Bowden Moor, Scottish Borders, Medieval Earthwork Excavations 2024

Data Structure Report

Peeblesshire Archaeological Society

Piers Dixon

Frontispiece: Trench 1 after the removal of the topsoil showing the earthwork with the ditch in the foreground and the Eildons in the background.

Introduction

This Peeblesshire Archaeological Society (PAS) project grew out of the PAS pre-forestry survey of Bowden Moor Farm, near Melrose, in the Scottish Borders in 2022 (Figure 1; PAS 2022), which identified a series of successive and interrelated bank and ditch earthworks on Bowden Moor (Canmore id 55759; Figure 2). These earthworks were first mapped by the Ordnance Survey in the 19th century (Roxburghshire 1899, Sheet VII) and recorded in the Royal Commission Roxburgh Inventory of Roxburgh in 1956 (RCAHMS 1956, 73, 114-116). RCAHMS noted their course and their dimensions, with ditches 2.7m to 4m (8-12 feet) across and banks 3.3-5m (10-15 feet) across, and argued they were 'boundary marks, linking natural features … of medieval and later date'. They mention a dispute between Melrose and Kelso Abbeys in 1200 but did not think these were the boundary that was defined at the time. Barber's Central Excavation Unit survey also concluded they were medieval and most likely to be boundaries related to woodland management comprising banks and ditches, while Gilbert observed that all but one had a ditch on the south while also outlining the history of the dispute between Melrose and Kelso Abbeys that came to a head in 1204 (Barber 1999, 75-6; Gilbert 2012, 92-94). Gilbert recognised that 'the banks may have been constructed … as boundary banks on an ever-receding woodland as they pushed arable and grazing into it'. Crone and Watson attributed the earthworks to woodland management by Melrose Abbey in c.1500 (2003).

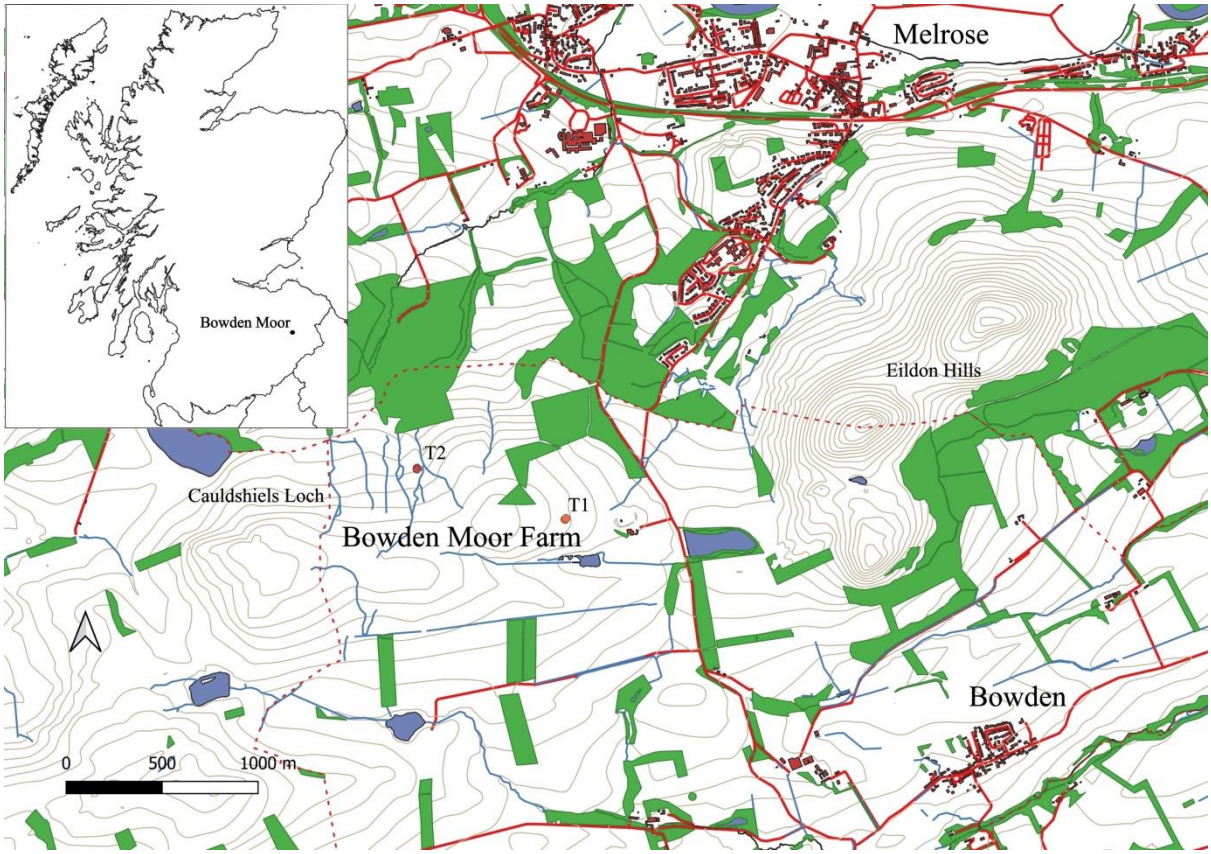

Figure 1 Location map of Bowden Moor Farm. T1 and T2 are the excavation trenches.

Such boundaries have also been recorded in Annandale (RCAHMS 1997, 36-9), Liddesdale (Dixon 1997, 346-352) and in Southdean parish, south of Jedburgh (Dixon 1994). Dixon argued that they are assarts, or intakes of land, particularly in the context of a hunting forest dating to the 12th-14th centuries during the expansion of the medieval economy. The boundaries were designed to manage

deer, limiting their access to cultivated farm land. They comprised a ditch on the outside of the bank forming a significant barrier to deer trying to get in when topped by a hedge or fence, but not sufficient to prevent egress, and subtending from natural features, particularly burns. The form of these intakes is described in a charter granting an assart at Newby in Kinmount in Annandale forest in which William de Carlyle was required to be enclose it 'with hedges and ditches' (Fraser 1894 i, no.11; Dixon 1997, 348), dated to the late 13th century.

