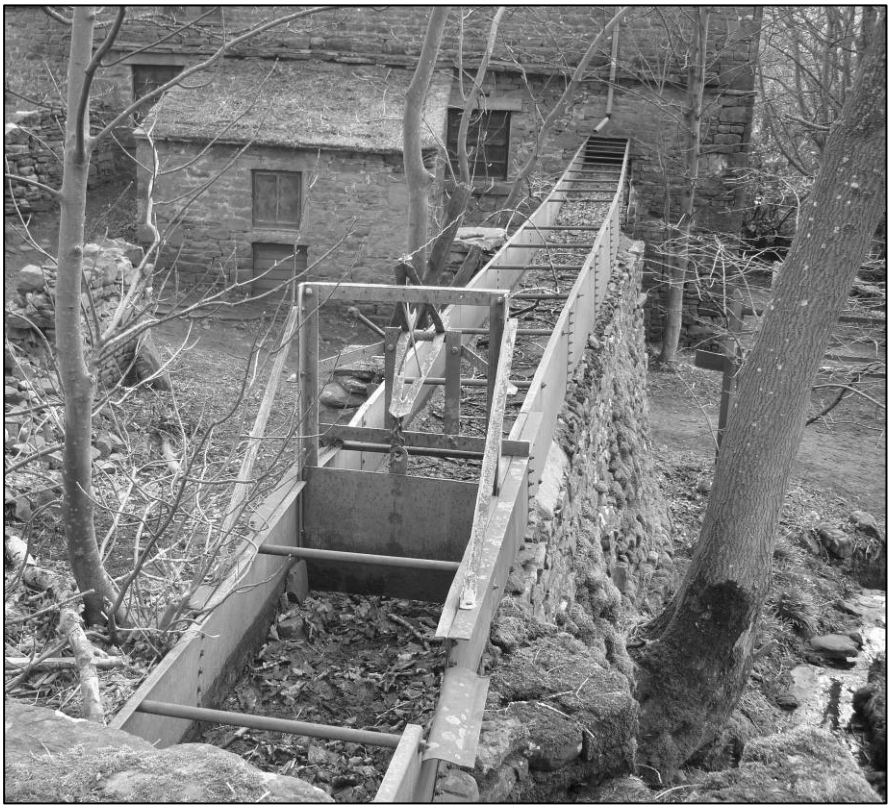
WEST MILL, ASKRIGG, NORTH YORKSHIRE

ARCHAEOLOGICAL AND ARCHITECTURAL SURVEY

VOLUME 1: TEXT



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CONTENTS OF VOLUME 1

CONTENTS OF VOLUME 2

List of Figures

List of Plates

8 Leas House survey area, inspection pit on line of 1913 culvert (Site 12b), looking N (photo 4/980).
9 Leas House survey area, pond for 1913 scheme (Site 12c), looking SE (photo 4/991).
10 Leas House survey area, 1913 collecting chamber (Site 12d), looking E (photo 9/991).
11 Leas House survey area, 1913 collecting chamber and pond (Sites 12c and 12d), looking S (photo 9/973).
12 Mill Gill survey area, quarry (Site 23), looking E (photo 8/759).
13 Mill Gill survey area, track (Site 27) to and from quarry, looking E (photo 8/761).
14 Mill Gill survey area, ruined structure (Site 21), looking W (photo 8/764).
15 Mill Gill survey area, natural channel or pond (Site 22), looking SW (photo 8/770).
16 Mill Gill survey area, building east of the power house (Site 31), looking N (photo 8/815).
17 Mill Gill survey area, building east of the power house (Site 31) after repairs, looking NW (photo 9/005).
18 Mill Gill survey area, weir and sluice (Site 29a) next to power house, looking NE (photo 6/804).
19 Mill Gill survey area, sluice channel (Site 29a) next to power house, looking SE (photo 6/793).
20 Mill Gill survey area, mill race (Site 29b), looking E (photo 8/829).
21 Plate 21: Mill Gill survey area, mill pond (Site 29c), looking E (photo 8/865).
22 Mill Gill survey area, mill pond and sluice (Site 29c), looking SE (photo 9/016).
23 Mill Gill survey area, head race (Site 29e), looking N (photo 8/758).
24 Mill Gill survey area, sluice arrangement at south end of header tank (Site 29f), looking S (photo 8/753).
25 Mill Gill survey area, launder and sluice mechanism (Site 29h), looking SE (photo 8/757).
26 Mill Gill survey area, overflow from launder (Site 29g), looking N (photo 9/032).
27 Mill (Site 36a), south external elevation (1), looking N (photo 8/745).
28 Mill (Site 36a), north external elevation (3), looking S (photo 8/750).
29 Mill (Site 36a), west external elevation (2), looking NE (photo 5/553).
30 Mill (Site 36a), east external elevation (4), looking W (photo 5/540).
31 Mill (Site 36a), ground floor room G2, looking NE (photo 7/058).
32 Mill (Site 36a), east wall of ground floor room G4 (elevation 15), looking NE (photo 7/079).
33 Mill (Site 36a), daisy mark on south wall of ground floor room G4 (elevation 11), looking S (photo 7/087).
34 Mill (Site 36a), launder sluice control on south wall (elevation 11) of first floor room 1F10, looking S (photo 7/978).
35 Mill (Site 36a), door in south wall (elevation 11) of first floor room 1F10, looking S (photo 7/981).
36 Mill (Site 36a), graffiti on west wall of first floor room 1F11 (elevation 16), looking W (photo 7/969).
37 Mill (Site 36a), lathe in first floor room 1F11, looking E (photo 7/961).
38 Mill (Site 36a), north wall of second floor room 2F15 (elevation 13), showing stored hay-rake blanks, looking NW (photo 7/867).
39 Mill (Site 36a), window at east end of south wall (elevation 11) in second floor room 2F15, looking S (photo 7/887).
40 Mill (Site 36a), door in west wall (elevation 16) of second floor room 2F16, looking W (photo 7/889).
41 Mill (Site 36a), inscription ‘JPA 1867’ to central roof truss in second floor room 2F15, looking SW (photo 7/883).
42 Garage (Site 36b), west end of south external elevation (10), looking N (photo 5/567).
43 Garage (Site 36b), east external elevation (9), looking W (photo 5/569).
44 Garage (Site 36b), ground floor room G7, looking E (photo 7/089).

45 Garage (Site 36b), north wall of ground floor room G7 (elevation 19), looking NW (photo 7/100).
46 Garage (Site 36b), doorway at east end of north wall (elevation 19) of first floor room 1F12, looking N (photo 7/907).
47 Garage (Site 36b), south wall (elevation 21) of first floor room 1F12, looking S (photo 7/936).
48 Garage (Site 36b), bench structure lever etc, north wall (elevation 19) of first floor room 1F12, looking N (photo 7/916).
49 Kiln range (Site 36c), north external elevation (5), looking S (photo 5/544).
50 Kiln range (Site 36c), rear of door in west wall (elevation 22) of ground floor room G6, looking W (photo 7/116).
51 Kiln range (Site 36c), passage around kiln in ground floor room G6, looking E (photo 7/136).
52 Kiln range (Site 36c), west face of kiln (elevation 26) in ground floor room G6, looking E (photo 7/127).
53 Kiln range (Site 36c), perforated clay tiles stacked in ground floor room G6 (photo 7/122).
54 Barn range (Site 36d), south external elevation (8), looking NW (photo 5/573).
55 Barn range (Site 36d), cart entrance in south external elevation (8), looking NW (photo 5/571).
56 Barn range (Site 36d), north external elevation (6), looking S (photo 5/547).
57 Mill (Site 36a), waterwheel and launder in wheelhouse (G1), looking N (photo 7/174).
58 Mill (Site 36a), pit wheel in ground floor room G2, looking NW (photo 7/023).
59 Mill (Site 36a), north post of frame and related beams in ground floor room G2, looking W (photo 7/039).
60 Garage (Site 36b), pulley with wooden casing on line shaft in first floor room 1F12, looking NE (photo 7/925).
61 Power house (Site 32), south external elevation, looking NE (photo 6/800).
62 Power house (Site 32), east external elevation, looking W (photo 8/808).
63 Mill Gill survey area, bolts on route of pipeline to power house (Site 30b), looking N (photo 8/776).
64 Power house (Site 32), west window in south elevation, looking S (photo 8/780).
65 Power house (Site 32), isolator over east doorway, looking E (photo 6/758).
66 Power house (Site 32), west internal elevation, looking W (photo 8/784).
67 Power house (Site 32), east internal elevation, looking E (photo 8/782).
68 Power house (Site 32), 3-phase and neutral supply wiring to west of concrete base, looking E (photo 8/802).
69 Power house (Site 32), fitting to external east gable (photo 8/803).
70 Poultry house (Site 33), south external elevation, looking N (photo 3/722).
71 Poultry house (Site 33), north external elevation, looking SE (photo 3/717).
72 Poultry house (Site 33), doorway to central south, looking N (photo 3/724).
73 Poultry house (Site 33), flagged culvert of mill race, looking E (photo 8/836).
74 Mill Gill survey area, structure to south of poultry house (Site 33),
75 Mill Gill house cheese press, looking S (photo 6/808).
76 Mill Gill house cheese press, press section, looking S (photo 6/811).

CONTENTS OF VOLUME 3

Appendices

EXECUTIVE SUMMARY

In December 2010 Ed Dennison Archaeological Services Ltd were commissioned by Professor D Blake to undertake a programme of architectural and archaeological survey work at West Mill, Askrigg, North Yorkshire (NGR SD 9434 9118 centred). The project included a topographical survey of Mill Gill and an area to the west of Leas House (6.82ha in total), a detailed analytical record of the mill complex, a visual and descriptive record of associated structures, and a condition survey with recommendations for repairs of the mill buildings. The work was required as part of a Higher Level Environmental Stewardship special project to safeguard and enhance the integrity of the complex. The scope of the recording work was defined by an Archaeological Project Brief produced by the Yorkshire Dales National Park Authority, supplemented by an EDAS methods statement.

West Mill forms part of a complex multi-period landscape to the west of Askrigg. The survey recorded elements of the wider medieval and early post-medieval agricultural landscape and a probable medieval routeway to the west of Leas House, possibly linking properties owned by Jervaulx Abbey on either side of Whitfield Gill via a medieval stream crossing point at Slape Wath. Another possible early routeway diverges from this medieval track and runs south-west, partly along a natural hollow created by a small landslip. This has a number of ruined structures and platforms situated on or just above its northern slope.

Documentary evidence notes that there was a corn mill near or on the site of the present West Mill in the 16th and 17th century, and it is probable that a mill had been located here during the medieval period, serving the township of Askrigg. In c.1576 it was reported that the watercourse was obstructed, and in 1607 the mill was reported to be in 'greate decaie and of little valewe'. The existing water mill was clearly present in 1799 when William Wordsworth visited Mill Gill, and structural anomalies identified within the building could be explained by the remnants of a much earlier structure, perhaps resulting from a rebuilding after the early 17th century, for example. It is also possible that, in common with other recorded examples in Wensleydale, that part of the water supply system to the existing mill originated during the medieval period. This early water supply may have survived relatively unchanged into the mid 19th century, and the survey has recorded traces of its route through surviving earthworks. The buildings associated with the mill, such as the kiln range, also incorporate parts of potentially earlier structures, although like the mill, few closely dateable early features survive.

By the beginning of the 19th century, West Mill was a corn mill, with an associated oat drying kiln and dwelling. For much of the 19th century, the mill was occupied by the Addison family, initially Ralph and then his son James Pratt Addison. James took over the complex in 1851, and he seems to have been responsible for a number of significant changes, including the addition of a second storey to the mill in c.1867, and most probably the construction of a new mill pond and the realignment of the leat between 1839 and 1854. The Addisons were farmers as well as millers, and this wider agricultural activity is reflected by the presence of structures such as a barn and a cheese press within the mill complex.

Corn milling ceased at some point between 1881 and 1887, and the interior of the mill was then stripped out to facilitate the hay-rake making, saw milling and joinery business of the Burton family. A structure (later used as a garage) was built onto the south side of the kiln range, a first floor was added to the kiln range (rendering the kiln inoperable), a lean-to was added to the north side of the mill, and a second structure subsequently added between the garage and the mill. All these changes had taken place by 1892. New machinery was also installed, and the water supply system was modified. During this period, the ground floor of the mill was largely occupied by power transmission, with circular and other saws probably housed within the garage range's ground floor. The first floor of the mill housed the machinery for manufacturing the rakes from their constituent parts, including drilling the heads and turning the shafts. The drilling machine for the rake heads, and almost certainly much of the other machinery as well, is very

likely to have been specifically designed and purpose-built by the Burton family, and so represents an unusual survival. Some of the power transmission equipment may have been acquired from another mill in the vicinity. Surviving documentation and historic graffiti within the mill indicate that thousands of hay-rakes were being manufactured every year at West Mill, and being distributed by railway well beyond the immediate area of Wensleydale.

In addition to these activities, the Burtons also seem to have been involved in poultry keeping at West Mill, to judge by surviving receipts for birds bought and sold in the 1940s and 1950s. It is also probable that some of the quarrying activity recorded within the Mill Gill survey area was associated with the Burton family, and stone from these quarries was used to build a number of important buildings in the locality during the later 19th century.

However, more importantly, in the early 20th century, the Burton family started to generate electricity in Mill Gill, using turbines and oil engines, providing electrical lighting for the mill, the associated mill house and the wider community of Askrigg. It is no exaggeration to say that they were the most influential of the local Wensleydale electricity producers, not just in terms of their electricity generation at Mill Gill, but also in their role as electrical engineers to other similar enterprises in both Wensleydale and Swaledale. The power house generating the electricity at Mill Gill underwent several phases of modification during its lifetime; surviving receipts and bills indicate that these mainly took place in c.1919-1920 and c.1942-1944. The generation of electricity ceased in Mill Gill in the late 1940s, with hay-rake manufacturing probably stopping at around the same time, although the Burtons continued their joinery business at West Mill into the late 1950s.

The condition survey of the mill buildings has produced a series of recommendations for repairs, prioritised in terms of their urgency. A number of other recommendations have also been produced, for additional survey work and enhanced public interpretation.

1 INTRODUCTION

Reasons and Circumstances for the Project

1.1 In December 2010 Ed Dennison Archaeological Services Ltd (EDAS) were commissioned by Professor D Blake to undertake a programme of architectural and archaeological survey work at West Mill, Askrigg, North Yorkshire (NGR SD 9434 9118 centred).

1.2 The project included a topographical survey and an analytical record of the mill complex, as well as a visual and descriptive record of associated structures. The work was required as part of a Higher Level Environmental Stewardship special project to safeguard and enhance the integrity of the complex. The scope of the recording work was defined by an Archaeological Project Brief produced by the Yorkshire Dales National Park Authority (YDNPA), which was supplemented by an EDAS Methods Statement (see Appendices 7 and 8 in volume 2).

1.3 A further area of topographical survey was added to the project during the course of the fieldwork. This area, which lies to the west of Leas House, some 0.6km to the north-west of West Mill, covers part of a complex archaeological landscape relating to adjacent medieval landholdings but also includes elements of the water supply for a 20th century power house associated with the mill.

1.4 This report comprises three volumes, volume 1 contains the report text, volume 2 contains the figures and appendices, and volume 3 contains the various appendices.

Site Location and Description

1.5 West Mill comprises a complex of conjoined buildings of different periods, occupying a position on the east bank of Mill Gill, some 500m to the west of the centre of the market town of Askrigg in Wensleydale, North Yorkshire (NGR SD 94346 91184), at an elevation of 220m AOD (see figure 1). The survey area, as defined by the YDNPA project brief, measured 5.14ha and was centred on NGR SD 9411 9134) - it was bounded by Mill Gill to the south and west, and by enclosed pasture to the north and east; a public footpath runs through the southern edge of the survey area (see figure 2). The eastern half of the survey area is relatively level, with the exception of a steep south-facing scarp rising to the boundary with the pasture to the north. The western half is formed largely by a very steep and heavily vegetated south-facing scarp, which becomes near vertical as it nears Mill Gill Force at the north-west end of the survey area; due to dense vegetation and the steepness of the slope, access into this area was difficult. All parts of the mill complex were accessible at the time of the survey, with the majority of the building's interiors being relatively clear of debris. There were large amounts of stored material in some parts of the mill complex, at least some of which related to its historic usage.

1.6 The West Mill complex essentially comprises three conjoined buildings of different periods, together with lesser attached structures, all predominantly stone built. The mill, at the north end of the complex, is of three storeys, and there is a two storey range attached to the east end of the mill's south elevation; together, the two form an approximate L-shape in plan forming the north and east side of a small elongated yard. The attached structure has a corn-drying kiln on the ground floor, while a later two storey extension with a single pitch roof and large windows has been added to the west side. At the south end of the attached structure, there is a

two storey barn/coach house. All parts of the complex retain *in situ* and *ex situ* historic machinery. The wheelhouse of the mill retains an overshot waterwheel, whilst within the mill and attached range there is the pit-wheel, an adjacent wooden frame, line-shafting, hay-rake machinery and wooden hay-rake blanks, and early electrical supply equipment. There is also considerable evidence in both flagstone and board floors relating to the position of machinery and how materials were transported around the mill, in the form of sockets, traps, areas of wear and fixings, as well as historic graffiti relating to the occupants of the complex and the activities carried out within.

1.7 To the north and north-west of the mill complex, there is an elevated zinc pentrough supported on stone piers, sluices, a header tank, headrace, culverts and a 100m long mill pond. Further away are the remains of a power house, built in 1908, with associated sluices and watercourses, along with extensive quarrying on the steeply sloping ground here. There are also a number of smaller structures within the survey area that were required to be recorded, namely a churn stand, cheese press and poultry house.

1.8 West Mill is a Grade II Listed Building (IOE ref 323047), first listed on 9th July 1986 (see Appendix 5), and it lies within the Askrigg Conservation Area; the 'Images of England' website incorrectly shows a photograph of the adjacent flax mill rather than one of West Mill. The complex is also listed on the YDNPA's Historic Environment Record (site MYD 34289). The house associated with the complex, known as 'Mill Gill House' is not listed and was not required to be surveyed as part of the current project.

1.9 During the course of the project, the survey area was expanded to include an area to the west of Leas House, some 0.6km to the north-west of West Mill (see figure 2). This second area, which measured 1.71ha, lies on the north side of Mill Gill (NGR SD 9373 9175 centred) and includes elements of the water supply for the 1908 power house noted above.

Aims and Objectives of the Project

1.10 The aims and objectives of the project (as set out in the YDNPA project brief) were:

- to produce a new measured survey to provide a basis for the preparation of detailed consolidation specifications;
- to provide a condition survey, with ball park costings, for conservation work to the main mill building and the overhead mill race;
- to identify archaeological and historical features and assess their conservation importance;
- to identify timbers potentially suitable for a programme of dendrochronological analysis;
- to provide a detailed, pre-intervention record of the complex;
- to provide information for display and interpretation purposes;
- to produce a survey report and archive;

- to produce text and illustrations for an article in an appropriate journal such as the *Industrial Archaeology Review*;

- to provide recommendations on the need for any further work, including urgent conservation works, that might be necessary to enable the waterwheel to turn, sluice management etc.

Previous Investigations

1.11 Askrigg is surrounded by and forms part of a complex and well-preserved archaeological and historical landscape, parts of which have been surveyed in detail, including areas close by to the north and east of the survey area (Moorhouse 2003). The results of this survey work have been published in part, although the documentary evidence upon which the interpretation of the recorded earthworks is based awaits full publication.

1.12 The West Mill complex itself appears not to have been the subject of any detailed previous investigation, but aspects of its history, specifically hay-rake making and early electricity generation have been covered in secondary publications (e.g. Hartley & Ingilby 1989, 195; Hartley & Ingilby 1981, 132; Hay 2000).

Survey Methodologies

1.13 As noted above, the scope of the architectural and archaeological survey work was defined by a YDNPA project brief and an EDAS methods statement (see Appendices 7 and 8). The topographical survey and architectural survey of the mill complex represented a Level 3 analytical record as defined by English Heritage (2006, 13-14; 2007, 20-24), while the associated structures were subject to a Level 1 visual and Level 2 descriptive record. Readily available documentary material was gathered, and some oral history was also obtained from local people and unpublished material. A detailed explanation of the survey methodologies is contained in Appendix 6 while a full list of all sources consulted as part of the project is given in the bibliography (Chapter 9) below.

1.14 The initial topographical EDM total station survey work at West Mill took place in January and February 2011, with hand-enhancement in April 2011. The EDM work at Leas House took place in March 2011 and the hand enhancement in May 2011. An initial phase of building recording took place on 20th October 2010, but the bulk of the survey work was done between May and July 2011, together with the surveys of the associated structures. The photographic and descriptive record was produced at intervals in October 2010, between April and July 2011, and in March and May 2012.

Condition Survey and Recommendations for Repairs

1.15 The YDNPA project brief also required the production of an outline condition survey, with ball-park costings, for conservation work to the main mill building and the overhead mill race. This survey was produced by Peter Gaze Pace, conservation architect, in conjunction with EDAS, following a site visit in June 2012. The resulting report is produced as Appendix 4, with a summary contained in Chapter 8 below.

Survey Report and Archive

1.16 This archive survey report forms a detailed written record of the buildings and their landscape setting, prepared from the survey data gathered by the project, and cross-referenced to the drawn and photographic record. It describes the surviving earthworks and structures, and analyses their form, function, history, and sequence of development. The buildings are placed within their historical, social and industrial context where possible, using the available documentary and secondary evidence. The report also comments on the quality and reliability of the evidence, and how it might need to be supplemented by further work, for example additional desk-based research, structural survey, dendrochronological analysis, urgent conservation work etc. As previously noted, the report comprises three volumes. Volume 1 contains the text and volume 2 contains the figures and plates. The various appendices are contained in volume 3, and include a structured gazetteer of room record sheets, photographic registers and catalogues, details of survey methodologies, and copies of the original project brief and the EDAS Methods Statement.

1.17 In order to aid description, the identified earthworks, structures and other features recorded by the archaeological and architectural survey have been assigned unique identifier numbers, indicated in the report as **Site 1**, **Site 2** etc. It has sometime been necessary to further sub-divide these identifiers, e.g. **Site 1a**. Reference should also be made to the various survey plans and photographs which form volume 2 of this report. Appendix 1 provides a list of all the identified sites while Appendix 2 provides a detailed room-by-room inventory of the four buildings within the mill complex, together with a catalogue of the *ex situ* machinery and fittings in each room. Appendix 3 provides a catalogue of all the photographs taken as part of the project, and they are referenced throughout the following report in italics, the number before the stroke representing the film and the number after indicating the shot [e.g. *5/032*]. Other appendices contain the outline condition survey, survey methodologies etc. All these appendices are contained in volume 3 of this report.

1.18 The full archive, comprising paper, magnetic and plastic media, relating to the project has been ordered and indexed according to the standards set by English Heritage and the National Archaeological Record (EDAS site code WMA 11). It was deposited with the YDNPA's Historic Environment Record at Bainbridge, North Yorkshire, on completion of the project.

2 DOCUMENTARY AND HISTORICAL BACKGROUND

Introduction

2.1 No detailed documentary research, other than an assessment of such existing information as was known to the owners and the YDNPA, was required as part of the survey project. However, in view of the historic significance of the mill complex, and the potentially important results arising from the archaeological survey, it was considered that some original documentary research would be beneficial, particularly given that one of the aims of the project was to provide information for display and interpretation purposes. This was therefore done, although the following chapter still relies heavily on published secondary sources.

The Medieval Period

2.2 By the medieval period, a complicated system of landholding had developed around Askrigg, involving both lay and ecclesiastical ownership, which had a profound and long-lasting influence on the wider landscape.

2.3 During the medieval period, Mill Gill formed part of the boundary between the vills or townships of Fors to the south-west and Askrigg to the north-east (Moorhouse 2003, 304). At a later date, possibly by the mid to late 13th century, the township of Fors had disappeared, to become part of the large administrative unit known as the Forest of Wensleydale. Mill Gill became part of the boundary between the Forest and the township of Askrigg (Hartley & Ingilby 1989, 35), and it also marked the north-eastern boundary of Jervaulx Abbey's property here. Jervaulx Abbey had two vaccaries on the land to the immediate south-west of Mill Gill, at Helm and at Dale Grange. These were both listed in documents at the very beginning of the 14th century and they developed into small settlements in their own right during the 16th and early 17th centuries (Moorhouse 2003, 295, 335 & 342). Raistrick (1967, 90) cited the name 'Mill Gill' as evidence that an early mill had been sited here, but provided no supporting documentary or fieldwork references, although Moorhouse (2003, 323) states that the name 'Mill Beck' at Newbiggin in Bishopdale has survived as a place name for over 500 years after the mill there was abandoned.

2.4 Within and around Askrigg, detailed field survey of the Town Head area on the north side of the town has almost certainly revealed traces of the planned settlement of the now obsolete vill of Little Askrigg referred to in the 13th century (Moorhouse 2003, 307). Within the same area, there are many other features forming part of the contemporary and later landscapes, including groups of linear stackgarths (small raised platforms on which hay was stacked to dry) running down the hill, and random and successive stackgarth groups placed around a still-functioning barn (Moorhouse 2003, 313). Slightly further north, bisected by Moor Road to the west of High Field, there are the earthworks of a former Y-shaped funnel-like feature which provided access from the settlement to the commons before the enclosure of the present fields. Within this funnel is a series of north-south aligned terraced platforms, whose plan and assumed timber structures that they contain may well pre-date the introduction of typical stone barns into the Dales in c.1600. Examples of these funnels are known from elsewhere within the Dales, and they often have the name 'Lead' associated with them (for example, 'Lead Green' at Askrigg), deriving from Old Norse for 'barn' or 'laithe', the dialect development leading to 'lead' rather than 'laithe'. Elsewhere around Askrigg, detailed earthwork survey has also revealed linear groups of buildings, arranged end to end, within contemporary field systems (Moorhouse 2003, 316).

2.5 Further west, to the immediate east of Leas House, a suggested medieval horse stud has been identified at Stoned Horse Paddock, the name 'stoned horse' being a dialect term for a stallion. The stud is represented by a sub-square enclosure, which appears to re-use an earlier earthwork, partly defined by a ditch on the southern and western sides. Two lines of adjoining buildings lie in the ditch. The southern group has a stone barn of possible 18th century date built on the eastern of three adjoining platforms, while the northern building of the western pair was stone-built, with gable access; both groups were thought to be contemporary with the stud. The stud enclosure contains further internal rectangular building platforms and is set on a raised tongue of land, providing the well-drained ground on which horses need to be housed. Fodder was stored on stackgarth stances within the enclosure and on the hillside to the north. The water supply to the stud was provided by two artificial channels, the upper one coming from a spring on the hillside and the lower one being gravity fed from a stream in the valley to the north beyond Low Straits Lane (Moorhouse 2003, 316 & 332-333).

2.6 The stud lay within the large enclosure of a probable sheephouse, possibly belonging to Jervaulx Abbey (Moorhouse 2003, 332), although it lies to the immediate north-east of the suggested boundary of the Abbey's estates, formed by Mill Gill (Moorhouse 2003, 342). The northern boundary of the western part of this sheephouse or grange enclosure is described as following the wall line south of the trackway leading to Leas House, the western boundary formed by Mill Gill and the southern boundary by the scar edge above Mill Gill. Within this large enclosure, there are internal divisions lying beneath existing walls, with lynchets to the south and south-west of the stud enclosure, two long earthwork sheephouses and associated enclosures to the south of the terraces, and further buildings to the east. A large rectangular dried-up tarn to the west of the stud was almost certainly the reason for the long-term landscape development at this location (Moorhouse 2003, 333).

2.7 Both the 1819 Askrigg Cow Close enclosure plan and the 1st edition 1856 Ordnance Survey 6" map mark "Slape Wath" to the north-west of Leas House, at the point where a bridle road crosses the beck. The Old Norse name elements 'ford' or 'wath', denoting a river or stream crossing, are by far the most commonly occurring examples of such relating to routeways. Such crossings were far more numerous in the medieval and earlier periods than they are today, and the identification of such points is important, for by implication they may identify routes leading to them. A common compound name is 'Slapewath', deriving from the Old English 'slippery, muddy' and Old Norse 'ford', hence a slippery ford. Such names are nearly always found on limestone and describe crossing points that could be slippery (Moorhouse 2003, 319). Hartley and Ingilby (1989, 157-158) note that the Slape Wath across the beck formed part of the long-distance pack-horse route, originated by the monks of Jervaux Abbey, between Lancaster and Richmond.

The Post-Medieval Period

2.8 Relatively little information relating to either of the survey areas or the West Mill complex has been uncovered for the early post-medieval period. However, Hartley and Ingilby (1989, 57-58) note some details for a corn mill near or on the site of the present West Mill in the 16th and 17th century. These details come from leases granted to men and women of Askrigg who sublet to the millers. For example, in 1555 Lucy Kettlewell rented the mill for 'a terme of 21 years if she lyve so longe'. When it was next let, to Peter Thornton for 30 years, it was said that the watercourse was obstructed by rocks falling into it from the cliff under which it ran, and that the stream could not be 'removed or brought anny other waye because

the ground nexte adjoyninge belongeth unto the Lord Scroope'. In 1607 a surveyor stated that 'the same Mylle is in greate decaie and of little valewe, by reason that it is driven by a small water cominge from the moors which in Somer tyme is cleane dryed up, and the current runneth neere a greate rockie hill, parte of which often falleth into the same current and stoppeth the passage thereof'. Repairs must have been carried out however, as a Edmund Pratt took a new lease and paid, in addition to the old rent, a new lamb valued at 6s 8d and a fine (which was usually demanded with a new lease) amounting to £13 6s 8d.

The 18th century

2.9 The earliest document noted during the research undertaken for this report dates to 12th October 1721, housed inside an envelope bearing the written inscription "Old Deed / 1721 / West Mill / Askrigg" (Blake collection). This is an indenture between Alexander Smith of Camshouse and John Forster, dyer, of Askrigg in the one part and Christopher Caygill, dyer, of Askrigg in the second part. However, it also records that in 1621 George Norton and Rowland Norton, his son (both of Dishforth) sold to John Forster, yeoman and father of the above dyer of the same name, *all that workhouse or Dying House situate standing and being on the Mill Green within the territory of Askrigg aforesaid containing twelve yards and a half or thereabouts in length and four yards and a half in breadth within the walls which was (sic) then lately before erected and built and then in the tenure or occupation of the sd. John Forster or his assigns ...* However, despite the words on the envelope, there is no specific reference to West Mill, or Mill Gill House. The precise location of Mill Green is not known, but there are numerous references to dyers in the township from the 16th century onwards, and in the 18th century the Caygills' dye-houses (Christopher Caygill is mentioned in the above document) were located on Mill Green (Hartley & Ingilby 1989, 231). It is believed that Mill Gill House was built in c.1721 (Prof. D Blake *pers. comm.*), and so perhaps two separate documents and their envelopes have become mixed up. However, as yet, there is no real evidence that Mill Gill House should be assigned such a specific date, and it is only possible to suggest that it was there by the mid 18th century (see below); a detailed survey of the house (which was beyond the scope of the current survey) may provide a more information of the date of construction.

2.10 Nevertheless, later documents of 1925 and 1952 (see below) record a previous indenture made on 22nd November 1754 detailing a 999 year lease between Thomas Errington of the first part, Christopher Caygill the younger of the second part and Gregory Ellsey of the third part for the 'messuage or dwelling house with the outbuildings, garden and appurtenances' (Blake collection). The order in which the names appear implies that Errington was the first occupant and Ellsey was the second, with Caygill being a partner. This is obviously Mill Gill House, and no details of the mill are noted. However, Hartley and Ingilby (1989, 122) note that the Terry family were the millers at West Mill in the late 18th century - John Terry was one of the largest landowners in the town, and his son James took over the mill on the death of his father.

2.11 In c.1784 or 1785, a cotton mill was established on the east bank of the Paddock Beck (downstream of Mill Gill) by John and Joseph Driver of Keighley and John Dinsdale of Nappa Hall, with a reservoir serving the mill constructed to the north-west, between the cotton mill and West Mill (Kershaw und.; Ingle 1997, 206-207). In c.1804, a second textile mill, the Low Mill, was built at Askrigg by Agnes Hastwell, the former wife of the aforementioned John Driver. The Low Mill was initially used for spinning and weaving wool (Kershaw und.), and was located close

to the east bank of the Paddock Beck where it was crossed by the road leading west out of Askrigg.

The 19th century

2.12 West Mill is sometimes ascribed an early to mid 19th century date, although the evidence on which this dating is based is not clear. It was certainly present in 1799, when the poet William Wordsworth undertook a walk to view Mill Gill Force. In a letter dated 24th-27th December 1799, written to Samuel Taylor Coleridge, Wordsworth described the visit thus:

After walking through two fields we came to a mill which we pass'd and in a moment a sweet little valley opened before us, with an area of grassy ground, and a stream dashing over various lamina of black rocks close under a bank covered with firs. The bank and stream on our left, another woody bank on our right, and the flat meadow in front from which, as at Buttermere, the stream had retired as it were to hide itself under the shade. As we walked up this delightful valley we were tempted to look back perpetually on the brook which reflected the orange light of the morning among the gloomy rocks with a brightness varying according to the agitation of the current. The steeple of Askrigg was between us and the east, at the bottom of the valley; it was not a quarter mile distant, but oh! how far we were from it. The two banks seemed to join before us with a facing of rock common to them both, when we reached this point the valley opened out again, two rocky banks on each side, which, hung with ivy and moss and fringed luxuriantly with brush-wood, ran directly parallel to each other and then approaching with a gentle curve, at their point of union presented a lofty waterfall, the termination of the valley (Hill 1984, 37).

2.13 The artist J M W Turner also visited Mill Gill, on Friday 26th July 1816, and returned the day afterwards. He produced several pencil sketches of the falls, and one watercolour. Climbing to the top of the waterfall, he dropped his sketchbook, covering a page with mud, but then returned down the gill to sketch the mill itself (Hill 1984, 48-51; reproduction in Blake collection; see figure 3). In the foreground, the sketch shows the forerunner of the existing footbridge carrying the footpath over Mill Gill, with the mill in the right-hand background. The mill is shown as a relatively large building with a pitched roof, with a launder leaving an abutment and running towards the western end of the north elevation, in a similar manner to the existing zinc launder; the church tower is clearly visible over the launder and a figure stands beneath it next to the mill. The presence of the launder and its relationship to the mill, even if only portrayed in outline, implies that, by the early 19th century, the waterwheel was positioned at its western end and was already enclosed, and that it was probably overshot.

2.14 By the mid 19th century, census returns, directories and cartographic depictions begin to aid interpretation of the surviving post-medieval earthworks and structures within the two survey areas. In 1829, a Ralph Addison is listed as a miller and corn dealer in Askrigg (Pigot 1829); this is the first reference to Ralph Addison, and he followed the Terrys as millers at West Mill (Hartley & Ingilby 1989, 146). The 1841 census returns record the occupants as being Ralph Addison (aged 60 - miller and farmer), his wife Mary (also aged 60), their children James (30) and Mary (20), and two farm servants, John Birkbeck (15) and Katherine Metcalf (15) (*www.dalesgenealogy.com/census/ask_41.html*; TNA HO107/1252/3 p10). By the time of the 1851 census, only Ralph Addision (now a widower) and his son James Pratt Addison were listed at the mill (*www.dalesgenealogy.com/census/ask_51.html*; TNA HO107/3280 p24).

2.15 The 1839 tithe map for Askrigg provides the first detailed cartographic depiction of the township. West Mill is depicted as a small collection of three buildings, within an enclosure numbered 42 which corresponds to 'Mill House etc' on the apportionment (see figure 4). The mill is shown on the west side of the complex as a right-angled structure with a line representing the mill leat entering the lower half from the west, and the house lies adjacent to the beck. Between these two buildings is a small square structure which is difficult to identify and marry with later cartographic depictions. It might, for example, represent the east half of the present kiln range, which has been identified as being an early element within the mill complex (see Chapter 7). Of perhaps more significance is the fact that the tithe map does not depict the mill pond to the west of the mill, although the leat is shown in some detail, and another mill pond associated with a separate flax mill is shown to the east of West Mill (see below). Any detailed interpretation and analysis of features shown on a tithe map is always problematic, as the maps were being drawn for a specific purpose and it was not always necessary to record all features; in some cases, buildings known to have been in existence are missed off the maps. However, the fact that the leat and associated watercourses, as well as the other pond to the east, are shown does imply that the West Mill pond had not yet been constructed. The 1839 tithe map also notes that the mill complex was occupied by Ralph Addison, who also held fields 13 and 14 to the north-west of the mill as well as two other fields to the north and east of the village; the owner of the mill complex was Earl de Grey.

2.16 The more accurate 1856 Ordnance Survey 6" to 1 mile map marks "Slape Wath" to the north-west of Leas House, at the point where a bridle road crosses the beck (see figure 5). To the west of the beck, the road runs west for a short distance before turning south towards Helm as an enclosed trackway. To the east of the beck, the road follows a south-easterly line, turning gently to the north-east at a point just to the north of Leas House and then ascending steeply rising ground towards Low Straits Lane. A watercourse leaves the west side of a well marked to the immediate north-east of Leas House, and runs north-west parallel to the bridle road, before curving around to the south-west and entering the beck. As noted above, the bridle road, which has medieval origins, represents part of a long distance route between Lancaster and Richmond.

2.17 To the north-west of West Mill, a "weir" is marked where the leat supplying the mill pond is taken off Mill Gill (see figure 6). The leat follows a sinuous course south-east towards the mill pond, which took the form of an elongated oval. The head race of the mill left the south-east end of the pond and was initially formed again by a narrow leat which then widened to become a narrow linear pond immediately to the north-west of the mill complex. A footpath crossed or wound its way around the south-east end of the lower pond, leading to a "Foot Bridge" over Mill Gill. A bypass or overflow leat also left the south-east end of the pond and drained into Mill Gill. The mill is named as "West Mill (Corn)" and is shown as a sub-square building with a small projection at the south-east corner (see figure 6). There was a long, apparently separate, range to the immediate south-east of the mill, with a smaller structure beyond this, opposite the mill house. The complex was reached via Mill Lane, an enclosed trackway leaving the western side of Askrigg.

2.18 Two further mills are shown to the south of Mill Lane in 1856 (see figure 5). A sub-triangular earthwork, named as "Old Reservoir", lies to the north-west of the cotton mill established in c.1785. By 1856 this building is named as a "Flax Mill"; it had been offered for sale in 1814 but was turned over to flax spinning in about 1820 (Ingle 1997, 206-207). Either the water supply system or internal machinery had presumably been changed, causing the former reservoir to become redundant.

Further south, a sub-rectangular enclosure labeled “Dam” is shown, with a leat leading to Low Mill, marked as corn mill by this date.

