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Barwick Farm, Cuby, Cornwall

Archaeological assessment of proposed wind turbine

Cornwall Archaeological Unit

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This study was commissioned by Cornwall Council and carried out by Cornwall Archaeological Unit, Cornwall Council (CAU).

The viewshed mapping was carried out by Krysia Truscoe.

The views and recommendations expressed in this report are those of CAU 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.

Cornwall Archaeological Unit, Cornwall Council is a Registered Organisation with the Institute for Archaeologists

Cover illustration

The view northeast towards Veryan Enclosure Fort

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Abbreviations

ADS	Archaeological Data Service
BGS	British Geological Survey
CAU	Cornwall Archaeological Unit
CC	Cornwall Council
DBA	Desk-based Assessment
DTM	Digital Terrain Model
EH	English Heritage
EIA	Environmental Impact Assessment
GIS	Geographical Information Systems
HBSMR	Historic Buildings Sites and Monuments Record
HER	Cornwall and the Isles of Scilly Historic Environment Record
HEPAO	Historic Environment Planning Advice Officer
IfA	Institute for Archaeologists
LB	Listed Building
LPA	Local Planning Authority
MoRPHE	Management of Research Projects in the Historic Environment
NGR	National Grid Reference
NMP	National Mapping Programme
NPPF	National Planning Policy Framework
NRHE	National Records for the Historic Environment
OASIS	Online Access to the Index of Archaeological Investigations
OD	Ordnance Datum
OS	Ordnance Survey
SAM	Scheduled Ancient Monument
WHS	World Heritage Site
WSI	Written Scheme of Investigation
ZTV	Zone of Theoretical Visibility

1 Summary

Cornwall Archaeological Unit, formerly Historic Environment Projects, Cornwall Council, was approached by Cornwall Council in September 2013 with a request to provide costs for an archaeological assessment of the potential impacts of construction of a wind turbine at Barwick Farm, Cuby as part of a proposed planning application by Cornwall Council (ref GCWEP).

The proposal is for a wind turbine with a hub height of 60m and a maximum blade tip height of 100m positioned on agricultural land at Barwick Farm, to the northeast of Tregony, in the parish of Cuby at SW 95290 45799 (NGR). The wind turbine is to be sited at a height of approximately 70m OD in a shallow valley. The area surrounding the site proposed for the turbine is recorded as Farmland, Medieval.

The assessment consisted of a desk-based assessment, viewshed analysis out to 10km and consideration of designated sites up to 15km from the proposed turbine location, together with a walkover survey.

Given the location chosen for the wind turbine, it was anticipated that there was some potential for negative impacts on the settings of a number of important Scheduled Monuments, Listed Buildings, Registered Parks and Gardens and Conservation Areas within a 15km radius. Visibility of the site at which the turbine is proposed is minimal from, and restricted by, the ridge-tops that characterise the area. The intervening valleys are often narrow and substantially vegetated, inhibiting views back to the proposed turbine site. The heritage assets are spread quite equally around the proposed turbine site, although at approximately 5-10km the coastline cuts across from southwest to northeast in the southeasterly sector. A small section in the northern part of the Charlestown World Heritage Site Area is potentially intervisible with the proposed turbine, though the distance from the site at Barwick limits the impacts. Cumulative impacts were also assessed as a result of the increasing number of existing and proposed turbines in the area.

Two designated sites are located within 1km of the proposed turbine site whilst there are sixteen undesignated sites that in general survive as documentary records only. Tregonan Farmhouse and its gate piers are Grade II Listed and are given a moderate impact rating due to their proximity to the turbine site. There are also significant numbers of Scheduled Monuments and Grade I, II* and II Listed Buildings, predominantly farmhouses, cottages and agricultural buildings relatively close to the proposed turbine site.

Overall the potential visual or setting impacts of the proposed wind turbine on the identified heritage assets are rated as minor.

A report summarising the results of the assessment and its conclusions was prepared for the client.

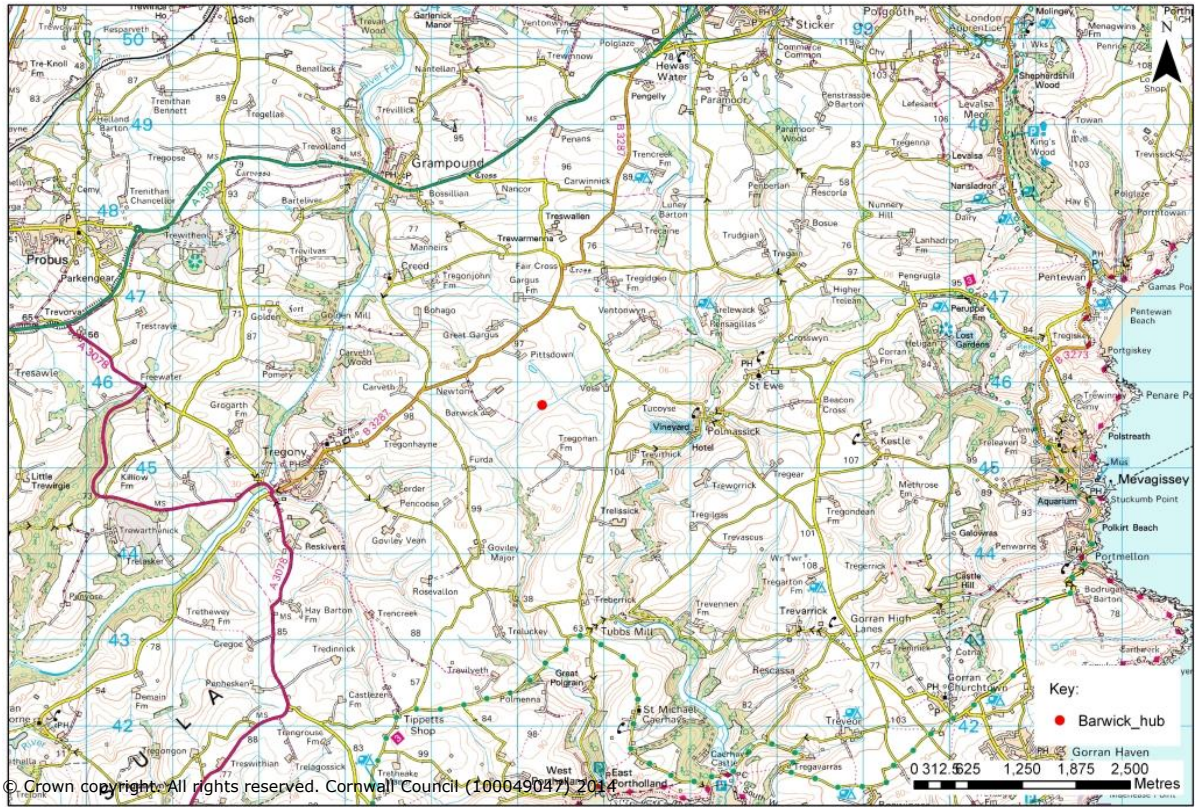

Figure 1: Location of the proposed wind turbine in south central Cornwall.

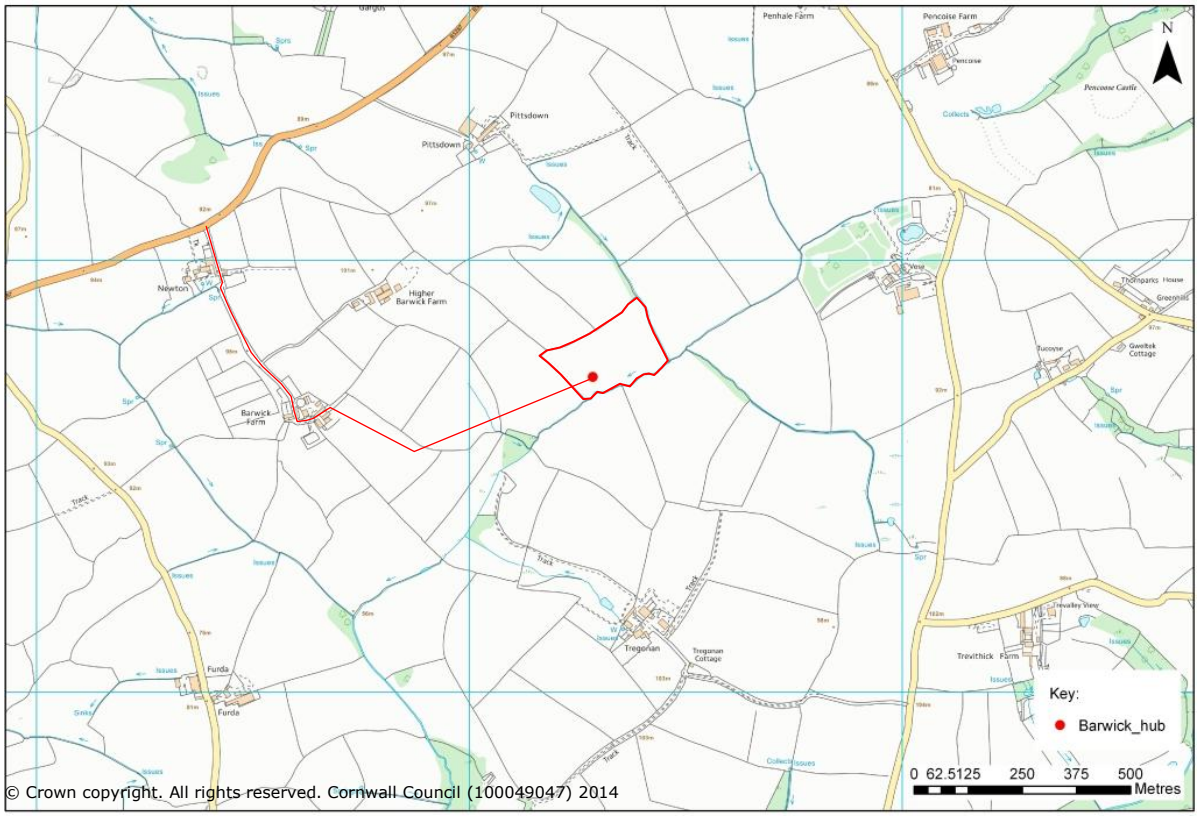

Figure 2: Location of the proposed wind turbine at Barwick Farm showing the field boundary and cable route.

2 Introduction

2.1 Project background

Cornwall Archaeological Unit, formerly Historic Environment Projects, Cornwall Council, were approached by Cornwall Council in September 2013 with a request to provide costs for an archaeological assessment of a proposed wind turbine planning application. The proposal is for a wind turbine with a hub height of 60m and a maximum blade tip height of 100m. This proposal is part of the Cornwall Council GCWEP project.

The site chosen for the wind turbine is currently semi-agricultural land at an elevation of approximately 70m OD to the west of a ridge-top at SW 95290 45799. The site lies in a shallow valley to the southeast of Barwick Farm buildings, in the parish of Cuby (Figure 1 andFigure ***2***). The area surrounding the site proposed for the turbine is recorded as Farmland, Medieval. This forms the agricultural heartlands with farming settlements documented before the 17th Century whose field patterns are morphologically distinct from the generally straight-sided fields formed in the later Enclosure Acts.

Pre-application screening for the turbine and associated infrastructure has determined that this application is considered an EIA Development within the meaning of the EIA Regulations.

A model brief prepared by the Historic Environment Planning Advice Team, Cornwall Council, was used to guide this archaeological assessment, in conjunction with the advice provided by English Heritage (2011). The brief states:

An assessment of the archaeological potential of the site and the potential impacts of the development on surrounding historic assets will be required to provide information in support of a planning application for the proposed development in accordance with the requirements of National Planning Policy Framework paragraph 128.

Cornwall Council Historic Environment Service believes high quality design should play a key role in minimising any adverse effects of renewable energy projects, whether this is directed at the disposition of wind turbines and energy crops in the landscape or the positioning of photo-voltaic cells on historic buildings or within the countryside. Fundamental to achieving high quality design will be a sound understanding of the character and importance of the historic asset involved, whether at the scale of individual buildings and sites or more extensive historic areas and landscapes.

Cornwall Council Historic Environment Planning Advice Officer's further advice dated late May 2013 states:

Our current guidance (agreed with EH & Planning) for large-sized (100 to 150m) turbines is:

- *All proposals will require an archaeological assessment. Those with HER sites within 500m will also require a geophysical survey.*
- *An assessment of the settings of designated heritage assets will be required when Scheduled Monuments, Listed Buildings, Conservation Areas, the World Heritage Site, Registered Battlefields or Registered Parks and Gardens lie within 15km (100m to tip) or 20km (150m to tip).*

The assessment consisted of a desk-based assessment, viewshed analysis out to 10km and consideration of designated sites out to 15km from the turbine location, a walkover survey of the location and site visits intended to determine setting impacts on designated sites within the surrounding landscape. The potential for cumulative impacts was considered. Given the location of the proposed wind turbine, the potential for negative impacts upon important heritage assets or their settings as a result of erecting the wind turbine was anticipated. Of those identified, the Listed Buildings at Tregonan and St Ewe, which are within 3km, and the four surrounding Registered Parks and Gardens within 5km were of particular interest because of their proximity to the

proposed wind turbine location and were thought likely to be subject to the greatest negative impacts (Figure 18 andFigure ***20***).

2.2 Aims

The principal aim of the study is to gain a better understanding of the archaeological impacts which would result from the construction of a wind turbine at Barwick Farm, Cuby.

The overall project aims were to:

- Establish viewsheds of the proposal site.
- Draw together existing historical and archaeological information about the site and its landscape setting from published and unpublished sources and information on designated and undesignated assets from national and local Historic Asset registers (such as the CSHER, NMR, Heritage Gateway, etc.).
- Review and analyse historic map evidence for the site.
- Consider any geotechnical or geophysical data for the site.
- Undertake a site 'walkover'.
- Produce 'statements of significance' for all designated historic assets, that are identified as potentially impacted on by the current proposals following the initial filtering of the ZTV. Where currently undesignated assets are identified their likely significance should be indicated i.e. 'national', 'regional' or 'local'.
- Inform whether archaeological recording of any extant remains is required.
- Inform whether an archaeological evaluation or further archaeological recording of any potential buried remains is required.
- Inform whether palaeoenvironmental sampling would be required.
- Identify the construction, use and 'end of life' impacts of the current proposals on designated heritage assets (as listed in the NPPF, but including the Outstanding Universal Value of the World Heritage Site) and on undesignated historic assets.
- Follow English Heritage Guidance 'The Setting of Heritage Assets' (2011) to produce assessments of the significance of setting of affected assets and the impacts of the proposals on those settings.

The principal project objective was to produce an illustrated report setting out the range of potential impacts of the proposal, the relative significances of the potentially affected sites and suggestions for suitable mitigation measures.

2.3 Methods

2.3.1 Desk–based assessment

As part of the desk-based assessment (DBA), historical databases and archives were consulted in order to obtain information about the history of the site and its surroundings, and the structures and features recorded within the site boundaries. The main sources consulted were as follows:

- Published sources available in the Cornwall and Scilly HER.
- Historic maps including
    - Norden's Map of Cornwall (printed in 1728 but mapped *circa* 1600)
    - Joel Gascoyne's map of Cornwall (1699)
    - Thomas Martyn's map of Cornwall (1748),
    - OS 1 inch survey (*circa* 1810)
    - Cuby Tithe Map (*circa* 1841),
    - 1st and 2nd Editions of the OS 25 inch maps (*circa* 1880 and *circa* 1907).
- Modern maps.
- National Mapping Programme transcripts from aerial photographs.

- Other aerial photographs in the Cornwall and Scilly HER.
- Historic Landscape Characterisation mapping.
- Cornwall and Scilly Historic Buildings, Sites and Monuments Record (HBSMR).
- Information held as GIS themes as part of the Cornwall and Scilly HER.

The historical and landscape context of the site was also considered during this stage of the assessment in order to establish the nature of the heritage assets which are located within the area surrounding the proposed wind turbine.

2.3.2 Viewshed Analysis

An assessment of the impacts of the proposals was made from the surrounding area using the guidelines and methodological approaches set out in English Heritage's recent consultation draft guidance on the setting of heritage assets. The methodology employs ArcGIS software and a Digital Terrain Model (DTM), which ignores potentially temporary surface features such as buildings, woodland, vegetation, etc. to provide a surface model of potential intervisibility between the proposed wind turbine and key heritage assets within the surrounding landscape. This 'bare earth' modelling provides a clear baseline from which to assess changes and impacts that could occur as a result of the proposed wind turbine. A viewshed or ZTV (Zone of Theoretical Visibility) was generated for an 'observer point' based on the location of the proposed wind turbine.

When performing viewshed analyses, several variables are used to limit or adjust the calculation including offset values, limitations on horizontal and vertical viewing angles (azimuth) and distance parameters (radius) for each observer point. For the proposed wind turbine at Barwick Farm, the viewshed was based on an 'overall observer elevation value' made up of the 'elevation value' or height above sea level of the ground at the observer viewpoint, with added to this additional offsets of 60m to represent the height of the turbine hub and 100m to represent that of the blade tips (Figure 13 andFigure ***14***).

This viewshed was checked on the ground, given that vegetation and other factors may substantially block views to and from key sites, whilst significant heritage assets within the theoretical viewsheds were visited (where access was possible) and the landscape within which they sit considered to determine likely intervisibility with the proposed development site, inclusion within key views, and the natures of their settings, both locally and at a distance. This informed the likely scales and types of any visual impacts which might affect their settings, as required by English Heritage (2011). Viewshed radii of 10km or 5km were used to determine potential impacts on designated heritage assets (as appropriate); a radius of 1km was used for undesignated heritage assets (**Error! Reference source not found.**).