Bowden Moor was part of the toun of Bowden in the 12th century granted to Kelso Abbey by King David and there are no references to any hunting forest in this area. This would seem to be confirmed in 1236 when Alexander II confirmed that all Melrose Abbey lands south of Tweed bounded by Lessudden on the east and to the south and west by the Bowden lands of Kelso Abbey were forever outwith the forest area (Fawcett and Oram 2004, 218; John Gilbert pers. comm.). Further documentary sources indicate that the boundary between Bowden and Melrose Abbey lands was defined by King David and confirmed by William I in 1204 in settling a dispute between two Abbeys (Melr. Lib. 1837, No. 145-6; Gilbert 2012, 92-4). This estate boundary later became the line of the parish boundary and is marked in places by an earthwork, particularly over Eildon Mid Hill and also on the north side of Bowden Moor (Figures 1 and 2).[1] To the south of this boundary, a series of earthworks have been recorded that take off from the parish boundary building upon one another as new intakes were enclosed until the last which runs along the crest of the moor. Only one bank and ditch contradicts this with a pronounced ditch on the north side of a much denuded bank, which cuts across the penultimate earthwork in the sequence of boundaries (Figure 2, No. 4 and K on plan respectively).

The boundaries are clearly marking intakes of land on the north side of Bowden Moor, in other words the Melrose Abbey side. If so it would be likely that they were carried out by or on behalf of Melrose Abbey, since it is known that Melrose Abbey disputed the division of the woods by King David and sought to gain greater access. Indeed, Melrose Abbey was told by William I in c1193 that the disputed land was Kelso Abbey's and there should be no more disputes about land or wood (RRS, 2, 1984, no. 367). It is therefore possible that these earthworks are Melrose Abbey's illegal assarting of land during the later 12th century. The driver for them is most likely to have been to obtain more timber for their building work in the early years of the Abbey's foundation, although once established they could be used for farming purposes. Another possibility is that they are late or post-medieval intakes. However, these are different in character, comprising rig and furrow enclosed in earthen banks, as at Menstrie Glen (Cowley 2001), with no external ditch or the successive intakes seen here, usually referred to as head-dykes.

The Project

The main aim of the project was to apply modern scientific dating techniques to establish the date of the earthworks, but also to understand the construction of the earthwork. Experience of excavating earthworks is that they rarely provide artefactual or even charcoal suitable for c14 dating. Recent excavations of park pales that are generically similar to assart dykes, except that the ditch is on the

[1] The earthwork on the north side of Bowden Moor can probably be associated with the boundary described in Latin as '*per nemus quod scissum fuit inter domos illos per regem David*', and in English, 'by the woodland which was divided between those abbeys by king David', in William I's confirmation of David I's boundary (Gilbert 2012, 93).

inside, have produced no artefacts or charcoal that date the earthwork (Hall and Malloy 2016, 25-34). However, another technique is available that has been used in Northumberland on the Wallington estate to date earthworks (Kinnaird, Turner et al. 2020). This is Optically Stimulated Luminescence (OSL) which makes use of the susceptibility of quartz and feldspar to absorb light radiation on exposure to the sun. This provides a signature that can be dated when soil with these minerals has been exposed to the sun during the construction of an earthwork, for example.

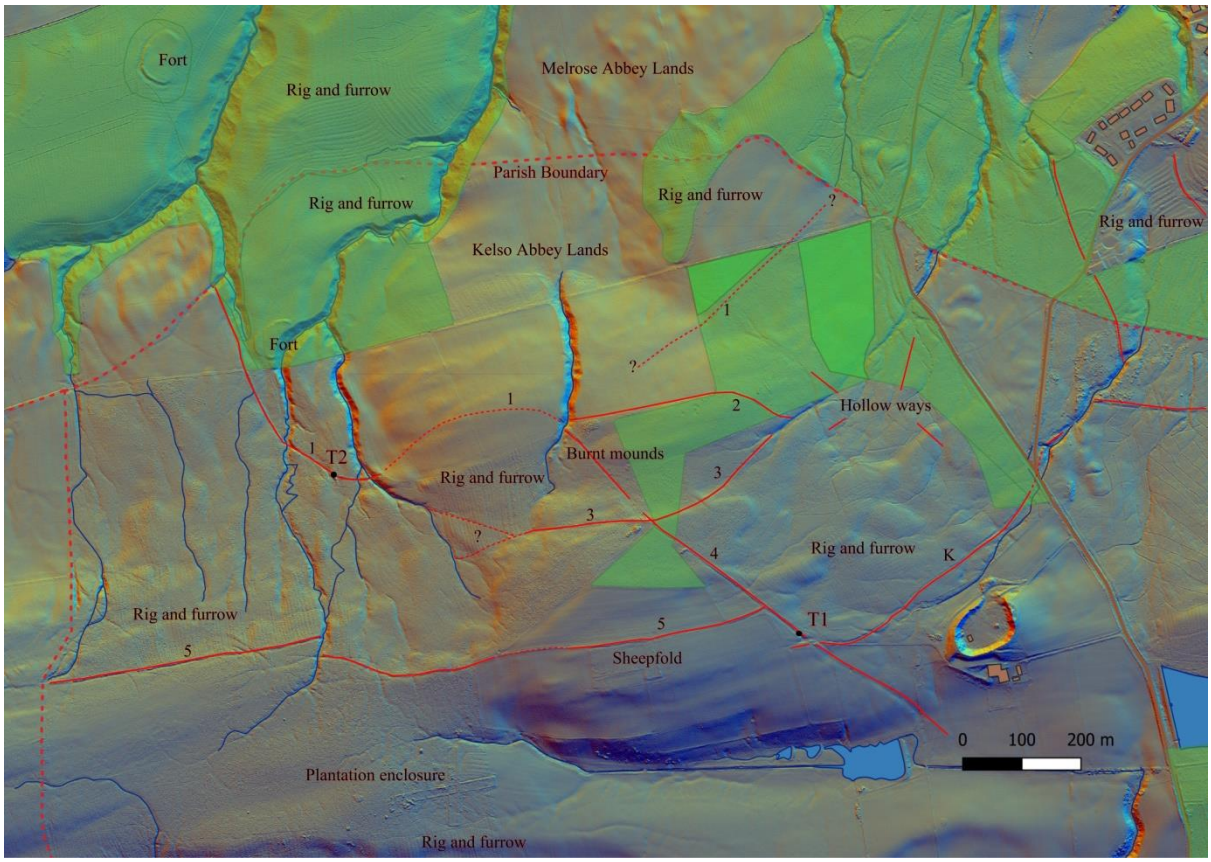

Figure 2 Plan of the earthworks on Bowden Moor, showing the likely sequence with that labelled K cutting across boundary 4, with a bank on the south. Trenches 1 and 2 are marked T1 and T2. The background is a multi-hillshade model derived from Scottish Government LiDAR data Phase 3 50cm resolution (Scottish Remote Sensing Portal; Crown copyright Scottish Government, SEPA and Fugro (2020)) .

