Mr M Hayhurst

Barn No. 1 at Wheatley Farm, Four Acre Lane, Thornley with Wheatley , PR3 2TD

Structural Condition Survey for Conversion to Dwelling

PSC-001 Rev A

March 2017

Paul Snape Consulting
The Granary
Woodfold Farm
Crombleholme Fold
Goosnargh
Preston PR3 2ES

Tel. 01995 643040
Mob 07718 150261

paulsnape@btinternet.com

Mr M Hayhurst
Structural Condition Survey
Wheatley Farm, Thornley with Wheatley

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1.0 Terms of reference

Paul Snape was appointed by Mr M Hayhurst to carry out a visual structural inspection and produce a structural condition survey report for the existing barn to the east of the farmhouse at Wheatley Farm, 4 Acre Lane, Thornley with Wheatley. The brick barn is one of two buildings surveyed at this location.

2.0 Purpose of the survey

It is proposed to convert the barn to form a new dwelling. The proposals are currently being prepared by PGB Architectural Services Ltd and they have provided details of the existing layout which are included in Appendix A, together with the proposed layout. The visual structural survey is required to confirm the current condition of the buildings and to assess their suitability for conversion. There are photographic records of the building in Appendix B and these are referenced throughout the report.

The drainage and electrical systems of the building have not been inspected. These will be renewed as part of the proposals and detailed for Building Regulation purposes.

We have not inspected parts of the structure that are covered, unexposed or inaccessible. Hence we are unable to report if such parts of the property are free from defect.

Our inspection was undertaken on 2nd November 2012 at which time the weather was fine and sunny.

The survey was undertaken by a Chartered Civil Engineer, Paul Snape BEng (Hons) CEng MICE

3.0 Description of Building

The barn is a brick building with a slated, pitched, timber roof and concrete ground floor. The single storey building has a slate roof supported by traditional timber purlins and rafters. In the larger upper section of the barn, additional support to the roof is provided by steel beams and brick infills. The building is constructed into the slope of the hillside and has changes of floor level through the building as indicated on the drawings.

The building, together with the other building to be converted (Barn No. 2) and a small outbuilding, are to the east of the farmhouse on the opposite side of Four Acre Lane.

4.0 External Survey

South West Elevation (Gable) (Photos 1 to 5)
This brick built gable is 225mm thick (double brick) and has been rendered externally as can be seen on the photos. There are two existing openings with evidence of a former opening to the right (lintel evident on photos 3 & 4). The wall is in a poor condition with bowing across its length and damage to the right hand corner. The existing large opening is proposed to be retained, whilst the small opening is to be bricked up. In carrying out this work, an allowance of 75% (approx. 20m^2) of this wall should be taken as requiring rebuilding due to the bow and damage.

South East Elevation (photos 6 to 9)
This elevation is a 225 mm brick wall. The wall is plumb, reasonably well pointed and free from signs of movement. There are some blown bricks to the lower part of the left hand side but these are to be rendered under the proposals. Photo 9 shows more severe damage to the brickwork around the existing downspout and this will require replacement over 1m^2. There are 5 existing openings on this elevation which are to be retained with no further openings proposed.

North West Elevation (Photos 10 to 13)
The elevation is a 225 mm brick wall with a lower outrigger section to the right. The outrigger section has damaged brickwork to the right of the doorway, below the windows and at the junction with the gable. This will require re-building over 2m^2.

The remainder of the wall is in good condition, plumb, reasonably pointed and free from movement.

There are 7 existing openings in this elevation and all these are to be retained. No further openings are proposed but one window to the left hand section is to be extended down vertically to form a doorway. The land in front of the left hand side is to be levelled to form a parking area and care will need to be taken with relative levels when constructing the retaining structure.

North East Elevation (photos 14 to 16)
This gable wall is a 225mm brick wall. There is a single existing opening which has been closed with blockwork (photo 15) and this is to be re-opened. There is a small area of damaged brick at a low level (photo 16) but this area is to be rendered under the proposals. The wall is plumb, reasonably pointed and free from movement.

Roof (Photos – External - 8 & 10 & 13, Internal – 19 & 20)
The roof is slate on traditional rafters and purlins. In the main, upper section of the building it is further supported by brickwork carried on steel beams which in turn are sat on buttress sections within the elevations (photo 20). The roof is in reasonable condition with little sign of movement, rot or infestation. The roof will be re-constructed under the proposals but existing elements may be retained subject to structural checks and treatment for rot/infestation.

5.0 Internal Survey

Ground Floor – Lower Section (Photos 17 & 18)
The ground floor is in two separate sections divided by a solid 225mm thick brick wall. The lower section has a solid concrete floor with rendering to the lower sections of the walls. The walls are generally in good condition but do reflect the damage noted externally. The timbers do not exhibit any sign of rot or infestation.

