

# **Proposed Kernow Solar Farm, Newquay, Cornwall**

## **Archaeological Assessment**



**Historic Environment Projects**



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<b>Client</b>	<b>Property Services, Cornwall Council</b>
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This study was commissioned by David Malen of Property Services, Cornwall Council, and carried out by Historic Environment Projects, Cornwall Council.

This report is based on the format of the archaeological assessment for a solar farm at Brill, Constantine by Cathy Parkes (Parkes 2010).

Within Historic Environment, the Project Manager was Adam Sharpe. Bryn Tapper of HE's Information Team created the GIS mapping of the viewshed of the project location.

ArchaeoPhysica Ltd undertook the geophysical survey and produced the report attached as an appendix.

The views and recommendations expressed in this report are those of Historic Environment Projects and are presented in good faith on the basis of professional judgement and on information currently available.

## **Freedom of Information Act**

As Cornwall Council is a public authority it is subject to the terms of the Freedom of Information Act 2000, which came into effect from 1st January 2005.



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## **Cover illustration**

*View taken from the centre of the site looking north to Newquay Cornwall Airport.*

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## **Abbreviations**

AEL	Anciently Enclosed Land (HLC Zone)
BA	Bronze Age
AONB	Area of Outstanding Natural Beauty
CC	Cornwall Council
CRO	Cornwall Record Office
EH	English Heritage
HBSMR	Historic Buildings, Sites and Monuments Record
HE	Historic Environment, Cornwall Council
HLC	Historic Landscape Character
ICS	Institute for Cornish Studies
LB	Listed building
LPA	Local Planning Authority
NGR	National Grid Reference
NMP	National Mapping Programme (digital plotting from aerial photographs)
OS	Ordnance Survey
PRN	Primary Record Number in Cornwall HBSMR
PPS5	Planning Policy Statement 5 ('Planning for the Historic Environment')
RIC	Royal Institution of Cornwall
SM	Scheduled Monument
WSI	Written Scheme of Investigation

# 1 Archaeological Summary

This archaeological assessment of the proposed Kernow solar farm at St Mawgan, Newquay, Cornwall, for Property Services, Cornwall Council was undertaken by the Projects team of Historic Environment, Cornwall Council (HE Projects, CC). The study was designed to gain a better understanding of the impacts which would result from the solar farm, both within the limits of the application site, and in the surrounding historic landscape with its key archaeological sites or 'heritage assets'. It includes desk-based study, site visit, watching brief on geotechnical trial pits and geophysical survey results; it also follows current planning policies and guidance, relevant extracts from which are provided in the report. Viewshed mapping generated in ArcGIS, showing the theoretical inter-visibility between the proposed solar farm and the surrounding landscape was used to inform the assessment.

The proposed area does not include any Scheduled Monuments (SMs) or Listed Buildings (LBs) and there are no other designations applied to the land. However, just over 1km to the north of the site the landscape is designated as an Area of Great Landscape Value (AGLV). The 'Cornish hedges' or boundary banks enclosing the fields within the site are considered 'important' under the historic criteria of the Hedgerow Regulations.

Most importantly within the site are two possible enclosures (**sites 1 and 2**) of probable Iron Age or Romano-British date identified through aerial photographs; both are probably 'rounds' (settlement sites). Although undesignated, these enclosures are likely to have high archaeological potential; however, this may need confirmation through further evaluation as neither site showed on the geophysical survey. In addition, linear and curvilinear features identified by the geophysical survey in the southern half of the site are also likely to be prehistoric in date and may be of regional importance. During the excavation of the geotechnical trial pits an undated pit containing charcoal was encountered in trial pit 4 located in the vicinity of **site 1** and possibly associated with it.

On the basis of current knowledge the proposed site includes or is bordered by eight archaeological sites of particular significance. Those within the proposed area are the sites of two potential prehistoric enclosures (**sites 1 and 2**), a strip-derived field system of regional importance (**site 3**), the historic parish boundary between Colan (formerly St Columb Minor) and Mawgan-in-Pydar of regional importance (**site 4**), the possible site of a post-medieval settlement of local importance (**site 5**) and linear and curvilinear features across the site, picked up by the geophysical survey (**site 8**). Those sites bordering the area include the site of a prehistoric settlement of national importance immediately to the south (**site 6**) (but probably extending into the southern part of the site), and the site of a WWII radar station of local importance to the south-west (**site 7**). In the viewshed within a 4km radius of the site (where historic features such as field systems can be discerned) are ten Scheduled Monuments, and eight Listed Buildings. Although undesignated (but still of national importance) there are also ten prehistoric enclosures (settlement sites) within a 2km radius of the site plotted as part of the NMP from cropmarks visible on aerial photographs.

In terms of Historic Landscape Character, the development area appears to have once been part of a medieval strip field system, subsequently modified by the addition and removal of some boundaries. The fields immediately to the west are surviving medieval strip fields of which the site seems to have once been part. These fields are classed as 'Anciently Enclosed Land'. The area is surrounded on all sides by existing settlements of medieval origin such as Trebarber, Carnanton, Higher Trewince and Nanswyden. 'Anciently Enclosed Land' is associated with a high potential for a significant resource of prehistoric or medieval features, artefacts or deposits surviving below ground.

The scheme would involve erecting arrays of solar panels up to 2m high over most of the ground, as well as a control station, and associated cable trenching and anchor points which

are likely to be up to 1m deep. Its potential impacts include in the construction phase the disturbance or loss of below ground elements of the recorded sites and of other buried features as yet unrecorded. In the operational phase it would impact adversely on HLC and, in varying ways, on the settings of designated heritage assets in the viewshed. Overall, the impact on the archaeological resource is assessed as potentially negative/substantial without appropriate mitigation; there would be a negative/minor residual impact were the recommended mitigation undertaken.

The recommendations set out a programme for further recording and other work likely to be required to mitigate for the archaeological impact should the development proceed. This includes evaluation of the two enclosures (**sites 1 and 2**), it also includes some controlled soil stripping and an archaeological watching brief to provide preservation by record of significant buried remains within any areas where the topsoil is to be removed, and allow identification of any further needs such as additional excavation or sampling. Disturbance to boundary banks should be avoided; recording of any affected sections may be required, and careful reconstruction of any temporarily-demolished sections would be appropriate.

## **2 Introduction**

### **2.1 Project background**

This archaeological assessment of the proposed Kernow solar farm at St Mawgan, Newquay, Cornwall, was commissioned by David Malen of Property Services, Cornwall Council, and undertaken by the Projects team of Historic Environment, Cornwall Council (HE, CC). It incorporates methods of working and reporting developed by Adam Sharpe of HE, CC for a similar project (Sharpe 2010) and is based on a similar assessment for a solar farm at Brill carried out by Cathy Parkes (Parkes 2010). The site lies immediately south of Newquay Cornwall Airport and is centred at SW 8664 6333 within a north-south-orientated series of three fields (Figs 3 and 4).

### **2.2 Aims**

The principal aim of the study is to gain a better understanding of the impacts on the historic environment which would result from the construction of the Kernow solar farm at St Mawgan, Newquay both within the application site, and on heritage assets within the surrounding landscape in line with developing English Heritage guidelines (English Heritage 2010). The objectives were to identify the archaeological potential and significance of the site and to provide the client with advice on the impacts of the proposed development and any mitigation which would be likely to be required should the development go ahead. A further objective is to satisfy the requirements of PPS5 HE6 (information requirements).

### **2.3 Methods**

#### **2.3.1 Desk-based assessment**

For the desk-based study, historical databases and archives were consulted. Information about the history and significance of the sites and the features likely to survive in the proposed development area was recorded, and evidence for the development and present character of the wider historic landscape (HLC) was gathered. Key surrounding heritage assets (those of high archaeological importance) whose settings could be affected by the solar farm project were included in this work. GIS mapping was used to assist identification of the viewshed of the solar farm, to inform the study of impact on the settings of those surrounding assets.

The main sources studied were as follows:

- Cornwall's HBSMR, the computerised database of the county's archaeological and historical sites maintained by Cornwall Council.
- GIS based computerised mapping showing features plotted from aerial photographs as part of the NMP (National Mapping Programme).
- GIS mapping of Historic Landscape Character (HLC) Types, and related text derived originally from the Cornwall Historic Landscape Assessment, 1994.
- Historic maps and original documents (see Section 9.1 for a list of these).
- Archaeological reports, histories and other relevant publications (listed in Section 9.2).
- Relevant designation and planning documentation.
- Geophysical survey results (see Appendix for full report)

### 2.3.2 Study of viewshed

The viewshed mapping (as used in Figs 16, 17), showing the theoretical inter-visibility between the site with solar arrays as proposed and the surrounding landscape, was generated in ArcGIS using the following methodology (Bryn Tapper, pers comm). It is based on a Digital Surface Model (DSM), which takes account of surface features such as buildings, woodland, vegetation, roads etc, and so is more realistic when compared to a 'bare earth' or DTM elevation models. A viewshed was generated for each of five 'observer points' based on the centroid of each of the five fields in which an array is proposed. The five were combined to produce the *multiple viewshed* for the proposed solar farm area.

The viewshed mapping was verified and qualified through observation as part of the project fieldwork, looking both out from and into (from selected points) the proposed site. Inevitably, localised atmospheric conditions will have a variable affect on actual as opposed to theoretical visibility, and there are practical limitations to the feasibility of checking all potential 'inward' visibility to a site which is currently similar in terms of its ground cover and other features to neighbouring farmland, but which would have a colour and texture more distinguishable than at present at distances of over a kilometre or so if developed as proposed. However, in general the areas of landscape visible on the ground proved to conform well to those generated by the GIS modelling.

The checking of the viewshed on the ground also allowed identification of particular belts, within these areas theoretically visible from the proposed solar farm site, whose historic landscape character can be 'read' *from* the site with varying degrees of clarity through discernible patterns of historic features, primarily field systems, and can be expected to have views *to* the site of similar quality. The belts observed were used to help determine useful distance buffers (at 0.5km, 2km and 4km around the site) for application to the original viewshed mapping, to show zones with inwardly increasing quality of visibility and legibility of the proposed solar farm's historic landscape (Figs 16, 17). The GIS was then used to capture for these zones the designated key heritage assets; their Scheduled Monuments and Listed Buildings.

- (It should be noted that the site viewshed is used in this report to aid assessment and presentation of archaeological impacts. This work is not intended to convey more general impacts on views from dwellings, etc.)

### 2.3.3 Fieldwork (assessment)

Following completion of the desk-based assessment, a 'walk-over' survey of the site was undertaken using a composite base map generated by that research. This involved walking systematically over the ground, recording the following;

- Any further details of sites identified during the desk-based survey
- Other features visible on the ground
- Areas of ground with particular evidence for potential survival of below-ground remains
- Relevant aspects of Historic Landscape Character
- Associations with the area's key heritage assets, contributing to their setting
- Views over surrounding sites and historic landscape.

At the time of the walk-over the fields had been harvested of their crop and partially ploughed. All the fields were accessed but not the dense wooded area at the northern end of the site.

Digital colour photographs were taken as appropriate to record sites and aspects of the historic landscape, or illustrate potential effects on these.

#### **2.3.4 Fieldwork (geophysical survey)**

In accordance with the terms of the brief, HE Projects contracted a suitably qualified specialist contractor (ArchaeoPhysica) to undertake a geophysical survey of the area proposed for the Kernow Solar Farm. The survey was carried out using six caesium vapour magnetometers mounted on a sledge-based system with real-time GNSS and robotic TS tracking towed by a quad bike, enabling rapid survey completion. A report on the findings was supplied by the contractor to inform the archaeological fieldwork and archaeological assessment report. This has been added as an appendix (see section 11).

#### **2.3.5 Fieldwork (watching brief on geotechnical pits)**

An archaeological watching brief was undertaken during the excavation of eight trial pits for a geotechnical survey. The pits were scattered across the site and each measured approximately 1.4m by 2.5m. They were excavated to archaeological levels by a machine equipped with a toothless bucket and any archaeological features were recorded appropriately before they were excavated to the full depth required.

#### **2.3.6 Post-fieldwork**

The cultural resource of the study area, and potential impacts of the solar farm scheme upon this were assessed and reported using current standards and methodologies, combined with professional judgement. The area's individual archaeological features, its specific archaeological potential for further, buried sites, its Historic Landscape Character (HLC), and its significance for the settings of key surrounding heritage assets (in terms of both visual and historic or other aesthetic connections) were all considered. The viewshed study was used to inform the HLC and 'settings' assessments. Finally, notes and images generated by the project were archived, following established HE guidelines (see Section 10).

## **3 Site description**

### **3.1 Site location**

The proposed Kernow solar farm site is centred at SW 8664 6333 just to the south of Newquay Cornwall Airport, approximately 3km to the north-east of Newquay. It lies in the parish of Colan (but formerly in St Columb Minor) and is bound to the north by the parish boundary between Colan and Mawgan-in-Pydar and to the south by the A3059. The site lies at between 75m and 95m OD on land sloping down to the north and consists of three large fields derived from a medieval strip field system whose Historic Landscape Character is

Anciently Enclosed Land. The site lies within a landscape in which the National Mapping Programme has recorded a number of Iron Age/Romano-British rounds, elements of field systems and associated sites, these now taking the form of crop mark features; the survival of sub-surface archaeology linked to these sites is likely. Two of the crop mark enclosures are located within the proposed application site (**sites 1 and 2**).

The total area of the fields is approximately 16 hectares.

### 3.2 Geology and soils

The bedrock geology within the study area comprises Dartmouth and Meadfoot Group slates, siltstones and sandstones. These are overlain by well drained fine loamy soils.

### 3.3 Landuse

The site is arable farmland. At the time of the site visit the crops in all the fields had been harvested and small defined areas within the fields had been freshly ploughed.

### 3.4 Access

The site can be accessed from the south where it borders the A3059 from Newquay to St Columb Major. There are no public footpaths or rights of way within the development area.

### 3.5 Viewshed

The Zone of Theoretical Visibility (ZTV) for the proposed solar farm (that is, the area of the surrounding historic landscape which can be seen from the site and from where the site can be seen) generated for the project is not too extensive, but in summary includes the following (see Figs 16 and 17);

- **In a 0.5km radius**, ground mostly to the north within the airport but also fields to the east and west.
- **In a 0.5-2km radius**, ground mostly on the north, east and west, inter-visible with most of the site.



*Fig 1 View from roughly the centre of the site looking north-east showing airport buildings and the location of Carnanton House (Grade II\* listed building) hidden behind the trees approximately 1.5km away*



- **In a 2-4km radius**, ground to the south-east and north-west, inter-visible with the south and central parts of the site and in particular two skylining Bronze Age Barrows (CO402) on the coast to the west (Fig 2).



*Fig 2 View from roughly the centre of the site looking west to the coast and Scheduled Monument CO402 (two Bronze Age barrows) approximately 3km away*

### 3.6 Historic Landscape Characterisation

Historic Landscape Characterisation, developed for Cornwall from 1994 (Cornwall County Council 1996), captures the varying evidence for change and earlier landscapes existing in the present landscape, identifying extents of landscape with similar essential or distinguishing features, principally field boundary patterns. These extents have been mapped across the county, forming a continuous patchwork of Units of various Historic Landscape Character (HLC) Types (Fig 10). HLC Units of any given Type share a similar distinctive character today, the result of historic processes common to that Type, and tend to contain a predictable range of archaeological sites and historic features.

As shown in Fig 10, in the county-wide 1994 assessment the majority of the land proposed for the Kernow solar farm has been classed as the HLC Type 'Post-medieval enclosed land' with a small section in the northern part of the area as 'Plantation and scrub'. Both of these lie within the HLC Zone of 'Recently Enclosed Land' (REL), that is, land which was enclosed during the creation of new farms or as a result of the expansion of existing farms. However, the medieval origins of the fields within the site can clearly be seen as an extension to the medieval strips that still survive immediately to the west. The long north-south alignment of these fields suggests that they were probably derived from medieval strip fields, presumably associated with the settlement of Trebarber to the south, which were enlarged during the post-medieval period by the removal some of the north-south field boundaries. The presence of two possible prehistoric enclosures (**sites 1 and 2**) within the site indicates that this land was

occupied throughout later prehistory. Review of the historic landscape character would therefore suggest that the area should instead be characterised as the 'Farmland medieval' (Part of the Zone 'Anciently Enclosed Land').

Other HLC Types represented in the surrounding area and visible in Fig 10 include 'Farmland medieval' immediately west and south of the site; 'Extensive military complexes' immediately north of the site at Newquay Cornwall Airport; more 'Post-medieval enclosed land' to the east; 'Twentieth century settlement', expanded from medieval origins, at Newquay, St Columb Major and St Mawgan; 'Plantation and scrub' typically on steep-sided valleys and 'Ornamental' at Carnanton and Nanswhyden.

Two further prehistoric settlements have been recorded by the National Mapping Programme (NMP) immediately to the south and south-west of the site, surviving as crop marks (see Fig 12). There may have been as many unenclosed prehistoric settlements as there were enclosed and remains of such activity are increasingly being discovered through geophysical survey, archaeological watching briefs and excavations. As well as the two prehistoric enclosures within the development area and the ditches and curvilinear features picked up by the geophysical survey, other undetected buried features and artefacts are also likely to be present.

### 3.7 Designations

There are no Scheduled Monuments, Listed Buildings or designated areas within the site, although a milestone classified as a Grade II listed building lies immediately outside its southern boundary on the A3059.

Within the potential viewshed in a 4km radius of the site (a distance within which historic features can still be viewed on the ground) there are ten Scheduled Monuments, and eight listed buildings. These designated heritage assets are listed in the following tables along with a description of their inter-visibility with the site.

