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Healey Court Farm

Trial Pit Investigation and Structural Feasibility Assessment

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Client Name: Mrs June Vere
Client Address: Healey Court Farm, Pucklechurch Road, Hinton, SN14 8HG
Site Address: Healey Court Farm, Pucklechurch Road, Hinton, SN14 8HG

RICS

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2. INTRODUCTION

Western Building Consultants (WBC) were commissioned by Mrs Melissa Watt and Mrs June Vere, the client, to undertake an assessment of the proposed structural works at Healey Court Farm, Hinton. The following assessment will review the existing configuration and likely works required for the proposed refurbishment of the existing storage barn structure into a habitable space.

2.1 DESCRIPTION OF WORKS

It is proposed to refurbish the original milking sheds from the storage barn in it's current use into a habitable annex space. The works will incorporate the refurbishment of the existing roof structure, with the exploration of lifting the existing roof formation to enable a more amenable internal volume.

The existing masonry walls will need to be consolidated, with loose stonework reformed within the wall face. In addition, the internal volume would require installation of suitable insulation and finishes.

Finally, to improve headspace and enhance the heat retention o the habitable space, a new slab and insulation will be installed, requiring the existing slab to be removed and the formation level reduced suitably.

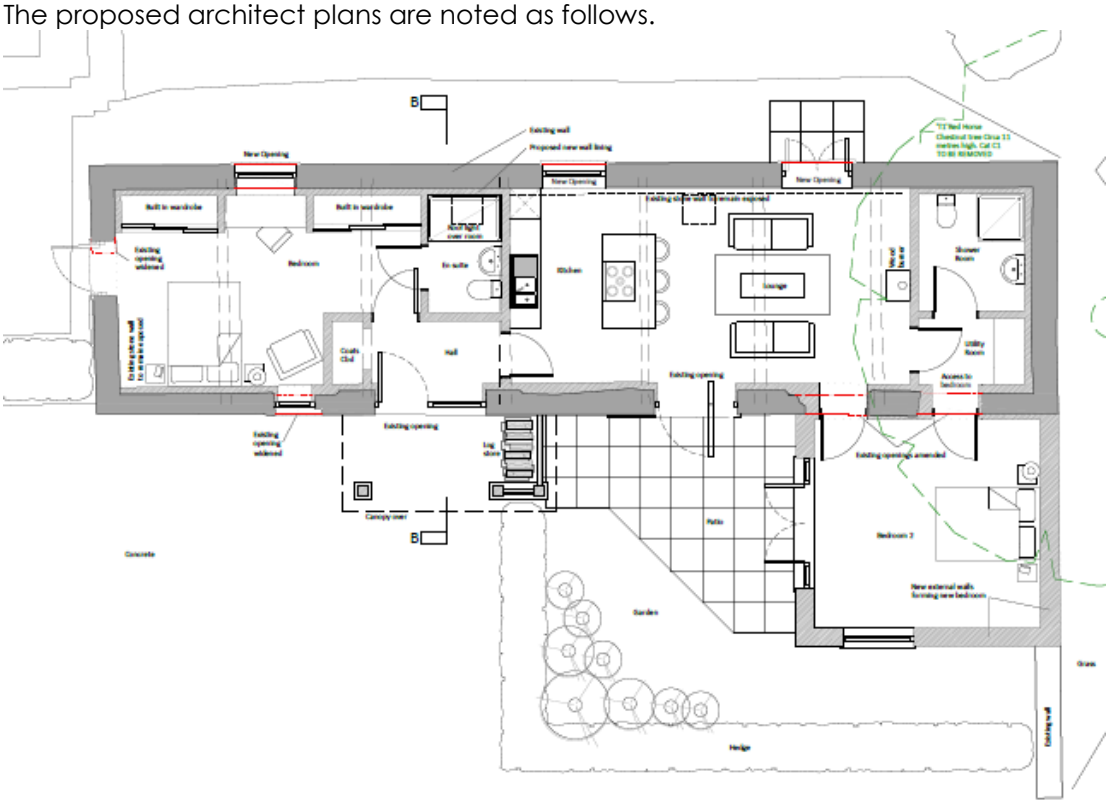
It is assumed that the contractor is competent and experienced in undertaking these works.

No intrusive investigations have been undertaken to the internal areas and details assumed may vary following demolition and removal of finishes. The contractor is to notify the design team of any discrepancies noted during the demolition and enabling works phases.

