reinstated to grass land.

The farm buildings have altered very little in their form since they were constructed in the mid 1800's according to the historic ordnance data.

Barn A

Barn A is a two storey stone barn with internal dimensions of 19.2 x 7.0m span. Walls are on average 450 to 500mm thick constructed in two leaves of regularly coursed stone with a rubble fill cavity. The height to eaves is 5.3m and 7.7m from floor level to the ridge. It is orientated on a north south axis along the contours and there is potential for some under-build along the east elevation where levels reduce.

The roof is constructed of six equally spaced timber king post trusses with two purlins to each roof slope. Timber rafters support a predominantly blue slate roof but part of the west facing pitch has been replaced with asbestos cement sheeting.

There are two separate areas of first floor within the building, one at either end with a full height void in the centre section. It is likely that the first floors are a later additional and judging by the limited number of openings it is possible that the building was originally used as a hay storage barn. There is a large double height barn door in the centre of the west elevation and a smaller single storey opening in the centre of the east elevation.

The upper gable wall of the north elevation has collapsed together with the most northerly bay of the roof up to the first truss, see Fig 1. The purlins within this bay have fractured and are unsuitable for reuse. All of the trusses and the remainder of the purlins appear to be in good condition and capable of being retained, see Fig 2. The ends of the timbers trusses sit onto timber bearers and these together with the ends of the purlins at the south gable wall will require further inspection once the roof is removed to ensure that no deterioration of the bearing ends has occurred. The rafters and the wall plate will need to be replaced as part of the re-roofing works.

The open plan nature of the building which has no effective internal restraint has lead to distortion of the east and west elevations to such a degree that some rebuilding of the upper parts will be necessary. A plan is attached to the report which identifies the areas of walling affected. The majority of the external walls can be retained and the trusses reset as required. Internal scaffolding should be erected to support the trusses and retained areas of external walls to help stabilise the remainder of the building during the course of the works. New internal walls and the installation of a first floor will provide rigidity to the structure.

There is a small area of weathered stonework adjacent to the entrance door on the East elevation which will need to be replaced. There is also an area of cementitious render to the lower part of the east elevation which it is assumed has been undertaken due to weathered stonework. The render should be removed and repairs carried out to the stonework as necessary.

Barn B

Barn B is subdivided into a number of two and single storey buildings which have been separately referenced for identification.

Barn B1
Barns B1 to B4 are predominantly of stone wall construction around 450 to 500mm thick. B1 is a two storey stone barn with internal dimensions of 13.0 x 4.5m span. The height to eaves is 4.7m and 6.2m from floor level to the ridge. It is orientated on an east west axis across the contours and has a concrete ground floor that slopes from east to west.

The roof is divided into four equal bays by three timber king post trusses which have a single timber purlin to each roof slope. A thorough inspection of the roof structure was not possible due to the presence of timber boarding and a detailed examination of the roof structure and the bearings ends of the members will be necessary, but, from the exposed parts of the trusses that were visible the roof appears to be in good condition. Each of the king post trusses has had a section of the lower tie beam removed presumably to increase headroom, See Fig 3. This may have affected the structural integrity of the tie and some localised strengthening may be required.

The first floor is constructed from substantial timber beams generally 150mm wide and 280mm deep with timber joists let into the sides of the beams. The floor appears to be in good condition and the majority of the floor beams should be capable of being retained. Beams should be checked for rot at the bearing ends and all retained timbers should be treated by a specialist against rot and insect attack.

The external walls are generally straight and true with without significant defect. There is a timber lintel over one of the one of window openings on the south elevation and some repairs/reinstatement is necessary below the bearing ends of the lintel over the principal doorway in the centre of the elevation. Timber lintels over openings in the external walls should be inspected and replaced with precast concrete. Retained timber lintels should be treated against rot and insect attack.

Barn B2
B2 is a single storey barn that was originally two storey. The external walls are 450 to 500mm thick constructed in roughly coursed stone walling with rubble fill. The profile of the original roof can be seen on the eastern gable wall of Barn B1 and two original first floor beams are still in situ but now used to support a low pitched roof. The building has a sloping floor which follows the general contours.

There are a number of windows which have timber lintels to the external face which appear to be a relatively modern addition and were these to be retained they should be replaced.

