

Mr N Forshaw

Daniels Farm, Alston – Agricultural Building

Structural Condition Survey for Conversion to Dwelling – Barn No. 1



PSC-357-001- Barn 1

November 2019

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Structural Condition Survey
Agricultural Building at Daniels Farm

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1.0 Terms of reference

Paul Snape Consulting were appointed by Mr N Forshaw, through PWA Planning, to carry out a visual structural inspection and produce a structural condition survey report for the existing agricultural building at Daniels Farm, Alston.

2.0 Purpose of the survey

It is proposed to convert the barn to form a new dwelling. The preliminary proposals have been prepared by the architect and a provisional layout is indicated in Appendix A. The visual structural survey is required to confirm the current condition of the building and to assess the 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. Therefore we are unable to confirm that these are in a satisfactory condition.

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 September 2019 at which time the weather was dry but overcast and damp. This is one of two barns surveyed at Daniels Farm.

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

3.0 Description of Building

The building is single storey constructed with solid masonry walls, with a pitched timber purlin roof supported by steel "A" frames. The elevations consist of concrete block walls and the building has concrete ground floors. The roofing consists of corrugated cement/asbestos sheeting. Details of the existing layout are included in Appendix A.

4.0 External Survey

West Gable (Photos 1 & 2)

This gable is constructed of 215 mm concrete blocks and has a large double door opening (photo 1). The double door has replaced a previous sliding door which is still partly in place. Photo 2 shows localised damage to the top of the north pitch blockwork. The blockwork is plumb and apart from the damage noted above, is in reasonable condition.

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East Gable (Photos 3 to 5)

This elevation is constructed as per the west gable but retains the original sliding door. The blockwork is plumb and is in reasonable condition. There are some external metal fixings visible.

North Elevation (photos 7 & 8)

This elevation is constructed with 215mm blockwork and has 215 x 440mm piers/buttresses at the "A" Frame locations (photo 8). The blockwork is plumb and is in reasonable condition.

South Elevation (Photo 6)

This elevation is as per the north elevation in terms of construction and condition. Part of this elevation is shared or obscured externally by an adjacent dwelling and so could not be inspected externally.

Roof (Photos 9, 13 & 14)

The existing roof is cement or asbestos, profiled sheeting, carried on timber purlins which run between steel "A" frames. The roof showed no sign of damage, movement or excessive deflection. The A frames are constructed with 152x89 UB sections with a 90 x 90 mm angle tie. The steel is in reasonable condition with surface rust only. The steel bears onto the blockwork piers with no steel columns evident.

5.0 Internal Survey (Photos 11, 12 & 14)

Internal inspection shows concrete floors with block walls. The floors were raised where cattle stalls have been formed (photo 12). The concrete appeared in reasonable condition where visible. The timber purlins appeared to be free from rot or infestation.

6.0 Suitability for Conversion and Method of Construction

It can be seen from the survey detailed above that this building is in a reasonable condition in terms of structure. There are no signs of movement to the masonry and the concrete floor appears solid with no movement.

Proposals for the conversion have been prepared by PGB Architectural Services Ltd and details are included in Appendix A. The proposals are for a single dwelling. It is expected that the steel "A" frames and the block work walls would be retained, with a new insulated floor and internal leaves built off the existing ground floor slab.

In converting the building, it would be necessary to provide an inner skin to the existing external blockwork, forming an insulated cavity wall. Internal masonry loadbearing walls would also be provided. Consideration may also be given to the use of Structural Insulated Panels to form the new internal leaves and loadbearing walls. These walls would be structurally independent of the existing steel trusses and would take the loading from new floor and ceiling.

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structures. They could be founded off the existing concrete floor slab if this is structurally adequate. Cores could be taken through the slab and the loading capacity analysed for the predicted loading. If the slab is not deemed suitable then foundations would be necessary for any load bearing walls.

The existing "A" frames appear in good condition and re-cladding the roof with similar materials will not add any loading to the frames. The steelwork will need cleaning and then given a protective coating as necessary. It is likely that the timber purlins would be replaced with metal Z purlins during any re-cladding of the roof. Any timber retained must be assessed by a timber expert for rot and infestation. It was noted above that the "A" frames sat on the blockwork piers but the actual mode of connection was not visible. Further investigation will be necessary to ensure the connection and bearing is adequate. This should be addressed by the Engineer under the proposed conversion. The proposals indicate a number of new openings in the north elevation and these will need careful consideration with regard to overall structural stability. It may be necessary to introduce additional steelwork columns or wind posts to ensure the masonry wall provides adequate bearing and flexural capacity.

