Model farm buildings at Fleensop, Carlton Highdale, North Yorkshire: Historic Building Record

July 2012

STEPHEN HAIGH

Buildings Archaeologist

11 Browcliff Silsden Keighley West Yorkshire BD20 9PN
Tel/Fax: 01535 658925 Mobile: 07986 612548
www.stephenhaigh.co.uk enquiries@stephenhaigh.co.uk

OASIS ID: stephenh1-130480

This report is formatted to allow printing on both sides of the paper

Model farm buildings at Fleensop, Carlton Highdale, North Yorkshire: Historic Building Record

CONTENTS

SUMMARY

The model farm buildings at Fleensop (NGR: SE 03331 82347) were built in the late 1920s by W J Lister, for a herd of dairy cows and formed part of a major re-organisation of this upland farm using money he had earned in the confectionary industry. They include an octagonal cow-house designed for milking by machine, an attached dairy and feed store, and a manure tip linked by overhead rails. Historic building recording, involving measured and photographic survey, was carried out between April and June 2012 for the owners J C Lister Farms Ltd, as part of a management plan funded by Natural England.

July 2012

STEPHEN HAIGH

Buildings Archaeologist

11 Browcliff Silsden Keighley West Yorkshire BD20 9PN
Tel/Fax: 01535 658925 Mobile: 07986 612548
www.stephenhaigh.co.uk enquiries@stephenhaigh.co.uk

LIST OF PHOTOGRAPHS

Photo	Subject
1	General view of the farm at Fleensop, from the north
2	The model farm buildings, with the octagonal cow-house in the centre
3	The cow-house, from the north-east
4	The cow-house, with cows' entrance in north-west side
5	Cow-house: detail of roof lights
6	Cow-house: detail of louvre vents in roof (internal view)
7	Cow-house: detail of under-floor ventilation inlet, north-east elevation
8	Cow-house interior, from the south-east, with gated entrance to feeding area
9	Detail of standings (north-west part of cow-house)
10	Detail of standings (south-east part of cow-house)
11	Detail of standings (south-east part of cow-house)
12	Detail of asphalt floor in stalls
13	Detail of manger, ventilation pipe, and water bowls
14	Detail of feeding area with ventilation grills and hay rack
15	Detail of manure bucket, in cow-house
16	Underside of cow-house roof
17	Detail of baffles to upper vents, cow-house roof
18	Dairy/feed store and cow-house, from the east
19	Dairy/feed store, from the west
20	Dairy/feed store, from the north, showing link with wash-room etc
21	Dairy/feed store: detail of original window, north-west elevation
22	Dairy/feed store: wash room, from the north
23	Water cooled churn store in dairy
24	Water cooled churn store: interior
25	Dairy/feed store: header tank supply churn store
26	Feed preparation room, from the north-west
27	Feed preparation room: detail of pulleys with control lever
28	Feed preparation room: partition enclosing machinery
29	Remains of milking machine with electric motor
30	Vacuum pump for milking machine
31	Gascoigne's name plate "Milking troubles – no sir! I milk the Gascoigne way"
32	Loft forming feed store, from the north-east
33	Overhead rails and manure tip, viewed across the yard, from the east
34	Manure tip with bucket, from the south
35	Manure tip, from the west, showing lower entrance for cart or trailer
36	Manure tip: roof truss with suspended rails below
37	Manure tip: suspended rails, with bucket stop against north wall
38	Detail of manure bucket
39	Manure bucket positioned over tipping hole
40	Manure bucket inverted over tipping hole

MODEL FARM BUILDINGS AT FLEENSOP, CARLTON HIGHDALE, NORTH YORKSHIRE:

HISTORIC BUILDING RECORD

1 Introduction

1.1 This report presents the results of historic building recording of a group of model farm buildings of the late 1920s at Fleensop, near Gammersgill in Coverdale, North Yorkshire. The work was carried out between April and June 2012 for J C Lister Farms Ltd, as one component of a management plan for the buildings, funded by Natural England under an environmental stewardship agreement.

1.2 The buildings recorded comprise an octagonal cow-house, designed for up to 24 cows with a vacuum milking system, an attached dairy and feed store, and a covered manure tip, linked to the cow-house by an overhead rail with suspended manure bucket. They were erected for the owner, Mr W J Lister, who had spent his childhood at Fleensop, but acquired his wealth through a career in the confectionary industry.

1.3 The recording work was carried out in accordance with a brief supplied by Natural England (Appendix 1), and involved documentary research, site survey, and photographic, drawn and written recording. This report is intended to inform the management plan but will also be submitted to the Yorkshire Dales National Park Authority's Historic Environment Record (YDNPA HER), and published on the internet via the OASIS project (reference: stephenh1-130480).

2 Location and current use

2.1 Fleensop is a small outlying settlement located in a tributary valley of Coverdale in North Yorkshire, lying about 2km west of Gammersgill, which is itself some 10km south-west of Leyburn. It lies at 340m above sea level at NGR: SE 03331 82347, in Carlton Highdale civil parish and within the Yorkshire Dales National Park (figure 1). The postcode is DL8 4TR.

2.2 The farm at Fleensop consists of a farmhouse and a number of outbuildings of various dates, with the model farm buildings lying to the north-west of the house (figure 2). The cow-house itself is used only seasonally for lambing, but other parts of the complex described here are used for storage.

3 Heritage designations

3.1 None of the buildings are listed as having special architectural or historic interest, or lie within a conservation area.

4 Previous investigations

4.1 No previous detailed archaeological, architectural or historical investigations are believed to have been made of the site, although the model farm buildings are noted in the YDNPA HER[1], where in 2006 they were described as:

> An unusual circular/octagonal form cow house of probable early to mid C20 date. The cow house is of stone construction with metalwork roof structure, that is part glazed and part slate covered. The main building contains concrete boskins and clearly housed a milking system. There is also a tracked runway with large metal hoppers that connected at least one of the outbuildings to the cow house. At least one hopper remains in place.
>
> The building is highly unusual and worthy of more detailed survey.

5 Historical background

The history of Fleensop

5.1 The North Yorkshire County Record Office (NYCRO) holds a collection of documents relating to the Listers of Gammersgill, although the vast majority of those relating to Fleensop are from the nineteenth century and earlier.[2] In addition, private research by Jennifer Lister is also valuable in understanding the history of the site.

5.2 There was a vaccary (cattle farm) at Fleensop in the thirteenth and fourteenth centuries, but under King Charles I (ie between 1626 and 1649), it was granted by the crown to the City of London, when it was named “Fleming shopp” or “Flemshopp”, but it was sold on again in 1656. At the start of the nineteenth century the property was owned by Thomas Tattersall, but in the 1810s it was conveyed to Christopher Topham, and on his death in 1832 it was inherited by his son, also Christopher, one tenant of whom in 1842 was John Lister (the property seems to have been divided into a number of landholdings historically). On Topham’s death in 1869 it passed to his wife and then to A C T Orde-Powlett, who held it until 1921. As well as farmland, the estate was also valuable for its game shooting, and for deposits of lead and coal, which were mined there into the early part of the twentieth century.

[1] record no MYD56008

5.3 William John Lister (born 1859, died 1945) was the eldest son of John Lister, tenant at Fleensop from the 1840s. Although his early life was spent on the farm, as a young adult he went to live in the Manchester area, where in 1884 he married Louisa Faulder, whose father was proprietor of a confectionary firm called Silver Pan. Lister became closely involved in managing the company, later to become Squirrel Confectionary, and benefited greatly from its success, to the extent that in 1920-1 (on his retirement when in his early sixties) he had achieved the means to purchase his childhood home at Fleensop.

5.4 Lister invested heavily in the farm and its infrastructure, and had a new road built so he could reach it in his Rolls Royce, a project which took two years to complete. The Yorkshire Dales topographers Hartley & Ingilby wrote in 1956 that:

> At the present day the hamlet is a single model farm, planned by William John Lister who, born at Fleensop, bought it in the early 1920's. After building the road up to it he set about reclaiming the land. Eventually the amount of meadow and pasture was doubled, all old grass land reseeded, the allotments improved, several new byres built, including a round one to hold 24 cows, a herd of Friesian cattle for milk production introduced, and about 1933 a grass-drying plant set up.[3]

5.5 It is possible that Lister's motivation for transforming the farm arose from shrewd business sense and that he saw potential for economic success in investing so heavily in Fleensop, but perhaps the resources and capacity he had for spending (using his earnings from industry) were so great that a commensurate return was not crucial to him, and the farm was something of a hobby in which he could indulge; his grandson recalled that it was his attachment to the farm that brought him back there, so it was evidently not a straightforward economic decision for him. One account suggests that he was concerned to provide employment in a time of economic depression[4], although there is something of a paradox in this regard, in that the model farm buildings themselves were designed to save labour. Perhaps there was also some degree of cross-subsidy within the property, where coal mining and shooting would also have brought an income. The physical resources at Fleensop mean that it is not ideal dairy farming land when compared to other areas of the country such as parts of Cheshire, although the Yorkshire Dales do have a long history of producing cheese and butter, and the Coverham dairy, situated about 8km to the north-east of Fleensop, would have provided a nearby market for the increased milk production Lister instigated.[5]

---

[2] NYCRO ZLS
[3] Hartley, M & Ingilby, J 1956 *The Yorkshire Dales* (second edition, 1965), p223
[4] *The Dalesman* Nov 1968, Vol 30, No 8, p645
[5] The dairy, which produced Coverdale cheese, opened at some time in the early to mid twentieth century but closed in the 1990s (NGR: SE 0993 8640; YDNPA HER no MYD15747)

5.6 According to John Faulder Lister, William John's grandson, the transformation of the agricultural enterprise at Fleensop, from what was probably a typical, traditional Yorkshire Dales hill farm in 1920, to a more innovative and modern system, took place under the supervision of a certain "Professor Armstrong", one of the foremost agricultural scientists of the time, whose course at Aberystwyth University W J Lister had attended.[6] It seems likely that this was Professor Sydney Frederick Armstrong, author of *British Grasses and their Employment in Agriculture*, a work first published in 1917 when Armstrong was at Cambridge University's School of Agriculture, but republished in a third edition as late as 1937. It is highly plausible that Armstrong was also responsible for, or influenced, the design of the model farm buildings at Fleensop.

