
Rhiwgoch Raw Water Main Replacement Works Near Harlech



Report on archaeological mitigation works

GAT Project No. 2055
Report No. 857
November 2010

RHIWGOCH RAW WATER MAIN, HARLECH
Report on Archaeological Mitigation Works

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Prepared for United Utilities
on behalf of Dŵr Cymru/Welsh Water

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Cover: stripping the temporary site compound in typical Ardudwy weather

Gwynedd Archaeological Trust
Ymddiriedolaeth Archaeolegol Gwynedd

RHIWGOCH RAW WATER MAIN, HARLECH (G2055).

Report on Archaeological Mitigation Works

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RHIWGOCH RAW WATER MAIN, HARLECH.

Archaeological Report (G2055)

Summary

A programme of archaeological excavation work was carried out on the route of a raw water pipe-line to the east of the Rhiwgoch Water Treatment Works in advance of its replacement. The pipe route runs through a landscape of particular archaeological importance, with evidence surviving of settlement patterns and field systems from prehistoric to medieval times. Features investigated include ancient field boundaries, a burnt mound, evidence of early woodland management and post medieval agricultural structures. This report describes the findings of the archaeological works.

1 INTRODUCTION

Gwynedd Archaeological Trust (GAT) has carried out a programme of archaeological excavation work near Rhiwgoch, Harlech for United Utilities on behalf of Dŵr Cymru Welsh Water, in advance of the replacement of a raw water main. The work was monitored on behalf of the local planning authority by the Snowdonia National Park Authority (SNPA) archaeologist. The pipe-line starts at Llyn Eiddew Mawr (SH 645337) at a height of approximately 350m, and drops to 250m at SH 605308 over a course of some 4.4km. The route then levels off for a further distance of 2.5km; dropping to 210m at the water treatment works (SH 592304) (figure 1).

Despite the high frequency of known archaeological features in the area, liaison between the client, contractor, and the SNPA archaeologist enabled a route to be determined which avoided known archaeological features, and thus reduced the possibility of uncovering buried archaeology.

The groundworks along the pipe route were preceded by an archaeological assessment (Kenney 2009a, GAT report **775**), which proposed the mitigatory measures then carried out and reported on in the current document. Additional assessment was done on possible locations for a site compound (Kenney 2009c and d, GAT reports **800** and **803**). The chosen compound site was incorporated into the mitigation works. An archaeological assessment (Kenney 2009e, GAT report **804**) was also carried out on a farm track to be used as access to the north-eastern end of the pipe route.

The replacement of the raw water main was carried out in the context of a wider water infrastructure programme including a new link main between Harlech and Llanfair, the construction of a new water treatment works and the building of a pumping station. Archaeological assessment and mitigation works were carried out for all these and have been reported in the following documents, which provide additional background information not necessarily included here.

Harlech to Llanfair Link Main: Evans 2008a, GAT report **753**; Evans 2009, GAT report **820**
Rhiwgoch Water Treatment Works: Evans 2008b, GAT report **754** (excavation report forthcoming)
Harlech Pumping Station: Kenney 2009b, GAT report **777**; Kenney 2009f, GAT report **809**; Kenney 2009fg GAT report **810**; Kenney 2009h, GAT report **817**; Cooke and Kenney 2009, GAT report **819**

2 SPECIFICATION AND PROJECT DESIGN

The aim of the works was to mitigate the impact of the development on known or potential archaeological remains. An Archaeological Project Design was written by Gwynedd Archaeological Trust and submitted to Dŵr Cymru Welsh Water and the SNPA archaeologist in April 2009. This also formed the basis of a method statement submitted for the work. The archaeological excavation and recording was undertaken in accord with this Project Design.

The first 4.0km of the pipe-line from Llyn Eiddew Mawr running southwest was replaced via a pipe-bursting technique, by which the original pipe was burst and the new one inserted through it. This was initially planned as a watching brief but the need to terrace some slopes to allow access meant that more continuous observation was required for part of the project.

Due to the unsuitability of pipe-bursting in the lowland 3.2km section to the water treatment works, the existing pipe was replaced by a new pipe in an open cut trench. Because of the thinness of the soils the risk to buried archaeology from plant and vehicular traffic was sufficient enough to warrant a 'strip, map and sample' methodology to be implemented across much of the width of the pipe easement. This involved the removal of top and ploughsoil across 12m of the 15m wide easement, along the 3.2km route. In places the fenced easement was wider than 15m and a greater width than usual was stripped. The methodology was intended to discover any buried archaeology cut into the natural strata, in this case glacial deposits dating to the Pleistocene era.

The fields along the whole route were numbered to allow their identification during the project. The numbers ran from south-west to north-east and are shown on figures 2 to 6. In the following report national grid references will be used to locate archaeological features but field numbers are also used to define parts of the route. The field numbers are of particular use if the site archive is consulted as they are used to identify field boundaries and the location of stripping and features. These field numbers were occasionally divided by footpaths and streams rather than field boundaries, and do not easily correspond to OS field numbers.

The ground-works were undertaken by Daniels Ltd.

On completion of the fieldwork a post-excavation project design was submitted. Post excavation analysis was carried out according to this design leading to the production of the current report and the long term archiving of finds and site records.

3 METHODS AND TECHNIQUES

3.1 Lowland Section

Gwynedd Archaeological Trust undertook the programme of archaeological works on the lowland section between 5th May and 19th June 2009.

Prior to stripping field boundaries to be breached were recorded by photographs and notes. See appendix I for details of individual field boundaries.

The removal of top and ploughsoil within the easement was carried out by two 13 tonne tracked excavators with toothless ditching buckets, and the process was continuously monitored by archaeologists. The stripped easement and baulks were inspected for archaeological features and assemblages, with representative samples being recorded via photographs and basic descriptions, including dimensions, topography and soil morphology. In total forty-one fields of various dimensions had the stripped easement running through them.

In field B3 a site compound was set up. Prior to this the topsoil was stripped. This was done under archaeological supervision and known or suspected features within the field were fenced off so that they could be avoided.

Potential archaeological features revealed were evaluated. Any significant features were subsequently excavated and recorded to a basic or detailed level, depending on their archaeological importance. At the very minimum all archaeological features were photographed, basic descriptions and sketches taken, and their locations surveyed using a Total Station Theodolite. Significant features were excavated and planned by hand according to the Project Design.

Five field clearance cairns of unknown age were located during the topsoil stripping, four in field B3 and one in field E13. Two of these were recorded in detail, including digital photographs, detailed hand-drawn plans and sections, while the remaining three were recorded at a more basic level, which included Total Station Theodolite (TST) survey. This type of field clearance cairn was common in most periods due to the large quantity of glacial stone present, but they are difficult to date and to differentiate from prehistoric burial cairns without excavation. All potential cairns were therefore investigated.

Ridge and furrow earthworks in field D2 were recorded by TST survey and a textual description was compiled prior to commencement of the groundworks. Both broad and narrow ridges were identified and these were also recorded in two drawn sections along the edge of the stripped area.

The tumbled remains of two dry-stone walls were located in fields A5 and D2. Segments of these were cleaned and planned in detail, with sondages dug across them to investigate construction and underlying deposits.

Towards the north-western end of the lowland section, a probable peat drying platform was located and recorded. In field C13 a large burnt mound of probable Bronze Age date was identified during topsoil stripping. Upon discussions with the contractor, it was agreed that this feature could be avoided in its entirety despite being within the easement. Approximately 2m² of topsoil had been removed, and this was replaced, a fence erected around the mound and further disturbance was avoided.

In several places the pipe trench crossed roads. Between 6th and 10th July three of these trenches were monitored by an archaeologist (RDX1 to 3 on figure 2). The depth and character of layers were noted and a careful watch for any archaeological features, especially previous road surfaces, was maintained, but nothing of significance was seen. The rest of the trenches were cut in a way that did not produce a clean section. This, combined with the lack of results from the first three trenches, led to the decision not to monitor or record these in detail. See appendix II for a description of deposits recorded in the trenches.

The south-western end of the pipe-line easement abutted an area fenced off for the construction of the new waterworks. The archaeological works undertaken in connection with the works were carried out as part of a separate project (GAT Project G2046), and a report on the excavations carried out there is forthcoming. .

3.2 Upland Section

Gwynedd Archaeological Trust undertook the watching brief on the upland section between 4th of June and 13th August 2009, when the access route was completed and all pipe bursting pits close to archaeological features had been excavated. This involved an intensive watching brief between 4th June and 17th July, and a partial watching brief thereafter. The engineering works and reinstatement were completed by 23rd October and a visit was made on 28th October to check on the reinstatement.

Field boundaries to be breached for the project were recorded by photographs and written description. See appendix I for details of individual field boundaries.

Access to the old pipe-line for pipe bursting and replacement was achieved by creating a temporary track running adjacent to the pipe-line. The construction of this track was monitored, with advice being given on appropriate routes that would avoid all visible archaeology. The assessment report had identified features along the general route but the specific route of the access track was further inspected and the route was altered to avoid any features identified. Visible archaeological features identified within 15m of the access track were fenced off prior to any vehicles entering the area, to reduce risk of damage.

In order to allow safe access for vehicles the route had to be terraced into some steeper slopes, a process known as ‘benching’. Where benching was required the removal of turf and all layers above the natural sub-soil were carried out by 360° tracked excavators, varying in size from 6 to 13 tonnes, using a toothless ditching bucket. All benching work was constantly monitored by an archaeologist. In all 5 features were identified during benching, a possible field clearance cairn, a post medieval earth bank, and three areas of burning, one of which was potentially ancient. All were recorded with digital photographs and written notes, while the possible ancient burnt feature was also drawn in plan and section, and a charcoal rich soil sample collected for further analysis and potential radiocarbon dating.

Certain areas along the access route did not require benching, however it was necessary to remove stones that would otherwise damage vehicles and bog mats. Where this was the case all stones were inspected by an archaeologist prior to removal, and if deemed to be of potential archaeological significance slight alterations were made to the route.

Timber bog mats were laid along all parts of the route that were not to be disturbed by groundworks. Hundreds of these bog mats were used and many had previously been used on a site rich in natural flint pebbles. Many of these were still adhering to the bog mats and have been deposited along the route. Any flints found in future in this area are likely to have been imported on the bog mats and are not genuine prehistoric finds.

Pipe bursting access pits and open cut sections were all excavated directly on the line of the original water main, in disturbed ground. Because of this the likelihood of identifying any archaeological features was low. An archaeologist was present during the excavation of pits located close to known archaeological features; however the excavation of the majority of pits was not closely monitored. All were inspected for any features visible in the pit walls once fully excavated. The locations of the pipe bursting pits are indicated on figures 4 to 6.

Throughout the works it was made clear to the contractors that no vehicles should divert from the access route that had been agreed with the archaeologist, and that no ground, unless directly on the line of the existing main, would be broken unless an archaeologist was present. This was largely adhered to, and no archaeological features were damaged.

3.3 Access track

An existing farm track was used for additional access to the north-eastern end of the pipe route. This track left the Llanfair to Talsarnau road at SH 6069 3203 and running through the col between Moel Goedog and Moel y Gerddi. It then contoured along the upper edge of the Nant Steicyn valley and met the pipe-line route at SH 6383 3338 (Figure 1). In order to support the greatly increased traffic it was necessary to up-grade the track by laying hard-core to consolidate and improve the surface.

An archaeological assessment of the track was carried out (Kenney 2009e, GAT Report 804) and features adjacent to the track were identified. It was concluded that the use of the track as such would not cause damage to any of the sites and to ensure this all drivers were made aware that they had to keep to the track and not leave it to allow passing or to park. The track was clearly marked so that no drivers would take alternative routes by accident. A turning circle at the eastern end was defined in consultation with an archaeologist and the ground there was consolidated with gravel over geotextile. The location was chosen to ensure there was no risk to known archaeological features.

Features identified close to the track were fenced with high-visibility fencing before intensive use of the track commenced. Where the track needed reinforcing the topsoil was stripped and geotextile laid down. Crushed stone was deposited on this. The initial intention was to remove the stone at the end of the project but at the local farmers' request it was left to permanently improve the track. The condition of the track and adjacent features was monitored by an archaeologist during the project.

As the archaeological features near the track were avoided and not directly impacted by the works they are not included in the results below.

The track passes through the middle of a scheduled area (Me 133). Scheduled Monument Consent was obtained to improve the track in this area to ensure no damage occurred to the monument. A report on the work within the scheduled area is attached as appendix III.

3.4 Reinstatement

Access routes had been well established during the works and further disturbance during reinstatement was not anticipated. There was, therefore, no archaeological monitoring of the reinstatement. Shortly after completion of the reinstatement (on 28th October 2009) parts of the route were inspected for archaeological impact. The access track passing through Scheduled Ancient Monument (Me 133) had been heavily used during the project but the improvements to the track had held up well and no damage of any sort had been caused to the Scheduled Monument.

The pipe route from the point at which it leaves the road to the northern boundary of field G1 was inspected. It was noted that the area around the burnt mound was very wet but that the burnt mound had not been damaged by the works. The area of turf previously removed and replaced on the mound was re-growing well.

Although the visual impact of the access route into the uplands was considerable this is temporary as it will grow over and become less visible. The reinstatement had caused no additional disturbance and all archaeological features had been avoided during the process with one exception. The exception was feature 25 (PRN 29242) located on the top of a crag to the east side of a small gorge that the pipe passes through. This feature was not fenced off because the archaeologists had been assured that no works or vehicles would impact on this area, which was clearly defined by the crag edge. During the reinstatement vehicles did gain access to this area above the crag and removed boulders from here, this included completely removing feature 25. Feature 25 was a short section of very rough walling along the top of the crag and minor significance; however, its removal should not have occurred.

3.5 Post-excavation analysis and reporting

The post-excavation analysis, report and archiving has been carried out according to the post-excavation project design submitted in July 2009.

Data collection from site records

Site records were checked, and photographs, plans, finds and samples were cross referenced to the relevant context sheets. Site records, including context sheets and field drawings, were scanned to provide a security copy of the information. These records were used as the basis of descriptions and discussion of individual features and for the creation of illustrations. A database of photographs was created to provide appropriate metadata to allow for the active curation of the digital photographs.

Finds

The finds have been catalogued and grouped by material type. All finds, where appropriate, were cleaned, and have been packaged in suitable containers for long term storage. The flint flakes and other stone items have been studied by George Smith, GAT's in-house lithics expert. Finds have been drawn where appropriate. See appendix IV for descriptions and illustrations of finds.

Environmental samples

The four soil samples (see appendix V) were collected and were processed by flotation and wet sieving, using a 100 micron mesh to collect charred plant remains. The residue from the sieving was sorted to check for small artefacts. The charred plant remains were studied by Pat Denne of the European Plant Science Laboratory to identify the species and the age of wood charcoal. Appropriate pieces were selected for radiocarbon dating. See appendix V for the report on the charred plant remains.

Radiocarbon dating

Sample 01 was collected from a potentially prehistoric field boundary (PRN 31047). The charcoal it contained was eroded and unidentifiable. The loose nature of the tumbled stones forming the boundary made its origin very insecure, so this material was not dated. Two other samples (02 and 03) were collected from contexts below the boundary but these were much earlier than and not directly related to the field boundary. This material was also considered not worth dating. A burnt patch in the upland part of the route (PRN 31067) produced considerable quantities of hazel charcoal (sample 04). The stratigraphic location of this deposit under a layer of colluvium suggested an early date so two pieces of material were submitted to Beta Analytic Inc, Miami, Florida for dating by Accelerator Mass Spectrometry. Both pieces dated were single pieces of charred hazel twig with small diameters. Obtaining two dates allowed these to be compared to detect any mixing or contamination of the deposit. See appendix VI for details of the radiocarbon dates.

Reporting and dissemination

The present document provides a record of the methodology and results of the archaeological works. It will be held in the Gwynedd Historic Environment Record and to be available for public and academic consultation. A copy of the report will be sent to the Snowdonia National Park Authority Archaeologist. A copy of the report will be sent to the Royal Commission on the Ancient and Historical

Monuments of Wales and will be made available on their website. A summary of the work with appropriate illustrations will be published in the journal *Archaeology in Wales*.

Archiving

The artefacts are to be held by the Gwynedd Museum and Art Gallery, Bangor and the paper archive will be held by the National Monuments Record (NMR), Aberystwyth. The full digital record including photographs with the appropriate metadata will be stored by the Royal Commission for the Ancient and Historical Monuments of Wales in their active digital storage facility.

4 TOPOGRAPHY

The pipe-line runs from the natural lake of Llyn Eiddew Mawr at 355m OD (figure 1). It initially follows closely the stream of Nant Steicyn, and then traverses the upper slopes of the western side of the valley of the Afon Artro. It descends, through undulating terrain, to a plateau at about 240m OD, over 2.5km west of the river. The Water Treatment Works, at 210m OD, lies just where this plateau starts to slope down towards the narrow coastal plain and the coast of Cardigan Bay.

This landscape is defined by the Cambrian rocks of the Harlech dome (Bowen and Gresham 1967, 1), which the British Geological Survey describes as Cambrian shales, sandstones and quartzites (British Geological Survey 1930). The rugged laminations of Carreg y Saeth sloping at a steep angle at the foot of Rhinog Fawr demonstrate the geological history of uplift, distortion and erosion. Glaciation shaped these rocks into the peaks of the Rhinogau, which can be clearly seen from many points on the pipe-line route. The soils have developed on boulder clay and exposed undifferentiated drift, with peat blanketing much of the upland section of the route. The whole area is scattered with a large numbers of glacial erratic rocks. In the improved fields these have been collected and heaped into piles, some of which have been created recently with heavy machinery.

5 HISTORICAL AND ARCHAEOLOGICAL BACKGROUND

5.1. Introduction

This area is one of outstanding archaeological richness. The marginal nature of the agriculture here has enabled monuments to survive as upstanding structures rather than buried remains. Even in the more improved pastures ancient field walls and settlements can be seen. Typically sites are presented as single dots on maps, however this gives a false impression of isolated monuments, whereas the reality is of extensive areas of surviving ancient landscape. In some areas, and this can be seen particularly well around the prehistoric settlement of Muriau Gwyddelod (PRN 1054-105), sites are joined together by ancient field boundaries running through modern fields or preserved beneath extant field boundaries. Visible either as low stone walls, or often as low terraces or scarps, the earlier boundaries define fields surrounding numerous settlements. While the relict landscapes are particularly impressive from the Iron Age and Romano-British periods, traces of the medieval landscape can also be seen. This is more extensive than may be initially apparent as many of the present field walls preserve the line of earlier medieval fields. The more recent landscape from the last two or three centuries is naturally the most complete, and the hills are scattered with small cottages and sheepfolds, no longer used, whilst within the lower fields are isolated barns, many of eighteenth century origin.

The following chronological summary is based on the assessment report (Kenney 2009a, GAT report 775). See that report for more detail. Appendix VII lists the sites in the area of the pipe route as shown on figures 2 to 6. The numbers shown on the figures and used in the text are the Primary Record Numbers (PRN) allocated by Gwynedd HER.

5.2. Earlier Prehistoric

No Mesolithic sites are known in the area but the presence of charcoal in a valley mire studied by Chambers and Price (1988) suggests Mesolithic clearance of woodlands may have been responsible for the local increase in alder carr observed in the pollen record. Neolithic tombs are rare in Merioneth but a group of six clusters around the mouth of the Afon Artro (Bowen and Gresham 1967). Very few other Neolithic sites are known, and the few stone axes that have been found are restricted to the coastal belt

(Bowen and Gresham 1967). However, the lack of sites of this period is most probably due to limited excavation in the area. A Neolithic hearth, probably representing the remains of a small settlement, was identified under a later settlement excavated on Moel y Gerddi (Kelly 1988, 107). Chambers and Price (1988) detected episodes of Neolithic woodland clearance near Moel y Gerddi, probably relating to early farming activity.

Gresham (Bowen and Gresham 1967, 286) states that burnt mounds, usually one of the most common types of Bronze Age site in upland Wales, are very rare in Merioneth, but more have been found since he wrote and two (PRNs 5943 and 6159) lie close to the pipe route. Occasional objects dating from the Bronze Age have been found including a bronze palstave from near Llanfair (PRN 3904), a hoard of palstaves from Harlech (PRN 2906), and a gold torque (PRN 2896) found near Harlech Castle in 1692 (Bowen and Gresham 1967). A bronze 'celt' found at Cilbronrhydd and exhibited at a meeting of the Cambrian Archaeological Association in 1866 (RCAHMW 1921, 111).

Most Bronze Age activity in the area is represented by funerary and ritual monuments including standing stones, stone circles and burial cairns. While there are many round cairns there are also more unusual types including ring cairns and cairns with upright orthostatic kerbs, like that at Bryn Cader Faner (Bowen and Gresham 1967, 87). Some ring cairns also make use of upright slabs. One such cairn (PRN 1008) was excavated on Moel Goedog and proved to enclose several cremation burials in urns (Lynch 1984). Within the study area is the ring cairn Bedd Gurfal (PRN 1007). This also has a ring of upright stones (Bowen and Gresham 1967, 88; Kelly 1982, 132). Only 8m from the pipe-line is the Ffridd Fron kerbed cairn (PRN 5212). This has a ring of upright slabs, in this case forming a kerb to the outside of a small round cairn.

Standing stones, normally an enigmatic monument type, appear in this area to mark a prehistoric routeway. This route running from the mouth of the Artro over the hills to the Trawsfynydd Basin was suggested by Gresham (1967) and has been accepted by later writers (e.g. Lynch 1984, 34-35). It is best marked over the uplands where cairns, such as the pair of ring cairns (PRN 1008 and 1009) on Moel Goedog, indicate the route as well as standing stones. It is most convincingly defined by the seven standing stones along Y Fonllech Hir, starting with Garreg Standing Stone (PRN 1049) immediately adjacent to the pipe-line. The route is still used as a road and then footpath, and may have been further marked to the south-west by a standing stone, now removed (PRN 1048).

5.3 Late Prehistoric / Romano-British

Roundhouse settlements and their associated field systems are one of the outstanding features of the archaeology of the Ardudwy Uplands. Round houses can be difficult to date. Excavation has revealed some Bronze Age examples and they probably continued into the early medieval period and can be easily confused with shelters and other structures of later periods (Smith 1999). The most prolific dating evidence tends to be Roman, but this simply reflects the introduction and dissemination of Roman pottery following the Roman invasion, and the majority are thought to have their origins in the late prehistoric period (Ghey *et al* 2007). Two circular enclosures with central stone-built roundhouses have been excavated at Moel y Gerddi and Erw-wen not far from the study area. The evidence suggested a date in the first millennium BC for the main phase of occupation at both sites and in both cases the stone roundhouse was preceded by a timber one (Kelly 1988). Whilst survey of field remains has identified numerous stone-built round houses, excavations on lowland sites have demonstrated that timber and clay-walled roundhouses were also common. The density of settlement was, therefore, far greater than current observations allow (Ghey *et al* 2007).

The most extensive system of huts, enclosures and fields in the area is the scheduled site of Muriau Gwyddelod (PRN 1054-56). Although the scheduled area is 700m in length the remains continue well outside the area, and indeed extend into the fields just west of the water works. These remains include a trackway known as Y Ffordd Wyddelig (PRN 2901). This is recorded on the HER as early medieval but there is no reason not to associate it with the rest of the field system and settlements. Other hut circle settlements and enclosures in the area, such as PRN 1050, 1064, 1066, 1071 and 2903, are all joined to each other and to Muriau Gwyddelod by field walls, some only visible from the air as slight scarps in improved fields.

An archaeological assessment (Kenney 2009c, GAT report 800) of a field considered for the site compound adjacent to Capel Engedi, Rhiwgoch identified more boundaries related to this field system

including some that appeared to have been in continuous use up to the present day. The Muriau Gwyddelod field system appears to continue to the north-east as far as the Rhiwgoch cross-roads. More elements of this system were investigated during the current works and are discussed below.

The assessment for the pipe route (Kenney 2009a, GAT report 775) identified fragments of field systems extending north-east of the waterworks. One boundary (PRN 29252) is associated with a long hut (PRN 20612) and may be medieval in date, but a cleared area defined by an irregular boundary to the east of the water works is apparently associated with the recently excavated Romano-British settlement PRN 20613. Nearby rectangular fields associated with small huts or shelters (PRN 29255) are of unknown date, though from their morphology they may be of medieval date.

The undulating ground to the south and south-west of Moel y Gerddi is also rich in hut circle settlements. There is a group of these settlements just to the north of Ffridd Farm that have been recorded from aerial photographs but have not been studied or surveyed on the ground. Few such sites are known from higher levels but the existence of an extensive roundhouse settlement (PRN 5214) at 230m OD and a small number of other sites on the moorland suggest that the scarcity is due to the current difficulty of accessing this area rather than a lack of occupation in the past. Pollen analysis has shown that woodland clearance started in the early Bronze Age and that the uplands may have been fairly open in the Iron Age, although regeneration occurred locally (Chambers and Price 1988).

5.4. Roman period

Some of the roundhouse settlements probably continued in use throughout the Roman period but there is little evidence of a Roman military presence in the area. The Roman road between Tomen-y-Mŵr and Pennal (Margary 1996, 354-5) takes an inland route about 6km to the east of the study area. However, late Roman coin hoards found at Harlech Castle and Llanbedr (Bowen and Gresham 1967) do suggest some trade or other contact between the Ardudwy area and the Roman army.

5.5. Early Medieval

It is likely that some of the roundhouse settlements were occupied into the early medieval period but firm evidence for this has proved hard to find. The proximity of later medieval long huts to hut circle settlements has been taken to suggest continuity of occupation. However, Smith considers that the relationship is due to reuse of favourable locations and that in the uplands, at least, there is no good evidence for continuity of settlement (Smith 1999, 48). The early medieval settlement pattern is, therefore, at present, unknown.

While pollen evidence shows that woodland clearance continued throughout the Roman period in the area there was some regeneration in the early medieval period, perhaps suggesting less intensive use, especially the uplands, but clearance continued from the mid 12th century (Chambers and Price 1988).

The clearest evidence for early medieval activity in the area is early Christian inscribed stones. Two of these are built into the fabric of Llandanwg old church (Nash Williams 1950, 278-9), and two more stones of similar date have recently been found there (Davidson *per comm.*). It has been suggested this church was at one time a *clas* church, acting as a mother church or Minster to the area (Pryce 2001).

5.6. Medieval

The study area lies within the parish of Llanfair in the commote of Ardudwy. The commote was divided into the half commotes of Is Artro and Uwch Artro, Llanfair being in the former (Thomas 2001). Ardudwy was a relatively rich commote, being the second most productive in Merioneth after Tal-y-bont (Thomas 2001, 200).

