

METRIC SURVEY ON SWAP HILL, LARKBARROW,  
EXMOOR, SOMERSET  
Exmoor National Park ELB19  
PROJECT REPORT

By Hazel Riley



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OASIS PROJECT NO 367990

## **ABBREVIATIONS**

EH English Heritage

EMP Exmoor Mires Partnership

ENPA Exmoor National Park Authority

ENPHER Exmoor National Park Historic Environment Record

ETRS89 European Terrestrial Reference System 1989

GPS Global Positioning System

HEO Historic Environment Officer

NE Natural England

NMP National Mapping Programme

OSGB36 (15) Ordnance Survey Great Britain 1936 (National Grid)

OSGM15 Ordnance Survey Geoid Model 2015

OSTN15 Ordnance Survey Mapping Transformation 2015

PAL Principal Archaeological Landscape

RICS Royal Institution Chartered Surveyors

SSSI Site of Special Scientific Interest

SWARCH South West Archaeology

## **ADMINISTRATIVE INFORMATION AND DESIGNATIONS**

ENPHER: MSO7020; MMO2476

County: Somerset

District: West Somerset

Parish: Exmoor

NGR: SS 8127 4208

Exmoor National Park

## **ACKNOWLEDGEMENTS**

Thanks to the ENPA and their tenants for background material and access arrangements.

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## 1.0 EXECUTIVE SUMMARY

1.1 A metric survey of part of a contour leat and a herringbone drainage system on Swap Hill, NW of Exford, Exmoor, was carried out in July and August 2019 for the Exmoor National Park Authority in advance of plans to improve the condition of the SSSI. The contour leat is part of an extensive system of irrigation via water carriages constructed by John Knight in Exmoor Forest in 1819 and 1820 to improve the grazing resource; the drainage system is also part of John Knight's improvements to the Forest and was probably dug in the 1820s or early 1830s.

## 2.0 INTRODUCTION

2.1 This report sets out the results of a metric survey of archaeological features on Swap Hill, Larkbarrow Farm, Exmoor. Swap Hill is part of the North Exmoor SSSI, an extensive area of south-western lowland heath communities (designated sites. [naturalengland.org.uk](http://naturalengland.org.uk)) and this survey work is part of mitigation work in advance of works to be carried out by the ENPA, according to a plan to deliver carbon capture and bio-diversity gains to take the SSSI out of declining condition (ENPA 2019).

2.2 The survey area comprises part of a contour leat and a drainage system on the SW side of Swap Hill, 1.2km to the NE of Larkbarrow Corner, in the parish of Exmoor, centred at SS 8127 4208 (Fig 1). Swap Hill is an area of partially reclaimed moorland drained by the headwaters of Badgworthy Water. It has an open, north-facing aspect and rises gently from 370m OD in Long Combe in the north to 425m OD at the boundary with Elsworth to the south (Fig 2).

2.3 The underlying geology of Swap Hill consists of Devonian sandstones of the Hangman Sandstone Formation ([bgs.ac.uk](http://bgs.ac.uk)).



*Fig 1 Location map*



2.4 The vegetation of Swap Hill is predominantly grassy mires, dominated by Purple Moor-grass and associated species such as Tormentil. The area is grazed extensively by cattle and sheep (Front cover; Fig 3).

2.5 Swap Hill was part of the Royal Forest of Exmoor; the Forest was enclosed by 1820 when it was sold to John Knight. As part of the holding of the remote Larkbarrow Farm, created by Frederic Knight in the mid 19<sup>th</sup>-century, Swap Hill was primarily used as sheep pasture in the later 19<sup>th</sup> and 20<sup>th</sup> centuries (Riley 2017).