5.7 The model farm buildings were erected by S W Storey of Carlton[7], and although their exact date has not been established, tradition attributes them to the late 1920s, and it is almost certain that they were built in or after 1927, as the Gascoigne company, whose milking machine was installed in them, was not established until that date. It can also be assumed that the buildings were in place by 1933, on the following grounds. The surviving records of the Leyburn Rural District Council's Building Control begin in 1933, and do not include any reference to their construction, though they do include proposals by W J Lister for a gamekeeper's cottage at Fleensop, in June of that year.[8] (Other proposals at Fleensop approved by the council in 1940, drawn up by the architect Frank Tranmer of Harrogate,[9] included a stockman's cottage and a new cow byre, though neither of these was actually built in the proposed location. The new byre was to replace a Dutch barn which then stood to the west of the octagonal building[10]; possibly it was built to the north-east instead, where a rectangular cow-house of breeze block, clad in corrugated iron, now stands (building 5 on figure 2).)

5.8 The Ordnance Survey's 1:2500 map of 1912 shows Fleensop before its acquisition by W J Lister in 1921, when the farm buildings seem to have comprised only three relatively modest structures, forming a small courtyard facing south-east (figure 3). It has not been possible to obtain a later edition of the county series 1:2500 map, which might provide dating information on the octagonal cow-house.

[6] "Fleensop: as told by John Faulder Lister" – typescript provided by Jennifer Lister
[7] Jennifer Lister holds a copy of a photograph of the cow house under construction, though it is undated
[8] NYCRO DC/LEY, Register No 1
[9] Tranmer died in 1938 but his practice may have continued under his daughter's proprietorship.

5.9 On W J Lister's death in 1945 the farm was gifted to his grandson John Faulder Lister, though initially it was managed by his nephew Clifford Foster Lister. Clifford went on to purchase the estate from him and it has now passed to his own grandsons, who trade as J C Lister Farms Ltd. Dairy farming ceased at Fleensop by the 1980s, and although the model buildings have been in occasional use since then, with some maintenance having been carried out, they are generally unsuited for modern agricultural practice.

Cow housing and milking in the early twentieth century

5.10 By the later stages of Britain's "agricultural revolution" in the second half of the nineteenth century, the application of modern biological principles and an understanding of livestock health were well established within modern farming practice, so that by the early twentieth century, farm building design had evolved to take account of various aspects of husbandry, as well as the latest construction materials and ideas of efficiency, as regarded time and labour. In dairy farming (perhaps the most profitable sector in agriculture at the turn of the twentieth century, when foreign imports, particularly from the new world, exerted downwards pressure on grain and meat prices), hygiene was also an increasingly significant factor, because of greater understanding of the health risks associated with milk, and the fact that cleaner milk led to better dairy products, with less wastage. In illustration, a guide to building and adapting farm buildings first written in 1935,[11] noted that the most difficult farm buildings to plan for were those for milking, which needed to take into account the circulation of the cows themselves, the supply of feedstuffs, and the movement of milk and manure, all of which would ideally be independent and separate.

5.11 Taking these in turn, it was advised that the cows should be able to enter and leave the building easily without risk of slipping, and areas next to the building should be paved. Feedstuffs (hay, cake, grain or roots) should be stored and mixed close to the cow-house, but with easy access for delivery by lorry or cart, while milk should be kept clear from contamination by dung and the dust from feed. The removal of manure from the cow-house should be able to be carried out quickly and easy, and away from the routes intended for milk and fodder. These considerations can all be recognized in the planning and construction of the buildings at Fleensop.

5.12 As further illustration of the ideas prevalent in the 1930s, the same work on farm buildings gives detailed guidance on the design of the cow-house itself, though

[10] NYCRO DC/LEY, Register No 3; this is the earliest known detailed plan of the farm buildings, but cannot be reproduced for copyright reasons
[11] Gunn, E 1935 *Farm Buildings New and Adapted* (second edition, 1945)

all relates to a rectangular plan, and no mention of an octagonal or circular arrangement is made. Fundamental to cow-house design was the space required for stalling a cow (tethering at the neck was assumed as the norm), and a Shorthorn, the breed widely used at the time and that kept at Fleensop, needed a stall 3'6" wide by 8' long (substantially less than that required by modern dairy breeds, such as the Friesian). The floor surface for the stalls was recommended to be of a type which could be easily kept clean, but also warm and comfortable for the cows, and one material in vogue was "cork-asphalt", though it was known to have drawbacks. Another aspect of the cow-house was lighting: natural light needed to be shed on the rear of the animals, where milking would take place, but could be in the wall (where glass was vulnerable to breakage), or the roof. Ventilation was also essential to consider, and the free circulation of air through the building was necessary, without creating draughts, so an ideal system was one in which low inlets brought fresh air to the cows where they breathed it in, and outlets were located high up where the warm, stale air would rise. It should be noted that the cow-house at Fleensop was intended to house the milking herd through the winter months, but that during the summer the cows would have grazed outside, being brought into the building twice a day for milking.

5.13 The cow-house at Fleensop is especially significant because it was designed and built to use a mechanical milking system, so is an early example of the employment of this new technology, particularly so because vacuum milking was more commonly fitted in existing buildings, which underwent only minor adaptation. Hand milking was a very labour intensive activity and the development and introduction of machines to reduce the time spent on it was an important part of agricultural advances in the early twentieth century, in part driven by the increase in the proportion of farming income nationally which was derived from milk. A milking machine is essentially a suction pump which is connected to a cluster of four teat cups (the "unit") attached to the cow's udder, which mimics the suckling action of a calf. Early machines simply collected the milk in a movable vessel, and successful, commercial versions of this "bucket plant" were available by 1918. A significant advance on this was the invention of a "releaser" machine in the 1920s, which incorporated an overhead pipeline from the cow-house, to transfer milk to a central collecting point, as at Fleensop.[12] Despite the potential benefits of machine milking, its uptake was constrained by a number of factors, including the generally depressed state of British agriculture

[12] Harvey, N 1996 "The origin of a species: from cowhouse via bail to milking parlour" *Historic Farm Buildings Group Journal* Vol 10, p40-48

in the 1920s and 1930s, and difficulties in maintaining cleanliness, so that it was not until after World War II that widespread adoption took place.[13]

5.14 The poor economic situation in agriculture in the early twentieth century meant that adaptation of existing farm buildings was often preferred, and where new building did take place it was normally to a cheap and functional, rather than opulent design, using materials such as concrete, corrugated iron and asbestos cement; the few model buildings from that time were the preserve of the very wealthy.[14]

The octagonal cow-house as a building form

5.15 There are a number of examples of cow-houses with an octagonal, circular or other polygonal exterior both in the United Kingdom and overseas, most being 19th century, and although the form can be attributed in part to the most practical way of constructing an interior with an essentially circular plan, and thereby achieving the benefits that conferred in terms of farming operations (as well as the structural benefits of minimising surface area), in many cases it is clear that there was also an aesthetic goal, as the symmetry of the octagonal form can be more pleasing to the eye than a rectangular structure.

5.16 Examples of octagonal cow-houses from the United Kingdom include an eighteenth or early nineteenth century one in a parkland setting at Llangedwyn, Powys[15], and a larger one of the 1880s at Heron's Farm on the Buckhold estate in Berkshire, intended for a herd of prize Jerseys and provided with an internal tramway for manure removal[16]. It has not been possible to substantiate the idea that there is a very similar example to the Fleensop building in south-west England, however. In the United States, "round barns" were popular from the late eighteenth century, with octagonal examples most commonly built between 1850 and 1900, and these "American Barns" (as they became known in Britain) were illustrated in one or two treatises on farming in this country. Such buildings were much larger than the cow-house at Fleensop however, and were in effect combination barns with a vertical arrangement typically of three storeys (feed being stored in lofts over the cow housing, with cellars below for manure)[17], so cannot be seen as a model for W J Lister's building.