Sites identified through intersection of the ZTV modelling with GIS layers containing designated and undesignated heritage assets produced data sub-sets which were further filtered according to their intersection with zones representing 1km, 5km and 10km from the site, as required by the HEPAO model brief and English Heritage guidance.

The site types within these data sets were then analysed to determine their likely sensitivity to impacts on settings. Those site types which have no setting (documented sites) were excluded from further analysis, as were those which by their nature have very localised settings (for example, milestones, wayside crosses and fingerposts) except where in very close proximity to the application site. The resultant site lists were further filtered by close examination of the ZTV data and a 2005 vertical aerial photograph GIS layer to remove from the lists those sites where mature vegetation or proximal buildings would almost certainly block intervisibility and where intrusion into key views would be unlikely. Designated sites with limited settings and those with local settings which were more than 2km from the application site tended to be excluded

from assessment at this stage unless specific reasons, such as wholly unimpeded intervisibility, were identified to justify their retention.

The resultant site list consisted of a mixture of designated assets having substantial intervisibility with the proposal site, Scheduled Monuments whose original settings were intended to include large areas of the surrounding landscape (for example, prominent hilltop barrows, hillforts, and rounds), or which were designed to function as parts of intervisible elements of larger groups with landscape settings (for instance barrow cemeteries), other high grade designated historic structures which were intended when built to be highly prominent within the landscape (predominantly church towers), and upstanding undesignated sites in close proximity to the development site. This filtered group of sites was assessed to determine impact.

2.3.3 Fieldwork

In order to check the validity of the Zone of Theoretical Visibility (ZTV) indicated by the viewshed analysis, and thus the potential setting impacts on key heritage assets within the ZTV, site visits were made to both the site proposed for the wind turbine, and to selected key locations within the surrounding landscape. A visual check and photographic record were made of intervisibility (or the lack of it) between the proposed development site and heritage assets indicated by the ZTV mapping as being likely to be within the viewshed and whose settings were assessed as vulnerable to impacts from the development where public access was available. Where this was not the case, the nearest possible vantage point was utilised, preferably one in which the proposed development site formed the backdrop to a view of the designated heritage site or was within the same view.

A walkover survey of the site proposed for the wind turbine and for its cabling was also undertaken to examine the site for upstanding archaeology and to record the nature of the boundary types which might be impacted upon during the development.

2.3.4 Geophysical Survey

Grid locations

A magnetometer survey was commissioned from Stratascan Ltd (part of the Sumo Group).

The location of the survey grids was plotted together with referencing information. Grids were set out using a Leica 705auto Total Station and referenced to suitable topographic features around the perimeter of the site or by using Leica Smart Rover RTK GPS, (Real-time Kinematic Global Positioning System) which can locate a point on the ground to a far greater accuracy than a standard GPS unit. A standard GPS suffers from errors created by satellite orbit errors, clock errors and atmospheric interference, resulting in an accuracy of 5m-10m. An RTK system uses a single base station receiver and a number of mobile units. The base station re-broadcasts the phase of the carrier it measured, and the mobile units compare their own phase measurements with those they received from the base station. A SmartNet RTK GPS uses Ordnance Survey's network of over 100 fixed base stations to give an accuracy of around 0.01m.

Survey equipment and gradiometer configuration

Although the changes in the magnetic field resulting from differing features in the soil are usually weak, changes as small as 0.2 nanoTeslas (nT) in an overall field strength of 48,000nT, can be accurately detected using an appropriate instrument.

The magnetic survey was carried out using a dual sensor Grad601-2 Magnetic Gradiometer manufactured by Bartington Instruments Ltd. The instrument consists of two fluxgates very accurately aligned to nullify the effects of the Earth's magnetic field. Readings relate to the difference in localised magnetic anomalies compared with the general magnetic background. The Grad601-2 consists of two high stability fluxgate gradiometers suspended on a single frame. Each gradiometer has a 1m separation

between the sensing elements so enhancing the response to weak anomalies. Readings were taken at 0.25m centres along traverses 1m apart. This equates to 3600 sampling points in a 30m x 30m grid. The Grad 601-2 has a typical depth of penetration of 0.5m to 1.0m, though strongly magnetic objects may be visible at greater depths. The collection of data at 0.25m centres provides an optimum methodology for the task balancing cost and time with resolution.

The readings are logged consecutively into the data logger which in turn is daily down-loaded into a portable computer whilst on site. At the end of each site survey, data is transferred to the office for processing and presentation.

2.3.5 Post-fieldwork

On completion of the project and following review with the HE Project Manager the results of the study were collated as an archive in accordance with: *Management of Research Projects in the Historic Environment (MoRPHE) English Heritage 2006*. The site archive will initially be stored at ReStore, with the eventual aim of deposition at Cornwall Record Office.

An archive report (this report) has been produced and supplied to the Client. This report will be lodged with the Cornwall and Scilly Historic Environment Record (HER) and made available for public consultation once a planning application for the site has been made. A copy of the report will be supplied to the National Record of the Historic Environment (NRHE) in Swindon, to the Courtney Library of the Royal Cornwall Museum and to the Cornish Studies Library. All digital records will be filed on the Cornwall Council network.

An English Heritage/ADS online access to the index of archaeological investigations (OASIS) record has been made covering this assessment project.

3 Location and setting

The site is located approximately 70m OD at SW 95290 45799 (NGR). It is approximately 12km east of Truro and 2.5km northeast of the village of Tregony (Figure 1). Topographically the site is on the south facing slope of a shallow valley surrounded by ridge-tops that form a truncated plateau (Figure 11). The site consists of a sub-rectangular field bounded by Cornish hedges on all four sides (Figure 22). These hedges were approximately 1m in height with vegetation including brambles, hawthorn, blackthorn and grasses extending up to 2m, together with sporadic trees, the majority being oaks 5-10m tall.

The topography defines the views to and from the site, with the greatest intervisibility being to and from the higher ground. Agricultural activities immediately surround the site, whilst pockets of designed landscapes populate the wider area. Barwick Farm occupies the higher ground close to the B3287 road, the turbine being proposed to be located to the east of the farm buildings.

From the proposed turbine location the views extend uphill to the ridge tops to the north and south. From ground level, views to the east are closed off by the rising land within the turbine field, however beyond the field boundary the view extends to the next ridge. Looking west, the views are most extensive along the valley bottom (Figure 23). Given the height of the wind turbine, this development is likely to be visible from a considerable distance away in the surrounding landscape (Figure 13Figure 15).

The bedrock geology in this location consists of sandstone and argillaceous rocks of the Portscatho Formation. This is a sedimentary bedrock formed approximately 375-392 million years ago in the Devonian Period in a deep sea environment. No superficial deposits are recorded (British Geological Survey website).

The Historic Landscape Characterisation of the turbine site is recorded as Farmland, Medieval (Anciently Enclosed Land). This HLC Type forms Cornwall's agricultural heartlands, and contains farming settlements documented before the 17th Century set

within morphologically distinct field patterns of Medieval or Prehistoric origins (Figure 10), and is likely to contain archaeological evidence for early settlements.

4 Project Extent

The archaeological assessment was focussed on those heritage assets (whether designated or not) which might be physically impacted upon by activities associated with the erection of the wind turbine, including cable trenching, siting of temporary compounds, cranes or other equipment and with any associated semi-permanent infrastructure.

The assessment also takes into account and quantifies impacts on the settings of heritage assets (both designated and undesignated) within the viewshed and selected radii of the proposed turbine sites in line with paragraph 129 of the 2012 National Planning Policy Framework (NPPF), sections 16(2) and 66(1) of the Planning (Listed Buildings and Conservations Areas) Act 1990 Chapter 9, and English Heritage guidance relating to the setting of historic assets (2011) and on wind energy and the historic environment (2005). These impacts were assessed out to the following distances:

- Non-designated heritage assets – 1km radius.
- Grade II Listed Buildings and Conservation Areas – 5km radius.
- World Heritage Sites – 10km
- Scheduled Monuments, Grade 1 and Grade II* Listed Buildings and Registered Parks and Gardens – 15km radius.

5 Designations

The table below cross-references the designated and undesignated assets with the radial distance of their locations from the study area (Figure 16). The distances used refer to the English Heritage guidance relating to the setting assessments of potentially impacted heritage assets. Where assets cross over between two distances, the closest distance to the study area has been used to account for that asset. The first number in each box refers to the total number of assets within that radius, the second refers to those which fall within the ZTV. For the 10-15km zone there was only a consideration of sites within it, not a full viewshed analysis, so the single number represents the total number of sites of each designation within the zone.

Designation	Within 1km/ viewshed	1-5km/ viewshed	5-10km/ viewshed	10-15km	Total/ viewshed
Undesignated Sites (Regional/ Local)	16/16	-	-	-	16/16
Conservation Areas (National)	-	2/2	-	-	2/2
Registered Parks and Gardens (National)	-	4/4	1/1	2	7/7
Grade II Listed Buildings (National)	3/3	220/54	-	-	223/57
Grade I & II* Listed Buildings (National)	-	20/10	30/8	69	119/18
Scheduled Monuments (National)	-	9/6	19/17	71	99/23
World Heritage Sites (International)	-	-	1/1	-	1/1

Table 1: Quantification of sites within 15km of the study area and those which fall within the viewsheds.

5.1 Rights of Way

No rights of way traverse the site proposed for the wind turbine, or the remainder of the area required for sub-surface cabling. This area is not registered as open access land under the CROW Act 2005.

6 Policies and guidance

The following section brings together policies and guidance (or extracts from these) used in the development of the assessment and its methodology.

6.1 National Planning Policy Framework 2012

The following paragraphs within the above document frame planning policy relating to the Historic Environment and are germane to this assessment:

128. *In determining applications, local planning authorities should require an applicant to describe the significance of any heritage assets affected, including any contribution made by their setting. The level of detail should be proportionate to the assets' importance and no more than is sufficient to understand the potential impact of the proposal on their significance. As a minimum the relevant historic environment record should have been consulted and the heritage assets assessed using appropriate expertise where necessary. Where a site on which development is proposed includes or has the potential to include heritage assets with archaeological interest, local planning authorities should require developers to submit an appropriate desk-based assessment and, where necessary, a field evaluation.*

129*. Local planning authorities should identify and assess the particular significance of any heritage asset that may be affected by a proposal (including by development affecting the setting of a heritage asset) taking account of the available evidence and any necessary expertise. They should take this assessment into account when considering the impact of a proposal on a heritage asset, to avoid or minimise conflict between the heritage asset's conservation and any aspect of the proposal.*

132*. When considering the impact of a proposed development on the significance of a designated heritage asset, great weight should be given to the asset's conservation. The more important the asset, the greater the weight should be. Significance can be harmed or lost through alteration or destruction of the heritage asset or development within its setting. As heritage assets are irreplaceable, any harm or loss should require clear and convincing justification. Substantial harm to or loss of a grade II listed building, park or garden should be exceptional. Substantial harm to or loss of designated heritage assets of the highest significance, notably scheduled monuments, protected wreck sites, battlefields, grade I and II* listed buildings, grade I and II* registered parks and gardens, and World Heritage Sites, should be wholly exceptional.*

133*. Where a proposed development will lead to substantial harm to or total loss of significance of a designated heritage asset, local planning authorities should refuse consent, unless it can be demonstrated that the substantial harm or loss is necessary to achieve substantial public benefits that outweigh that harm or loss, or all of the following apply:*

- *the nature of the heritage asset prevents all reasonable uses of the site; and*
- *no viable use of the heritage asset itself can be found in the medium term through appropriate marketing that will enable its conservation; and*
- *conservation by grant-funding or some form of charitable or public ownership is demonstrably not possible; and*
- *the harm or loss is outweighed by the benefit of bringing the site back into use.*

134*. Where a development proposal will lead to less than substantial harm to the significance of a designated heritage asset, this harm should be weighed against the public benefits of the proposal, including securing its optimum viable use.*

***135**. The effect of an application on the significance of a non-designated heritage asset should be taken into account in determining the application. In weighing applications that affect directly or indirectly non designated heritage assets, a balanced judgement will be required having regard to the scale of any harm or loss and the significance of the heritage asset.*

***139**. Non-designated heritage assets of archaeological interest that are demonstrably of equivalent significance to scheduled monuments, should be considered subject to the policies for designated heritage assets.*

6.2 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.

7 Results of desk-based assessment

The prehistoric remains in this area are concentrated into a series of hilltop enclosures rather than of a scattering of findspots or a clustering of smaller monuments such as barrows as typified by other areas in Cornwall. There are some barrows in elevated locations such those at Carnwinnick (1020751), Bodrugan (1004470) and on the Dodman (1020865). These hilltop sites are variously described as 'camps,' 'enclosures,' 'hillforts' or 'cliff castles', and there are additional probable enclosures recorded by NMP mapping around the proposed turbine site (Figure 12). All are located on hill crests, the majority taking advantage of positions overlooking the multiple river and stream valleys throughout this area. Castle Hill is one of the most typical of these, sited at a confluence of three valleys and overlooking a small cove, it also commands good views inland. Resugga (1017685), Carvossa (1016890) and Golden Camp (1016889) all overlook, from west to east, the upper reaches of the Fal River, thought in the past to be navigable as far as Grampound (Figure 27 andFigure ***30***). Dodman Point (1020865) is the most impressive of the sites of this type within this area. At 34ha it dwarfs the other promontory fort of Black Head close by to the northeast. Apart from its large ramparts that utilise and modify the naturally precipitous cliffs, it has a long history of use physically represented by Bronze Age barrows, an Iron Age enclosure and occupation and Medieval field systems. There are also two phases of signal stations, the surviving hut dated to 1794, and a large granite cross erected as a navigational aid.

The Medieval field system on the Dodman is indicative of the characteristic agricultural features still surviving within the wider landscape. Many local place-names have a Medieval origin. The earliest record of Barwick is not clear however the prefix 'bar' means top or summit in Cornish whilst the suffix 'wick' probably derives from an Old English word 'wíc' meaning settlement. This therefore lends a Medieval or earlier origin for the name that directly refers to the geographic location of the settlement. Similarly the Domesday Book reveals no direct evidence. The closest recorded Domesday manor is Tucoyse, around 1km to the east, which was held by Richard and valued at 20s.

Barwick is not depicted on Norden's 17th century map or Gascoyne's 1699 map but it is shown on the more detailed Martyn's Map of 1748 and is referred to on the 1807 OS map (Figure 3 toFigure ***6***). On the Cuby Parish Tithe Map of 1841 (Figure 7), and the adjacent St Ewe Tithe Map of 1839, the field patterns can be seen to have changed little in the immediate area. Many of the fields are quite large and rectangular and may be a product of the Enclosure Acts that were enacted from the 17th century onwards. Unfortunately the Tithe Apportionment, dating to 1841, is in poor condition which made it difficult to read all of the relevant details. Barwick was listed as being owned by the Earl of Falmouth and leased to the occupier Thomas Harris. The Ordnance Survey Maps of 1875 and 1908 indicate few changes were made to the landscape during the late 19th and early 20th centuries (Figure 8 andFigure ***9***). Only a few field boundaries close to the turbine site are shown to have been removed since the making of the Tithe Map,

probably a continuation of the enclosure process creating larger fields suitable for modern farming methods. Between the making of the 1908 OS map and modern OS mapping, a field boundary has been added to the west of the turbine site and a further field boundary has been removed to its south. More extensive changes have been made around Vose and Pencoise almost 1km to the east where formerly small fields have been opened out into significantly larger enclosures by the removal of a considerable number of boundaries.

The Post Medieval period in Cornwall and elsewhere saw the development of large estates with country houses, designed landscapes and significant collections of plants. Heligan (1000538), Caerhays (1000448), Trewarthenick and Trewithen almost equidistantly surround Barwick (Figure 19). Heligan was part of the Arundell estate during the 12th Century and was sold to Sampson Tremayne in the late 16th Century. The house was developed from the 17th Century, with the garden undergoing several remodelling phases in the 17th-18th Centuries. In the 19th Century there was extensive planting of exotic species including rhododendrons and bamboo. These gardens have now been restored after they became derelict following World War II.

Caerhays (1000448) was also part of the Early Medieval estate of the Arundell family, passing by marriage into the Trevanion family c1379. Improvements to the house and garden were made in 1703 and successively throughout the 18th and 19th centuries with input from John Nash and possibly Humphry Repton. The estate was sold to the Williams family in 1853 and c1885 John Charles Williams began the woodland garden that features the camellias and rhododendrons that Caerhays is now noted for.

Trewarthenick was purchased by John Gregor, a wealthy Truro merchant, in 1640. His grandson John 'the giant' Gregor built a new house, almost certainly on the site of an existing one by 1680 in the latest Palladian style. In the late 18th century Francis Gregor invited Humphry Repton to draw up proposals for improvements to the house and landscape, many of which were undertaken. Henry Harrison was then invited to further improve the grounds and house in particular in the early 1800s by Sarah Gregor. Further changes were made in the early 20th century, according to the fashions of the day, by Paul Welman, though the estate was largely broken up following his death and the house was converted into flats in the 1960s.