#### *Scheduled Monuments in potential viewshed, within a 4km radius*

Scheduled Monument No.	HBSMR no	Ref	Name	Inter-visibility with the site
32974	DCO1101		Liveloe later prehistoric cliff castle.	Not visible
CO88	DCO1652		Trevelgue promontory fort and two Bronze Age Barrows.	Not visible
31834	DCO992		St Pedyr's holy well, Treloy.	Not visible
CO431	DCO1332		Melanchose Iron Age/ Romano-British round.	Not visible
32969	DCO1096		Iron Age/ Romano-British round 340m north of Tresawle Farm.	Some visibility
CO402	DCO14890		Two Bronze Age Barrows south of Zachry's Island	Visible
30419	DCO950		Wayside cross in Colan churchyard.	Not visible
30438	DCO969		Cross Putty, medieval wayside cross.	Not visible
32971	DCO1098		Lanherne Cross, standing cross in the grounds of the Lanherne Convent.	Not visible

32972	DCO1099	Standing cross immediately west of St Mawgan church	Not visible
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***Listed Buildings in potential viewshed, within a 4km radius***

<b>LB Ref no [UID]</b>	<b>HBSMR Ref no</b>	<b>Name</b>	<b>Grade</b>	<b>Inter-visibility with the site</b>
71064	DCO14110	Carnanton House and associated buildings and structures	II*	Possibly visible
71157	DCO13005	Middle Lodge	II	Possibly visible
71158	DCO13371	Milestone	II	Not visible
71015	DCO14082	Milestone	II	Not visible
71168	DCO13008	Nanswyden Farmhouse and associated buildings and structures	II	Not visible
492426	DCO14265	Bosoughan Cottage	II	Possibly visible
71008	DCO14079	Bosoughan Farmhouse	II	Possibly visible
71027	DCO14085	The Vale, Mountjoy	II	Possibly visible

To the west of the site the coastline north of Newquay is an Area of Great Historic Value (AGHV) and an Area of Great Scientific Value (AGSV). Over 1km to the north of the site is an Area of Great Landscape Value (AGLV). St Columb Major to the east is a Historic Settlement and there are small areas of Cornish Nature Conservation Sites (CNCS) approximately 1km from the site to the north-east, south and west.

The ‘Cornish hedges’ or boundary banks of the fields making up the site are considered ‘important’ under the historic criteria of the Hedgerow Regulations. All are recorded on the c1840 Tithe Map.

## **4 Policies and Guidance**

The following section brings together policies and guidance, or extracts from these, referred to in this report and/or used in the development of the assessment and its methodology.

### **4.1 Planning Policy Statement 5 (PPS5), ‘Planning for the Historic Environment’**

#### **4.1.1 Policy HE9.6**

HE9.6 ‘There are many heritage assets with archaeological interest that are not currently designated as scheduled monuments, but which are demonstrably of equivalent significance....The absence of designation for such heritage assets does not indicate lower significance and they should be considered subject to the policies in HE9.1 to HE9.4 and HE10.’

#### **4.1.2 Extracts from Policies HE9.1 to HE9.4 and HE10**

Policies HE9.1 to HE9.4 and HE10, referred to in Policy HE9, include the following;

- HE9.1 ‘There should be a presumption in favour of the conservation of designated heritage assets and the more significant the designated heritage asset, the greater the presumption in favour of its conservation should be. Once lost, heritage assets cannot

be replaced and their loss has a cultural, environmental, economic and social impact. Significance can be harmed or lost through alteration or destruction of the heritage asset or development within its setting.’

- HE9.2 ‘Where the application will lead to substantial harm to or total loss of significance local planning authorities should refuse consent unless it can be demonstrated that: (i) the substantial harm to or loss of significance is necessary in order to deliver substantial public benefits that outweigh that harm or loss....’
- HE10.1; ‘When considering applications for development that affect the setting of a heritage asset, local planning authorities should treat favourably applications that preserve those elements of the setting that make a positive contribution to or better reveal the significance of the asset. When considering applications that do not do this, local planning authorities should weigh any such harm against the wider benefits of the application....’

#### **4.1.3 PPS5 English Heritage guidance**

The English Heritage and DCMS (Department for Culture, Media and Sport) document ‘PPS5 Planning for the Historic Environment: Historic Environment Planning Practice Guide’ provides guidance on PPS5 and its application.

This refers to the need, for decision-making in response to an application for change that affects the historic environment, of providing and assessing, at a level appropriate to the relative importance of the asset affected, information on the asset and its extent, on its setting, and on the significance of both of these aspects. Section 5, 54 states that ‘Heritage assets may be affected by direct physical change or by change in their setting. Being able to properly assess the nature, extent and importance of the significance of a heritage asset and the contribution of its setting is very important....’

Section 5 on Policies HE6 to HE 12, 58, notes among appropriate actions (in point 5) ‘Seek[ing] advice on the best means of assessing the nature and extent of any archaeological interest e.g. geophysical survey, physical appraisal of visible structures and/or trial trenching for buried remains.’

The section on Policy HE10 defines setting as follows;

‘113. Setting is the surroundings in which an asset is experienced. All heritage assets have a setting, irrespective of the form in which they survive and whether they are designated or not. Elements of a setting may make a positive or negative contribution to the significance of an asset, may affect the ability to appreciate that significance, or may be neutral.

114. The extent and importance of setting is often expressed by reference to visual considerations. Although views of or from an asset will play an important part, the way in which we experience an asset in its setting is also influenced by other environmental factors such as noise, dust and vibration; by spatial associations; and, by our understanding of the historic relationship between places. For example, buildings that are in close proximity but not visible from each other may have a historic or aesthetic connection that amplifies the experience of the significance of each. They would be considered to be within one another’s setting.’

## **4.2 Cornwall Structure Plan**

The following policies in the Cornwall Structure Plan relate to the historic environment.

### **4.2.1 Policy 1**

Development should be compatible with:

The conservation and enhancement of Cornwall's character and distinctiveness;

The prudent use of resources and the conservation of natural and historic assets;

A reduction in the need to travel, whilst optimising the choice of modes, particularly opportunities for walking, cycling and the use of public transport;

Through developing the principles of Policy 1 it is intended to integrate environmental values with land use and transport policies, achieving patterns of development that reflect strong environmental protection and stewardship of resources.

#### **4.2.2 Policy 2**

Throughout Cornwall, development must respect local character and:

Retain important elements of the local landscape, including natural and semi-natural habitats, hedges, trees, and other natural and historic features that add to its distinctiveness;

Contribute to the regeneration, restoration, enhancement or conservation of the area;

Positively relate to townscape and landscape character through siting, design, use of local materials and landscaping.

The conservation and enhancement of sites, areas, or interests, of recognised international or national importance for their landscape, nature conservation, archaeological or historic importance, including the proposed World Heritage Site, should be given priority in the consideration of development proposals.

### **4.3 Former Restormel Local Plan**

Although now part of Cornwall Council, Restormel District Council's policies listed in its local plan continue to be relevant. Those policies concerning the historic environment are listed below.

The Restormel Local Plan contains policies designed to protect the archaeological resource, using the following elements of policy framework:

#### **4.3.1 Policy 11**

The Council will seek to conserve and enhance the landscapes, features and habitats of heritage importance within the Borough.

#### **4.3.2 Policy 12**

(1) Proposals for interpretation and educational facilities which support greater awareness and incorporate positive management of landscapes, features and habitats of heritage importance will be permitted. (2) Where appropriate, opportunities will be taken to make conditions and enter into agreements relating to their conservation and proper management.

With particular reference to archaeology are the following extracts and policies:

5.88 The importance of preservation of archaeological sites and monuments is accepted at national level as set out in Government Circular 8/87 and PPG 16 (1990).

5.91 Where application is made for planning permission to carry out development which would affect an ancient monument whether scheduled or unscheduled, the desirability of preserving the monument and its setting is of course a material consideration.

5.92 The Planning Policy Guidance Note on Archaeology (PPG 16) expands on circular 8/87.

para 6 - "Archaeological remains should be seen as a finite, and non-renewable resource, in many cases highly fragile and vulnerable to damage and destruction .... They are part of our

sense of national identity and are valuable for both their own sake and for their role in education, leisure and tourism.”

para 14 - “... the key to the future of the great majority of archaeological sites and historic landscapes lies with local authorities, acting within the framework set by central government ... as well as with the owners of the site themselves. Appropriate planning policies in development plans and their implementation through development control will be especially important”

5.95 National guidance is reflected in the Cornwall Structure Plan where policy ENV2 seeks to prevent development which will adversely affect sites of archaeological importance.

#### **4.3.3 Policy 26**

Development proposals which adversely affect locally important archaeological sites held on the county sites and monuments record or identified as a result of a prior archaeological investigation will only be permitted where: (1) physical preservation in-situ is not feasible and the importance of the development outweighs the case for preservation of the remains; and (2) satisfactory arrangements are made for the excavation and recording of the remains before or during development.

5.112 In addition to the Scheduled Ancient Monuments, a large number of archaeological sites have been identified by the County Sites and Monuments Record (SMR). This record is being continuously updated and enlarged as a result of historical research, fieldwork, aerial photography and substantiated reports from the general public.

#### **4.3.4 Policy 27**

Where there is evidence to suggest that significant remains may exist on the site of a proposed development the extent and importance of which are unknown, an archaeological assessment will be carried out prior to the granting of planning permission.

5.113 In 1984 the Government acknowledged that the Schedule of Ancient Monuments no longer coincided with the consensus of informed opinion as to the monuments which were of most archaeological and historical interest. The fact that nationally only 2% of known sites and monuments were scheduled was considered to indicate the need for a nation wide review of the archaeological resource. In 1986 the Historic Buildings and Monuments Commission for England began work on the Monuments Protection Programme (MPP) which seeks to review and evaluate existing information (largely drawn from the County Sites and Monuments Records) so that those monuments which are of National Importance can be identified and scheduling or other means of protection can be recommended.

5.116 The Planning Authority supports the Cornwall County Council and its Archaeological Unit in their efforts to record, interpret and preserve the County’s historic landscape and has contributed to the costs of providing the new detailed constraint maps.

5.117 Where proposals are submitted affecting a site which has been identified as having archaeological value, the County Archaeological Officer will be involved from the early stages of negotiations with applicants to ensure proper implementation of these policies.

5.118 Policy 27 will enable the Borough Council to make properly informed decisions on proposals which may affect sites of interest. For well researched known sites an assessment will be relatively straightforward and probably based on existing information. For sites with archaeological potential, small scale surveys, trial trenching etc. may be necessary. A geophysical survey can be an important method of evaluating potential sites.

5.122 The preservation in-situ of important archaeological remains is always to be preferred and this should be the primary objective of all negotiations. If preservation in-situ is not

feasible an archaeological excavation for the purpose of preservation by record may be an acceptable alternative. This should always be seen as very much a second best option.

5.123 Where the development is permitted on any site considered to be of potential archaeological value, Policy 26(2) requires the developer to make appropriate and satisfactory arrangements for archaeologists to excavate and record the remains before or during development. This could involve investigation and observation prior to and during the work and the recording of any archaeological deposits, features or finds which might be revealed during the course of the development.

5.128 The CAU (HES) has recently reviewed the Historic settlements of Cornwall and suggested additional settlements which although not conforming with the National definition above are worthy of recognition for their historic importance. The CAU (HES) recommends that these settlements should be designated as Conservation areas. In this plan they have been identified as Areas of Local Architectural or Historic Value.

#### **4.4 Hedgerow Regulations**

Under the current, 1997 Hedgerow Regulations, owners wishing to remove all or part of a hedgerow considered to be historically important must notify the Local Planning Authority (LPA). Criteria determining importance include whether the hedge marks a pre-1850 boundary, and whether it incorporates an archaeological feature. The LPA may issue a 'hedgerow retention notice' prohibiting removal.

## **5 Archaeological results**

### **5.1 Chronological summary of the site and its landscape**

The site of the proposed solar farm occupies the southern slope of a river valley. The river marking the northern extent of the site forms the parish boundary between Colan (formerly St Columb Minor) to the south and Mawgan-in-Pydar to the north. This area of farmland is shown on Martyn's Map of 1748 (Fig 5) with 'Trebarva' and 'Treizack' shown to the south of a road (now the A3059). Trebarva (or Trebarber as it is now known) is a medieval settlement first recorded in 1221 as 'Trebervet' meaning 'middle homestead' (Gover 1948).

The site is set in a landscape of later prehistoric settlement. Within the site itself are two settlement enclosures and associated features; there are at least ten settlement sites within a 2km radius of the site. It is likely that all or the majority of these sites date to the Iron Age or Romano-British periods although the presence of other unidentified earlier sites cannot be ruled out. Further afield, evidence of Bronze Age activity is represented by the two round barrows (CO402) on the coast to the west and two more at Trevelgue Head (CO88) slightly further south along the coast.

In this landscape, Iron Age and Romano-British enclosed settlement sites known as 'rounds' with associated field systems have been identified through the National Mapping Programme (NMP) and can be seen both within and surrounding the site. An enclosure with associated linear features and smaller enclosures (**site 1**), lies approximately at the centre of the development area, whilst another circular enclosure (**site 2**) lies within the northern half of the site. In addition, there is a settlement site (**site 6**) immediately to the south of the area (see Figs 11 and 12) with related features extending into the southern end of the site identified by the geophysical survey (Figs 13, 14 and Appendix). It has been increasingly noticed in recent years that settlement associated with rounds does not just occur within the enclosure and there is potential for the remains of other unenclosed structures and settlement related features surviving within the site which may not have been detected by the NMP or

geophysical survey. The enclosures may well represent different or overlapping activities or phases of use.

The medieval landscape in the area is typified by small farming settlements with their associated field systems. Medieval strip fields remain intact immediately to the west of the site including the western boundary of the site itself.

Apart from the western field boundary, which appears to be medieval in origin, the field system that exists within the development area (**Site 3**) shows formation in post-medieval times by enclosing earlier bundles of open strips. The ground may contain buried traces of abandoned strip field boundaries, and possibly of the old 'ridge and furrow' or cultivation ridges within the strips, but these are not apparent on the geophysical survey.

A process of map regression helps to understand the recent landscape history of the site. Martyn's map of 1748 (Fig 5) is not greatly detailed but shows the development area bound to the south by the existing road and to the north by the river. It also shows a settlement called 'Hard to come by' (**site 5**) within the area although it is unclear if this was located within the site itself. It is possible that this settlement was located within the enclosure shown on the Tithe Map in the northern half of the area and recorded on the geophysical survey (see below and Fig 7). The 1809 OS surveyors' drawing (Fig 6) shows that at this date the settlement of 'Hard to come by' no longer existed and that the surrounding road patterns were as they are today.

The Tithe Map of 1840 for the parish of St Columb Minor (Fig 7) shows the field boundaries as they are today except that the northernmost field is divided in two by a boundary that was removed during the 20<sup>th</sup> century (this is also shown on the geophysical survey). In the south-west corner of the northernmost field a small rectangular enclosure is shown (possibly **site 5** 'Hard to come by', also visible on the geophysical survey). In the Apportionment all the fields are listed as part of 'Trebarva' (now 'Trebarber' located to the south of the site) which was owed by the Vyvyans. All the fields are listed as arable in the Apportionment.

The First edition OS 25" to the mile map of 1880 (Fig 8) shows that the boundary dividing the northern field in two was still present and that the northernmost field at this date had become overgrown with bushes and trees. The small rectangular enclosure in the northern field, shown on the Tithe Map no longer existed or had been abandoned. Besides this all the other boundaries are portrayed as they exist today.

By the time of the Second Edition OS map in 1907 (Fig 9) no changes had occurred to the plan of the site since 1880 and the northernmost field remained overgrown. The modern OS map indicates that at some point during the 20<sup>th</sup> century the boundary dividing the northernmost field in two (shown on the earlier maps) had been removed and most of the overgrown northern field had been brought back into use as arable land.

## **5.2 Interpretation of geophysical survey results**

The full report on the results of the geophysical survey is presented as a separate document by ArchaeoPhysica attached as an appendix (see Section 11).

Studying the geophysical survey results in combination with the information gathered during the desk-based assessment has confirmed the presence of some below ground features expected to be present such as the rectangular enclosure (**site 5**) and the removed boundary both shown on the Tithe Map (see Figs 7, 13 and 14). It has also detected features that were previously unknown but which are likely to be of prehistoric origin (Figs 13 and 14); for example, there are several ditches shown on a north-east south-west alignment which must pre-date the medieval field system as this is on a north-south alignment. In addition, the features identified in the southernmost field are likely to be related to the settlement at **site 6**. However, some of the features identified by the NMP, most importantly **sites 1** and **2**, were



not picked up by the geophysical survey. A few possible reasons for this put forward by Martin Roseveare of ArchaeoPhysica are as follows:

- It is likely at this site that the magnetic anomalies are due to increased topsoil depth over buried fills due to these settling over time. This means the strongest magnetic anomaly would come not from the fill itself but from a relatively thin lens of topsoil over it. If ploughing has been sufficiently deep (and prolonged – one season isn't enough) to truncate the feature and destroy this lens, little or no magnetic anomaly may result. This effect is most pronounced for deep features where the relatively magnetic primary silt may contribute a relatively weak anomaly due to its depth of burial. This has to be examined on a case by case basis – generalisations across sites aren't valid as it depends on the specific circumstances of each feature.
- On the south side of the enclosure (**site 1**) there is an arc of very weakly enhanced magnetic field fairly typical of a deep source, however, it is obscured by cultivation furrows and only with the eye of faith could one suggest it formed part of a ring. However, this could well be part of the round in which case there is magnetic expression, albeit weak and obscured by recent surface disturbance.
- Regardless of whether a magnetic anomaly is present or not, cropmarks are predominantly a thermal response to the volume of the fill and therefore there is little real correlation with magnetic response which is primarily chemical in origin. Some sites have little or no cropmark evidence because they have magnetic fills but insufficient volume to influence crop development. Conversely, some major cropmark sites have little or no magnetic expression. Generalisations are not possible because it depends on local conditions.

In the light of these results it seems appropriate to use both the evidence from the geophysical survey combined with the NMP cropmark plots when determining any further archaeological work on site or any constraints on the development of this site.

### **5.3 Inventory of sites within and immediately outside the proposed development area**

(See Fig 11 for site locations)

#### **Site 1. Settlement enclosure, HER No MCO33257, SW 86640 63370 (centre)**

This is described on the HER as a polygonal prehistoric settlement enclosure showing as a faint cropmark on vertical photographs taken in 1946 (106GUK1662/3087-8.ABP) and plotted by the NMP (this photograph was not readily available for further inspection). The cropmark is located approximately in the centre of the site. The main component is a sub-circular enclosure, 71m x 75m in plan. Inside the enclosure is a small oval enclosure 16m x 13m in plan and there is another small curved feature on the exterior of the large enclosure along with several associated linear features. This site probably dates to the Iron Age or Romano-British period. Additional features, as yet unidentified, are likely to exist. The features have been recorded by the NMP using digital plotting of remains visible on aerial photographs. This site is likely to consist of more than one phase. No evidence of this site was identified by the geophysical survey.

