

## Stratfield Farmhouse, Oxford Road, Kidlington, OX5 1DL

## Structural Inspection Report



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Date	Version	Notes/Amendments/Issue Purpose
October 2018	2	For information

## Note:

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## 1 Introduction

Price & Myers visited Stratfield Farm, Kidlington, on behalf of Manor Oak Homes, on 21st August 2018. The purpose of the inspection was to advise on the structural condition of the farmhouse building and outbuildings and identify the areas requiring structural repair for its conversion to a retirement living development.

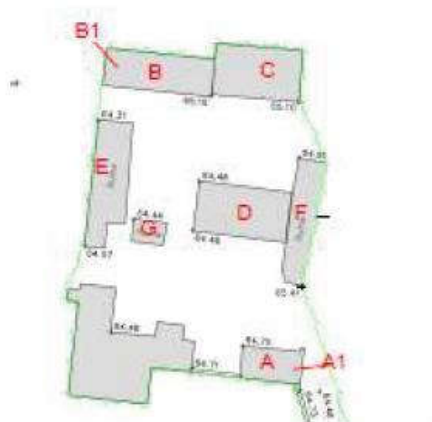
The scope of the inspection includes the farmhouse and several of the farm outbuildings. The inspection was limited to what could be seen without the removal of any finishes.

The farmhouse is a Grade II listed early-19th Century building, with some parts potentially pre-dating this period.

## 2 Description of Existing Structure

The farmhouse is a traditional two-storey building of limestone wall and timber floor and pitched roof construction. The original building has clearly been altered and extended from its original footprint but all parts look to be of similar age.

There are eight outbuildings of varying size and construction located around a central walled yard. These are labelled as Blocks A-G in the Design & Access Statement which will be used as the outbuilding references within this report. Generally these buildings are of similar age and construction to the main farmhouse, with a couple of exceptions being Blocks C & D which are of relatively modern steel construction.



Block A: Brick and timber building, timber framed and weather-boarded above first floor and to front elevation. Roof is traditional duopitch timber with modern corrugated sheeting. Lean-to building on one end, with thick stone wall on this end. Timber first floor structure in part of the building, with the other half open from ground up to the roof.

Block B: Stone walls with timber roof and modern corrugated sheeting. Roof space could not be accessed during inspection but floor structure comprises timber joists on timber bridging beams.

Block B1: Stone building with clay tiled timber roof. Building adjoins Block B.

Block C: Steel frame shed of three bays with corrugated roof.

Block D: Steel frame shed of three bays with corrugated roof, although of smaller size than Block C.

Block E: Stone wall construction, originally partially with timber roof but now removed throughout.

Block F: Stone walls and timber roof construction of five bays. Timber rafters supported on purlins and primary timber trusses.

Block G: Timber frame shed with brick and stone walls, partially collapsed.

### 3 Observations

#### Stratfield Farmhouse

- i. The farmhouse is in extremely poor structural condition with extensive and severe cracking throughout.
- ii. Building elevations show clear signs of structural movement: lintels set on angles and extensive cracking to the stonework. The front door frame and stone arch on the south elevation has dropped on the east side. The south wall appears also to fall to the west generally.
- iii. The west wall has extensive cracking and movement which can be seen in the lintels and bowing outwards of the roof eaves.
- iv. Many of the lintels have spread and keystone dropped following movement and cracking to the walls. Previous repairs to lintels are apparent.
- v. The less prominent north and east walls have timber lintels which appear to have suffered some rot and the surrounding stonework cracked.
- vi. Internally the ground floor is uneven and falls markedly from the central hallway to the west. The same is apparent at first floor. The fall in the hallway does not correspond with the movement in the main door which suggests localised settlement issues.
- vii. Timber joists were observed under the stair at ground floor, some with rotten joist ends.
- viii. There is extensive cracking in the internal walls at ground and first floor, particularly those on the west side. The spine wall and west wall have fully detached and the first floor separated from the west wall.
- ix. Lintel movement internally corresponds to the movement observed externally, as does the bowing of the west wall observed from the north west bedroom.
- x. The east part of the building is in much better condition compared with the west, both in terms of movement of walls and floors.
- xi. The roof structure was inspected in two locations and in both the timber rafters and purlins appeared in reasonable condition.
- xii. There is a large gap in the roof between the original roof and the catslide roof. The internal timbers in this location have rotten from weather exposure. Externally there is evidence of repairs in this location.

#### Block A

- i. 9inch solid brick wall on west elevation is leaning significantly, particularly at the base on the front elevation where a tree, now cut back to a stump, appears to have undermined the wall. The remainder of the wall further from the stump is much straighter.
- ii. The two other 9inch brick walls are in OK condition.
- iii. The east and south elevation has vegetation coverage which has penetrated the timber structure into the internal space.
- iv. Some rot in the first floor timber joists.

