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ARO42: Hirta, St Kilda: Archaeological Investigations

By Alan Hunter Blair

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Abstract

Archaeological investigations were carried out on St Kilda as part of the development process for a new MOD accommodation block and energy centre, and during the extensive refurbishment of some of the existing MOD legacy buildings. The works were carried out between May 2017 and September 2019 and involved the historic building recording of existing MOD structures to be demolished, building recording of the manse, a watching brief on all ground works, an evaluation and importantly, the largest archaeological excavation ever undertaken on the island. The archaeological remains comprised; relict agricultural soils, a meandering canalised stream channel, other features and structural remains as well as artefacts including pottery, lithics, coarse stone tools, glass shards and metal objects. Although the channel remains undated, radiocarbon dates suggest finds from within it and use of the area around the channel is from the middle Iron Age period to the thirteenth century AD.

Introduction

This report draws together the results of the archaeological works undertaken as part of a new MOD development and refurbishment scheme on Hirta, St Kilda, a UNESCO designated World Heritage Site. The work was instigated in 2016 by QinetiQ who commissioned GUARD Archaeology Ltd to undertake a desk-based assessment as part of a Environmental Report submitted with the detailed planning application to develop the land for a new accommodation block, energy centre and associated infrastructure. The desk-based assessment recommended an appropriate archaeological mitigation strategy for the site's development.

In May 2017 GUARD Archaeology began a watching brief and programme of building recording (Byledbal and Villis 2019). The watching brief was carried out prior to, during, and after the construction of the new accommodation building and energy centre located to the east of Village Bay, and during the refurbishment works of some of the radar station buildings situated towards the summit of Mullach Mor. Building recording was also carried out prior to the demolition of the current MOD buildings sited east of the Red Square and west of the Manse (Figure 1).

An archaeological evaluation took place on the footprint of the proposed new accommodation building. The archaeological remains encountered during the course of the trial trenching consisted of a series of linear features defined by stone, pits, a possible wall or dyke, a stone-lined channel, and a possible stone-built surface or platform (Byledbal et al 2017).

The results of the evaluation led to a subsequent five-month archaeological excavation across the entire footprint of the new accommodation block from November 2017 to March 2018. The excavation recorded a meandering canalised stream channel with the remains of a wall along part of its northern side. Minor elements of parts of demolished MOD buildings were also recorded along with areas of earlier structural remains (Hunter Blair 2018). In April 2019, a Heritage Impact Assessment was carried out prior to proposed new service connections to The Manse (Hunter Blair 2019).

All elements of the project were conducted following Chartered Institute for Archaeologists (CIfA) standards and guidance. The site archive is lodged with Nation Record of the Historic Environment, Edinburgh, and the finds have been declared to the Treasure Trove Unit. The method statements specifying the scope of work were developed by GUARD Archaeology Ltd, in consultation with NTS and Comhairle nan Eilean Siar Archaeology Service.

Location and Geology

St Kilda is an island group that is situated c. 64 km west of the Outer Hebrides. The islands are all that remain of an eroded volcano that was active during plate tectonic movements and the creation of the North Atlantic Ocean c. 55 million years ago. The rocks of the island are of igneous origin and comprise mostly granites and gabbro (The Geological Society of London 2012). The islands were glaciated and the subsoil is predominantly clays, capped by thin peaty topsoil prone to waterlogging, with iron-pan development.

Figure 1: Site location.

The site is located in the south-east of the island of Hirta within a roughly rectangular shaped area of ground leased by the MOD overlooking a large bay - Village Bay or Bàgh à Bhaile (Loch Hoirt) and is centred on NGR: NF 10291 99187.

Archaeological and Historical Background

By Christine Rennie

The results of the 2016 Cultural Heritage Assessment found that prehistoric activity on Hirta is thought to have occurred from at least the Neolithic, as pottery from that period has been found in Village Bay. Stone tools that were also found in Village Bay are typologically similar to late Neolithic/Bronze Age examples found in the Hebrides and on the Northern Isles. Cairns at An Lag Bho 'N Tuath and Geo Na Eaige could be Bronze Age, or evidence of more recent activity, and some of the structures at Gleann Mor on the northern side of Hirta are probably of Iron Age date.

The Viking influence on St Kilda is apparent from place-names such as those of the individual islands of the group (Hirta, Boreray and Soay) and names such as Oiseval/Oiesebhal (the east hill) and Ruaival (the red hill) which are derived from Norse. The Viking age is represented by artefacts such as brooches dating from the ninth or tenth centuries, and steatite artefacts that were brought to the islands from Norse Shetland or further afield. Further evidence for Norse influence comes from the early Christian crosses incised onto slabs that were subsequently built into houses.

The medieval village on Hirta appears to have been centred in the area to the north of the head dyke, and possible remnants of that settlement include a chapel and burial ground, a well and a single house. The arrival of Rev. Neil Mackenzie in 1829, the first resident minister on the islands in over 100 years, precipitated the re-planning of the village in its now familiar crescent shape. The new single-roomed blackhouses each had a cultivation plot, and the head dyke surrounding the new village was built at this time. A storm in 1860 damaged the blackhouses so severely that a second phase of re-building was necessary. The Hebridean-style two-roomed houses in Village Bay date from this period and, from then until the evacuation of the island, the blackhouses were re-used as byres.

In 1957, the MOD leased land on Hirta for the establishment of a radar tracking station for the missile range on Benbecula. Since the evacuation of the St Kildans in 1930, MOD staff have been the only permanent human presence on the islands.

The special qualities of St Kilda's natural scenery and cultural landscape are among the attributes that make the islands a National Scenic Area. The surviving remains of the nineteenth century settlement and associated structures within the natural amphitheatre of Village Bay combine to produce an outstanding cultural landscape (Rennie 2016). The National Trust for Scotland owns the archipelago and it achieved a UNESCO World Heritage Site status in 1986 for its natural significance. In 2005 it was inscribed as a cultural landscape and therefore became the UK's first and only mixed World Heritage Site. Large parts of St Kilda are also Scheduled, and it is also designated as a National Scenic Area, a Site of Special Scientific Interest, a European Union Special Protection Area, a Special Area of Conservation and a National Nature Reserve.

Historic Building Recording 2017-2019 - the MOD Buildings

By Anthony Byledbal

The military first arrived on St Kilda during World War I when the Royal Navy erected a signal station on Hirta allowing daily communications with the mainland for the first time. Towards the end of the war, when the U-boats were wreaking havoc with allied shipping, a German submarine surfaced in Loch Hiort and started shelling the island damaging the Manse, church and jetty storehouse, and destroying the wireless station installed in the factor's house. In response to this, naval gun, a 1896 4" Mark III QF (quick firing), was installed on a promontory at the east side of Village Bay to the east of the jetty storehouse. The weapon was never fired in anger but still survives today in its original position with a magazine terraced into the south-west facing slope of Oiesebhal (Steel 1988).

St Kilda does not seem to have played a part in World War ll, as by that time it was uninhabited. However, there are three military aircraft crash sites from this period (Quine 2000), and the wreckage is still plainly visible on the ground in Glean Mhor. It was not until 1957, after 'Operation Hardrock' was begun during the Cold War that a MOD base was established initially by the RAF as an early warning radar station (Harden and Lelong 2011, Figure 1.8). This resulted in the island becoming permanently inhabited once again (Scottish Executive 2003). A range of new buildings at the east side of Village Bay, with radar stations positioned at 'the top of the hill', were constructed during this period, and the site was gradually remodelled over the following decades.

The last major period of construction was during the 1970s, and included buildings serving as an office, kitchen, canteen, and for recreation, medical and dormitory space (Plate 1). Perhaps more importantly it also included the island's first staff club, the 'Puff Inn'. The buildings erected in the 1960s-70s were originally destined for use by the British Army during the Suez Crisis 1956-57 but were never sent there, and as surplus stock it was decided to use them on St Kilda, an environment they were not designed for. Surprisingly they endured the hostile St Kildan winters incredibly well but ultimately started to fail. The buildings were built on concrete bases and were formed of lightweight precast-concrete slabs with flat felt roofs and were in use for around 40 years before they began to deteriorate.

During a particularly violent winter storm the roofs partially detached from the walls resulting in an improvised repair using high tensile wire attached to concrete blocks to anchor the roofs for the remainder of the buildings tenure. This last phase of MOD buildings formed the focus of the building recording work.

A comprehensive photographic building record forms part of the site archive, part of which part can be found in Appendix 1. It records the exteriors and the interiors of the eight remaining buildings forming the existing MOD facilities on a room-by-room basis prior to their demolition. Hand drawn elevations were also recorded in key areas. This represented the first formal historic building recording of the MOD base on the island. The buildings recorded included:

- Building 1 (Accommodation Block/Recreation)
- Building 2 (Power House)
- Building 3 (Accommodation Block 'Signal Shack')
- Building 7 (Storage Unit)
- Building 9 (Medical Bay)
- Building 10 (Water Treatment Facility)
- Building 11 (Mess Hall/Offices)
- Building 13 (Accommodation Block 'VIP Building')
- Building 16 (Recreation/Sports Hall)

Plate 1: The 1970s MOD buildings. Taken by Anthony Byledbal.

Heritage Impact Assessment 2019 - The Manse

by Alan Hunter Blair

A photographic record was made for both the exterior and the interior of the Manse (Figure 1 with images and plans in Appendix 2) on a room-by-room basis prior to the replacement of service openings into the property by new ones, principally a new power supply from the new energy centre.

The original building of the St. Kilda Manse was designed by Robert Stevenson in 1827, and was square in plan with many later additions and alterations (Plate 2). These alterations started from as early as 1830 when a porch was constructed in front of the original entrance to the property, with an extension to the east for a library and byre, and with a further outshot forming a possible privy, latterly used as a store. The alterations and extensions carried on well into the twentieth century. The building is in good condition having undergone a comprehensive restoration in 2010. The roof has been refinished in reclaimed Ballachuilish slate; new sash and case windows matching the original fenestration patterns were installed, with additional double-glazed casements fitted to the inside of the windows. Six panelled reproduction period doors with brass hardware have been fitted throughout the property with the exception of the doors entering the building which are flush tongue and groove panel. External render and paint were chosen to match the original finish applied to conceal the original rubble-built walls, and to preserve and repair the improvements on the building carried out by Rev. MacKenzie in 1838. The property now provides staff accommodation, office and retail space, and public facilities, and is under the care of The National Trust for Scotland.

Plate 2: The location of the manse (the traditional building in the foreground) in relationship to the MOD buildings. Taken by Anthony Byledbal.

Excavation and Archaeological Fieldwork 2017-2019

Three phases of archaeological fieldwork investigations were undertaken. Initially, a programme of archaeological monitoring in the form of a watching brief was carried out during the course of ground breaking works associated with geotechnical test-pitting in May 2017. Monitoring of all other ground works associated with the development continued until September 2019. An archaeological evaluation was undertaken on the site of the proposed new accommodation block in August 2017 followed by an excavation over the entire footprint of the new building from November 2017 until March 2018. The results of these investigations are presented below.

Archaeological Evaluation 2017

By Anthony Byledbal, Dave McNicol and Erica Villis

A total of 204 square metres of evaluation trenching was undertaken evenly across the footprint of the new MOD accommodation building, amounted to c. 20% of the area (Plate 3). The ten evaluation trenches were each 2 m wide but ranged in length from 5 m to 20 m. Potentially significant archaeological features were only discovered in six of the trenches ET 05 to ET10 (Figure 2).

At approximately 1.46 m below the present ground level in ET 05, and towards the north-east end of the trench, four possible linear features were observed within colluvium/hillwash or relict topsoil. Investigative sondages revealed that the stones within the features were set firmly into the natural subsoil and that they were covered over by the relict topsoil layer. No material culture was recovered from the investigation.

In ET6 two linear features and one small pit were discovered c. 1.3 m below the present ground level, again at the north-east end of the trench that may be the continuation of the features in ET5. The linear features, between 0.45 m and 0.65 m in width, were defined by up to 3 courses of stones positioned along their edges. The pit measured 0.50 m by 0.30 m. A sherd of undated pottery was recovered from the trench.

A large subsoil feature measured 2.4 m by 3.5 m at the north-east end of the trench ET7 was partly revealed. It too lay below colluvium. One flint flake and 13 sherds of pottery were recovered during the investigation of the feature and the hillwash deposit.

ET8 contained a 1 m wide drystone wall or dyke orientated NW/SE that was visible over a distance of 2.5 m. It survived to a height of 0.5 m where it had not been truncated by modern services.

ET9 and ET10 contained the remains of a 2.8 m wide stone-lined drain or channel aligned c. N/S that lay c. 0.2 m to 0.3 m below the current ground level. A total of 10 sherds of pottery were recovered from the trenches.

Plate 3: General view of the site. Taken from the north-west.

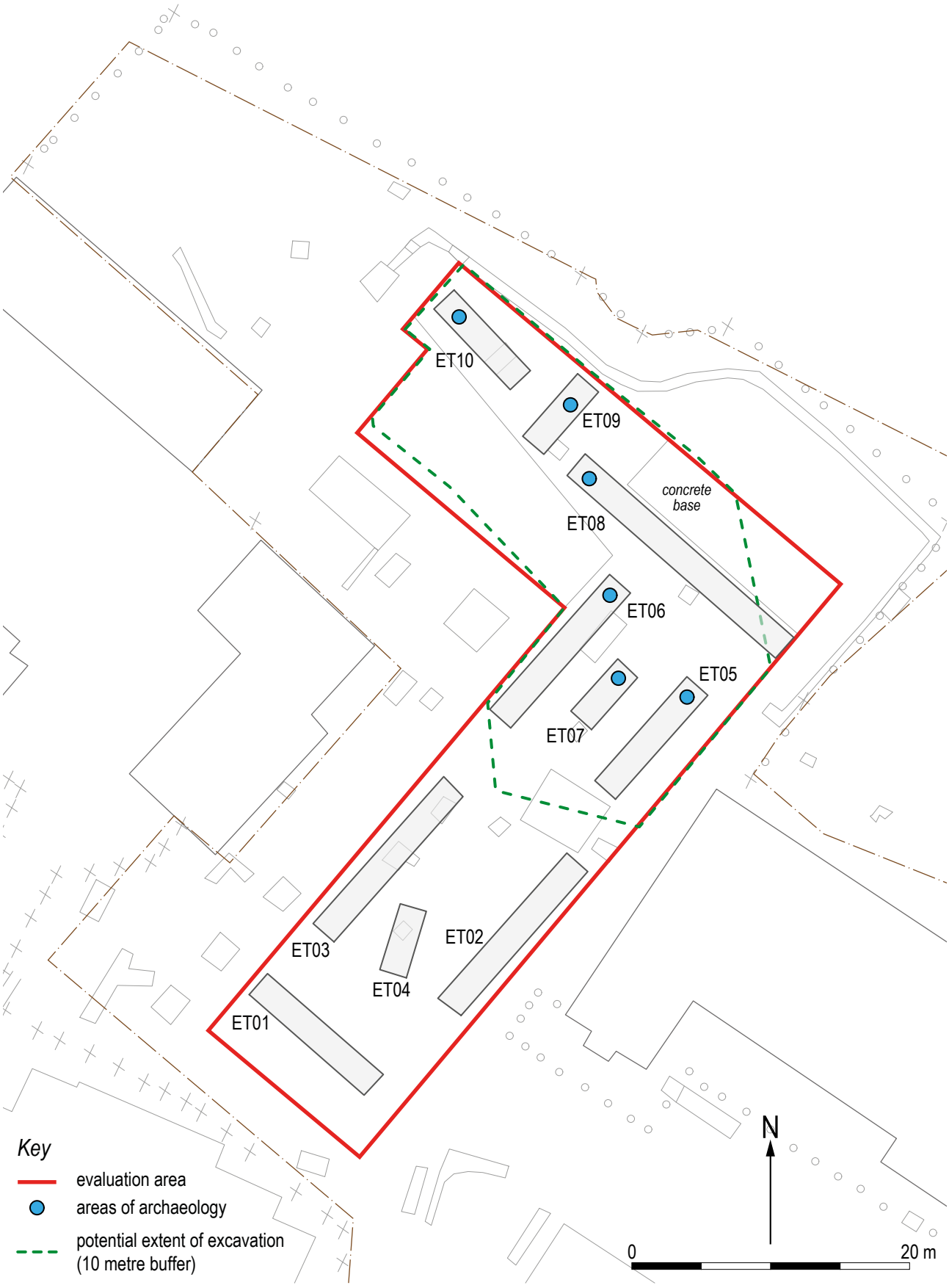

Figure 2: Trench plan indicating areas in which archaeological features were encountered.

Archaeological Excavation 2017-2018

By Alan Hunter Blair 2018

The excavation followed on from the trial trench evaluation (above) but in four phases associated with the demolition of old buildings and the construction of new ones by the MOD (Plate 3). The excavation involved monitored stripping of topsoil or overburden within the footprint of the proposed new accommodation building, which extended in an L-shape to the north-west and south-west of the existing block (Figure 2). Although the evaluation highlighted archaeological features in the northern half of the footprint, features of potential archaeological significance were discovered throughout much of the investigation area. Phases 1 and 2 took place on the downslope southern arm of the L-shaped area and Phase 3 and 4 with the up slope northern arm.

Results

Across the area remnants of relict agricultural soils (5003 and 5006/5084) were sealed below MoD landscaping deposits (5004) which comprised demolition debris from former camp buildings and a shallow layer of topsoil. However, this material was contaminated by diesel fuel spillage from a former MOD fuel dump (Figure 3). These relict soils contained small fragments of granophyre derived from the bedrock and they overlay a thin discontinuous layer of dark humic soil (5008) up to 0.08 m deep (Plate 4), which was possibly the remnant of a primary soil formation that overlay the natural sand and gravel subsoil (5002) that also included small granophyre stones. Occasional discontinuous lenses of iron pan were visible, at the interface between the base of the relict agricultural soils and the subsoil. The buried agricultural soils were extensive but had been denuded or removed where earlier MOD development had taken place and frequent service trenches with manholes had been inserted. In some instances, the MOD demolition/ landscaping deposits directly overlay the natural subsoil. The agricultural soils varied slightly in colour but this could have been a result of the differing types of cultivation practises carried out in small plots as depicted on Macgregor's map of 1957 (see Geddes 2018, Figure 8). Some of the rubble walls identified during the evaluation (above) may have been associated with the agricultural soils and represent the remains of drystone walls between small plots.

Plate 4: South-west facing section showing depth of buried soil horizon 5006 sealed below demolition debris.

The buried agricultural soils produced numerous finds of pottery, coarse stone tools and occasional fragments of flint, which may have accumulated within the soils over millennia as they range in date from the prehistoric period to post-medieval times.

The water channel

The main archaeological feature was a meandering stream channel or water course (5057) (Plate 5, Figure 4), heavily modified with stone-lined sides along part of its course, and the remains of a wall along part of its northern side. The channel, which was aligned NW/SE, crossed the excavated area and was recorded over a distance of 45 m over gently sloping ground, although it appeared to continue beyond the area of investigation to the north-west and south-east. It reduced in height from c. 15 m OD at its north end to c. 13.5 m OD at its southern end. Numerous fragments of pottery and coarse stone tools were recovered from its upper fill. The walls of the channel (Figure 5) were positioned c. 0.5-0.6 m apart and were built on top of the subsoil that also formed the base of the channel.

At some point, the sides of the natural watercourse were partly consolidated, requiring a considerable amount of effort and investment. Consolidation was carried out along its up-slope, north-eastern side over a distance of 16.2 m using large heavy granophyre boulders (5083) canted back at a slight angle to line and revet the edges of the channel (Plates 6 and 7). In this area the feature was 0.55 m deep.

Figure 3: Site plan MOD building foundations and services in the excavation area.