2.19 The 1851 census was taken on 30th March, and on 29th December 1851 Ralph Addison died. His son, James Pratt Addison, took over the corn milling business, and the 1861 census records that he (now aged 52 and described as a ‘corn miller’) occupied West Mill, together with his wife Rose Mary (aged 37), their two daughters, Margaret Rose (3) and Mary Ann (1 month), and two others, Alexander Tiplady (16 - a carter) and Isabell Batty (18 - a dairymaid) (*www.dalesgenealogy.com/census/ask_61.html* ; TNA RG9/3670, p19).

2.20 In July 1864, an assignment was made between William Pratt, farmer, and his wife Mary Ann, of Nappa House near Askrigg and James Pratt Addison, farmer, of West Mill, Askrigg (Blake collection). The document shows that Ralph Addison, yeoman (deceased) of West Mill, by the terms of his will dated December 1849, had equally divided his dwelling house, garden outbuildings and appurtenances near West Mill between his son James Pratt Addison and his daughter Mary Ann, wife of William Pratt, as tenants in common. At the time of his death in 1851, Ralph Addison was in occupation of the dwelling house for the residue of a term of 999 years created by an indenture dated November 1754 between Thomas Errington, Christopher Caygill the younger and Gregory Ellsey (see above). The 1852 probate of the will of Ralph Addison (Blake collection) confirms the details set out in the 1864 assignment. This 1864 assignment records the fact that James bought his sister’s half share of the tenancy for £50.

2.21 James Pratt Addison died on the 26th January 1869, and was described in a Residuary Account of the Inland Revenue as a ‘Corn Miller and Gamekeeper’ late of West Mill, Askrigg. He was survived by his widow Rose and their four children, Margaret Rose, Mary Ann, Elizabeth and Ralph (Blake collection). James died intestate, and in the administration document of the Court of Probate dated 15th March 1869 he was again described as a corn miller and gamekeeper (Blake collection).

2.22 James Addison’s death in January 1869 is reflected in the 1871 census returns, when Rose M Addison (aged 42) is recorded as being a miller employing one man. Also living at West Mill at this time were Margaret R Addison (13), Mary A Addison (11), Elizabeth Addison (10) and Ralph Addison (8), all described as ‘scholars’, as well as John Johnson (aged 20 and a miller) (*www.dalesgenealogy.com/census/ask_71.html*). By 1881, James Addison’s son, Ralph P Addison, had taken over the business. Although only 18, he is listed as the head of the family and is described as a miller and farmer of 20 acres. Also at West Mill with him were his sister, Mary A Shields (aged 21 and described as an ‘Indian Railway Engineer’s wife’) and his nephew, James A Shields (aged 2 from Leeds) (TNA RG11/4875 p1).

2.23 According to Kershaw (und.), William Handley (W H) Burton (1853-1937) established a hay-rake manufacturing business at West Mill in 1887, the products being widely distributed over the north of England; the mill must have therefore ceased to be used for corn milling at some point between 1881 and 1887. William Handley Burton is listed as a ‘joiner and sawmill’ at West Mill in 1890 (Bulmer’s 1890 Directory). Although horse-drawn hay-rakes had been known since the late 18th and early 19th centuries (Fussell 1952, 139-151), manual hay-rakes continued in use into the mid 20th century - the central importance of haymaking to the agriculture of Wensleydale and the wider Dales was emphasised by Hartley and Ingilby (1981, 122-129). Kershaw also states that the woodworking machinery

was designed and constructed by William's father, and was driven by the mill's overshot waterwheel which also powered 'traditional' corn milling equipment (Kershaw und.). However, Hartley and Ingilby (1981, 132) state that the machinery was bought from Prospect Mill in Hawes.

2.24 By the time that the 1891 census returns were compiled, there is no further mention of corn milling at West Mill. At this time, William H Burton (aged 38 and described as a joiner and builder born in Garsdale) was the head of the family and he lived at West Mill with his wife Mary (34), two sons (Ernest aged 14 and William aged 8), one daughter (Annie aged 3) and John H Cliffe, a 20 year old border described as a joiner (journeyman); Ernest was also described as an apprentice joiner (TNA RG12/4032 p1).

2.25 The 1893 Ordnance Survey map, which labels the building complex as "West Saw Mill", shows that a number of changes had taken place since 1856 (see figure 7). The main body of the mill had a rather squat, irregular L-shaped plan, with a small projection from the north side. The range to the immediate south-east was now continuous with the mill. As in 1856, the main access to West Mill was from the east along Mill Lane. Further upstream in the beck, "Sluices" are marked together with a "Weir" which diverted water into a long "Mill Race" - this has a sinuous route to the south-east, passing beneath a wall and underneath a footpath/track which runs along the north side of the beck, before entering the "Mill Dam" or pond, which has the same overall form as in 1856. The head race is then shown continuing east to feed water into the mill via an "Aqueduct".

The 20th century

2.26 According to several sources, following a conversation with some Lancashire electrical engineers regarding hydro schemes using mountain streams in Italy to generate electricity, William Handley Burton envisaged setting up a similar scheme using Mill Gill Force (Kershaw und.; Matkin 1978). There is also anecdotal evidence that John William Handley of Askrigg (b.1871), possibly a cousin of W H Burton, had been taught how to generate electricity from water power at Yorebridge Grammar School in Askrigg in the 1880s, and that he had experimented in West Mill, putting up the first two electric lights in 1906 (Hay 2000, 38-39). William Handley Burton's son, Ernest Burton (1887-1959), stated that by using the overshot waterwheel at West Mill in 1908, Mill Gill House became the first house in Wensleydale to be lit by electricity, although the exact manner of generation is not made clear (Kershaw und.); presumably a dynamo was driven directly by the waterwheel, as had taken place at Godalming in Surrey in 1881 (Hay 2000, 35).

2.27 Although it is now difficult to verify the accuracy of some of these early accounts, documentary records show that in December 1908 William Handley Burton paid £10 to Abram Scarr and Isabella de Winton for land, water rights and grant of an easement, water rights and permission to lay a pipeline, which was to run to a small power house subsequently built by him in 1909 below Mill Gill Force. By the terms of the indenture, Burton (described as a 'builder') purchased a piece of land c.26 yards square "being part of and near to the north west corner of a certain close of land known by the name of 'Slapewath'" (marked 'A' on the accompanying plan - see figure 8). He was also allowed to divert water from the Askrigg Beck by constructing a dam, and to lay a "main or pipe below the surface of the land" to convey water to his "manufactory or works near to Mill Gill", at which point it was returned to the stream. The surface of the pipe or main was to lay not less than one foot below the ground surface and Burton was to provide a free supply of

water to the land through which it passed for the purposes of watering cattle. The plan accompanying the indenture also shows the route of the pipe or main through the two fields between Leas (Lease) House and Mill Gill (Blake collection). Just a few months later, a letter from his landlord, Robert Charles de Grey Vyner of Newby Hall, dated 1st July 1909, allowed Burton to erect "at his own expense a small stone and slate building to contain the motor which was for the purpose of working the machinery" (Hay 2000, 39).

2.28 The weir and small collection chamber above Mill Gill Force had been installed by 1910. A cast-iron pipe, laid in a trench cut into the sides of the gorge below Mill Gill Force, descended some 40m to the power house (Kershaw und.; Hay 2000, 39). An early photograph of the power house, taken before the building was subsequently extended in c.1913 (see below), provides valuable evidence as to its original appearance (Kershaw, und.) (see figure 9). The photograph shows a small, single storey building, with an unevenly pitched stone slated roof. A large stove-type circular flue rises from the west end of the south slope, from a small domed projection. There is a doorway in the east gable and a single large window in the south wall; the upper light of the window frame contains eight panes (two rows of four) but the lower light appears to be boarded. A low level opening can be seen beneath the window. To the front of the power house, the embanked leat forming the mill race for West Mill can be seen, as well as the regular stonework forming the weir of the mill race. Behind the power house, the cast-iron pipe descending the north slope of Mill Gill on the east side of a drystone wall is clearly visible. Close to the lower end of the pipe, there are two poles carrying electricity from the power house towards West Mill.

2.29 The power house was originally equipped with a 1910 16 hp Gilkes Vortex Special turbine (number 2105) with an 8½ inch runner, consuming 90 cubic feet of water per minute at 126 feet head at a speed of 1600 rpm. The turbine drove a Westinghouse direct-drive 12kW DC 110 volt generator, employing a Gilbert Gilkes 4½ inch self-contained hydraulic speed governor. The overall efficiency was claimed to be about 80% (Kershaw, und.; Matkin 1978). A second photograph, apparently taken in c.1910, shows what Kershaw (und.) terms the 'forbay' (collection chamber) above Mill Gill Force under construction (see figure 9). The chamber was constructed adjacent to a small existing barn, west of Leas House, close to a footbridge across the beck, and both barn and footbridge are prominent in the foreground of the photograph. The drop over the weir is just visible, as is the gang of men working on the chamber. Two large timbers are placed across the beck adjacent to the where the men are working (Kershaw, und.; Hay 2000, 47). A third photograph, again seen only as a reproduction, shows the pipeline to the power house under construction (reproduction in Blake collection) (see figure 9).

2.30 With his supply of water secure, Burton was able to start producing electricity. On the 23rd September 1909 he offered to provide street lighting for £12 per annum to Askrigg Parish Council, but it was not until a year later that the council agreed to the proposal, at an increased cost of £14 per annum. As a result, in 1910, Askrigg became the first village in Wensleydale, and indeed one of the earliest in the country, to have its own public electricity supply. As well as providing electricity for street and domestic lighting in Askrigg, Burton also supplied electric lighting for West Mill and Mill Gill House; one source additionally states that the mill machinery was also converted to be driven electrically at an early date (Hartley & Ingilby 1981, 132).

2.31 Some of these innovations can be seen on the 1912 Ordnance Survey 6" to 1 mile map (see figure 10). Both the chamber and weir are marked to the west of Leas

House, but they are not named or otherwise distinguished on the map. The pipe connecting the chamber to the pipe feeding the power house turbine must have been buried, as it is not shown. The wall adjacent to the turbine pipe passes through an area of outcrops, shown as "Old Quarry", towards the power house. The power house, and the quarry, were accessed by a footpath or track running parallel to Mill Gill from West Mill. A branch diverted from the main route down the short slope to the power house, which is shown as a small square building. In the adjacent beck, a weir with a sluice at the western end diverted water into the mill race for West Mill. This followed a sinuous line south-east, named as "Mill Race", passing beneath a wall and underneath the footpath/track before entering the "Mill Dam" or pond, which has the same overall form as in 1856. A "Sluice" at the east end fed water into the mill's headrace. To the south-east of the dam, a small rectangular building had been built since 1856, and the race was culverted adjacent to this. It then re-emerged to pass into the small pond shown in 1856, which ran along the top of a substantial embankment. The pond passed beneath a field wall and had a "Sl" (sluice) marked at the point where it entered an "Aqueduct", which in turn entered the mill.

2.32 The 1911 census notes that William Handley Burton was now described as a 58 year old builder and contractor, and he lived at West Mill with his wife Mary Isabel (54), his son William Burton (28 - assistant in business), his daughter Annie Burton (23) and a 15 year old general servant, Elizabeth Annie Oxley from Darlington; his other son Ernest was by now living at The Lodge in Askrigg with his wife Mary Ellen (*www.dalesgenealogy.com/census/ask11.html*).

2.33 In 1912, West Mill is marked as "West Saw Mill", and it is largely as depicted in 1893 (see figure 10). However, the main body of the mill had a structure built in its south-west angle, and there was a small open-fronted shed just to the north-west of the mill house, which must have somewhat restricted access into the complex. The flax mill and reservoir to the south of Mill Lane are both marked as 'Old' in 1912, indicating that the mill too had become disused.

2.34 In 1913, William Handley Burton, and his two sons Ernest (d. 1952) and William (d. 1964) were trading not only as hay-rake manufacturers but also as electrical engineers. In the same year, improvements were made to the water supply system to the power house, presumably due to the lack of a buffer storage facility in the original system to cope with short-term peak demands and also clogging of the inlet screen by debris and ice (Hay 2000, 39). Under the terms of a conveyance dated 29th October 1913, Burton transferred the original land, water rights and pipeline wayleave to the aforementioned de Grey Vyner Esq for 10 shillings (Blake collection) (see figure 11). Under the terms of another conveyance dated the day afterwards, de Grey Vyner then paid £50 for ¼ acre of land and grant of easements from Abram Scarr and Isabella de Winton to improve the water supply by taking water off the beck slightly further upstream via a culvert or pipe and to construct a new dam (reservoir) which then connected to the old collection chamber via a new pipeline; these works are shown on the plan accompanying the indenture (Blake collection) (see figure 12). Not only did de Grey Vyner pay the £50, but he also undertook the works - the relative sums involved imply that the Burtons' landlord had a significant capital investment in their hydro-electric scheme (Hay 2000, 39). De Grey Vyner owned the site of the power house and West Mill itself, and so it was presumably to his commercial advantage to encourage the electrical enterprise to develop. As a result of the improved water supply, the turbine was apparently duplicated, the power house in Mill Gill was extended (Hay 2000, 39) and, at a later date, two 45 hp (33.5 kW) National oil engines driving dynamos were installed to supplement the hydro system (Kershaw und.; Hay 2000,

48). It is difficult to know what 'duplicated' means in terms of the turbine - it may mean a second plant rather than a second turbine. In 1914, de Grey Vyner also used the new reservoir at Slape Wath to improve the agricultural water supply for his other tenants in the fields to the east of Leas House (Blake collection).

2.35 By 1915, the Askrigg Electric Light Company, with William Handley Burton as the managing director, was advertising 'Hydroelectric lighting schemes, country house installations, petrol or oil engines supplied where no water power is available', and encouraging customers to 'Save your decorations by installing electric light .. see samples in our show room at Reeth' (Hay 2000, 39-40). A surviving receipt from the company, dated Mayday (May 1st) 1917, shows that the Rev. F M Squibb paid £2 13s for 677 units (less 590), presumably for lighting Askrigg church (Blake collection) (see figure 13).

2.36 The works at Askrigg were only one of the local electricity generating schemes with which the Burton family were involved, which in turn formed part of a wider contemporary movement for electricity generation via water power in Wensleydale, Swaledale and Wharfedale. At around the same time as he was building the power house in Mill Gill, William Handley Burton had also purchased a water corn mill on the Arkle Beck at Reeth in Swaledale and in 1911 he installed a Gilkes Trent turbine (number 2201) driving a 110 volt DC generator for lighting in the village (Matkin 1978). On the 1912 Ordnance Survey map, this mill was marked as an 'electric light station' (Hay 2000, 39). In addition, in 1914, William Handley Burton had installed a Gilkes Vortex turbine at Bainbridge High Mill for the Bainbridge Electric Lighting Company, and 1917 W H Burton and Sons were employed at Gayle Mill to install, on behalf of the Hawes Electric Lighting Company, a twin flywheel gas engine with a belt drive to a dynamo inside the mill; W H Burton was injured in the course of these works (Hay 2000, 41 & 43). In 1927, the Burtons had installed hydro-electric plant in a mill at Wensley (Hay 2000, 47). Furthermore, Hay (2000, 42) notes that in 1930 the 'Burton Brothers' took over the Aysgarth Electric Lighting Company, but it is not clear if this refers to the same family. A surviving Gilkes Turgo impulse turbine at Walk Mill in Leyburn has the name 'Askrigg Lighting Co. Askrigg' on the casing, an unusual feature implying that the Burton family were involved in its installation (Hay 2000, 46 & 51).

2.37 It is clear from the available documentary material that the Burton family were at the height of their power in the first half of the 1920s. Although Mill Gill House remained in the tenancy of the Addison family, the Burtons lived in it and tenanted the adjacent mill complex from the Newby Hall estate. However, in 1925, Ralph Addison was thinking of selling the house. A letter from him to a Mr Dale, dated 28th March 1925, states:
Dear Sir, I must apologise for not answering your letter before, I had to put the matter before my sisters. I thank you for the offer made on behalf of Captain Crompton, taking everything into consideration I consider the sum too small. If you think we could approach some settlement and if convenient to you I should be pleased to see you at your office any day this week. I think we might come to some terms as I should like to have the matter settled, should you consider my proposal favourably. Would you please let me know what day and hour would suit you. Believe me Sir,
Yours very faithfully, R Addison (Blake collection).

2.38 A further letter from Ralph Addison to Ernest Burton, dated 9th July 1925, states:
Dear Sir,
I must apologise for not replying to your letter before but the fact was I could not make up my mind to part with the place, however I have decided to take the price

you offered in your last litter (sic) namely £310 I should be very much obliged if we could get the matter settled as soon as possible trusting this will meet with your favour,
I am yours very faithfully, R Addison (Blake collection).

2.39 A subsequent assignment between Ralph Addison and his sisters (Mary Anne Leggett and Elizabeth Addison) and Ernest Burton, dated 26th July 1925, confirms that Burton bought the remainder of the 999 year leasehold for £310 - the property was described as the "messuage or dwelling house with the outbuildings, garden and appurtenances thereto belonging situate and being near to West Mill Askrigg in the County of York now in the occupation of W H Burton and Sons" (Blake collection). A few months earlier, in September 1924, Ernest Burton had bought 44 acres of meadow land (comprising 16 fields and including various cowsheds and barns) around the complex from Mrs Barbara Bell for £1,800 (Blake collection); Ernest Burton was charged £35 17s 6d for solicitor's fees for preparing and completing the necessary paperwork (Blake collection).

2.40 By the terms of another conveyance dated September 1933, Ernest Burton then bought 14 acres of land in Mill Gill to the north-west of the mill complex from the Newby Hall Estate for £600 (Blake collection). Included in this sale were *the corn mill and saw mill and buildings, dams, ponds and sluices situate thereon or held therewith and also all such water rights and the vendors may be entitled to in respect of the said corn mill. All which premises are now in the occupation of the Purchaser*. In other words, the Burtons had finally bought the mill complex which they had been occupying and working since at least 1829.

2.41 In the late 1920s, the Burton family began to face competition from larger, regional electricity producers. The Newcastle upon Tyne Electricity Supply Company (NESCo), founded in 1889 by industrialist John Theodore Metz, had pioneered a grid distribution system in the north-east of England from 1909 onwards, based on its coal-fired power stations; in 1932 it was renamed as the North Eastern Electric Supply Company as it expanded supply across the north-east. In 1928, the NESCo proposed a bill to supply electricity to the North Riding of Yorkshire, which was strongly opposed by the Burtons. The eventual result was the Askrigg and Reeth Electricity Special Order 1929, which empowered the Burtons to supply electricity to the Askrigg and Reeth areas. In 1932, the Askrigg and Reeth Electricity Supply Company was formed, again with William Handley Burton as the managing director. Surviving receipts from 1933 show that the cost of electricity to the customer was 8d per unit, decreasing to 7d after the first 27 units (Matkin 1978); Hartley and Ingilby (1989, 195) say that 6d a unit was charged. The company changed its supply from 110 volt DC to 230v/50Hz AC 3 phase and neutral supply, to comply with the NESCo standard; other local supply companies which had not opposed NESCo continued to supply their customers with direct current, backed up by storage batteries. Given that dynamos cannot generate AC current, only DC, this change in supply must have necessitated changes to both the equipment of the power house (i.e. the installation of alternator/s) and the means of distribution.

2.42 An important archive of bills and other documentary material relating to the Burtons' improvements covers the period c.1915 to c.1958 (Blake collection). Clearly not all of the paperwork necessarily relates to the Mill Gill power house, or indeed even to Askrigg, but it is significant that the majority of the surviving documents are concentrated in two periods, c.1915 to 1922 and c.1942 to 1944.

2.43 Commencing with the first period, in 1915, the Askrigg Electric Supply Company paid the Waverley Engineering Works in Edinburgh £2 for repairs, and in April 1919 £2 13s was paid to Callender's Cable and Construction Company Ltd., who are described as engineers, cable manufacturers and contractors. In the same month, they bought wooden electric casings worth £4 11s from Beechcroft and Wightman Ltd. of Bradford, and in July 1919 a further £4 10s was paid to the same firm. In August 1919, goods worth £34 were purchased from A P Lundberg and Sons, Electrical Accessories Manufacturers of London, with a further £11 in February 1920 and £1 19s in September 1920, the bill carrying a query regarding '2 way switches'. More significantly, in April 1920, the Askrigg Electric Lighting Company Ltd. bought £280 worth of electric plant comprising 'Engine, Dynamo, Switchboard and Battery, Shafting Plummer Blocks, shafting, pulleys etc' from Church Brothers, Electrical Engineers and Contractors of Chertsey (see figure 13), and in September 1920, goods worth £44 were purchased from the Batley Engineering and Wrought-Iron Pulley Company Ltd. In April 1922, they paid £3 to Garnet Tucker and Company of Glasgow for 'Fitting Mavor & Coulson Dynamo No. 1264 with 4 carbon (brushes?) complete with brush holders and spindle' (see figure 13), and in the same year, a further £5 9s went again to Callender's Cable and Construction Company Ltd.

2.44 There is then a gap in the documentary material until 1940, when payments relating to electrical matters recommence. This gap is interesting, for in a conveyance dated September 1933 (see below), there is no mention of any electricity works; the complex is described as the "corn mill and saw mill and buildings dams ponds and sluices situate thereon" (Blake collection). It may be that the electricity part of the business took a back seat at this time. However, in October 1940, W H Burton and Sons again made a payment of £41 to Callender's Cable and Construction Company Ltd. In 1942, a case was sent to Pritchett and Gold and EPS Ltd, manufacturers of Storage Batteries in Essex. However, the most important of all the surviving documentation is a typed account dated February 1943, documenting work undertaken in November and December 1942 (Blake collection) (see figure 14). This unquestionably relates to the power house in Mill Gill, and is as follows:

Brought forward	42	0	9
Nov 14 Two men at top dam		14	6
21 Getting Engine Block from the Station and up Gill		10	6
22 23 24 Getting Engine into house and work on engine etc	3	3	0
6 new lamps for power house		12	0
4 new D, P, Swt and fuses for Reeth and Carr	1	2	0
Paid Gilks for new parts for Governor	2	6	6
Paid Carriage on Empty Barrels		3	3
Decm Carting oil up Gill		7	6
Pipes for Ruston Air Starter and for Air Compressor	1	4	0
32 ft 1¼ @ 9d			
One Tee One Union and three bends		12	6
25 Ft ¾		10	7
7 fittings at 1/-		7	0
One ¾ union and 3 Fullway valves	1	4	0
One T and 2 Plugs		2	6
46 ft of 7 x 2½ costprice 10½	2	0	3
20 ft 6 x (?) costprice 10½		17	6
103 ft 5 x 1 costprice 3½	1	7	11
8 six inch bolts and 3 six inch coach screws		3	4
9 ft of 1¼ x 4 and one bag of cement		6	9
	59	16	4

2.45 Subsequent to these works, more monies were laid out in 1944. In January, the National Gas and Oil Engine Company Ltd. of Ashton-under-Lyne was paid £9 8s (see figure 15) and a further £101 in October 1944. In February, the No-Val Engineering Company Ltd., Hydraulic and General Engineers, were paid just over £8. In April, W H Burton and Sons bought £7 3s worth of goods from Stephens Belting Company Ltd. of Birmingham (see figure 15), while in the same month, they paid Captain Whitehead of Thornton Rust the sum of £31 15s for 'one second hand engine' and a block (see figure 15), and also dispatched a dynamo to the B A Winding Company via Bradford Valley station on the London and North Eastern Railway (see figure 16). In May, W H Burton and Sons made a payment of £7 15s to Crofts (Engineers) Ltd. of Bradford and in June they bought 50 gallons of burning oil from the Petroleum Board. In September, the large payment of £117 was made to the Tudor Accumulator Company Ltd, Dukinfield; on the16th April of the same year, W H Burton and Sons had dispatched either a battery or two 'R/Eng cases' from Askrigg to the firm via the London and North Eastern Railway, and in May they had paid £22 to the same firm. In October 1944, a payment of £13 16s was made to J H Tucker & Company Ltd. of Birmingham. In the same month, £18 12s was paid to Ideal Boilers and Radiators Ltd. in Hull. In December 1944, goods worth £5 7s were purchased from the Bowthorpe Electrical Company Ltd., Oxford.

2.46 The Askrigg and Reeth Electricity Supply Company maintained about 100 customers in 1948, although the supply was sometime erratic - its cost was said to prevent it being used for cooking and radiators (Pontefract & Hartley 1942, 66). However, as a result of the nationalisation of supply and distribution following the 1947 Electricity Act, a Reeth sub-station was commissioned in 1946 and an Askrigg sub-station in 1949, causing the closure of the Burtons' schemes at Askrigg and Reeth. Nevertheless, the family maintained their connection with electricity generation, Ernest Burton becoming 'Chief Executive Officer of the National Electricity Board, Askrigg Area', while his nephew, another William Handley Burton, began five years employment as a supervisor at Reeth (Kershaw, und.; Hay 2000, 39-41). Ernest Burton was subsequently involved in ensuring that adequate compensation was paid to the owners of some of the small electricity generating companies in Wensleydale for 'loss of their business as a going concern in the open market' (Hay 2000, 43). The aforementioned William appears to have also maintained his own business; on a bill dated December 1952, W Handley Burton and Son are described on a billhead as 'Electrical Engineers & Contractors, Radio & TV based at High Row, Reeth, Richmond, Yorkshire'. Their business was both domestic and commercial, and demonstrations could be arranged. Fluorescent lighting was a speciality and they also undertook the installation of 'Private Plant for Country House Lighting' (Blake collection). The great grandson of William Handley Burton now runs Maxwell's of Northallerton, a supplier of electrical products (*www.maxwellselectrical.co.uk*).

2.47 Despite their ventures into hydro-electricity, hay-rake making remained an important business at West Mill. In September 1919, William Handley Burton of 'Mill Gill Saw Mill' purchased £22 worth of goods from Mitchell Brothers, timber merchants and mangle roller manufacturers, Liverpool. In 1926, Ernest Burton was supplied with 57 roofing tiles and 22 feet of ridging by Robert Abraham of Askrigg, perhaps relating to works in or around the mill complex. In 1934, 6 tons 18 cwts of lime were purchased by 'E & W Burton Mill' from W Banks of Askrigg, although the purpose of the purchase is uncertain. In January 1944, the Askrigg and Reeth Electric Supply Company Limited sold 124 gallons of Pool Gas Oil to Messrs Ernest Burton & Son, West Mill, Askrigg, suggesting that they may by then have made use of an oil engine in the mill complex (Blake collection). In the

1930s, Ernest Burton and his father were turning out between 5,000 and 12,000 rakes a year, and on one machine Ernest remembered making 1,000 rake shafts in a single day. The rakes were sold as far afield as Beverley and Newcastle (Hartley & Ingilby 1981, 132). A surviving London and North Eastern Railway receipt notes that on the 9th May 1944, 3,800 6ft rake handles and 285 4ft rake handles were sent to R Launder via West Hartlepool station (Blake collection) (see figure 16). Transport was evidently not always trouble free; a card from Hardy and Holgate Ltd., Ironmongers, York, dating to 1921, states: *Dear Sir, one of the rakes has arrived broken to pieces. None of the others are badly damaged (a few teeth out here and there). Shall we claim from NER Co for this one or will you allow for it*. (Blake collection).

2.48 Hay-rake making was also carried on in Dent, and Hartley and Ingilby (1981, 132-33, plates 162-6) contains a very valuable illustrated account of the process based on observations made in the 1960s, as follows:

At Dent Town Mr R. Haygarth, joiner and undertaker, still makes about forty-five dozen a year. Up to 1930 when it was usual to see joiners standing selling hayrakes at local markets, two other men in Dent earned a living making them working full time all year round. Just as the large scythes have gone, so rakes with sixteen to eighteen teeth have been superseded by the twelve-tooth head. In 1900 a hayrake with a pitch-pine shaft sold for 10d. Now one with a Douglas fir handle (pitch-pine would be prohibitive) costs 8s. 6d.
Bought from local farmers, about a dozen straight strong ash trees, growing in open woodland, are felled each year. The best grained wood is reserved for rake bows, and the rest kept for the heads. English elm, from trees whose boles should not be more than 9 ins. to 10 ins. in diameter, is suitable for the teeth. Shafts, formerly cut in the workshop and rounded with the rounding plane, were turned out eight per hour. At first worked by a large paraffin engine and then by electricity, machinery is now used. To make bows lengths of wood are steam heated for thirty minutes, bent with a bow bending jig and then bent over the former, a smooth even log about 10 ins. in diameter, and lastly stored on racks.
Finally, the three main parts of the rake – the shaft, head and bow – are quickly fitted together, the finished rakes bound up in bundles of six, and dispatched for sale.

2.49 It is not absolutely certain when hay-rake making ceased at West Mill, but joinery and associated activities clearly continued in the late 1950s; in August 1957, W H Burton and Sons, 'Joiners, West Mills' bought £2 11s worth of Ovoline E H Motor Oil and Ovoline Spring Oil (Blake collection). The Burton family also appear to have been involved in breeding poultry. In May 1944, they bought chicks to the value of £6 16s from Hill Top Poultry Farm at Patrick Brompton, and in October of the same year, Mr J Chamberlain of Morecambe wrote to one of the Burtons stating: *Thanks for your letter and cheque for £15 in payment for the 12 pullets. I received it yesterday afternoon. The fowls left on the 2.25pm passenger train today and I trust will reach Aysgarth safely. They should do well*. At least one of the birds concerned was a Gloucester. In 1957 Mr Alderson of West Borrins purchased 18 pullets, six cocks and a number of six month old birds from them; at this date, the family still traded under the name of W H Burton and Sons, and the partners are given as E Burton, E D Burton and I Burton (Blake collection) (see figure 16).

2.50 In 1952, Ernest Burton (still described as an 'electrician') sold Mill Gill House to Mary Isabel Morgan, together with the land forming the Mill Gill survey area. However, the 'corn mill and saw mill' were excepted from the agreement, as were

the ‘dams ponds and sluices’ supplying them (Blake collection). Ernest Burton died in January 1959. Mary Isabel Morgan subsequently sold Mill Gill House (formerly West Mill) to Clifford Crisp in August 1969 - the sale also included easements and appurtenances, the washhouse on the north side of the mill yard, and 11.94 acres of land on the north side of the beck; the complex of mill buildings were excluded although the mill ponds and races were included (Blake collection). Clifford Crisp then purchased the mill complex (described as ‘the Corn Mill Saw Mill Joiner’s Shop and the building known as ‘The Stores’’), as well as the hydro collection chamber and pond to the west of Leas House, from Muriel Burton, Ernest Dixon Burton’s widow, in October 1971 (Blake collection). It was therefore at this point that the Mill Gill and the West Mill complex were joined together under a single ownership. In August 1974, Mill Gill House and the West Mill complex were then sold by Clifford Crisp to Terence and Judith Hodson (Blake collection).

2.51 An aerial photograph taken of the complex in 1979 is particularly useful, in that there was at this time little tree cover along the adjacent part of the Gill, and it also shows several structures since demolished (Blake collection) (see figure 17). One now demolished part of the mill was also illustrated by Pontefract and Hartley (1942, 65) (see figure 18). These details are discussed further in the relevant descriptive chapters below. The property was bought by the current owners in September 1984, and again, photographs taken at the time are useful in assessing the form of the building prior to any modern repair works (Blake collection) (see figure 17).

3 DESCRIPTION OF LEAS HOUSE SURVEY AREA

Introduction

3.1 The Leas House survey area lies within a larger pasture field, lying to the west of the farm and located between the base of the steep, south-east facing natural slope descending from Low Straits Lane to the north and the beck to the south (see figure 2) (see plate 1). Modern Ordnance Survey maps name the beck as Whitfield Gill, and this name is used in the following description and figures. Leas House was also previously called 'Lease House', although the modern name is used here (e.g. see figure 8).

3.2 The survey area has maximum dimensions of c.280m south-east/north-west by c.110m north-east/south-west (1.1711 ha); the north-east side is not quite continuous with the area to the east of Leas House previously surveyed by Moorhouse (2003, 332-333). Within the survey area, the ground surface falls from 275m AOD to c.268m AOD from north to south. The survey area has no artificial boundary to the north side, but is bounded to the east and west by drystone walls, and to the south by the beck. The larger pasture field is named as "Allotment", occupied by William Lambert and owned by Ralph Terry, in the 1839 tithe map.

3.3 It should be noted that the survey area contains many complex and discrete earthworks, likely to belong to many different phases of activity and with some almost certainly re-used in different periods for different purposes. It is sometimes difficult, and indeed might be considered erroneous without further research and investigation, to place the earthworks within anything other than a broad chronological framework (e.g. medieval, early medieval, later post-medieval, modern) - it should also be stressed that the assignment of a particular earthwork to one of these periods is based on a combination of available documentary sources, the plan form of the earthwork and its relationship to other features, and professional judgement. When considering the following description, reference should be made to figure 20 which depicts the recorded earthworks.

The Pre-Medieval Period

Field system

3.4 In the northern limit of the survey area, there are two parallel banked and ditched boundaries (**Site 5**), on a general north-south alignment and set 26m apart. The north-western boundary is the better preserved, comprising a 1m wide spread bank with a slightly wider 0.50m deep ditch on the east side. This ditch can be traced further south than the bank, and both may be disturbed by low, parallel east facing scarps cut into the natural slope here. The south-eastern boundary is less well defined but its ditch also runs further south than the bank, towards the western end of a group of possible structures (see Site 3 below). Both boundaries continue for some distance up the natural slope to the north-east [*4/988, 4/989*] where they are linked by cross-boundaries, forming fields or enclosures with a pattern suggestive of being a fragment of a once large co-axial system. Some of these boundaries are shown on the YDNPA HER, plotted from aerial photographs.

The Medieval and Early Post-Medieval Periods

Routeways

3.5 As has already been noted in Chapter 2 above, previous survey by Moorhouse suggests that a horse stud, located within a larger sheephouse enclosure possibly belonging to Jervaulx Abbey, was located to the east and south of the existing Leas House. Jervaulx Abbey had two documented vaccaries in the area to the immediate south-west of Whitfield Gill, and on the 1856 Ordnance Survey map a bridle path runs between the two (see figure 5). In addition, where this bridle path crosses the beck in Whitfield Gill, the crossing point is marked as "Slape Wath", a common compound name denoting a medieval stream or river crossing across limestone. The evidence suggests that there was therefore a medieval routeway through the survey area, possibly linking properties owned by Jervaulx Abbey on either side of Whitfield Gill.

3.6 The eastern origin of the routeway is not certain. It may have originated close to the horse stud complex, or perhaps have once continued beyond this. Moorhouse's survey (2003, 333) shows the existing trackway leading to Leas House to be terraced into the base of the slope here. As it moves south-west, along the northern edge of the suggested enclosure within which the horse stud is located, a narrower, slightly terraced trackway leaves its north side and runs west on a shallow north-western alignment. This trackway can be traced to the west beyond a drystone field wall into the gap between the previous and the current survey areas. It then begins to fade and become less visible, although its line is arguably continued by a several lines of parallel east facing shallow scarps (**Site 10**) within the EDAS survey area. However, these do not run in the direction of Slape Wath.

3.7 There is a route which runs more directly towards Slape Wath (**Site 1**), and it is a continuation of the existing track to Leas House. It may therefore be this that represents the main medieval routeway that used the stream crossing. This routeway has remained in use by farm vehicles until relatively recently, and so the eastern part within the EDAS survey area is somewhat rutted and spread. The routeway is clearly visible as a flattened linear strip with an average width of 3m, slightly terraced into the natural slope, which can be followed for c.90m on a general east-west alignment. At the lower end of this section, the sides of the trackway diverge slightly and its line is then lost. However, it appears to become visible again 30m to the west, its line (again partly enhanced by wheeled vehicles) cutting into, and faintly across, a broad curvilinear depression [*4/976*], almost certainly natural in origin and denoting one side of an earlier, higher, stream bed. Further to the west, close to the current bank of the beck, there are several large limestone blocks that may have been artificially worked and shaped, together with a c.10m length of stone rubble edging or footings, visible in plan only.

3.8 There is also a depression in this bank of the beck, leading down to the "Slape Wath" marked in 1856. The 'wath' itself comprises a worn, smoothed area of limestone outcrop (**Site 11**), the surface of which has split naturally in a grid of semi-regular fissures of similar appearance to limestone pavement [*4/978*, *9/985*]. The routeway also is visible on the opposite side of the beck, continuing its line to the west. Although the smoothed limestone outcrop appears to mark the main crossing point, it is quite possible that as the course of the beck has changed over time, so has the position of the crossing. There are several further smoothed limestone outcrops, similar to that described above, c.20m to the south.

3.9 Another routeway of possible early date (**Site 2**) may diverge from the north side of the Slape Wath routeway (Site 1) described above, to follow a more north-western line [*4/965, 4/967*, *9/979*]. In contrast to the route crossing the beck at Slape Wath, which is terraced into a natural slope, this routeway appears to party re-use a natural hollow created by a small landslip. The base of this routeway is also very marshy as it ascends a gentle slope, and it is possible that water may have drained down it at one time. This would either have run across or have been crossed by the line of the Slape Wath routeway, and entered a funnel-shaped natural depression, which passed into the former east side of the earlier, higher line of the beck.

3.10 At its south-east end, the routeway curves to the north between two natural scarps, and then turns north-west to run behind a prominent mound created by the landslip. It climbs steadily as it runs north-west and is formed by a relatively flat-bottomed depression, 5m-6m across; the lower south side stands up to 1m in height, but the north side is over 2m high, and has a number of structures situated on or just above it (see Site 3 below). The routeway narrows adjacent to a small sub-rectangular platform, and then levels out. Here it maintains a similar width, and is terraced into the base of the natural slope to the north but runs across the top of a steep south-facing natural scarp [*4/960*]. There may be a rectangular structure placed on the line of the track and running parallel to it (see Site 3d below); alternatively, the latter may be the line of a wall defining one edge of the routeway. To the north-west of this possible structure or wall, the routeway again becomes a slight hollow, and has a sub-rectangular, slightly raised platform on its south side (see Site 4a below). The routeway becomes more spread after this point, and there is a second group of possible structures or small quarries on its north side (see Site 4b below). The drystone field wall defining the west side of the survey area has a gateway close to the line of the routeway, but it is likely that the earlier line ran just slightly to the north, although there is now no indication of any blocked feature in the wall. Beyond the wall, the course of the routeway may be marked by a south-facing scarp, one of several here at the base of the natural slope.

Group of structures

3.11 As already noted, there are two groups of structures located on the north side of the routeway (Site 2) that may be of early date.

3.12 The larger, eastern group (**Site 3**) is positioned on or just above the steep scarp of the marshy central section of the routeway [*9/981*]. Within this group, the best preserved and most obvious feature is a ruined stone building (**Site 3a**), which is not shown on any of the historic Ordnance Survey maps. The building has a sub-rectangular plan and is aligned east-west, with maximum dimensions of 6m long by 4m wide (NGR SD93735 9180) (see plate 2). The walls stand up to 0.70m in height and have an average width of 0.5m, although the north wall which partly retains the slope behind is somewhat thicker [*4/970*]. The walls are built of roughly squared limestone rubble and there is a doorway at the south-east corner; on either side of the doorway, larger stones have been used to define the base of the opening [*4/973*]. The building may once either have been larger, or could perhaps be a rebuilding of an earlier structure on the same site, as stone footings in line with the south wall are visible extending at least 4m further east, incorporating at least one larger stone in their line. To the east of these footings, there is a short length of angled trackway, partly disturbed by stock that leads to a modern springhead located c.10m to the north-east; this is represented by a concrete construction dug into the hillside with a manhole cover on the top [*9/982-9/983*].