Trewithen was purchased in 1715 by Philip Hawkins of Pennans. Philip made improvements to the existing house and grounds including planting the pleasure grounds and park. In 1766 Sir Christopher Hawkins inherited the estate and extended the property, commissioning the picturesque circuit ride. During World War I the government requisitioned timber from the park, the clearance of which provided space for the establishment of a woodland garden with collections of rhododendrons and camellias. Many of these plants were derived from the nearby gardens at Caerhays and Trengwainton.

The wider landscape to the north has been significantly altered by china clay extraction, an industry which continues to significantly alter the appearance this part of the landscape. The resultant pits and spoil dumps are clearly visible and the ports and coastal villages around St Austell Bay have many related industrial features. Charlestown, a component of the Cornish Mining World Heritage Site, is the prime example (Figure 20 andFigure ***31***). In the modern period few changes have been made to the immediate surroundings of Barwick; the small farming settlements and fields remain, many structures being protected by Listed Building status; the estates remain largely intact and maritime activities are still pursued from the coastal settlements.

8 Results of viewshed analysis

Given the topography of the site, its surroundings and the height of the turbine, the viewshed analysis suggests that it is likely to be visible over a fairly large proportion of the surrounding countryside. In line with the requirements of English Heritage guidance, a Zone of Theoretical Visibility has been mapped to a distance of 10km from the proposed site, though the ZTV mapping was extended out to 15km in view of the

height of the proposed wind turbine. The visibility of the turbine will diminish with distance, and will at many local sites, be blocked by the local terrain, by intervening buildings within settlements or farmsteads, or by high hedgerows and mature groups of trees. However the blocking effects of vegetation, particularly deciduous trees, changes seasonally and trees may be subject to cutting back or complete removal which could significantly change the degree of intervisibility between a historic asset and the proposed turbine site, potentially affecting the degree of setting impact which might occur.

8.1 1km radius ZTV

See Figure 15 andFigure ***17***

The ZTV suggests that the turbine mast or blades could potentially be visible from almost the entire zone, with the exception of a few steep slopes facing away from the site to the north and south. The zone includes two related Grade II Listed Buildings at Tregonan, however it does not include any Scheduled Monuments, Grade I or II* Listed Buildings or Registered Parks and Gardens.

8.2 1km to 5km radius ZTV

See Figure 15 toFigure ***19***

Parts of the wind turbine could potentially be visible from most of the ridge-tops that encircle the proposed site within the 1-5km radius area. The area extends northeast to the village of Polgooth, south to Portholland and the coastline, and west to Trewarthenick. It is characterised by a series of steep-sided valleys and broader ridge-tops which influence the theoretical intervisibility.

The wind turbine will not be intervisible with some sites, including some properties in the Conservation Areas of Tregony and Grampound due to the topography (Figure 24). Similarly the Grade I Listed Church of St Creda and manor houses including Grade I Listed Pennans and Grade II* Listed Garlenick will not be intervisible due to their locations in valleys or on slopes facing away from the proposed turbine site. There will be greater potential intervisibility with the proposed site from features on ridge tops, in particular the prehistoric camps at Sticker and Castle Hill (Figure 30).

This zone contains a number of potentially intervisible Scheduled Monuments and Listed Buildings. Notably, there will be partial intervisibility with the Registered Parks and Gardens of Trewithen, Trewarthenick, Heligan and Caerhays Castle (Figure 25,Figure ***26***,Figure ***28*** andFigure ***30***).

8.3 5km to 10km radius ZTV

See Figure 15,Figure ***16***, andFigure ***20***

The wind turbine would potentially be visible from approximately 40% of the 5km to 10km radius area around it, visibility again being significantly constrained by the local topography of ridges and valleys. Equally significantly, approximately 20% of this zone is located over the sea, specifically St Austell, Mevagissey and Veryan Bays. Whilst the sea does not feature any historic assets, the maritime activities and seaward approaches are significant to the landscape setting and history of the area. They are likely to have a high degree of intervisibility with the proposed site.

Within the ZTV for this radius are a number of notable sites including the Scheduled Monuments of Resugga, St Stephens Beacon and the promontory forts at Black Head and Dodman Point (Figure 27). All will be potentially intervisible to some extent with the proposed turbine site.

8.4 10km to 15km radius ZTV

See Figure 16 andFigure ***21***

This radius extends to Indian Queens in the north, Menabilly in the east, and Truro to the west. The southern extent is approximately 10km out to sea from the coastline. The visibility of the proposed wind turbine site within this zone is likely to be low, probably confined to ridge-tops, and will be moderated by the relatively considerable distance of heritage assets from the proposed wind turbine site. The zone does contain a number of Grade I and II* Listed Buildings, three Registered Parks and Gardens and clusters of Scheduled Monuments.

8.5 Scheduled Monuments within the 10km ZTV

There are 23 Scheduled Monuments within 10km of the proposed wind turbine site falling within the ZTV, as follows:

Note – some of these sites have multiple entries in the Schedule of Monuments.

Reference	**Site Name**
1019746	Veryan Castle multiple enclosure fort and annexe 500m south west of Churchtown Farm
1010843	Fair Cross, 420m west-northwest of Tregidgeo Farm
1006647	Corran Cross 350yds (320m) east of Lanuah
1016889	Golden Camp hillfort
1019064	Three bowl barrows 670m and 775m northwest of Homer Downs
1007952	Medieval wayside cross base 550m west-northwest of Lanhadron Farm
1011994	Sticker Camp later prehistoric Roman round
1003269	Longstone at Mount Charles
1007291	Round southwest of St Stephen's Beacon
1016890	Prehistoric and Roman settlement at Carvossa
1004391	Black Head promontory fort
1004470	Round barrow 950yds (870m) SE of Bodrugan
1003091	St Stephen's Beacon hillfort
1020865	Later prehistoric cliff castle, two prehistoric round barrows, Medieval field system and associated remains on Dodman Point
1020104	Standing cross 200m south of Trelowthas
1004256	Camp 200yds (180m) N of Castle Hill
1003101	Tregargus stone grinding mill No 2
1010849	Medieval cross base at St Ewe
1020752	Round 330m southeast of Penhale
1020750	Four round barrows 480m north of Besowsa
1017685	Resugga Castle later prehistoric univallate hillfort
1019743	Castlezens multiple enclosure fort
1020751	Round barrow 530m northwest of Carnwinnick

Table 2: Scheduled Monuments within the 10km radius.

Some of these potentially intervisible Scheduled Monuments consist of structures such as wayside crosses, churchyard crosses and cross bases whose settings are inherently very local. The majority are not close to the site proposed for the wind turbine and in

line with English Heritage guidance, no assessment of impacts on their settings therefore needs to be made. No Scheduled Monuments are within a kilometre of the proposed turbine site

Hillforts, barrows, standing stones and stone circles, in contrast, were intended, when constructed, to have far-ranging settings. Many of the Scheduled Monuments within the 10km viewshed consist of monuments of these types, and assessments of impacts on the settings of a number of these were judged to be required where they lay relatively close to the site proposed for the wind turbine, where substantial intervisibility was likely, where they were judged to have sensitive settings, or where impacts on or intrusion into key views of the sites appeared likely to occur.

8.6 Registered Parks and Gardens within the 15km ZTV

Reference	Site Name	Grade
1000658	Trewarthenick	II
1000538	Heligan	II
1000545	Tregrehan	II*
1000510	Trewithen	II*
1000655	Tregothnan	II*
1000448	Caerhays Castle	II*
1000656	Trelissick	II*

Table 3: Registered Parks and Gardens within the 15km radius.

The Grade II Registered Parks and Gardens at Heligan and Trewarthenick and the Grade II* Gardens at Caerhays Castle and Trewithen are within 5km of the proposed turbine site (Figure 19). All are positioned within or incorporate valleys, and as such the potential intervisibility with the turbine will be sporadic across the protected areas. Tregrehan, Trelissick (Figure 20) and Tregothnan are more than 10km away and both intervisibility and visual impacts are likely to be minimal. The density of vegetation recorded within all of the parks reduces the likelihood of intervisibility, however all are designed landscapes within a natural or agricultural context.

8.7 Areas of the Cornish Mining World Heritage Site within the 10km radius ZTV

The north-western edge of the Charlestown Area of the Cornish Mining World Heritage Site is intersected by the 10km radius ZTV (Figure 20). The majority of the area, along with its associated leat lies within a valley and is unlikely to be intervisible with the turbine site at all, significantly reducing the likelihood or severity of any potential impacts.

8.8 Grade I and II* Listed Buildings within the 15km radius

There are 119 Grade I or II* Listed Buildings within 15km of the proposed wind turbine site, 18 of these falling within the ZTV.

Reference	Site Name	Grade
1137082	Church of All Saints	I
1328913	Pavilion approximately 15m northwest of Trewithen House	I
1141100	Trewithen House	I
1327073	Church of St Michael	I

1160827	Pavilion approximately 15m northeast of Trewithen House	I
1138159	Higher Lodge	I
1219187	Crugsillick	II*
1141132	Golden Manor	II*
1310504	Barn with gate piers and adjoining building approximately 50m east of Golden Manor House	II*
1141079	Barn and two adjoining engine houses approximately 10m north of Trewithen Farmhouse	II*
1212080	Long Stone	II*
1141133	The Keep approximately 50m east of Golden Manor	II*
1136796	Levalsa Farmhouse	II*
1291361	The left round house and adjoining wall to west side	II*
1291400	The east round house	II*
1218978	Penkivel Farmhouse	II*
1291360	The right round house	II*
1219588	Chyrond	II*

Table 4: Grade I and II Listed Buildings within the 15km radius.*

The Listed Buildings within St Ewe and Tregony are the closest of these at only 3km from the proposed site (Figure 19). Golden Manor, Trewithen House and Caerhays Castle are within 5km; the remaining heritage assets are all outside the 5km radius zone around the proposed turbine site (Figure 20). The churches, in particular, are potentially significant landmarks in addition to their inherent historical importance; however many of the sites listed above, such as the barns and pavilions are more locally important and have much more limited landscape settings.

8.9 Grade II Listed Buildings within the 5km radius ZTV

Within the 5km zone there are 223 Grade II Listed Buildings. Of these, 57 are within the ZTV:

Reference	**Site Name**	**Grade**
1141094	Tregellas Farmhouse	II
1144802	Signpost at SW 982 461	II
1144791	Bosue Farmhouse	II
1160506	Benallack Farmhouse and garden walls with iron gate	II
1252449	Entrance gate with piers approximately 500m northwest of Trewithen House	II
1160802	Trevilvas Farmhouse with garden wall, iron railings and gate to south	II
1160837	Kitchen garden walls adjoining the service wing to west of Trewithen House	II
1328893	Golden Mill House	II
1137990	Caerhays Barton Farmhouse	II

1160650	Wall approximately 30m to southeast of Golden Manor	II
1328891	Ice house, wall and ash house 20m north of Golden Manor	II
1136891	Barn about 50m west of Luney Barton Farmhouse	II
1141130	Bart-Liver Farmhouse, garden walls, iron railings and gate to south	II
1160839	Gate with piers approximately 100m northeast of Trewithen House	II
1327055	Upper Crosswyn Cottage	II
1144031	Guidestone at SW 957 473	II
1327077	Outbuilding about 10m southeast of The Crown Inn	II
1312541	Pair of gate piers about 100m southeast of Tregonan Farmhouse	II
1327076	Cross	II
1328892	Wall, approximately 5m northwest of Golden Manor	II
1144768	Johns Monument in the churchyard about 4m northwest of the tower of the Church of All Saints	II
1144803	Tregonan Farmhouse	II
1136914	Signpost at SW 961 461	II
1219106	Congregational Church and boundary wall	II
1144028	Cross shaft at SW 955 473	II
1244089	Unidentified monument in the churchyard about 6m northwest of the north transept of the Church of St Michael	II
1160614	Mounting block and adjoining walling approximately 30m north of Golden Manor	II
1141104	Pavilions and implement shed with garden walls adjoining Trewithen Home Farmhouse	II
1328920	Fore Street Tregony	II
1141081	Carbeth Farmhouse and outbuildings around courtyard to the northeast	II
1144030	Guidestone at SW 954 473	II
1144794	Guidestone at SW 984 471	II
1320577	K6 Telephone kiosk (Tregony 656)	II
1144769	Price Monument in the churchyard about 12m south of the south aisle of the Church of All Saints	II
1144771	1 and 2 St Ewe	II
1396123	A3078 Milestone approximately 382m northwest of Trelagossick Cottage	II
1144801	Stable about 20m south of Luney Barton Farmhouse	II
1137040	Eastern Cottage and Western Cottage	II
1327443	Creed House	II

1144767	Unidentified monument in the churchyard about 12m north of the nave of the Church of All Saints	II
1141040	Tredinnick Farmhouse adjoining walls to north and west and mounting block	II
1144806	Pengrugla	II
1144804	Trelewack Farmhouse	II
1144770	Lychgate at the north entrance to the churchyard of the Church of All Saints	II
1137017	Trelewack Cottage	II
1136621	The Thatched Cottage	II
1141102	Gate with piers approximately 110m northeast of Trewithen House	II
1144034	Tregonjohn Farmhouse	II
1396162	A390 Milestone approximately 186m south of Telephone Exchange	II
1137241	Churchtown Farmhouse	II
1144027	Stable/coach-house about 30m north of Creed House	II
1327052	Rose Cottage	II
1312473	Harris monument in the churchyard about 9m north of the nave of the Church of All Saints	II
1138253	Unidentified monument in the churchyard about 6m north of the north transept of the Church of St Michael	II
1144774	Pair of attached houses about 50m southwest of The Crown Inn	II
1327050	Lodge with attached walls and piers at the northwest entrance to Heligan House	II
1144772	Nantuat	II

Table 5: Grade II Listed Buildings within the 5km radius.

Impacts on the settings of all of these feature types are very unlikely unless they are in very close proximity to the proposed wind turbine. The list includes structures such as guideposts, milestones, gate piers, churchyard features, headstones or chest tombs and crosses, all of which have very localised settings. Others such as houses, farmhouses, ice houses and manors have originally been intended to have rather more extensive settings; however these are still likely to be limited in extent. Few if any of these structures are likely to have been constructed with the aim of being dominant in the landscape, with the intention to be viewed from a distance, or with designed vistas. On the other hand, several of the assets were probably designed to be 'ornaments' to the adjacent area, often to be viewed from an adjacent approach.

8.10 Conservation Areas within the 5km radius ZTV

Both of the Conservation Areas within 5km of the proposed turbine site are partially within the Zone of Theoretical Visibility (Figure 18). The western edge of the Grampound Conservation Area and the southern and southwestern extents of the Tregony Conservation Area alone fall within the ZTV. This could expose them to some visual and setting impacts from the wind turbine.

Both Grampound and Tregony are slightly larger nucleated settlements compared to others in the vicinity and are therefore quite visible within the landscape. Views of Grampound and Tregony from outside their boundaries are likely to include the proposed wind turbine. In particular views of Grampound from the high ground to the north including from the public rights of way near Benallack, from points along the road between Grampound Road and the A390 when travelling in a southerly direction and from the pathway from Carvossa to Grampound may incorporate the proposed turbine. Surrounding Tregony, views from the high ground along the River Fal, along the boundaries of Trewarthenick Park, Grogarth Farm and the pathways around Tregony and Golden may include the turbine. Views from public rights of way including the Conservation Areas and the proposed turbine may be especially significant because they are publicly accessible and the viewpoint is from that of a walker who is likely to have the time and intention to appreciate the various aspects of the scenery. This is compared to the viewpoint from drivers on the roads highlighted above where their experience of the landscape is likely to be rapidly changing and not very focussed on specific elements. Whilst both types of viewer may experience a negative impact as a result of the proposed turbine the impact to the walker is enhanced by the extended length of time that they may experience that negative impact.

8.11 Undesignated assets within the 1km radius ZTV

The ZTV mapping suggests that the majority of the landscape within a 1km radius of the site will be intervisible with all or part of the proposed wind turbine (Figure 17). Within this zone, the Cornwall and Scilly Historic Environment Record (HER) records 16 potentially intervisible sites:

Reference	**Site Name**	**Period**
MCO10584	TREGONAN - Post Medieval dovecote	Post Medieval
MCO20546	BARWICK - Medieval field system, Post Medieval field system	Medieval
MCO8639	TREGONIAN - Prehistoric enclosure, Iron Age round, Romano British round	Prehistoric
MCO13331	BARWICK - Medieval settlement	Medieval
MCO10277	TREGONAN - Medieval chapel	Medieval
MCO15924	NEWTON - Medieval settlement	Medieval
MCO11415	TREGONAN - Early Medieval settlement, Medieval settlement	Early Medieval
MCO20941	FURDA - Iron Age field system, Romano British field system	Prehistoric
MCO20545	BARWICK - Prehistoric field system, Medieval field system	Prehistoric
MCO18228	VOSE - Early Medieval settlement, Medieval settlement	Early Medieval
MCO21570	FURDA - Iron Age enclosure, Romano British enclosure	Prehistoric
MCO3645	TREGONAN COTTAGE - Bronze Age barrow	Prehistoric
MCO49364	VOSE - Post Medieval signpost	Post Medieval
MCO9475	TREGONAN - Medieval farmhouse, Post Medieval farmhouse	Medieval
MCO8365	PITTS DOWN - Iron Age round, Romano British round	Prehistoric

MCO54669	TREVITHICK - C20 signpost	Modern

Table 6: Undesignated assets within the 1km radius.