2.6 There have been several pieces of archaeological work in the survey area. Swap Hill was included in an archaeological survey of Larkbarrow Farm carried out by EH for the ENPA in 2001 (Jamieson 2001). The NMP project for Exmoor mapped the archaeological and historic landscape features of the National Park from aerial photographs (Hegarty and Toms 2009; Hegarty and Wilson-North 2014). The NMP transcription recorded the contour leat and the drainage system (ENPHER MSO7020; MMO2476). The area was included in a walkover survey carried out in 2014 by SWARCH in advance of proposed mire restoration by the EMP (Morris 2014), and in a re-assessment of the 19<sup>th</sup>-century reclamation landscape in the light of Lidar analysis by the University of Exeter undertaken by the EMP HEO (Anderson and Cowley 2011; Ferraby 2016). A walkover survey designed to examine the questions posed by this work was carried out in 2017 (Riley 2017).

2.7 A study of the effects of drainage on the condition of pollen grains within upland peat deposits used monitoring and coring sites on Beckham, Swap Hill and the head of Long Combe to assess the effects of water-table draw down on the condition of pollen remains within the peat matrix. The study concluded that there had been significant localised water-table draw-down caused by drainage, and that although pollen within the peat had been damaged as a result of this, it is rarely so damaged that

counted pollen assemblages are unreliable (Davies et al 2015).

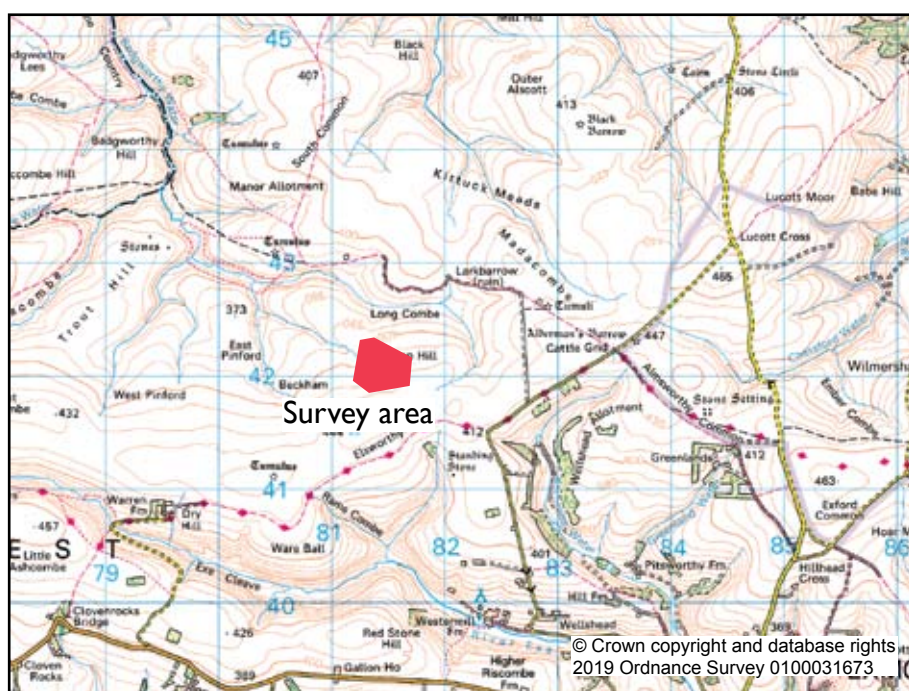


Fig 2 Survey area location and topography

2.8 Swap Hill is part of the Larkbarrow and Tom's Hill PAL, designated on account of the 19<sup>th</sup>-century reclamation landscape, the prehistoric archaeology and the palaeo-environmental potential of the valley mires (Balmond 2015, 94-6).

### 3.0 OBJECTIVES

3.1 The principal aim of the survey was to undertake a detailed earthwork and topographic survey of the contour leat and its relationship to the drainage system in order to accurately survey, record and interpret the leat to inform proposed restoration works.

### 4.0 METHODOLOGY

4.1 The survey work was carried out in July and August 2019. The whole of the drainage system was recorded using GPS survey (where features were accessible) and by the Lidar images of the area (where features were inaccessible due to wet ground conditions) to a scale of 1:1000. The survey work was undertaken using survey grade differential GPS. The resulting ETRS89 data was transformed to OSGB36(15) using OSTN15 and OSGM15 ([www.ordnancesurvey.co.uk/gps/transformation](http://www.ordnancesurvey.co.uk/gps/transformation); Greaves et al 2016). Observation times were based on those recommended by the OS and RICS in order to obtain accurate height information (OS 2010; RICS 2010). Contours were derived from the GPS survey. The resulting plan is reproduced here at a scale of 1:1000 (Fig 4). A digital, GIS-compatible version at scale forms part of the survey archive.

