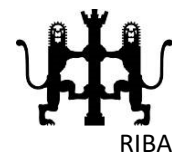


STRUCTURAL INSPECTION REPORT

Conversion of barn to a dwelling for visitor accommodation
at
Wilcroft Farm, Pecket Well, Hebden Bridge, HX7 8QY

27th October 2021

Thornton Architects Ltd



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1. Brief

To carry out a structural inspection at the barn at the above premises.
To establish the structural condition of the subject parts of the existing building.
To prepare a written report outlining our findings with concluding comments on the feasibility of retaining, repairing and adapting that part of the building for reuse.

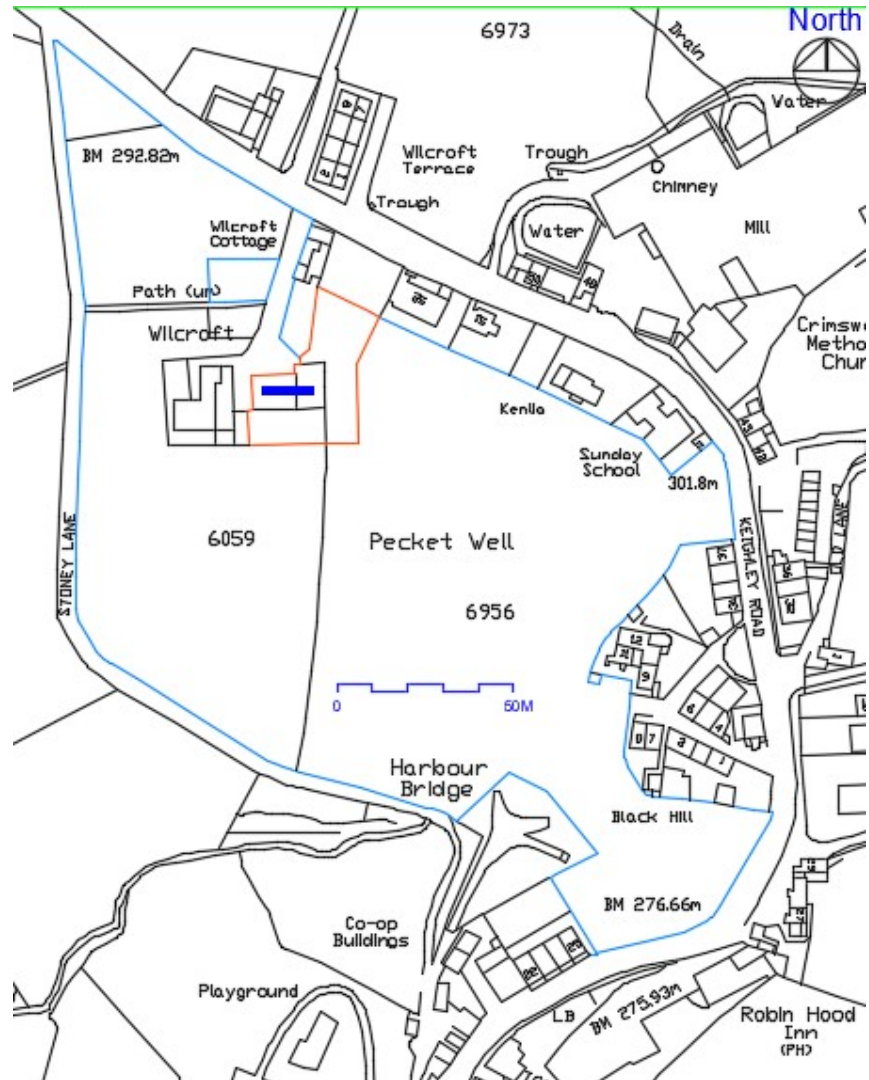
2. Date of inspection

5th August 2021

3. Limitations of the Survey

- 3.1. The survey is limited to a visual inspection of the relevant part of the building as viewed from ground floor level. No samples, tests or trial holes were taken or carried out on the superstructure or substructure.
- 3.2. The report has been prepared only for the sole use of the client, in the context of an application for planning and listed building consent to convert the barn to living accommodation.

