

Structural Assessment of East Wing at
Littlecott Mill, Enford
Pewsey, Wiltshire,
SN9 6AW

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1.0 Brief and overview

MLDE have been commissioned to provide structural engineering consultancy services for a domestic property in Enford, Pewsey, where an extensive package of refurbishment works is to be undertaken. Littlecott Mill is situated relatively close to the River Avon. The structure has been altered and extended over the last few centuries, resulting in its current form.

A historic leat once ran alongside of the footprint of what is now the east wing. The original building has been extended and altered on many occasions. At some point in time, the leat was backfilled to allow further extension. The quality of fill within the leat is extremely poor and loose, and almost self-levels when tipped out of an excavator bucket onto the ground. The infill material does not provide a serviceable or structurally load bearing stratum to build upon, nor does it effectively laterally retain and contain the alluvial material under the footprint and foundations of the east wing.

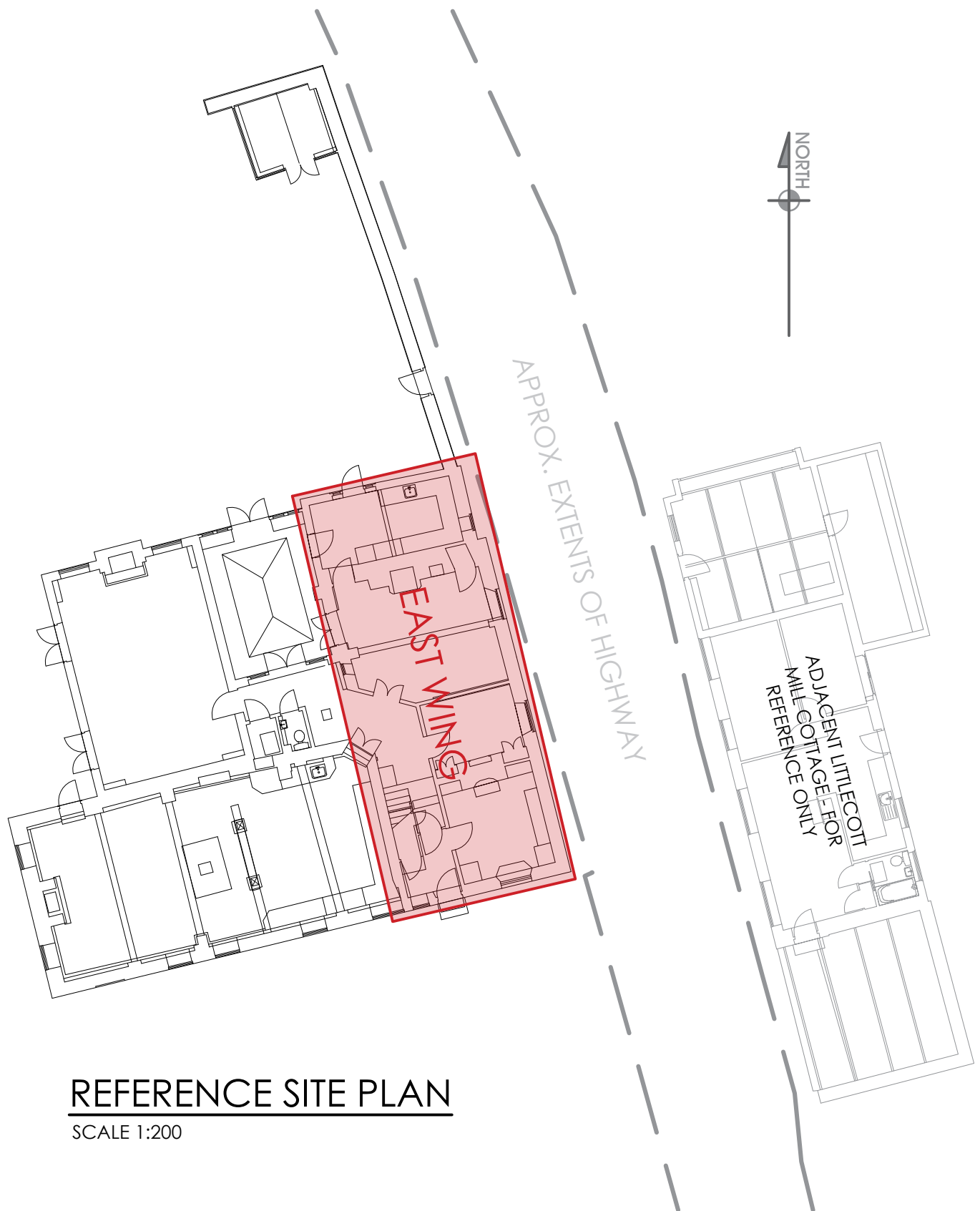
To facilitate the next stage of the building's evolution, alterations to the form of the existing building are planned. This currently involves the repair and complete refurbishment of the structural fabric of the east wing.