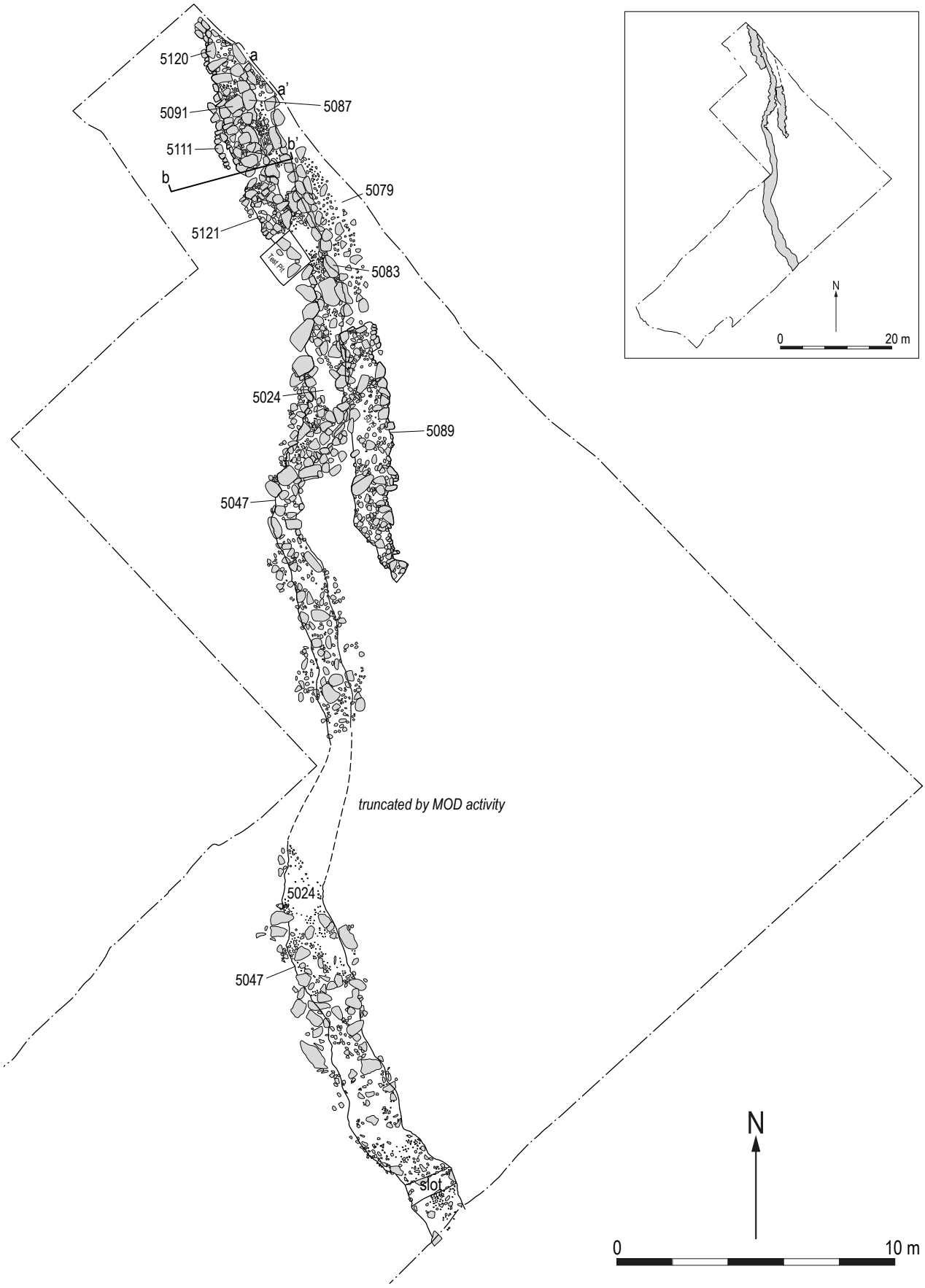

Figure 4: Detailed plan of the channel 5047 wall 5079/5087/5089 showing position of sections and through the features.

Plate 5: General view of the channel. Taken from the north-west.

Plate 6: Large granophyre boulders forming the north-eastern wall of the channel.

Plate 7: General view of the channel from the south. The original stream edge is visible towards the left with the rubble infill narrowing the channel and retained by a roughly built wall parallel to the large boulders that form the north-east side of the channel edge.

In contrast, the opposite south-west side of the channel was modified but in a different way from that of the north-east side. The original curved edge of the stream channel (5047) had eroded and it was reduced in width by revetting its edge with stone (5120) possibly built on a stone footing (5115), then infilling in front of this revetment with granophyre rubble (5091), before facing it with a rough wall (5087) (Plate 8). The resulting channel walls were not parallel, but the new side wall (5087) was up to two courses or 0.42 m in width, and it stood to a height of 0.53 m, or three irregular courses, with an occasional boulder incorporated into it. This side of the channel wall only survived a distance of c. 7 m as areas of facing stone had later been eroded away. During the excavation of the wall, part of an earlier wall face (5115) was exposed suggesting there was at least one phase of rebuilding, perhaps occurring as a result of undermining and erosion of the rubble wall by water flowing fast down the channel during the St Kilda winters.

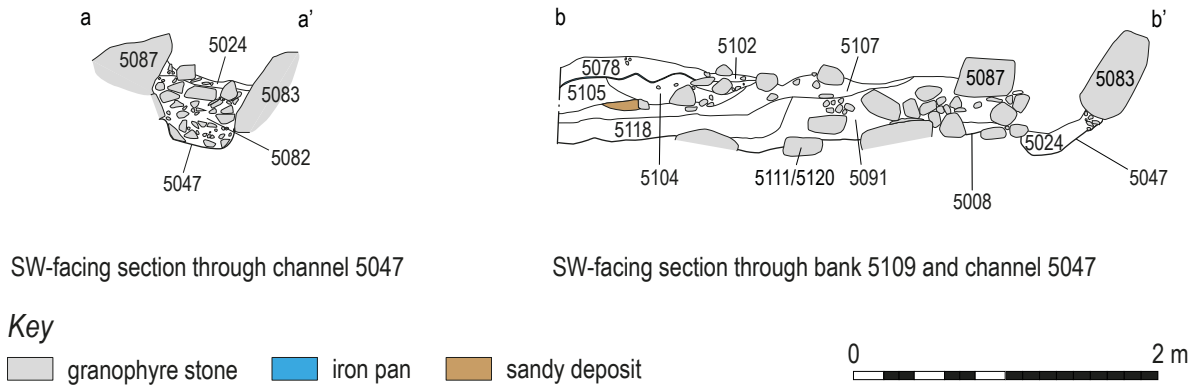

Figure 4a: Sections through the features.

A primary deposit (5082) of dark brown silt c. 30 m deep within the water course was occasionally visible between its walls and the natural channel side, which may have accumulated after the channel had been filled in. Overlying the silt was a redeposited, layer of granophyre rubble and gravel (5024) which still could have acted as a conduit for water in the form of a rubble drain (Plate 9). A low energy water flow in this area would have enhanced the deposition of silt. The rubble and gravel infill contained numerous finds of coarse pottery sherds and both lithic and course stone artefacts.

In the north of the excavated area and beneath a shallow modern topsoil horizon, a later wall (5079/5086/5089) was built partially over the north-eastern side wall (5083) of the channel, and over the top of the buried agricultural soil horizon (5006). It had facing stones along both its edges (5086 and 5089), using granophyre rubble of varying sizes with no clear coursing, and an earth and rubble core (5079) (Plate 10). The wall was poorly preserved particularly towards its northern extent (Plate 11).

Plate 8: The south-west wall 5087 of the channel. Taken from the north-east.

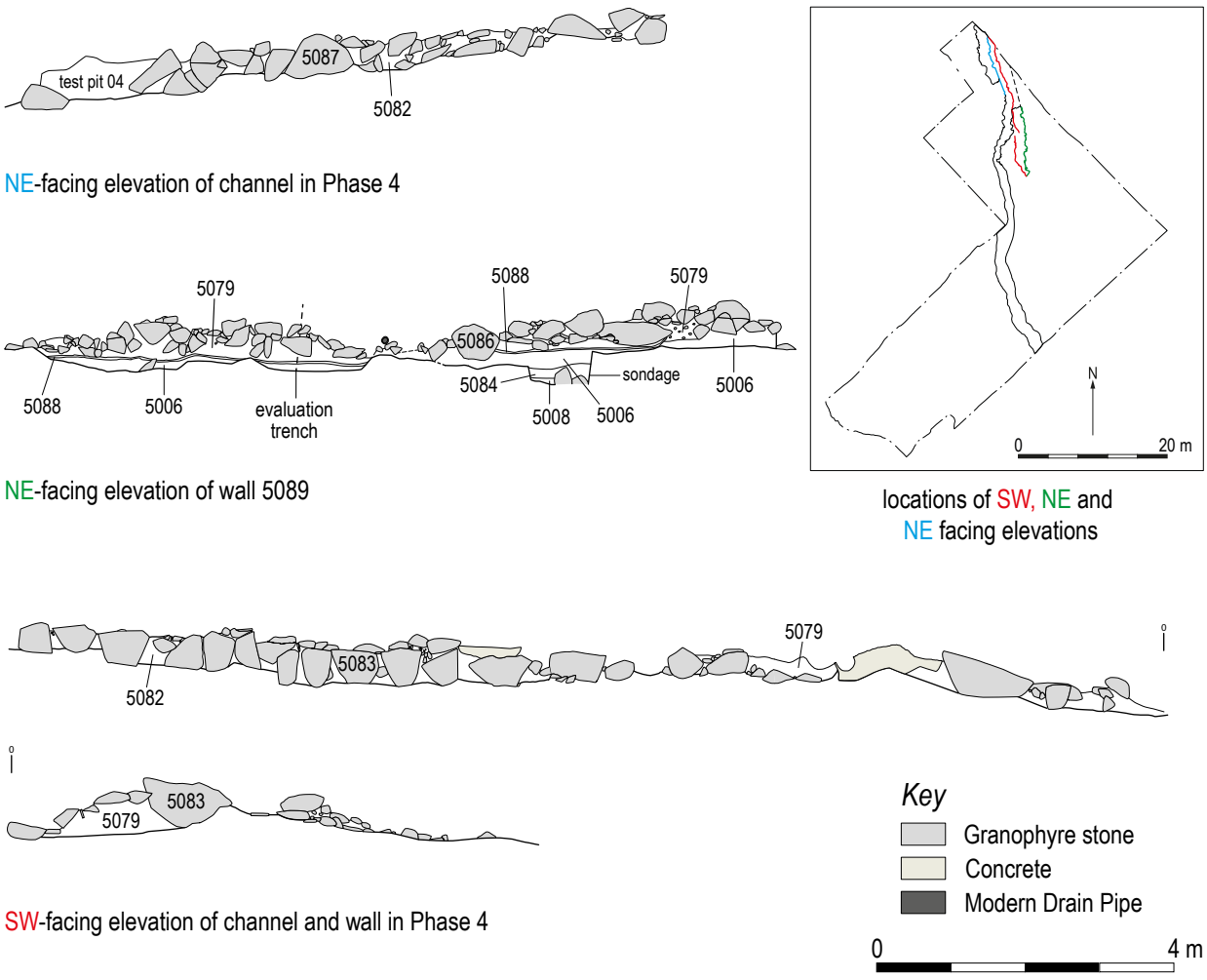

Figure 5: Elevations - (top): SW-facing elevation of channel wall 5047 with boulder revetting 5083 and SW wall remnants 5089, (middle): NW-facing elevation of channel wall 5087, (bottom) NE= facing elevation of wall 5086..

Plate 9: South-facing section showing the extensive build-up of soft silt forming the primary fill of the channel with the later granophyre rubble and gravel above and plunging down into the basal sediment.

Traces of a thin layer of redeposited granophyre gravel (5088), overlay the relict agricultural soil (5006), as a possible bedding layer for the facing stones (5086) of the later wall. The soil horizon (5006) over which the wall was partially built is described above, but in this area it contained some charcoal, was up to 0.64 m deep, (with 5084) and lay directly on the subsoil (5002).

Lithic and earthenware pottery finds were recovered from the wall core (5079) during excavation. The wall measured 17.26 m long by up to 1.3 m wide and survived to a height of 0.38 m.

Plate 10: Detail of remnant of wall face 5089 towards the north-west end of the excavation, with heavily truncated rubble core 5079 overlying buried soil 5006. The channel is visible to the NW. Taken from the east.

Plate 11: Overhead view of the northern end of channel 5047 after excavation.

Plate 12: General view of rubble 5009. Taken from the south-west.

Minor elements of parts of demolished MOD buildings, were also recorded in the southern arm of the excavated area, along with possible earlier structural remains, which were later interpreted as natural stone deposits (Plate 12). A possible hearth (5024), formed by a putative stone setting with remnants of an ashy layer was also recorded. However, the lack of any carbonised remains from the feature makes this less likely, and it was possibly also a natural feature.

Radiocarbon Dates

It was difficult to assign a specific period for the construction and use of the features recorded during the course of the excavation, although much of the coarse ware pottery recovered appeared prehistoric in date. A radiocarbon dating programme was therefore undertaken to investigate the date of the features excavated. Although identified carbon was considered from the environmental remains as samples for radiocarbon dating, it was eventually decided to use the carbon encrusted on the pottery sherds found in the channel and its associated contexts. In total, 10 samples were submitted for AMS dating to the Scottish Universities Environmental Research Centre (SUERC). One of those samples did not contain sufficient charcoal and did not return a date. The remaining nine samples produced date ranges of the Iron Age through to the medieval period (Table 1).

The infilling of the channel included many sherds of pottery (see below), from Iron Age occupation in the vicinity. The earliest of those dates produced a date range of 381-204 cal BC, SUERC-90927, (GU53649) and the latest of 170-45 cal BC, SUERC-90922 (GU53646) and SUERC-90923 (GU53648). They suggested that the early to middle Iron Age occupation was reasonably well established. The lining of the channel also produced a middle Iron Age but slightly later date of 163 cal BC–16 cal AD, SUERC-91034 (GU53651).

The buried colluvium or hill-wash (5091) above the channel fill, produced an early/middle Iron Age date range of 363-203 cal BC SUERC-91033 (GU53650), perhaps suggesting that the filling in of the channel and covering it over were part of the same event. However, these dates tell us that clearance of some ground/habitation area, possibly from near the head of the excavated channel was used to infill it. When

that happened we do not know precisely, but there is one clue from the overlying agricultural soil, which produced a medieval date range of 1220–1273 cal AD, SUERC-91035 (GU53652). Sometime after the end of the Iron Age and into the early historic period, but prior to the beginning of the thirteenth century AD, there was some reorganisation of the landscape. An area of land previously used for habitation was cleared and then used for agricultural activities and completely infilled and covered over the canalised water channel.

In spite of the radiocarbon dates there is no evidence for the date of the formalisation of the watercourse into a channel. By the thirteenth century AD or earlier, it was no longer necessary as part of the organisation of settlement and land use. It could have been built in the earlier Iron Age for example, or it could even be earlier in date, or possibly even of post-Iron Age construction. The sherds of pottery found in the channel were extremely abraded and this could indicate that it was used as means of disposing of refuse as early as during the Iron Age occupation up-slope, suggesting an earlier date for the channel. There are too many variables and the radiocarbon dates still leave open the question of when the channel was built.

Lab Code	δ13C	Sample Nr	Context	Radiocarbon Age BP	95.4% probability	Structure	Period
SUERC-90919 (GU53643)	-23.9 ‰	327 - pottery body sherd with thick interior deposits	5024 silty/ sandy upper fill of southern part of channel	2100 ± 25	188–51 cal BC	Channel	MIA
SUERC-90920 (GU53644)	-23.5 ‰	332 - pottery body sherd with thick interior deposits	5024 silty/ sandy upper fill of southern part of channel	2178 ± 26	359–170 cal BC	Channel	E-MIA
SUERC-90921 (GU53645)	-25.2 ‰	369 - pottery body sherd with thick interior deposits	5024 silty/ sandy upper fill of southern part of channel	2127 ± 23	345–57 cal BC	Channel	E-MIA
SUERC-90922 (GU53646)	-26.7 ‰	383 - pottery body sherd with thick interior deposits	5024 silty/ sandy upper fill of southern part of channel	2081 ± 22	170–45 cal BC	Channel	MIA
SUERC-90923 (GU53648)	-26.2 ‰	436 - pottery base with good deposits	5024 silty/ sandy upper fill of southern part of channel	2082 ± 22	170–45 cal BC	Channel	MIA
SUERC-90927 (GU53649)	-25.6 ‰	439 - pottery body sherd with thick deposits	5024 silty/ sandy upper fill of southern part of channel	2227 ± 26	381–204 cal BC	Channel	E-MIA
SUERC-91033 (GU53650)	-25.6 ‰	470 - pottery body sherd with thick deposits	5084 hill wash or buried agricultural soil above channel revetment wall	2210 ± 24	363–203 cal BC	Buried soil	E-MIA
SUERC-91034 (GU53651)	-26.1 ‰	466 - pottery body sherd with thick exterior deposits	5091 rubble wall? in north part of channel	2050 ± 24	163 cal BC–16 cal AD	Channel lining	MIA
SUERC-91035 (GU53652)	-26.0 ‰	15 - pottery body sherd with thick deposits	5003 Agricultural soil	783 ± 19	1220–1273 cal AD	Agricultural soil	Medieval

SF 428 pottery sherd with 14C deposits from context 5024 did not return a 14C date.

Table 1: Radiocarbon dates.

Environmental Remains

Carbonised plant macrofossils and charcoal

By Diane Alldritt

Introduction

A total of thirty environmental sample flots taken during archaeological excavation work on Hirta, St. Kilda were examined for carbonised plant macrofossils and charcoal. In addition twenty four of the sample retents were found to contain charred remains which were subsequently analysed for identifiable material. The excavation was divided into four areas with samples examined from all. The agricultural soils and stone structures encountered could potentially be prehistoric through to medieval in date (see Radiocarbon dates, above).

Extensive archaeological survey work and selective excavation were previously carried out on the island of Hirta between 1991-2006 by University of Glasgow and GUARD (also University of Glasgow). Iron Age or later stone structures were found built into the scree slopes to the south of Village Bay, whilst field systems, plots and stone structures were surveyed to the north-east, indicating organisation and cultivation of land since later prehistory (Harden and Lelong 2011). The carbonised plant assemblage obtained from these excavations was somewhat limited in range with the majority of charred material found to be burnt remains of heather, rhizomes and minerogenic turf or peat. Very little evidence was found for food plants apart from an occasional grain of six row hulled barley (Ramsay and Miller 2011, 42). Wood charcoal was extremely rare with only a few fragments of spruce/larch and oak present, perhaps arriving as driftwood or boat wreckage, although interestingly the pollen analysis showed a trace presence of alder, birch and possibly hazel also. During the Iron Age and Norse/Medieval period the occupants of St. Kilda made extensive use of grassland and heathland turves for fuel and construction purposes, largely in the absence of any substantial woodland resources (Ramsay and Miller 2011, 42).

The present work on archaeobotanical remains from Hirta has produced similar indications for the use of heathy turves and peat for fuel and construction purposes, but with greater evidence for the presence of agricultural crops, including six row hulled barley and oats. The results have provided evidence for the types of cereal crops being grown on Hirta and the potential agricultural regimes and practices that might have been taking place. A mixture of peat ash and heathy turf fuel waste from hearth places was probably middened with other refuse, such as burnt seaweed, decaying organic structural material, broken pottery and cooking waste, and then spread onto the agricultural fields as manure to enrich the soils. In some cases, the waste may have been deliberately allowed to accumulate in one area and then simply ploughed over in preparation for the growing season, a practice suggested at Northton on the island of Harris (Guttmann 2005). Over time repeated manuring and re-use of the same land produces a re-worked and highly homogenized midden-rich soil horizon, incorporating a mixture of organic and inorganic remains, and effectively modifying the landscape in form and constituency. Radiocarbon dating of charcoal and cereal grain from these deposits may prove slightly problematic given the mixed and re-deposited nature of some of the remains.

Methodology

The bulk environmental samples were processed by GUARD Archaeology Ltd. using a Siraf style water flotation system (French 1971). The samples were 0.5 to 10 litres in volume. The flots were dried before examination under a low power binocular microscope typically at x10 magnification. All identified plant remains including charcoal were removed and bagged separately by type.