Given the proposed construction options briefly outlined above, it is considered that the building is suitable for conversion to a dwelling. When converting agricultural buildings, it is essential that the construction techniques and sequence are carefully considered. Loading should not be added to the existing structure and conversion actually gives the opportunity to remove loading from the existing frames and place it on new structural walls. The final proposals should be assessed and designed by an Engineer prior to construction.

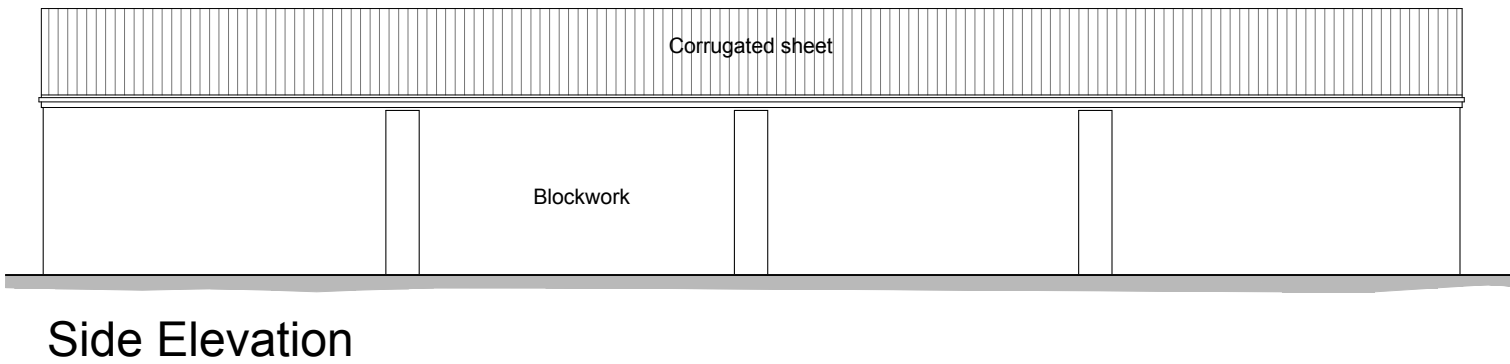
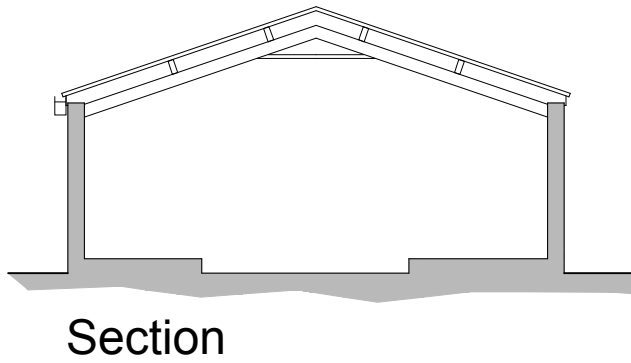
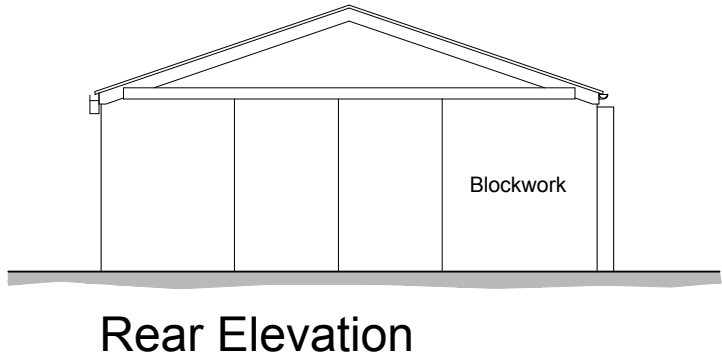
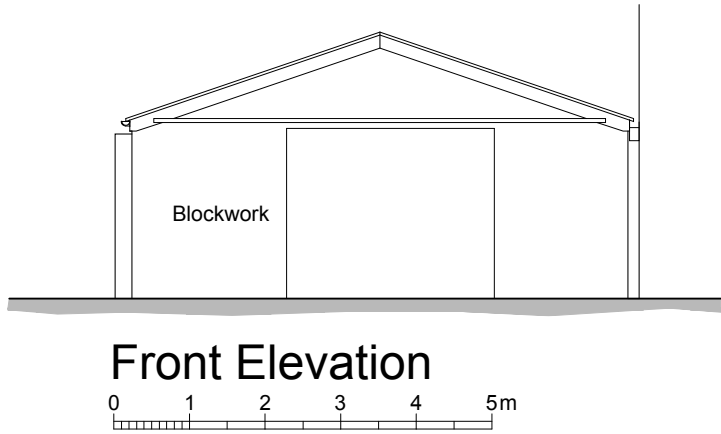
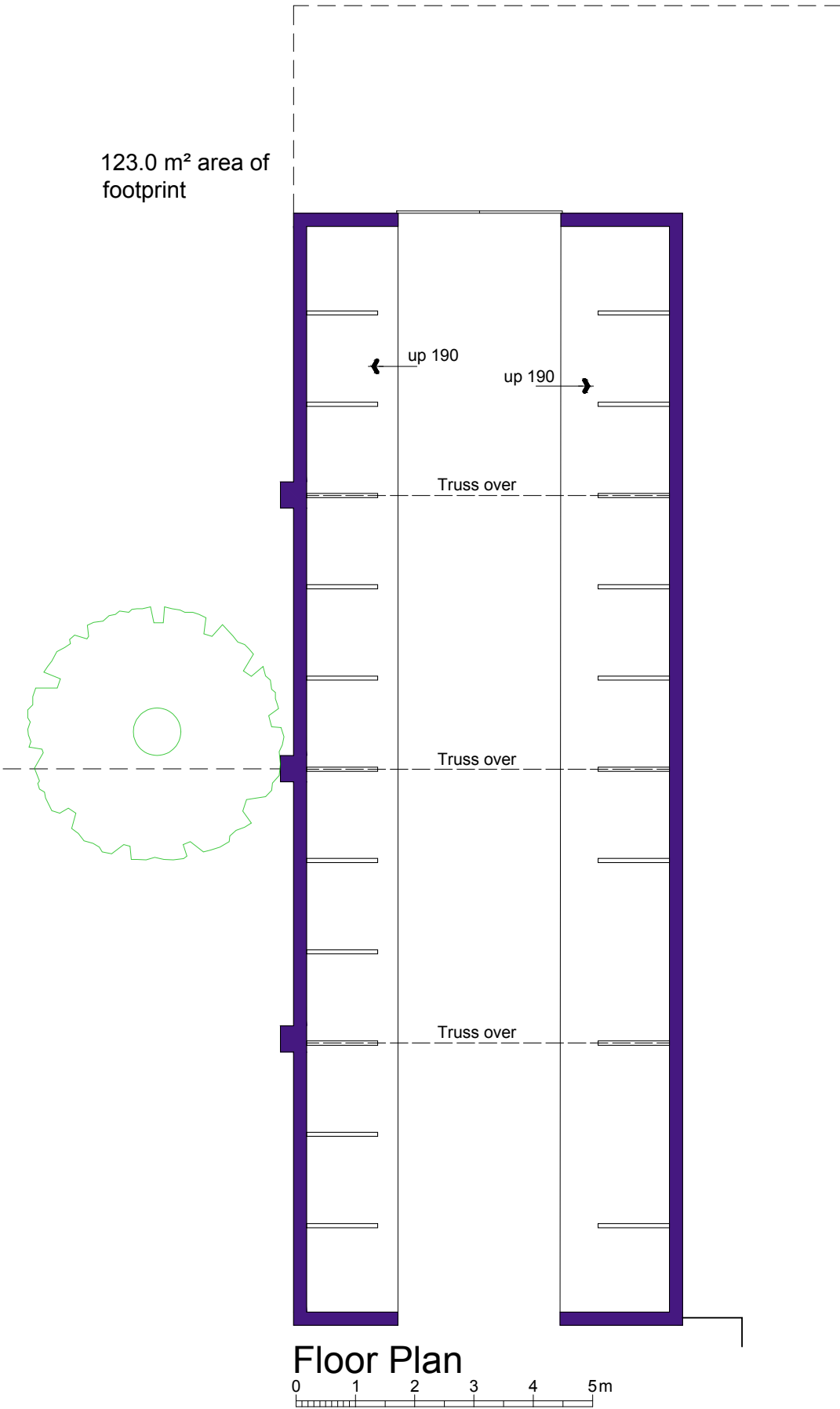
7.0 Conclusions

The building is in a reasonable structural condition and is considered suitable for conversion by the method or options outlined above. The new internal structure should be independent of the existing steel frame and be designed to have little or no effect on the existing structure.