Where B2 abuts B1 there is a straight joint to each flanking wall. Whilst there are no signs of significant movement at this junction it would be prudent to install internal structural ties.

It is proposed that this building be reinstated to two storey height. Further examination of the foundation will be required to confirm it is suitable prior to construction. The addition of the upper storey will provide an opportunity to help tie the flanking walls at the abutment.

At the eastern gable are two large openings with a central stone pier and timber lintels. This will need to be inspected for adequacy if they are to be subjected to additional load.

Barns B3 and B4
B3 and B4 are two single storey outbuildings. They comprise external walls approximately 450mm thick constructed in coursed stonework with rubble fill. B4 retains the original stone columns which would have carried trusses supporting the roof although this has been replaced with a low pitched roof covered with fibre cement sheeting. To the rear (north elevation) of B3 there is a section of stonework which is weathered and has bowed outwards, see Fig 4. The lack of any restraint at the top of the wall has caused a section of the stonework to bow. This will need to be taken down and replaced. There is a vertical straight joint at the north end of the wall between B3 and B4. This should be tied in as part of the restoration works.

It is likely that Barn B3 had similar subdivision of the south elevation to B4 although this has now been replaced with more modern timber posts and beams which support the roof. This form of construction should be replaced as part of the works.

General Condition
Other than the areas identified walls are acceptably plumb with no significant defects. Internal timber lintels should be inspected and if retained treated with a preservative against rot and insect attack or replaced with pre cast concrete.

There is no evidence of vertical settlement and given the age of the buildings it can therefore be assumed that foundations are constructed from suitable bearing ground.

The extent of the structural defects is not uncommon with buildings of this age and the majority of the structural elements can be retained without the need for replacement. The extent of repairs and reconstruction necessary is not extensive and the buildings are capable of conversion to residential use.



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Fig 1. North gable of Barn B1 showing collapse.



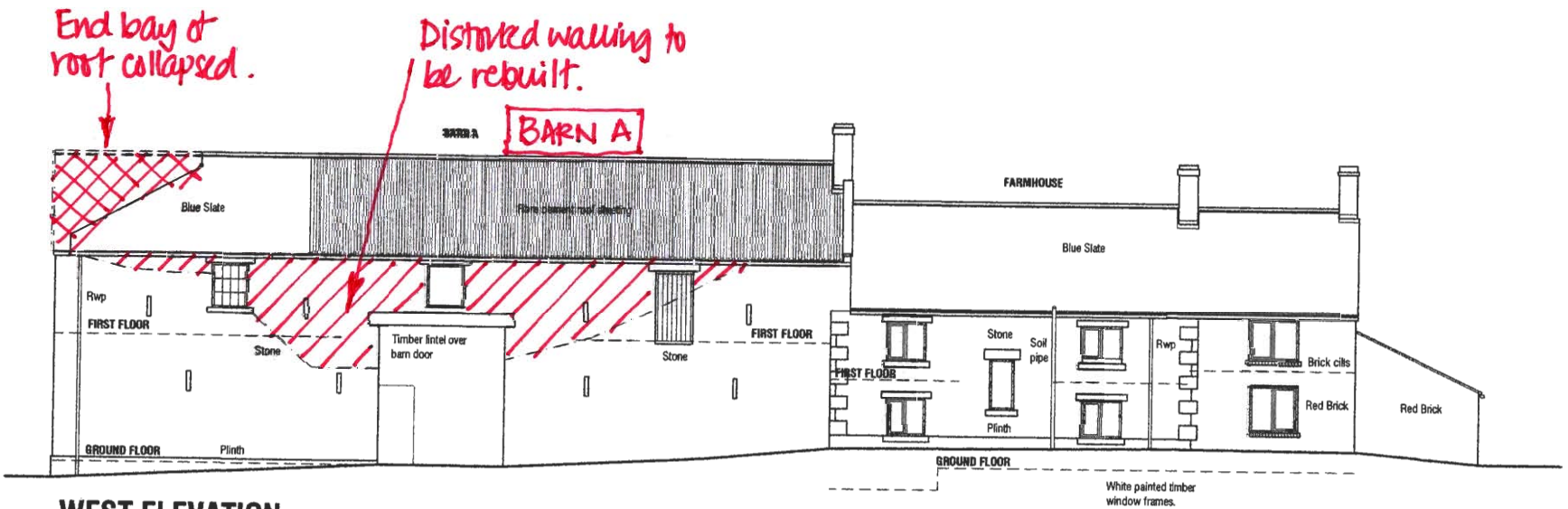
Fig 2. Existing trusses and purlins to Barn B1, good condition.



