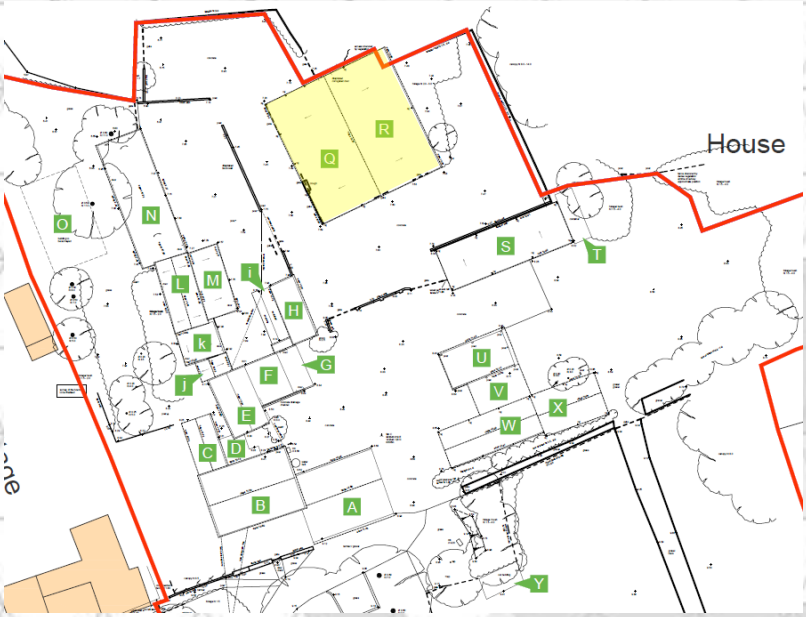
BARNS Q and R
Report on a Visual Inspection of Proposed Barn Conversions Under Permitted Development (Class Q) at Rose Farm, Shapwick Road Westhay, Glastonbury, BA6 9TU for the T W Willcox Will Trust

BASED ON A LIMITED VISUAL INSPECTION

- Version 2
- 26 September 2022

MBE REF–MBE–2021–025–Rose Farm Barns – QR – v2



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Contents

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1. Introduction

1.1 MBE Limited was instructed by the client Mr Alan Willcox on behalf of the T W Willcox Will Trust (by email dated 20/06/2022, to conduct a visual inspection of the existing agricultural barn properties (Barns K, L, and M) and to prepare a structural report on the nature of construction, suitability for incorporation within the conversion and general condition of the visible structure.

1.2 The inspection of a total of six barns (Barns K, L, M, N, Q, R and S) was undertaken. Refer to the Architect's drawings for the location of each barn and the proposed arrangements. This report concerns Barns Q and R only.

1.3 It is proposed to convert the existing agricultural building to a domestic residence under Class Q of the Town and Country Planning (General Permitted Development) (England) Order 2015 (Amended).

1.4 This report relates to the proposed conversion of the existing agricultural buildings into residential accommodation based on visual inspection, from floor level, of Barns Q and R at Rose Farm, Shapwick Road, Westhay, Glastonbury, BA6 9TU.

1.5 An inspection was undertaken in order to understand the structural form that was visible at the property. Our inspection was undertaken from ground level only with the aid of binoculars and a camera where necessary.

1.6 The report is based on a visual inspection undertaken on 12/08/2022 from 10:00. A limited number of photographs were taken as shown in Appendix A and an approximate sketch of the existing arrangement is provided on Figure 1 in Appendix B.

1.7 This report should be read in conjunction with the Architect's drawings.

1.8 This report is written with reference to the published guidance notes relating to building operations allowed under the change to residential use:

Class Q part (b) covers the design and exterior of the building; as such this report does not consider the internal works. Internal alterations are deemed to be covered within the legislation which allows necessary works in order for the building to function as a dwelling. The updated guidance, issued in June 2018, confirms that some structural works are allowable and the internal works are not generally development. The government guidance states:

"The right permits building operations which are reasonably necessary to convert the building, which may include those which would affect the external appearance of the building and would otherwise require planning permission. This includes the installation or replacement of windows, doors, roofs, exterior walls, water, drainage, electricity, gas or other services to the extent reasonably necessary for the building to function as a dwelling house; and partial demolition to the extent reasonably necessary to carry out these building operations".
Source: https://www.gov.uk/guidance/when-is-permission-required

1.9 This report uses the guidance of BRE Digest 366 Part 2 in terms of assessing the general condition of the building in relation to the proposed future use as a dwelling.