4. Location: Wilcroft Farm and barn is located at the northern end of the village of Pecket Well just to the south of Keighley Road. The grid reference is Easting 399628, Northing 429631. The postcode is HX7 8QY



Location Plan



P1 Wilcroft House (left), Wilcroft Farmhouse and Barn viewed from south 05.08.2021



P2 Aerial view of Wilcroft House, Wilcroft Farmhouse and Wilcroft Barn (1982)

5. Description The subject building is that of a traditional nineteenth century barn with loadbearing coursed sandstone walls and a sandstone slate pitched roof. It has been reported that the roof structure collapsed around 1996 under the previous owner but the walls remain. There is a mid 20th Century lean-to byre on the east side. It can be deduced from the remaining structure and by comparison with similar local archetypal barns that the collapsed roof would have been carried over the barn on two queen post trusses with supporting purlins between. The trusses would have divided the entire space between the gables into 3 equal structural bays. The original cart entrances, each with a stone arch, remain on the north and south sides. These define the central structural bay. There are internal stone cross-walls remaining that divide the central bay, originally made for hay loading and cereal threshing, from the milking parlours and dairy bays on either side.



P3 Internal view of north cart entrance with remains of stone cross-walls either side

6. Full Description of Wilcroft Barn from the Listing Description:

Barn, 5 metres to east of Wilcroft House

Address: Barn 5m East Wilcroft House Keighley Road Pecket Well Hebden Bridge
West Yorkshire

Grade: II

Group detail: Pecket Well

Full description:

Barn, dated 1861. Punch dressed stone, stone slate roof. Elliptical arched cart entry with rusticated voussoirs. 2-light window over with arched lights and false keystones bears date. To right mistal doorway with sill-tie to left of small window. 2 lunettes with keystones. Left hand return wall has owl hole to apex. Rear in small coursed stonework may be earlier. This has quoins, segmental arched cart entry with chamfered surround and mistal doorways to either side with chamfered surrounds. 3 bays of queen-post trusses.

Full description of adjacent listed farmhouse: from listing

Wilcroft Farmhouse and eastern part of Wilcroft House

Address: Wilcroft Farm Keighley Road Pecket Well Hebden Bridge West Yorkshire HX7 8QY

Grade: II

Group detail: Pecket Well

Full description:

House, c1728 (first deed) now in 2 occupations. Hammer-dressed stone, stone slate roof. 2 storeys. 2-room front, double-depth. South front has 4-light double chamfered mullioned window lacking 2 mullions and with lowered sill, similar altered window over to 1st floor. This bay is occupied by Wilcroft House. 6-light double chamfered mullioned window with king mullion to right, 4-light window over to 1st floor. Quoins. Right hand return wall has wide gable with central doorway with double tie-stone jambs and monolithic lintel, chamfered surround. All windows are chamfered mullioned. 2-light over doorway and oculus to apex (blocked); 6-light with same over to 1st floor. One gable stack and 3 others. Attached to west end is early C20 house (Wilcroft house) of no particular interest.



P4 Wilcroft Barn, north side

7. Observations.

7.1. The adjacent eighteenth century farmhouse has been repaired and renovated for use as visitor accommodation in accordance with the Listed Building Consent 13/00410/LBC see P1. There is a yard approximately 5M wide between the east side of the farmhouse and the west gable of the subject barn.