Following a series of invasive investigations and opening up works which have been carried out (discussed in more detail later in this report), it has become apparent that the east wing is in an extremely unstable condition and in a significantly worse structural condition than had previously been anticipated.

This report has been produced to assess the potential risks associated with the proposed scheme of temporary and permanent works, based on the recently disclosed structural condition of the existing fabric. The information presented within this report is informed by numerous visits to the site, during which opening up works and exposure of the structural fabric has been carried out; some limited temporary holding measures have already been put in place by the principal contractor. A series of trial pits and bore holes have now been excavated, and a full strip of surface finishes has been completed, including the roof coverings.

All observations within this report have been based on visual inspections only. No testing has been carried out at this stage, nor does it seem necessary to do so. Structural calculations have not been carried out in relation to the existing structure to justify the professional opinions made, and it is possible that other issues/complications are present which are not currently apparent. This report is entirely focussed on the east wing only.

The conclusions drawn within this document are intended to inform the future decisions of the project design team and to assist in helping to minimise health and safety risks. The east wing sits directly alongside a public highway, which adds further risk for the general public over a projected contract period of about eighteen months. This report and all associated documents have been produced for the private use of the Clients, their Agents and the Design Team and cannot be sold or copied to a third party without the prior express written permission of MLDE.



REFERENCE SITE PLAN

SCALE 1:200

2.0 East wing structural assessment

Littlecott Mill is a domestic, two storey masonry structure with a timber roof situated near to the River Avon (001, 002).

The walls are generally solid masonry with timber joists at first floor level spanning between cross walls. A series of decorative external flint bands can be seen on the roadside elevation. A dual-pitch timber roof structure, consisting of a traditional rafter/purlin arrangement, spans between the primary structural walls.

2.1 Settlement and Alteration

Substantial structural movement has occurred in the east wing during its service life. There is clear evidence that the inner wall of the east wing has differentially settled by around 250-300mm, relative to the roadside wall. A number of courses of masonry have clearly been added to the western wall of the east wing during previous reroofing works (003). This would have been an attempt to re-align the opposing wall plates, following considerable and differential settlement occurring between the roadside and corresponding inner wall. It is now evident that the gable wall has also been reordered at high level to try to mask the settlement across the width of the building by rebuilding and adding to the upper section of wall.

The actual magnitude of the ongoing differential settlement which has occurred to the walls and supporting foundations of the east wing became very evident and apparent on the first floor once all existing boards were lifted. Furrings were previously added on top of the existing joists in an attempt to level the floors. These taper from say 5mm to around 300mm in height, over the 5m width of the footprint.

Beyond the remedial works that were carried out to the primary fabric to re-level the structure, alterations have been made to window openings, position of walls, and other general internal modifications.

The results of these numerous alterations, when combined with the local damage caused by ongoing differential settlement have weakened the structural capacity of the wider building.

Some level of instability had been previously anticipated; however, the additional evidence that has since been uncovered during the removal of the surface finishes clearly shows the significant issues which are contained within the structural fabric (the full extent of this is discussed in Section 2.3).

2.2 Local ground conditions and foundations

Prior to any on-site investigation works being carried out, it was determined from the British Geological Survey Maps that this site was underlain by a bedrock of the New Pit Chalk Formation.

However, it has been discovered that a thick band of alluvium had then been deposited above the New Pit Chalk layer. A series of boreholes have since confirmed this and highlighted that the chalk strata slopes steeply to depth from east to west across the site.