It is proposed to remove 2 cross walls in this area but to replace them with two others, therefore maintaining stability. In addition, an opening is to be introduced into the main section of the barn, with a rebuilt section of the existing internal elevation adjacent to the proposed lounge. This rebuilding takes place along the line of the level change and this will need to be considered in terms of a retaining structure.

Upper End – Main Barn (Photos 19 to 22)
The upper end of the barn is a large open area with stalls for cattle and a concrete floor. The walls to this area are all in good condition with rendering to the lower sections. There are buttress sections to carry the steel beams and brickwork supporting the purlins at regular intervals.

It is proposed to add further cross walls in this area and this will add to the stability of the elevations.

The timbers to the roof can be seen on the photos and show little or no sign of rot or infestation. The roof is to be reconstructed but some of the timbers may be re-used either structurally or cosmetically, subject to design checks and appropriate treatment.

6.0 Suitability for Conversion and Method of Construction

It can be seen from the survey detailed above that this barn is generally in good condition but has one poor gable elevation and other small areas of damage/movement. The area identified for re-build is around 23m^2, which is around 16% of the total area of external walls. Given that this is well below the acceptable limits, it is therefore considered suitable for conversion to a dwelling. When converting barns, it is essential that the construction techniques and sequence are carefully considered.

PGB Architectural have indicated the construction of a masonry inner leaf. This may comprise of a cavity with insulation plus a block inner leaf or a backing block to the stone with a cavity and a further block inner leaf. With this technique, care must be taken as the existing walls may be founded at a shallow depth. Trial holes should be dug to ascertain the actual depth. Ground floor levels should be set as high as possible and we would recommend the use of a concrete floor slab with thickened edges along external walls and thickenings under new internal walls. The thickening can be taken down to a similar depth as the existing walls. We would recommend a minimum depth of 400mm for the thickenings. Levels lower than the existing foundations should be avoided and if this is necessary an Engineer should be consulted as underpinning may be required. The new inner leaf (and backing block if used) should be tied to the existing wall with suitable cavity and/or specialist ties.

It is recommended that this new internal skin is in place and the ground and first floor are put in place prior to the roof being removed and reconstructed. This will add stability to the exiting walls.

The architectural layout does not introduce any new openings to the external walls but does extend two openings vertically. This should not affect the integrity of the structure.

Internally, changes are proposed with the existing 225mm wall between the upper and lower sections (bedrooms and lounge) removed and replaced with a new block wall. In addition, the existing cross wall to the lower section will be removed and replaced with new internal walls. The new wall between the lounge and the bedrooms will need to form a retaining wall at the lower section and carry the roof structure. In the main, upper section of the barn it is assumed that the steel beams and brick supporting the purlins will be removed. The new purlins will sit on the new blockwork cross walls indicated. The majority of the buttresses are to remain and be incorporated within the new cavity wall.

The existing purlins and rafters appear to be in good condition with little sign of rot or infestation. Any timber retained should be assessed by a timber specialist, with regard to rot and infestation. All retained timber should be treated against rot/infestation and an indication of residual section given for structural purposes. All retained timber to be used structurally should be checked for structural adequacy.

Externally, the parking area in front of the North West Elevation will require a retaining wall and care must be taken not to undermine the existing foundations in this area when forming this level area.