Although the structure is clearly modern, the spring could have been used as a water source during earlier periods.

3.13 To the south of this springhead, and south-east of the ruined structure (Site 3a), there appear to be several conjoined sub-rectangular enclosures (**Site 3b**). They are all located on the steeply sloping north scarp of the depression forming the routeway here, and are most easily visible from the top of the south scarp. Viewed from here [*4/975*, *9/980*], they are defined by intermittent lines of stone rubble or boulders, with more convincing wall footings towards their eastern end; it is possible that the stones have fallen naturally but they do form short alignments, although the insides of the enclosures are steeply sloping, and so they are unlikely to have formed actual structures. Described from west to east, the enclosures may measure c.5m square and then 5m by 8m, with smaller structures or platforms slightly terraced into the slope at the very eastern end. To the south-east of this group, there are several shallow, south-facing scarps running parallel to one another across the relatively steep natural slope, some of which probably result from natural erosion but others of which might be the remains of either terraces or former trackways.

3.14 To the north-west of the ruined structure (Site 3a), there are further low angular scarps which may represent other structures and platforms (**Site 3c**). At the north end of one of these, a spread of stone rubble partly obscures a short length of built footing or wall base [*9/984*]; this might represent another former spring head. Within the limestone rubble heaped around it, there is a large stone measuring over a metre square, which has a very pitted, weathered surface [*4/968, 4/969*]. As noted above, there may be a further rectangular structure (**Site 3d**) to the west, positioned on the line of the adjacent track (see Site 2 above) and running parallel to it, the south side of which appears to be partly defined by buried rubble wall footings.

3.15 The second group of possible small structures (**Site 4**) lies at the north-western limit of the survey area. On the south side of the routeway (Site 2) there is a sub-rectangular slightly raised platform (**Site 4a**) measuring c.5.5m by 4.0m, with the outer edges perhaps being formed by buried rubble footings. On the north side of the routeway, there are at least three sub-rectangular conjoined platforms terraced into the natural slope (**Site 4b**). They might be interpreted as small former quarries, although the easternmost one in particular has a regular appearance with a level interior, and the suggestion of former wall footings forming the north and east sides [*4/957*]. These platforms run beneath the adjacent drystone field wall, and at least one further example can be seen in the field to the west.

Boundaries

3.16 When viewed from the west, the buildings of Leas House are placed on a prominent natural platform [*4/955, 4/956, 4/961, 4/966*], the western edge of which is formed by a steep west-facing natural scarp. A curvilinear earthwork (**Site 6**) runs along the top of this scarp, and may once have partly defined the limit of the medieval enclosure in which the horse stud is suggested to have been placed (Moorhouse 2003, 332-333). The earthwork may be a continuation of a prominent depression, resembling a holloway, which curves around the south-eastern corner of the walled enclosure to the south-west of the farm buildings. The natural ground level falls away steeply to the south-east onto a more level field here, and there are a number of widely spaced west-facing lynchets; one of the lynchets curves around at its southern end almost into the very top part of the Mill Gill survey area.

3.17 The curvilinear earthwork is represented by a curving shallow depression or ditch, averaging 2m wide but only 0.3m deep [*4/020*]. A spread bank runs parallel to the west side and for much of its length there is another parallel scarp set slightly further down the natural slope below. Tracing the earthwork to the north, the ditch becomes narrower and the bank more prominent [*4/021*]. The bank stops short of a prominent steep-sided gully (see Site 7 below), but the ditch may be cut by it. However, the line of the earthwork may be continued to the north by a shallow west-facing scarp on the same alignment, which is not clearly visible until the area north of the Slape Wath routeway (Site 1) is reached [*4/022*], where it appears to cross an earlier routeway (Site 10).

Other features

3.18 There are several other features within the Leas House survey area which, although they are difficult to date closely, almost certainly pre-date the early 20th century works associated with the hydro-electric scheme in Mill Gill.

3.19 The earlier survey by Moorhouse (2003, 333) shows a depression or ditch commencing on the west side of the curving wall to the west of the horse stud enclosure, at the point where a "well" is marked on the Ordnance Survey 1856 map. The ditch follows the line of a watercourse shown leaving the well in 1856 and running north-west on a relatively straight alignment before curving around sharply to the south-west, following the base of a contour and emptying into the beck. This watercourse is not shown in 1893 or 1912, but a newly constructed walled enclosure to the north of Leas House respects its line, while a footpath leading to the footbridge over the beck (also erected after 1856 but before 1893) appears to cross its former route.

3.20 By the time that it reaches the EDAS survey area, the depression or ditch (**Site 7a**) is over 8m wide at the top and c.5m wide at the bottom, with steeply sloping sides up to 2m deep. It curves around to the south-west, becoming narrower and shallower. At the point where it narrows, there are at least two sub-square grassed-over features resembling stone bases (**Site 7b**). One of these is placed opposite a bolt projecting from the grass [*4/019*], which has another shorter bolt set through the head with a corroded washer or nut at either end; the arrangement is suggestive of a former sluice being placed across the deep channel here. Just south of the position of the base and bolt, a ditch and bank enters the line of the main depression from the north-west. The ditch then appears to turn south-west, to run towards the 1913 mill pond/dam (see Site 12e below), and there is also a shallow scarp on the east side. Beyond the aforementioned base and bolt, the main depression becomes very shallow and marshy, although the line shown in 1856 can still just be traced, including the right-angled alignment at the very southern end just before the beck (**Site 7c**), which is still partly embanked and retains traces of stone lining here.

3.21 Adjacent to the north side of former drain or watercourse, there is a U- or horse-shoe-shaped earthwork, open to the south-west, of unknown function (**Site 9**) [*9/992*] (see plate 3). It is possible that it represents the site of a sow kiln (an early form of lime kiln), although they are generally thought to be pre-18th century in date. Alternatively, it might be a very small more recent lime kiln, perhaps associated with the construction of the adjacent field barn (Site 14, see below) or even the hydro-electric structures.

Later Post-medieval Period

Footbridge

3.22 The historic maps show that the footbridge spanning the beck to the south-east of the Slape Wath was built between 1856 and 1893 (**Site 13**). The existing wooden footbridge is of a similar form to that shown on the c.1910 photograph (Kershaw und.; see figure 9) but it is obviously a modern replacement [*4/007*, *9/994*]; the upper parts of the stone bridge abutments have also been rebuilt.

Field barn

3.23 A small rectangular field barn (**Site 14**), measuring 7.0m by 6.0m, stands at the southern end of the survey area (NGR SD 93830 91660) [*9/975*]. This is shown on the 1856 and later Ordnance Survey maps, although not on the 1839 tithe map. It is of two storeys, with a pitched stone slated roof and ridge coping which appears to have been reset and repointed relatively recently (see plate 4). It is built of roughly coursed and squared sandstone/limestone rubble with corner quoins, set with a lime mortar. The main (east) elevation has a pair of ground floor doorways with slightly projecting stone lintels, retaining plank and batten doors [*9/996*]. Above, to the first floor, there are two narrow slit ventilators, flanked by smaller square recesses or openings. There are intermittent courses of throughstones through the full height of this elevation, but none cross the complete width. The north gable has two courses of throughstones, above which there is a first floor forking hole to the apex [*9/997*]. The west elevation, like the east, again has intermittent courses of throughstones through the full height of the elevation, and what could be a blocked ground floor opening at the south end [*9/993*]. The south gable has four courses of throughstones but otherwise appears blank. The interior was not inspected, but the evidence in the external elevations, together with comparison with other surviving examples (Pacey 2009, 14-17), suggests that it forms an example of what has been described as the 'two-door plan' barn. The south doorway in the east elevation would have led into the shippon, and the more central doorway to the foddergang and mew.

The 20th century

Water system associated with hydro-electricity generation

3.24 The majority of 20th century features within the Leas House survey area are associated with either the original 1908 supply for the power house in Mill Gill or the 1913 extension to this scheme.

1) The original 1908-10 works (**Site 8**)

3.25 The weir representing part of the 1908-10 works (**Site 8a**) is formed by a series of relatively large sub-square blocks, arranged in a line across the bed of the beck on top of a c.1.50m natural step in the watercourse [*4/010, 4/016*, *9/999*] (see plate 5). There is a partly displaced timber at the front of the weir, spanning the beck, and with another *in situ* timber of similar size below it [*4/015*].

3.26 At the south-west end of the weir is a masonry pier [*4/008, 4/014*], standing 1.80m high with a slightly canted plan form (**Site 8b**). It is built of coursed squared limestone/sandstone set with a lime mortar. A grooved vertical cast-iron bracket is fixed to the base of the pier's north face using bolts with square-headed nuts, and has the remains of a mechanism which helped to raise or lower a fitting set within

the groove. It is assumed that this fitting was a vertical timber passing along the top of the weir, housed in the grooved bracket, and able to be raised or lowered to allow water to be directed into the collecting chamber to the north (see below). On the top of the pier, a flat wrought-iron bracket with a raised semi-circular centre is held in place by two bolts with square-headed nuts; there is a small diameter circular recess in the south face of the stone to which the bracket is secured directly in line with the semi-circular centre [*4/013*]. The remains of a similar bracket and bolts are visible at the south-west corner of the collecting chamber on the opposite side of the beck, and therefore a fitting would have been suspended over the watercourse. This may have been a pole with hanging chains or similar fittings, to stop debris washing down towards Mill Gill Force.

3.27 A low wall, apparently one edge of a rectangular flagstone surface of uncertain function, also runs west from the south abutment to the pier, towards the footbridge abutment.

3.28 The collecting chamber (**Site 8c**) is situated on the east side of the beck at the north-east end of the weir, adjacent to a small field barn unconnected to the scheme (NGR SD 93827 91651) [*9/995*]. The chamber is rectangular in plan, aligned south-east/north-west, and measuring 7.50m long by 3.50m wide externally; the south-east end of the north wall projects slightly beyond the east wall of the chamber. It is built of roughly squared stone rubble, set with a thickly applied lime mortar, and rising from bedrock [*4/018*] (see plate 5). The walls stand to a maximum height of c.1.50m and have a squared sandstone capping. The site of the original inlet is now unclear. There is a large collapse to the west of centre in the south wall, close to the weir, which may have destroyed the inlet [*9/998*]. However, further to the east on the same side, there is a 0.40m square hole passing through the wall. It is possible that this once housed one end of a wooden launder, fed by the combination of the weir and a sluice or vertical timbers mounted above it. A ceramic pipe of uncertain function projects from the base of the east end of the south wall [*4/017*]. At the time of the survey, the interior of the chamber was in poor condition and party obscured by vegetation [*4/009*]. However, a stone rubble inset running parallel to the internal north wall is built over the pipe which was installed in 1913 to replace the original inlet and to link the c.1908-10 chamber to the 1913 mill pond/dam (see Site 12c). There is another, wider, inset at a lower level against the east wall.

3.29 The pipe left the south-east end of the chamber and ran on a north-east alignment towards the top of the cast-iron pipe within the Mill Gill survey area (see Chapter 4). The pipeline was grubbed up in the 1940s or 1950s, and comprised a mixture of cast-iron and ceramic pipes (Mr S Metcalfe, *pers comm.*). The former route of the pipeline is now partly visible as a very shallow, intermittent depression.

2) The 1913 extension (**Site 12**)

3.30 The weir (**Site 12a**) constructed as part of the 1913 works survives in relatively good condition, still spanning almost the entire width of the beck [*4/982*] (see plate 6). It is built of one line of well cut sub-square stone blocks, set slightly above the level of the bed of the beck, and served to direct water into a culvert [*4/984*] still visible in the east bank of the beck.

3.31 The culvert opening [*4/983*] is now in poor condition, although the remains of the south side wall and the flagstone top remain visible; a ceramic pipe can be seen emerging from the bank [*9/986*, *9/987*]. A short distance (c.1.5m) to the north of here are the remains of a wooden structure, possibly a revetment for the bank or

even a sluice gate, eroding from the bank [*9/989*, *9/990*]. The underground culvert (**Site 12b**) follows a line to the north-east, running along the base of a natural scarp marking the east side of an earlier alignment of the beck. Approximately 9m to the east of the culvert opening there is a rectangular 1m long and 0.5m wide stone-lined inspection pit [*4/980, 4/981*], once covered with flagstones, although these have now fallen into it (see plate 8). Further to the east, several flagstones remain *in situ* [*4/990*], either exposed or just below the turf. The line of the culvert can be traced for a total length of 37m from the inlet on the beck, after which point its course is no longer clear from the surface. It may be that water was later piped into the west end of the pond/dam, as several *ex situ* ceramic pipes remain visible in this area [*4/992*], including one bearing the impressed mark "THE NORTH BITCHBURN FIRECLAY CO LTD DARLINGTON" [*4/993*]. This company was formerly located at Howden-le-Wear in County Durham, and was once the largest producer of fireclay goods in the county. North Bitchburn was the last colliery in the area to close, in 1968, followed by the company's pipe-yard a few years later (*www.durhamintime.org.uk*). The plan accompanying the 1913 conveyance notes that the supply to the new dam was to be a 'culvert or pipe line' (Blake collection; see figure 12).

3.32 Whereas the 'site of new dam' as shown on the 1913 plan is fairly large and oval in shape, the actual pond/dam (**Site 12c**) is more sub-triangular in plan, with maximum external dimensions of 55m north-south by 31m east-west. The north-west corner is open but the east and west sides of the pond/dam are formed by substantial earth banks, up to 7m wide, and standing up to 2.5m high externally and 1.5m high internally [*4/991*, *9/972*, *9/978*] (see plate 9). The east corner may be disturbed or broken by a channel running in from the north-east (Site 12e), and to the immediate west of this depression, parallel sections of stone edging might suggest a roughly culverted section leading to the pond (see below); Beyond these features, the well-defined and steep internal scarp of the dam resumes. The earthwork forming the west side of the dam is considerably wider than that to the east, presumably because it is this side which effectively ponds the water. Indeed, it gradually increases in width as it runs north-west, although the external scarp becomes lower and more spread, while the internal scarp retains its steep and well-defined profile. Towards the southern end of the dam, both sides of the interior retain stone lining to a maximum visible height of 0.50m; the stone lining is set forward from the base of the internal scarp of the earthwork bank [*9/973*].

3.33 A second possible inflow into the pond is perhaps represented by a shallow channel which runs south-west from close to the potential sluice position (see Site 7b above). A channel runs towards this area from the north-west, and then turns sharply south-west (**Site 12e**) to run through a short culvert (seen as two buried parallel lines of stone edging) before entering the east corner of the pond just before the start of the stone lining; a section of ceramic pipe can be seen emerging from the stone edging [*9/974*].

3.34 In the southern corner of the dam is the collection chamber (referred to as a 'forbay' by Kershaw), used to prevent debris and ice entering the water supply of the power house, together with its associated overflow sluices and other structures (**Site 12d**) (NGR SD 93800 91695) [*9/991*]. These elements are all placed within or adjacent to a north-east/south-west aligned wall running across the end of the pond/dam [*4/002, 4/994*, *9/977*] (see plates 10 and 11). This wall is 9m long and the side facing the pond stands up to 1.5m high. It is built of roughly coursed and squared limestone/sandstone, set with a lime mortar. The wall was apparently once surmounted by crenellations, and had small crenellated turrets at either end but these were subsequently destroyed (Mr S Metcalfe, *pers. comm.*), although

slightly raised areas to the outer ends of the wall top may mark the former turret positions.

3.35 To the immediate north of the north end of the wall, a self-regulating stone-lined spillway or overflow angles around the chamber, stepping down and then discharging into a shallow marshy area at its base; this spillway stopped the water level in the pond from becoming too high, and waste water must have eventually found its way from the end of the overflow into the nearby beck. The water level within the pond, and therefore the flow into the chamber, was also controlled by a sluice built into the wall to the immediate south of the chamber [*4/995*] (see plate 10). The cast-iron mechanism for raising and lowering the sluice paddle is held in place by a decayed piece of timber resting on short pieces of angle-iron mounted to the west face of the wall [*4/996*]. Although the mechanism has lost its handle, the screw and brackets survive, as does the cast-iron paddle, which moves within two grooved vertical cast-iron brackets bolted directly to the wall face [*4/997*]. After passing through the sluice opening, water was discharged into a narrow gap between the south wall of the chamber and a freestanding wall to the south [*4/005*]; the east end of the latter descends in a series of steps. The water then presumably found its way into the beck through the same shallow marshy depression as that from the overflow [*4/011*].

3.36 The collection chamber itself is slightly sub-rectangular in plan, with maximum external dimensions of 3.75m north-south by 3.00m east-west. The walls of the chamber are tied into those of the main wall at their north ends, and are built of the same materials. Due to the falling ground level, the south external face of the chamber [*4/004*] stands 2.50m in height, with the east [*4/003*] and west [*4/006*] faces being generally lower. Larger stones, resembling capping stones, on the top of the south external face suggest that the walls of the chamber did not rise any higher, at least not in stone. The external faces of the chamber are largely blank, with a few projecting stones to the south face but no other visible features. There is no sign externally or internally of an inlet into the chamber, and so this must presumably lie below the visible parts. Similarly, there is no visible means by which water flow into the chamber was controlled, although one must surely have been present to prevent flooding. The interior of the chamber is c.2m deep, and is crossed at a high level by two east-west aligned cast-iron members of differing sections, which are assumed to be bracing the side walls [*4/999*]. At the bottom of the south side of the inside of the chamber, there are two inclined cast-iron grilles [*4/001*] (see plate 7), designed to stop debris and ice entering the buried pipe supplying the earlier c.1908-10 chamber to the north-east (see Site 8b above).

3.37 The exact route of the pipe to the east of the collecting chamber is not clear, although it may run beneath the embankment defining one end of the watercourse (Site 7c) shown in 1856. It must then pass close by the north end of the footbridge across the beck (Site 13).

4 DESCRIPTION OF MILL GILL SURVEY AREA

Introduction

4.1 The Mill Gill survey area was formed by a partly grassed and partly wooded piece of land, running between the West Mill complex in the east and Mill Gill Force to the north-west (see figure 2). The survey area has maximum dimensions of 525m east-west by 140m north-south, and covers a total of 5.114 ha. The majority of the survey area, as far west as the power house, is essentially divided into three parts; a broad strip of level ground, narrowing to the west, below a steep south-facing natural slope and then another broad strip of level ground between the base of the slope and Mill Gill.

4.2 The north-west end of the survey area lies at c.255m AOD while the mill at the south-east lies at 220m AOD. Moving west from a point c.30m east of the power house, the survey area is essentially all sloping downwards, with varying degrees of steepness, towards Mill Gill; it also has a covering of dense deciduous woodland. After this, Mill Gill curves to the north, and the survey area narrows to only c.20m wide with a strip of slippery rocky outcrops, again covered in dense deciduous woodland, above a near vertical drop into the gill. For reasons of safety, and practicability of access, this area was not surveyed in detail. The whole of the survey area is formed by one field bounded to the north and east by drystone walls, which contain a small selection of wall furniture, and to the south and west by Mill Gill. The field is named as 'Mill Gill top' on the 1839 tithe map and, apart from the mill leat, no features are depicted within it (see figure 4).

4.3 When considering the following description, reference should be made to figure 21 which depicts the recorded earthworks within the survey area. It should be noted that the power house and the poultry house, which also lie within this survey area, were subject to a more detailed architectural survey, and so are discussed in Chapter 6 below.

The Medieval and Early Post-medieval Periods

Lynchet field system elements

4.4 As has already been noted in Chapter 2 above, previous survey by Moorhouse suggests that a horse stud, located within a larger sheephouse enclosure possibly belonging to Jervaulx Abbey, was located to the east and south of the existing Leas House. The southern boundary of the western part of this enclosure was suggested to be formed by the scar edge above Mill Gill, which lies partly within the survey area. The suggested eastern boundary of the enclosure is not shown by Moorhouse (2003, 333), although the plan form of field boundaries shown on the 1856 Ordnance Survey 6" map may indicate that it extended approximately as far as the point where the field wall forming the northern limit of the survey area returns in a right angle to the south.

4.5 An area of west-facing lynchets was recorded within the boundaries of the suggested enclosure (Moorhouse 2003, 333), while more extensive areas of lynchets with a variety of associated structures have been recorded within the boundaries of the medieval township of Askrigg, as they have elsewhere within the Dales. These lynchet field systems are complex and often of several phases of development, covering the early medieval period through to the 17th century and themselves overlying earlier co-axial systems (Moorhouse 2003, 312). Two areas

of lynchets, forming part of the wider medieval and early post-medieval agricultural landscape surviving within Askrigg township, fall within the Mill Gill survey area.

4.6 The first area of lynchets (**Site 15**) is located towards the centre of the northern part of the survey area, on the broadly level ground above the steep south-facing natural slope. At the east end of this area, there are at least eight south facing lynchets, up to 4m wide and 1m high. The southern four lynchets are on a more north-west/south-east alignment, following that of the top of the natural slope to the south, whereas the northern lynchets are more generally east-west. It is quite possible that not all are contemporary, the overall form of the earthworks perhaps indicating that the northern lynchets are the result of a localised re-organisation; a larger area would need to be surveyed before this could be confirmed. On one of the terraces created by the southern lynchets, there are three sub-rectangular platforms positioned in a line, possibly with another platform on the terrace above them (**Site 17**); similar lines of platforms, acting as bases for timber structures, have been noted within the township field system of West Bolton in Wensleydale for example (Moorhouse 2003, 312). In addition, the southernmost lynchet may overlie a shallow curvilinear depression. The northern lynchets are also disturbed by a later sub-circular earthwork, possibly a quarry (see Site 18 below).

4.7 The lynchets converge as they move west, partly as a result of local natural topography. As they converge, they generally become narrower and shallower, although they remain well-defined. The Ordnance Survey 1856 6" map shows a small drain or watercourse leaving the south side of the field wall forming the northern boundary of the survey area and running south down the steep slope below (see figure 6) - part of a much longer alignment, rising to the north of High Strakes Lane is shown on the 1839 tithe map (see figure 4). The line of this feature survives as a shallow depression which has disturbed the lynchets. At the point where it meets the wall, there is a low blocked opening beneath a flat lintel that might be mistaken for a sheep creep but which allowed the passage of water through the wall. There may be the remains of a small structure incorporated into the wall c.10m to the east, while there is a possible blocked gate c.28m to the west. On either side of the depression, the remaining lynchets begin to angle gently to the north-west, and may incorporate at least one more platform. Several of the lynchets run beneath the drystone field wall into the fields to the north, where relatively widely spaced lynchets on an approximate east-west alignment are visible. Within the survey area, a shallow south-facing scarp on a similar alignment can be followed for over 80m to the west from the former watercourse noted above; this may represent another lynchet.

4.8 The second area of lynchets (**Site 16**) lies to the north of the mill complex itself, forming part of Askrigg's well preserved early field system [*5/538*]. Within the field to the north-east (actually outside the EDAS survey area; see figure 17 top), a series of west-facing lynchets are the most prominent (**Site 16a**). There are also other scarps here, which may or may not be contemporary, on a different, more south-facing alignment, while others relate to footpaths shown crossing the area on the 19th and 20th century mapping. The alignment of the west-facing scarps is arguably carried into the survey area by a number of earthworks (**Site 16b**), some of which have been re-used in the post-medieval period. The field wall forming the east side of the survey area here is set on the same alignment as these lynchets, and it is butted by all other walls within this part of the survey area. The field wall is set slightly back from the edge of a west-facing scarp, up to 1m in height, running parallel to it. There is then a second parallel scarp set c.5m to the west of the first. Both may have been re-used to define one of a number of terraced trackways in this general area, associated with gateways in the adjacent field walls. These

earthworks are shown on the line of a footpath or track in 1893 and 1912, forming part of a longer distance route linking Leas House to Mill Lane (see figures 7 and 10). The line of this route appears to have been crossed or disturbed by several terraced trackways on a general north-west/south-east alignment, originating from a point close to the poultry house, where the mill race (Site 29d) for the water mill has been culverted. Although the steep scarp on the north side of the narrow pond (Site 29e) at the east end of the mill race was probably created by cutting into the base of the natural slope here, it is possible that the prominent south-west facing scarp on which the pond is located could also be an earlier earthwork that has been re-used.

Other earthworks

4.9 There are some other earthworks within the Mill Gill survey area which are difficult to date with any certainty, but which might also relate to medieval or early post-medieval activity.

4.10 In the area to the east of a small building (Site 31), the ground surface is marshy and there are some poorly defined, low curvilinear scarps (**Site 19**). One of these may retain traces of stone edging, but this is not certain, while several combine to perhaps form a shallow sub-rectangular depression. To their east, there is a slightly higher curvilinear mound, again apparently with rubble edging or reinforcement, reminiscent of a hard-standing surface for a cart or other vehicle [*8/828*].

4.11 Some 70m east of the small building (Site 31), evidence for a shallow linear depression or ditch becomes visible at the base of the steep natural slope to the north (**Site 20**). As it moves east, this becomes a better defined depression, 2m-3m wide and 0.4m deep, with a spread bank running parallel to the south side [*8/831*]. This earthwork, which can be traced as far as the north side of the mill pond (Site 29c), may well represent the mill leat as depicted on the 1839 tithe map. The depression terminates in an area of disturbance caused by modern tree planting. This area measures 25m long (east-west) by 5m wide and within it there is a higher proportion of stone rubble than that which can be seen in the surrounding ground surface; some of this could arguably form the remains of footings or edges [*8/832*]. A narrow footpath leaves the east end of this area of disturbance, and runs around the north side of the mill pond and then up the steep natural slope towards a stile in a field wall here. It is possible that the linear depression and bank to the west of the disturbed area are also part of the same former footpath or trackway, although its location at the base of the slope would have made it difficult to negotiate in wet weather. Alternatively, it may be some form of drain or leat, either gathering water draining off the steep slope or bringing it into this area from ground further to the west.

4.12 Between the mill pond (Site 29c) and the beck, there is a second damp or marshy area, containing further low curvilinear scarps and earthworks (**Site 35**). Many of these are probably associated with former courses of the beck, and some are relatively recent. For example, set back slightly from the present north bank of the beck, there is an isolated section of low stone revetment wall, c.32m in length, probably dating to the later 19th century and built to prevent further erosion here. To the north of this, a prominent curvilinear south-facing scarp, up to 1m in height, probably represents an earlier course of the beck. This scarp was used to support a trackway (Site 27, see below) shown in 1893 and 1912 running towards the area of quarrying (Site 23, see below) at the west end of the survey area. Above and to the north of the scarp, there are several shallow and very spread curvilinear

depressions which may represent even earlier routes of the beck. To the immediate south-west of the poultry house (Site 33), there is a spread sub-oval platform, measuring c.15m by 10m, with a marshy strip of ground curving around the west side and continuing south towards the beck.

4.13 In an area between two scars of rock outcrop, on the northern edge of the survey area to the north of the power house (Site 32), there are a number of shallow south-facing scarps and also other sub-circular or sub-oval platform-like features (**Site 25**). The most prominent of these has been slightly terraced into the slope and is c.4m long (east-west). It retains traces of stone edging around the south side, and appears to be flanked by two very ruinous wall lines on an approximate north-south alignment. The date and function of the features in this area are hard to assess but, if the adjacent rock scar (see Site 24 below) did form the southern boundary of the medieval enclosure to the north as has been suggested above, they may once have lain either within or immediately adjacent to it.

4.14 The alignment of this rock scar is continued to the east by a steep south-facing scarp (**Site 26**) for a distance of almost 100m. This scarp stands over 2m high and is formed by a soil slope within which outcropping stone is frequently visible. At the western end, there is very little level space in front of the scarp and the top of the natural slope below, but c.30m to the east there is another parallel south-facing scarp to the south, defining a terrace or level area c.4m wide and c.30m long. To the east of here, the scarp curves in sharply to the north, to a pinch-point which is presumably associated with the watercourse depicted here in 1856. The main scarp then continues for a further c.85m to the east with a narrow level area 4m wide to the front. This area is accessed by a terraced trackway at the eastern end, but there is otherwise a complete lack of the features that might be expected if even small scale quarrying had taken place, including some spoil heaps, small shelters and further access points. It may be that this scarp represents the edge of the medieval enclosure to the north.

The Later Post-medieval Period

4.15 The following elements of the landscape within the survey area are primarily categorised as being of later post-medieval date due to the cartographic evidence, the appearance of the earthworks and their relationships to neighbouring features, and professional judgement. While some, such as the water supply associated with the 20th century power house (Site 32), are demonstrably recent in date, it is likely that others, such as the extensive quarrying (Site 23) contain earthworks relating to several different phases of activity over an extended period.

Main area of quarrying

4.16 There are extensive areas of quarrying and possible quarrying, covering a relatively narrow band of outcropping limestone on the north side of Mill Gill, running through the central and western parts of the survey area. No quarries are marked in 1856, although a prominent scar on the line of the outcropping stone is shown. However, a “Quarry” is marked in the area to the north-west of the power house in 1893, with extensive scars to both the east and west, and by 1912 it is marked as “Old Quarry” (see figures 7 and 10).

4.17 The most prominent, and most recent, area of quarrying (**Site 23**) is located at the north-west end of the survey area, where an angular working face extends over 25m in length and stands between 5m-6m high in places [*8/759, 8/760*] (see plate 12). It retains evidence for horizontal bedding planes within the rock, varying

between 0.5m-1.0m in height. The working face is near vertical, and in some places is actually undercut, with little surviving evidence for benching. The form of the quarry is of the 'hillside' type, as defined by the English Heritage Step 3 MPP report for the quarrying industry (Richardson & Trueman 1997, 8-9). No drill marks or other similar features are visible in the working face, and so it is assumed that the stone was extracted using hand tools. There is a substantial spread of very large blocks of stone around the base of the working face (some measuring 1.5m by 1m by 1m), but very little in the way of associated spoil heaps apart from to the south-east, where some waste and soil has been thrown up to create a curvilinear bank 1.80m in height. A field wall shown in 1893 and 1912 following a north-east/south-west alignment towards the top of the working face survives to a low level [*2/667*]. It was presumably built to keep stock away from the quarry edge but no longer serves this function. It is also shown as returning to the east from its south end on these maps, and there are very fragmentary traces of a wall line here, although much has been destroyed. It is reported that stone from this quarry was used to build the 19th century railway station buildings and the Wesleyan chapel in Askrigg (Hartley & Ingilby 1989, 225).

4.18 This most prominent area of quarrying was accessed via a well constructed track (**Site 27**), shown in both 1893 and 1912; the later map shows the track extending further to the north-west, right up to the edge of the steep-sided ravine. The track starts as a flattened strip c.3m-4m wide adjacent to the west side of the quarry, and then follows a route along the top of a steep natural scarp, first south and then east [*8/761*] (see plate 13). In places, the south side has been strengthened with a stone revetment; to the west of the power house, one of the revetments is over 1.4m tall and has the appearance of an abutment [*6/803*]; it is only really visible from the opposite side of the beck. The trackway remains a prominent feature, 2m-3m wide as it passes the north side of the power house, but it fades as an earthwork close to a small building (Site 31). From here, until the West Mill complex itself, it is little more than a footpath, following the line of the top of a prominent south-facing scarp (see Site 35). The contrast between the two sections is curious; the upper part is well engineered, and robust enough to take quarry carts, whereas that to the east of the power house is far less substantial. It is possible that the eastern part was replaced by a small railway (occasional rails have been found in this area; Prof. D Blake, *pers. comm.*), and it is also possible that other earthworks have been altered or partly buried by subsequent flooding.

Other quarrying activity

4.19 A steep south-facing scarp runs east from the largest area of quarrying, and has smaller, sub-rectangular areas of quarrying above and below it, both east [*8/774*] and west of the former pipe (Site 30b) supplying the power house. One quarry to the west of the pipe measures c.15m long by c.5m wide (**Site 24**). The early photograph of the power house (see figure 9) appears to show lighter coloured waste or spoil below the quarry to the east, suggesting that it had been worked relatively recently. This lighter coloured material is no longer distinguishable following a century of weathering and vegetation growth. Beyond these quarries, the scarp becomes a bare outcrop or scar, standing over 2.50m high in places. The area above the scar has a more gently sloping ground surface (compared to below the scar), running up towards another scar on which the ruinous drystone wall forming the northern limit of the survey area is built. The scar or outcrop ceases to have a visible rock face approximately in line with a small building (see Site 31 below) to the south [*8/817*].

4.20 Above possible structural platforms in the north-east angle of the survey area (Site 17), a line of lynchets is disturbed by a sub-oval depression, set within a larger curving scarp, perhaps the remains of another small quarry (**Site 18**).

Buildings, structures and earthworks

4.21 Towards the west end of the survey area, situated within the curve where Mill Gill swings around to the north-west, there is a series of successive parallel south-facing scarps and linear depressions. The origin of most of these is natural, most likely created by the beck cutting its way through softer deposits over time, causing the water level to drop and its route to shift to the south. However, there is at least one structure which is clearly man-made, and others which appear to have been artificially enhanced.

4.22 On the level ground at the base of the steep natural south-facing slope supporting a trackway (see Site 27), are the ruined remains of a small structure (**Site 21**) (NGR SD 93908 91380), almost certainly later post-medieval in date, now containing collected felled timber [*2/677, 8/762*]. The structure is sub-rectangular in plan, measuring 3m by 2m, with an opening centrally placed in the east wall (see plate 14); the east end seems originally to have once been completely open, but was later blocked to create the existing, narrower, opening [*8/764*]. The drystone walls stand up to 0.40m high and are built of squared stone rubble with a luxuriant covering of moss. There is another stone rubble structure, apparently a wall footing, set c.2m to the west of the structure [*8/765*]. Both structures were probably associated with the adjacent quarrying (see Site 23 below), the larger building perhaps forming a workman's shelter. Alternatively, they may to relate to woodland management, and be associated with sawing or working timber in some way.

4.23 To the south of these structures, there is a steep south-facing curvilinear scarp, which defines one side of a channel (**Site 22**). This channel is set on an east-west alignment, and has an average width of 5m [*2/676*]. The base is bare, without the lush vegetation that grows to either side, suggesting that water has flowed through it relatively recently, although the west end in particular is set almost 1m above the existing level of the beck (see plate 15); prior to 2011, when falling stones, soil and trees altered the water level in the adjacent section of the beck, water did flow through the channel more frequently (Prof. D Blake, *pers. comm.*). Along the south side of the channel, there are fragmentary traces of what may be artificial stone rubble lining [*8/766, 8/767*]. In addition, there are at least two larger stones which project into the channel from its sides that appear to have been deliberately placed. Taken together, these features suggest the presence of a shallow artificial tank or pond here [*8/770*]. To the south of the channel, the beck has exposed a bank which contains further concentrations of stone rubble of artificial appearance but probable natural origin.

4.24 Below the main south-facing scarp (Site 26) to the north-east of a small building (Site 31), on an area of level ground, there are two conjoined stone rubble platforms (Site 28). The larger western platform [*8/826*] measures 4m by 2m, and stands almost 1m high; with a concrete surface, and the apparent remains of steps at the south-west corner, it appears to have once formed the base for a now-removed structure. The eastern platform [*8/827*] is lower and smaller. Some 10m to the south-east of these concrete platforms, the remains of a small sub-square stone rubble footing survives approximately half way up the steep natural slope. Neither this nor the platforms are shown on the 1893 or 1912 maps. These features may have been built by Ernest Burton to support poultry houses, and

there is another similar structure on the south side of the beck close to the decayed footbridge (Prof. D Blake, *pers. comm.*).

4.25 A short distance to the east of the power house (Site 32), there is a small single storey rectangular building (**Site 31**), which is not shown in either 1856 or 1893/1912 (NGR SD 94025 91375). It is aligned almost east-west and is rectangular in plan, measuring 4.32m long by 3.07m wide (see plate 16). It clearly once extended further east for the same length, or perhaps slightly further, in the form of a structure with a single pitch roof, as evidenced by the mortar scar on the west gable and associated projecting stones, and partly buried footings [*9/006*]; this structure was formerly used for housing poultry (Prof. D Blake, *pers. comm.*). The surviving building is of a single storey, with a pitched slated roof, and is built of stone rubble re-pointed with a cement mortar. The south elevation has a doorway at the east end fitted with a modern plank and batten stable type door, and a window opening to the west fitted with a modern 9-pane fixed timber frame [*8/815*]. The east gable [*8/816*] preserves the roof line of the former structure to the east, while the north elevation and west gable are blank [*8/818*]. Internally, the building has a modern softwood roof structure, the only surviving earlier structure being a brick fireplace in the centre of the west wall [*8/820*]; there was no obvious evidence for any chimney in the roof. Soon after the survey was complete, the owner constructed a small chimney at the west end of the ridge, repaired the window and door, and repointed the structure (Prof. D Blake, *pers. comm.*) [*9/005*, *9/007-9/008*] (see plate 17).

4.26 On the east side of the embankment and launder (see Site 29h), just off the west side of West Mill, the remains of the rectangular structure (**Site 34**) shown in 1912 are still visible. In 1979, this structure appeared to be a single storey in height, with a corrugated-iron sheeting roof and a large cart shed-type doorway in the south end, possibly a garage or storage building (Blake collection). The structure is no longer roofed, and the walls survive to a maximum height of c.1m; it has maximum total dimensions of c.7.80m north-south by 3.70m east-west. The west side was largely carried out on two stone piers [*8/752*, *9/028*], while the north and east sides are formed by roughly coursed and squared stone walls [*7/851*, *9/029*]. No evidence for any former opening in the south end remains.

Water supply to the West Mill complex (**Site 29**)

4.27 The 1839 tithe map shows that water was taken off the beck in a leat, which follows a curving alignment to the mill to the east (see figure 4). The Ordnance Survey 1856 6" map shows that there was a "weir" across the beck, built opposite the location that the power house would later occupy, and the leat then passes through an unnamed mill pond, and from here to the mill itself (see figure 6). At its west end, the leat contains a curve which is not depicted in 1839. The 1893 25" map depicts the weir with "Sluices" named; the weir is shown as a construction across the bed of the beck with a further structure between it and the mill race, extending for a short distance to the east beyond the weir (see figure 7). This second structure presumably represents a stone-lined embankment which acted as a self-regulating overflow system. The 1912 map only shows the beck-bottom weir (see figure 10). After the construction of the power house in 1909, the inlet to the race was almost certainly modified, and it was likely to have been altered again when the power house was enlarged at some point after 1913.