2. Report Limitations

2.1 The report is based on a limited visual inspection from floor level of the visible elements of the existing general condition of the structure and a cursory inspection of the grounds from floor level.

2.2 It is a condition of this report that we have not inspected the foundations or other parts of the structure which are covered, unexposed or inaccessible and we are therefore unable to report that such parts of the wall are free from defect.

2.3 Also, the inspection was restricted to a walk over of the grounds around and alongside the property from ground level. A full clear view of the structure was restricted in some places by vegetation, a spoil heap to the northern end of the building and old finishes. Access to the foundations was not possible at the time of the visit and the roof was too high to access fully and safely, so no clear view of the entire roof structure could be obtained.

2.4 The report is confined to structural aspects only and should not be construed as a comprehensive building survey.

2.5 No non destructive or destructive tests or samples were taken at the time of the visit. No as built records were made available or known to exist and there was no means to inspect or review the right hand side elevation, since access was physically not possible at the time of the inspection.

2.6 Comments contained within this report are strictly limited to, and based solely on, the visual inspection, record drawings and record photographs, as well as our understanding of similar structures, built using similar materials and techniques of a similar age.

2.7 It is assumed that all the load bearing elements are supported off a similar foundation (based on the existing trial hole information) taken to the same formation level into competent materials.

2.8 Further investigations are recommended, as outlined in Section 6.0 of this report.

2.9 This report shall be for the private and confidential use of the client only and shall not be reproduced in whole or in part or relied upon by third parties for any use whatsoever without the expressed written authority of MBE Limited.

2.10 This report does not guarantee that any works carried out in the past have been executed in accordance with the statutory and mandatory regulations, British Standards, Codes of Practice or the like current at that time. Refer to Appendix C for a full explanation of the limitations of this report.

3. Observations

3.1 Weather Conditions and Survey Details

3.1.1 The inspection was conducted on 12th August 2022 from 10:00 am. The weather was extremely dry and sunny with clear skies. Visibility was very good.

3.1.2 The inspection was conducted by Matthew Andrew Bennett BEng (Hons) CEng MIStructE, Director in charge of MBE Limited Consulting Engineers.

3.1.3 Visible areas of the property were viewed from ground floor level and a limited digital photographic record is provided in Appendix A (Photos 1 - 26). For reference purposes, the front and rear elevations are shown in Photos 1 and 2 in Appendix A. The external elevations are shown on Photos 1 - 5 in Appendix A. The existing arrangement of the property is illustrated on plan in Figure 1 in Appendix B.

3.2 Description of the Property

3.2.1 The property is located at National Grid Reference: ST4333642369

3.2.2 The subject barn comprises a post Second World War steel portal framed structure arranged in three spans (defined in Figure 1 as grid lines A – D), with each span approximately 6.00 m from column to column and it is formed in four identical bays spaced at roughly 4.60 m such that the building is approximately 18.0 m wide by 18.40 m long on plan.

3.2.3 The building is divided into two main compartments (Barns Q and R); each compartment is fundamentally open-plan. The internal arrangement of Barn Q is shown on photos 6 – 10 and the internal arrangement of Barn R is shown 11 - 26 in Appendix A.

3.2.4 Each barn is covered with a corrugated profile asbestos cement roof deck that is supported by sixteen lines of angle purlins (of various sizes) in total. The roof purlins are supported by the steel portal frame rafters via cleats welded to the frame.

3.2.5 At the perimeter of the barns, where it is clad, the external fabric of the elevations comprise a combination of dado blockwork and vertically spanning asbestos cement corrugated sheeting, supported by hot rolled angle section steel rails.

3.2.6 Barn Q comprises a mono-pitch portal frame (grids A – B) which is broadly open on the low eaves side (along grid line A / 1 – 5).

3.2.7 Barns Q and R are divided by a dado blockwork wall and vertically spanning asbestos cement corrugated sheeting, supported by hot rolled angle section steel rails (along grid line B / 1 – 5).

3.2.8 Barn R (grids B – D / 1 – 5) comprises a pitched portal frame (spanning between grids B – C) with a central ridge adjoining a mono-pitch portal frame to the right (spanning grids C – D).