3. ARCHITECTURAL STRATEGY

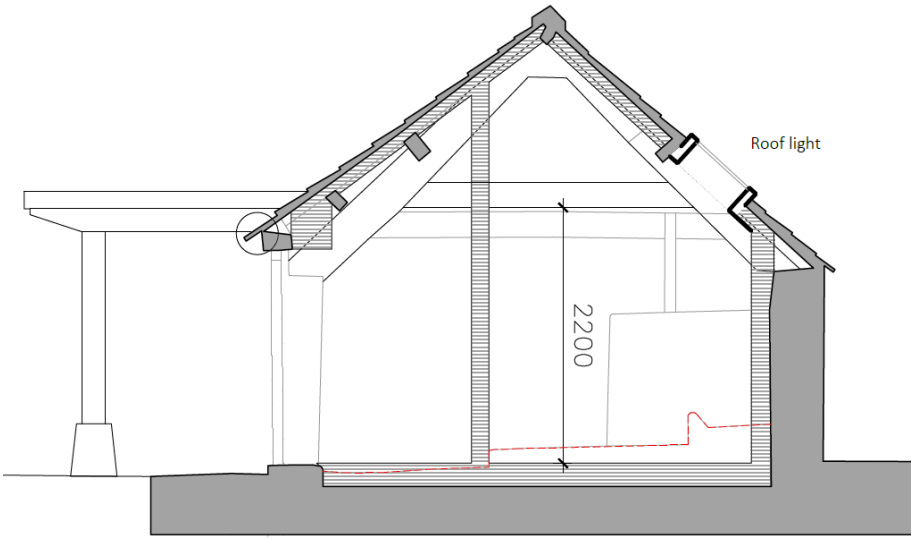
3.1 ARCHITECTURAL PLANS

The proposed architect plans are noted as follows.



3.2 SECTION

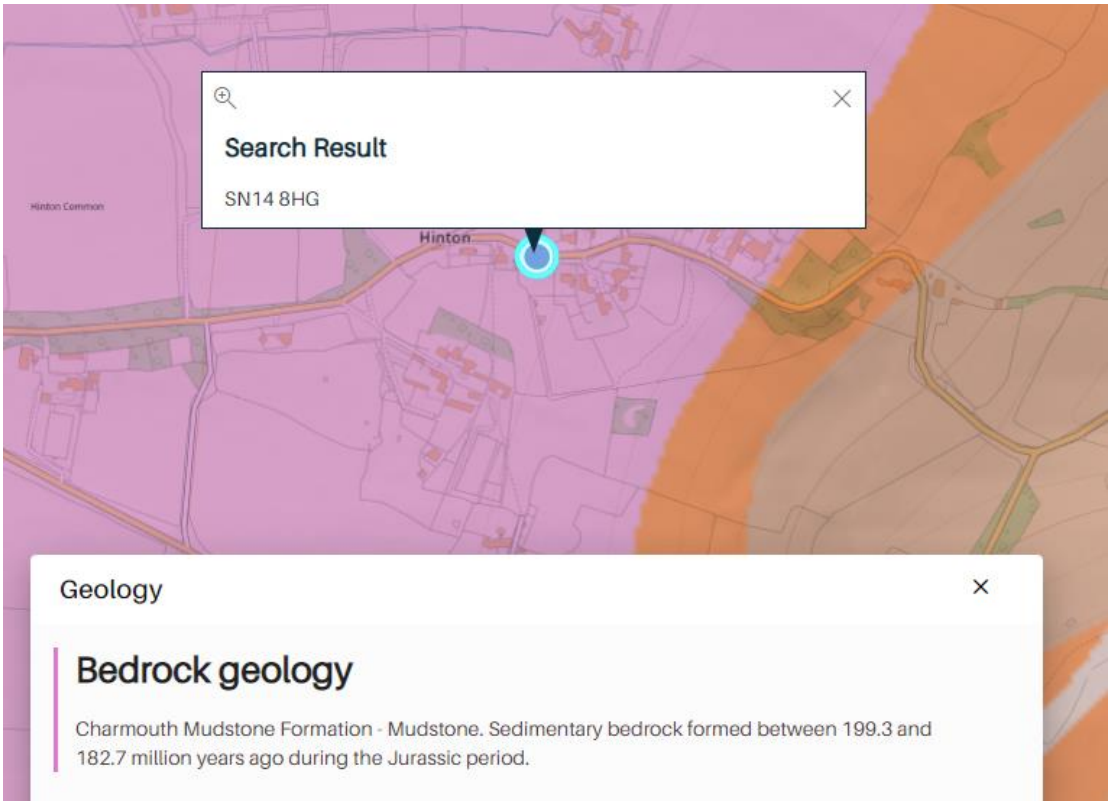
The proposed architect sections are noted as follows.