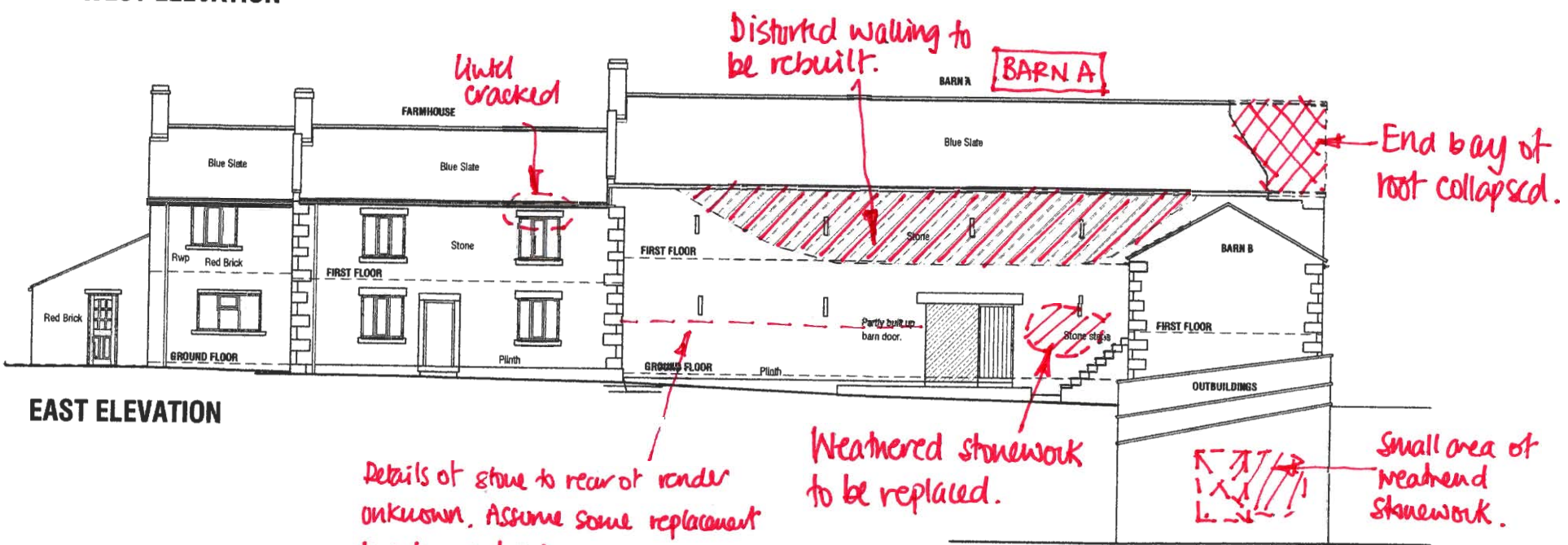
Fig 3. Trusses over Barn B2 with cut out of bottom tie.



Fig 4. Rear north wall of Barn B3 showing horizontal displacement.