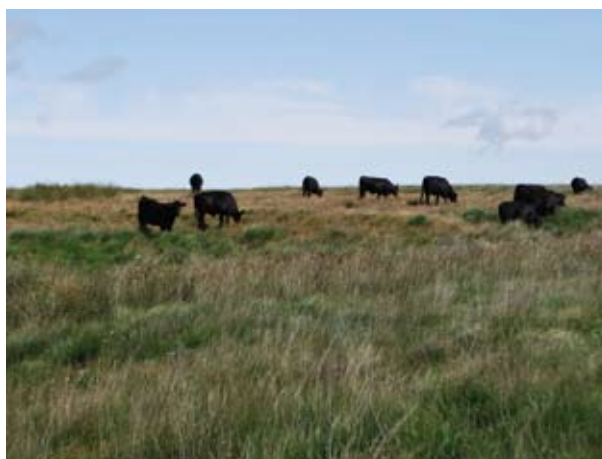
4.2 Fourteen profiles were surveyed using GPS at a scale of 1:250 across the leat, the three main drainage channels and four of the feeder drains (Fig 5).

4.3 An analytical earthwork survey of the archaeological features contained within the large scale survey area was undertaken. The features were surveyed at a scale of 1:500 using survey grade differential GPS.

4.3.1 The resulting plan is reproduced here at a scale of 1:500 (Fig 6).