4.28 There is little remaining of the mid 19th century inlet into the mill race (**Site 29a**). The large weir marked in 1893 and 1912, and partly visible on the early photograph of the power house (see figure 9), has almost completely disappeared. There are

the remains of a modern reconstruction, done in 1986 and using stone-filled gabions [*8/821*], on the south side of the beck, but it is now no longer clear exactly how water was directed into the surviving inlet. The inlet is set to the immediate south-west of the power house, and is formed by a block of thickly pointed stone rubble, shaped in plan rather like a squat 'V' or capital 'Y' [*6/795*] (see plate 18). A crude skin of concrete, laid roughly over rubble and pieces of timber, butts the south-west corner of the inlet. It has a flat upper surface but a sloping west face, and may be the remains of a concrete weir which replaced an earlier stone structure [*6/804, 6/805*]. The central channel of the inlet has a wrought-iron grille mounted at the west end, to stop debris entering the channel. At the east end, there is a sluice mechanism, formed by a steel frame on which a steel paddle and handle are mounted [*6/797*]. The handle is constructed of two separate pieces, both pierced by a number of small circular holes; a short peg or rod would have passed through one of these holes to hold the paddle in position at the required height. Beyond the sluice, water passes through a short PVC pipe, and then into a c.25m long open channel [*6/793, 6/794*] (see plate 19). The south side is built of two, or sometimes three, courses of mortared stone rubble, set on a rough concrete footing which rests directly on the bed of the beck. All of the inlet system described above, and the leat adjacent to the power house, were rebuilt in 1986 (Prof. D Blake, *pers. comm*. - see figure 19); the early photograph of the power house shows the leat to be contained within a higher embankment (see figure 9).

4.29 At its east end, the leat opens out into the upper part of the mill race (**Site 29b**), which may well represent a post-1839 alignment. This is formed by a steep-sided ditch, up to 1.50m deep and initially 4m wide, but narrowing to 2.50m as it follows a sinuous course eastward [*8/824*]. At the point where the race passes closest to the north bank of the beck, a smaller channel leaves the south side and runs directly towards the beck; part of this channel may also be depicted on the 1839 tithe map. The east side of the channel retains traces of a stone lining, with a sluice position, indicated by bolts with square nuts [*8/823*], at the junction with the mill race, and so the channel is likely to have functioned as an overflow. It may be that there was a particular problem with the race's water level at this point, as a short distance to the east, the outer edge of a bend has a short stone rubble bank running parallel to it [*8/822*]. Alternatively, it has been noted that, as the water level in the adjacent beck rises, the character of the water changes. It is first clear, then peaty and finally becomes muddy as higher water levels erode the soil of the banks to either side. It is possible that the overflow was designed to let muddy water run off when the beck was high, so as to stop it entering and silting the mill pond (Prof. D Blake, *pers. comm*.). Beyond this point, the race runs first north-east, where it is crossed by a footbridge formed from a single stone slab (placed here in 1984 and replacing an earlier stone bridge - Prof. D Blake, *pers. comm*.), and then south-east [*8/825*], becoming shallower and less well defined as it does so [*8/829*] (see plate 20). It then enters the mill pond/dam (Site 29c) via a short covered section crossed by flagstones [*8/830*].

4.30 The mill pond (**Site 29c**) is sub-oval in plan, aligned approximately east-west, with a maximum length of 108m and a maximum width of 22m at the east end [*8/865*, *8/866*] (see plate 21). As previously noted, depending on the accuracy of the tithe map, this may be a post-1839 construction. The north side of the pond is terraced into the base of the natural slope to the north, producing a scarp up to 1.4m in height. The south side is formed by a substantial earth bank, up to 7m wide, standing up to1.6m high externally and 1.2m internally [*7/814, 8/833*]. As it moves west, the external scarp becomes lower and more spread, while the internal scarp retains its steep and well-defined profile. Towards the east end of the dam, both sides of the interior retain stone rubble lining to a maximum visible height of 0.40m

[*9/004*]; the stone lining is set forward from the bottom of the internal scarp of the earthwork bank. Along the east end of the south side, the interior scarp also preserves the remains of an upper lining level formed by inclined flagstones. The mill pond was dredged in the 1980s (Prof. D Blake, *pers. comm.*) (see figure 19).

4.31 A sluice is positioned at the east end of the dam, and was extensively repaired/rebuilt in 1987 (Prof. D Blake, *pers. comm.)* [*9/016*] (see plate 22). On either side of the sluice, there is a raised block of mixed stone rubble and concrete construction [*7/816*]; that to the south is much larger than the block on the north side. A timber runs between the top of the two blocks, which holds the cast-iron mechanism for raising and lower the sluice paddle [*7/817*, *9/017*]. The screw was turned by passing a handle or rod through a circular hole at the top of the screw, which passes through a bracket secured to the timber. A second piece of cast-iron, of square section, is bolted to the base of the screw but the paddle has been lost [*7/818*]. To the immediate east of the sluice position, a vertical flagstone runs almost as far down as the base of the dam's outlet; a second vertical flagstone to the east of this runs only half the way down [*7/819*]. There are no visible traces of an overflow or a bypass leat for the mill pond.

4.32 There is a short section of covered leat with a flagstone top to the immediate east of the sluice, and then the water once again enters an open race (**Site 29d**). This comprises a steep-sided ditch, but with no traces of an artificial lining. It continues south-east in this form for a distance of 33m, before it enters a 19m long culverted section with a flagstone capping [*7/824, 8/835*]. This culverted section is immediately adjacent to the poultry house (see Site 33) (see plate 73), and both were present by 1893. It is likely that the culvert was constructed at the same time as the poultry house, and it extends east beyond it [*8/836*], to allow access across the race and up an adjacent terraced trackway.

4.33 From the end of the culverted section, the head race (**Site 29e**) is again open, and formed by a relatively shallow ditch with a flat bottom. It then gradually widens to form the long sinuous pond shown in both 1856 and 1893/1912 (see figures 6, 7 and 10). In plan, the pond as it survived at the time of the survey more closely resembles that shown in 1912, rather than earlier. The pond reaches a maximum width of 3.50m towards the east end, but remains very shallow, being no more than 0.40m deep [*7/828, 8/758*] (see plate 23). In places, particularly along the south side, the pond retains traces of an artificial lining of large stones placed along the edge [*7/826*]. Approximately one third of the way along the south side from the culverted section, the edge is inset slightly, apparently as a result of a small structure or wall being situated here [*7/825*]. At the east end of the pond, the stone lining becomes more regular, and rises to several courses in height. The pond itself is set on top of a substantial south-west facing scarp, over 3m wide and up to 1.4m high. Towards its east end, a small, partially surviving stone-lined pit lies immediately to the south of the scarp base [*8/838*]. This pit is rectangular in plan, measuring 2.90m long by 2.10m wide, with a maximum depth of 0.40m, and traces of flagstone capping to the western side; its purpose is uncertain.

4.34 The water from the pond passes through a low opening in the east-west aligned drystone wall built across its eastern end [*7/827, 7/829*, *9/027*]; at the base of the north face of the drystone wall, several flagstones have been placed against it, presumably to try to prevent water from leaking through [*9/020-9/021*]. This wall does not seem to have been present in 1856 or 1893, the pond merely narrowing at its eastern end. On the 1856 plan, two features leave the eastern end of the pond; a thick line which runs south-west towards Mill Gill, and a second, fainter pair of lines running south-east towards the wheelhouse (see figure 6). The former

represents an overflow or bypass leat, while the latter are likely to represent the headrace of the wheel, although it is not possible to tell if it was raised on a launder at this date. The specific detail is not clear on the 1893 edition, although an "Aqueduct" is marked (see figure 7). By 1912, the drystone wall was present, cutting off the southern end of the pond which narrowed to a sluice at its southern end (see figure 10). From here, an "Aqueduct" is marked, with a narrow rectangular structure running parallel to its eastern side. On both the 1893 and 1912 maps, the aqueduct or launder ran south-east into a small structure projecting from the north elevation of the mill, and thence into the wheelhouse.

4.35 The area to the east of the drystone wall was surveyed in greater detail than the rest of the mill's water supply (see figures 22 and 23). At the time of the EDAS survey, immediately beyond the drystone boundary, there was a stone-line header tank (**Site 29f**) [8/755]. This tank measures 4.40m long (north-south) and narrows to 2.10m wide (east-west) at its southern end. It is a maximum of 0.30m deep and of the same plan form as shown in 1912. The sides are lined with stone, squared stone rubble on the east side and upright flagstones on the west. The base of the tank is largely formed by east-west aligned flagstones, although there is a substantial spread of concrete at the western end. Some 2.70m to the west of the tank, the edge of the stone rubble embankment which carries the launder (see below) is visible, again set on the same line as shown in 1912. To the east, there is a low stone embankment, c.4.50m long (north-south) by 1.50m wide (east-west). Its western side is lined with upright flagstones, and it is likely that this structure represents a dam to catch water overflowing from the main header tank, rather than representing the remains of any earlier tank.

4.36 At the south end of the header tank, there is a sluice arrangement formed by two concrete slabs and a number of upright flagstones [*8/753, 8/754*, *9/023-9/024*] (see plate 24). These concrete slabs define two channels. The entrance to the western channel (the overflow or bypass) could once be closed by an upright stone slab placed into two vertical slots. The overflow ran south to pass though an opening measuring 0.46m wide by 0.38m high with a curved head cut into the base of a large upright flagstone; this flagstone measures a total of 1.60m wide by 1.10m high. Above the opening, horizontal threaded bolts with square nuts project from the face of the upright flagstone, presumably once supporting some other kind of sluice mechanism. After passing through this opening, the overflow channel has a short stone-lined section beneath a horizontal flagstone, and then broadens and curves to the south-west. From here, water tumbles over the stone embankment supporting the launder [*7/836*, *9/031-9/032*] (see plate 26) and enters a 1.40m wide shallow overflow channel cut into the outcropping stone. This channel (**Site 29g**) then follows a curvilinear alignment [*7/837*], narrowing as it does so and then entering a flagged section [*7/838, 8/748*], finally discharging into Mill Gill. There are several bolts projecting from the rock in the bed of the gill some 5m-10m to the south-west of the outflow, but they do not appear to be associated with it or to be the remains of some weir or other structure across the beck bed; nothing is shown in this position on the historic Ordnance Survey maps.

4.37 The second, eastern, channel, at the south end of the header tank, is closed by an upright stone slab placed within two vertical slots. It then passes through a sub-square opening measuring 0.44m wide by 0.35m high cut into the base of the large upright flagstone mentioned above. As with the overflow opening, horizontal threaded bolts with square nuts project from the face of the upright flagstone, presumably once supporting some other kind of sluice mechanism. After passing through the opening, the channel enters the launder proper [*8/756, 8/757*].

4.38 The launder (**Site 29h**) is of zinc (or zinc-plated steel) construction, and has a U-shaped cross section, measuring 0.70m wide by 0.40m high (see plate 25). Soon after emerging from beneath a horizontal flagstone, the top of a small part of the west side of the launder is bent over slightly [*7/831*], to allow water to overflow into the eastern channel when the adjacent sluice was shut. Immediately to the south, an additional zinc plate is bolted to the west side of the launder [*7/834*], partly supporting a sluice mechanism [*7/833, 7/853*, *9/025*]. This sluice mechanism is constructed from angle-iron pieces, with a frame rising over the launder supporting a V-shaped moving piece, pivoting around the centre. The outer end of the upper arm is attached to a steel wire which runs towards the mill and into the first floor (see 'power transmission' of Chapter 5 below). The lower arm is attached to a short chain, itself connected to a metal paddle. When the steel wire was pulled from within the mill, the paddle was raised, and then fell when the steel wire was slackened. The sluice mechanism was repaired after 1984 (Prof. D Blake, *pers. comm.*). Beyond this point, the launder is constructed from zinc plates with an average length of 1.75m; the plates are joined to either side by between five and nine short bolts with hexagonal nuts and washers. Each section is additionally strengthened by a pair of circular section metal bars, a single bar crossing the top of the interior at both of the outer ends. The base of the launder is lined with concrete, relatively recently applied to prevent seepage onto the footpath below (Prof. D Blake, *pers. comm.*); water staining on the internal sides of the launder indicate that the average depth of water passing through it was 0.14m. The launder has a total length of 22.65m before discharging over the waterwheel [*9/026*], and over this distance the base falls a total of 0.30m from north to south (see figure 23).

4.39 For the majority of its length, the launder is carried on a stone embankment [*7/839, 8/747*], rising to a maximum height of 2.35m and measuring up to 2m in width (east-west). It is built of roughly coursed and squared stone, set with a lime mortar. The lower 1.60m of the embankment's sides are battered, whereas the upper part rises vertically; the latter might possibly represent the rebuilding of an original structure or perhaps a later increase in height. Where the main stone embankment ends, the launder is carried on a wrought-iron or steel plate [*7/840*], pierced by numerous small circular holes arranged in a grid pattern and almost certainly re-used from elsewhere. The plate carries the launder over a single free-standing stone pillar [*7/841*], c.0.95m square, before entering the north elevation of the mill [*7/847*] and passing into the wheelhouse; earlier maps show that the south end of the launder would originally have passed through a lean-to before entering the main mill building (see figures 6 and 10). Where the plate leaves the main embankment, crosses the pillar and enters the mill, the base is set on a thin concrete slab. The route of the launder after entering the mill is described below in Chapter 5.

The water supply associated with hydro-electricity generation (**Site 30**)

4.40 As has been noted in Chapter 2 above, a buried pipeline ran south and then south-east from the collection chamber (Site 8c above) to the south-west of Leas House (see figures 8 and 12). This pipeline was at least partly contained within a flagstone-capped culvert, and this is how it enters the Mill Gill survey area.

4.41 At a point 48m north-west of the power house, the culvert (**Site 30a**) is visible within a low curvilinear revetment wall, set below the remains of the drystone wall following the top of the outcrop or scar here [*2/668*]. The culvert is 0.45m wide by at least 0.25m high; it is blocked by a fall c.1m back from the entrance [*2/671*]. The entrance is crossed by a horizontal wrought-iron bar, which would have

blocked the route of the pipe, and so it is assumed that this was added after the pipe had been removed. The early photograph of the power house shows the cast-iron pipe emerging from the culvert and descending the north slope of Mill Gill, on the immediate east side of a drystone wall (see figure 9). The uppermost part of the wall line [*2/674*] is now extremely ruinous, resembling little more than a spread of stone rubble. It fades out completely, and in the 11m long gap before it recommences, there is a shallow ditch or trench [*2/675*], cut through the scarp, created at least in part by quarrying (see Site 24 above).

4.42 When the wall (**Site 30b**) recommences, it is generally better preserved than in the upper part of the slope, measuring 0.50m wide and standing up to 0.80m high on the western face; it is essentially retaining the ground to the east [*8/773*]. Approximately half-way along the length of this part of the wall, a bolt rises vertically from the ground surface to the east; the upper end is threaded and retains a square nut. Immediately to the west, closer to the wall, the remains of a wrought-iron bracket are visible [*8/775, 8/776*] (see plate 63). Both these features would have helped to secure the pipe and maintain its position. At its south-east end [*8/779*], the pipe crossed a trackway (see Site 27 above) and entered the power house (see Site 32). The power house has been recorded in detail, and is described in Chapter 6 below.

5 DETAILED SURVEY OF THE WEST MILL COMPLEX

Introduction

5.1 The complex of mill buildings known as West Mill (**Site 36**) is essentially formed by four conjoined buildings; for the purposes of description, these are known as the mill (**Site 36a**), the garage (**Site 36b**), the kiln range (**Site 36c**) and the barn (**Site 36d**). The recorded external and internal elevations of each building have been given a unique identifier number [Elevation 1, Elevation 2 etc] (see figure 24), as have the major internal spaces; the latter are differentiated by floor level using a prefix in front of the letter identifier e.g. [**G1**] for ground floor, [**1F10**] for first floor and [**2F15**] for the second floor. Appendix 2 provides a detailed room-by-room inventory of the four buildings, with more detail than in present in the descriptions below. Due to the rising ground level to the north, the ground floor level as entered on the southern side of the complex becomes a semi- or full basement, but the entire lower level of the complex is termed the 'ground floor'.

5.2 In addition, as a result of construction over an extended period, the overall complex and the buildings within have an irregular ground plan, forming an angular 'arc' on south-east/north-west and north-east/south-west alignments. For ease of description therefore, the long axis of each building is considered to be aligned east-west (see figure 24). This needs to be borne in mind when reading through the descriptions below, as some confusion may arise.

5.3 The complex is described below in a logical sequence. The plan form, structure and architectural detailing of each building are described first, followed by the external elevations and a circulation description of the interior, from the lowest to the uppermost floor level; detailed descriptions of doors and window frames are given as part of the circulation description. Subsequent separate sub-sections deal with the evidence for power transmission and *in situ* machinery, the more significant of the *ex situ* machinery and fittings recorded in the inventory, and finally surviving early electrical fittings. When considering the architectural description, reference should be made to the plans, elevations and plates, and the photographic record which appears as Appendix 3. Unless otherwise noted, the terms used to describe surviving timber-framing and roof structures are taken from Alcock *et al* (1996) and Campbell (2000). Where possible, specific architectural terms used in the text are as defined by Curl (1977). Finally, in the following text, 'modern' is used to denote features or phasing dating to after c.1945.

General Setting and Location

5.4 The buildings forming the mill complex stand on the north-east side of Mill Gill, separated from the east bank of the gill by a track and drystone wall (see figures 2 and 17). To the south, the complex is separated from the gill by a number of smaller structures and Mill Gill House, while to the north-west is the aqueduct supplying water to the internal waterwheel. The east side of the complex faces onto the public footpath crossing the adjacent hay meadow, which itself contains a series of south-west facing lynchets and earthworks (see Site 16a above).

5.5 Even without considering the changing ground levels noted above, there is clear evidence within the building complex that both the mill and kiln range were terraced into a natural north to south slope here. What might at first be taken to be large blocks of worked stone are actually large pieces of natural limestone bedrock, some of which appear to have been left *in situ*, such as that projecting from the base of the east wall of the mill's ground floor [**G2**]. Further blocks are visible in

the same wall (*Elevation 14*), as well as in the north wall to the east of the central doorway (*Elevation 13*). They can also be seen at the north-east corner of the domestic ground floor area [**G4**] and within the ground floor of the kiln range, where there are three worn, slightly raised areas, two of which are incorporated into the wall bases (see figure 25). In addition, inspection of the bed of the gill during a dry period revealed a narrow, natural fissure, south-east of the overflow/bypass for the launder (see figure 22). The east side of this fissure had been artificially strengthened by a masonry pillar, but the west side is entirely natural. The fissure can be traced at least 5.45m northwards from the side of the gill, and significantly appears to run in the general direction of the limestone blocks which can be seen in the north internal walls of the mill.

The Mill (Site 36a)

Plan form, structure and materials (see figures 25 to 27)

5.6 The mill forms the north-western part of the recorded complex and is the largest surviving individual building within the complex. The eastern, 'domestic' end of the mill [**G4**; **1G11**; **2F16**] butts the main body of the building, and the north external elevation is butted by the attached lean-to [**G3**]; cartographic evidence indicates that the lean-to was constructed between 1856 and 1893 (see figures 6 and 7). The south wall is butted by the south wall of the garage.

5.7 Overall, the mill is sub-rectangular in plan, with maximum external dimensions of 13.75m east-west by 7.50m north-south. It is of three storeys, with a pitched stone slated roof; the lean-to to the north external elevation also has a stone slated roof. Internally, the majority of the building has a maximum total height of c.8.15m from ground floor level to the underside of the roof ridge; within the wheelpit, the same measurement from the base of the tail race is c.10.40m.

5.8 The mill has load-bearing external walls which vary in width, but which are at their widest (0.70m) around the wheelpit and to the north wall. All the external walls are built of a mixture of limestone and sandstone, coursed and squared to varying degrees and with prominent sandstone corner quoins, set with a lime mortar. Internally, the mill has three floor levels. The ground floor has a sandstone flagstone floor, while the upper floors are of a mixture of different-sized boards, retaining much evidence for the former location of fixtures and fittings. The roof trusses are of softwood, although substantial pieces of re-used hardwood are present both as window lintels and in the frame securing the line shafting from the pit wheel.

External elevations (see figure 28)

5.9 The south elevation (*Elevation 1*) [*8/745*] faces onto the small enclosed area in the angle of the mill and garage buildings; in 1912, this was occupied by a rectangular structure set into the angle of the two walls. This stood until relatively recently, and was demolished after 1984. An aerial photograph taken in 1979 and colour photographs taken in 1984 (see figure 17) show the structure to have been of two storeys in height, with a stone ground floor, open to the east end; a number of structures of uncertain purpose projected to the west side. The first floor was weather-boarded and projected beyond the ground floor to the south and east sides. There were three windows to the south elevation and a single larger window to the east elevation (although this appears to be filled with loading doors in 1979). The roof was corrugated iron sheeting, and sloped slightly downwards from south

to north. This now demolished part of the mill was also illustrated by Pontefract and Hartley (1942, 65) (see figure 18).

5.10 The south elevation of the mill range is three storeys in height and is of coursed and squared stone (see plate 27); to the ground floor, both coursing and squaring are less regular but become more so rising up the elevation. The quoins to the south-west corner are chamfered to 1.45m above ground level, and thinly coursed to 1.75m; above this, they assume a more regular alternating short and long pattern.

5.11 The most prominent feature of the south elevation is a two storey shallow semi-circular projection [*8/746*], set to the west of centre, and shown in 1893 and 1912, when it was contained within the aforementioned demolished structure. The projection is built of less regularly coursed stone than the main body of the elevation and the lowest 1.40m butts the face of the elevation, whereas the rest above is tied in. To the immediate east, at 1.40m above ground level, a stone block projects from the elevation face into the circular projection, while those parts of the elevation flanking the projection appear to have been re-pointed. The projection has a small window at ground floor, a larger opening at first floor level and a gently sloping single-pitch roof of stone slates.

5.12 To the west of the projection, there is a staggered joint at ground floor level and a small first floor opening with a stone lintel above, lighting the wheelhouse [**G1**]. Above the projection, there is a window with stone lintels and sills. To the east of the projection, a ground floor doorway has a shallow arched head of voussoirs; a short staggered joint may rise up the elevation above the doorway's west jamb. There is a straight joint to the doorway's east, with an adjacent large stone resembling a quoin, perhaps indicating a former opening or other structural feature; there are also two plain wall-ties here. Above, there are vertically aligned loading doorways to the first and second floors; a timber with a pulley for a rope would once have projected above the upper doorway. Finally, a smaller window is just visible above the roof slope of the adjacent garage range.

5.13 The external west gable of the mill (*Elevation 2*) faces the track between the building and Mill Gill beck. This gable is three storeys in height and is of coursed and squared stone (see plate 29); the coursing is somewhat irregular, and there are several instances of much deeper part-courses, such as to the north of the ground floor doorway [*5/553, 5/554*]. As with the south elevation, the lower quoins to the south-west corner are chamfered and thinly coursed, but then assume a more regular alternating short and long pattern. There are similar thinly coursed quoins to the base of the north-west corner, which steps inwards at 3.95m above ground level. There are six intermittent courses of throughstones in the gable, set at differing intervals. Above the third course, there is a pair of small square openings with stone lintels placed centrally to the elevation, and a third example to the south. The pair fall within what appears to be an earlier, slightly irregular gable line, set at a slightly steeper pitch than the existing gable, and rising approximately from first floor level. In the centre of the ground floor, a doorway provides the only current access to the interior of the wheelhouse [**G1**]. A first floor opening lighting the wheelhouse was once either twice the current width and subsequently blocked, or its position may have been moved to the south. A small second floor window is set towards the north end of the gable.

5.14 The north elevation (*Elevation 3*) comprises a number of different parts [*8/749, 8/750*] (see plate 28). At the west end, at ground floor level, there is a blocked doorway-sized opening, 1.60m in height, with a quoined east jamb [*7/847*, *9/033*],

formerly leading into the wheelhouse [**G1**]. The west jamb is not quoined but it rises higher than the east jamb. The wall face follows an irregular line in plan to the east of the doorway, veering in towards the building. The zinc launder enters the elevation above the blocked doorway-sized opening, and there is a modern inserted first floor window to the east. Above this window, a string course comprising two lines of stone slates, possibly the remnant of earlier, lower eaves, crosses the elevation as far as the point where it returns to the south. The string course is set at the same level as the inset to the north-west corner, and is also at the same level as the top of the single-pitch roof of the lean-to. This lean-to was present by 1893, although at that date it extended further to the west (see figures 7 and 10), so that it was approximately twice its current size; the doorway-sized blocked opening to the west would therefore have been located within the lean-to.

5.15 The west elevation of the lean-to [*7/845, 7/846*] (not drawn) has a crudely blocked opening, more clearly visible internally (see G3) at the south end, but few other features of interest. In the north elevation [*7/842*] (*Elevation 3*), there is a two part opening, and prominent quoins to the east and west ends. The upper opening, housing a small window, has a stone lintel and sill, the sill forming the head of the opening below. The east elevation of the lean-to [*7/843*] (not drawn) is blank.

5.16 To the east of the lean-to, there is a second inserted modern first floor window, and an inserted second floor window above [*7/844*]. The elevation then returns to the south; this return was formerly the external east gable of the mill but now forms an internal wall (see Elevation 16) and is described under the circulation description below. The north wall of the 'domestic' part of the mill has a blocked doorway (formerly accessing the first floor room [**1F11**]) with a very low window, lighting room (G4) to the east. There are three courses of throughstones, and prominent quoins to the north-east corner [*8/751*]. A quoin is 'missing' at 3.10m above ground level, marking the former eaves level of a lower gable visible in the external east elevation (Elevation 4; see below). One of the lower quoins [*5/549*] has a number of capital letters carved into it, possibly initials, in a style that suggests they are 19th century or possibly even slightly earlier in date - the letters "A T" appear to occur at least twice, with "W B" as well, and others no longer clearly legible.

5.17 The external east gable of the mill (*Elevation 4*) [*5/539, 5/540*] faces into the adjacent hay meadow (see plate 30). The gable is two storeys in height (the first and second floors internally) and the lower part is of roughly coursed and squared stone. Approximately the uppermost quarter comprises better coursed and larger stones, with more open joints and several throughstones. There are prominent quoins to the north-east corner and, as with the north elevation, a quoin is 'missing' at 3.10m above ground level, marking the former eaves level of an earlier, lower gable. The lowest window in this gable may be contemporary with it, while the upper window cuts across it, and clearly belongs to the period when this part of the mill was heightened. The earlier gable rose a maximum of 4.60m above the existing ground level, and was surmounted by a low ridge stack [*5/541*]. At a later date, the building was considerably heightened, and subsequent to this, a larger end ridge stack was built on the raised gable. At the same time as it was raised, the gable was probably also extended southwards. This portion now lies within the first floor of the garage [**1F12**] and is described in the circulation section below.

Circulation: ground floor (see figures 25, 29, 30 and 31)

5.18 The wheelhouse [**G1**] is located at the west end of the mill, and is an integral part of the main structure, rather than, for example, a lean-to as is sometimes seen. At the time of the survey, the only access to the interior of the wheelhouse was

through the low doorway in the west gable (Elevation 2). The wheelhouse is open to two storeys internally. The doorway in the west wall leads through onto a 0.50m wide ledge or step which runs along the west side of the wheelpit. The wheelpit itself measures 6.25m long by 1.10m wide; the height from the top of the ledge to the base of the wheelpit is c.2.40m, although the base is somewhat choked with rubble and soil (see figure 23). The north wall of the wheelpit steps inwards slightly at the same level as the ledge itself. The tailrace for the waterwheel is located at the bottom of the south wall of the wheelpit [*7/180*]. The tailrace is formed by a flag-topped opening, 0.95m wide and 0.60m in height. The tailrace runs south-east, eventually emerging in the garden of Mill Gill House some 20m to the south-east [*7/165*].

5.19 It is noticeable that the waterwheel does not sit quite parallel to the sides of the wheelpit, and the axle is also offset to one side of the opening in the east wall through which it passes. There is indeed evidence for alteration and development of the wheelhouse preserved in the internal elevations. Above the slight step in the north wall, there is a blocked doorway-sized opening, 0.80m wide, also visible externally (see Elevation 3 above). If this was a doorway, then it could quite clearly not have functioned as such with the waterwheel in its existing position. It must therefore either pre-date the installation of the existing waterwheel, or perhaps be associated with a water supply system pre-dating the zinc launder (see Chapter 7 below). Above this, the launder enters the wheelhouse through a flat-headed opening, at a slight angle to the wheel (see figure 26).

5.20 The east wall of the wheelhouse was difficult to inspect in detail due to lack of access, but nevertheless a number of observations can be made. There are three sockets or possible sockets in this east wall, all set at approximately the same height. At the very north end, a c.0.15m square socket is set just beneath the base of the launder's wrought-iron plate. To the south, a small opening at a high level leads through from the first floor of the mill building (see 1F10 below). Behind the waterwheel, there may be a second central and shallow socket set at approximately the same level as the first, opposite a socket in the west wall. Finally, towards the south end of the east wall, there is a third 0.15m square socket. Between this socket and the possible central example, there appears to be a sloping line in the wall where the masonry changes, sloping downwards from north to south [*7/179*].

5.21 As has already been noted, the tailrace is set at the base of the south wall [*7/178*]. Above the level of the ledge or step on the west side of the wheelpit, there are two small sockets, one at either end of the south wall. Above them, there is a small plain opening [*7/993*] at first floor level. The west wall also preserves a number of sockets. Towards the north end, there is a 0.15m square socket set 1.80m above the level of the ledge, and another of similar size, vertically aligned, set 2.81m above the ledge; the lower socket is 0.60m deep, like those in the south wall. Closer to the central doorway, there is another socket set 2.57m above the ledge. This is set at approximately the same height as the existing steel beam to the south-west of the doorway which supports the launder, and so may be the remains of another support for this or an earlier launder. There are also further examples. Above all of these sockets, and the launder itself, there is a plain opening at first floor level, north of the central doorway.

5.22 There is no access between the wheelhouse and the main body of the mill [**G2**]. The principal access into this room, and indeed the mill as a whole, is through the doorway in the south wall, fitted with a six-panelled door; the upper group of four panels are glazed [*8/862*]. The door was apparently once hung on strap hinges,

but has been re-hung on smaller hinges mounted on the east jamb. It was once lockable, and has the initials “E B” (presumably Ernest Burton) scratched on the rear (internal) face of the central upright of the glazed panels. On the west side of the room, there is a 0.80m deep pit, measuring 3.10m north-south by 1.10m east-west which houses the pit wheel mounted on the waterwheel’s axle (see below) (see plate 58). The north end of the pit is slightly stepped, whilst the south end slopes gently down towards the base. The east side of the pit has a low wall of mixed stone and wooden construction mounted above it, which carries the bearing supporting the east end of the waterwheel’s axle. To the south of the pit, there is a shallow impression left by the removal of a rectangular base plate, 0.90m long by 0.40m wide, once secured by two bolts; this may be set within a re-used millstone fragment [*7/019*].

5.23 The majority of the ground floor of the mill is laid with neatly cut rectangular flagstones of varying size (see plate 31), but to the south of centre, two millstones have been set into the floor [*1/545-1/547*]. The northern millstone appears to have once been c.1.50m in diameter, and to be formed from a single piece of stone [*7/057*]. It was not possible to identify the exact geology but it is likely to be an example of either a ‘grey’ stone, used for milling oats, or a German ‘blue’ millstone, commonly installed in local mills by the early 19th century and particularly suitable for milling fine flour from wheat (Harrison 2001, 64-66). It retains sets of furrows radiating out from the centre. The southern millstone was once of a similar size, but it has been cut down to give a roughly octagonal shape and appears to be of the same geology [*7/055*]. Both stones have 0.20m diameter circular holes to the centre [*7/053*]. To the north-east of the northern millstone, a shallow rectangular socket is cut into the surface of the flagstones [*7/064*].

5.24 The west wall of the ground floor room (*Elevation 12*) has a square recess with a flat lintel near its south end. Above this recess, and running for a total length of 2.50m along the wall, a line of slightly projecting slabs are visible at 1.80m above the floor level. Where the slabs stop, a shallow inset is carried north across the whole of the wall at a slightly higher level. There is a second projecting slab at 0.15m above floor level, and above this, a small square recess. This recess appears to be set at the base of a larger blocked opening, some 1.10m long by 0.60m high. To the north of the flat-headed opening through which the waterwheel axle passes, a bearing box secures one end of the line shaft running north-eastwards (see ‘power transmission’ below). Below this, there is a slightly projecting stone, with a large timber lodged in the wall which forms part of the frame adjacent to the pit wheel’s pit (see ‘power transmission’ below).

5.25 The north wall (*Elevation 13*) has a 0.70m square recess towards its west end. Above this recess, the base of blocking beneath a first floor window [1F10] is just visible below ceiling level. Adjacent to the east side of the recess, there is a smaller opening or recess, blocked with three upright timbers, and above this a large timber lodged in the wall which forms part of the frame adjacent to the pit wheel’s pit. Slightly to the east of centre, a doorway leads through into the adjacent lean-to [G3; see below] to the north. The doorway is fitted with a softwood plank and batten door, housed within a softwood frame; an eight-pane wooden framed fixed light, probably a later insertion, is placed in the upper part of the door [*7/063*]. The south face of the doorway’s east side has been cut back to approximately two-thirds of its height to produce a curved profile. This cutting back has partly affected an apparent large block of bedrock on the same side of the doorway [*7/065*]. A line of similar blocks are also visible at the base of the east wall (*Elevation 14*), which has also been cut back at its south end. At the top of the

east wall, a shaft passes through the wall to emerge in the room [G4; see below] to the east.

5.26 At the west end of the south wall (*Elevation 11*), the back of the splayed window opening set within the external semi-circular projection has two steps at the base [*7/020*]. Above the second step, but below the window sill, there is a small 0.20m square recess, 0.30m deep. The window opening itself has a flat timber lintel, and is fitted with a fixed two-pane wooden framed light set flush with the external face of the building. To the east of this window opening, a substantial timber is set into the wall, forming part of the frame adjacent to the pit wheel's pit. This timber sits on a slightly projecting stone at its base, and on its immediate east side, there is a narrow upright recessed area of vertical scarring, suggesting that another timber may have been removed. Beyond this is the external doorway, and then two large posts which support the shaft mounted here (see 'power transmission' below). Behind the shaft, a vertical joint, apparently one side of a narrow blocked opening, is just visible in the wall.

5.27 The ground floor room is crossed by two substantial ceiling beams and, for the purposes of description, the ceiling area has been divided up into three bays around these beams (see figure 31). The west bay is crossed by a number of irregularly spaced joists and other timbers, including clearly relatively recent replacements or insertions. Towards the centre of the bay, one of the timbers has a semi-circular recess cut into the eastern side of the soffit, with a single bolt remaining in place within. The adjacent timber to the south has two bolts projecting from the soffit, while between the two timbers, there is a square slot cut into the ceiling boards.

5.28 The western ceiling beam, which divides the west bay from the central bay, is actually of composite construction, rather than comprising a single timber, and forms part of the frame on the east side of the pit wheel's pit (see 'power transmission' below). On the immediate east side of the frame, within the central bay, the ceiling is pierced by a steeply inclined and rather worn flight of steps rising to the first floor [*7/032*]. To the immediate east, one of the ceiling joists has a small triangular piece of timber fixed to the soffit. This has a small grooved wooden disc fixed to one side. Further to the north, a partly broken cast-iron bracket to secure a short spindle is mounted on the north face of the second joist out from the wall. To the south of the stairs, a sack hoist is visible [*7/071*], and to the north, at least four small sub-square slots can be seen, clustered either side of the line shaft from the pinion wheel meshing with the pit wheel. Close by, a turned wooden object or peg of unknown function is suspended from the ceiling by a cord [*1/549*], with another object resembling a wooden weight or balance hanging from a nail [*7/069*]. On the north side of the central bay, a cross-timber with four bolts projecting from the soffit runs between two joists and has a slot cut in the ceiling to the east and west. The hardwood east ceiling beam retains traces of stopped chamfers to either side; it is supported to the south of centre by a post, introduced here after 1984 because of concerns about the beam sagging (Prof. D Blake, *pers. comm.*). There is a slot in the centre of the east ceiling bay, adjacent to the beam, with a large ceiling trap to the north-east. The latter is large enough to have once housed a second flight of steps leading to the first floor.

5.29 The doorway in the north wall of the mill's ground floor leads through into the small lean-to structure [**G3**], which butts the mill's north elevation. Internally, the lean-to rises through the equivalent of two storeys of the main mill building. The south wall, housing the doorway, is largely blank, but there is a line of projecting throughstones at 3.50m above the floor level, once formerly an external feature of

the mill building (not drawn). The east wall (*Elevation 14*) is blank, but the west wall (*Elevation 12*) has a tall 1.70m high blocked doorway-type opening at the south end, the base of which is set 0.50m above the internal floor level. This doorway was blocked in two stages, first being reduced in width by approximately half, and then blocked completely. The base of the two-part opening in the north wall is set c.1m above the existing internal floor level (not drawn); the lower part is boarded over, while the upper part is fitted with a modern two-pane wooden window frame. The roof structure over this room is very simple, comprising a pair of east-west timbers.

5.30 The room [**G4**] at the east end of the mill's ground floor is reached through an opening in the south-west corner; there is nothing here resembling a doorway, both walls running towards this corner having been substantially cut back. The floor was once flagged, but the majority of the flagstones are now in poor condition and broken, particularly to the southern side [*7/110*]. All walls of this room are whitewashed and also retain large areas of plaster; for this reason, it is considered to have had a 'domestic' function (see below).

5.31 The north wall (*Elevation 13*) has a low window opening, fitted with a fixed three-pane wooden framed window, with a deep sloping sill, the result of the raised external ground level here. The east wall (*Elevation 15*) (see plate 32)has recesses at either end, both of similar size (0.45m square by 0.3m deep) and positioning [*7/081*]. To the south of the northern recess, there is a faint circular scar or impression left on the wall plaster, 0.30m in diameter, perhaps caused by a pulley rubbing against it [*7/083*]. The recesses flank a low former fireplace opening, with a substantial stone lintel and containing the remnants of an iron grate [*7/079, 7/080*]; evidence for the chimney can be seen externally (Elevation 4). The south wall (*Elevation 11*) has been substantially truncated, but retains an interesting 'daisy wheel' mark cut into the plaster on the east side of the door [*7/084-7/087*] (see plate 33). These marks are often interpreted as having had a protective function, commonly placed near openings such as doorways, windows and chimneys (Cant 2011, 40-41). Here, the mark might relate either to the fireplace or possibly to a doorway that once existed in the south wall but which has been lost due to later alteration. The lower 1.10m of the west wall (*Elevation 16*) is set slightly forward of the wall face above, and its upper part slopes into the wall face but, due to the thick plaster coating, it is not possible to tell if this is the remains of a proper offset or two different phases of building. Towards the top of the wall, the east end of one of the line shafts from the ground floor of the mill building [G2] projects into the room. Towards the north-west corner of the room, two vertical softwood posts rise to ceiling level. Immediately to their east, a timber projection with boarded sides frames an opening in the ceiling above, resembling a former chute. The ceiling of the room is formed by evenly spaced softwood joists running approximately parallel to the north wall (see figure 31).