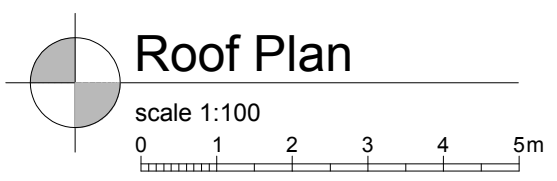
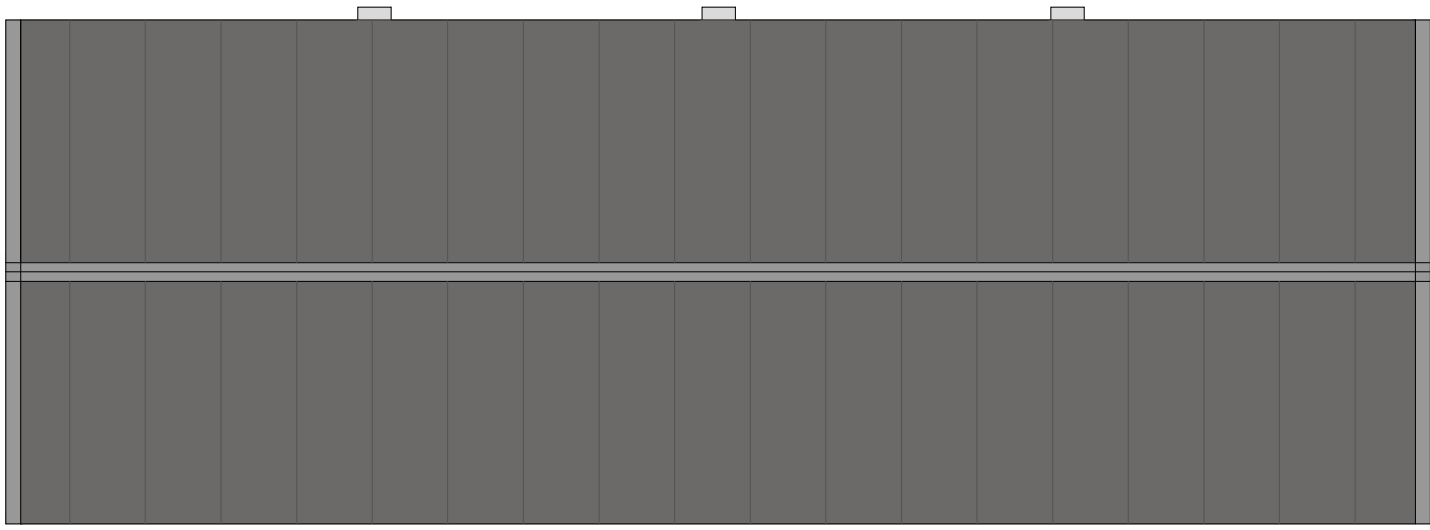
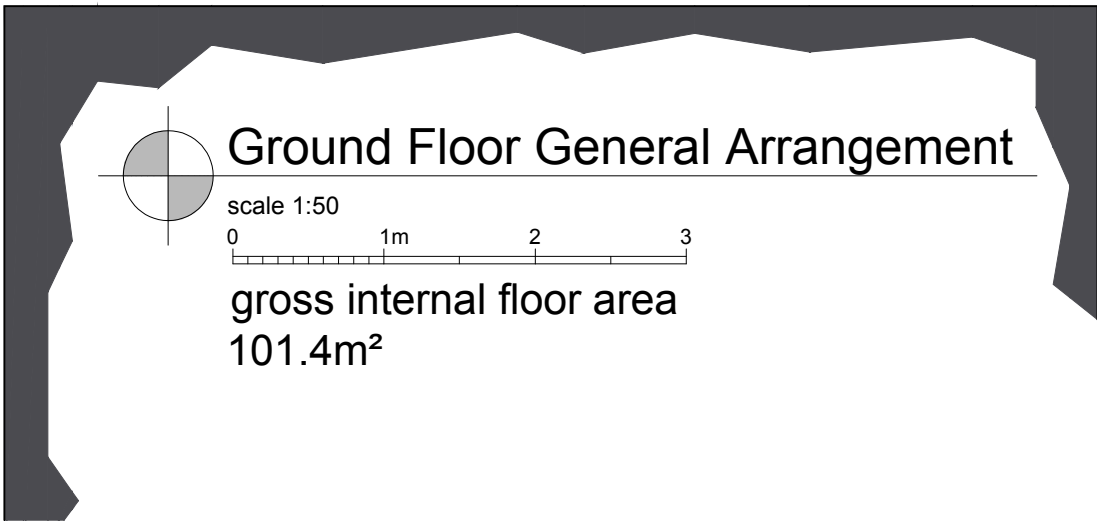