Tim Kinnaird of St Andrews University Environmental Science offered to come and take the samples if Peeblesshire Archaeological Society excavated the banks to provide a context for sampling. Two banks were chosen, one that appears to be earliest in the sequence of banks in that it abuts the parish boundary and a second which appears to be fourth in the sequence (Figures 1 & 2, T1 and T2 on plan). A well-preserved section of each bank was chosen for excavation. The work was carried out in May and June 2024 in generally appalling wet weather, except for the last weekend.

The Excavations

Following the layout of the trenches in May using high resolution GPS mapping by Stephen Scott, Neil Crawford, Joyce Durham and Piers Dixon, a drone survey was carried out to provide terrain models of the earthwork and its surroundings (Appendix 1). The excavations were carried out over two weekends in June. The nearest to the farm buildings was selected first and is known as Trench 1 and the other as Trench 2. Excavations were directed by Piers Dixon with the assistance of Joyce Durham. Recording was carried out by photograph, drawn plans and sections at 1:20 (Appendix 2). It quickly became evident that it was more efficient to limit excavation of the bank to half of the bank provide a good basis for OSL sampling. However, it was important to excavate enough of the bank and ditch to ensure its construction and use were recorded and understood. Tim Kinnaird also indicated that sampling the ditch would give a date for the abandonment of the bank as functioning barrier, adding to the importance of excavating to the bottom of the ditch.

Trench 1 (NT 53262 31815)

Excavated under repeated heavy showers, the bank and ditch uncovered in Trench 1 showed that its ditch had been eroded on the SW side by water run off gathered in heavy rain from further uphill (Figure 4, Trench 1 on plan). In effect this doubled the size of the ditch from c.1.25m across to c.2.5m prior to excavation. The primary ditch appears to have been cut into the underlying subsoil to a depth of about 0.5m, with steep sides at 60 degrees and was about 1m across at its base and c.1.25m in breadth at it top (Figure 3). There appears to have been some erosion of the ditch edge on the bank side where its slope is gentler, which was then covered over subsequently with the ditch fill, extending its breadth to 1.6m across prior to excavation. The fill of the ditch was red-brown silty clay, presumably washed in from the ditch sides from further uphill. Only half of the ditch was excavated (Figures 3 and 4), but the edge of the steep cut on the bank side was also located. The subsoil was not excavated at its bottom only the interface with it.

The bank was built directly on the subsoil with no sign of a buried soil, suggesting the topsoil was removed before construction. The bank material was light brown clay with some small stones, c.0.3m in height, on top of which there was covering of gritty brown silty clay adding another 0.14m, giving a total height of about 0.44m (Figure 5). The subsoil was cream clay with small grey stones and sloped gently from SW to NE and it appears the NE side of the bank was more spread than that on the steeper SW side, intentionally so it would appear. The bank, it appears, had been eroded in the same way as the ditch, as supported by the slight concavity of the bank on this side. Based upon the point where the upper bank material was spread (Figure 4, Trench 1 Section), the bank was 3m thickness, but the relationship of the red-brown clay beyond was not tested. Four sets of samples were taken, three from the bank (2 from the NW-SE section and one from the SE) and one from the ditch (Figure 4). Tim Kinnaird has reported his initial results (Appendix 3).

Figure 3 The ditch sondage showing the steep cut, flat base and ditch fill.

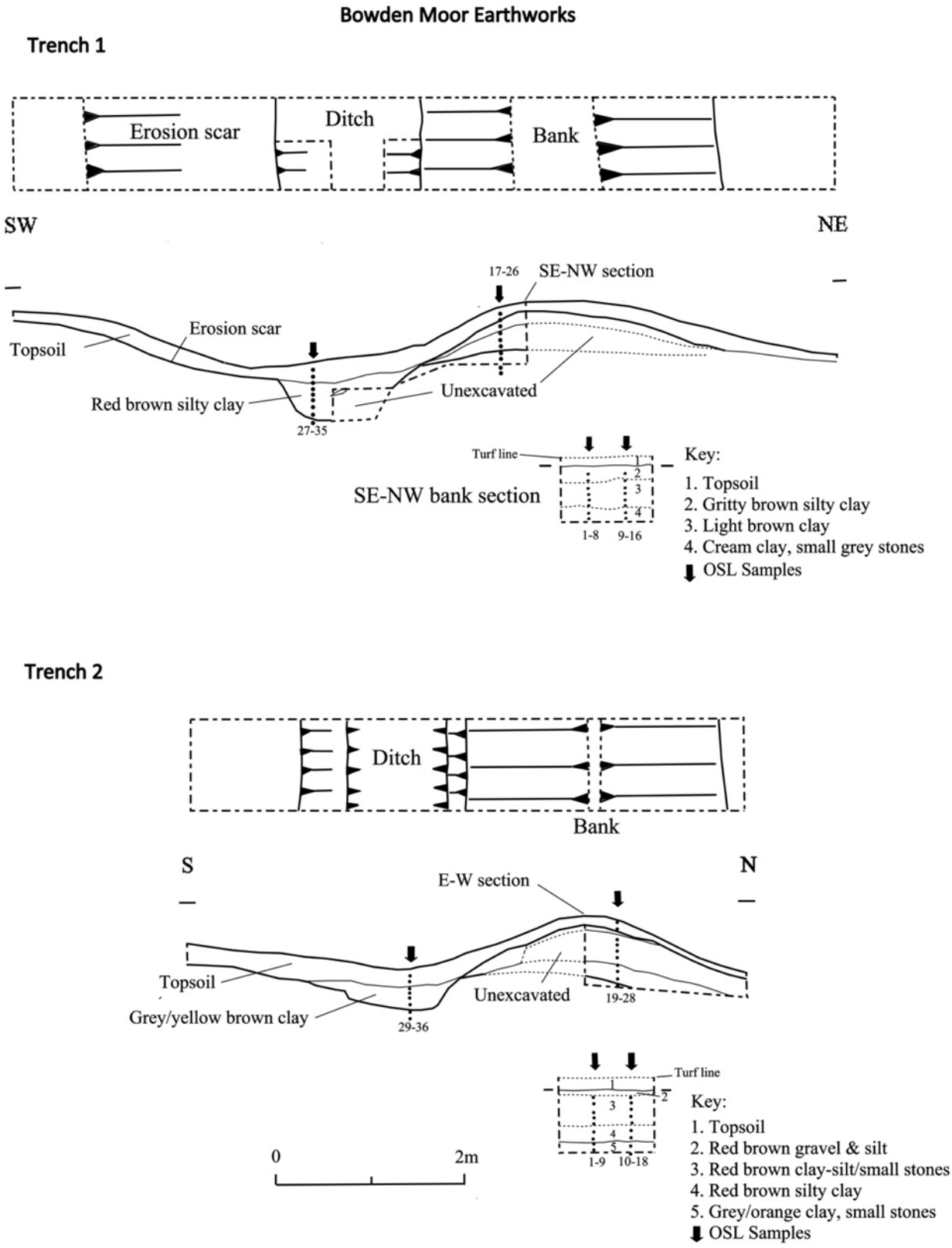

Figure 4 Plans and Sections of the banks and Ditches in Trenches 1 and 2, showing OSL sample points.