4.4 A photographic survey of the archaeological features was carried out and this forms part of the project archive.

4.5 The project archive is held at the Exmoor HER, ENPA.



*Fig 3 Cattle grazing around the contour leat  
(Hazel Riley)*

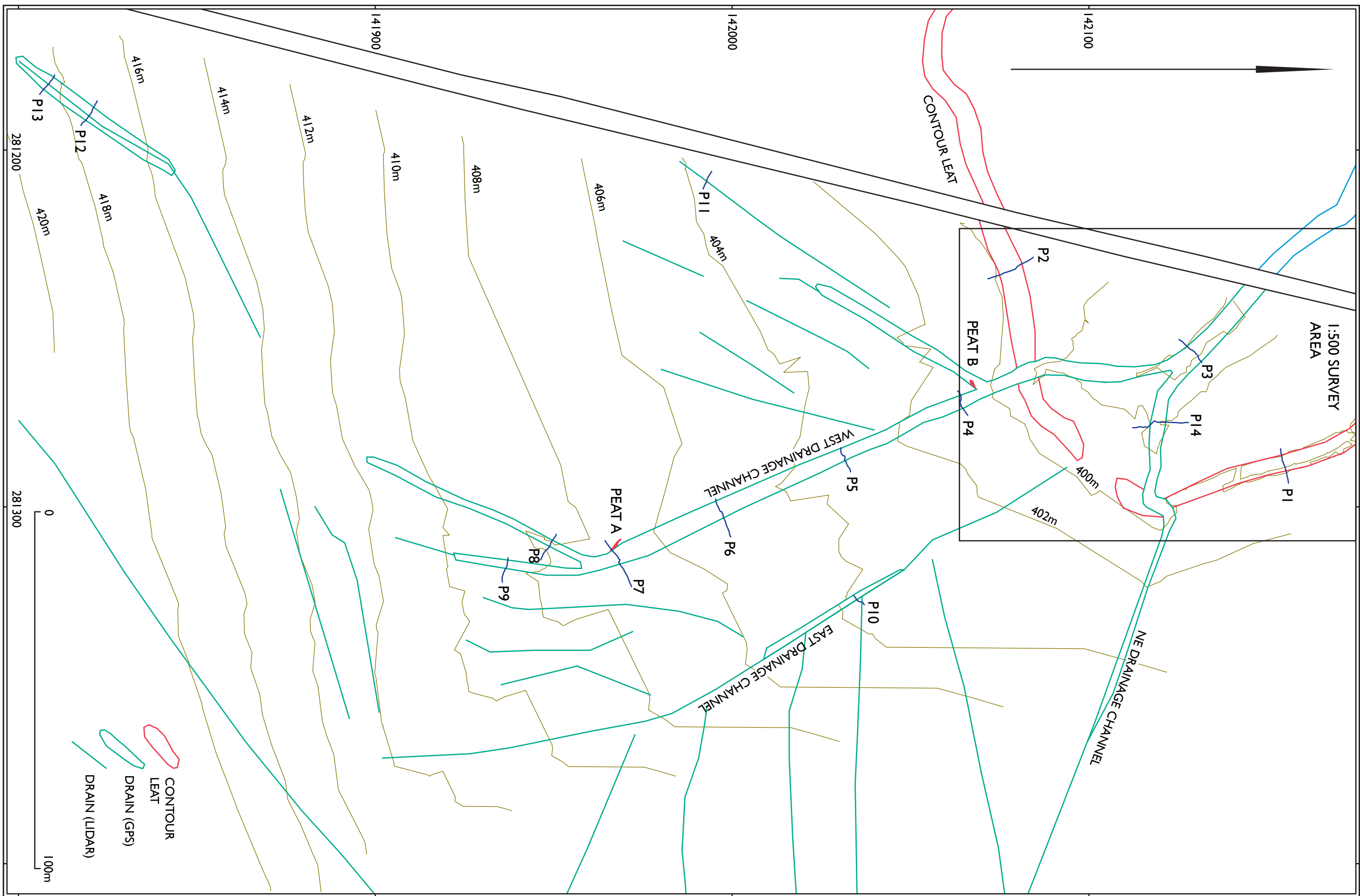


Fig 4 The drainage system and contour leat on Swap Hill 1:1000 scale



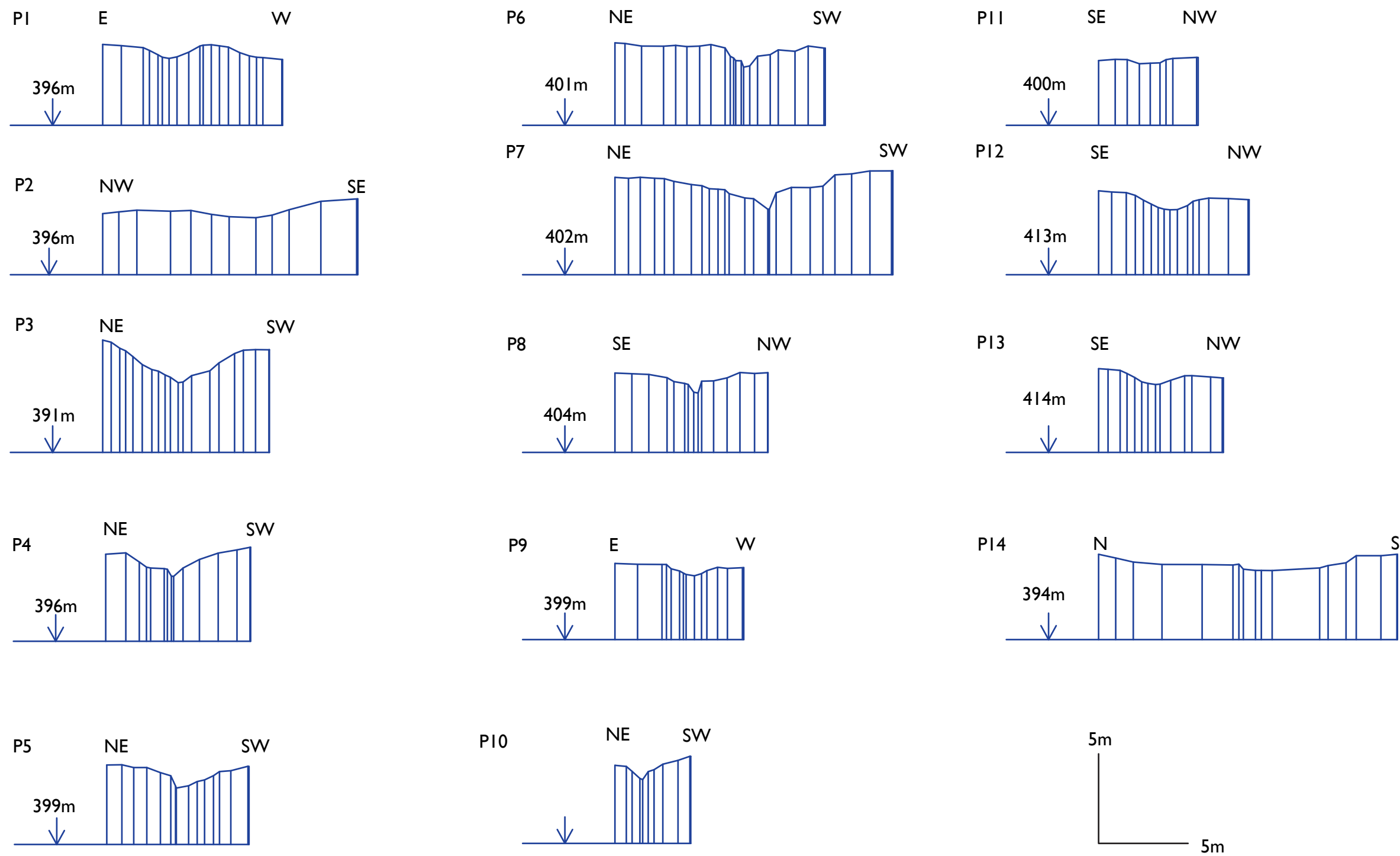


Fig 5 Swap Hill: profiles across the leat and drainage channels 1:250 horizontal and vertical scales