#### **Site 2. Enclosure, HER No MCO33258, SW 86670 63590 (centre)**

This has been identified as a circular ditched enclosure measuring 30m across and probably dates to the Iron Age or Romano-British period. It was plotted by the NMP (from an aerial photograph taken in 1995, BKS9548/097-9.ABP) within the northern part of the site. On inspection this circular enclosure could be clearly seen on the 1995 photograph. Additional

associated features, as yet unidentified, are likely to exist. No evidence of the site was found by the geophysical survey.

### **Site 3. Field system, SW 8664 6333 (centre)**

This is the field system which extends across the site. All the field boundaries that survive within the site pre-date the c1840 Tithe Map. All of the boundaries are stone-faced earth banks (Cornish hedges) mostly overgrown with grass and brambles, bracken etc. On average they measure 1.2m high by 1.2m wide at the base. The field boundaries are recorded in detail on the c1840 Tithe Map (Fig 7) and subsequent c1880 and c1907 25" OS maps (Figs 8 and 9). The pattern of the fields shown on this mapping and still visible on the ground indicates derivation from a medieval 'open' or sub-divided strip field system which has been enclosed during the post-medieval period. All the boundaries are likely to be post-medieval in date except the westernmost boundary, which is likely to have medieval origins. Remains of removed boundaries, and other early elements of the system, may survive below ground.

### **Site 4. Parish Boundary, SW 86714 63726 (centre)**

This boundary separates the parishes of Colan to the south and Mawgan-in-Pydar to the north. It forms the northern boundary of the site in the form of a river running from east to west and leading out to the coast at Newquay. At the time of the field visit the boundary could not be reached due to dense vegetation and it is possible that a Cornish hedge exists on this side of the river. The location of the parish boundary is unlikely to have changed since the medieval period although the parish itself changed from St Columb Minor to Colan at some point after 1840.

### **Site 5. Post-medieval settlement, SW 86600 63541 (possible location)**

This is the settlement of 'Hard to come by' which is shown on Martyn's map of 1748 but not recorded on any maps after this date. Its exact location is hard to pinpoint due to the small-scale nature of the map, but it is possible that it was located within the site itself and may have been detected through geophysical survey.

### **Site 6. Settlement site, MCO33256, SW 86653 62806 (centre)**

This settlement site is located immediately to the south of the site (south of the A3059). It was plotted by the NMP from aerial photographs and is characterised by several small enclosures and ditches including a multi-ditched trackway and up to four small ditched enclosures (see Fig 12). It is probably of Iron Age or Romano-British date, and similar features identified by geophysical survey (Figs 13 and 14) in the southern part of the site are likely to be related to it.

### **Site 7. WWII radar station, MCO33255, SW 86478 62937 (centre)**

Four masts, indicating the location of a World War radar station, are visible on vertical aerial photographs taken in 1946. The position of the masts lie immediately west of the southern end of the site and were plotted by the NMP (see Fig 12). It is possible that features associated with the radar station may survive within the site.

### **Site 8. Features revealed by geophysical survey, SW 8664 6333 (centre)**

These features include a post-medieval enclosure (**possibly site 5**) and a removed Cornish hedge in the north of the site, some ditches aligned north-east south-west and some aligned north-west south-east in the centre of the site (probably prehistoric) and a collection of linear and curvilinear features (also probably prehistoric) in the southern part of the site.

## **5.4 Results of watching brief during excavation of geotechnical pits**

Eight geotechnical trial pits were excavated within the site, scattered across the three fields (for pit locations see Fig 15). Each of the trial pits measured approximately 1.4m wide by 2.5m long. The results are as follows:

### **TP1**

The topsoil measured approximately 0.3m deep and comprised a mid greyish brown silty clay containing moderate small shillet fragments. This directly overlay the natural subsoil; a pale yellowish brown silty clay with frequent shillet fragments. No archaeological deposits were encountered.

### **TP2**

The topsoil measured approximately 0.3m deep and comprised a mid greyish brown silty clay containing moderate small shillet fragments. This directly overlay the natural subsoil; a pale yellowish brown silty clay with frequent shillet fragments. No archaeological deposits were encountered.

### **TP3**

The topsoil measured approximately 0.3m deep and comprised a mid greyish brown silty clay containing moderate small shillet fragments. This directly overlay the natural subsoil; a pale yellowish brown silty clay with frequent shillet fragments. At the interface between the topsoil and subsoil ploughmarks were noted on a north-south alignment. No significant archaeological deposits were encountered.

### **TP4**

The topsoil measured approximately 0.25m deep and comprised mid greyish brown silty clay containing moderate small shillet fragments. At the north end of the trench this overlay an oval pit aligned north-west south-east measuring 0.5m wide x 0.7m long x 0.2m deep. The fill of the pit (1) comprised mid orangey yellow silty clay containing occasional charcoal fragments and flecks. The cut of the pit [2] had steeply sloping sides and a concave base. Pit [2] was cut into the natural subsoil; a pale yellowish brown silty clay with frequent shillet fragments.

### **TP5**

The topsoil measured approximately 0.25m deep and comprised a mid greyish brown silty clay containing moderate small shillet fragments. This directly overlay the natural subsoil; a pale yellowish brown silty clay with frequent shillet fragments. At the interface between the topsoil and subsoil ploughmarks were noted on a north-south alignment. No significant archaeological deposits were encountered.

### **TP6**

The topsoil measured approximately 0.3m deep and comprised a mid greyish brown silty clay containing moderate small shillet fragments. This directly overlay the natural subsoil; a mid yellowish orange silty clay with moderate shillet fragments. No archaeological deposits were encountered.

### **TP7**

The topsoil measured approximately 0.25m deep and comprised a mid greyish brown silty clay containing moderate small shillet fragments. This directly overlay the natural subsoil; a mid yellowish orange silty clay with moderate shillet fragments. No archaeological deposits were encountered.

## TP8

The topsoil measured approximately 0.25m deep and comprised a mid greyish brown silty clay containing moderate small shillet fragments. This directly overlay the natural subsoil; a mid yellowish orange silty clay with moderate shillet fragments. At the interface between the topsoil and subsoil ploughmarks were noted on a north-south alignment. No significant archaeological deposits were encountered.

### 5.5 Further archaeological potential

In addition to the known features other, buried archaeological remains as yet unrecorded can be expected to survive within the extent of the proposed solar farm.

The crop marks plotted for **sites 1 and 2** are an indication of some of the larger features present within the site but they do not represent the sites in their entirety and are unlikely to represent the full extent of these sites. Unfortunately the geophysical survey plot did not add any detail to the NMP plot for **sites 1 and 2** but did identify other features immediately south of (and likely to be associated with) **site 1** and features at the southern end of the site, probably associated with **site 6** (see Figs 13, 14 and Section 11: Appendix). Although the geophysical survey has identified some archaeological features present it is unlikely to give a full representation of all the features present and smaller, shallower features may well not be shown. The presence of prehistoric enclosures shown on aerial photographs both within the site and immediately outside it to the south and south-west show that this was a well populated area during later prehistory and that there is potential for, as yet undetected, related features to exist across the site. There is high potential for both 'stray' and *in situ* artefacts such as pottery and flint surviving in the soils.

There is also potential for the survival of medieval farming-related activity and the possibility of locating the former post-medieval settlement of 'Hard to come by' (**site 5**).

## 6 Significance

Of the known individual archaeological sites within the proposed solar farm, the enclosures and associated features (**sites 1 and 2**) in the centre and north of the site and also **site 6** to the south with associated features in the southern part of **site 8** are all considered to be of high significance. Although these sites are not designated they are considered potentially of regional importance. The nature of the crop marks and geophysical survey results imply the survival of buried settlement-related remains dating to the Iron Age or Romano-British period. All these sites have potential for complex phased archaeological deposits. They also have high group value, particularly in association with settlement site (**site 6**) immediately to the south of the site and a round two fields away to the south-west, and also as part of a scatter of similar enclosures/settlement sites surrounding the site. The relationships between these enclosures/settlement sites, and between the farmsteads of medieval origin across the same area, have the potential to tell us much about the development, density and change of early farming settlement in the district. The two enclosures (**sites 1 and 2**) have not however been confirmed by the geophysical survey and so their potential and their significance remain uncertain.

The site of the abandoned settlement (**site 5**), possibly in the northern half of the development area, is of moderate significance since it is shown on Martyn's map of 1748 but cannot definitely be proved to be located within the development area. The fact that the settlement had disappeared by c1809 implies that the buildings were old and run down by the late 18<sup>th</sup> century. Although a start date for the settlement is not known it is possible that its

origins are pre-18<sup>th</sup> century. Buried remains associated with the settlement may be present within the northern half of the site.

Another, more extensive, known feature, the field system (**site 3**) (possibly including the parish boundary (**site 4**) covering the whole of the solar farm location, has moderately high significance, and is important on a regional scale, showing fairly well a derivation from a medieval 'open' or subdivided strip field system, with one early strip boundary being maintained as a Cornish hedge. There is potential for buried evidence of early farming, and datable deposits, in the form of buried traces of other strip divisions, and of cultivation ridges within the strips.

In terms of its contribution as the setting of important 'heritage assets' *beyond* its limits, the development area has some significance, but this is low overall. The central part of the site is visible as a distant sliver of land from two Bronze Age barrows (CO402) on the coast 3km to the west and an Iron Age/Romano-British round (32969) 3km to the north-east. Both of these sites are likely to be located on private farmland and are located at distances where the proposed solar farm would form only a minor component of views from them. None of the other scheduled monuments within the viewshed appear to be visible. The central and southern parts of the site may be partially visible from five out of the eight listed buildings within the viewshed.

The development area is significant as part of an area of 'Recently Enclosed Land' adjoining 'Anciently Enclosed Land'. Within the site the fields show derivation from early strips in their form. Association with an existing settlement of medieval origin 'Trebarber' can be traced from the Tithe Apportionment c1840 and possible association with a post-medieval settlement 'Hard to come by' can be traced from Martyn's map of 1748. The 'Post-medieval enclosed land' within the area in close proximity to 'Medieval farmland' is also associated with high potential for a significant resource of prehistoric or medieval features, artefacts or deposits surviving below ground.

Finally, it should be noted that the Cornish hedges still in use, considered important under the historic criteria of current hedgerow regulations, contribute to the significance of the proposed solar farm area in several, related ways. The boundaries may contain early fabric and may seal buried soils with evidence of past environments. They also indicate the time depth of the historic landscape here.

## 7 Archaeological Impact

### 7.1 Types and scale of impact

It should be noted that the exact proposals for layout and construction at the Kernow site are not yet known. Two general types of archaeological impact associated with solar farm developments have been identified and summarised by Sharpe (2010) as follows.

#### 7.1.1 Types of impact; construction phase

Construction of a solar farm would have direct, physical impacts on the above-ground or buried archaeology of the site through construction of solar arrays and associated control plant, with the undergrounding of cables, and through provision of any works compound, and permanent or temporary vehicle access ways into and within the site.

The creation of the solar arrays within the project area may entail the driving of piles or anchors on which to site the individual arrays. In addition, linear trenching is likely to be required to house the conduits carrying the cabling linking up the individual arrays. These various works could involve considerable ground disturbance up to around 1m in depth.

The proposed Kernow solar farm is likely to have arrays running in rows over most of the site, apart from, possibly, the corners of the existing field pattern and maybe the northernmost part of the site where clearance of trees and bushes would be required if arrays were to be installed there.

#### 7.1.2 Types of impact; operational phase

A solar farm may be expected to have a visual impact during the operational phase, with tightly-packed arrays of dark glass photovoltaic panels, together forming a surface in the region of 2m above ground level, extending across the site with limited gaps allowing for fitting between field boundary banks.

It is understood that the solar farm is regarded as a temporary development, but that its operational phase might extend for some twenty to thirty years, which may be regarded in terms of peoples' experiences of it as a generation.

#### 7.1.3 Scale and duration of impact

As noted by Sharpe (*ibid*) the impacts of a solar farm on the historic environment may include positive as well as adverse effects. For the purposes of assessment these are evaluated on a seven-point scale:

**positive/substantial**

**positive/moderate**

**positive/minor**

**neutral**

**negative/minor**

**negative/moderate**

**negative/ substantial**

with the additional **negative/unknown** used where an adverse impact is predicted but where, at the present state of knowledge, its degree cannot be evaluated satisfactorily.

The assessment also distinguishes where possible between **permanent** and **temporary** effects, or between those that are **reversible** or **irreversible**, as appropriate, in the application of the scale of impacts.

#### 7.1.4 Potential and residual impacts

Potential adverse impacts may be capable of mitigation through archaeological recording or other interventions. In the assessments forming the following Section 7.2.1, where appropriate, both 'potential' and 'residual' impacts are given; that is, expected impacts 'before' and 'after' such work. A proposed mitigation strategy is outlined below in Section 8.

### 7.2 Assessment of impact

Overall, the proposed solar farm on the archaeological resource is assessed as having a potential impact scored as **negative/substantial** without appropriate recording and other mitigating work, and a **negative/minor** residual impact provided that the recommended mitigation is undertaken.

The assessments supporting this general statement are outlined in the following sub-sections. To comply with current policies and guidance (Section 4) these provide assessments of impact in terms of different aspects of the archaeological resource - its individual sites, the settings of sites, HLC, on field boundaries and on key heritage assets within the neighbouring landscape.

### 7.2.1 Impact on known individual archaeological sites within the project area

Ground disturbance associated with the installation of supports for solar arrays or cables or with ancillary works could result in permanent, irreversible loss of upstanding or belowground remains of the known archaeological sites within the area, or elements of these. The works if up to around a metre deep will significantly affect any buried archaeological features associated with the enclosures (**sites 1 and 2**), the post-medieval settlement (**site 5**) and elements of the field system (**site 3**).

The scale of impact will vary with the significance of the individual site, and with the proportion of the whole site which would be affected. Altogether this impact is considered to be potentially **negative/substantial** without appropriate recording and other mitigating work, with a **negative/minor** residual impact.

### 7.2.2 Impact on the project area as the setting of surrounding key heritage assets

The proposed solar farm is considered to have an impact on the setting of key surrounding heritage assets, summarised as a **negative/minor** impact overall, as follows;

- During its operational phase the solar farm would detract from the visibility and understanding of the area as ancient farmland, and so obscure aspects of the significance - as an early farming settlement working this land.
- In operation the solar farm would also have some adverse impact on the settings of two of the Scheduled Monuments out of a potential ten within the generated viewshed within 4km from the site. Inter-visibility between these SMs and the solar farm site is limited due to distance.
- However the impacts noted above would be limited with regard to site settings because the medieval strip-derived layout evident in the upstanding field boundaries means that the predominant historic character of the solar farm area today is medieval/post-medieval, so it contributes less directly to understanding of the prehistoric landscape.
- The above effects would also be limited because any direct impact on buried remains of **sites 1, 2 and 7** could be avoided or adequately mitigated (see Section 8) and because the visual impact could be reversible.
- During the operational phase the solar farm could also impact on the settings of up to five out of the eight listed buildings within the generated viewshed within the 4km radius. The following listed buildings are possibly inter-visible with the site: 71064 Carnanton House and associated buildings and structures, 71157 Middle Lodge, 492426 Bosoughan Cottage, 71008 Bosoughan Farmhouse and 71027 The Vale, Mountjoy.

### 7.2.3 Impact on Historic Landscape Character

The Kernow solar farm can be predicted to degrade the historic character of the landscape. The expected effect on HLC is **negative/minor**. Factors contributing to this assessment are as follows;

- Land-take for the project would be substantial but relatively small in comparison with the very large area of the HLC Units of 'Post-medieval enclosed land' and 'Medieval Farmland' of which it forms part. Also this land lies immediately south of an area of 'Extensive military complexes', which it is already compromised by.
- Impact in terms of physical loss during the construction phase of the upstanding boundaries which form the visible components of HLC would be **neutral** or **negative/minor**.

- Visual impact throughout the operational phase would mean the loss of visibility of historic open farmland, reduced visibility of semi-natural hedgerows, and low but extensive introduction of modern design and materials.
- Some scope for mitigating measures to reduce or avoid this impact on HLC has been identified. (These relate to treatment of the historic boundary banks which form the major tangible component of HLC here; see Sections 8.2 and 8.5).
- However the impacts on the legibility of HLC could be largely or wholly reversible should the solar farm installations be removed in the future.

#### 7.2.4 Other archaeological impact

Any ground disturbing works here could encounter significant buried prehistoric, medieval or post-medieval remains resulting in permanent, irreversible loss of these, or elements of them. This potential impact is assessed as **negative/substantial**. It is likely that it could be mitigated satisfactorily through archaeological recording, reducing the residual impact to **neutral** or **negative/minor**.

#### 7.2.5 Impact on historic field boundaries

It is understood that it is proposed that the solar farm scheme would not involve removal of the historic field boundaries, which show derivation from a medieval strip-derived field system. However, without full details of any proposed trenching or ground disturbance, which might entail disturbance to the Cornish hedges or their gateways, there remains a potential **negative/minor** impact on these features. It is likely that it could be mitigated satisfactorily through archaeological recording, and if appropriate, careful, guided reconstruction; reducing the residual impact on boundaries to **neutral**.

## 8 Mitigation Strategy

### 8.1 Geophysical survey (completed, see appendix)

Due to the nature of the crop marks identified by the NMP within the site, a geophysical (magnetometer) survey was recommended for the whole site to gain greater knowledge of the extent and nature of archaeological features and to further inform this assessment. The geophysical survey has allowed the plotting of previously unknown features within the solar farm site, to enable a strategy for further archaeological work likely to be required.

The results of the geophysical survey did not, however, identify the two enclosures (**sites 1** and **2**) previously identified by the NMP. This may be due to a number of reasons, but does not mean that these two sites do not exist. Both the NMP plot and the geophysical survey plot should be used in conjunction to plan any further archaeological work. A means of testing the results of the geophysical survey would be to excavate two evaluation trenches, one positioned over the enclosure of **site 1** and the other over the enclosure of **site 2**. This would confirm the presence or absence of the enclosures and help dictate any further mitigation required in these areas. If the sites were confirmed to be present, possible mitigation might involve a redesign of the layout of the arrays to avoid the sites.

### 8.2 Close design of proposed works to reduce impact

The archaeological assessment indicates that careful design of the proposed solar farm to avoid or reduce particular impacts should be considered;

- If the enclosures of **sites 1** and **2** are identified through evaluation (see 8.1 above) the overall impacts of the proposals for these sites could be mitigated to some degree through a redesign of the array layout to avoid siting them on top of the two cropmark enclosures.