The uplands and lowlands worked as part of an integrated agricultural system and it is notable that all the parishes in this area run from the coast inland to maximise land of all types within the parish boundary. In the twelfth and thirteenth centuries there may have been arable cultivation up to 450m OD but the limit of cultivation then retreated until it was unlikely to be above 300m by 1600 (Thomas 2001, 178). This still allows the possibility of cultivation along much of the pipe-line route; however, woodland was likely to be extensive even on the high ground. The nineteenth century field names recorded in the tithe schedule may give hints of previous agricultural and environmental conditions.

Within the study area the use of 'defaid' (sheep) in field names suggests the importance of sheep. The tithe map shows numerous arable fields and names such as 'talar' (headland of a ploughed field) may suggest these are of medieval origin. The farm name of 'Ffridd Llwyngwrfel' indicates the presence of woodland ('llwyn' = grove). Some of the small patches of ridge and furrow visible on aerial photographs may be remnants of medieval cultivation, although some may be earlier.

As discussed above, the relict field walls in the area often have a long history, and their origin is difficult to date. The rectangular fields near the Water Treatment Works (PRN 29255), however, could be medieval. They are not far from a long hut visible as a clear earthwork just behind the water treatment works (PRN 20612). This is a rectangular structure with low, overgrown walls, about 15m long, 9m wide and 0.5m high. It has not been excavated and its date cannot be known for sure but the earthwork is of a type usually attributed to the medieval period. It is related to a field boundary (PRN 29252), which is therefore also attributed to the medieval period, although sondages across it produced no dating evidence (R Evans, pers. comm.).

Close to the western end of the road to Cwm Bychan scarps defining the corner of two fields crossing the road were noted during the assessment (PRNs 29268 and 29289). The regularity of these boundaries, which are visible on the ground just as low, rocky scarps, may indicate a medieval date. Their orientations are not too dissimilar to present field boundaries, perhaps also supporting a historical rather than prehistoric date. Further east other denuded walls seem to be related to medieval long huts (PRN 5490). Many of the present field walls follow wandering and irregular routes. Many of these are shown on the 1840 tithe map but are better represented on the 1889 First Edition Ordnance Survey maps. Some of these wandering walls were fully rebuilt in the nineteenth century and their construction is of the same character as more regular walls, but others are largely tumbled down and robbed and must have been of significance in the system that pre-dated the nineteenth century one. A careful assessment of surviving walls could identify a fairly complete field system dating at least to the later medieval period, and this may suggest that many of the present farms are of medieval origin, despite the lack of surviving buildings that predate the eighteenth century.

Some medieval settlements are known in the area. The excavations at Erw-wen demonstrated the re-use of the site sometime between the thirteenth and sixteenth centuries, when the roundhouse was converted into an animal pen and a rectangular platform house was constructed (Kelly 1988, 128, 140). The earthwork and rubble remains of long huts or rectangular hut platforms have been dated to the medieval period since Gresham's work in Caernarvonshire (Gresham 1954). These often indicate isolated dwellings and the one adjacent to the waterworks (PRN 20612) is a good example. At a height of 266m OD PRN 5213 is one of the higher examples. This is a substantial platform, measuring 8m by 6m, revetted by large stones.

The long huts at higher altitudes were presumably hafodau (Gresham 1954), the summer dwellings used as part of the hafod and hendre system of annual transhumance. At least some of the family would inhabit a hafod in the hills to milk their livestock while they were on the mountain pastures in the summer. They would return to the family home (hendre) at lower altitudes for the winter. In Caernarvonshire documents record many hafodau in the sixteenth century but they are mentioned as early as the thirteenth century. However the practice was declining by the eighteenth century (Davies 1979, 26-29, 18).

5.7. Post-Medieval

Many of the farm houses in and near the study area can be dated back to the eighteenth century and that at Gerddi Bluog may date to the late seventeenth century (Cadw listed buildings information). They are all shown on the 1840 tithe map, which also indicates a pattern of fields almost identical to that of today.

An enclosure award was drawn up for the parishes of Llanbedr and Llanfair in 1836 (Merioneth RO QR/En/5). Most of the land must have been enclosed by this time but the award divided commons, marsh lands and waste land between landowners with rights to their use. Each farm had an allotment of the common land in the uplands, and field walls in the uplands must have been built after 1836. Many walls elsewhere were probably rebuilt at around this time, as many are of a similar style.

The road to Talsarnau is shown on the tithe map and as discussed above is possibly in part a very ancient route. The road to Cwm Bychan was not a continuous track in 1839 but paths must have joined the two sections shown and allowed access to farms in between. Both sections of track shown on the tithe map seem to follow the present road line closely, except for at the western end where the track joined the Talsarnau road. The track used to run straight here, keeping south of the stream, whereas now it turns towards the north-west.

The hafod and hendre system had largely gone out of use by the nineteenth century (Davies 1979), but the existence of small cottages on the ffridd, often close to sheep folds, demonstrates that the uplands were still extensively used. Most people probably travelled to the upland pastures and brought down livestock or milk the same day, but the cottages suggest longer periods of occupation. Trackways, such as PRN 29230, must have been quite heavily used for livestock management and other tracks gave access to the turbaries. Peat cutting presumably took place every summer, and numerous peat stacks, some provided with flat, dry platforms can still be identified near productive peat bogs.

A raw water pipe was laid from Llyn Eiddew Mawr to the new Rhiwgoch water treatment works in 1968. The route is still clearly visible through the uplands on 1971 aerial photographs, so it took several years for the vegetation on the route to recover. Evidence on the ground showed that it had involved blasting through rock along several sections especially at the north-eastern end in field E1 and through a narrow gorge in field F6. The route had been benched through field F4 and rubble from this partially obscured an ancient field boundary (PRN 29244). Occasional pieces of iron pipe and other items could be seen left along the route. All the field boundary walls in the uplands breached for the current project had previously been breached and rebuilt when the pipe was originally laid, although not always in exactly the same places.

6 RESULTS OF THE PROGRAMME OF ARCHAEOLOGICAL WORKS

Many of the features listed in the assessment report are not discussed below. Features not included here were avoided by the works. In the lowland section the route was altered to avoid as many features visible on the surface as possible. In the upland section sites near the route were fenced off and groundworks and vehicles avoided them. The route was regularly monitored during groundworks to ensure that no damage occurred.

6.1 Lowland Section

The natural sub-soils varied in morphology, but mainly constituted variations of silts and clays originating from glacial boulder clays and loess deposits. Glacial boulders were frequent, except for where obvious agricultural stone clearance had taken place. The depth of topsoil remained fairly consistently shallow throughout the lowland route, ranging between 0.32m and 0.03m in depth. Below the topsoil was generally a mixed deposit. This was only rarely a genuine ploughsoil but worm activity and other bioturbation had formed mixed horizon ranging from 0.45m in depth to being non-existent, especially at the higher end of the scheme. The thin soil can be attributed to the high relief of the landscape causing increased erosion, as well as the lack of any real ploughing in the upland areas.

Within the A-horizon layers, any features present would have been visible if their fills were sufficiently different to the general layer, but no negative features e.g. pits, ditches etc. were discovered at this level. However, all the positive features, e.g. walls and cairns, were exposed upon the removal of only the topsoil. The identification of stone features, in particular field clearance cairns, was made substantially more difficult due to the frequency of glacial stone across the landscape.

Despite using toothless ditching buckets for the removal of soil layers down to natural glacial deposits, the sheer concentration and frequency of glacial boulders made it particularly difficult to identify archaeological features. However several negative features were identified and recorded.

No significant archaeological deposits or features were identified during the monitoring of the trenches crossing the road. In trench RDX1 a possible relict soil deposit was recorded below the current road. This was described as purple/red brown clayey silt 0.3m deep. In the other trenches the road was laid directly on the glacial boulder clay. The ground beneath the modern road seems to have been levelled

and reduced prior to the construction of the road resulting in the loss of any traces of earlier road surfaces. See appendix II for details of these trenches and figure 2 for their location.

The features excavated will be discussed from south-west to north-east and their locations are shown on figures 2 to 4, whilst most also appear on more detailed plans as indicated below.

PRN 31045 Probable boulder deposit

Period: Natural

Grid reference: SH 59334 30498

(Figure 7, plate 1)

In field A1 a rough linear hollow [019] ran south-east to north-west across the trench. At this point the width of the stripped easement had been reduced to approximately 7.0m to avoid a tree, thus only this amount of the hollow was visible. The hollow had gradually sloping sides, and a slightly undulating but mostly flat base. It was filled by a firm, mid-orange brown sandy-silt with medium sized sub-rounded cobbles (023). There was recent disturbance [024] on the north-eastern edge of this feature.

This feature was first believed to be a wall boundary, as the boulders in its fill resembled a rough wall. Upon further investigation it became clear that the stone inclusions did not appear to have a real structure. The glacial deposits in the area were particularly stony and natural glacial boulders lay in concentrations on the ground surface, visible even before the topsoil was stripped. It is probable that [019] was not a foundation cut for a field boundary wall, but a natural linear hollow containing natural boulders.

PRN 29253 Field wall

Period: Post medieval but with possible early foundations

Grid reference: SH 59349 30541

(Figure 7, plate 2)

This is a fairly well-built dry-stone wall of mixed local stone. It has larger stones 0.5-1.3m in length at its base with smaller stones no longer than 0.5m higher up. The larger stones run through the wall with no distinction between facing stones and core. The wall is 1-1.5m in height and between 0.6m and 1m wide. The section through the wall was recorded where a particularly massive stone set on edge formed the foundation of the wall. The wall rested directly on the mixed B-horizon with no trace of a buried soil.

The wandering line of the wall suggests it has an early origin and the massive foundation stones may have been part of the early version of this wall, but no dating evidence was recovered.

PRN 31046 Gully

Period: Unknown, possibly natural

Grid reference: SH 59371 30637

(location on figure 2, plate 3)

In field A5 a shallow gully [014] was discovered. This projected 0.9m beyond the north-western baulk of the trench. The feature, 0.5m wide and 0.15m deep, had shallow sides that curved gradually into a rounded base. It was orientated north-west to south-east and was filled by a loose dark grey-brown-black clay-silt, with less than 10% sub-rounded and angular large pebbles (015). This feature contained no archaeological finds or charcoal inclusions, and the cut was of an irregular form. Therefore it is not certain whether this feature was a gully of archaeological importance, or simply a natural feature such as a stone-hole or glacial scar.

PRN 31047 Ancient field boundary wall

Period: Probably late prehistoric or Romano-British

Grid reference: SH 59414 30675

(Figure 8, plates 4 to 6)

Further north-east but still within field A5, a distinct field boundary wall was discovered running east to west across 17m of the stripped easement. The whole feature measured 5m wide at its western end, but much of this was (033). The *in situ* wall remains (013) were little over 1m wide. The wall was of a dry-stone construction with large sub-rounded cobbles acting as facing stones. The interior wall core was comprised of smaller sub-rounded cobbles in a dark orange-brown clay-silt matrix. The wall had collapsed to produce tumble at both sides (033), but this tumble contained few large stones, which had presumably been reused in later walls.

Two exploratory slots were excavated across the wall, the first at the eastern end and the second towards the centre of the feature. The relationships were confused by variations in the deposits that initially resembled cut features until further investigated. A possible cut [029] to the north side of the wall, seen in one section but not others, seems to have been one of these illusory features caused by variations in the tumble from the wall. There were hints that the ground might have been levelled prior to wall construction [035], but reconsideration of the evidence suggested that there was no foundation cut. Beneath the wall was a thin layer (0.07-0.1m deep) of mid yellow-brown clayey-silt (038), which may have been a fragmentary relict soil. On the northern side of the wall was a firm mid brown-orange clayey-silt (031) up to 0.35m deep. This depth probably indicates an accumulation of soil due to ploughing on this side. Sealed beneath the relict soil was a feature [036] filled with firm dark grey-brown clay-silt (037). This feature was initially thought to be a pit but on removal of the wall stones it could be seen to be a natural fissure, probably of peri-glacial origin. This cut through a firm dark orange-brown clay-silt, with occasional small sub-angular and sub-rounded cobbles (recorded in different places as 032, 034 and 039), which formed the undisturbed B-horizon directly above the glacial deposits.

No artefacts were found within the wall but a flint flake (SF 05) was found 13m to the north and a small convex end scraper (SF 04) was located close to the northern boundary of field A5. Both were found during machine watching and were not related to any features. See appendix IV for detailed descriptions of finds, and figure IV.1 for drawing of SF 04.

Three soil samples were taken and flotation was used to recover charred plant remains (see appendix V for full report on the charred plant remains). The deposits sampled were the only ones to contain visible charcoal. One sample from amongst the stones of the wall contained only a very small quantity of unidentifiable charcoal pieces. The other two samples were from deposits sealed beneath the relict soil. Context 034 contained 4 identifiable pieces of charcoal, all *Pomoideae* species as well as unidentifiable pieces. Context 037 contained 22 pieces of *Pinus* species and one fragment of *Betula* (birch), as well as unidentifiable pieces. The *Pomoideae* group includes *Crataegus* spp (hawthorns), *Sorbus* spp (rowans and whitebeams), and *Malus* spp. (apples), which are not distinguishable from their charcoal. The pine pieces belong to the 'Scots pine' group of *Pinus* spp., which includes *Pinus sylvestris* (Scots pine) and *Pinus nigra* (Corsican pine). They had narrow growth rings curved in an obvious arc, suggesting that they were from slow-growing side branches rather than from main stems. These species suggest open scrub with pines, and are typical of early Holocene woodland.

The species are consistent with an early date, although the *Pomoideae* could be later, and it is possible that the wood was charred during a natural fire started by a lightning strike. It must be assumed that root action and other bioturbation introduced the charcoal into the deposits. It is most probable that the charcoal predates the field boundary by a very considerable period. The inability to relate the charcoal to the field boundary makes it useless for dating the boundary itself and so this material was not submitted for radiocarbon dating.

PRN 31048 Drain

Period: Probably modern

Grid reference: SH 59593 30813

(Figure 2, plate 7)

In field B1 the very shallow cut of a probable drain [016] was discovered. The feature curved slightly from the south-west to the north, measuring 0.45m in breadth, over 5.0m in length and 0.15m in depth. The feature had concave sides, a slightly rounded base, and was filled with stones in a loose mid grey-brown silt-clay matrix (017). This feature was in close proximity to a similarly constructed drain to the north-east which yielded modern pottery fragments and iron objects, suggesting this feature is of a similar modern age.

PRN 31049 Possible field clearance cairn

Period: Natural feature?

Grid reference: SH 59775 30922

(Figure 9, plate 8)

Several field clearance cairns were identified in field B3. The glacial deposits contained concentrations of stones and it was not always obvious which were natural features and which were cairns. Natural

concentrations had the stones well embedded in the boulder clay or B-horizon, but some natural stones had worked their way into the topsoil and a clear differentiation could not always be made. Cairn (007) was situated at the south-western part of the field and lay up against the south-eastern trench baulk. It measured 3.0m by 2.5m and was about 0.3m high. The cairn contained up to 80% sub-rounded and sub-angular cobbles, ranging from small to very large, in a red-brown silt-clay matrix. The stones filled a natural hollow in the ground and formed a rather irregular shape. There was no dating evidence and it is not certain that this was primarily a clearance cairn, although some stone was probably deposited on top, even if it is mostly a natural accumulation of stone.

PRN 31050 Possible field clearance cairn

Period: Prehistoric?

Grid reference: SH 59782 30926

(Figure 9, plate 9)

Cairn (008) was situated near (007), and was similar in appearance although rather more regular in shape. It measured 3.0m by 2.15m, was 0.3m high and contained up to 80% sub-rounded and sub-angular cobbles, ranging from small to very large, bonded by a red-brown silt-clay, filling a natural hollow. No dating evidence was found.

PRN 31051 Possible field clearance cairn

Period: Prehistoric?

Grid reference: SH 59817 30954

(Figure 9, plate 10)

Clearance cairn (011) lay further to the north-east and immediately south-west of the compound, and measured 4.7m by 2.8m. It comprised a spread of 70-80% large sub-rounded cobbles and small sub-angular boulders within a dark grey-brown silt-clay. The cairn lay directly between a cairn to the north (PRN 29321) and a hollow to the south (PRN 29322). Many of the stones within the feature were well embedded into the natural deposits, suggesting they were glacial in origin. However, most of the stones from the higher levels appeared to have been deliberately added. This feature was probably a field clearance cairn of unknown age created by depositing stones on a naturally stony area.

A small piece of worked flint was found in the feature (SF 02), however due to the looseness of the stones the context of this find is by no means secure. SF 02 is a graver with a small burin removal on the distal end and a small amount of secondary shaping and use-wear abrasion on the tip. A stone (SF 03) marked with striations on a vertical surface was found within the stone spread. Once cleaned it could be seen that there were numerous striations several crossing at rough right-angles and a small worn area (see figure IV.2 for rubbing and photograph). This could be a pillow stone for metalworking, not dissimilar to the arrow stones found on the hills, where a natural boulder has been used for sharpening or working tools. It is unlikely that this stone has been moved far from where it was used. The nearest roundhouse settlement is Cefnfilltir (PRN 1052), 400m to the west, so it appears that like the arrow stones this stone was used by some-one while out in the fields away from the settlement. This stone may help support a prehistoric date for the cairns in this field.

Other hints of prehistoric activity in the area are two flint flakes found during stripping. SF 01 from 55m north-east of feature 011, and SF 07 from 95m to the north-east. SF 01 is a small, broad secondary flake from a fluvio-glacial pebble and SF 07 is a casually retouched piece, which is possibly a graver. See appendix IV for full descriptions of finds and figure IV.1 for drawing of SF 07.

PRN 31052 Field clearance cairn

Period: Prehistoric?

Grid reference: SH 59846 30979

(Figure 9, plates 11 and 12)

Further to the north-east and within the contractors' compound, a fourth clearance cairn was located (006). This feature measured 5.7m by 2.9m and comprised an abundance of medium to large sized rounded, sub-rounded, and sub-angular boulders. Some of the stones were well embedded into the natural and clearly glacial in origin. The feature appears to have been created by the deposition of stones upon a naturally stony area, thus the upper layers of the feature were rather loose and had a lot of voids. This feature was planned in detail and fully excavated to test whether there were any features, such as cists below. There was nothing to suggest that this was any other than a very casual field clearance cairn.

All these cairns seem to be adding stones to existing stony patches and seem to represent very casual clearance activity. This is not comparable to the careful creation of regularly spaced clearance cairns typical of prehistoric fields and cairns of this type could have been created at any period. The occasional flint flakes found in this area described above cannot be used to date the clearance cairns. They could be related to the ring cairn in field B4 or to occasional loss by people passing through, perhaps on the prehistoric routeway.

PRN 31053 Possible field clearance cairn

Period: Unknown

Grid reference: SH 59831 30985

(Figure 9)

When marking out the compound a possible cairn was identified. This was excluded from the compound area and was not stripped or investigated. The cairn was a rough pile of stones measuring about 7.0m by 6.8m. There were natural boulders and possible bedrock outcropping in this area and vegetation made it difficult to determine what was cairn and what was natural, but this appears to be a casual field clearance cairn similar to the others with stones deposited on natural boulders.

PRN 29321 Field clearance cairn

Period: Unknown

Grid reference: SH 59814 30961

(Figure 9)

Low, rather irregular heap of stones very overgrown by grass and gorse, c.6m in diameter and 0.2m high. Field clearance cairn, but possibly of some antiquity. This was excluded from the compound area and fenced off. It was not stripped or investigated.

PRN 29322 Hollow

Period: Unknown

Grid reference: SH 59822 30949

(Figure 9)

Small irregular hollow, measuring c.7m by 4m, with fairly steep western side. Up to 1m deep with rushes in base. Some stones are visible around the edge. This was excluded from the compound area and fenced off. It was not stripped or investigated.

PRN 30435 Clearance cairn

Period: Unknown

Grid reference: SH 59843 30969

(Figure 9)

An irregular elongated cairn, basically a heap of stones behind a natural boulder. The heap measures about 6m by 3m and is about 0.5m high maximum. This is a field clearance cairn and its irregular character suggests that it might be quite late, possible 18th or 19th century, although the stones are well overgrown with grass. This was excluded from the compound area and fenced off. It was not stripped or investigated.

PRN 31054 Gully

Period: Unknown

Grid reference: SH 59970 30992

(Figure 2, plate 13)

In field B4 a meandering linear gully [027] was discovered which had fairly steep sides and a concave base. The feature ran north to south, originating from the edges of a small stream in the north and running into the baulk in the south after 12.0m. The feature measured 0.6m in breadth and averaged 0.15m in depth, and was filled by a soft black-brown silt with medium sized sub-angular cobbles. This deposit appeared to have been water-borne. No dating evidence was found. It ran downhill from the stream and it seems possible that it is an overflow channel for this stream.

PRN 29289 Ancient field boundary wall

Period: Medieval or earlier

Grid reference: SH 60664 30998 to SH 60117 31031

(Figures 2 and 10, plates 14 and 15)

A linear spread of stones (040) running south-west to north-east and varying between 2 and 3m in width was exposed for a length of 29m. Some of the stones were nearly 1m in length but most were

much smaller and generally sub-rounded. Two large slabs were laid horizontally at the north-eastern end of the feature but generally the stones were fairly randomly distributed with no clear evidence of facing stones or other structure. The stones were within a matrix of dark brown clayey loam and the quantity of soil to stone may suggest a collapsed clawdd boundary rather than a dry-stone wall. One section showed a hollow [083] filled with dark brown clayey silt and only occasional stones (084). It had thick lenses and patches of redeposited natural clay within the fill, and was probably a natural hollow or animal burrow.

The wall continued as an earthwork for another 35m to the north-east. The assessment had identified this feature. Before the stripping took place it appeared that at its north-eastern end the wall turned a right angle to run towards the south-east. This return was not recognised in the stripping and probably was little more than a slight scarp. This boundary continues to the south of the road, where it can be seen as a scarp in the pasture.

The scarps as a whole define the corners of two rectangular fields. This regular shape and the fact that the alignment is not far from that of the present field boundaries may indicate a medieval date. However, as discussed above many boundaries seem to have been used in several periods and dating tends to rely on special relationships with diagnostic settlement remains.

PRN 29271 Ridge and furrow

Period: Post medieval

Grid reference: SH 60390 31050

(Figure 11, plates 16 and 17)

An area of ridge and furrow was identified in the assessment. Where this lay within the pipe easement it was surveyed prior to stripping. The ridges generally ran north-west to south-east parallel to the current eastern wall of field D2. The area from the wall to about 52m to the west contained broad ridges about 8m wide. The ones closest to the wall were obscured by rushes and appeared to have been disturbed. Others were well preserved. They were no more than 0.1m high and so were not well developed. These broad ridges were overlaid by narrow ridges about 3m wide. These had developed on top of the broad ridges and continued to the west when the broad ridges ended. Most of the furrows were straight and parallel. One furrow running at a diagonal may be the trace of a later drain.

The straightness of the ridges and the fact that they are parallel to the current field boundary suggests that they are late, possibly 19th century, although it is unusual to have such broad ridges at this period. There were two phases of ploughing but these need not to have been separated by many years.

Two sections were drawn across the ridges, one in the area with only narrow ridges and one where there were both broad and narrow ridges. These showed the plough soil to be a mid orange-brown sandy silt up to 0.22m deep. Rather than being deepest where there were two phases of ploughing it was slightly deeper in the single phase area. This demonstrates that the ploughing was probably not long-lived. The ridges were so slight that they were difficult to record in section and no furrows had penetrated the boulder clay below.

The field is called 'ffrith ffordd' (upland/sheep pasture of the road) on the tithe map and was used for pasture, although the adjacent part of 'ffrith ffordd' and the larger field to the west were under arable, demonstrating that crops were grown at this altitude. To the north was 'cae newydd' (new field) and to the west a field is described as 'allotment on common', so all these fields with long straight boundaries are likely to have been enclosed soon after the enclosure award of 1836 and it appears that some farmers experimented with arable on these new fields. The fields marked as arable on the tithe map have no visible ridge and furrow and field C2, which was part of the allotment on the common can never have been very heavily cultivated as the ancient field wall survived as quite a clear earthwork. Other fields in this area in which ridge and furrow can be seen on the aerial photographs are all labelled as pasture on the tithe map. It is likely that arable agriculture on this former commonland soon proved to be unproductive and was soon abandoned for pasture.

PRN 31055 Clawdd boundary

Period: Post medieval (19th century)

Grid reference: SH 60548 31050

(Figure 11, plate 18)

The boundary cut through between fields E1a and E2 proved to be a clawdd boundary, i.e. a stone-faced earthen bank rather than a dry-stone wall. Due to its atypical nature in this landscape of dry-stone walls this boundary was recorded in more detail than others. The boundary runs very straight east-west and the bank stands about 1m high. The bank was composed of a core of natural yellowish clay mixed with darker brown soil (055). This material was probably dug from the two ditches flanking the bank. The core was built-up over a thin dark layer (054), probably an initial layer of turf, again from digging the ditches. The bank was faced on both sides by stones (056) up to 0.5m in length embedded in a yellow brown clayey silt. These had originally been carefully laid, but most were tumbled and several had collapsed into the top of the ditch to the south (057).

A ditch ran parallel to the bank on each side. To the north the ditch [050], which was 0.72m wide, was no more than 0.1m deep, and became very shallow at the section. It was filled with dark yellow-grey clayey silt with few stones (051). The ditch [052] to the south was 0.8m wide and up to 0.35m deep. It had a very similar fill, although it contained some larger stones tumbled from the bank.

Although the tithe map shows a straight boundary similar to PRN 31055 close inspection shows that this started to the south of the present road, although it also ran to the barn to the east. It is likely that when this section of the road was created in the late 19th century this end of the boundary was moved north. The boundary was rebuilt using the local clawdd technique, which required less skill than the dry-stone walls that had been built, presumably by specialists, soon after the enclosure award. It is therefore possible to date this boundary between the tithe map of 1840 and the First edition OS map of 1889, presumably towards the end of this period.

PRN 31058 Field clearance cairn

Period: Prehistoric?

Grid reference: SH 61282 30832

(Located on figure 4, figure 12, plates 19 and 20)

A cairn (081/082) measuring 4.2m by 3.2m was located in field E13 terraced into a fairly steep slope. This was a fairly regular, near circular shape with some large boulders placed around the eastern, down slope edge, so there was the possibility that it might be a burial cairn. The cairn was therefore recorded in plan, half sectioned and the section was drawn. The remainder of the cairn was then removed to search for any cists or burial remains that might have been beneath it. No such remains were found.