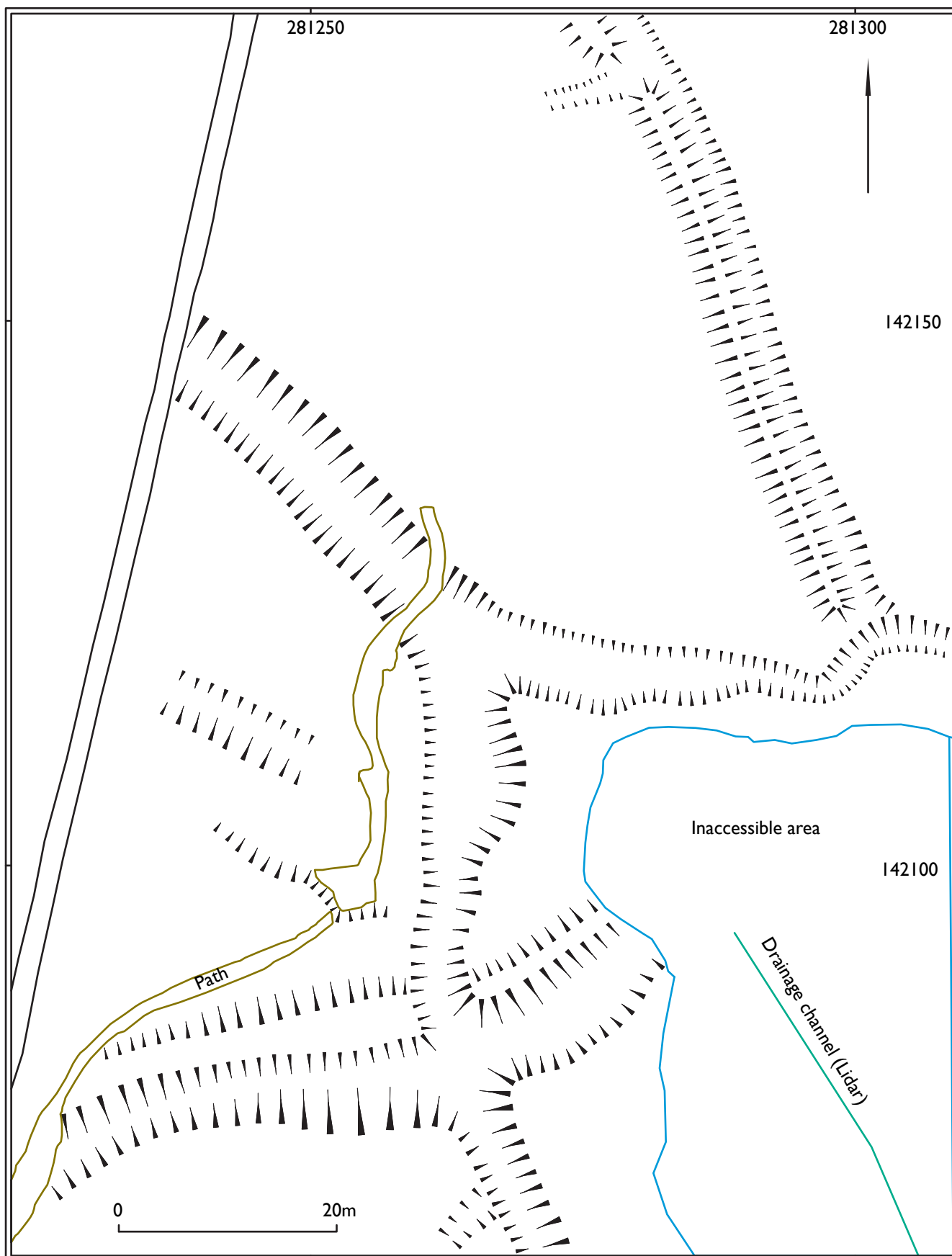


Fig 6 The contour leat and drainage system 1:500 scale

## 5.0 RESULTS

5.1 There are two extensive archaeological features contained within the survey area on Swap Hill: the contour leat ENPHER MSO7020 and the drainage system ENPHER MMO2476.

5.2 The contour leat runs from a tributary stream of Hoccombe Water on Great Buscombe, and follows the 400m contour across West and East Pinford, Beckham and Swap Hill to end in one of the enclosed fields of Larkbarrow Farm: a total length of some 3.6km. On Great Buscombe, the Pinfords and Beckham the morphology of the earthwork is uniform for most of its course: it comprises a rush-filled, U-shaped channel, 2.5-2.8m wide, 0.5-0.8m deep, with a bank, 1-1.1m wide, 0.9-1m high, on the downslope side (Fig 7). On Swap Hill, the contour leat is cut by the drainage system ENPHER MMO2476 (below, 5.3) and by the long, straight enclosure boundary between Beckham and Swap Hill (Figure 8). The leat is cut by the three main drainage channels of the drainage system but survives to the west and east of the west drainage channel as a silted, rush-filled channel with a bank on its downslope side (Figs 9 and 10). The channel is 5.6m wide, 0.7m deep, the bank is 4m wide and 0.6m high (Fig 5, profile 2). A path has caused some erosion to the east of the enclosure boundary (Fig 11). Where the leat is cut by the east drain of the drainage system, the ground is very wet and inaccessible; the Lidar image shows the course of the channel (Fig 12). To the north of the drainage system, the leat survives in very good condition. The channel is 2.5m wide, 0.6m deep; the bank is 2.8m wide (Fig 5, profile 1; Fig 13).



*Fig 7 (above right) The contour leat on East Pinford (1m scale) (Hazel Riley)*

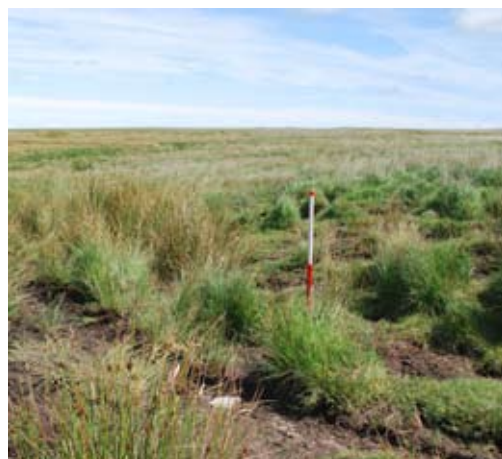


*Fig 8 (above) The contour leat at the enclosure boundary between Beckham and Swap Hill (Hazel Riley)*