[13] Grant, O 1998 "The diffusion of the herringbone parlour: a case study in the history of agricultural technology" University of Oxford, Discussion Papers in Economic and Social History Number 27
[14] Lake, J (no date) An Introduction To English Agricultural History and Farm Buildings: Their Development, Survival and Significance
[15] http://www.cpat.org.uk/projects/longer/histland/tanat/1001.htm
[16] Brigden, R 1986 *Victorian Farms*, p77

6 Recording methodology

6.1 The recording of the buildings was carried out between 20 April and 7 June 2012, and followed national guidelines[18]. It involved the production of floor plans and section drawings of the three buildings and a photographic record, made using a digital camera and a medium format camera with black and white film. The digital photographs form the primary record, as listed at the front of this report, while the black and white photographs form a secondary record, and are catalogued in appendix 2. External and internal photographs were taken, in most cases using a scale, either a 2m ranging pole marked with 0.5m graduations, or a 1m baton marked with 0.1m graduations, and the locations of the photographs are shown on copies of the plans. They are also referred to in the following account by numbers in bold.

7 Description of the buildings

General

7.1 The three buildings occupy a relatively level area, between the track running through Fleensop from north-east to south-west, and the Fleemis Gill, which to judge from the 1912 map, was previously vacant of structures. Building A, the octagonal cow-house, stands in the middle of this area, with building B (dairy and feed store) adjacent to its south-east side, while building E, the manure tip, stands some 10m to the north[19] (**1**,**2**). The layout of the three within this area therefore seems to have been determined by a combination of the vehicular access provided by the track, next to which building B stands, and by the falling ground to the north, which was exploited for the removal of manure. The remains of a contemporaneous walled and concreted yard lies between building A and E, though its integrity has been lost through partial demolition and addition of later buildings.

7.2 The principal walling material for the buildings is local sandstone rubble, which means that to some extent they blend in with the older buildings at the site, but otherwise they employ a variety of other materials brought from a distance and widely used in early twentieth century buildings generally, including Cumbrian slate, ridge tiles, corrugated iron, steel roof trusses and beams, and pre-cast and cast-in-situ concrete for flooring, window dressings and cow stalls. A slightly peculiar feature is the use of concrete blocks for some of the quoins, which may have been made specifically for these buildings.

[17] Wade Martins, S 2002 *The English Model Farm*, p177
[18] English Heritage 2006 *Understanding Historic Buildings: A guide to good recording practice*

Cow-house (Building A)

7.3 The octagonal cow-house forms the focus of the group, and is plain and functional in appearance, with walls which are blind on all sides except for the entrance in the north-west elevation, where the overhead manure rail emerges (**3**,**4**); otherwise access is possible from the adjoining dairy and feed store. The wide north-west entrance would have been used by the cows for entering and exiting the building from the adjacent concrete yard, and is fitted with a pair of sliding doors, which appear to be an original feature (although the door stop set within the external step is secondary).[20] The absence of windows in the walls, where disadvantages would be uneven lighting and shadows, as well as vulnerability to damage, is adequately compensated by a large fixed light running around all eight pitches of the roof, although few of the original steel frames and frosted glass panes survive. The roof is notable for its close-mitred slates, and for the staged central part, which incorporates fixed steel louvres in the vertical faces to provide ventilation outlets in all eight sides; these fixtures are similarly in poor condition, and boarded over on the exterior, so their remains are only visible from inside the roof (**5**). The intake for the ventilation flow is a small rectangular opening at ground level in the building's north-east side, which leads to a horizontal duct now serving as a dog kennel (**7**), and thence to a ring or circular chamber in the centre of the building, below floor level, from which there are various ducts to the cow standings and feeding area.

7.4 The interior of the building is arranged in an essentially circular plan, a layout which was clearly the fundamental principle of its unusual design, but one which would have been much harder to express in the outer structure, which is translated to the external, octagonal form. It is occupied by 24 cow standings, arranged in pairs radially around a central feeding area, and constructed of reinforced concrete which must have been laid in situ (**8**,**9**). An entrance into the feeding area, fitted with a timber gate, is positioned at the south-east side, where it would have been directly accessible from the wider of two adjacent doorways, through which hay from the Dutch barn and concentrates from the south-west end of building B could have been brought with minimum effort. The second doorway leads to the dairy at the other end of building B, and the separation of these two would have minimised the risk of contaminating the milk.

7.5 The cow standings themselves are raised above the main floor level in the building by 250mm, by a kerb which also serves to retain the asphalt surface laid

[19] The letters A, B and E are used to correspond with the identifiers in other parts of the management plan

[20] This stop, which is set within a patch of re-laid concrete, is embossed with the maker's name, "Henderson, Romford". The company moved to Romford only in 1955. Pers comm, Miles Johnson, YDNPA.

within them. The boskins between the pairs have brackets bolted to them for the tethering pins, to which the neck chains are attached, and apertures containing the automatic drinking bowls, most of which serve two stalls. At the front of the stalls each standing has a salt-glazed manger or trough, in which individual rations of concentrates could be placed, and above these a timber hay rack, to be shared by each pair of cows (**10**-**13**). Vertical pipes located between the mangers brought fresh air to the animals, but are also supplemented by vertical grills facing into the circular feeding area (**14**), and all of these are linked to ducting below the floor.

7.6 As well as feeding, watering and ventilating the cows, the building's circular plan readily facilitated efficient means of mucking-out and most importantly, milking. The overhead milk pipe, running from building B, is suspended from the steel roof trusses and runs horizontally around the rear of the standings, with a single tap set between each pair of animals, to which the milking units would have been attached, so one cow in each pair could be milked in turn. A branch was later connected to the milk pipe, in order to extend the system to the later cow-house to the north-east (building 5 on figure 2).

7.7 Mucking out, normally achieved in Yorkshire Dales cow-houses by simply shovelling manure through a hole in the wall onto an adjacent heap, or in larger buildings by wheelbarrow, was made less onerous at Fleensop by the use of a large bucket (**15**), suspended from an overhead, horizontal rail (a steel beam of I-section), which was then pushed out of the cow-house, across the yard, and into building E, where it was tipped by rolling the bucket upside down on its bearings, a method which relieved the operator of carrying any of the weight of the manure, although some effort would still have been required to push the full bucket, which has a capacity of some 300 litres. The bucket itself is manufactured from a sheet of steel, with plywood ends, and is clearly a one-off rather than a patented design, though it is not unique as similar, albeit smaller examples are still in use in Austria.[21]

7.8 The cow-house's roof structure is not of special historic interest: it has steel trusses, attached in the centre to circular plates at top and bottom, the plates tied together by a vertical rod, and the purlins are a combination of softwood and steel. The underside of the roof was fully lined with softboard at one time, as a means of insulation and increasing hygiene. At the top, galvanized steel baffles with a hopper-like profile have been incorporated below the louvres, to draw air away from the apex, where there appears to be no opening at all below the concrete capping; this would not only have reduced condensation in this area,

[21] Personal observation by author

but would also have removed the corrosive gases which accumulate in cow housing (**16**,**17**).

Dairy and feed store (Building B)

7.9 This dual purpose, two storey building faces directly onto the track passing through Fleensop, giving ready access for the collection of milk churns, and delivery of feedstuffs. Its rather traditional appearance is, on close inspection, misleading, as there is widespread use of concrete in the dressings, and the hipped roof is not a vernacular motif in the Yorkshire Dales (**18**-**20**). Most of the window frames (which are confined to the ground floor) have been replaced, but an original, hopper-style window characteristic of the early twentieth century survives in the north-west elevation (**21**). There is also evidence for a tall structure once having adjoined the north-east elevation, in the presence of a short spur of wall constructed from breeze blocks, which formerly ran to the eaves, but the nature of such a building is not known. On the north-west side building B is linked to the cow-house by a narrow lean-to of a single storey, with external doorways at either end.

7.10 The building is divided into three areas: the ground floor has the dairy at the north-east end, and feed preparation and milking machine areas at the south-west end, with the first floor being for feed storage. The last two are connected by internal stairs, but there is no means of access between these and the dairy except by passing through the cow-house and then the wash room within the lobby – clearly an arrangement intended with cleanliness of the milk foremost – so that one could not pass from the cow-house into the most hygienically sensitive part of the building without being given the opportunity to at least wash one's hands at the sink provided (**22**).

7.11 The dairy area, which appears to be largely unaltered except for the removal of doors and minor equipment, is divided into three rooms by stud partitions, and has a concrete floor and softboard ceiling. The southern, innermost room, has an outlet from the milk pipe, from which churns were filled (it appears that the dairy was never adapted to hold a bulk tank). These would then have been placed in the patent water-cooled churn store, made by Martins, dairy engineers of Stamford. This comprises a tank, 1.3m long by 1m wide, constructed from galvanized steel and timber, with a door at either end, with robust catches capable of retaining the pressure of water once filled, a process achieved by means of a perforated pipe at the base of the store, supplied with water from a header tank in the adjacent lobby, presumably necessary because the local water supply would have been inconsistent (**23**-**26**). As the store was fitted with

two doors, the churns were removed for collection from the outer room, an arrangement which further contributed to the dairy's cleanliness.