4. INVESTIGATIONS

4.1 DESK STUDY

Following a review of British Geological Society information the following applies to the site.

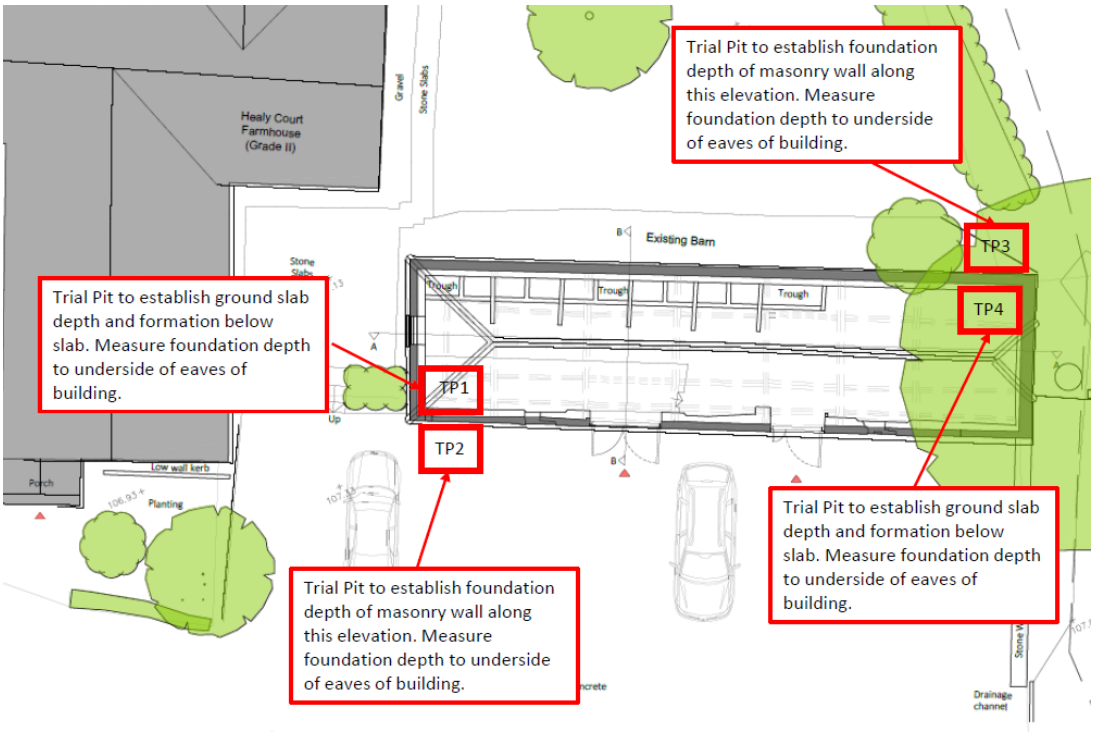


Review of local boreholes for the surrounding works available on BGS suggest the shallow substructure likely to be encountered to be of Firm Grey/Green Clay with small clusters of limestone and siltstone bands close to the surface level.

4.2 SITE INVESTIGATION

A shallow trial pit investigation was undertaken to establish the current foundation arrangement of the existing structure, the formation material and the thickness of the existing internal slab construction.

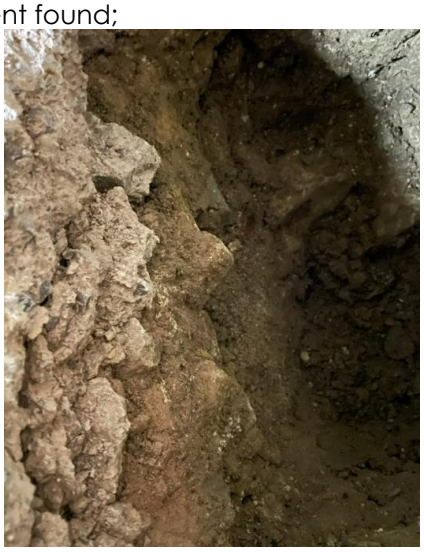
The location plan of the trial pit is noted on the following page