P5 Wilcroft Barn, north and west sides

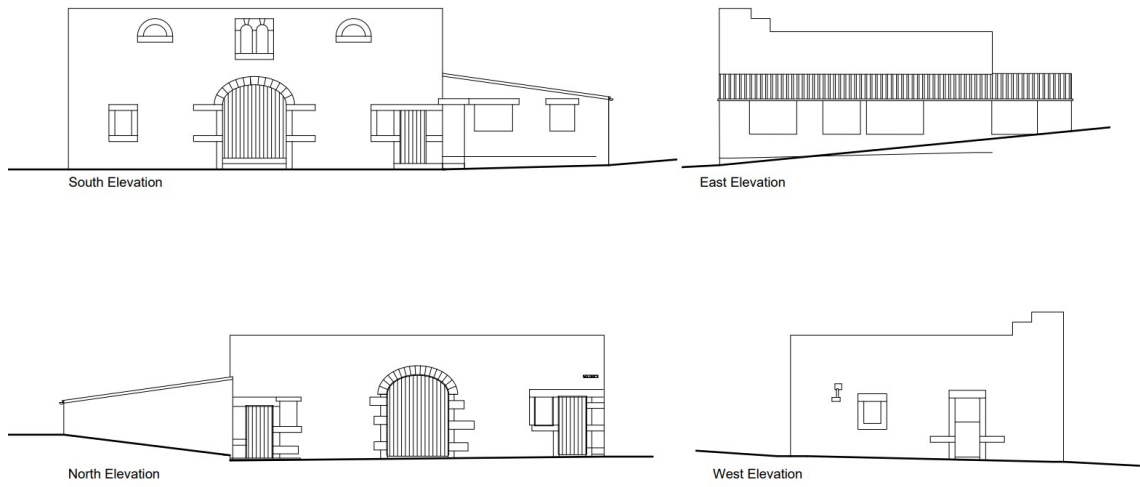
- 7.2. The barn has loadbearing coursed sandstone walls. As noted in the listing description, the stonework and dressing of stonework around the openings appears to be older on the north elevation indicating that the barn was rebuilt in the nineteenth century.
- 7.3. Although the roof would have been carried on a pair of queen post trusses these decayed and rotted following the roof collapse. The upper parts of the gable walls collapsed down to wall plate level in 1996, approximately 5m height presently remaining above ground floor level.



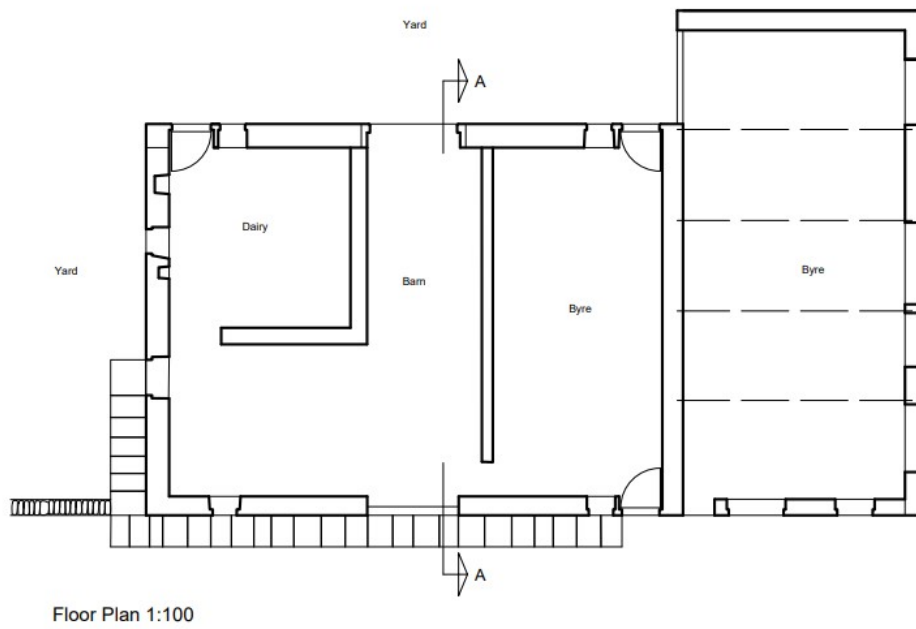
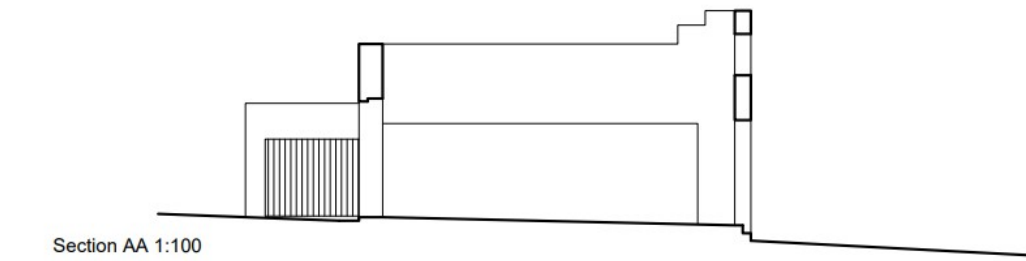
P6 Wilcroft Barn, south side