Wood charcoal was examined using a high powered Vickers M10 metallurgical microscope at magnifications up to x200. The reference photographs of Schweingruber (1990) were consulted for charcoal identification. Plant nomenclature utilised in the text follows Stace (1997) for all vascular plants apart from cereals, which follow Zohary and Hopf (2000).

Results

The environmental samples produced small concentrations of carbonised material with typically <2.5ml and occasionally up to 15ml of burnt remains encountered. This material consisted mainly of heather charcoal, together with rhizome and burnt peat fragments, suggesting peat or heathy turves were being cut for fuel. Highly crushed fragments of clinker, some glossy and vesicular in appearance, others dull and amorphous, were possibly remains of minerogenic peat or turf, or perhaps dung burnt as fuel. Wood charcoal finds were extremely limited and confined to seven samples, with 50m to 10 mm fragment sizes recorded. Carbonised cereal grain was found in thirteen samples and consisted of barley and oat types, with mostly good preservation, although a few showed signs of slight rubbing and degradation. Modern material was recorded in amounts from <2.5ml up to 50ml and consisted of modern roots, straw fragments, seeds and earthworm egg capsules. Occasionally quite large volumes of modern straw and seeds were encountered indicating potential for mixing and bioturbation occurring through the deposits, and suggesting some of the material was likely to be post-medieval/modern in origin or had been subject to substantial disturbance.

Results are given in Table 2 in Appendix 3 and discussed below.

Detailed results

Excavation of the southern end of the excavated area revealed evidence for a relict agricultural soil (5003) and a dark brown soil (5006) lying below the MOD landscaping deposits (5004). This area also contained rubble deposits (5009) and a series of possible oval or sub-circular kerb features, with isolated stone setting (5018).

Thirteen samples were examined from producing small concentrations of carbonised remains which consisted of a mixture of fuel waste and cereal grain. The demolition layer (5004) had probably disturbed lower layers and churned up degraded grain of *Hordeum vulgare* var. *vulgare* (six row hulled barley) and a few thin slivers of *Calluna* (heather) stem.

Buried soil horizons (5003 and 5006) were probably formed by the same processes with a highly homogenized mixture of midden material that had also incorporated some modern remains. From 5003, Sample 1 contained a small concentration of clinker, possibly peat or dung derived, this was fused smooth and glossy, together with a few thin stems of *Calluna* (heather) and a slightly rubbed grain of *Hordeum vulgare* sl. (barley). Sample 2 was similar with heather stems, a 10 mm fragment recognisable as burnt peat, and a couple of grains of nicely preserved *Hordeum vulgare* var. *vulgare* (six row hulled barley) and *Avena* sp. (oat) in excellent condition. Sample 5 had barley and oat cereal grain and a large concentration of heather, whilst sample 7 had a small amount of barley and a few fragments of heather. Sample 8 was notable for producing two fragments of *Salix* (willow) charcoal, albeit very small at <5 mm in size, and in degraded and iron panned condition, suggesting the material had possibly been moved around. Sample 12 also contained a 10 mm fragment of willow charcoal but in this case better preserved and a possible candidate for radiocarbon dating. In other parts of the site there was more evidence for modern intrusion apparent through the deposits.

The two samples from (5006) contained mixed waste material with peaty fuel remains and cereal grain. Sample 3 produced a large concentration of heather stems, lots of highly crushed fragments of clinker (possibly burnt peat), and a few grains of oat and six row hulled barley cereal, mixed with modern seeds and straw. Sample 13 contained less modern material but a good concentration of well- preserved heather stems, a large 20 mm rhizome probably dug up during peat or turf cutting, a single fragment of carbonised seaweed, and a nicely preserved collection of six row hulled barley and oat cereal grains. Sample 13 also had a thin sliver of *Corylus* (hazel) charcoal that could possibly be radiocarbon dated but was very small.

In the middle part of the excavated area three samples also from (5006) suggested fairly recent post-medieval deposition, intrusion or mixing. Sample 14 contained a few grains of six row hulled barley, one of which not fully carbonised and probably fairly recent, together with a large piece of burnt bone. Sample 16 had an extremely

large cache of modern seeds and straw fragments along with a very fresh looking piece of conifer type charcoal, which is probably all post-medieval or modern. Sample 18 had a few trace remains of clinker, heather stems and burnt peat with nothing particularly significant. Sample 27 from the soil horizon (5006) in the north contained two very small fragments of burnt peat.

Three samples from (5008), possibly a degraded soil horizon, produced a few traces of remains, with sample 9 being largely sterile and sample 10 having a few crushed heather stems. Sample 6 was probably the most informative with a large 1.5cm rhizome, a few thin heather stems, a single very degraded barley grain and a 10 mm fragment of *Corylus* (hazel) charcoal. The hazel charcoal is large enough to date but is possibly from re-deposited or mixed material given the condition of all of the remains in this context. Sample 24 from the middle part of the site was largely sterile with just a few traces of degraded heather stem. This area was possibly too highly disturbed by more recent activity to preserve any significant amounts of archaeological remains.

Sample 11 (5017) was from part of the rubble makeup of wall (5015/5016). This contained a few trace crushed stems of heather which were probably intrusive in the deposit and not particularly significant.

Sample 15 (5022) from the southern part of the site formed an area of clay around a possible hearth (5021) and produced a single half fragment of oat grain and a few very degraded thin heather stems, providing little indication for any significant burning activity taking place in the hearth. Sample 17 (5042) from pit (5043) was probably the base of a stone hole rather than a pit and contained a few trace crushed charred remains with nothing identifiable.

In the northern part of the excavated area recent service trenches were found to have truncated some of the archaeological features. The infilled channel (5047) continued in this area and contained re-deposited material.

Nine samples reflected this modern intrusion and were largely sterile or contained only trace remains, the notable exception being deposit (5104) which contained a concentration of fuel waste and cereal grain. Sample 32 (5104) contained a significant deposit of fuel waste with a concentration of 10 mm to 30 mm fragments of burnt peat and thick 10 mm pieces of heather and rhizome, indicating peat cutting for fuel. Cereal grain was also present and consisted of six row hulled barley and oat grains in good condition. This is possibly a discrete concentrated deposit of hearth fuel waste from the drying or cooking of cereal grain, and does not appear to be as mixed as some of the other ash-rich soil horizons such as (5006 and 5003), and it may be from a single burning episode or represent material burnt in situ.

Post or pit (5099) sample 30 (5098) had a degraded oat grain, a few traces of heather stem, a very poorly preserved indeterminate fragment of charcoal and an extremely large concentration of modern seeds, suggesting a recent feature or modern intrusion. Samples 34 (5079) and 35 (5079) from the infill of wall (5089) had a few traces of heather stems, whilst samples 20 and 31 (5024) from re-deposited material in the upper fill of meander (5047) contained only trace charred debris or only a few crushed traces of clinker probably intrusive from nearby activities, whilst the basal fill (5050) contained lots of modern detritus and a few trace heather stems.

Samples 25 (5082), 29 (5006) and 33 (5024) were sterile of carbonised remains.

Discussion and conclusion

The environmental samples produced small quantities of carbonised remains consisting mainly of heath and peaty turve fuel waste indicators including charred heather stems, rhizomes, and burnt peat fragments found throughout the samples. Evidence for arable agriculture was also present with a small amount of barley and oat cereal grain recorded scattered throughout the ash-enriched soil horizons (5003 and 5006), and also in re-deposited layer (5004), silty horizon (5008) and deposit (5104). Peat and heathy turf were most likely the main source of domestic fuel for heating and cooking purposes, as well as for agricultural purposes such as the drying of cereal grain. Ashy waste from hearths mixed with other domestic refuse such as bone, dung and straw were probably all being middened together for later use as fertilizer on the fields. In addition, some of the heather and peat remains may have come from decayed

structural material, such as smoke-blackened roofing thatch, and other occupation debris being re-used and recycled as organic compost.

Homogenized and re-worked ash-enriched midden material was suggested by the remains in soil horizons (5003 and 5006), possibly also (5008). In contrast discrete deposit (5104) might be something different, such as in situ cereal processing or a single episode dump of hearth waste material, as the carbonised remains here were highly concentrated and in better condition with large chunks of burnt peat and well-preserved cereal grain.

Cereal identification indicated a mixed cereal economy growing six row hulled barley and oats. In total nineteen grains of barley and fourteen grains of oat were recorded from approximately 120 litres of sediment processed. Ashy fuel waste and other organic detritus probably formed the main constituents of the midden material, and any burning of cereal grain is usually an accidental occurrence, so the recovery of a number of well-preserved cereal grains in these deposits has significance to our understanding of the economy and daily farming life on St. Kilda.

Charcoal recovery from the samples mirrored that seen by Ramsay and Miller (2011, 42) in their earlier study of plant material from Hirta in that there was very little present, with only a few trace finds of hazel in (5006 and 5008), willow in (5003) and conifer type charcoal in (5006). Whilst it is possible the hazel and willow could have been growing as low lying scrub in sheltered areas of St. Kilda in the past, there is also the possibility for random finds of driftwood or wreck material arriving at the shore being opportunistically gathered. The conifer charcoal from (5006) is probably modern or otherwise intrusive.

Radiocarbon dating material was obtained from six of the samples with the caveat that some of these remains are probably from re-deposited or mixed midden material. The area around (5003) was noted as having some diesel contamination so this should also be taken into account, although there was no apparent damage visible on the plant remains.

Future excavation work has a very high probability for continuing to produce further quantities of well-preserved carbonised plant remains based upon the samples analysed for this project.

Faunal remains

By Catherine Smith

Introduction

Fragments of animal bone and crustacean exoskeleton were retrieved from soil samples and as individual small finds.

Contexts from which bone fragments were recovered were the buried soil horizons (5003, 5005, 5006) considered to be relict agricultural soils associated with a former MOD fuel dump; a redeposited soil/landscaping layer (5078) and the fill of a pit or posthole (5098).

Results

A catalogue of fragments recovered is listed by context and sample/small find number in Table 3.

With only two exceptions, the bone fragments were burnt to the point of calcination. Those retrieved from soil samples were of a very small size from 3.1 mm to 4.8 mm in length, consistently weighing less than 0.1g and were white in colour, occasionally showing a blackened core. These were identifiable only as indeterminate mammal bone.

Not unexpectedly, only the unburnt fragments were identifiable to species. The two unburnt bones were the right coracoid (part of the shoulder girdle) of a puffin (*Fratercula arctica*) SF 076, context 5006 and an unfused parietal bone from the skull of an immature sheep (SF 141, context 5078). The puffin bone bore a slight, abraded mark which could be interpreted as either a cut mark or accidental damage. Unfortunately the area around the mark was lighter in colour than the surrounding bone, usually an indication of recent damage, and so cannot be determined as deliberate butchery.

One piece of crustacean, part of a crab claw, was recovered from SF 018, context 5003. It could represent a crab caught for food, for fishing bait, or a piece dropped by a bird.

Species	No of fragments	Details	Burnt/ unburnt	Weight (g)	Length (mm)
indeterminate mammal	1	tiny calcined fragment	calcined	<0.1	4.3
indeterminate mammal	1	tiny calcined fragment	calcined	<0.1	3.1
indeterminate mammal	1	tiny calcined fragment	calcined	<0.1	3.0
indeterminate mammal	1	tiny calcined fragment	calcined	<0.1	3.9
indeterminate mammal	1	tiny calcined fragment	calcined	<0.1	4.2
indeterminate mammal	1	tiny calcined fragment	calcined	<0.1	3.0
indeterminate mammal	1	tiny calcined fragment	calcined	<0.1	4.8
indeterminate mammal	1	tiny calcined fragment	calcined	<0.1	4.2
crustacean	1	fragment of crab chela		0.6	
indeterminate mammal	2	calcined fragment, ?shaft	calcined	0.4	12.9
indeterminate mammal	1	calcined fragment, ?shaft	calcined	1.1	18.6
puffin (Fratercula arctica)	1	R coracoid	unburnt	0.2	31.6
sheep	1	unfused parietal; light, porous condition	unburnt	3.9	
indeterminate mammal	1	porous fragment	calcined	0.9	11.6

Table 3: Catalogue of animal bone fragments.

Interpretation

In common with the other artefacts recovered from the landscaping layers, it is difficult to determine the age of the sheep skull fragment in context 5078. It is in a porous, fragile condition and presumably dates to the period before the MOD constructed their buildings, between 1957 and 1969 (Thompson 1988, 25), but by how many decades it is not possible to say.

In the case of the puffin bone, there is every possibility that it originated from a bird that was hunted and eaten at any time up to the evacuation of the island by its human population. Martin Martin on visiting St Kilda in the late seventeenth century gives a full account of the birds consumed by the islanders and on which they relied for their survival. According to Martin, seafowls such as puffins, various auks, gannets and fulmars were all exploited, for their flesh, eggs and feathers. In the first half of the nineteenth century, some 18,000 to 20,000 puffins were reported to have been killed each year in the hunting season but by 1928 the number had dropped to around 4000 birds preserved for human consumption (Thompson 1988, 76). At the present day seabirds of all species are in dangerous decline and St Kilda's importance as a breeding colony is paramount.

These few scraps of bone are evidence both of the wildlife of the islands and the harsh reality of existence there.

The coarseware pottery

Beverley Ballin Smith

Introduction

Most of the prehistoric pottery recovered from archaeological interventions in 2017 and 2018 was found in the infill of a stone-lined water channel and its related stratigraphy. Although not the largest assemblage of pottery recovered from the island, it can be compared to previous archaeological work undertaken at Mullach Sgar and the village excavations (Harding and Lelong 2011). The assemblage is predominantly Iron Age in date, confirmed by radiocarbon dated samples. A catalogue of the diagnostic and interesting pieces can be found in Appendix 4.

Methodology

This assemblage is a collection of handmade, prehistoric pottery. All the sherds were gently brushed, before analysis and all sherds were examined using a x6 hand lens, and their attributes and statistics compiled in an archivable table devised using Microsoft Excel. Pieces of pottery smaller than 10 by 10 mm are identified as fragments and were not examined further. The pottery was analysed according to the revised guidelines of the Prehistoric Ceramics Research Group (2010), the CIfA's *Standards and guidance for the collection, documentation, conservation and research of archaeological materials*

(2014), and the *Standard and guidance for the creation, compilation, transfer and deposition of archaeological archives* (2014).

Analysis and description of the pieces

There are a total of 497 sherds from the evaluation, the watching brief and the excavation, with most deriving from the excavation (Figure 6). The majority of sherds came from the infilling material within the southern part of the channel and from the overlying agricultural soil. The remaining contexts from the excavation all produced sherds but in much smaller numbers. The watching brief intervention provided twice as many sherds as the evaluation, but these are significantly smaller numbers than those from the excavation (Table 4). The numbers of identified rim and base sherds amount to 10.2% of the collection.

The total weight of the assemblages is a little less than 6.3 kg (Table 5), with average sherd weights varying from less than 6 g to over 31 g. The number of pieces compared to the average sherd weight gives some idea of fragmentation. Low sherd weights are noticed in sherds that have lain in agricultural soils (5003/5006 and 5094). The soils in the southern part of the excavation (5003/5006), below the demolition layer had generally thinner sherds but ones that also show a high degree of fragmentation. This is probably due to agricultural activities and the dumping of later building debris. The presence of thinner sherds may indicate that they are later Craggan type vessels when compared with the thicker-walled sherds of other contexts. The agricultural soils (5094) across the revetment wall in the northern part of the excavation also had sherds of low weight but there were very few of them.

Sherds from contexts associated with the wall and revetment in the north and the channel, including the hill-wash (5084) over the revetment wall, all produced sherds with average weights over 10 g but with varying average wall thicknesses, implying there was less fragmentation and a variety of pots were discarded. The heaviest and thickest walled-sherds were those of a cooking pot found in agricultural soil in the northern part of the excavation.

Location	Context	Total Nr. Pieces	Rims	Bases	Body sherds	Fragments
Excavation						
Agricultural soil	5003, 5006	93	1	2	90	29
From southern part of the channel	5024	261	20	8	233	41
Below demolition layer	5026	1	0	0	1	0
Topsoil	5078	2	0	0	2	0
Wall and revetment in north	5082, 5090, 5106, 5110	17	0	1	16	0
Hill wash	5084	20	0	1	19	0
Hill wash - dark pot	5084	11	1	0	10	0
Agricultural soil - heavy cooking pot	5084	10	0	1	9	0
North part of channel	5091, 5114, 5118, 5122, 5123	7	2	0	5	0
Unidentified	5091, 5092	3	0	0	3	0
Agricultural soil	5094	3	0	0	3	0
Fill of pit	5098	1	0	0	1	0
Unstratified	Unstratified	2	0	0	2	0
Evaluation and watching brief						
Evaluation (ET07 and ET09)	6, 20, 23 and 31	22	0	4	18	1
Watching brief (TP8, T134, T135, T143	801, 13405, 13505, 14309	44	2	8	34	2
	Total	497	26	25	446	73
			5.20%	5%	89.70%	

Table 4: Sherd forms.

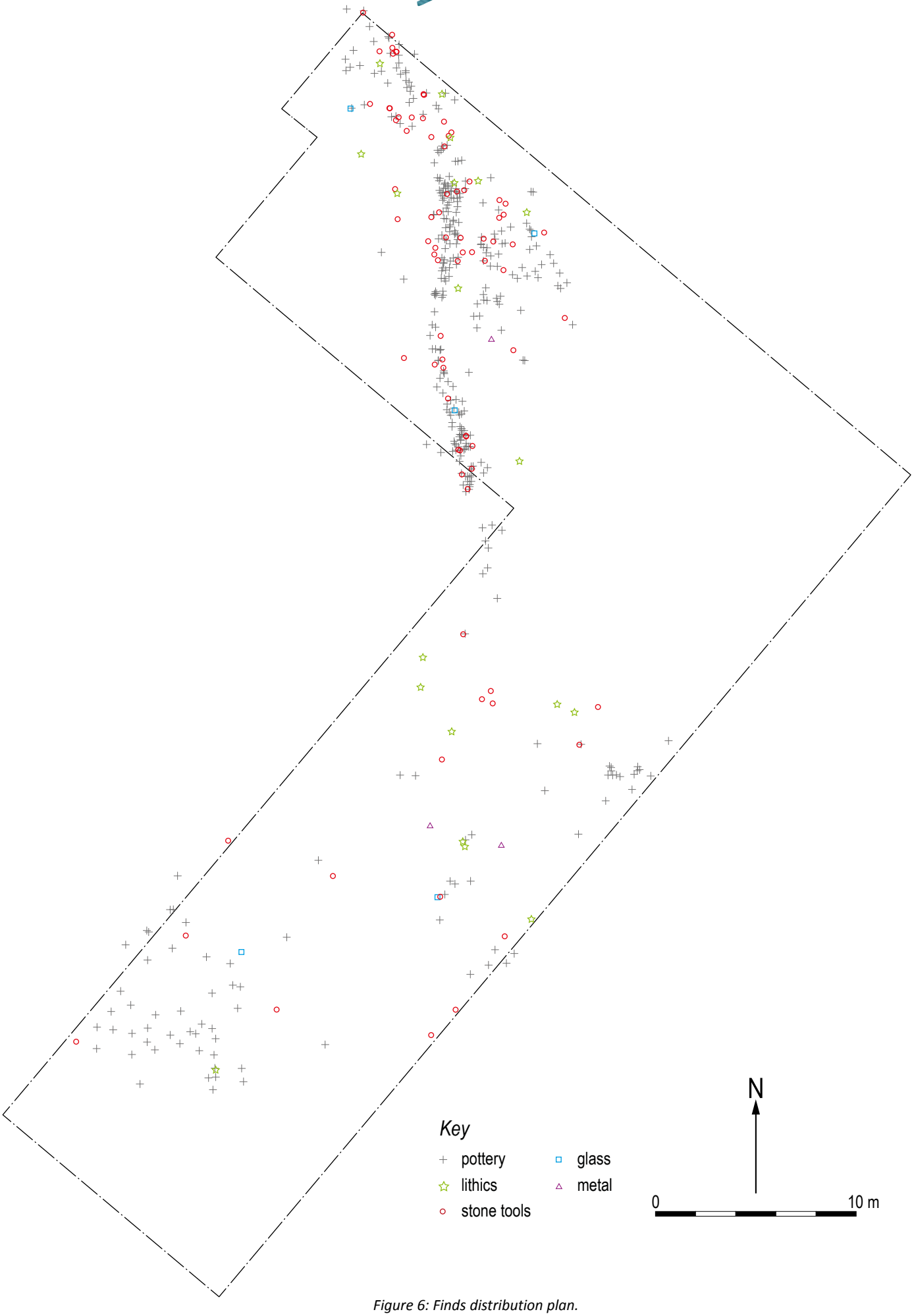

Figure 6: Finds distribution plan.