- v. Roof structure and rafters are not tied against thrust at the eaves but seem to be in reasonable condition. The purlins and wall plates may be offering restraint through their connections back to the rafters and the primary stud walls.
- vi. The ridge board and rafters are straight and the roof form is in reasonable condition.
- vii. Some damp staining in the roof structure, possible timber rot, subject to specialist assessment.
- viii. Modern timber framing along the rear elevation.

**Block B**

- i. Significant damage to corners of stone wall on east elevation which correspond to large cracks internally.
- ii. Timber ceiling joists are sagging between bridging beams and in some areas the floor above has collapsed. Cause is likely to be a combination of inadequate size for the applied loading conditions and water damage/ rot.
- iii. Bridging beams appear straight and in reasonable condition, although due to damage to joists should be surveyed by timber specialist for rotting.
- iv. Base of stone walls are in poor condition due to weather exposure and will need to be replaced extensively with new stonework or concrete.
- v. Ground floor is brick construction.

**Block B1**

- i. Stone walls with cracking but generally in reasonable condition given condition of building generally.
- ii. Timber roof has collapsed substantially.

**Block C**

- i. Steelwork appears in generally reasonable condition except for some corrosion of the post bases.
- ii. There is no structural bracing of the steel posts except for some haunching and this may not be adequate, however the structure is partly open-sided and so wind loading is reduced.

**Block D**

- i. Steelwork appears in generally reasonable condition except for significant corrosion of the post bases.

**Block E**

- i. Stonework in reasonable condition although substantially covered in vegetation.

**Block F**

- i. Building structure in good condition to north, with stone walls and timber roof all sound.
- ii. Three bays of roof structure are in reasonable condition, with vegetation causing some damage to rafters towards the middle bays. The fourth bay is damaged severely by vegetation and a large tree growing internally. From this point south, the trusses and roof have fully collapsed.
- iii. Movement of roof eaves beam has resulted in detachment from rafters.

**Block G**

- i. Shed building is substantially collapsed.

## 4 Discussions

### Stratfield Farmhouse

The movement observed in the elevations indicates a differential subsidence on a local scale, particularly to the main north elevation. There is however a noticeable wider settlement of the south wall towards its west end, this observation being supported by the significant falls in this direction at both ground and first floor. The west wall is also bowing outwards, particularly at the roof eaves, and this may be further evidence of foundation movement (although roof spread is also a common cause). The result internally is separation of the spine wall from external walls and this loss of restraint between the walls then exacerbates the movement.

The movement of the west wall has caused a gap to open between the wall and floor. The first floor joists span parallel to the west wall and therefore the joist bearing on the spine wall should not be compromised by the movement.

The movement in the west wall may also be responsible for the roof separating between the original building and the catslide roof.

The condition of the east part of the building is significantly better than the west. The building looks to have been constructed in three parts: the original farmhouse on an L-shape footprint, the smaller adjoining building to the east, and the infill with catslide roof between the two. It is possible that the east building has more substantial foundations, or that the ground is locally improved to the east.

The structural works to the house to convert it to retirement-living use would be substantial. The footings would be investigated in several trial pits around the perimeter to establish their construction and depths and the ground conditions locally. Provided that subsidence is the cause, we would recommend that the external walls are underpinned to reduce the risk of further movement.

The walls would be strengthened and restrained by means such as restraint ties and crack stitching. The spine walls are so severely damaged in places that removing parts and rebuilding would be required, and the internal and external walls can then be positively tied together to reintroduce the necessary restraint conditions. Lintels would be re-set where undamaged. Embedded timber should be removed throughout and infilled with new masonry and the timber lintels inspected need to be removed and replaced with suitable alternatives.

The floor joists in the west rooms, where their ends are currently unsupported, would need to be removed and replaced or each of them spliced to extend their length. All floors and roofs, new and existing, would be tied to the walls with galvanised mild steel restraint straps.

The roof structure form suggests the roof may be in reasonable condition, however this would be subject to inspection and further assessment.

### Block A

Masonry including stonework is in reasonable condition except for the leaning wall which is repairable. The building has previously suffered from water leaks through the roof and cladding and the timber is rotten in places. Roof and floors should be surveyed by timber specialist to establish extent of rot. The floors may require local replacement of some of the joists, whereas the roof and walls would more likely need to be removed and replaced, although many of the timbers will be salvageable.

**Block B**

The roof space was not accessible however the form of the roof and modern corrugated cladding suggests it may have been replaced in the past. The timber floor needs full replacement although the two bridging beams may be salvageable subject to a timber specialist survey for rot. The stone walls will need substantial repair, particularly to the corners of the east wall. The stonework at the base of the wall is soft and weak and will need to be replaced with new stonework or concrete. It may be that this would need to be completed using a typical underpinning methodology, and this should be weighed up against a full re-build of the affected walls, given that the timber structure over is also to be replaced.