7.12 At the other end of building B, the feed preparation room is divided into two areas by a plain boarded partition (contrasting with the more hygienic plastered ones in the dairy), which served to enclose the Gascoigne milking machine and engine, and more recently an electric motor. Two chutes supply feedstuffs from the floor overhead, one with its dedicated barrow beneath, and a group of pulleys remaining on a single, short line shaft must once have been connected by belts to a machine such as a feed mill or chopper, but this has been removed (**27**,**28**).

7.13 Beyond the partition (**29**,**30**), the various items of milking and power equipment are or were located on concrete beds, and include the vacuum pump which drew the milk through the system (**31**), as well as an electric motor to power it (clearly not original). There appear to have been two engines in different locations, one of them perhaps for the feed mill (slots in the partition indicate that the belts were driven from the south-west side of it), and one for the milking machine. Other parts of the milking system (whose details and operation are not fully understood) include a vessel, pressure gauge and maker's sign. The Gascoigne company was founded in 1927 and continued to trade under its original name until 1974, but the logo used on the maker's sign here seems to have been in use until the 1950s,[22] so it is not certain that this was fitted as part of the original machine at Fleensop (**32**-**33**). However, given the nature of the model farm buildings, it does seem likely that W J Lister or Professor Armstrong chose to plan them around this emerging technology which the Gascoigne company manufactured.

7.14 The feed loft occupying the first floor of building B comprises a single space open to the roof, with its own taking-in door in the south-east elevation allowing easy unloading from a lorry or cart. Light is provided only by six roof lights, no doubt to protect stored feedstuffs from vermin and birds; the roof is carried on steel trusses (**34**).

Manure tip (Building E)

7.15 Disposal of manure from the cow-house was achieved by pushing the bucket suspended from the overhead rail across the yard and into a shed to the north, identified on the 1940 plan as the "manure tip", where it would have been emptied into a cart or trailer parked below. The distance between the two buildings necessitates an intermediate support for the rail, in the form of an A–shaped trestle, which is otherwise simply bolted beneath the trusses of buildings

A and E (**35**,**36**). The rail is doubled-up between the two buildings, to enable the bucket to be pushed around the cow-house in only direction during mucking out, rather than backwards and forwards – a particularly good illustration of the degree to which money was spent, which could have been saved with no real detriment to the farm's functioning.

7.16 The shed housing the manure tip is a simple structure, two storeys high. Its west side is formed by a continuation of the yard wall, and both this and its east side are of rubble with concrete block quoins. On the south side these are joined by a retaining wall to the lower floor only, with a simple timber frame and corrugated iron cladding with pedestrian door to the upper (ground) floor, while the north side is open at the lower level to allow vehicular access, but similarly clad with corrugated iron above (**37**). Two steel trusses similar to those in building B support the slate roof, the north truss having stops for the bucket rail attached below (**38**,**39**). There is a timber floor to the upper storey, which appears formerly to have occupied the full length of the building, but the north part of it has been removed. This contains an opening about 1.5m long and 1.0m wide, forming a trap through which the manure from the bucket was tipped (once the catches on the bucket's arms had been released) (**40**-**42**), into a cart or trailer housed beneath, for removal to a midden for storage, or perhaps for spreading directly onto the land.

8 Discussion and conclusion

8.1 Although of relatively modern date, the buildings at Fleensop clearly fall within the tradition of the "model farm", which has a history dating back to at least the eighteenth century (though the term was only coined in the mid nineteenth century).[23] As such, they were a planned unit constructed by a wealthy landowner, with the intention of providing an example of good practice and design, in conjunction with the wider re-organisation and improvement of the whole farm. Of key importance was the design of the buildings to incorporate a mechanical milking system with pipeline, which was new technology in the 1920s, and it is highly likely that the Gascoigne company's foundation in 1927 and the opportunities this afforded Lister which influenced the octagonal cow-house's design. More widely, other aspects of the buildings reflect the chief concerns of dairy farming in the early twentieth century, including hygiene and efficient operation, with the overhead rail for manure transport being a highly unusual manifestation of the latter.

[22] Danielle Mills, Museum of English Rural Life, pers comm
[23] Wade Martins, S 2002 *The English Model Farm*, p1

9 Assessment of heritage significance

9.1 It is believed that the group of buildings at Fleensop has national heritage significance. This is based on the following grounds, which consider the various contributing aspects of this significance.

9.2 The structure and fabric of all main components of the group (buildings A, B and E, as well as the overhead rail system and yard) are largely unaltered since construction, and they retain a high proportion of original fixtures and fittings, which can still be seen to work in an integrated system. They are arguably associated with leading agricultural ideas in the early twentieth century, by the inclusion of a milking system manufactured by Gascoigne and the involvement of Prof S F Armstrong, and many aspects of their construction illustrate key features of dairy farm buildings from that time, such as the ventilation system and provision for hygiene. Aesthetically, the octagonal cow-house with its central, louvred roof turret and continuous roof lights is undoubtedly an attractive structure which, because of its use of local stone, does not look entirely out of place in its upland setting dominated by more traditional, vernacular buildings. There is also some communal value in that the buildings are well known in the local area, as an unusual part of the valley's farming heritage.

10 Acknowledgements

10.1 This historic building record has been produced as part of a management plan under the leadership of Paul Knowles Architect, commissioned by J C Lister Farms Ltd, and funded by Natural England. The author is grateful to Mr & Mrs Lambert and Jennifer Lister for providing historical information on the site, the staff of the Museum of Rural Life for consulting their records on the Gascoigne company, and Miles Johnson of YDNPA for providing information from the Historic Environment Record. The survey drawings are based in part on those by Aline Knowles, but all other work is by the author.

Appendix 1: Brief For Building Recording

From *Project Brief for Detailed Recording of Traditional Farm Buildings at Fleensop near Leyburn including Condition Assessment and Consideration of Repair Requirements.*

by Dr Margaret Nieke, Yorkshire and the Humber Historic Environment Adviser (HEA), Natural England, November 2011

Brief for Building Recording

Introduction
This brief outlines the necessary level of building recording. It should be used to inform the production of the Management Plan.
Level of Recording
The building recording should be undertaken to Level 2 of 'Understanding Historic Buildings: A Guide to Good Recording Practice' as referenced in section 4 above. This guidance should be referred to in conjunction with this brief.
Both the exterior and interior of the building will be photographed and a plan made. The examination of the building will produce an analysis of its development and use and the record will include the conclusions reached.
A level 2 record will typically include:
Written Record
1. The precise location of the building.
2. The date of the record and the name(s) of the recorders.
3. A summary statement describing the buildings type or purpose, materials and possible date(s).
4. A short account of the buildings plan, form, age and development sequence, where known. There should also be a note of building's setting and contribution to the local landscape.
Drawn Record
1. A site plan drawn to an appropriate scale.
2. A floor plan to scale which should show the form and location of any structural features of historical significance (e.g. blocked doorways and windows, former openings, masonry joints, changes in internal levels).
3. Drawings (to scale or fully dimensioned) recording the form and location of other significant structural detail (e.g. timber framing, roof construction, internal features relating to use such as troughs, fittings etc).
Photography
Photography should be undertaken before and after works. Should the situation warrant it (for example a high level of repair to historically significant fabric) then photos should be taken during works. The record should consist of:
1.Views of the exterior of the building, including details of any structural features of historical significance 2. Views of the interior of the building, including details of any structural features of historical significance.
The photographs should be tied in with the block plan.
Deposition of Record
The results of the building recording are to be included within the Management Plan.

One copy of the building recording, as described in Section 9 above, should also be submitted to Historic Environment Record at the County Council.

Appendix 2: Contents of the photographic archive

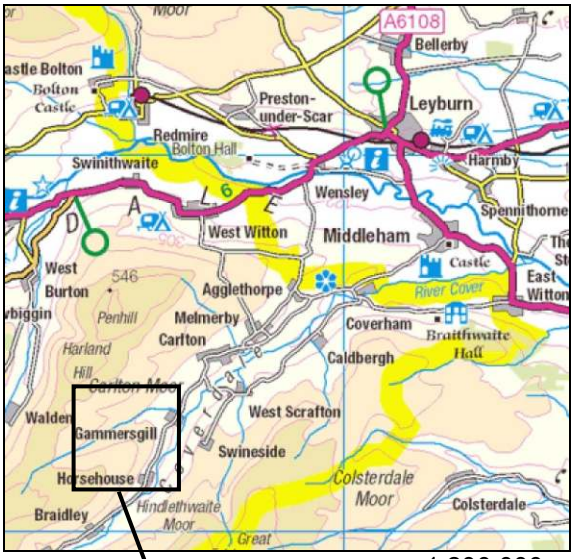
To be deposited with the YDNPA Historic Environment Record

1 file, containing:

- full set of labelled, digital colour prints
- full set of labelled, black and white prints
- full set of black and white negatives
- CD-ROM of digital photographs (jpg format)