3.2.9 The frame to the barns measures roughly 5.20 m high to the underside of the apex and roughly 3.00 m to the top of the rafter at the left hand eaves from existing ground floor level. The right hand eaves is slightly lower.

3.2.10 The portal frame rafters are robustly joined to the supporting columns with a minimum of six bolts with haunched end plate connections.

3.2.11 At the front gable there is a small panel of asbestos cement cladding which extends from the ridge / verge to intersect with the top of the internal columns (located along grid lines B and C).

3.2.12 The rear and right hand side elevation is mostly clad. The envelope has no thermal value and will need to be upgraded by the inclusion of a suitable lining internally.

3.2.13 The ground floor to Barn R appears to be a concrete slab that is cast upon the ground and Barn Q may could also have a simialr floor or could be compacted earth. The floor of Barn Q was covered with hay.

3.2.14 Within Barn R there is a run of four lines of cattle pens located at either side of the building and set in opposing pairs either side of the central line of columns (along grid line C). Each cattle pen is set onto concrete plinths that protrude above the general ground level. The floor probably has no effective damp proof membrane. The floor is also mostly covered in mud and vegetation.

3.2.15 Lateral stability across the building, from left to right, is provided by the rigidity of the portal frame rafter / column connections. Lateral stability in the longitudinal direction, from front to rear, is provided by a system knee bracing elements; the knee bracing is bolted to the supporting columns and is part of a wind girder in the line of the purlins along grids A – D / 1 -5, to link each portal frame (see Photos 8, 9, 11, 13 and 24 in Appendix A). The combined stiffenss of the knee bracing frames, acting with the columns about their minro axis, resist the lateral wind loads.

3.2.16 Portal frame columns and rafters are measured to be 152 x 76 mm except the portal columns along the right hand side of the building which were measured to be 178 x 102 mm. Gable posts to the front and rear of Barn Q measure 127 x 76 mm.

3.2.17 The rafters are connected to the columns with rigid bolted haunches, comprising c8mm thick mild steel plate welded to the underside of the rafters and c480 mm deep x 85 mm wide x 8 mm thick mild steel end plates, with 6 M12 bolts (see Photo 10 in Appendix A). The portal rafters are joined at the ridge apex of the portal frame with 4 M16 bolts (8.8) fastened through 10mm end plates welded to the rafters.

3.2.18 The portal columns are the primary load bearing elements which are assumed to be supported by traditional concrete pad foundations toed into soft to firm (grey/) clays.

3.3 Documents Reviewed, The Site, Structural Condition and Use.

3.3.1 The following documents were reviewed:-

- The BGS website.
- Some photos of the property (see Appendix A).
- The Local Authority Planning Portal.
- Google Maps.
- National Library of Scotland - Ordnance Survey (OS) maps online www.maps.nls.uk

3.3.2 From a review of the historic OS maps available online it is evident that the land was developed and established as a working farm by the 1800's. Now there is a collection of approximately 21 buildings that form the property known as Rose Farm.

3.3.3 Shapwick Road is located to the south and the River Brue (and local drainage ditches / Rhynes) are located to the north.

3.3.4 The barns are bounded by fields to the north and dwellings to the west. The site is bounded to the south by a former camp site field.

3.3.5 The buildings are accessed via a narrow lane to the south from Shapwick Road that connects to the main concrete yard slab, from which the buildings are accessed.

3.3.6 The property is aligned such that the ridge line of Barn R is approximately in a north west –south east direction.

3.3.7 The general topography is such that finished ground levels around the subject barns vary between 7.69 m to 7.20 m adjacent the building facade and the surrounding ground levels appear to generally gently slope downwards from south to north. The ground floor level of Barn Q varies between 7.67 m to 7.39 m along grid line A. At the right hand end the ground floor is slightly higher than the surrounding ground levels. The ground floor level of Barn R varies between 7.62 m to 7.45 m between grid lines C and D.

3.3.8 To the right hand side of the barn building there is a large hedgerow and series of trees that are within influencing distance. A self seeded tree is right against the front right hand corner of the building and the canopy extends over the roof of the property.

3.3.9 The barn building was unoccupied at the time of the inspection.

3.3.10 The building appears to have been used as a cattle shed and feed store and is proposed to be converted to be used as a residential property.

3.4 Ground Conditions and Foundations

3.4.1 There is no original Site Investigation (SI) Report or "as built" records available to review.

3.4.2 The BGS website has no borehole records within 100m of the site. Borehole records in the area generally indicate that the underlying geology should be alluvium deposits overlying clays of the Blue Lias and Charmouth Mudstone Formations.