Location	Context	Total Nr. Pieces	Total Weight (g)	Average sherd weight (g)	Av Wall thickness (mm)
Excavation					
Agricultural soil	5003, 5006	93	682.3	7.3	7.9
From southern part of the channel	5024	261	3759.8	14.4	9.9
Below demolition layer	5026	1	11	11	11
Topsoil	5078	2	29	14.5	10.2
Wall and revetment in north	5082, 5090, 5106, 5110	17	214.7	12.6	9.6
Hill wash	5084	20	212.4	10.6	10.2
Hill wash - dark pot	5084	11	123.3	11.2	7.4
Agricultural soil - heavy cooking pot	5084	10	315.3	31.5	13.2
North part of channel	5091, 5114, 5118, 5122, 5123	7	78	11.1	8.7
Unidentified	5091, 5092	3	17.5	5.8	8
Agricultural soil	5094	3	18.2	6.1	9.7
Fill of pit	5098	1	18.8	18.8	11.5
Unstratified	Unstratified	2	61	30.5	12.1
Evaluation and watching brief					
Evaluation (ET07 and ET09)	6, 20, 23 and 31	22	288.9	13.1	11.7
Watching brief (TP8, T134, T135, T143	801, 13405, 13505, 14309	44	464	10.5	11.3
	Total	497	6294.2		

Table 5: Sherd thickness and weight.

Post-depositional changes

One of the most striking things about this collection is the severe amount of abrasion noted on most sherds. The appearance of those from the infill of the channel indicates they lay in running water over a long period of time, as their surfaces have worn away and they are heavily water-worn. The rounded edges to the sherds suggest their abrasion has also been mechanical with sherds being moved, bumping into each other or the sides of the channel during periods of water flow. Some of the sherds of early and middle Neolithic pottery recovered from enclosed lochs in north Lewis, Western Isles where water movement is much gentler, still exhibited various levels of abrasion and adhering deposits, but other sherds were in excellent condition (Copper in Garrow 2017, 40). The lack of well-preserved sherds and the post-depositional changes noticed on much of the St. Kilda assemblage is most likely due to mechanical abrasion in what was an open and operational water channel.

Some of the sherds also exhibit deposits, staining and infiltration of iron from the southern part of the channel, the hill-wash, the agricultural soils and the evaluation, which is most likely a result of heavy rainfall and water impedance. Another change to some of the sherds that have adhering carbonised food remains, and especially those from the buried topsoil (5084), was the mineralisation of those deposits. This may again be an effect of heavy rainfall combined with soil acidity.

An unusual post-depositional change, but more accurately post-excavation change, is the high number of recently broken sherds, especially from the main channel filling to the south. The general opinion of the archaeologists working on the site is this is most likely due to transporting the collection from the island by boat.

Manufacture of the pottery

Raw materials

The inhabitants of Hirta would have used local resources of clay, stone, sand and organic material to make their pottery. Clay is found on the island overlying the bedrock and usually below an iron pan layer. It has been described by McVean (1961, 47), as red-brown gritty sandy clay or gritty stony brown clay depending on its location. Some of the sherds, SF 472 for example, indicate the use of pockets of other mineral clays

where the glacial till has given the fired pottery a green/grey colour. This was also seen in late Neolithic pottery from Udal, North Uist (Ballin Smith 2018, 184-185). Clay, if not dug directly from the subsoil, could have been dug out of the sides of streams, flowing down from the hill areas.

The other raw materials included quartz sand, ground quartz rock, mica, some diorite and other unidentified igneous minerals. Sand was probably procured from the head of Village Bay, and rock from scree slopes. The other important ingredient that was necessary to incorporate into the glacial clays to make them usable was organic material, most likely chopped up waste from grain production or animal bedding. The evidence for organic material, including the occasional grain impression (SF 200), was abundant with most of the sherds displaying voids in the pottery from where it burnt away during the firing process. The added mineral content was finely ground and there were only a few examples of coarse stone temper added to the clay mix.

In general, there is little variation in raw materials used in pottery manufacture on the island and most sherds have a sandy texture. However, sherds from context 5003 contain more mica, and are considered to be sherds of Craggan ware pots.

Forming the vessels

The bases indicate that many vessels were flat bottomed, but not all. Coils of clay were added to a base to build the pot to the required height and diameter. There are many examples from all contexts of vessels that had broken along the junction of two coils. It would appear that the methods of pottery construction and joining the coils together were fairly consistent, but many pots seem to have broken apart at the inadequately luted tongue and groove coil joins. It was a problem that was not easily resolved by the potters. However, one vessel SF 422 from context 5024, the infill of the water channel, had an additional layer of clay (in this case a slab of clay with a cordon) added to the surface of an already partly formed vessel, the lower part of this appeared to be deliberately roughened, but given the amount of abrasion, it is a cautious observation. SF 283, also from the channel appears, to have been built up in layers to make a lumpy and uneven exterior surface (Plate 13). Using this method, a heavier pot could be made and the coil joins reinforced. The same technique has also been identified on a heavy pot from the late Bronze Age at Carnoustie in Angus (Ballin Smith forthcoming). The addition of clay layers has also been noted at the Iron Age structures at Sollas, North Uist, where pots 393 and 304 (Campbell 1991, 150, Illus 15 and Illus 16) had a clay layer added to the exterior of the pots above the base. This was most likely intended to protect the base of the vessel from burning through. A thickened roughened surface, would also aid in moving and holding an otherwise smooth vessel.

Plate 13: SF 283/311 pottery with added clay layer.

Rims

Due to abrasion some of the rims have been difficult to characterise but 26 have been identified (Table 4). There appears to be two main forms, either straight or ones that are rounded and everted, representing different vessel shapes. In some cases the rims can be flat on top or rounded (Table 6) and in two examples the rim top has been decorated (see below). Where sufficient length of a rim sherd survives its diameter has been measured, and the evidence suggests that vessels from 140 mm to 240 mm in diameter are present in the assemblage.

Several of the rim sherds have finger moulding marks on their exterior surfaces where the rim coil has been attached to the vessel body. In some examples they have been removed and replaced by a horizontal linear indentation or runnel, where a finger has been pressed into the clay in a continuous circuit around the bottom of the rim. In several examples, e.g. SF 385, the neck of the vessel is short or almost non-existent suggesting the vessel was shaped like a bag with

a draw-string top. On other sherds the neck is straight or concave. SF 368 and SF 416 have slight bevels to the back of the rim indicating they may have been deliberately moulded to take a pot lid.

Bases

The majority of bases seem to have been made using the thumb-pot method – opening up a lump of clay with the thumb and gradually working round it to form the sides and base of a vessel. This was the method used for making round-based vessels of the early Neolithic, but the technique may have carried on into the Bronze Age until different methods of manufacture were introduced (but noticing that flattish to round bottomed Craggan or Crogan wares were made in the Western Isles into the beginning of the twentieth century AD). The fact that many of the existing base sherds had very round basal edges, and sometimes flaring shapes to the vessel body, suggest they were not made on a flat stone or made with coils of clay.

The diameters of base sherds indicate that relatively small vessels were produced (Table 7). The vessel represented by SF 228 has a flaring body and the interior of the base has a slight central dome created by a finger running round the base between it and the vessel wall. This is common seen on pottery of Iron Age date, and is a method of securing the join between the first coil and the base on the interior of the pot (MacKay 1974, bases in Figs 13 and 14). Many of the base sherds are heavily abraded through use and contact with hot ashes or flames from the hearth.

Perforations

Another feature of the pottery was the occurrence of two perforated sherds, SF 124 (Plate 14) from the agricultural soil context 5006 and SF 378 from the wall and revetment (context 5079). Both perforations were drilled through the vessel wall after the pot had been fired. The former had a diameter of 6.4 mm and the hole was slightly worn. The latter had a 3 mm diameter hole, which may not have been finished as the vessel broke. The perforations can also be called 'suspension' holes and there would have been a minimum of three below the rim of the vessel. The occurrence of perforations can suggest the presence of round bottomed vessels, but also pots pre-Iron Age in date, but this may not be relevant in the island context of Hirta.

SF Nr	Rim Shape	Diameter
Context 5024		
115	Straight, slight exterior concavity, a rounded edge and a flat top	c. 240 mm (c. 5% present)
133	Rounded and straight to slightly inverted	
243	Rounded and everted	
307	Rounded and everted rim with a flat top	
326	Rolled over and everted	
357/393	Straight with flattish top	
358	Rounded and everted	
377	Gently rounded and everted	
386	Rounded and everted	
401	Everted and flattened top	c. 160 mm (c. 11.5% present)
406	Straight with internal bevel	
436	Slightly everted, rounded back	
458	Finely rounded and everted	c. 180 mm (c.6% present)
497	Rounded and everted	
Context 5084		
453	Slightly everted, flat top	c. 140 mm (c. 5% present)
Context 5113		
368	Rounded and everted, slight interior bevel	c. 140 mm (c. 5% present)
Context 5003		
51	Rounded and everted, slight interior bevel	c. 140 mm (c. 5% present)
Watching brief		
102	Rounded and slightly everted	

Table 6: Details of rims by context.

SF Nr	Base Type	Diameter
Context 5024		
168	Flat base with rounded basal edge	
228	Flat base with rounded basal edge	c. 80 mm (c. 15% present)
330	Flat base	c. 90 mm(c. 25% present)
356	Edge of flat base	c.80 mm (c.17% present)
379	Flat base	c.100 mm (c. 7.5% present)
436	Round bottomed, or from close to base	
Context 5084		
472	Flat with slightly rounded and splayed base edge	
Context 5003		
104	Base edge slightly protruding, rounded to flat base	c.100 mm (c.10% present)
125	Flat base with a rounded base edge	
Context 5084		
485	Flat	
Evaluation		
84	Flat base with rounded edge	
85	Flat base with rounded edge	
Watching brief		
104	Flat base with rounded edge	
105	Flat	

Table 7: Detail of bases by context.

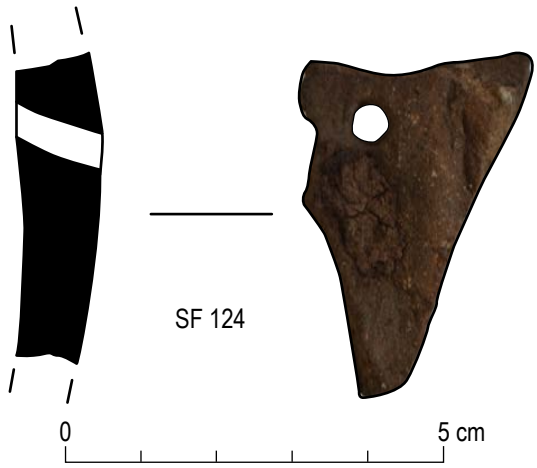

Plate 14: SF 124 sherd with perforation.

Decoration

Although there are few decorated sherds, the evidence indicates there are two types of decoration, incised (motives impressed or pinched into the clay) and applied (added to the vessel such as cordons), although the latter can be also incised. One of the rarest types of decoration found on St Kilda pottery is that of impressions made by the edge of a shell. SF 51 is most likely a badly damaged rim sherd from agricultural soil 5003/5006 (Plate 15). This thin-walled sherd is not differentiated from the rest of the assemblage except by its decoration of slightly oblique/vertical parallel lines impressed into the clay below the rim of the vessel and most likely created by a cockle or limpet shell. This sherd closely resembles sherds of Beaker pottery found at the Udal, North Uist from the early Bronze Age period (Ballin Smith 2018, 196, Figure 5.59).

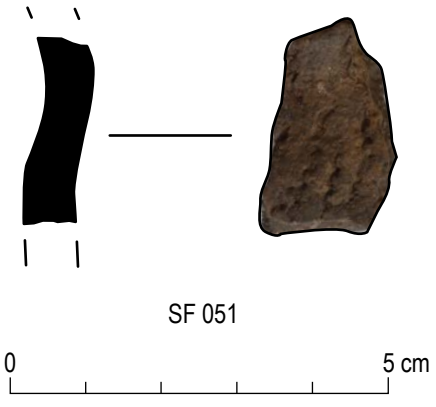

Plate 15: SF 51 cockle shell impressed pottery.

The remaining decorated sherds are from context 5024, the infill of the channel. Rim SF 115 (Plate 16) is decorated along its top by a row of closely positioned oval-shaped and slightly conical impressions possibly made by a bird bone. Each impression is c. 5 mm in length and c. 4 mm wide. A pot rim with a similar design is noted at Sollas from the early part of the wheelhouse (Campbell 1991, Illus 15, 365). The highly abraded but possible rim sherd SF 133 could have had a pie-crust top to it which was incised obliquely by a deep finger nail impression. SF 357 and SF 393 conjoin to form a rim decorated with a single horizontal row of six incised motifs c. 8 mm below the rim top (Plate 17). The motifs appear to be created by a small animal or bird bone inserted into the clay at an angle and then dragged out to form an inverted triangle or 'ice-cream cone' shape.

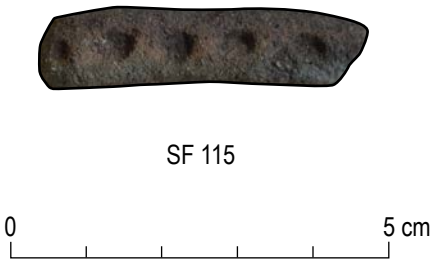

Plate 16: SF 115 decorated rim top.

The decoration on SF 276, two conjoined sherds, is in the form of a plain cordon pulled out from the joining of two coils. The cordon is 9.5 mm wide and c. 5 mm in depth and has a rounded profile. SF 175 is very heavily abraded and possibly burnt but it retains faint evidence of decoration consisting of a line of pinched finger-nail marks in the clay.

Applied decoration was also noticed on one sherd, also from context 5024. SF 422 is a large abraded sherd broken at its coil joins. The pot was decorated by the addition of a clay strip or slab from which an 18 mm wide cordon was formed. Three deep and wide oblique slashes were incised across it (Plate 18). It is similar to Vessel 1 from Mullach Sgar on Hirta, where an applied cordon is incised with a rough zig zag, and considered to be a bucket-shaped pot of second to first century BC date (MacSween 2011, 36-37, Figure 2.16).

Finishing

Where it has been possible to identify the finishing of the vessels before they were fired, some were obviously smoothed, or wiped with dried grasses, but finger moulding marks were not often removed. The evidence of finishing is largely absent due to abrasion in the channel and through wear.

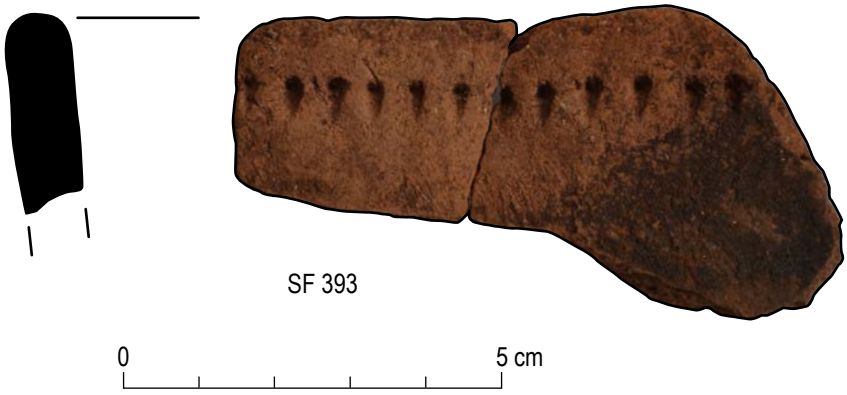

Plate 17: SF 357/393 decorated rim sherds.

Plate 18: SF 422 body sherd with applied cordon.

Surface deposits

Carbonised food remains are commonly noted as deposits on most sherds. They can be present on exterior and/or interior surfaces, on rims and bases. Some sherds, mostly from the channel had particularly thick deposits and some of these were sampled for the production of radiocarbon dates (Table 1). The predominantly grey colouring of sherds from context 5003 is most likely due to the infiltration of soot and food deposits.

Firing and burning

Most sherds appear to be well-fired, most likely with peat on a domestic hearth (described by Cheape 1993, 121). There is good integration of the clay and mineral content and sherds are relatively hard. Most of the sherds are orange/brown in colour reflecting the colours of the natural clays. However, SF 472 exhibits a green/grey colour in the interior sections of its sherds, which this may be due to the use of clay from a different location than that used for the majority of vessels.

Although there is no lamination noted in the collection, vessels surfaces have disappeared through their use on the hearth and by abrasion. Many of the sherds are burnt from the use of pottery on the hearth, and possibly from later burning events after being discarded.

Pottery artefacts

Within the assemblage are two small flattish but sub-circular pieces made from sherds from broken vessels (Plate 19). Both were found in the fill of the channel, context 5024.

SF 247 is a roundel of pottery measuring 20 by 17 by 8 mm. The interior surface of this piece is well preserved and very smooth and there is a suggestion that the edges and the sides of the piece have also been worn smooth, in spite of abrasion. The piece is also burnt. SF 319 is a less regular small roundel of pottery which measures 22 by 20 by 8 mm. Due to the abrasion of the piece it is difficult to ascertain whether it was deliberately shaped.

These two pieces are unusual in the context of the assemblage as a whole, and it is more than likely that they have been deliberately fashioned from sherds as playing pieces or counters. Spindle whorls, beads, as well as counters, were made from pottery sherds in the Iron Age, for example at the broch at Dun Mor Vaul, Tiree (MacKie 1974, 151, 153-154), and during later periods.

Plate 19: Possible counters SF 247 (left) and SF 319 (right).

Craggan or Crogan Ware

This pottery was made on the islands of the Hebrides until modern times. In the present assemblage, it is difficult to identify sherds of this hand-made pottery with their rounded or semi-rounded bases, baggy globular shapes with weak shoulders and narrow rim apertures, and distinguish them from prehistoric coarse wares. It has already been noted that some of the sherds from the agricultural soil (5003/5006) had mica included as a temper in the clay, along with quartz sand, organic material and sometimes additional mineral content. They are often small, thinner sherds, less than 10 mm in thickness, and dark grey in colour, and there is a possibility that they are evidence of medieval and later coarse wares, or Craggan wares. Sherd SF 15, grey in colour, and with mica in its composition, had thick carbonised food remains that were radiocarbon dated to the early to middle part of the thirteenth century, the medieval period (SUERC-91035, Table 1).

A single sherd, SF 358, from the fill of the channel is considered to be a piece of Craggan ware. The sherd is thin, finely made with a rounded and everted rim, and indicates the pot would have been globular or bag-shaped with virtually no neck. It is the largest sherd of this type and the only one from the channel.

Discussion

The radiocarbon dating of the pottery is interesting as it is all based on samples taken from the carbonised food remains adhering to sherds. Contexts represented are the infill of the channel (5024), the hill-wash or buried topsoil above channel revetment wall (5084), a rubble wall in the north part of channel (5091) and agricultural soil (5003). A sherd from the rubble channel lining (5091) produced a date of the second century BC to the first century AD (SUERC-91034, Table 1). Sherds from the infill of the channel and the hill-wash produced date ranges of the early part of the fourth century BC to almost the end of the first century BC. The early to middle Iron Age date ranges are consistent with the styles and decorative elements of the assemblage, and also with pottery from previous work on the island by GUARD, University of Glasgow from 1998-2003 (see MacSween in Harden and Lelong). Iron Age pottery was also found in a souterrain of the same period called ‘House of the Fairies’ (Gannon and Geddes 2015, 37-38), and therefore the assemblage from the channel adds further to our knowledge of Iron Age occupation of the island. The radiocarbon dates from Sollas, North Uist, with its seemingly later styles of pottery and decoration are predominantly the first to mid-third century AD (Campbell 1991, 140) and emphasise the earlier Iron Age dates of the current assemblage.