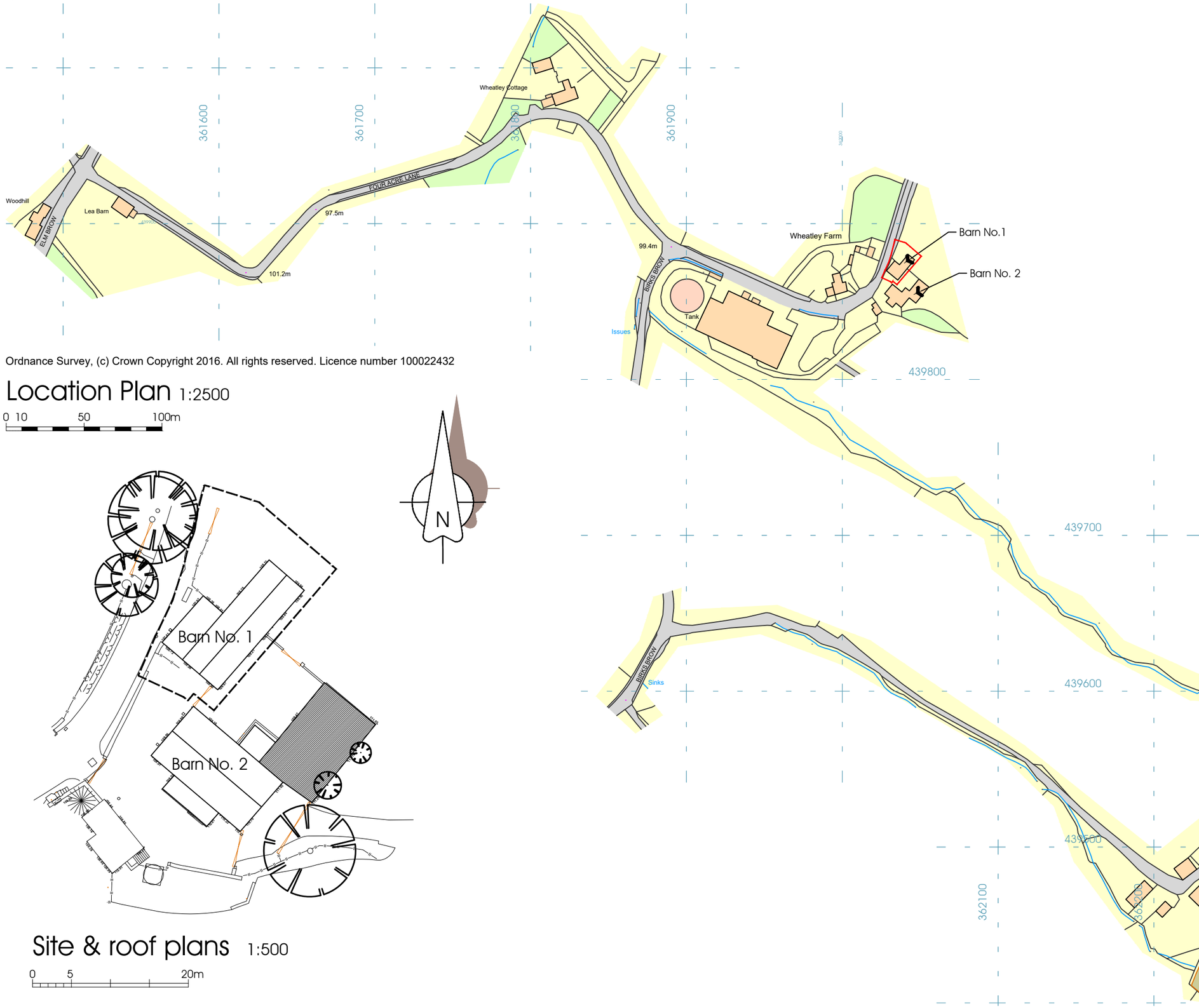
7.0 Conclusions

The barn is in a reasonable structural condition, with some requirement for rebuilding of external walls. It is considered suitable for conversion. The construction should follow the guidance set out above and a structural engineer should be consulted with regard to the final layout for Building Regulation compliance.

Appendix A

Drawings

NOTES:
1: Do not scale this drawing, use figured dimensions only 2: The Contractor, Sub Contractor or specialist supplier are responsible for confirming site dimensions prior to fabrication 3: Any dimensional discrepancies are to be reported to the Architect immediately



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Location Plan 1:2500

0 10 50 100m

Site & roof plans 1:500

0 5 20m

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07866366565 01254 820092 info@pgb-arch.com pgb-arch.com