Along the roadside edge, the chalk is at a reasonably shallow depth but is covered by about 6m of soft alluvial head material toward the west side of the site. A series of geological tests suggest that the local strata may have an allowable bearing capacity of around 25-35kN/m², but will be subject to ongoing movement and consolidation which makes it unsuitable for reliably founding a brittle masonry structure onto.

Due to the magnitude of the previous movement evident from outside, it was deemed appropriate to carry out a series of trial pits around the perimeter of the building to establish the extent of foundations around the building. It was indicated that the roadside wall was founded around 300mm below the existing ground level directly on a chalky head material (004 to 006). Nothing in the way of traditional strip footings was discovered and the east wing's internal floor level was found to be below the level of the adjacent highway in places.

As previously noted, the historic leat alongside the east wing was backfilled at some point in time. Investigations in this area have found the fill to consist of a very loose, clayey sandy material or a very dark, soft, muddy organic type material with some rubble and timber sections.

Subsequent trial pits were carried out in the centre of the footprint in April 2026 and assessed in MLDE's letter of 22/04/26. These excavations demonstrated that the inner wall of the east wing is founded on the same extremely poor-quality fill, however it extends to a minimum of 1.8m below ground. The water table in this region is around 700mm below ground level (007 to 011). This disparity in founding conditions is believed to be the cause of differential settlement.

Almost all of the structural settlement noted in the building to date can be attributed to the unsuitability of the existing foundations. The existing shallow footings are not capable of supporting the current applied loadings and most certainly should not be considered reliable or serviceable for the founding of a heavy weight domestic building.

All evidence indicates that structural movement will continue if any of the building is retained in its current form. While foundation enhancement might be carried out to try to mitigate against this, any underpinning would need to be founded to the depth of the solid, natural chalk which was found to be a minimum of 1.8m. In other areas, the chalk beds are far deeper than this. It becomes physically impractical to try to form a suitable foundation at this depth whether considering multistage underpinning or retrospective bored piles.

Multistage underpinning to significant depth, especially when under water is slow, expensive and unnecessarily dangerous to carry out from a health and safety perspective. Alternatively, the practicalities of trying to install bored piles around the existing building would be extremely difficult. The weight of piling machine is likely to consolidate the ground to depth and cause further movement and instability within the supporting walls of the east wing structure.

2.3 Current Superstructure Condition

In preparation for the wider package of refurbishment works, the existing finishes have been stripped, and the roof coverings removed. This has allowed for a more holistic review of the structural condition of the primary fabric as it currently stands.

Some internal cross walls are not bonded to the external skin and are simply butted against each other (012 to 014). There are also numerous cracks that have propagated around openings, further indicating a level of ongoing movement. Several walls are not sufficiently toothed together within the building and are an eclectic, haphazard mix of steel and timber elements, thus they provide no lateral support to one another.

Poorly bonded masonry highlights historic positions of doors and openings, but these now provide little in the way of structural robustness or support to the wider structure (015 to 020).

Further evidence of the historic movement has been uncovered during this package of enabling works as discussed in Section 2.1. Furrings have been found across first floor zones, where efforts have been made to re-level floors (021). The 250-300mm settlement of the inner wall has never been fully addressed, but rather adjustments to finishes and internal structure have been made to mask this ongoing movement.

When viewed from eaves level, the roadside wall appears to be constructed of three distinct separate 100mm thick skins which are practically not bonded together (as opposed to a solid leaf of fully toothed masonry) (022, 023). Areas of flint throughout the wall act as structural breaks in the masonry and prevent the wall from acting effectively as a single panel (024, 025). Modern blockwork can be found interspersed between old brickwork.

The entire roadside wall has experienced a global rotational settlement toward the highway. The upper section at first floor is now bowed toward the centre, possibly as a result of unresolved lateral forces imparted by the roof (026 to 032).

The condition of this area of the building is considerably poorer than initially anticipated and it can be safely assumed that the internal finishes were providing a considerable portion of the load transfer and structural rigidity. Without these, some areas of the building now behave as loose laid, free standing masonry panels.

The lintels within the building have inadequate, short bearings onto fractured and shattered panels of masonry formed from a multitude of incompatible materials of a non-homogenous nature. Most of the walls need to be completely rebuilt to provide a reliable and durable structure.