The radiocarbon date from the Craggan Ware sherd SF 15, (SUERC-91035, Table 1), suggests that not only the pot but also the agricultural soil could be medieval in date, and this may be important to our understanding of activities prior to more documented contact with the inhabitants of the island.

The anomaly is SF 51, potentially a Beaker sherd, found in the agricultural soil (5003). If the soil is a plaggan soil (artificially enhanced) it suggests that it has been manured with debris from other areas of the village or the bay area. It has been suggested there is no evidence of Neolithic activities on Hirta but two sherds were identified from the cliff by Village Bay as Neolithic (Gannon and Geddes 2015, 27, 29). However, the authors suggest that the earliest occupation of the island would have been from the Bronze Age, but there is little or no evidence of settlement or field systems to currently support this (ibid, 32).

This assemblage is beset with problems not least that all of it appears to be in secondary contexts: dumped in the channel, incorporated in the backfill of its walls and in the agricultural soils that overlay the channel. To all intents and purposes it can be considered largely to be unstratified. It tells us little about where it came from, only where it was deposited secondarily. A comparable scenario has been discussed for the stone tools (see Ballin Smith, below) found with the pottery, with the suggestion that the artefacts were settlement debris that possibly came from buildings demolished when the village was reorganised in the nineteenth century, if not earlier. There are many puzzles still left to solve.

Conclusions

The pottery assemblage covers mainly the early to middle part of the Iron Age period but the occasional rare sherd suggests use of the landscape, if not occupation from the early

Bronze Age. At the other end of the timescale, medieval Craggan wares are also present, if in small numbers of sherds mainly found in the agricultural soils overlying the channel. The questions remain as to when was the channel constructed and where did all the pottery come from that was deposited within it? The assemblage highlights the issues of movement of human cultural debris from one area to another, and the problems of wet taphonomic conditions, and the abrasion of pottery.

The lithic assemblage

By Torben Bjarke Ballin

Introduction

The purpose of this report is to characterize the lithic artefacts briefly, referring to raw-materials used and their typo-technological attributes, followed by a section on their dating and a discussion of the assemblage. The evaluation of the lithic material from St Kilda is based upon a detailed catalogue (an Excel database) of the lithic finds where the artefacts are referred to by their catalogue number (CAT no.).

The Assemblage

From the excavation on St Kilda, 21 lithic artefacts were recovered (Table 8 and Figure 6). In total, 53% of the assemblage is debitage, whereas 14% is cores and 33% tools. One flint pebble and five small natural quartz/rock crystal crystals were retained as it was thought that they may have been collected by the St Kilda settlers.

The definitions of the main lithic categories are as follows:

Chips: All flakes and indeterminate pieces the greatest dimension (GD) of which is ≤ 10 mm.

Flakes: All lithic artefacts with one identifiable ventral (positive or convex) surface, GD > 10 mm and L < 2W (L = length; W = width).

Indeterminate pieces: Lithic artefacts which cannot be unequivocally identified as either flakes or cores. Generally the problem of identification is due to irregular breaks, frost-shattering or fire-crazing.

Chunks: Are larger indeterminate pieces, and in, for example, the case of quartz, the problem of identification usually originates from a piece flaking along natural planes of weakness rather than flaking in the usual conchoidal way.

Blades and microblades: Flakes where L ≥ 2W. In the case of blades W > 8 mm, in the case of microblades W ≤ 8 mm.

Cores: Artefacts with only dorsal (negative or concave) surfaces – if three or more flakes have been detached, the piece is a core, if fewer than three flakes have been detached, the piece is a split or flaked pebble.

Tools: Artefacts with secondary retouch (modification).

Type	Number
Debitage	
Chips	2
Flakes	6
Thermal flakes, burnt	1
Microblades	1
Indeterminate pieces	1
Total debitage	11
Cores	
Irregular cores	2
Bipolar cores	1
Total cores	3
Tools	
Short end-scraper	1
Side-scraper	1
Scraper, atypical	2
Pieces w edge-retouch	1
Fire-flints	1
Crystals, used	1
Total tools	7
TOTAL	21
Pebbles/crystals	
Pebbles	1
Quartz crystals, natural	4
Total pebbles/crystals	5

Table 8: General artefact list.

Raw materials – types, sources and condition

The collection's artefacts include two raw materials: flint (12 pieces) and quartz (nine pieces). The quartz is generally white milky quartz, which could have been collected from natural occurrences around the island (Ballin 2008), whereas the flint includes grey, buff, light-brown and black forms, which may be fine-grained (most) or medium-grained. It is possible that some of the flint may have been brought to the island from other parts of the Hebridean area, mainland Scotland, or Britain at large, and for example, fire-flint CAT 8 could possibly be based on ballast flint. It is also possible that some flint was available from the beach in front of Village Bay, as chalk from which flint derives, is found in some of the offshore sedimentary basins (Hunter Blair 2018, 23).

Five natural quartz crystals were retained, and some of these are of rock crystal. CAT 20 is a large crystal of rutilated quartz, that is, milky quartz/rock crystal with black rutile crystals embedded in the silica matrix (Hall 2000, 87).

Characterization and discussion

The flakes/blades and the flaked tool blanks were mostly detached by hard percussion, but one flake is based on bipolar technique, and one flake and a microblade (CAT 13) were detached by the application of soft percussion. CAT 13 is a small quartz microblade which was clearly struck from a crystal, as the dorsal face consists of two crystal facets. This is interesting, as in western Scotland quartz crystals were usually reduced by bipolar technique (i.e. smashed). In his report on the quartz assemblage from Lealt Bay, Jura, the author wrote (Ballin 2014): *Some flakes [from crystals] were produced in platform technique, but the general approach in reduction of rock crystal [in western Scotland] was by the application of bipolar technique, disregarding the possibilities of the raw material. It may have been collected for its appearance (symbolic value) more than for its utilitarian value*. During the Mesolithic of southern Norway, rock crystal and smoky quartz crystals were used extensively for microblade production (Plate 20), and large quartz crystals are excellent for this purpose as they were formed with six natural crests (Ballin 1998; 2008, 47).

Plate 20: Microblade of rock crystal from southern Norway (Ballin 2008, 47).

The site's cores include two irregular cores of flint (GD=22-25 mm) and one bipolar core of quartz (GD=26 mm). Both irregular cores (CAT 7, 10) were reduced in an unschematic manner. The bipolar core (CAT 22) is a bifacial specimen with two reduction axes, that is, it was reorientated to exhaust the raw material as much as possible.

The tools include four scrapers, one piece with edge-retouch, one fire-flint, and one used quartz crystal. Two scrapers are relatively regular: one is a hard-hammer quartz flake with a convex scraper-edge at the distal end (CAT 15: 26 by 22 by 9 mm) and one is a bifacial bipolar core with a slightly convex scraper-edge along one lateral side (CAT 9: 26 by 26 by 8 mm). One atypical scraper is a tiny proximal fragment from a hard-hammer flake with slightly convex scraper-edges along two edges (CAT 12: 9 by 13 by 5 mm). Another atypical scraper is based on a small irregular core, and it has slightly convex scraper-edges along several edges (CAT 1: 18 by 12 by 10 mm). CAT 4 is a small soft-hammer flake with fine retouch along both lateral sides, and the abraded nature of this modification suggests that the piece may have been used for scraping. One relatively large indeterminate flake (CAT 8: 32 by 26 by 11 mm) has robust wear along most edges and may have been used for fire-making with a steel strike-a-light (see the report on the lithic assemblage from Allt Iain near Fort William; Ballin 2018a). CAT 20 is a large quartz/rock crystal

(38 by 18 by 14 mm) with clear abrasion and peck marks at its apex, and it may have been used as a *percussoir/retoucheur*.

Approximately half of the artefacts and crystals (12 pieces) are from relict agricultural soils (5003/5006/5008); four pieces are from an ashy fill (5024) associated with a possible hearth (5021); and the remainder are from various redeposited fills, for example, the fill of a wall and various fills and soils associated with the stream channel. It is not possible to date the artefacts on the basis of their find contexts or formal typology, but together they seem to form a typo-technologically homogeneous assemblage, and they could easily represent a single industry. The presence of a microblade and soft-hammer blanks suggests that this industry might date to the late Mesolithic/early Neolithic framework. A possible fire-flint (CAT 8) may date to later prehistory or medieval/post-medieval times.

Although the assemblage is numerically small, it is also informative and draws a picture of an industry seriously economising a sparse resource characterised by few and small flint pebbles supplemented by quartz. This economical approach is defined by:

- The blanks, cores and tools are generally diminutive,
- There is extensive use of quartz,
- and extensive use of bipolar technique to exhaust cores, with some bipolar cores being reorientated to exhaust the cores completely.
- The use of quartz crystals for the production of microblades by soft percussion; generally, crystals were worked in bipolar technique (smashed) in the remainder of the Hebridean area and on the Scottish west-coast.
- There is an exceptionally high tool ratio.
- Small cores were generally recycled as tools, such as scrapers.
- The scrapers were worked down to exceptionally small sizes.
- There was the use of a large crystal as a *percussoir/retoucheur*.

Most likely, this approach is a product of St Kilda's remote location, where the knappers had to make the most of a sparse resource of diminutive local pebbles or the importation of lithic raw material across a stretch of c. 65 km of open sea, with the nearest coast (that of North Uist, the Western Isles) also being characterized by sparse resources of flint (cf. Ballin 2018b)

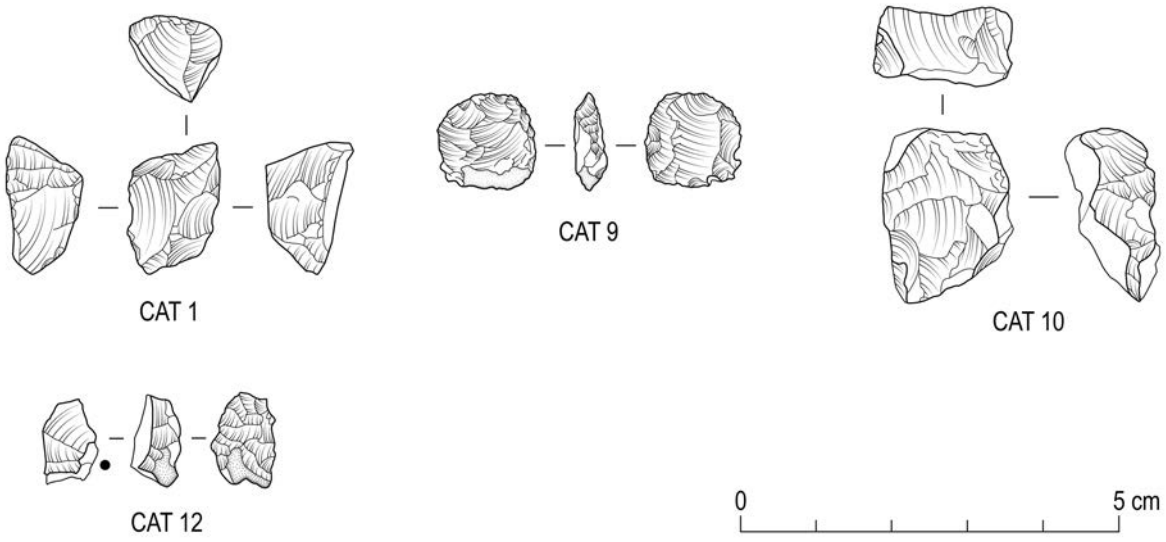

Figure 7: Lithics.

The coarse stone

By Beverley Ballin Smith

Introduction

Archaeological work associated with the construction of a new accommodation block at Village Bay, included the excavation of a stream or channel beneath the former MOD building, where 32 stone tools were identified (Figure 6). Evaluation trenching and a watching brief were subsequently carried out in connection with an accommodation and infrastructure development, where an additional two stone tools and fragments of slate were retrieved. A catalogue of all worked pieces can be found in Appendix 5.

The stones were gently brushed or washed before being weighed and measured, and before examination with a x6 hand lens. Their attributes and statistics were compiled in an archivable database devised using Microsoft Excel. Unworked stone was separated out of the worked collection and discarded. The most interesting worked pieces have also been photographed and catalogued (see below). The collection was analysed according to CIfA's Standards and Guidance for the collection, documentation, conservation and research of archaeological materials (2014).

Most of the stone artefacts and samples were collected by hand from the archaeological interventions, and although soil samples were taken and later sieved, no further tools were found. It is difficult to indicate with any degree of certainty the historical the period(s) to which the worked stones belong but the Iron Age period or later is most likely.

The rocks of the St Kilda island group are igneous and most of the identified tools are igneous, but sedimentary and metamorphic rocks are also present indicating the movement of boulders by the sea and the bringing to the island of imported materials for use in construction.

Many of the stone tools are not in good condition. Their burial in deposits associated with the construction, use and filling of the channel have caused many of the stones to be abraded by mechanical movement and through the action of water, particularly if located in the channel. The surfaces and edges of bar-shaped tools especially, have been worn smooth by water. Others have lost fine detail, and collected surface deposits. In some cases the identification of stones as tools is unclear and therefore there is some ambiguity about them.

The results

The raw materials used for tools

Most of the stones used for tools are granite, with the addition of dolerite and basalt. In addition, tools and worked pieces in sandstone, mudstone, Welsh slate and garnetiferous mica schist have also been recorded. The inhabitants of St Kilda used locally available stone for their domestic and other needs, including suitable cobbles washed up in Village Bay that could be readily used without much transformation, and boulders or larger pieces of stone that could be flaked to produce specific tool shapes. Depending on the needs of people, the resources required for tools were simply collected from the shore or low coastal cliffs, although grey-green dolerite is likely to have derived from the scree slopes below Clais a Bearnaich, Mullach Sgar (Senior 1996, 81, also Fleming and Edmonds 1999). The acquiring of raw materials would have occurred from the first appearance of people on St Kilda and continued into the nineteenth century AD, or even into the early twentieth. Stones alien to the area would have been brought by boat, such as slate for roofs and mica schist for querns, from other parts of the western highland region and further afield. Other stones such sandstones and mudstones could have washed up on beaches, or been brought as ballast in sailing ships. On a remote location as Hirta, any suitable stone resource would have been utilised, if there was a need.

Cobble tools from the excavation

Cobbles of granite, dolerite basalt and other igneous types with smooth surfaces were used for the tools identified in Table 9. They are all stones that fitted easily in the hand, for cutting, hammering, polishing, grinding and pounding. Cobbles were chosen for their weight (density), size and suitability for the intended job, and were not altered in any way prior to being used. They were expedient tools often used for a short time, in the case of hammerstones, or for a longer time,

if used as pestles (one end ground, the other end pecked), or grinders (one or both ends smoothed and faceted by a grinding action). The wear patterns on the latter tools indicate that some of them were in use for a considerable time.

Cobble tools	Small find number	Weight range (g)
Hammerstone	12, 60	744-838
Pounder	171, 194, 311, 403, 494, 495	158-302-566-718-1156-1330
Hammerstone/ grinder	252, 489	992-1280-1688
Hammerstone/ pounder	222, 459, 508	412-752
Pounder/ polisher	59	838
Pestle	72, 155	386
Grinder	81, 151, 152, 167, 206, 467, 477	125-382-424
Weight	236	510

Table 9: Cobble tool types by type and weight.

A hand tool could also be put to other uses, such as hammering or polishing. Tools with secondary polished edges or surfaces, such as SF 59, could still fulfil its primary function as the action of polishing did not destroy the tool. In contrast, a grinder or pounder used secondarily as a hammer, such as SF 508, often became damaged in the process and was discarded after use. Of the total number of artefacts, 24 (75%) were cobble tools.

The weights of tools were often important (Table 9), with grinders, pestles and some pounders weighing under 500 g, at the lighter end of the range. The lighter the tool the longer it could have been used at one event, for example, if it was used for food production, and possibly in conjunction with a quern or mortar to crush and grind grain. There could also have been a gender bias, if females of the population prepared food, then lighter and smaller cobble tools were probably preferred. SF 459, a hammerstone/ pounder was a lighter weight tool but it was also heavily abraded.

The majority of the remaining cobble tools lay within the range of 500 to 1000 g, with two pounders and two hammerstone/grinders approaching the top of the range at 1688 g. The heaviest of these were likely to have been used in construction activities, for example, the erection of structures, cultivation boundaries, and indeed the building of the water channel, through the trimming and breaking of stones or gentle nudging them into place. Pounder/polisher SF 59 had a worn (polished) side and this may have been the result of using the stone as a hone or whetstone. It is the only tool of the collection to indicate the possibility of metal knives or other implements requiring sharpening.

SF 236 is a naturally flatted cobble with one domed surface, and it was used as possible weight. Its ends are notched, as if to take a rope, but whether they are natural or a result of manufacture by pecking is not possible to determine due to abrasion and by burial in the channel. The cobble is considered to have been a weight for a thatched roof (tied onto a rope to keep the thatch in place), or possibly even for a fishing net or line (to sink the net in fishing).

Flaked tools from the excavation

Seven cobbles or stone bars were modified in order to produce tools (Table 10). The materials used in these cases include sandstone for the chisel, dolerite for the ard rough-out, possible pot lid and the mattocks, an igneous rock for the knife and possibly a piece of mudstone for the struck piece. As with the cobble tools, a suitable stone was selected, and if a sharp edge was required, such as SF 117 the knife or SF 398 the struck piece, it would have been smashed, perhaps with a hammerstone to split it. An improvised tool with a sharp edge could easily be manufactured using the simplest of methodologies. Both the knife and the struck piece were created in the same way. One piece that displays evidence of further use is the chisel SF 267. It is a flake struck from a sandstone cobble with the intention of using it as an expedient knife. However, one end of it has been worn smooth through use as a chisel or scraper.

Flake tools	Small find number
Chisel	267
Knife	117, 384
Ard rough-out	150
Pot lid	245
Mattock	254, 488
Struck piece	389

Table 10: Flaked tools by type.

SF 245 is a possible unfinished pot lid that broke during manufacture. The edges of the stone were struck by a pounder or hammerstone to detach flakes to shape the piece into a more rounded

form. It is a thinner stone than those used for the mattocks and therefore broke more easily.

The three most interesting tools of the collection are the ard rough-out and two mattocks, all made on igneous stones, most probably dolerite.

SF 150 is a bar shaped stone that was partially manufactured (Plate 21). It was flaked down one side and the tip of the piece had been shaped to a narrow rounded point. However, the stone broke when a large flake was detached at its opposite end. The shape of the piece suggests it was intended to be an ard point, the working end of a primitive wooden plough that would cut through turf and soil.

Plate 21: SF 150 flaked bar, ard roughout.

SF 254 and SF 488 are two mattock blades. SF 254 is the coarser of the two and was shaped and its edges thinned by flaking. The blade end or cutting edge of the tool was also shaped but scarred through use. An area of polish on one surface is also evidence of the tool's use. The tool was discarded when it broke across its shaft (Plate 22).

Plate 22: SF 254 mattock blade.

SF 488 is a well-preserved example of another mattock blade (a digging tool) that also broke across its shaft (Plate 23). The piece was chipped or flaked to linear shape but the blade end is rounded and displays wear marks through heavy use. The smoothing of the stone through use is noted from the blade edge and up the sides of the stone for approximately 90 mm. Faint linear striations can be seen on the worn surfaces of the tool.

Plate 23: SF 488 mattock blade.

Flaked tools from the watching brief

Two flakes from cobbles were probably intended to be used as knives. SF 1 has smoothed edges, and SF 2 has rounded edges, indicating both were used and worn. Two pieces of slate, a Scottish example from Ballachulish and a Welsh example, indicate the importation of stone during the nineteenth century for the construction of improved housing for the islanders (Emery 1996; Senior 1996, 81), or more likely for the church and manse. Gannon and Geddes (2015, 98) noted that the storehouse and tacksman's house which were built after 1779 had a slate roofs, and the church and manse received theirs in 1827-28.