3.4.3 Weathered soils near the surface are likely to comprise a veneer of topsoil over soft to firm blue, grey or brown slity clays, possibly interbedded with bands of fibrous peat. The clays are likely to have some plasticity rendering them susceptible to changes in volume with changes in moisture content, with the potential to either shrink or swell. These soils can also soften when wet. The soils are expected to stiffen at some depth into weathered mudstones / shales.

3.4.4 Presumed safe ground bearing pressures in the order of 50 - 75 kN/m^2 would be anticipated at 1.0m depth, to be confirmed by further ground investigations.

3.4.5 An intrusive site investigation is required to prove the prevalent ground conditions and aid in the design / specification of foundations / foundation repairs.

3.4.6 The water table is expected to be below the depth of conventional foundations but further investigations would be required to confirm the requirements for the management of ground water during construction (whether sump / pumping or similar would be needed).

3.5 Structural Movement, Damage and Other Possible Defects

3.5.1 The structural arrangement of the barns and primary damage is illustrated on Figure 1 in Appendix B.

Barn Q

3.5.2 All visible steelwork was inspected from ground level and no significant structural defects were observed in the form of either excessive corrosion, distortion, distress, deflection or the like. The frame would appear to be in reasonable condition.

3.5.3 The envelope has no thermal value and will need to be upgraded by the inclusion of a suitable lining internally.

Barn R

3.5.4 All visible steelwork was inspected from ground level and, with the exception of some movement at grid line B / 5 (see Photo 22 in Appendix A), no significant structural defects were observed in the form of either excessive corrosion, distortion, distress, deflection or the like. The frame would appear to be in reasonable condition.

3.5.5 A significant portion of the right hand elevation is overgrown with vegetation and self seeded trees that have established and are within influencing distance of the building.

3.5.6 The envelope has no thermal value and will need to be upgraded by the inclusion of a suitable lining internally.

4. Discussion

4.1 Barns Q and R Movement

4.1.1 In general the building appears to be in reasonable condition, with the exception of a displaced joint located at the rear left hand corner of Barn R (intersection of grids B / 5. The rafter appears to have slipped away from the supporting column by about 25mm. The cladding to the upper portion of the gable is not tightly secured to the frame either and a large gap is evident between the joints in the asbestos cement sheeting in the uppermost panel of the rear gable between grids B and C.

4.1.2 The cause of the movement is unknown and may either be due to an accidental impact or lack of fit (or even poorly tightened or fatigue failed bolts). In essence the movement observed does appear to be historic and it would appear as though the structure has not suffered from further distress or a local collapse.

4.1.3 Provided the frame is locally repaired and the integrity of the rafter / column connection restored this would allow the column / rafter to be re-used in the conversion. Given the likely age of the steel frame we would recommend that the joints are generally overhauled and the primary steel cleaned and protected, so the steel coatings and bolts were renewed.

4.1.4 The disposal of surface water and roof rainwater around the barn is not via a conventional "positive" drainage system and all surface and roof water that is discharged around the building perimeter is allowed to infiltrate the ground. Under storm conditions, there is a risk that the flows could exceed the capacity of the ground to allow infiltration, which might lead to water pooling on the surface or in extreme conditions local flooding.

4.1.5 Lias Clays form a belt crossing England extending from Yorkshire to the Dorset coast. It also extends into South Wales. Usually blue, white or grey the Lias clays comprise a compact argillaceous (clayey) limestone or cement stone dating back to the Jurassic era. These clays are known to typically have medium to high shrinkage/swelling potential [(1/2)], and can be particularly problematic in the presence of vegetation.

4.1.6 On the basis that trees / vegetation can cause foundation movement we recommend all the foliage and nearby trees are removed from all wall faces to prevent foundation damage to the structure. The removal also provides more natural light.

4.2 Type of Construction and Loadings

4.2.1 The steel portal frame is a suitably robust form of construction that lends itself to this type of conversion; especially when it is anticipated that the new dwellings will also comprise a new upper / mezzanine floor; whereby vertical loads can be transferred into the primary columns via the internal floor structural elements.

4.2.2 The "as built" size and depth of the existing foundations to the barn columns have not been proven but are assumed to be sufficient to carry the additional loads expected to be imposed due to the conversion and it is unlikely that they will require local underpinning. Where new upper floors are formed some internal supports may be formed to suit the arrangements.