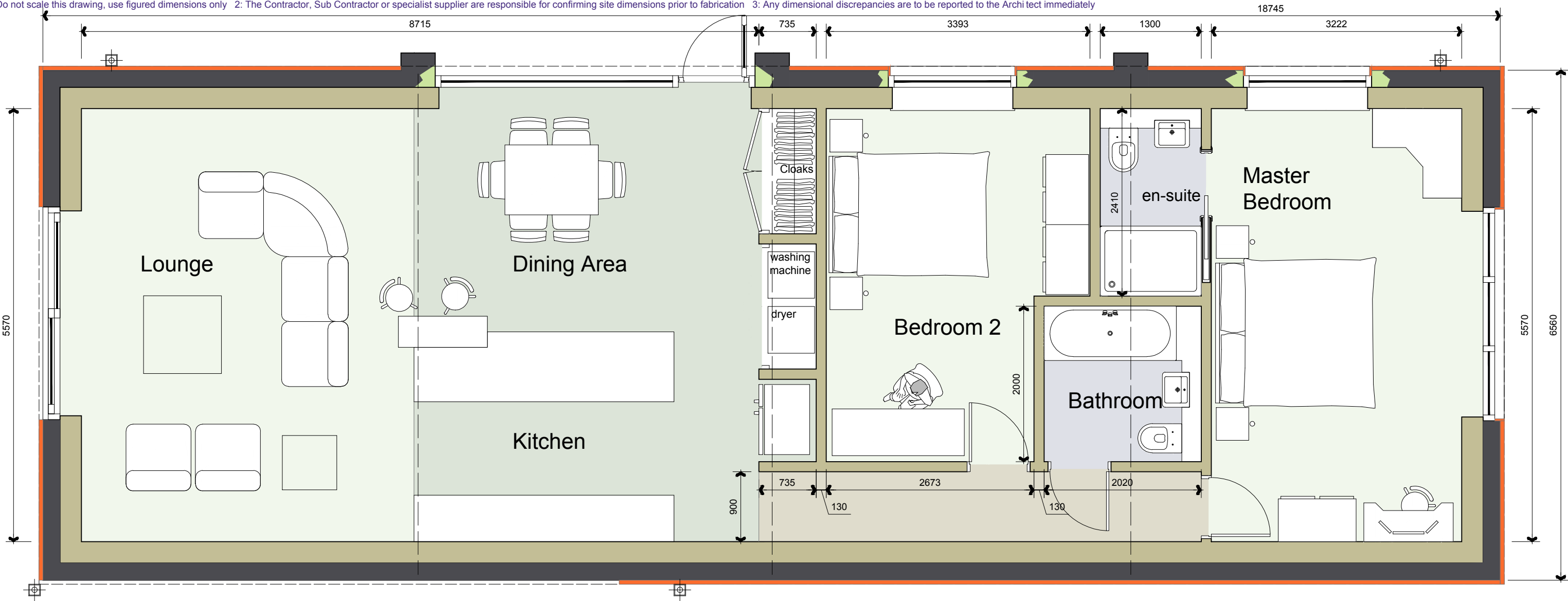
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Appendix A
Existing Layout & Provisional Proposals