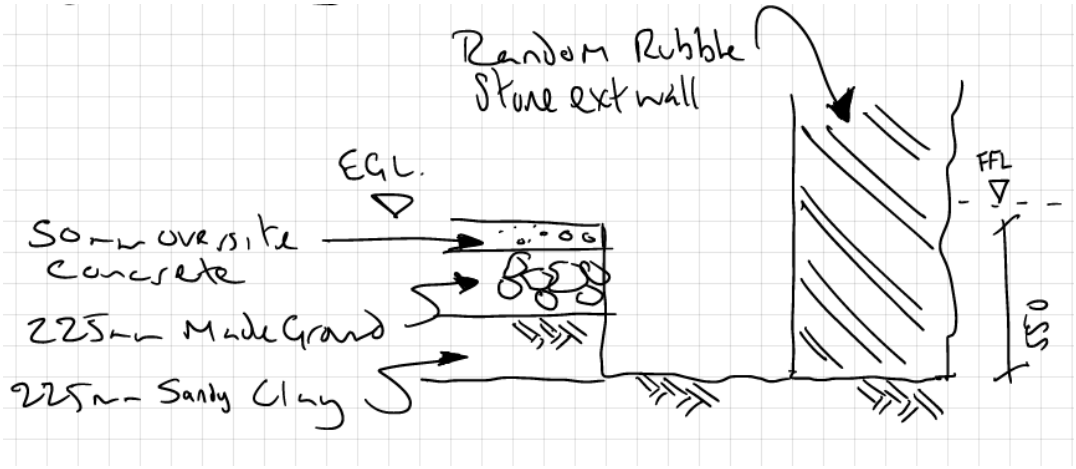


4.2.1 Trial Pit 1

Trial Pit 1 was excavated to the internal areas through the existing concrete slab. It exposed the thickness of the slab to be 50mm over 225mm made ground and 225mm thick firm sandy clay. The footing consisted of a large rubble stone laid on compacted clay formation material. Footing level approximately 400mm below ground level.

The photos and sketch below shows the arrangement found;

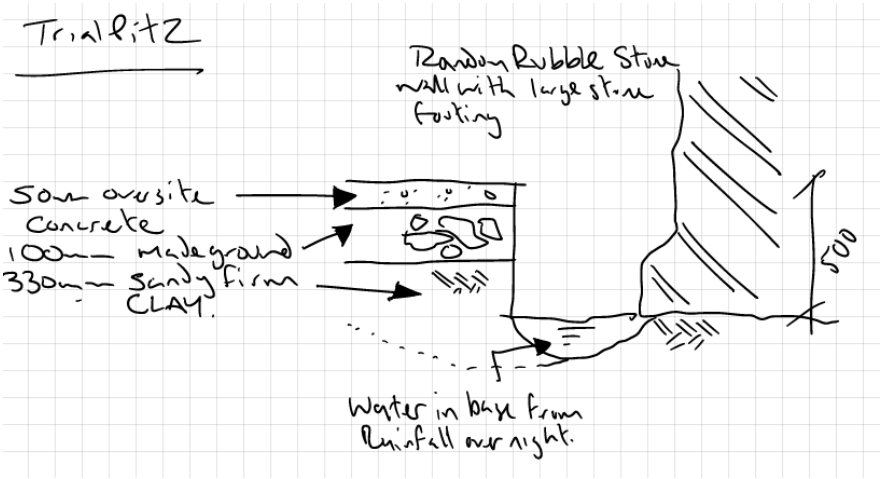




4.2.2 Trial Pit 2

Trial Pit 2 was excavated externally on the other side of the wall to TP1. This confirmed the arrangement for the external slab as 50mm also, over 100mm made ground with bricks noted over sandy clay and confirming the large rubble stone footing is full width of the wall.

The photos and sketch below shows the arrangement found.