- **Field system (Site 3)** Disturbance (through works such as cable laying, gateway opening or widening) of the fabric of the upstanding elements of the medieval and post-medieval field system (the Cornish hedges still in use as field boundaries) should be avoided or minimised to reduce loss of early features and of their contribution to HLC.

### 8.3 Controlled soil stripping and archaeological watching brief

Before any further archaeological work a Written Scheme of Investigation (WSI) should be prepared and agreed to establish and direct a programme of mitigation once the proposals for ground disturbance have been decided. This is likely to include the elements outlined below.

Controlled soil stripping (direction by an archaeologist of mechanical topsoil and subsoil stripping) is recommended either where any large areas of ground are to be disturbed (including works compounds/access roads) or in areas where significant NMP plots or geophysical survey results have been identified and which remain proposed for ground disturbance in the final scheme design. This would provide for preservation by record of buried archaeological features or artefacts, and would also allow identification of any further recording or other needs such as wider area excavation or sampling. In other areas where narrow trenches or small areas of ground disturbance are proposed, an archaeological watching brief during groundworks may be more suitable.

### 8.4 Excavation

Archaeological excavation might be appropriate for any areas of high significance identified either by NMP plots or the geophysical survey or during controlled soil stripping. Initial decisions regarding excavation can only be made once the extent of ground disturbance has been finalised.

### 8.5 Boundary recording and reconstruction

Any of the historic field boundaries or parts of these disturbed by the works should be recorded in advance. Sections through disturbed boundary banks should be drawn at a suitable scale. Boundaries should also be sampled for buried soils and palaeoenvironmental evidence if considered appropriate by the archaeologist. If possible boundaries disturbed during the construction phase should be re-instated using original or similar local rubble stone, and in the existing style.

### 8.6 Analysis and presentation of findings

The results of the mitigating archaeological recording outlined above should be compiled and analysed, and significant findings should be presented as required with publication to professional standards as appropriate.

## 9 References

### 9.1 Primary sources

Thomas Martyn, 1748. Map of Cornwall (photocopy at HE)

Ordnance Survey, c1809. *Surveyors' Drawing*

Tithe Map and Apportionment, c1840. *Parish of St Breock* (digital copy at HE)

Tithe Map and Apportionment, c1840. *Parish of St Issey* (microfiche copy at HE)

Ordnance Survey, c1870. *25 Inch Map* First Edition (licensed digital copy at HE)

Ordnance Survey, c1907. *25 Inch Map* Second Edition (licensed digital copy at HE)

Ordnance Survey, 2007. *Mastermap Digital Mapping*

## 9.2 Publications

Cornwall County Council 1994. *Cornwall Landscape Assessment* Truro

English Heritage, 2010. *The Setting of Heritage Assets, English Heritage Guidance* Consultation Draft

Gover, J E B, 1948. *Placenames of Cornwall*. Typescript held by the Courtney Library, RCM

Parkes, C, 2010. *Proposed Brill Solar Farm, Constantine, Cornwall, Archaeological Assessment* Cornwall Council: Truro

Sharpe, A, 2010. *Proposed Four Burrows Solar Farm, Cornwall Archaeological Assessment* Cornwall Council: Truro

## 9.3 Websites

<http://www.imagesofengland.org.uk/> English Heritage's online database of Listed Buildings

# 10Project archive

The HE project number is **2010096**

The project's documentary, photographic and drawn archive is housed at the offices of Historic Environment, Cornwall Council, Kennall Building, Old County Hall, Station Road, Truro, TR1 3AY. The contents of this archive are as listed below:

1. A project file containing site records and notes, project correspondence and administration.
2. Digital photographs stored in the directory R:\Historic Environment (Images)\SITES.I-L\Kernow solar farm assessment 2010096
3. Viewshed mapping stored in the directory L:\Historic Environment (Data)\HE\_Information\Viewsheds\Solar\_Panels\kernow\_solar\_multiple\_viewshed.shp
4. This report text is held in digital form as: G:\Historic Environment (Documents)\HE Projects\Sites\Sites K\Kernow solar farm assessment 2010096\Kernow solar farm assessment report 2010096.doc

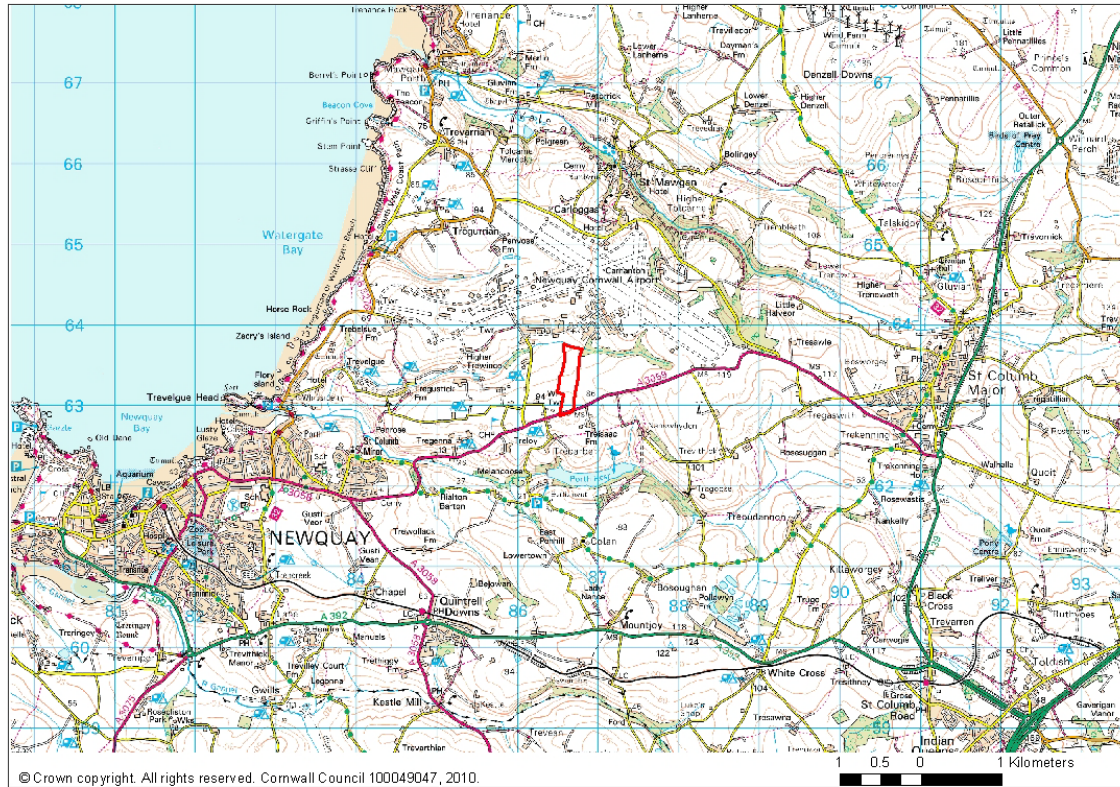


Fig 3 Location map

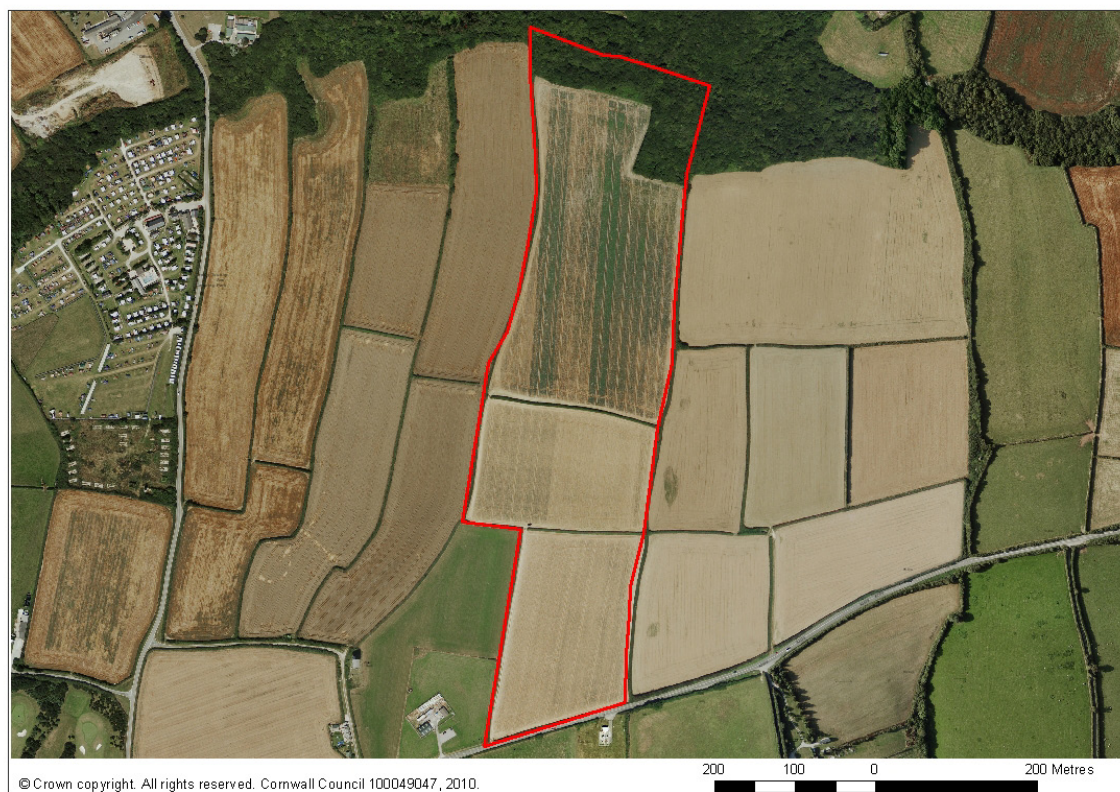
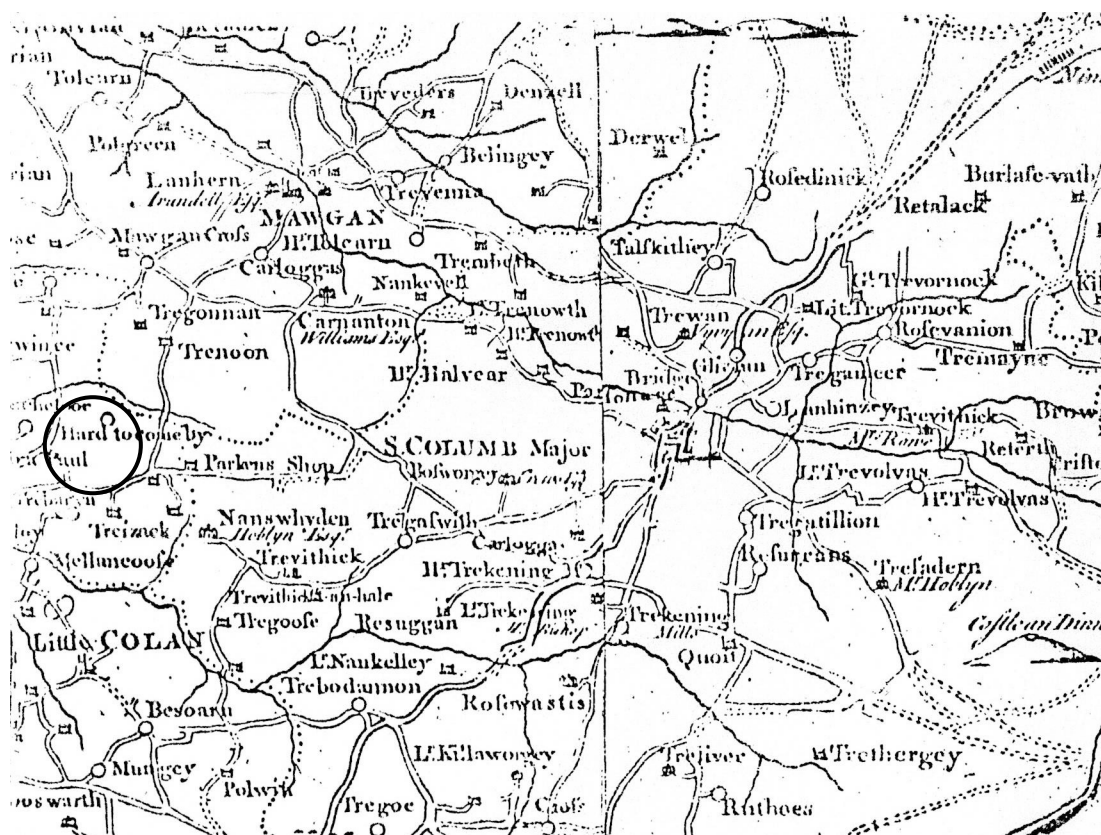
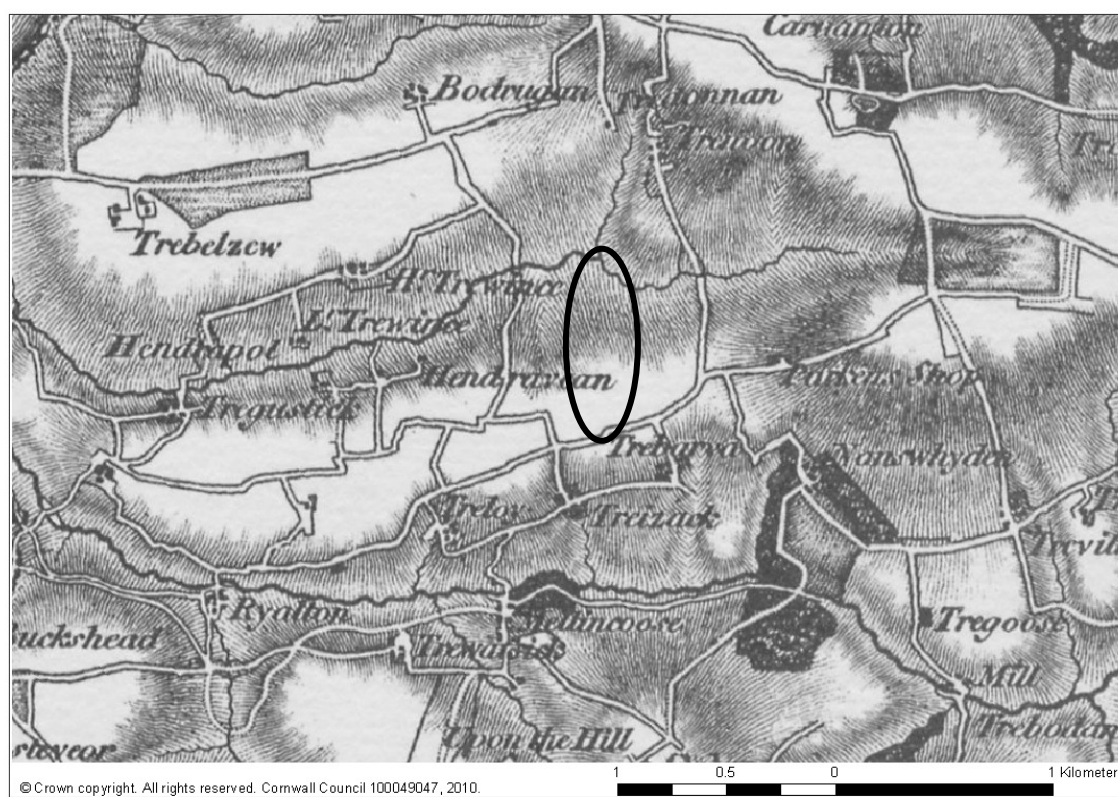


Fig 4 Aerial photograph of the proposed solar farm





*Fig 5 Thomas Martyn's map of 1748*



*Fig 6 The area on the c1809 OS Surveyors' drawing, showing the farm settlement (site 3)*