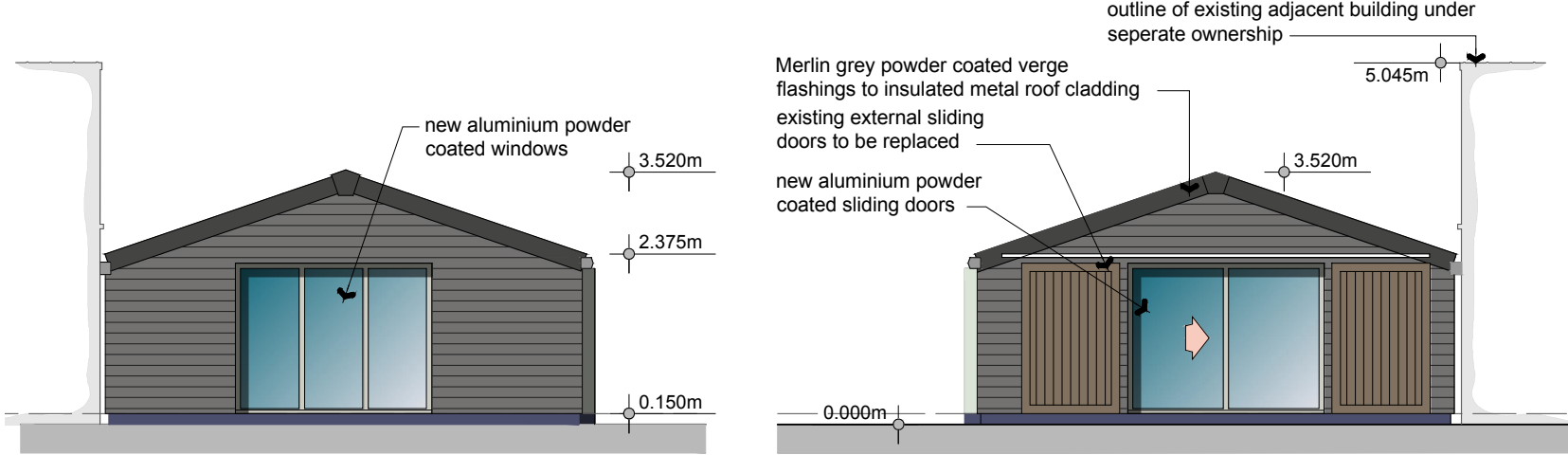
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1: Do not scale this drawing, use figured dimensions only 2: The Contractor, Sub Contractor or specialist supplier are responsible for confirming site dimensions prior to fabrication 3: Any dimensional discrepancies are to be reported to the Archi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