The severity of impacts on undesignated assets will depend on the degree of their survival, the type of monument and the nature of its setting. Many are undesignated because they are no longer upstanding and have only documented records which have no setting. Others such as signposts have very immediate settings and dovecotes or chapels have specific settlement-related settings, likely to be less sensitive to the visual impacts implied by the ZTV.

9 Results of site walkover

A site walkover was undertaken on 21st March 2014. The weather was generally sunny with showers and cloudy periods. The proposed turbine field is located on a south facing slope in a shallow valley and is approximately rectangular. The field is gently sloping to the south with a series of small flatter areas, eventually flattening out along the southern boundary close to the stream that runs along the valley bottom (Figure 22). Currently it is grass pasture. No upstanding archaeological features were visible within the site. The field boundaries are low, approximately one metre high, Cornish hedges topped with a further metre of vegetation including hawthorn, blackthorn and brambles. The views to the east were quite restricted by the topography of the field but from ground level beyond the boundary they extended to the next ridge top. To the north and south the views were up the valley sides to the top of the ridges only. Views to the west were the most extensive along the valley bottom (Figure 23). No turbines are currently visible from the site.

10 Field verification of ZTV

Sites of archaeological significance identified using ZTV analysis and within the 15km radius from the proposed site are located in the fieldwork table (Table 10), and were numbered from 1-21 working from those sites closest to the turbine site outwards in an approximately clockwise order.

The significance of each site is graded as follows:

WHS- World Heritage Site
S Scheduled Monument
L Listed Building
A Site of National Importance
B Site of Regional Importance
C Site of Local Importance
D Natural Feature or non-antiquity

The condition of each site was assessed where possible during the walkover survey and is graded from 1-4:

1 No surviving remains evident above ground
2 Poor preservation
3 Fair preservation
4 Good preservation

The sites have been given one of five Overall Impact grades; from Very Large which approximates to damage and loss of the site's integrity and which represents a key factor in the decision-making process, to neutral which equates to no perceptible effects. The full scale is:

Impact Category	**Typical Descriptors of Effect**
Very Large	Only adverse effects are normally assigned this level of significance. They represent key factors in the decision-making process. These effects are generally, but not exclusively, associated with sites or features of international, national or

	regional importance that are likely to suffer a most damaging impact and loss of resource integrity. However, a major change in a site or feature of local importance may also enter this category.
Large	These beneficial or adverse effects are considered to be very important considerations and are likely to be material in the decision-making process.
Moderate	These beneficial or adverse effects may be important, but are not likely to be key decision-making factors. The cumulative effects of such factors may influence decision-making if they lead to an increase in the overall adverse effect on a particular resource or receptor.
Slight	These beneficial or adverse effects may be raised as local factors. They are unlikely to be critical in the decision-making process, but may be important in influencing the subsequent design of the project.
Neutral	No effects or those that are beneath levels of perception, within normal bounds of variation or within the margin of forecasting error.

Table 7: Overall Impact descriptors

In addition to the above descriptors the Overall Impact is determined using the combined result of the Sensitivity rating and the Magnitude of Impact rating (DMRB Vol.11; 2/1-5).

The Sensitivity ratings are:

Sensitivity Rating	**Typical Descriptors**
Very High	Very high importance and rarity, international scale and very limited potential for substitution.
High	High importance and rarity, national scale and limited potential for substitution.
Medium	High or medium importance and rarity, regional scale, limited potential for substitution.
Low	Low or medium importance and rarity, local scale.
Negligible	Very low importance and rarity, local scale.

Table 8: Sensitivity Rating descriptors

The Magnitude of Impact ratings are:

Magnitude of Impact rating	**Typical Descriptors**
Major	Loss of resource and/or quality and integrity of resource; severe damage to key characteristics, features or elements.
Moderate	Loss of resource, but not adversely affecting the integrity; partial loss of/damage to key characteristics, features or elements.
Minor	Some measurable change in attributes, quality or vulnerability; minor loss of, or alteration to, one (maybe more) key characteristics, features or elements.
Negligible	Very minor loss or detrimental alteration to one or more characteristics, features or elements.
No Change	No loss or alteration of characteristics, features or elements; no observable impact in either direction.

Table 9: Magnitude of Impact Rating descriptors

The viewshed mapping and potential impacts were, where possible (given constraints on public access and the general topography of the area), ground checked from a number of locations. The fieldwork results and impact assessment are detailed in the table below.

10.1 Fieldwork results and impact assessment

No	Site Name & Reference	Grid Ref. SW/SX	Description	Probable Date	Significance	Condition	Sensitivity	Magnitude of Impact	Overall Impact
1	Barwick Field Systems MCO20546 / MCO20545	SW 95000 46120 / 94990 45320	The extant prehistoric to post medieval field systems were not easily discernible from ground level at or close to the turbine site. However walking through the fields it was clear that many are irregular in shape. The fields will all be highly intervisible with the turbine. The field systems are set within a wider historic agricultural landscape context.	Prehistoric - post medieval	C	3	Low	Minor	Minor
2	Tregony Conservation Area DCO40 Figure 24	SW 92534 44873	The Tregony Conservation Area also includes many listed buildings. The village has a well preserved historic character, though is a busy modern village with a quite well-used road through its centre. The majority of the buildings face in towards this central street. There is no intervisibility with the turbine site from the centre of the village, however from the rear of these properties views of the turbine may be possible. Much of the outskirts of the village appear to be screened by mature deciduous trees, though this is not a substantial block in winter months. The village is set within an agricultural landscape.	Medieval - modern	A	3	Medium	Negligible	Minor
3	Caerhays Castle 1000448 / 1327073 Figure 25	SW 97160 41109	The grounds of Caerhays are a Registered Park and Garden whilst St Michael's Church and Higher Lodge are high grade Listed Buildings. The main aspect of the Castle is out to sea over	Medieval or Post Medieval	A Grade II* L Grade I	4	High	Minor	Minor

No	Site Name & Reference	Grid Ref. SW/SX	Description	Probable Date	Significance	Condition	Sensitivity	Magnitude of Impact	Overall Impact
			the lawns in front of it, however the majority of the garden and protected landscape extends north behind the house. This designed landscape is set within a wider agricultural environment with roads cut into the bedrock or surrounded by woodland, controlling views of the estate. Although the Church is small, it is in a prominent hilltop location and, significantly, is intervisible with Gorran church tower. The Park and Listed Buildings are on high ground with generally good views inland. Due to the 2m high hedges on parts of the western boundary, intervisibility from ground level was severely restricted. However from areas where the hedges are low or absent intervisibility with the turbine site is likely to be possible, though at a fair distance and the undulating topography will probably obscure much of the turbine or allow for intermittent views only. There is very little intervening screening. At least two small existing turbines are visible within these views.						
4	Tregonan Cottage Barrow MCO3645	SW 95870 44930	A Bronze Age barrow surviving as a low earthen mound though not visible behind a hedgerow greater than 2m in height. It is located on high ground and is likely to experience good intervisibility with the turbine dependant on the extent of any	Bronze Age	C	2	Low	Minor	Minor

No	Site Name & Reference	Grid Ref. SW/SX	Description	Probable Date	Significance	Condition	Sensitivity	Magnitude of Impact	Overall Impact
			intervening screening. The barrow is set in an upland agricultural landscape.						
5	Tregonan Farmhouse 1144803	SW 95387 45133	A 17th-18th century farmhouse with 19th century alterations. It is located on high ground on a north facing slope in a slight valley almost overlooking the turbine field. It is very likely to have good views of at least the upper parts of the turbine unless any intervening screening from the associated farm buildings, hedges and trees is particularly substantial. The farmhouse is in quite an isolated location and set within a very agricultural upland landscape.	Post medieval	L Grade II	3	High	Minor	Moderate
6	Church of All Saints, St Ewe village 1137082	SW 97791 46044	The village includes the Grade I Listed Church of All Saints, the Grade II Crown Inn, the undesignated Schoolmaster's House and adjacent School and multiple Grade II Listed houses. The village is located in a slight hollow facing in towards the church. The small Church spire is not a significant landmark. The village is set in a rural environment and retains its historic character with few overtly modern intrusions. The proposed turbine is unlikely to be visible from much of the village. However the western extent of the village has more open views towards the site with screening provided only by garden hedges.	Medieval or Post Medieval	L Grades I and II	4	High	Minor	Minor

No	Site Name & Reference	Grid Ref. SW/SX	Description	Probable Date	Significance	Condition	Sensitivity	Magnitude of Impact	Overall Impact
7	Castle Hill Camp 1004256	SX 00045 43740	The remains of this site are located on a prominent hilltop overlooking river valleys and Portmellon Cove. Although the valley sides are quite densely wooded, the hillcrest on which the camp is sited is largely devoid of trees and is thus exposed to a high possibility of intervisibility with the proposed turbine site 5km away. The typically prominent location of this prehistoric asset is set within a relatively undisturbed rural environment, although there is significant modern intrusion nearby at Portmellon and Mevagissey and as a result of the two turbines already constructed to the southwest.	Unknown possibly Prehistoric	S	3	High	Minor	Minor
8	Heligan 1000538 Figure 26	SX 00316 45854	The gardens of Heligan predominantly occupy a valley and south facing slope, however there are upland areas to the north and northwest, including the main visitor entrance. Heligan is a designed landscape set within a wider agricultural and rural environment with few modern incursions nearby. It is a significant visitor attraction in this area. From the upland areas there are extensive views to the west and northwest, with little intervening vegetation, and it is probable that some parts of the turbine will be visible. Two small existing turbines are visible to the south.	Post Medieval	A Grade II	4	High	Minor	Minor

No	Site Name & Reference	Grid Ref. SW/SX	Description	Probable Date	Significance	Condition	Sensitivity	Magnitude of Impact	Overall Impact
9	Tregrehan 1000545	SX 05192 53547	The Registered Park and Garden of Tregrehan is located in a hollow and on a west facing slope between St Austell and St Blazey Gate. It is set within the urbanised area of St Austell, close to busy roads and housing, although to the north the generally rural environment is partly occupied by features associated with the china clay industry and mineral extraction. The garden has a mix of open areas and mature trees, potentially allowing some views towards the proposed turbine site though at a great distance.	Post Medieval	A Grade II*	4	High	No change	Neutral
10	Charlestown 17 Figure 31	SX 03760 51785	The internationally important area of Charlestown is located in a valley leading to the sea. Within the settlement the eye is directed down the main street with a view of the sea to the south. To the west, in the intervening space between Charlestown and the proposed turbine site is occupied by a significant hill obscuring any view of the proposed turbine completely. Charlestown has a maritime and coastal setting within the conurbation of St Austell. It includes many modern amenities, tourist features and a high proportion of new houses which are not particularly sympathetic to the original cottages in the centre of the settlement. The density of housing, garden vegetation and topography taken together obscure	Post Medieval	WHS	3	Very High	No change	Neutral

No	Site Name & Reference	Grid Ref. SW/SX	Description	Probable Date	Significance	Condition	Sensitivity	Magnitude of Impact	Overall Impact
			any views of the turbine site.						
11	Sticker Camp 1011994	SW 98579 50327	The later prehistoric-Roman round at Sticker is on a hilltop with good views of the surrounding landscape, although is adjacent to the village and a busy road. Its setting is generally rural though industrial remains of mineral extraction to the north and an engine house to the south are included. There is little substantial screening provided by vegetation and it is possible that the top of the turbine will be visible.	Prehistoric -Roman	S	3	High	Minor	Minor
12	Grampound Conservation Area DCO102	SW 93648 48252	Grampound village contains a number of Listed Buildings and its character is quite well preserved. However there is an extremely busy road running through its centre with associated modern street furniture. The buildings which make the principal contribution towards its Conservation Area status generally face inwards towards this road. The village is set within a rural environment. Topographically the village is located on a west facing slope and in a valley bottom. A significant quantity of trees and vegetation surrounds the settlement, particularly around the base of the valley, which provides substantial screening from the rest of the landscape. It is unlikely that any sections of the turbine will be	Post Medieval	A	3	Medium	Negligible	Neutral

No	Site Name & Reference	Grid Ref. SW/SX	Description	Probable Date	Significance	Condition	Sensitivity	Magnitude of Impact	Overall Impact
			visible from any part of the village or will intrude into its immediate setting.						
13	Resugga Castle 1017685 Figure 27	SW 93961 51064	Resugga is a later prehistoric univallate hillfort located on the crest of a ridge which is covered in scrub vegetation. It is adjacent to the village of Coombe in a rural setting. To the south of Coombe is a larger ridge developed by the railway with bridges and a nearby viaduct. It is possible that some of the upper parts of the turbine will be visible at a distance, but any views may include the railway infrastructure.	Later prehistoric	S	3	High	Negligible	Minor
14	St Stephen's Beacon Hillfort 1003091	SW 96009 54490	The hillfort is located on top of a substantial hill covered only with grass and scrub vegetation and has good landscape views. It has a mixed setting of past and present mineral extraction activity, agricultural and semi-urban landscapes. At least one turbine is already visible from the Beacon and it is likely that the proposed turbine will also be visible, though at quite a distance away.	Prehistoric	S	2	High	Negligible	Neutral
15	Penhale Round 1020752	SW 88495 51023	The prehistoric round is 330m southeast of Penhale and located on a hilltop with good landscape views to the south and southeast. There is little screening in the vicinity except for 1-2m high Cornish hedges. The round has a rural agricultural setting with Ladock village forming part of the wider landscape. Two small existing turbines	Prehistoric	S	3	High	Negligible	Neutral

No	Site Name & Reference	Grid Ref. SW/SX	Description	Probable Date	Significance	Condition	Sensitivity	Magnitude of Impact	Overall Impact
			are located approximately 500m to the southwest. It is unlikely that much, if any, of the proposed turbine will be visible due to the distance and the undulating nature of this landscape.						
16	Trewithen 1000510 Figure 30	SW 91172 47510	Trewithen is a Registered Park and Garden which includes Listed barns, farmhouses and other buildings. The majority of the garden is located in a hollow and its perimeter is quite densely wooded. Although a modern visitor attraction, Trewithen is a designed landscape in a highly rural setting. It is possible that some sections of the turbine may be visible from the majority of the protected area.	Post Medieval	A Grade II* L Grades I and II	4	High	Minor	Minor
17	Carvossa 1016890 Figure 30	SW 91879 48266	The prehistoric settlement is located in quite open farmland with some hedgerows and wooded valleys between it and the turbine site. Carvossa is on a hilltop overlooking the Fal river in a rural setting containing sporadic farm settlements. Views from it to the east are quite extensive and it is possible that at least the top of the turbine will be visible. This will be dependent on weather conditions and vegetation density, and the turbine will be at quite a distance from the site.	Prehistoric	S	2	High	Minor	Minor

No	Site Name & Reference	Grid Ref. SW/SX	Description	Probable Date	Significance	Condition	Sensitivity	Magnitude of Impact	Overall Impact
18	Golden Camp and Golden Manor 1016889 / 1141132 Figure 30	SW 92454 46853 / SW 92045 46847	The hillfort is situated on high ground close to the Fal river valley in a rural setting. Its ridge-top location affords it potentially good landscape views however the intervening space to the proposed turbine site includes areas of woodland which may block intervisibility. It is, however, possible that part of the turbine may be visible from this site.	Prehistoric	S	3	High	Minor	Minor
19	Trewar-thenick 1000658 Figure 28	SW 90415 44098	The Registered Park and Garden surrounding the east-facing house is quite open on the east side but densely wooded to the west and north and around much of the perimeter. Trewarthenick is a designed landscape within a woodland and agricultural setting. Although unlikely, it is possible that the turbine will be visible from parts of the gardens, though it will be a very minor feature within such views.	Post Medieval	A Grade II	3	High	Minor	Neutral
20	Veryan Enclosure Fort 1019746 Figure 29	SW 90927 38786	Veryan Castle is a prehistoric multiple enclosure fort with an annex in an elevated location overlooking a steep valley leading to the sea. Its setting is predominantly rural though with a wider maritime setting. Though there is little substantial vegetation screening the ridge-top, topography closes off views towards the proposed turbine site. It is unlikely that any part of the turbine will be visible.	Prehistoric	S	3	High	Negligible	Neutral

No	Site Name & Reference	Grid Ref. SW/SX	Description	Probable Date	Significance	Condition	Sensitivity	Magnitude of Impact	Overall Impact
21	Trelissick 1000656	SW 83325 39051	The Registered Park and Garden is situated to the west of the River Fal with the main aspect of the house and grounds facing south towards the Carrick Roads. Parts of the Park are densely wooded. Trelissick is a designed landscape within a woodland, agricultural and maritime setting. Due to distance and topography, it is very unlikely the turbine will be visible from the Park.	Post Medieval	A Grade II*	4	High	No change	Neutral
22	Tregothnan 1000655	SW 85876 41258	The Registered Park and Garden is located on undulating land on a spur between the Truro and Fal rivers. The surrounding landscape is highly wooded and often low-lying close to the river banks. The north-eastern parts of the Park are more elevated with more extensive views. The Park is set within an agricultural, wooded and marine environment. It is unlikely that the turbine will be visible due to distance from the site and undulating landscape obscuring views.	Post Medieval	A Grade II*	4	High	No change	Neutral

Table 10: Fieldwork Impact Assessment Results

At each accessible designated heritage asset listed in the table above, the potential visibility of the proposed wind turbine was considered and views out from the proposed turbine site towards key heritage assets were checked. Though true levels of intervisibility were impossible to determine from ground level given that the proposed turbine has not yet been constructed, the general degree of openness of the views out from the heritage assets could be assessed.