The context and location of the finds

The tools were mainly associated with deposits overlying and infilling the stream channel, the infilling behind its walls and colluvium, and are not considered to have been found in contexts that aid the dating of themselves, or the channel (Table 11). Most of the tools could have been washed into the channel with movement of soil downhill, or in backfilling material. The ard rough-out was recovered from the upper buried

agricultural soil horizon, suggesting a link with agricultural activities there or higher up the slope, and therefore of a different date than that of the construction and use of the stone-lined channel built for water management.

From the Excavation	Number	Tool types
Unstratified	1	Pounder/ polisher
5003=5006 upper buried agricultural soil horizon	2	Hammerstones
	1	Pestle
	1	Grinder
	1	Flaked knife
	1	Ard rough-out
	1	Pounder
5019 MOD brick feature	1	Grinder
5024 upper fill of stream	1	Pestle
	3	Pounder
	1	Weight
	1	Pot lid
	1	Mattock blade
	1	Hammerstone/ grinder
	1	Knife
	1	Struck piece
5079 infill of wall 5089	1	Grinder
	1	Possible pestle
	1	Pounder/ hammerstone
	1	Chisel/knife
5082=5094 hill-wash	1	Grinder
5084 hill-wash	1	Pestle
	1	Hammerstone/ pounder
	1	Mattock blade
	1	Hammerstone/ grinder
	2	Pounders
5091 remnant wall on S side of channel 5047	1	Grinder
5123 bottom fill of stream	1	Hammerstone/ pounder
From the evaluation	Number	Tool types
	2	Knives
	2	Slate pieces
Total	36	

Table 11: The contexts associated with the stone tools.

The number of finds from these contexts indicates that many were expedient tools, to be used a few times and then discarded. Some may have been used in the making of the stone-lined channel and thrown away afterwards, but their high number suggests other reasons for their disposal. The reorganisation of the village in the early 1800s would have generated debris, perhaps debris containing many of the stones and pottery that was dumped downhill, in and over the channel. The pottery found with the tools is highly abraded and waterworn, indicating at the time the sherds found their way into the channel, it was open with running water. Some of the tools are also highly abraded. The inference is that the channel was open for a considerable period of time before it was filled in.

The sherds of pottery, which provided the radiocarbon date range for the contexts associated with the channel, may also provide a realistic time frame for the deposition of most of the stone tools.

Discussion and conclusions

In earlier archaeological work on St Kilda, 'blade' shaped tools were found in the excavations of the village houses. House 6 and House 8 produced pebble edge-scrapers possibly used as knives (Senior in Emery 1996, Fig 34, sf 220, Figures 53-55), with a range of cobble hand tools. Two blade tools were located in Blackhouse W, one from phase 4 and one from phase 6 (Senior 1996, Figure 75 and 76 sf 49, 50 and 55), with the addition of cobble tools with edge wear. There is no overall discussion of the use of stone tools at a time of the importation of metal and ceramic finds into the settlement on St Kilda, but Emery (1996, 187) suggested that both coarse pottery and stone tools were used into the nineteenth century. The range of cobble and flake tools from his excavations suggests that they carried on being used into modern times.

Cobble tools are an important element of prehistoric life in Scotland from the Bronze Age onwards, and especially during the Iron Age in other island groups such as Orkney and Shetland (see Clarke, A 2006). The tools from the recent excavation at St. Kilda, either individually or as a collection, are not diagnostic in themselves of any particular period. The radiocarbon dates from the excavation, mainly taken from carbonised food remains from sherds of pottery deposited with the stone tools, provide a rough date range of the end of the fourth century BC to the beginning of the first century AD – the middle Iron Age. The topsoil or disturbed deposits associated with an Iron Age souterrain

on St Kilda the 'House of the Fairies', produced a variety of stone artefacts including cobble pounders, grinders and smoothers, skaill knives and flaked stone bars (Gannon and Geddes 2015, 37-38). Other comparative collections are those from Iron Age broch sites on Orkney and Shetland, where a wide range of cobble tools, including combination or multiple-use tools such as hammerstone/grinders or hammerstone/pounders were found in significant numbers (see Ballin Smith 1994, 92-204).

It is quite clear from Emery's work that 'blade' tools or mattocks (flaked stone bars) were commonly found and therefore used on St Kilda, but their frequency in other areas may be dependent on geology, such as at Sumburgh in Shetland (Clark 2006, Illus 4.46 and hafted bar, Illus 4.27) where other types of stone were used, or the availability of alternative materials such as cattle bones, antler or whalebone, from for example, Howe on Orkney (Ballin Smith 1994, Illus 104). Excavations at Udal, North Uist in the 1970s and 1980s by Iain Crawford, identified both mattock and ard marks in consolidated blown sand from the early Bronze Age (Ballin Smith 2018, 40, Figures 2.21a and 2.23) but no tools were recovered due to landscape changes and acidic soils. The blades of stone or bone mattocks would have been hafted in a wooden handle and used like a modern day mattock with a metal blade.

Other fieldwork research on St. Kilda in the late 1990s and early 2000s by GUARD, University of Glasgow, also found numerous stone tools and flaked stone bars from secure Iron Age contexts (Harden and Lelong 2011, 29 and Clarke 2011, 37-42, 66-67, 247-151) but none of these was recognisable as an ard point. SF 150, the ard rough-out, that broke before it was finished, is the only identified stone plough tip, to date, from the island group. A variety of other digging tools may have existed as flaked stone bars, as well as the mattocks, in order to cultivate small fields of oats (Steel 1975, 59). Stone ard points are common on Shetland, where they have been found from at least the Bronze Age (Ballin Smith 2005, 24-26, Illus 24), and into the middle Bronze Age and early Iron Age (Cracknell and Smith 1983, 27-29, Fig 16).

Emery's work produced other tool types not found in association with the excavation of the channel or the watching brief. These included whetstones, which probably did not appear until much later on in St. Kilda, and querns. Querns would have been extremely valuable household tools and were probably used until they completely worn out.

It is highly likely that given the radiocarbon dates suggest a middle Iron Age date range for the infilling of the channel, and the occurrence of pottery from the same period, that the majority of stone tools recovered are contemporary. There may be a suggestion that tools from the upper buried agricultural soil horizon are later in date, but that depends on where that soil comes from.

The collection of cobble and flaked stones is not the largest recovered from the island, but add useful information and complement those already found.

The glass assemblage

By Robin Murdoch

This small assemblage of glass from St Kilda consisted of six items, three of which were retents from bulk samples (Table 12). The bottle neck SF 065 has the characteristics of a free-blown bottle and with the neck and lip hand finished. The slightly uneven lip suggests the bottle might have been made before the first semi-automatic moulding machines came into use around 1821 (Ricketts Mould). However, it is unlikely that this moulding technique was universally adopted all at the same time, hence a suggested broader date of the first half of the nineteenth century.

One shard of window glass SF 069 (Sample A) was submitted for pXRF analysis to identify its composition. Although clear the shard did have quite a number of small seed (gas bubbles) indicating it was probably earlier than the MOD occupation of the site.

Comparison with a larger group of shards recovered from around the houses in the village between 2003 and 2006 show similar dating of nineteenth to early twentieth century. Five

shards of window glass were analysed from the 2003-6 group. One was kelp fluxed and probably pre c. 1835 and a further two dated to the period c. 1835–c. 1870. An even earlier excavation from 1986-1990 uncovered considerable quantities of glass and was published by Emery in 1996. These excavations also yielded a considerable amount of glass, again mostly early nineteenth century to the early twentieth, and the report was liberally illustrated. Both of the earlier excavations were undertaken on behalf of NTS but none of the 1986-90 shards were analysed.

SF No.	Context	Description
65	5006	Part neck and lip from probable wine bottle in firebright very dark green (black) glass. Downturned triangular string ring below slightly uneven lip. Faint small twist striations on neck. Hand-blown bottle of first half of nineteenth century.
69	5004	Small shard clear window glass, no apparent tinge but occasional very small seed (gas bubbles) Shard thickness 2.7mm, (Sample A)
190	5006	Wall shard in pale to mid amber from cylindrical bottle (possibly medicine), firebright, no earlier than very late nineteenth century and more likely twentieth.
Bulk Sample	Context	
3	5006	Miniscule shard clear glass, possibly thin blown vessel, too small for further comment.
8	5003	Tiny shard clear glass, thin blown 0.8 mm, may be slightly curved therefore possible drinking vessel. Too small for pXRF analysis.
15	5022	Miniscule shard clear glass, looks thin blown but may be shatter shard

Table 12: Glass catalogue.

The metalwork assemblage

By Gemma Cruickshanks

A total of ten iron objects were recovered, nine of iron and the others are copper alloy (see Figure 6 and Table 13 for the catalogue). Three objects are differing forms of pegs or stakes, most likely from military tents. SF 86 is a large, 440 mm long, pointed rod with hooked head, while SF 77 has a more complex T-sectioned profile with notched head to secure the ropes. Such large, robust pegs would have been particularly suitable in soft ground, particularly SF 77, as the T-section would have helped to prevent the peg from twisting under tension. Only the top of SF 140 survives but evidence of burring on the head indicates it underwent repeated blows with a hammer or mallet and is therefore also likely to be a stake or peg. Both pegs SF 77 and SF 86 were recovered from a buried soil horizon (5006) while SF 140 was from the upper fill (5024) of an infilled stone-lined stream (5047). As pegs/stakes are driven into underlying contexts when used, their context of discovery is often earlier than when they were used and made. Given the robust nature of these pegs and their location within the MOD area, they are likely to have been used for military tents during the twentieth century.

Two handmade nail shanks (SF 139), a modern circular-sectioned nail (SF 142a) and rove (SF 142b) are typical fittings used for a range of timber fittings. They were recovered from remnants of hardstanding associated with previous MOD activity (SF 5080) and a landscaping layer of redeposited soil (5078). Handmade nails and roves were in use from the Iron Age onwards and have changed little in form, but these are likely to be relatively recent.

A fragment of large composite iron and wooden object is difficult to identify (SF 126). It comprises mineralised wood riveted within a V-shaped iron strap, with traces of surrounding plate-like fragments adhering. The object was recovered within granophyre rubble (5040), subsumed by relict agricultural soil suggesting it may be have had an agricultural function, for example as part of a plough, but its identification remains obscure.

An unstratified iron screw fragment (SF 138) is relatively recent in origin and a recent copper-alloy domed fitting (SF 71) from redeposited topsoil (5004) could have been attached to a range of objects, such as tool handles.

Discussion

The archaeological investigations recorded a variety of features, the most recent of these associated with earlier use of the site by the MOD. Tent pegs and other small metal objects

recovered relate to the original resettlement of Village Bay in the 1950s, the brick and concrete building remnants recorded during the watching brief and during the excavation relate to the former ablutions block and ratings accommodation, part of the gymnasium, the former canteen and recreation building and the temporary Contractor's Accommodation or Stores Unit. These buildings were part of the original complex of Nissan huts and other buildings constructed by the Air Ministry Unit from 1957 onwards, on land that is leased to the MOD from the National Trust for Scotland. Some of the buildings were demolished in 1969-70 and the present complex of green painted MOD buildings was built.

Artefacts

The earliest evidence of human activity on site may be represented by finds of flint or quartz, these were fairly evenly distributed across the site, but with the exception of a thumbnail scraper from a possible hearth and an unworked flake from a pit, the lithics were recovered from reworked soils. However, their typology indicates a late Mesolithic/early Neolithic date for some of these artefacts. The flint was possibly imported to the island during this period although there is a slight possibility it was washed up on the beach in front of Village Bay in from offshore sedimentary basins. Several flint cores and flakes were recovered during the excavations carried out between 1986-90 (Emery 1996) around and below buildings on the street, and more recently a flint flake was recovered from *Tobar Childar* in 2010 by Ian McHardy the former St Kilda archaeologist (McHardy 2010, 176-17).

The earliest evidence for prehistoric activity to date on St Kilda is find spots of Neolithic pottery. Some were recovered during the excavation

SF Number	Context	Description	Diameter (mm)	Length (mm)	Width (mm)	Thickness (mm)	Perforation (mm)
71	5004	Slightly domed circular copper alloy mount with central circular perforation. Modern. Possibly from a tool handle.	25			1	8.5
77	5006	Tapering robust peg with T-section and notch beneath head for securing rope. Bent, particularly close to tip and head, which may have happened during an attempt to drive it in, leading to its discard.		290	27	25	
86	5006	Large, robust circular-sectioned peg with hooked head and tapered point. Bent around the middle.	17	440			
126	5040	Iron strap bent into 'V' with mineralised wood within, secured by circular-sectioned rivets at the top and bottom (near bend – only visible on X-ray). Traces of iron plate survive around one side, indicating substantial components of this object are now missing.	rivet head 13, shank 6.5	45	26	wood thickness 48, plate thickness 4	
138	u/s	Modern screw fragment, at least one end broken.	12	101			
139	5080	SF139 Two nail shanks, one straight and the other curved, both missing heads.	10, 4	69, 43			
140	5024	Iron peg or stake with burred head from hammering slightly but broken before tip.	head 23	86			
142a	5078	Modern circular-sectioned nail with sinuous shank, indicating removal. Head and tip damaged.	4	60			
142b	5078	Sub-square rove/washer with central circular perforation.	8	38	37	2	

Table 13: Metalwork catalogue.

of part of a consumption dyke to the NNW of cleit 48 (Fleming and Edmonds 1996), and two decorated rim sherds of Neolithic pottery, in the Hebridean style, along with a sherd of cordoned pottery, were discovered eroding out of the cliff face on the east side of village bay (Copper 2017).

The majority of the pottery recovered during the recent work dates from the Iron Age, although a sherd of a possible early Bronze Age Beaker, two sherds of medieval or later Craggan ware were also present. The Craggan sherds were found in the buried agricultural soil and from the infill of the channel. The pottery assemblage demonstrates the land in the vicinity of the excavated area was subject to use / occupation from at least the Bronze Age. Although evidence of structures on the island dating to the Bronze Age is low, a number of cist burials of that period were found below grassy covered mounds in the glebe and the fields in Village Bay known as *cnocan sithichean*, or *House of the Fairies*. They contained earthenware vessels but the majority were removed during agricultural improvements associated with the redevelopment of Village Bay organised by the incumbent minister Reverend Neil Mackenzie (Mackenzie 1904-05). A stone-capped, and stone-lined chamber survives on the lower meadow on the croft belonging to House 7 and may be a similar structure to those removed by the minister during clearance of the glebe (Stell and Harman 1988). ouseHouse 7

Occupation in this area appears to have intensified during the middle Iron Age and the soils are likely to have been developed and improved by repeated manuring and cultivation from this period onwards. The evidence for middle Iron Age activity is not limited to the recent excavation area but adds to the *corpus* of earlier archaeological investigations indicating that a fairly intensive period of settlement and activity was taking place across Village Bay during this period perhaps as a result of an increasing population due to improved farming practises and the introduction of new crops.

A series of excavations carried out over a five-year period, located on the lower slopes of *Mullach Sgar*, near *Clash na Bearnach* on the west side of Village Bay, recovered stone tools from structures dating to the middle Iron Age c. 200 BC-AD 400 (ScARF 2012), the first-time pottery and stone tools were dated from a secure archaeological context on St Kilda (Duncan and Will 2002).

A programme of geophysical survey and trial trenches excavated across the village between 2004 and 2006 identified the remains of structures, drains and surfaces and found that ashy midden had been dumped to improve cultivated soils. The finds assemblage along with modern glass and metalwork included post-medieval Craggan ware, and mainly Iron Age pottery, as well as a variety of stone tools that together suggested a sustained period of domestic and agricultural activity from the later prehistoric period onwards (Harden and Lelong 2011)

The numerous stone tools recovered across the recent study area, included pounders, hammer stones, and mattock blades which although of local dolerite could date to any period from the prehistoric to the medieval periods or later. Numerous stone tools have been found discarded in Village Bay and many of these have been found incorporated into the walls of *cleitan* often used as pinning stones (Craig Stanford *pers. comm.)*.

During a survey of the dolerite scree slopes of *Clash na Bearnaich* or *The Chimney*, by Fleming and Edmunds (1999), tools and waste quarry material was discovered located at higher levels to the north and south of *The Chimney*, suggesting that quarrying was taking place for raw materials to manufacture stone tools from possibly as early as the Neolithic period.

Further evidence of prehistoric stone tool production and use was found during excavations on *Tigh an t-Sithiche*, or *House of the Fairies*, believed to be an Iron Age souterrain, located 36 m to the north-east of the churchyard. It was discovered by accident around 1844 and initially investigated by Sands in 1878. The souterrain has been subject to five further investigations between 1897 and 2004, and during the course of the works a number of stone hoe blades, hammer stones and Iron Age pottery were recovered. The stone tools removed from the souterrain during Sand's exploration were instantly recognisable by the St Kildan's living on the island and they could name their counterparts still in use (Sands 1878).

During the excavations initiated by the National Trust for Scotland, and undertaken by Durham University over a five year period from 1986 to

1990, a mound was investigated at Blackhouse 8, located towards the centre of the village street. Further stone tools including hammer stones and hoe blades or ard points were recovered from soil horizons during its excavations (Emery 1996).

Water courses and milling

The recently excavated infilled stream channel was an enigmatic feature and despite a broad middle Iron Age date range attributable to the radiocarbon dating of sherds of pottery recovered from it, its origins remain difficult to date with any degree of confidence. The suggestion was put forward that this could have been the formalised channel leading from a mill situated further upslope.

A mill, erected 1861 is depicted on Sharbau's plan of village bay but it is unclear if this was a working corn mill, as there is no clear channel to the building from the nearby water course (Stell and Harman 1988, 19). Towards the latter half of the nineteenth century the mill probably became redundant as no further records of it or any other mills exist, and hand milling of grain appears to have been the norm from this period onwards.

During the course of the excavations at Blackhouse 8, the subsoil surface of part of the site had an infilled stream channel draining water from the spring at *'Tobar childa'*, curving to the south-east with a slight mound dividing the broad main channel from a narrow tributary. Numerous coarse pottery fragments were recovered from the principle stony fill, along with steatite vessel fragments, stone tools and a fragment of iron. A date of AD 1135 was returned from a fragment of the pottery submitted for thermos-luminescence dating, and barley and oat grains were recovered from a silt layer at the base of the channel (Emery 1996). However, the channel itself was not dated.

The recently excavated stream channel meandered across the site from the north-west to the south-east, where it was found to have been extensively modified with stone-lined edges, with the addition of a ruinous wall along its north-eastern edge. At this point the channel resembled a form of mill lade where it traversed the north-western part of the excavation area (Plate 24).

Plate 24: General view of the stone-line channel (right) with the infilled meander in the centre of the picture with the scale bar.

The function of the wall along the north-east side of the channel is unclear. The wall was built with facing stones enclosing an earth and rubble core which is dissimilar to that of the traditional drystone construction of the majority of the walls on St Kilda. Many of the walls in the area of the excavation sub-divide the present layout of crofts and are consumption dykes, or form the *cleitean* structures. The construction of the water-course wall resembles the foundations of the rounded-wall around the north end of a nineteenth corn drying kiln at Blackhouse W, which included large earthbound stones (Emery 1996). Martin during his visit in 1697 records the stone dwelling houses as low-built with a cement of dry earth. Although the wall beside the channel did not appear to be associated with a building, it cannot be discounted that the wall formed part of a larger structure.

At Shawbost, a crofting village on the Island of Lewis, an Iron-Age / Norse click- or horizontal-mill and a corn drying kiln have recently been subject to a series of restorations. Both structures have

double-faced round-cornered walls with thatched roofs and closely resemble the pre-1830s houses on St Kilda. A stone-lined channel or lade diverts water to the mill from a stream draining water from Loch Roinavat. This primitive horizontal water-powered mill is the only surviving working example on the Western Isles of what would have been hundreds in the 1840s. Many mills would have been simple structures and were unlikely to have adjacent associated corn-drying kilns (Canmore NB24NE 60).

The location of the stone-lined channel in Village Bay is topographically similar, located on gently sloping ground, to the mill complex at Shawbost on Lewis, although there is not a loch on St Kilda from which the water could drain. However, given the location of the recently excavated channel there is probably sufficient gradient, if the stream was temporarily dammed far enough upstream to generate a head of water, to drive a horizontal mill for a sustained period.