The cairn was set in a hollow [076] terraced into the slope. This was 0.3m deep on the uphill side. The main body of the cairn was composed of sub-rounded and sub-angular stones up to 0.5m in length. There was no structure to these stones. Around the eastern, downhill arc were some larger boulders up to 1m in length (080). These seemed to have been deliberately placed and revetted the cairn on this side. There were also some larger stones around the outside of the cairn on the northern side. Towards the middle of the cairn was a mixed orange-brown deposit containing few stones.

The absence of traces of a cist or other burial beneath the cairn and the generally casual structure of the cairn suggests that it was a field clearance cairn, but it was more deliberately formed than most of the others excavated, with some attempt to keep the stones in place by roughly revetting the downhill side. This more deliberate construction may indicate a prehistoric date. The cairn contained a crude chopping tool made on a large quartzite pebble imported from the coast (see appendix IV for full description). However, this simple tool is not diagnostic of period, and can do no more than suggest a probable prehistoric date.

PRN 31059 Peat stack

Period: Post medieval

Grid reference: SH 61731 30943 (250m OD)

(Figure 4, plate 21)

This feature measures 25.5m by 11.0m and is aligned nearly north-south. It is roughly boat-shaped but its shape is largely defined by the rock outcrop on which it is constructed. Low stone walls or revetments 0.5m high have been built around the edge of the outcrop to create a level area on top. This feature was described by Mr Evans of Gerddi Bluog as a peat stack. It is located adjacent to a peat

basin and similar to other features on the uplands also grouped around peat areas, so there is little doubt about its function. These features are hard to date but there is no reason not to assume that it is 19th century in date.

This feature lay outside the pipe easement and should not have been impacted by the works. It was noticed that a few stones on the eastern side had been knocked loose but there were no vehicle tracks visible and no indication that this damage was related to the pipe works.

PRN 29286 Building (site of)

Period: Post medieval

Grid reference: SH 61784 30997

(Figure 4)

A building is shown on tithe map at this location. Some stone slabs were noticed in the reeds that may have formed foundations. The pipe and access route was restricted to the existing track and gateway to avoid potential remains.

PRN 31061 Burnt mound

Period: Bronze Age

Grid reference: SH 61899 31022

(Figure 13, plates 22 and 23)

A low rounded knoll was noticed adjacent to a stream. It did not have the typical kidney-shaped form of a burnt mound and was not easily identifiable as an archaeological feature before topsoil stripping took place. An area of turf from the top of the mound was removed by the mechanical excavator with a toothless bucket revealing burnt stone and charcoal beneath. As the mound had been confirmed to be a burnt mound discussions were held with the contractors (Daniels) and it was agreed to take both the pipe and the access route around the north side of the mound to enable it to be preserved *in situ*, and the mound was fenced off for the duration of the works. Bog mats were laid for vehicles to run on to minimise disturbance in the wet ground. The turf that had been removed on the mound was replaced and it quickly re-established itself so no damage was done to the mound.

The mound is roughly oval and measures c.17m by 14m. It is not more than 1m high. The removal of a small area of turf showed that the mound was composed of small heat-shattered stones with charcoal fragments and dust. Most of the stone seen was small in size, between 70-30mm in length, suggesting that it had been used many times and reduced to a small size. However some heat-fractured stones visible in the stream bank were larger than 200 mm in length, so there may be some sorting within the mound with small stones on top and larger stones towards the base. A fairly substantial amount of charcoal was present around the exposed stones.

The mound came right down to the edge of the stream on the western side and that next to the stream the top edge of 3 stone slabs were visible protruding from the mound material. These seemed to form the short west and long south side of a rectangular feature measuring c. 1.75 by 0.75m and almost certainly represented a stone-lined trough. This feature was photographed but not further investigated. The presence of a trough next to the stream suggests that the present stream had run along a similar route since the Bronze Age and that it had been used to fill the trough with water to be heated by the stones then discarded in the mound.

PRN 5930 Enclosure (possible cemetery)

Period: Post medieval

Grid reference: SH 61923 31067

(Figure 13, plates 24 and 25)

This is a rectangular structure with well-built walls of the local slate, aligned north-east to south-west. Most of the stones are slabs laid flat but at the base of the wall, especially on the south-eastern side larger stones have been laid on edge. On the north-western side some large slabs have been placed on edge against the wall. There are narrow entrances in the middle of the south-western wall and in the south-eastern wall at the east corner. The north-eastern side of the enclosure backs on to a rock outcrop.

It is assumed that this feature is the rectangular structure recorded as PRN 5930. This and many other features in this area were first recorded as part of an aerial photograph mapping project (Dutton 1996, GAT report 205). The map in that report marks PRN 5930 directly over this structure but the grid

reference used and input into the HER is wrong. All these aerial photographic sites in this area seem to have been shifted in respect of their correct co-ordinates.

The construction suggests a 19th century date and it is marked on the First Edition OS map. On this and later OS maps it is marked as a sheepfold but there are indications that was built for an entirely different function. There are traces in the middle of the enclosure of a rectangular kerbed feature resembling a family grave plot in a cemetery. This is particularly clear in summer when the grass parches. Mr Evans of Gerddi Bluog remembered that an Englishman who had briefly owned the land had done some digging within the enclosure and this can be seen as an area of disturbance at the south-western end of the kerbed feature.

There is a narrow entrance with neat stone steps in the field boundary to the east immediately adjacent to the entrance in the eastern corner of the enclosure. This entrance suggests human rather than sheep access. The First Edition OS map shows a track running from the road just north of Gerddi Bluog passed the enclosure. This would make the enclosure less isolated than it appears at present. Peter Crew, the former Snowdonia National Park Authority Archaeologist, has visited the site and suggested that the enclosure might be a Quaker cemetery but no documentary evidence for this is known.

Apparently some distance to the north on a rocky knoll is a structure known locally as the pulpit. The tithe map gives no indication of anything unusual in this field. The field is called 'cae grafod ty issaf' (the gravely field belonging to the lower house), and it was under meadow.

Field boundaries

The field boundaries on the lowland section were almost all well-built high dry-stone walls of mixed local stone. Often there were larger stones at the base of the wall, occasionally particularly large stones up to 2.5m long. The walls have well-defined faces and rubble core and are generally not over 1.5m in height but occasionally reach 2m. Their condition was variable, but several were completely or partially collapsed. The stones vary between angular and rounded depending on stone available on surface, and whether stone from bedrock or from glacial boulders has been used. Several of the walls have wandering lines but there was no clear difference in the construction of these walls compared to straight walls. However, it seems likely that some of the walls have been repeatedly rebuilt over a very long period of time. The walls were directly built onto subsoil and no deposits of archaeological potential were recorded under them. The main exception was PRN 31055, described above, which was a clawdd boundary rather than a dry-stone wall. See appendix I for full details on each wall.

6.2 Upland Section.

The nature of the deposits along the route varied but generally there was either a thin peaty soil no more than 0.3m thick or peat up to 1.2m thick. These overlay glacial gravels and boulder clay which contained numerous large boulders. In many places on the steeper slopes there was scree more or less embedded in the soil. Some areas of scree appeared well-defined and discrete when stripped and were initially thought to be the remains of clearance cairns or short sections of walling but further investigation demonstrated them to be natural scree.

The low mound over the original pipe trench was visible along most of its route and in field F7 small heaps of stone were deposited next to the trench. Some of the larger ones could be confused with field clearance cairns but their distribution clearly demonstrated that they were directly related to the pipe trench. In field H1 a low earth bank (091) ran parallel to the visible mound over the pipe trench (SH 63326 32575). This was initially thought to be part of an ancient field boundary but investigation showed it to be related to the pipe trench, probably forming a gully to divert water into a nearby stream.

PRN 29244 Ancient enclosure wall

Period: Medieval?

Grid reference: SH 62270 31270

(located on figure 5, plate 26)

During the archaeological assessment a wandering, semi-ruined enclosure wall up to 1m in height was recognised running from near the pipe route towards the stream. As vegetation was cleared during the project it could be seen that this wall led to a corner adjacent to pipe route and there were hints that the collapsed wall continued along the slope to the north-east essentially parallel to the pipe route. Bracken

obscured most of this feature. At the corner of the wall there was a suggestion of a small structure but this was completely collapsed and partly obscured by debris from the original pipe trenching. This area was protected by boarding and fences during the works to ensure that no further rock or other material was dumped over the features.

PRN 29242 Short section of rough walling

Period: Post medieval

Grid reference: SH 62350 31370

(located on figure 5, plate 27)

This was a short section of very rough walling along top of a crag, consisting of some boulders heaped very casually on a rock outcrop. This feature was beyond the working area of the pipe route and on top of a crag where no vehicles were to have access. However during reinstatement stone was removed from the top of the crag without authorisation and this feature was removed. Although the structure could have been the remains of a boundary wall not otherwise surviving, its very casual nature suggested a temporary sheep shelter or similar structure. It was probably post medieval in date and of minimal significance but ideally should have received more recording before destruction.

PRN 31063 Rock shelter

Period: Post medieval

Grid reference: SH 62356 31416

(located on figure 5, plate 28)

Large boulder creating a natural rock shelter with one or two stones possibly placed on one side to roughly wall the shelter in further. It was clearly frequently used by sheep but numerous stones on floor of shelter suggest was never much more than a sheep shelter. This feature was removed by the works to allow access through this narrow gorge.

PRN 29241 Enclosure

Period: Medieval?

Grid reference: SH 62389 31476

(located on figure 5, plates 29 and 30)

A small enclosure, measuring 12m by 8m and up to 0.75m high, defined on two sides by a rough boulder wall and a revetment and on the third side by crags. Only the foundation of the wall survives. This site was within the pipe route within only a fairly narrow gap between it and a field wall but the site was clearly fenced and no damage was caused to it during the works.

PRN 31064 Openings in field wall corner (possible structure)

Period: Post medieval

Grid reference: SH 62470 31675, 281m OD

(located on figure 5, plate 31)

There are several openings in the walls forming the north-west corner of field F6. These openings are about 1m wide and 1m high with single stones above as lintels. Some are open and some blocked. The openings seem too large to be ordinary hog-holes (access for sheep) and joints and variations in construction in the field wall suggest that it may have incorporated part of an earlier structure. This presumably accounts for a dog-leg in the boundary at this point. Little was seen on the ground but much of the area was over grown with reeds and bracken.

The 1889 OS map shows no structure in this location, not even a sheepfold. It may be that this corner was used for temporary pens to sort and handle sheep and that the opening were to allow sheep into separate pens.

PRN 31065 Sheepfold

Period: Post medieval

Grid reference: SH 62687 31902

(located on figure 5, plate 32)

Small semi-ruined sheepfold measuring 5.8m by 5.4m and standing up to about 1m high maximum. There is an entrance in the north-east side and the north-east side is revetted into the hill slope. There is no evidence that the structure was ever roofed and it is probably a sheep pen, but it is not shown on the 1889 OS map or on later maps. It was not recorded in the assessment as it is not visible from the pipe route that runs below it.

PRN 31066 Ruined structure

Period: Medieval?

Grid reference: SH 62734 31913, 265m OD

(located on figure 5)

A possible small rectangular enclosure or structure measuring 7.8m by 7.5m. It is set in a hollow to the north-east of a small rock outcrop and is defined by a low, straight bank running up slope south-east to north-west. This turns a right angle to run across the slope, and there may be a return running down the slope. Where the bank runs across the slope it is 2.1m wide but it is narrower where it runs up the slope. Some stones are visible in the bank and it may be the remains of a tumbled wall. Nettles grow in the middle of the feature suggesting former occupation. The whole feature is over-grown with bracken and very difficult to spot in summer (no photograph was taken as little would have been visible). The original pipe-line runs along the south-eastern side of the feature and may have removed the south-eastern side of the structure, but no damage was caused to this feature in the present works.

PRN 31067 Burnt area under colluvium

Period: Early Bronze Age

Grid reference: SH 63068 32234, 276m OD

(Figure 14, plates 33 and 34)

This feature was not identified during the initial stripping of topsoil, and did not become apparent until what was believed to be the natural subsoil was levelled for the construction of the access route. Once identified it became apparent that the feature had been sealed under a layer of colluvium, or hill-wash, which was virtually indistinguishable from the natural subsoil.

The feature (086) was located approximately 9.5m from boundary G1-H1, on the uphill edge of the running track. The visible portion of the deposit measured 1.5m x 1.5m, and was clearly continuing beyond the edge of the excavated area. The burning appeared to be contained in a shallow natural depression, rather than in a pit. The deposit, a mottled dark grey brown clayey silt, was only 0.13m deep, but contained a large amount of charcoal, including some substantial chunks. As well as the charcoal, some carbonised hazelnut shells present in the deposit.

Fragments of heat-altered clay present within the deposit and discolouration of the natural subsoil below indicate that burning had taken place *in situ*, and had been fairly intense.

The colluvium layer (087) sealing the deposit demonstrated erosion of the hill slope above after the burning episode, either gradually over months and years or as one dramatic event. As well as sealing (086) this event also appears to have sealed the original ground surface (088), a dark greyish brown layer of clayey silt, which was clearly visible in section. The colluvium layer had itself been covered by further movement of material down the slope. This was apparent as a relatively thick layer at 0.25m, of mixed orangey brown clayey silt which formed the current mixed topsoil layer.

Nearby was a smaller patch of burning (089) 2.7m wide and 0.2m deep (plate 35). This was located immediately beneath the turf and above the colluvial layer (087), so must be of a later date than 086. The burnt deposit consisted of very dark greyish brown clayey silt with frequent charcoal, and approximately 50% angular and sub-angular stones, some of which were heat-fractured. There were only small quantities of burnt stone and its location above the colluvial layer and on a steep hill slope suggests that it may be a recent episode of gorse burning rather than a burnt mound, although it was in close proximity to a small stream.

A sample of (086) was collected and charred plant remains were recovered from it using flotation. For the full report on these see appendix V. The only species identified was *Corylus* spp (hazel). 108 pieces were inspected closely and the remaining pieces were scanned visually but no species other than hazel was detected. Although there were some large chunks of charcoal none was from a branch of larger diameter than about 3cm to 5 cm.

Two pieces of charred hazel twig were sent to Beta Analytic Inc, Miami, Florida for dating by Accelerator Mass Spectrometry. The full results are presented in appendix VI. The resulting calibrated dates were cal BC 1950 to 1740 (Beta – 269065) and cal BC 1970 to 1750 (Beta – 269066). These two dates are statistically indistinguishable and can be used to suggest that all the charcoal was produced during a single event.

Three small fragments of pot (SF 10) were found within 086. They have red fabric on the outside with a black core and fairly large inclusions. This pot is not very diagnostic but is consistent with a Bronze Age date, although more typical of the mid or late Bronze Age.

Pottery is normally associated with domestic sites and the presence of pot fragments in the burnt layer could indicate other nearby activity not identified in the stripped area. However, the probability is that this was not a domestic site and that the pottery represents only temporary settlement. Elsewhere in the uplands on this project earthworks have proved to be a good indicator of ancient activity. Stripping in areas avoiding earthworks has revealed very little buried archaeology. It would be expected that the existence of a domestic site in this location would have been indicated by the remains of field walls, clearance cairns or particularly terracing. The site is on a fairly steep slope and no trace of a terrace was seen either before or after stripping. It is therefore suggested that the burning was the remains of a bonfire associated with scrub clearance and that any associated settlement was very short-lived. This interpretation is supported by the colluvial layer (087). It is most likely that this is the result of a land slip caused by removing vegetation from the slope and exposing it to weathering. Further work in the area may alter this interpretation but on the present evidence this site is suggested as evidence for the clearance of hazel scrub from this hill slope in the early Bronze Age.

PRN 31068 Patch of burning

Period: Unknown

Grid reference: SH 63253 32437

(located on figure 5, plate 36)

Further north-east across field H1 was a fairly small charcoal-rich deposit (085), of which 1m was protruding from the south-eastern (downhill) baulk of the running track. The section showed that the feature had a width of 1.2m, and was a deposit 0.12m thick lying between the subsoil and topsoil. The deposit consisted of charcoal-rich, very dark brownish grey clayey silt, and approximately 50% heat fractured stone. The presence of the heat fractured stone and the feature's close proximity to a stream raised the possibility that it could be a small burnt mound of prehistoric or medieval date, however it may be the result of recent episodes of gorse burning.

PRN 31069 Probable scree patch in area of cairns

Period: Natural

Grid reference: SH 63558 32962

(located on figure 6, plate 37)

A heap of stones, context (090), was seen in field J1, in an area where prehistoric cairns were clearly visible. It was identified during benching as a concentration of angular to sub-angular stones generally ranging in size from 0.15m to 0.3m, with occasional larger stones up to 0.5m. The visible portion of the feature was 6.5m x 2.1m, continuing north into the baulk. After cleaning the feature by hand it was recorded using digital photographs and written notes, before removing the stone using a 6 tonne 360° excavator with a toothless ditching bucket. Upon removal of the stone it became apparent that the feature was a single layer of stone, under which no features were identified, raising the possibility that the feature may actually have been the edge of a scree slope that was visible up-slope from the running track.

Although the feature may have been natural, a small poor quality thumbnail scraper made of chert (SF 11) was found in the mixed topsoil approximately 5m east of the feature (see figure IV.1 for drawing).

Field boundaries

The field boundaries on the upland section were very similar to those on the lowland section. They were all well-built dry-stone walls mainly of angular stone from the bedrock. Their condition was generally good with few collapsed examples. Particularly large stones used as foundations were rarer than in the lowland section and the majority of the walls appear to have been built entirely new after enclosure of the uplands. There are some walls with wandering lines but none of those breached were of this type. See appendix I for full details on each wall.

6.3 Finds

(by George Smith)

Only a small number of finds have been recovered from the project but they are of an importance beyond their number because the project has provided an unusual sample of a wide area of inland Merioneth. Chance finds of worked flint of any period are rare in Merioneth but this must be due in part to a collection bias because of the low density of population and the small proportion of cultivated land in the present and the low availability of usable flint in the past. Those worked flints that are known from this area come mainly from excavations of funerary monuments, such as the Dyffryn Ardudwy Neolithic chambered tomb (Lynch 1969) or the Bronze Age cairn below Moel Goedog (Lynch 1984). The discovery of these pieces in the present project, as random, mainly unstratified finds point to a wider presence of such material, and therefore of early activity, in the area than has so far been recognised.

The earliest of the pieces found during the project is the scraper on the end and side of a blade (SF 08), from Field E8, which is of a type characteristic of the Mesolithic period. The fine opaque brown flint seems also to be typical of that period and notably different to the poorer grey flint of most of the other items. Finds of Mesolithic material are so far almost absent from Merioneth. In Wales such finds come mostly from coastal locations. The only find of that period near here is a perforated antler hammer that seems to have eroded out of peat near Mochras Island, 5km to the south-west (Guilbert 1981). There are also 19th century records of flints being found in that area.

The flake (SF 05) from Field A5 is of a better quality flint than the rest of the assemblage and seems to have come from a nodule, rather than a pebble. It may, therefore, have been imported and for that reason is likely to be of a Later Neolithic date, when exchange or transport of objects and material began to occur. A fairly extensive human presence in the Neolithic period is demonstrated by numerous chance finds of stone axes, concentrated in the Mawddach-Dee valley, which may have been an important route between coast and inland. Considerable activity could also be expected in Ardudwy, associated with a group of tombs at Dyffryn Ardudwy, Gwern Einion, Bron-y-foel, Cors-y-gedol and Hengwm. Such activity close to the pipe-line has previously been demonstrated by the discovery of two pits of Neolithic date at the (Iron Age) settlement of Moel y Gerddi, one with a flint knife, producing calibrated radiocarbon dates in the second half of the 4th millennium BC and associated with charred seeds indicative of broken ground as well as of cereal growing (Kelly 1988). This was confirmed by environmental study of nearby peat which showed a decline in woodland and appearance of plants typical of broken ground at about the same time (Chambers and Price 1988).

The remaining objects are all made from locally obtained pebble flint of rather poor quality and small size. Flint pebbles up to c. 100mm diameter can be found on the beaches around Llandanwg to the west. The two thumbnail scrapers, from Fields A5 (SF 04) and J1 (SF 11) are the only objects that are possibly diagnostic and of a type most characteristic of Beaker assemblages, i.e. from the later 3rd millennium BC. However, they are less diagnostic in western Britain, where most assemblages of all periods are restricted in size and diversity because of dependence on small pebbles as raw material. Scrapers are regarded as evidence of domestic, that is settled activity, and both these are worn by use.

The quartzite pebble object (SF 09) from Field E13 must be a tool, because the pebble has been selected and imported, probably from the coast. Therefore it was almost certainly deliberately worked to create a chopping tool edge. However, the quartzite is so hard that it does not leave any recognisable artificial fracture features and the edges that are present do not show any certain signs of use-wear. However, the fractures that are present are almost certainly deliberate. Such a pebble tool could be of any prehistoric period but would be typical on a domestic settlement site.

7 DISCUSSION

The pipe-line route provided a transect for investigation from the high upland in open moorland to lower upland of enclosed and partly improved pasture. It runs through an area with numerous recorded prehistoric sites including cairns, burnt mounds and roundhouse settlements showing that the lack of modern settlement and low agricultural value of the land today is misleading in estimating prehistoric activity.

Most of the features excavated in the current project were field boundaries or clearance cairns. These produced very little dating evidence but consideration of their place within the wider landscape may help to clarify dates to some degree.

The field boundary excavated in field A5 (PRN 31047) runs parallel to an area of ridge and furrow (PRN 30440) visible on the aerial photographs, and in certain lights on the ground, just north of the road (figure 2). Groups of ridges run in different directions suggesting several small fields. A field close to the road is bounded on the western side by a scarp with stone in its face. It is this field that is on much the same alignment as PRN 31047. This area is beyond the pipe route and has not been surveyed or closely inspected on the ground.

The tithe schedule shows that this field was not under arable agriculture in the 19th century, but does indicate arable cultivation in neighbouring fields. The hut circle PRN 1052 lies on the north-eastern boundary of this field and the ridge and furrow might be of Iron Age or Romano-British date. PRN 1052 consists of a hut circle defined by an earthen bank with faint traces of associated field walls (Bowen and Gresham 1967, 186). About 170m to the north-west of the field containing the ridge and furrow is the main Cefnfilltir settlement (PRN 1053). This is an enclosed settlement with one large, massively built hut circle and two smaller circular structures (Bowen and Gresham 1967, 197). The area between these settlements most probably contained contemporary fields.

Further into the uplands aerial photographs also show small areas of narrow ridge and furrow near the hut circle settlement PRN 1004. Crew and Musson (1996, 23) have identified ridge and furrow thought to be contemporary with a hut circle settlement in Cwm Prysor, near Trawsfynydd, so it is not impossible for small areas of narrow ridge and furrow to be of a prehistoric date.

The assessment identified a series of small sub-rectangular fields and pens or huts (PRN 29255) in fields A2 and A3. Most of the field walls are reduced to little more than overgrown lines of boulders, but some of the standing field walls, such as PRN 29253 and PRN 30438c may have been built on earlier foundations which formed part of this field system (Kenney 2009d, GAT report 803). To the west of this field system, and probably part of it, is another ancient field boundary (PRN 29252). Its proximity to the long hut (PRN 20612) may suggest a medieval date, but there appears to be Romano-British settlement in this area as well. PRN 20613 was excavated by Gwynedd Archaeological Trust in January 2009 and the excavations are currently being written up. However, it appears to have consisted of one or more Romano-British houses, and it is located on the edge of an irregular area cleared of rubble, probably part of the early field system (R. Evans pers. comm.). Both medieval and Iron Age/Romano-British settlements therefore seem to be associated with the field system around and east of Rhiwgoch.

The field system around the Iron Age or Romano-British settlements of Muriau Gwyddelod (PRN 1054-56) can be dated by its special relationship to the roundhouse settlement that forms its focus. However, the same field system seems to have been reused in the medieval period when two rectangular house platforms (PRN 2907) were built just north-west of the main Muriau Gwyddelod settlement.

On the aerial photographs the Muriau Gwyddelod field system can be seen radiating out from the settlement. Long narrow fields run north-east to the Cefnfilltir settlement (PRN 1053) and sub-rectangular fields follow the trackway known as Y Ffordd Wyddelig (PRN 2901) towards Rhiwgoch and the newly excavated settlement (PRN 20613). Many of the existing upstanding walls can be seen to be part of this system. Some have been straightened but others, e.g. PRN 30327 forming the north-western wall of the field west of Capel Engedi, still follow a very wandering line. This wall is joined by the reduced remains of boundaries to the prehistoric field system (PRN 30325 and 30326) (Kenney 2009c, GAT report 800).

A group of rectangular house platforms of probable medieval date (PRN 1050, Kelly 1982, 142) have been inserted into this field system just south of the Water Treatment Works. The long hut just north of the works (PRN 30612) seems to have been similarly built within the existing fields.

The likelihood, therefore, is that most of these remnant field walls originated in the prehistoric or Romano-British period but were used and modified in the medieval period. Many of the existing upstanding walls may have been in continuous use since the Iron Age, although they have been rebuilt

in 19th century style. A boundary such as PRN 31047 could have been used in the medieval period but is most probably of prehistoric origin.

The remnant boundary PRN 29268/29289 in field D2 is more isolated from Iron Age and Romano-British activity but this might be because the area became common land, and the boundaries were not maintained. After the enclosure award the commonland was divided by new walls, during which any relict boundaries may have been robbed. PRN 29268/29289 may be best seen, therefore, as a lone survivor in an area where other boundaries have been removed. The presence of field clearance cairns in field B3 and cairn PRN 29288 in field C2 also suggest early agricultural activity in this area. The boundaries of field B3 may themselves be traces of an Iron Age field system. Immediately north of B3 is a group of fields radiating out from a semi-circular enclosure in a pattern very similar to the fields around Muriau Gwyddelod. No hut circle settlement has been recorded in the middle of this system but it seems likely to have existed. The walls survive because they are on the edge of the commonland and were part of pre-enclosure award enclosures. Field B3 seems to be one of the outer fields in this system.

The dating of many of the upland wandering walls is problematic. Many are fairly well-preserved and were surveyed on the 1889 OS map even though they were fragmentary and unlikely to have been effective as boundaries for stock at the time. Walls such as PRN 29239 in field F6 are wandering walls built of large boulders in a style that could be replicated from prehistoric to modern times. There is no known prehistoric activity in the immediate vicinity of this wall but the large roundhouse settlement (PRN 5214, SAM Me 166) lies 550m to the north-east, whilst the medieval settlement on Moel y Gerddi lies 380m to the north-west. The probability is that the wall has been in use for millennia, but firm evidence has not been found to support this.