- 7.4. The north, west and south elevations of the barn remain as described in the listing except for the gable apex. The owl hole, referred to in the listing, is missing but may be recoverable amongst the stored walling stone within the barn.
- 7.5. The mid 20th Century lean-to byre on the east side, visible on the 1982 aerial view, remains intact and is used for storage.

EXISTING



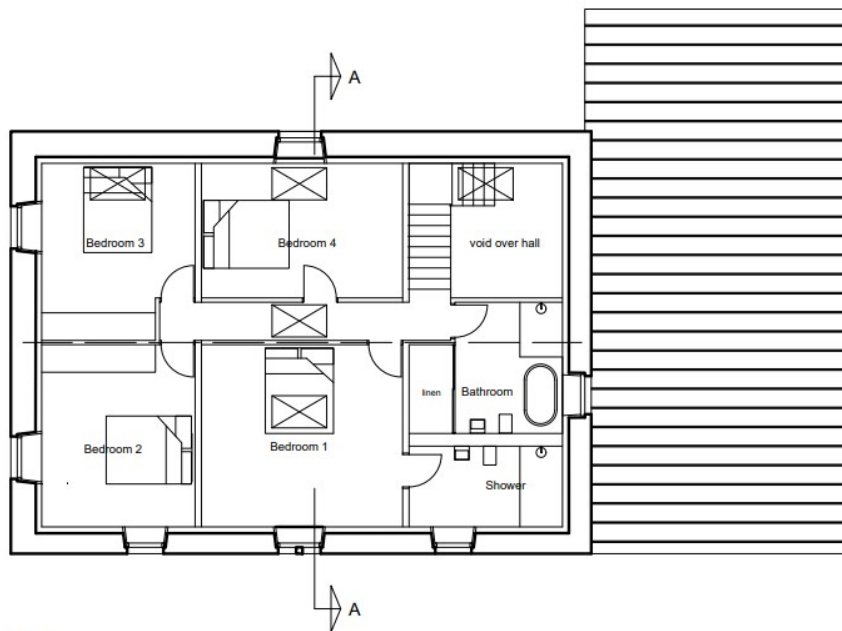
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PROPOSED