3.0 Refurbishment Risks

The current scheme of refurbishment was based around the partial reconstruction of significant sections of the East Wing building.

In light of the opening up works and investigation packages that have been recently carried out, significant structural and health and safety risks have been identified with trying to maintain and repair the existing east wing's structure. These highlighted defects are of such concern that rebuilding the structure is the most sensible, safe and appropriate course of action to take with the east wing. It is suggested that the east wing should be carefully measured and recorded, deconstructed and then visually reconstructed on a like-for-like basis.

3.1 Highway considerations

The east wing sits directly adjacent to a single lane section of public highway which links between the villages of Littlecott and East Chisenbury. No support can be provided to the wall from the roadside so any temporary works must be designed in both a tension and compression capacity. At the time of writing this report, a scaffold is in place against the roadside wall, but this highlights the limited space that could be made available during any works for protective measures (033, 034).

The proximity of the East Wing to the public highway increases the logistical complexity of any works to be carried out. Rebuilding the East Wing would significantly reduce the construction time period over trying to retain and maintain the existing structure. This would help to minimize and limit Health & Safety Risks.

4.0 Suggested Schedule of Works

To mitigate against some of the risks, an alternative approach should be considered. The careful demolition and rebuilding on a like-for-like basis of the east wing, is now considered to be the only viable safe option for refurbishment. This structural approach would minimize safety issues of working on site, as well as users of the neighbouring highway.

This approach would come with a considerably reduced risk of collapse, as no structural elements would be left in a vulnerable state at any point of the project programme and all potentially destabilising works could be carried out in a controlled manner. This would limit the structural dangers of trying to maintain and stabilize the degraded and very unstable east wing structure.

Beyond the evident advantages with respect to safety, a reconstructed property would provide superior thermal and structural performance, and in turn provide a likely increased service life and long term lower carbon footprint.

5.0 Summary and Conclusion

The east wing's fabric is currently in a structurally unstable and unsafe condition, primarily due to inadequate foundations and inappropriately executed development of the property over a few centuries.

Furthermore, when the architectural finishes were removed to allow refurbishment of the East Wing to take place, it became clearly visible that the structure is in a much poorer and unserviceable condition than previously envisaged prior to the opening up works.

The exposed structure clearly indicates that it is a mass of non-bonded elements, which are to some extent acting as freestanding elements, lacking stability in the vertical and lateral axes. The individual elements themselves have undergone numerous inappropriate interventions and modifications, which have incorrectly inserted new openings in wall planes. Previous openings have been loosely infilled with a variety of unsuitable and incompatible materials, which cannot now sensibly or practically be remediated. The instability of the superstructure is further compounded by the ongoing movement which is occurring within the supporting foundations.

In Health & Safety terms, it is not practical or safe to stabilize the existing foundations by underpinning or piling and therefore, it is strongly recommended that the east wing is carefully dismantled. The removed structural fabric should be reclaimed where possible, and rebuilt on a like-for-like basis. Suitably engineered, piled foundations will be required to allow the superstructure to be rebuilt to visually emulate the existing.

Appendix A – Record of Condition [Site Images]

