Samson Flats
Inter-tidal Field Survey

Project Report 2010

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With contributions by

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CISMAS

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The Team

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Sarah Chaddock

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Contents

Abbreviations

ADS	Archaeology Data Service
BP	Before Present
CAU	Cornwall Archaeological Unit (now HE Projects)
CEP	Coastal Erosion Project
CISMAS	Cornwall and Isles of Scilly Maritime Archaeology Society
CSV	Comma Separated Values
DXF	Drawing eXchange Format
EDM	Electronic Measuring Device
EH	English Heritage
GPS	Global Positioning System
GPRS	General Packet Radio Service
GRS 1980	Geodetic Reference System 1980
HE Projects	Historic Environment Projects Cornwall Council
HER	Historic Environment Record
HE	Historic Environment (Cornwall Council)
IoS	Isles of Scilly
ISET	Isles of Scilly Environmental Trust (Isles of Scilly Wildlife Trust from 2001)
MSL	Mean Sea Level
OSGB	Ordnance Survey Great Britain
PDL	Position Data Link
PRN	Primary Record Number
RCZAS	Rapid Coastal Zone Assessment Survey
RTK	Real Time Kinematic
UKTM	United Kingdom Transverse Mercator

Project Name

Samson Flats Inter-tidal Field Survey

Summary Description

Samson Flats : NGR SV 88000 12800
The *hedges and ruins* on Samson Flats in the Isles of Scilly were first noted by Dr William Borlase in the mid-eighteenth century. The location of these features within the inter-tidal zone was taken as evidence that they were part of an inundated landscape and possibly prehistoric. However, this interpretation of their function and date has sometimes been questioned. This project aims to produce an accurate survey of the features and the topography in the inter-tidal zone on Samson Flats. The survey of these features should allow a better determination of their function and date. The project also tries to engage the local community through site open days and local presentations.
Six days of fieldwork were undertaken by a team of nine CISMAS members in June 2009. A further six days of fieldwork were undertaken in July 2010 by a team of six CISMAS members.

Background

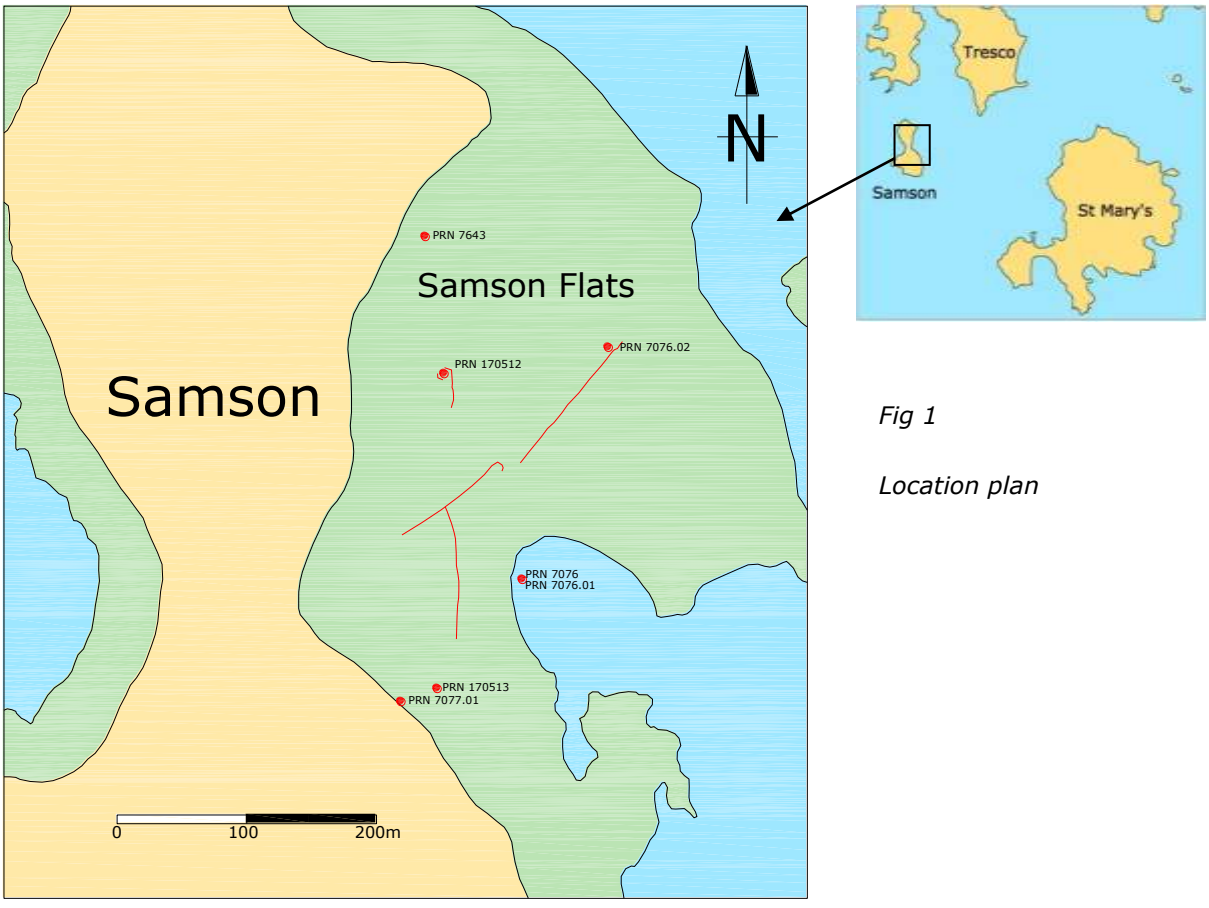

Fig 1

Location plan

Samson Flats is an expanse of littoral sand located to the east of Samson, Isles of Scilly. On a spring low tide, this area consists of about 0.15 km^2 of exposed ground. Within this area the Isles of Scilly Historic Environment Record (HER) lists seven features of archaeological importance (Fig 2). These form part of Scheduled Monument 15526 'Prehistoric to post-medieval funerary, field system and settlement remains etc, on and adjacent to Samson'.

Fig 2

HER records for Samson Flats

PRN	Description
7076	Hut Circle
7076.01	Field System
7076.02	Hut Circle/Settlement
7077.01	Field System
7643	Stone Working Site
170512	Hut Circle
170513	Hut Circle

Summary of the Geology of Samson (by Phil Rees)

The Isles of Scilly is an archipelago formed by the erosion and partial submergence of an oval shaped batholith of granite. The weathering and denudation of the exposed granite has created a glacial deposit known as head material which can be seen in the cliffs on the exposed shorelines of the islands, together with large accumulations of sand which has been transported initially by the action of the sea and then sculptured by the wind into a variety of land forms including dunes, beaches, bars including tombolos which is a type of sand bar connecting two islands.

The makeup of the granite was divided by Barrow (British Geological Survey 1906) into two types, coarse and fine, the latter occupying a roughly central position bounded by the most southern part of Tresco, all of Samson, the northern part of Annet and the most northerly parts of St. Marys.

The island of Samson is the largest of the uninhabited islands, and takes the form of two distinct hills connected by a sand bar isthmus. The twin hills effectively form the summits of two granitic "tors" with the lower sides cloaked in "head" material which can be seen in the exposed cliff faces on the west side of the island facing onto the "sand flats". The granitic tors have been preferentially eroded along the joint planes into blocks which have been dislodged and broken away to form boulder fields along the foreshore. This is particularly pronounced on the North Hill just to the north of East Porth where the accumulation of boulders has extended out from the foreshore for some tens of metres.

In addition to the occurrence of head material within the cliff face there is also a well-defined exposure of head material along the foreshore some 100 metres to the south of the beach at East Porth in the vicinity of a "wall like structure" SF 1000. At this location the head deposit extends from the base of the sand dune for a distance of at least ten metres below the HW mark and comprises a brecciated conglomerate of ovate shaped granitic cobbles typically 250mm in diameter set in a fine matrix with angular clasts. It was noticeable that the ovate cobbles were closely packed and set on their ends within the clay matrix with their long axis pointing upwards at a slight tilt. – see photo below.

A more detailed investigation may establish whether this deposit equates to the upper Porth Loo Breccias noted by Scourse (2006,ed). Apart from the small beach at East Porth there is a significant accumulation of sand which extends from the base of the North Hill on the north east side of the Island. This comprises an accumulation of shelly sand partly covered in marram grass in the form of a spit which extends towards the group of rocks known as the Black Ledges.

Between the Black Ledges and the central neck of Samson is what appears to be a linear system of walls as reported by Borlase (1753; 1756), Troutbeck (1794), Crawford (1927) and Ashbee (1974) which become exposed at around half tide.

These "walls" comprise isolated small boulders of granite many of which are set on their ends up to one metre high. As reported by Ashbee (1974) this includes a well defined wall about 200 metres long running out across the flats, which apart from some scattered smaller stones, is covered by an expanse of "bare" sand.The likely sequence of sediments within the vicinity of the "walls" is an unconsolidated layer of shelly quartzitic sand a few tens of centimetres thick overlying a glacial brecciated deposit (head material) formed from the weathering of the granite which lies unconformably on weathered granitic

substrate. The only way that the sequence can be verified would be to excavate a limited number of "trial pits" close to the line of the "wall" systems. This would not only provide evidence of the stratigraphy of the underlying deposits but it may also make it possible to correlate them with other glacial deposits investigated by Scourse (1991) on other parts of the islands. According to Scourse (1991) these deposits would have been formed during the very last phase of the Devensian Glaciation which had a large influence on the area as far south as the northern margins of the islands.

The cobbles and boulders forming the "walls" consist of fine grained granite with the exception of the occasional chert/flint pebbles and a limited number of angular shelly limestone cobbles along a line centred at SV 8807 1295. Whereas the chert/flint deposits are thought to be erratics from the area of the Bristol Channel, the source of the limestone cobbles is more conjectural as they could well occur as ballast from a stranded vessel.

Previous Work

The 'Hedges and Ruins' on Samson Flats were first noted by Dr William Borlase in the mid-eighteenth century (Borlase 1756) and later discussed by OGS Crawford (1927). The location of these features within the inter-tidal zone was taken as evidence that they were part of an inundated landscape and possibly Bronze Age in date (eg Thomas 1985). However, the interpretation of these linear stone features as field boundaries by Borlase, Crawford and Thomas has sometimes been questioned.

The linear stone features on Samson Flats were recorded by Fowler and Thomas (1979) as part of a wider investigation 'the early walls of Scilly'.

In 1988 the Cornwall Archaeological Unit (CAU – now Historic Environment, Cornwall Council) was commissioned by EH to undertake an assessment of the archaeological resource on Scilly, including submerged remains and those in the inter-tidal zone. The resulting report (Ratcliffe 1989a) formed the archaeological input into an Integrated Management Plan by ISET. The hut circle/settlement and field system on Samson Flats was one of the sites prioritised for archaeological recording (Ratcliffe 1989b, 19). The Coastal Erosion Project (CEP) resulted in the publication of *The Early Environment of Scilly*, which similarly recommended further survey of inter-tidal remains (Ratcliffe and Straker 1996, 52).

In 2003 English Heritage commissioned the Cornwall County Council HES (now HE) to conduct a Rapid Coastal Zone Assessment Survey (RCZAS) for the Isles of Scilly (Johns *et al* 2004). In this report the function and antiquity of certain inter-tidal and sub-tidal features listed in Scilly was debated:

> *It has been suggested recently that at least some of those submerged and inter-tidal stone remains, which have been interpreted since Dr Borlase's time as old field walls, could in fact be fish traps, or possibly boundaries between kelp gathering territories. The kelp burning industry was introduced to Scilly in 1684; submerged 'Hedges' were noted by Dr Borlase 72 years later in 1756 and assumed to be prehistoric in date. Was Dr Borlase actually noting comparatively recent features associated with kelp burning? As a caveat to this hypothesis it is useful to note that Hooley (pers comm) has observed that the inter-tidal walls show a very poor correlation with areas of kelp growth and are not aligned in a suitable manner to function as fish-traps.* (Johns *et al* 2004, 94).

The 'settlement and field system' in the inter-tidal zone on Samson Flats was one of the sites prioritised for survey by the RCZAS (Johns *et al* 2004, 199-200).

Sea Level Rise

Since the Last Glacial Maximum, rising sea level has served to isolate the Isles of Scilly from the Cornish mainland and transform them into their present form (Johns *et al* 2004, 21). This process would have impacted significantly upon the islands' inhabitants. As areas once suitable for settlement gradually became inundated, the means by which islanders utilised a changing landscape would have altered accordingly (Johns *et al* 2004, 90-93). An early submergence model for the islands postulated by Thomas (1985) has more recently been questioned by Ratcliffe and Straker (1996) through the dating of inter-tidal peat deposits.

The current EH funded Lyonesse Project aims to build on previous work and resolve the question of sea level rise in Scilly. Radiocarbon determinations and OSL ages from samples taken in Year 1 of the project indicate that that, for the late Bronze Age and Early Iron Age (1500 BC – 500 BC), the Ratcliffe and Straker model is likely to be more accurate than the Thomas model (Camidge et al 2010).

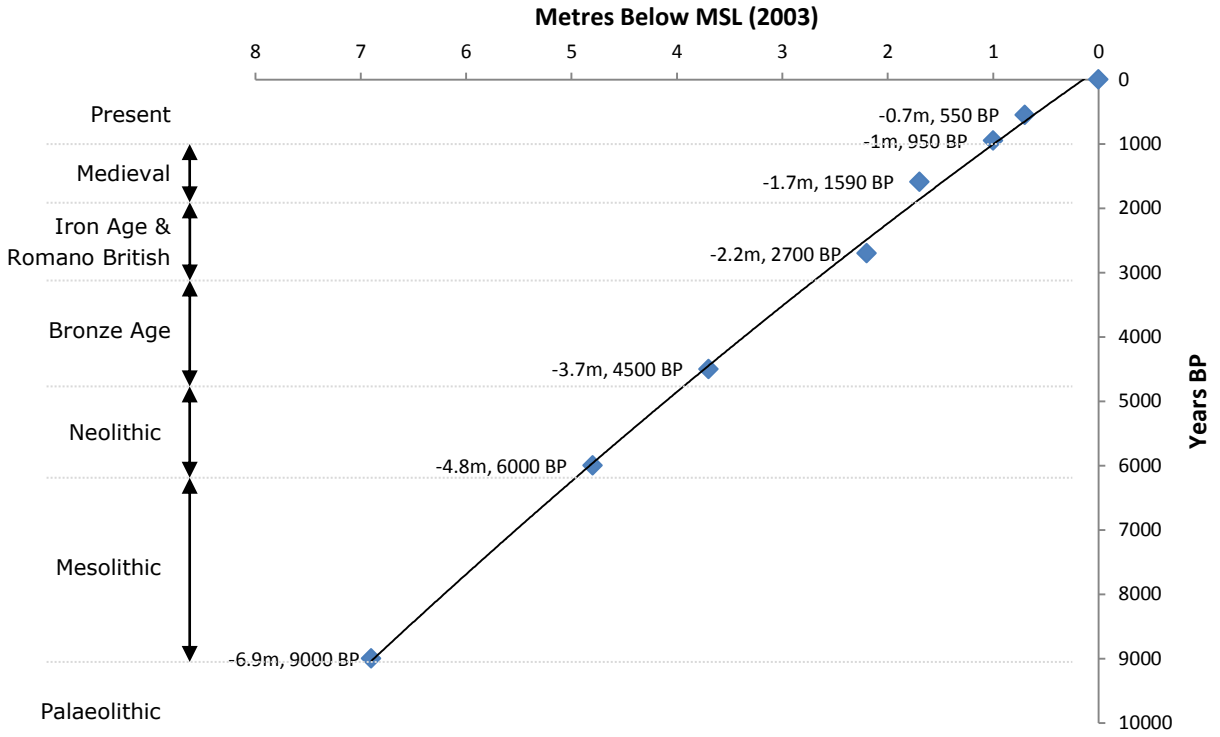

Fig 3 Graph of sea level rise in Scilly (based on carbon dating of bulk-sampled inter-tidal peat deposits). After Johns et al (2004)

Interpretation of the Features

The principal archaeological features visible on Samson Flats are linear stone features set into the sand of the inter-tidal zone. Several interpretations of these features have been voiced (Johns *et al* 2007, 94). These features could be associated with prehistoric settlements, fish-trapping or the kelp burning industry.

Submerged Prehistoric Settlement

There are seven HER records for Samson Flats. Of these, two are classified as 'Field Systems' and four as 'Hut Circles'. Thomas (1985, 241) suggests that the linear structures on Samson Flats might form part of a field system that extends over much of the island. It has been suggested that these features are Bronze Age in date (Thomas 1985; Robinson 2007) and present models for sea level rise in Scilly suggest that such a date is feasible (Ratcliffe & Straker 1996 cited in Johns *et al* 2004).

It has also been suggested that some of these structures may have a ritual rather than practical function:

> *Agriculture was undoubtedly practised on Scilly, but its expansion into a system of permanent land tenure may have been, at best, short-lived. If this is the case, then some of the so-called 'field systems' may be symbolic references to the problem of soil degradation (real or threatened?) rather than agricultural enclosures,* (Kirk, 2002).

Fish Traps

Although Crawford (1927) originally wrote in support of the submerged field boundary hypothesis he later suggests, in an editorial for *Antiquity* (Crawford 1946), that these features might instead be the remains of medieval fish traps (cf English Heritage 1996; Hooper 2001; Jones 1983). Bannerman and Jones (1999) state that seven types of fish trap can be identified, although variations upon these can be demonstrated (Dawson 2004; Hooper 2001). All types work on the same principle, acting to either isolate fish within a broad area or guide them towards a staked net during the ebbing tide.

Fig 4

Fish-trap types, after Bannerman and Jones (1999)

Type	Description
1	Natural feature adapted as a trap
2	Semi-permanent wattle and wood trap
3	Modified natural feature trap
4	Crescent – shaped trap
5	Rectilinear trap
6	The *V* or *Double V* – shaped trap
7	The S – shaped weir trap

The dating of stone-built fish-traps is often problematic. However, timber stakes found in association with stone-built traps at Strangford Lough, Co. Down, have been dated to the late medieval period (McErlean *et al* 2002 cited in Dawson 2004, 16). Historical sources have also been used to date a trap in Caernarfon, North Wales, to the 12th or 13th century (Momber 1991, 108) and fish-traps in Scotland are known to have been used well into the 19th century (Dawson 2004, 25).