Proposed Conversion
Barn No. 1

Mr M Hayhurst
Wheatley Farm Four Acre Lane PR3 2TD

Existing Site & Location Plan

DATE August 2016

JOB NO. 2867
DRAWING NO. 100
REVISION
SCALE Shown @ A3

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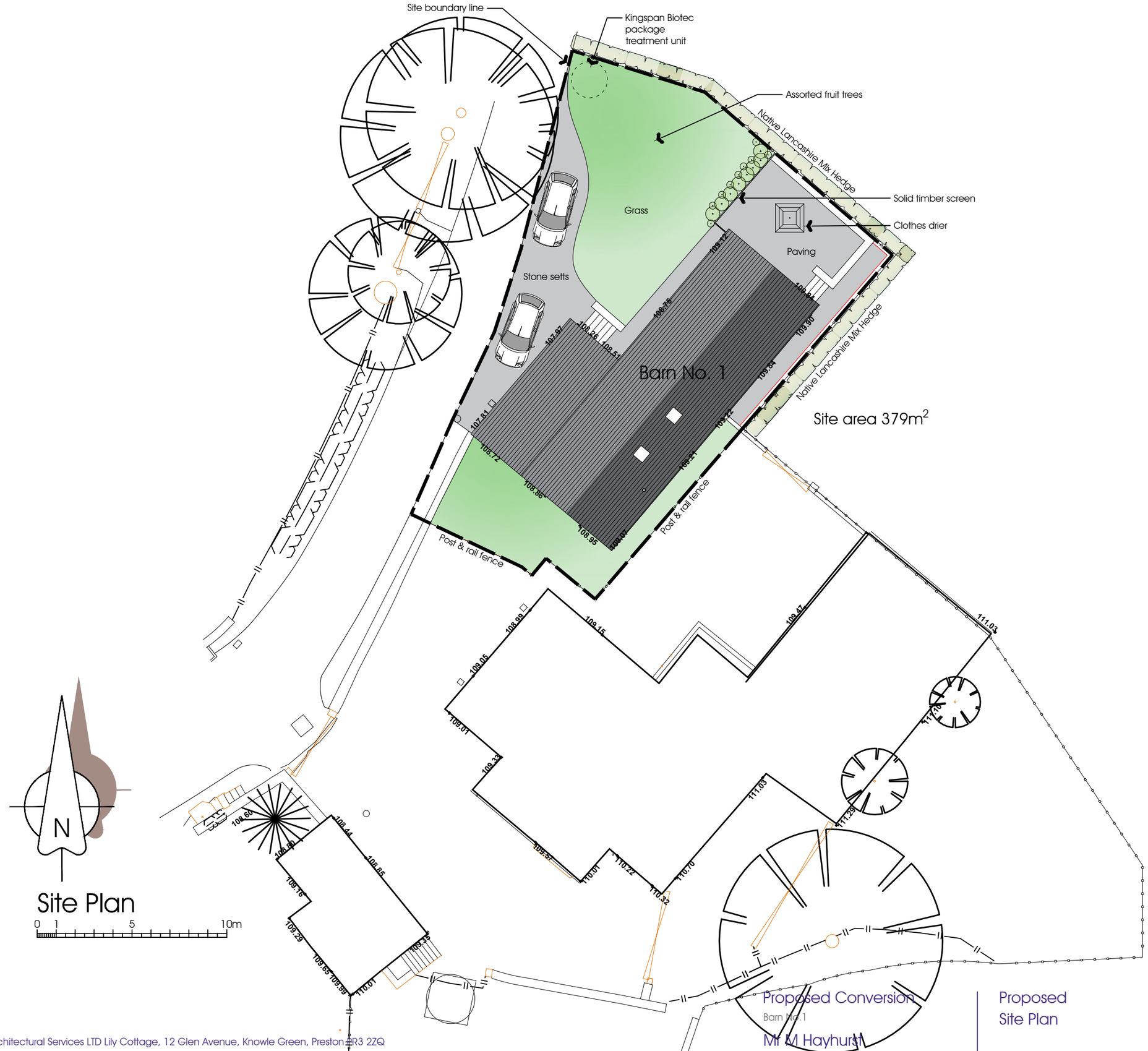

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Proposed Conversion
Barn No.1
Mr M Hayhurst
Wheatley Farm Four Acre Lane PR3 2TD

Proposed
Site Plan

DATE August 2016

JOB NO. 2867
DRAWING NO. 120
REVISION
SCALE 1:200 @ A3

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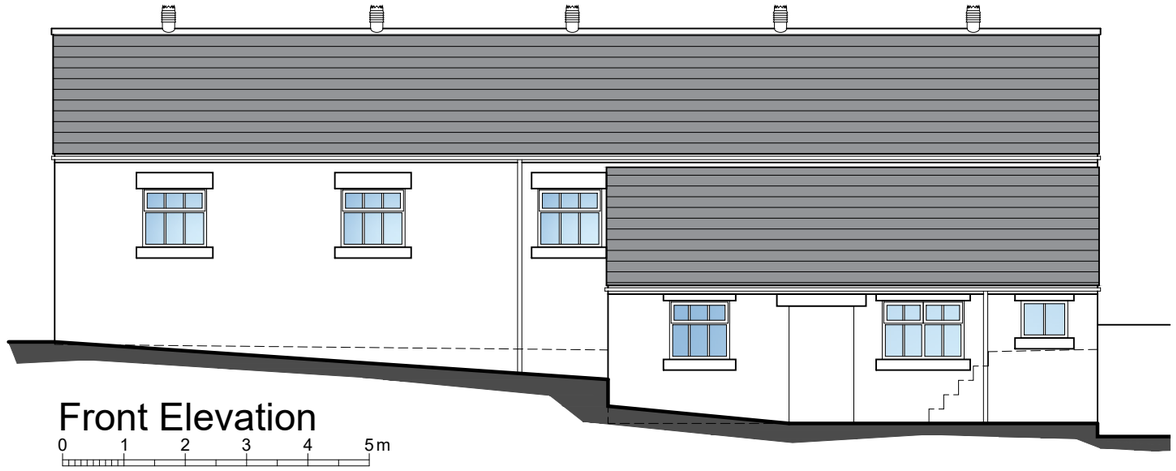
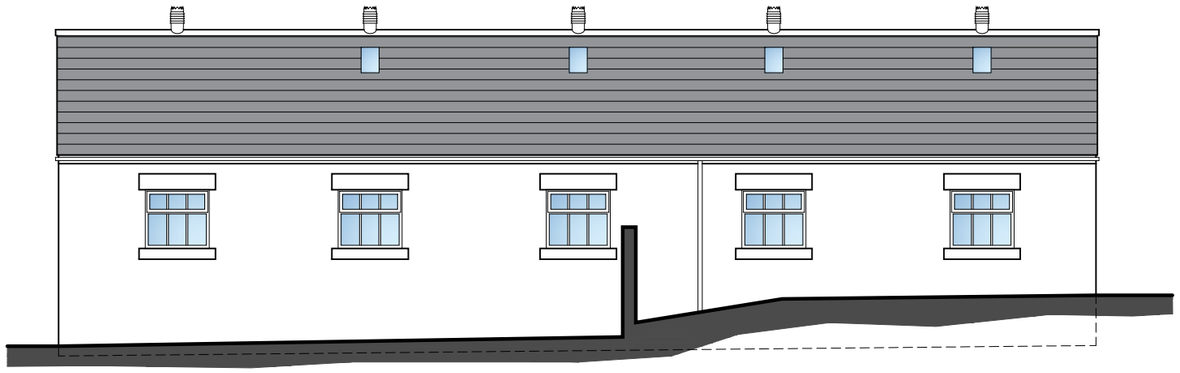