Circulation: first floor (see figures 26, 29 and 30)

5.32 The main internal access to the first floor of the mill [**1F10**] is via the steeply inclined wooden steps to the west of centre of the ground floor [G2]; these were repaired after 1984 (Prof. D Blake, *pers. comm.*).

5.33 The first floor of the mill building is effectively divided into three bays by two north-south hardwood ceiling beams, both with stopped-chamfers to the soffits. Each beam is 0.22m wide and 0.25m deep, and there are east-west joists running between them. The joists to the central and east bays have long strips of softwood nailed to their soffits, running north-south and fairly regularly spaced, but not of the

correct form to support a lath and plaster ceiling, for example. The ceiling beam can be used to describe the features in the floor. The majority of the first floor is laid with east-west aligned boards, the majority of which are 0.19m wide but with considerable disturbance, especially to the north side. Many slots or former openings through the floor have been covered over by nailing slightly larger pieces of timber across them, and these are referred to as 'covered slots' below.

5.34 In the west bay, there is a larger rectangular covered slot to the north of centre, with a smaller similar slot to the south. In the central bay, the sack hoist opening is fitted with a pair of small doors on leather hinges [*7/014*] and has a covered slot to the south, adjacent to a loading door. To the centre of this bay, east of where the steps rise from the ground floor, there is a sub-rectangular area measuring 2m long by 0.95m wide where the boards have been relaid, with further adjacent covered slots. Against the north wall, there is a further area of disturbance where boards have been relaid or altered. This area has a total length of 4.50m, extending into the east bay, and a maximum width of 1.30m, although it is generally no more than 1.0m. Described from west to east, there is a slightly raised T-shaped arrangement of timbers. Within this arrangement, the boards are not quite aligned with those in the main part of the floor, and in places are set at a very slightly higher level, particularly where they are edged with timbers running perpendicular to the floor boards [*7/008, 7/009*]. To the east, there are three wider boards, and then another sub-rectangular area beyond in the east bay, with two bolts securing a hanging bracket on the ground floor ceiling below. There is a similar area of disturbance against the centre of the east wall, adjacent to the steps rising to the second floor [2F14].

5.35 The majority of the walls in the first floor of the mill are of whitewashed roughly coursed and squared stone, although the most substantial area of plaster survives to the west wall. This west wall (*Elevation 12*) [*7/984*] has a double-height recess with a central stone shelf [*7/986*] at its south end. A level line of projecting slabs runs north for 1.10m at the same height as the sill of the recess. The inscription "J E B March 1898" is pencilled on the wall plaster in this area. Towards the north end of the wall, a small doorway fitted with a modern plank and batten door allows the upper part of the waterwheel and launder within the wheelhouse [G1] to be viewed [*7/987, 7/990*]; the door is accessed by a modern set of open steps, repaired after 1984 (Prof. D Blake, *pers. comm.*) [*7/989*].

5.36 There is a window opening at the west end of the north wall (*Elevation 13*) fitted with a modern 12-pane (6 over 6) two-light wooden frame; the upper light is top-hinged and opens outwards [*7/995*]. Beneath the window opening, a shallow recess is approximately the same width as the window itself. The recess is shallow but has a slightly curved profile in plan, with evidence of blocking below, and it may be significant that this is placed approximately opposite the curved window recess in the south wall. To the east, between this window and another window opening (fitted with a similar, modern, frame) with unevenly splayed jambs at the east end of the wall, several pieces of timber are set into the wall, flush with the wall face, some having the appearance of having been sawn off [*7/997*]. The largest piece is 0.80m long, and is secured by a central square-headed nut and bolt [*7/003*]. The east wall (*Elevation 14*) is blank, and has a doorway at the south end; steeply inclined wooden steps rise parallel to the wall, leading to the second floor of the mill [2F15].

5.37 At the west end of the south wall (*Elevation 11*), the back of the splayed window opening set within the external semi-circular projection has a shallow arched head formed from a piece of curving timber [*7/982*]. To the east jamb, there is a very

shallow rectangular recess set 0.70m above floor level, with another similar very shallow recess just above floor level [*7/983*]. The window opening itself is fitted with a pair of modern softwood shutters. To the east, a board is fixed to the wall on one side of a loading doorway [*7/980*]. This doorway retains a folding two-leaf plank and batten softwood door (see plate 35), hung on two-part spearhead strap hinges mounted on the east jamb and equipped with a sliding wooden bolt; the east leaf is slightly narrower than the west leaf [*7/981, 7/016*]. Beyond this, there is a doorway leading up, via two wooden steps, into the first floor of the garage range [1F12]. This doorway is 1.10m wide but above the head (and this is more clearly viewed from the second floor - [2F15]), there appears to be the remains of a much narrower opening, perhaps an earlier window, with a substantial but irregularly-shaped stone lintel. On the east side of the doorway, vertical timbers affixed to the wall support the mechanism operating the water flow for the waterwheel's launder (see 'power transmission' below) (see plate 34). The wall plaster of the south wall retains a reasonable amount of historic pencilled graffiti, but much is now so faint as to make it difficult to read. Examples that are more legible are "A Walker, Silver Street, Askrigg, Yorks, 1938" [*8/853*], "Railway (Jack or Tack?)" [*8/854*], a small drawing with "base" written on it [*8/855*] and "29 ft single mould, 6-6 double mould" [*8/856*].

5.38 As with the board floor, for the purposes of description, the ceiling area has been divided up into three bays around the ceiling beams. The west bay has the remnants of three chutes, each 0.35m square and forming a straight line, projecting slightly downwards from the ceiling [*7/996*]. The southern chute has two smaller timbers affixed to the ceiling to the west. In the centre of the bay, there are two very small opposed grooved wooden pulleys, which appear to have once had a wire running between them. Within the central bay, the sack hoist in the ceiling is slightly misaligned with that rising from the ground floor, and there is another trap of similar dimensions in the centre of the east side of this bay. Two small timbers are fixed to the ceiling to the north of the point where the steps from the ground floor rise up. There is a semi-circular piece of timber fixed to the east face of the east ceiling beam, while there is an irregularly-shaped piece of timber in a similar position to the west. The former has a shallow groove to the centre of the curved face, with a latch that fastens across it [*7/012*].

5.39 The doorway at the south end of the east wall leads into the eastern end of the mill's first floor [**1F11**]. The majority of the floor is formed by east-west aligned boards. There is a rectangular covered slot in the floor adjacent to the approximate centre of the west wall, and a 0.50m square trap to the front of the drilling machine (see 'power transmission' below) occupying the north end of the room; it is thought likely that the latter was to enable sawdust created by drilling to be swept directly into the room [G4] below. On the east side of the room, a large flagstone is set into the boards, projecting from beneath a stack of hay-rake blanks, almost certainly a hearth for a fireplace, now hidden by the blanks. There is a straight joint between two areas of boarding running across the southern end of the floor. There are also some very small rectangular cut-outs in the central part of the floor, together with at least three bolts flush with the floor surface.

5.40 The majority of the wall surfaces in this room are plastered and whitewashed. The north wall (*Elevation 13*) has what was once an external doorway at the west end, 1.70m high by 0.95m wide, subsequently blocked on the outside and two levels of stone shelving inserted. The stone shelving (especially the lower level) is difficult to reach due to the position of the drilling machine, suggesting that the door was blocked as part of an earlier phase of works. The east wall (*Elevation 15*) has a small window at the north end, set within a splayed opening and fitted with a

modern four-pane wooden frame [*7/972*], and there is almost certainly a fireplace in the centre of the wall, obscured by a stack of hay-rake blanks at the time of the survey. Above the blanks, close to the window, "Sept 15th" and "(Paid?) (£)" are written on the wall plaster in a flowing hand using red crayon. The doorway at the south end of the wall is now partly obscured by a lathe (see 'power transmission' below), but it opens out into a restricted area of the first floor of the garage range [1F12; see below], which is crowded with machinery and fittings. The sides of the doorway opening indicate that there are two separate phases of wall here, a 0.25m wide outer skin which projects slightly into the doorway opening, and a 0.35m wide inner skin. The south wall (*Elevation 11*) is largely obscured by the mechanism for operating the sluice of the waterwheel's launder and shelving [*7/965*], although there is a doorway with three steps rising to the first floor of the garage range [1F12]. To the east of the doorway, "The End of a Perfect Night" is written on the wall plaster using a pencil, together with crossed-out writing [*8/852*]. The west wall (*Elevation 16*) is largely blank, apart from a recess towards the north end, but the wall plaster retains interesting early-mid 1940s pencilled graffiti. The majority comprises totalled columns of figures, of varying amounts in their tens, hundreds and thousands [*7/968*]. Some figures are dated from the early to mid 1940s; one example is dated "Feb ^{19} 40" and has a column of figures beneath which add up to 2,280 together with an arrow dated "May 1943" [*7/969*] (see plate 36), while another dated "1945" has two figures totalling 2,097. There is also a pencilled sketch of a piece of machinery and a rake, and also two sketches of what appear to be engines showing different crank/driving arrangements [*7/970*].

Circulation: second floor (see figures 27, 29 and 30)

5.41 The second floor of the mill can only be accessed via the steeply inclined wooden steps leading up from the first floor [1F10] [*7/869*].

5.42 The main second floor room [**2F15**] is effectively divided into four bays by the three north-south roof trusses (see below), and for the purposes of description, these are used to describe the features in the floor. The majority of the floor is laid with north-south aligned boards, of varying widths; the floor of the western bay, over the wheelhouse [G1], is entirely modern and was replaced after 1984 (Prof. D Blake, *pers. comm.*). In the west central bay, there are three sub-square openings marking the position of the chutes visible on the floor below [1F10]; each opening is fitted with a moveable cover with a simple handle [*7/884*]. To the south, there are two sets of much smaller paired timbers set into the surface of the boards; a long narrow east-west slot, blocked by a timber, is visible adjacent to the south wall. In the east central bay, the sack hoist opening survives as a 0.70m square slot, with the similarly sized trap in the centre of the east side retaining a pair of small doors on leather hinges [*7/886*]. There are further small blocked rectangular slots to the north and south. The easternmost bay has three blocked slots of varying size to the northern half, together with an east-west board laid over the north-south boards adjacent to the south wall.

5.43 The west wall (*Elevation 12*) is plastered and white-washed to c.2m above floor level, above which bare, roughly coursed and squared stone is visible [*7/861*]. With the exception of a splayed window opening at the north end, fitted with a modern fixed four-pane wooden frame, the west wall is largely blank, although much of the face is obscured by hanging frames. These might have been intended for small framed saws, but do not closely resemble published photographs of other locally manufactured examples (Hartley & Ingilby 1981, 138). The north wall (*Elevation 13*) has a splayed window opening at the east end, fitted with a modern window as seen below on the first floor; the wall is plastered and white-washed to

full height. A large quantity of hay-rake blanks are stored at a raised level against the central part of the wall on hanging frames and timbers running between two roof trusses [*7/863*, *7/865*] (see plate 38). There is a line of what appear to be former joist holes placed just above the existing floor level, and the scar left by the removal of a skirting board at the east end [*7/866, 7/867*]. The east wall (*Elevation 14*) has two sets of paired timbers projecting from c.1.80m above floor level [*7/870, 7/871*], with the remains of a skirting board at the base. A doorway at the south end retains a door of nailed softwood plank and batten form. The west face is formed by three broad planks and one narrower plank, and there is a decorative metal latch plate with a keyhole above [*7/872*]. The door is hung on spear-head strap hinges and the wooden lock block retains decorative metal Gothic Revival mountings [*7/889-7/891*] (see plate 40). To the immediate north of the door, a picture of a machine(?) has been lightly sketched on the wall in pencil [*8/857*].

5.44 The south wall (*Elevation 11*) is plastered and whitewashed to its full height [*7/880*]. Below the east window, the irregularly-shaped stone lintel of a narrow opening projects above floor level; the opening appears to have been largely destroyed by the creation of a doorway directly below on the first floor [1F10] [*7/887*] (see plate 39). The jambs of the window opening are c.0.40m deeper internally than the height of the window frame itself [*7/873*], which is of modern six-pane (three over three) form. The loading doorway to the west retains a folding two-leaf plank and batten softwood door, hung on two-part spearhead strap hinges mounted on the east jamb and equipped with a sliding wooden bolt; the east leaf is half the width of the west leaf [*7/874*]. Above the doorway, there is a 0.20m square opening that passes through the thickness of the wall. The west window is fitted with a modern 12-pane (four rows of three) frame. The south wall retains a moderate amount of historic pencilled graffiti, which is not always legible. Examples that are include writing relating to chicks and poultry [*8/859*], figures relating to March, April and May of an unknown year [*8/860*] and further columns of figures [*8/861*].

5.45 The main room of the mill at second floor level is crossed by three north-south aligned softwood roof trusses, all of similar construction [*7/881*]. The trusses are of tie-beam and principal rafter form; the principals are lapped at the apex, where there is a ridge piece. Each principal supports a pair of through-tenoned butt purlins; to the east face of the south principal of the central truss, there are the incised marks “JPA 1867” [*7/882, 7/883*] (see plate 41). There are no wall plates, the feet of the common rafters resting directly on the wall tops. Between the roof trusses, on the south side of the east central bay, a small grooved wooden disc is suspended from a roof purlin. On the opposite side of the purlin, there is a projecting wooden peg. Close by to the north, two timbers suspended from a common rafter once housed a similar grooved wooden disc, set on the same alignment [*7/879*]. It is not clear what purpose the wire or cable that once passed through them served, but it might have been associated with the opening over the loading doorway. A similar grooved wooden disc survives over the south-east corner of the east bay, but is set on the opposite alignment to that described above.

5.46 The east end of the mill’s second floor [**2F16**] can only be accessed from the main room [2F15] to the west. Like the main room, the floor is boarded, and retains a number of infilled slots. In the west wall (*Elevation 16*), to the immediate north of the doorway, a slightly projecting piece of timber, set 1.75m above floor level, passes through the wall to project from the opposite face (within 2F15) [*7/893*]. At the north end of the wall, there is a small square recess placed at a very similar height and aligned with another projecting timber within 2F15. At 1.95m above

floor level, there is a line of six small square recesses and also a softwood timber which crosses the room on a slight east-west alignment [*7/894*]. The north wall (*Elevation 13*) is blank, with the top of the wall rising gently from west to east. This wall is plastered and whitewashed to c.1.30m above floor level, whitewashed only for a further 1.0m above this, and then of bare roughly coursed and squared rubble to roof height [*7/892*]. The east wall (*Elevation 15*) has a window (fitted with a modern four-pane fixed frame) at the north end, with a line of four small square recesses and a timber at the same height and spacing as those described above in the opposite wall, indicating that the room was once ceiled with limited loft or attic space over. The south wall (*Elevation 11*) is plastered and whitewashed to c.0.90m above ground level, with whitewashed roughly squared and coursed rubble above this [*7/888*]. There are a single opening and two recesses, all positioned at the base of the wall. The opening (at the east end) appears to have allowed a belt to rise from a shaft positioned on the first floor (1F12) of the garage range; the function of the two recesses is unclear. The roof structure over the room is very simple, comprising a number of east-west aligned softwood purlins, carrying the common rafters which meet at a ridge piece. There appear to be no wall plates.

The Garage (Site 36b)

Plan form, structure and materials (see figures 25 and 26)

5.47 The garage forms the south-central part of the recorded complex. It butts both the kiln range to the east and the mill to the north. Cartographic evidence indicates that the garage was built between 1856 and 1893, and that by 1912, there was a later structure attached to the south external elevation (Elevation 10) which is shown in 1979 and 1984 (see figures 6, 7, 10, 17 and 18). It is also clear that the external appearance of the garage owes much to repairs and alterations undertaken following the demolition of this later structure after 1984. In 1979, only the very east end of the south elevation is visible; there appears to be a wide opening on the ground floor, with a window of similar width over. The east gable had an external staircase leading to a first floor doorway (see figure 18). The garage also includes the small, partly infilled, area between the mill and the kiln range. This was an open passage between the two buildings in 1856, but had been covered over by 1893.

5.48 The garage is sub-rectangular in plan, with maximum external dimensions of 10.90m east-west by 7.90m north-south. It is of two storeys, with a single pitch stone slated roof [*7/875-7/877*]. Internally, the building has a maximum total height of c.7m from ground floor level to the underside of the roof ridge. It has load-bearing external walls, with an average width of 0.65m. All the external walls are built of a mixture of limestone and sandstone, coursed and squared to varying degrees, originally set with a lime mortar but repointed using a cement mortar.

External elevations (see figure 32)

5.49 The south external elevation (*Elevation 10*) faces onto the small enclosed area in the angle between the mill and garage buildings; as noted above, this was almost wholly occupied by a rectangular structure set into the angle of the two walls by 1893. This was demolished after 1984 due to its very poor structural condition (Prof. D Blake, *pers. comm.*). Following the demolition, the south external elevation of the garage was extensively repaired [*5/566, 5/567*]. There are three ground floor window openings, all of the same size and form, and all three fitted with modern fixed 12-pane (six over six) frames (see plate 42). Beneath the east

window there appear to be two vertical joints indicating that it once formed a doorway opening; it is shown as being open in 1979. There are two window openings to the first floor, flanking a central area of blocking of similar size [*5/568*]. The first floor window openings are of a similar form to those to the ground floor, although somewhat deeper, and also fitted with modern frames.

5.50 The external east gable of the garage (*Elevation 9*) faces the track to the mill complex past Mill Gill House. This gable is two storeys in height and is of coursed and squared stone (see plate 43). There is a large opening to the ground floor, housing a pair of modern garage doors with a smaller modern door to the south, all beneath a substantial timber lintel [*5/569*]; the doors were made after 1984 to replicate those that formerly existed here (Prof. D Blake, *pers. comm.*). At the north end of the ground floor, there is a blocked opening, c.1.20m square; Pontefract and Hartley's sketch appears to show a door here as well as a small opening to the south for which no evidence survives (see figure 18). There is a second large doorway opening to the first floor, accessed by a flight of modern external wooden stairs (excluded from the drawing); these replaced an earlier set in the same position, shown in 1979 and in the aforementioned sketch. The opening is fitted with a single modern full-height opening door, while the rest is infilled with a modern plank and batten screen beneath which are a pair of low opening doors; again, as with the ground floor, these were made after 1984 to replicate the doors that formerly existed here (Prof. D Blake, *pers. comm.*). The doorway has a small opening over the south end of the steel joist lintel, housing a pulley mounted on a block. To the north, a window opening is fitted with a modern fixed 12-pane (four rows of three) frame [*5/570*].

Circulation: ground floor (see figures 25 and 33)

5.51 At the time of the survey, the ground floor of the garage range [**G7**] could be accessed either through the modern external doorway in the east wall or the opening at the south-east corner of the ground floor of the mill [G2]. The room is floored with a variety of different materials [*7/089*] (see plate 44). At the east and west ends, there are patches of worn and fragmentary stone cobbles [*7/091, 7/092*]. On the south side of the room, there is a spread of modern concrete which contains a sub-rectangular infilled pit measuring 1.60m long by 1.10m wide, perhaps a former vehicle maintenance pit but possibly associated with the operation of machinery. The northern half of the floor consist of several well cut flagstones of varying sizes, some very large. Three of the flagstones bear impressions left by substantial base plates, all aligned east-west and with remnants of holding-down bolts to the corners [*7/093*]. An *ex situ* piece of machinery (Inventory 7.4) now standing in the north-east corner of the room was once fixed on a north-south alignment on four of these bolts (Prof. D Blake, *pers. comm.*).

5.52 All the internal walls are of whitewashed roughly coursed and squared stone. With the exception of the aforementioned modern doorway, an intermittent line of throughs over the doorway, and the blocked opening at the north end, the east wall (*Elevation 20*) is largely blank. The south wall (*Elevation 21*) contains the three window openings averaging 2.30m long by 1.25m high [*7/108*]; there is also a bearing box above the east end of the western window with an adjacent stain of grease (see 'power transmission' below). Much of the west wall (*Elevation 17*) (which was originally part of the mill) appears to have been cut away to create a wide opening with a steel I-section beam for a lintel; beyond the lintel, the ceiling level drops by 0.30m, reflecting the lower first floor level within the main mill building [1F10] [*7/075*]. The north wall of the room (*Elevation 19*) was formerly an

external wall of the kiln range (see plate 45). The eastern half of the wall rises from a projecting plinth. This stops abruptly approximately halfway across the elevation, although a horizontal joint in the masonry can be traced west at the same height towards the quoined west end of the wall. Described from east to west, there is a 0.45m square opening with a timber lintel passing through the thickness of the wall, with an adjacent stain of grease associated with a former line shaft here [*7/097, 7/098*]. Beyond this is a smaller, possibly inserted, lower level opening, just above the point where the plinth ceases to project, skewed through the thickness of the wall. To the west, there is the tall partially blocked doorway-like opening described under the interior ground floor of the kiln range [G6; see below] [*7/105, 7/106*].

5.53 The room is crossed by a large number of softwood ceiling joists, generally set at right-angles to the south wall, but with a number of cross-timbers, particularly at the west end (see figure 31). In the eastern part of the ceiling, there is a rectangular trap set just to one side of the position of the line shaft which apparently crossed the room here. A short distance to the west, there are two lines of more irregular disturbance to the ceiling boards, the longer of which is roughly aligned with the joists with soffit cut-outs adjacent to the striking mechanism (see 'power transmission' below).

5.54 The former passage [**G5**] between the mill and the kiln range, blocked and covered by 1893, was once accessed by a flight of five steps rising from the floor [*7/115*]. The steps are of stone construction and are on average 0.25m wide, although that giving access to the ground floor of the kiln range [G6] is considerably wider, comprising two flagstones. The passage is now blocked by a thickly mortared stone wall [*7/114*]. It is possible to peer into the stair passage though the base of an external opening in the north wall (Elevation 4), but little can be discerned, save for the fact that it appears to be floored with broken flagstones.

Circulation: first floor (see figures 26 and 33)

5.55 At the time of the survey, the first floor of the garage [**1F12**] could be accessed either through the modern external doorway in the east wall, reached by a flight of external stairs, or by the two doorways at the south-east corner of the mill's first floor [1F10].

5.56 The majority of the room is laid with east-west aligned differently sized softwood floorboards [*1/519*], many of which are old boards which were re-used here after 1984 (Prof. D Blake, *pers. comm.*). However, at the north-west corner, within the irregularly-shaped space over the blocked-up passage [G5] on the ground floor, the floor is of concrete. In addition, on the north side of this area, the floor level drops vertically by 0.65m. Because of the modern repairs to the floor, there is surprisingly little evidence of alteration, apart from on the north side where there is an opening associated with a striking mechanism (see 'power transmission' below).

5.57 The walls are of roughly coursed and squared rubble, the majority of which are whitewashed [*1/520*]. With the exception of the aforementioned inserted doorway and window opening, the east wall (*Elevation 20*) is largely blank [*1/490*, *7/908*]. Over the wider southern division of the doorway, there is a projecting shelf, supported on three projecting timber brackets [*1/498*]. Above this shelf, there is a second horizontal board, with an angled board rising from the north end towards a roof purlin [*1/497*]. Above the second board, in the approximate centre of the wider part of the doorway, there is a narrow opening fitted with a small plank and batten

door; a chain is suspended from the roof timbers in front of the opening [*1/499*]. At the north end of the elevation, two stones project at a higher level above the window. As on the ground floor, the south wall (*Elevation 21*) is occupied mainly by the three large window openings, the central one being blocked [*1/521, 7/935, 7/936*] (see plate 47).

5.58 The west wall (*Elevation 17*) has been the subject of much alteration, partly as a result of once having been an external elevation of the mill [*1/527*]. At 1.85m above ground level, the stonework changes. Below this level, the wall is of roughly coursed squared stone, largely whitewashed. Above this level, the stonework is better coursed and more regularly shaped, and is laid to a watershot profile. It is also partly whitewashed [*1/526*]. Just above this level, the quoins at the north end of the wall (the former south-east corner of the mill building) change to neat edge-laid quoins. The doorway at the south end of the wall has a slightly curved recess to the centre of the north jamb, with a blocked opening of some kind, c.0.35m wide, beyond this. The doorway to the north has large quoins to the south jamb, but small stones to the north jamb. A vertical board is mounted to the wall, and appears to rise through the roof here [*1/512*]. Beyond this point, one moves into the irregularly-shaped space over the blocked ground floor passage [G5]. As has been noted above, the floor level within this space drops, so that part of the base of the south wall is set 0.70m lower than the rest of the first floor level of the garage (see Elevation 4). In addition, part of this wall was once also an external elevation of the mill. The quoins at the south-east end rise to 1.50m above the upper floor level, and there is then a break before they resume again in a more regular edge-laid form. A doorway rises 2m above the lower floor level, and is crossed by a timber housing (see 'power transmission' below). Over the doorway, a part stepped, part sloping earlier roof line can be seen within the stonework, which is also visible externally (see Elevation 4). The north wall of the irregularly-shaped space is formed by a curved wall, largely blank, with a tall opening at the western end (not drawn).

5.59 The east wall (*Elevation 18*) was once the external west gable of the kiln range, and this has a blocked doorway at the north end; the doorway has a quoined south jamb and a wooden lintel. In the central part of the wall, there is an irregularly-shaped hole passing through the thickness of the wall, with much disturbance to one side, including brickwork blocking. The south end of the wall is quoined to 2.55m above the upper floor level.

5.60 The north wall of the main first floor garage room [1F12] (*Elevation 19*) was also formerly an external elevation of the kiln range. It is built of roughly coursed squared stone, whitewashed for the main part [*1/517, 1/518*]. At the western corner, quoins rise to 2.55m above floor level, and then stop. A break in the stonework at this level, which gradually becomes a shallow inset, can be traced east across the whole elevation [*7/909*]. Above the inset, the stonework is also whitewashed, but is built of generally larger pieces laid to deeper courses. There is a small window, fitted with a 9-pane wooden fixed frame, towards the west end of the elevation (see plate 48), and a doorway towards the east end. The doorway retains narrow double doors of plank and batten softwood construction - the west leaf is fitted with a decorative latch plate [*7/907*] (see plate 46). At a higher level, just below the inset, projecting timbers relate to the roof structure within the first floor of the kiln range [1F13; see below]. The wall continues upwards beyond the roof, and is visible externally [*7/875, 7/876*], with lead flashing at the west end.

5.61 The roof over the room has been subject to much repair, most recently in 1985 (Prof. D Blake, *pers. comm.*), and it was repaired again at the end of 2010 before

the main recording work commenced (although the roof was photographed and described prior to any works taking place). The roof over the main body of the room was constructed entirely in softwood, and basically comprises two north-south aligned principal rafters [*1/493*]; the eastern principal is set substantially higher than the other, and a variety of different joists run between them, fanning out to the east as the room widens [*1/491, 1/492*, *1/495*]. The joists support the common rafters on which the stone roof slates are secured [*1/500, 1/501*]. The ends of the principal rafters are set directly into the walls of the room, but the feet of the common rafters rest on a composite wall plate [*1/503*].

5.62 The irregularly-shaped space in the north-west corner, over the blocked-up passage [G5] on the ground floor, is crossed by a number of softwood timbers [*1/511*] at varying centres, although many of these formerly supported the line shaft here (see 'power transmission' below). One of a cluster of timbers at the south end of this area has a cast-iron fitting hung on projecting nails on the north face [*1/513*].

The Kiln Range (Site 36c)

Plan form, structure and materials (see figures 25 and 26)

5.63 The kiln range forms the north central part of the recorded complex. It is butted by the barn to the east and the garage to the south and west; cartographic evidence indicates that the kiln range formed part of a longer, free-standing, range with the barn in 1856, without any surrounding structures (see figure 6). However, the 1839 tithe map might suggest that it originated as a smaller square structure (see figure 4). By 1893, the range had been incorporated into the larger complex (see figures 7 and 10).

5.64 The kiln range is sub-rectangular in plan, with maximum external dimensions of 9.40m east-west by 5.15m north-south. It is of two storeys, with a single pitched stone slated roof, sloping down from south to north. Internally, the building has a maximum total height of c.6.95m from ground floor level to the underside of the roof ridge. The kiln range has load-bearing external walls which vary in width, but which are at their widest (0.70m) around the south-east corner - the former external south elevation and east gable rise from a projecting plinth, and a similar feature is just visible at the north-east corner. The external walls are built of a mixture of limestone and sandstone, roughly coursed and squared and, set with a lime mortar. Internally, the kiln range has two floor levels. The ground floor has a largely sandstone flagstone floor, while the upper floor is a mixture of different-sized boards and flagstones. The roof trusses are of softwood.

External elevations (see figures 32 and 33)

5.65 The former west and south external elevations of the kiln range now lie within the garage, while the former east gable is set within the barn, and these are described above and below as part of these buildings. The only external elevation which remains so is the north elevation (*Elevation 5*) [*5/544*], facing into the hay meadow, and this preserves evidence for several different phases of development (see plate 49). At the base of the east end of the elevation, a slightly projecting plinth [*5/546*] is visible for several metres but then disappears beneath the rising ground level. However, it is highly likely that it continues as far as a vertical straight joint in the elevation some 7m to the west, which would make it of similar length to the plinth at the base of the former external south elevation (Elevation 19); the east side of the joint coincides with the east side of a low opening here (see below). The

vertical joint rises for 2.20m before stepping in slightly to the east, and then rising for a further 1.30m [*5/545*].

5.66 This slight inset may mark the former height of an early single storey building associated with the plinth, as a horizontal break in the stonework of the elevation is visible at approximately the same height to the east. This building was then heightened to two storeys, and subsequently extended west by a further 2.50m. The earlier building, in both its single storey and two storey forms, makes use of larger stones to the corners as quoins, but these are quite different to the regular long and short quoins surviving to the western extension and elsewhere within the complex. Within the earlier building, there is a low opening at the very east end, fitted with a grille of vertical square-section wrought-iron bars held in place between two horizontal timbers [*5/546*]. To the west of this, there are at least three blocked openings, sub-square or sub-rectangular in form and all set at different heights. Within the western extension, there is a larger ground floor opening, again fitted with a grille of vertical square-section wrought-iron bars held in place between two horizontal timbers. To the first floor, and extending across the earlier building as well, there are three tall window openings, all fitted with modern 16-pane (four rows of four) frames. The outer windows are fixed, but in the central window the upper row forms a separate light, top-hinged and opening outwards.

5.67 The west end of the western extension is butted by a short section of slightly curved wall between the kiln range and the mill [*5/542*]. This blocked the former passageway between the two buildings, shown open in 1856, but closed by 1893. At its west end, there is a tall opening [*5/543*] with a wooden frame, now partly boarded over. The upper part of the opening retains a c.0.50m high softwood plank and batten door, hung on a single visible spearhead strap hinge mounted on the west jamb. Below the door, the base of a square section timber channel or housing is visible. It is believed that this was used to transfer power, from a traction engine or tractor parked externally, to at least part of the line shafting within the mill (see 'power transmission' below). The vehicles were apparently located within a corrugated-sheeting lean-to type structure formerly set against the north elevation (Mr T Metcalfe, *pers. comm.*).

Circulation: ground floor (see figures 25 and 34)

5.68 At the time of the survey, the only access into the ground floor of the kiln range was through the doorway at the south end of the west wall (Elevation 18). This doorway retains a plank and batten softwood door, much repaired, but still substantially complete. The outer face has been repaired with a number of irregularly-shaped pieces of timber [*7/113*]. The door is hung on long round-headed and spear-headed strap hinges, mounted on the south jamb, and has a simple latch and lock block [*7/116*] (see plate 50). The central batten has "R ADDISON" carved or stamped into it [*7/117*].

5.69 The majority of the ground floor room [**G6**] is floored with well-cut flagstones. These continue around the narrow passage which runs around the south, east and north sides of the kiln itself. This passage is 0.90m wide on the south side of the kiln, but gradually narrows to 0.70m on the east and north sides. As the passage runs around the east and north sides of the kiln it rises, so that after passing beyond the western limit of the kiln it opens out onto a sub-rectangular raised area, measuring 2.90m east-west by 1.70m north-south. This raised area is set up to 0.40m above the level of the rest of the floor, and has sides built of stone rubble; its surface is also flagged, and has a pile of perforated clay tiles from the kiln's former drying floor stacked on it (Inventory 6.1) [*7/122-7/124*] (see plate 53). On

the lower part of floor, immediately to the west of the kiln, one of the flagstones carries a circular scar. The flagstones in the north-west area of the floor are badly broken and in addition, within this area, there are two slightly raised irregularly-shaped 'lumps' of stone which appear to be worn limestone bedrock [*7/119, 7/120*]. A similar piece of material can be seen adjacent to the bottom of the central part of the south wall.

5.70 The walls are generally whitewashed roughly coursed and squared stone. With the exception of the aforementioned doorway, the west wall (*Elevation 22*) is blank [*7/118*]. The north wall (*Elevation 23*) has openings fitted with wrought-iron grilles at either end [*7/121, 7/139*]. The east wall (*Elevation 24*) is blank [*7/137*]. The south wall (*Elevation 25*) appears to have a low-level blocking or area of repair towards the east end and, beyond this, a small window opening with two wall-ties adjacent [*7/134*]. There is then another low level opening, probably a later insertion, which passes through the wall thickness [*7/126*] and finally, a tall, partially blocked, opening, resembling a former doorway [*7/125*].

5.71 The kiln itself has a base measuring 2.40m square. At c.1.60m above the lower floor level, all four sides of the kiln spring outwards to form broad half vaults [*7/136*] (see plate 51); if it covered the same area as these vaults, then the upper part of the kiln (i.e. the tiled drying floor) could have been as much as 4.10m square. The vaults on the north, east and south sides of the kiln meet the wall of the room, whereas that to the west meets a substantial ceiling beam (see below). The kiln is constructed almost entirely of brownish-red handmade bricks (average dimensions 230mm by 110mm by 60mm) set with a lime mortar but not laid in any particular bonding pattern; some parts have been re-pointed since 1984 (Prof. D Blake, *pers. comm.*). There are two openings in the west face (*Elevation 26*) of the kiln (see plate 52). The 1.55m tall firehole is centrally positioned, with a curved cast-iron lintel [*7/127*], and runs back for a maximum of 0.95m from the face, preserving the remains of an internal iron fire grate [*7/130, 1/731*]. The jambs are formed by bull-nosed yellow bricks, and there was once a closing external door hung on the south side, of which one pintle remains. The yellow bricks continue south to form one side of a smaller opening with a projecting lintel, running back 1.40m from the face. There may once have been an opening of similar size, but set at a lower level, to the north of the firehole [*7/128, 7/129*]. By crawling into the firehole, it is possible to examine the interior of the kiln. Unfortunately, it has been badly truncated, and only fragments of the side walls, partly constructed in brick, remain to the north and south sides, with no surviving structural detail [*7/132, 7/133*].

5.72 The ground floor room is crossed by two (hardwood?) ceiling beams with stopped chamfers to the soffits (see figure 31). They are not quite set parallel to one another, and have joists running between them. At the south end of the ceiling bay between the two beams, the joists are spaced much more closely together; one is substantially wider than the others, and also has stopped-chamfers to the soffit. Immediately adjacent to the east side of the east ceiling beam, there is a parallel timber, set at a slightly lower level, which supports the brick half-vault on the west side of the kiln. In the north-west corner of the ceiling, there is a former trap, that might conceivably once have housed a ladder-like stair allowing internal communication between the floors of the building. To the east of this, the remains of a pair of chutes project from the ceiling.

Circulation: first floor (see figures 26 and 34)

5.73 At the time of the survey, the only access to the first floor of the kiln range was through the doorway at the east end of the south wall. The majority of the room

[**1F13**] is floored with north-south aligned boards. There is however a rectangular flagstone at the south-east corner, and a line of three large flagstones crossing the floor just to the west of centre [*7/905*]. The eastern part of the floor has a large rectangular area of disturbance, centrally positioned.

5.74 The walls of the first floor room are all of roughly coursed and squared stone, the majority are whitewashed. The west wall (*Elevation 22*) has a blocked doorway at the north end, with two holes to the south, relating to the area of disturbance that can be seen on the opposite face of the same wall [1F12; Elevation 18] [*7/900*]. The north wall (*Elevation 23*) is largely occupied by three windows [*7/903*]. At the very east end of the wall, where it meets the east wall and commencing at 2.10m above floor level, the wall faces are crudely corbelled out across the corner.

5.75 On the east wall (*Elevation 24*), this corbelling out appears to be placed just above an earlier roof line visible within the wall face, which is itself related to the phasing described above in the north external elevation of the garage range (Elevation 19) [*7/895*]. The earlier roof line is pitched, with the apex set at 3m above floor level. There is a blocked central opening to this gable, with a stone lintel which is slightly recessed, and a stone sill [*7/897*]. The blocking comprises a single upright stone slab, and the whole has been subject to heavy repointing with cement, especially around the base. Above the blocked opening, a line of four recesses crosses the wall. Above them, there is a second earlier pitched roof line, the apex of which is set c.0.80m higher than that described above. Finally, the existing single pitch roof rises above this.

5.76 At the east end of the south wall (*Elevation 25*), at 2.10m above floor level (i.e. the same height as the corbelling described above), there may be a small recess, above which the wall bulges outwards. At the top of this bulge, 3m above floor level, a horizontal joint can be traced running west across approximately half the length of the wall. The doorway towards the east end of the wall retains much chalked graffiti, but all of this appears relatively recent [*7/898*]. Between the doorway and the window at the west end, there are two further features. A very narrow opening resembles a slit breather, and a smaller blocked recess appears to have a straight joint on its south-east side.

5.77 The room is crossed by three softwood half trusses, all of the same form, comprising a narrow tie-beam with a raking strut to a deep principal rafter. Each principal carries four through-tenoned butt purlins. The roof structure was repaired after 1984 (Prof. D Blake, *pers. comm.*).

The Barn (Site 36d)

Plan form, structure and materials (see figures 25 and 26)

5.78 The barn forms the eastern part of the recorded complex, and it butts the kiln range to the west. Cartographic evidence indicates that in 1893 and 1912 there were once further structures at the east end of the barn, forming a continuous range with an existing dovehouse to the south, but these no longer exist (see figures 6 and 10).

5.79 The barn is sub-rectangular in plan, with maximum external dimensions of 10.35m east-west by 5.95m north-south. It is of two storeys, with a pitched stone slated roof. Internally, the building has a maximum total height of c.6.70m from ground floor level to the underside of the roof ridge. It has load-bearing external walls, with an average width of 0.55m. The external walls are built of a mixture of limestone

and sandstone, roughly coursed and squared with intermittent courses of throughstones, and set with a lime mortar. Internally, the barn has two floor levels. The ground floor is a mixture of concrete, flagstones and earth, while the upper floor is of softwood boards. The roof trusses appear to be of hardwood.