Where possible, photographs were taken from the proposed turbine site towards the filtered list of heritage assets and from the assets back to the proposed site. In practice, this process was somewhat hampered in terms of capturing the historic asset and the view towards the proposed site in the same photograph due to difficulties of access. The practicality of finding both suitable viewpoints and safe places to stop for photographs further constrained attempts to capture ideal viewpoints. However every effort was made to get as close as possible to the historic assets and to take photographs at least representative of the view when the asset itself could not be included. Within settlements, groups of buildings, mature trees and shrubs also blocked many views back to the site. The visibility cut-off imposed by the local topography suggested by the viewshed mapping was confirmed, though from ground level several areas of suggested intervisibility were closed off by woods and hedgerows as well as by topography.

Field verification tended to confirm the viewshed mapping; the turbine will be visible to some extent from many ridge-tops and to a lesser extent as the viewer descends into the valleys. Visual impacts are likely within this area. At distances of around 5km from the proposed site, visual impact may occur but will become weaker. Given the increasing number of wind turbines proposed for this area it will also become harder to distinguish individual turbines and cumulative impact will become increasingly relevant.

11 Geophysical Survey Results

An initial geophysical survey covered the turbine base area and cable route extending to the west. Subsequent changes to the likely construction plans meant that a revised cable route to the north of the wind turbine was proposed and is the most likely to be used if and when construction commences. The results below combine the initial geophysical survey with the revised northern cable route.

The geophysical survey identified a number of anomalies that have been characterised as being either of a probable or possible archaeological origin.

The difference between probable and possible archaeological origin is based on a confidence rating. Features identified within the dataset that form recognisable archaeological patterns or seem to be related to deliberate historical acts have been interpreted as being of a probable archaeological origin. Features of possible archaeological origin tend to be more amorphous anomalies which may have similar magnetic attributes in terms of strength or polarity but are difficult to classify as being archaeological or natural.

The following list of numbered anomalies refers to numerical labels on the interpretation plots (Figure 32 andFigure ***33***).

Probable Archaeology

1 Positive linear features in the western part of the survey area, associated with archaeological cut features. A number of point features indicate pitting.

2 Linear anomalies probably representing former field boundaries intersecting the central part of the site.

Possible Archaeology

3 Positive linear features. Possible evidence of archaeological cut features.

Other Anomalies

4 Closely spaced parallel linear anomalies probably related to agricultural activity such as ploughing.

5 Areas of magnetic disturbance are the result of substantial nearby ferrous metal objects such as fences and underground services. These effects can mask weaker archaeological anomalies, but on this site have not affected a significant proportion of the area.

6 Scattered magnetic debris.

7 Areas of amorphous magnetic variation caused by natural geological or pedological features.

8 A number of magnetic 'spikes' (strong focussed values with associated antipolar response) indicate ferrous metal objects. These are likely to be modern rubbish.

The site has revealed a number of archaeological features including linears and point anomalies. There is a concentration of these in the west of the site indicating a focus of activity of cut features and possible enclosures. The central part of the site contains a number of historic field boundaries, one of which is also present in the northern section.

A small number of weaker positive linear features possibly provide evidence for archaeological cut features but further interpretation is difficult owing to the weaker responses.

The rest of the site contains several areas of modern magnetic disturbance and two cases of amorphous variation probably caused by geology or pedology. Evidence for ploughing is also visible in the north of the site.

12 Statements of significance

Many of the sites have already had their significance assessed by Scheduling or Listing. Where sites are Scheduled or Listed they have not been considered under the Sites and Monuments Records category below, even though they usually feature on that list, to avoid duplication. Subsurface and associated remains are likely to be of equal significance to the sites identified below.

12.1 World Heritage Site (Site 9)

These sites are designated and defined by UNESCO (UNESCO website):

The United Nations Educational, Scientific and Cultural Organization (UNESCO) seeks to encourage the identification, protection and preservation of cultural and natural heritage around the world considered to be of outstanding value to humanity. This is embodied in an international treaty called the Convention concerning the Protection of the World Cultural and Natural Heritage, adopted by UNESCO in 1972.

Sites inscribed on the World Heritage List benefit from the elaboration and implementation of a comprehensive management plan that sets out adequate preservation measures and monitoring mechanisms. In support of these, experts offer technical training to the local site management team.

The inscription of a site on the World Heritage List brings an increase in public awareness of the site and of its outstanding values, thus also potentially increasing tourist activities at the site. When these are well planned for and organized respecting sustainable tourism principles, they can bring important funds to the site and to the local economy.

12.2 Scheduled Monuments (Sites 6, 10, 12, 13, 14, 16, 17, 19)

Scheduled Monuments have Statutory Protection under the Ancient Monuments and Archaeological Areas Act 1979. These are sites that have been identified by English Heritage, the Government's archaeological advisory body, as being of national

importance, and are included in the County Lists maintained by the Secretary of State for Culture, Media and Sport. A schedule has been kept since 1882 of monuments whose preservation is given priority over other land uses. The current legislation, the Ancient Monuments and Archaeological Areas Act 1979, supports a formal system of Scheduled Monument Consent for any work to a designated monument (English Heritage Website).

12.3 Registered Parks and Gardens (Sites3, 7, 8, 15, 18, 20, 21)

Registered Parks and Gardens are described and defined by English Heritage (English Heritage Website).

The English Heritage 'Register of Historic Parks and Gardens of special historic interest in England', established in 1983, currently identifies over 1,600 sites assessed to be of national importance The emphasis of the Register is … *on 'designed' landscapes; … gardens, grounds and other planned open spaces, such as town squares … rather than on planting or botanical importance.*

Historic parks and gardens are a fragile and finite resource: they can easily be damaged beyond repair or lost forever … The main purpose of this Register is to celebrate designed landscapes of note, and encourage appropriate protection. It is hoped that, by drawing attention to sites in this way, English Heritage will increase awareness of their value and encourage those who own them, or who otherwise have a role in their protection and their future, to treat these special places with due care.

Registration is a 'material consideration' in the planning process, meaning that planning authorities must consider the impact of any proposed development on the landscapes' special character.

12.4 Listed Buildings (Sites 3, 5, 7, 8, 15, 17, 18)

Sites are Listed to mark their special architectural and historical interest; they are protected by law, and Listed Building Consent must be granted for any alterations to a designated building. Some sites, such as Levalsa and Penkivel Farmhouses, have been given Grade II* status, which means they are considered 'particularly important...of more than special interest.' The remaining sites are designated as Grade II listed and are therefore considered 'nationally important and of special interest' (English Heritage Website).

12.5 Conservation Areas (Sites 2, 11)

Conservation areas are designated for their special architectural and historic interest. They are designated by the local planning authority and comply with national standards. Designations of Conservation Areas were first made in 1967 and typically include town or city centres, fishing and mining villages, historic estates, housing and transport links (English Heritage Website).

12.6 Regional and Local Significance (Sites 1, 4)

These remains are considered of regional significance because of their rarity, setting and upstanding evidence but are otherwise undesignated assets.

13 Likely impacts of the proposed development

13.1 Construction phase impacts

The construction of the wind turbine at Barwick will create some minor visual and audible disturbance, though as these will be temporary and reversible they are considered as negligible impacts only. An assessment of the likely noise impact due to the construction phase of the proposed turbine has been undertaken by an appropriate specialist. The assessment indicates that heritage assets close to the receptors at

Tregonan Farm and Higher Barwick Farm may experience audible impacts from construction activities. However these are considered to be below the guideline levels and temporary in duration and are therefore assessed as insignificant.

The construction of the turbine, specifically the excavations for the foundations and cable run will have major direct, physical and irreversible impacts upon any upstanding or sub-surface archaeology in these locations. The geophysical survey results indicates that the construction of the turbine base will have little or no physical impact as there is only one anomaly close to the edge of the development area, which is likely to be a historic field boundary (Figure 32 andFigure ***33***). Provision of a works compound, additional access routes or any widening of the existing gateways will also have a moderate physical and irreversible impact on any archaeology in these locations. There are a series of linear and point anomalies at the western extent of the initial cable route which are likely to be physically impacted by the construction works if this route is used (Figure 32 andFigure ***33***). Their location and arrangement are suggestive of potentially significant and sensitive prehistoric remains. In the revised cable route, extending north from the turbine base, the geophysical survey indicates three anomalies which are likely to be field boundaries and upon which construction would have at least a minor negative, direct and irreversible impact. The overall impacts on probable sub-surface archaeology are likely to be minor negative but have the potential to be moderately severe should the west cable route be used.

Construction will also create some minor visual disturbance though as this is temporary and reversible it is considered as a negligible impact only.

13.2 Operational phase impacts

During the operational phase only the visual and setting impacts will apply. These will vary according to the weather, season, distance from, and intervisibility with, the proposed site and the sensitivity of individual heritage assets. Such impacts are temporary and potentially reversible (when the turbine is eventually dismantled, as required by the planning conditions applying to such features) and will vary in overall magnitude according to receptor distance from the turbine, degree of intervisibility, intrusion of the turbine within key views of them and the sensitivities of their settings.

An assessment of the likely noise impact during the operational phase of the proposed turbine has been undertaken by an appropriate specialist. The assessment indicates that there is potential for recommended noise limits to be exceeded in a worst case scenario by the operational wind turbine at the receptor site of Higher Barwick Farm, which may impact on heritage assets closest to it, namely the Barwick Field Systems. However the assessment demonstrates that overall the turbine will operate within the relevant ETSU-R-97 noise limits and the residual noise impacts are considered to be insignificant.

13.3 End of use impacts

Assuming the proposed turbine is not re-powered or replaced, the end of use impacts will be as a result of machinery to remove the turbine components. It is anticipated that foundations will be removed to a depth of 1m below grade and the soil profile restored. Access tracks will either be removed or retained, depending on the landowner's preference. The associated noise impacts are considered by the specialist's assessment as likely to be insignificant and there will be negligible but temporary visual impacts resulting from the use of machinery during this phase. The partial removal of the foundations and possibly also the access track and cabling, may result in further physical, irreversible impacts on surrounding subsurface archaeology but this is considered likely to be a minor negative impact and should be capable of mitigation.

13.4 Impacts on the Cornish Mining World Heritage Site

The Charlestown World Heritage Site area is located to a very minimal extent within the viewshed (Figure 20). The area will not be physically impacted upon and there will not be visual and audible impacts resulting from the construction, operation and end of use activities because potentially intervisible areas are substantially obscured by housing and associated vegetation (Figure 31). Current distractions from the significance of the area originate from the conurbation of St Austell slightly to the north of Charlestown. The addition of the proposed turbine has the potential to alter the setting of the World Heritage Site area, though at a distance of approximately 10km this will be a negligible impact. Any setting impact will only be perceived from a viewpoint out to sea where the turbine and Charlestown could potentially be seen in the same view. The overall impact is rated as neutral.

13.5 Impacts on Scheduled Monuments

No Scheduled Monuments will be physically impacted upon by the proposal. Carvossa, Golden Camp and Castlezens may experience minor visual impacts during all three phases due to their relatively close proximity (Figure 19 andFigure ***30***). The settings of those within the viewshed such as Sticker, Castle Hill Camp and Resugga may also be visually impacted to a minor extent, dependant on how much of the proposed turbine will be visible from them, and the degree to which views of them will include the wind turbine as a significant feature, as their prominent settings are vulnerable to intrusion (Figure 20 andFigure ***27***). For example, Castle Hill Camp has a prominent setting over a river valley. Views from the Camp and of it from the surrounding countryside are likely to include the proposed turbine, impacting appreciation of its setting negatively. The promontory fort on Dodman Fort occupies a commanding position over the adjacent land and seascape, the site having significant open views in all directions. Similarly, Veryan Fort has a prominent hilltop location and incorporates the seascape into its setting with views down a narrow valley into Veryan Bay. There will be minor visual and wider setting impacts, particularly during the operational phase. Overall however the impacts on Scheduled Monuments can be rated as minor.

13.6 Impacts on Listed Buildings – Grade I and II*

The wind turbine will have a neutral impact on those Listed Buildings which do not fall within the viewshed, except in the cases of those where it will appear as a prominent feature in key views of them. There may be a slight visual impact for all Listed sites closer than 5km from the proposed site during all three phases; this will, however, diminish with increasing distance from the site. Those within St Ewe, a relatively unspoilt and quiet village, are highly likely to experience visual and setting impacts during the construction, operational and end of use phases to a minor level, though this will be dependent on the extent of intervisibility, the degree of screening afforded by vegetation or topography, and the degree to which the turbine will appear in key views of the settlement. This particularly applies to the west side of the village where there is only a limited amount of screening provided by garden hedges. The Grade I Church of All Saints in St Ewe has the most extensive setting of the Listed Buildings in the village. Although it has a very small spire which is not a landmark feature, the church is well preserved with a secluded churchyard to the east and south. The surrounding mature trees do not provide substantial screening, particularly to the west and therefore there is the potential for the church to experience greater visual impacts on its setting compared to the remainder of the village.

St Michael's Church and Higher Lodge at Caerhays approximately 4km to the south of the proposed site are Grade I Listed, with extensive views northwards. Their settings mainly relate to the formal grounds of Caerhays but they also interact with the wider rural landscape (Figure 25), as the estate farms much of this land and the church is intervisible with the church at Gorran to the east. Although the turbine will be quite

distant from features at Caerhays, visual and setting impacts will occur but are rated as minor.

The Grade I and II* buildings in Grampound and Tregony, such as the Dolphin Inn, the Church of St Cuby and the Alms-houses, are very unlikely to experience any severe negative impacts as their location in the centre of the village obscures most views out and their settings already incorporate modern semi-urban features. The overall impact on Grade I and II* Listed Buildings is assessed as minor.

13.7 Impacts of Listed Buildings – Grade II

No Listed Buildings will be physically impacted upon and only those within the viewshed are likely to experience a visual impact during all three phases (Figure 18). Tregonan Farmhouse may experience visual and setting impacts, these being at worst rated as moderately severe, due to its close proximity to the proposed turbine site. However a direct line of sight between Tregonan and the turbine site was difficult to establish; as a result visual impact may be intermittent or limited to that arising from intervisibility with the upper parts of the turbine only. Setting impacts may also arise due to the inclusion of the turbine in key views of the Listed Building. Due to its proximity, Tregonan Farmhouse is potentially susceptible to noise impacts from the proposed turbine. However assessment by a qualified specialist with measurements taken very close to this heritage asset has shown that the predicted worst case scenario noise levels will be less than 35dB(A), within the ETSU-R-97 limits and therefore are not considered to cause a disturbance.

The Crown Inn at St Ewe and at farmhouses at Creed, Carveth and Golden Manor are set within a rural environment (Figure 30). Although open views from them are limited, they may well include the proposed turbine, as well as the surrounding farmland and prominent dumps of industrial waste arising from china clay extraction on the horizon. There are currently few, if any, turbines visible from these locations. As a result of the restricted and varied views out from these sites and their settings, the impacts on these sites are considered to be minor. The overall impact for Grade II Listed Buildings is assessed as minor.

13.8 Impacts on Conservation Areas

There are two Conservation Areas within 5km and both will be potentially partially intervisible with the turbine site (Figure 18 andFigure ***24***). Those parts outside the ZTV will probably not experience any visual impacts. However, there may be minor impacts on their settings when they are viewed from some locations within the landscapes surrounding them, as a modern turbine will be juxtaposed with the historic agricultural landscapes within which they are set. The topography and aspect of Grampound and Tregony villages greatly restricts intervisibility with the turbine from within the villages. Many of the properties face in towards the centre so any visual impact arising from intervisibility will be to the rear of the buildings. The ground surface of the site will not be visible and as it is highly unlikely the turbine will be visible during any of the three use phases, the impacts are assessed as minor to neutral. The overall impact on Conservation Areas is therefore assessed as minor to neutral.

13.9 Impacts on Registered Parks and Gardens

Visual impacts may be limited by the density of vegetation making up these designated landscapes; however many views across the parks from the houses or features within the parks were specifically designed and many may now include the proposed turbine (Figure 19 andFigure ***20***). For example, from parts of Trewarthenick Park there is a clear view of Tregony. The proposed turbine may be visible beyond Tregony in this view. The view east from Trewithen includes the church at Creed which may include the proposed turbine slightly to the south. The view west from Heligan is towards the church at St Ewe, with which there is a historical connection with the Tremayne family, and may include the wind turbine in the background (Figure 26). The settings of these

parks are simultaneously both formal and deliberately natural, within related or unrelated surrounding agricultural land and a number interact with the nearby seascape.

The proposed turbine will theoretically be intervisible to some extent from all seven parks though distance will diminish the impact during the construction, operational and end of use phases. At 4-5km from the proposed site, Heligan, Caerhays, Trewarthenick and Trewithen will experience the greatest impacts (Figure 19). Heligan is mostly located in a valley but the park entrances and woodland are on the crest of a ridge and part of the garden is on a southwest facing slope exposing it to visual impacts. The planted gardens, particularly the upslope areas, have extensive settings including the agricultural and coastal surroundings, which will be impacted on to a minor degree by the installation of a turbine (Figure 26). Similarly Caerhays has extensive views and some elements of its setting to the north towards the turbine location (Figure 25). However, the main aspect of Caerhays Castle is southwards to the sea and the formal gardens surround it. Nevertheless, the parkland, woodland and agricultural land, including the church and lodge discussed above will be intervisible with the wind turbine, and all views and the setting of the park will experience a minor impact.