Figure 4 Trench 1 bank excavated showing the two main deposits of its make up over subsoil at its base. The eroded upper slope of the ditch is also visible in the foreground.

Figure 6 The bank in Trench 2 during excavation – the bank was partly over dug and the ditch was not fully excavated on the near edge at this stage.

Trench 2 (NT 52488 32077)

The bank and ditch in Trench 2 was treated in a similar way to Trench 1.

Prior to excavation the ditch was narrower with less sign of erosion. However, the south side of the ditch had a second gentler cut that would indeed seem to be the result of erosion as well as a gentler slope to the upper part of the ditch on the bank side (Figure 4, Trench 2 section). This extended the fill of the ditch to 1.6m in breadth. In consequence the ditch fill occupied a similar extent to that in Trench 1 at its top. Like that in Trench 1 the ditch was steeply cut at a similar angle of 60 degrees; it was filled with grey-yellow brown clay (Figure 6). The ditch was only 0.38m in depth, but if measured from the level of the subsoil under the bank it must have been 0.45m in depth at construction and about 1m across at its base.

The bank like that in Trench 1 was built of more than one deposit and with no sign of a buried soil (Figure 7). It was higher than that in Trench 1 at 0.63m and was in excess of 3m in breadth, but its full extent on the N was not determined. The subsoil comprised grey-orange clay with small stones, not unlike that in Trench1. On top of this the base of the bank was made up of a red-brown silty clay, 0.22m thick, under a red-brown clay-silt with frequent small stones, 0.36m in depth, capped by a thin spread of red-brown gravel and silt, 0.05m in thickness. Like Trench 1 the bank was gentler on the downhill side and its full extent was not reached in the trench.

As with Trench 1, 4 sets of OSL samples were taken, 1 from the ditch and 3 from the bank (Figure 7).

Figure 7 Sampling locations in the bank sections showing the make-up of the bank in Trench 2.

Discussion

The two banks and ditches have similar characteristics in terms of size with banks about 3m across and 0.44m and 0.63 in height respectively. The ditches are steeply cut, about 1m across the bottom and 0.5 and 0.45m in depth respectively. It is possible some of the topsoil started out as part of the top of the bank which has been loosened and weathered by natural processes, leading to some loss of height. Even so, this does not produce a height overall that would deter a deer leaping unless it was surmounted by a fence or hedge of which no evidence was located in the trenches excavated.

Evidence for such a timber fence has been found on the top of the bank of a similar type of earthwork at Buzzart Dykes, Perth and Kinross, part of a park pale, the difference being that the ditch was on the inside the prevent deer escaping. Here three post-holes were found cut in the top (Hall and Malloy 2016, 32), of which the spacing was about 0.5-0.6m between them, but their alignment suggests they are from different phases. It was noted that the post-holes were cut leaning at slight angle to the vertical towards the ditch in order to make a deer leap more precarious. A post hole was also found in the top of the bank of Falkland park pale in Cash Wood, Fife (O'Grady 2016, 82). Such a barrier could obtain the overall height necessary to deter a deer from escaping the park, or in the case of the Bowden Moor earthworks of deer entering the newly enclosed land, if the fence was high enough, at least 3-4 feet in height, giving a barrier of perhaps 6-7 feet high when combined with the ditch.

These two earthworks compare well in size with that excavated at Alnham Moor, Northumberland, except that that example has a stone revetment on its external face making a more robust barrier (Dixon 2014, 176-179). The Alnham Moor bank also had a gentler back slope like those on Bowden Moor, making egress easier for deer. Also comparable in size are the two park pales excavated at Kincardine, Aberdeenshire, and Buzzart Dykes, Perth and Kinross by Hall and Malloy (2016, 25-34). While these differ in having the ditch on the inside, they are otherwise similar in the thickness and surviving height of the bank, while that at Buzzart Dykes also had a steeply cut ditch too. However, it is noted that earlier excavations at Buzzart Dykes and Kincardine parks produced more substantial earthworks with stone bases from different parts of the park pales (Hall, Malloy and Oram 2011).

The bank and ditch at Alnham Moor is given a *terminus ante quem* by its appearance as the limit of an enclosed arable field depicted on an estate map of 1619 and it is argued that this earthwork was originally built to enclose the lands cultivated by the village settlement of Alnhamsheles in the forest of Alnham that was occupied from c.1280 to 1550 (Dixon 2014, 216-7). The Buzzart Dykes earthwork is thought be the pale of a park or reserve created for William the Lion in the late 12th century 'towards Clunie' (Hall and Malloy 2016, 32), which Alexander III specifically refers to in the forest of Cluny in 1266x73 (RRS 4, 2013, 9, 21-2 and no. 164). Kincardine Park was extended by Alexander III, but is also thought to date back to William the Lion's reign as he stayed at a nearby castle several times (Hall and Malloy 2016, 29). Uniquely, Falkland park pale was dated archaeologically by two sherds of 13th century pottery that were found in the excavations at Cash Wood (O'Grady 2016, 82).

The OSL samples are designed to provide dates for the construction of the banks assuming the soil in the bases of the banks have been exposed to sunlight well enough to give a date. Good preliminary light intensity results for Trench 1 suggest this should be successful (Appendix), but those for Trench 2 were less intense (Kinnaird pers. comm.). The ditch samples may also give a date for the ditches starting to be filled in and going out of use.

Acknowledgements

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Appendix 1 Drone Survey and 3D Models

The drone survey was carried by Stephen Scott and Neil Crawford following the GPS survey of the trenches in May 2024 in order to provide a 3D terrain model of the two earthworks and their immediate surroundings. This data can be viewed and analysed in a geographical information system (GIS) with other data and in multiple ways. The images below are digital elevation models (DEM) to give the general relief and a local relief models (LRM) to highlight the archaeological features. The DEM legend gives the height above sea level.