Fig 7 Tithe map c1840 for the Parish of St Breock

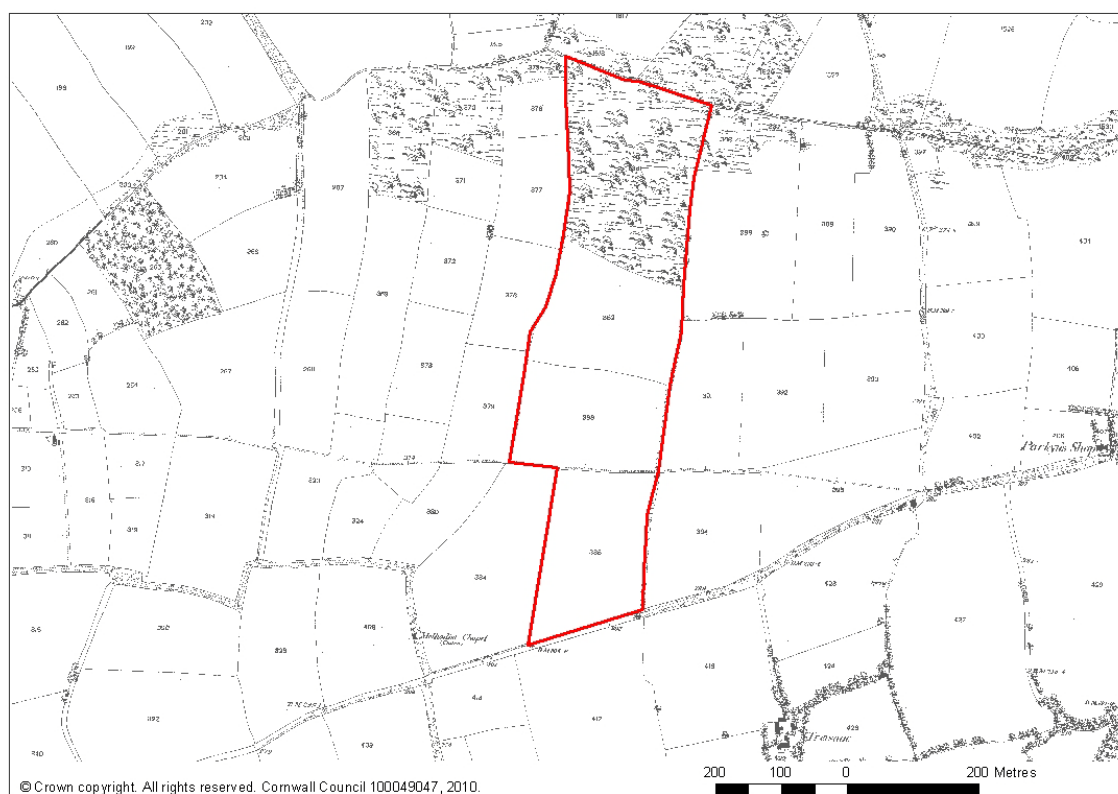


Fig 8 First edition OS map of c1880



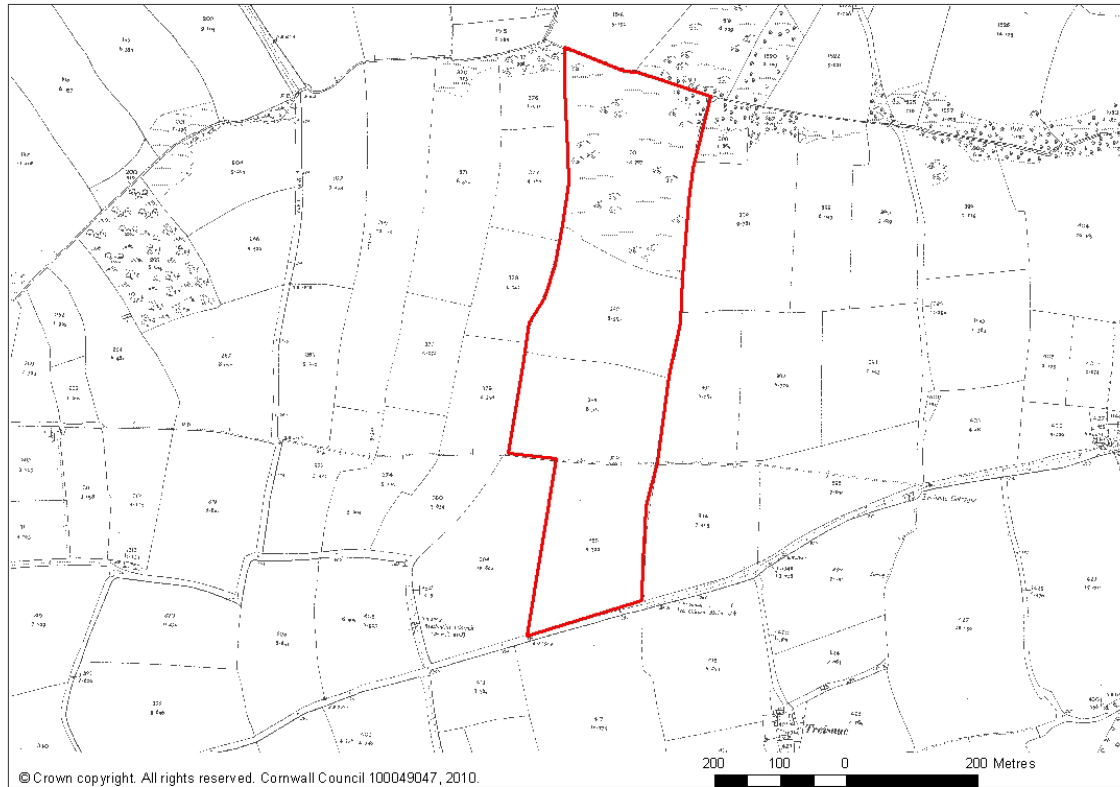


Fig 9 Second edition OS map of c1907

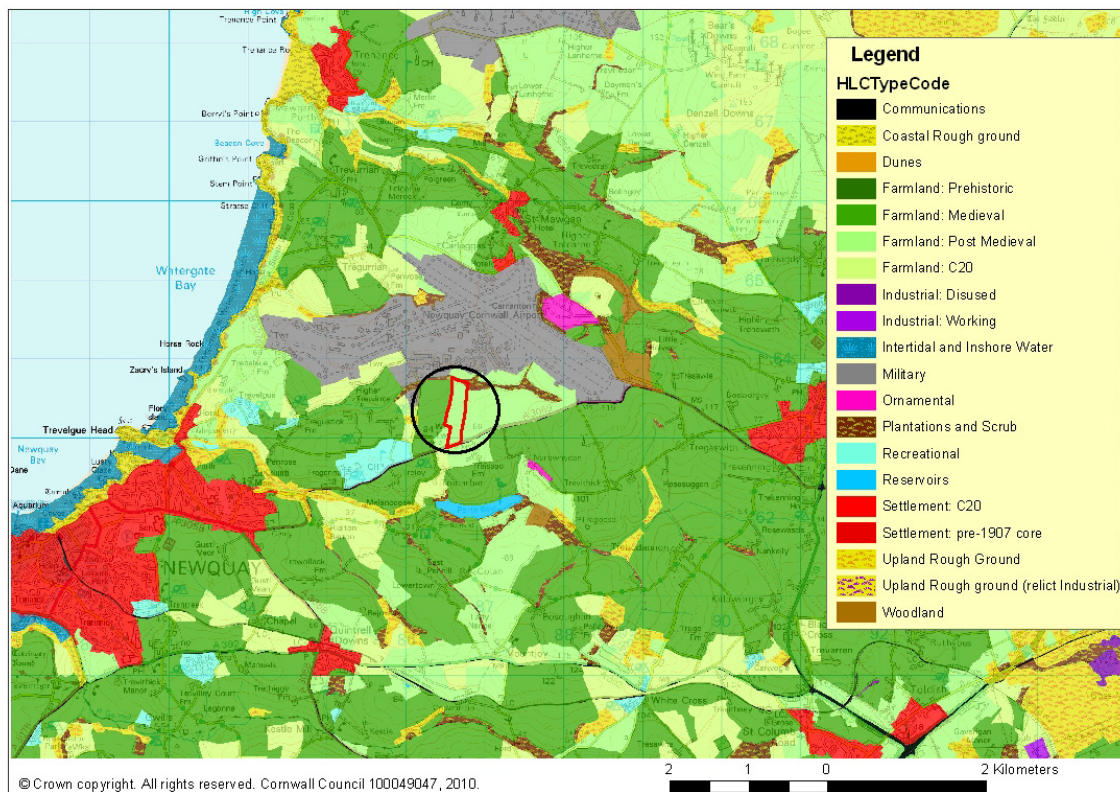


Fig 10 The 1994 HLC mapping, showing the site on the southern edge of a large tract of 'Medieval farmland'

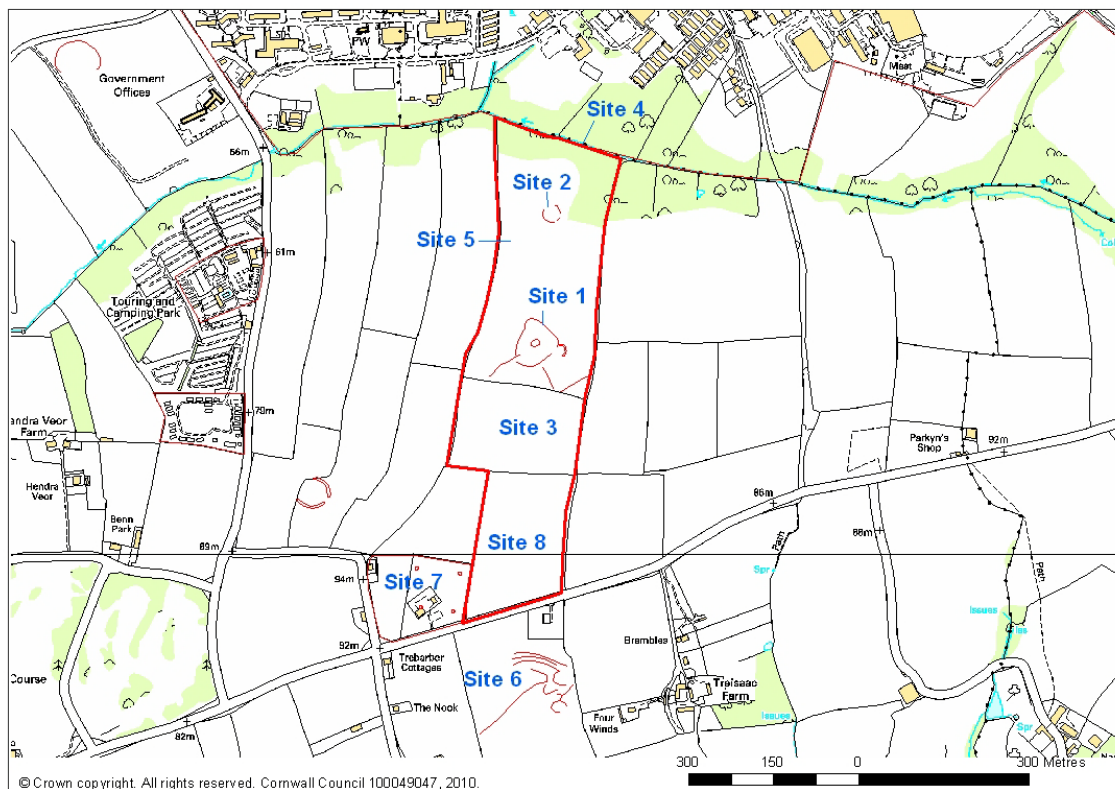


Fig 11 Archaeological sites location map

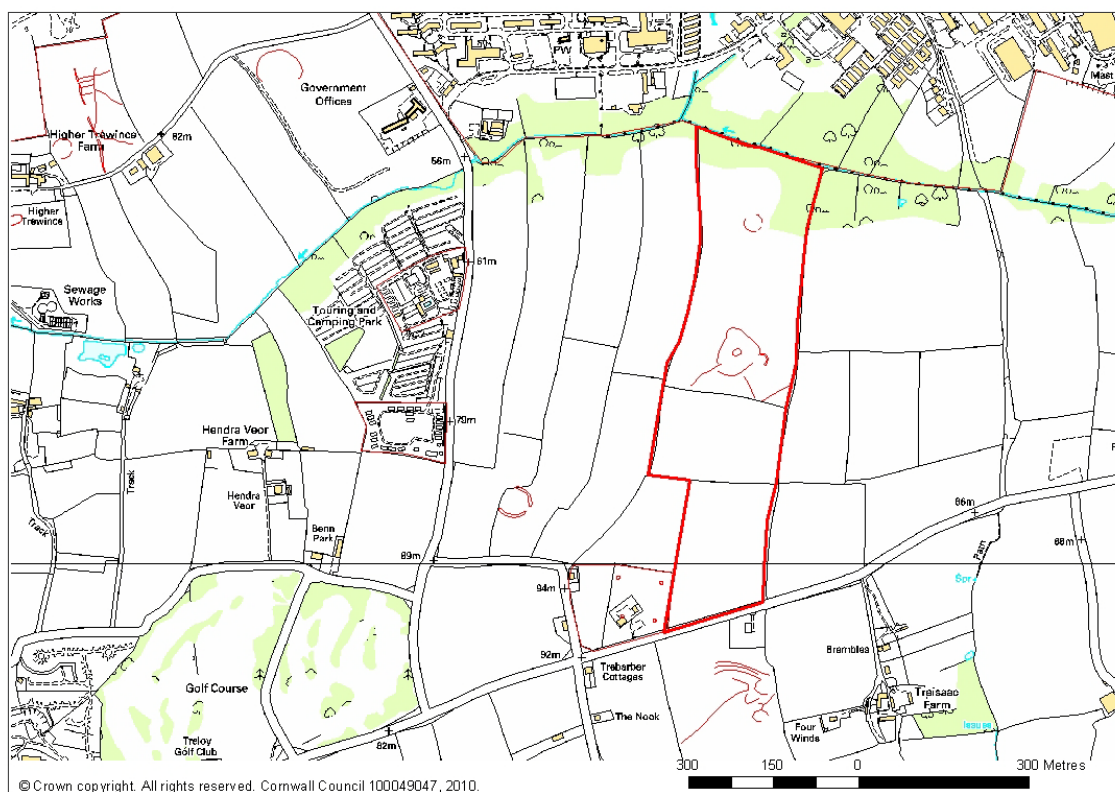


Fig 12 Distribution of Iron Age/Romano-British rounds/enclosures plotted by the NMP within a 1km radius of the site