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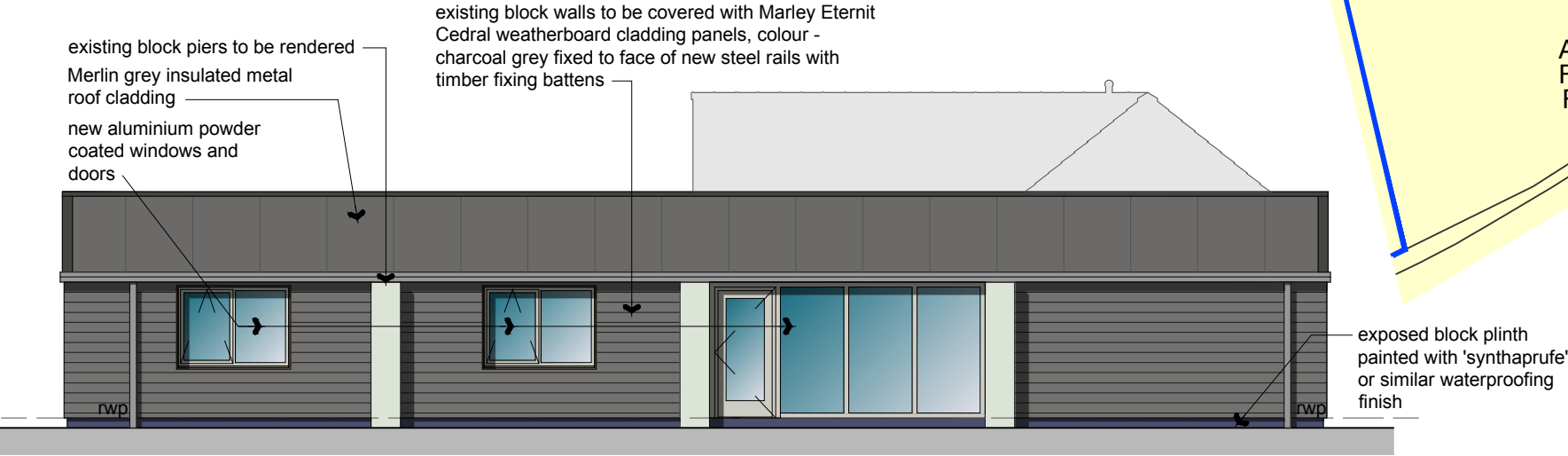
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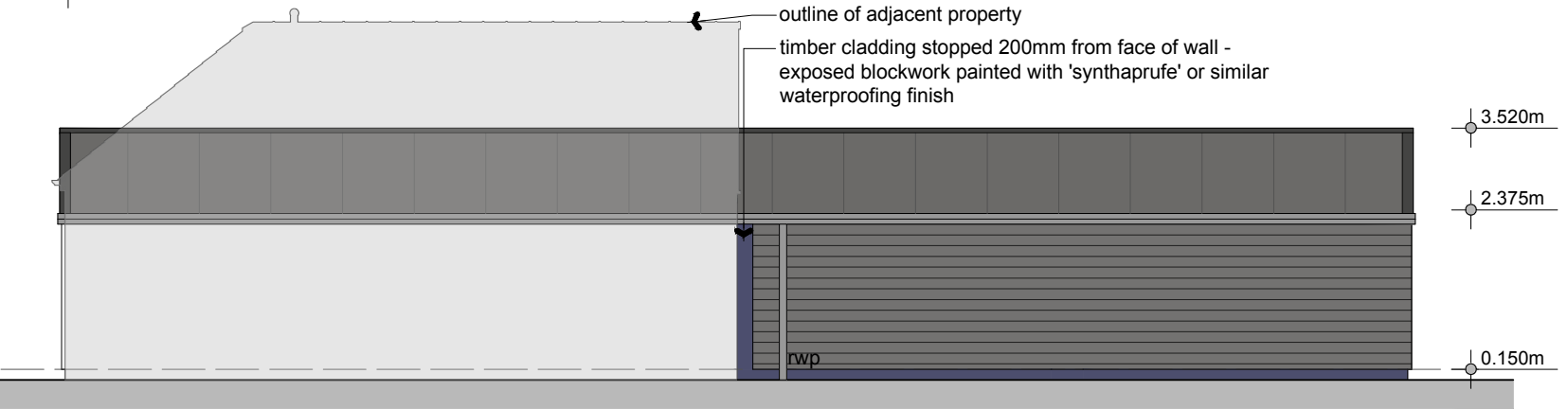
South West Elevation