Ashbee (1978, 55) and Hooley (cited in Johns *et al* 2004, 94) state that the alignment, position and construction of the linear features on Samson Flats all indicate they would function poorly as fish traps. High resolution survey of the features and surrounding topography should help resolve these issues.

Kelp Industry

The collection and burning of kelp for the extraction of sodium carbonate and iodine formed a seasonal industry in Scilly from the mid 17th to 19th century (Thomas 1985, 109). There are three types of archaeological feature associated with the kelp industry which are analogous to the inter-tidal remains on Samson Flats: drying walls, territorial boundaries and structures designed to encourage kelp growth.

Inter-tidal structures intended to increase yield – these are evidenced at Strangford Lough in Co. Down, Northern Ireland. They were shallow linear structures built within the inter-tidal zone in order to encourage the growth of kelp (McErlean *et al* 2002 cited in Forsythe 2006, 220).

Drying walls – structures intended to keep kelp off wet ground, thus allowing it to dry thoroughly in advance of burning. These are prevalent features in both Co. Donegal and Rathlin, Northern Ireland (Forsythe 2006, 221).

Territorial boundaries - Johns *et al* (2004, 94) suggests that the linear features on Samson Flats might represent boundaries between kelp territories. Thomas (1985, 110) cites historical accounts of disagreements in Scilly regarding kelp collection in certain areas.

Objectives

The project aims fall into three main categories:

Increasing Public Awareness and Community Involvement

- Involvement of the local community and schools in the project by means of guided site open days, school visits and presentations.
- Involvement of the community in the survey: CISMAS members undertook the fieldwork and recording. All participants in the fieldwork were volunteers.

Improved Site Management

- Determination of the most efficient survey methods in the inter-tidal zone.

Understanding the Monuments

There is a degree of uncertainty regarding the function of the archaeological features at Samson Flats. Early interpretations of these and other, similar features around Scilly are open to question and the lack of any detailed survey of these remains renders their re-interpretation difficult. The following methods were used to address these issues:

- Completion of an accurate survey of feature positions and alignments using RTK GPS.

- Detailed recording of exposed features, consisting of 1:20 planning frame drawings and 1:10 profiles.

- Production of a high-resolution contour survey of site topography.

Fig 5 'Field walls' in the inter-tidal zone on Samson Flats. 17th September 2008

Methods

Site Access

The fieldwork took place during spring tides to allow access to the inter-tidal features. The field work took place between 21-26 June 2009 and 10-15 July 2010. The tables below show the predicted tides for those weeks. The tides were very similar for each week of field work. In practice the majority of Samson Flats was exposed for approximately two to two-and-a-half hours either side of low water, allowing a working day of four to five hours on most parts of the site.

Date (2009)	High Water		Low Water	
Sun 21 June	02:54	5.2m	09:19	1.2m
	15:18	5.4m	21:51	1.1m
Mon 22 June	03:46	5.5m	10:10	1.0m
	16:09	5.7m	22:43	0.9m
Tue 23 June	04:36	5.6m	11:01	0.9m
	16:58	5.8m	23:34	0.8m
Wed 24 June	05:26	5.7m	11:51	0.8m
	17:48	5.9m	-	-
Thu 25 June	06:16	5.6m	00:25	0.7m
	18:39	5.9m	12:40	0.9m
Fri 26 June	07:05	5.5m	01:15	0.8m
	19:29	5.6m	13:30	1.0m

Fig 6
2009
*Table of tidal heights above **chart** datum for St Mary's. Heights are in metres and times in GMT. The low tides when survey took place are highlighted in blue.*

Date (2010)	High Water		Low Water	
Sat 10 July	03:07	5.1m	09:30	1.4m
	15:29	5.3m	22:02	1.2m
Sun 11 July	03:56	5.4m	10:19	1.1m
	16:17	5.6m	22:50	0.9m
Mon 12 July	04:42	5.6m	11:06	0.9m
	17:03	5.8m	23:38	0.7m
Tue 13 July	05:28	5.7m	11:53	0.8m
	17:50	6.0m	-	-
Wed 14 July	06:15	5.7m	00:25	0.6m
	18:37	6.0m	12:39	0.7m
Thu 15 July	07:01	5.7m	01:11	0.6m
	19:24	5.9m	13:26	0.8m

Fig 7
2010
*Table of tidal heights above **chart** datum for St Mary's. Heights are in metres and times in GMT. The low tides when survey took place are highlighted in blue.*

Seaweed

Most of the stone features in the inter-tidal zone on Samson Flats are covered in a thick growth of bladder wrack and other seaweeds. To record the form and structure of the features it was necessary to remove this weed in the areas where the characterisation drawings were made. Following consultation with the Isles of Scilly Wildlife Trust the amount of seaweed removed was kept to a minimum. The bladder wrack is removed by hand, with the aid of a knife to cut the holdfasts from the granite boulders to which they are attached.

Fig 8

Linear stone feature SF100, partly obscured by bladder wrack. Samson Flats September 2008

Fig 9

Thick covering of seaweed over much of the inter-tidal zone on Samson Flats – This can make identification of features difficult. July 2010

Real Time Kinematic GPS Survey (Luke Randall)

A Real Time Kinematic (RTK) Global Positioning System (GPS) was employed in the course of the survey. This system, which is capable of resolving real world positions with centimetric accuracy, was used to

- fix the control point network used for the drawn survey
- allow rapid collection of contour data for the area around the exposed features
- establish precise positions and alignments of the exposed features

The RTK GPS utilised consisted of two separate units, a Leica 1200 series SmartRover and a Leica 500 series reference station. The former of these two units is capable of working either as a stand-alone instrument or in conjunction with the reference station.

All positions were recorded as OSGB co-ordinates using the GRS 1980 ellipsoid and UKTM projection. Data were recorded in the proprietary Leica format and then converted within the instruments to DXF and CSV files.

Reference Control Points

Although the Leica SmartRover can be used as a standalone unit it is reliant upon the constant availability of a mobile phone signal in order for it to receive Leica SmartNet RTK corrections. It was thus decided to use it in conjunction with a Leica 500 series reference station, from which it could receive RTK corrections via a PDL radio. To facilitate the use of this system, it was necessary to accurately establish the location of at least one semi-permanent Control Point (CP) above which the reference station could be assembled at the start of each day's survey.

Fig 10
The Leica 1200 series SmartRover (right) and the Leica 500 series reference station (left).

Two such reference CPs (CP01 and CP02) were installed on the periphery of the survey area, outside of the inter-tidal zone, so as to provide a degree of redundancy should one be lost between the 2009 and 2010 survey seasons. These reference CPs consist of 0.5m lengths of 12mm steel reinforcing bar set into approximately 0.45m of concrete and labelled with survey tags. The positions of the reference CPs were established using the Leica 1200 series SmartRover, tripod mounted, receiving Leica SmartNet RTK corrections via a GPRS connection. One hundred and eighty observations were made and averaged for each CP.

During this process the stated 2D (x,y) and 1D (z) accuracy did not exceed 15mm and 25mm respectively.

An opportunity for operator error existed as the antenna height of the reference station had to be measured and manually entered at the start of each day's survey. To test for any errors in measurement and/or transcription an observation was made of a recorded position (whichever of the two reference CPs was not in use), the two positions compared and any discrepancies noted.

Survey Control Points

In the course of the fieldwork 77 temporary CPs were installed within the project area to provide baselines for the planning frame and offset (profile) surveys. The positions of these CPs were fixed using the SmartRover receiving RTK corrections from the reference station via a PDL radio. Stated 2D and 1D accuracy was typically 10mm and 20mm respectively.

The location of these CPs is recorded in appendix I. All temporary CPs were removed from the project area at the conclusion of the fieldwork.

Topographic Survey

A topographic survey of the project area was undertaken, spot heights were collected at approximately 5 metre intervals. This sample interval was achieved by navigating the GPS unit between two ranging poles and recording spot heights every five paces. At the conclusion of each line the ranging poles were offset 5 metres in the direction of survey.

All spot heights (z) and their positions (x,y) were recorded using the SmartRover receiving RTK corrections from the reference station via a PDL radio. Stated 2D and 1D accuracy was typically 10mm and 20mm respectively.

Feature Extents

Basic plans of each archaeological feature were completed using the RTK GPS (Fig 13). Although these lack the detail of the planning frame drawn characterisations, they successfully illustrate the visible extent and alignment of each feature. Similarly, basic 'profiles' of each feature were completed by recording positions and heights along their centre. Again, these are considerably cruder than the offset profiles drawn as feature characterisations. However they can be integrated with the topographic survey data to indicate the impact each feature has upon the topography of the project area.

All positions recorded to this end were fixed using the SmartRover receiving RTK corrections from the reference station via a PDL radio. Stated 2D and 1D accuracy was typically 10mm and 20mm respectively.

Stone features

The position and outline of these features was established using the RTK GPS survey system. In addition to this outline several six-metre sections of each feature were drawn using planning frames at a scale of 1:20 in order to characterise the construction of each feature. These plans each covered an area of 6m x 4m, and included a longitudinal profile over the stones. The number of 1:20 plans for each feature varied; thirteen were made for SF100, three each for SF200, SF500, SF600, and five for SF400. The whole of SF300 and SF700 were drawn in detail while only a single section of SF800 and SF1000 were drawn. The plans have been incorporated into the overall site plan maintained in AutoCAD, which will allow easy export of the survey as DXF files to GIS systems.

Fig 11
Planning frame drawing. The planning frames were located using base lines which were positioned using the Leica SmartRover receiving RTK corrections from the reference station via a PDL radio.

Stone working

Two main areas were located where there is evidence of stone working, as well as two isolated stones. These consist of large granite boulders which have been split using drilled holes with plug-and-feather splitting. The boulders were positioned and outlined using the RTK GPS system. Measured sketches were made and overhead digital photographs taken. The photographs were then fitted to the RTK points in AutoCAD to allow the finished drawings to be produced.

Photography

All contexts were photographed using digital compact and SLR cameras. All photographs are stored electronically in folders labelled by context number – these can be found on the DVD ROM in appendix II of this report. In several instances overhead photographs were obtained by attaching a ball-and-socket head to the top of a telescopic 5m levelling staff. The auto focus camera was then fired using an infra red remote control. The framing of the photographs had to be established by trial and error – but the results were generally worth the effort entailed.

Fig 12 Camera mounted on telescopic levelling staff (left) and an example of an overhead view obtained using the system (right).

The survey team

The team were all members of CISMAS working as volunteers. Most members of the team have worked together on a number of underwater surveys including the wrecks of *Colossus* and *Firebrand* and the Mount's Bay Survey. The team consisted of:

The 2009 team:

Sharon Austin	Photographer
Kevin Camidge	Project Manager
Innes McCartney	Draughtsman
Charlie Johns	Volunteer and seaweed cutter extraordinaire
Maureen Murphy	Draughtsman
Luke Randall	RTK Survey and Site Supervisor
Phil Rees	Draughtsman and geologist
Janet Witheridge	Draughtsman
Robin Witheridge	Community liaison

The team for 2010 was changed due mainly to the illness of Luke Randall – who was sorely missed – and the sudden death of Sharon Austin's husband. I am indebted to Sarah Chaddock for stepping into the breach at the last minute.

The 2010 team:

Kevin Camidge	Project Manager
Innes McCartney	Surveyor and Community liaison
Sarah Chaddock	Survey supervisor
Maureen Murphy	Draughtsman
Helen Thomas	Draughtsman
Janet Witheridge	Draughtsman

Results

Community Involvement

During the 2009 season the project sought to engage members of the local community and visitors to the islands on the topic of cultural and environmental heritage. This was achieved through the organisation of site visits and a presentation to local students. A hand-out, which introduced the project and discussed the nature and location of other archaeological features on Samson, was prepared for all site visitors.

Fig 13

A site visit for students from The Five Islands School on Samson flats

In June 2009, a presentation was delivered to Key Stage 3 students of Carn Thomas Secondary (St. Mary's), Five Islands School. This presentation introduced the basic concepts of archaeological enquiry and discussed the project area and varied interpretations of the archaeological features in question. The topic of past and present sea-level rise and its implications were also considered.

A site visit for students from The Five Islands School was also organised in 2009 through liaison with teaching staff from Tresco Primary and Carn Thomas Secondary (St. Mary's). Approximately forty students aged between six and twelve years and ten teachers were given a tour of the multi-period archaeology present on Samson's North Hill, prior to visiting the exposed inter-tidal archaeology of Samson Flats. The students were introduced to the different survey methodologies being implemented during the project and were invited to discuss possible interpretations of the stone-built structures present on Samson Flats.

A public site open-day was organised in 2009. This was advertised through the local tourist information centre and an interview given by CISMAS to the local radio station. The public site open-day received approximately a dozen visitors, who were shown the exposed inter-tidal features of Samson Flats and the survey methodologies being used by the team. The project area was visited daily by interested members of the public, with whom CISMAS members discussed the project and site in addition to those who attended the site open day.

The theme of community outreach was continued during the 2010 survey season with an additional public site open day and another visit by the Carn Thomas Secondary (St. Mary's) school children. A local radio broadcast was also undertaken from Samson Flats.

Topographic survey

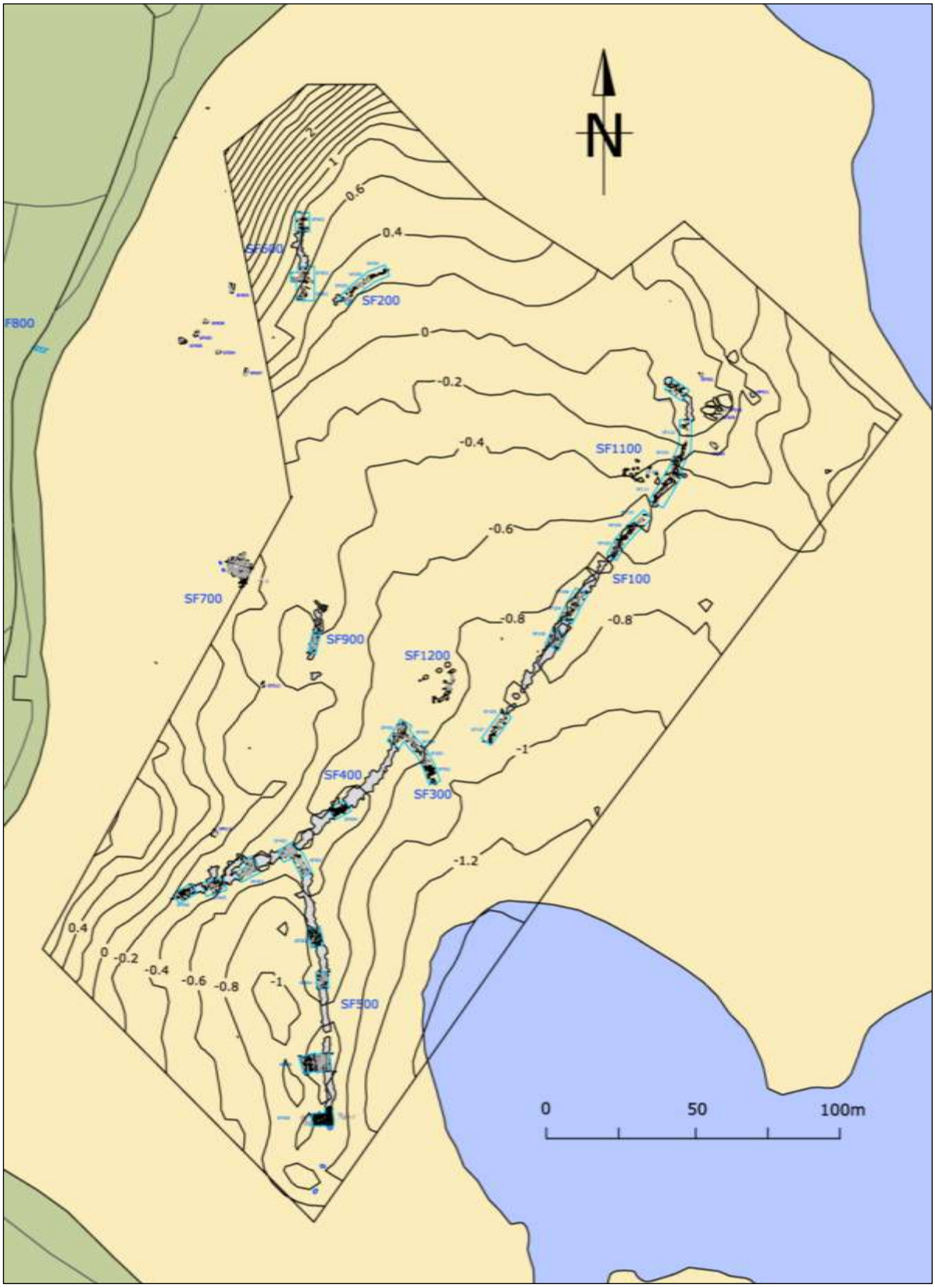

Fig 14
Topographic survey plotted as 0.20m contours, sampling interval 5m squares

The topographic data was collected as spot heights, with a corresponding horizontal position using the RTK GPS unit. Heights and position were taken at approximately every 5m. 30,000m^2 were surveyed in 2009, a further 30,000m^2 were surveyed in 2010. In total an area of about 60,000m^2 around the stone features have been surveyed in this fashion. This data has been plotted as contour maps at vertical intervals of 0.10m and 0.20m – Fig 14 shows the contours at 0.2m intervals.

From the contour map produced, it is possible to see how the water depth varies with the receding tide relative to the linear stone features SF100, SF300, SF400 and SF500. Fig 16 shows the extent of the sea at 0m above OS datum level (mean or mid tide). At this point, the linear stone features form a barrier between the enclosed water and the open sea. The existing height of SF400 exceeds the 0m height of the water, as does most of SF100. The only parts of the existing structures lower than 0m OD are the southern end of SF100 and SF300 which are currently at -0.13m and -0.16m respectively. Thus with the addition of a single course of stones these would also exceed 0m.