Trewarthenick House has an easterly aspect but the perimeter of the Park is substantially wooded and views towards the proposed wind turbine will be restricted by the ridge-top near Tregony (Figure 28). Trewithen is similarly substantially wooded and is also situated in a slight hollow. The agricultural settings of Trewarthenick and Trewithen extend beyond the Park boundaries, however impacts on their settings resulting from the construction of the turbine are likely to be minimal because of local topography (Figure 30).

Beyond 5km from the proposed turbine site the effect on Registered Parks and Gardens decreases considerably and will consist of limited setting and visual impacts. The parks at Trelissick, Tregrehan and Tregothnan are included in this category. Any views of the turbine will be intermittent, vegetation will provide screening and the turbine will be a very small and distant component within views. The turbine will intrude on the wider setting of these sites, but due to distance this will result in negligible impacts. The minor impacts on Heligan, Caerhays, Trewithen and Trewarthenick result from the higher degree of intervisibility and the negative effect upon their settings compared to the other Registered Parks and Gardens. The overall impact on Registered Parks and Gardens is assessed as minor.

13.10 Impacts on Undesignated Historic Assets

All sites within the viewshed will be visually impacted to some degree during all three phases, though at worst this is considered as minor for the more prominently positioned, extant or closest sites such as the Barwick field systems (Figure 17). The noise assessment indicates that there is potential for recommended noise limits to be exceeded in a worst case scenario by the operational wind turbine at the receptor site of Higher Barwick Farm, which may impact on heritage assets closest to it, the Barwick field systems. However the assessment demonstrates that overall the turbine will operate within the relevant ETSU-R-97 noise limits and the residual noise impacts are considered to be insignificant. One site, Pencoose Castle, is just beyond the 1km radius zone and therefore the impacts would normally not be considered. However Pencoose is a substantial bivallate round, though much reduced by modern farming activities, on the crest of a spur with a good view to the southwest along the valley below. Pencoose is within the viewshed for the proposed turbine and is likely to have good views of the majority of the turbine. Views from other high vantage points in the landscape surrounding Pencoose are likely to include the turbine and the heritage asset. There will be no physical impacts though there will be moderately negative setting and visual impacts, probably at all three use stages and certainly during the operational phase. The majority of the remaining undesignated sites are known from documentary sources

only or are signposts and crosses with very limited settings. The overall impact on such sites is therefore assessed as minor at worst.

13.11 Impacts on Historic Landscape Character

The landscape surrounding the proposed wind turbine site is dominated by extensive areas of farmland of Medieval origin interspersed with tracts of later enclosed land (Figure 10). The land has been farmed since at least the Medieval period, in some places long before, as is alluded to by the surviving place names and prehistoric remains, and specifically by the features revealed by the geophysical survey in the field immediately to the south east of Barwick Farm. From the 17th Century onwards parts of this area were subjected to enclosure under the Enclosure Acts with the imposition of larger, more regularly shaped fields and intensive farming methods that reduced some archaeological sites to below ground remains only. In places within the surrounding landscape this is highlighted by the use of blockwork walls, very visible from several main roads as field boundaries instead of the more traditional Cornish hedges. The seven Registered Parks and Gardens in the vicinity also influence the layout and character of the land. However the Post Medieval enclosures still preserve much of the original open character of the landscape, with small farming settlements scattered throughout it.

With the exception of the growth of the St Austell conurbation some distance away, the overall character of this landscape has changed little in many centuries. The elevated nature of the area is clearly ideal for locating the proposed wind turbine and is likely therefore to become increasingly popular for generating electricity from wind power as has been the case in other areas of Cornwall. The insertion of individual wind turbines will erode the coherency and legibility of the former and surviving historic landscape character of this area. The construction of the proposed wind turbine at Barwick will materially affect the local landscape character, given the relatively few wind turbines already operational within it and the lack of similarly modern and intrusive infrastructure, resulting in a minor impact.

14 Cumulative Impacts

Recent English Heritage and Cornwall Council guidance requires assessments of applications for renewable energy installations to consider the cumulative impacts of wind turbine installations in addition to specific impacts. The area surrounding Barwick is not currently populated with wind turbines but there are proposals for a number, and the elevated landscape is ideal for generating energy from wind. This indicates a high potential for future cumulative impacts.

From the proposed turbine site at Barwick Farm, no operational turbines are currently visible and from the majority of the heritage sites visited, no turbines or occasionally one or two, were visible. Few of the sites highlighted in this assessment are significant landmarks although many have extensive and sensitive settings, including the multiple Registered Parks and Gardens and the Scheduled Monuments. In particular the prehistoric Scheduled Monuments occupy prominent hilltop locations, command significant landscape views and have a degree of intervisibility with other approximately contemporary sites. They are important features within a landscape which is currently not populated with prominent modern features. From the sea, a wider viewpoint of multiple heritage assets and their relationships can be appreciated, and will incorporate both existing and proposed turbines. The distraction created by the rotating blades of the proposed wind turbine at Barwick and other wind turbines proposed within the area to the south of Hensbarrow, to the east of the Fal Estuary and to the west of St. Austell Bay could be, or at least could become, detrimental to the appreciation and understanding of the setting of these monuments and of the historic character of the wider landscape, especially if, in the future, this area sites multiple wind turbines.

The majority of the sites considered consist of Listed Buildings within settlements, and although their settings are quite localised, many of these settlements have landscape

views, and a degree of visual prominence within the surrounding agricultural landscape. The setting of some of these, such as sites within St Ewe, Tregonan and those within the Registered Parks and Gardens in particular, may be adversely affected to at least a minor degree by visual distraction resulting from cumulative impacts arising from the construction of multiple turbines in the landscape surrounding them.

It should be noted that assessments of setting refer to the heritage significance and the nature of the landscapes surrounding historic assets. Individuals' perceptions of setting, the associated aesthetics and appreciation and their perception of the impact of one or multiple wind turbines will vary.

Wind farms, where multiple turbines of similar sizes are installed in close proximity, can have a visual coherency which despite their size and quantity may limit the negative impacts they may otherwise impose on their surroundings. The placement of individual wind turbines of varying heights and designs sporadically across the landscape, as may become the case around Barwick, is unlikely to result in a similar degree of coherency and therefore is likely to be potentially more distracting in perceptions of the historic landscape or in the appreciation of the settings of heritage assets.

Such adverse visual impacts are, given the 25 year lifetime of any specific wind turbine, judged to be temporary in nature (though long-lived) and would be reversed on its dismantling . Therefore, any unmitigated impacts associated with their construction and operation will not be permanent, though they may impact on the settings of designated sites and in the ways in which these sites and this historic landscape are perceived and appreciated for substantial periods. For those sites with local or limited settings having small-scale and/or limited numbers of turbines within the surrounding landscape, impacts are likely to be minor in most cases. For those sites with sensitive settings, where the construction of additional wind turbines is considered likely to result in a significant alteration to the historic character of the surrounding landscape, cumulative impacts may well be significantly greater, and assessment of them should form an important part of the planning process.

15 Mitigation Strategy

A range of means to mitigate the potential impacts identified in this assessment may be considered by the Historic Environment Planning Advice Officer, who may choose to recommend one or more of the following.

15.1 Micro-relocation of the turbine and cabling

Mitigating any potential impacts on heritage assets might be possible through the relocation of the wind turbine and redesign of cabling routes to reduce or avoid direct physical impacts on sub-surface archaeological remains within the proposal site elements of which have been revealed by the geophysical survey. There is minimal evidence for sub-surface archaeology at the turbine base and in the favoured northern cable route and this approach is unlikely to achieve any substantial diminution of impact to the linear anomalies in this area. If the western cable route were used, relocation may allow the avoidance of physical impacts to the substantial and potentially significant remains highlighted by the geophysical survey. Micro-relocation may also reduce of avoid setting impacts on sensitive assets within the landscape surrounding the proposed turbine site. However given the topography, the substantial height of the turbine and the minimal nature of the surrounding vegetation screens, such an approach would seem unlikely to be able to achieve any substantial diminution of setting impact. English Heritage or Cornwall Council may require the production of photomontages demonstrating that any submitted proposal could achieve an aim of minimising such impacts.

15.2 Archaeological recording

In a case where the finalised site design would seem likely to result in unavoidable physical impacts on likely sub-surface features, a brief for work to mitigate these

impacts would need to be prepared by the relevant Cornwall Council Planning Officer, setting out its scope. A Written Scheme of Investigation (WSI) to meet the brief would need to be prepared and agreed to establish and direct a programme of mitigating archaeological work.

The senior Development Officer (Historic Environment) may require further archaeological evaluation or recording to provide a level of information sufficient to determine the potential and scale of sub-surface impacts on archaeological features identified by the geophysics before a recommendation for a grant of planning permission could be made.

Subsequent archaeological recording works could include a watching brief (observation by an archaeologist during mechanical ground reduction activities) or full excavation and recording of some areas of the site prior to construction works. This could target areas where significant features had been identified through geophysical survey, or where the balance of probability suggests that sub-surface archaeology might survive. This approach provides for preservation by record of buried archaeological features or artefacts and reduces any impacts on the archaeology of the sites to moderate with some benefits in the form of increased knowledge and awareness of the heritage assets.

It should be noted that the form of any mitigation applied to the site would be determined by the relevant Planning Officer, who might require studies additional to those identified within this assessment in order to determine his recommendations.

16 Conclusion

Significant archaeological sites and heritage assets have been identified within a 15km radius of the proposed wind turbine. These include Scheduled Monuments, such as those at Sticker and Carvossa, for which the overall impacts have been rated as minor negative, due to their distance from the site and the reversible effects on their settings. Impacts on the Registered Parks and Gardens vary from neutral to minor negative according to distance, intervisibility with the proposed site and extents and natures of their settings. Although the impacts will be reversible, the operational impacts in particular will alter the settings of the parks at Heligan, Caerhays, Trewithen and Trewarthenick and may also apply to the other Registered Parks and Gardens, though to a considerably more limited extent. Upon the Listed Buildings such as those in St Ewe, Tregony and Grampound Conservation Areas and especially those with more limited settings, minor visual impacts may result. However the combination of proximity, visual and setting impacts upon Tregonan Farmhouse increases the impact rating to moderate negative for this particular designated heritage asset.

Although there are currently few wind turbines within this landscape, the cumulative impact arising from the construction of this proposed turbine, taken together with those currently also under consideration within the planning process and any future turbines will become increasingly negative as they erode the historic character of this landscape. The viewshed mapping includes large areas out to sea with considerable views of the landscape that combine the World Heritage Site, additional Conservation Areas, Scheduled Monuments and Registered Parks and Gardens, together with their rural setting. The high volume of maritime leisure and economic pursuits in this area, past and present, mean that views from the sea are frequently accessed. The negative visual impact resulting from the construction of one or more turbines within this view is an important consideration.

Due to the topography and location of the heritage assets considered, the adoption of a site redesign mitigation strategy (as suggested above) is unlikely to achieve any positive change in the impacts which have been identified. The geophysical survey identified several linear and point anomalies within the initial cable route for the proposed turbine which may represent prehistoric activity. However the preferred cable route, to the north of the wind turbine, indicated minimal archaeological activity probably relating to Medieval or later field boundaries. Further archaeological

investigation into the existence and nature of any subsurface archaeology in the proposed turbine field and along the cable connection route may enhance our understanding of the archaeology of this site and surrounding area and help to mitigate direct impacts on archaeology resulting from the construction of the turbine at Barwick.

The impacts of the wind turbine are all reversible, with the exception of those identified through the findings of the geophysical survey which may prove to be incapable of mitigation by redesign, and there are considerable environmental benefits associated with its installation. However the high level of significance already placed on the designated heritage assets with sensitive settings surrounding the proposed turbine site and the potential impacts on their settings should certainly be taken into account when considering this and similar applications within this part of Cornwall.

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http://www.cornish-mining.org.uk Cornish World Heritage Site

http://www.english-heritage.org.uk/caring/listing/ English Heritage designation information

http://www.english-heritage.org.uk/publications English Heritage guidance

http://www.heritagegateway.org.uk/gateway/ English Heritage's online database of Sites and Monuments Records, and Listed Buildings.

http://www.legislation.gov.uk Government documents, Acts and legislation

http://www.oxforddictionaries.com/definition/english/road?q=road Oxford English Dictionaries Online historic and current definitions

http://whc.unesco.org/ World Heritage Site information

18 Project archive

The HE project number is **146341**

The project's documentary, photographic and drawn archive is housed at the offices of Historic Environment, Cornwall Council, Fal Building, New County Hall, 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.A-D\Barwick_Farm
3. English Heritage/ADS OASIS online reference: cornwall2-176004
4. This report text is held in digital form as: G:\TWE\Waste & Env\Strat Waste & Land\Historic Environment\Projects\Sites\Sites B\ Barwick_Farm_Wind_Turbine_Assessment

Figure 3: The proposed turbine site at Barwick Farm and its surroundings as shown on John Norden's 17th Century Map of Cornwall.

Figure 4: The proposed turbine site at Barwick Farm and its surroundings as shown on Joel Gascoyne's 1699 Map of Cornwall.

Figure 5: The proposed turbine site and its surroundings as depicted on Martyn's Map of Cornwall 1748.

Figure 6: The proposed turbine site as depicted on the 1807 OS 1 inch Map.

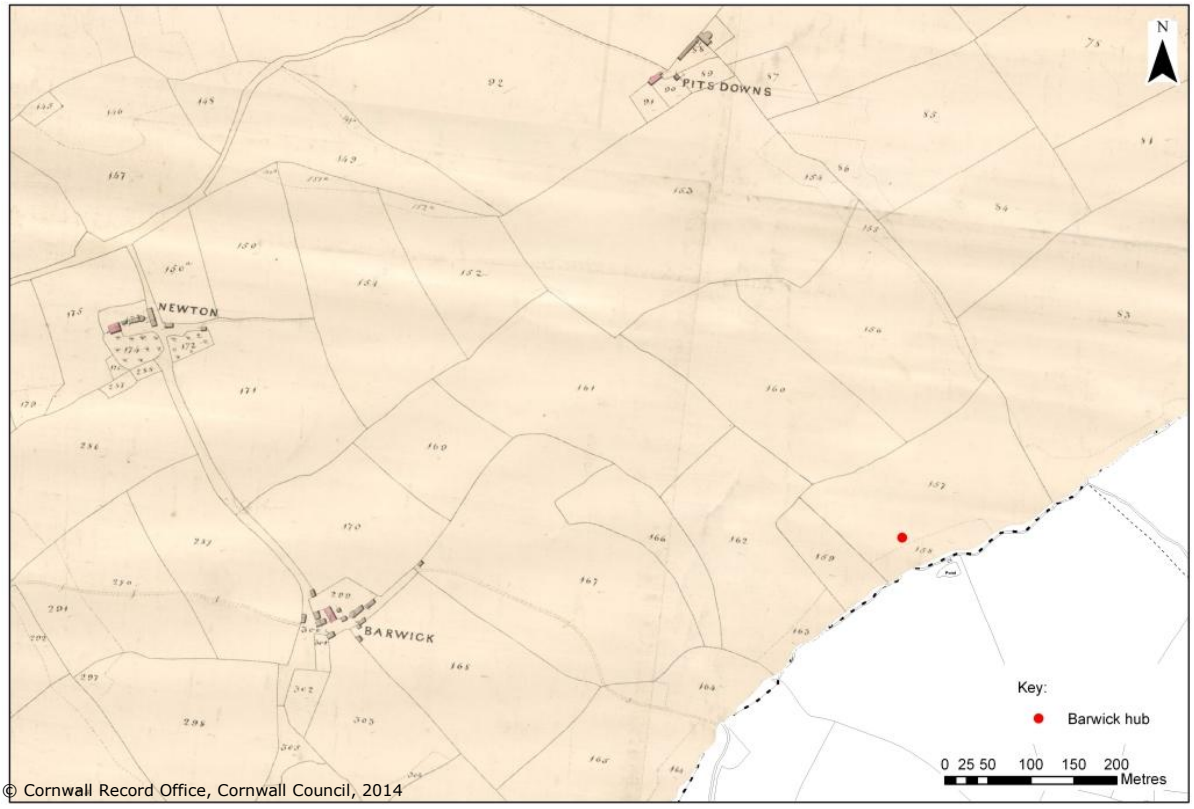

Figure 7: The proposed wind turbine location superimposed on the c1841 Tithe Map for the parish of Cuby.