4.2.3 In terms of lateral loading the building is essentially clad on three elevations with the open side deemed to be a dominant opening when considering wind loading. There would therefore be no increase in lateral wind loading when the building is fully enclosed by the conversion.

4.2.4 The existing frame is thought to have been designed to standard BS 2053[(3)] *General purpose farm buildings of framed construction*.

4.2.5 For agricultural buildings, where there is no access to the roof except for necessary cleaning and repair, the uniformly imposed load on the roof would most probably be taken as 0.5 kN/m² as a maximum value. This imposed loading is slightly less than modern code requirements, whereby a minimum imposed load of 0.60 kN/m^2 is required to be resisted. However, the conversion will include internal works that will allow elements of the existing roof to be internally propped, thus relieving load from the original frame.

4.2.6 The basic snow load for the area being sb = 0.4 kN/m^2, so with a roof slope, μ , of 12-15^o , the shape coefficient μ 1 = 0.8.

Basic snow load	- sb	= 0.4 kN/m^2
Site altitude	- A	= 10 m
Roof slope	- α	= 12°
Altitude correction coefficient		salt = 0.1*sb+0.09
		= 0.1*0.4+0.09
		= 0.13 kN/m2Site snow load
		s_0 = sb+salt*((A-100)/100)
		= 0.4+0.13*((10-100)/100)
		= 0.28 kN/m^2

Hence the snow load on the roof, sd = μ 1*s0

= 0.8*0.28

= **0.22 kN/m^2**

4.2.7 The roof cladding for the proposed conversion is going to be a lightweight composite deck or similar trapezoidal profile (possibly standing seam) and as such will not impart additional dead loads on the existing portal frames. The structure would be deemed to satisfy Approved Document A of the Building Regulations.

4.2.8 Subject to the findings of a site investigation, the following is assumed for a traditional strip foundation:

- A perched water table should be anticipated but a ground water cut off is not expected to be required as excavations should be able to be pumped dry.
- Presumed safe ground bearing pressures in the order of 50 – 75 kN/m^2 would be anticipated at 1.0m depth, to be confirmed by further investigations. .

4.2.9 Column loads in the order 35 – 95 kN are anticipated to be likely due to the conversion (assuming a floor is to be added) which would potentially be within the anticipated safe bearing capacity of the existing foundations. The existing foundations will need to be uncovered and confirmed so that they can be re-used to support the new superstructure loads. However, where new floors are formed internally it is likely that new lines of sub-dividing structure will be provided to enable the loads to be shared by internal walls (to give fire / acoustic separation between rooms / dwellings).

4.2.10 The existing walls have no thermal value and it is intended to line the perimeter walls with an insulated panel or construction to conform to Approved Document L of the Building Regulations.

4.2.11 It is intended to form new openings for glazing as required to comply with the requirements for natural daylight for habitable rooms. These new openings will be located, as far as possible to avoid the primary structural elements (bracing and ties).

4.2.12 The existing ground floor construction would need to be improved or replaced with a suitable DPM and floor insulation.

4.2.13 Where the elevations are to be filled in the external cladding will either be detailed to be supported off the existing foundations or off the ground slab (suitably thickened and reinforced). The new cladding could also be potentially hung from the primary frame or supported off a suitably reinforced ground floor slab with an edge thickening. The details will be undertaken at Building Regulations stage (technical design), but it is envisaged that a lightweight cladding (possibly composite cladding, SIPs panels or timber frame panels) will be used, either hung off the existing columns or bearing on a thickening set into the perimeter of the new ground bearing slab construction.

5. Conclusions

5.1 Conversion of Barns Q and R

5.1.1 The superstructure of the property is generally regarded to be in the form of a steel portal framed structure. Portal frame columns and rafters are measured to be 152 x 76 mm except the portal columns along the right hand side of the building which were measured to be 178 x 102 mm. Gable posts to the front and rear of Barn Q measure 127 x 76 mm.

5.1.2 Each barn is covered with a corrugated profile asbestos cement roof deck that is supported by sixteen lines of angle purlins (of various sizes) in total. The roof purlins are supported by the steel portal frame rafters via cleats welded to the frame.