*Fig 9 (right) The leat channel looking west from the west drain of the drainage system (1m scale) (Hazel Riley)*

5.3 The drainage system on Swap Hill covers an area of some 5ha and drains the NW facing slopes of Swap Hill via numerous small feeder drains taking water into three main channels which discharge water into a single channel which then drains into a tributary stream of Badgworthy Water on the south side of Long Combe. The drainage system is overlain by the long, straight enclosure boundary between Beckham and Swap Hill. Here, the channel is a deep, V-shaped channel, 6.2m wide and 1.7m deep (Fig 5, profile 3; Fig 14). Two main drainage channels run NW/SE across the slope. The west drainage channel is 170m long and divides into two at its southern end. The channel is V-shaped, 4-6m wide and up to 2m deep, with uneven, eroded edges and water running in a sharply cut channel at its base (Fig 5, profiles 4,5,6,7; Fig 15). At the southern end, where two feeder drains run into the main channel, erosion has led to the exposure of peat, 3.5m long, up to 0.7m deep, on the west side (NGR 281310, 141966) (Fig 4 PEAT A Fig 16). Some 108m to the NW, at NGR 281265 142068, is a second peat exposure, 2.5m long and 0.7m deep (Fig 4 PEAT B). The east drainage channel is 200m long; for much of its course it is difficult to access. At its northern end the drain is a silted, rush-filled channel, 2.7m wide and 0.6m deep (Fig 17). The drain could also be reached to the SE of the leat, where it is a V-shaped channel, 3.4m wide and 1m deep, with running water in a sharply cut channel at its base (Fig 5, profile 10; Fig 18). The third main drainage channel lies at the NE side of the drainage system. It is 240m long and flows SE/NW across the slope. The channel is 2.5-5m wide, 0.6m deep and cuts the leat at NGR 281299, 142120 (Figs 12;19). The feeder drains are narrow, U-shaped channels, 2.4-4m wide and 0.4-0.8m deep (Fig 5, profiles 11,12,13; Fig 20).



*Fig 10 (above left) The rush-filled leat channel (middle ground) looking east from the west drainage channel (Hazel Riley)*



*Fig 11 (above) Erosion where a path crosses the leat (1m scale) (Hazel Riley)*

*Fig 12 (left) The leat is cut by the east and NE drainage channel (1m scale) (Hazel Riley)*



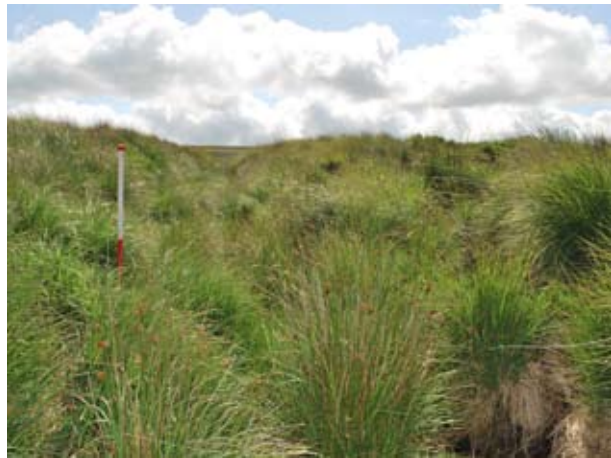


*Fig 13 (above right) The leat to the north of the drainage system (1 m scale) (Hazel Riley)*



*Fig 14 (above) Drainage channel overlain by enclosure boundary (Hazel Riley)*

*Fig 15 (right) Detail of the west main drainage channel, looking south from the leat (1 m scale) (Hazel Riley)*



*Fig 16 (left) Peat exposure on the west side of the west drainage channel (1 m scale) (Hazel Riley)*



*Fig 17 (below left) The southern end of the east drainage channel (1 m scale) (Hazel Riley)*