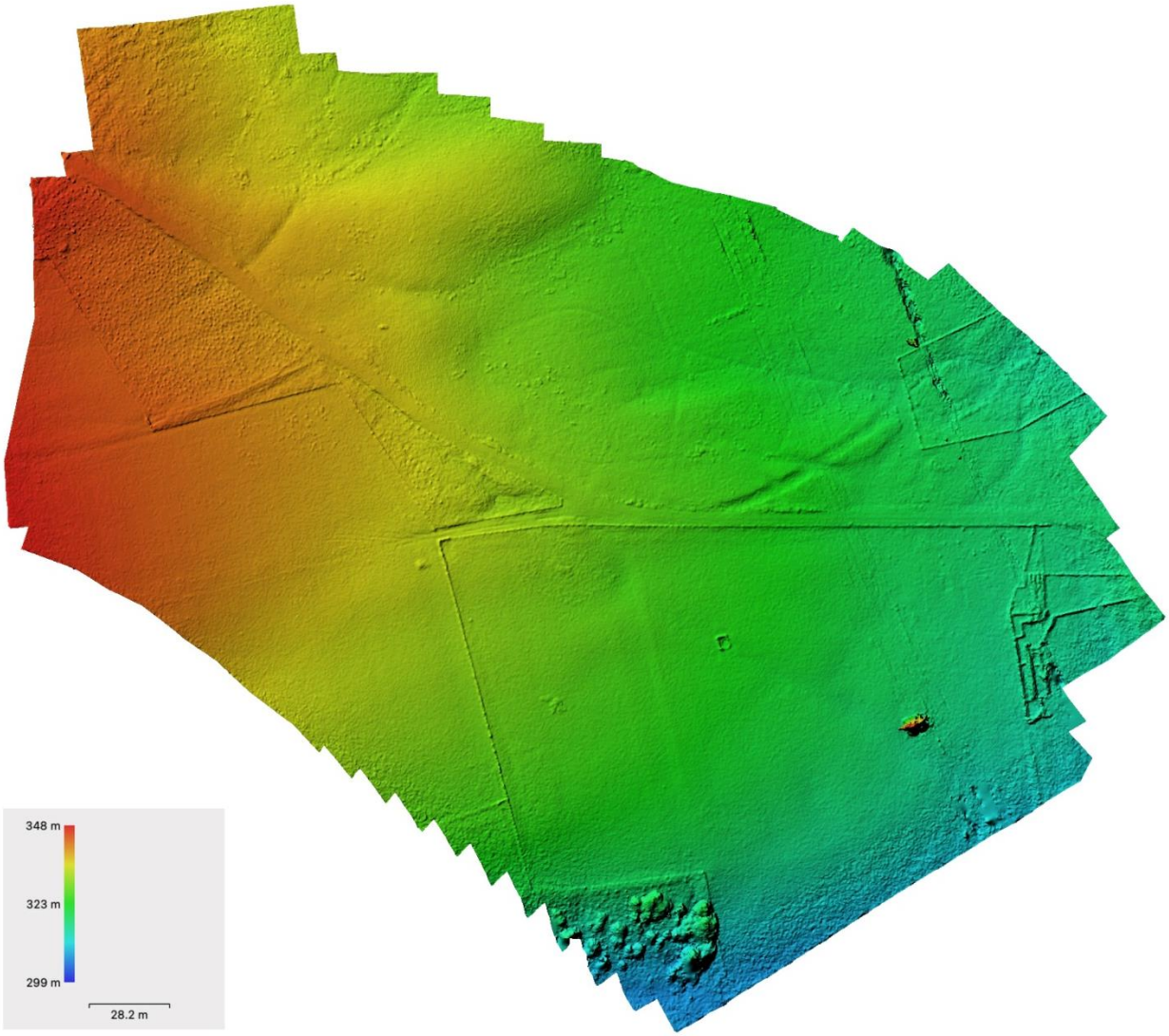

Figure 8 DEM of the terrain and earthwork with Trench 1 (T1 on Figure 2). The earthwork runs diagonally from the northwest corner of the image and the higher ground (orange on plan) southeast to the arable field in the centre of the image (green on plan) where it has been ploughed flat. It is cut just north of the track that runs along the edge of the arable field by another earthwork whose ditch describes a curving arc from where it cuts the earthwork to the northeast where its course is lost in boggy ground surrounded by a fenced enclosure on the top right of the image. A third earthwork is visible in the orange area on the left of the image as a bank and ditch that runs north-east to abut the excavated earthwork and is therefore later than it.