It can be seen from the contour plan (fig 14) that, as the tide falls, the trapped water is funnelled to the short gap between SF300 and SF100 – the end of this process can be seen in figure 17 where the water is shown at -0.8m (0.8m below OS datum) with only a small pool by the gap. This demonstrates that with a short length of net (16m) secured between SF300 and SF100 these features could have functioned as a tidal fish trap.

Fig 15

Collecting data for the contour map using the RTK GPS unit

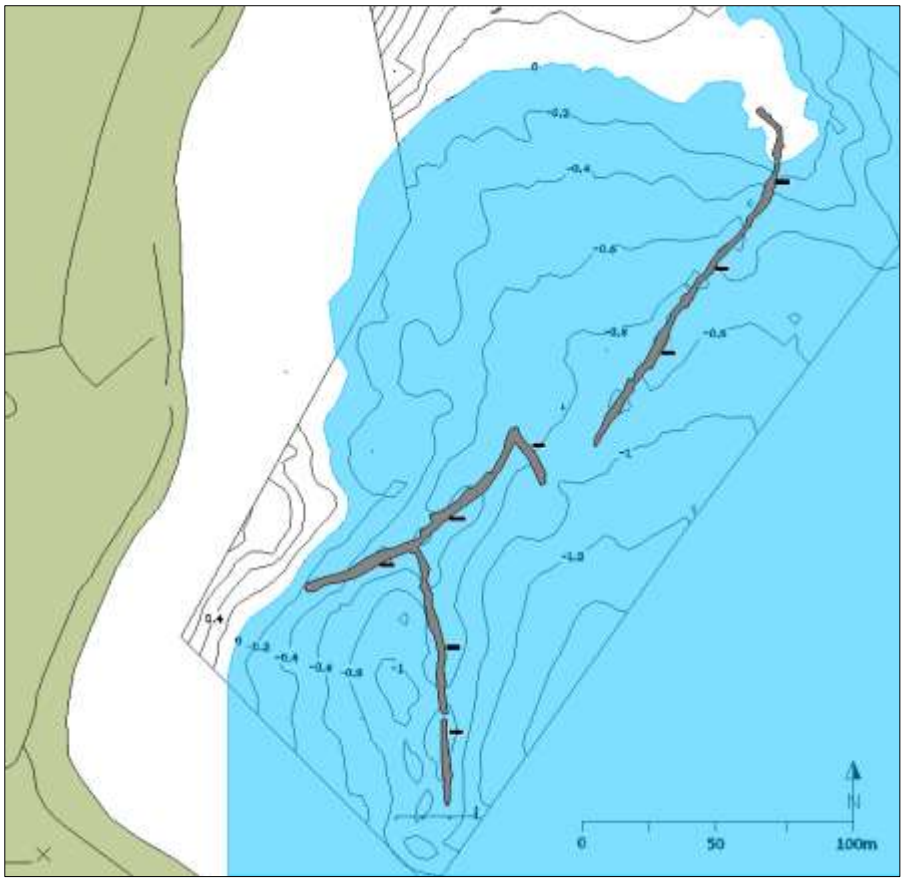

Fig 16

Water at 0m (OS datum) roughly mid tide

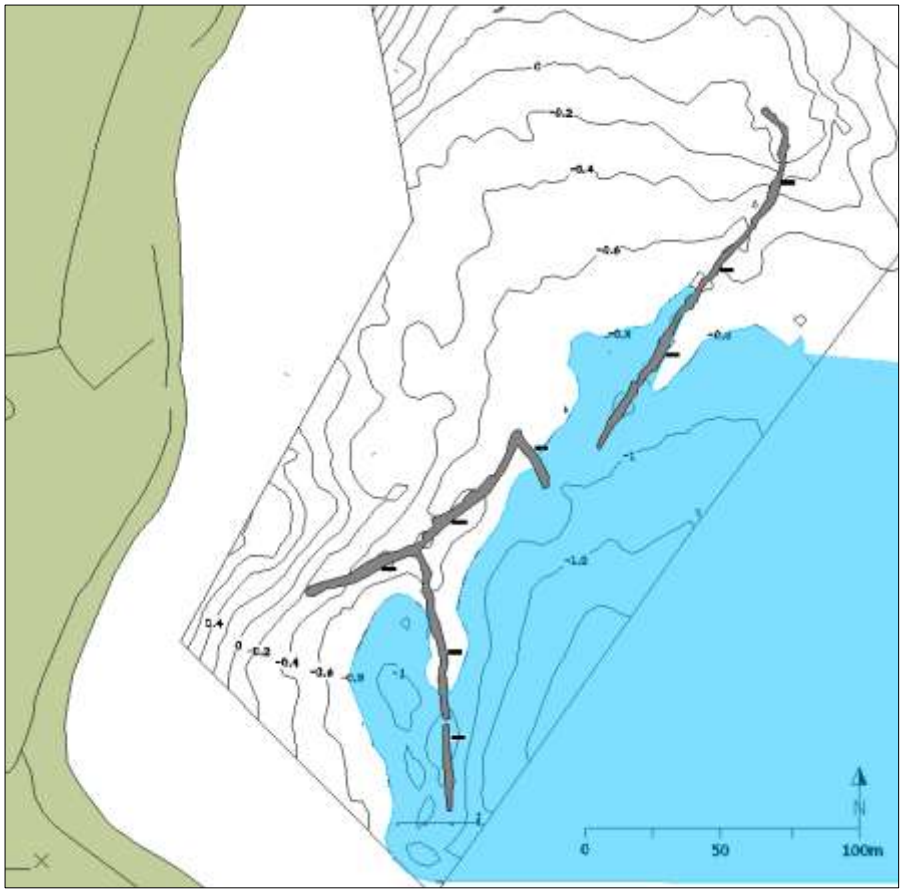

Fig 17

Water at -0.8m (OS datum).

Note also how the sediments are higher on the seaward side of features SF100 and SF400/500

Stone features

Six stone features were identified and recorded in 2009, and a further six recorded in 2010. The stone features were allocated context numbers SF100 to SF1200, and details of each are summarised in the table below (fig 44). Details of the construction of these features could only be observed where the thick covering of seaweed was removed; each cleared section was recorded by 1:20 planning frame survey, longitudinal profile and photographs. It was not possible to draw the whole of the features due to time constraints and the desire of the Isles of Scilly Wildlife Trust that we remove as little weed from the features as possible.

These features were all constructed from undressed granite boulders. Broadly speaking, two different construction techniques were observed. Firstly, there were lines of medium sized granite boulders and slabs, with many of the stones set on end, and the feature only consisting of a single line of stones in places. This type is referred to as 'boulder wall' in the Isles of Scilly Historic Landscapes Assessment (Land Use Consultants, 1996). SF100, SF200, SF600 and SF1200 are of this type of construction. The second type of construction was more typical of normal stone wall construction, with stones laid flat side down in courses with the larger stones defining the edges of the wall – referred to as 'Stone faced stone wall' in the IoSLA. SF400, SF500, SF800 and SF1000 were of this style of construction. SF300 exhibited elements of both types of construction, with the former predominating. For a more detailed description see Fig. 44 below. These two construction methods were also reported by Fowler and Thomas (1979).

Dating of these features is problematic and will probably only be established if limited intrusive investigation is undertaken at some time in the future (see Future Work below). We know that at least some of the linear stone features were visible when Borlase visited the Islands in the middle of the 18th century. However, the presence of plug-and-feather cut granite recorded in two of these features (SF200 and SF300) would indicate that these at least may post date the introduction of plug-and-feather cutting sometime after 1800 (Herring, 2008). The different construction techniques observed in these linear stone features may indicate that they are of different dates. The possibility that submerged field walls have been utilised in later structures should at least be considered.

All the 1:20 plans, longitudinal profiles and photographs are reproduced on the DVD ROM in appendix II. Examples from each context are reproduced below.

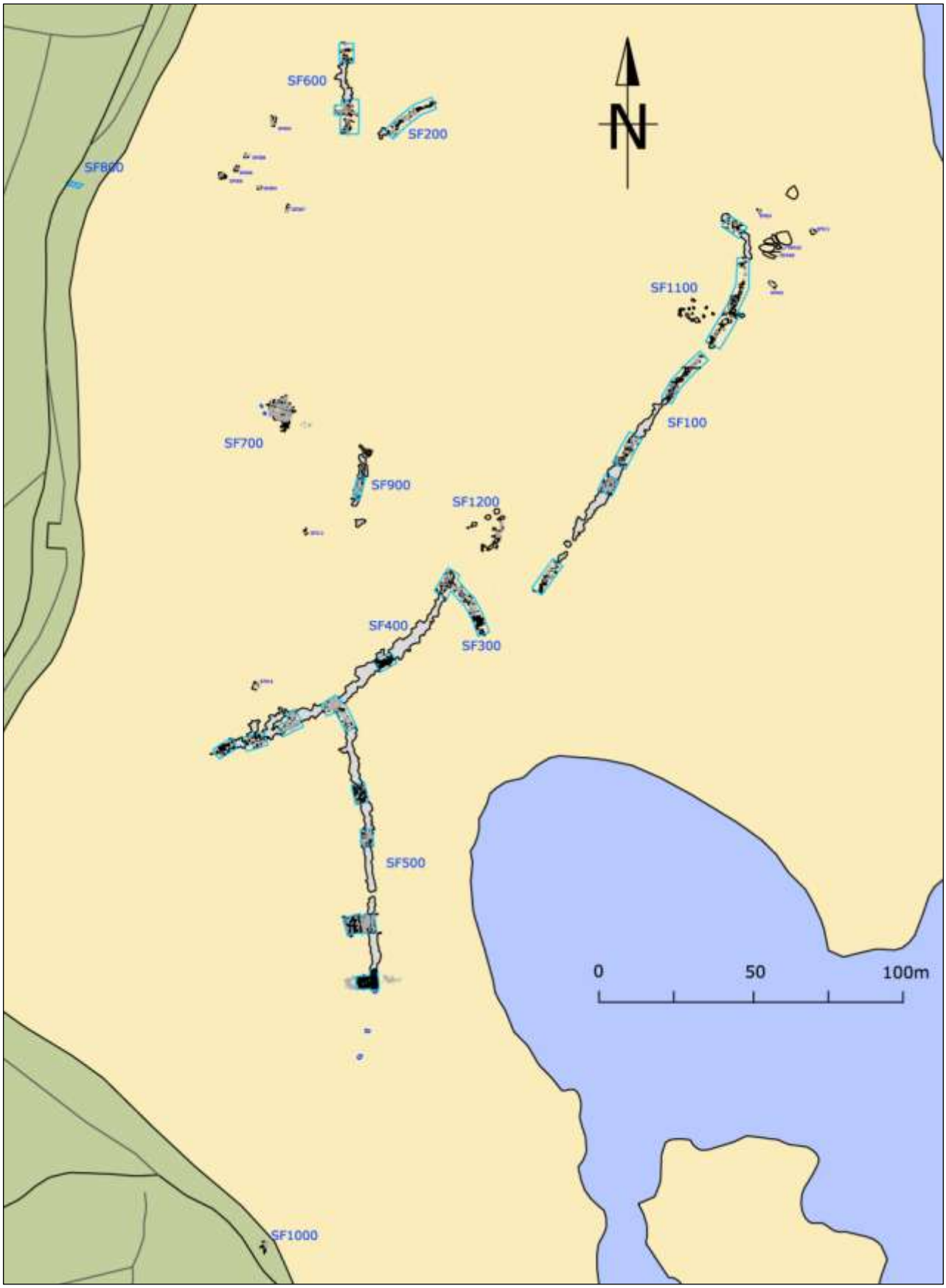

Fig 18
Outline plan of stone features recorded on Samson Flats in June 2009.A higher resolution version of this plan is included on the DVD ROM

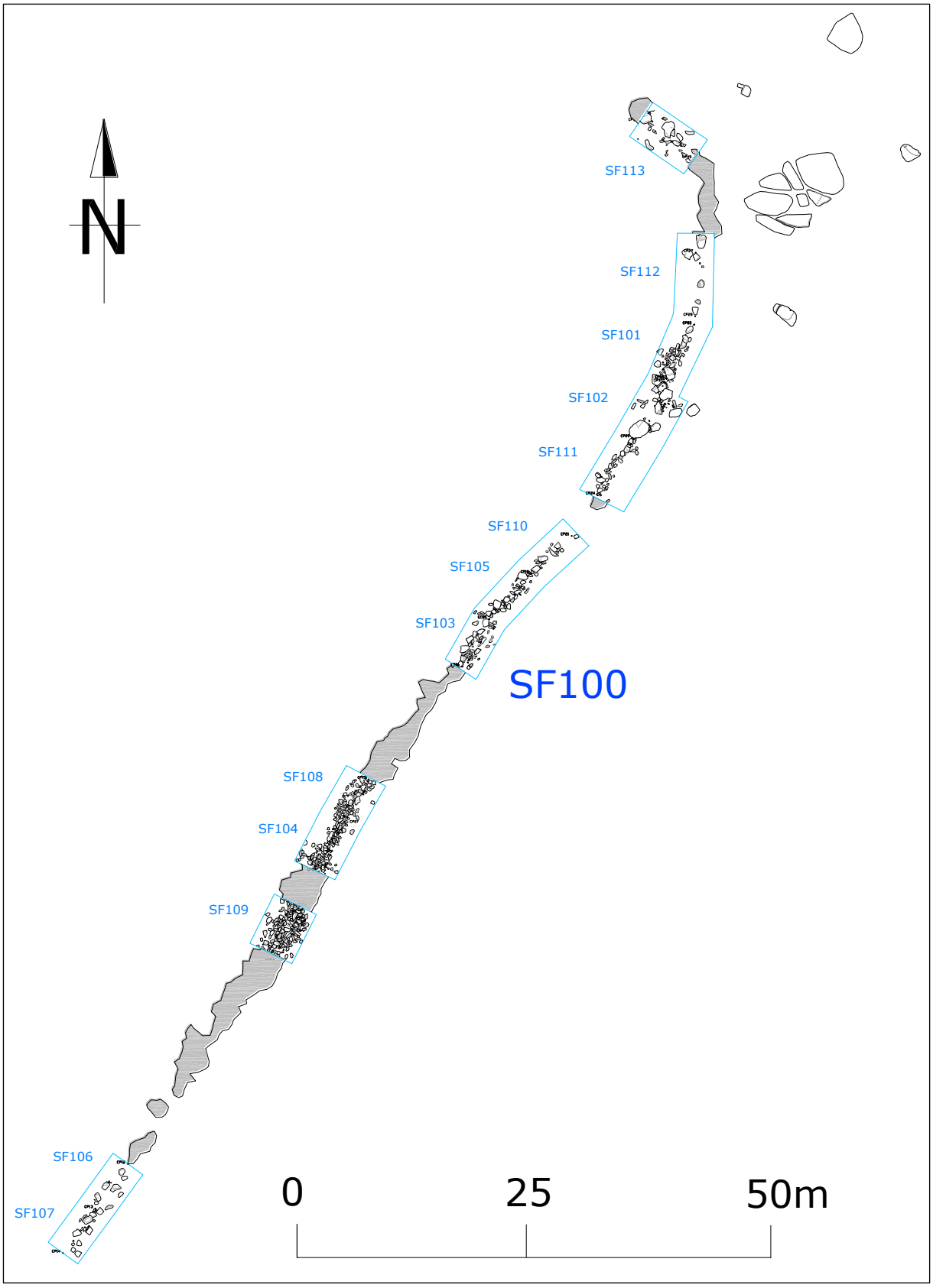

Fig 19
Linear stone feature SF100, showing the location of the drawn segments SF101 to SF113

SF100

PRN 7076.01 describes this as *'A wall of tumbled stone 1.0m – 3.0m wide and up to 0.6m high with no obvious orthostatic construction, runs for 130m'.*

This is a linear stone feature formed from granite boulders and stones, apparently set into coarse pinkish-grey sand. The feature runs for about 140m from the south west to the north east. The northern end bends round to the north west, almost at right angles to the line of the main feature (fig 19). This feature is of variable construction with larger boulders at the north and smaller stones to the south. A number of the larger stones at the north end are set on edge rather than laid flat - in places the feature consists of only a single line of granite stones set on end. See fig 44 for details of dimensions, position etc.

The sand on the eastern (seaward) side of this feature is about 0.12m higher than on the western (inland) side of the feature. This effect was noticed on all the linear stone features on Samson Flats and is probably a tidal effect. There is a gap in the feature, approximately 4m wide 35m from the northern end. This may represent an area where stones have been lost from the wall or an original entrance or feature.

A number of limestones have been observed around SF100 despite limestone not being native to the region. At least one limestone has been recorded as part of this feature (SF103 fig 20). A number of suggestions have been made to account for the presence of limestones in this feature, including ship's ballast and glacial erratics.

A total of thirteen characterisation sections, each 6m long, were drawn for this feature. An example of one of these, SF101, is shown in fig 21 below; the others are reproduced on the DVD ROM which accompanies this report.