Martin Martin (1698) during his visit to St Kilda mentions two watercourses, describing them as *a rivulet runneth close by the town, and another larger beyond Kilder's well, this rivulet drops form (sic) the mossy ground in the tops of the hills*. The rivulet may refer to what is now known as the Dry Burn, dependant on the still fully undetermined location of the 'town' and the other larger stream beyond Kilder's well may refer to the deep ravine carved out by Abhainn Mhor at the east side of Village Bay. It is interesting to note that Martin does not describe the rivulet as flowing from Kilder's well as it appears on Macgregor's map of 1957[1] (see Geddes 2018, Fig 8). The excavated channel may have originally been the lower reaches, or a deliberately constructed branch, off a natural meandering stream or rivulet, channelling the water from the hollow at An Lag deriving from the surrounding hill slopes before flowing into Loch Hiort at the east side of Village Bay.

An additional stream channel is depicted on Macgregor's plan (ibid) towards the eastern side of the common ground but this does not appear to correspond to the position of the channel identified during the excavation and could conceivably have been an early watercourse from which the stone-lined channel drew water from, or conversely the watercourse could have been formed after the stone-lined channel was filled in, and used for irrigating the small enclosures depicted adjacent to it on Macgregor's plan. The excavated channel almost certainly has been a continuation of a stream channel that crossed the glebe on a similar alignment. The majority of this channel has been culverted and filled in but during recent monitoring as part of the watching brief programme, a further section of the channel was recorded sited close to the outfall of the stream, which survives today adjacent to the entrance to the former MOD accommodation block.

Today, the remains of further stream channels are still visible on the ground partially infilled, some clearly showing recent maintenance by NTS work parties in the form of narrow slit trenches cut along the course of the channel were it appears to have been infilled. An example of this lay almost parallel to the excavated channel around 30 m to the north of the excavation area.

Perhaps the excavated stream channel was formerly the original course of the *Abhainn llishgil* or Dry Burn prior to it being canalised and straightened to conform to the current croft boundary sub-divisions created during the 1834 reorganization of the land (Plate 25). Its course appears canalised and built up with stone walling, and part of it is surrounded on both sides by walls which form the boundary between the croft of Lachlan McKinnon and the crofts under common ownership. Even the present course of the Dry Burn has been modified, albeit crudely, where it has been diverted to accommodate the shed forming the east range of the 'Red Square' MOD complex. It is likely that during the 1834 reorganization of the village, a small stream running between Blackhouses G and H was canalised and culverted where it passed below the street (Stell and Harman 1988), this is close to the site of the infilled stream channel excavated at House 8 (Emery 1996).

The wall along the north-eastern side of the excavated channel may have been built with material accumulated during the remodelling of the channel as a useful means of its disposal, but it could also represent a relict boundary from an

1. Surveyed in 1957 but published in 1960, as Macgregor, D R The island of St. Kilda – a survey of its character and occupance, Scottish Studies 4, 1-48.

Plate 25: The Abhainn llishgil coursing past the MOD establishment Village Bay. Taken by Anthony Byledbal.

earlier field system. The function of the channel to simply control the flow of water was perhaps also an attempt at alleviating flooding, and to maximise the potential of the available arable land, which on St Kilda is a finite resource.

The buried agricultural soils

The depth of buried agricultural or plaggen soils recorded during the recent excavations (Plate 4) have probably accumulated over centuries if not millennia by the action of repeated manuring with household waste, animal bedding, etc. Most of the Iron-Age pottery sherds recovered from them are likely to have been deposited when litter, dung and midden material were used to fertilise the soil. Prior to 1834 and the construction of new blackhouses with allocated manure pits along the course of the existing village street, and the reorganisation and redistribution of the land around Village Bay into the crofts visible today, the tradition of internal manure accumulation in domestic dwellings during the winter months was vital. *All the ashes, dirty water, and still worse, was spread out over the floor, and covered from time to time with layers of dry peat dust* (Mackenzie 1904-05). This material could accumulate over 1 m in height, higher than the side walls of the buildings, and would have been carried out each spring to the plots of cultivable land. The faunal remains recovered during the course of the excavation included puffin and sheep bones along with other fragments of burnt bone that are likely to have derived from this manuring process.

The darker soils found across parts of the site may have been affected by a direct result of another form of manuring process carried out during this period. In the early half of the nineteenth century in spring, thatch was removed from the roof of the cottages and the interior soot blackened portion of the thatch was spread on the young barley crop as a top dressing. The outer half of the thatch was replaced on the roof as a thin summer thatch before restoring a thicker thatch in the autumn for protection over the winter months (Mackenzie 1904-05). This part of Village Bay was certainly still under cultivation in the middle of the nineteenth century (see Sharbau's 1860-61 plan in Stell and Harding 1988, 5), sand the new accommodation block for the MOD is positioned towards the eastern side of the bay adjacent to the glebe and on three or four former crofts marked as common property. The previous occupants of these crofts emigrated to Australia

in 1856 (Hutchinson 2014). By 1957 Macgregor's plan of Village Bay depicts this area as remodelled into a concentration of small cultivation plots aligned NW/SE and NE/SW and sub-divided by stone dykes or traces of dykes. This patterning is also visible on aerial photographs of the site taken by the Royal Commission on the Ancient and Historical Monuments of Scotland in 1957 (NCAP 1957).

The areas of unstructured rubble and putative stone settings recorded across the site were found subsumed by these relict cultivated soils. Within a deposit of this rubble the very slight remains of a possible curvilinear wall or track were visible. However, given the unique nature of the building style of the majority of structures on St Kilda, it cannot be ruled out that this was the vestigial remains of a robbed out earlier building. The remainder of the rubble deposits at the south end of the excavated area contained no structural integrity (Plate 26), and it seems likely that the rubble was a glacial deposit, and the tentatively identified structures and settings at the time of the excavation are no more than this. In addition, discontinuous patchy remnants of a possible degraded primary soil formation horizon were found partially overlying some of the stones of this rubble, and had survived the construction of the MOD base.

Conclusions

The recent archaeological work has increased the understanding of the development of the eastern part of Village Bay, and the wider area, by adding to the information gathered by earlier archaeological investigations. It is clear that a fairly intensive period of occupation and use of the land was taking place during the middle Iron Age period, although no domestic structures were found on the site. The presence of large quantities of middle Iron Age pottery across the site suggests settlement must have existed nearby.

One of the most significant problems facing archaeologists working on St Kilda is that earlier buildings were dismantled and cleared away in order to build new ones using the old stone as a building resource (Maclean 1972). Stone was also cleared, including that in burial mounds (Mackenzie 1904-05), to increase the available cultivation area, leaving little trace of what may have been there before.

Plate 26: The south-east end of the rubble, viewed from the north-west.

There is some evidence to support the possibility that water draining from An Lag may have driven a click-mill, and the area of the stone-lined channel may have presented an ideal site for one. Saddle querns, many of which have been found in Village Bay, would have been the tool of choice for milling in the early Iron Age, by which time on mainland Scotland rotary querns, from which water powered horizontal mills evolved, would have been in use. It is well documented that visitors to the Village regularly heard the growl of hand mills or querns which were still in use in the late nineteenth century and quite possibly until the island's evacuation in the 1930s. It is almost certain that during the continuous episodes of landscape reorganising and rebuilding that water channels also required extensive work such as channelling and realigning to accommodate the ever changing layout of settlement, stores and field systems.

The fact that any archaeological remains survived at all on the recent investigated area is remarkable given the location of the site on extensively utilised and landscaped ground, and that seemingly prominent features mapped in great detail in the 1950s have entirely disappeared. The remote island group of St Kilda has not been immune from change, but understanding what is left, allows us to understand the lives of its past inhabitants in a little more detail.

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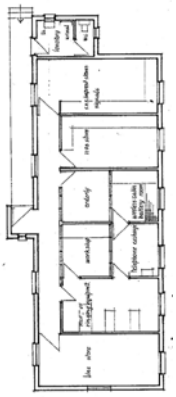
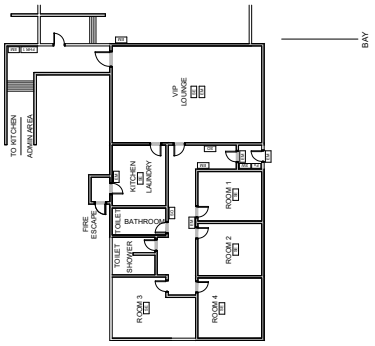
Appendices

Appendix 1: MOD Base building recording

Building 3

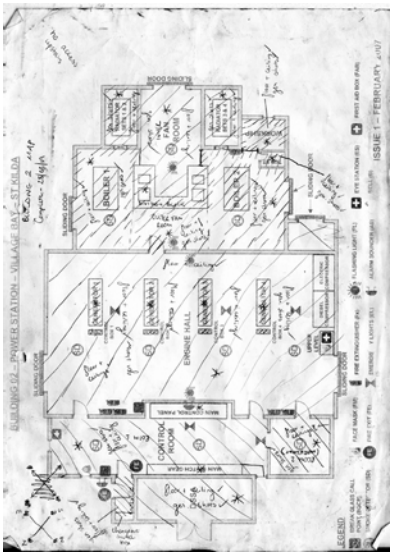


Building 13

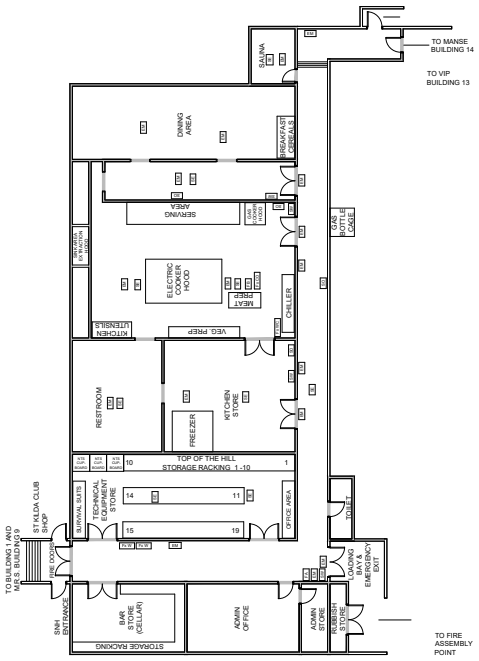


Drawings are not to scale

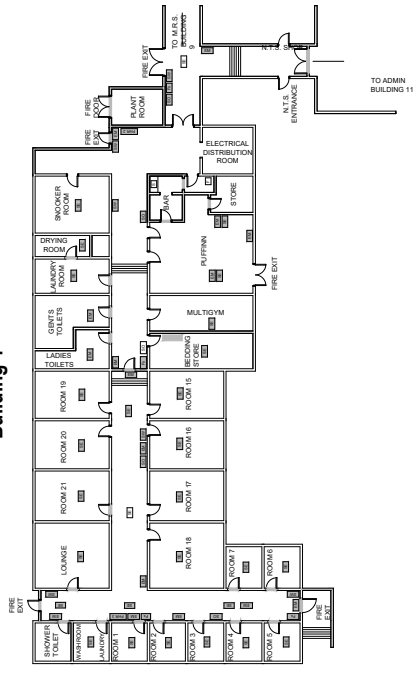
Building 2



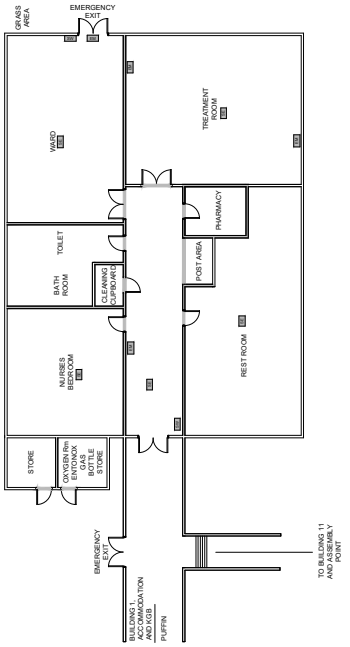
Building 11



Building 1



Building 9



Appendix 2: The Manse building recording

Appendix 3: The environmental remains

Table 2a: Carbonised plant macrofossils and charcoal

	Context	5003	5003	5003	5003	5003	5003	5004	5006	5006	5006	5006	5006	5006	5006
	Sample	1	2	5	7	8	12	4	3	13	14	16	18	27	29
	Area	1	1	1	1	1	1	1	1	1	2	2	2	4	4
	Feature	buried soil	buried soil	buried soil	buried soil	buried soil	buried soil	redep topsoil	buried soil	buried soil	buried soil	buried soil	buried soil	buried soil	buried soil
	Sample Volume (litres)	4	2	6	7	4	2	6	13	4	8	3	1	4	1
	Total CV	10ml	5ml	5ml	2.5ml	2.5ml	5ml	5ml	15ml	10ml	2.5ml	2.5ml	5ml	<2.5ml	<2.5ml
	Modern	<2.5ml	<2.5ml	5ml	<2.5ml	<2.5ml	<2.5ml	10ml	40ml	<2.5ml	15ml	50ml	<2.5ml	5ml	<2.5ml
Carbonised Cereal Grain	Common Name														
Avena sp.	oat		2	3		2			2	1					
Hordeum vulgare var. vulgare	six row hulled barley		2	2				2	1	4	3				
Hordeum vulgare sl.	barley	1		1	1										
Cerealia / Poaceae stem	cereal / grass stem								1						
Charcoal															
Corylus	hazel									1 (0.02g)					
Salix	willow					2 (0.05g)	1 (0.10g)								
Conferous Type	Conifer											1 (0.05g)			
Indeterminate															
Carbonised Wild Resources															
Burnt peat			1 (0.07g)										1 (0.03g)	2 (0.07g)	
Calluna stems	heather	7 (0.06g)	14 (0.13g)	42 (0.44g)	14 (0.16g)	9 (0.07g)	14 (0.16g)	22 (0.19g)	36 (0.31g)	20 (0.02g)		3 (0.01g)	1 (0.05g)		
Rhizomes										1 (0.30g)					
Seaweed										1 (0.02g)					
Other Remains															
Clinker		20+							50+				20+		3
Burnt bone											1 (0.88g)				
Modern seeds				1				5+	20+	10+		200+			
Modern straw								1	10+			100+			
Earthworm egg capsules							1	1	1		2				

Table 2b: Carbonised plant macrofossils and charcoal

	Context	5008	5008	5008	5008	5017	5022	5024	5024	5024	5042	5050	5079
	Sample	6	9	10	24	11	15	20	31	33	17	21	34
	Area	1	1	1	3	1	2	2	4	4	2	2	4
	Feature	silty deposit	silty deposit	silty deposit	silty deposit	wall core	clay nr hearth [5021]	redep natural	redep natural	redep natural	pit [5043]	stream [5047]	infill wall [5089]
	Sample Volume (litres)		0.5	3	0.2	1	1	5	10	0.2	6	4	3
	Total CV	10ml	<2.5ml	2.5ml	2.5ml	<2.5ml	<2.5ml	<2.5ml	<2.5ml	0	<2.5ml	2.5ml	<2.5ml
	Modern	<2.5ml	<2.5ml	<2.5ml	<2.5ml	<2.5ml	25ml	<2.5ml	<2.5ml	0	<2.5ml	<2.5ml	<2.5ml
Carbonised Cereal Grain	Common Name												
Avena sp.	oat						1						
Hordeum vulgare var. vulgare	six row hulled barley												
Hordeum vulgare sl.	barley	1											
Cerealia / Poaceae stem	cereal / grass stem												
Charcoal													
Corylus	hazel	1 (0.06g)											
Salix	willow												
Conferous Type	Conifer												
Indeterminate								1 (0.04g)					
Carbonised Wild Resources													
Burnt peat													
Calluna stems	heather	11 (0.11g)		10 (0.10g)	14 (0.10g)	3 (0.01g)	2 (0.02g)	5 (<0.01g)				10 (0.08g)	7 (0.06g)
Rhizomes		1 (0.33g)											
Seaweed													
Other Remains													
Clinker									10+				
Burnt bone													
Modern seeds												50+	
Modern straw													
Earthworm egg capsules								1					

Table 2b: Carbonised plant macrofossils and charcoal *(continued)*

	Context	5079	5079	5082	5098	5104
	Sample	34	35	25	30	32
	Area	4	4	4	4	4
	Feature	infill wall [5089]	infill wall [5089]	hillwash	post/pit [5099]	deposit
	Sample Volume (litres)	3	0.3	0.5	5	10
	Total CV	<2.5ml	<2.5ml	0	<2.5ml	20ml
	Modern	<2.5ml	0	2.5ml	2.5ml	<2.5ml
Carbonised Cereal Grain	Common Name					
Avena sp.	oat				1	2
Hordeum vulgare var. vulgare	six row hulled barley					1
Hordeum vulgare sl.	barley					
Cerealia / Poaceae stem	cereal / grass stem					
Charcoal						
Corylus	hazel					
Salix	willow					
Conferous Type	Conifer					
Indeterminate					1 (0.05g)	
Carbonised Wild Resources						
Burnt peat						5 (1.37g)
Calluna stems	heather	7 (0.06g)	1 (0.01g)		7 (0.06g)	37 (0.39g)
Rhizomes						2 (0.08g)
Seaweed						
Other Remains						
Clinker						
Burnt bone						
Modern seeds					200+	
Modern straw						
Earthworm egg capsules					2	

Table 2c: Carbonised plant macrofossils and charcoal

	Context	406	1203	1303	1702	14309	14309	14311	14311	14314	20303
	Sample	1	4	5	6	14301	14303	14302	14304	14309	20301
	Area	T4	T12	T13	T17	T143	T143	T143	T143	T143	T203
	Feature	poss linear	str. [1205]	str. [1304]	infill layer	upper channel	lower channel	upper silt			
	Sample Volume (litres)	15	1	1.5	5	4	3	4	4	4	3
	Radiocarbon Y/N	Y cer	N	N	N	N	N	N	N	N	N
	Total CV	5ml	<2.5ml	0	<2.5ml	<2.5ml	0	<2.5ml	<2.5ml	2.5ml	<2.5ml
	Modern	<2.5ml	<2.5ml	<2.5ml	15ml	<2.5ml	<2.5ml	<2.5ml	<2.5ml	5ml	2.5ml
Carbonised Cereal Grain and Chaff	Common Name										
Avena sativa grain in floret	common oat		1								
Avena sp.	oat				1						
Hordeum vulgare sl.	barley	2	1		1			1	1		
Carbonised Wild Resources											
Calluna stems	heather	43 (0.36g)	7 (0.05g)			4 (0.08g)		10 (0.07g)	1 (0.01g)	14 (0.14g)	23 (0.15g)
Rhizomes		2 (0.12g)								2 (0.09g)	
Carbonised Weeds											
Empetrum nigrum	crowberry										1
Other Remains											
Pumice? / Tufa? fragments				3 (0.80g)	10 (2.96g)						
Modern seeds		3	10+	10+	20+						
Waterlogged wood slivers (dry)					20+						
Earthworm egg capsules					2						

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St. Kilda Pottery Catalogue

Context and location	*Vessel description*	*Image*
Context 23 ET07	SF 79 is a base edge that weighs 17. 6 g with a sherd thickness of 8.5 m. The piece includes quartz sand and rock, other minerals and organic material. The flat base has a rounded edge to the body and it is highly burnt. Finger-tip indentations are noted internally between the junction of the base and the wall. There are also some grass marks and the sherd is highly abraded.	
Context 5003 agricultural soil	SF 51 is decorated and most likely the remains of an everted rim that weighs 3.5 g with a sherd thickness of 6 mm. The fabric contains quartz sand, and rock, other minerals and organic material. The sherd has four parallel, vertical lines of cockle shell impression on its exterior surface. Carbonised food deposits are present on the interior surface. The pottery is hard and well-fired.	
Context 5006 agricultural soil	SF 124 is a perforated body sherd weighing 23.5 g, with a sherd thickness of 8 mm. The fabric of the pottery includes quartz sand and rock, other minerals and organic material. Two sherds and four fragments are non-joining but the largest is perforated with a 6.4 mm diameter hole drilled through the fabric. The hole is slightly worn and is likely to have functioned as one of a number of suspension holes below the rim of the vessel. Carbonised food remains are noted on both surfaces of this sherd.	