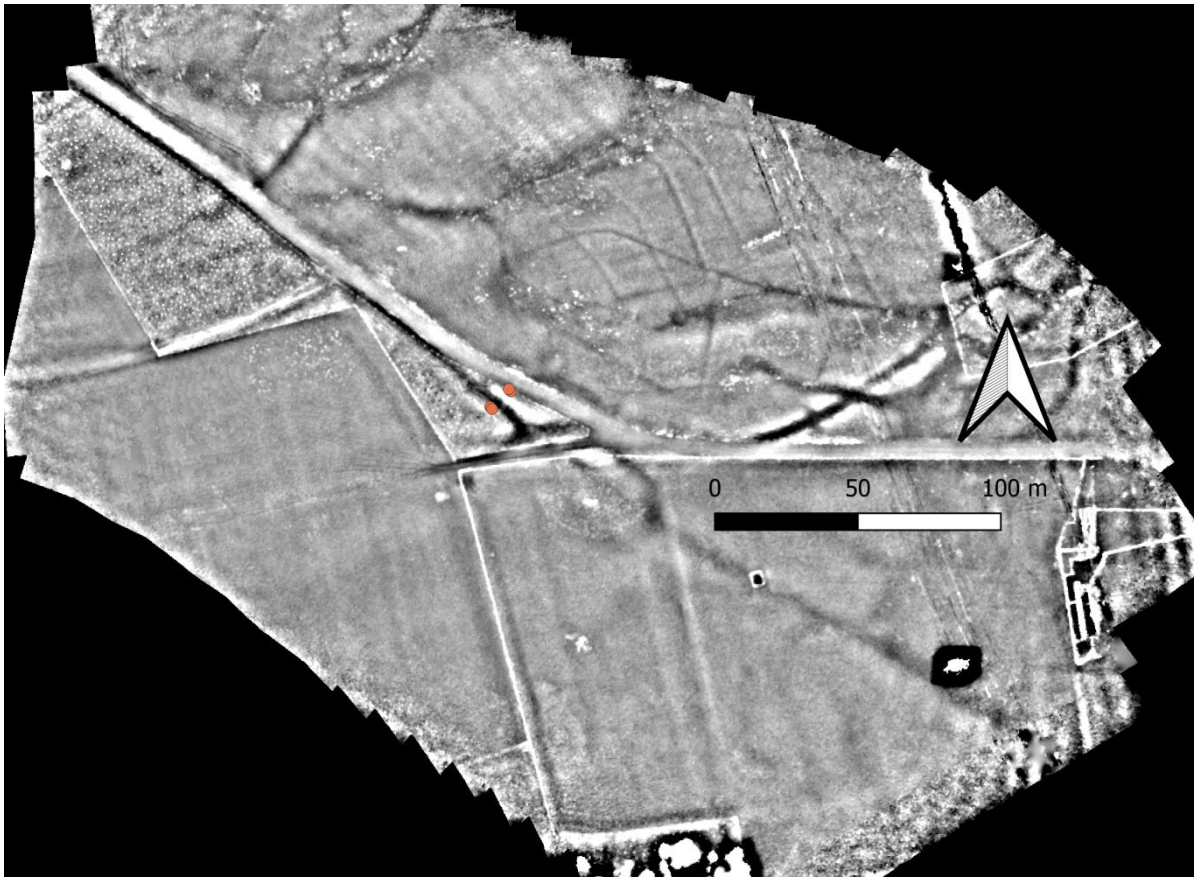

Figure 9 LRM of the earthwork with Trench 1 marked by red spots on the image. The earthwork is revealed in high relief with this view showing the ditch in black and the bank in white. The earthwork's ditch continues in the arable field as a dark line to the southeast edge of the image, showing the benefit of using the local relief model in picking up slight changes in the ground surface. The breadth of the bank of the earthwork at the top left has been exaggerated by the addition of road metalling to make a farm track which makes use of hard base provided by the bank. The track metalling also runs across and obscures part of the secondary earthwork that runs in an arc to the northeast. The earthwork that abuts the excavated earthwork on its west is highlighted as a vivid, slightly curving white line.

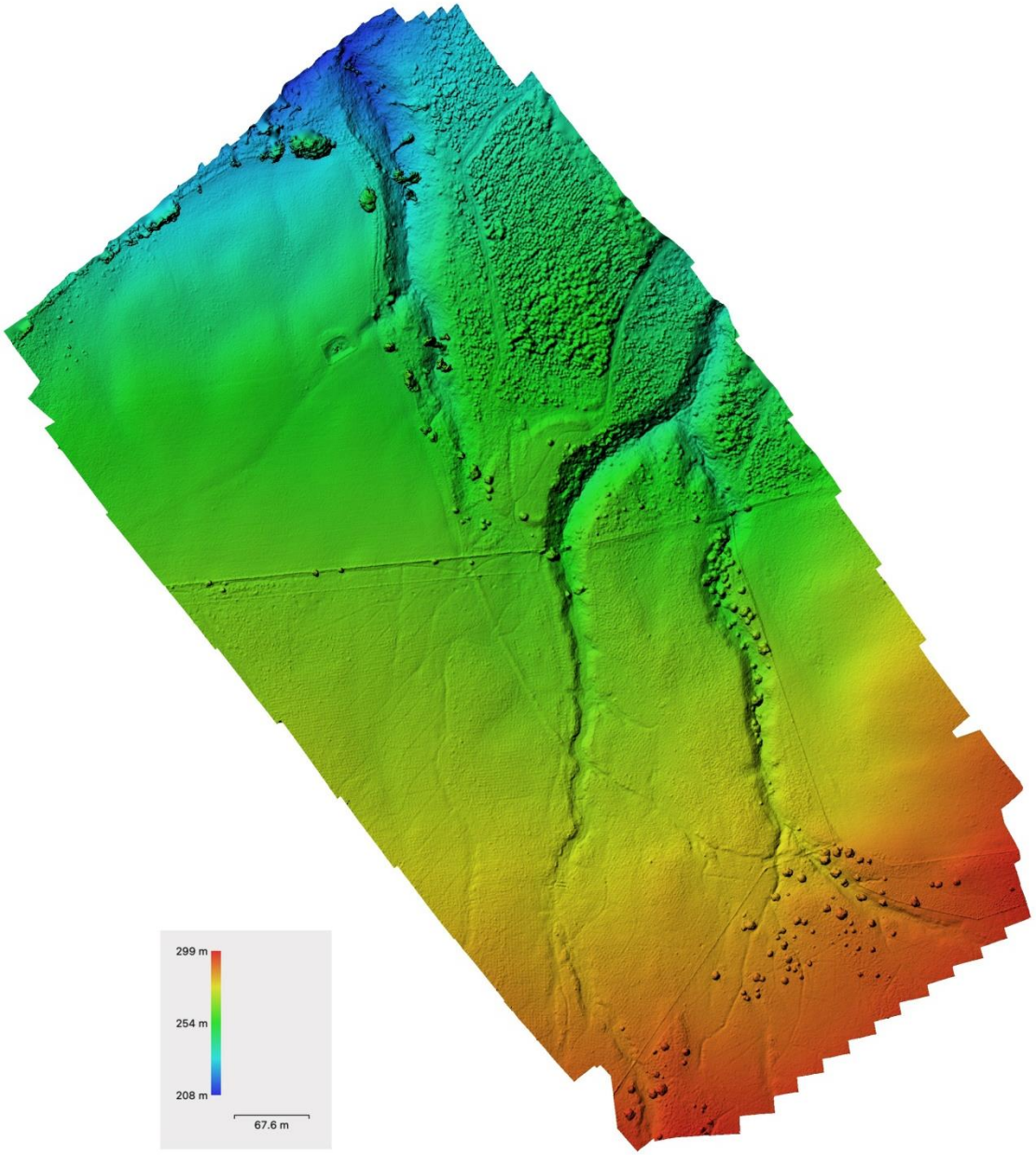

Figure 10 DEM of the earthwork with Trench 2 (T2 on Figure 2) showing how it rides up onto the higher ground of the ridge. The earthwork is visible in the middle of the image going from top left beside the deep cut gully towards the bottom right where it is lost in the smooth ground of an arable field.