5.1.3 At the perimeter of the barns, where it is clad, the external fabric of the elevations comprise a combination of dado blockwork and vertically spanning asbestos cement corrugated sheeting, supported by hot rolled angle section steel rails.

5.1.4 The existing building is of a robust form of construction and is structurally sound with no evidence to indicate any significant deterioration to the primary structural elements. The only structural damage evident at the time of the inspection is the local displacement of the rafter / column joint at grid intersection B / 5. This damage observed can be readily repaired once the roof and wall cladding is safely removed, prior to conversion.

5.1.5 Given the volume of the building it is envisaged that an internal mezzanine floor and sub-dividing internal partitions / walls (to create compartments) are proposed to be added.

5.1.6 The proposed conversion could feasibly be constructed in either timber frame or traditional masonry form of construction, with some elements of steel frame to facilitate the internal alterations necessary to create a new mezzanine / first floor and to provide enhanced resistance to racking.

5.1.7 The primary foundations are likely to be of a size that is sufficiently adequate to carry the proposed loads that will flow from the conversion. In addition, any scheme of conversion on a property of this size will no doubt comprise a limited number of proposed openings to comply with natural daylight requirements for habitable rooms. Such openings should be located, as far as possible between the existing cladding rails to ensure only reasonable building operations are required to undertake the conversion.

5.1.8 The gable steelwork supports 50 % of the loading applied to the internal frames, where the roof is supported on one side only. Provided the foundations are found to be of reasonable proportions the increase in loads on the perimeter columns due to the increased roof loads should be deemed to satisfy Document A of the Building Regulations.

5.1.9 Whilst the barns are generally noted to be in need of some repairs, in the context of the conversion scheme that is proposed, by inspection of the primary frame, the general proportions, rigidity of the masonry and from my practical experience, in my opinion, it is feasible to convert the existing barn and retain the primary steelwork and foundations for the support of the proposed conversion (subject to a scheme of repairs and backlog maintenance). This assumes that the dwellings will be separated by a suitably robust party wall and further sub-divided internally with compartment walls of solid construction, such that the overall rigidity of the frame is enhanced.

5.1.10 The roof and wall cladding is most likely a hazardous asbestos fibre containing material and is unacceptable to retain it so it will need to be wholly removed and replaced.

It should be noted that the above reasoning is only based on the visible evidence and anecdotal evidence, available at the time of the initial inspection and is not supported by an intrusive site investigation and/or backed up by a reliable intrusive site investigation to support the above technical hypothesis.

6. Recommendations for Further Works

6.1 Trees, Vegetation

6.1.1 Remove the nearby trees and hedgerows. Maintain the vegetation and restrict planting / use low water demanding species of shrubs / trees that will be outside the influencing distance of the property. That is keep trees away by at least a distance equivalent or greater than their height (e.g. 3m tree greater than 3m from the dwelling).

6.2 Drainage

6.2.1 The site will require a drainage strategy / flood risk assessment commensurate with the flood risk attributed to this site.

6.2.2 A drainage / infrastructure engineer should be engaged to investigate sustainable methods to provide drainage to the site to meet current standards and local planning policy guidelines.

6.3 Site Investigation / Further Surveys

6.3.1 In order to successfully develop the site and reduce risks in the ground a professional site investigation should be undertaken in order to determine the ground profiles at depth, assess the degree of contamination present (if any) and define geotechnical and environmental parameters for the site going forward.

6.3.2 The existing foundations should be further investigated to verify their actual construction (type / detail /depth / thickness) and condition around the portal column base plates and holding down anchors prior to construction.

6.3.3 The fabric probably contains Asbestos materials which should be checked / identified as part of a specialist survey (e.g. refurbishment/demolition survey). All asbestos waste is subject to Schedule 2 of The Control of Asbestos Regulations 2012. More information on handling potentially asbestos containing sheets can be found on the Health and Safety Executive's website.

6.3.4 Underground utilities should ideally be located / surveyed and mapped on the topographical survey for the site.

6.4 Superstructure Repairs Barns Q and R

6.4.1 The damage in the main barn (Barn R) is generally restricted to the connection between the column and rafter at grid intersection B / 5. The displaced joint and steel frame should be locally taken down and re-assembled with a new bolted joint, once the cladding is safely removed.

6.4.2 In general the steelwork joints should be overhauled and new bolts provided to ensure tightness of fit and the frame checked to ensure it is true and square.