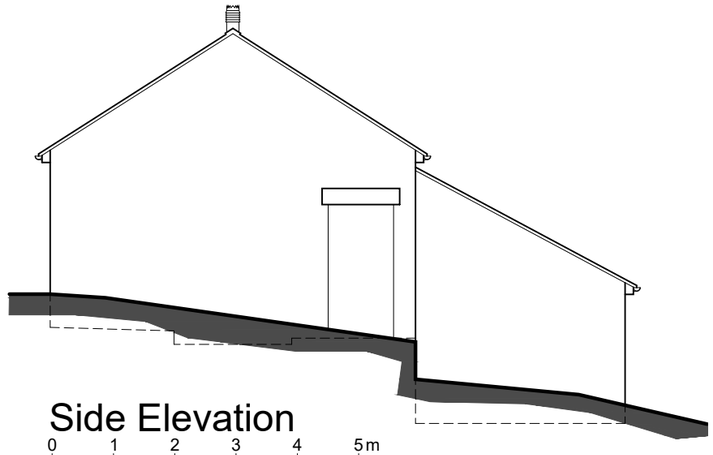
Front Elevation

0 1 2 3 4 5m



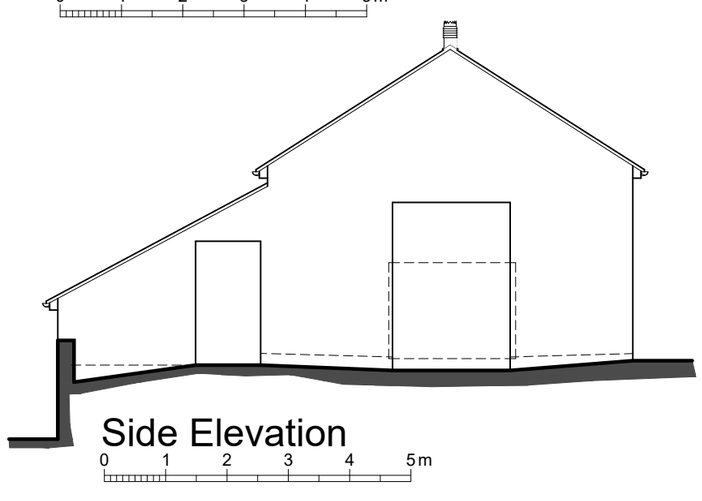
Rear Elevation

0 1 2 3 4 5m



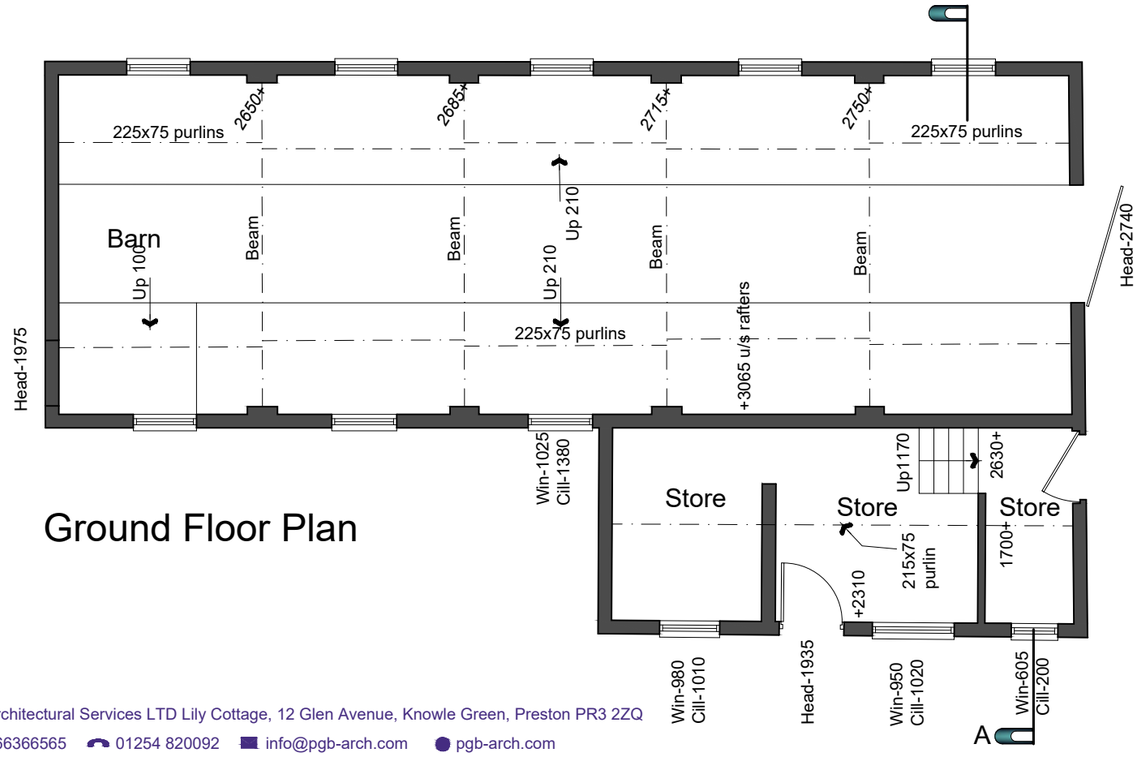
Side Elevation

0 1 2 3 4 5m

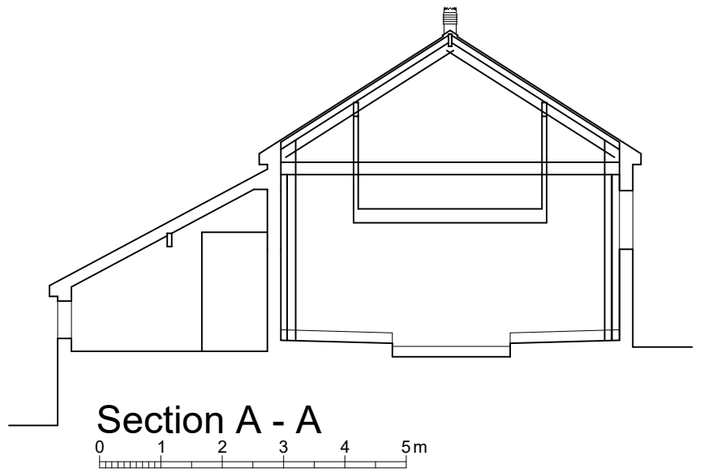


Side Elevation

0 1 2 3 4 5m



Ground Floor Plan



Section A - A

0 1 2 3 4 5m