Complete list of black and white photographs taken, in film order

Digital photo equivalent	Film	Frame	Subject
1	2	12	General view of the farm at Fleensop, from the north
2	2	15	The model farm buildings, with the octagonal cow-house in the centre
3	1	18	The cow-house, from the north-east
7	2	10	Cow-house: detail of under-floor ventilation inlet, north-east elevation
8	2	16	Cow-house interior, from the south-east, with gated entrance to feeding area (and temporary hurdles)
10	2	18	Detail of standings (south-east part of cow-house)
18	1	16	Dairy/feed store and cow-house, from the east
19	1	15	Dairy/feed store, from the west
20	1	17	Dairy/feed store, from the north, showing link with wash-room etc
33	1	2	Overhead rails and manure tip, viewed across the yard, from the east
34	2	6	Manure tip with bucket, from the south
38	2	7	Detail of manure bucket
-	1	1	Dairy/feed store and cow-house, from the south-east
-	1	4	Cow-house, from the west
-	1	13	Dairy/feed store, from the south-east
-	2	1	Overhead rails and trestle, linking cow-house and manure tip
-	2	3	Cow-house and over head rails, from the north
-	2	4	Overhead rails leading to manure tip, from the south
-	2	9	Detail of cow-house roof (original roof lights replace)
-	2	17	Stalls in cow-house, from the south-east



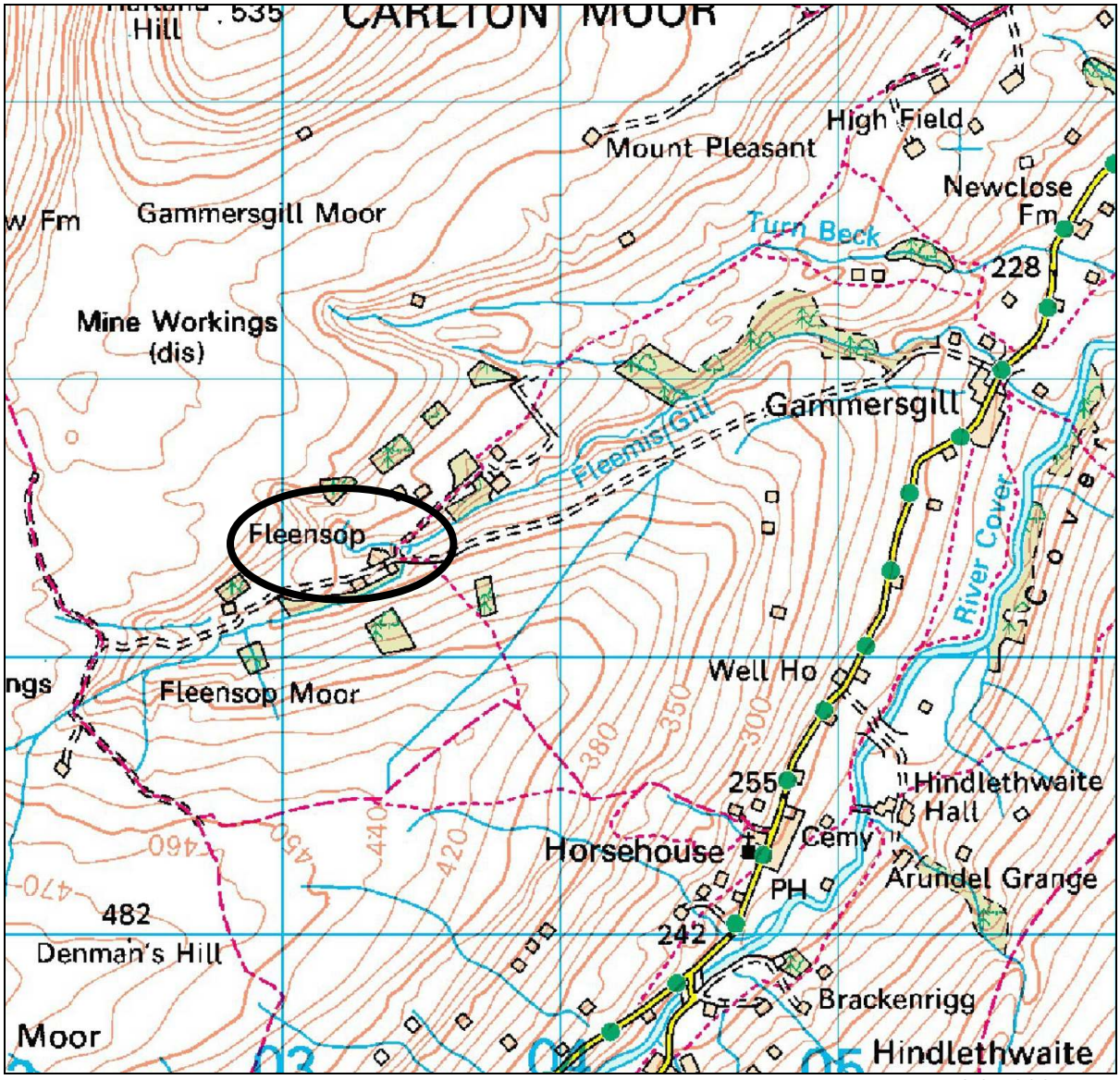
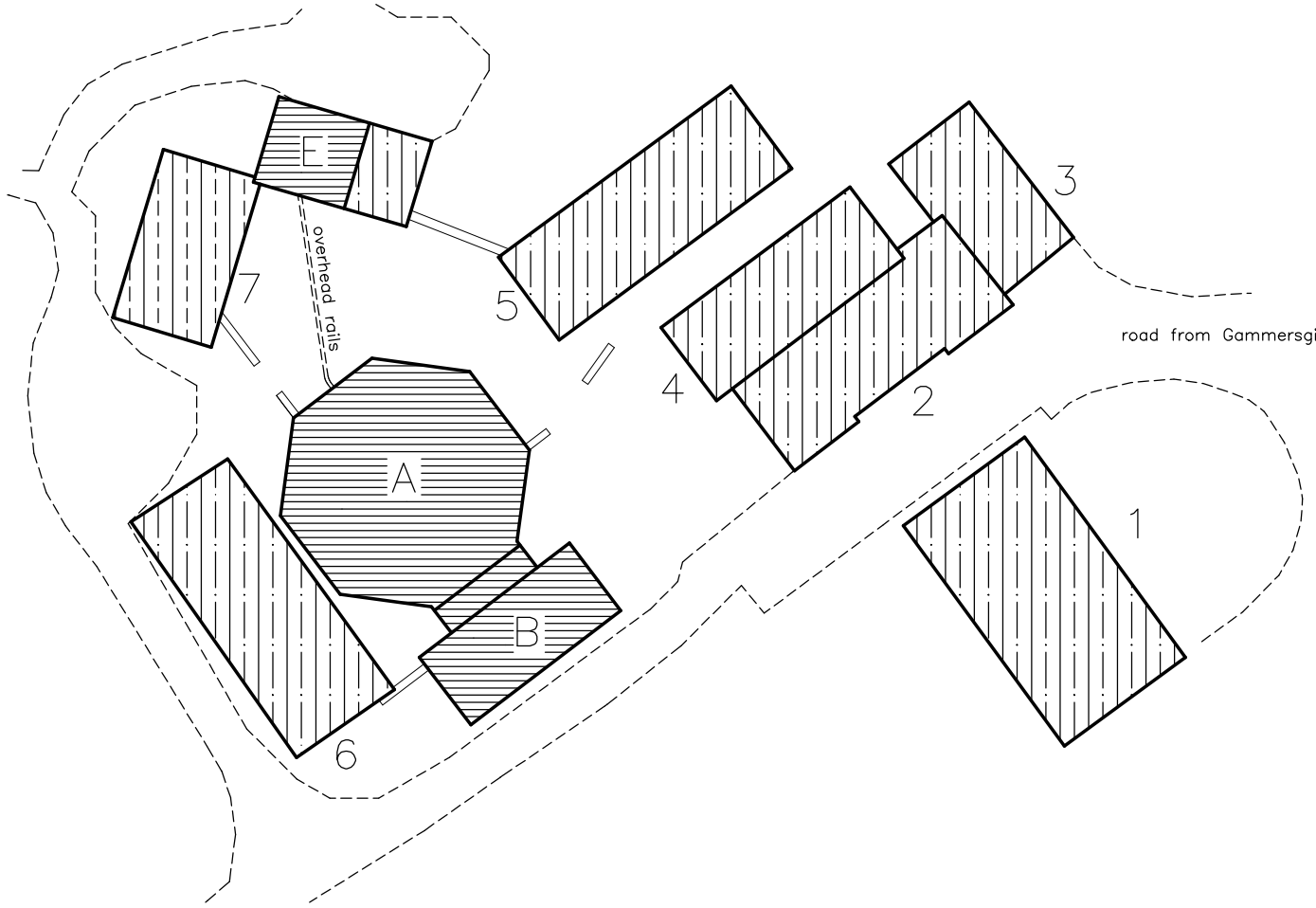


Figure 1: Location maps



buildings recorded

A = cow–house
B = dairy & feed store
E = manure tip
(identifiers to correlate with other parts of management plan)

other structures of various dates

1 = farmhouse
2 = stone farm building
3 = stone farm building
4 = stone farm building
5 = breeze block shippon
6 = Dutch barn
7 = calf shed