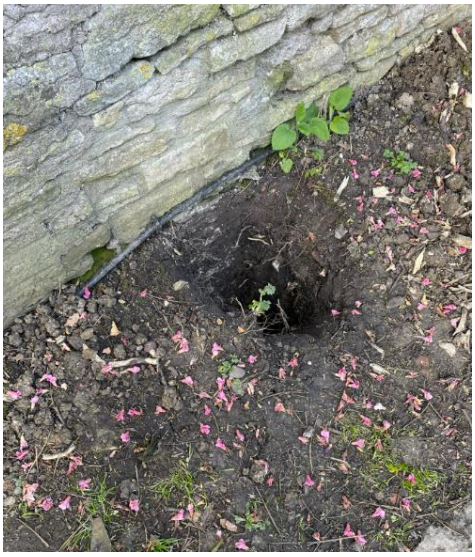


4.2.3 Trial Pit 3

Trial Pit 3 was excavated externally. It confirmed the depth of the footing to be around 700mm below ground level, with the ground raised by top soil and roots by around 500mm. The material at the base of the footing was noted as firm Sandy Clay and the wall was served by coursed rubble stone footing.

The photos and sketch below shows the arrangement found.

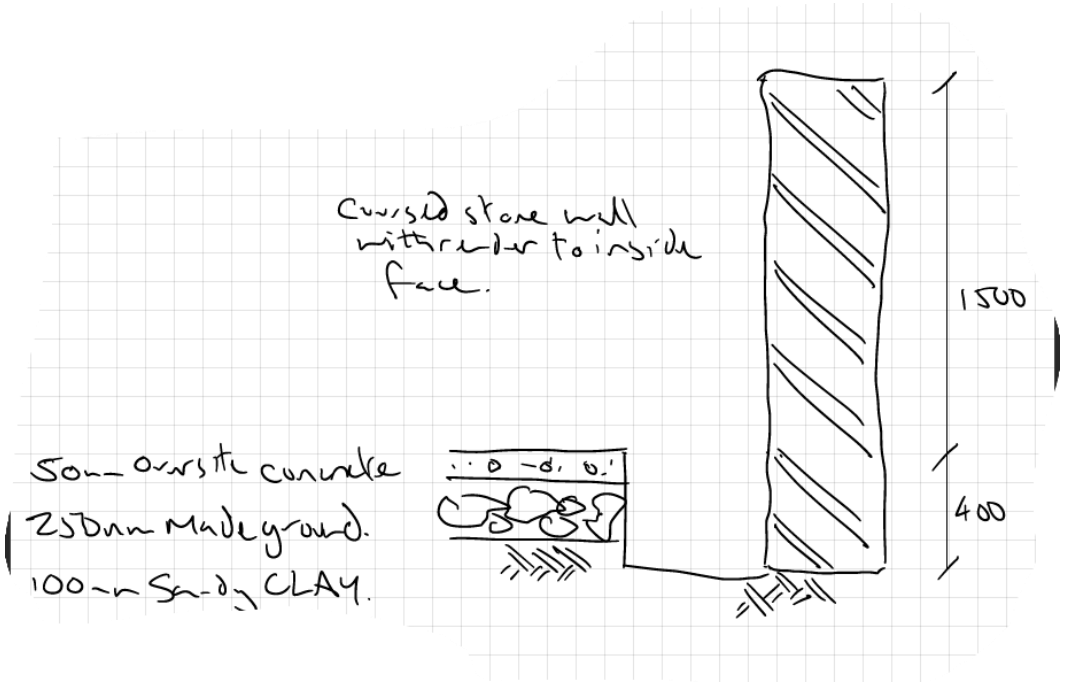
A large tree is noted around the corner to the gable end wall. The roots of the tree were abundant in the top soil of the



4.2.4 Trial Pit 4

Trial Pit 4 was excavated internally and exposed 50mm thick oversite concrete slab over 250mm made ground. The material below consisted of sandy Clay and the formation of the foundation consisted of coursed stone footings bearing directly to the clay at around 400mm below slab level. There was approximately 400mm level difference between internal and external areas.

The photos and sketch below shows the arrangement found.

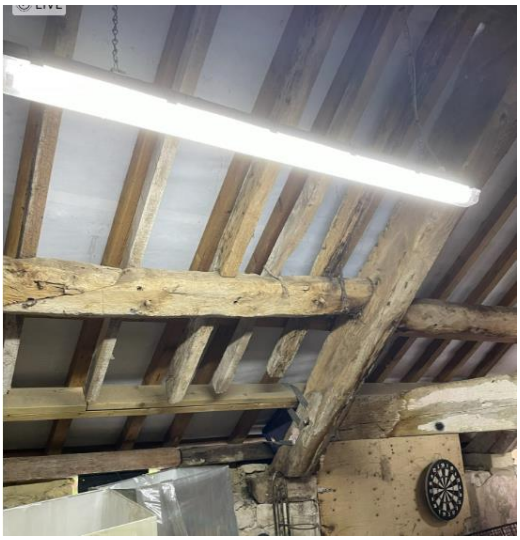


4.2.5 Roof Assessment

The existing roof arrangement consisted of large hardwood, assumed Oak, trusses supporting purlins at the mid span of the common rafters. The common rafters had severe water damage where they had not been replaced by common softwood members. The rafters currently area exposed, with breathable membrane, battens and roof tiles installed over.