Similarly the wall PRN 29244 running into the gorge in field F4 seems along part of its length too well preserved to be considered a prehistoric wall but as argued above if the walls are maintained they can survive through into the present day.

If there was an extensive field system over much of the uplands in this area in the late Iron Age it raises the question of when this area was first cleared and used for agriculture. Pollen analysis has shown that significant woodland clearance started in the early Bronze Age and that the uplands may have been fairly open in the Iron Age, although regeneration occurred locally (Chambers and Price 1988). The present work has been able to contribute something to this study in the form of the dates on the burnt patch 086 (PRN 31067). If the interpretation of this as the remains of a bonfire related to the clearance of hazel scrub is correct it demonstrates this activity taking place in the early Bronze Age. Only hazel was present in the charred wood and this is highly suggestive of a pure stand of hazel rather than natural ancient woodland. It seems probable that rather than clearing virgin woodland this activity was related to a managed hazel coppice. The small size of the branches burnt would support this. Hazel coppice would be a good use of the steeper slopes not suitable for agriculture. It suggests intensive woodland management at this date and probably woodland clearance in more favourable areas.

Further probably Bronze Age activity in the uplands is indicated by the burnt mound PRN 31061. Typically these sites are dated to the Bronze Age but examples dated to the late Neolithic have been found recently at Llandygai, near Bangor (Kenney 2008). The discovery of this site indicates that burnt mounds might be more common in the uplands than previously thought. Before the topsoil was removed it was very difficult to distinguish this low mound from natural undulations. As these features are generally located in wet areas many might be further obscured by reeds and peat. In this location conditions are likely to have been consistently waterlogged since the site was in use and organic remains are likely to be preserved under the mound and within the trough. The stone trough could indicate a local tradition of using the easily available stone rather than timber, which is more commonly used to line these troughs.

The more recent features indicate a continued but less intensive use of the uplands through to the present day. This is largely restricted to agricultural activities but peat cutting was clearly also important. Perhaps the most interesting feature in this later period, the rectangular enclosure PRN 5930, lies just beyond the pipe easement and was not impacted by the works. This means that no investigation of the feature was carried out for this project but it would repay investigation in future either on the ground or historical research. There is clearly more to this site than the sheepfold it is claimed to be on

the maps and an understanding of its history is likely to contribute significantly to the recent history of the area.

8 CONCLUSIONS

This project did not result in the excavation of complex archaeological sites but it has allowed the close study of a long transect through an archaeologically rich landscape. This has led to a clearer understanding of the development of the landscape from prehistoric times to the modern period. Also of importance, however, has been the close collaboration with United Utilities and their contractor, which allowed the work to be undertaken with minimal impact on the archaeological resource. Flexibility in the route of the open cut trench in the lowland section and in the access route to the upland section allowed many significant sites to be avoided. Most of these were known about prior to the project or identified in the assessment but some, such as the burnt mound, were discovered as the work proceeded and alterations were agreed on the ground to ensure features were preserved with minimal or no impact.

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Tithe map for the parish of Llanfair in Merionethshire 1840.

Tithe Apportionment Schedule for the parish of Llanfair in Merionethshire 1839.

Tithe map for the parishes of Llanfihangel y Traethau and Llandecwyn in the County of Merioneth 1842.

Tithe Apportionment Schedule for the parishes of Llanfihangel y Traethau and Llandecwyn in the County of Merioneth 1842.

QR/En/5: Enclosure award for the parishes of Llanbedr and Llanfair 1836 (no map surviving)

APPENDIX I: Table of boundaries

All boundaries breached by the works were recorded and the information is tabulated below. Walls appearing in the assessment report but not listed below were not breached or otherwise damaged by the works. See figures 2 to 6 for location of the boundaries

Field numbers	PRN	Feature number	Height	Width Base	Width Top	In cut?	Photo Numbers	Notes
A1-A2	29253	40	1-1.5m	1m	0.6m	No	C1, 5-8	A fairly well built dry stone wall of mixed local stone, larger stones at base, no distinct construction of facing-core-facing. Curving nature of wall may suggest boundary has early origins.
A3-A4	29254	41	1.5-3m	1m		No	C1, 9-10	A well constructed high dry stone wall of mixed local stone. Has well-defined facing stones and a rubble core, large stones up to 1m used as lower facing. Likely to date from 19 th C.
A5-B1	29259	46	1.2-1.5m	1m		No	C1, 11-12	A fairly well built dry stone wall of mixed local stone, constructed with fairly large facing stones and a rubble core.
West end of B3	29324	95	1-1.6m	1m		No	C1, 13-14	A fairly well constructed dry stone wall of mixed local stone. Has fairly large facing stones and a rubble core, base consists of large stones up to 1m. Wall 'dog legs' unusually suggesting a change in boundaries in the past. Stock proofed in areas with stones set on edge.
B5-C1	29266b		1.1m	1.1m	0.5m	No	C2, 8-13	A double skinned wall of large sub rounded and sub angular cobbles, and small local granite boulders. Wall core of medium, angular granite cobbles.
C2-D1	29267	56	1.5m	1.1m	0.6m	No	C1, 271-272	A well built dry stone wall of sub rounded and sub angular stones. Larger stones at base, up to 1.45m, and medium stones up to 0.45m forming the general facing, has a rubble core.
D1-D2	29269	58	1m	2m	0.5m	No	C1, 273-274	A roughly built wall, similar to a 'clawdd' type boundary. Outer wall consists of a mix of local stone ranging from rounded to angular. Core consists of a mix of rubble and earth.
D2-E1	29270	59	1.3m	0.9m		No	C1, 275-276	A well constructed dry stone wall with facings and a rubble core. Facing stones typically 0.3m and sub rounded, angular rubble in core typically 0.18m
E1-E1A	29272		0.7m	1.8m		No	C1, 277-278	A poorly built dry stone wall, which wonders slightly. Predominantly consists of large rounded and sub rounded cobbles. Appears to be some attempt at a rubble core, but wall is mostly a mound of large cobbles.

Field numbers	PRN	Feature number	Height	Width Base	Width Top	In cut?	Photo Numbers	Notes
E1A-E2	31055		1.2m	2m	0.85m	No	C1, 134-136, 279 C2, 20,21	A 'clawdd' type boundary. Consists of a turf covered mound of earth and stone. Ditches run parallel to the boundary on both sides.
E2-E3	29273	62	1.05m	1.2m		No	C1, 280-281	A fairly poorly constructed dry stone wall of mixed local stone. Generally constructed using fairly large sub rounded cobbles (0.5m), with larger stones forming the base.
E6-E7	31056		1.3m	0.9m		No	C1, 282-283	A fairly well constructed dry stone wall of mixed local stone, running parallel to road. Wall has facings made of angular and sub angular stones of approx. 0.35m, and a core of angular stone generally 0.2m. Bedrock and glacial boulders form the base in places.
E9-E10	29277	67	1.5m	0.85m		No	C1, 284-285	A dry stone wall mostly constructed of local slate/ schist. Some evidence of a rubble core, however some stones span the width of the wall. Bedrock and glacial boulders make up the base in areas. Stones generally range from 0.2-0.6m. Possible attempts at stock proofing in areas.
E10-E11	29279	69	2m	1.3m		No	C1, 286-287	A well built dry stone wall of mixed local stone. Constructed with facings and a rubble core, with some stones spanning width of wall. Facing stones generally angular slate/ schist of approx. 1m. Very large glacial stones at base (2.5m), some upright stones at base of wall.
E12-E13	29280	70	1.1m	0.7m		No	C1, 288-289	A dry stone wall of mixed angular and sub angular local stone. Some evidence of core between facing stones, stones range from 0.18m to 0.9m. Built on bedrock.
E13-E14	29281	73	1.7m	0.7m		No	C1, 290-291	A slightly wandering dry stone wall. Has facings and a core, facings generally consist of sub angular and angular slate/ shale (0.3-0.9m), core of smaller angular stones. Bedrock forms the base in places.
C3-C4	29283	75	1m	1.1m		No	C1, 292-293	Stone wall/ revetment constructed of mixed local stone 0.1-1m. Constructed at bottom of slope to hold back soil. Bedrock forms the base in places.
C13-C14	29248	31	0.4-1m	0.65		No	C1, 294-295 C2, 29-30	A wandering dry stone wall of local shale/ slate. Has facings and core in area of breach but doesn't appear to be constructed

Field numbers	PRN	Feature number	Height	Width Base	Width Top	In cut?	Photo Numbers	Notes
C15-F1	29247	30	1.5m	0.8m		No	C1, 296-297 C2, 36-37	in the same way in its entirety. Facings consist of sub angular and angular slabs (0.25-0.7m) with a core of smaller angular stones. Constructed on bedrock. A fairly roughly built dry stone wall of mixed local stone, including quartz. Has some evidence of a core of smaller stones but is mostly built of angular and sub angular slate/ shale slabs with occasional sub rounded boulders. Snakes around field and is actually connected to boundary C13-C14.
F1-F2	31062		1.2m	1.1m	1.2m	No	C2, 60-61	A fairly well constructed dry stone wall generally built of slate slabs, with some granite used in the base. No clear core visible, stones are generally 0.3-0.6m and angular, slightly larger in the base.
F2-F3	29245	28	1m	0.9m		No	C2, 62-64, 124	A fairly roughly built dry stone wall of slate slabs and mixed boulders. No real difference between the construction of the base and the main body of the wall, slightly smaller stones used in the base in places. Wall is generally a single line of large slabs and boulders with smaller stones used as infill in places. Stones generally 0.4-0.9m. Construction and curving nature may suggest early origins.
F4-F5	29243	26	0.9m	0.8m	0.6m	Poss.	C2, 66, 123	A fairly well constructed dry stone wall of granite, in state of poor repair in areas. Base of large granite boulders (0.5-0.8m) which may be in a slight cut. Remainder of wall constructed of mixed stones (0.2-0.7m) with no definite facing and core.
F5-F6	29251	37	1.5-3.2m	1m	0.7m	No	C2, 65, 75-76, 125	A well constructed dry stone wall generally of granite. Section in area of breakthrough appeared to have been re-built/ repaired recently and was much higher than the average height of the wall. Base generally constructed of larger stones than main body of the wall (0.5-0.8m) and utilizes glacial boulders and bedrock in places. Main body has granite facing stones (0.3-0.7m) and a rubble core.
F6-F7	29238	21	1.6m	0.8m	0.55m	No	C2, 107-108, 121-122	A well constructed wandering dry stone wall of mixed local stone. No apparent difference in construction of the base and main body of the wall, mixed stone 0.15-0.5m. Wandering

Field numbers	PRN	Feature number	Height	Width Base	Width Top	In cut?	Photo Numbers	Notes
								nature of wall suggests early origins but no evidence of this found in breakthrough, this may be due to disturbance caused during installation of the original main. Wall appears to have been constructed directly on old ground surface which could be seen in section. Stock proofing was evident in overhanging slabs placed on top of the wall.
F9-G1	29237	20	1.5m	0.8m	0.7m	Yes	C2, 115-1116, 120	A well constructed dry stone wall of slate and granite in a shallow cut (0.3m). Base made of slightly larger stones than main body (0.5m), general construction of facing stones (0.3-0.5m) and a rubble core. Wall is earlier than the one that butts up to it at breakthrough point.
G1-H1	29236	19	1.5m	0.9m	0.7m	No	C2, 98-99, 119	A well constructed dry stone wall of slate/ shale slabs and granite. Generally constructed of slate and shale slabs laid flat, no evidence of a core, stones generally 0.15-0.6m.
H1-J1	29234	17	1.3m	1.1m	0.5m	Yes	C2, 56-57, 88-89	A well constructed dry stone wall of granite and low quality slate/ shale. Base constructed using large stones (0.5-0.7m) in a slight cut. At point of breakthrough a roughly constructed culvert/ gap in foundation stones was identified. Main body of wall consists of facing stones (0.3-0.5m) and a narrow rubble core.
J1-K1	29223	03	1.2-1.6m	1m	0.6m	Yes	C2, 51-52, 82-83	A well constructed dry stone wall mostly built of granite. Base of large boulders (0.6-0.8m) in a shallow cut (0.3m). Main body of wall is made up of facing stones of 0.25-0.5m and a rubble core of stones up to 0.2m.
K1-E1	29221	01	1.4m	0.9m	0.7m	Yes	C2, 80-81, 96-97	A well constructed dry stone wall mostly built of granite. Base of larger stones (0.5-0.6m) in a shallow cut. Main body consists of facing stones (0.2-0.5m) and a fairly poorly defined core of slightly smaller stones.

APPENDIX II: trenches at road crossings

In several places along the lowland section of the route the pipe trench crossed the road. Between 6th and 10th July three of these trenches were monitored by an archaeologist (RDX1 to 3 on figure 2). The depth and character of layers were noted and a careful watch for any archaeological features, especially previous road surfaces, was maintained, but nothing of significance was seen. The rest of the trenches were cut in a way that did not produce a clean section. This and the lack of results from the other trenches meant that it was considered not worth monitoring the rest of the trenches.

Trench RDX 1

1.2m wide

1.1m deep

0-0.08m: Tarmac

0.08-0.28m: Hardcore

0.28-0.58m: Possible relict soil, purple/red-brown clayey silt. Boulders protrude through this layer from the natural.

0.58m+: Natural boulder clay with some large boulders.

Photos: G2055 (2) Harlech 109.jpeg and G2055 (2) Harlech 110.jpeg

Trench RDX 2

0.85m wide

1.1m deep

0-0.07m: Tarmac

0.07-0.17m: Hardcore

0.17m+: Natural boulder clay. Red-brown silty clay with fairly frequent medium sub-rounded cobbles.

Photos: G2055 (2) Harlech 111.jpeg and G2055 (2) Harlech 112.jpeg

Trench RDX 3

1.05m wide

1.1m deep

0-0.07m: Tarmac

0.07-0.27m: Hardcore

0.27m+: Natural boulder clay. Light brown silty clay with occasional medium sub-rounded cobbles.

Photos: G2055 (2) Harlech 113.jpeg and G2055 (2) Harlech 114.jpeg

APPENDIX III: works done under Scheduled Monument Consent

Report on works carried out under Scheduled Monument Consent at the settlement 400m SE of Moel Goedog, Llanfair, Harlech (SAM Me 133)

On 22nd May 2009 an application for Scheduled Monument Consent was submitted by Dŵr Cymru/Welsh Water. This consent related to a prehistoric settlement 400m SE of Moel Goedog, Llanfair, Harlech (SAM Me 133) (NGR SH 6155 3216). A project to replace the raw water pipe-line from Llyn Eiddew Mawr to Rhiwgoch, near Harlech, required improved access for vehicles to the uplands. An existing trackway was chosen as the most appropriate access route but this passed through the middle of the above monument. The Consent application proposed reinforcement of the track without widening it. The reinforcement was to consist of a permanent improvement by filling in existing ruts by hand using a locally sourced stone approximately 75mm in diameter. This was to be covered by a geotextile membrane and a road-stone surface was then to be laid. The road-stone surface was to be at least 100-150mm deep to raise vehicles above the level of the track verges.

Ian Halfpenny, Assistant Inspector of Ancient Monuments, visited the site on 21st May and authorised the immediate infilling of the ruts while the Consent was submitted. This work was carried out in the afternoon of 21st May under the supervision of an archaeologist from Gwynedd Archaeological Trust.

The Scheduled Monument Consent was received on 27th May 2009 and the geotextile and road-stone surface was laid on the track through the monument on 29th May 2009. The work was supervised by an archaeologist from Gwynedd Archaeological Trust and Trust staff monitored the use of the track throughout the duration of the project. Temporary fencing and signs were erected to clearly mark the monument and drivers were made aware of the monument and the need to keep strictly to the track. All drivers were instructed to drive slowly and carefully through this area. Occasionally wider vehicles needed to use the track and a route-way was marked out under the instruction of an archaeologist to allow tracked vehicles to drive around the scheduled area. This route was only used very occasionally and only by tracked vehicles causing minimal ground damage.

The project was completed on 23rd October and the site was inspected on 28th October. The track had withstood well the increased traffic and no damage had been done to the monument. There were no traces of vehicles leaving the track within the Scheduled Monument and a monolith standing particularly close to the track was stable and untouched by vehicles. The full length of the reinforced track is to be left in place to benefit the farmers whose land it crosses, so all the road-stone is to remain where the track crosses the monument. This should provide long-term protection for the monument.

Jane Kenney
Gwynedd Archaeological Trust

APPENDIX IV: Finds

List of finds with their locations

Find No.	Context number	Field number	Description	Location	Altitude (OD)
01	Unstrat	B3	Flint flake	SH 59869.4 30974.8	243.8m
02	011	B3	Flint flake	SH 59814.5 30952.6	241.8m
03	011	B3	Stone with striations	SH 59816.2 30954.1	241.9m
04	Unstrat	A5	Flint scraper	SH 59530.5 30767.5	241.8m
05	Unstrat	A5	Flint flake	SH 59425.0 30688.7	239.5m
06	Unstrat	E2	Retouched flint flake	SH 60675.2 30998.7	242.1m
07	Unstrat	B4	Flint flake	SH 59909.7 30982.2	244.2m
08	Unstrat	E8	Flint scraper	SH 61132 30831	252m
09	081	E13	Worked stone	SH 61282 30831	251m
10	086	H1	Prehistoric pot fragments	SH 63068 32234	276m
11	Surface of natural	J1	Flint scraper	SH 63562 32965	318m

Lithics

Introduction

During the Rhiwgoch raw water pipe-line project seven pieces of flint and one stone object were collected, described here. None of the pieces were found close together and so all may be unrelated although two pieces came from Field B3 and two pieces from Field A5. Most were unstratified finds, and were not associated with any known above ground or subsoil features.

Flint

Raw material

Five of the pieces were made from pebbles of fluvio-glacial origin, small and of poor working qualities. Pebbles of this material can be collected on Llandanwg beach close by to the west, where they have eroded out of the glacial till cliffs. One piece was of a finer translucent mid-brown flint, probably from a pebble but origin uncertain. This type of flint is occasionally found in north-west Wales and seems to occur on objects belonging to the Mesolithic and perhaps earlier Neolithic periods and so possibly deriving from a different source of glacial pebbles that were exposed when sea-levels were lower. One larger waste flake is of a dark grey fine flint and has nodular cortex, which seems to be more than just a bit of cortex surviving in a concavity in a pebble, so is probably imported material.

Technology

The splitting of small pebbles restricts the size of usable flakes and of tools that can be made. However, these are all true flakes, not just split or ecaillé pebbles, suggesting that the pebbles were of sufficient size to allow flaking, although there are no cores here and no evidence of platform preparation, and just simple secondary edge working with no invasive working.

Description

The objects are summarised below. The detailed records are listed in Appendices IV.1 and 2 below.

<i>Field</i>	<i>Rec no.</i>	<i>Context No.</i>	<i>Flint Colour</i>	<i>General type</i>	<i>Description</i>
B3	1	Unstrat	Light grey	Waste flake	Small, broad secondary flake from fluvio-glacial pebble. Hard hammer struck. The pebble seems to have been slightly burnt to heat treat it before flaking. No evidence of use and nothing diagnostic of period.
B3	2	11	Light grey	Utilised piece frag	Graver. Distal end of a pointed tertiary flake with a small burin removal and a small amount of secondary shaping to a point and use-wear abrasion on the tip.

A5	4	Unstrat	Light grey	Retouched piece	Small convex end scraper. Made from a small pebble split with a hard hammer. Retains pebble cortex. Shaped by steep secondary flaking. Use wear f crushing and rounding on the distal edge (see figure IV.1, SF 04).
A5	5	Unstrat	Dark grey	Waste flake	Large thin secondary flake, very fresh (from peat deposit?) fine flint wit some white probably unrolled nodular cortex and therefore possibly imported flint. Some fine edge damage or casual utilisation. Probably Later Neolithic if imported raw material.
E2	6	Unstrat	Light grey	Retouched piece	Spurred piece. Small approximately triangular tertiary flake with minor retouch around two points. No visible wear. Possibly Neolithic (see figure IV.1, SF 06).
B4	7	Unstrat	Mid-grey with brown flecks	Retouched piece	Casually retouched piece, possible graver. Small flake with abrupt retouch on both edges and end and small removal from the tip suggests possible use as graver but no visible use wear (see figure IV.1, SF 07).
E8	8	Unstrat	Light brown	Retouched piece frag	End and side scraper. Distal end of a thin broad flake or blade with fine abrupt marginal retouch around the convex end and one side. Both end and side edges are rounded by abrasion use-wear. Retains some cortex on the other side. Possibly Mesolithic based on tool type, type of secondary working and material type (see figure IV.1, SF 08).
J1	11	Unstrat	Mid grey	Retouched piece	Small thick convex scraper on a small split pebble. Retouched all around its circumference and despite its small size shows some evidence of abrasion use-wear also around most of its circumference. The flake has a small fossil sponge inclusion centrally within it and it is likely that this was a deliberately included as a decorative feature.

Stone

Field B3, Context 11, Recorded find 3 (see figure IV.2). A glacial boulder of hard igneous rock, 450mm x 270mm x 210mm. It is of natural sub-rectangular shape, with naturally rounded edges. One edge face is blackened and has a few straight scratches diagonally to the face and some probable impact chips. The absence of any similar marks on the other 5 faces suggest that they are of human origin and possibly from use of the stone as an anvil or pillow stone from iron or other industrial activity, although, if so, not for an extended period. However, another possibility is that the stone has previously been set in a wall or track and the marks (and the blackening) could have been sustained as random damage.

From Field E13, Context 81, Recorded find 9. A crude chopping tool. A large quartzite pebble worked in basic way by heavy removal of large pieces from either face at each end to leave sharp strong angular edges. The material is so hard that conchoidal flaking was probably not possible. There are no visible use wear marks. The pebble must have been brought to its find location from a beach or coast-edge exposure some distance away and not being easily portable suggests a domestic use. It is a rather simple tool that is not diagnostic of period.

Pottery

The pot fragments (SF 10) found in burnt patch 086 were inspected by Frances Lynch on 19/11/09. Her opinion is that it is genuine pottery and is prehistoric, possibly dating to the mid or late Bronze Age but not very diagnostic. The fabric is red on the outside with a black core and fairly large inclusions. The

three sherds have recent breaks and two of the three join. The third probably joins but some material has been lost. This is what Frances terms “Rude British Pottery” and she did not consider it worth further analysis.

GAT Lithic database field codes and definitions

rec: recorded find number

context: stratigraphic unit

mat: material. c: chert, bac: banded chert, gc: greensand chert, cq: crystal quartz, f: flint, gl: Graig Lwyd, mr: Mynydd Rhiw, mud: mudstone, o: other, q: quartz, sh: shale, tf: tuff.

gtyp: general lithic type, fl: flake, rp: retouched piece, up: utilised piece, c: core, crp: casually retouched piece, ep: ecaille piece, if: irregular fragment, b: burnt, np: natural piece, f: fragment, mf: microflake/fragment, sp: split pebble piece.

styp: specific type: c: core, cp: core prismatic, cs: core single directional, cb: core bidirectional, ci: core irregular, cr: core reject, cf: core frag, ctf: core trimming flake, aho: arrow-head oblique, ahl: arrow-head leaf, ahb: arrow-head barbed and tanged, np: nosed piece, ndp: notched piece, sce: scraper end, scs: scraper side, sth: scraper thumbnail, erk: edge-retouched knife, bin: bifacial knife, cut: utilised cutting flake, bbl: backed blade, pcr: piercer, awl: awl, bbmic: broad blade microlith, nbmic: narrow blade microlith, ser: serrated piece, spp: spurred piece, tf: truncated flake, up: utilised piece, bur: burin, sp: split pebble, gf: gunflint, unc: unclassified, m: missing.

col: colour: l: light, d: dark, m: mid, gr: grey, br: brown, bf: buff, bl: black, y: yellow, r: red, pnk: pink, mot: mottled

pat: patina/cortication coded 1-3, low, medium, high

bur: burning, 1: slight, 2: medium, 3: high

dam: secondary damage, 1: slight, 2: medium, 3: high

cor: cortex type code, 1: pebble, 2: rolled, 3: nodular, 4: tabular, 5: uncertain

imp: primary impact type, 1: normal, 2: pronounced, 3: flat, scalar, 4: bipolar, 5: punch

cla: reduction class, 1-3

fra: fragmentation class, 1: distal, 2: proximal, 3: mid-part

pla: platform type code, 1: plain, 2: cortical, 3: battered, 4: facetted, 5: dihedral, 6: prepared edge

len: length of complete piece, perpendicular to the striking platform

ilen: length of incomplete piece, perpendicular to the striking platform

bre: breadth of complete piece, parallel to the striking platform

ibre: breadth of incomplete piece, parallel to the striking platform

rettyp: retouch type: ab: abrupt, mar: marginal, st: steep, inv: invasive, sc: scalar

retpos: retouch position: side, distal, proximal

retfac: retouch face: b: bulbar, n-b: non-bulbar

retsha: retouch shape: str: straight, conv: convex, conc: concave, ang: angular

retlen: retouch length, mm

wrtyp: usewear type, 1: polish/gloss, 2: crushing, 3: abrasion, 4: microchipping

Appendix IV.1 Flint: General record

Field A5

<i>cont</i>	<i>rec</i>	<i>gtyp</i>	<i>mat</i>	<i>col</i>	<i>cor</i>	<i>imp</i>	<i>len</i>	<i>ilen</i>	<i>bre</i>	<i>ibre</i>	<i>dep</i>	<i>idep</i>
0	5.0	wf	f	dkgy	3	2	37	0	37	0	7	0
0	4.0	rp	f	lgy	1	2	25	0	26	0	7	0

Field B3

<i>cont</i>	<i>rec</i>	<i>gtyp</i>	<i>mat</i>	<i>col</i>	<i>cor</i>	<i>imp</i>	<i>len</i>	<i>ilen</i>	<i>bre</i>	<i>ibre</i>	<i>dep</i>	<i>idep</i>
11	2.0	upf	f	lgy	0	1		30	0	19	0	4
0	1.0	wf	f	lgy	1	3	13	0	23	0	6	0

Field B4

<i>cont</i>	<i>rec</i>	<i>gtyp</i>	<i>mat</i>	<i>col</i>	<i>cor</i>	<i>imp</i>	<i>len</i>	<i>ilen</i>	<i>bre</i>	<i>ibre</i>	<i>dep</i>	<i>idep</i>
0	7.0	rp	f	mg	0	1	17	0	22	0	5	0

Field E2

<i>cont</i>	<i>rec</i>	<i>gtyp</i>	<i>mat</i>	<i>col</i>	<i>cor</i>	<i>imp</i>	<i>len</i>	<i>ilen</i>	<i>bre</i>	<i>ibre</i>	<i>dep</i>	<i>idep</i>
0	6.0	rp	f	lgy	0	1	22	0	18	0	4	0

Field E8

<i>cont</i>	<i>rec</i>	<i>gtyp</i>	<i>mat</i>	<i>col</i>	<i>cor</i>	<i>imp</i>	<i>len</i>	<i>ilen</i>	<i>bre</i>	<i>ibre</i>	<i>dep</i>	<i>idep</i>
0	8.0	rpf	f	lbr	1	1		0	19	20	0	6

Field J1

<i>cont</i>	<i>rec</i>	<i>gtyp</i>	<i>mat</i>	<i>col</i>	<i>cor</i>	<i>imp</i>	<i>len</i>	<i>ilen</i>	<i>bre</i>	<i>ibre</i>	<i>dep</i>	<i>idep</i>
0	11.0	rp	f	mg	1	1	22	0	20	0	11	0

Appendix IV.2 Flint: Specific records

Field A5

<i>context</i>	<i>rec</i>	<i>gtyp</i>	<i>styp</i>	<i>rettyp</i>	<i>retpos</i>	<i>retfac</i>	<i>retsha</i>	<i>retlen</i>	<i>retdep</i>	<i>retang</i>	<i>wrtyp</i>
0	5.0	wf						0	0	0	0
0	4.0	rp	sth	st	s,d	nb	conv	55	9	65	3

Made from a segment of a small pebble split by a hard hammer and retaining pebble cortex. Shaped by steep secondary flaking. Crushing and rounding from abrasion on distal edge.