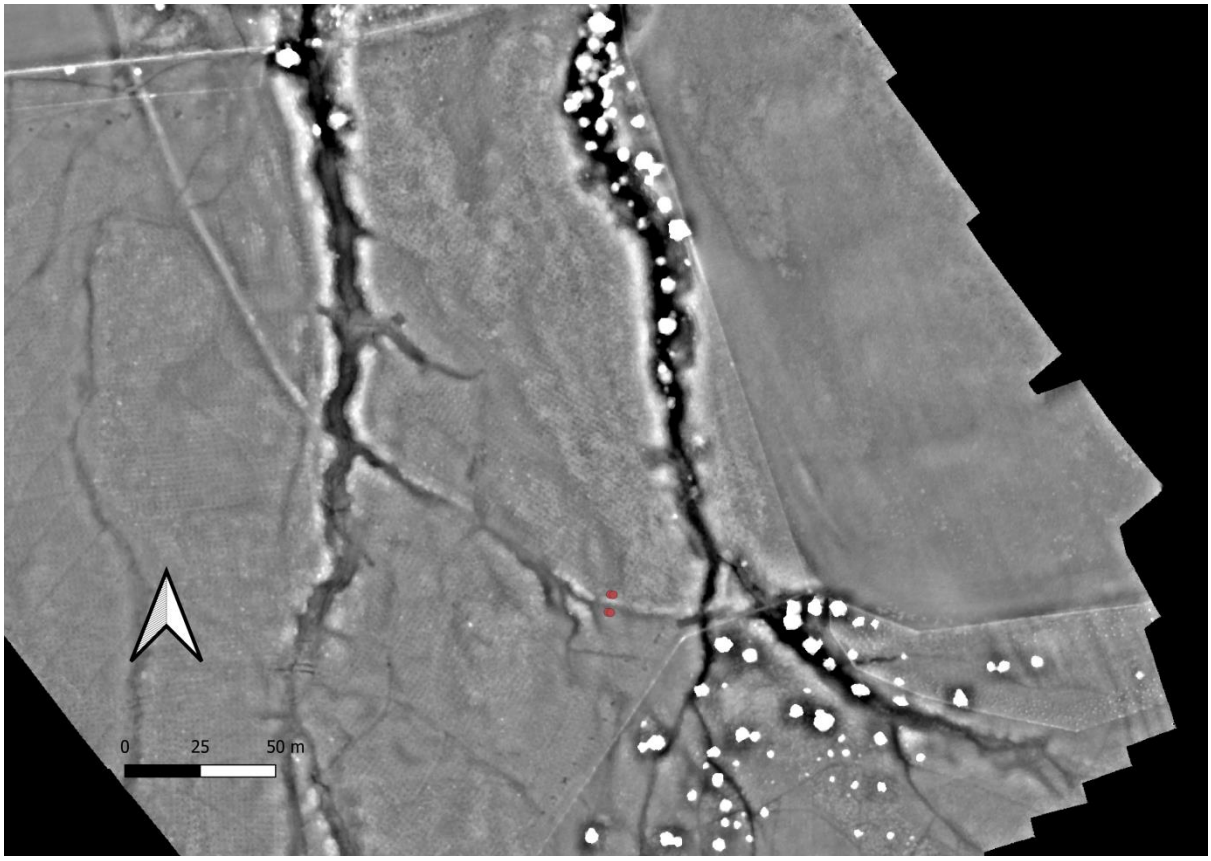

Figure 11 LRM of earthwork with Trench 2 marked with red spots on the image. This view highlights the earthwork better than the DEM. The bank shows white and the ditch is dark grey and easily picked out until the fence line of the arable field on the right of the image. What may be a second bank can be detected on the north edge of the gully at the bottom right. The white blobs are shrub trees and bushes.

Appendix 2 Site records

List of site plans and sections on plastic film
Trench 1 drawn plan and sections
Trench 2 drawn plan and sections

GPS and UAV survey data
20240529_Bowden_Trench_1_Corrected.csv
20240529_Bowden_Trench_2_Corrected.csv
Bowden_Trench_1_GPS.tif
Bowden_Trench_1_GPS_Palette.tif
Bowden_Trench_1_Ortho.tif
Bowden_Trench_2_DEM.tif
Bowden_Trench_2_Ortho.tif
Bowden_Trench_2_Palette.tif

List of photographs
Trench 1 15-17 June 2024
20240615_153244.jpg excavation of topsoil 15th
20240615_153351.jpg excavation of topsoil 15th

20240615_153401.jpg excavation of topsoil 15th
20240615_153523.jpg excavation of topsoil 15th
20240615_153532.jpg excavation of topsoil 15th
20240616_114850.jpg excavation of topsoil 16th
20240616_115019.jpg excavation of topsoil 16th
20240616_115028.jpg excavation of topsoil 16th
20240616_115229.jpg excavation of topsoil 16th
20240616_115237.jpg excavation of topsoil 16th
20240616_125943.jpg excavation of topsoil 16th
20240616_125947.jpg excavation of topsoil 16th
DSC00045.JPG bank and ditch with topsoil removed 16th
DSC00046.JPG bank and ditch with topsoil removed 16th
DSC00047.JPG bank and ditch with topsoil removed 16th
DSC00048.JPG bank and ditch with topsoil removed 16th
DSC00049.JPG bank and ditch with topsoil removed 16th
DSC00050.JPG bank and ditch with topsoil removed 16th
20240616_144921.jpg excavation of bank half section 16th
20240616_144935.jpg excavation of bank half section 16th
20240616_144949.jpg excavation of bank half section 16th
20240617_114035.jpg OSL Sampling 17th
20240617_120851.jpg OSL Sampling 17th
20240617_120859.jpg OSL Sampling 17th
20240617_134519.jpg OSL Sampling 17th
20240617_140206.jpg ditch sondage 17th
20240617_140301.jpg ditch sondage 17th
20240617_142633.jpg OSL Sampling 17th
20240617_142642.jpg OSL Sampling 17th

Trench 2 22-24 June 2024
DSC00055.JPG pole AP of bank and ditch 23rd
DSC00060.JPG Bank and ditch from S 23rd
20240622_153235.jpg ditch under excavation 23rd
20240623_113656.jpg bank and ditch from S 23rd
20240623_113900.jpg ditch section 23rd
20240623_114013.jpg ditch section 23rd
20240623_114036.jpg ditch section 23rd
20240623_114254.jpg bank half-section 23rd
20240623_114533.jpg bank half section 23rd
DSC00055.JPG aerial view
DSC00058.JPG aerial view
20240624_122227.jpg OSL Sampling 24th
20240624_122310.jpg OSL Sampling24th
20240624_122441.jpg OSL Sampling 24th
20240624_122557.jpg OSL Sampling 24th
20240624_123537.jpg OSL Sampling 24th
20240624_123612.jpg OSL Sampling 24th
20240624_133211.jpg OSL Sampling 24th

Appendix 3 Preliminary OSL results by Tim Kinnaird

OSL signal intensities may act as a proxy for age in well-bleached sediment. You'll see that I have coloured the OSL intensities to reflect there magnitude: cool colours = low intensities, and sediment deposited most recently; warm colours = high intensities, and sediment deposited in the past (slides 2 and 3). You can see that the base of the bank is marked by a progression from 1.35 x10^5 to >3.94 x10^5 counts (the 'red' band at ~ 58-59cm depth, is the layer characterised by high intensities that I mentioned in the field, 3.94 to 6.07 x10^5 counts). Also, notable, is that the ditch is filled with sediment characterised by intensities, 9.95 x10^3 to 2.11 x10^4, then 4.57 x10^4 to 5.55 x10^4 counts. This implies to me that there are at least two fills present, the upper fill, is presumably a recent deposit as its intensities are similar to those that characterise the 'turf', then a lower unit, older in relative time-depth. It also implies that we could have dug a little deeper, as we didn't reach a 'unit' characterised by substrate-derived signals! We will be able to test this, as we progress the samples to laboratory characterisation.