50m

MODEL FARM BUILDINGS AT
FLEENSOP
CARLTON HIGHDALE
NORTH YORKSHIRE:
HISTORIC BUILDING RECORD

FIGURE 2:
SITE PLAN

SCALE: 1:500 (at A4)

DATE OF SURVEY: APRIL – JUNE 2012

STEPHEN HAIGH
Buildings Archaeologist

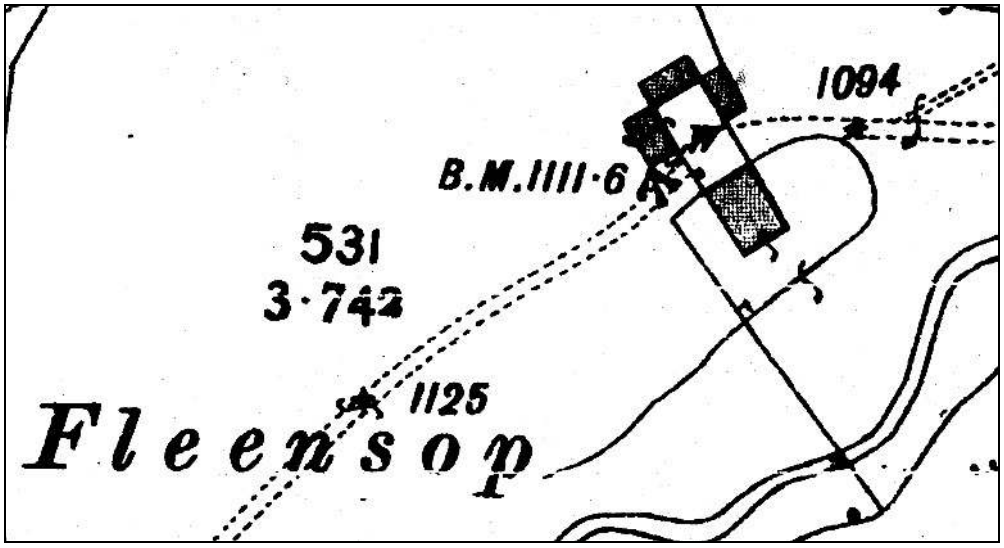


Figure 3: Ordnance Survey 1:2500 map (enlarged), showing the farm shortly before W J Lister's improvements
Published 1912 (surveyed 1891, revised 1910); sheet no: Yorkshire 83.11

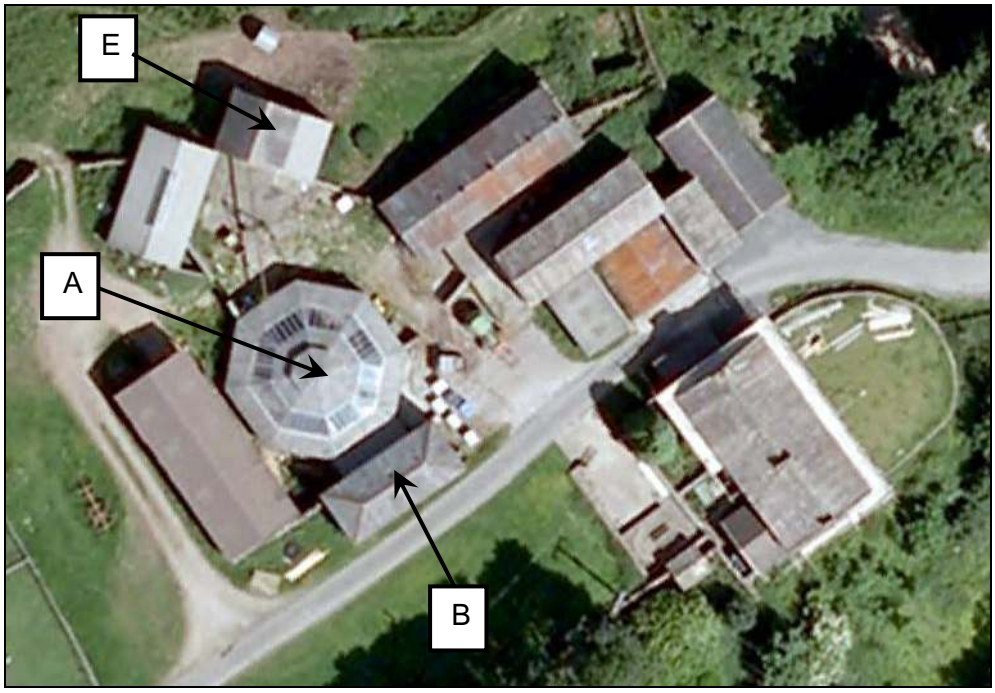


Figure 4: Recent satellite image
© Google

machine room

feed preparation

dairy

wash room

BUILDING B:
DAIRY/
FEED STORE

overhead rail

roof trusses

cow stalls

roof light over

feeding area

turret over

water trough

BUILDING A:
COW-HOUSE

gateway

yard wall

BUILDING 7
LATER CALF SHED

A

trestle

overhead rails

B'

corrugated iron

roof truss

tipping hole in floor

roof truss

corrugated iron

floor removed

B

BUILDING E:
MANURE TIP

see figure 6 for detailed plans of buildings A & B

other buildings and structures not shown

feed store

BUILDING B:
FIRST FLOOR

yard wall

10m

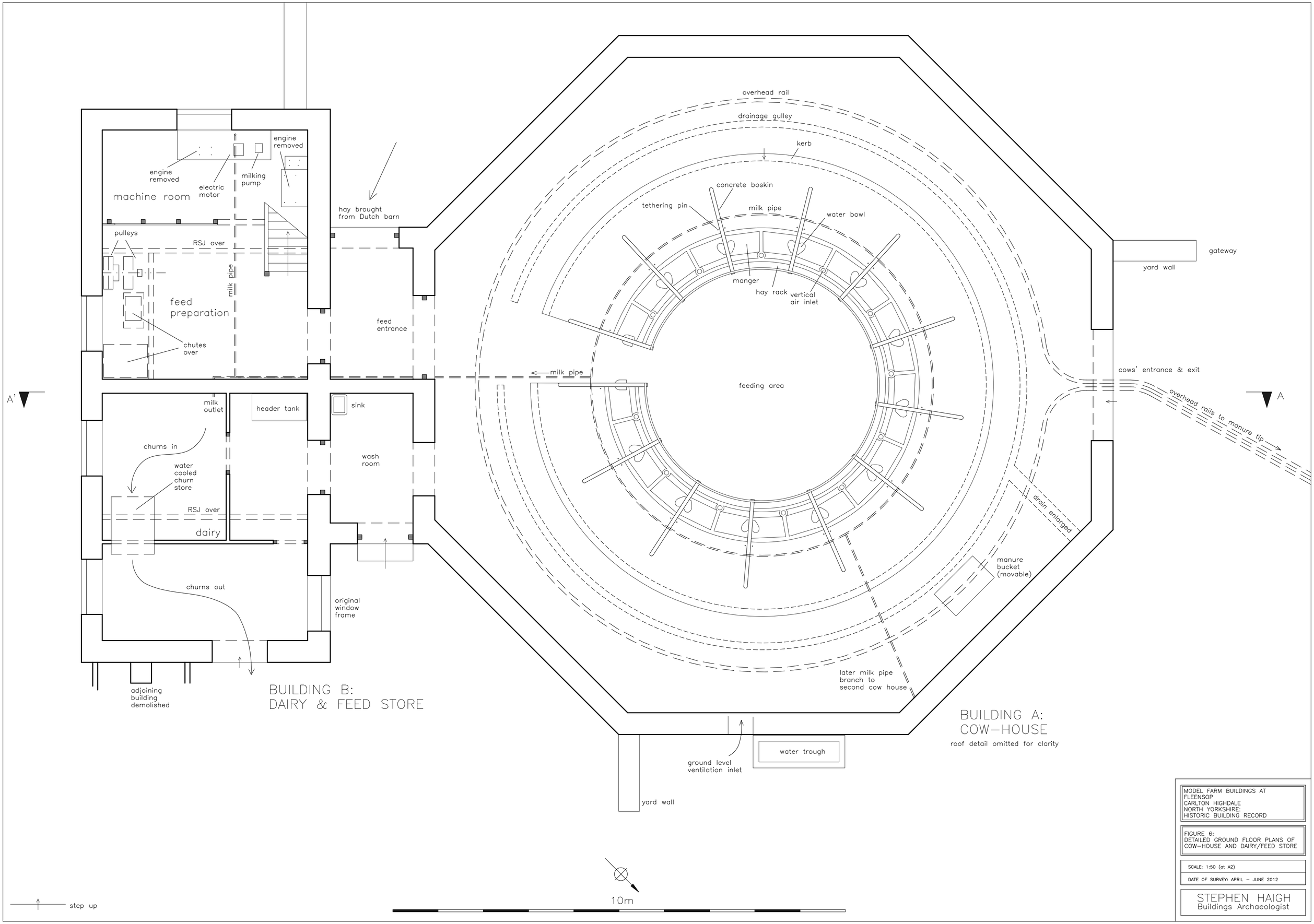
MODEL FARM BUILDINGS AT
FLEENSOP
CARLTON HIGHDALE
NORTH YORKSHIRE:
HISTORIC BUILDING RECORD