Field B3

<i>context</i>	<i>rec</i>	<i>gtyp</i>	<i>styp</i>	<i>rettyp</i>	<i>retpos</i>	<i>retfac</i>	<i>retsha</i>	<i>retlen</i>	<i>retdep</i>	<i>retang</i>	<i>wrtyp</i>
11	2.0	upf	upf					0	0	0	1
0	1.0	wf						0	0	0	0

Distal end of a pointed flake with possible slight shaping and use wear polish on the tip

Field B4

<i>context</i>	<i>rec</i>	<i>gtyp</i>	<i>styp</i>	<i>rettyp</i>	<i>retpos</i>	<i>retfac</i>	<i>retsha</i>	<i>retlen</i>	<i>retdep</i>	<i>retang</i>	<i>wrtyp</i>
0	7.0	rp	crp/b	mar	s,d,p	nb	irreg	33	2	0	0

Small tertiary flake with fine abrupt retouch around most of its periphery, with a small area at the tip, which has a small damage removed flake, not a normal burin removal but perhaps from use as a burin.

Field E2

<i>context</i>	<i>rec</i>	<i>gtyp</i>	<i>styp</i>	<i>rettyp</i>	<i>retpos</i>	<i>retfac</i>	<i>retsha</i>	<i>retlen</i>	<i>retdep</i>	<i>retang</i>	<i>wrtyp</i>
0	6.0	rp	spp	mar	p,d	nb	ang	0	0	0	0

Approximately triangular flake with slight retouch on two points. No visible use wear.

Field E8

<i>context</i>	<i>rec</i>	<i>gtyp</i>	<i>styp</i>	<i>rettyp</i>	<i>retpos</i>	<i>retfac</i>	<i>retsha</i>	<i>retlen</i>	<i>retdep</i>	<i>retang</i>	<i>wrtyp</i>
0	8.0	rpf	sce	mar	s,d	nb	conv	32	1	0	3

Distal end of thin flake with fine abrupt marginal retouch around the side and end, all of which is rounded by abrasion.

Field J1

<i>context</i>	<i>rec</i>	<i>gtyp</i>	<i>styp</i>	<i>rettyp</i>	<i>retpos</i>	<i>retfac</i>	<i>retsha</i>	<i>retlen</i>	<i>retdep</i>	<i>retang</i>	<i>wrtyp</i>
0	11.0	rp	sth	st	s,d,p	nb	conv	75	8	75	3

Small thick scraper retouched all round its circumference and with abrasion wear around most of it too. Worked around a fossil sponge inclusion in the flint, probably deliberately for decorative value.

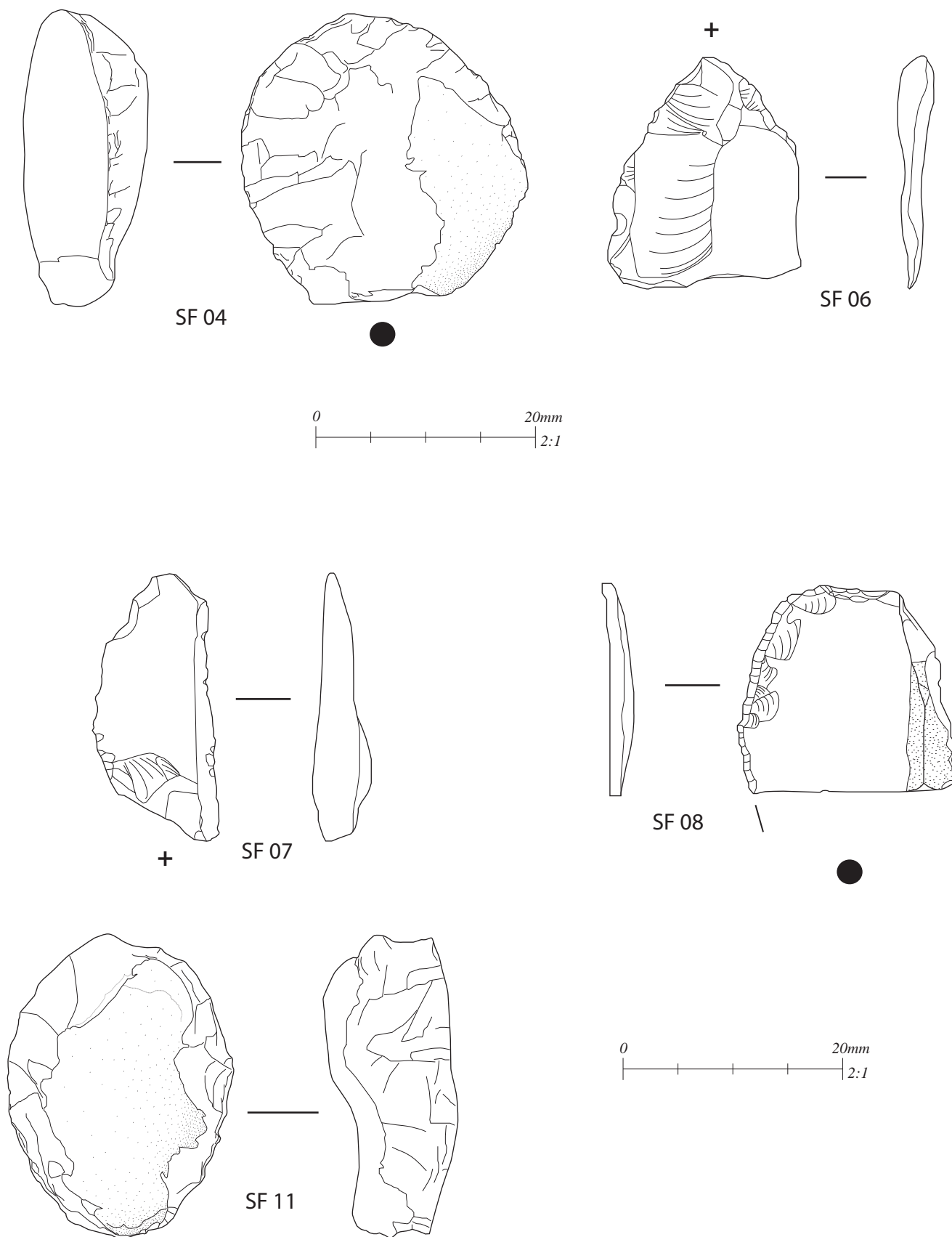


Figure IV.1: Flint and chert tools from the Rhiwgoch pipeline

SF 04: a small convex end scraper found close to the northern boundary of field A5

SF 06: a spurred piece, possibly Neolithic, from field E2

SF 07: a casually retouched piece, possibly a graver, from field B4

SF 08: an end and side scraper, possibly Mesolithic, from field E8

SF 11: a small poor quality thumbnail scraper from field J1



Figure IV.2: small glacial boulder with straight scratches on one face
Rubbing (left) and photograph of scratched face at same scale

APPENDIX V: Charcoal Identification

Table of samples

Sample number	Context number	Context description	Weight of flot	Description of flot
01	013	Sample from amongst stones of tumbled wall	<1g	Soil crumbs with modern roots and a very small quantity of unidentifiable charcoal pieces.
02	034	undisturbed B-horizon below wall 013	1g	Soil crumbs with modern roots with some small charcoal pieces.
03	037	Fill of probable natural fissure	6g	Soil crumbs with modern roots and frequent small charcoal pieces.
04	086	Patch of burning	415g	A large quantity of charcoal fragments, some large with few modern roots.

Four bulk soil samples were taken on site and wet sieved with flotation through a 100 micron mesh used to recover charred plant remains. One sample contained modern roots and very little charcoal (sample 01). This was not analysed. The other three were studied by P. Denne of European Plant Science Laboratory, Intec, Parc Menai, Bangor, Gwynedd, LL57 4FG, who reported on 22nd September 2009.

Sample 02 from context 034. Context 034 was part of the undisturbed B-horizon below wall 013 (PRN 31047)

Identified species: *Pomoideae* 4 pieces

The Pomoideae group is a sub-family of the Rosaceae, and includes *Crataegus* spp (hawthorns), *Sorbus* spp (rowans and whitebeams), and *Malus* spp. (apples), which are not distinguishable from their charcoal.

All other pieces in this bag were either too small or too incinerated for identification.

Sample 03 from context 037. Context 037 was the fill of feature [036], which was sealed beneath the relict soil under wall 013. This feature was initially thought to be a pit but on removal of the wall stones it could be seen to be a natural fissure, probably of peri-glacial origin (PRN 31047).

Identified species: *Pinus** spp. (pine) 22 pieces

Betula spp. (birch) 1 piece

All other pieces in this bag were either too small or too incinerated for identification.

*These pine pieces belong to the 'Scots pine' group of *Pinus* spp., this group includes *Pinus sylvestris* (Scots pine) and *Pinus nigra* (Corsican pine). They had narrow growth rings (mostly less than 1mm) curved in an obvious arc, suggesting that they were from slow-growing side branches rather than from main stems.

Sample 04 from context 086. Context 086 was a patch of burning in a shallow natural depression,. The deposit, a mottled dark grey brown clayey silt, was only 0.13m deep, but contained a large amount of charcoal, including some substantial chunks. As well as the charcoal, some carbonised hazelnut shells were present. Fragments of heat-altered clay present within the deposit and discolouration of the natural subsoil below indicate that burning had taken place *in situ*, and had been fairly intense. (PRN 31067)

Identified species: *Corylus* spp (hazel) 108 pieces

These 108 pieces were a sample of about 50g taken at random from the bag of 415g charcoal. The remaining pieces were scanned visually and appeared very uniform and similar to those that were positively identified as hazel. No species other than hazel were detected. All pieces examined had narrow growth rings (around 1mm), and judged from the arc of the growth rings in the larger pieces were parts of branches with a diameter of about 3cm to 5 cm.

APPENDIX VI: Radiocarbon dates

After species identification single pieces of charred hazel twig (small diameter twigs in both cases) were sent to Beta Analytic Inc, Miami, Florida for dating by Accelerator Mass Spectrometry. Below are the results of the analysis and the calibration curves for each sample.

Lab number	Local sample number	Analysis	Material /pre-treatment	Measured Radiocarbon Age	¹³ C/ ¹² C Ratio	Conventional Radiocarbon Age(*)	2 sigma calibration
Beta - 269065	G2055/86/04A	AMS-Standard delivery	Charred hazel twig: acid/alkali/acid	3530 +/- 40 BP	-25.8 o/oo	3520 +/- 40 BP	Cal BC 1950 to 1740 (Cal BP 3900 to 3690)
Beta - 269066	G2055/86/04B	AMS-Standard delivery	Charred hazel twig: acid/alkali/acid	3540 +/- 40 BP	-25.2 o/oo	3540 +/- 40 BP	Cal BC 1970 to 1750 (Cal BP 3920 to 3700)

CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

(Variables: C13/C12=-25.8;lab. mult=1)

Laboratory number: **Beta-269065**

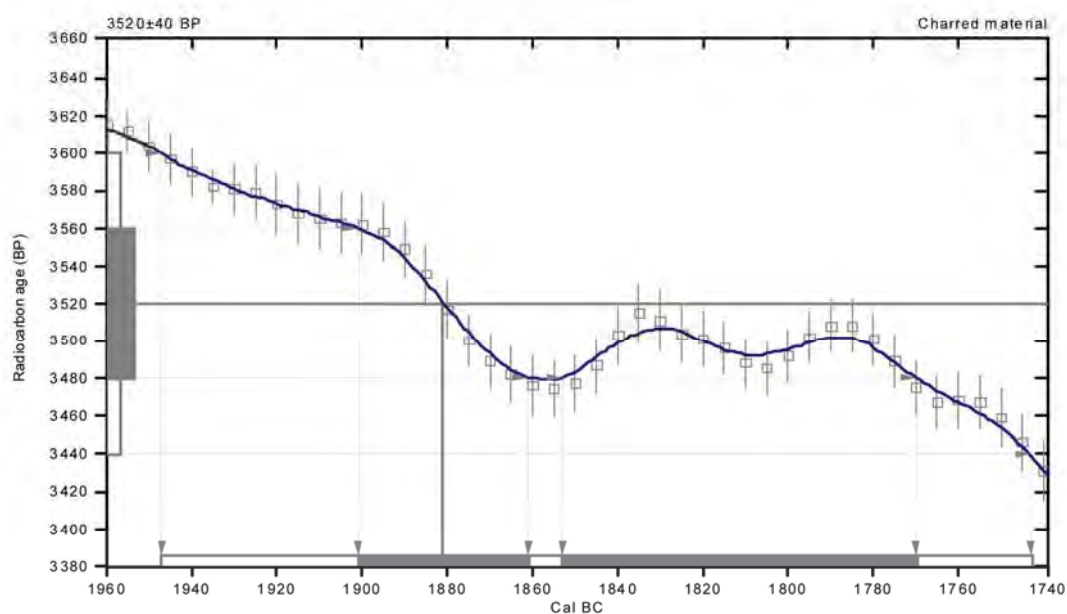
Conventional radiocarbon age: **3520±40 BP**

2 Sigma calibrated result: **Cal BC 1950 to 1740 (Cal BP 3900 to 3690)**
(95% probability)

Intercept data

Intercept of radiocarbon age
with calibration curve: **Cal BC 1880 (Cal BP 3830)**

1 Sigma calibrated results: **Cal BC 1900 to 1860 (Cal BP 3850 to 3810)** and
(68% probability) **Cal BC 1850 to 1770 (Cal BP 3800 to 3720)**



References:

Database used

INTCAL04

Calibration Database

INTCAL04 Radiocarbon Age Calibration

IntCal04: Calibration Issue of Radiocarbon (Volume 46, nr 3, 2004).

Mathematics

A Simplified Approach to Calibrating C14 Dates

Talma, A. S., Vogel, J. C., 1993, Radiocarbon 35(2), p317-322

Beta Analytic Radiocarbon Dating Laboratory

4985 S.W. 74th Court, Miami, Florida 33155 • Tel: (305)667-5167 • Fax: (305)663-0964 • E-Mail: beta@radiocarbon.com

CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

(Variables: C13/C12=-25.2;lab. mult=1)

Laboratory number: **Beta-269066**

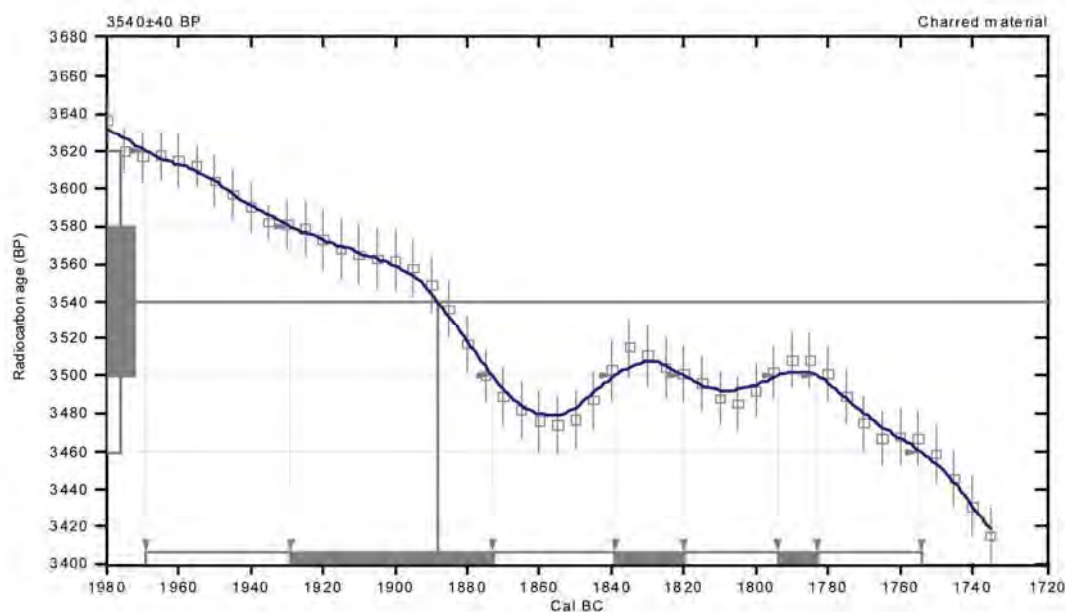
Conventional radiocarbon age: **3540±40 BP**

2 Sigma calibrated result: **Cal BC 1970 to 1750 (Cal BP 3920 to 3700)**
(95% probability)

Intercept data

Intercept of radiocarbon age
with calibration curve: **Cal BC 1890 (Cal BP 3840)**

1 Sigma calibrated results: **Cal BC 1930 to 1870 (Cal BP 3880 to 3820) and**
(68% probability) **Cal BC 1840 to 1820 (Cal BP 3790 to 3770) and**
Cal BC 1790 to 1780 (Cal BP 3740 to 3730)



References:

Database used

INTCAL04

Calibration Database

INTCAL04 Radiocarbon Age Calibration

IntCal04: Calibration Issue of Radiocarbon (Volume 46, nr 3, 2004).

Mathematics

A Simplified Approach to Calibrating C14 Dates

Talma, A. S., Vogel, J. C., 1993, Radiocarbon 35(2), p317-322

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APPENDIX VII: Archaeological and historical sites along the route of the raw water pipe-line

Table 1: Sites on or very close to the pipe route or access track

PRN	SITE NAME	NGR	status	SITE TYPE	PERIOD	FORM
1002	Hut group + field system, SE of Moel Goedog	SH 6155 3216	Me133	settlement	Roman/IA	Stone built feature
1040	Standing stone	SH60673203	Me57e	Standing stone	Prehistoric	Stone built feature
1041	Standing stone	SH60713204	Me57d	Standing stone	Prehistoric	Stone built feature
1049	Carreg standing stone	SH 59886 30968	M57b	Standing stone	Prehistoric	Standing Monument
1153	Garreg round cairn	SH 59906 30953	M107	Ring cairn	Prehistoric	Stone built feature
1175	Funerary cairn	SH 6322 3320		Cairn	Prehistoric	Stone built feature
1176	Hut circle	SH 63750 33290		Hut circle	Prehistoric	Earthwork
1176	Hut circle	SH 63785 33285		Hut circle	Prehistoric	Earthwork
1176	Hut circle	SH 63731 33295		Hut circle	Prehistoric	Earthwork
2952	Ancient field boundaries	SH 6140 3200		Field boundaries	Prehistoric?	Stone built feature
5212	Ffridd Fron kerb cairn	SH 63161 32395	Me208	Burial cairn	Prehistoric	Stone built feature
5213	Platform house, NE of Moel y Gerddi	SH 63043 32150		Hut platform	Medieval	Earthwork
5214	Hut group & field system, NE of Moel y Gerddi	SH 63014 31990	Me166	Hut circle settlement	Prehistoric	Earthwork
5930	Rectangular enclosure	SH 61923 31067		Cemetery?	Post medieval	Stone built feature
5931	Rectangular structure & enclosure	SH 61940 31040		Enclosure	Unknown	AP site
5932	Enclosures and walls	SH 62010 31050		Enclosure	Unknown	AP site
5940	Poss long hut/enclosure and field walls	SH 60776 30971		Enclosure walls	Medieval?	Stone built feature
5957	Trackway	SH 61117 30833		Trackway	Post medieval	Earthwork
5958	Small house with barn	SH 61299 30755		Small house with barn	Post medieval	Building - ruined
5965	Irregular enclosure	SH 61730 30960		Enclosure	Unknown	AP site
5967	Farm building and enclosure	SH 61749 30895		Barn	Post medieval	Building - roofed
5971	Sub-rectangular enclosure/fold	SH 61688 30814		Sheepfold	Post medieval	Stone built feature
12898	Cairn	SH 6320 3324		Cairn	Prehistoric	Stone built feature
20612	Long hut	SH 59246 30455		Long hut	Medieval	Earthwork
21791	Ffridd Llwyn Gurfal mine	SH 61362 30785		Manganese mine	Post medieval	Earthwork
28907	Sheepfold	SH 6335 3324		Sheepfold	Post medieval	Stone built feature
28919	En-gedi Scotch Baptists' Chapel	SH 5905 3043		Chapel	Post medieval	Stone built feature
29221	Wall	SH 64260 33580		Wall	Post medieval	Stone built feature
29222	Hut/shelter	SH 64045 33399		Hut/shelter	Post medieval?	Earthwork
29223	Wall	SH 64020 33360		Wall	Post medieval	Stone built feature
29224	Peat stack	SH 63921 33360		Peat stack	Post medieval	Earthwork
29225	Shelters and enclosures, peat stack?	SH 63862 33272		Shelters and enclosures, peat stack?	Post medieval	Stone built feature
29226	Peat stack	SH 63849 33370		Peat stack	Post medieval	Earthwork
29227	Peat stack	SH 63823 33345		Peat stack	Post medieval	Stone built feature
29228	Small building	SH 63675 33210		Small building	Post medieval	Building - ruined
29229	Denuded wall	SH 63691 33203		Denuded wall	Prehistoric?	Stone built feature
29230	Trackway	SH 63592 33058		Trackway	Post medieval	Earthwork
29231	Multicellular Sheepfold	SH 63557 32996		Multicellular Sheepfold	Post medieval	Stone built feature

PRN	SITE NAME	NGR	status	SITE TYPE	PERIOD	FORM
29232	Cairn	SH 63563 32953		Cairn	Prehistoric	Stone built feature
29232	Cairn	SH 63582 32916		Cairn	Prehistoric	Stone built feature
29232	Cairn	SH 63599 32922		Cairn	Prehistoric	Stone built feature
29232	Cairn	SH 63590 32958		Cairn	Prehistoric	Stone built feature
29233	Small building	SH 63310 32699		Small building	Post medieval	Building - ruined
29234	Wall	SH 63340 32580		Wall	Post medieval	Stone built feature
29235	Burial cairn	SH 63321 32527		Burial cairn	Prehistoric	Stone built feature
29236	Wall	SH 63050 32220		Wall	Post medieval	Stone built feature
29237	Wall	SH 62770 31970		Wall	Post medieval	Stone built feature
29238	Wall	SH 62520 31670		Wall	Post medieval	Stone built feature
29239	Wandering wall	SH 62545 31629		Wandering wall	Medieval?	Stone built feature
29240	Wall	SH 62410 31560		Wall	Post medieval	Stone built feature
29241	Enclosure	SH 62389 31476		Enclosure	Medieval?	Stone built feature
29242	Wandering wall	SH 62350 31370		Wandering wall	Medieval?	Stone built feature
29243	Wall	SH 62290 31320		Wall	Post medieval	Stone built feature
29244	Wandering wall	SH 62270 31270		Wandering wall	Medieval?	Stone built feature
29245	Wall	SH 62130 31090		Wall	Post medieval	Stone built feature
29246	Wall/cairn	SH 62088 31083		Wall/cairn	Post medieval	Stone built feature
29247	Wall	SH 61980 31060		Wall	Post medieval	Stone built feature
29248	Wall	SH 61930 31060		Wall	Post medieval	Stone built feature
29249	Wall	SH 61840 31000		Wall	Post medieval	Stone built feature
29250	Wall	SH 62360 31440		Wall	Post medieval	Stone built feature
29251	Wall	SH 62320 31370		Wall	Post medieval	Stone built feature
29252	Wandering wall S end	SH 59257 30410		Wandering wall S end	Medieval	Stone built feature
29252	Wandering wall N end	SH 59282 30464		Wandering wall N end	Medieval	Stone built feature
29253	Wall	SH 59350 30550		Wall	Post medieval	Stone built feature
29254	Wall	SH 59360 30560		Wall	Post medieval	Stone built feature
29255	Enclosures and possible hut circles	SH 59430 30560		Enclosures and possible hut circles	Prehistoric?	Stone built feature
29256	Sheepfold	SH 59350 30561		Sheepfold	Post medieval	Stone built feature
29257	Hut circle?	SH 59412 30588		Hut circle?	Prehistoric?	Earthwork
29258	Hollow/pond	SH 59347 30580		Depression/pond	Post medieval	Earthwork
29259	Wall	SH 59530 30770		Wall	Post medieval	Stone built feature
29260	Trackway	SH 59542 30773		Trackway	Post medieval	Linear Feature
29261	Heap of stones	SH 59618 30828		Heap of stones	Post medieval	Stone built feature
29262	Wall	SH 59680 30870		Wall	Post medieval	Stone built feature
29263	Ring cairn?	SH 59848 30949		Ring cairn?	Prehistoric	Earthwork
29264	Hollows	SH 59944 30924		Depressions	Unknown	Earthwork
29265	Heap of stones	SH 59940 30990		Heap of stones	Modern	Stone built feature