**Block B1**

The roof structure needs full replacement and the stone walls may be salvageable in part.

**Block C**

Corrosion of steel column bases is a common problem with weather-exposed steelwork and free drainage around the base and frequent paint repairs are required in these instances. Steel columns can be spliced with new base sections to avoid full replacement.

**Block D**

The same applies as with C, except the corrosion to the bases is more severe, with substantial reduction in steel section and end bearing capacity.

**Block E**

Stone walls appear to be in reasonable condition and could be re-used as the structural walls to a new building on the same footprint, subject to assessment of the existing footings and ground conditions and load capacity to support a new building structure.

**Block F**

Three bays to the north end could be retained, with some repairs and strengthening to walls and roof structure. The southern three bays would need significant repairs to stonework and a new roof structure.

**Block G**

The shed building is substantially collapsed and offers no realistic opportunity for re-use.

## 5 Conclusions

The farmhouse building is currently in an unsafe condition with major cracking and movement to walls and floors throughout. The worst-affected areas are the west side of the building where the internal spine wall and first floor have separated from the external wall. The first floor joists span parallel to the west wall and therefore their bearing on the spine wall should not be compromised by the movement.

The cause appears to be largely related to differential settlement due to poor and variable ground conditions and inadequate foundations. Foundation movement can also be caused by damaged drains and soil fines being eroded from around the footings. We would recommend a CCTV survey of the existing drainage to establish condition and presence of fractures/ cracking through the pipes or joints. Subject to further investigation of the existing footings, significant structural repairs and strengthening including underpinning are likely to be required. Further details of the works required are indicated within the Discussion section of this report.

The outbuildings are in poor condition generally and in need of significant structural repair. Their age and construction vary from steel-framed sheds to traditional stone and timber construction.

Blocks A, B & F offer the most potential in terms of the degree to which materials and the base structure could be salvaged.

The timber framing has widely experienced weather exposure and damage and would generally require replacement or strengthening depending on condition and subject to specialist timber survey.

Stonework may be repaired and retained in many areas. As a general rule, timber embedded within stone walls should be removed and replaced with masonry.

Consideration should also be given to proposed internal floor build-ups and depths, since existing footings cannot be under-mined by new floor construction and we often find that older buildings have particularly shallow footings. Underpinning of walls is often a potential solution if the proposed build-ups exceed the footings depths, although there are means of avoiding this approach by reducing the floor build-ups and raising internal floor levels.

It should also be noted that many of the outbuildings are in a precarious condition and are at continued risk of collapse. Access should be avoided, particularly to internal spaces with roofs/ceiling structures. The exception is Block A which appears to be in reasonable condition, although care should be taken around the leaning wall on the west elevation.



# Appendix A

## Photographs



Photograph 1 - East elevation





Photograph 2 - Cracking to east wall indicating relative movement with south wall





Photograph 3 - South elevation



Photograph 4 - Differential movement through arch lintel





Photograph 5 - Slipped keystone



Photograph 6 - North elevation



Photograph 7 - Movement and cracking around timber lintel





Photograph 8 - Main hallway floor relative to north door lintel





Photograph 9 - Main hallway fall towards west



Photograph 10 - First floor joist separation from west wall from below





Photograph 11 - First floor joist separation from west wall from above





Photograph 12 - Severe cracking in first floor spine wall and separation from west wall



Photograph 13 - Internal lintel in south wall, central window over front door





Photograph 14 - Rotten timber beneath gap between roofs





Photograph 15 - Roof structure showing primary rafters and ties forming A-frame



Photograph 16 - Junction between roofs with previous repair and embedded timber





Photograph 17 - Block A, north elevation



Photograph 18 - Block A, leaning wall and tree stump





Photograph 19 - Block A, south-east elevation



Photograph 20 - Block A, mezzanine timber joists, with rot damage





Photograph 21 - Block A, weather-boarded stud framing



Photograph 21 - Block B, south elevation





Photograph 22 - Block B, corner wall





Photograph 23 - Block B, corresponding internal location to 22



Photograph 24 - Block B, bridging beams and collapsed floor joists





Photograph 25 - Block B1 , south elevation





Photograph 26 - Block B1, internal



Photograph 27 - Block C





Photograph 28 - Block D



Photograph 29 - Block D, column base corrosion





Photograph 30 - Block E



Photograph 31 - Block F, north west elevation





Photograph 32 - Block F, south west elevation





Photograph 33 - Block F, north bay





Photograph 34 - Block F, roof trusses looking south



Photograph 35 - Block F, dropped eaves beam separating from rafters





Photograph 36 - Block F, south roof collapsed