External elevations (see figure 35)

5.80 The south external elevation of the barn (*Elevation 8*) faces onto the small yard area to the south of the mill complex (see plate 54). The elevation is three bays in length, and the ground floor of the central bay is occupied by a tall cart entrance with a broad semi-circular head of well cut voussoirs [*5/571, 5/573*, *8/864*] (see plate 55). There are two ranks of voussoirs, the inner (lower) rank being slightly recessed from the outer (upper) rank. Above the outer rank, a very slightly projecting course of thin stones, again very neatly cut, follows the arc of the head. The entrance is fitted with a pair of modern plank and batten doors, introduced after 1984, as were all the existing doors in the building (Prof. D Blake, *pers. comm.*). This cart entrance is flanked by smaller doorways in the bays to the east and west, which are also fitted with modern plank and batten doors [*5/572*]. To the first floor, above the cart entrance, there are two small breathers with stone lintels, while either side to the outer bays there are two low pitching openings, 0.95m wide by 1.15m high, again fitted with modern plank and batten doors; the eastern opening has a small square blocking above it. There are prominent quoins to the south-east corner. The east gable (*Elevation 7*) [*5/574*] was partly obscured by vegetation at ground floor level at the time of the survey, but a single, central, opening is visible at first floor level, perhaps with a staggered joint to the north; there is no real external evidence for a blocked opening to the south seen internally (see below). The external north elevation (*Elevation 6*) [*5/547*] (see plate 56) has prominent quoins to the north-east corner, but smaller quoins to the north-west corner, where it butts the kiln range. There is a small window at the west end of the ground floor, and a larger example at the east end, both fitted with modern six-pane wooden frames. To the first floor, there is a central pitching doorway, fitted with a modern plank and batten door, and with evidence of repointing around it and the blocking above; again, there is no real evidence for two small blocked openings seen internally on either side of the door (see below). At either end of the first floor, other small blocked openings are also visible.

Circulation: ground floor (see figure 25)

5.81 As set out in the survey methodologies (see Appendix 6), the internal elevations of the barn range of the complex were not drawn, partly because they did not contain significant structural information that was not visible externally, and partly due to concerns about the condition of the barn's first floor.

5.82 For the purposes of access, at the time of the survey, the ground floor of the barn was divided into two parts. The ground floor of the west part [**G8**] is reached through the doorway at the west end of the south wall. The eastern half of this room has a modern concrete floor, while the western half is floored with neatly cut flagstones [*7/142*]. The west and north walls are plastered and whitewashed, while the major part of the east wall is whitewashed only. The west wall was formerly an external gable of the kiln range, and it has a shallow projecting plinth at its base. It has a recess, positioned c.1m above floor level, towards the south end; the interior of the recess is also plastered and whitewashed [*7/143*]. The plaster on the west wall also respects the former joists above [*7/144*]. Other than this, the north, south and east walls are largely blank; the latter is a modern blockwork insertion. The north wall has a small window opening towards its west end [*7/145*]. On the south

wall, on the east side of the doorway, there is some pencilled graffiti headed "BARRELS, TRAPS ETC" and with a long column of figures beneath [*7/146, 7/147*]. The room is crossed by a single north-south aligned beam, with a rectangular trap to the west, large enough to have once accommodated a steeply inclined set of steps or a ladder (see figure 31).

5.83 The ground floor of the east part of the barn [**G9**] is divided into two parts, separated by a post and board partition [*7/148*]. The partition comprises three posts; a pair at the southern end defining a former doorway, and a larger post just to the north of centre. The posts support horizontal timbers, which have vertical planks nailed to the west face; the horizontal timber forming the doorway lintel has the same "R ADDISON" stamp over it as was noted on the ground floor of the kiln range [G8] [*7/149, 7/150*]. Beyond the doorway, there are upright flagstone partitions framed in timber running between the posts, resembling the boskins sometimes seen in barns [*7/164*]. Of the two parts to this room, the narrower western part was reached through the cart entrance in the south elevation of the barn; this part was used to store logs at the time of the survey, and the original floor covering could not be seen. The wider eastern part is accessed through the doorway at the east end of the south wall. A strip along the east side of the floor retains neatly cut flagstones, but the remainder is floored with modern concrete [*7/159*]. A board partition set at a right angle to the main post and board partition sub-divides this part of the barn still further, into two smaller parts of equal size [*7/160, 7/163*]. There is a window at the east end of the north wall [*7/162*], and a pair of recesses at the south end of the east wall [*7/161*].

Circulation: first floor (see figure 26)

5.84 At the time of the survey, the only access to the first floor of the barn [**1F14**] was by setting up a ladder in the central bay of the ground floor [G9], which was open to roof apex height. The condition of the board floors of the two-bay wide areas flanking the open central bay was uncertain, and so these were not inspected in detail. The two areas were linked by a wooden ramp placed adjacent to the north wall.

5.85 All walls are of roughly coursed and squared stone. The west wall, formerly the external east gable of the kiln range, has a blocked opening at a low level, which appears to correspond with that visible to the first floor of the kiln range [1F13]. However, due to thick repointing, it is difficult to see the earlier gable lines which are visible internally from within the first floor of the kiln range [*7/154, 7/155*]. The north wall has a central pitching opening flanked by partially blocked narrower inner and outer openings [*7/152, 7/156*]. There is a further opening to the south of centre of the east wall, with a blocked opening of similar width at the south end [*7/157*]. The south wall has pitching openings to the west [*7/153*] and east [*7/158*] ends, with two narrower openings between.

5.86 The room is crossed by four (hardwood?) roof trusses, set at equal centres and all of similar form. They are formed by what appear to be slightly tapered principal rafters, butting at the apex where there is a plank ridge piece. Each principal carries a pair of staggered purlins. The feet of the principals are set directly into the walls of the barn. There is a softwood timber bolted to either face of the principals, essentially forming a collar [*7/151*]. Some repairs to the roof were undertaken after 1984 (Prof. D Blake, *pers. comm.*)

Power Transmission

5.87 It is clear that the vast majority, if not all, of the surviving *in situ* machinery, line shafting and mechanical fittings within the mill complex relate to its use as a saw mill and for hay-rake manufacturing. Furthermore, much of the line shafting has the appearance of being 'made to fit', suggesting that it was bought in second-hand from elsewhere and then adapted for West Mill. There are also several modifications to allow operation by a single person, including controlling the flow of water to the waterwheel from inside the mill.

The waterwheel

5.88 The primary power source for the mill's machinery was the waterwheel, housed within the wheelhouse [**G1**], on the west side of the mill building. As has already been noted, the waterwheel was overshot, and was fed by a launder entering the north wall of the wheelhouse at a height of 2.75m above the level of the step or ledge running along the west side of the wheelpit [*7/991*] (see figure 23). The launder is supported on the internal elevation by a single rolled steel I-section beam, inserted here after 1984 (Prof. D Blake, *pers. comm.*). The end of the launder over the waterwheel is angled to direct water into the buckets [*7/992*]. The flow of water into the launder could be controlled from inside the mill. As has been noted, the sluice on the zinc launder is connected to a steel wire which passes through the mill's north wall above a first floor window. Within the first floor [**1F10**], the steel wire crosses from north to south to a grooved metal disc suspended from a metal bracket adjacent to the east end of the south wall. Thereafter, it is attached to a chain, which itself passes through a long wooden lever mounted on two vertical timbers located at the east end of the south wall (*Elevation 11*), and then through a small gap in the floor to the ground floor [**G2**] of the mill [*7/978*] (see plate 34). Pegs set into the timbers allow the lever to be secured in either a raised or a lowered position. It was therefore possible to increase or decrease the water flow across the waterwheel from inside the mill, rather than having to do so externally; this also allowed the operations within the mill to be undertaken by fewer workers, perhaps only a single operator.

5.89 The waterwheel itself is 5.05m in diameter and 0.90m in width, and is of a hybrid cast-iron and timber construction. It is mounted on an octagonal cast-iron axle, 0.25m wide. An octagonal inner hub and flange, both of cast-iron, are mounted on the axle at either side of the wheel [*7/166, 7/167*]. The wheel has eight square-section wooden spokes projecting from the inner hub in a compass arm pattern [*7/168, 7/171-1/172*]. The shrouds of the wheel [*7/170*], which are formed from curved cast-iron felloes, are bolted to the spokes. The wheel has a total of 56 buckets, comprising wooden rising and bucket boards, and wooden sole plates [*7/169*], some are modern (see below) [*7/174*, *1/177*] (see plate 57). The axle of the waterwheel is mounted on a bearing at the west end, which has had its brass removed [*7/173*]; the bearing plate is bolted to a piece of timber set into the upper surface of the wheelpit step or ledge. Since 1984, a new oak block has been put in place for the axle, all of the spokes replaced, new buckets and boards provided, and nuts and bolts replaced. Further buckets were replaced in 2010 (Prof. D Blake, *pers. comm.*).

5.90 Calculations based on the surviving waterwheel, launder and water supply suggest that the wheel could generate power directly proportional to the quantity of water fed down the launder, up to an optimum output of around 23 horse power. However, it is likely that it ran well below this level. The various items of surviving machinery and equipment within the mill would probably not require more than two

to three horsepower to run at one time, with the rest being dissipated through transmission inefficiencies. Approximate calculations have also been made as to the revolutions per minute of the various surviving shafts and pulleys within the mill, and a copy of these is included in the project archive.

The ground floor (see figures 25 and 31)

5.91 The axle [*7/034*] of the waterwheel passes through an opening in the east wall of the wheelhouse, and into the main body of the mill [**G2**]. It continues over a shallow pit to a bearing [*7/033*] secured on a low timber and stone wall [*7/028, 7/036*] on the east side of the pit. A cast-iron toothed pit wheel is mounted on the axle, close to the west wall (see plate 58). This pit wheel is 2.30m in diameter, 0.12m wide and cast in two parts, bolted together along two of the eight arms, which are arranged in a compass pattern [*5/576, 7/023, 7/027*]. The pit wheel has 144 teeth, and meshes with a toothed pinion wheel mounted on a line shaft to the east [*1/535*]. The pinion wheel is 0.35m in diameter, and has 20 teeth. The line shaft is mounted in a bearing box at the west end, and it runs 4.70m east, being partly secured beneath a substantial wooden frame on the east side of the pit wheel's pit.

5.92 The frame is broadly formed by the composite west ceiling beam, a lower horizontal timber and three substantial upright posts (see figure 36). The southernmost post is buried in the south wall. It is c.0.35m square and stands 1.25m in height. There is a 0.45m long vertical slot in the north face, and the whole sits on a slightly projecting base or padstone, although there is no evidence to suggest that it was ever a free-standing post. Above the slot, there is at least one small recess cut out of the visible face, and a horizontal timber set across the post above this [*7/021, 7/022*].

5.93 The central post measures just over 0.35m square, and stands a maximum of 1.47m in height (see figure 36). It too has a long vertical but shallow slot cut into the east face [*7/030, 7/031*], with a slightly shallower slot to the south side. There are three circular holes left by bolts or screws to the latter, suggesting that a timber may have once run south towards the southernmost post. A chamfered north-east corner rises the full height of the east face. A chain with small links is nailed to the head of the face. It loops downwards, and has a rusty metal tag suspended on it. It then rises again, being tied to a cord suspended from the ceiling, and rises once more to a nail on the east face of the ceiling beam. There are other nails here, from which other shorter lengths of chain are suspended, and also a small hook [*1/540*]. The north face of the central post has a shallow recess which rises the full height of the west side, and which incorporates a 0.20m square cut-out which extends across the face as far as the chamfer on the opposite, east, side [*7/051*]. The west face of the central post has another long vertical slot towards the base, although viewed from this side, it appears to be a deeper opening blocked by a piece of timber, which may have the remnants of Roman numerals marked on it using grease. To the south of the slot's head, there is a single former bolt hole, and above, two circular holes, one infilled, resembling former peg holes; a similar feature can be seen in the horizontal timber immediately above. The south face of the central post has a shallow slot approximately one third of the way up one side. There is a broadly semi-circular cut-out, just over 1.0m in height, to the opposite side, with a broad chamfer carried the full height of the post above this. At its head, the post can be seen to be tenoned into the lower of the timbers forming the composite ceiling beam [*1/539, 7/029*].

5.94 The northernmost post measures 0.32m by 0.25m, and stands a maximum of 1.52m in height (see figure 36). The majority of the east face is occupied by a long vertical opening which runs the full width of the post [*7/038, 7/039*] (see plate 59); the face is stop-chamfered to either corner flanking the opening. Above the opening, a tenon projects from the face of the post. The north face has a 0.45m long vertical slot positioned towards its east side, whilst opposite there is a semi-circular cut-out [7/*048*]. The west face [*7/049*] has the same opening as is visible in the east face, while the south face is largely blank [*7/050, 7/052*], with the exception of a possible bolt or peg hole towards the top. A horizontal timber runs west from the west face, skirting one end of the pit wheel's pit. To the immediate north of this horizontal timber, there is another post [*7/043*]. However, while this, like the others, is c.0.30m square, it stands only 0.75m high, and has no obvious connection with the rest of the frame.

5.95 The lower of the horizontal timbers forming part of the frame runs between the central post and the north wall, a distance of some 3.90m. It is, on average, 0.32m deep by 0.25m wide. As has already been noted, the head of the central post is tenoned into the soffit of the horizontal timber, and it is assumed that the northern post is jointed into it in a similar manner. The majority of the east face has the remnants of a broad stopped-chamfer to the soffit. To the north of the central post, there is a mortice to the base of the timber's face [*7/037*], and slightly beyond this, a shallow semi-circular cut-out to the upper part of the face. To the south of the northern post, the line shaft from the pinion wheel meshing with the pit wheel passes beneath the timber [*7/042*]. A semi-circular recess has been cut out of the face of the timber to allow this to happen, and a curving piece of cast-iron affixed to the face to support the shaft [*1/541, 1/544, 7/070*]. As might be expected, there is a great deal of grease staining to the face of the timber around the shaft. To the north, there are two further mortices, and above, partly overlapping with the ceiling beam, a sub-circular scar with a total diameter of 0.41m apparently caused by a pulley rubbing against the face of the timber [*1/542, 1/543*]. There are two distinct parts to this scar [*7/041*]. The inner part is c.0.30m in diameter, and comprises a reasonably well-defined circle around a central recess; a mortice immediately below it is probably unconnected. The outer part is only well defined below the inner part, but it appears to have been caused by a circular object of c.0.60m diameter moving around the same centre as the inner part. The west face of the horizontal timber is far simpler. It too has a chamfer running almost the entire length of the soffit, with two recesses, separated by an unmarked section of face, occupying the upper part of either end of the face. That at the south end is 1.14m long, and that to the north end 2.28m long [*7/045, 7/046*]. As has already been noted above, the ceiling beam running over the frame is of composite construction, rather than comprising a single piece of timber; on average, it is 0.23m high by 0.18m wide. It generally rests directly on the upper surface of the frame's horizontal timber, but in at least one place a tapered piece of packing timber has been placed between the two, with more modern softwood also to the west face.

5.96 After passing beneath the frame described above, the opposite end of the line shaft turned by the pinion wheel is secured by a hanging bracket bolted to the easternmost ceiling beam. At its east end, two flat belt pulleys are mounted on the line shaft. Both are 0.15m wide, but the western pulley is 0.90m in diameter, while the eastern pulley is slightly larger at 1.10m; the smaller pulley has slightly sinuous spokes, while the larger wheel has curving spokes [*1/548, 7/058*] (see plate 31). Both appear to have driven belts which ran south, towards two further line shafts [*7/060*].

5.97 The nearest (northern) of these line shafts has a total length of 3.15m within the room, although it extends through the east wall into the room [**G4**] to the east, making 4.4m overall. At its west end, this line shaft is secured to a hanging bracket running between two ceiling timbers. Close to this bracket, there is a 0.25m flat belt pulley mounted on the shaft, while to the east, there is a 0.45m diameter flat belt pulley. The east end of the shaft, in room G4, is secured in a bearing suspended between two heavily grease-stained wooden blocks fixed to two ceiling joists [*7/076, 7/077*]. A spoked flat belt pulley, 0.15m wide by 0.45m in diameter, is mounted on the shaft and once drove a belt passing up through a ceiling slot into the room [1F11] above (see below). The second (southern) line shaft is attached to vertical brackets which are themselves mounted on vertical posts adjacent to the south wall [*7/068*]. This shaft has a total length of 2.60m. At the west end, there is a flat belt drive pulley, 0.20m wide and 0.40m diameter. Towards the east end, there is a much larger spoked flat belt drive pulley, 0.25m wide and 1.15m in diameter; this is mounted very close to, indeed almost touching, the adjacent wall. Beyond this large pulley, there is a third flat belt drive pulley mounted on the very east end of the shaft; this is 0.18m wide and 0.55m in diameter. It too is spoked, but has a wooden casing, possibly part of some form of clutch, or for safety reasons [*7/073*]. Below this pulley, there is a large concrete block, 1.20m long by 0.50m wide and standing a maximum of 0.70m high. The north-east corner of the block is chamfered, and the top steps down from west to east, but it has unfortunately been damaged by the removal of whatever was once attached to it. The 1.15m diameter spoked pulley noted above once drove a belt running south into the ground floor room [**G7**] of the garage. Towards the west end of the south wall, a bearing box is set above a window (see figure 33, Elevation 21), but rather than supporting one end of a line shaft within the garage, a pulley was mounted here, powered by the belt from the 1.15m diameter spoked pulley (Prof. D Blake, *pers. comm.*). This pulley once turned a line shaft extending south into the now-demolished structure shown adjacent to the south elevation in 1912. To the immediate east of the bearing box, there is a shallow recess associated with two threaded bolts projecting from the lintel of the next window, with a circular grease stain on the adjacent wall. Approximately 1.10m to the north-east of this feature, a small belt drive pulley is suspended between two timbers attached to the ceiling joists. At the west end of the east window, there are two more threaded bolts projecting from the lintel, again associated with a grease stain and a shallow recess [*7/109*]. These are aligned on a grease stain and bolt on the opposite north wall of the room [*7/097, 7/098*] (figure 33, Elevation 19), suggesting that a line shaft ran across the ground floor here; it is possible that the former line shaft is lying on the floor (Inventory 7.2) [*7/101*] (see plate 45).

5.98 There is also some evidence for power transmission in the ground floor of the garage [**G7**]. A moveable upright wooden lever, c.1.30m in height, is secured to a block of stone on the floor [*7/102*]. This lever has the remains of a cord attached to it, and it was associated with structures on the wall and in the ceiling above forming the remnants of a striking mechanism for a belt drive. In the ceiling above, there are two sub-rectangular openings (see figure 31). The smaller, eastern, of the pair, has an adjacent cut-out in the soffit of the joist on its east side, and a further aligned cut-out in the soffit of the joist beyond this. The larger, western opening is set adjacent to the partially blocked doorway-sized opening in the wall here, which has a piece of timber set across the top (Elevation 19). The southern face of this timber has a cut-out with two projecting bolts, set at an angle to run parallel with the east wall of the garage range. The piece of timber between the two openings has the striking mechanism bolted to it. The cord that was once attached to the lever rose to one end of the striking mechanism, and was used to operate it. A slightly curving timber, now loose, hangs down from the striking

mechanism, while on the wall side, an L-shaped iron bracket has a chain attached to it, which is secured to a cord rising to the first floor [1F12] of the garage [*7/103, 7/104*].

The first floor (see figure 26)

5.99 There are two places within the mill complex where there is evidence for power being transferred between the ground and first floors. Firstly, as already described, the east end of the central line shaft within the ground floor room [G2] projects into the adjoining room [G4] from the west wall. A spoked flat belt pulley, 0.15m wide by 0.45m in diameter, is mounted on the shaft and once drove a belt passing up through a slot in the ceiling into the room [1F11] above.

5.100 In room **1F11**, this belt transferred power to a c.2.15m long line shaft, aligned east-west and once crossing the room close to the hay-rake drilling machine at the north end. The line shaft, which was suspended from a bracket at the east end [*7/973*], has now been removed. However, it clearly once had at least one pulley at the east end, with a belt running down to the drilling machine. The drilling machine itself is located at the north end of the room, and is aligned east-west; it measures 2.15m long, 0.80m wide and 1.15m high. It is secured to a substantial stone base, which supports the timber frame, which is itself partly encased by vertical boards [*1/529-1/531, 7/930, 7/932-7/934*]. The line shaft is mounted at approximate eye level over the foot pedal of the drilling machine, and one assumes that, to keep out of the way of the shaft, the operator must have assumed a somewhat crouched or even a sitting position. The drive was taken off the east end of the line shaft to fast and loose pulleys mounted on a spindle which runs the majority of the length of the machine, but there is no trace of a striking mechanism. At the east end of the machine, there is a cast-iron flywheel, the spindle rotating clockwise when viewed from the flywheel end. The drive to the multiple drills was transmitted through bevel gears, one pair to each drill. There is provision for a maximum of 20 drills (although only 16 were in place at the time of the survey), which are of the conventional auger type. The piece of wood forming the hay-rake head blank was clamped by means of a simple snail clamp arrangement, and the wood able to be raised to meet the drills by use of a foot pedal. There is an example of a head blank still resting on the machine, showing 16 holes. The holes are drilled right through the wood, removing the necessity to have the drills all of a constant length. The drills are fixed in place, but it would be possible to alter the spacing, by removing every other one for example. There is a large stack of hay-rake blanks adjacent to the drilling machine [*7/974-7/975*].

5.101 Secondly, as noted above, the moveable upright wooden lever on the north side of the garage's ground floor [**G7**], has the remains of a cord attached to it, and it was associated with structures on the wall and in the ceiling above forming the remnants of a striking mechanism for a belt drive in room **1F12** above. After passing through the western of the two openings in the ceiling [*7/917*], the cord rose through the room to one end of a curving 2.20m long wooden lever, pivoting on a slanting timber positioned above a bench-like structure [*1/522, 7/918, 7/919*] (see figure 33, Elevation 19) (see plate 48). The opposite end of the curving wooden lever crosses a 1.70m tall vertical timber [*1/524*], with a substantial cast-iron shield-shaped bracket bolted to the wall at its head. The bearing set on this bracket secures one end of a north-south line shaft, with a total length of 2.95m [*1/523*]. At its north end, the shaft carries a 0.55m diameter spoked split pulley with stepped wooden casing [*1/525, 7/921, 7/924, 7/925*] (see plate 60). The bench-like structure has a total length of 2.60m and stands 0.75m high, being set on a sturdy leg or piece of timber at either end [*7/916*]; there is a gap in the

floorboards below this bench (see plate 48). Its upper surface has a shallow square recess to the south-east of centre, and a slightly curved piece of timber bolted to the north face [*7/915*], again possibly part of a former clutch mechanism or fitted for safety reasons. This bench-like structure was originally in the now demolished building which used to abut the south side of the garage (Prof. D Blake, *pers. comm.*).

5.102 Also within the first floor of the garage [**1F12**] but apparently unconnected with the above, adjacent to the east end of the blocked opening in the centre of the south wall, two vertical timbers are mounted on the wall, with a board nailed onto them. One of the vertical timbers has a broken remnant of a cast-iron bracket bolted onto it. Two additional softwood timbers hang down from the bracket [*1/504, 1/506*]. Above this assembly, adjacent to the eastern principal rafter, there is a 0.14m diameter grooved wooden disc bolted onto the wall plate [*1/505*] but still able to revolve. Between the two principals, two of the common rafters have U-shaped clips nailed to their soffits [*1/507*]. The western principal has a curving cut-out to the upper surface [*1/508*], perhaps once associated with the aforementioned line shaft towards the west side of the room. To the west of the western window opening, there are two wooden discs of the same form as that described above bolted to the wall plate [*1/515, 1/516*].

5.103 Over the north-west corner of the garage's first floor [**1F12**], there is a north-south aligned line shaft, with a total length of 2.70m [*1/514*]. This line shaft formerly passed through bearings bolted to the upper surface of a number of softwood cross-timbers here, although surviving cut-outs indicate that it is no longer quite *in situ*. The shaft has a pair of fast and loose flat belt pulleys, both 0.30m in diameter, mounted on the south end. A belt from these formerly ran west and upwards through a slot in the adjacent wall into the second floor of the mill's east end [**2F16**]. Towards the north end of the line shaft, there are three further flat belt pulleys, varying between 0.20m and 0.35m in diameter. The southern pulley has stepped wooden casing (possibly part of a former clutch mechanism or fitted for safety reasons), while the two flat-belt pulleys are of spoked form [*7/953*]; a belt would have passed from one of these to the pulley mounted on the 'lathe' to the west. A wooden striking mechanism is suspended from beneath the south part of the shaft [*7/945, 7/946, 7/948*].

5.104 The 'lathe' is largely accommodated within room **1F11** but it also extends into the extension of room **1F12** to the north. It has a maximum total length of 3.20m and stands 0.75m high, and is aligned east-west [*7/960, 7/961*] (see plate 37). It is a unusual device, and like the drilling machine, almost certainly designed in-house by the Burtons, presumably for turning the tines and perhaps also the handles of the rakes. The bed is formed by two parallel timbers with a gap between, set into the wall at the east end and on a single timber block or leg at the west end (see Elevation 11). A vertical timber bolted to the west end has a circular hole cut into the top. Approximately one third of the way along its length, a tailstock is mounted over the central gap, with a crank handle to one side; a shaft projects from the opposite side of the mounting. Beyond this, there is a box-section timber channel or housing set at a right angle to, and on top of, the parallel blocks [*7/963, 7/957*]. This housing is 0.40m square, and has a diamond-shaped hole cut into the top surface, directly over a bearing secured inside the housing [*7/958*]. The housing runs north as far as a boarded opening in the external elevation, and local oral information suggests that it may once have been associated with external driving from either a traction engine or a tractor. This must have interrupted the operation of the 'lathe' and so is presumably a later addition/alteration. The parallel blocks

continue beyond the housing, and have a headstock mounted on the east end [*7/954, 7/955*].

The second floor (see figure 27)

5.105 There are two places within the mill complex where there is evidence for power being transferred between the first and second floors. As noted above, a pair of fast and loose flat belt pulleys mounted on the south end of the line shaft over the north-west part of the garage's first floor [1F12] formerly turned a belt running north and upwards through a slot in the adjacent wall into the second floor of the mill's east end [**2F16**]. Similarly, in the east end of the mill [**1F11**], it appears that a belt ran south from the same line shaft driving the drilling machine, towards a slot in the ceiling. Despite this evidence, there is little remaining in room 2F16 to suggest the former presence or either machinery or processes that would require motive power.

Ex Situ Machinery

5.106 The inventory made of the objects within the mill recorded hundreds of different items. Amongst these, there are significant quantities of *ex situ* line shafting and pulleys, and also several larger items of machinery. It is likely that at least some of these were originally placed in the structure attached to the south elevation of the garage, built between 1893 and 1912; indeed, the majority of *ex situ* machinery was stored in the garage at the time of the survey. The inventory of the items recorded within the internal spaces of the mill complex is included with the room record sheets (see Appendix 2); only the larger items of machinery are described below.

5.107 On the ground floor of the complex, in the north-east corner of the garage [**G7**], there is a machine (Inventory 7.4) mounted on a cast-iron bed and legs. The drive was taken from a worm via a pinion, a large spur gear driving small spur gears, two at each end, operating cross-shafts which rotated in opposite directions. The centre housing, which appears capable of rotation, grips the material to be worked on, while the rollers on the cross-shafts appear to pull it through [*7/094, 7/096*]. It is possible that the machine might have been associated with the covering of electrical cables. The machine was formerly fixed on a north-south alignment to the flagstones to the west, and four sawn-off bolts mark its former position (Prof. D Blake, *pers. comm.*). Against the south wall of the same room, there is a saw bench (Inventory 7.12) with the cast-mark "W B Haigh Patent Oldham", of one piece cast-iron construction comprising a table on four legs [*7/074*]. The circular saw was driven by a shaft, but the aspect of the patent is not obvious.

5.108 In the first floor of the mill [**1F10**], there are two pieces of machinery (Inventory 10.7) stored in the north-east corner. The first comprises a wooden block mounted on two cast-iron legs, beneath which is what appears to be a cast-iron headstock from a lathe with thrust arrangement. The second piece is of cast-iron, again on two legs and with a similar headstock but larger than the one on the floor. It has a curious wooden 'cover' over where the work-piece would be, and two stepped pulleys, for changing speed, on the bed [*7/011*].

5.109 In the first floor of the garage [**1F12**], there is a stored metal-turning 8" centre lathe, with an 8 feet long bed (Inventory 12.2). It has been converted to a single speed by the removal of a stepped pulley and back gear, and set up for turning between centres. The lead screw is two threads per inch. It bears the maker's plate

"James B Watson & Sons Tool Merchants, Leeds" and presumably dates to pre-1914 [*7/941, 7/944, 7/950-7/952*].

Electrical Fittings

5.110 As has already been set out in Chapter 2, the accuracy of some accounts concerning the very early use of electricity at West Mill is now difficult to verify. It is variously stated that the first two electric lights were installed in West Mill in 1906 (Hay 2000, 38-39), using the overshot waterwheel at West Mill (presumably directly driving a dynamo, although this is not made clear), that in 1908 Mill Gill House became the first house in Wensleydale to be lit by electricity (Kershaw und.) and that in 1910, West Mill was electrically lit, with the mill machinery also being converted to be driven electrically at an early date (Hartley & Ingilby 1981, 132). The identification of early electrical fittings within the mill complex is therefore important when trying to substantiate some of these statements. Nevertheless, it is highly likely that the majority of the early electrical fittings surviving within the mill complex date to the mid to later 1930s, when the Burtons' Askrigg and Reeth Electricity Supply Company had to change its supply from 110 volt DC to 230v/50Hz AC 3 phase and neutral supply, to comply with the Newcastle Electric Supply Company standard (Hay 2000, 39-41). However, in contrast to the power house (see Chapter 6), no cloth-bound cables survive within the mill complex, all wiring being plastic-coated.

5.111 It is not certain where electricity entered the mill complex but two points can be suggested. High up on the south-west external corner of the mill, metal straps are bolted to the south elevation and west gable, with a metal upright rising from their junction [*8/745*]. Alternatively, on the second floor of the mill [**2F15**], at the very north end of the west wall, two ceramic pipes are inserted horizontally through the wall [*8/858*]. A similar feature in the power house (see Chapter 6) appears to mark the point where an electrical cable left the building, and so the pipes may have served a similar purpose at the mill.

5.112 Commencing in the main ground floor of the mill [**G2**], within the central ceiling bay, close to the inclined wooden steps and adjacent to the frame, a horizontal timber is bolted to the ceiling joists. This timber retains a pair of two-part ceramic clamps, each designed to hold two cables; each clamp is fixed to the soffit using a single screw [*1/540*]. There are two similar clamps above the lintel of the door in the south wall, and a similar, but larger, ceramic clamp to the east, designed to hold three cables [*8/846*]. There are two further ceramic two-cable clamps to the west face of the easternmost ceiling beam. In the ground floor of the garage [**G7**], the twelfth ceiling joist from the east end of the ground floor has a pair of two-part ceramic two-cable clamps fixed to the soffit. To their north, a ceramic light fitting is mounted on a wooden disc [*8/847*]. In addition, on one of the timbers running south-west from the former south-west external corner of the kiln range, there is a two-part ceramic three-cable clamp [*8/848*].

5.113 On the first floor of the mill [**1F10**], there is a pair of two-part two-cable ceramic clamps, one to the lintel and one to the west jamb. Further east, the doorway to the first floor of the garage has two lines of similar clamps, one of five and one of two, re-used to take modern cables. On the south jamb of the doorway leading to the east end of the mill's first floor, there is a re-used circular bakelite switch, mounted on a ceramic body which is in turn attached to a wooden disc [*8/850, 8/851*]. A small number of re-used ceramic clamps can also be seen in the east end of the mill's first floor [**1F11**]. In the first floor of the garage [**1F12**], to the north of the opening above the second board over the doorway in the east wall, there are

further ceramic fittings re-used with modern plastic cabling. A ceramic light fitting is suspended from a cable wrapped around one of the roof timbers. The cable descends to a two-part two-cable ceramic clamp and then north for a short distance before it has been cut off. Two further cables originate around the same roof timber and run north. The lower cable enters a circular bakelite switch mounted on a wooden disc over the doorway. It then leaves, and together with the other cable, passes through a two-part ceramic clamp. Beyond this, both cables pass into a circular fitting, probably a junction box, with a domed profile and a small raised circular area to the top of the dome [*1/496*]. A single cable emerges from the opposite side of the fitting, eventually making its way to the doorway at the east end of the north wall [*7/907*]. It then enters a wooden disc mounted on the soffit of the doorway lintel and then descends to a composite ceramic/bakelite switch on the east side of the doorway. On the soffit of the western principal rafter, there are further two-part two-cable ceramic clamps. Re-used ceramic clamps also survive within the first floor of the kiln range [**1F13**].

5.114 On the second floor of the mill [**2F15**], at the south end of the west wall, there is an isolated example of a two-part two-cable ceramic clamp, and a re-used circular bakelite switch on a wooden base over the doorway. On the south wall, two similar clamps, but of the larger three-cable form, can be seen over the east window. Both the east and central trusses retain re-used two-cable ceramic clamps for modern cabling. As on the first floor below, a small number of ceramic clamps have been re-used in the east end of the mill's second floor [**2F16**].

6 DETAILED SURVEYS OF OTHER BUILDINGS AND STRUCTURES

Introduction

6.1 As noted in Chapter 1 above, a number of other buildings and structures within the West Mill complex were subject to a detailed architectural survey. These were the power house, the poultry house, a cheese press, a milk stand and an isolated mill stone.

The Power House (Site 32) (see figure 37)

Plan form, structure and materials

6.2 The power house is located to the south-east of Mill Gill Force, at the base of a steep south-facing slope, immediately below a track (Site 2) leading to an area of quarrying to the north-west and above the Mill Gill beck (NGR SD 93980 91387) (see figure 21).

6.3 As described in detail in Chapter 2 above, the power house was built in 1909, and was initially provided with a single 16 hp Gilkes Vortex Special turbine (number 2105) driving a Westinghouse direct drive 12 kW 110 volt DC generator. Water to the turbine was supplied by a cast-iron pipe (Site 30) running down the steep slope to the north, while the electricity generated by the turbine was transmitted to West Mill and Askrigg by wires suspended from high poles. The power house is shown on the 1912 Ordnance Survey 6" to 1 mile map, and an early photograph of the building provides valuable evidence as to its original appearance, before later alteration (see figures 9 and 10). In 1913, improvements were undertaken to the water supply system, allowing the turbine to be duplicated and the power house extended - it is presumed that the term 'duplicated' refers to a second plant rather than a second turbine. At a later date, oil engines driving dynamos were installed to supplement the turbines; surviving bills and receipts indicate that there may have been two phases of alterations, one in the period c.1919-1922 and the other in late 1942 to 1944.

6.4 The power house is aligned slightly north-west/south-east but, for the ease of description, it is considered to be aligned east-west. It is sub-rectangular in plan, with maximum external dimensions of 12.25m long by 7.25m wide; this maximum length includes a short projection to the west gable. The building is of a tall single storey, with a pitched corrugated asbestos cement roof which was probably added in the 1950s; the underside is painted white, presumably to reflect the light. The roof structure is a lightweight construction of softwood king post trusses with composite tie beams and purlins spanning between - there is no evidence of rafters. The lower half of the east end of the roof is now missing, following damage from a recent rock fall. The power house has load bearing external walls, which have an average width of 0.60m. The external walls are built of a mixture of limestone and sandstone, roughly coursed and squared, and thickly pointed with a sand cement mortar; external rendering survives in several places. The ground floor is largely formed by concrete, while the roof trusses are constructed in softwood. Some external re-pointing was undertaken after 1984 and two low walls were removed at the west end of the building; this area had been used for slaughtering animals by a Mr Hammond, a local butcher who had leased Mill Gill for a short period (Prof. D Blake, *pers. comm.*).

6.5 The power house is approached via a graded ramp [*8/811*], as shown in 1912, and branching off the main track leading to the former quarries to the north-west. On

the north side of the trackway, there is a stone retaining wall, standing up to 1.40m high. As it approaches the power house, it becomes higher, and curves around to the north-west, where there is a small projecting platform to the top [*6/769*]. The ramp appears to have been created over the masonry spillway adjacent to the weir as shown on 1893.

External elevations

6.6 It is clear from the early photograph of the power house that the cast-iron pipe supplying water to the turbine must have entered the power house somewhere near the north-west corner. Due to the situation of the building, the north elevation lies almost completely below ground level, essentially acting as a retaining wall. The west elevation [*6/792*] contains an approximately central angular return, dividing it into two halves. The north half is blank, as is the southern half, and there is no visible opening marking the point at which the cast-iron pipe entered the building. Viewed from inside the building, there is an angled passage through the wall (see below), but externally this lies below current ground level; comparison of the existing ground surface with the early photograph suggests that pipe must have been placed either below ground or within a trench to the south of the adjacent track.

6.7 The south elevation (see plate 61) is clearly of two phases, relating to the original structure shown on the early photograph and the subsequent extension [*6/800, 6/801*]. The original structure was 4.80m in length. There was a single window opening, with a timber lintel and sill, placed slightly to the west of centre. The window opening retains the remnants of a 16-pane (8 over 8) wooden-framed vertical sash window, the upper light fixed and the lower light moving [*8/780*] (see plate 64); the early photograph appears to show the lower light to be covered with a piece of timber. Below the window, there is a low level opening, c.0.70m square, fitted with the remnants of a wooden frame slightly recessed from the wall face. This opening runs north for 2.55m beneath the power house floor [*6/798*], maintaining a similar width and height, with mortared rubble walls and a flagstone capping; it is likely to have been an outflow to take water away from the original vortex turbine (see Chapter 7 Discussion). Towards the north end of the east wall, there is a narrow slot rising the full height of the wall. The former east end of the south elevation, as shown on the early photograph, is still clearly visible as a straight joint. To the immediate east of the straight joint, the wall face of the later extension is pierced by a small irregularly-shaped hole, which can be traced north for nearly 1m beneath the power house floor. There are three window openings in the later extension of the south elevation, spaced at equal centres and all of the same size and form. They have concrete sills and lintels, and are fitted with steel framed two-light windows, each light having three panes [*8/781*]. The upper light is hinged at the bottom, and opens inwards, resting against two brackets when open. There is a third opening through the wall face below the easternmost window, and again placed at a low level. This opening can be traced north for c.1m beneath the power house floor.

6.8 The early photograph of the power house (see figure 9) shows that the original east elevation had a plank and batten door with a projecting lintel situated towards the south end. Although this elevation was demolished when the building was extended, the doorway [*8/807*] in the existing east gable has more or less the same location. The stonework of the east gable [*8/808*] is much more neatly coursed and squared than that of the rest of the external elevations (see plate 62). The doorway at the south end is fitted with a pair of softwood plank and batten doors, painted mid green to the exterior and interior, both leaves pierced by a series of

small circular ventilation holes towards their tops. Each leaf is hung on a pair of substantial round-headed strap hinges, and the doors were lockable [*6/759*, *8/805*]. To the north, a tall window opening is fitted with what appears to be the remnants of a 12-pane (6 over 6) wooden-framed fixed casement, with a concrete lintel and sill [*8/809*]. To the north of the window, there appears to be a small high level recess, and near the apex of the gable, two concentric (zinc?) washers are held in place by a bolt, apparently with wire wrapped around them.