PRN	SITE NAME	NGR	status	SITE TYPE	PERIOD	FORM
29266	Wall	SH 59970 31010		Wall	Post medieval	Stone built feature
29267	Wall	SH 60182 31012		Wall	Post medieval	Stone built feature
29268	Possible field boundary	SH 60182 30971		Possible field boundary	Medieval?	Earthwork
29268	Possible field boundary	SH 60206 30976		Possible field boundary	Medieval?	Earthwork
29268	Possible field boundary	SH 60182 30990		Possible field boundary	Medieval?	Earthwork
29269	Wall	SH 60274 31020		Wall	Post medieval	Stone built feature
29270	Wall	SH 60452 31045		Wall	Post medieval	Stone built feature
29271	Ridge and furrow	SH 60390 31050		Ridge and furrow	Post medieval	Earthwork
29272	Wall	SH 60480 31044		Wall	Post medieval	Stone built feature
29273	Wall	SH 31000 30998		Wall	Post medieval	Stone built feature
29274	Sheep wash	SH 60728 31040		Sheep wash	Post medieval	Stone built feature
29275	Wall	SH 61100 30850		Wall	Post medieval	Stone built feature
29276	Wandering wall	SH 61100 30800		Wandering wall	Medieval?	Stone built feature
29276	Wandering wall	SH 61120 30740				
29277	Wall	SH 61220 30830		Wall	Post medieval	Stone built feature
29278	Wandering wall	SH 61193 30764		Wandering wall	Medieval?	Stone built feature
29279	Wall	SH 61240 30830		Wall	Post medieval	Stone built feature
29280	Wall	SH 61270 30840		Wall	Post medieval	Stone built feature
29281	Wall	SH 61370 30820		Wall	Post medieval	Stone built feature
29282	Building	SH 61453 30865		Building	Post medieval	Building - ruined
29283	Wall	SH 61440 30810		Wall	Post medieval	Stone built feature
29284	Wall	SH 61650 30790		Wall	Post medieval	Stone built feature
29285	Trackway	SH 61752 30934		Trackway	Post medieval	Earthwork
29286	Building (site of)	SH 61784 30997		Building (site of)	Post medieval	Cartographic
29287	Trackway	SH 61389 30758		Trackway	Post medieval	Earthwork
29288	Field clearance cairn	SH 60025 31018		Field clearance cairn	Prehistoric?	Stone built feature
29289	Field boundary?	SH 60063 31000		Field boundary?	Medieval? Prehistoric	Stone built feature
29290	Trackway	SH 61730 30890				
29290	Trackway	SH 59978 31020		Trackway	Post medieval	Linear Feature
29316	Wall	SH 59988 31027		Wall	Post medieval	Stone built feature
29317	Wall	SH 59981 31030		WALL	Post medieval	Stone built feature
29318	Field clearance cairn	SH 59949 31040		Cairn	Unknown	Stone built feature
29319	Trackway	SH 59948 31016		Trackway	Post medieval	Linear Feature
29320	Wall	SH 59907 30992		Wall	Post medieval	Stone built feature
29321	Field clearance cairn	SH 59814 30961		Cairn	Unknown	Stone built feature
29322	Hollow	SH 59822 30949		Depression	Unknown	Earthwork
29323	Hollow	SH 59822 30903		Depression	Post medieval?	Earthwork
29324	Wall	SH 59690 30880		Wall	Post medieval	Stone built feature
29325	Disturbed ground	SH 59580 30832		Earthwork	Unknown	Earthwork
29326	Road from Rhiwgoch to Talsarnau	SH 59984 31030		Road		

PRN	SITE NAME	NGR	status	SITE TYPE	PERIOD	FORM
29326	Road from Rhiwgoch to Talsarnau	SH 59599 30830		Road	prehistoric-post med	Linear Feature
30323	Hollow	SH 59041 30461		Hollow	Post medieval?	Earthwork
30324	Drainage	SH 59002 30499		Drainage	Post medieval	Stone built feature
30325	Ancient field boundary	SH 59010 30445		Field boundary	Iron Age/Romano-British	Earthwork
30326	Ancient field boundaries	SH 58945 30390		Field boundary	Iron Age/Romano-British	Earthwork
30327	Ancient field boundary	SH 58960 30440		Field boundary	Iron Age/Romano-British	Stone built feature
30425	Short section of walling	SH 61042 32096		Track?	Post medieval?	Stone built feature
30426	Curving wall with ditch	SH 61082 32102		Wall	Post Medieval	Stone built feature
30427	Ancient field boundaries	SH 61129 32125		Field boundaries	Prehistoric?	Stone built feature
30428	Terraced field boundary	SH 61220 32079		Field boundary	Medieval?	Earthwork
30429	Cairn/site of cottage?	SH 61287 32125		Cairn/site of cottage?	Post medieval	Stone built feature
30430	Clearance cairn	SH 63431 33173		Cairn	Prehistoric	Stone built feature
30431	Trackway	SH 61780 32230		Trackway	Post medieval	Linear Feature
30432	Sheepfold	SH 61480 32184		Sheepfold	Post medieval	Stone built feature
30433	Sheepfold	SH 61961 32117		Sheepfold	Post medieval	Stone built feature
30434	Sheepfold	SH 62548 32640		Sheepfold	Post medieval	Stone built feature
30435	Clearance cairn	SH5984330969		Cairn	Unknown	Earthwork
30436	Stream in field 4766	SH5947530633		Stream	Post Medieval	Earthwork
30437	Stream in field 8100	SH5980930991		Stream	Post Medieval	Earthwork
30438	Walls around field 4766	SH5946330680		Wall	Post Medieval	Other structure
30439	Walls around field 8100	SH5979231007		Wall	Post Medieval	Other structure
30440	Possible ancient ridge and furrow	SH5940030733		Ridge And Furrow	Prehistoric?	Earthworks
31045	Probable boulder deposit	SH5933430498		Natural feature	Not Applicable	Buried feature
31046	Gully	SH59371 30637		Feature	Unknown	Buried feature
31047	Ancient field boundary wall	SH59414 30675		Wall	Prehistoric?	Buried feature
31048	Drain	SH59593 30813		Drain	Post Medieval?	Buried feature
31049	Possible field clearance cairn	SH59775 30922		Clearance cairn	Unknown	Buried feature
31050	Possible field clearance cairn	SH59782 30926		Clearance cairn	Unknown	Buried feature
31051	Possible field clearance cairn	SH59817 30954		Clearance cairn	Unknown	Buried feature
31052	Field clearance cairn	SH59846 30979		Clearance cairn	Unknown	Buried feature
31053	Possible field clearance cairn	SH59831 30985		Clearance cairn	Unknown	Earthwork
31054	Gully	SH59970 30992		Clearance cairn	Unknown	Buried feature
31055	Clawdd boundary	SH60548 31050		Wall	Post Medieval	Linear Feature
31056	Wall	SH60997 30880		Wall	Post Medieval	Stone built feature
31057	Not used					
31058	Field clearance cairn	SH61282 30832		Clearance cairn	Unknown	Buried feature
31059	Peat stack	SH61731 30943		Peat stack	Post Medieval	Stone built feature
31061	Burnt mound	SH61899 31022		Burnt mound	Prehistoric	Earthwork

PRN	SITE NAME	NGR	status	SITE TYPE	PERIOD	FORM
31063	Rock shelter	SH62356 31416		Rock shelter	Post Medieval	Stone built feature
31064	Openings in field wall corner (possible structure)	SH62470 31675		Structure	Post Medieval	Stone built feature
31065	Sheepfold	SH62687 31902		Sheep fold	Post Medieval	Stone built feature
31066	Ruined structure	SH62734 31913		Building	Post Medieval?	Earthwork
31067	Burnt area under colluvium	SH63068 32234		Feature	Bronze Age	Buried feature
31068	Patch of burning	SH63253 32437		Feature	Unknown	Buried feature
31069	Probable scree patch in area of cairns	SH63558 32962		Natural feature	Not Applicable	Buried feature

Table 2. Sites within about 500m of the pipe route

PRN	NPRN	Site name	SAM or listed building grade	Site type	Period	Form	Easting	Northing
1001	56799	Hut group - enclosed, SE of Moel Goedog	M134	Hut group	Roman/IA			
1003	56801	Hut circle - near Moel Gerddi						
1004	56109	Enclosed hut circle-probably I/A, nr Moel y Gerddi		Hut circle	Roman/IA	Stone built feature	261370	331170
1005	56802	Wandering walls - near Moel Gerddi						
1006	56803	Cairn/clearance cairn?, nr Moel y Gerddi						
1007	56804	Ring cairn Bedd Gurfal	M135	Cairn	Bronze Age	Stone built feature	261290	331130
1038	56827	Fonllech Hir standing stone (1)	M057a	Standing stone	Bronze Age	Standing monument	260140	331300
1045	57357	Hut circle, nr Gerddi Bluog	M165	Hut circle	Roman/IA	Stone built feature	262180	330570
1046	57358	Field system, nr Tyddyn y Gwynt		Field system	Unknown	Recorded	260100	330600
1047	56807	Hut circle + wandering walls, nr Fonllef Hir		Hut circle	Prehistoric	Stone built feature	261120	330940
1048	55198	Site of standing stone nr Tyddyn y Felin		Standing stone	Bronze Age	Recorded	259480	330470
?		Possible standing stone identified by Kelly		Standing stone	Bronze Age?	Standing monument	259060	330120
1050	55200	Hut group + field system, W of Clogwyn Caseg-wen		Hut settlement	Medieval?	Stone built feature	259200	330100
1052	55202	Hut circle + field system, nr Tyddyn y Felin		Hut circle	Early-Medieval	Stone built feature	259410	330880
1053	55203	Cefnfilltir hut group (enclosed)	M098	Hut circle settlement	Roman/IA	Stone built feature	259020	330800
1054/5	55204/5	Muriau'r Gwyddelod settlement & field systems	M010	Hut circle settlement	Roman/IA	Stone built features	258200	330380
1066	57369	Circular enclosure, nr Hafod y Llyn		Enclosure	Roman/IA	Stone built feature	259180	329900
1151	57415	Hut and paddocks, Llyn Eiddew Bach		Settlement	Medieval	Stone built features	264450	334330
1174	57424	Hafoty settlement & other remains, SE of Moel y Glo	M189	Settlement	Prehistoric/medieval	Stone built feature	263170	333470
1175	57425	Cairn?, SE of Moel y Glo		Cairn	Bronze Age?	Stone built feature	263220	333200
1181	57428	Settlement site, Moel y Gerddi		Settlement	Medieval?	Stone built feature	261850	331740
1182	57429	Hafoty settlement, Moel y Gerddi		Settlement	Medieval?	Stone built feature	262270	331900
2901	55259	Y Ffordd Wyddelig (near Muriau Gwyddelod), Harlech		Trackway	Prehistoric	AP site	259020	330350
2902	55260	Sub - rectangular enclosure near Muriau Gwyddelod		Enclosure	Unknown	Stone built feature	258970	330240
2956	56915	U-enclosure, hut + cairn, Cwm Mawr		Hut circle	Prehistoric	Stone built feature	263850	333520
2960	57845	Gerddi Bluog house (C16AD +	GII	House	Post-	Building -	261940	330850

PRN	NPRN	Site name	SAM or listed building grade	Site type	Period	Form	Eastings	Northing
		later)			Medieval	roofed		
4298	58056	Cairn - Cae'r Garnedd - Foel		Cairn	Prehistoric	Stone built feature	259650	331380
5178	58877	Cairn, NW of Cwm Mawr		Cairn	Prehistoric	Stone built feature	263200	332140
5900	63940	Cairn		Cairn	Prehistoric	AP site	262000	331770
5901	63994	Rectangular building		Building	Post-Medieval	AP site	261250	330540
5902	64019	Enclosure/strip fields		Enclosure	Unknown	AP site	261900	330690
5905	63943	Enclosure/walls, Moel y Gerddi		Wall	Prehistoric	AP site	261000	331000
5906	63944	Cultivation terraces/lynchets, Moel y Gerddi		Cultivation terrace	Unknown	AP site	261640	331600
5908	63946	Trackway		Trackway	Unknown	AP site	261910	331430
5909	63947	Sheepfold		Sheepfold	Post-Medieval	AP site	261980	331320
5910	63948	Enclosure/walls		Enclosure, wall	Post-Medieval	AP site	261960	331330
5911	63949	Enclosure and banks		Enclosure	Unknown	AP site	261900	331300
5912	63950	Sheepfold		Sheepfold	Post-Medieval	AP site	261790	331280
5913	63951	Rectangular building and enclosure		Building	Post-Medieval	AP site	261960	331260
5914	63952	Enclosure		Enclosure	Unknown	AP site	261980	331210
5915	63953	Rectangular enclosure		Enclosure	Unknown	AP site	261980	331180
5916	63954	2 enclosures		Enclosure	Unknown	AP site	261870	331250
5917	63955	Wandering walls		Wall	Prehistoric?	AP site	261800	331170
5918	63956	Sub-circular enclosure		Enclosure	Unknown	AP site	261340	331200
5919	63957	Hut circle and enclosure		Hut circle	Prehistoric	AP site	261390	331160
5920	63958	Wall and terraced fields		Field system	Prehistoric	AP site	261410	331180
5921	63959	Sub-rectangular enclosure		Enclosure	Unknown	AP site	261480	331240
5922	63960	Sub-oval enclosure		Enclosure	Unknown	AP site	261520	331310
5923	63961	Farm buildings and enclosure		Farm	Post-Medieval	AP site	261600	331280
5924	63962	Hafod and enclosure		Hafod	Post-Medieval	AP site	261600	331040
5925	63963	Hut circle and enclosure		Hut circle	Prehistoric	AP site	261760	331200
5927	63965	Enclosures/banks		Enclosure	Unknown	AP site	261750	331060
5928	63966	Sub-circular & rectangular enclosures		Enclosure	Unknown	AP site	261860	331100
5929	63967	Enclosure/fold		Enclosure	Unknown	AP site	262000	331150
5933	63971	Area of cultivation ridges		Cultivation terrace	Unknown	AP site	261660	331150
5934	63972	Cairn/mound		Cairn, mound	Prehistoric	AP site	260700	331090
5935	63973	Cairn/mound		Cairn, mound	Prehistoric	AP site	260740	331110
5936	63974	Rectangular building		Building	Post-Medieval	AP site	260780	331110
5937	63975	Hut circle/enclosure		Hut circle, enclosure	Prehistoric	AP site	260740	331110
5938	63976	Cairn/mound		Cairn, mound	Prehistoric	AP site	260780	331060
5941	63979	Circular enclosure		Enclosure	Unknown	AP site	260620	330890
5942	63980	Circular enclosure		Enclosure	Unknown	AP site	260620	330850
5943	63981	Burnt mound		Burnt mound	Prehistoric	AP site	260690	330860
5944	63982	Cairn/mound		Cairn, mound	Prehistoric	AP site	260650	330590
5945	63983	Circular enclosure		Enclosure	Unknown	AP site	260650	330580
5946	63984	Banks/walls		Bank, wall	Unknown	AP site	260690	330500
5948	63986	Poss. Long hut and wall		Long hut, enclosure	Medieval	AP site	261000	330810
5949	63987	Poss. Hut circle		Hut circle,	Prehistoric	AP site	261200	330910

PRN	NPRN	Site name	SAM or listed building grade	Site type	Period	Form	Easting	Northing
				enclosure				
5950	63988	Terrace		Terrace	Prehistoric	AP site	261150	330910
5951	64023	Hut circle and enclosure		Hut circle	Prehistoric	AP site	261960	330700
5952	63989	Sub-rectangular enclosure		Enclosure	Unknown	AP site	261500	330980
5953	63990	Farm buildings		Building	Post-Medieval	AP site	261160	330610
5954	63991	2 long huts/enclosures		Long hut, enclosure	Medieval	AP site	261170	330610
5956	63992	Trackway		Trackway	Medieval	AP site	261100	330500
5958	63995	Three sheepfolds		Sheepfold	Post-Medieval	AP site	261290	330750
5959	63996	Long hut		Long hut	Medieval	AP site	261320	330660
5960	63997	Cairn/mound		Cairn, mound	Prehistoric	AP site	261330	330650
5961	63998	Wandering wall		Wall	Prehistoric?	AP site	261310	330700
5962	63999	2 hut circles and enclosure		Hut circle	Prehistoric	AP site	261380	330690
5963	64000	Hut circle		Hut circle	Prehistoric	AP site	261400	330730
5964	64001	Field system		Field system	Prehistoric	AP site	261400	330700
5965	64002	Irregular enclosure		Enclosure	Unknown	AP site	261730	330960
5966	64003	Concentric sub-circular enclosure		Enclosure	Prehistoric	AP site	261660	330880
5968	64005	Enclosure		Enclosure	Unknown	AP site	261910	330950
5969	64006	Sub-rectangular enclosure		Enclosure	Post-Medieval	AP site	261650	330680
5970	64007	Enclosures		Enclosure	Unknown	AP site	261630	330690
5972	64009	Sub-circular enclosure and bank		Enclosure	Unknown	AP site	261750	330690
5973	64010	Sub-rectangular hut platform		Platform	Medieval	AP site	261720	330730
5974	64011	Circular enclosure		Enclosure	Prehistoric	AP site	261740	330760
5975	64012	Circular enclosure		Enclosure	Prehistoric	AP site	261780	330830
5976	64013	Field system		Field system	Unknown	AP site	261700	330800
5977	64014	Poss. Rectangular hut/enclosure		Enclosure	Medieval	AP site	261770	330810
5978	64015	Enclosure/sheepfold		Enclosure	Post-Medieval	AP site	261900	330870
5979	64016	Field system		Field system	Unknown	AP site	261980	330940
5980	64017	Hut circle/ring cairn		Hut circle, ring cairn	Prehistoric	AP site	262070	330930
5981	64018	Circular enclosure		Enclosure	Unknown	AP site	261840	330600
5982	64020	Rectangular enclosure		Enclosure	Post-Medieval	AP site	261880	330660
5983	64021	Large circular enclosure		Enclosure	Unknown	AP site	261910	330650
5984	64022	3 small enclosures/folds		Enclosure	Post-Medieval	AP site	261930	330640
5985	64024	Rectangular building/enclosure		Building	Post-Medieval	AP site	261970	330670
5986	64025	Rectangular enclosure/fold and walling		Enclosure	Unknown	AP site	262020	330770
6120	64241	Hut circle, Cwm Mawr		Hut circle	Prehistoric	Stone built feature	263200	332040
6158	60978	Peat stacks, Nant y Steicyn		Peat stack	Post-Medieval	Other structure	263300	333000
6159	60977	Burnt mound, Nant y Steicyn		Burnt mound	Prehistoric	Other structure	263330	332950
6160	60975	Settlement, Cwm Mawr		Settlement	Prehistoric	Stone built feature	263600	332950
6161	60979	Peat stack, Nant y Steicyn		Peat stack	Post-Medieval	Other structure	263800	333000
6162	60976	Hut circle under peat stack, Cwm Mawr		Hut circle	Prehistoric	Other structure	263900	333350
6163	60980	Peat stacks, Llyn y Fedw		Peat stack	Post-Medieval	Other structure	262800	332900
6164	60974	Round hut/long hut Cwm Mawr c/d		Hut	Unknown	Stone built feature	263400	332100

PRN	NPRN	Site name	SAM or listed building grade	Site type	Period	Form	Easting	Northing
6165	60972	Rectangular hut, Cwm Mawr a		Long hut	Post-Medieval	Stone built feature	263100	331500
9862	0	Gwyddelfynydd medieval township		Township	Medieval	Documentary	261300	330380
9929	0	Platform hut, Cilbronrhydd		Platform hut	Medieval	Stone built feature	260800	330730
9930	0	Hut circle, Cilbronrhydd		Hut circle	Prehistoric	Stone built feature	260830	330750
10141	59721	Sheepfold on S shore of Llyn Eiddew-bach		Sheepfold	Post-Medieval	Stone built feature	264520	334140
10143	59723	Structure/shelter NE of Llyn Eiddew-mawr		Building	Post-Medieval	Stone built feature	264890	334070
10145	59725	Stone shelter NW of Llyn Eiddew-mawr		Building	Modern	Stone built feature	264670	334200
10146	59726	Enclosure & structure N of Llyn Eiddew-mawr		Enclosure	Post-Medieval	Stone built feature	264550	334210
10147	59727	Hut circle at N edge of Llyn Eiddew-mawr		Hut circle	Prehistoric	Stone built feature	264560	334130
10148	59728	Building foundation NNE Llyn Eiddew-mawr		Building	Medieval	Stone built feature	264550	334120
10149	59729	Mining remains NW Llyn Eiddew-mawr		Mine	Post-Medieval	Stone built feature	264480	334050
10150	59730	Peat mound NW of Llyn Eiddew-mawr		Peat stack, mound	Post-Medieval	Other structure	264340	334250
10151	59731	Peat mounds WNW of Llyn Eiddew-mawr		Peat stack, mound	Post-Medieval	Other structure	264070	334040
10152	59732	Sheepfold S of track to Llyn Eiddew-bach		Sheepfold	Post-Medieval	Stone built feature	264170	334230
10153	59733	Possible long hut NW of Llyn Eiddew-mawr		Long hut	Medieval	Stone built feature	264200	334080
11771	40009	Gerddi Bluog mill	GII	Chaff mill	Post-Medieval	Documentary	261910	330840
11846	41649	Drws yr Ymlid - barn	GII	Building	Post-Medieval		259710	330520
11847	41650	Drws yr Ymlid - fowl house	GII	Building	Post-Medieval		259700	330500
11848	41651	Drws yr Ymlid - pigsty/brewhouse	GII	Building	Post-Medieval		259700	330500
11852	41659	Gerddi Bluog (NE, SW)-out - buildings	GII	Building	Post-Medieval		261940	330850
11853	41662	Gerddi Bluog - dower house?	GII	Building	Post-Medieval		261950	330860
11854	41663	Gerddi Bluog - pigsties/shed	GII	Building	Post-Medieval		261930	330830
12352	28363	Drws yr Ymlid	GII	Building	Post-Medieval		259720	330480
12898	0	Cairn, E of Llyn y Fedw		Cairn	Prehistoric	Stone built feature	263200	333240
18259	0	Fieldscape and woods - landscape		Landscape	Multi-period		261780	330320
20613		Settlement		Settlement	Romano-British	Earthwork, excavated site	25925	33031
20643	60763	Manganese mine, Llyn Eiddew-mawr		Manganese mine	Post-Medieval	Other structure	264400	333900
20650	60764	Manganese mine, Cwm Mawr		Manganese mine	Post-Medieval	Other structure	263400	332300
21749	0	Cambrian mine		Manganese mine	Post-Medieval	Earthwork	263400	332200
21792	0	Ffridd Tyddyn Du mine		Manganese mine	Post-Medieval	Earthwork	263700	332800

Table 3: Listed buildings near the pipe route

Listing No.	Grade	Name	Eastings	Northings
4772	II	Gerddi Bluog	261938	330856
4802	II	Barn (1) at Gerddi Bluog	261923	330801
5251	II	Drws yr Ymlid Farmhouse	259726	330483
5252	II	Pigsty & Brewhouse at Drws yr Ymlid Farm (including rubble-walled yard between)	259751	330504
5253	II	Fowl House at Drws yr Ymlid Farm (including rubble-walled yard)	259740	330507
5254	II	Barn at Drws yr Ymlid Farm	259763	330516
81071	II	Barn (2) at Gerddi Bluog	261922	330808
81072	II	Barn (3) at Gerddi Bluog	261929	330781
81076	II	Field Barn at Drws yr Ymlid	259684	330604
81077	II	Field Barn at Gerddi Bluog	262117	331014
81079	II	Ffridd Farm	261235	330471

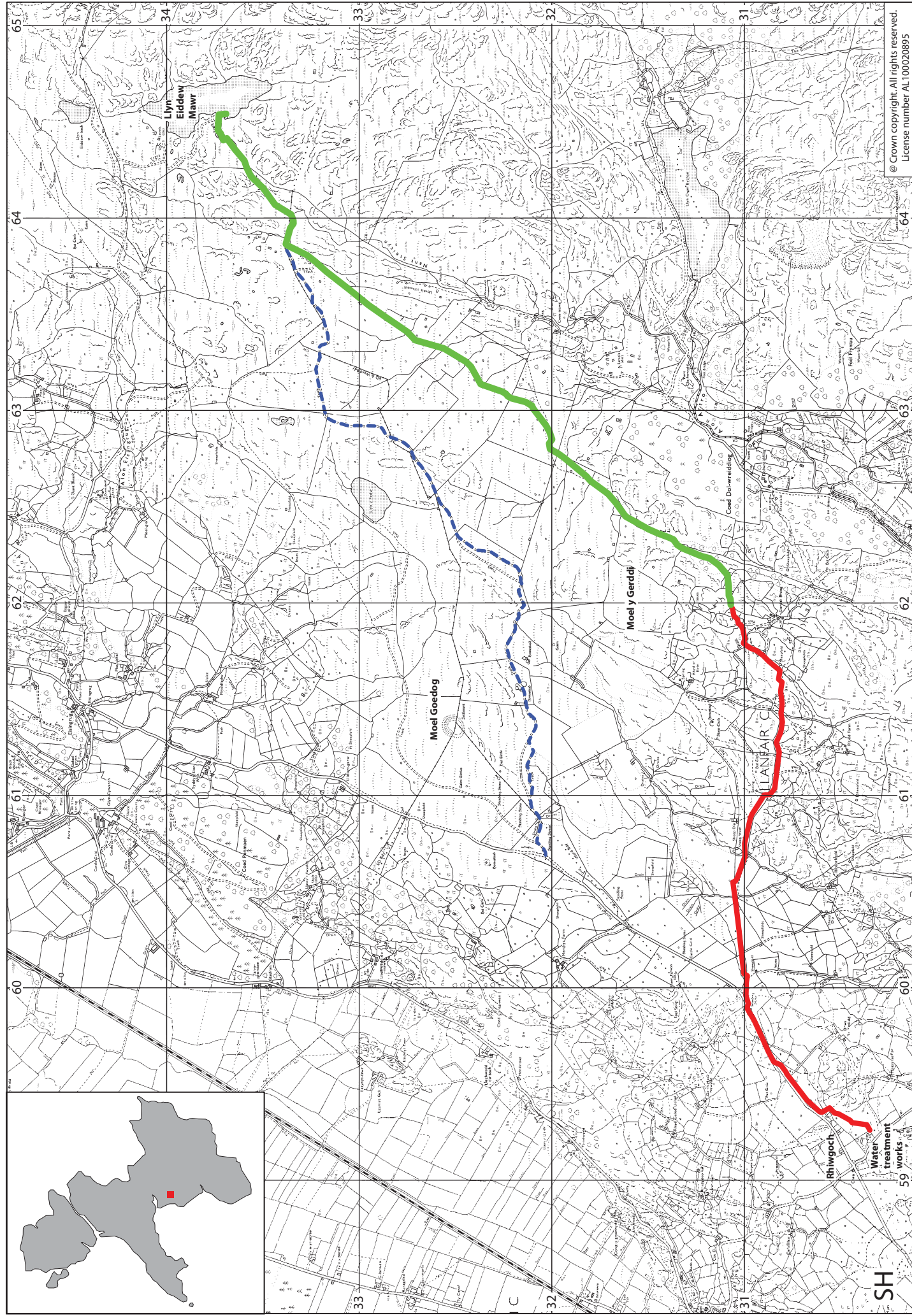


Figure 1. Route of pipe-line and access track (open cut trench in red, pipe to be replaced by pipe-bursting in green and access track in blue)