FIGURE 5:
FLOOR PLANS OF BUILDINGS A, B, E
(GENERAL LAYOUT)

SCALE: 1:100 (at A3)

DATE OF SURVEY: APRIL – JUNE 2012

STEPHEN HAIGH
Buildings Archaeologist



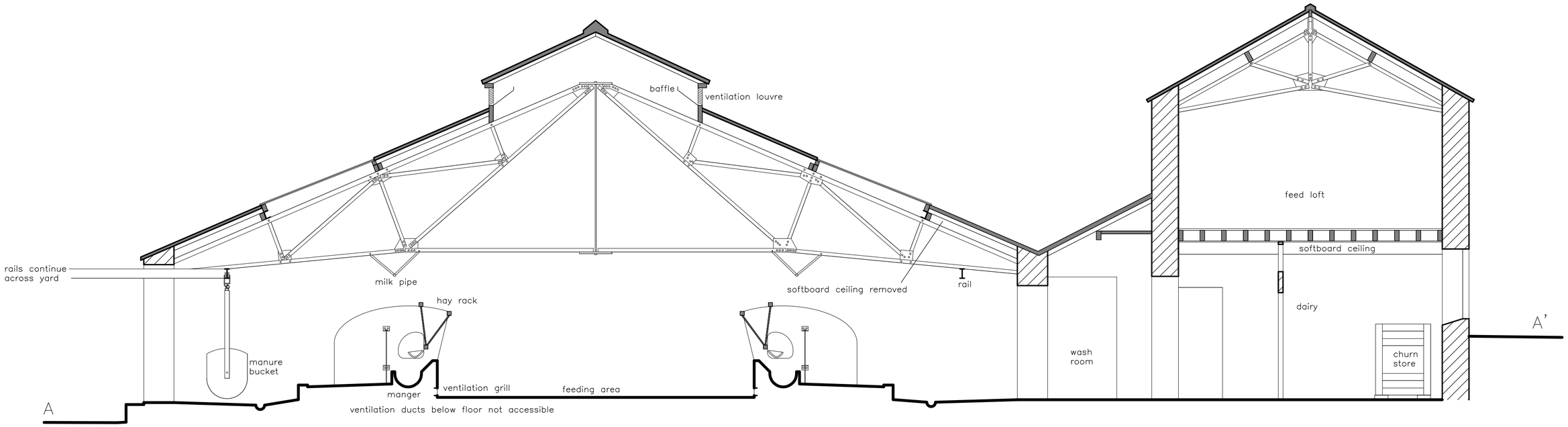
MODEL FARM BUILDINGS AT FLEENSOP CARLTON HIGHDALE NORTH YORKSHIRE: HISTORIC BUILDING RECORD

FIGURE 6:
DETAILED GROUND FLOOR PLANS OF COW–HOUSE AND DAIRY/FEED STORE

SCALE: 1:50 (at A2)

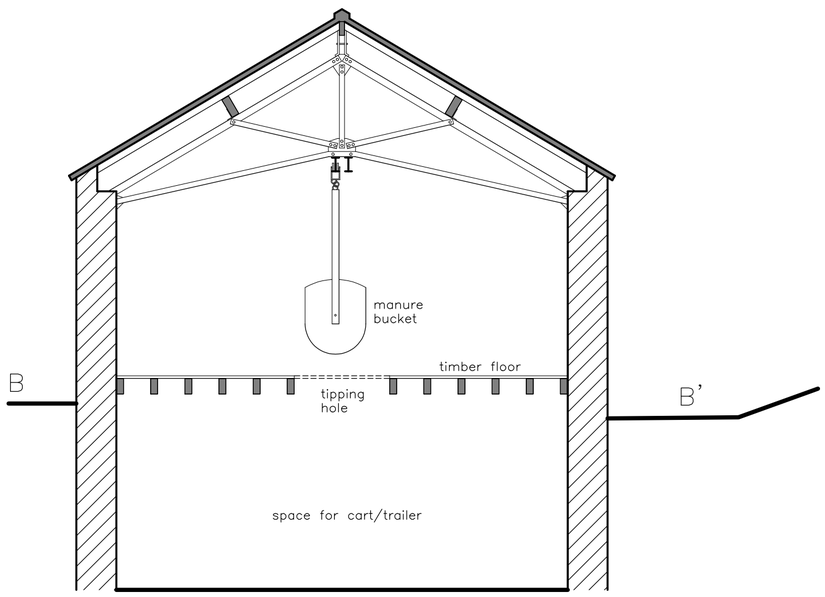
DATE OF SURVEY: APRIL – JUNE 2012

STEPHEN HAIGH
Buildings Archaeologist



BUILDING A:
COW–HOUSE
(composite section)

BUILDING B:
DAIRY/FEED STORE



BUILDING E:
MANURE TIP

10m

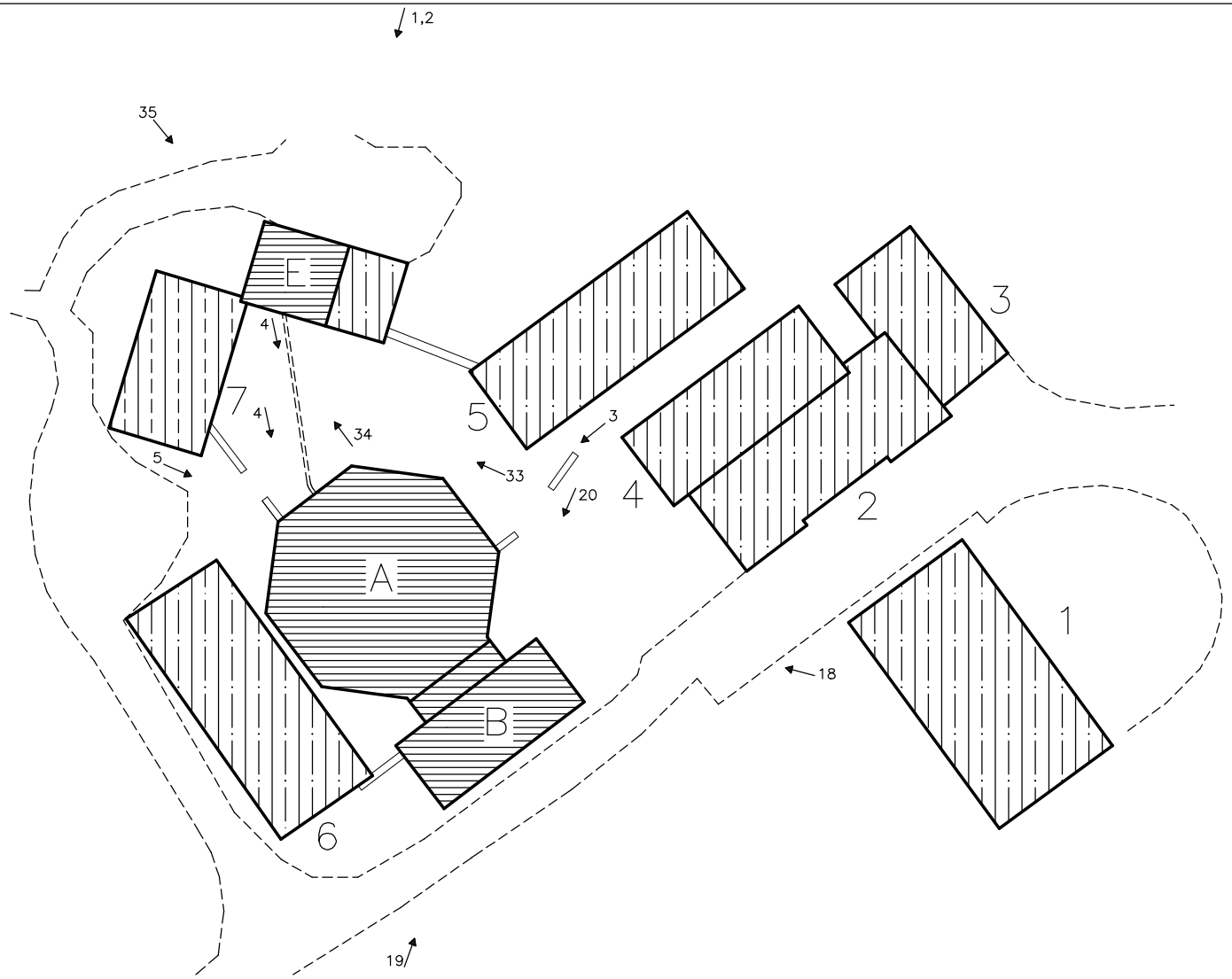
MODEL FARM BUILDINGS AT FLEENSOP
CARLTON HIGHDALE
NORTH YORKSHIRE:
HISTORIC BUILDING RECORD