6.4.3 The existing steelwork should be thoroughly cleaned and protected with a suitable protective paint system.

6.4.4 The roof and wall cladding should be entirely replaced with a new system of cladding that is commensurate in weight and ideally the roof should drain to gutters that feed into down pipes that should discharge into a dedicated drain and not release water onto the ground near the outside walls of the barn.

References

[1] Ddriscoll R. (1983) "Influence of Vegetation on Clays" Geotechnique. Vol. 33.
[2] Table 1, Chapter 4.2, Para. 2.3 of N.H.B.C. Standards, 1986.
[3] BS 2053 General purpose farm buildings of framed construction, London, British Standards Institution.

Appendix A Photographic Record

Photo 1 – Front – Viewed from access driveway

Photo 2 – Rear – Viewed from rear left hand side

Photo 3 – Front – Viewed from front right hand side looking north

Photo 4 – Front right hand side – Viewed from yard against site boundary

Photo 5 – Left elevation – Viewed from eastern boundary

Photo 6 – Interior view Barn Q – Front elevation viewed toward rear

Photo 7 – Interior view Barn Q – Rear elevation viewed towards front

Photo 8 – Interior view Barn Q – Right hand side dividing wall to Barn R – Knee bracing

Photo 9 – Interior view Barn Q – Left hand elevation – Knee bracing

Photo 10 – Interior view Barn Q – Typical portal column / rafter joint

Photo 11 – Interior view Barn R – Viewed front toward rear left hand corner

Photo 12 – Interior view Barn R – Viewed rear toward front left hand corner

Photo 13 – Interior view Barn R – Viewed rear left hand corner to rear right hand corner

Photo 14 – Interior view Barn R – Right hand elevation cont'd from Photo 13

Photo 15 – Interior view Barn R – Right hand elevation cont'd from Photo 14

Photo 16 – Interior view Barn R – Right hand elevation cont'd from Photo 15

Photo 17 – Interior view Barn R – Front right hand elevation toward rear right hand corner

Photo 18 – Interior view Barn R – Left hand elevation dividing wall to Barn Q

Photo 19 – Interior view Barn R – Left hand elevation cont'd from Photo 18

Photo 20 – Interior view Barn R – Left hand elevation cont'd from Photo 19

Photo 21 – Interior view Barn R – Left hand elevation cont'd from Photo 20

Photo 22 – Interior view Barn R – Rear left hand frame column – Frame movement

Photo 23 – Interior view Barn R – Typical internal column / rafter joint

Photo 24 – Interior view Barn R – Typical 178x102 portal column / rafter joint

Photo 25 – Interior view Barn R – Typical internal column – Junction with ground

Photo 26 – Interior view Barn R – Rear perimeter internal column - Junction with ground