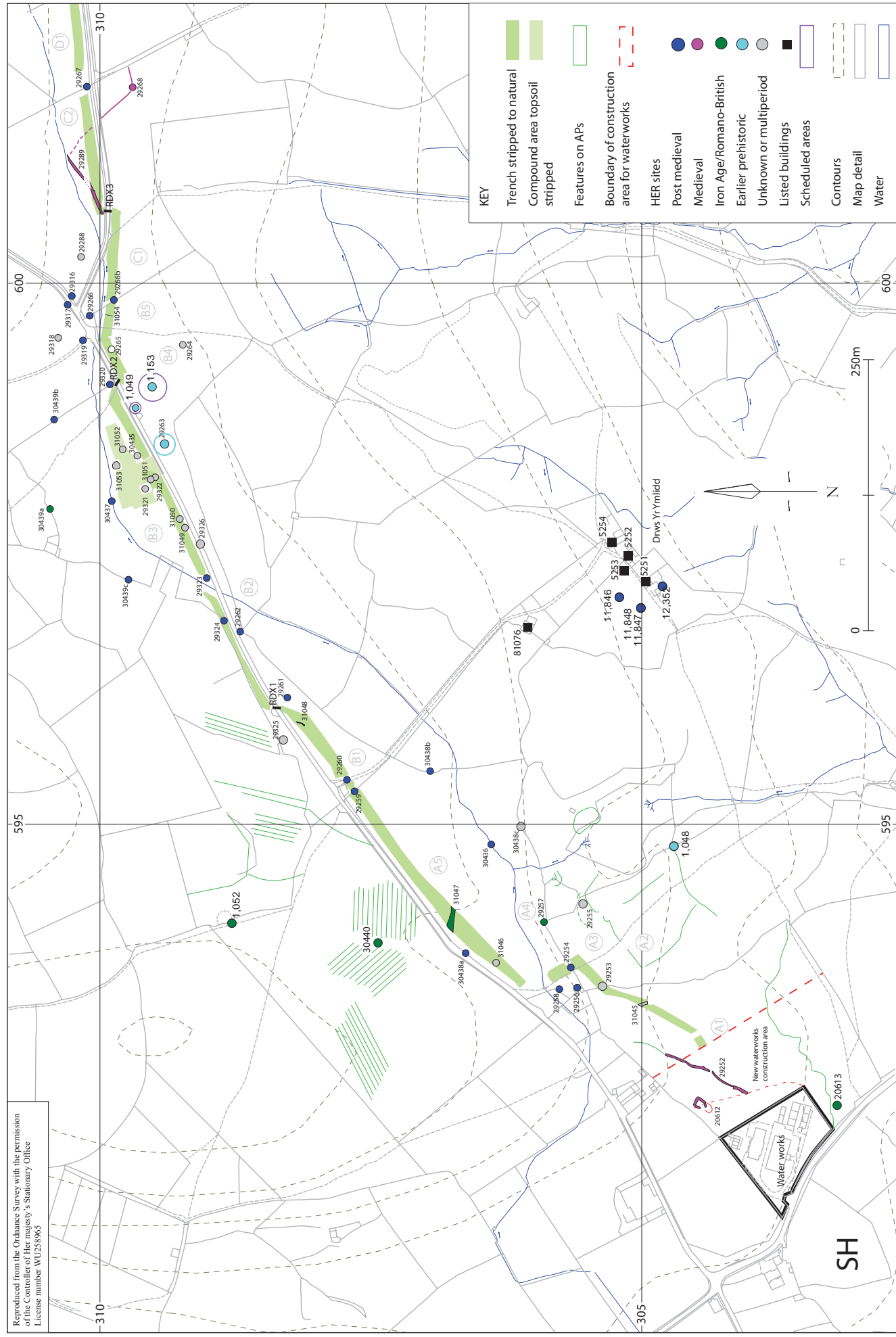
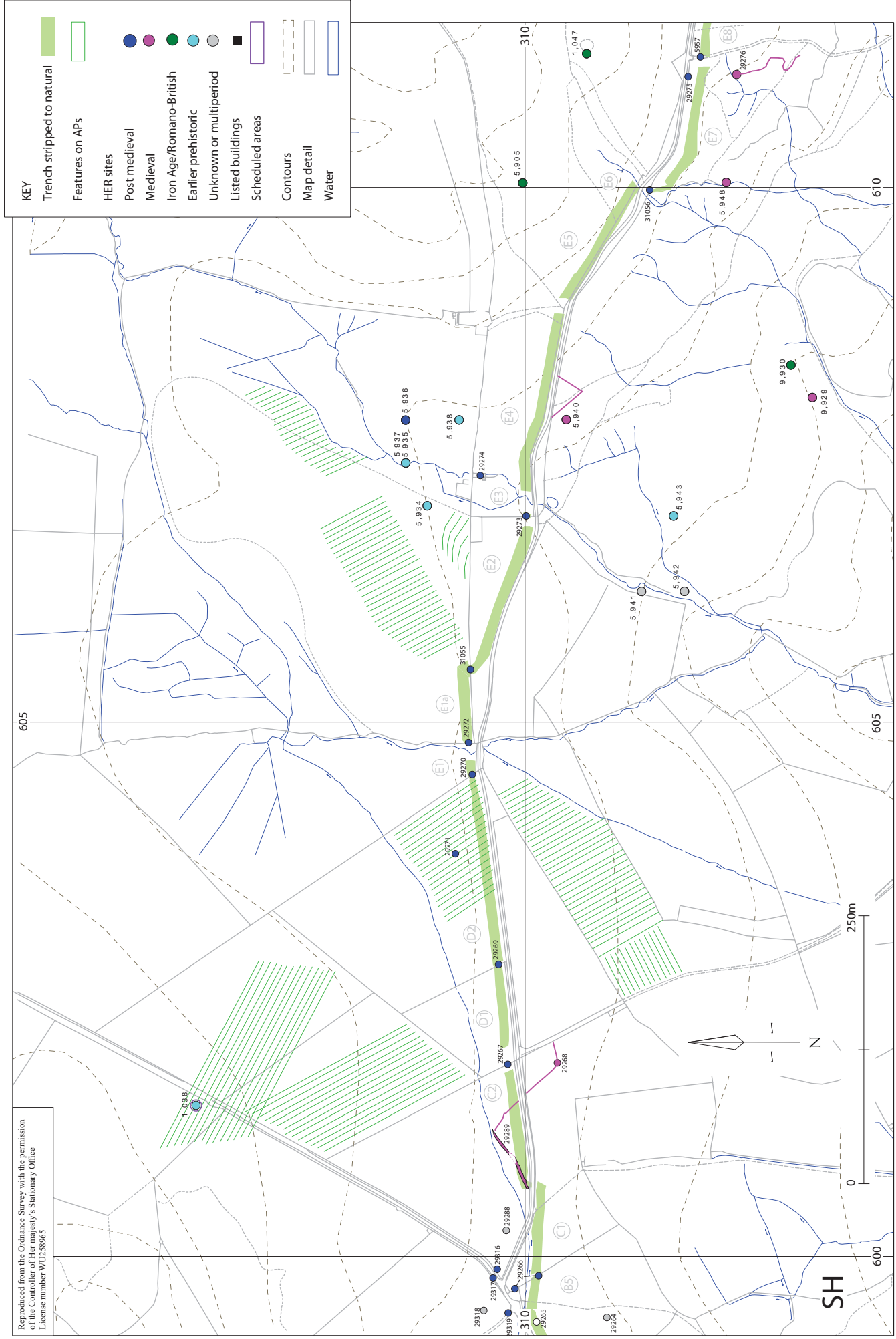


Figure 2. Pipe easement stripped and features on and near the route
(field numbers in circles)



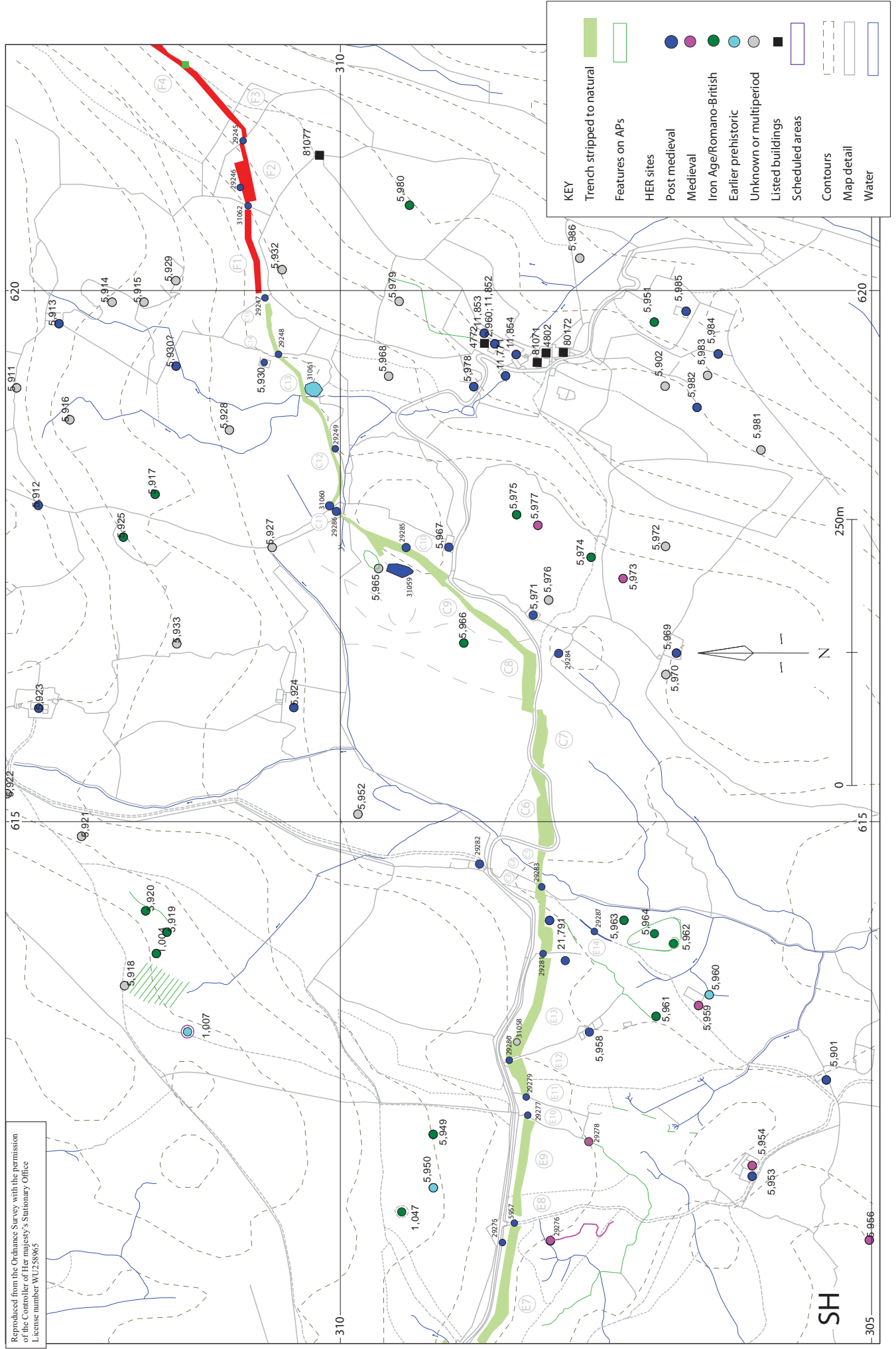


Figure 4. Pipe easement stripped and features on and near the route (field numbers in circles)

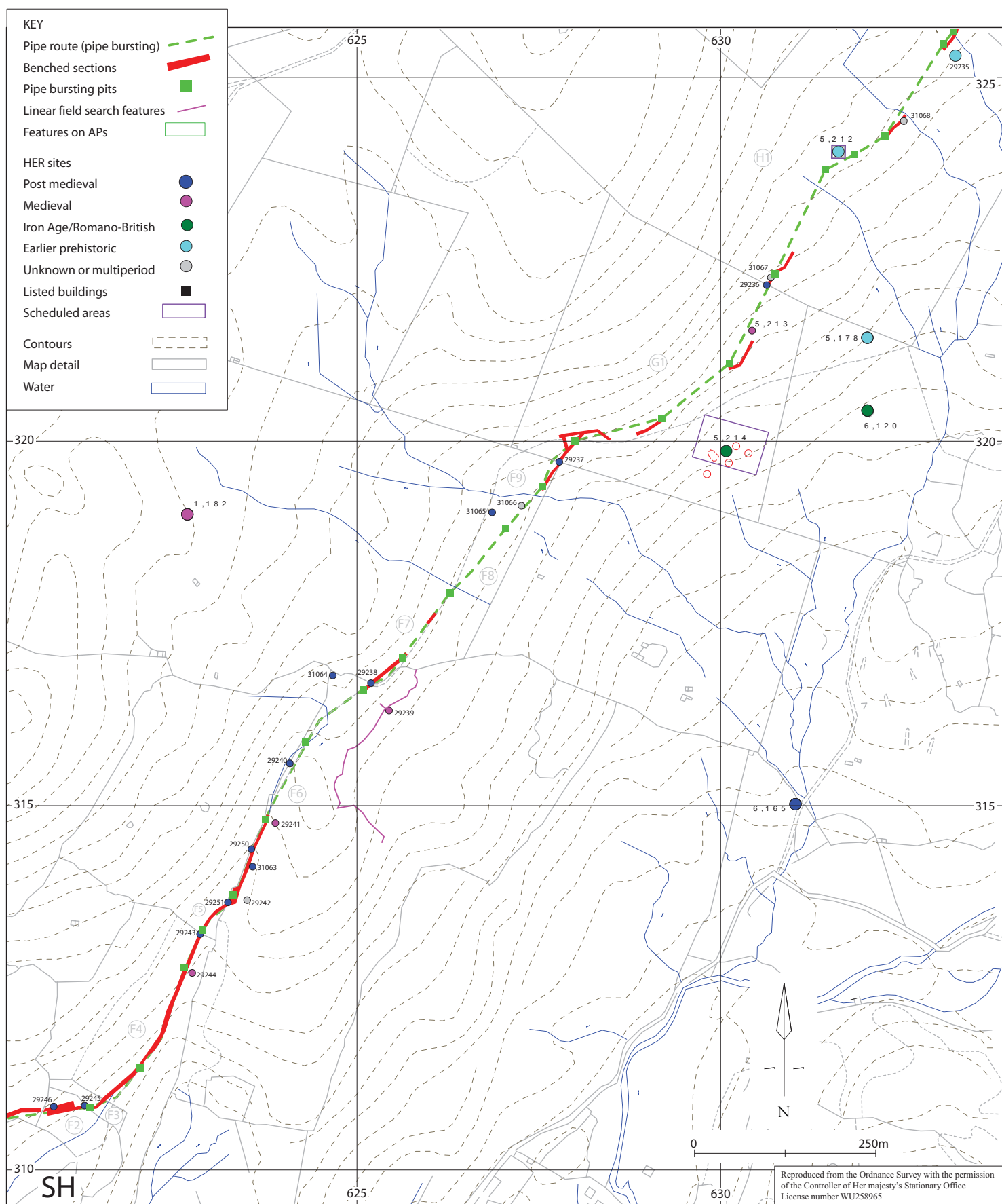


Figure 5. Route of pipe, areas of benching and location of pipe bursting pits with features on and near the route (field numbers in circles)

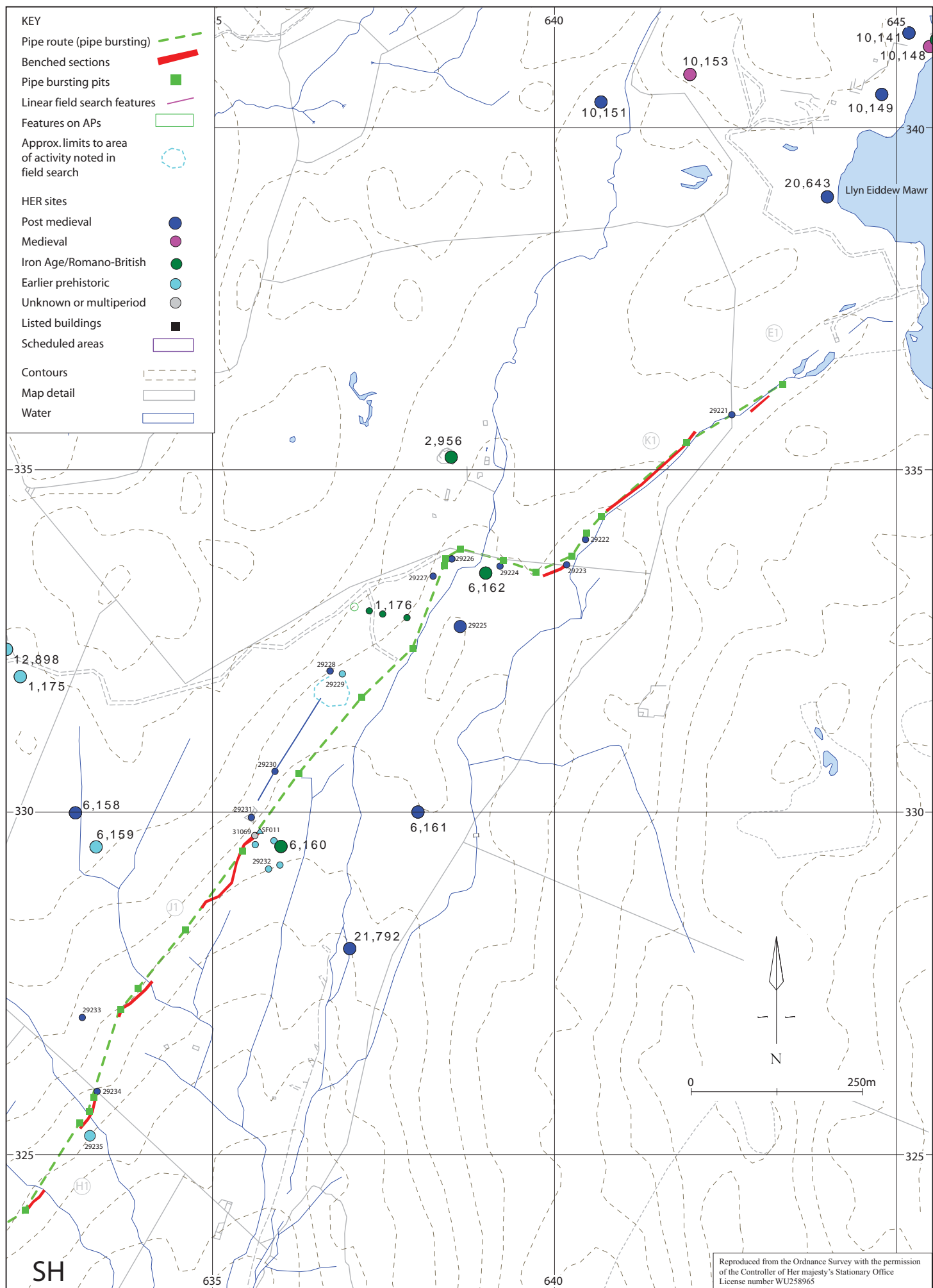


Figure 6. Route of pipe, areas of benching and location of pipe bursting pits with features on and near the route (field numbers in circles)

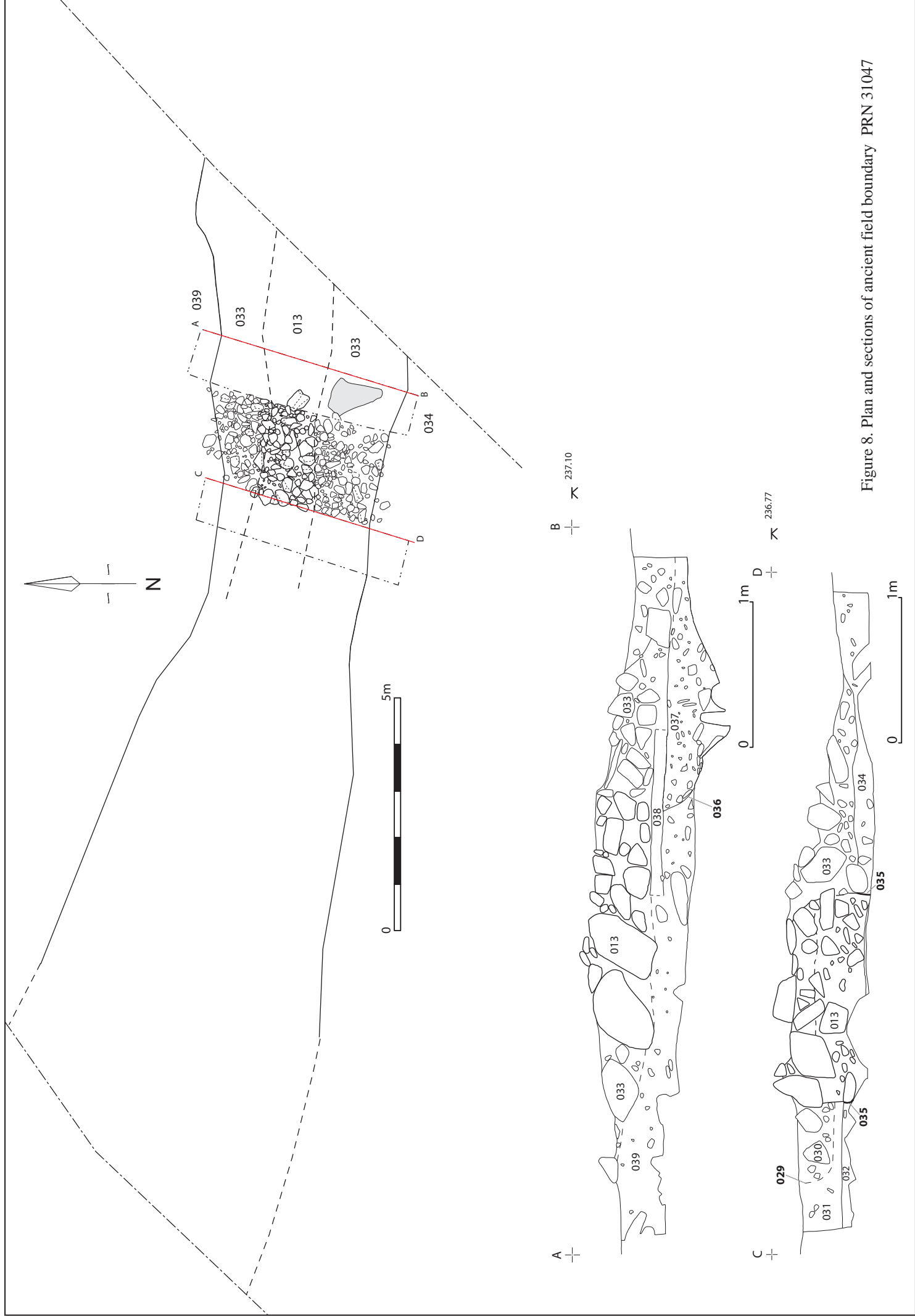


Figure 8. Plan and sections of ancient field boundary PRN 31047

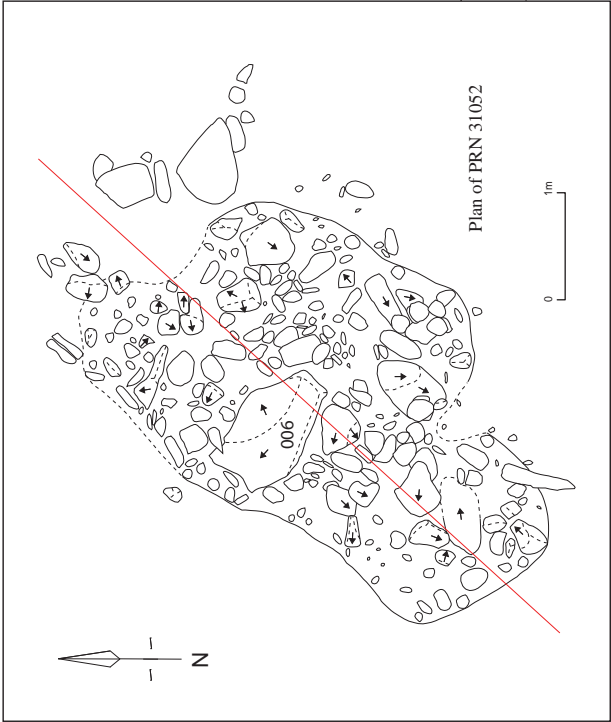
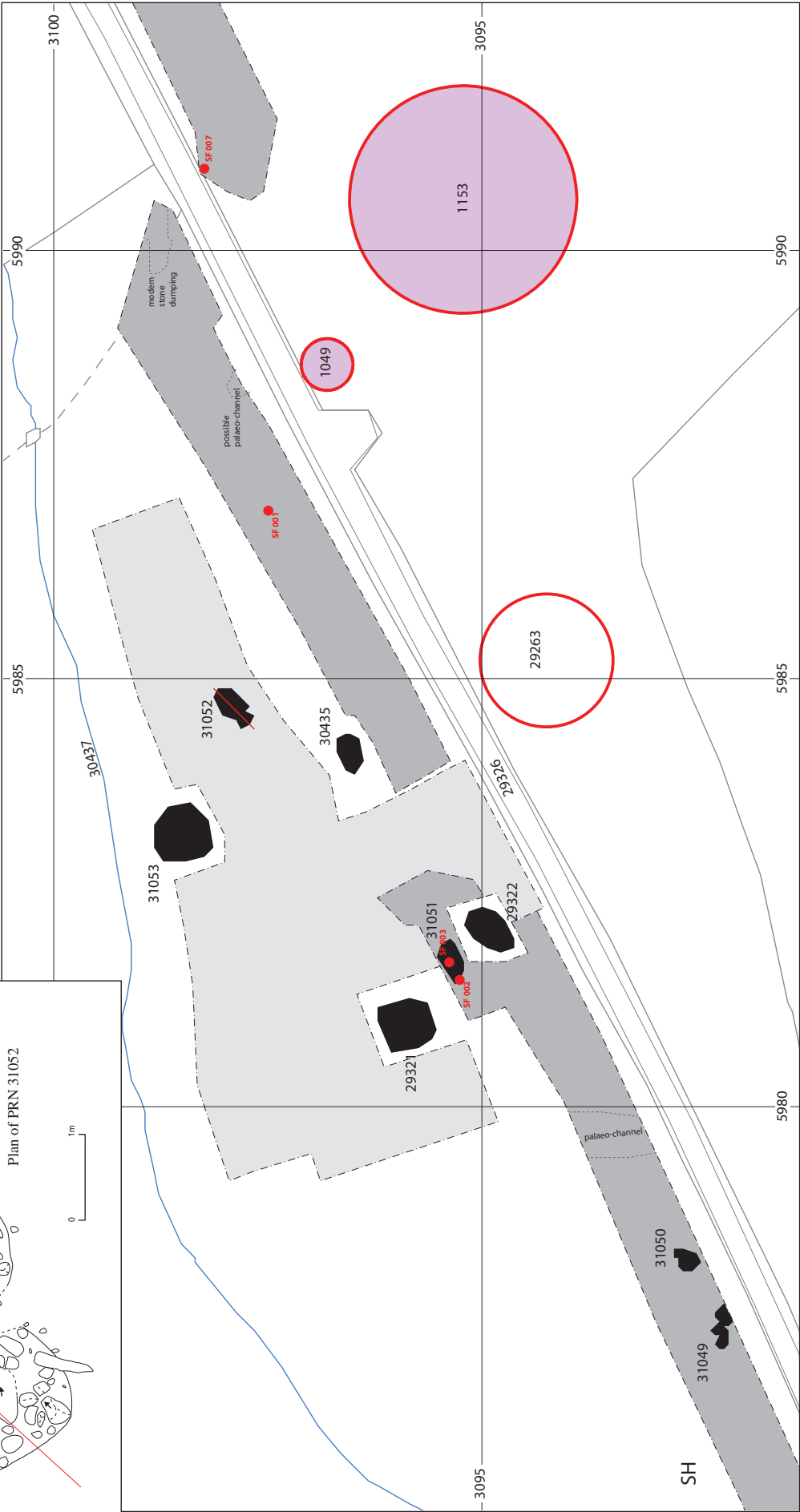