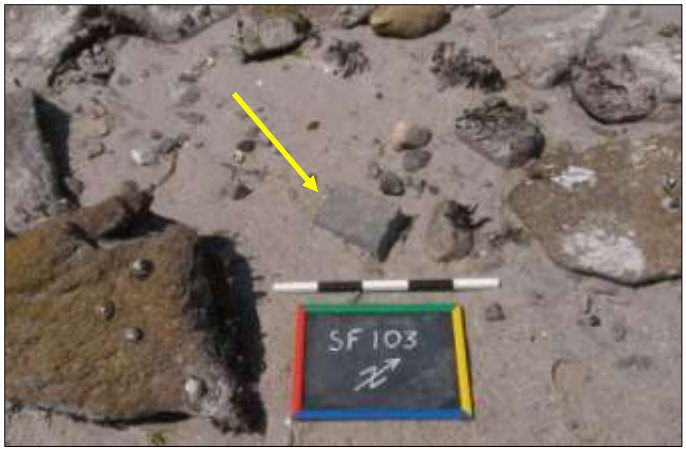

Fig 20

Limestone incorporated in SF103 (arrowed)

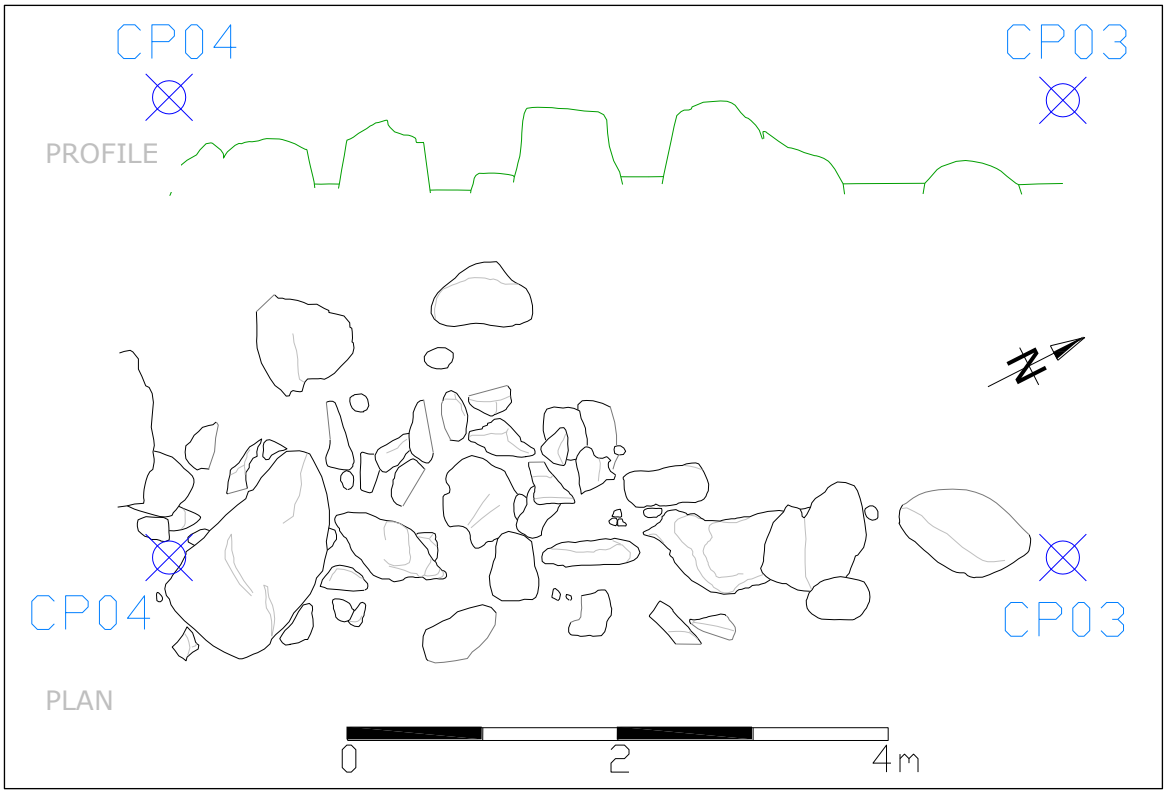

Fig 21
An example of one of the drawn segments of SF100. Shown here is SF101.

SF200 and SF600

There is no apparent entry for these features in the HER record for Samson Flats.

SF200 is a slightly curved linear stone feature consisting of medium to small granite boulders aligned approximately south-west to north-east. Some of the boulders have been set on end and are surrounded by the coarse grey sand prevalent on this part of Samson Flats. The feature often consists of little more than a single line of stones. The construction of this feature is generally similar to that of SF100, but with smaller, sparser stones. A granite stone at the northern end of this structure (SF203 fig 23 below) is noteworthy as it shows evidence of having been drilled and split using plug-and-feather. If this stone is part of the original structure it must post-date 1800 when this technique of splitting stone was introduced to this country.

Three 6m sections of this feature were drawn, SF201-203; these are shown in fig 22 below.

SF600 is a short linear stone feature running north-south. It is very similar to SF200 in construction but has more small stones, some of which appear to be displaced. These two stone features look as if they are converging towards their southern ends – they are likely to be associated and contemporary.

Three 6m sections of this feature were drawn, SF601-603; these are shown in fig 22 below.

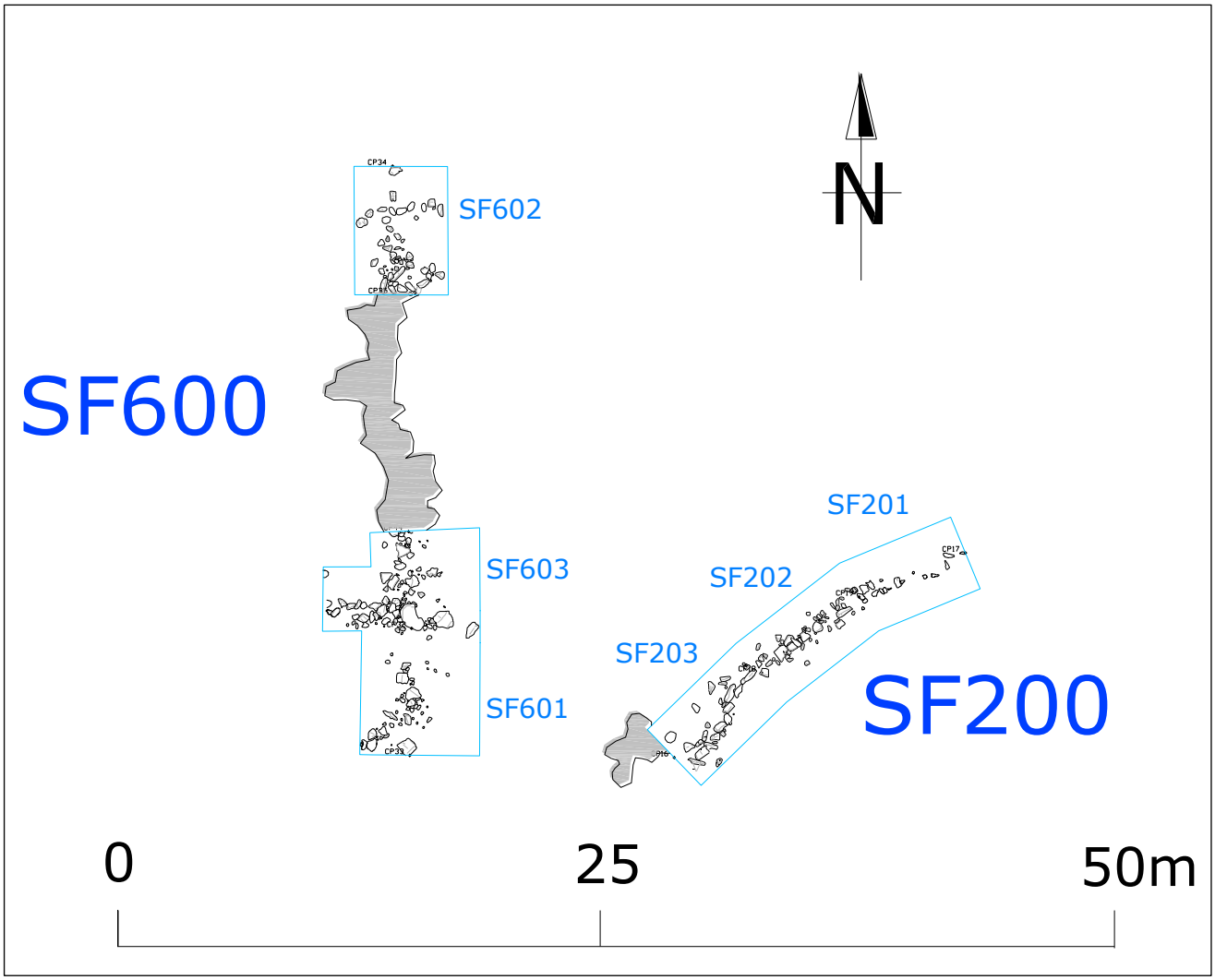

Fig 22
Linear stone features SF200 and SF600, showing the location of the characterisation drawn segments.

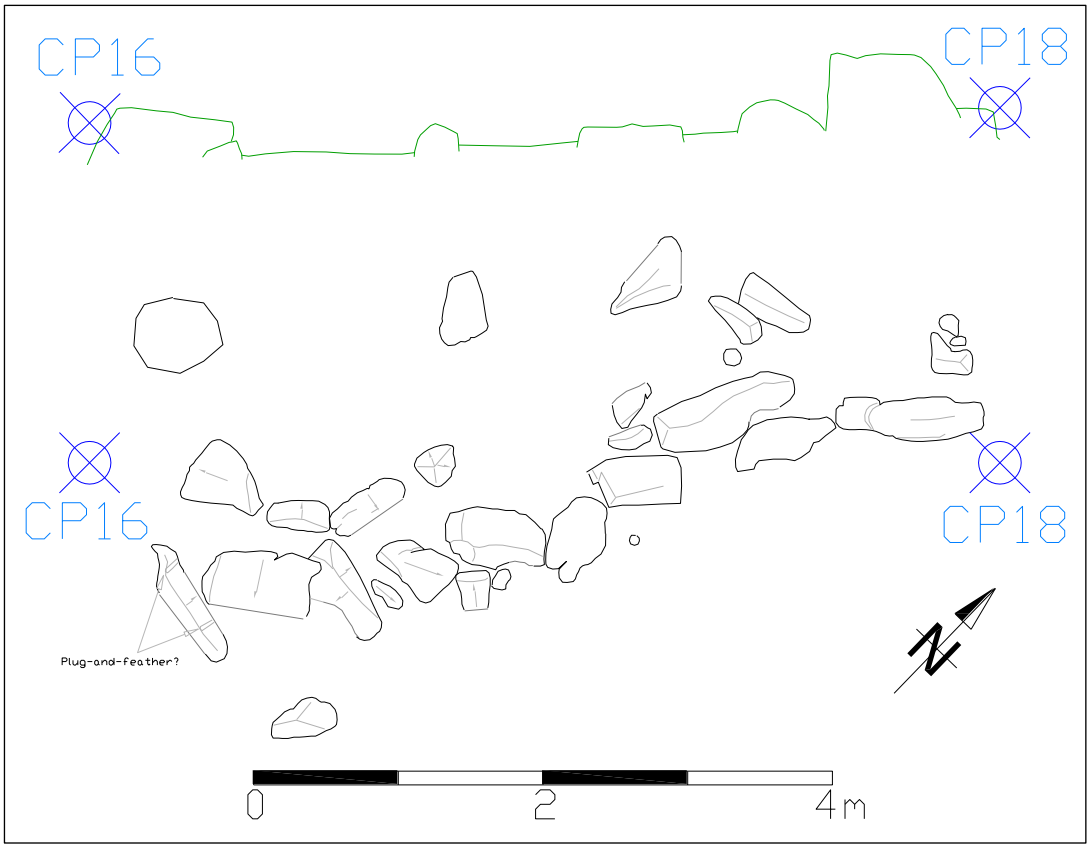

Fig 23 . An example of one of the drawn segments of SF200. Shown here is SF203, plan and profile (above) and photograph looking NW (below)

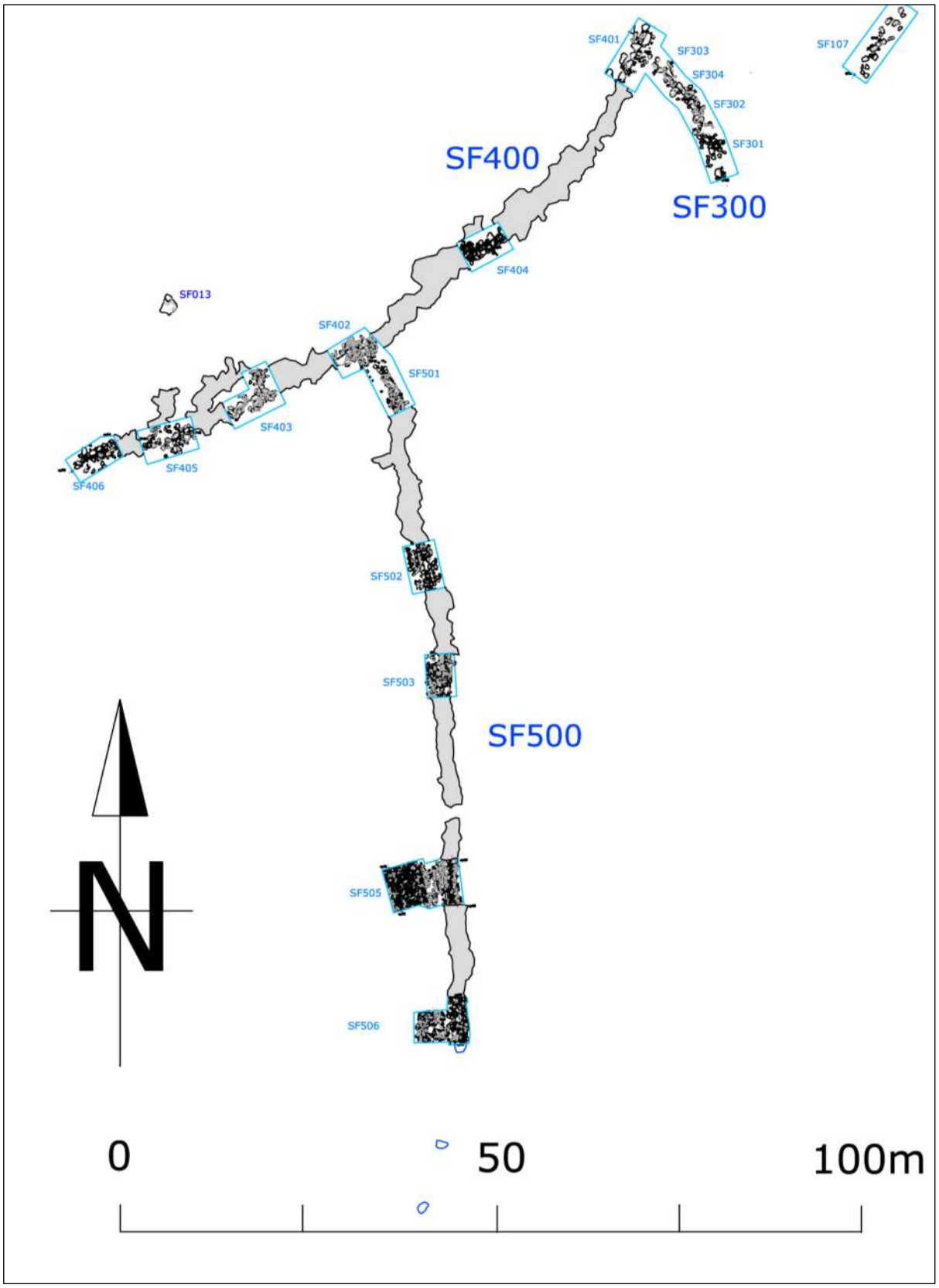

Fig 24
Linear stone features SF300, SF400 and SF500, showing the location of the characterisation drawn segments.

SF300

PRN 7076.01 describes this as '*wall B – a 100m curving wall of tumbled stones* [SF400], *1.0m – 3.0m wide and up to 0.8m high, incorporating some naturally placed boulders. At the north east end is an abrupt change of direction to the south east for 16m '* [SF300].

This is a linear stone feature 19m in length aligned approximately north-west to south-east. It is composed of medium sized granite boulders, some of which are set on end into coarse grey sand with some silty clay with small granite chippings. The granite stones are tightly packed in places and have a distinct 'built' appearance.

Of note is a granite stone at the north west end of this structure which shows evidence of having been drilled and split using plug-and-feather. If this stone is part of the original structure it must post-date 1800 when this technique was introduced to this country. This feature joins SF400, roughly at a right angle (fig 24).

As this was a relatively short feature it was drawn in its entirety, SF301- SF304; these are shown in fig 26 below

Fig 25 SF304 looking east. The scale is 2m long.

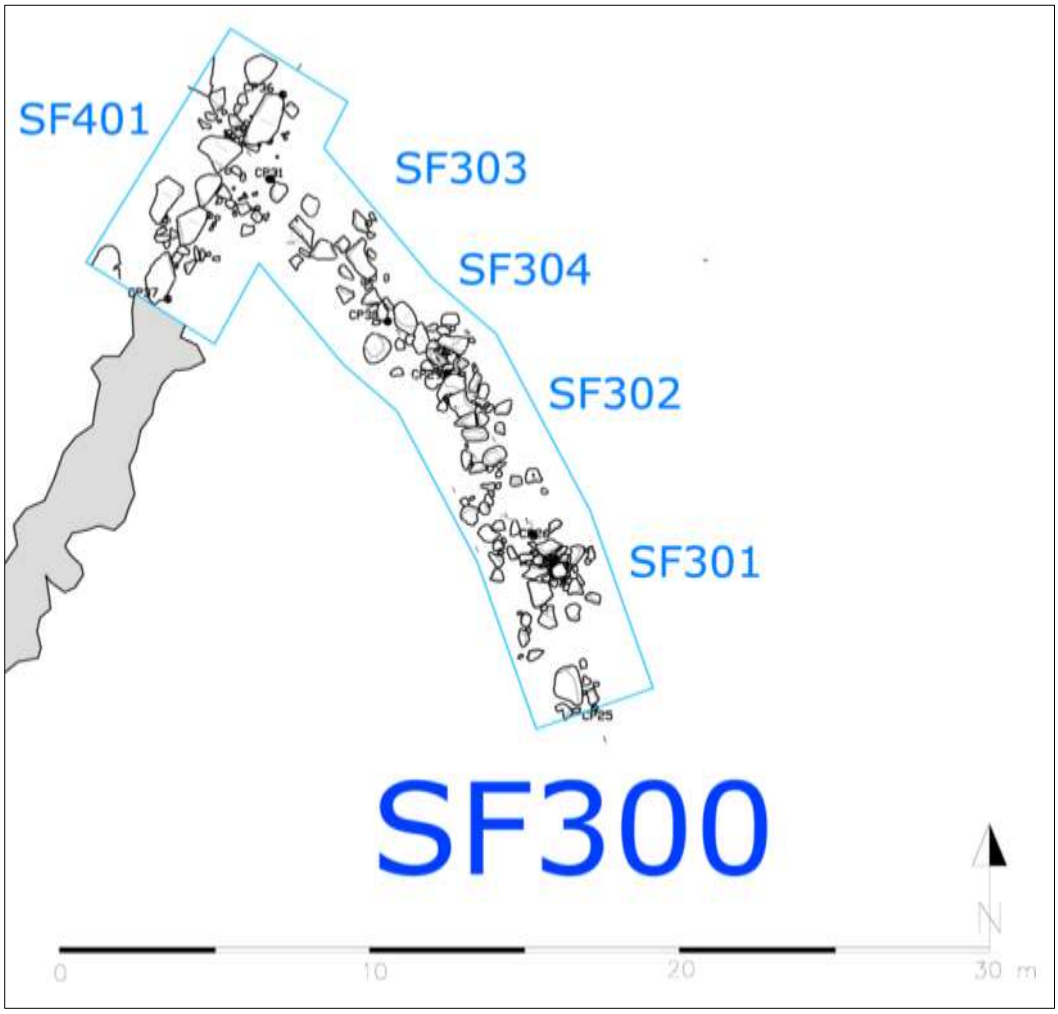

Fig 26
Linear stone feature SF300, comprising SF301 to SF304

SF400

PRN 7076.01 describes this as '*wall B – a 100m curving wall of tumbled stones* [SF400], *1.0m – 3.0m wide and up to 0.8m high, incorporating some naturally placed boulders. At the north east end is an abrupt change of direction to the south east for 16m '* [SF300]. *Midway along B another wall branches off at right angles...'* [SF500]

Slightly curved linear stone feature, consisting of medium-sized granite stones generally laid flat with the larger stones defining the edges, much as in typical stone wall construction. The north-eastern end of the feature (SF401) exhibits some larger granite boulders. The stones appear to be set into coarse grey sand with some pinkish silty clay, containing many small granite chippings. The sand on the south (seaward) side of this feature is about 0.35m higher than on the north (inland) side of the feature. This was particularly evident at the eastern end of the feature, where even at low tide a pool of water remained to the north of the feature.