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Context 5024 fill of southern part of channel	SF 115 rim is one of four sherds weighing 49.9 g, with a sherd thickness of 11.5 mm. The fabric contains predominantly quartz sand, other minerals and some organic remains. The pottery is sandy to the touch and is abraded. The rim is straight but is moulded with a rounded edge a flattened top and a slight exterior concavity to the neck. It was measured to suggest a vessel with a rim diameter of c. 240 mm and c. 5% is present. The top of the rim is decorated with a row of closely positioned oval-shaped and slightly conical impressions (possibly made by a fine bone). They motifs measure c. 5 mm in length and c. 4 mm in thickness. The body sherds are similar, and two that conjoin are burnt, indicating that they are from near the base of the vessel. The finish of the vessel has been removed by abrasion internally and masked by carbonised food deposits externally. The pottery is reasonably well fired.	 
Context 5024 fill of southern part of channel	SF 133 is an uncertain rim sherd that weighs 13.3 g, and has a thickness of 15 mm. The fabric contains some sand but other minerals such as diorite, iron stone and organic materials are present. The piece is highly abraded. The piece is a broken and abraded sherd, but if it is a rim, it was rounded and straight to slightly inverted. It could also have had a pie-crust shaped top, which is split obliquely with a deep finger nail impression. There is a shallow, horizontal, linear runnel below the 'rim' on interior surface. There are faint carbonised deposits on the surfaces.	

Context 5024 fill of southern part of channel	SF 168 is a base sherd that weighs 18.3 g. the maximum thickness of the sherd is 9.5 mm. The clay contains some sand and other minerals are present as is organic material. This sherd is heavily abraded both externally and internally. The pot was flat-bottomed but the basal edge is rounded, suggesting the bases of pots were initiated as thumb pot. Impressions are present from the organic temper.	
Context 5024 fill of southern part of channel	SF 173 is a rim sherd weighing 28.1g, with a thickness of 11 mm. It was not possible to measure the rim diameter. Some quartz sand, other minerals, and organic materials, are noted as being added to the clay. The sherds feel sandy. Two non-joining pieces are present of the same rim with another piece of the same vessel. The neck is straight with an everted rounded rim. The moulding is uneven and part of the rim has been badly folded over and the join between the neck and the rim coil has not been smoothed out. Iron staining and sooting adhere to the sherds externally.	
Context 5024 fill of southern part of channel	SF 247 is a possible counter. It weighs 3.3 g and measures 20 by 17 by 3 mm. It is made from a sherd of pottery that contained fine quartz sand as well as organic material in the clay. It is difficult to determine whether this is an artefact, because of the amount of abrasion in this collection. However, it is only one of two objects that have been made from sherds. There is a suggestion that the edges of the surface and the sides of the piece may have been worn smooth, while the lower (interior) surface of this piece is well preserved and very smooth with faint traces of sooting. Exterior of the piece is burnt and smoothed.	

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Context 5024 fill of southern part of channel	SF 276 is two conjoined body sherds with the remains of a highly abraded cordon 11.1 mm thick that weighs 42.6 g. The clay contains quartz sand and organic temper. The largest piece carried the remains of a cordon pulled out from the clay of a coil join. The cordon is 9.5 mm in thickness and c. 5 mm in depth with a rounded profile. Above and below it are carbonised food deposits. The exterior surface is patchy in its survival. The interior surface of the sherds is smoothed through use.	
Context 5024 fill of southern part of channel	SF 283a and 315 are two conjoined body sherds, together weighing 160.9 g with an average sherd thickness of 19 mm. The clay fabric contains quartz sand, other minerals and organic material as temper. For the collection, this is an exceptionally thick piece of pottery that seems to have broken at a coil join, where it had been cracked and carbonised food deposits had accumulated. It is broken along the bottom of the sherd where there is another coil join. The exterior clay is exceedingly lumpy and uneven, almost as if it is deliberate. There are also signs of burning.	
Context 5024 fill of southern part of channel	SF 307 rim comprises three conjoined fragments, with recent brakes weighing 62.2g with an average sherd thickness of 14.3 mm. The fabric contains quartz sand, other minerals and organic material. The everted rim has a rounded edge and a flat top. The neck is slightly concave to a curved body. The exterior surface is plain and may originally have been smoothed. Some sooting survives on the abraded sherds.	

Context 5024 fill of southern part of channel	SF 319 is a second possible counter. It measures 22 by 20 by 8 mm and weighs 3.7 g. This small roundel of pottery containing quartz sand and other minerals is likely to have been deliberately shaped but it is difficult to ascertain due to the amount of abrasion.	
Context 5024 fill of southern part of channel	SF 322 rim 3.2 5.6 Flat-topped, everted rim with an acute edge. Thin and fine piece Fine quartz sand and other minerals Smoothed exterior, internal sooting	
Context 5024 fill of southern part of channel	SF 326 is a rolled over and everted rim to a straight neck. The sherd weighs 3.2 g with a sherd thickness of 5.6 mm. The clay is slightly heavily gritted with quartz sand. The vessel was probably smoothed all over as some slight smoothed areas survive but there are no other surface finishes.	

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Context 5024 fill of southern part of channel	SF 330 flat base comprises two conjoined sherds that are recently broken. The fabric comprises quartz sand, other minerals and organic material. The sherds weigh 36.3 g with a 9 mm thickness. The base was c. 90 mm in diameter and c. 25% survives. The pieces were smoothed externally, but the interior is worn. The base broke at its join with the walls of the vessel.	
Context 5024 fill of southern part of channel	SF 356 base comprises two sherds weighing 44.9g with a thickness between 9, and 13 mm. The curved sherd is probably part of a flat base that measures c.80 mm in diameter and c.17% survives. The sherds are very sandy with a fabric of quartz sand, other minerals and organic material. They also have deposits of iron pan, soot and thick carbonised food deposits.	Not illustrated
Context 5024 fill of southern part of channel	SF 357/393 rim comprises two conjoined pieces weighing 19.7 g with a sherd thickness of 9 mm. The fabric contains quartz sand with other minerals and organic material. The rim is straight to the neck with a flattish top. It is decorated 8 mm below the rim with a horizontal row of 12 incised motifs, possibly made by a small bone inserted into the clay at an angle and then dragged out to form an 'ice-cream cone' motif. The vessel was probably smoothed, and has some moulding marks and surface sooting.	

Context 5024 fill of southern part of channel	SF 358 is a rim sherd of craggan ware weighing 75.3 g with a sherd thickness of 8.5 mm. The rim is not well preserved, being largely broken off the neck and body. It is thin, short, rounded and everted with no neck, to a bag shaped pot. The fabric contains quartz sand, other minerals and organic material and the sherd is infiltrated with iron pan deposits. Finger moulding marks are noted as well as some sooting. The piece was probably smoothed before firing.	
Context 5024 fill of southern part of channel	SF 377 is a rim comprising two conjoined fragments broken recently. The piece weighs 49.7 g and the sherd thickness is 12.3 mm. The fabric is quartz sand, other minerals and organic material. The rim is gently everted and rounded, although worn, to a straight neck. The exterior is sooted, with prominent moulding marks and a coil join. It is likely that the vessel was also smoothed prior to firing.	
Context 5024 fill of southern part of channel	SF 379 is a base edge with a weight of 6.1 g. The sherd thickness is 9.5 mm and the base was measured to be c.100 mm diameter and c. 7.5% survives. The fabric contains quartz sand, other minerals and organic material. The wall and interior of the sherd are smoothed, but the basal surface is worn and infiltrated with iron pan.	

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Context 5024 fill of southern part of channel	SF 386 is a rim with a conjoined body sherd that weighs13.8 g. The sherd thickness is 9.5 mm and the fabric contains quartz sand, other minerals and organic material. The rim is simply rounded and slightly everted with sooting and food deposits around it. The sherd is burnt internally with loss of surface externally.	
Context 5024 fill of southern part of channel	SF 387. This piece weighs 162.6 g with a sherd thickness of 18mm. The fabric is predominantly quartz sand, other minerals and organic material. The large body sherd has a conjoined fragment, and is broken at a coil join. However, it is not certain whether this is a rounded rim sherd or a body sherd. The exterior is rough, possibly due to loss of surface. The piece is also heavily abraded and burnt. Interior is smoothed by wear, with some moulding and grass marks	
Context 5024 fill of southern part of channel	SF 401 is a rim sherd weighing 30.9g with a wall thickness of 7.5 mm. The rim suggests a diameter of c. 160 mm of which 11.5% is present. The fabric is predominantly quartz sand, other minerals and organic material. The rim is slightly everted with a flattened top, to a slightly convex neck and the body. The rim join is clear on the interior surface of the sherd. Moulding marks are visible as are thick exterior carbonised food deposits.	

Context 5024 fill of southern part of channel	SF 422 is a large body sherd with a cordon weighing 118.5 g and a sherd thickness of 15 mm. The fabric contains quartz sand, other minerals and organic material. The sherd is heavily abraded and broken at coil joins. It is decorated by the addition of clay to form an 18 mm wide cordon with deep and wide oblique slashes (3 remain). It seems that the pottery thickness has been built up with the addition of the coil. There may also have been a deliberate roughening of an additional layer of clay to the vessel, to aid handling. The original smooth surface can be seen below the addition of the cordon and roughened clay below it. The piece has some interior sooting.	
Context 5024 fill of southern part of channel	SF 458 rim weighs 13.5 g with a 9 mm sherd thickness. The rim diameter measures c. 180 mm and c.6% is present. The fabric contains quartz sand, other minerals and organic material. The rim is fine, rounded and everted. The flattening of its back suggests a slight chamfer. The sherd is burnt internally and it has carbonised food deposits. The exterior surface is cracked and abraded.	
Context 5024 fill of southern part of channel	SF 497 is a heavily abraded rim weighing 10.7 g with a sherd thickness of 10.5 mm. The fabric is predominantly quartz sand, other minerals and organic material. The rim is everted and rounded, with slight depression below it. Thick carbonised food deposits are present on the exterior surface.	

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Context 5084 hill wash	SF 453 rim weighs 9.4 g with a sherd thickness of 7.5 mm. The fabric contains quartz sand, rock and probably other minerals as well as organic material. The rim is straight-topped, slightly everted, and the neck leads into a bulbous body. The rim suggests a vessel with a diameter of c. 140 mm and c. 5% of the rim survives. Sooting survives on the sherd.	
Context 5084 hill wash	SF 484 is a base edge to a flat base weighing 8.7 g with a thickness of 9 mm. The sherd is small but has a curved, expanded edge to the base. The diameter of the base could not be measured. The fabric contains quartz sand, other minerals and organic material. There are thick carbonised food deposits, but the sherd is burnt and abraded.	
Context 5114 northern part of channel	SF 368 rim sherd weighs 5 g with a wall thickness of 9 mm. The rim diameter measures c. 140 mm and c.5% of it is present. The fabric contains predominantly quartz sand and organic material. The rim is small, everted and rounded, with slight bevel to the interior. There are exterior carbonised food deposits.	

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St. Kilda Coarse stone catalogue

SF no.	*Context Information*	*Description*	*Image*
12	Area 1, context 5006 upper buried agricultural soil horizon	Cobble of granite with one end removed by fracturing by hammering. Hammerstone. Weight 794 g, ML 99.3 mm, MW 90 mm, MT 72 mm.	
59	Area 1, u/s	Dolerite cobble with a possible worn side, discrete area of pecking at one end with larger pecked area at the other, with loss of surface by flaking. Pounder/polisher. Weight 838 g, ML 124 mm, MW 90.5 mm, MT 44.8 mm.	
60	Area 1, context 5003 (see 5006)	Igneous cobble damaged by severe flaking at one end. Loss of some surface on one face. Hammerstone. Weight 744 g, ML 109.2 mm, MW 91.4 mm, MT 48.5 mm.	Not illustrated

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72	Area 2, context 5006 upper buried agricultural soil horizon	Basalt cobble with narrower end noticeably facetted by grinding. Small scars have broken away along the edge of the wear. The broader end is rounded and pecked by the action of pounding. Pounder/pestle Weight 386 g, ML 110 mm, MW 51 mm, MT 20 mm.	
81	Area 1, context 5006 upper buried agricultural soil horizon	Dolerite cobble fragment, with one end slightly facetted by grinding. Grinder Weight 492 g, ML 104 mm, MW 67 mm, MT 39 mm.	Not illustrated
117	Area 2, context 5006 upper buried agricultural soil horizon	Split and flaked igneous cobble with sharp edges, possibly a flaked knife. Weight 134 g, ML 72 mm, MW 64 mm, MT 205 mm.	
150	Area 4, context 5006 upper buried agricultural soil horizon	Flaked bar of dolerite. Flaking down one side from both faces. The tip of the stone has been flaked to shape it to a narrow point. The bar broke across its width through the detachment of a large side flake. Possible ard rough-out. Weight 1374 g, ML 1220 mm, MW 108.7 mm, MT 45.5mm.	

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151	Area 4, context 5079 infill of wall 5089	Small cobble with one end facetted from use in two directions forming a ridged edge. Rubbing stone. Possible grinder. Weight 342 g, ML 94 mm, MW 59 mm, MT 28 mm.	Not illustrated
152	Area 4, context 5079 infill of wall 5089	Small cobble with discrete wear at one end. Small area of polish on one face, possibly from use. Small pestle. Weight 198 g, ML 88 mm, MW 42 mm, MT 28 mm.	Not illustrated
155	Area 4, context 5084 hill wash	Large split cobble of basalt. Has facetted wear on the surrounding end through grinding, but subsequently worn smooth. Pestle. Weight 1260 g, ML 123 mm, MW 88 mm, MT 65 mm.	
167	Area 4, context 5024 upper fill of stream	Basalt cobble with facetted and smoothed narrow end, with a discrete area of wear on the broader end. The flatter surface is possibly polished by handling or its use as a rubber/424 g, ML 95 mm, MW 58 mm, MT 36.8 mm.	
171	Area 4, context 5024 upper fill of stream	Cobble with narrow end worn by pecking. Opposed broader end has been slightly pecked. Pounder. Weight 566 g, ML 100 mm, MW 77 mm, MT 29 mm.	Not illustrateed

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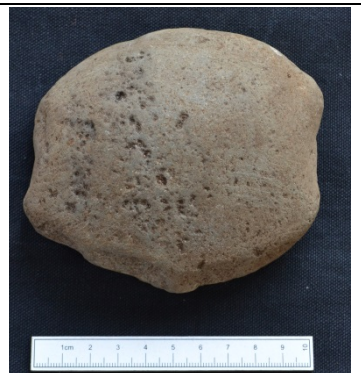
194	Area 4, context 5006 upper buried agricultural soil horizon	Rounded triangular shaped cobble, one end has been worn flat with related striation marks on one surface, where the tool has been used. Pounder. Weight 158 g, ML 175 mm, MW 35 mm, MT 25 mm.	
206	Area 4, context 5019 MOD brick feature	Tear-drop cobble with narrow end facetted by grinding. The broader end is also extensively facetted. Grinder. Weight 742 g, ML 125 mm, MW 88 mm, MT 39 mm.	
222	Area 4, context 5079 infill of wall 5089	Fragmentary cobble used most likely as a hammer at one end, which has shattered a large piece off. The surviving end seems to have been used as a pounder. Pounder/hammerstone. Weight 752 g, ML 147 mm, MW 71 mm, MT 52 mm.	Not illustrated
236	Area 4, context 5024 upper fill of stream	Flat sided cobble, possibly used as a weight due to opposed concave ends. There are chip marks on one side but the piece is heavily abraded and wear marks are lost. Possible weight. Weight 510 g, ML 116.7 mm, MW 96.6 mm, MT 34 mm.	

245	Area 4, context 5024 upper fill of stream	Highly abraded fragment of flat cobble, chipped partly around the rounded end of the stone. Could have been intended to be a pot lid. Weight 198 g, ML 67.7 mm, MW 91.5 mm, MT 21.9 mm.	
252	Area 4 ?context 5024 upper fill of stream	Three-sided cobble with the narrow end used for grinding possibly over slight pecking. Scars from percussion are found on both ends and predominantly down one side. Slight pecking is also noted on two edges of the broad end. Hammerstone/grinder/pounder. Weight 922 g, ML 147.4 mm, MW 95.5 mm, MT 51.4 mm.	
254	Area 4, context 5024 upper fill of stream	Abraded mattock head, possibly dolerite, shaped by flaking around its edges, but broken across its shaft. Its cutting edge is damaged, but an area of polish on one surface survives, indicating it was used. Mattock. Weight 654 g, ML 143.8 mm, MW 91.7 mm, MT 35.8 mm.	

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267	Area 4, context 5079 Infill of wall 5089	Flake from a split cobble of sandstone, whose sharp edges were possibly used as a rough knife or more likely a chisel at one end. Weight 140 g, ML 102 mm, MW 55.2 mm, MT 18.6 mm.	
311	Area 4, context 5024 upper fill of stream	Rounded cobble of dolerite? with flattened apices, due to use of the tool as a pounder. Due to the heavy abrasion, further wear is undetermined. Pounder. Weight 1156 g, ML 122.3 mm, MW 104.5 mm, MT 60 mm.	
384	Area 4, context 5024 upper fill of stream	Struck flake from a cobble. The crescent-shaped 'knife' edge shows evidence of having been used, with concave nicks on its edge. Knife. Weight 132 g, ML 103 mm, MW 67 mm, MT 19 mm.	

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389	Area 4, context 5024 upper fill of stream	Possible mudstone core. Struck piece. Weight 102 g, ML 70 mm, MW 47.4 mm, MT 26.1 mm.	
403	Area 4, context 5024 upper fill of stream	Cobble of gneiss? altered at both ends due to being well used as a pounder. Wear marks are also seen down one side of the tool. There is a scar from being struck on the opposite side. Pounder. Weight 718 g, ML 130 mm, MW 80 mm, MT 52 mm.	
459	Area 4, context 5084 hillwash	Heavily abraded stone, used as a pounder at one end and a hammer at the other. Hammerstone/pounder. Weight 412 g, ML 127 mm, MW 64 mm, MT 34 mm.	Not illustrated

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467	Area 4, context 5091 remnant wall on S side of channel 5047	Small elongated stone used as a grinder at both its ends. Slight faceting noted at the end with the more extensive wear. Grinder. Weight 3862 g, ML 107.9 mm, MW 54 mm, MT 40 mm.	
477	Area 4, context 5082 hillwash = 5094	The tip of a grinder on an elongated cobble. The ground edge is slightly faceted. Grinder. Weight 162 g, ML 57.5 mm, MW 50 mm, MT 33.6 mm.	
488	Area 4 context 5084 hillwash	Well-preserved mattock blade, broken across the shaft. The piece has been chopped to shape and the blade end is rounded and heavily worn, although there are nicks in it due to its use. Wear marks and smoothing of the stone extend c. 90mm up the shaft from the blade end. The sides are correspondingly smoothed. Linear striations are faintly seen on its used surfaces. Weight 880 g, ML 154 mm, MW 120.9 mm, MT 37mm.	

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489	Area 4, context 5084 hillwash	Large elongated cobble used secondarily as a hammerstone at its broader end while its original purpose was as a grinder - used at both ends and facetted. Some pounding marks are also visible around the ground wear. Grinder/pounder/hammerstone. Weight 1688 g, ML 180mm, MW 84 mm, MT 64 mm.	
494	Area 4, context 5084 hillwash	Flattened but circular cobble, worn around most of its circumference as it has been used as a pounder. Weight 302 g, ML 83 mm, MW 74 mm, MT 27 mm.	Not illustrated
495	Area 4, context 5084 hillwash	Large cobble with slight wear at either end, probably as a result of it being used as a pounder. Weight 1330 g, ML 148 mm, MW 107 mm, MT 46 mm.	Not illustrated
508	Area 4, context 5123 bottom fill of stream	Slightly elongated cobble, used at both ends as a hammerstone/pounder. Weight 1280 g, ML 151 mm, MW 69 mm, MT 61 mm.	
259	Area 4, context 5024 upper fill of stream	Large spherical stone, most likely natural and unworked. Weight n/m, ML 280 mm, MW 230 mm.	Not illustrated

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