Figure 9. Plan of field clearance cairns in field B3, with inset showing detailed plan of cairn PRN 31052



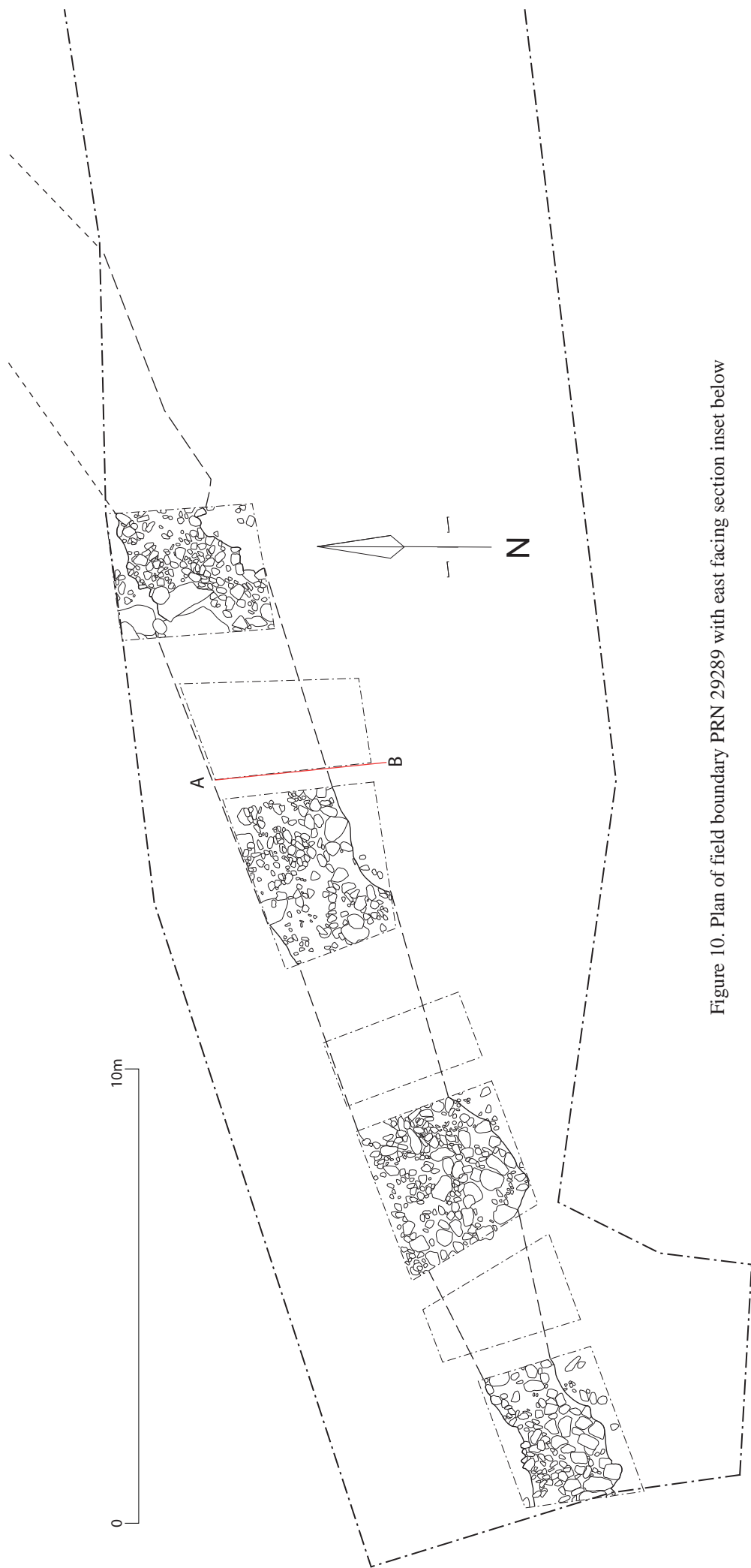
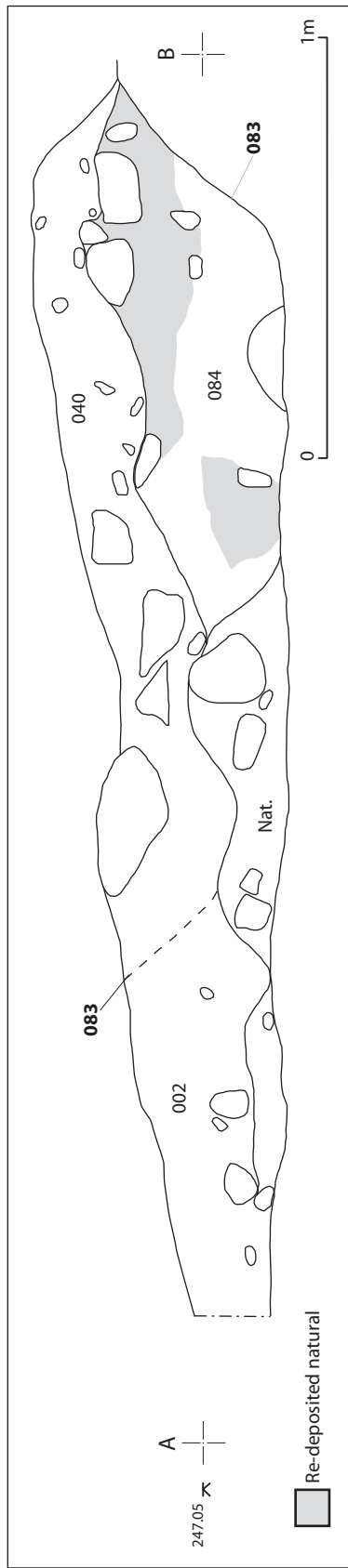


Figure 10. Plan of field boundary PRN 29289 with east facing section inset below



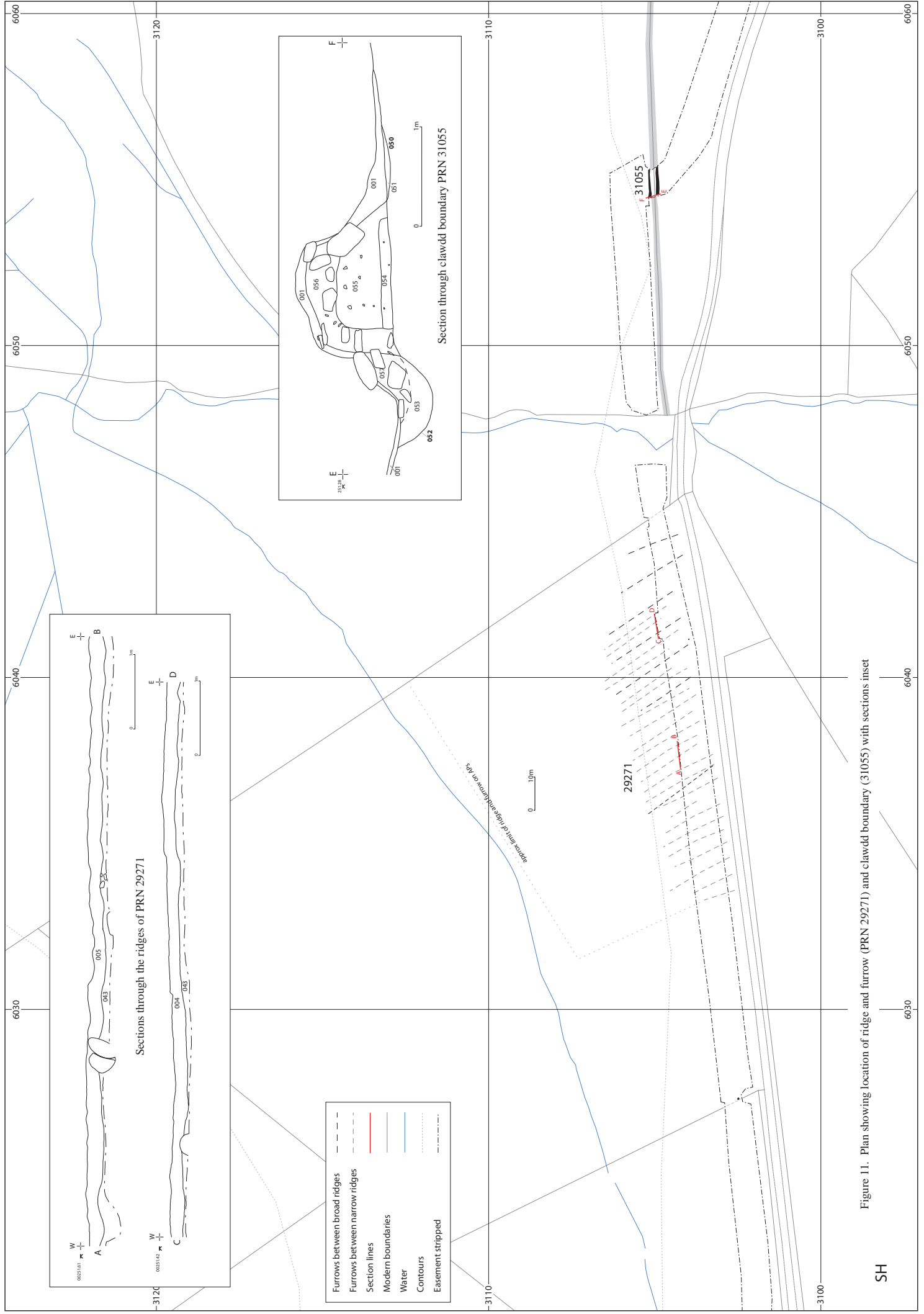


Figure 11. Plan showing location of ridge and furrow (PRN 29271) and clawdd boundary (31055) with sections inset

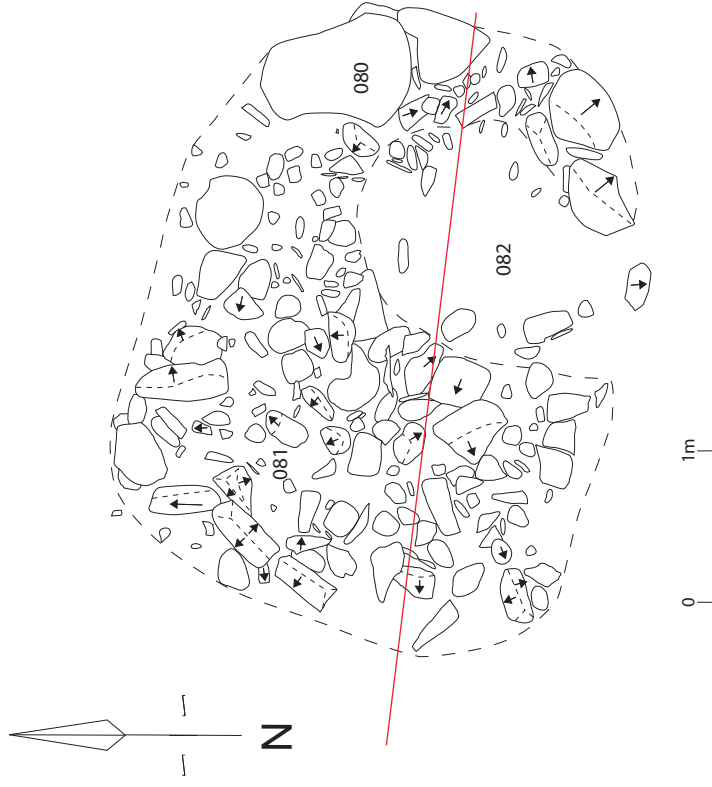
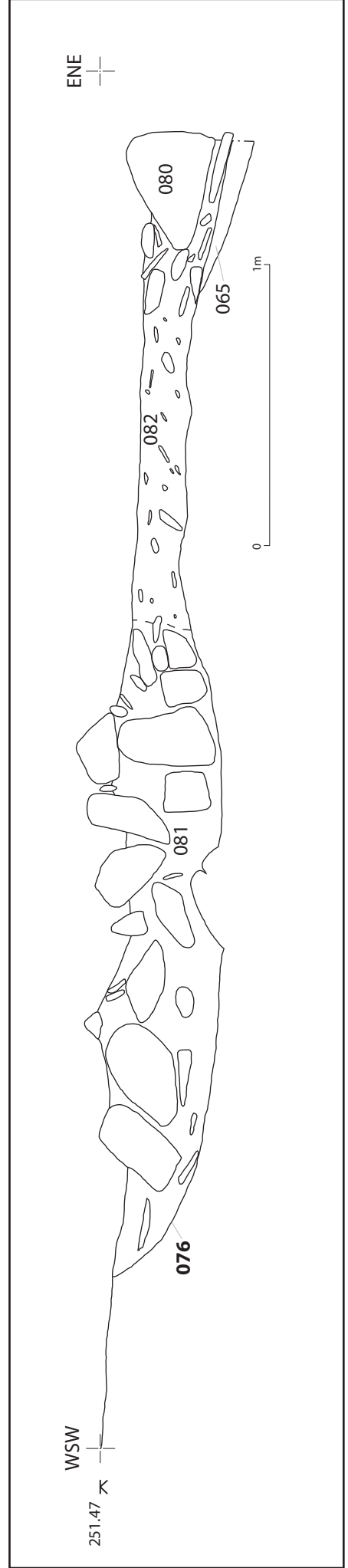


Figure 12. Plan and section of cairn PRN 31058



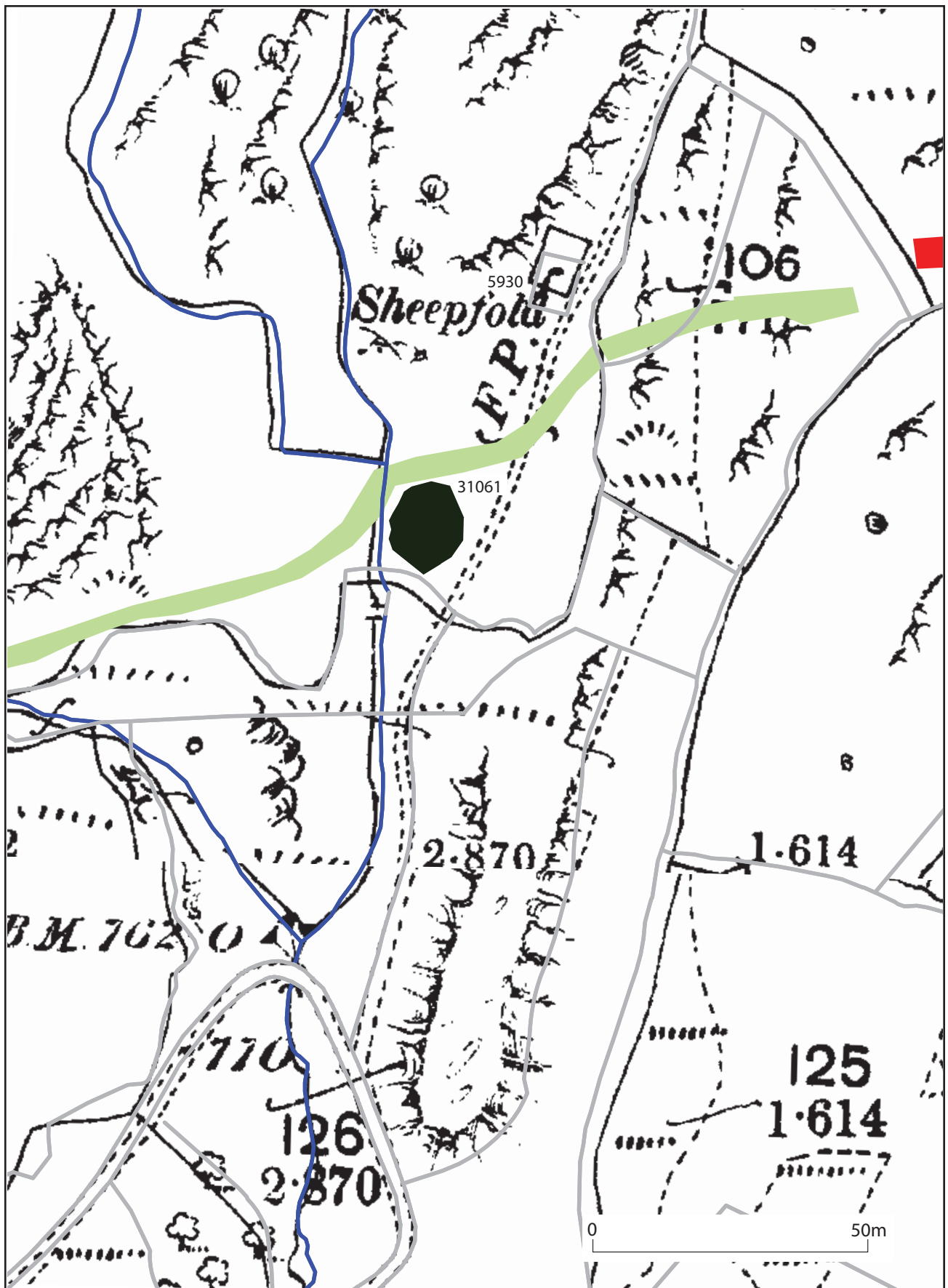
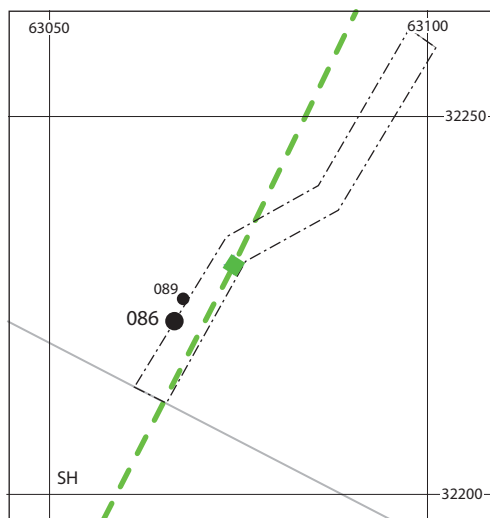
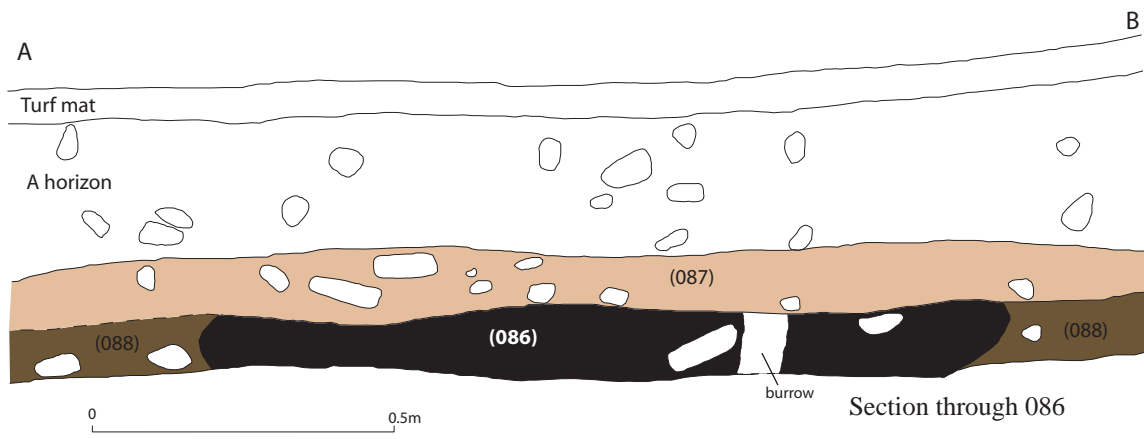
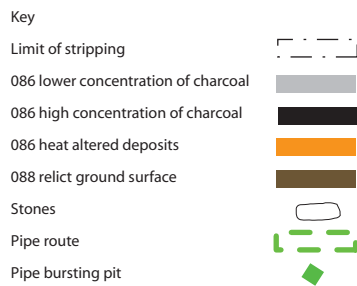


Figure 13. Location of burnt mound (PRN 31061) and possible cemetery (PRN 5930)
Modern map data overlaid on 1889 First Edition OS map



Location of 086 and 089



stripped area

Boundary H1-G1

Canter line of original main



0 5m

Figure 14. Plan of burnt patch 086 (PRN 31067) with location and section as insets



Plate 1. Boulders (0023) in linear hollow [019], from the north.



Plate 2. Wall PRN 29253, from the east.



Plate 3. Gully [014] from south-east.



Plate 4. Wall (013) from the south-east



Plate 5. Wall (013) from the north-west



Plate 6. Section through wall (013)



Plate 7. Drain [016] from the north-east (PRN 31048)



Plate 8. Cairn (07) from the west (PRN 31049)



Plate 9. Cairn (08) from the north (PRN 31050)



Plate 10. Cairn (011) from the north-east (PRN 31051)



Plate 11. Cairn (06) from the east (PRN 31052)

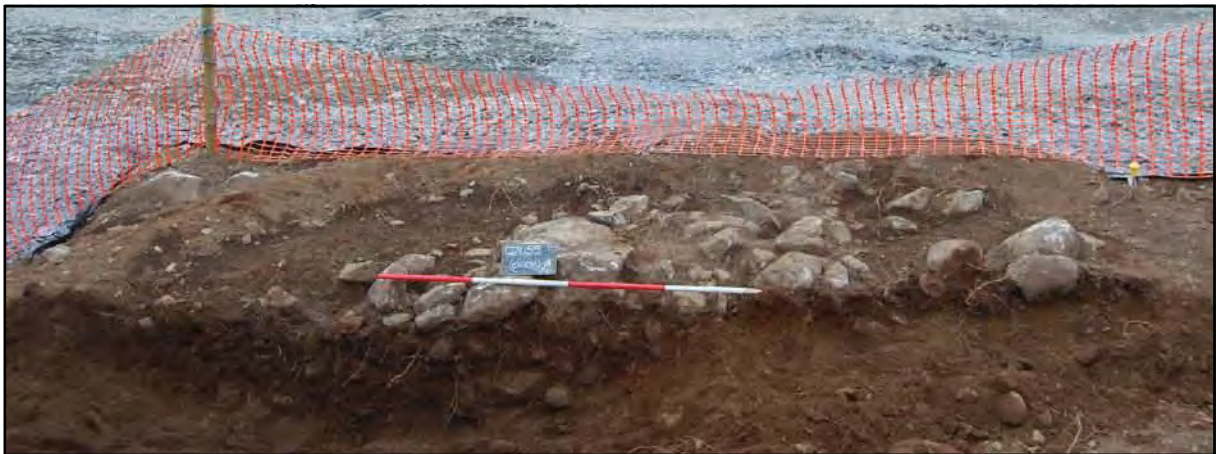


Plate 12. South-east facing section through cairn (06) (PRN 31052)



Plate 13. Gully [027] (PRN 31054) from the south



Plate 14. Field boundary [040] from the north-east (PRN 29289)



Plate 15. North-east facing section through field boundary [040] (PRN 29289)



Plate 16: Ridge and furrow PRN 29271, from south-east



Plate 17: Section through ridge and furrow PRN 29271, from south



Plate 18: Section through clawdd boundary PRN 31055, from east



Plate 19. Cairn 081 (PRN 31058) from the west



Plate 20. Section through cairn 081 (PRN 31058) from the south-west



Plate 21. Peat stack PRN 31059
from the south

Plate 22. Burnt mound PRN 31061
showing the extent of topsoil
stripping, from the west



Plate 23. Burnt mound PRN 31061
showing stone slabs, probably a trough
from the south-east



Plate 24. Enclosure PRN 5930 showing parchmark, from the north



Plate 25. Enclosure PRN 5930, from the south-west



Plate 26. Corner of tumbled wall
PRN 29244 adjacent to terrace created
for original water pipe, from the north

Plate 27. Rough possible wall
PRN 29242, from the east



Plate 28. Natural rock shelter
PRN 31063, from the west



Plate 29. North wall of enclosure PRN 29241, from the west



Plate 30. West side of enclosure PRN 29241, from the west



Plate 31. Openings in field wall PRN 31064, from the west



Plate 32. Sheepfold PRN 3106, from the west



Plate 33. Burnt patch 086 PRN 31067, from the south-east



Plate 34. Charcoal deposit 086 in section and showing heat altered natural under 086 PRN 31067, from the south-east



Plate 35. Section through burnt deposit 089 (PRN 31067), from the south-east



Plate 36. Burnt deposit 085 (PRN 31068), from the north-west



Plate 37. Scree patch (090) initially thought to be a cairn (PRN 31069), from the south.
Note other areas of clearly natural scree in background



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