Generally, the formation of the roof trusses are as follows;

The trusses form bays around 2.2m – 2.6m wide and span approximately 3.9m. The trusses are formed by varying sized timbers, commonly these consist of 330mm x 100mm inclined members and 230mm x 80mm bottom chords. The bottom chords are raised approximately 300mm above the eaves level. Purlins are typically undersized for the loads applied and several have failed along the South elevation.



4.3 GEOTECHNICAL SUMMARY

4.3.1 Properties for foundation design

Criteria	Details		
Bearing strata description	Sandy Firm Grey Clay		
Allowable bearing pressure	Made Ground	0-0.25m bgl	10kN/m^2
	Sandy Firm Grey CLAY	0.25-0.4m bgl	100kN/m^2
Ground water level	Ground Water not encountered internally – some water evident in trial pits but from rain events overnight.		

4.3.2 Volume change potential

The site is noted to be on material which has the potential to alter volume following influence from moisture content of the material. As such, no laboratory testing has been undertaken and as such a conservative approach would be to assume High volume change potential.

Modified Plasticity index	Volume Change potential	Site Specific
40% and greater	High	No specific testing undertaken, thus would be prudent to incorporate conservative approach in design.
20% to less than 40%	Medium	
10% to less than 20%	Low	

4.3.3 Tree Influence

The presence of a large mature tree circa 500mm from the foundations should be addressed. The potential removal of the tree should be a last resort and other options should be explored fully before undertaking the removal of the tree.

On this basis, it would be essential to install a root protection system to the external face of the stone wall to reduce the impact of tree roots on the wall. The barrier ideally would be located below the footing level, circa 300mm below – reference to the manufacturers guidance would confirm this requirement.

Additionally, the new internal ground floor slab should be keyed into the existing footings via stainless steel dowels to prevent relative uplift from the roots.

5. DESIGN FEASIBILITY

5.1 ROOF STRUCTURE

It is anticipated tat the roof structure is to be rationalised as much as possible as part of the works whilst accommodating the historic nature and economic constraints.

The works will incorporate the removal of the existing roof tiles, setting aside for reuse where possible, the removal of the existing battens and felt and replacement with new suitable materials.

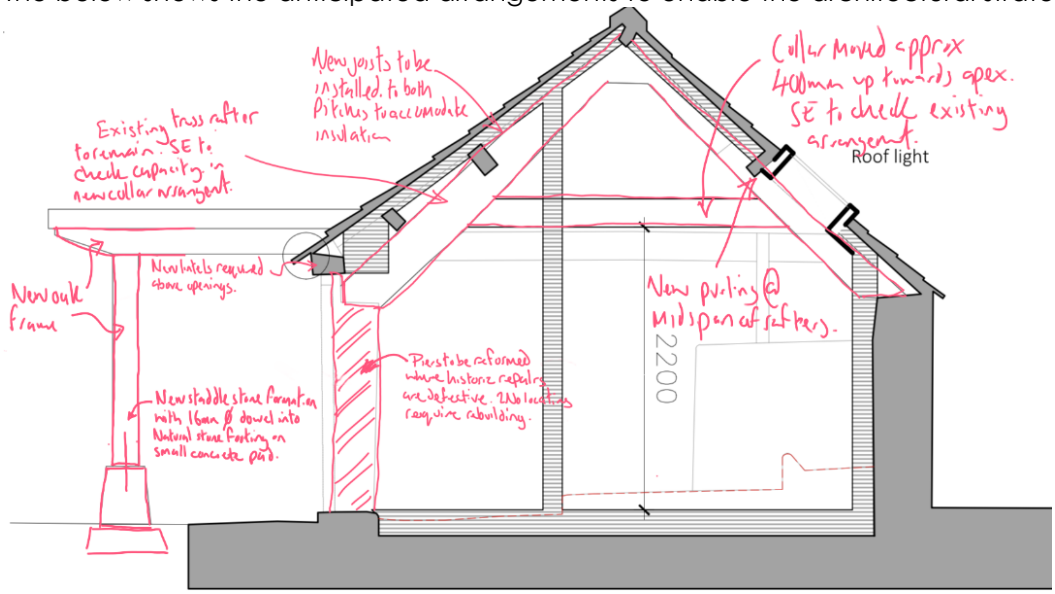
The existing timber rafter arrangement consists of damaged original members and replacement members of unsuitable sizing to accommodate modern habitable load arrangements. It is recommended that all rafters are removed and replaced with arrangements of suitable depth.