Field ID	Depth /cm	IRSL signal intensities / counts	IRSL depletion	OSL signal intensities / counts	OSL depletion	IRSL : OSL ratio
BM24-1/1	23	18640 ± 150	1.38 ± 0.02	89550 ± 300	1.53 ± 0.01	0.2082 ± 0.0018
BM24-1/2	32	49010 ± 230	1.35 ± 0.01	205340 ± 460	1.55 ± 0.01	0.2387 ± 0.0012
BM24-1/3	40	36880 ± 200	1.39 ± 0.01	149590 ± 390	1.53 ± 0.01	0.2465 ± 0.0015
BM24-1/4	46	25490 ± 160	1.41 ± 0.02	109980 ± 330	1.57 ± 0.01	0.2318 ± 0.0017
BM24-1/5	52	52770 ± 230	1.36 ± 0.01	215240 ± 470	1.62 ± 0.01	0.2451 ± 0.0012
BM24-1/6	59	89800 ± 300	1.36 ± 0.01	393710 ± 630	1.64 ± 0.01	0.2281 ± 0.0009
BM24-1/7	67	34250 ± 190	1.34 ± 0.01	217820 ± 470	1.46 ± 0.01	0.1572 ± 0.0009
BM24-1/8	73	55550 ± 240	1.40 ± 0.01	282190 ± 540	1.51 ± 0.01	0.1969 ± 0.0009
BM24-1/9	21	38100 ± 200	1.35 ± 0.01	170140 ± 420	1.48 ± 0.01	0.2239 ± 0.0013
BM24-1/10	28	29620 ± 180	1.41 ± 0.02	122700 ± 350	1.56 ± 0.01	0.2414 ± 0.0016
BM24-1/11	40	26460 ± 170	1.26 ± 0.02	119840 ± 350	1.53 ± 0.01	0.2208 ± 0.0015
BM24-1/12	42	29120 ± 180	1.36 ± 0.02	132040 ± 370	1.50 ± 0.01	0.2205 ± 0.0015
BM24-1/13	50	27290 ± 170	1.43 ± 0.02	135130 ± 370	1.64 ± 0.01	0.2020 ± 0.0014
BM24-1/14	58	154580 ± 400	1.42 ± 0.01	606690 ± 780	1.66 ± 0.01	0.2548 ± 0.0007
BM24-1/15	65	69780 ± 270	1.37 ± 0.01	335910 ± 580	1.60 ± 0.01	0.2077 ± 0.0009
BM24-1/16	71	75110 ± 280	1.39 ± 0.01	341770 ± 590	1.59 ± 0.01	0.2198 ± 0.0009
BM24-1/17	8	6910 ± 90	1.30 ± 0.03	34060 ± 190	1.50 ± 0.02	0.2028 ± 0.0029
BM24-1/18	12	16100 ± 130	1.37 ± 0.02	64840 ± 260	1.47 ± 0.01	0.2483 ± 0.0023
BM24-1/19	20	16680 ± 140	1.34 ± 0.02	74510 ± 280	1.49 ± 0.01	0.2238 ± 0.0020
BM24-1/20	27	19040 ± 140	1.33 ± 0.02	83640 ± 290	1.65 ± 0.01	0.2277 ± 0.0019
BM24-1/21	34	22690 ± 160	1.34 ± 0.02	102160 ± 320	1.50 ± 0.01	0.2221 ± 0.0017
BM24-1/22	42	19330 ± 140	1.41 ± 0.02	87250 ± 300	1.57 ± 0.01	0.2216 ± 0.0018
BM24-1/23	50	29160 ± 180	1.38 ± 0.02	144780 ± 380	1.61 ± 0.01	0.2014 ± 0.0013
BM24-1/24	58	36470 ± 200	1.42 ± 0.02	147470 ± 390	1.58 ± 0.01	0.2473 ± 0.0015
BM24-1/25	66	43690 ± 210	1.38 ± 0.01	201670 ± 450	1.51 ± 0.01	0.2166 ± 0.0012
BM24-1/26	71	33980 ± 190	1.33 ± 0.01	190280 ± 440	1.42 ± 0.01	0.1786 ± 0.0011
BM24-1/27	7	2090 ± 60	1.35 ± 0.07	24260 ± 160	1.32 ± 0.02	0.0863 ± 0.0025
BM24-1/28	13	1490 ± 60	1.22 ± 0.07	14960 ± 130	1.39 ± 0.02	0.0997 ± 0.0038
BM24-1/29	21	770 ± 50	1.12 ± 0.09	9950 ± 110	1.23 ± 0.03	0.0778 ± 0.0048
BM24-1/30	28	1130 ± 50	1.34 ± 0.09	10900 ± 110	1.33 ± 0.03	0.1033 ± 0.0048
BM24-1/31	35	2160 ± 60	1.39 ± 0.07	17410 ± 140	1.39 ± 0.02	0.1239 ± 0.0036
BM24-1/32	42	1620 ± 60	1.24 ± 0.07	20440 ± 150	1.29 ± 0.02	0.0794 ± 0.0028
BM24-1/33	50	1460 ± 50	1.33 ± 0.08	21110 ± 150	1.33 ± 0.02	0.0691 ± 0.0026
BM24-1/34	58	4480 ± 80	1.36 ± 0.04	45700 ± 220	1.28 ± 0.01	0.0980 ± 0.0017
BM24-1/35	64	8360 ± 100	1.33 ± 0.03	55540 ± 240	1.48 ± 0.01	0.1506 ± 0.0019

35 bulk sediment samples collected across feature, in four vertical profiles:
BM24-1/1 to 8 (bank)
BM24-1/9 to 16 (bank)
BM24-1/17 to 26 (bank, includes turf)
BM24-1/27 to 35 (ditch)

The proxies:
OSL signal intensities may act as a proxy for age in well-bleached sediment

The depletion index can inform on whether the luminescence grew in situ, during a single cycle, or whether it the composite of multiple signals, reflecting several cycles of deposition

The IRSL : OSL ratio reflects the different contributions from the IR-sensitive and OSL-sensitive grains i.e. a proxy for mineralogical variations

Table: Trench 1 preliminary results - the field id column gives the sample numbers shown on Figure 5