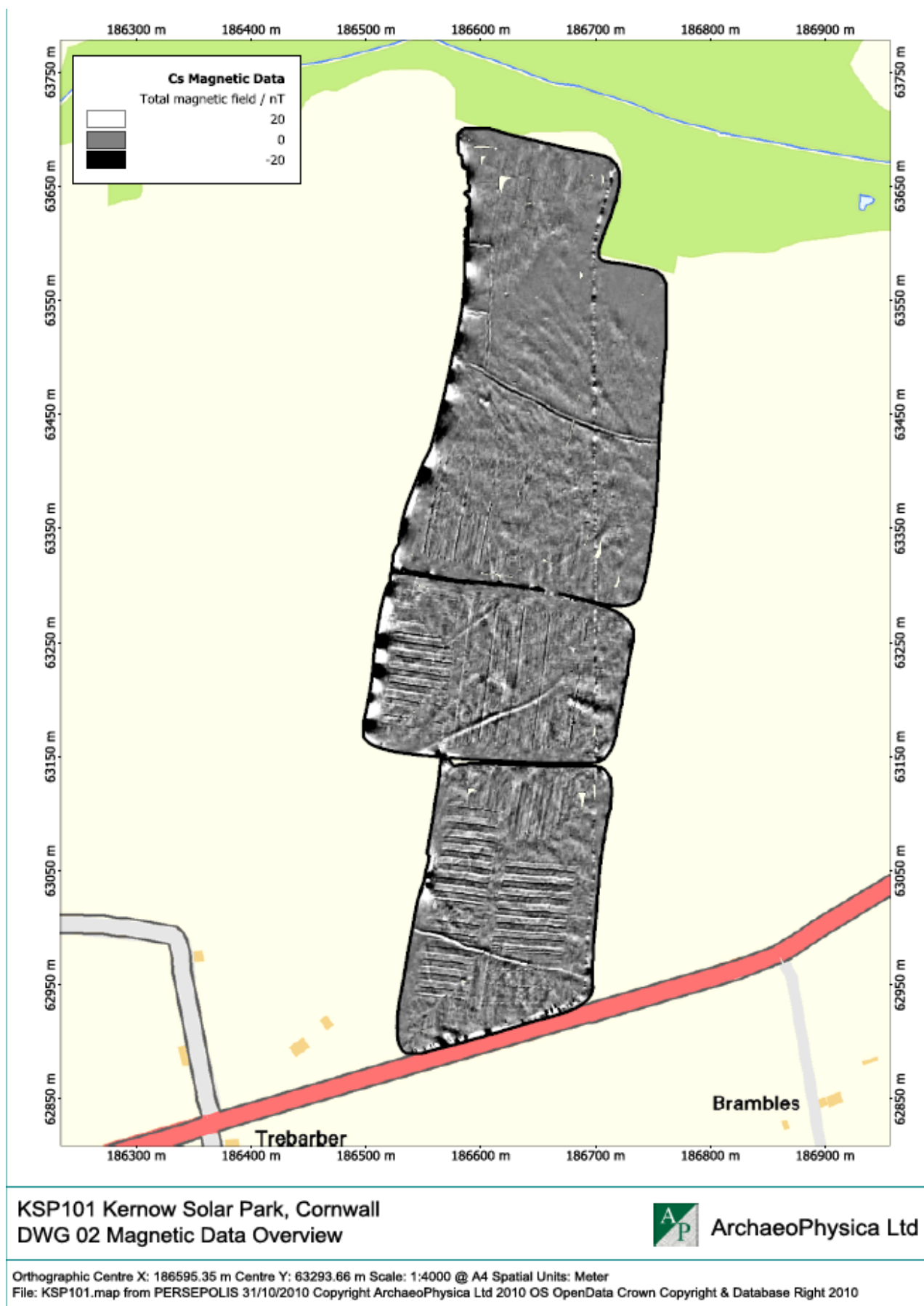


Fig 13 Overview of geophysical survey results by ArchaeoPhysica Ltd



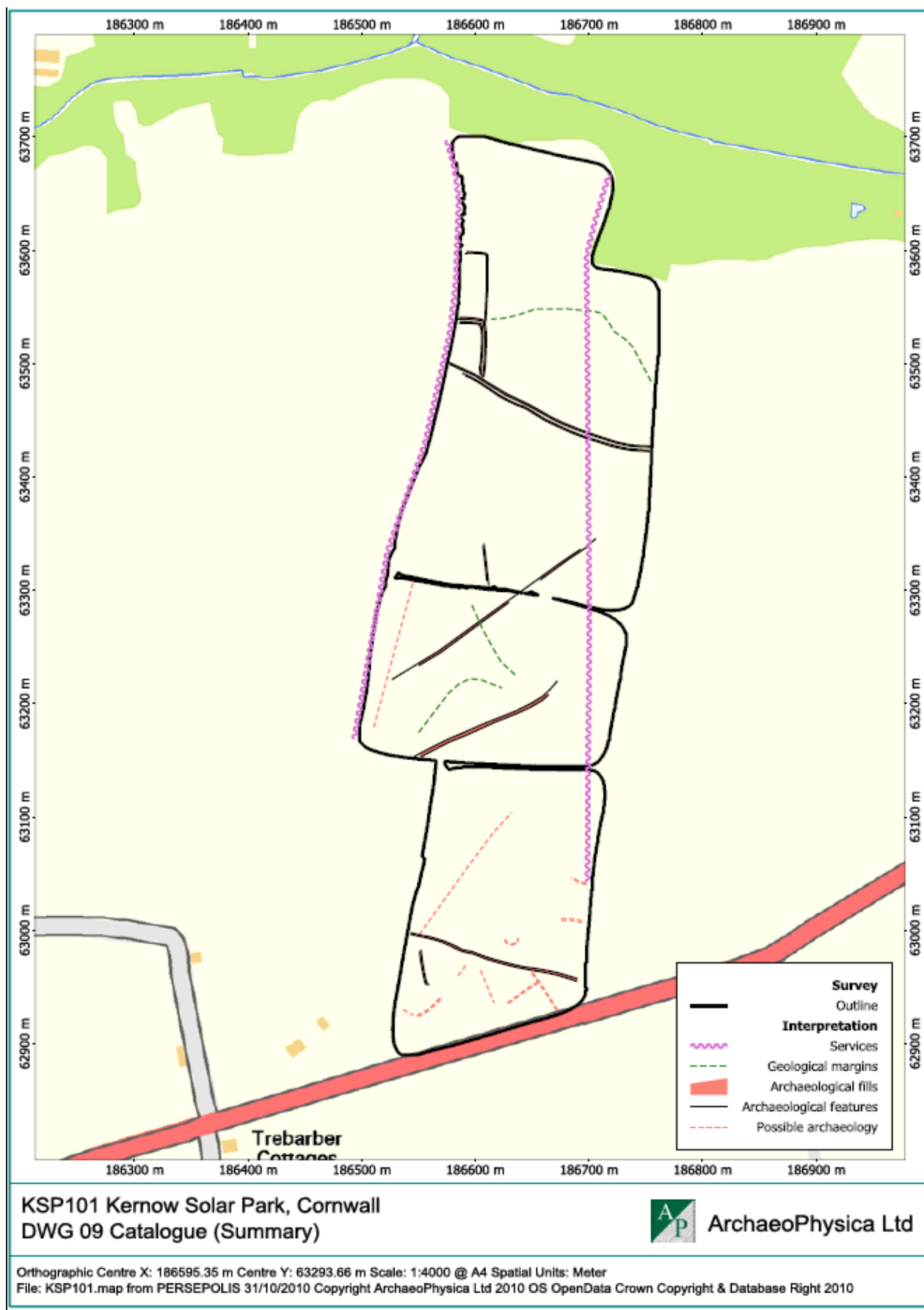


Fig 14 Interpretation of geophysical survey results by ArchaeoPhysica Ltd

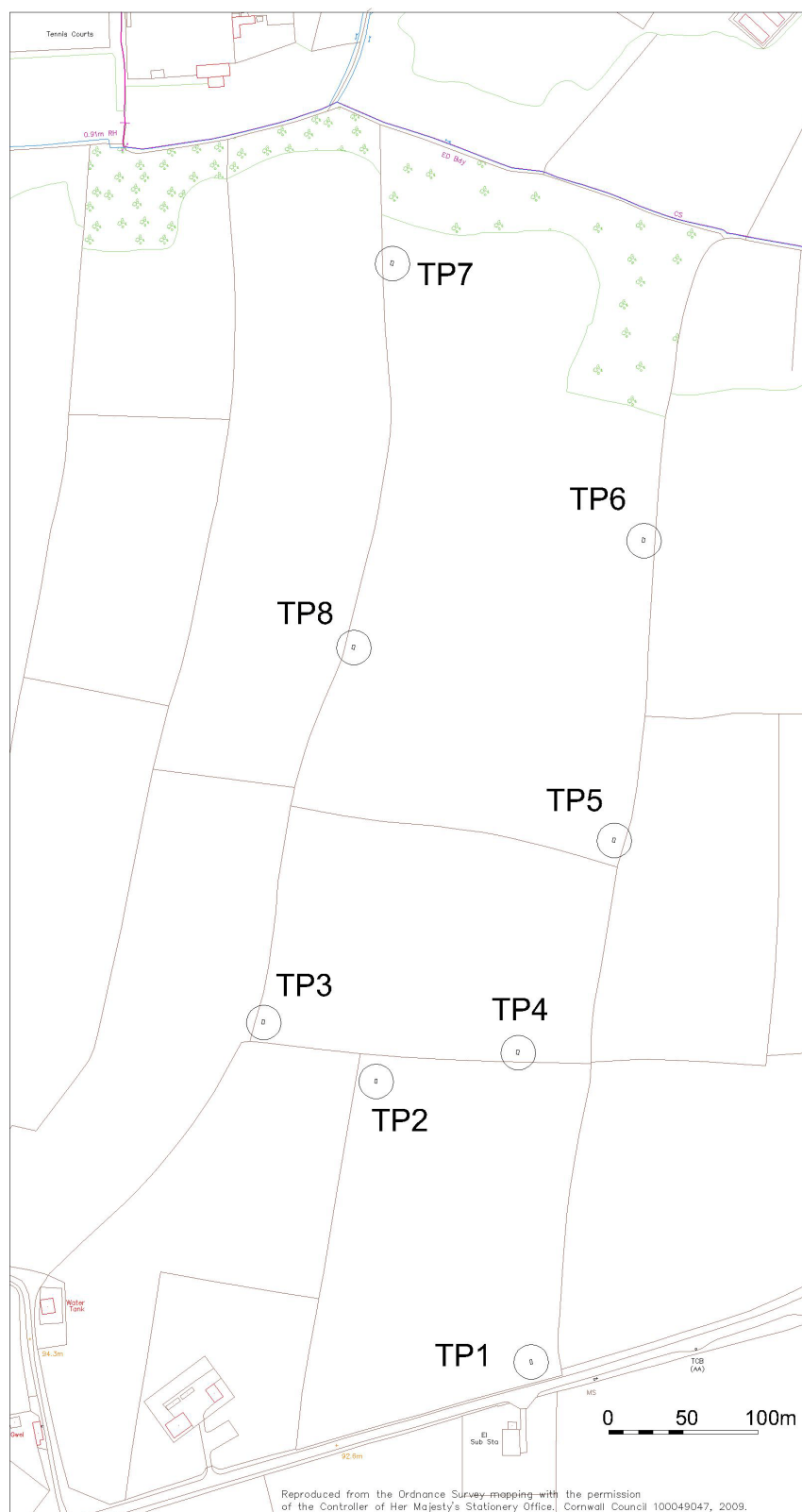


Fig 15 Locations of geotechnical trial pits



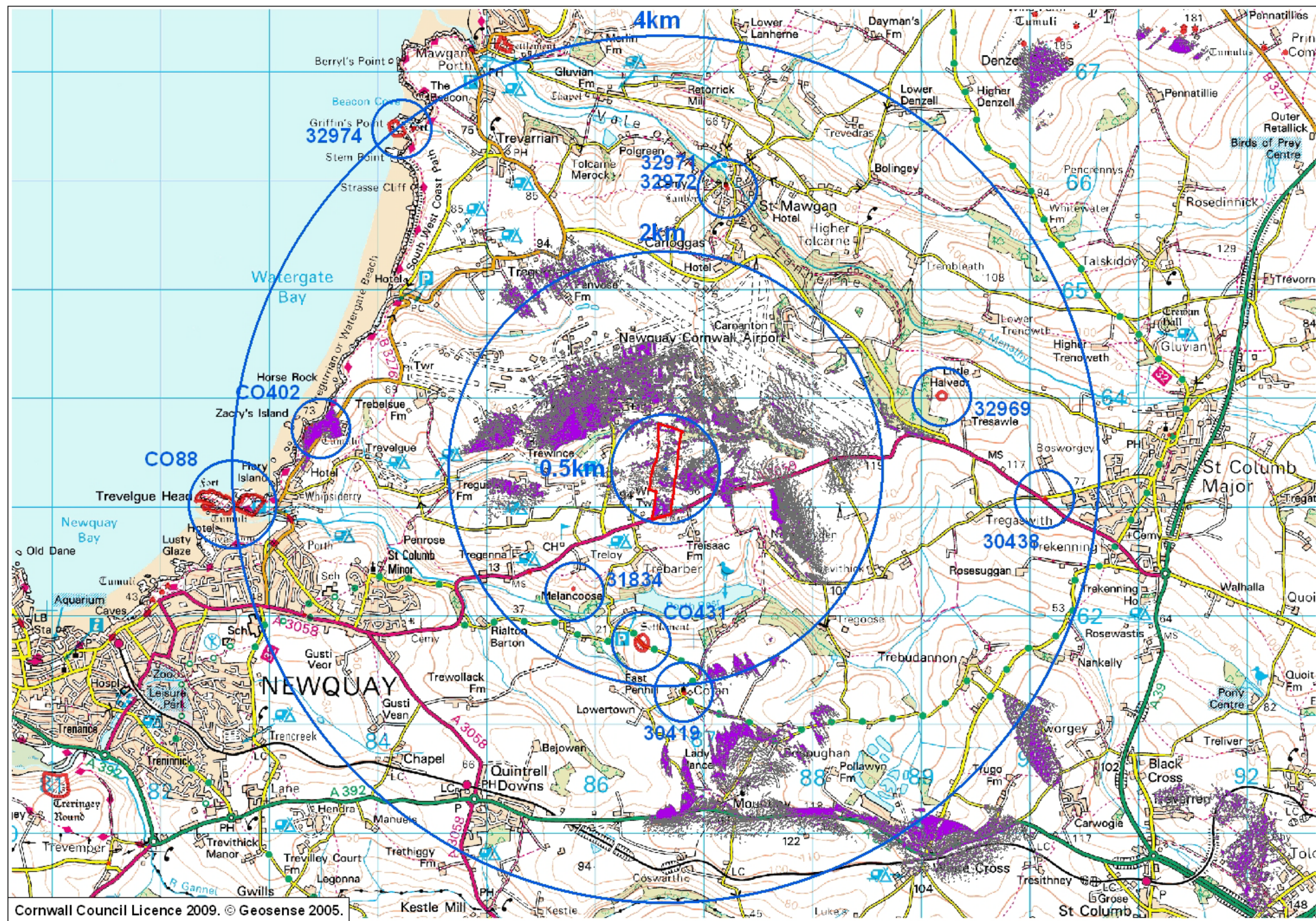


Fig 16 Map showing the computer generated viewshed of the proposed solar farm (in purple), and Scheduled Monuments (red but circled in blue) within a 4km radius



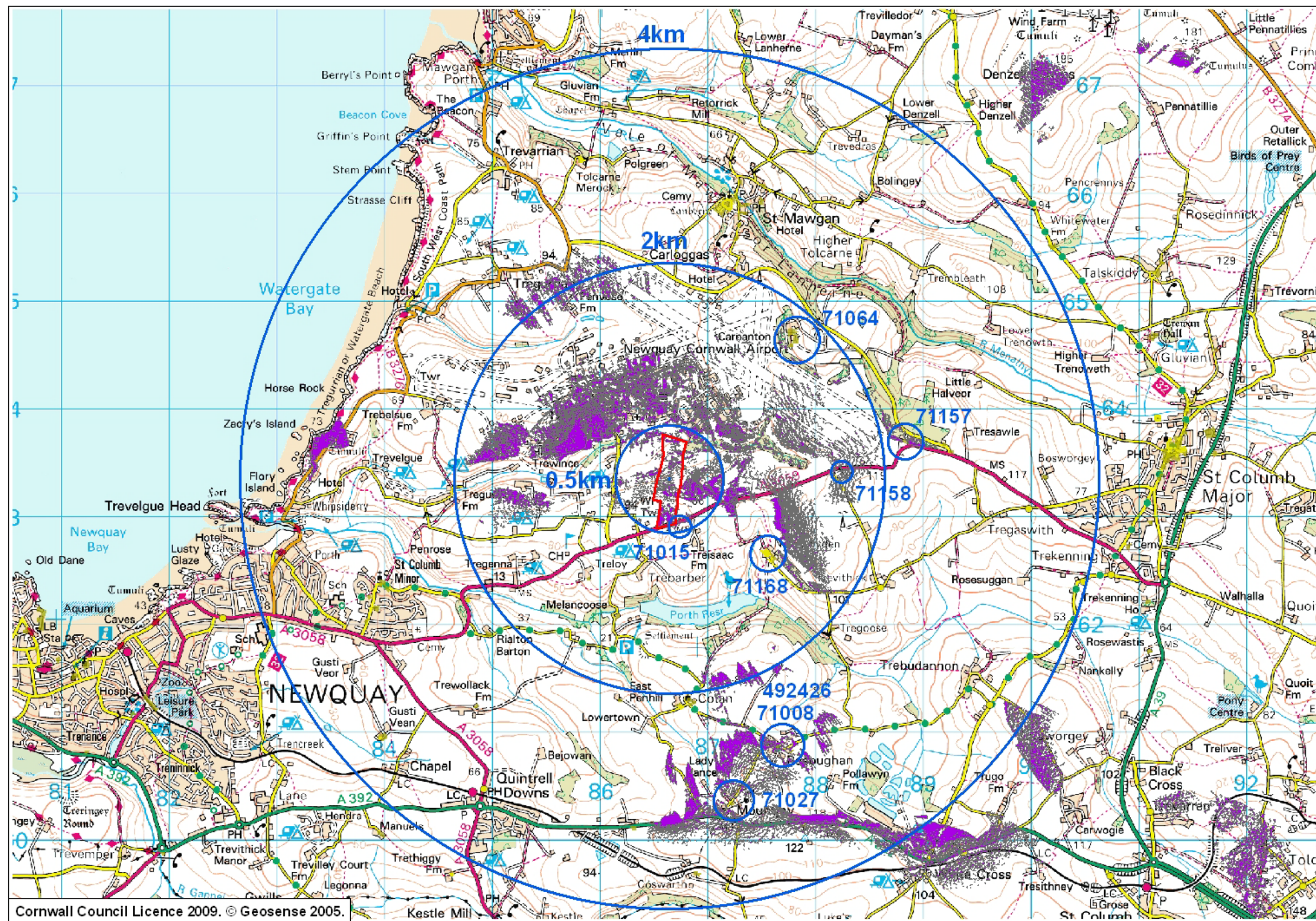


Fig 17 Map showing the computer generated viewshed of the proposed solar farm (in purple), and listed buildings (yellow but circled in blue) potentially visible within a 4km radius





# **11 Appendix: Geophysical survey report Kernow Solar Park, St Mawgan, Cornwall**

## **Geophysical Survey Report Produced for Cornwall Council**

**KSP101**

**16<sup>th</sup> November 2010**

**ACK Roseveare  
MJ Roseveare**



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## Non-Technical Summary

A magnetic survey of approximately 15 ha of land near St Mawgan, Cornwall, revealed numerous former enclosure ditches, some apparently former landscape scale divisions but others of smaller enclosures and therefore potentially indicative of nearby and contemporary settlement.

Earlier analysis of aerial photographs had suggested the presence of a round in these fields but no magnetic traces of this were found.

November 2010

## Digital Data

Data	Included?	Format
Survey outlines	Available	Vector: AutoCAD R12 DXF
Interpretation	Available	Vector: AutoCAD R12 DXF
XY Traces		Vector: AutoCAD R12 DXF
Contours		Vector: AutoCAD R12 DXF
Images	Available	Georeferenced raster: GeoTIFF
Catalogue	Available	Database: MS Access 2003

Media	Sent to	Date

## Audit

Version	Author	Checked	Date
Final	ACKR MJR	MJR	21/11/10

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# 1 Introduction

## Objective

1.1 Adam Sharpe of Cornwall Council commissioned ArchaeoPhysica on behalf of Wardell Armstrong to provide geophysical survey as part of a non-invasive assessment of potential archaeological remains prior to development of the site for photovoltaic power generation.

1.2 A specification for detailed magnetic survey was agreed.

1.3 The fundamental objective was to detect, characterise and define the extent of any archaeological remains within the survey area.

## Location

Country	England
County	Cornwall
Nearest Town	Newquay
Central Co-ordinates	186600, 063300

## Summary of methodology

1.4 The following instrumentation and procedures were used:

### Magnetic survey (caesium)

Measured Variable	Total field strength, nT
Instrument	Geometrics G858 MagMapper caesium magnetometer
Configuration	Non-gradiometric 1m separation (4-sensor array)
Sensitivity	0.03nT
QA Procedure	Static test, field observation
Resolution	Approx. 0.3m along lines approx. 1.0m apart

1.5 The array of magnetometers was sledge-mounted and towed, with GNSS-based tracking, as described in the WSI (Roseveare & Roseveare, 2010) and using the Geomatrix GEEP system.



## 2 Context

### Archaeology

2.1 Cropmarks visible on aerial photographs (transcription copy viewed in the field only) show a possible round at the southern end of the northern field; a ring ditch further north in this field and scattered linear features that may have archaeological origins in other parts of the site.

### Environment

Superficial 1:50000 BGS	None recorded
Bedrock 1:50000 BGS	Meadfoot Group – Slate and sandstone, interbedded (MDT), Dartmouth Group – Slate, siltstone and sandstone (DRTM)
Topography	Gently sloping down to north
Hydrology	Well drained
Current Land Use	Agriculture – arable
Historic Land Use	Agriculture – mixed
Vegetation Cover	Grass and none
Sources of Interference	None identified

### 3 Catalogue

3.1 The table below is the catalogue of anomalies found during survey for this project. The labels refer to DWGs 06 - 08 and also those in green in the text of this report.

Label	Description	Easting	Northing
1	Probable ditch fill < 1m wide defining with [2], [3] etc parts of enclosures	186593.5	63598.2
2	One of a pair, with [3] of probable ditch fills, each < 1m wide. The pair are parallel and spaced approximately 3m apart, so wide enough for a narrow lane but close enough to be the flanking ditches of a thick Cornish hedge. Why therefore [1] should be singular when part of the same complex is interesting	186589.4	63539.9
3	See [2]	186606.0	63526.0
4	One of a pair, with [5] of probable ditch fills. These are approximately 4m apart and may be sufficiently far apart to warrant interpretation as a track rather than the flanking ditches of a Cornish hedge. Some credibility is lent to the former by the way this ditch crosses the ends of [2] and [3] rather than turning to meet them	186581.5	63497.8
5	See [4]	186607.9	63480.2
6	Possible ditch fill, though this is not certain. Perhaps a former field boundary?	186608.8	63322.0
7	A likely ditch fill perhaps about 1.5m wide and most likely a former field boundary, though not of Cornish hedge type unless this was flanked by a ditch on only one side	186592.1	63262.3
8	Possible ditch fill. If it is a former field boundary it sits uneasily with [7] which it crosses. This could be a modern feature, perhaps a service trench?	186529.2	63250.3
9	A major likely ditch fill 2 - 3m wide and perhaps of prehistoric date? It may be relevant that it is almost parallel with [7], however, the two structures apparently have quite different widths	186586.1	63171.6
10	A weak and ill-defined linear anomaly of uncertain form but probably not natural	186591.0	63053.5
11	A weak linear anomaly perhaps from a fairly deeply buried fill. Uncertain, could be natural though perhaps also one of a pair with [12]	186696.3	63040.6
12	See [11]. This example seems more definite	186693.8	63008.3

Label	Description	Easting	Northing
13	A possible weakly magnetic ring ditch up to 10m diameter but identification is only tentative	186632.7	62987.3
14	Another major ditch fill (see [9]) 2 - 3m wide. There is some variation in form along its length which may suggest truncation or variable depth below the surface	186544.9	62996.3
15	With [16] and [17] this seems to be a ditch fill < 2m wide partly defining some small enclosures. Their irregular form may suggest a prehistoric origin and it is unclear if they relate to the more magnetic ditch fill [14] in any way. They do not appear to pass north of this	186553.3	62967.0
16	See [15]	186539.0	62928.2
17	See [15]	186566.8	62937.2
18	A weak linear enhanced field anomaly of uncertain origin	186610.7	62950.5
19	A possible fill < 1m wide which is perpendicular to another one, [20]. These could be ditch fills or they could be disturbance from structures erected next to the road	186658.2	62951.1
20	See [19]	186636.6	62941.4

## 4 Discussion

### Introduction

4.1 For an explanation of the data processing see the section entitled "[Process Documentation](#)" in the appendices.

4.2 The sections below first discuss the geophysical context within which the results need to be considered and then specific features or anomalies of particular interest. Not all will be discussed here and the reader is advised to consult the catalogue (*ibid*) in conjunction with the graphical elements of this report.