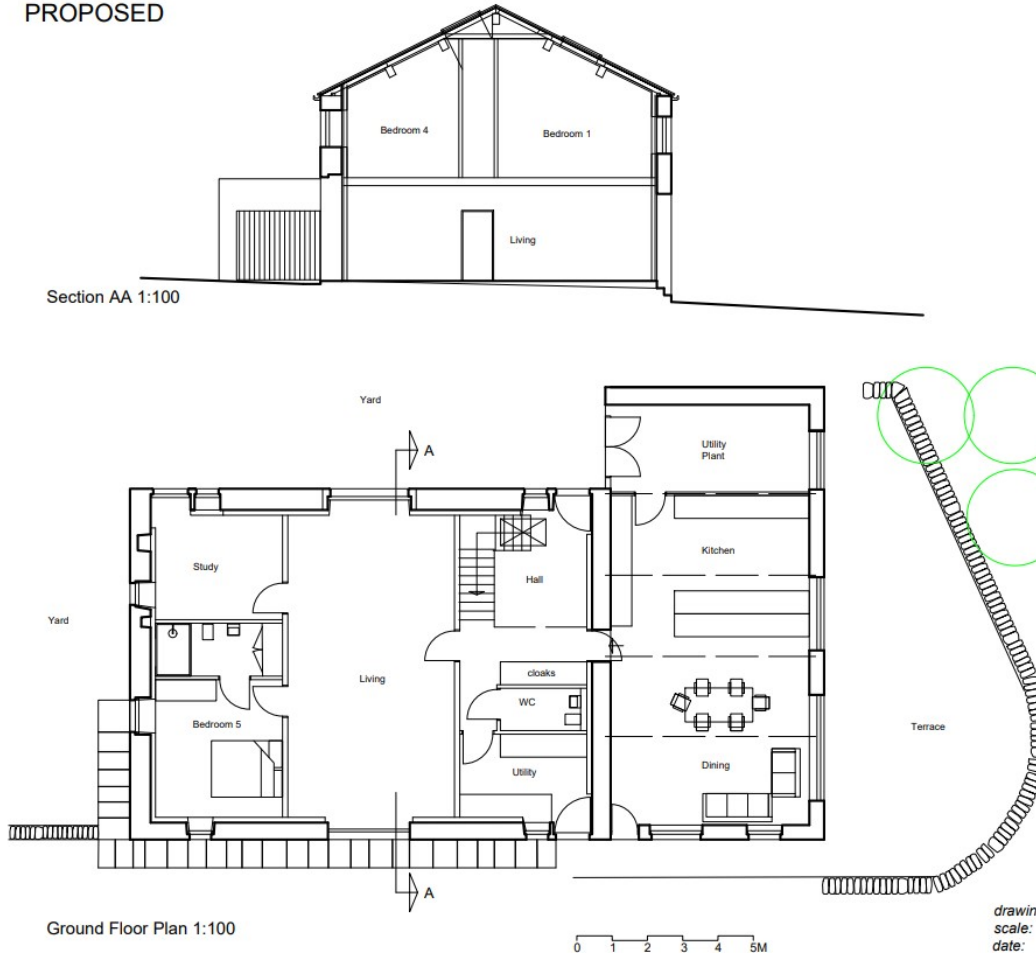
PROPOSED



Floor Plan 1:100

0 1 2 3 4 5M

PROPOSED



8. Proposal and Method Statement:

- 8.1. Provide and install scaffolding to ensure safe working in accordance with relevant Construction Health and Safety requirements. Prop external wall structure as necessary, demolish internal cross wall and recover existing stone, stack according to coursing for reuse on the project.
- 8.2. Take down areas of loose and bowing stonework and rebuild to pattern and with openings as shown on architect's drawings using a lime and sand mortar mix to be agreed with architect prior to commencement. Reinstall the owl hole on the west gable apex.
- 8.3. Repair or replace as appropriate any existing broken stone lintels and stone door and window surrounds to same pattern as original.
- 8.4. Excavate trenches, install foundation for internal block-work masonry cross walls and perimeter lining walls. Install new internal block-work cross walls and insulated masonry perimeter wall returns to positions as shown. Install proprietary DPCs to all new blockwork walls to integrate with subfloor DPMs.

- 8.5. Install new oak roof purlins as specified by the structural engineer to three structural bays between the reconstructed gables and the new cross walls.
- 8.6. Provide and lay sandstone slates, tanalized timber battens using proprietary stainless fixing pegs on treated timber rafters supported on oak purlins, sizes and spacings to be specified by the structural engineer and shown on the architect's drawings. Install integral proprietary rooflights to positions as shown on the architect's drawings.
- 8.7. Install to the main barn new timber rainwater troughings and sectional downpipes set to discharge over existing rainwater gulleys.
- 8.8. Prop existing lean-to roof to byre on east side of barn and reconstruct as necessary defective walling on north and east elevations forming new openings as shown on the architects drawings.
- 8.9. Remove the existing profile metal roof sheets to the lean-to byre and replace with proprietary Kingspan Tek panels finished with proprietary seamed grey roof.
- 8.10. Remove any existing stone floor coverings and stack for reuse on the project. Excavate existing barn ground floor, install new sub-floor drainage, install new concrete ground floor slab on damp proof membrane sand blinding and hardcore.
- 8.11. Install suspended timber first floor joists.
- 8.12. Allow for new floor build up to finish level with existing thresholds, floor screed with possible integral under-floor heating system on 100mm proprietary insulation 150mm float finish concrete floor on damp proof membrane on level weak-mix concrete blinding on 225mm well compacted hardcore
- 8.13. Install new painted timber external doors and windows to patterns as shown on drawings.
- 8.14. Insulate all floor wall and roof voids and provide vapour barriers and breather membranes where necessary.
- 8.15. Install new internal partition walls and door casings.
- 8.16. Install internal mechanical and electrical services.
- 8.17. Supply and fix plasterboard and skim wall and ceiling finishes
- 8.18. Install all internal joinery items including: doors skirtings, architraves, kitchen units and cupboards.
- 8.19. Form foul drain connection to adjacent farmhouse drains and/or connect to the existing main drain running through the field.