Circulation

6.9 At the time of the survey, the only access to the interior of the power house was through the doorway in the east gable. The interior is formed by a single room, floored with concrete throughout. Around the north and east sides of the room, the concrete is all set broadly at the same level. However, in the south and west parts, there is a slightly lower rectangular area measuring 7.80m long by 2.60m wide.

6.10 Described from west to east, in the south-west corner of the room, there is a small void which opens into the below-floor channel or passage here, whose exterior was described above. Running east-west from here, there are a series of shallow rectangular impressions left on the concrete floor [*8/789*] where items have been removed, with only evidence of two holding bolts remaining. The shallow rectangular impressions cover a total area measuring 3.50m long by 1.35m wide, and essentially comprise a main area with evidence for sub-division, with a number of small projections to the south side. At the very west end, a 0.05m diameter metal tube has been sawn off close to floor level. There are a number of these placed around the room, and they may be the remains of tubular steel safety rails used to screen moving machinery. To the east of the rectangular impressions, there is a broadly T-plan concrete base, with maximum dimensions of 1.40m east-west by 1.35m north-south, standing up to 0.40m high [*8/796*]. The upper surface has been badly damaged where attached machinery has been removed, and only the remains of two threaded bolts survive. At the bottom of the east side of the base, a probable cable sheathed in a 0.05m diameter iron pipe can be traced for over 1.50m to the east, where it dips beneath the concrete floor surface. Almost in line with this pipe, on the west side of the base, four wires can be seen projecting from the concrete floor surface, the remains of the three phase and neutral supply [*8/801, 8/802*] (see plate 68 and below). To the south-east of the base, there is another possible sawn-off handrail. A line or joint in the concrete floor can be followed east from the latter, and then returns to the south. Here, a second line or joint defines a rectangular area measuring 1.55m east-west by 0.85m north-south. Within this rectangular area, there are at least four sawn-off metal tubes, two of which may be former safety rails.

6.11 All of the above are located within the slightly lower area of concrete flooring on the south side of the room. Within the raised area forming the majority of the rest of the floor, further features are visible. In the north-west corner, a slightly raised sub-circular area [*6/774*], c.0.95m in diameter, is recessed into the junction of the north and west walls. To the immediate south-east, there is a pair of parallel concrete bases, both aligned north-south, again with evidence for surrounding tubular safety rails [*8/792, 8/794*]. The smaller, western, base measures 0.90m long by 0.45m wide, but is very low, reaching barely 0.10m in height. The surface has been damaged by the removal of attached machinery, and there is a bent over threaded bolt at the north-east corner some 0.56m in length, although only the top 0.075m is threaded. The larger, eastern, base measures 1.55m long by 0.55m wide, and stands 0.30m in height. The upper surface is again damaged, but there is a pair of sawn-off bolts located towards the north and south ends. An upright timber to the

immediate south, 1.18m tall, may once have supported a rail or horizontal timber running west, while from the opposite end, a very low and ruinous concrete wall runs north to the north wall of the room. To the south of the bases, there appears to be a shallow east-west aligned drain, returning to the south at its east end.

6.12 Two further machine bases survive towards the east end of the room, again both aligned north-south. The largest measures 2.10m long by 1.00m wide, and stands 0.25m in height [*6/761, 6/762*]. The outer edges of the upper surface are chamfered, and there are the remains of six regularly spaced sawn-off bolts visible; there is a spread of concrete around the southernmost pair of bolts. To the east of the base, there is a 0.90m long piece of damaged concrete, up to 0.30m high in the centre, with upright threaded bolts to the north and south ends [*6/765*]; the bolts are more substantial than those surviving elsewhere within the power house, standing 0.62m high and 0.07m in diameter, the top 0.075m only being threaded. The smaller, southern, base [*8/797*] is undamaged and measures 1.00m long by 0.60m wide, and stands 0.50m high; its long axis is offset to the east of the larger base to the north. The outer edges of the upper surface are chamfered, with short threaded bolts projecting from each corner. Each bolt has a small rectangular metal plate placed at the base. The bolts rise 0.05m from the surface and two retain hexagonal nuts. North-south lines on the surface of the base run between the bolts.

6.13 The internal walls of the power house are built of roughly coursed and squared stone, the majority of which has been whitewashed [*6/780*]. To the east wall [*8/782*] (see plate 67), above the window [*6/756*], there is a small recess with a wooden lintel. Much taller conjoined recesses [*6/751, 6/754*], over 2m in height and 0.4m deep, survive at the north-east corner of the room. Both have wooden lintels, but are quite shallow, being no more than 0.35m in depth; the lintel and stonework above the northern recess has largely collapsed. There is a further recess in the north wall aligned approximately on the north end of the larger of the two chamfered concrete bases described above [*6/760*]. This recess is 0.75m high and 0.95m long, but only 0.35m deep; it appears to be a later insertion, as both the jambs and rear face are of machine-made bricks, and it has a concrete lintel. Further west, there is another tall recess [*9/034*], similar to those seen at the north-east corner. This is almost 2.50m tall with a wooden lintel, but again, rather shallow at 0.30m in depth; the west jamb is quoined. At the north-west corner of the north wall, there are two tall conjoined recesses very similar to those described at the north-east corner [*6/773*]; at a low level, they accommodate the sub-circular concrete base described above.

6.14 The west wall of the room (see plate 66) is split into two parts by a return to the west [*8/784*]. The north part has a 0.67m high and 0.35m deep recess to the base, placed to the south of centre [*8/785*]. This recess has a stone lintel, which slopes down from front to back, so that at the back it is only 0.33m high. Above, and slightly to the north, there is a second recess. The base of this recess is placed 0.70m above the internal floor level, and it measures c.0.80m high by 0.60m wide, with an average depth of 0.36m. A vertical timber is mounted to the wall face above the recess. The timber has two semi-circular metal brackets mounted on it, one above the other, both held in place by a pair of screws. Above the timber, to the upper part of the wall, there are two further recesses cut through the wall thickness into what appears to be a void behind. There are also various nails and small iron fittings fixed to the wall face. At the south end of this part of the west wall, a horizontal timber is fixed to the wall face using three screws. The timber once secured paper instructions for operating a piece of equipment, but unfortunately most of these have been removed, the only remaining portion reads

"STARTING AND STOPPING THE ENGINE", with "HAND STARTING" in smaller capitals beneath [*6/784, 6/785*].

6.15 The west return of the west wall [*6/776, 8/787*] has a line running across it at a height of c.2.20m above floor level, marking the point at which a yellowish render or plaster ceases; this continues around the south part of the west wall at the same height. There appears to be a small blocked opening to the east of centre in the west return, but the main feature is a 0.80m wide opening at the west end [*6/777*]. This opening is c.0.30m high, but has been blocked to reduce its height, and may originally have been as much as 0.80m high. The interior is partly choked with rubbish, but the opening has a flagstone capping, and can be traced for at least 1m back from the wall face, following a slight north-west alignment. It then appears to rise vertically. There is no sign of this feature externally, as it lies below ground level, but it may represent the point where water entered the building from the adjacent pipe.

6.16 At the south end of the south part of the west wall, there is a small fireplace opening, with the cast-iron surround now displaced to the north [*6/778, 8/791*]; the surround is of a single piece, with floral and swagged decoration, but now very rusted [*8/813*]. It is presumably this fireplace which was served by the low chimney shown here on the early photograph of the power house (see figure 9). Above, various projecting nails and bolts have been used to hang small items of equipment. The line visible at 2.20m above floor level to the south part of the power house's west wall continues around onto the south wall. At 2.25m above floor level, there is a line of sawn-off joists. These run only as far the original east end of the power house prior to its extension, and so are likely to represent the original ceiling level within the earlier, smaller, building.

6.17 The room is crossed by three softwood roof trusses, all of the same bolted king-post form [*6/791*]; the north ends of the eastern two trusses are no longer supported by the north wall following a rock fall through the roof, although some temporary props are in place [*9/035*]. The narrower west end of the room is crossed by a single principal rafter, which has a U-shaped bracket suspended from its east face [*8/798*]. The roof eventually collapsed in June 2012 (Prof. D Blake, *pers. comm.*).

Electrical features

6.18 As with the West Mill complex, it is highly likely that the majority of the early electrical fittings surviving within the power house date to the mid to later 1930s, when the Burtons' Askrigg and Reeth Electricity Supply Company had to change its supply from 110 volt DC to a 230v/50Hz AC 3 phase and neutral supply, to comply with the Newcastle Electric Supply Company standard (Hay 2000, 39-41).

6.19 As has been noted above, on the west side of a broadly T-plan concrete base, four wires forming the remnants of a three phase and neutral supply project from the floor. On the opposite (east) side of the base, a probable cable sheathed in a 0.05m diameter iron pipe can be traced over 1.50m to the east, where it dips beneath the concrete floor surface. The route of this pipe after it disappears is uncertain, but it may have emerged at the base of a line of lead cable clips or ties, each secured by a single screw, rising vertically up the east wall [*8/806*] to the north of the doorway. These clips or ties commence at 0.40m above floor level, and rise to a ceramic pipe at a high level set horizontally through the wall; a scar is also visible running up the wall face [*6/757*]. On the external, east gable of the building, at 1.54m above ground level, a Y-shaped metal fitting projects 0.10m

from the wall face [*8/803*] (see plate 69). It has two small opposed holes through the 'arms' of the Y, where a fitting could be threaded through and could have secured a cable. It is set below, but not quite in line with, the horizontal ceramic pipe which runs through the wall. As has been already described, the early photograph of the power house shows two electricity poles on the bank to the north, and it is assumed that electricity was transferred above ground to West Mill and thence into Askrigg. However, perhaps latterly, the electricity cable left the east gable of the mill and was then carried east underground.

6.20 Returning to the interior, from the aforementioned vertical line of lead clips or ties on the east wall, a line of similar features runs south towards a piece of electrical equipment, probably an isolator, mounted on the lintel of the doorway at the south end [*6/758*] (see plate 65). The equipment was once contained with a metal box, and this appears to have a lever in the vertical position attached to the right hand side, operating a shaft running through the box. The upper part of the box was filled with a ceramic base, fixed to the wall using two screws. This base contains two parallel depressions with a complex plan, incorporating copper clips and with two cables emerging from the top; fuses were presumably once housed here. At the base of the ceramic fitting, there are four recesses, each recess containing a copper clip. The clips are used to secure two pairs of wires, attached to what may be a fuse running horizontally across the interior of the box. Below this, there are two small ceramic cylinders of unknown function but assumed to have once housed the incoming cables. A pair of cloth coated cables leaves the top of this piece of equipment, to run along the lowest purlin of the south roof slope, and from here onto each of the three roof trusses and the principal rafter over the west end of the interior, solely to former light fittings. The cables are secured using two-part two-cable ceramic clamps (measuring 45mm long by 25mm wide by 25mm deep), each of which is held in place by a single screw. Described from east to west, a line of clamps runs down the south wall on a vertical timber to the east of the easternmost window in the south wall [*6/781, 6/782*]. This timber has an additional piece of wood with a moulded edge (probably a former switch plate) secured to the base using two screws; the face of the additional piece also preserves six regularly spaced small diameter circular holes, three above the fixing screws and three below [*6/783, 8/812*]. The cabling and clips continue across the soffit of the east truss to a dome-shaped ceramic light fitting affixed to a circular wooden base at the truss' south end [*8/799*]; there was probably once a similar light fitting at the north end. The soffit of the central truss has a pair of similar light fittings to the south end [*8/800*], and a broken example to the north end. The west truss has similar light fittings at either end; below the north end of the truss, a loose timber once had a ceramic switch mechanism mounted on a wooden disc to the current lower end. The principal rafter over the west end of the building also once had light fittings mounted on it. Finally clamps and cables descended a vertical timber mounted over the westernmost window in the south wall [*6/779*], to three fittings secured to the underside of the window's lintel [*8/814*]. One is a wooden disc, probably the base of a former light fitting. The other two fittings are ceramic and circular, and threaded around the exterior. They contain two terminals, one with a cable entering from underneath the fitting and the other with the cable entering from above. One appears to bear a patent number on the ceramic part but this is not clearly legible.

The Poultry House (Site 33) (see figure 38)

Plan form, structure and materials

6.21 The poultry house is located to the north-west of the mill complex, at the base of a steep south-west facing natural slope [*3/715*] (NGR SD 94280 91275) (see figure 21). The poultry house is not depicted on the 1856 Ordnance Survey map, but in 1893 it is shown as a small single celled structure (see figures 6 and 7). By 1912 it is depicted as the three celled structure of the same dimensions as that surviving today (see figure 10). The head race of the mill was also culverted to the south of the poultry house in 1893, presumably when the original single celled structure was built.

6.22 For the purposes of description, the poultry house is considered to be aligned east-west. It is sub-rectangular in plan, with maximum external dimensions of 11.10m long by 3.70m wide. It is of a single storey, although the central cell is considerably taller and has a low 'attic' space over the ground floor (see plate 70). The east and west cells butt the central cell. All three cells are roofed with corrugated iron sheeting, that to the west end was replaced after 1984 (Prof. D Blake, *pers. comm.*); the central cell has a pitched roof over, while the outer cells have single-pitch roofs, sloping away gently from the central cell [*3/717, 3/719*] (see plate 71). The poultry house has load bearing external walls, with an average width of 0.60m, although the east wall of the central cell measures up to 0.80m. The external walls are built of a mixture of limestone and sandstone, coursed and squared, and set with a lime mortar; the south wall of the central cell is weatherboarded. The ground floor is largely formed by earth, while the upper floor over the central cell is of softwood boards. There are low rubble revetment walls extending for short distances to the north and south from the front corners.

External elevations

6.23 The south external elevation of the poultry house faces onto the flagstone capping of the mill's headrace [*8/835, 8/836*] (see plate 73). A drystone wall butts against and runs south from the west end of the south elevation [*3/727*] and then returns to the east, to meet an open rectangular structure, measuring 2.15m by 1.95m, formed by upright flagstones secured at the corners with wrought-iron strapping [*8/834*, *9/019*] (see plate 74). The function of this structure is unclear, but it may possibly have been a midden.

6.24 The south elevation of the west cell has a doorway at the east end, fitted with a softwood plank and batten door [*3/726*]. The right hand side of the upper part of the door is pierced by four closely spaced vertical slots. The south elevation of the central cell is weather-boarded to full height [*3/722, 3/723*]. The doorway towards the east end is fitted with a softwood plank and batten door [*3/724*] (see plate 72). This door has a horizontal plank fixed to the bottom of the outer face, while there were once four wide vertical slots to the upper half, which have subsequently been blocked. To the west of the doorway, a narrow 'pop hole' has been created in the weather-boarding to allow the poultry in and out, and to the west of this there is a window with a six-pane (3 over 3) wooden frame; the central pane of the upper row opens inwards in hopper fashion. There is also a five-pane fixed window opening to the apex of the gable. The upper part of the south elevation of the east cell is also weather-boarded. There is a doorway at the west end, fitted with a softwood plank and batten door, pierced by an integral 'pop hole' at the base. This door is hung on external T-shaped metal hinges mounted on the east jamb of the doorframe, and could be secured externally using a bolt [*3/725*].

6.25 The upper part of the east elevation of the east cell [*3/721*] is also weather-boarded, and incorporates a three-light window, each light of three-panes in a fixed timber frame. A low stone revetment wall butts the east elevation and runs east for a short distance. The north elevations of the east and west cells are largely obscured by the base of the slope to the north. However, the north elevation of the higher central cell is visible [*3/718*], and in contrast to the south elevation, is constructed entirely in stone. There is a least one large quoin to the north-west corner, and there is a low central doorway, also partly with quoined jambs. The doorway has a stone lintel, and a slightly projecting stone sill. It is fitted with a softwood plank and batten door, with a small 'pop hole' cut out of the base. The west elevation of the west cell [*3/720*] is blank.

Circulation

6.26 At the time of the survey, access to all three cells of the poultry house was through the doorways in the south elevation. The whitewashed interior of the west cell [*3/728*] was full of stored material, but appeared to contain few features of interest. The roof structure supporting the corrugated sheeting is very simple, comprising a single north-south aligned softwood purlin. The interior of the central cell [*3/730-3/732*] is whitewashed, but the fittings all appear to be relatively recent in origin. The cell is crossed by a number of north-south softwood joists. The interior of the east cell [*3/733*] is also whitewashed and relatively plain, and has a similar roof structure to the west cell. The upper or attic space over the central cell is accessed through the low doorway in the north elevation. This interior is also plain, with a boarded roof structure over [*3/735, 3/736*].

The Cheese Press (see figure 39)

6.27 The cheese press is located in the garden of Mill Gill House, just off the south-west corner adjacent to the beck. It is situated within a small U-shaped structure, open to the north-east and with a single pitch roof formed by a single flagstone [*6/808*]. A structure of similar size is shown in this location in 1912, although nothing is shown in 1893, and it seems likely that this was the cheese press; very similar presses in Swaledale, said to have remained in regular use into the 1920s, are illustrated by Hartley and Ingilby (1981, 43). The cheese press at Mill Gill was previously described as being 17th century in date (Hogg 1971, 79-80), although on what evidence this is based is unclear.

6.28 The U-shaped structure measures 1.10m east-west by 1.64m north-south, and is built of roughly coursed squared stone set with a lime mortar; the walls are on average 0.30m high (see plate 75). The internal base of the structure is set 0.40m below the surrounding ground surface, and it has a total height internally of 2.18m.

6.29 The cheese press comprises a number of different parts, and these are described from top to bottom. The uppermost part [*6/809*] (see plate 76) is formed by a wrought-iron bar, 0.50m in length, and curved upwards at the outer ends. It is secured by a square nut and washer to a circular section vertical wrought-iron rod. The rod passes down through a timber running across the press. This timber is 0.12m deep and has a small shallow slot cut-out to either end of the front face, with a small hole to the inner ends of the slots. The upper visible part of the rod below the timber is threaded, and it runs downwards to another timber bar, 0.75m long, suspended from the rod [*6/811*]. On either end of this timber, a circular section vertical wrought-iron rod is secured by a square nut. The two rods pass down to a dressed sandstone slab, which bears the form for the cheese. The form measures

0.22m in diameter and stands 0.18m high; it is made from a single thin metal sheet, secured by three rivets. The form is surrounded by a shallow circular channel, 0.30m in diameter, with a small drain running off the front side. After passing through the stone slab, the pair of rods continue down [*6/810*], terminating in small eyes. A wrought-iron ring is placed through each eye, and a wrought-iron hook is set through each ring. The hooks are set into the top surface of a large tooled sandstone block, measuring 0.84m in length by 0.62m in width by 0.40m in depth. Another probable *ex situ* cheese weight stands adjacent to the dove house at the end of the west barn range.

The Churn Stand

6.30 The churn stand is located to the east of Mill Gill house, on the north side of Mill Lane. It is aligned east-west, measuring 2.24m long and 1.25m wide, and standing up to 0.90m high [*6/806, 6/807*]. The stand is of mixed concrete, stone and breeze block construction, with the possible remnants of internal metal reinforcement visible at the west end; it is possible that the stand was once smaller, but was enlarged to the east. The west end of the upper surface steps down to the west, and then this lower area itself steps down again to the south. It is assumed that the stand was associated with the West Mill complex, although local oral information suggests that the ground floor of the barn situated a short distance to the east was used for hand milking cows by a local farmer, and that he was one of the last in the local area to do so (Mr S Metcalfe, *pers. comm.*). It may therefore be that the churn stand was at least in part also used by this individual.

Millstone

6.31 A millstone was noted to the south of the barn range, in dense undergrowth adjacent to the north garden wall of Mill Gill House [*8/863*]. The millstone has been set upright, but is clearly a French burr millstone, 1.30m in diameter and 0.30m thick. It is composed of several individual pieces of stone (known as 'burrs'), banded together with two iron hoops and cemented on the back with Plaster of Paris. Millstones of this type are known to have been used in Britain from the mid 18th century, but the majority of the burrs were imported and installed between the 1840s and the 1880s, to replace earlier stones for grinding wheat (Harrison 2001, 145).

7 DISCUSSION AND CONCLUSIONS

Introduction

7.1 As might be expected, the recording work undertaken at the West Mill complex, including the land along Mill Gill and at Leas House, has raised a number of issues meriting further discussion, which are outlined below.

7.2 As has been demonstrated by the current and previous survey work, West Mill forms part of a complex multi-period landscape to the west of Askrigg. The structural evidence for phased development within the mill complex itself is also complicated and not always straightforward. The easiest way to describe this development, and to highlight areas where further targeted research may answer specific questions, is therefore to consider the development of the survey areas in reverse, commencing with the most recent past and successively removing layers to reveal the earliest surviving parts.

Electricity Generation c.1909-1945

7.3 The chronology of how and why electricity generation came about in Mill Gill is fairly well documented, although as has already been noted in Chapter 2, previous statements made about the very earliest stages of the works are now difficult to verify. If two electric lights were being used in West Mill in 1906, or if the overshot wheel was lighting Mill Gill House with electricity in 1908 as Hay (2000, 38-39) asserts, then a dynamo must have been installed somewhere on the premises and been driven directly by the waterwheel. Contemporary accounts of the very early scheme installed at Godalming in Surrey, in 1881, describe a spoked flywheel or pulley apparently mounted on the waterwheel axle, with a short line shaft turning a belt linked to a pulley on a more substantial wall-mounted line shaft. At the opposite end of the latter, another pulley turned a belt which ran down to the dynamo itself (Tucker 1977, 128-132).

7.4 It is feasible that such an arrangement might have once been in place at West Mill, for example, with a dynamo driven by a pulley and belt mounted on the line shaft turned by the pinion wheel (see below). However, no conclusive evidence has been uncovered by the current survey to say that this was the case. Even if it did, the arrangement may have been very short lived, or even partly experimental. A similar venture at Limavady in Northern Ireland in 1894-95 was abandoned after a year when it was found that the waterwheel was prone to sudden stoppages, sometimes as a result of debris entering the system, and thus damaging the electrical plant; the solution that was adopted was to replace the waterwheel with a turbine (Gribbon 1969, 140-141). The Godalming scheme, begun in 1881, was abandoned in 1884 due to problems with the distribution of electricity to the more distant electric lights in the town (Tucker 1977, 128-132).

7.5 Whatever the truth about these early schemes, it is certain that by September 1909 the power house (**Site 32**) below Mill Gill Force had been built and was operational, as at this date W H Burton offered to supply street lighting to Askrigg Parish Council; when this offer was taken up a year later, Askrigg became the first village in Wensleydale and one of the first in the country to have its own public electricity supply (Hay 2000, 39). It is not an exaggeration to state that the Burton family were the most influential local electricity producers in Wensleydale, not just in terms of their electricity generation at Mill Gill, but also in their role as electrical engineers to other similar enterprises in both Wensleydale and Swaledale.

7.6 In its earliest form, water for the turbine in the power house was taken off the Whitfield Gill above Mill Gill Force, to the west of Leas House. A timber and stone weir (**Site 8a**) across the beck here probably directed water along a wooden launder into the west side of a collection chamber (**Site 8c**). Water was stored in the chamber, and then directed into a pipe leading towards Mill Gill and the power house. This pipe was certainly of cast-iron form when it reached Mill Gill, and it is assumed that the same material was used between the collection chamber and Mill Gill. On reaching the northern edge of Mill Gill, the pipe emerged from a culvert (**Site 30a**) and then dropped down the steep slope over a distance of 49m, running parallel to a drystone wall (**Site 30b**) that was purpose-built to provide it with some stability, preventing the ground to the immediate west eroding or slipping and undermining the pipe. The pipe most probably passed beneath the track (**Site 27**) on the north side of the power house and then entered the building at the west end of the north elevation.

7.7 In its earliest form, the power house (**Site 32**) was considerably smaller than the building which survives today. The early photograph, and the structural evidence, show that it measured 4.80m east-west but was presumably of a similar width to the existing building; if the west end contained the same return as is present today, then the power house would have had a broadly L-shaped plan. The feed for the 1910 16 hp Gilkes Vortex Special turbine (number 2105), supplied from the cast-iron pipe, most probably emerged from the angled opening in the return to the internal west wall, indicating that the turbine was originally placed in the south-west corner of the building. In a vortex turbine, water flow is radially inwards; incoming water passes moveable guide vanes, producing a swirl before it impacts on the curved blade of the turbine's runner or rotor - vortex turbines were thought to be particularly suitable for driving dynamos (Wright 1911, 21; Hay 2000, 38). Enclosed within a circular casing, they could be mounted either horizontally or vertically (Wright 1911, 22); the earlier vortex turbines had vertical shafts, whereas many of the later ones had horizontal shafts (Crocker 2000, 95-97). Having turned the rotor, water was discharged on each side of the casing through flumes or suction pipes, which extended below the water level in the turbine's tail race (Crocker 2000, 96).

7.8 The position of the original vortex turbine, almost certainly vertically mounted with a horizontal shaft, in the power house is indicated by the impression left in the concrete floor at the south-west corner, with water discharging through flumes into the passage or channel beneath the floor here, and then out of the opening in the bottom of the external south elevation. It is assumed that the Westinghouse direct drive 12kW 110V DC generator was placed immediately to the east of the turbine, and that its former position may again be indicated by the impressions left on the concrete floor in this area; in some instances it was possible to directly couple the turbine's output shaft to the generator (Hay 2000, 38). The northern part of the power house may have been used for storage, or perhaps to house batteries, which were sometimes used to store electricity in DC systems to be used at times of peak demand.

7.9 The size and layout of the existing power house result from the extension and changes that were undertaken after 1913. As a part of these changes, the water supply at Leas House was also improved, interestingly by the landowner rather than the Burtons. A new weir (**Site 12a**) was constructed across the beck some distance to the north-west of the earlier one, diverting water into a culverted leat (**Site 12b**) and thence into a new pond (**Site 12c**), greatly increasing the storage capacity of the old collection chamber. The pond had a new storage chamber (**Site 12d**) constructed at its east end, fitted with screens to prevent debris entering

the supply pipe. This passed through the old collection chamber and then is assumed to have followed the same route below ground as previously, before it emerged at the top of the north side of Mill Gill. The power house was extended to the east, more than doubling its original size. No firm dates are given for this extension, but the surviving receipts and bills described in Chapter 2 suggest that it was done in the period c.1919-1920, and it is possible that further major alterations were undertaken in the period c.1942-1944.

7.10 Hay (2000, 39) states that, as a result of the improvement works, the turbine was 'duplicated'; this may mean a second plant rather than two turbines - the current survey work has not uncovered any clear evidence for two turbines. The two 45hp (33.5kW) National oil engines driving dynamos installed at a later date to supplement the turbine (Kershaw und.; Hay 2000, 48), to judge by the surviving bases, were located away from the south-west part of the interior, but again, published information does not make it clear if they were both installed or indeed operational at the same time; it is also important to establish if they were driving generating equipment directly or if this was done via a belt, and whether they were installed prior to the conversion of the supply from direct current to alternating current in around the mid 1930s. The small surviving parts of the operating instructions for an engine on the west internal wall suggest that the base of one engine was formed by the two concrete bases at the north-west part of the floor, with the circular base let into the very north-west corner. This base may have supported an oil storage tank, although it is more likely to have been for a tank to hold water, which would have been needed to cool the oil engines - under-floor channels would have drained waste water away. However, the T-shaped concrete block to the south is reminiscent of the arrangement seen where a vertical oil engine was direct driving a dynamo (for example, see *www.oldengine.org/members/ruston*). The chamfered concrete bases towards the east part of the interior are different in form and in a better state of preservation than those noted above, probably a result of them being installed at different dates. The former bases may relate to the engine and dynamo purchased in April 1920, whereas the chamfered examples could well belong to the works described in November and December 1942, when an engine was taken up Mill Gill and installed in the power house. Given that by the latter date, the Burtons had gone over to a three-phase and neutral supply, dynamos would no longer have been in use to generate electricity. Instead, the oil engines (if both remained in use) must have been driving an alternator or alternators.

7.11 The remnants of the cable visible in the floor on the east side of the T-shaped concrete base, together with the fittings on the inside and outside of the east wall indicate that the main outlet for the electricity produced within the building was at the east end. Originally, electricity was transferred to West Mill, and then to Askrigg, by wires suspended from the wooden electricity poles visible in the early photograph of the power house. It is assumed that there was a line of these running down Mill Gill, past Mill Gill House and thence into Askrigg, although in some early schemes buried cables were used, with consumers connected to the main supply using insulated cables (Bowers 1973, 126). A detailed inspection of the village of Askrigg to try to locate any part of the pre-Nationalisation electricity distribution network associated with the Burton family lies beyond the scope of this report. However, work undertaken in Shropshire (e.g. Jones 1996) has demonstrated that associated features can survive.

Hay-Rake Manufacture, Saw Milling and Joinery c.1887-1955

7.12 Hay-rake manufacturing is suggested to have been established at West Mill by William Handley Burton in 1887 (Kershaw und.), and this suggestion is supported by the available documentary information. According to the census returns, the Addison family and corn milling remained in place until 1881, but had been replaced by 1891 by the Burton family, who are listed as joiners and builders. It is known from local oral information that the business was not only manufacturing rakes, but also items such as hay sweeps and doubtless other implements as well; the fact that West Mill is marked as "West Saw Mill" in 1893 and 1912 indicates that more general wood-working may also have been undertaken. Bills and receipts indicate that the Burtons carried on their joinery business at West Mill until at least 1957.

7.13 By 1912, the West Mill complex had reached its existing extent; indeed, it was actually somewhat larger than it is today. There was a structure placed in the angle of the mill and garage buildings, built between 1893 and 1912, together with two other structures attached to the south gable of the barn. By 1893, a former external access through a gap between the mill and kiln ranges had been blocked by the erection of an infilling structure, and so the main access was now solely along Mill Lane.

7.14 According to Kershaw, the woodworking machinery at West Mill was designed and constructed by William Handley Burton's father, and was driven by the mill's overshot waterwheel (Kershaw und.). However, Hartley and Ingilby (1981, 132) state that the machinery was bought from Prospect Mill in Hawes. There is probably an element of truth in both statements. Some of the surviving machinery within the mill, such as the drilling machine and 'lathe' on the first floor, was clearly constructed locally to serve a specific task, and was very probably made by the Burtons themselves. However, much of the line shafting, pulleys and other power transmission fits rather awkwardly within the mill, and has the appearance of being 'made to fit' i.e. that it was bought in from another building for which it was dimensionally suitable. Perhaps it was these elements of West Mill's machinery that were bought from Prospect Mill. Even the waterwheel at West Mill appears unlikely to predate the mid 19th century, and so this too may have been salvaged from another mill.

7.15 The current survey has also not found any evidence to support Hartley and Ingilby's statement (1981, 132) that the mill machinery was converted to be driven by electricity at an early date. Although it is highly likely that West Mill was lit by electricity, the waterwheel and power transmission appear to have been well maintained (as was the water supply - see below), and there is little surviving evidence for electric or other motors being mounted close to machinery. The one exception is the concrete base below the large pulley at the east end of the line shaft on the south side of the mill's ground floor. In addition, in January 1944, the Askrigg and Reeth Electric Supply Company Limited sold 124 gallons of Pool Gas Oil to Messrs Ernest Burton and Son, West Mill, Askrigg, suggesting that they may by then have been making use of an oil engine within the mill complex (Blake collection). Again, it is not certain where this was located, but it could have been on the ground floor of the now demolished structure in the angle of the mill and garage ranges. Finally, oral evidence suggests that provision was also made for external driving, using a tractor or traction engine parked opposite the west end of the north elevation. Nevertheless, it is possible that the waterwheel remained in use to drive at least some of the mill's machinery right up until the hay-rake manufacturing business ceased; Gribbon (1969, 36), writing about Northern

Ireland, notes that many owners of suitable sites continued to make some use of water power well into the 20th century – "even a small amount of power at negligible cost was an asset that should not be neglected".

7.16 The water supply to West Mill during this period re-used elements of the earlier water supply system laid out for the corn mill (see below), including the mill dam and headrace. The existing zinc launder (**Site 29h**) is an unusual feature, and metal launders in general are an uncommon survival at water mills. It is difficult to believe that the zinc launder pre-dates the 1930s, and it may be as late as the 1940s, again suggesting that provision was made for the waterwheel to remain in use until the mid 20th century. The flow of water into the launder could be controlled from inside the first floor of the mill, via a steel wire connected to the sluice mechanism, rather than it having to be controlled externally, and so allowed the operations within the mill to be undertaken by fewer workers, perhaps only a single operator.

7.17 The ground floor of the mill (room G2) was largely occupied by power transmission. The pattern of bases on the large slabs in the ground floor of the garage range (room G7) suggests that the larger of the saw mill's saws may have been located here. Large saws would have needed both space and access for larger pieces of timber to be brought in, and only the garage range or the structure formerly existing between the mill and garage ranges had this access; the garage range was built between 1856 and 1893, and the now demolished structure between 1893 and 1912. In the early 19th century, both circular and reciprocating saws were in use in saw mills, with the former being used for smaller timbers and the reciprocating for larger timbers such as planks, beams and rafters (Jamieson 1832, 914). However, by the later 19th century, and into the early 20th century, it is probable that only circular saws were in use, and at least one smaller example survives *ex situ* on the ground floor of the garage range.

7.18 Again, on the first floor of the mill (room 1F10), there is little evidence for the presence of machinery and it may largely have been used for storage, materials being brought in using the loading door in the south wall. The surviving hay-rake making machinery is concentrated at the 'domestic' end of the mill's first floor (room 1F11). The basic parts of the rake comprised shaft, head, bow and teeth. The square section heads could have been produced on saws located on the ground floor of the complex, and were then stacked where they would be next needed, adjacent to the drilling machine. The drilling machine could accommodate up to a total of 20 drills but the blank left in place on the machine has 16 holes; this is an interesting contrast to the evidence collected by Hartley and Ingilby in Dentdale (1981, 132-133), where it was stated that by the 1930s rake heads with 16 to 18 teeth had been superseded by those with only twelve. No surviving examples of teeth, bows or shafts remain within the mill complex, but the shafts may have been turned on the 'lathe' at the opposite end of the room to the drilling machine. Surviving bills and receipts indicate that the Burtons despatched both assembled rakes and component parts such as shafts, and that the shafts came in both four and six foot lengths. It is likely that further woodworking machinery was located on the first floor of the garage range (room 1F12), but exactly what is now uncertain, while the well-lit first floor of the kiln range (room 1F13) would have been suitable for more complex or assembly work. The second floor of the mill (rooms 2F15-16) may again have been given over largely to storage.

7.19 In addition to the activities outlined above, the Burtons also seem to have been involved in poultry keeping at West Mill, to judge by the receipts for birds bought and sold in the 1940s and 1950s (see Chapter 2). Some of the poultry could have

been kept in the poultry house (**Site 33**) recorded as part of the current survey. Although this structure shares some characteristics with other locally recorded poultry houses (e.g. Richardson & Dennison 2009; Dennison & Richardson 2009) in that it was built between 1856 and 1892, and enlarged by 1912, and that it stands in a relatively isolated location away from the main complex, in most respects it differs quite markedly, lacking the stone-built nesting boxes, 'pop' holes and security arrangements against vermin seen elsewhere. It's location also seems odd, as it necessitated bridging over a significant section of the mill's headrace. Although it could originally have been used to shut in geese at night, it is most likely that the structure originally served a purpose other than accommodating poultry, and was only turned over to this use at a later date. What this former use may have been is unclear - it was unlikely to have been a stable as this would be expected to be closer to the mill complex, but it may have been a small cow house or just a storage building. The adjacent path or track coming down the steep slope from the north-east might also have been important to this structure.

7.20 It is also probable that some of the quarrying activity recorded within the Mill Gill survey area was associated with the Burton family. It is recorded elsewhere that stone from the most prominent quarrying activity (**Site 23**) near Millgill Force was used to build the 19th century railway station buildings and the Wesleyan chapel in Askrigg (Hartley & Ingliby 1989, 225); the Wesleyan chapel was built in 1878 and the railway opened in 1877 (Bulmer 1890). Other stone from the quarry could have been used to build the power house and also the extensions to the mill complex undertaken after 1856. The small rectangular building (**Site 31**) to the east of the power house may be associated with quarrying, as could also be the stone and concrete bases (**Site 28**) on the north slope of Mill Gill, although both of these post-date 1912. The small ruined structure (**Site 21**) in the angle of the gill could also be associated with quarrying activity, perhaps forming a place of refuge for the workers away from the quarry face. Alternatively, it may relate to woodland management, and be associated with sawing or working timber in some way.

Corn Milling: c.1800 to c.1887

7.21 As stated above, corn milling at West Mill ceased at some point between 1881 and 1887. It is clear that when the building was converted from a corn mill to saw milling, hay-rake making and joinery, extensive alterations were made. There is no surviving *in situ* corn milling machinery within the mill complex, and indeed very few relics overall. This may suggest that it was sufficiently antiquated or worn by the late 19th century as to be deemed unsuitable for re-use in any way, although it may simply have just not been suitable. When the complex was taken over by William Handley Burton in the 1880s, the interior of the mill was stripped out, the garage range built onto the south side of the kiln range (thus significantly reducing the size of the adjacent yard), the first floor of the kiln range added (rendering the kiln inoperable), a lean-to added to the north side of the mill, and a second structure subsequently erected between the garage range and the mill. An earlier access point from the meadow to the north, between the mill and the kiln range, was blocked off, and so the main access was then from Mill Lane. It is not known whether these additions/alterations all occurred at the same time, but they were all in place by the time the 1893 Ordnance Survey map was surveyed a year earlier (see figure 7).

7.22 From at least 1821 and until the 1880s, the West Mill complex was occupied by the Addison family, and the overall form of the complex during this period is depicted on the 1856 Ordnance Survey 6" map, and to a lesser extent, the 1839 tithe map

(see figures 4 and 6). Although Mill Lane was then in existence as an enclosed trackway following its current route, there was clearly another way into the complex along the footpath running through the meadow to the north, entering between the kiln range and the mill by a separate flight of steps. This footpath was used by Wordsworth in 1799, and it may fossilise an earlier route linking the mill complex to Askrigg, possibly pre-dating the western end of Mill Lane.

7.23 The 1839 tithe map implies that the mill complex comprised the mill, the house and a small square detached structure which may have housed the kiln. The absence of any ponds on the map may well imply that they had not yet been constructed, although it is possible that the section of the leat nearest the mill was widened to form a small pond (**Site 29e**). The leat is depicted as curving further to the north along the base of the steep natural scarp, and an earthwork depression (**Site 20**) appears to partly represent its route. The position at which the leat left the beck appears to be roughly the same as the location of the existing sluice, which means that the course of the leat east of the sluice and earthwork 20, to the north of the later power house, has been lost by disturbance and landslip.