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Proposed Conversion

Barn No. 1

Mr M Hayhurst

Wheatley Farm Four Acre Lane PR3 2TD

Existing

Plan , Section & Elevations

DATE August 2016

JOB NO. 2867

DRAWING NO. 110

REVISION

SCALE 1:100 @ A3

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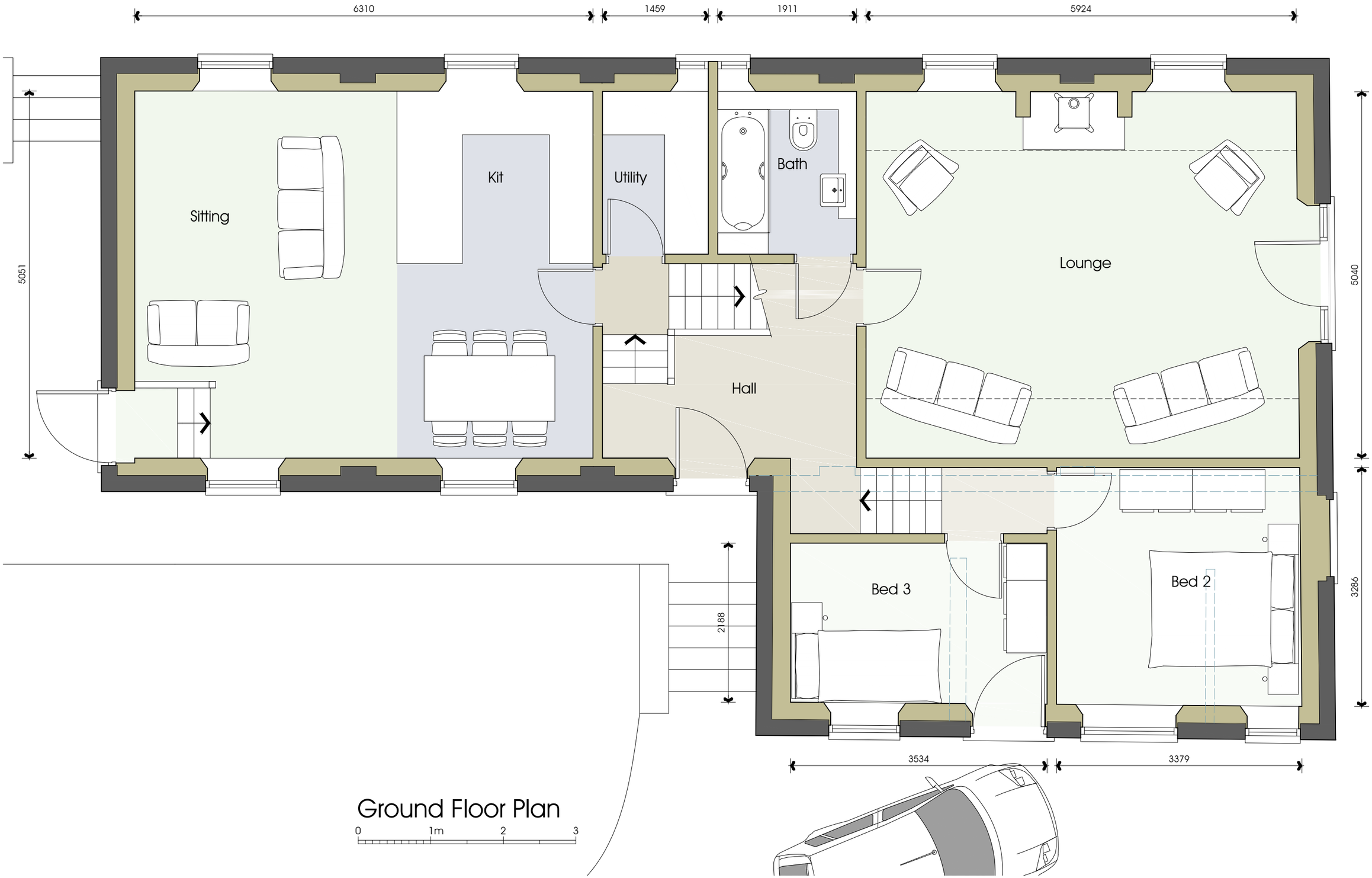