### Geophysical character & environment

4.3 The topsoil at the site is strongly magnetic (i.e. strongly magnetically susceptible as it is exhibiting a strong induced not remanent field), most likely for entirely natural reasons, which means that any disturbance of its structure tends to create a strong magnetic effect. This is why the furrows from the recent ploughing match are very (indeed, frustratingly) clear in the images of the data, but also the previous season's ploughing.

4.4 This magnetic susceptibility of the soil is lowest towards the bottom of the slope and there is an association with changing soil type. The lowest regions show clear alluvial patterning in keeping with their situation above a stream, with signs of a filled area opening northeast into the shallow valley, probably the site of a spring. Linear anomalies leading into this from the southeast are probably erosion due to drainage.



4.5 Higher up the slope there are variations in the magnetic field strength that are typical of fairly deeply buried sources, probably at the base of the soil. This may suggest that there is a shallow superficial geology over the bedrock, although none is known here, or that the upper surface of the rock is irregular.

4.6 As would be expected there is no magnetic distinction between the Dartmouth and Meadfoot bedrock groups.

## Interpretive framework

### Magnetic

4.7 Interpretative logic is based on structural class and examples are given below. For example a linear field or gradient enhancement defining an enclosed or semi-enclosed shape is likely to be a ditch fill, if there is no evidence for accumulation of susceptible material against a non-magnetic structure. Weakly dipolar discrete anomalies of small size are likely to have shallow non-ferrous sources and are therefore likely to be pits. Larger ones of the same class could also be pits or locally-deeper topsoil but if strongly magnetic could also be hearths. Strongly dipolar discrete anomalies are in all cases likely to be ferrous or similarly magnetic debris, although small repeatedly heated and *in-situ* hearths can produce similar anomalies. Reduced field strength (or gradient) linear anomalies without pronounced dipolar form are likely to be caused by relatively low susceptibility materials, e.g. masonry walls, stony banks or stony or sandy ditch fills.

### Chronology

4.8 It is not possible to attach dates to features through geophysical means alone, however, some attempt at recognition of broad phases of activity is sometimes possible.

## Results

### 'Missing' monuments

4.9 One major suspected monument was apparently not detected by the magnetic survey. A cropmark or relief feature typical of a 'round' or circular defended enclosure was detected on aerial photographs but there is no convincing magnetic evidence for this. There are various reasons why this could be the case, the most obvious being that the round may not exist and was a low natural mound perhaps since ploughed flat.

4.10 The presence of very strong anomalies in the absence of any settlement or other activity capable of elevating magnetic susceptibility indicates that the anomalies here are caused by variations in topsoil depth, possibly through features being rock cut or through accumulated topsoil within subsidence hollows. The latter is perhaps more likely and if so it may be that the most magnetic elements of buried features are lenses of (former) topsoil within the upper regions of their fills and within the primary silts at much greater depths.

4.11 If this is the case it is possible that the relatively broad ditches of a round contain little that is naturally magnetic and that ploughing has removed any deeper region of topsoil over them, thus removing anything capable of enhancing the local magnetic field. However, considering rounds are settlement sites, it is perhaps slightly surprising that there is no evidence for even a slight increase in magnetic susceptibility around its supposed position.

4.12 Other cropmarks include linear structures which we believe have been detected as ditch fills but without seeing the actual aerial photograph or transcription we cannot be sure.

### Other structures

4.13 Numerous linear structures, mostly fairly obviously ditch fills, have been detected, some e.g. [7] and [9] apparently parts of field systems and potentially of prehistoric date. However, a number of weak anomalies e.g. [11], [12], [15 – 17] and perhaps [19] and [20] hint at smaller-scale enclosure although this is far from certain; the anomalies exist but their attribution to features of archaeological interest is likely but not definite.



4.14 Of more interest are the major ditch fills [7], [9] and [14] which all suggest a significantly different layout of enclosure in the past. Fills [9] and [14] in particular seem to be major structures and given their position on the slope, perhaps rock cut.

4.15 At the northern end of the site a more complex set of probable ditch fills reveal a totally different set of enclosure, specifically two conjoined and probably rectangular enclosures off the north side of a major ditched boundary or track passing approximately east – west. There is some ambiguity associated with these pairs of linear anomalies because their separation does not preclude the possibility that they are the flanking ditches of thick Cornish hedges, especially [2] and [3]. However, [4] and [5] are fractionally further apart, sufficient to perhaps be flanking a track.

## Conclusions

4.16 This survey has demonstrated the unpredictability of archaeological prospecting with suspected structures, i.e. the round, absent from the magnetic data but with a host of former land divisions evident instead. It also demonstrates that when seeking structures of archaeological interest geophysical survey neither replaces nor is replaced by aerial photography and other means of prospection.

4.17 The purpose of most of these enclosures is not known, however, there are clear signs that they represent multiple phases of use and perform functions at different scales, e.g. the landscape scale of [7], [9] and [14] and the much smaller enclosures defined by [1 – 3].



## Caveats

4.18 Geophysical survey is a systematic measurement of some physical property related to the earth. There are numerous sources of disturbance of this property, some due to archaeological features, some due to the measuring method, and others that relate to the environment in which the measurement is made. No disturbance, or 'anomaly', is capable of providing an unambiguous and comprehensive description of a feature, in particular in archaeological contexts where there are a myriad of factors involved.

4.19 The measured anomaly is generated by the presence or absence of certain materials within a feature, not by the feature itself. Not all archaeological features produce disturbances that can be detected by a particular instrument or methodology. For this reason, the absence of an anomaly must never be taken to mean the absence of an archaeological feature. The best surveys are those which use a variety of techniques over the same ground at resolutions adequate for the detection of a range of different features.

4.20 Where the specification is by a third party ArchaeoPhysica will always endeavour to produce the best possible result within any imposed constraints and any perceived failure of the specification remains the responsibility of that third party.

4.21 Where third party sources are used in interpretation or analysis ArchaeoPhysica will endeavour to verify their accuracy within reasonable limits but responsibility for any errors or omissions remains with the originator.

4.22 Any recommendations are made based upon the skills and experience of staff at ArchaeoPhysica and the information available to them at the time. ArchaeoPhysica is not responsible for the manner in which these may or may not be carried out, nor for any matters arising from the same.

## Bibliography

Roseveare, M. & Roseveare, A., 2010. '*Generic WSI for Solar Energy Projects: Specification for Geophysical Survey*' unpublished ArchaeoPhysica specification



## Appendices

### Survey metadata

#### Project information

Project Name	Kernow Solar Park
Project Code	KSP101
Client	Cornwall Council
Fieldwork Dates	28-29.10.2010
Field Personnel	A. Roseveare, T. Bellomo
Processing Personnel	A. Roseveare
Reporting Personnel	M. Roseveare, A. Roseveare, T. Bellomo
Draft Report Date	16.11.10
Final Report Date	21.11.10

#### Data geolocation

Projection	Orthographic
Co-ordinate System	British National Grid
Bearing	Zero
Instrument Used	Hemisphere DGNSS @ 1Hz

### Process documentation

4.23 General information on processes commonly applied to data can be found in standard text books and also in the 2008 English Heritage Guidelines "*Geophysical Survey in Archaeological Field Evaluation*" at [http://www.helm.org.uk/upload/pdf/Geophysical\\_LoRes.pdf](http://www.helm.org.uk/upload/pdf/Geophysical_LoRes.pdf).

4.24 ArchaeoPhysica uses more advanced processing for magnetic data using potential field techniques standard to near-surface geophysics. Details of these can be found in Blakely, 1996, "*Potential Theory in Gravity and Magnetic Applications*", Cambridge University Press.

4.25 All archived data includes process metadata.

#### Magnetic survey

Measured Variable	Total field strength, nT
Instrument	Geometrics G858 MagMapper caesium magnetometer
Configuration	Non-gradiometric 1m separation (4-sensor array)
Sensitivity	0.03nT
QA Procedure	Static test, field observation
Resolution	Approx. 0.3m along lines approx. 1.0m apart

#### Process

- Rejection of any inaccurate geolocation data
- Suppression of individual outlying magnetic data (single-datum spikes, localised interference)
- Normalisation of parallel sensors to remove any offset
- Suppression of large-scale background and temporal changes by time-domain bandpass filter
- Interpolation to a regular grid of data for display



## Archive data

### Introduction

4.26 ArchaeoPhysica maintains an archive for all its projects, access to which is permitted for research purposes. Copyright and intellectual property rights are retained by ArchaeoPhysica on all material it has produced, the client having full licence to use such material as benefits their project.

4.27 Access is by appointment only. Some content is restricted and not available to third parties. There is no automatic right of access to this archive by members of the public. Some material retains commercial value and a charge may be made for its use. An administrative charge may be made for some enquiries, depending upon the exact nature of the request.

### General description

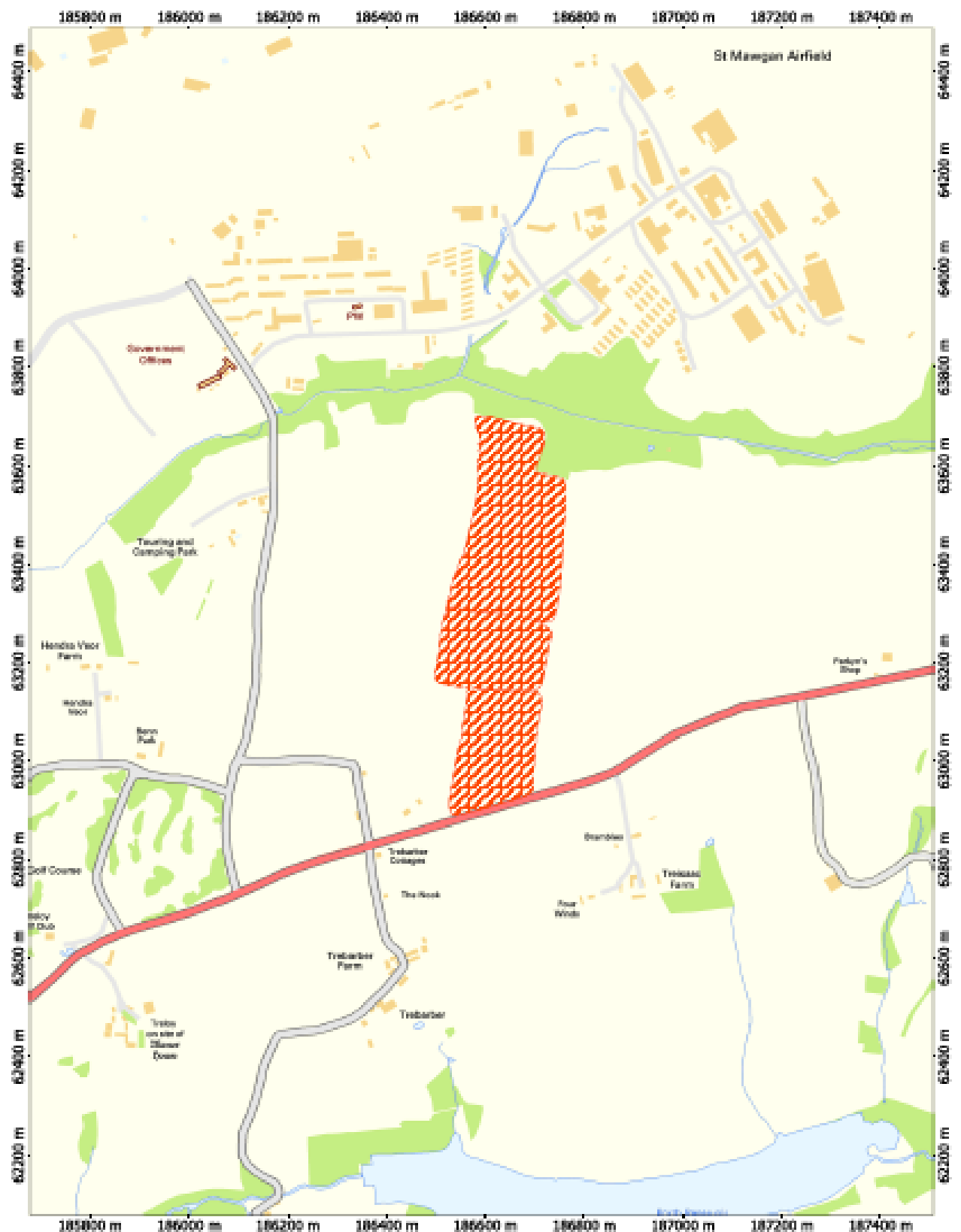
4.28 The archive contains all survey and project data, communications, field notes, reports and other related material including copies of third party data (e.g. CAD mapping, etc) in digital form. Many are in proprietary formats while report components are available in PDF format.

4.29 In addition, there are paper elements to some project archives, usually provided by the client. Nearly all elements of the archive that are generated by ArchaeoPhysica are digital.

### Dissemination

4.30 It is the client's responsibility to ensure that reports are distributed to all parties with a necessary interest in the project, e.g. local government offices, including the HER where present. ArchaeoPhysica reserves the right to display data from projects on its website and in other marketing or research publications, usually with the consent of the client. Information that might locate the project is normally removed unless otherwise authorised by the client.

4.31 ArchaeoPhysica are subscribed to the OASIS system and can initiate records within this if required.



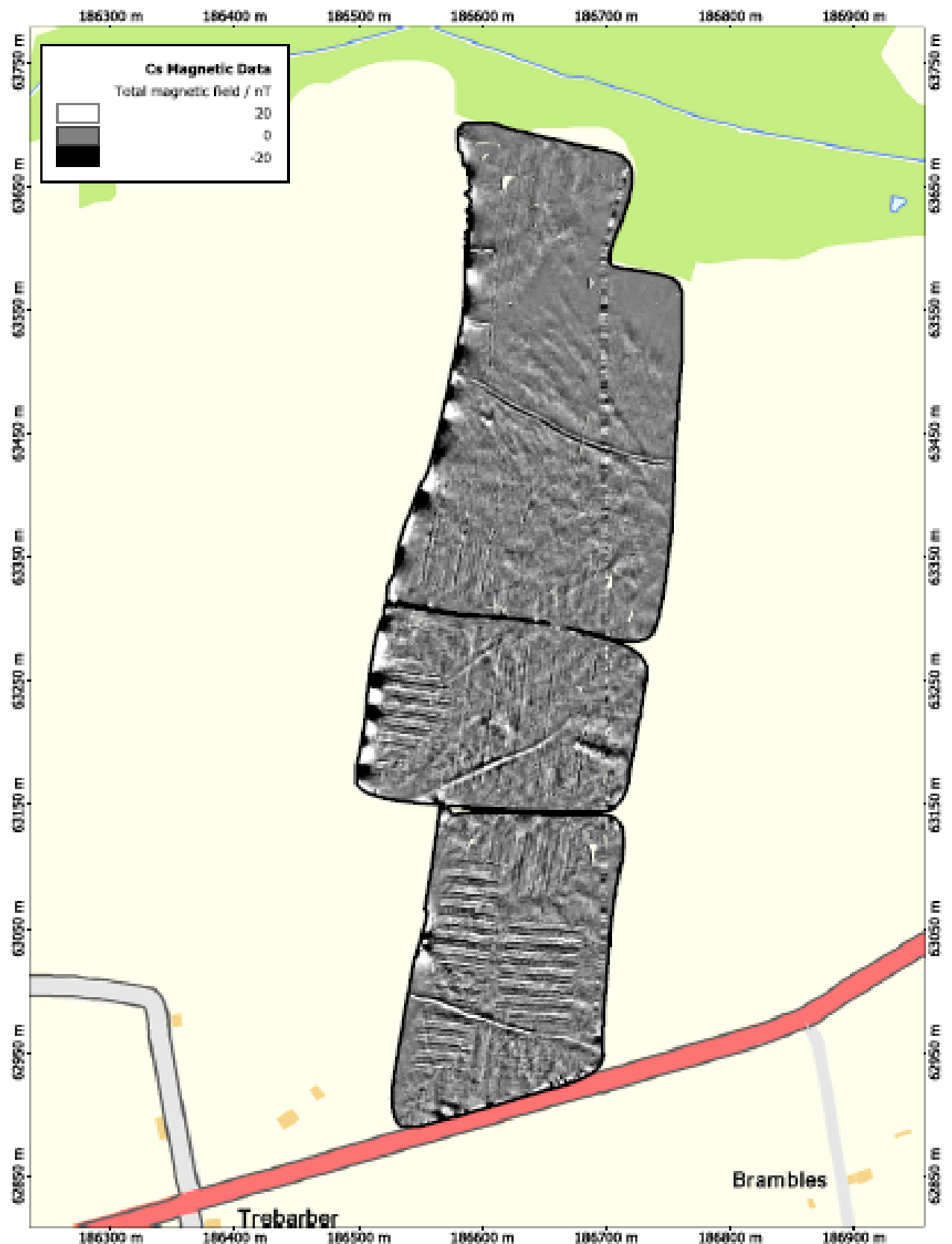
**KSP101 Kernow Solar Park, Cornwall**  
**DWG 01 Location**