Both ends of the feature were drawn (SF401 and SF406) as well as four 6m sections along the length of the feature (SF402 – SF405).

This feature is joined to SF300 and SF500 fig 24.

Fig 27

SF400 looking west – note the pool of water on the north (inland) side of the feature and the higher sand level on the south (seaward) side of the feature.

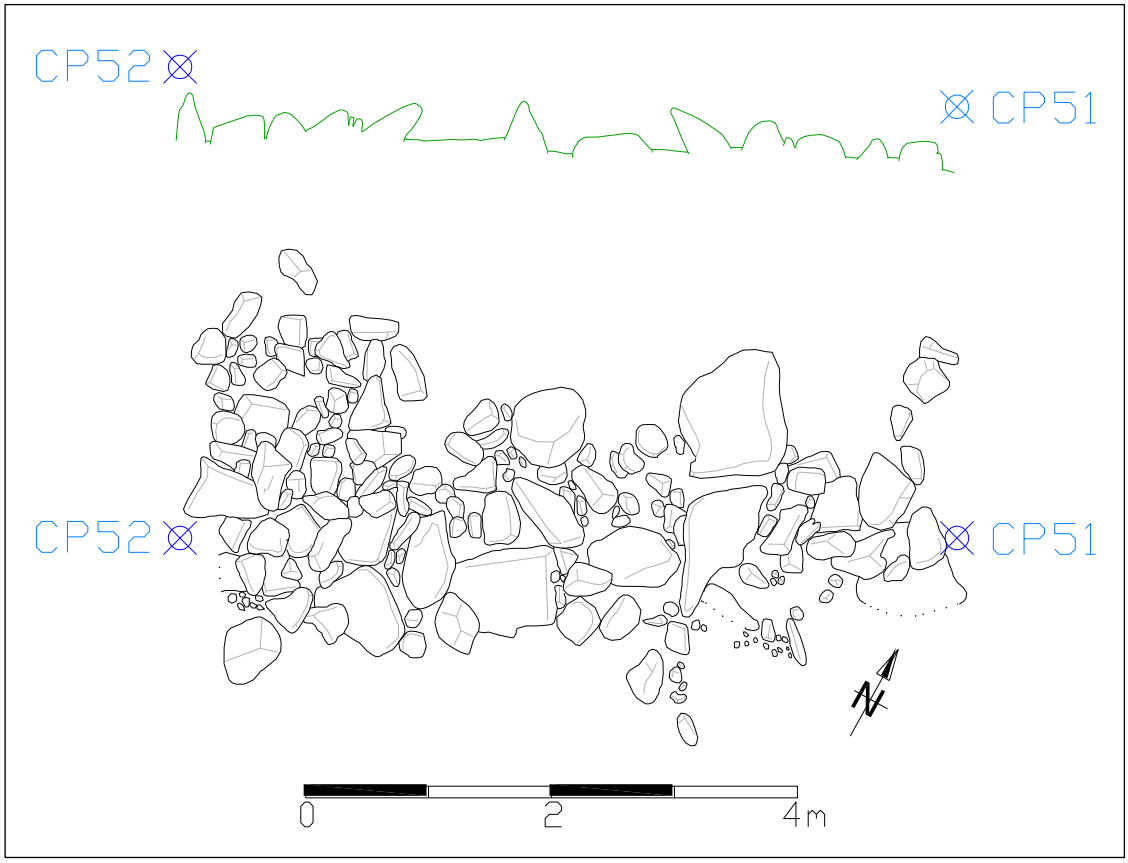

Fig 28. An example of one of the drawn segments of SF400. Shown here is SF404, plan and profile (above) and photograph looking SW (below)

SF500

PRN 7076.01 describes this as '*wall B – a 100m curving wall of tumbled stones* [SF400], *1.0m – 3.0m wide and up to 0.8m high, incorporating some naturally placed boulders. At the north east end is an abrupt change of direction to the south east for 16m '* [SF300]. *Midway along B another wall branches off at right angles to the south for 100m... which has an apparently original gap of 4.0m ... and is generally 2.0m wide with evidence of side slabs retaining a rubble core and in one instance two courses of laid stones*.' [SF500]

Very slightly curved linear stone feature, formed from medium sized granite stones and boulders. The structure is set into the light brown coarse sand with many small granite chippings. The edges of the feature are often lined with larger stones, sometimes with reasonable faces. Some stones are laid on top of other stones – up to three courses deep have been observed (see SF503).

There is a gap, which may represent a deliberate opening (see plan). This is currently just over 2m wide, but from the PRN entry it can be seen that this gap was once 4m wide. The diminution is presumably due to tumble from the wall and redistribution of stones by the sea.

Five 6m sections of this feature were recorded in detail (SF501 – SF503 and SF505 – SF506).

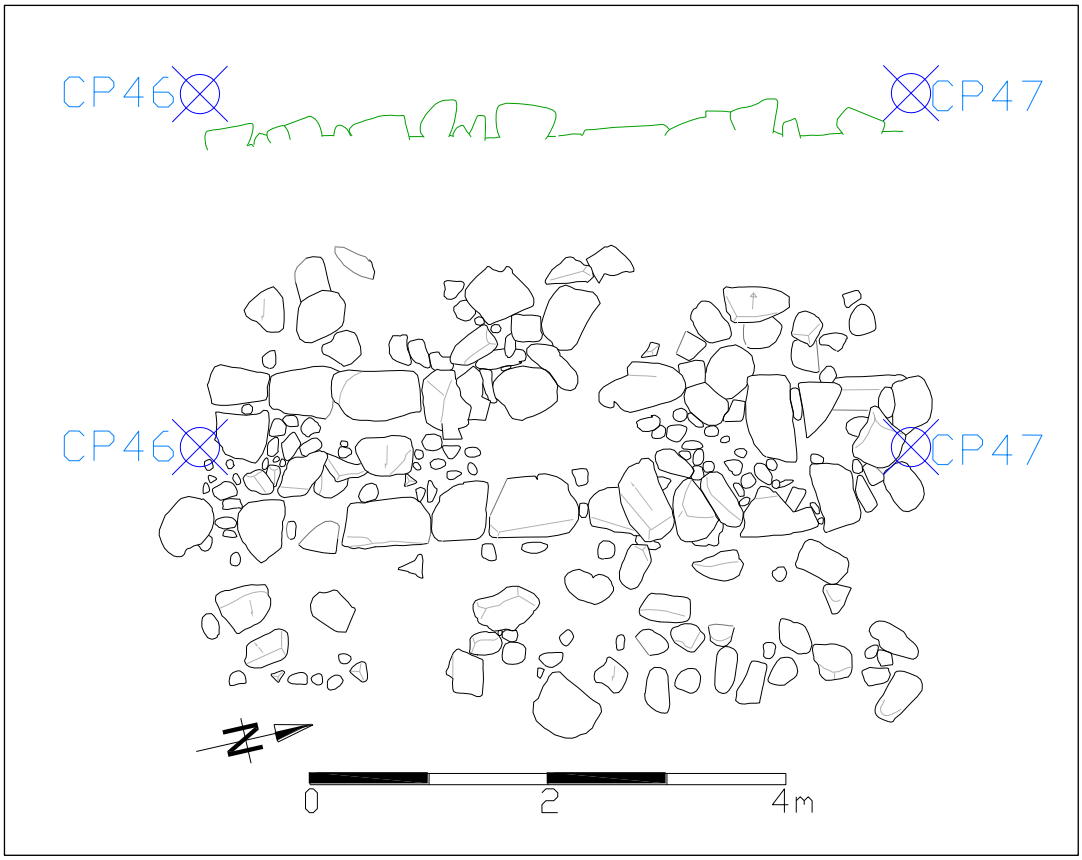

Fig 29
An example of one of the drawn segments of SF500. Shown here is SF502, plan and profile (above) and photograph looking NW (below)

At the southern end, clearing of the weed to the west of the feature revealed a possible rough stone surface , 4 – 5m wide running parallel to the 'wall' (SF505 and SF506) on the west (landward) side of the feature. The stone surface was such that it was hard to be certain that this was a deliberately laid surface without intrusive investigation. However, allowing for the inevitable redistribution of the stones by the action of the sea this may represent a deliberate feature.

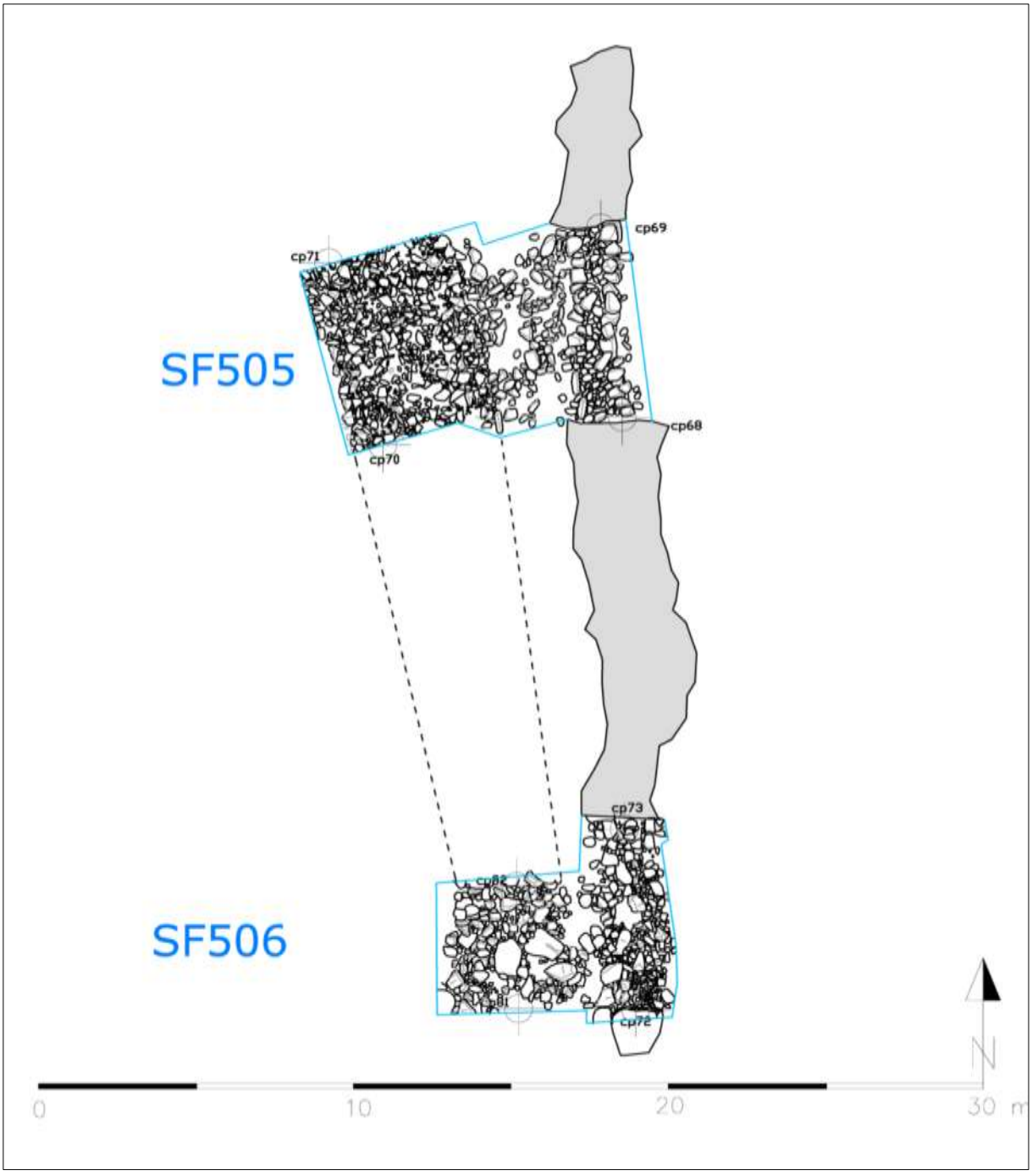

Fig 30
Possible stone surface SF505 and SF506

Fig 31
SF505, possible stone surface. Above: looking east with stone wall SF500 in the foreground. Below: looking west with wall SF500 in the background

SF700

PRN 170512 states *'A possible ruined hut circle, associated with a field system (7076.01). Evident as an angular enclosure, 6.0m diameter at the end of wall 'C' (h1) and found to stand to 1.2m high, consisting of rough coursed large irregular blocks of granite'.*

Roughly circular area of irregular granite boulders 5.9 to 6.4m in diameter (fig 32). The centre of this circle is some 19m to the SSW of PRN 170512.00, a possible hut circle. This is probably the same feature allowing for previous survey inaccuracies (no RTK GPS available). However the current state of this feature makes it difficult to be certain that this is a hut circle rather than a roughly circular collection of natural granite boulders. This may have been more convincing once – but has probably since suffered from movement of stones due to the action of the sea.

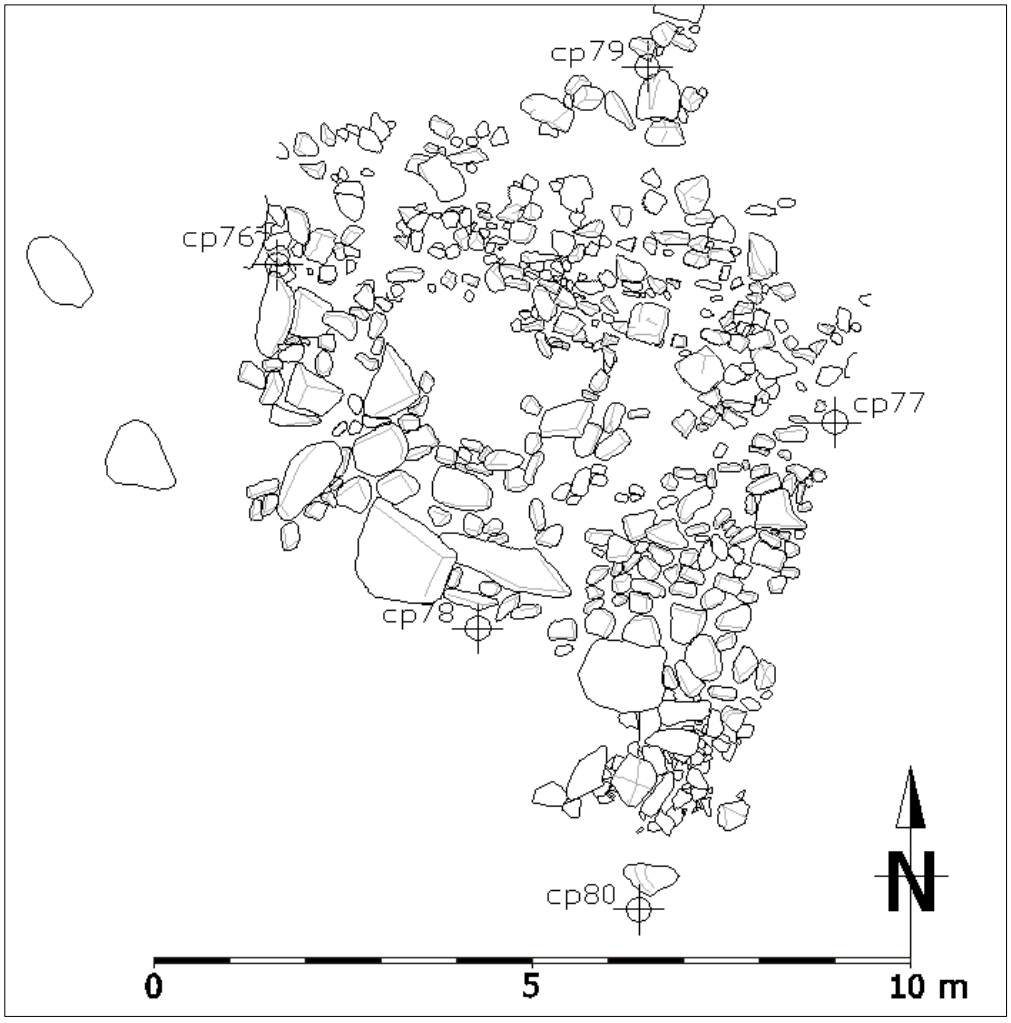

Fig 32 Plan of SF700

Fig 33

SF700 looking NNW. The area around the feature has been cleared of seaweed, this part of Samson Flats is covered with a thick growth of seaweed – which makes identification of features very difficult.