- 8.20. Make all necessary drainage and utility service connections.
- 8.21. Construct the flagged yard and enclosing drystone wall on the east side of the barn. Form the car parking and turning area on the north side of the barn to provide access to the converted barn.
- 8.22. Install bin and recycling store.

9. Design Approach

- 9.1. The alterations consequential to the change of use have been kept to a minimum. Existing external window and door positions have been retained wherever possible.
- 9.2. The works applied for include repairs and alterations that are necessary to safeguard the structure and fabric of the building.
- 9.3. In adapting the barn to a new use as a dwelling the original components of the barn where possible will be incorporated and a layout adopted that will allow for these being visually apparent in the dwelling. The proposed new cross walls will be installed close to the positions of the former queen post trusses in order to allow for the reinstatement of the 3 bay structural pattern of the barn. This is consistent with the retention of the pattern of the north and south elevations and their corresponding arched cart entrances.
- 9.4. The original traditional pattern of byre doorways will be retained at the east end of the south elevation and at either end of the north elevation.
- 9.5. The staircase hall and gallery has been positioned so that the full height of the original barn can be appreciated at both floor levels. The bedroom ceilings will be formed at the underside of the rafter position so that the purlins will be fully exposed. The intention is to retain and make visible the historic character of the roof structure within the dwelling.
- 9.6. The original openings have been retained to provide the main door and window positions. The number of new window openings has been minimised consistent with its conversion to a dwelling and with the requirement Building Regulations requirement for fire escape windows. Roof-lights, matching those in the adjacent farmhouse, are proposed in several positions to provide adequate natural daylight whilst minimising the number of new openings to the barn walls, so that the historic character of the barn is maintained with a low ratio of window to wall area.
- 9.7. Thermal insulation will be added in order to reduce carbon emissions consistent with the NPPF and current Building Regulation requirements.
- 9.8. The layout has been determined to meet Building Regulation requirements relating to means of escape but also respecting the current pattern of structural bays.

9.9. The whole scheme is intended to restore, repair and preserve the main elements of the barn with only the minimum of alterations necessary to achieve its change of use to a dwelling.

10. Materials for works have been selected to match those of the existing building and its environs. Stone slates for the roof and regular coursed gritstone for the minimal alterations to external walls will match the coursed stone to the existing building in colour, texture and tooling. The joinery items for the external doors and windows will be sympathetic to the existing materials and details.

11. Internal Inspection

11.1. The original timber queen post trusses and purlins to the subject part have not survived following the roof collapse in 1996. The wall bearing points of all proposed new roof timbers require detailed inspection, when scaffold access has been provided, to determine the extent of remedial work required.

11.2. The external solid stone walls within the subject barn are susceptible to penetrating damp and it is noted that it is proposed to line them with a new block-work wall incorporating a continuous horizontal damp proof course and tanking where appropriate.