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003



004



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007



008



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012



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018



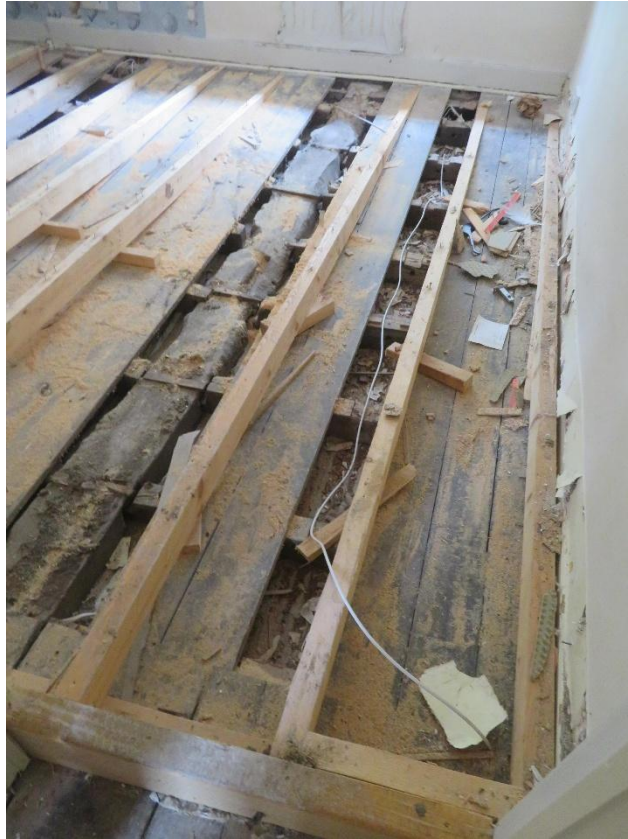
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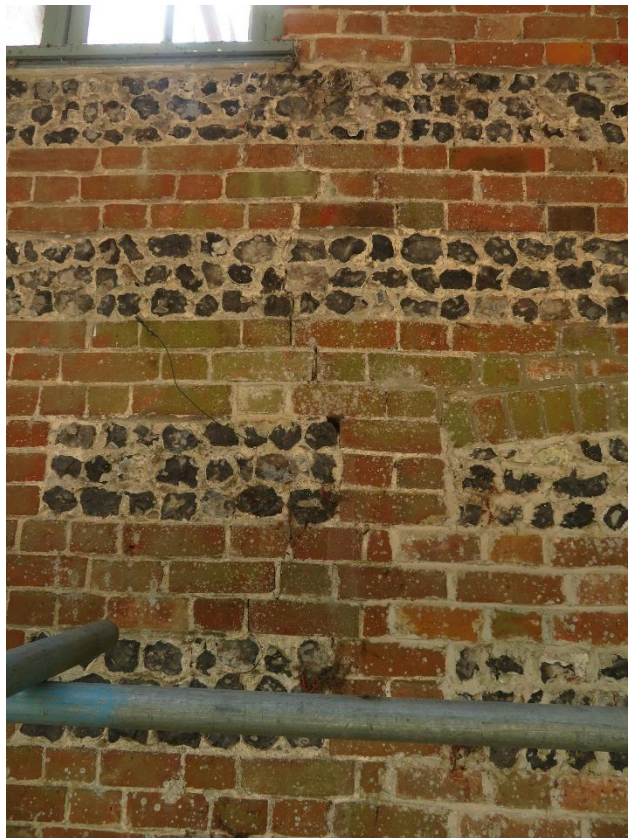
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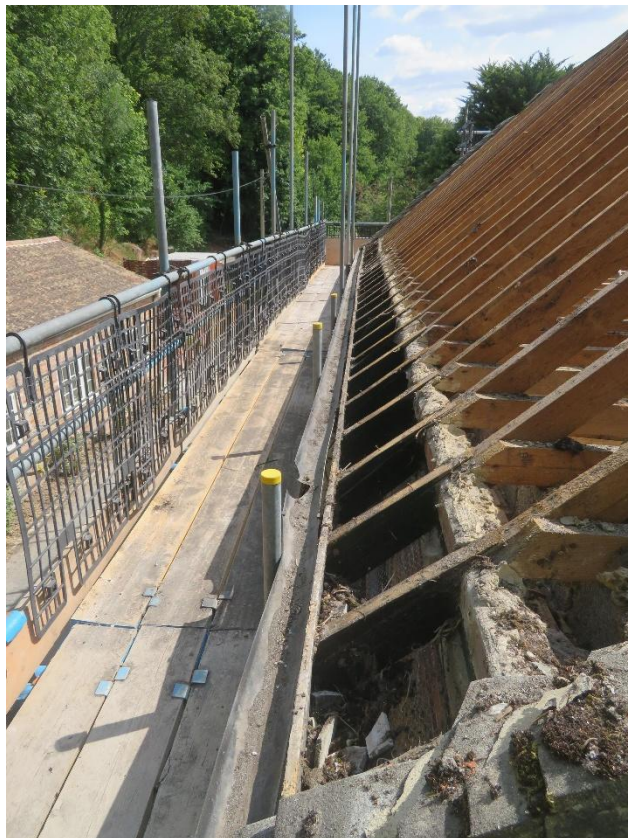
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