*Fig 18 (below) Looking NW down the the east drainage channel (Hazel Riley)*





## 6.0 DISCUSSION

6.1 The date and landscape context of John Knight's reclamation of Exmoor Forest has recently been reviewed in the light of analysis of documentary material held in archives of Knight family documents at the Worcester Record Office and the Somerset Heritage Centre (Riley 2019). John Knight set out an extensive system of contour leats – known as water carriages - to systematically irrigate and improve the upland pastures across Exmoor Forest. These water carriages were constructed in 1819 and 1820 and were one of the first elements of John Knight's transformation of Exmoor Forest; the contour leat which runs from Great Buscombe to Larkbarrow, across Swap Hill (ENPHER MSO7020), is one of these water carriages (Riley 2019, 5.3.5).

6.2 The drainage system MMO2476 is typical of the numerous such systems – known as herringbone drainage systems – which were constructed across Exmoor Forest. The drainage systems to the west of Swap Hill, on the Pinfords and Beckham, cut through the contour leat and may have assisted in the irrigation process. A reference to cleaning drains on Swap Hill in 1836 could well date the construction of that system to sometime in late 1820s or early 1830s (WRO 10470/899:310/122 Accounts of John Knight 1835 and 1836).



*Fig 19 (above left) The NE drainage channel (Hazel Riley)*



*Fig 20 (left) Feeder drain on the SW edge of the drainage system (1m scale) (Hazel Riley)*

## 7.0 REFERENCES

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## 8.0 APPENDICES

### 8.1 ELB19 Photographic archive index

8.1 ELB19 Photographic archive index				
Photo reference number	Date taken	HER reference	Description	Scale
ELB19A_NE_31JUL19_HRILEY	31/07/2019	MSO7020	Cattle grazing around the contour leat	
ELB19B_N_31JUL19_HRILEY	31/07/2019	MMO2476	Looking north across the drainage system	
ELB19C_S_31JUL19_HRILEY	31/07/2019		Peat exposure A on the side of the west drainage channel	1m
ELB19D_N_26SEP19_HRILEY	26/09/2019		Peat exposure B on the side of the west drainage channel	
ELB19E_N_31JUL19_HRILEY	31/07/2019	MSO7020	Contour leat N of the drainage system	1m
ELB19F_S_31JUL19_HRILEY	31/07/2019	MSO7020	Contour leat cut by the NE drainage channel	1m
ELB19G_E_31JUL19_HRILEY	31/07/2019	MSO7020	Contour leat cut by the W drainage channel	
ELB19H_W_31JUL19_HRILEY	31/07/2019	MSO7020	Contour leat to the west of the W drainage channel	1m
ELB19I_E_31JUL19_HRILEY	31/07/2019	MSO7020	Erosion where track crosses the contour leat	1m
ELB19J_S_31JUL19_HRILEY	31/07/2019		Peat exposure and erosion on the track N of the contour leat	1m
ELB19K_NW_31JUL19_HRILEY	31/07/2019	MMO2476	The NW end of the drainage system	
ELB19L_NW_31JUL19_HRILEY	31/07/2019	MMO2476	The NW end of the drainage system	1m
ELB19M_S_31JUL19_HRILEY	31/07/2019	MMO2476	The N end of the W drainage channel	
ELB19N_S_31JUL19_HRILEY	31/07/2019	MMO2476	The N end of the W drainage channel	1m
ELB19O_N_31JUL19_HRILEY	31/07/2019	MMO2476	Feeder drain at the SW end of the drainage system	1m
ELB19P_N_31JUL19_HRILEY	31/07/2019	MMO2476	S end of the E drainage channel	1m
ELB19Q_N_31JUL19_HRILEY	31/07/2019	MMO2476	S end of the W drainage channel	
ELB19R_N_31JUL19_HRILEY	31/07/2019	MMO2476	Feeder drains at the S end of the W drainage channel	1m
ELB19S_NW_08AUG19_HRILEY	08/08/2019	MMO2476	NW end of E drainage channel	
ELB19T_E_31JUL19_HRILEY	31/07/2019	MMO2476	W end of the NE drainage channel	