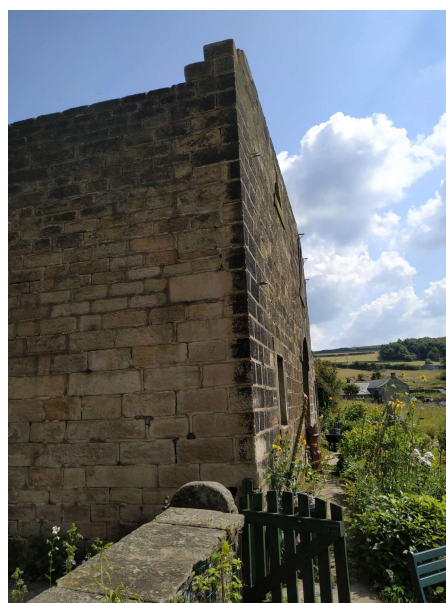
11.3. The lean-to cattle byre on the east side does provide some lateral restraint to the main body of the historic barn. It is noted that the proposed new cellular internal block work structure will substitute for this and proprietary horizontal restraint connections should be made to the external stone walls at regular intervals.

12. External Inspection

12.1. **South Elevation** (see P6 and P7): Inspection of the south elevation wall reveals localised significant historic bulging and some displacement of stone to the upper central section, around the cart entrance and arch, requiring remedial rebuilding. This has been exacerbated by the collapse of the roof in 1996. Rebuilding of the upper central section of the wall is required as indicated on the proposed elevation drawing above. Re-pointing of all the external stone walls is required. The perished mortar should be raked out and re-pointing with a suitable sand and lime-putty mortar.



P7. South side from east corner



P8 South side from west corner

- 12.2. **East Elevation**(see P8): Inspection of the gable wall reveals the collapse of the apex part and localised loosening of the remaining top courses. The remaining substantial part of the gable below wall plate level however is capable of retention without significant rebuilding. The gable has benefitted from the support of the lean-to cattle byre since the roof collapse to the main barn. It is noted that additional horizontal restraint will be provided by the proposed cellular internal masonry walls when conversion works are implemented. Re-pointing of all the external stone walls is required. The perished mortar should be raked out and re-pointing with a suitable sand and lime-putty mortar. The external byre walls, except for the south side, comprise unsubstantial panels of random stone walling that will require rebuilding with regular coursed sandstone walling. The new stone piers can be integrated with the proposed new door and window openings.



P9 East elevation

- 12.3. **North Elevation:** (see P3 and P4 above): Inspection of the north elevation wall reveals localised significant historic bulging and some displacement of stone to the upper central section, above the cart entrance and arch, requiring remedial rebuilding. This has been exacerbated by the collapse of the roof in 1996. Rebuilding of the upper section of the wall is required as indicated on the proposed elevation drawing above. It is noted that additional horizontal restraint will be provided by the proposed cellular internal masonry walls when conversion works are implemented. Re-pointing of all the external stone walls is required. The perished mortar should be raked out and re-pointing with a suitable sand and lime-putty mortar.
- 12.4. **West Elevation** (see P5, 10 and 11): Inspection of the gable wall reveals the collapse of the apex part and localised loosening of the remaining top courses. The remaining substantial part of the gable below wall plate level however is capable of retention without significant rebuilding. It is noted that additional horizontal restraint will be provided by the proposed cellular internal masonry walls when conversion works are implemented. Re-pointing of all the external stone walls is required. The perished mortar should be raked out and re-pointing with a suitable sand and lime-putty mortar.



P10 External west side from south corner



P11 Internal west side from south corner

13. Summary

- 13.1. Items of repair have been found necessary to the barn including reroofing and rebuilding of external stone walls identified by shading on the proposed elevation drawings above.
- 13.2. It is proposed to insert new block-work dividing walls and lining walls as part of the conversion works. The resulting cellular masonry structure will provide greater structural resilience and substantially increase the functional life of the building. All the external walling stone can be retained and reused. The introduction of proprietary horizontal restraint ties at first floor and gable roof level are recommended.
- 13.3. Taken as a whole, the remaining structure, including the remaining walls and rebuilding referred to above, is structurally capable of rehabilitation.

John Thornton BA Hons B Arch RIBA

27th October 2021