Appendix B Figure 1

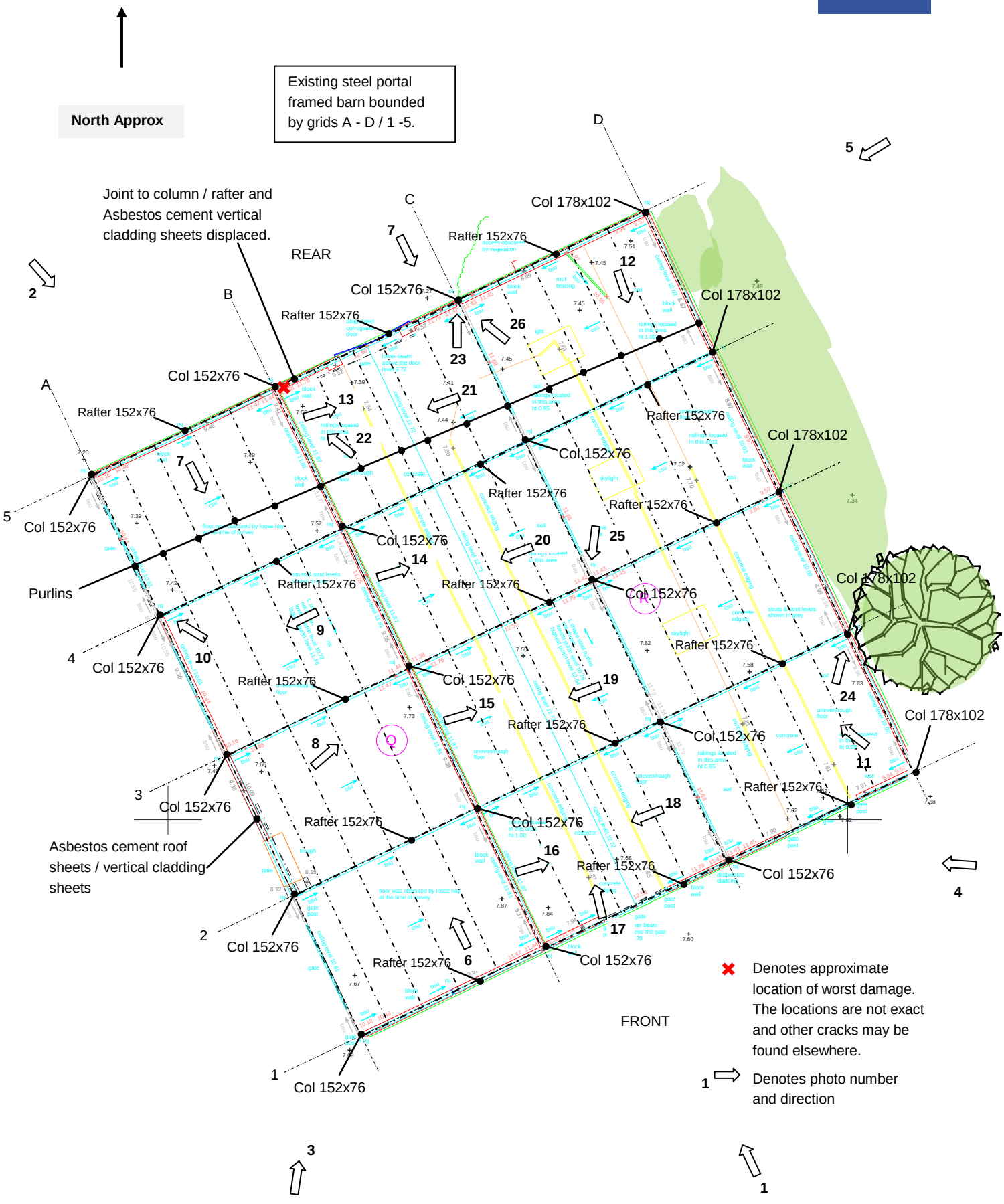

FIGURE 1 – INDICATIVE PLAN – EXISTING BARNS Q AND R

Appendix C Limitations

1. The purpose of the report is to apprise the client of the feasibility of converting the existing barn building into a dwelling, from a structural engineering perspective.

2. In accomplishing this purpose, a visual inspection of the barn was done. The inspection was limited because no uncovering or physical testing or intrusive ground investigation had been undertaken and the structural fabric was not fully exposed.

3. The diagnosis of the movement or damage is subject to further investigation(s) where required.

4. Reference in this report to the left and the right-hand means the follow:-

   a) Reference to the whole property when facing the front.
   b) References to individual walls or elements, when facing the appropriate side of the wall or element.

5. We were authorised to confine our attention to structural matters and this document should not be construed as a comprehensive survey or cost / budget report. Special reference is made to the following:-

   a) It was not possible to observe the foundations. The foundations to the main property were not inspected and we have referred to the work of others.

   b) No opening up was done.

   c) No non destructive or destructive tests or samples were taken at the time of the visit. As such the fabric was not tested or assessed (e.g. steel for loss of section due to corrosion).

   d) Existing records were not made available to show the layout of the building so all information is based on approximate measurements and what was visible. A limited photographic record was made.

   e) At the time of the visual inspection, vegetation was growing against the wall which prevented inspection of some areas of the fabric.

   f) Non-structural elements, such as windows, door joinery, fascias and soffits and the like were not inspected.

   g) The main property has not been inspected for building faults related to roof coverings, rainwater systems (gutters and rwps), gulleys/sumps/pumps, drains or other defects. No CCTV survey was done.

   h) In particular, we have not inspected or carried out physical testing on electrical, heating or plumbing installations, below ground drainage runs, or above ground drainage runs, either internally or externally.

   i) Fences were not inspected.

   j) We have not inspected timber nor any other part of the structural fabric that was covered, concealed, or inaccessible, and we are therefore unable to report that any such part of the property is free from defect.

6. Comments contained within this report therefore are strictly limited to, and based solely on, the visual evidence that is documented and our understanding of similar structures, built using similar materials and techniques of a similar age.

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