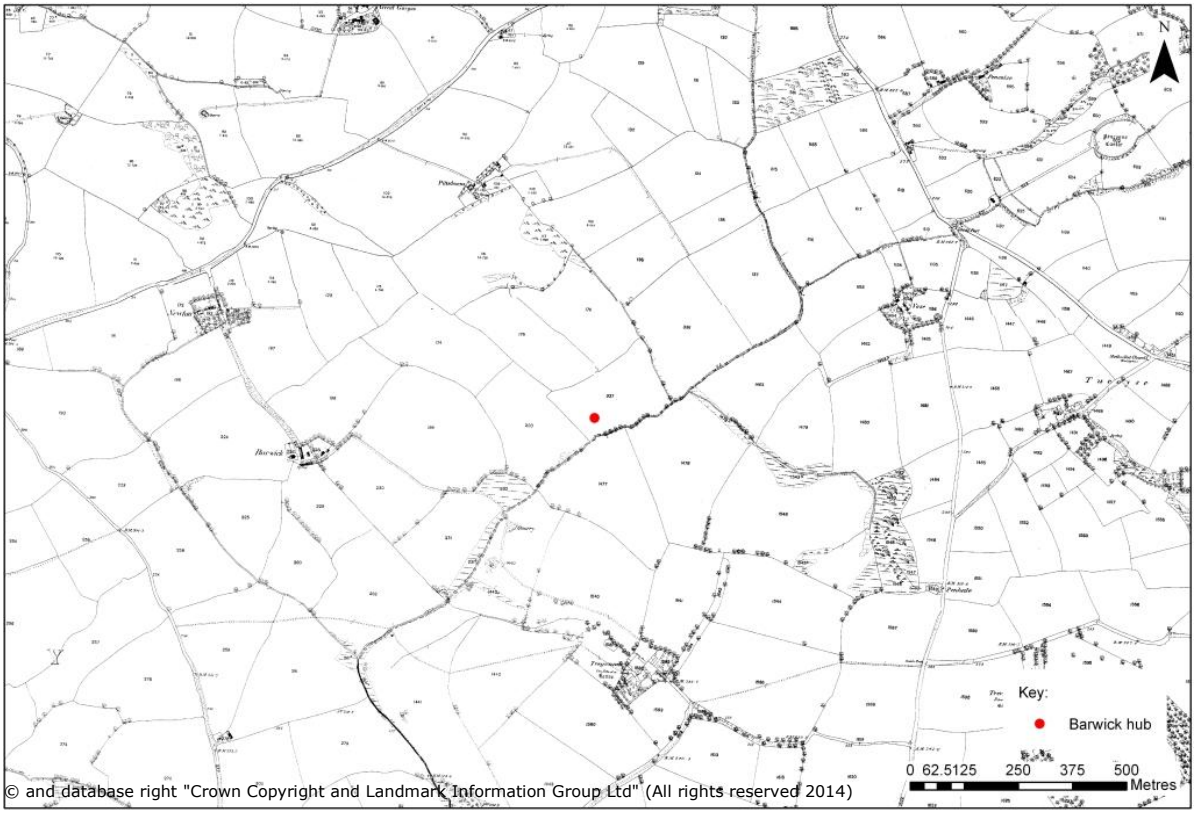

Figure 8: The proposed turbine site superimposed on the OS c1875 25" map.

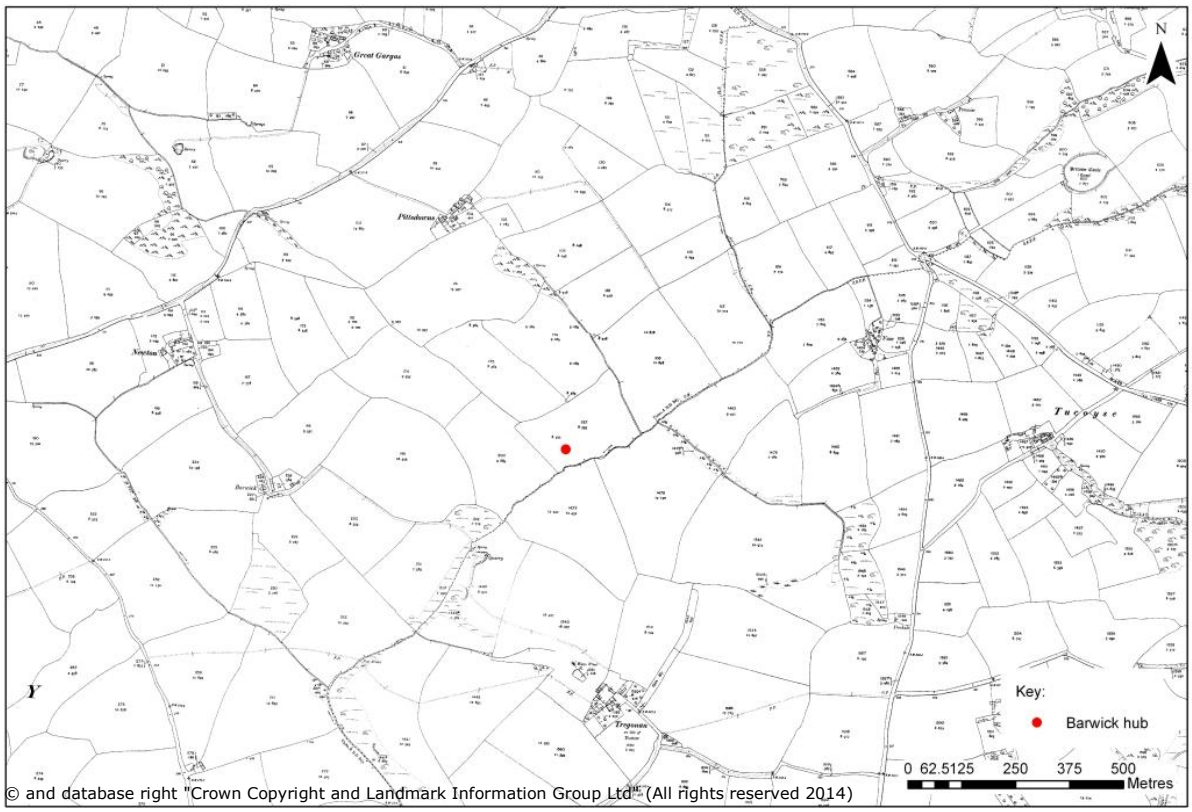

Figure 9: The proposed turbine site located over the OS c1908 25" map.

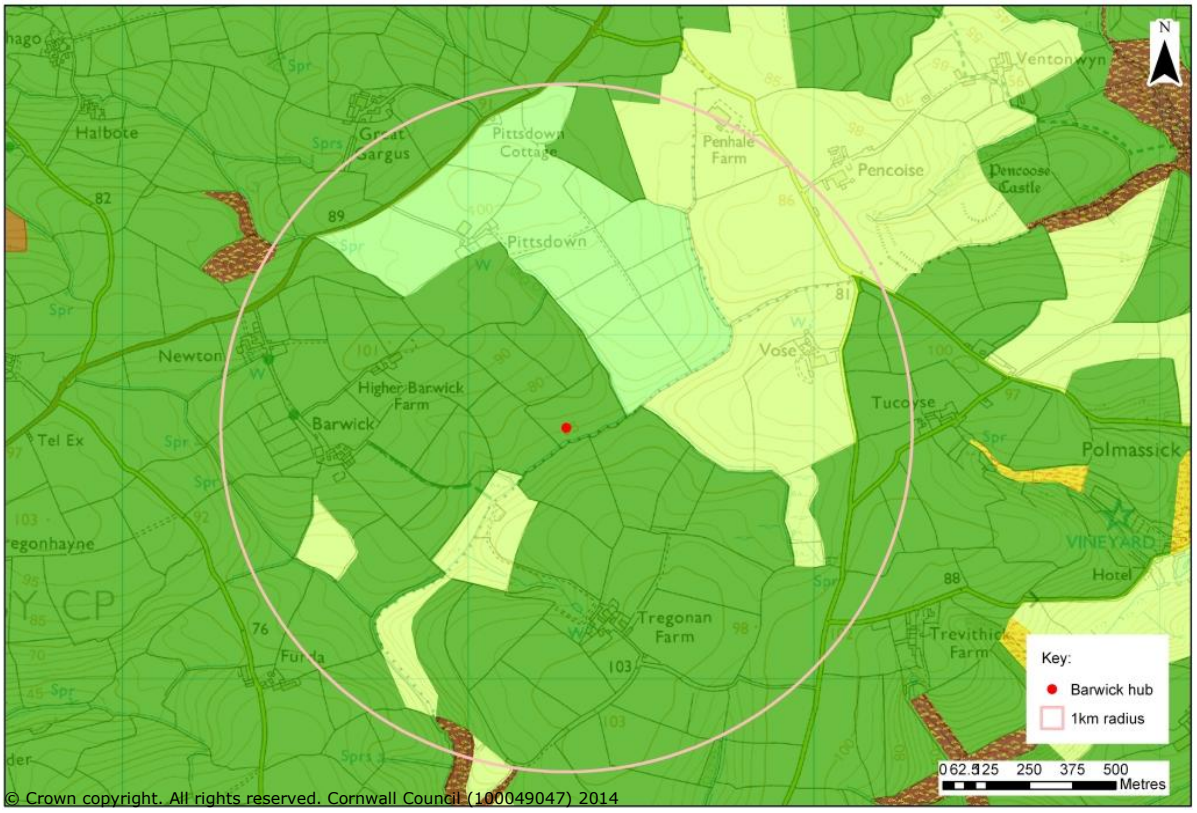

Figure 10: Historic Landscape Characterisation of the area surrounding the proposed turbine site. The green represents the Medieval farmland, the light green is post Medieval enclosed land and the cream the modern enclosed land.

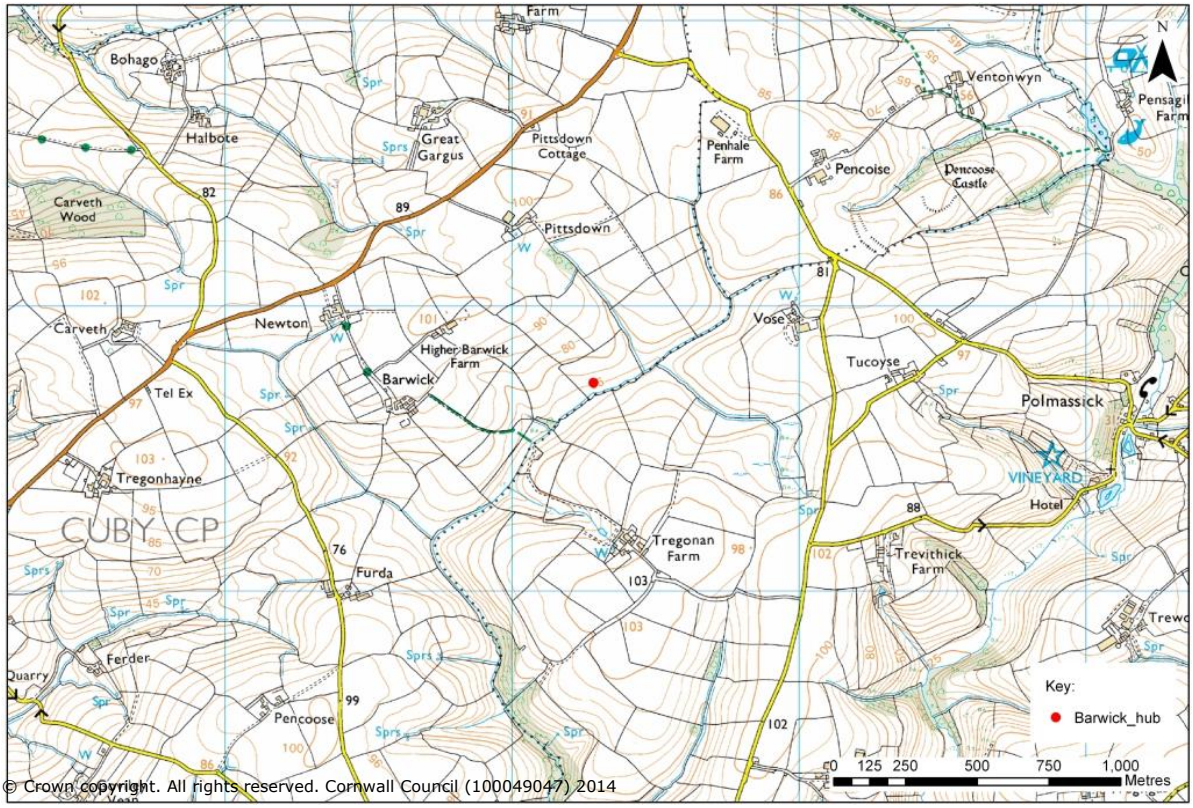

Figure 11: Contour map of the area surrounding the proposed site, note the ridges and steep slopes characterising this landscape.

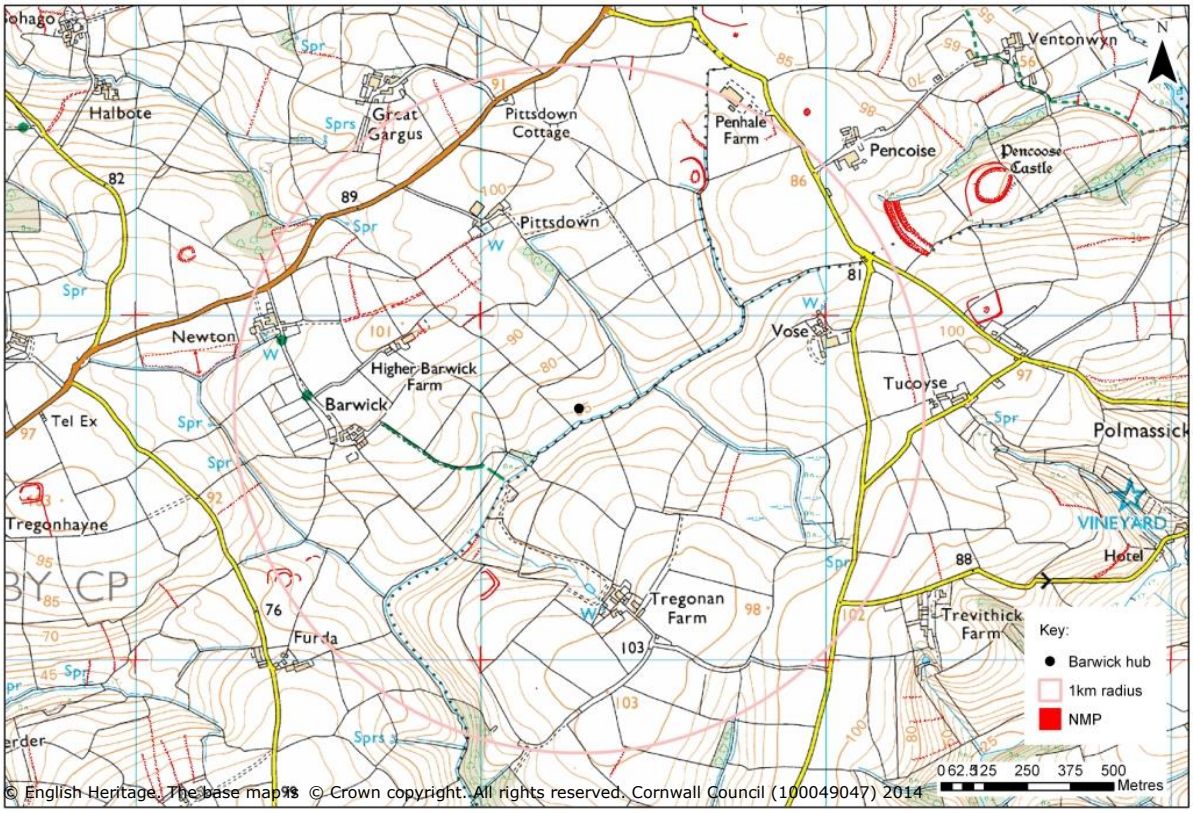

Figure 12: NMP data for the proposed site and surrounding area. Note the scatter of prehistoric enclosures on high ground surrounding the proposed turbine site.

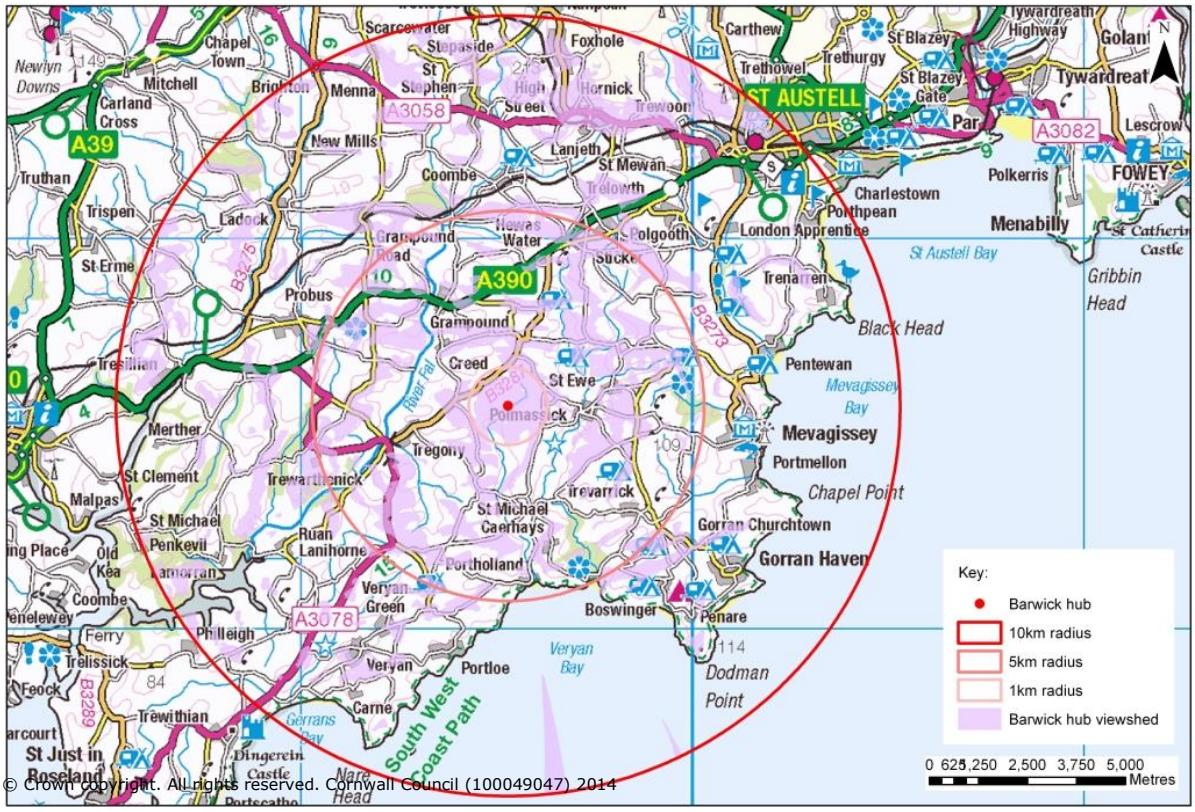

Figure 13: Viewshed for the turbine hub.