The whole of this feature was drawn using planning frames – see fig 32 above

SF800

NGR SV 87857.5E 13026.7N

Dry stone wall consisting of irregular granite stones aligned approximately east-west. The stones are laid in horizontal courses 0.95m wide and are partly obscured by the existing topsoil and vegetation. The wall is above mean high water (9.5m OD) and was only recorded where it crosses the coastal footpath around North Island. The wall has obviously been eroded beyond the cliff face, but must once have continued onto what is now Samson Flats, albeit at a higher level. SF800 does not form an obvious continuation of any of the linear features visible in the inter-tidal zone.

Fig 34

Wall SF801 running up to the cliff edge (just beyond the vegetation), Samson Flats in the background (looking east).

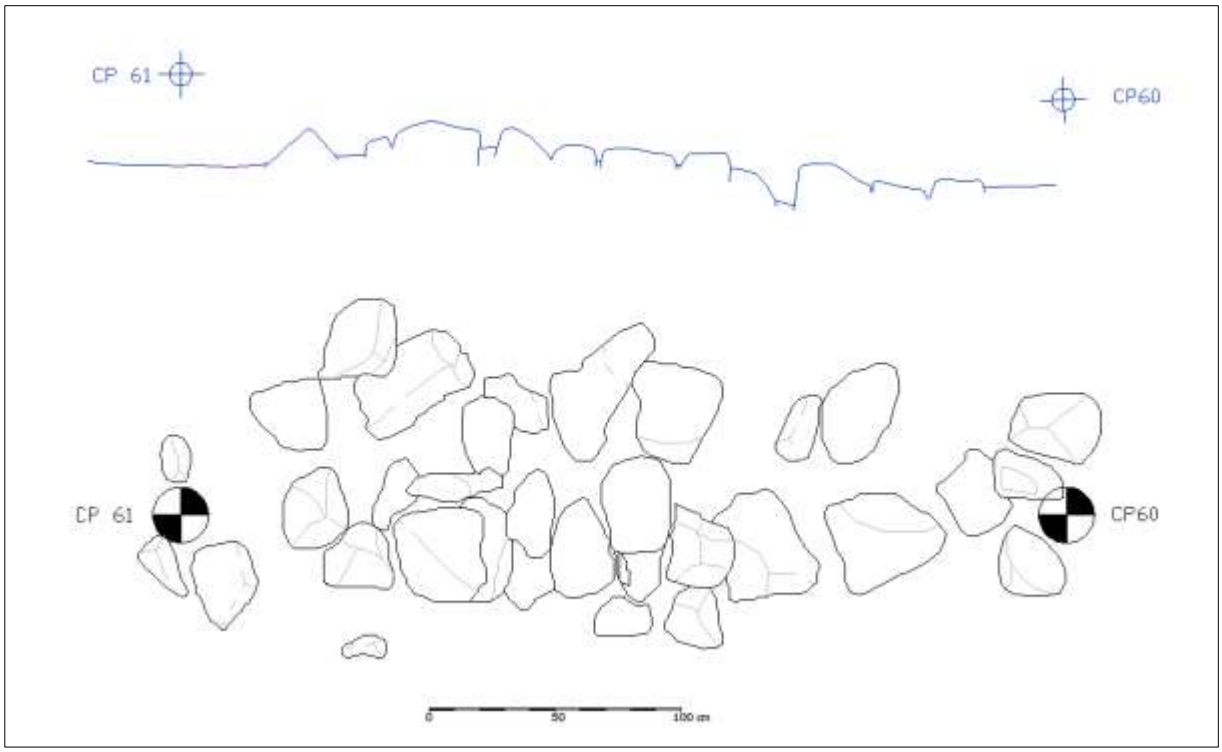

Fig 35
SF801 as it crosses the coastal footpath

SF900

The remains of a short, straight section of possible stone wall approximately 20m long and 1.8m wide consisting of medium sized granite stones, with possible coursing in places. many stones appear to have been displaced, probably by action of the sea. Similar in style to SF400, but less well-preserved. There is no specific entry for this feature in the Cornwall HER record.

The outline of the feature was drawn using RTK spot positions; one 6m length was drawn in detail using planning frames (SF901).

Fig 36
SF901 looking west. Note the standing water on the west (landward) side of the feature

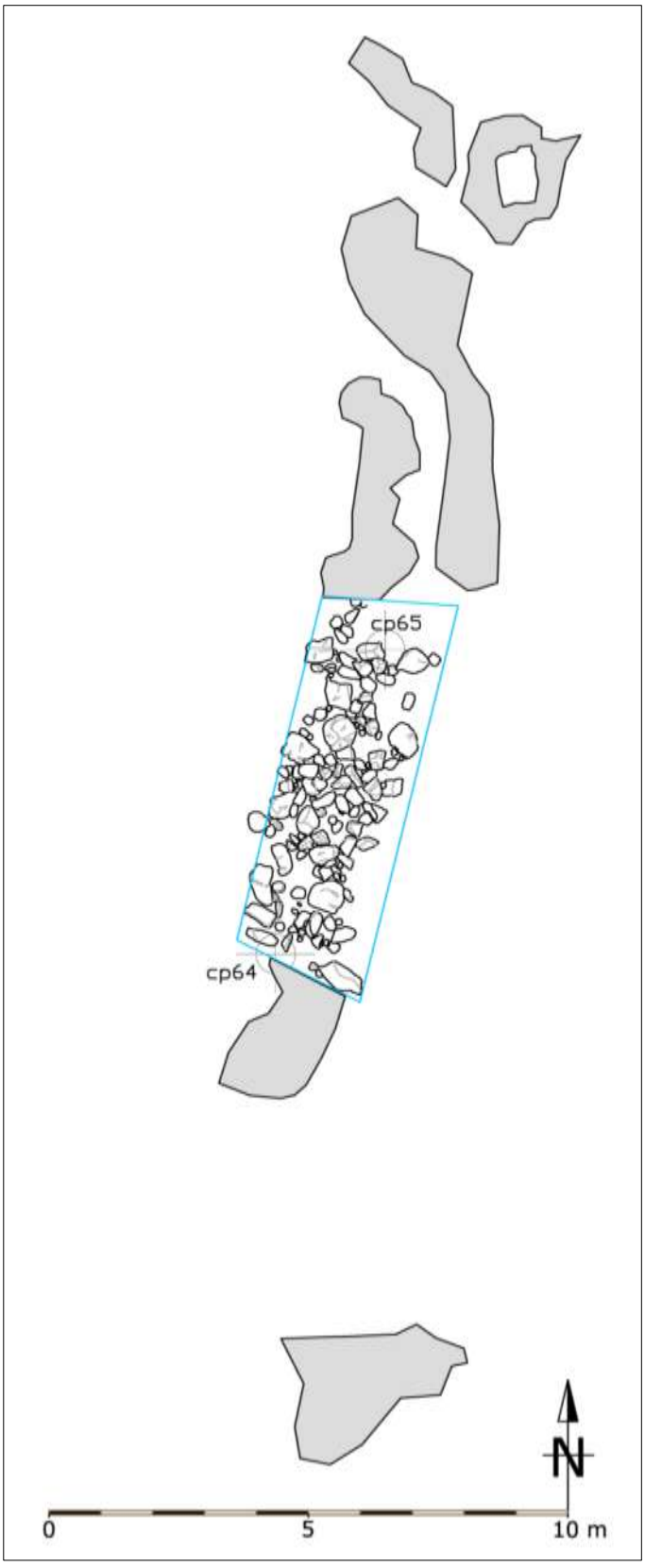

Fig 37

SF900 and the drawn section SF901.

SF1000

NGR SV 87921.0E 12672.5N

PRN 7077.01 records '*Traces of stone structures in two or three places in the cliff face, on the south side of East Porth*.'

35m south east of the recorded position for PRN 7077.01 a short section of granite wall exposed at the base of the cliff was recorded. This section of wall is above the inter-tidal zone (max 5m OD) but would clearly have originally headed northwards into the current inter-tidal zone (now washed away). The wall exhibits at least two courses of stones, many of which appear to be slightly displaced. It is 0.80m wide and is visible for 2.6m of length; it continues into the cliff face (sand) on the south and has been eroded by the sea to the north. The wall is sat on, or slightly cut into, reddish brown sandy ram (periglacial head material). The wall is buried by several metres of light brown sand – probably wind-blown.

This wall appears to be heading NNE and could possibly have joined SF500 (see fig 18)

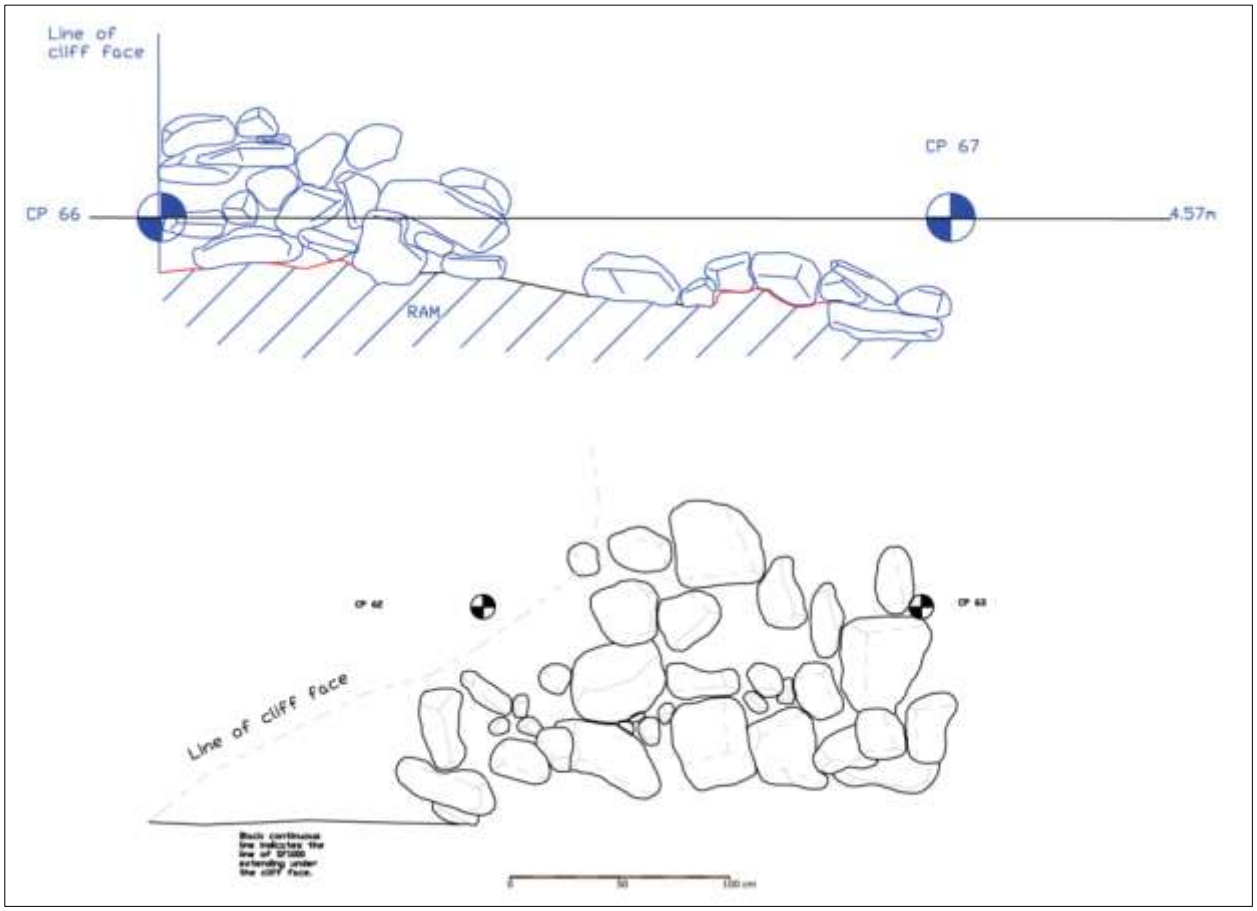

Fig 38
Plan and profile of SF1001, a section of stone wall.

Fig 39
Above, the wall looking SSW.
Below, the wall (position shown by the yellow arrow) seen from SF500 in the inter-tidal zone

SF1100

PRN 7076.02 states '*A possible hut circle associated with the field walls on Samson Flats (7076.01). The first is sited at approximately SV 8807 1299, Crawford's aerial photographs show a possible hut, about 10m diameter, with two lengths of wall diverging from it, situated 25m SW of the present NE terminal of wall 'A' surrounded by a scatter of naturally occurring boulders. This could not be found by the OS field worker (h1)'*

Roughly circular area of irregular granite boulders. The centre of this is some 7m to the SSW of PRN 7076.02. This no longer looks credible as a hut circle. It has either been severely eroded by action of the sea or it is buried beneath the sand. This was recorded as the only possible visible feature for this previously noticed hut circle.

Each stone of this feature was recorded by tracing round the stones with the RTK GPS, then plotting these on the master plan – see fig 40 below.

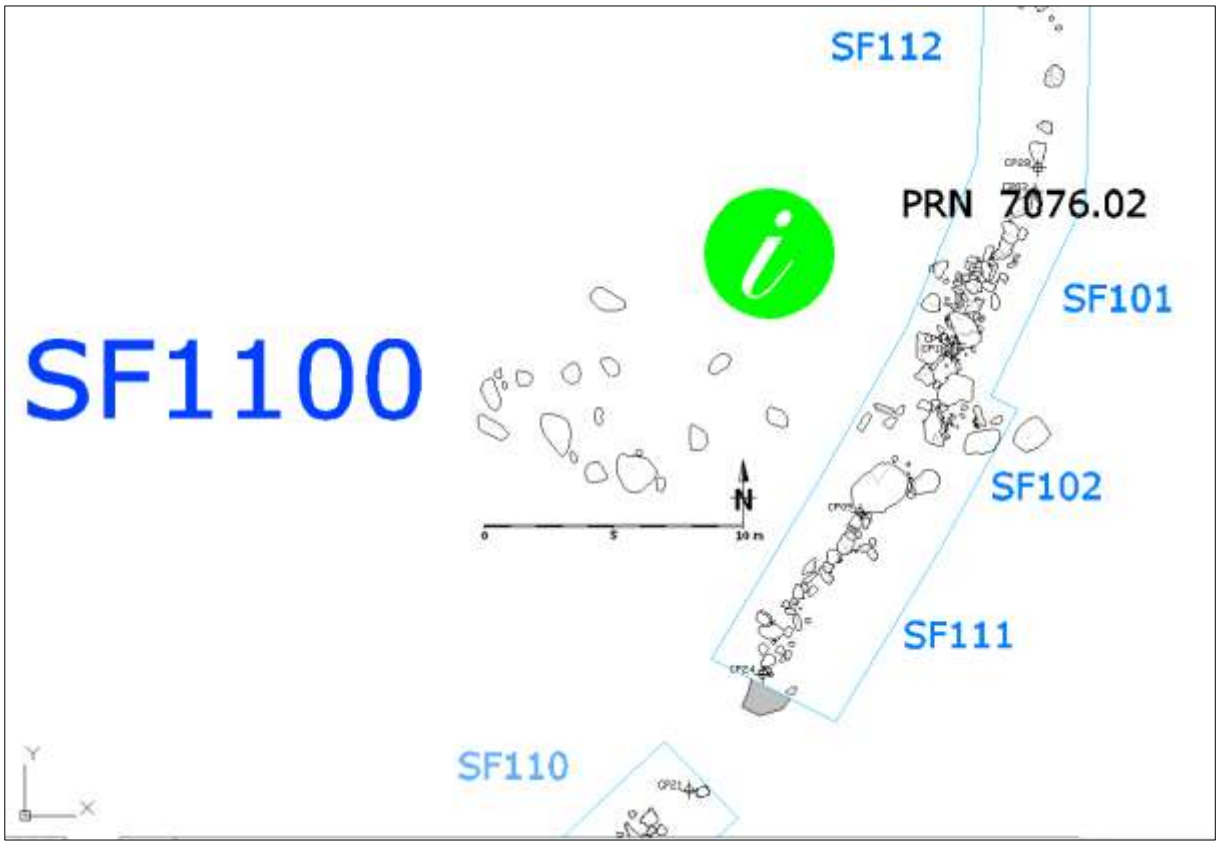

Fig 40
SF1100, plan drawn using RTK GPS.

Fig 41
SF1100 looking NNW. The scale is 2m long

SF1200

Slightly curved linear stone feature formed from large granite boulders and stones set into coarse grey sand. The feature often only consists of a single line of large stones and is similar in construction style to the northern part of SF100. The feature is 0.80m wide and 12.90m long, the height of the stones being roughly 0.8m below ordnance datum. Possibly associated with SF100.