FIGURE 7:
SECTIONS SHOWING
COW–HOUSE AND DAIRY/FEED STORE

SCALE: 1:50 (at A2)

DATE OF SURVEY: APRIL – JUNE 2012

STEPHEN HAIGH
Buildings Archaeologist



buildings recorded

A = cow–house
B = dairy & feed store
E = manure tip
(identifiers to correlate with other parts of management plan)

other structures of various dates

1 = farmhouse
2 = stone farm building
3 = stone farm building
4 = stone farm building
5 = breeze block shippon
6 = Dutch barn
7 = calf shed

50m

1: photograph direction and number

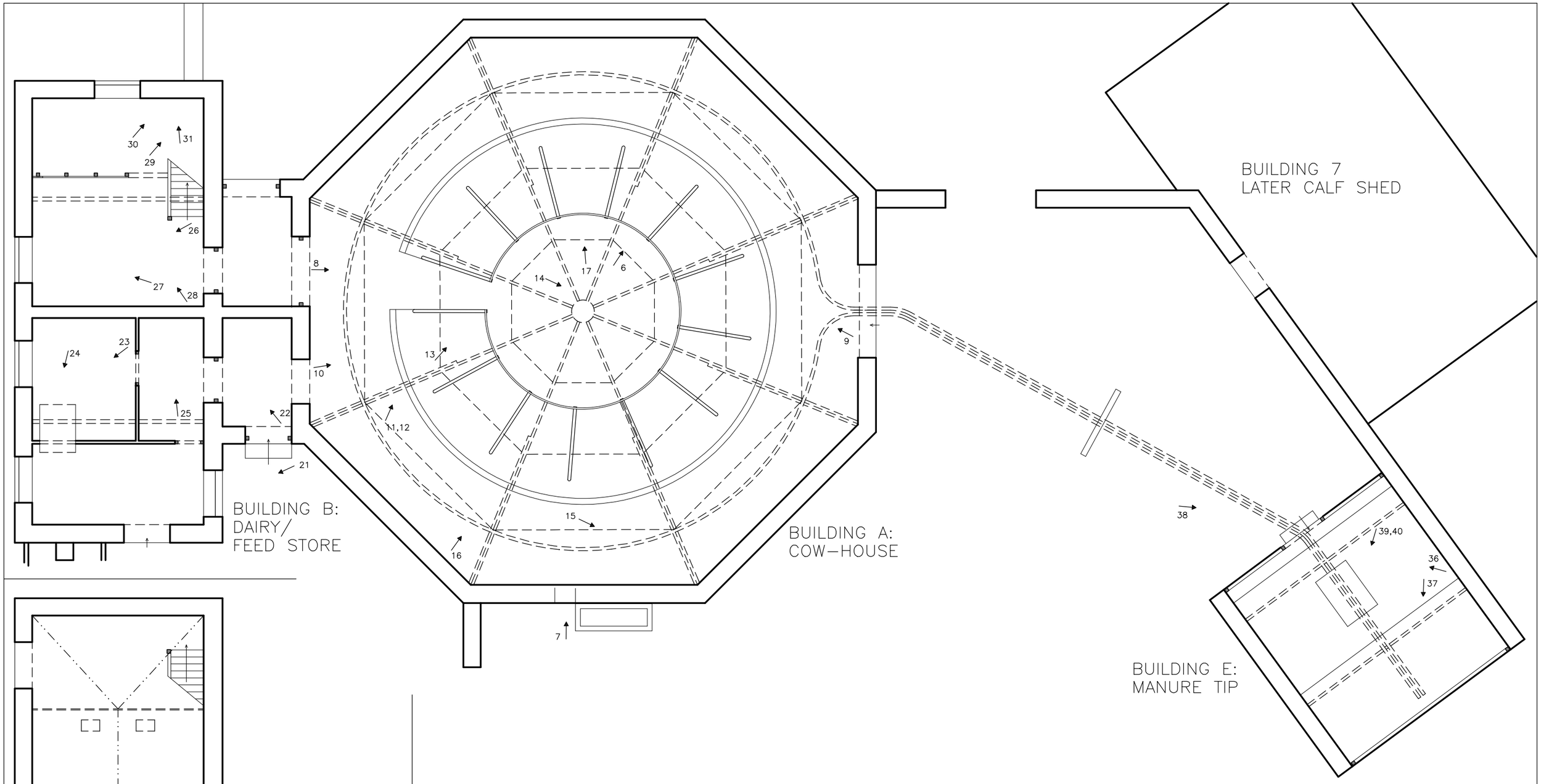
MODEL FARM BUILDINGS AT
FLEENSOP
CARLTON HIGHDALE
NORTH YORKSHIRE:
HISTORIC BUILDING RECORD

FIGURE 8:
SITE PLAN
WITH KEY TO PHOTOGRAPHS

SCALE: 1:500 (at A4)

DATE OF SURVEY: APRIL – JUNE 2012

STEPHEN HAIGH
Buildings Archaeologist



MODEL FARM BUILDINGS AT
FLEENSOP
CARLTON HIGHDALE
NORTH YORKSHIRE:
HISTORIC BUILDING RECORD

FIGURE 9:
FLOOR PLANS OF BUILDINGS A, B, E
WITH KEY TO PHOTOGRAPHS

SCALE: 1:100 (at A3)

DATE OF SURVEY: APRIL – JUNE 2012

STEPHEN HAIGH
Buildings Archaeologist

1: General view of the farm at Fleensop, from the north

2: The model farm buildings, with the octagonal cow house in the centre

3: The cow house, from the north-east

4: The cow house, with cows' entrance in north-west side

5: Cow house: detail of roof lights

6: Cow house: detail of louvre vents in roof (internal view)

7: Cow house: detail of under-floor ventilation inlet, north-east elevation

8: Cow house interior, from the south-east, with gated entrance to feeding area (and temporary hurdles for lambing)

9: Detail of standings (north-west part of cow house)

10: Detail of standings (south-east part of cow house)

11: Detail of standings (south-east part of cow house)

12: Detail of asphalt floor in stalls

13: Detail of manger, ventilation pipe, and water bowls

14: Detail of feeding area with ventilation grills and hay rack

15: Detail of manure bucket, in cow house

16: Underside of cow house roof

17: Detail of baffles to upper vents, cow house roof

18: Dairy/feed store and cow house, from the east

19: Dairy/feed store, from the west

20: Dairy/feed store, from the north, showing link with wash-room etc

21: Dairy/feed store: detail of original window, north-west elevation

22: Dairy/feed store: wash room, from the north

23: Water cooled churn store in dairy

24: Water cooled churn store: interior

25: Dairy/feed store: header tank supply churn store

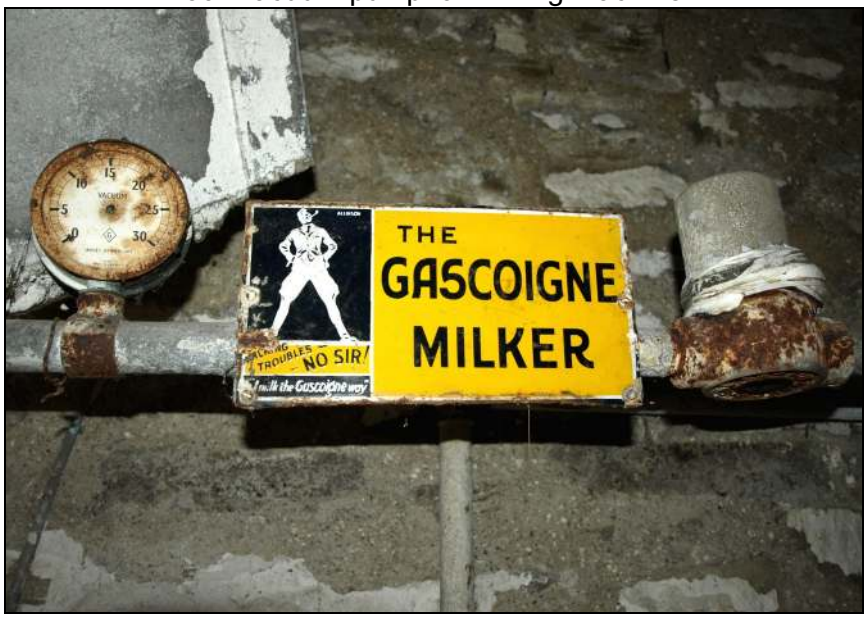
26: Feed preparation room, from the north-west

27: Feed preparation room: detail of pulleys with control lever

28: Feed preparation room: partition enclosing machinery

29: Remains of milking machine with electric motor

30: Vacuum pump for milking machine



31: Gascoigne's name plate "Milking troubles – no sir! I milk the Gascoigne way", with pressure gauge

32: Loft forming feed store, from the north-east

33: Overhead rails and manure tip, viewed across the yard, from the east

34: Manure tip with bucket, from the south

35: Manure tip, from the west, showing lower entrance for cart or trailer

36: Manure tip: roof truss with suspended rails below

37: Manure tip: suspended rails, with bucket stop against north wall

38: Detail of manure bucket

39: Manure bucket positioned over tipping hole

40: Manure bucket inverted over tipping hole