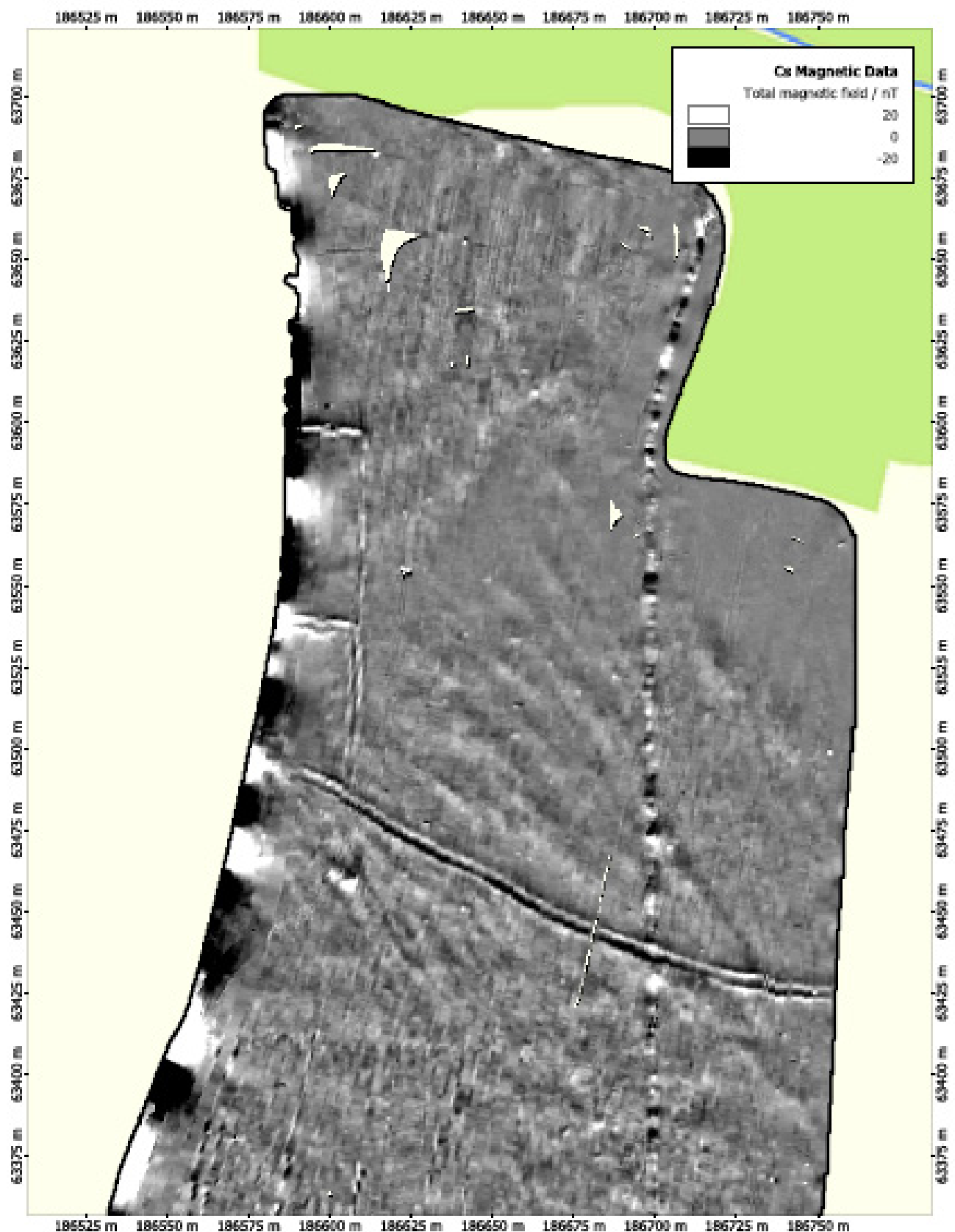


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Orthographic Centre X: 186592.48 m Centre Y: 63283.17 m Scale: 1:10000 @ A4 Spatial Units: Meter

File: KSP101.map from PERSEPOLIS 31/10/2010 Copyright ArchaeoPhysica Ltd 2010 OS OpenData Crown Copyright & Database Right 2010





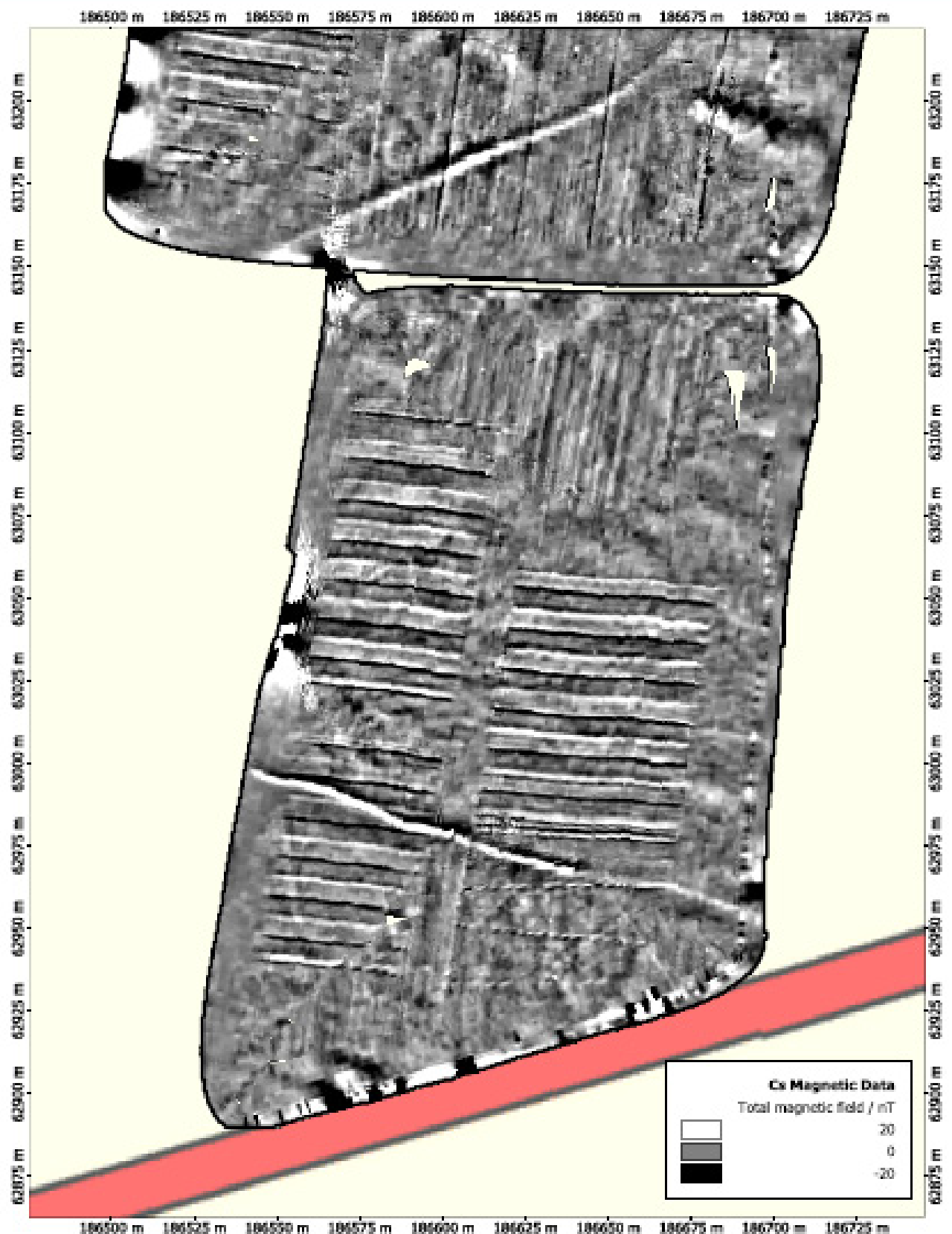
KSP101 Kernow Solar Park, Cornwall  
DWG 03 Magnetic Data (North)

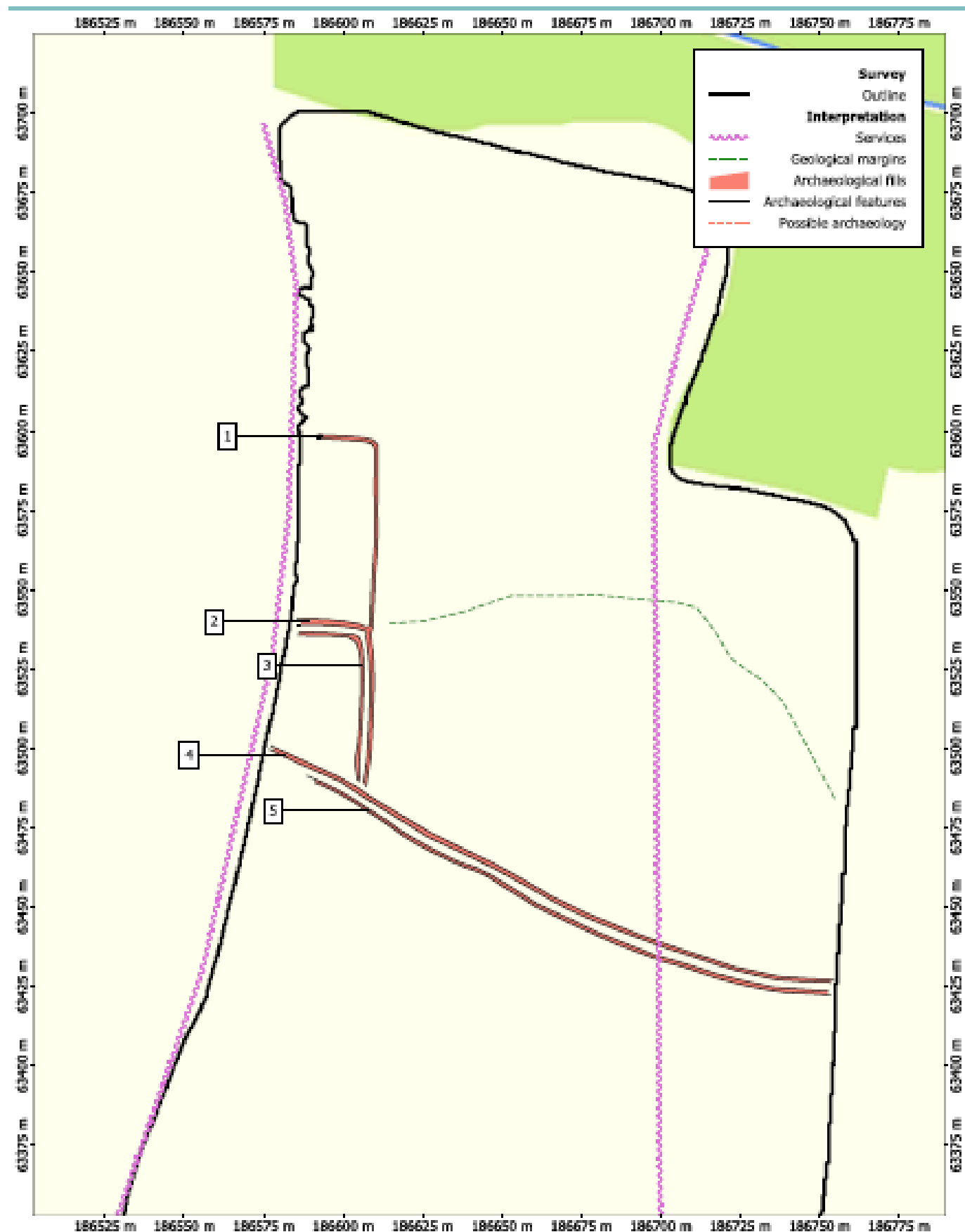


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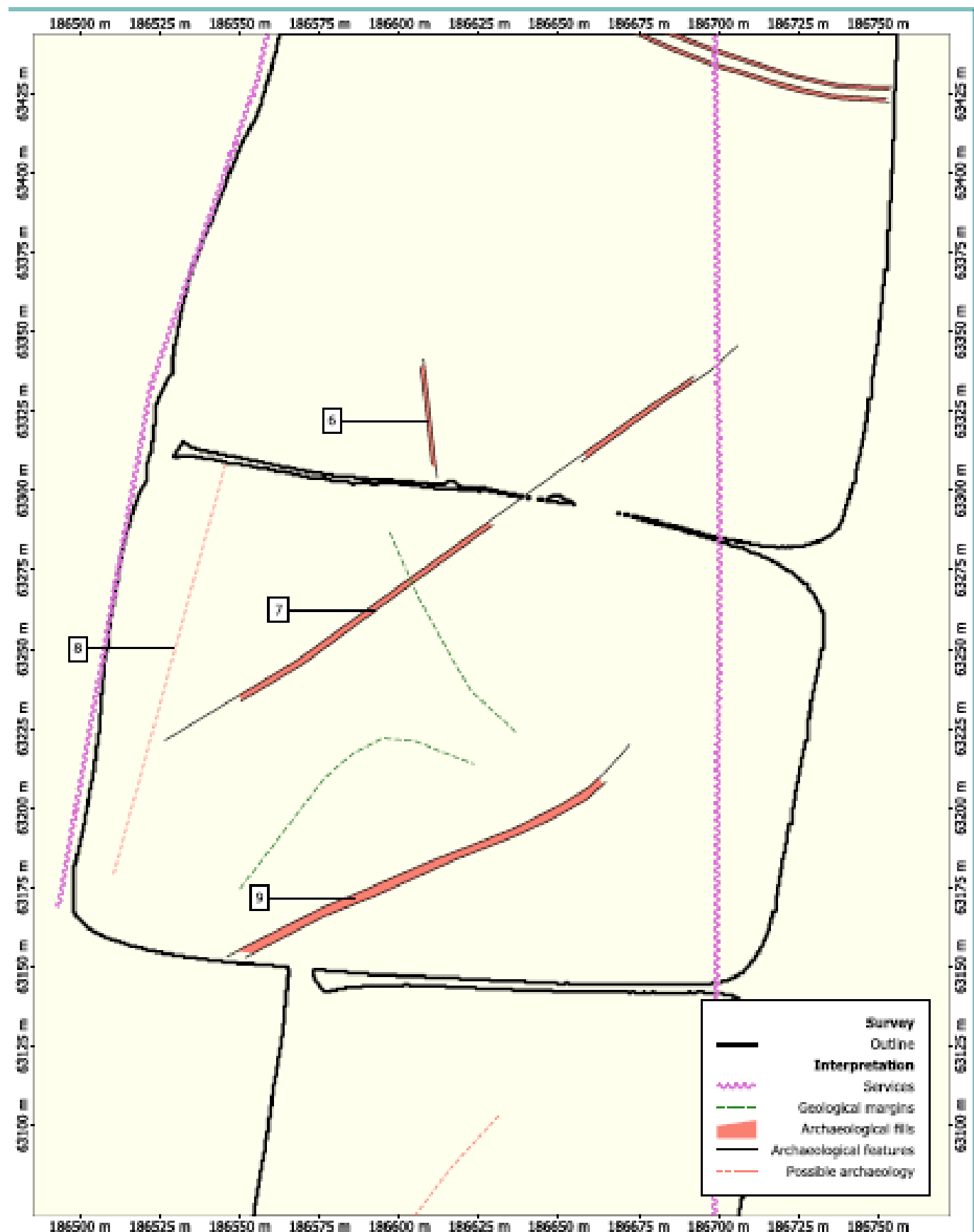




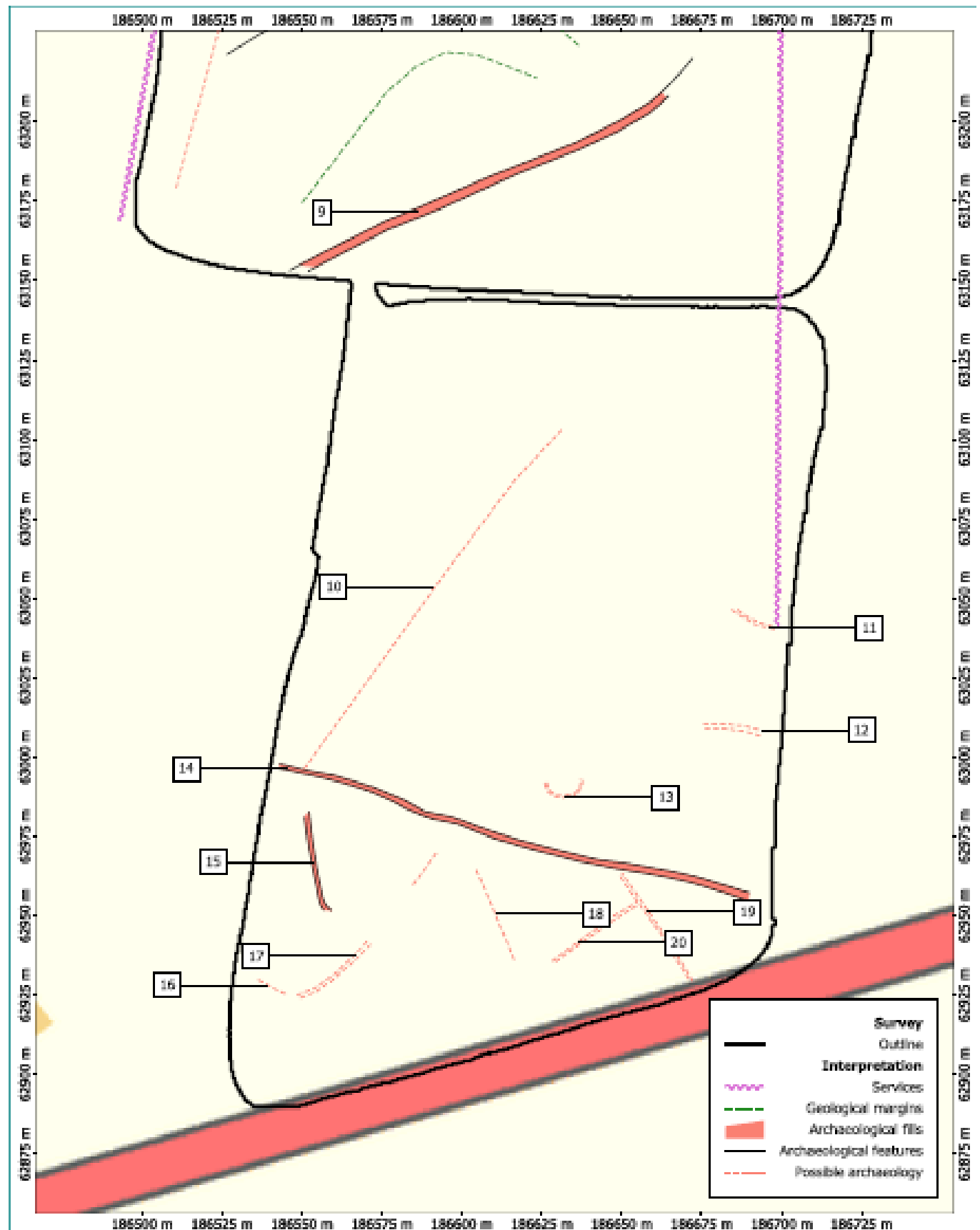
KSP101 Kernow Solar Park, Cornwall  
DWG 06 Catalogue (North)



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KSP101 Kernow Solar Park, Cornwall  
DWG 07 Catalogue (Middle)



KSP101 Kernow Solar Park, Cornwall  
DWG 08 Catalogue (South)



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