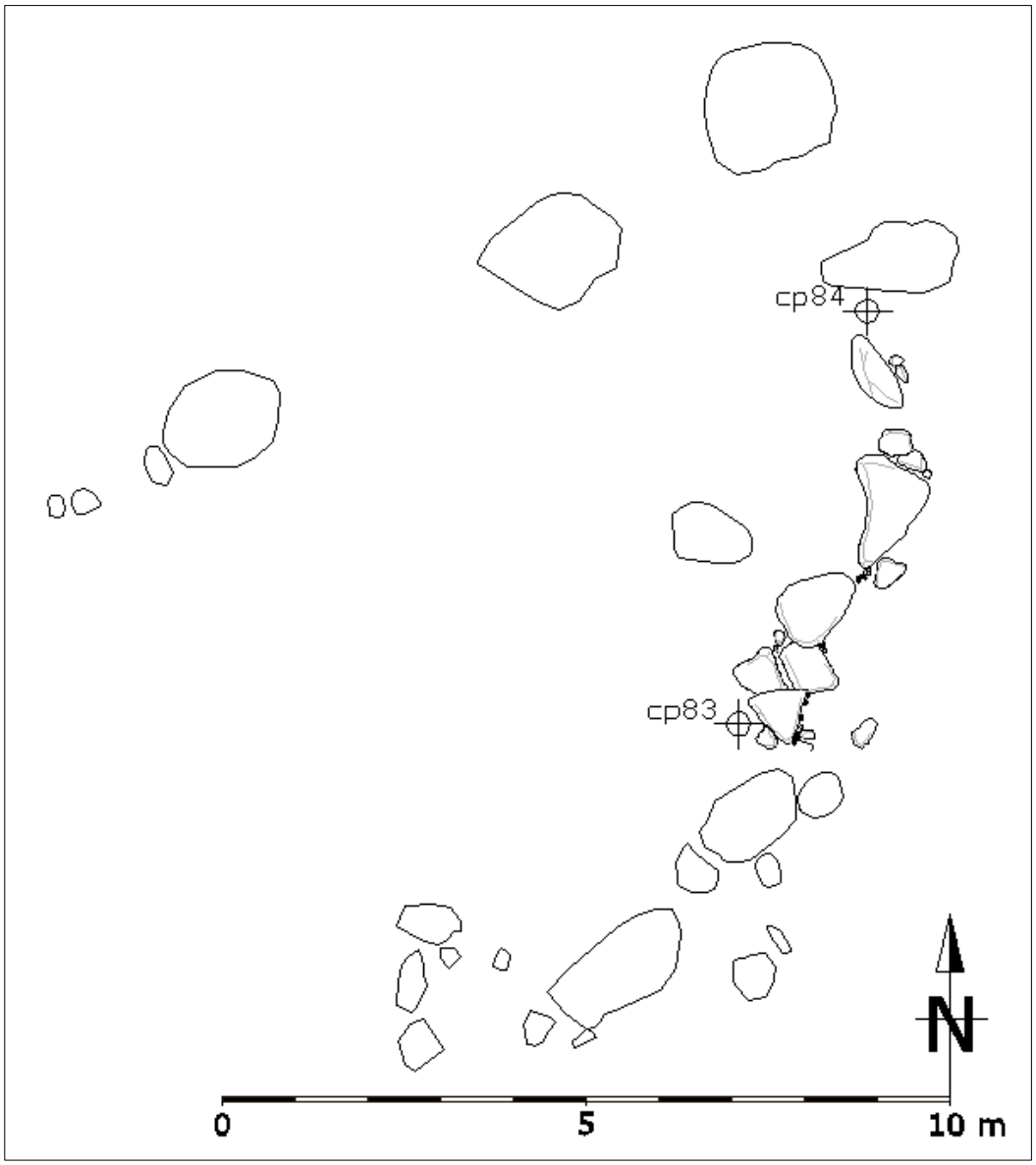

Fig 42
SF1200 plan

Fig 43
SF1200 looking south. The scale is 2m long

Samson Flats – Summary of stone features					
Context	Dimensions	Position	Alignment	Drawings	Description
SF100	L : 141.00m W : 0.50-3.00m H : 0.25-0.65m	N end 88074.5E 13015.7N S end 88012.4E 12891.4N Centre 88054.2E 12954.6N	NE-SW	101-113	Linear stone feature formed from granite boulders and stones set into coarse grey sand. The northern end bends round to the west, almost at right angles to the line of the main feature (see plan). Variable construction, larger boulders at the north smaller stones to the south. In places the feature consists of only a single line of granite stones set on end. Gap in the feature may represent a deliberate opening?
SF200	L : 21.70m W : 0.85-1.00m H : 0.30-0.58m	NE end 87977.3E 13053.9N SW end 87959.2E 13042.4N Centre 87968.3E 13049.3W	NE-SW	201-203	Slightly curved linear stone feature consisting of medium to small granite boulders. Some of the boulders have been set on end in the coarse grey sand prevalent in this part of Samson Flats. The feature often consists of little more than a single line of stones. The construction of this feature is similar to that of SF100, but with smaller, sparser stones. Of note is a granite stone at the N end of this structure (SF203) which shows evidence of having been drilled and split using plug-and-feather. If this stone is part of the original structure it must post-date 1800 when this technique started in this country.
SF300	L : 19.00m W : 1.20-2.00m H : 0.23-0.66m	NW end 87984.4E 12892.6N SE end 87993.5E 12876.9N Centre 87990.1E 12885.9N	NW-SE	301-304	Linear feature composed of medium sized granite boulders, some of which are set on end into the coarse grey sand with some small granite chippings. The granite stones are tightly packed in places and have a distinct 'built 'appearance. Of note is a granite stone at the NW end of this structure which shows evidence of having been drilled and split using plug-and-feather. If this stone is part of the original structure it must post-date 1800 when this technique started in this country. This feature joins SF400, roughly at right angle (see plan).

Samson Flats – Summary of stone features					
Context	Dimensions	Position	Alignment	Drawings	Description
SF400	L : 99.50m W : 1.70-2.20m H : 0.28-0.48m	E end 87983.4E 12897.3N W end 87904.8E 12837.1N Centre 87953.6E 12861.9N	Roughly E-W	401-406	Slightly curved linear stone feature. Consisting of medium sized granite stones generally laid flat with the larger stones defining the edges, much as typical stone wall construction. This feature is joined by SF300 and SF500
SF500	L : 96.00m W : 1.20-1.50m H ; 0.30-0.43m	N end 87946.5E 12851.4N S end 87957.8E 12756.6N Centre 87955.1E 12805.5N	N-S	501-506	Very slightly curved linear stone feature. Formed from medium sized granite stones and boulders. The structure is set into the light brown coarse sand with many small granite chippings. The edges of the feature are often lined with larger stones, sometimes with reasonable faces. Some stones are laid on top of other stones – up to three courses deep have been observed (SF503). Has a gap, which may represent a deliberate opening (see plan). At the southern end, clearing of weed to the west of the feature revealed a possible stone surface and other linear features (SF505 and SF506).
SF600	L : 30.50m W : 1.00-1.50m H : 0.35-0.43m	N end 87947.8E 13073.7N S end 87948.4E 13043.9N Centre 87947.8E 13059.4N	N-S	501-503	Similar to SF200 but has more small stones, some of which appear to be displaced. May be associated with SF200
SF700	NS : 5.65m EW : 6.40m H : 0.49m	Centre 87925.9E 12951.5N	-	701-702	Roughly circular area of irregular granite boulders. The centre of this circle is some 19m to the SSW of PRN 170512.00, a possible hut circle. This is probably the same feature.
SF800	L : 3.65 drawn W : 0.95m H ; 0.23m	Centre 87857.5E 13026.7N	Roughly E-W	801	Dry stone wall consisting of irregular granite stones. The stones are laid in horizontal courses and are partly obscured by the existing topsoil. The wall is above mean high water and was only recorded where it crosses the coastal footpath around North Island.
SF900	L : 19.90m W : 1.80m H : 0.35m	N End 87954.4E 12938.6N S End 87950.3E 12919.3N	Roughly N-S	901	Short, straight section of possible stone wall. Consists of medium sized granite stones, possibly coursed, many stones appear to have been displaced, probably by action of the sea. Probably similar in style to SF400, but less well preserved.

Samson Flats – Summary of stone features					
Context	Dimensions	Position	Alignment	Drawings	Description
SF1000	L : 2.60m W : 0.80m H : 0.71m	Centre 87921.0E 12672.5N	Roughly NE-SW	1001	Short section of granite wall exposed at the base of the cliff on the east side of South Island. The wall exhibits at least two courses of stones – many of which appear to be slightly displaced. The wall is sat on, or slightly cut into, the reddish brown sandy ram (periglacial head material). The wall is buried by several metres of light brown sand – probably wind-blown. May have originally joined SF500?
SF1100	NS : 7.70m EW : 9.00m H : 0.28m	Centre 88064.3E 12984.6N	-	RTK	Roughly circular area of irregular granite boulders. The centre of this circle is some 7m to the SSW of PRN 7076.02 a possible hut circle.
SF1200	L : 12.90m W ; 0.80m H : 0.58m	N End 88000.0E 12916.0N S End 87995.6E 12904.9N	Roughly N-S	1201	Slightly curved linear stone feature formed from granite boulders and stones set into coarse grey sand. Possibly associated with SF100

Fig 44
Table of the stone features recorded. The drawing numbers indicate how many six metre characterisation sections were drawn – these appear on the main site plan (fig 18).

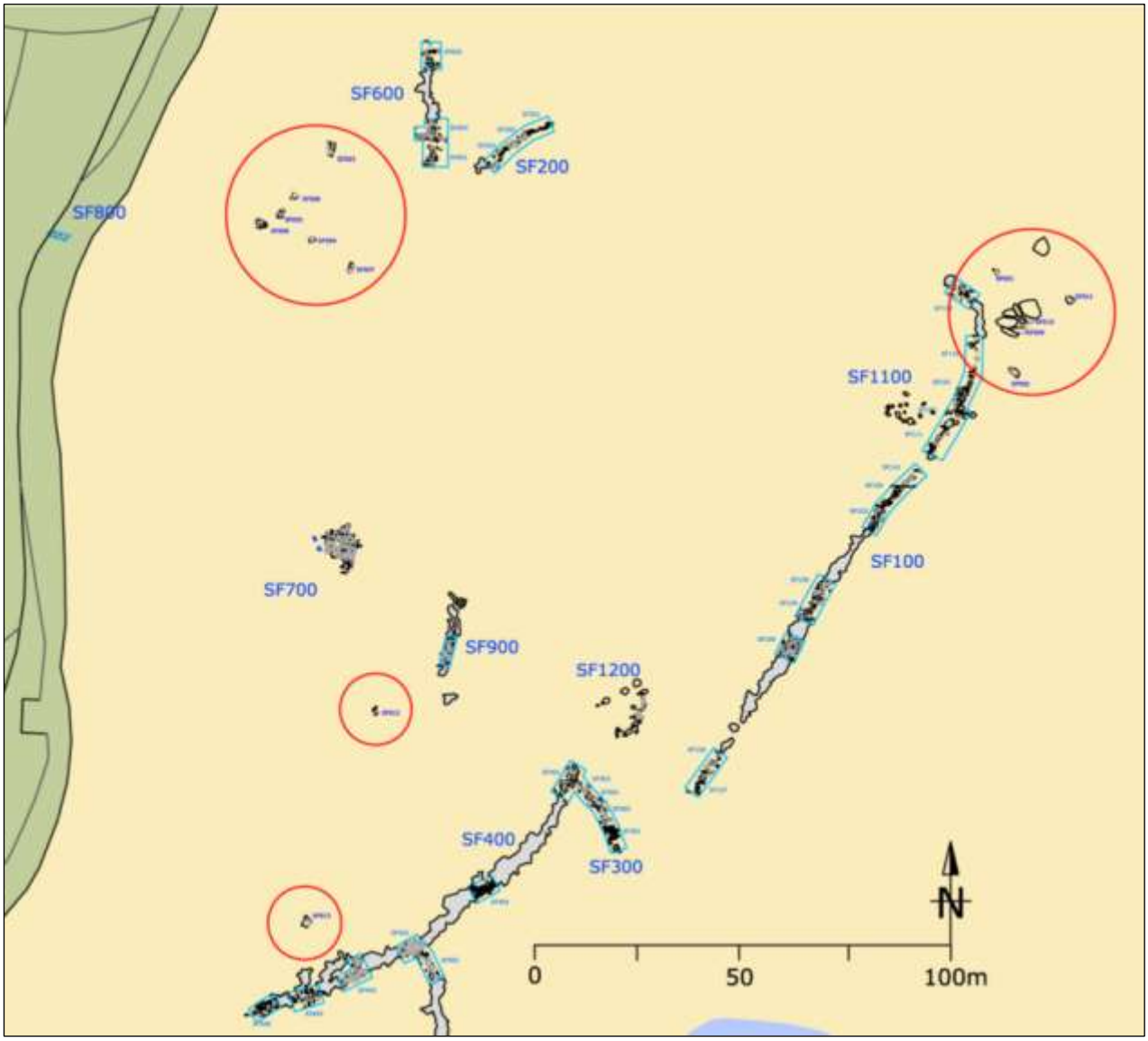

Fig 45
The location of the worked granite boulders on Samson Flats- shown here circled in red

Five worked stones are recorded on Samson Flats in the Cornwall Historic Environment Record (HER), four on East Porth and one on Black Ledge (an area of raised ground with large natural granite boulders at the north end of SF100).

A total of eleven worked granite boulders were located during the 2009 survey. A systematic search was made for worked stones in 2010 which revealed a further two isolated worked stones to the south, making a total of thirteen recorded. These stones were drawn, photographed and recorded – see fig. 45

The evidence for this stone working is easy to see, consisting of split granite boulders with the lines of drill holes used to effect the split still clearly visible (if somewhat eroded by the sea). The technique of splitting granite using plug-and-feather is described by Herring (2008:87-88) in Vol 2 of the Bodmin Moor Archaeological Survey:

> *A line of holes 0.075-0.10m deep and 0.10 to 0.15 apart was drilled along the intended cleavage line by giving hand-held stone borers or chisels part-turns between blows... Holes drilled in the first half of the 19th century tended to have larger diameters (0.028 – 0.035m) than more recent ones (0.015m)... Iron 'plugs', (short chisels), were placed between pairs of iron feathers reaching the bottoms of the holes. The plugs were struck in turn by a sledgehammer* (thus splitting the stone).

The technique was apparently introduced to Cornwall around 1800, probably from America (Herring, 2008).

Interestingly, all the worked stones observed are situated below the high water mark – (Black Ledge is roughly 0.10m above OD, East Porth 0.80m above OD). Given that many apparently similar granite boulders exist above the high water mark this must have been deliberate on the part of those splitting the stones. Possible reasons are that either the blocks were for use on Samson Flats or that the intention was to transport the stones by water. Only two stones worked in this manner (using plug-and-feather) were found in the linear stone features recorded to date. These were a single stone incorporated into each of SF200 and SF300 (see figs 44 and 48 for details). If these stones were deliberately incorporated into these features then that incorporation must have been at some time after 1800, when plug-and-feather splitting of granite started in Cornwall.

In most cases the blocks split from the granite boulder are still in place on site. Of the thirteen worked stones recorded, only two show evidence of split blocks having been removed (SF001 and SF009). The possibility that whole boulders have been split and removed cannot be discounted, but the surviving evidence is that the majority of the split stones were never removed from the site.

Drawings and photographs for all the worked stones are to be found on the DVD ROM which accompanies this report.

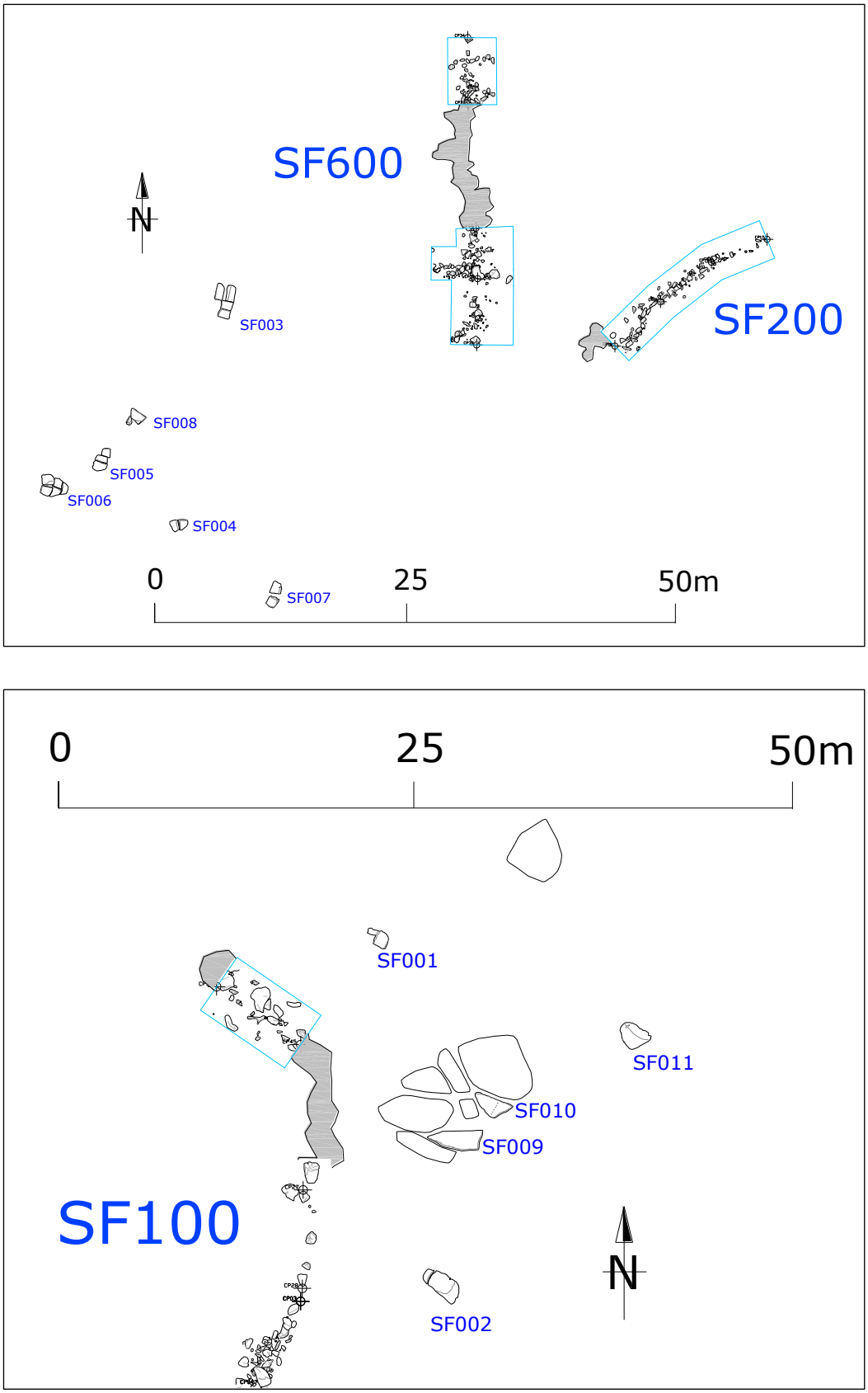

Fig 46 Plans showing the two clusters of worked granite boulders (SF001 to SF011) - those at East Porth (above) and those at Black Ledge (below).