The existing purlin arrangement will be removed, with the originals assessed against the minimal size as determined by the structural assessment. If the condition and size of the member is suitable these will be reinstalled, if not, these will be re-purposed for other elements within the proposed works.

The existing timber trusses will be left in place, with temporary propping installed following the removal of the other members. The collar of the trusses are to be lifted, with an assessment against the applied loading undertaken during the principal design phase.

Surrounding masonry walls are to have suitable additional courses reformed to accommodate ventilation and modifications to surrounding lintels and wall plates.

The below shows the anticipated arrangements to enable the architectural strategy.



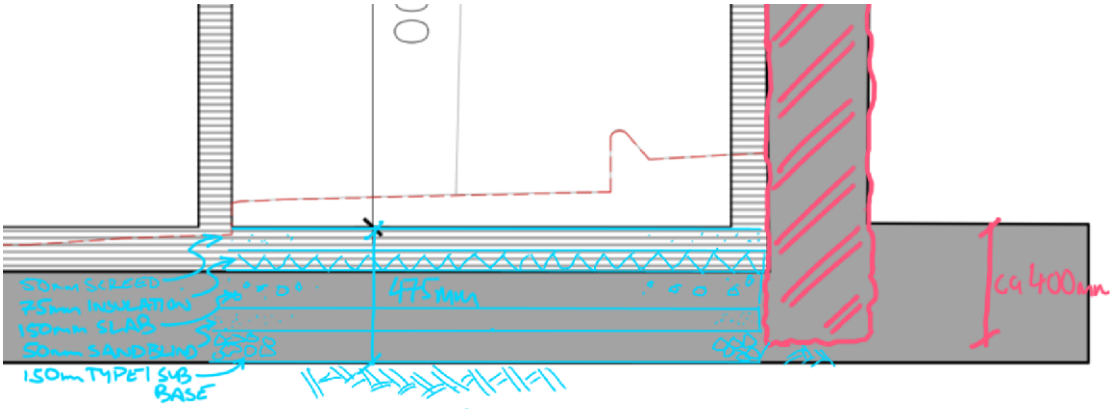
5.2 FLOOR STRUCTURE

To achieve the required internal volumes, it is proposed to reduce the existing internal floor level. This would be enabled by removing the existing floor slab and the material below to a level equal to the formation level of the external wall footings.

The new build up will accommodate compacted hardcore, blinding, damp proof membrane and concrete slab of traditional construction methods. This will be finished by an insulation layer and screed finish.

Where the wall retains earth, to the rear garden, whilst removing the slab and reducing the material, the wall panel should be monitored in case the natural load paths have developed to require the slabs restraint against lateral loads.

The below shows the anticipated arrangements for the reduced dig internally.



5.3 LINTELS

The existing lintel arrangement will need to be removed to accommodate the installation of the new roof. It would be anticipated that replacement lintels would utilise precast concrete formation internally, with an oak or recycled purlin member to the external face.

5.4 MASONRY CONSOLIDATION

The existing masonry formation within the wall panels are generally satisfactory. There are patches where suitable works are required to be undertaken to improve and enhance the durability of the wall structure.

The openings have had remedial works to accommodate new door formations, these have been formed in blockwork and may not co-ordinate with the proposed architectural strategy. These should be reduced down and reformed using stone facing matching the external faces.

Around the wall plate level loose stones are common and should be reformed and embedded in a suitable lime mortar mix.

The internal areas were used to store livestock have had cement render finish. It is recommended to undertake removal of the render in test areas to assess the ease of removal and the extent of bonding to the stone substrate. If significant damage is caused by removal, it is recommended to remain and ensure details around do not effect the breathability of the wall panel.