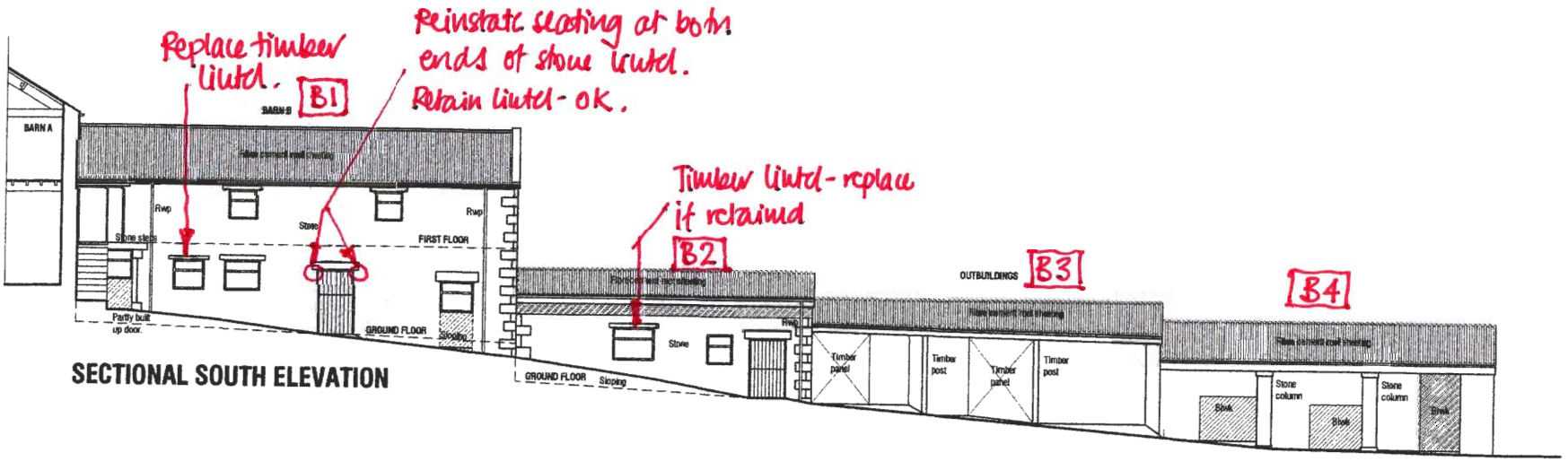
WEST ELEVATION



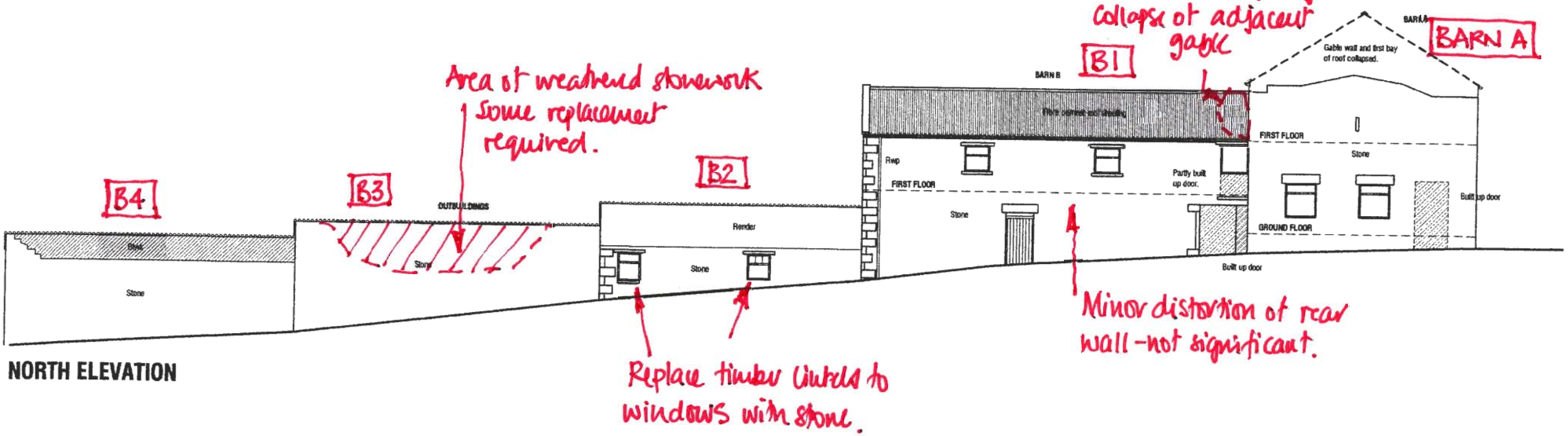
EAST ELEVATION

UPPER WOODHEAD FARM
HOYLAND

STRUCTURAL APPRAISAL PLAN 1



SECTIONAL SOUTH ELEVATION



NORTH ELEVATION

UPPER WOODHEAD FARM
HOYLAND

STRUCTURAL APPRAISAL PLAN 2