7.24 By the mid 19th century, as shown by the 1856 Ordnance Survey map (surveyed in 1854), the mill complex comprised the mill (**Site 36a**), the longer kiln range (**Site 36c**) and barn (**Site 36d**), a detached structure to the south-east of this, and Mill Gill House. By this date, the water supply to the mill was very much as it exists today, with water being brought along a re-aligned leat into the large mill pond (**Site 29c**), and from here into the headrace (**Site 29d**), which widened out into a second small pond or wider head race (**Site 29e**) closer to the mill itself. If the earlier 1839 depiction is correct, the creation of the main mill pond may well represent an attempt by the Addison family to regularise and control the water supply to the mill, to provide a more efficient and effective power source - this was possibly done by James Pratt Addison, who took over the complex after the death of his father, Ralph, in December 1851. The 1856 Ordnance Survey map and the 1816 sketch by Turner (see figure 3) indicate that at least part of the abutment to the north-west of the mill dates to the 19th century, and that the overflow or bypass was in approximately the same place as it is now. In 1816, water was carried on a wooden launder into the wheelhouse at the west end of the mill.

7.25 The mill as sketched by Turner was almost certainly only of two storeys. Changes in the stonework of the north and south external elevations and the west gable of the mill indicate that it was increased in height to three storeys at some point. The incised marks “JPA 1867” visible on one of the purlins to the central bay of the roof structure may well commemorate the date at which the extra storey was added, but at the very least, given that there is no evidence for re-used timbers in any parts of the softwood roof trusses, it demonstrates that the third storey must have been present by 1867. The initials “JPA” presumably belong to James Pratt Anderson (d.1869), and the work demonstrates that it was thought economically viable to add a third storey to the mill in the later 19th century. This is in contrast to similarly sized mills in north-east Yorkshire, which were often ‘improved’ by the addition of extra storeys in the late 18th or early 19th centuries (Harrison 2001, 86-108). The addition of the extra storey probably caused a number of other changes to the mill. Turner’s 1816 sketch might also be taken to indicate that the waterwheel was already enclosed within a wheelhouse by this date, but the external west gable of the wheelhouse shows that it too has been raised in height, probably in c.1867 to match the raised body of the mill; it is not certain what purpose the blocked ground floor opening in the north wall served, but it evidently could not afford access with the waterwheel in its existing position. The ‘domestic’ east end of the mill is probably shown in both 1839 and 1856, but it is clearly a later addition to the main

building, and has also developed in two main phases. An earlier, lower phase, was still of two storeys, but this was lower than the two storeys of the mill. It was heated by a fireplace in the east wall of the ground floor (room G4) and there was almost certainly a fireplace in the same position on the first floor (room 1F11), although this was obscured by a pile of hay-rake blanks at the time of survey. Latterly, the 'domestic' east end was also raised to meet the raised mill, although the second floor extension (room 2F16) was not provided with a fireplace.

7.26 How would the mill have functioned in the mid 19th century? The existing waterwheel is likely to be a later replacement of an earlier wheel, introduced after the mid 19th century. It has been speculated above that this could have been done in the 1880s as part of the wholesale changes undertaken by William Handley Burton, but it might also have been done in c.1867 when the mill was raised as part of more general improvements - perhaps this was done when the new mill pond was constructed between 1839 and 1854. In the mid 19th century, an earlier overshot waterwheel in the wheelhouse would most probably have driven a pit wheel mounted on the wheel axle within the ground floor of the mill, but set further to the east of the existing pit wheel. The pit wheel would have meshed with a 'wallower' mounted on an upright shaft, which would also have supported the great spur wheel. These parts of the transmission would have been held in place by a substantial wooden hurst frame, and it is likely that parts of this hurst frame were cut down and re-used for the frame now present in the mill's ground floor. The great spur wheel would have meshed with stone nuts to provide the drive to the stones themselves, mounted on the 'stone floor' or first floor of the mill. The surviving millstones set into the ground floor of the mill, the French burr stone set upright to the south of the barn range, and comparison with other recorded mills in north-east Yorkshire (Harrison 2001, 86-108), all suggest that in the mid 19th century West Mill was probably provided with two sets of stones, a set of 'greys' for grinding oats, peas and beans and a second set of stones (the burr stones) for grinding wheat; the latter may have replaced a set of German basalt or 'blue' stones in the early to mid 19th century. Above the stones, the upright shaft would have risen to a crown wheel, perhaps turning a lay shaft and also a shaft for a sack hoist. Although the internal floors of West Mill have clearly undergone a great deal of alteration, it is possible that the sack hoist openings are survivals from the use of the building as a corn mill, while the area of disturbance to the north side of the first floor may well be associated with the sawn-off timbers in the north internal wall, together perhaps indicating the presence of former storage bins here.

7.27 The drying kiln in the kiln range would have been used in conjunction with the mill. Larger types of drying kilns with an earthenware tiled drying floor, such as that at West Mill, were more common in those parts of England where oats were grown in a damper climate, such as Scotland, the Pennines and the west of England. In these areas, grain was less likely to be dry enough to mill straight from harvesting, and so drying or 'kilning' was necessary. Drying was also necessary so that the husks of the oat grains would become brittle and could be 'shelled' off prior to the production of oatmeal. In the north of England, corn-drying kilns are usually stone-built and square in plan, and the fire basket was often fitted with wheels so that it could be withdrawn when the correct amount of drying had been completed (Jones & Major 1978, 136). Examples of drying kilns are documented in North Yorkshire from the 16th century at least, and such kilns appear to have been introduced into the Lake District from the early 18th century. One stand-alone two phase probable 17th century corn drying kiln, adjacent to but physically separate from a former water mill, was recently excavated on Kilnsey Green by the Ingleborough Archaeology Group (Johnson *et al* 2009). There are records of corn drying kilns

from north-east Yorkshire in the early 19th century, although no complete examples now survive. Sometimes a kiln was located on an individual farm, but they were often shared between several farmers; they are also found in association with water mills (Mason & Pacey 2000, 82-93; Harrison 2001, 148). Surviving examples remain at Heron corn mill in Beetham (Cumbria), at Hartlington Mill and Haugh saw mill, Barden, both in the Yorkshire Dales National Park (Robert White, YDNPA, *pers. comm.*).

7.28 The drying kiln at West Mill may be early 19th century in date, as perforated clay tile floors are suggested to have replaced earlier slated drying floors from about c.1800 onwards (Mason & Pacey 2000, 88). Comparison with other examples indicates that the perforated clay tiles would have been supported on stone joists (Mason & Pacey 2000, 90). If the kiln covered the same area as the broad half vaults, then the upper part of the kiln (i.e. the tiled drying floor) could have been as much as 4.10m square, close in size to a surviving example at Hough Mill in Barden, North Yorkshire (Mason & Pacey 2000, 89). The kiln may originally have been accommodated in a single storey stand-alone structure as depicted in 1839, but soon after it was in a building of the same length as the existing range, although this was somewhat lower, the gable height being indicated by the upper of the two gable scars visible in the first floor east internal wall (room 1F13). The first floor was accessed through the now blocked doorway at the north end of the west gable. It may be significant that this door was accessed from the gap between the buildings, meaning that it could have been reached by people from beyond the mill complex, for example, in Askrigg village via the footpath shown on the early Ordnance Survey maps. There was presumably an opening or timber cowl of some kind in the roof over the kiln to take the smoke away. The kiln was rendered ineffective after 1887, when the first floor of the kiln range was added to form a well-lit workshop space, although the perforated clay tiles of the floor were evidently retained, as they survive to the present day.

7.29 Both Ralph Addison (from 1829), and his son James (in 1869), appear as millers with another occupation in documents, farmer and gamekeeper respectively. Surviving documentation forming part of the Blake collection shows that there was a landholding associated with the Addisons and then the Burtons, and the mill complex, specifically the barn, reflect this wider agricultural activity. The cheese press would have been used to make cheese for the family, but perhaps also for sale as well.

Corn milling: pre-1800

7.30 Documentary evidence provided by Hartley and Ingliby (1989, 57-58) notes that there was a corn mill near or on the site of the present West Mill in the 16th and 17th century. In 1555 the mill was let on a 21 year lease, and in c.1576 it was reported that the watercourse was obstructed by rocks falling into it from the cliff under which it ran. In 1607 the mill was reported to be in 'greate decaie and of little valewe', again because the supply ran under a 'greate rockie hill, parte of which often falleth into the same current and stoppeth the passage thereof'. It was noted above that the 1839 tithe map shows an earlier, more northerly, curving alignment for the leat (now partly represented by a depression - Site 20) which would have passed under the steep rocky slopes in the area of the present power house. It may well be the case that this depiction also represents the 16th-17th alignment of the leat, which was supplemented by a rill rising on the moors some distance to the north. However, repairs to the leat must have been carried out, as a new lease was subsequently taken out by Edmund Pratt.

7.31 The existing water mill at West Mill was clearly present in 1799 when William Wordsworth visited Mill Gill although it is difficult to judge exactly how much earlier than this it was built, based purely on structural evidence. Before the wheelhouse was built, the wheel may once have been open to the elements, while the 'domestic' east end of the mill is a later addition. If these two elements are removed, then one is left with a sub-square two storey building measuring c.7.80m east-west by c.7.10m north-south. Elsewhere, in north-east Yorkshire, the sub-square plan form may be significant; Harrison (2001, 108) noted that surviving medieval mills in north-east Yorkshire tended to have wide-span ground plans, whereas much later 18th century mills, sometimes associated with a specific type of gearing, tended towards a sub-square plan. There is however absolutely no evidence that this was the case at West Mill, but there are nevertheless a number of structural anomalies which are neither closely dateable nor easily explained.

7.32 Principal amongst these anomalies is the semi-circular projection to the south elevation of the mill. The sloping top and height of the projection suggests that it is contemporary with the pre-1867 two storey mill, but it is difficult to suggest a purpose. The projection does not appear necessary for the accommodation of machinery or moving parts, although it is noticeable that the window opposite in the first floor internal north wall of the mill has a rather crudely shaped curved recess beneath it. The projection bears some resemblance to the shallow semi-circular turrets containing stone spiral staircases which are known from pre-1750 houses in the northern Dales (Harrison & Hutton 1984, 218), although there are a number of problems with this interpretation. The spiral staircases generally occur as rear projections to houses, and illustrated examples (e.g. Harrison & Hutton 1984, 132) appear both wider and deeper than the example at West Mill. The current survey has found no other evidence to suggest that West Mill might contain the core of a converted domestic dwelling, but again, the recesses and internal stone 'string courses' to the south-east corner of the ground and first floors are not easy to explain in an industrial setting, and it may be significant that these features are placed close to the circular projection. An alternative possibility is, given that the mill was described as being in great decay in 1607 but was subsequently repaired and re-leased, that the apparent structural anomalies described above are the remnants of an early 17th century rebuilding. As the mill was enlarged, heightened and radically changed internally during the 19th century, perhaps partly evidenced by the 1839 tithe map, the earlier elements have been progressively removed, leaving only remnants.

7.33 Irrespective of whether the earliest surviving parts of West Mill represent the remains of an earlier building converted into a mill, or an earlier mill that was remodelled, they clearly did not exist in isolation. The kiln range was once formed by a significantly shorter building, measuring c.6m in length, and perhaps only of a single storey, or a low two storeys, the roof height represented by the lower of the two gable lines visible in the internal first floor east wall (room 1F13). This smaller structure may be that depicted on the 1839 tithe map. The building rose from a stepped plinth, and although even in its reduced form it would still have been able to accommodate the existing kiln, it would seem rather cramped internally to have done so. It is possible therefore that the core of the kiln range incorporates the remains of a building pre-dating c.1800; it clearly pre-dates the barn to the east. Quite what function this building might have served is unclear. It seems too small to have been a medieval mill, and may have been a dwelling associated with the earlier mill, but it is more likely to have been a stand-alone kiln house.

7.34 Besides the mill and the kiln range, the third building that was present within the complex before c.1800 was Mill Gill House itself. No survey of the house was

required as part of the project, and so its architectural development cannot be commented on. However, it is believed that the house was constructed in c.1721 (Prof. D Blake, *pers. comm.*), but the 1721 indenture noted in Chapter 2 above does not appear to relate to the site. The description of a 'workhouse or dying house' on 'the Mill Green' more likely refers to somewhere else in the village, but it is always possible that a related activity such as fulling, as well as corn milling, was carried out at West Mill. In the absence of clear documentary references, it is not always easy to disentangle water powered fulling mills from corn mills, particularly during earlier periods. As the main difference between a fulling mill and corn mill was formed by the equipment housed within, they would be difficult to distinguish on earthwork evidence alone, a situation exacerbated by the fact that both processes could be housed within the same building served by the same water system (Moorhouse 2003, 327). Furthermore, fulling mill sites might be re-used for corn milling and *vice versa* (Harrison 2001, 48).

Medieval Activity

7.35 The presence of a small community based around a mill (fulling or corn or both), associated buildings and perhaps also an associated dwelling by the late 17th/early 18th centuries is likely to have originated at an earlier period, and may well have its origins in the medieval period. A similar process took place at two of Jervaulx Abbey's former vaccaries, which developed into small settlements in their own right during the 16th and early 17th centuries - Helm and Dale Grange (Moorhouse 2003, 295, 304, 335 & 342). An examination of medieval primary sources for references to milling at Askrigg lies outside the scope of this work, but is likely to have already been undertaken by other fieldworkers (Moorhouse 2003) although as yet unpublished.

7.36 Nevertheless, even without this evidence, there are good reasons to believe that West Mill is a medieval mill site. The name 'Mill Gill' has been cited as evidence that an early mill was located here, and similar place-name evidence has been used to locate other medieval mill sites within the Dales (Moorhouse 2003, 323). It is important to understand that medieval corn mills were a manorial monopoly, the tenants being obliged to grind their corn at the landlord's mill, and as such the manorial structure dictated the distribution of corn mills, not the township structure (Moorhouse 2003, 323). West Mill was owned by the manorial overlords (latterly the Newby Estate) until 1933, and it presumably served the medieval township of Askrigg, as evidenced by the Mill Lane leading from the western end of the settlement; the siting of a mill was dictated in part by an adequate supply of water, and mills placed at a distance from those who were obliged to use them would require routes to them (Moorhouse 2003, 327).

7.37 There is little surviving field evidence that can be unequivocally linked to medieval milling at West Mill. As has already been noted, the mill buildings include no early features that are closely dateable, although it is quite possible that evidence for an earlier building could have been completely removed by later works. However, it is possible that some of the earthworks to the north-west of the mill complex may preserve an earlier arrangement. Moorhouse (2003, 324) notes that one of the characteristics of water-powered medieval corn mills in the Yorkshire Dales is the presence of header tanks or ponds on the leat, or between the main water source and the mill. In this respect, the shallow but long pond-like section of the head race (**Site 29e**) close to the mill complex, which is set on a prominent south-west facing scarp, is of interest. Could this be a remnant of an earlier header tank that was incorporated into the later mill race, later superseded by the larger capacity of the mill dam (**Site 29c**)? It was noted above that the leat as depicted on the 1839

tithe map, and which partially survives as an earthwork depression (Site 20), might represent the 16th-17th century alignment of the mill race. However, a medieval leat might have been expected to have taken water off the beck at a point closer to the mill. An examination of the area to the south of the beck, at the base of the south slope of Mill Gill would be helpful, as there is at least one artificial pond-like earthwork here, close to the point where the beck is crossed by a rotten wooden footbridge. This former pond is located within one of two small areas on this side of the gill shown on the historic Ordnance Survey maps as being within Askrigg township (see figure 6) - this is a curious arrangement, and may well imply that these areas were associated with the mill complex. If this was the case, the mill leat would need to have been carried over the beck in a launder-type arrangement.

7.38 Away from the mill complex, the current survey has recorded other elements of the wider local medieval landscape. Two areas of lynchets (**Sites 16a and 16b**), forming part of the wider medieval and early post-medieval agricultural landscape surviving within Askrigg township, fell within the Mill Gill survey area, although this lynchet system appears to have never extended into the base of Mill Gill; here, the majority of the surviving earthworks not associated with the mill's water supply appear to be associated with the former course of the beck. Further west, close to the power house, a channel (**Site 22**) appears to preserve evidence for an artificial tank or pond of potential early date. To the west of Leas House, the survey recorded a probable medieval routeway (**Site 1**), possibly linking properties owned by Jervaulx Abbey on either side of Whitfield Gill, with a medieval stream crossing point at Slape Wath (**Site 11**). Another possible early routeway (**Site 2**) diverges from the medieval track described above and runs east-west, partly along a natural hollow created by a small landslip. It has a number of ruined structures and platforms situated on or just above its northern slope (**Sites 3 and 4**) which might represent, in part, former field barns. Other potential early buildings might be represented by earthworks (**Site 17**) within the small part of the presumed medieval lynchet field system.

Recommendations for Further Work

7.39 Although the archaeological and architectural survey of the mill complex, and the adjacent earthwork surveys in Mill Gill and at Leas House, have produced a comprehensive understanding and appreciation of the historic resource at West Mill, a number of recommendations for additional survey and other work can be made. These will help to increase knowledge, provide further information on areas which are at present not fully understood, and enhance public awareness and appreciation of the complex.

7.40 These recommendations can be outlined under a number of broad headings, as set out below. However, it should be noted that they should not detract from the recommendations for the repair and conservation of the historic buildings, which are set out in Chapter 8 below and Appendix 4 of volume 3.

Survey of Mill House

7.41 A survey of the house (assuming the permission of the residents can be obtained) would contribute to an understanding of the development of the mill complex. Closely dateable features are more likely to survive in the house than in the mill, which has been subject to much change, especially from the later 19th century onwards. If the development of the house could be understood, especially the identification of the earliest phases, this would allow comparison with the available documentary evidence for its history, and perhaps also inform how the mill

complex had changed. For example, did the increasing prosperity on the part of the millers allow modifications to be undertaken to both house and mill at the same time? Is there any surviving evidence for early electric lighting within the house?

7.42 It is envisaged that a survey of the ground floor of the house, coupled with a detailed inspection of the exterior, interior and the attic spaces, accompanied by a photograph record, would be sufficient to understand the broad structural development of the building. A body of documentary material regarding the house has already been gathered as part of the survey of the mill complex, and is therefore readily available.

Further Documentary Research

7.43 Arguably the two most interesting phases of the mill complex and the landscape of which it forms a part are the late medieval/early post-medieval periods, and the period after the late 19th century when it was used for the manufacture of hay rakes.

7.44 With regard to the former, the survey has identified an earlier water supply system which is likely to have been in use from at least the 16th century, and which bears comparison to those at other late medieval mill complexes in Wensleydale. As has already been noted, it is highly likely that other historians and fieldworkers in Wensleydale have already amassed primary medieval documentary evidence relating to milling in Askrigg and the related manorial structure around which the mills would have been organised, but this has yet to be published. An understanding of the medieval development of the landscape within and around the survey area would therefore be enhanced by a study of this material.

7.45 In regard to the latter, it is possible that the collections of the Wensleydale Folk Museum in Hawes hold further material relating to West Mill, including transcripts and/or information gathered by Hartley and Ingilby which formed the basis of their published references to West Mill (e.g. Hartley & Ingilby 1981; 1989). The museum may also hold information relating to hay-rake making in other parts of the Dales, for example Dentdale, which would provide a useful comparison with the process as undertaken at West Mill. In addition, during the course of the EDAS survey, initial contact was made with the widow of Ernest Burton who still resides in Askrigg, although it was not possible to follow this up. An interview with her, and perhaps other residents in the locality, may yield important oral evidence for developments which took place in the latter years of the complex.

Additional Earthwork Survey

7.46 During the course of the current survey, it was noted that there are further earthworks on the south side of Mill Gill, including what appears to be a pond, that might be associated with the early history of the mill. Mill Gill formed a boundary between two medieval townships, but it is noticeable that the boundary left the beck in two or three areas (including that containing the pond) to ensure that they were included in Askrigg township.

7.47 A survey of these areas may lead to a greater understanding of the early water supply to the mill complex, and help to explain how changes in the course of the beck modified this, both physically and in terms of administration/ownership. Depending on the size and scale of the earthworks, this additional survey could be undertaken as a full measured topographical survey (using the same methodology

as for the rest of the Mill Gill survey area), or a tape-and-offset survey using modern Ordnance Survey scaled bases, or a simple sketch survey.

Enhanced Public Interpretation

7.48 It is already known that the owners allow a certain amount of public access to the mill, albeit under supervision due to health and safety concerns. Some local schools have visited, as well as members of special interest groups and the general public, although take-up has be less than expected (Prof. D Blake, *pers. comm.*). A certain amount of additional low-key public interpretation would therefore be beneficial to the site, both to inform general passers-by (the site is located on a well-used public footpath) and specific visitors to the mill.

7.49 Two display or notice boards could be erected on the approaches to the site, one close to the stile in the field adjacent to the north-east corner of the mill, and the other within the north side of the complex close to the launder and overflow channel; both these positions are on the well-used public footpath. These boards could summarise the development and history of the mill complex, and be augmented with photographs and drawings produced as part of this survey report, perhaps one even showing a reconstruction of the mill in its heyday.

7.50 One or a number of themed leaflets could also be produced, which could be given out to visitors and other interested parties. These could again explain the history and development of the site, but also have details of specific aspects of the mill, such as an explanation of how the mill and/or hay-rake machinery worked, how the site was important for local electricity production etc.

7.51 Subject to health and safety considerations, and after some repairs to the mill building (as outlined in Chapter 8 and Appendix 4 below) have been carried out, and assuming the owners are in agreement, a certain amount of publicity could be generated for 'mill open days' through the production of posters and flyers which could be distributed through local shops, museums, National Park offices, tourist information offices etc. These 'mill open days' could be limited to a number of days every year (e.g. as part of the 'Heritage Open Days' scheme), or more frequent if the owners felt so inclined.

8 CONDITION SURVEY AND RECOMMENDATIONS FOR REPAIRS

Introduction

8.1 As required by the original brief, a condition survey of the mill complex was also required as part of the West Mill project, together with outline costs for conservation work to the main mill building and the overhead mill race. The full condition survey report (including figures) is produced in Appendix 4, while the main points are summarised below.

General

Roofs and rainwater goods

8.2 All the roofs to the mill buildings are in stone slate and in reasonable condition. Oak pegs are evident. One area of the roof over the garage has been recently relaid (without underfelt) - there is no apparent need for repairs, but the remaining life of this roof is difficult to determine.

8.3 The rainwater goods to the mill, garage, kiln range and barn comprise PVC gullies and fall pipes. It is recommended they are replaced with 150mm wide half round cast iron gutters set on galvanised rise and fall drive-in brackets and 75mm cast iron rainwater pipes set on oak or lead pipe bobbins. The drains need to be investigated. At least one rainwater pipe requires a gulley (for access to) the north side of the barn.

Doors

8.4 All the doors exhibit some wood boring beetle attack, some more extensive than others. There is no sign of recent activity, but treatment is advised throughout the mill, kiln range, garage and barn using bat-friendly chemicals (water based).

Electrical installation

8.5 The wiring and fittings within the complex are not up to current standards. A new installation to provide sufficient light for general access and power sockets is advised.

The Mill Building

Exterior

8.6 There are numerous movement fractures in the south elevation (*Elevation 1*), and although not excessive, they do require some grouting and some bonding across the wall thickness, with *in situ* concrete bonder and stainless steel reinforcing bars. Existing cement repairs are unlikely to be properly grouted up, and so should be cut out and re-grouted with lime mortar. There are also many open joints to the south-west corner, which need to be deep pointed. The stone slates to the eaves of the rounded half turret section of wall need repair.

8.7 The west elevation (*Elevation 2*) has extensive open joints to the gable and in the lower middle section that will need repointing. At the base of the wall, a bulge to the south of the doorway opening needs the external skin rebuilding and tying back into the core. A large area to the first floor wall of the north elevation (*Elevation 3*) has numerous isolated open joints; although these are a low priority, it would make

sense to repair these at the same time as the rest of the works to this elevation. The section of elevation containing the launder entry needs repointing, as do the sides of the lean-to extension building, with a small area of rebuild to the verge. The chimney top in the east elevation (*Elevation 4*) is unstable and needs to be rebuilt, and the adjacent areas of wall face need repointing.

Interior

8.8 The structural movement evident around the window at the west end of the south elevation (*Elevation 11*) and at the south end of the west internal wall (*Elevation 12*) (both room 1F10) needs to be investigated, with potential pin or tie repairs and replastering likely to be required. Similarly, the fractures at the top of the north wall (*Elevation 13* - 2F15) need investigating and repairing, and some loose stones below the east window will need resetting.

Garage Range

Exterior

8.9 There are numerous vertical fractures in the east elevation (*Elevation 9*) which have been lightly repaired with just a surface application of mortar - these need to be raked out and deep filled with lime mortar. Some bonders will also be required to tie across the factures. On the south elevation (*Elevation 10*), open joints at the east end of the wall and above the window lintels will need repointing.

Interior

8.10 The fractures evident in the east elevation at first floor level (*Elevation 20* - 1F12) will need grouting and tying, in conjunction with the same work on the external elevation (see above). The rotting floor boards in the western half of the first floor room (1F12), caused by leaks before the roof was recently repaired, should be taken up and replaced. The loose and unsupported brickwork in the centre of the east wall (*Elevation 20* -1F12) needs to be built up. The fractures in the north wall (Elevation 19) also need investigation and grouting as necessary.

The Kiln Range

Exterior

8.11 An area of the lower part of the north elevation (*Elevation 5*) is bulging. This wall has been built in phases, but the movement is due to more than differing standards of construction. The outer skin needs to be taken down and rebuilt, and tied back into the core. Some minor pointing is required to the cill of the western window. The corrugated PVC skylight at the west end of the roof needs replacing with a metal-framed conservation roof light.

Interior

8.12 The brick vault over the west side of the kiln (*Elevation 26*) needs consolidating, using slate wedging and grouting. It should be possible to reset the majority of the few dropped bricks into their original positions. In the east wall (*Elevation 24* - 1F13), the fracture above the central recess should be grouted, as well as the junction between the east and south walls.

Barn

Exterior

8.13 Approximately half the north wall (*Elevation 6*) has open joints in need of repointing, while the open joints to the south-west corner and part of the north-east corner (*Elevation 7*) also need repointing. Vertical fractures in this elevation also need grouting and bonders fitted across. The whole of the south elevation (*Elevation 8*) needs repointing, as there are many open joints. The slight movement in the south-east corner, where thrust forces are apparent, needs investigation.

Dove house

8.14 All elevations exhibit fractures and general movement. Some areas of the walls are loose, and there are open joints to the end of the gable walls. There is a need to tie the fractures together and repoint the open areas. The stone slate roof is much disjointed. There is a need to strip/repair the rotted roof timber and re-cover with the existing slates.

Launder and Waterwheel

8.15 There is some minor erosion to the concrete capping of the stone piers/support wall - this should be made good to reduce water entry/frost damage. The launder channel is in zinc, and the base is concrete over zinc, inserted later to reduce leakage. It still leaks, and ideally should be re-lined with fibreglass or a rubberised compound. Latterly, ferrous metal trays were added to give support, but these are now rusting badly at the ends and may be becoming weak - investigation is needed with a view to possibly reinforcing with galvanised plates.

8.16 Some 30% of the timber paddle blades need overhauling, and the metal frame of the wheel needs treating, with repairs to the axle mounting and spokes. Specialist advice is needed with regard to proper treatment and the feasibility of getting the wheel to run.

Power House

8.17 The walls are of coursed rubble stone (local limestone) in a fair condition. There is much rich cement pointing, some in the ribbon style, although this does not appear to be causing any undue problems - it possibly contains lime as well as Portland cement. A section of the wall top in the north-east corner recess has collapsed due to a rotted lintel and wall plate. There are similarly rotted lintels to the recess in the north wall below the western truss, and the upper section of the wall needs rebuilding. Damp is not excessive, considering half of the building is set into the hillside.

8.18 The already damaged roof collapsed during the duration of the project, and needs replacement. The asbestos cement sheeting may date to the 1950's, or may be original. The underside is painted, presumably to reflect the light. Plain concrete tiles have been used at the end, perhaps as later repairs? A good third of the asbestos sheets were broken, mostly on the north slope before the collapse. The roof structure was a lightweight construction of softwood king-post trusses with composite tie beams and purlins spanning between - there is no evidence of rafters. This roof may be a 1950's replacement, but there is no evidence of more robust timbers and stone slates as would be traditionally used in the Dales.

Perhaps the roof dates from the 1930 expansion and if so, could be of historical interest. The trusses will be difficult to repair and, if the building is to be re-roofed (which is advisable to protect the structure), new trusses will be needed. A similar fibre cement (non-asbestos) sheet covering should be used. However, a lightweight roofing system of metal trusses, purlins, and steel profiled sheet with PVC coating would be an appropriate modern intervention.

8.19 The windows are mostly metal framed, and rusting, with most glazed panels broken. The tall west window is in timber and may have been re-used from the west wall of the original 1910 building. Ideally, the windows require extensive overhaul, but the roof repair is more important. The doors also need some minor overhaul. The stone and concrete floors are rough but not a concern.

Conclusions

8.20 The recommended works as set out in the condition survey have been prioritised according to urgency (see Appendix 4). The Priority A status works (High - 1 to 3 years) are considered to be the external works to the mill (elevations 1 to 4), garage (elevations 9 and 10), barn (elevations 6 to 9), and the dove house (including rainwater goods), the interior of the mill (elevation 13), the interior of the kiln range (elevations 24 and 26), the floor of the garage (1F12), the repairs to the walls of the power house, and general woodworm treatment. The other repairs were classed as being Priority B (3 to 5 years) and Priority C (5 to 20 years).

9 BIBLIOGRAPHY

Primary Sources

1721 Indenture between Alexander Smith, gentleman, of Camshouse in the parish of Aysgarth and John Forster, dyer, of Askrigg in the one part and Christopher Caygill, dyer, of Askrigg in the other part relating to workhouse and dying house on the Mill Green in the territory of Askrigg, 12th October 1721 (Blake collection)

1816 Sketch of West Mill by J W M Turner, made 27th July 1816 (reproduction in Blake collection)

1819 Enclosure plan of Cow Close, Askrigg (NYCRO I (DC/AY))

1839 Askrigg tithe map and schedule (WYL RD/RT 12)

1852 Probate of the will of Mr Ralph Addison deceased (Blake collection)

1856 Ordnance Survey 6" to 1 mile map Yorkshire sheet 66 (surveyed 1854)

1864 Assignment between William Pratt, farmer, and his wife Mary Ann, of Nappa House near Askrigg and James Pratt Addison, farmer, of West Mill, Askrigg relating to dwelling house, garden outbuildings and appurtenances near West Mill, Askrigg, 18th July 1864 (Blake collection)

1869 Residuary Account - Inland Revenue for James Pratt Addison, late of West Mill, Askrigg, died on the 26th January 1869 (Blake collection).

1869 Administration of the Court of Probate to the Estate of James Pratt Addison, deceased, dated 15th March 1869 (Blake collection)

1893 Ordnance Survey 1893 25" to 1 mile map Yorkshire sheet 66/3 (surveyed 1892)

1908 Conveyance of land and grant of easement from Mr Abram Scarr and one other to Mr W H Burton, 29th December 1908 (Blake collection)

1912 Ordnance Survey 6" to 1 mile map Yorkshire sheet 66/3 (revised 1910)

1913 Conveyance between W H Burton and R D de Grey Vyner Esq, 29th October 1913 (Blake collection)

1913 Conveyance of land and grant of easements from Mr Abram Scarr and one other to R C De Grey Vyner Esq, 30th October 1913 (Blake collection)

1914 Agreement between Robert Charles de Grey Vyner and William Bell as to water in Askrigg .. , 31st July 1914 (Blake collection)

c.1915-58 Collection of bills and other material relating to the Burton family (Blake collection)

1924 Conveyance between Mrs B Bell and Mr E Burton of freehold hereditaments situate at Askrigg .. , 10th September 1924 (Blake collection)

1924 Invoice from Mr Arthur H Wilkinson, Solicitor, Leyburn, to Ernerst Burton (Blake collection)

1925 Letters from R Addison, Askrigg, N Yorks (Blake collection)

1925 Assignment between Mr Ralph Addison and others to Mr Ernest Burton of a leasehold messuage and premises situate near to West Mill, Askrigg.., 26th July 1925 (Blake collection)

1933 Conveyance of Mill Gill situate at Askrigg from the Newby Hall Estate to Ernest Burton, 6th September 1933 (Blake collection)

1952 Conveyance of a dwelling house and land at Askrigg from Ernest Burton to Mrs M I Morgan (Blake collection)

1969 Conveyance relating to Mill Gill House Askrigg from Mrs M I Morgan to Mr C A Crisp, 5th August 1969 (Blake collection)

1971 Conveyance relating to West Mill Askrigg from Mrs M Burton to Mr C A Crisp, 1st October 1971 (Blake collection)

1974 Conveyance of Freehold land and premises from Mr C A Crisp to Mr & Mrs T R Hodson, 13th August 1974 (Blake collection)

1979 Aerial photograph of West Mill complex and Mill Gill House (Blake collection)

1984 Two colour 35mm prints of the West Mill complex (Blake collection)

Secondary Sources

Alcock, N W, Barley, M W, Dixon, P W & Meeson, R A 1996 *Recording Timber-Framed Buildings: An Illustrated Glossary* (Council for British Archaeology Practical Handbook in Archaeology No 5)

Bowers, B 1973 'Electric Power'. In Bracegirdle, B (ed) *The Archaeology of the Industrial Revolution*, 123-130

Bulmer 1890 *History and Directory of North Yorkshire: Askrigg* (available at http://www.genuki.org.uk/big/eng/YKS/NRY/Aysgarth/Aysgarth90.html)

Campbell, J 2000 'Naming the Parts of Post-Medieval Roof Structures'. *Vernacular Architecture* vol 31, 45-51

Cant, D 2011 'Markings and Designs on Timber and Stone'. *Yorkshire Buildings: The Journal of the Yorkshire Vernacular Buildings Study Group* no 39, 40-42

Crocker, A 2000 'The Rolt Memorial Lecture 1999: Early Water Turbines in the British Isles'. *Industrial Archaeology Review* vol 22(2), 83-102

Curl, J 1977 *English Architecture: An Illustrated Glossary*

Dennison, E & Richardson, S 2009 *Grange Gill Quarry, Lime Kiln and Hen House, Skellgill Lane, Low Abbotside, North Yorkshire: Archaeological Survey* (unpublished EDAS archive report 2008/322.R01 for Yorkshire Dales National Park Authority)

English Heritage 2006 *Understanding Historic Buildings: A Guide to Good Recording Practice*

English Heritage 2007 *Understanding the Archaeology of Landscapes: A Guide to Good Recording Practice*

Fussell, G 1952 *The Farmer's Tools: British Farm Implements, Tools and Machinery AD 1500-1900*

Gribbon, H 1969 *The History of Water Power in Ulster*

Harrison, B & Hutton, B 1984 *Vernacular Houses of North Yorkshire and Cleveland*

Harrison, J 2001 *Eight Centuries of Milling in North-East Yorkshire*

Hartley, M & Ingilby, J 1981 *Life and Tradition in the Yorkshire Dales*

Hartley, M & Ingilby, J 1989 *Yorkshire Village* (3rd edition, original 1953)

Hay, T T 2000 'Hydroelectricity Generation in the Yorkshire Dales'. *The Cleveland Industrial Archaeologist* vol 26, 35-53

Hill, A 1984 *Letters of William Wordsworth: A New Selection*

Hill, D 1984 *In Turner's Footsteps: Through the Hills and Dales of Northern England*

Hogg, G 1971 *The Shell Book of Exploring Britain*

Ingle, G 1997 *Yorkshire Cotton: The Yorkshire Cotton Industry, 1780-1835*

Jamieson, A 1832 *A Dictionary of Mechanical Science, Arts, Manufactures and Miscellaneous Knowledge*

Johnsom, D, Martlew, R, Carroll, P & Carroll, P 2009 *Report on the Excavation of a Corn Drying Lin on Kilnsey Green, Kilnsey, North Yorkshire* (Upper Wharfedale Heritage Group publication available at http://www.ingleborougharchaeologygroup.org.uk/pdfs/CDK08%20report.pdf)

Jones, C 1996 'Electricity Supply in Shropshire before Nationalisation'. *Industrial Archaeology Review* vol 18(2), 201-222

Jones, D H & Major, J K 1973 'Drying Kilns attached to British Corn Mills'. In van Hoogstraten, M (ed) 1973 *The International Molinological Society: Transactions of the 3rd Symposion*, 135-141

Kershaw, B (und.) *Power from Water* (unpublished pamphlet and accompanying map, left in mill building at West Mill)

Mason, K & Pacey, A 2000 'Corn-Drying Kilns in Wharfedale and Mid-Airedale'. *Yorkshire Buildings: The Journal of the Yorkshire Vernacular Buildings Study Group* no 28, 82-93

Matkin, R B 1978 'The Day they saw Light'. *The Dalesman* vol 40(8), 684-686

Moorhouse, S 2003 'Anatomy of the Yorkshire Dales: Decoding the Medieval Landscape'. In Manby, T G, Moorhouse, S & Ottaway P (eds) *The Archaeology of Yorkshire: An Assessment at the Beginning of the 21st Century*, 293-362

Pacey, A 2009 *Yorkshire Dales Field Barns Part 1: Types and Plans*

Pigot 1829 *Directory of Yorkshire: Askrigg* (available at http://www.genuki.org.uk/big/eng/YKS/NRY/Aysgarth/Aysgarth29Dry.html)

Pontefract, E & Hartley, M 1942 *Yorkshire Cottage*

Raistrick, A 1967 *Old Yorkshire Dales*

Richardson, S & Dennison, E 2009 *Poultry House, East Side of Grange Beck, Skelgill Lane, Low Abbotside, North Yorkshire: Archaeological Survey* (unpublished EDAS archive report 2008/322.R02 for Yorkshire Dales National Park Authority)

Richardson, S & Trueman, M 1997 *Monuments Protection Programme Quarrying Industry: Step 3: Introduction to Site Assessments* (unpublished Lancaster University Archaeological Unit report for English Heritage)

Tucker, D 1977 'Hydro-electricity for Public Supply in Britain, 1881-1894'. *Industrial Archaeology Review* vol 1(2), 126-163

Wright, R (ed) 1911 'Turbines'. *The Standard Cyclopedia of Modern Agriculture and Rural Economy* vol 12, 19-22

Electronic sources

http://www.dalesgenealogy.com/census - transcripts of census data for Wensleydale and Swaledale (accessed August 2012)

http://www.durhamintime.org.uk - Durham in time (accessed September 2012)

http://www.maxwellselectrical.co.uk - History of Maxwell's of Northallerton (accessed September 2012)

http://www.nationalarchives.gov.uk/records/census-records.htm - TNA (The National Archives) census data (accessed August 2012)

http://www.oldengine.org (accessed September 2012)

http://www.oldengine.org/members/ruston - Ray Hooley's Engine Pages (accessed Septemner 2012)

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