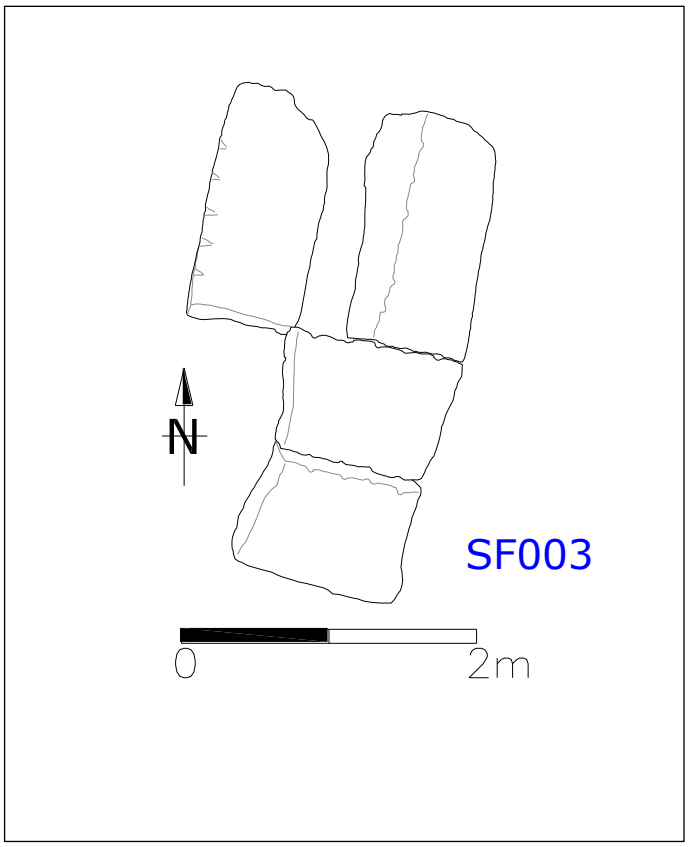

Fig 47

An example of one of the worked stones SF003. The granite boulder has been split into four blocks using drilled holes and plug-and-feather technique as evidenced by the surviving drill holes. None of the cut blocks have been removed. The scale in the photograph is 0.50m long.

Samson Flats worked stones (all dimensions in metres)								
Context	Position	Dimensions		Drill holes				Description
		Overall	Components	No	Diameter	Depth	Spacing	
SF001	88085E 13017N	1.55m 1.05m 1.10m	0.70x0.85x0.85m	5	0.03m	0.10m	0.18m	Granite boulder split using drilled holes and plug-and-feather technique. Split block has been removed.
SF002	88090E 12993N	2.75m 1.30m 1.00m	0.90x0.40x0.80m	5	0.035m	0.12m	0.20m	Granite boulder split into two blocks using drilled holes and plug-and-feather technique. Split block is still in place c. 0.15m from original position.
SF003	87923.5E 13047.7N	3.30m 1.00m 0.50m	0.70x0.90x0.50m 0.70x0.90x0.48m 0.70x1.45x0.37m 0.56x1.45x0.60m	15	0.04m	0.05 – 0.08m	0.20m	Granite boulder split into four blocks using drilled holes and plug-and-feather technique. All four blocks are still in position.
SF004	87919E 13025.8N	1.50m 0.95m 0.60m	0.80x0.77x0.80m 0.73x0.65x0.70m	5	0.04m	0.05 – 0.09m	c.0.17m	Granite boulder split into two blocks using drilled holes and plug-and-feather technique. Both blocks are still in position.
SF005	87911.3E 13032.2N	2.3m 1.25m 0.45m	1.25x1.10x0.40m 1.18x0.65x0.50m 0.90x0.95x0.40m	7	0.04m	0.08m	0.21m	Granite boulder split into three blocks using drilled holes and plug-and-feather technique. All three blocks are still in position.
SF006	87906.9E 13029.5N	2.60m 1.75m 0.50m	1.10x0.90x0.45m 1.10x0.90x0.45m 1.10x0.80x0.50m 0.90x0.80x0.50m 1.10x0.70x0.60m	15	0.04m	0.18m	c.0.18m	Granite boulder split into five blocks using drilled holes and plug-and-feather technique. All five blocks are still in position.

Samson Flats worked stones (all dimensions in metres)								
Context	Position	Dimensions		Drill holes				Description
		Overall	Components	No	Diameter	Depth	Spacing	
SF007	87928E 13018N	2.45m 1.00m 0.35m	1.00x0.90x0.35m 1.30x1.00x0.50m	5	0.04m	0.17m	?	Granite boulder split into two blocks using drilled holes and plug-and-feather technique. Both blocks are still in position.
SF008	87914.7E 13036.5N	1.50m 1.00m 0.65m	1.50x0.80x0.65m 0.80x0.50x0.50m	5	0.04m	?	0.17m	Granite boulder split into two blocks using drilled holes and plug-and-feather technique. Both blocks are still in position. Drill holes are very eroded.
SF009	88091.5E 13003.7N	3.80m 1.30m 0.95m	3.80x1.30x0.95m	9	0.04m	0.07 – 0.09m	0.25m	Granite boulder split using drilled holes and plug-and-feather technique. The split off block could not be located.
SF010	88093.8E 13006.1N	2.70m 1.25m 0.30m	270x1.25x0.30m	6	0.035m	?	0.20m	Triangular granite boulder with a line of six drill holes on the upper surface. The stone was not split.
SF011	88103.6E 13010.9N	2.10m 1.40m 1.05m	2.10x1.40x1.05m	3	0.035m	?	0.18m	Irregular granite boulder with a line of three drill holes on a vertical face. The stone was not split.
SF012	87934.3E 12910.7N	1.60m 1.41m 0.76m	0.88x1.15x0.76m 1.30x0.38x0.50m	6	0.025m	0.10m	0.16m	Granite boulder split using drilled holes and plug-and-feather technique. At least one block appears to have been removed.
SF013	87917.6E 12859.2N	2.00m 2.40m 1.30m	1.70x1.60x1.30m 1.35x0.55x0.45m	3	0.023m	0.11m	0.15m	Granite boulder split using drilled holes and plug-and-feather technique. One corner split off and still in place. It appears the split did not occur as intended.

Fig 48
Table of worked stones found on Samson Flats

Discussion

What is clear after the survey on Samson Flats is that the extent and complexity of the exposed archaeological features is greater than was originally envisaged. It would seem that the linear stone features, Borlase's *hedges and ruins*, exhibit at least two different construction techniques and may in fact be of different date and function. These two techniques of construction are 'boulder wall', consisting of medium to large stones set on edge, often consisting of little more than a single line of stones with smaller stones filling in the gaps. SF100, SF200, SF600 and SF1200 are all of this type of construction. The other technique 'stone-faced stone wall' is the more familiar method of placing courses of flattish stones with larger, more regular stones defining the edges, the more irregular 'rubble' in the core of the wall. SF400, SF500 and SF900 are all of this type. While the short section of wall SF300 exhibits both techniques it is probably best considered as part of the first group. Both types of construction have been recorded for prehistoric field walls on Scilly (Land Use Consultants, 1996) and (Fowler and Thomas, 1979).

The most convincing of the linear features as prehistoric field walls are SF400 and the adjoining SF500 (99m and 96m long respectively). Although sections of these features are now partly dispersed and tumbled other sections show as clearly coursed stone walls. The possible stone surface recorded on the west (landward side) of SF500 is difficult to interpret, especially as only two short sections were cleared of the obscuring seaweed to enable detailed recording.

The longest (141m) and most obvious of the linear stone features on Samson Flats is SF100. The use of single lines of large stones set on edge, particularly at its northern end may be significant and certainly differentiates this from the other long linear stone features SF400 and SF500. If any of the features are fish traps this is felt to be the most likely candidate. There are no published fish traps known on Scilly (features recently identified on West Porth, Tean are possibly associated with fish trapping). Without dating evidence for these features it is difficult to determine possible function and interaction.

Several short sections of linear stone feature were also recorded. The most obvious were SF200 and SF600 (21m and 30m long) which are notable for their location quite high on the flats between the 0.2m and 0.8m contours. More difficult to differentiate from the dense general scatter of boulders were SF900 and SF1200 (19m and 13m long). These short sections were all partly dispersed and tumbled, but all were thought to be genuine built features.

Two short sections of stone wall situated above the high tide line were also recorded as they both were aligned such that they must have continued out onto what is now Samson Flats. Both these walls are constructed of small, coursed granite stones and appear similar in style to walls SF400 and SF500 in the inter-tidal zone.

Dating of the linear stone features is problematic. The possibility that prehistoric walls may have been reused as part of later structures (for example fish traps) cannot be discounted. The only dating evidence so far is the presence of plug-and-feather holes in stones within SF200 and SF300 (a single stone in each). This technique of splitting

granite was only introduced after 1800 (Herring, 2008). The possibility that these stones were introduced to these features some time after their construction cannot be discounted. A number of strategies could be employed to shed more light on this matter. Ultimately, limited small scale excavation - which falls outside the scope of the current project - will probably be necessary to establish the presence and depth of any buried soils (and possibly date them). One possible strategy for this is suggested below (Future Work). Scheduled Monument Consent would be required for any such work.

The contour survey has established that the linear stone features could have functioned as fish traps, but what we cannot prove are that they were actually used as such. One tentative suggestion is that SF400 and SF500 were constructed as prehistoric field boundaries which have been inundated by rising sea levels and subsequently reused as part of a tidal fish trap by the addition of SF100 and SF300, possibly in the post-medieval period.

Two possible hut circles were recorded, SF700 and SF1100. These are both recorded in the HER as possible hut circles. Of the two, SF700 is the most credible, but even so the identification must be considered tentative. SF1100 does not appear at all convincing as a hut circle, and if the HER entry did not exist this would never have been considered. More of this feature must have existed when the HER record was made.

Suggestions for Future Work

The only feature identified but not investigated was the apparent gap in linear stone feature SF500 (see fig 24). Recording was scheduled for the last day of the survey but due to severe storm conditions this task was not completed. If any future work on Samson Flats is undertaken, then it would be advantageous to record this area of SF500.

Several aspects of the geology of the site would benefit from expert review, for example the presence of limestones in and around SF100.

A possible sampling/dating strategy (Dan Charman)

It is not known if in-situ organic material suitable for radiocarbon dating occurs beneath the walls but given that many of the individual stones appear to be in their original position, there is a good prospect of palaeosol preservation beneath the more substantial sections in more sheltered locations. A short core/tin could be hammered in to the sediment under each excavated wall to provide a stratigraphically intact sample. Samples would be split and subsamples taken from the centre of the core for carbon analysis, to identify the levels with highest organic C content. Based on the C analysis, further subsamples should be taken for radiocarbon dating and pollen analysis. It is unlikely that dateable macrofossil remains will be recovered during excavation so bulk humin and humic acid fractions will be dated from at least two levels in each core. An assessment of the potential influence of contamination from marine sources could be made by comparison with similar dates from walls that continue on to terrestrial areas, some of which are available in section (SF800 and SF1000). It may be possible to use OSL dating in addition to radiocarbon.

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Appendix I – Control Point Positions

Control Point ID	Easting	Northing	Hieght OD	Use	Correction
CP01	87904.798m	13099.609m	5.109m	Reference	SmartNet
CP02	87916.057m	13109.894m	5.010m	Reference	SmartNet
CP03	88080.323m	12992.302m	0.449m	SF101	PDL
CP04	88077.312m	12986.414m	0.466m	SF101	PDL
CP05	88058.005m	12960.161m	-0.267m	SF103, Sf105	PDL
CP06	88055.057m	12954.965m	-0.339m	SF103	PDL
CP07	88042.226m	12938.052m	-0.216m	Sf104, SF108	PDL
CP08	88039.418m	12932.586m	-0.248m	SF104	PDL
CP09	88073.575m	12979.955m	0.325m	SF102, Sf111	PDL
CP10	88062.596m	12965.134m	-0.085m	SF110, SF105	PDL
CP11	88077.078m	12986.053m	-0.366m	SF102	PDL
CP12	88018.637m	12900.631m	-0.717m	SF106	PDL
CP13	88015.107m	12895.764m	-0.671m	SF106, SF107	PDL
CP14	88011.556m	12890.906m	-0.695m	SF107	PDL
CP15	88044.865m	12942.648m	-0.454m	SF108	PDL
CP16	87962.230m	13043.440m	0.382m	SF203, SF202	PDL
CP17	87977.306m	13053.993m	0.401m	SF201	PDL
CP18	87966.747m	13047.820m	0.489m	SF203	PDL
CP19	87971.798m	13051.726m	0.523m	SF201, Sf202	PDL
CP20	NOT USED				
CP21	88066.980m	12969.234m	-0.370m	SF1110	PDL
CP22	88037.374m	12928.767m	-0.326m	SF109	PDL
CP23	88034.701m	12923.401m	-0.316m	SF109	PDL
CP24	88069.819m	12973.703m	0.148m	Sf111	PDL
CP25	87993.805m	12876.677m	-0.662m	SF301	PDL
CP26	87991.834m	12882.267m	-0.561m	SF301, SF302	PDL
CP27	88080.497m	13000.170m	0.788m	SF112	PDL
CP28	88080.441m	12993.222m	0.523m	SF112	PDL
CP29	87989.021m	12887.582m	-0.344m	SF302, SF304	PDL
CP30	87987.115m	12889.245m	-0.428m	SF304, SF303	PDL
CP31	87983.292m	12893.857m	-0.304m	SF303	PDL
CP32	87948.627m	13050.103m	0.558m	SF601	PDL
CP33	87948.532m	13043.551m	0.479m	SF601	PDL
CP34	87947.646m	13073.941m	1.136m	SF602	PDL
CP35	87947.681m	13067.319m	1.091m	SF602	PDL
CP36	87983.747m	12896.619m	-0.082m	SF401	PDL
CP37	87980.014m	12889.967m	0.039m	SF401	PDL
CP38	87945.993m	12854.182m	0.145m	SF402	PDL
CP39	87940.901m	12851.125m	0.068m	SF402	PDL
CP40	87946.462m	12851.404m	-0.159m	SF501	PDL
CP41	87949.486m	12845.062m	-0.198m	SF501	PDL

Control Point ID	Easting	Northing	Hieght OD	Use	Correction
CP42	87926.362m	12844.334m	0.186m	SF403	PDL
CP43	87931.614m	12846.978m	0.331m	SF403	PDL
CP44	87948.468m	13055.100m	0.752m	SF603	PDL
CP45	88080.329m	13010.431m	0.483m	SF113	PDL
CP46	87953.678m	12820.646m	-0.167m	SF502	PDL
CP47	87952.099m	12826.412m	-0.168m	SF502	PDL
CP48	87920.962m	12841.783m	0.107m	SF405	PDL
CP49	87914.181m	12839.852m	0.060m	SF405	PDL
CP50	88074.407m	13014.513m	0.452m	SF113	PDL
CP51	87963.796m	12868.657m	0.030m	SF404	PDL
CP52	87958.245m	12865.638m	0.408m	SF404	PDL
CP53	NOT USED				
CP54	NOT USED				
CP55	NOT USED				
CP56	NOT USED				
CP57	87955.184m	12805.484m	-0.175m	SF503	PDL
CP58	87954.816m	12811.445m	-0.241m	SF503	PDL
CP59	NOT USED				
CP60	87855.734	13027.159	10.287	SF801	PDL
CP61	87859.123	13026.443	9.717	SF801	PDL
CP62	87920.355	12671.728	5.327	SF1001	PDL
CP63	87921.217	12673.469	4.793	SF1001	PDL
CP64	87950.856	12922.163	0.363	SF900	PDL
CP65	87952.966	12928.020	0.441	SF900	PDL
CP66	NOT USED				
CP67	NOT USED				
CP68	87957.184	12777.118	-0.190	SF505	PDL
CP69	87956.501	12783.155	0.035	SF505	PDL
CP70	87949.568	12776.239	-0.485	SF505	PDL
CP71	87947.850	12782.044	-0.469	SF505	PDL
CP72	87957.614	12758.230	-0.418	SF506	PDL
CP73	87957.258	12763.967	-0.430	SF506	PDL
CP74	87910.304	12840.386	0.390	SF406	PDL
CP75	87904.517	12836.505	0.314	SF406	PDL
CP76	87922.606	12952.881	0.804	SF700	PDL
CP77	87929.971	12950.803	0.284	SF700	PDL
CP78	87925.257	12948.085	0.777	SF700	PDL
CP79	87927.492	12955.494	0.289	SF700	PDL
CP80	87927.381	12944.379	0.399	SF700	PDL
CP81	87953.888	12758.244	-0.359	SF506	PDL
CP82	87953.827	12762.142	-0.165	SF506	PDL
CP83	87997.820	12909.093	-0.406	SF1200	PDL
CP84	87999.587	12914.784	-0.447	SF1200	PDL

Appendix II – DVD ROM

Samson Flats DVD contents		
FOLDER	SUB-FOLDER	CONTENTS
Photos	Contexts	Photographs of each context recorded – indexed by context
	Reci 2008	Photos of the initial site visit 2008
	AP	Ariel photographs of Samson Flats
Worked stones	Drawings	Worked stone drawings – stored by context number
	Stone working	Table of worked stones
	Location	Plan showing location of worked stones
Bathy profiles of features		Autocad draweings of bathy profiles
		Location plan of bathy profiles
Bathymetry		Contour plan 0.1m intervals
		Contour plan 0.2m intervals
Plans	Master drawing	Master Autocad file
	Plans and profiles	Plan and profile drawings of each context recorded
Survey data		2009 RTK data
		2010 RTK data
Auger Samples 2009		Auger samples taken by Dan Charman 2009
Reports		2009 Interim Report
		2010 Final Report
Handout		Open day information handout
Presentations		2009 schools powerpoint presentation
		2010 schools powerpoint presentation
		Presentation notes
Press release		Press release June 2010
Tidal bathymetry		Plot of sea at 0m, -0.2m, -0.6m and -0.8m OD