Ground Floor Plan

0 1m 2 3

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Proposed Conversion
Barn No.1
Mr M Hayhurst
Wheatley Farm Four Acre Lane PR3 2TD

Proposed
Ground Floor Plan

DATE August 2016

JOB NO. 2867
DRAWING NO. 130
REVISION
SCALE 1:50 @ A3

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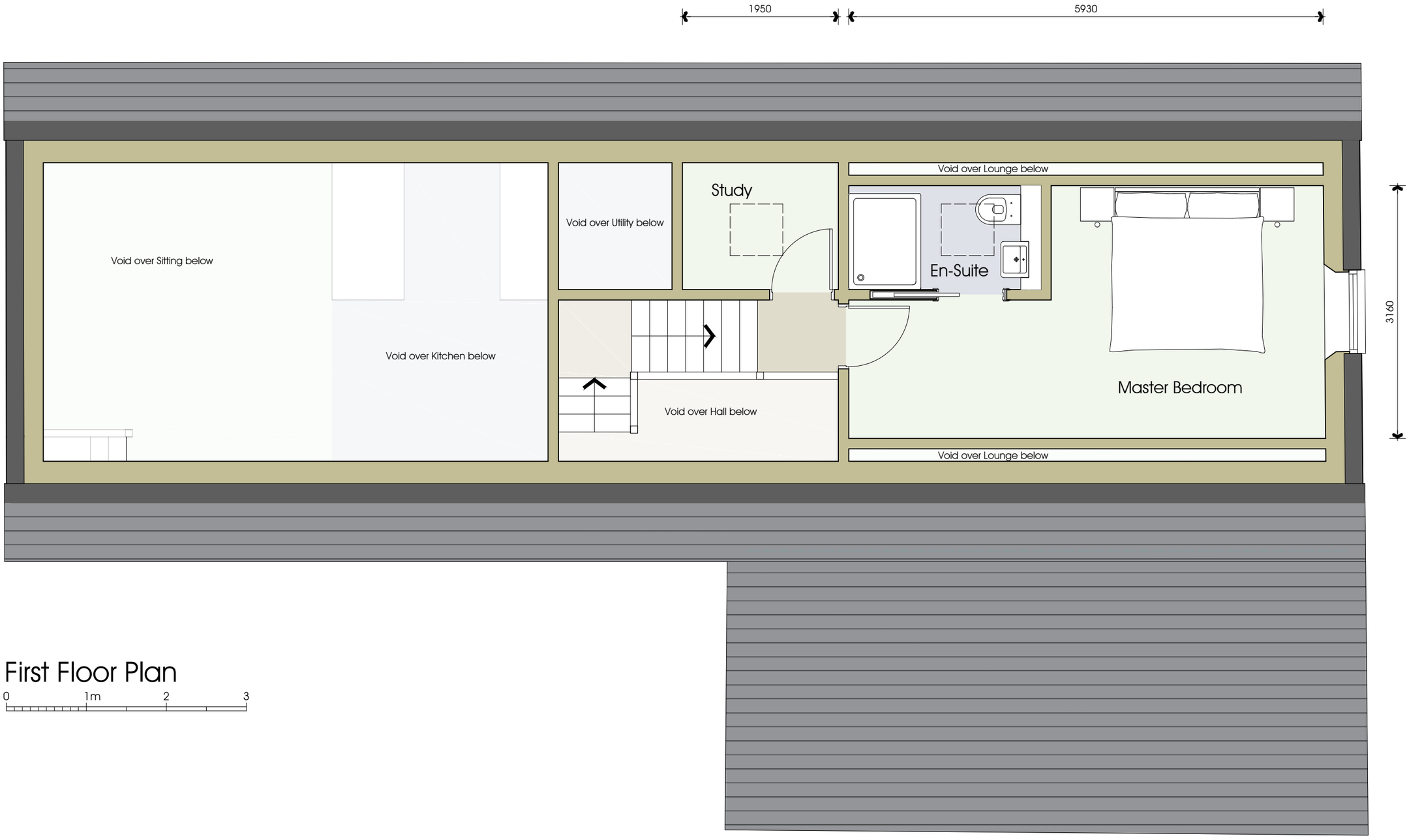