scale 1:100



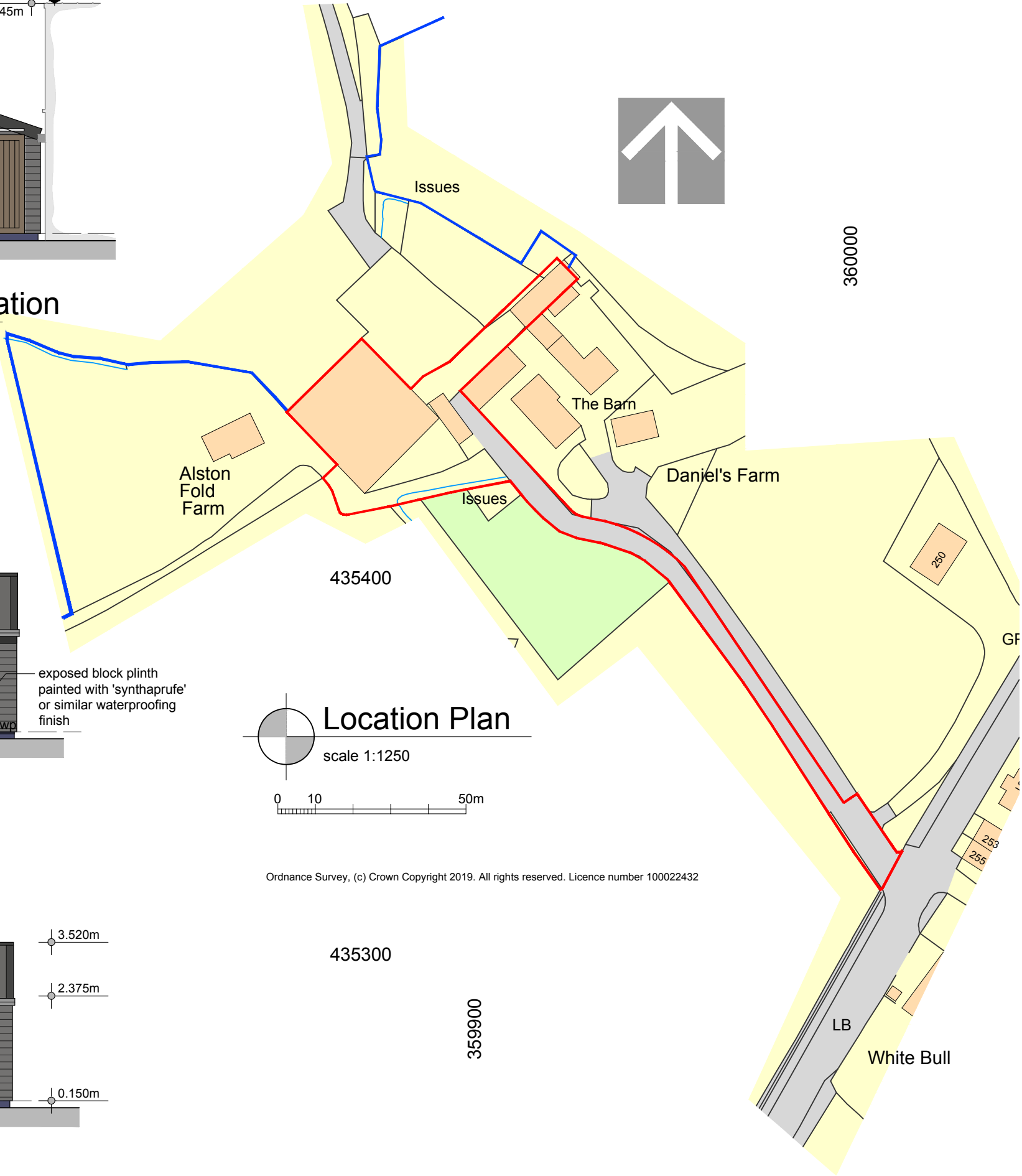
North West Elevation

scale 1:100



South East Elevation

scale 1:100



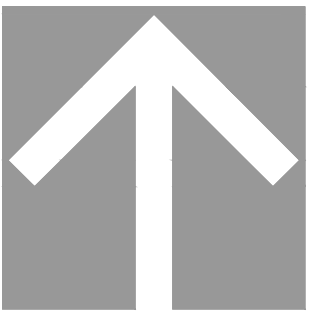
Location Plan

scale 1:1250

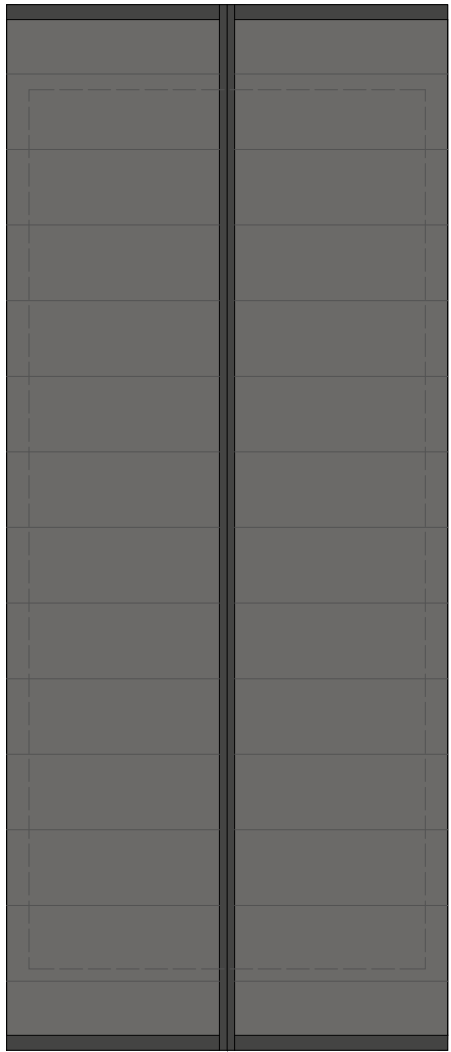
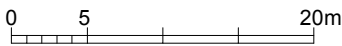
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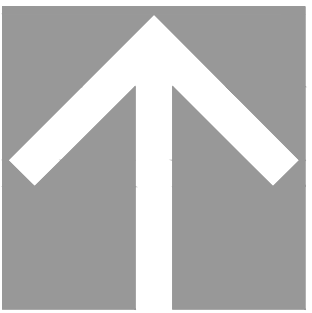
Indicative Block Plan
scale 1:500



Roof Plan - Barn 2
scale 1:100



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Existing Block Plan
scale 1:500

0 5 20m



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Appendix B Photographs



Photo 1 - West Gable



Photo 2 – West Gable



Photo 3- East Gable



Photo 4 – East Gable



Photo 5 – East Gable



Photo 6 – South Elevation



Photo 7 – North Elevation



Photo 8 – North Elevation – pier/buttress



Photo 9 – A frame



Photo 10 – Internal



Photo 11 - Internal



Photo 12 – Internal looking west



Photo 13 – Internal looking west



Photo 14 - Internal east end