First Floor Plan

0 1m 2 3

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Proposed Conversion
Barn No. 1
Mr M Hayhurst
Wheatley Farm Four Acre Lane PR3 2TD

Proposed
First Floor Plan

DATE August 2016

JOB NO. 2867
DRAWING NO. 140
REVISION
SCALE 1:50 @ A3

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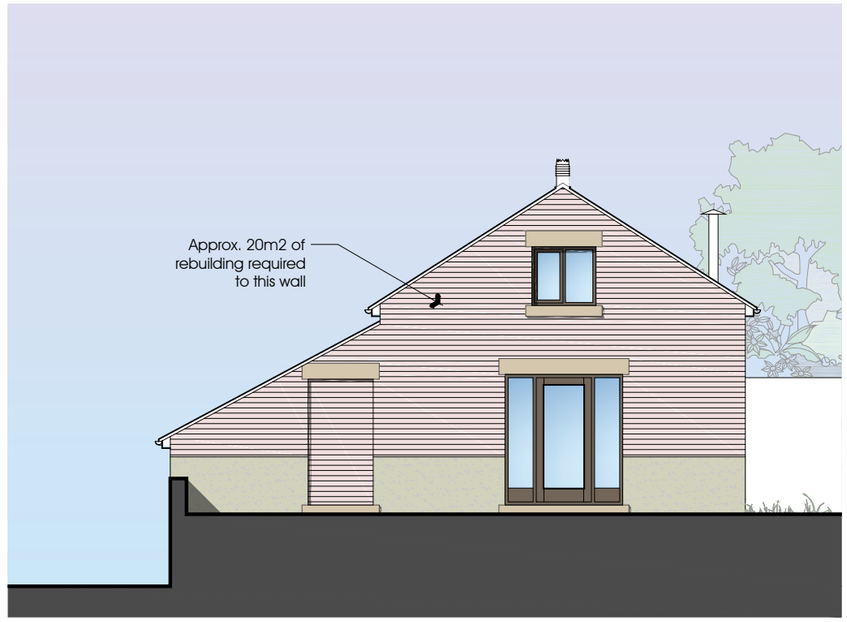
North West Elevation

0 1 2 3 4 5m



South West Elevation

South East Elevation

North East Elevation

Materials

Painted softwood Doors & windows
Painted cast iron gutters and rainwater pipes
Stone setts for vehicle access points and hardstandings

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Proposed Conversion
Barn No. 1
Mr M Hayhurst
Wheatley Farm Four Acre Lane PR3 2TD

Proposed
Elevations

DATE August 2016

JOB NO. 2867
DRAWING NO. 150
REVISION
SCALE 1:100 @ A3

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Appendix B

Photographs

Photo 1 - South West Elevation

Photo 2 – South West Elevation

Photo 3 - South West Elevation – damaged corner

Photo 4 - South West Elevation – damaged corner

Photo 5 – South West Elevation – showing bowing/movement

Photo 6 – South East Elevation

Photo 7 – South East Elevation – blown bricks

Photo 8 – South East Elevation

Photo 9 – South East Elevation – damaged around downspout

Photo 10 – North West Elevation

Photo 11 - North West Elevation – damage at gable corner

Photo 12 - North West Elevation – damage at below window

Photo 13 - North West Elevation

Photo 14 - North East Elevation

Photo 15 - North East Elevation

Photo 16 - North East Elevation – row of damaged/blown bricks

Photo 17 - Internal of lean-to section

Photo 18 - Internal of lean-to section

Photo 19 – Roof to lean-to section

Photo 20 – Internal main section

Photo 21 - Internal main section

Photo 22 - Internal main section – showing buttress to beams