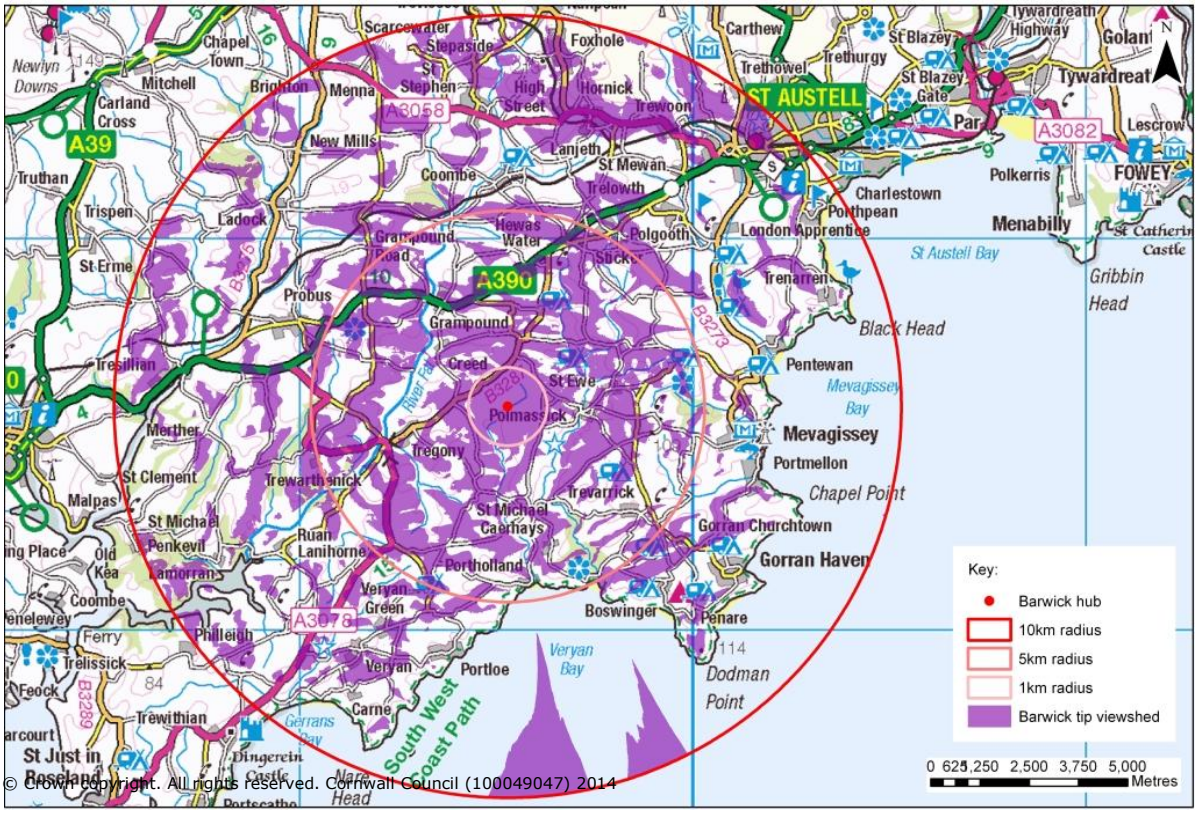

Figure 14: Viewshed for the turbine tip.

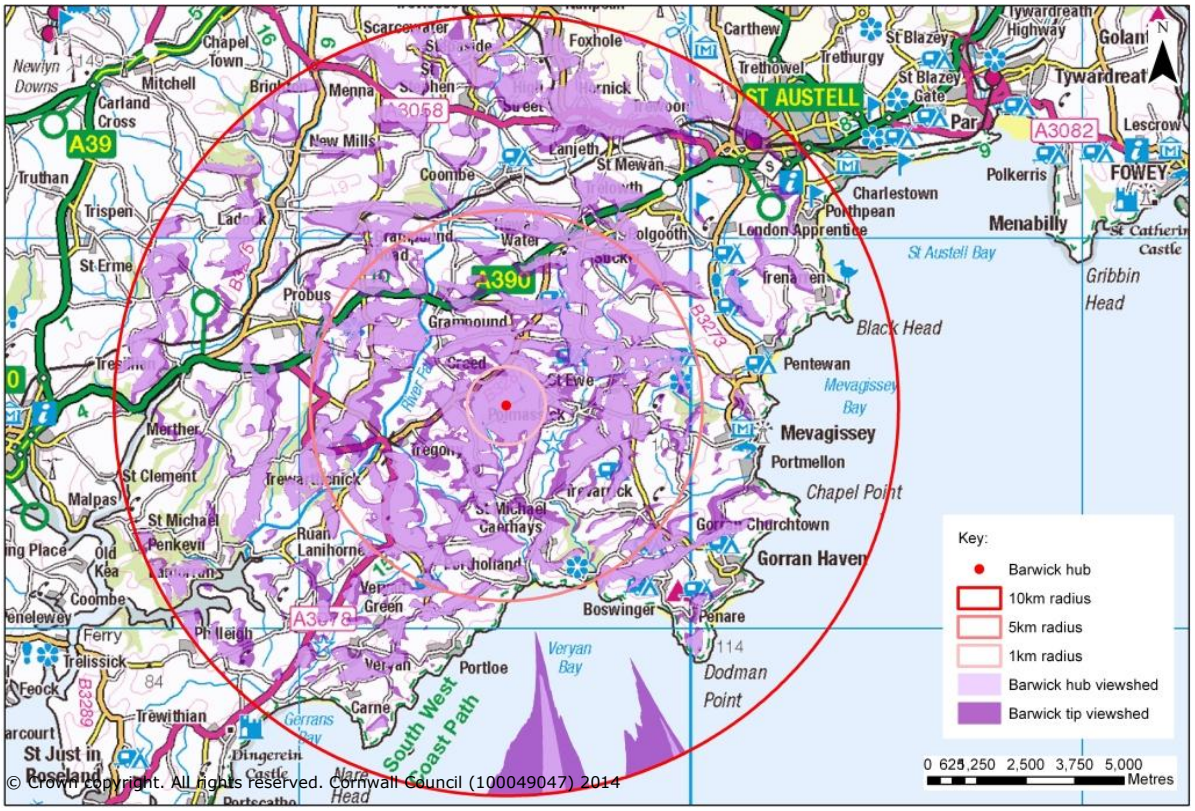

Figure 15: Combined hub and tip viewshed for the proposed turbine.

Figure 16: Map showing the radial zones within which each category of heritage asset has been considered.

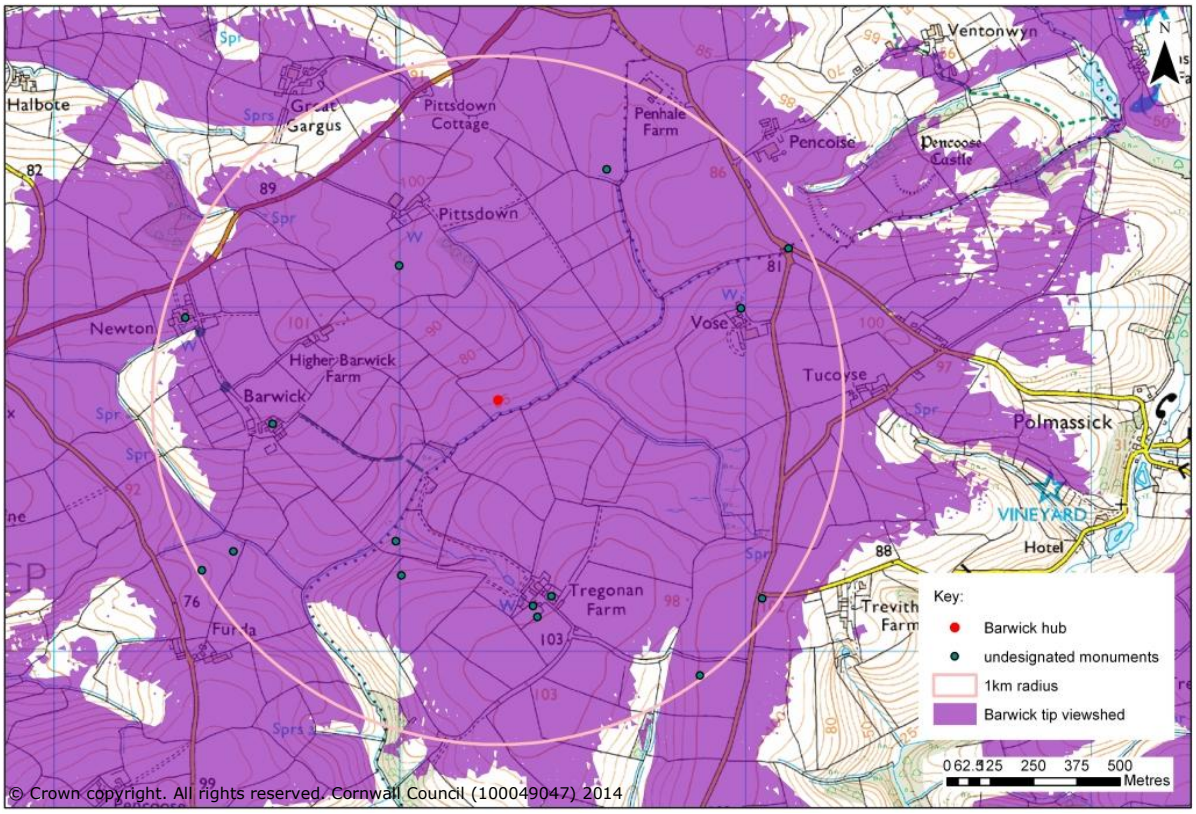

Figure 17: The 1km radius around the proposed site showing undesignated assets within the viewshed.

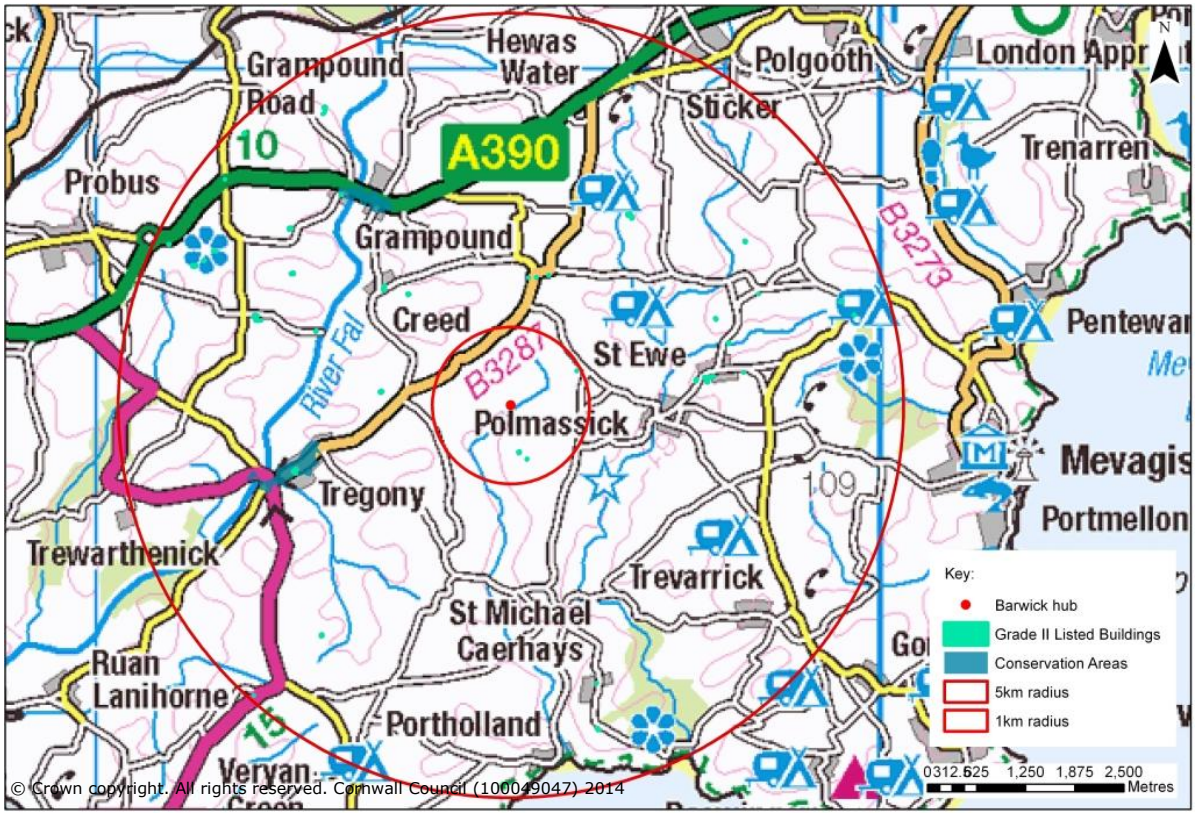

Figure 18: Map illustrating the Grade II Listed Buildings and Conservation areas within a 5km radius and the viewshed from the proposed turbine site.

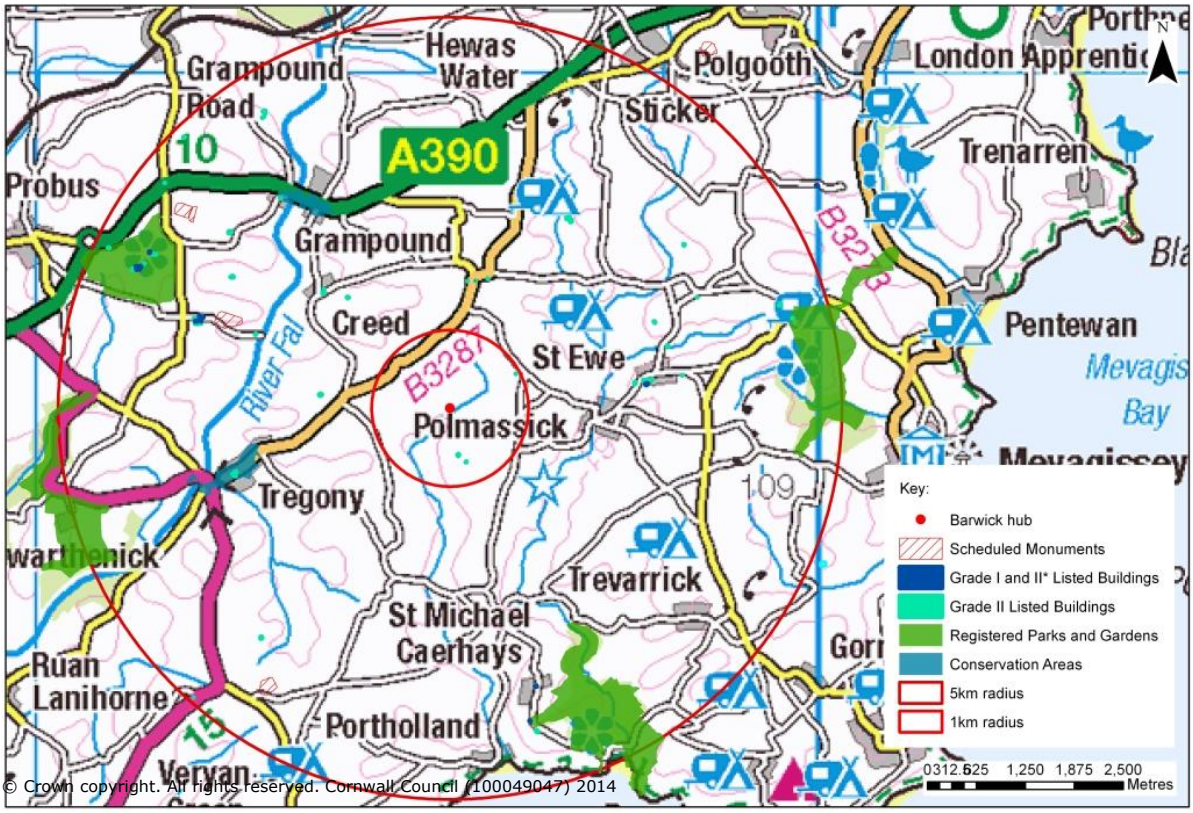

Figure 19: The 5km radius zone showing all designated assets within the viewshed.

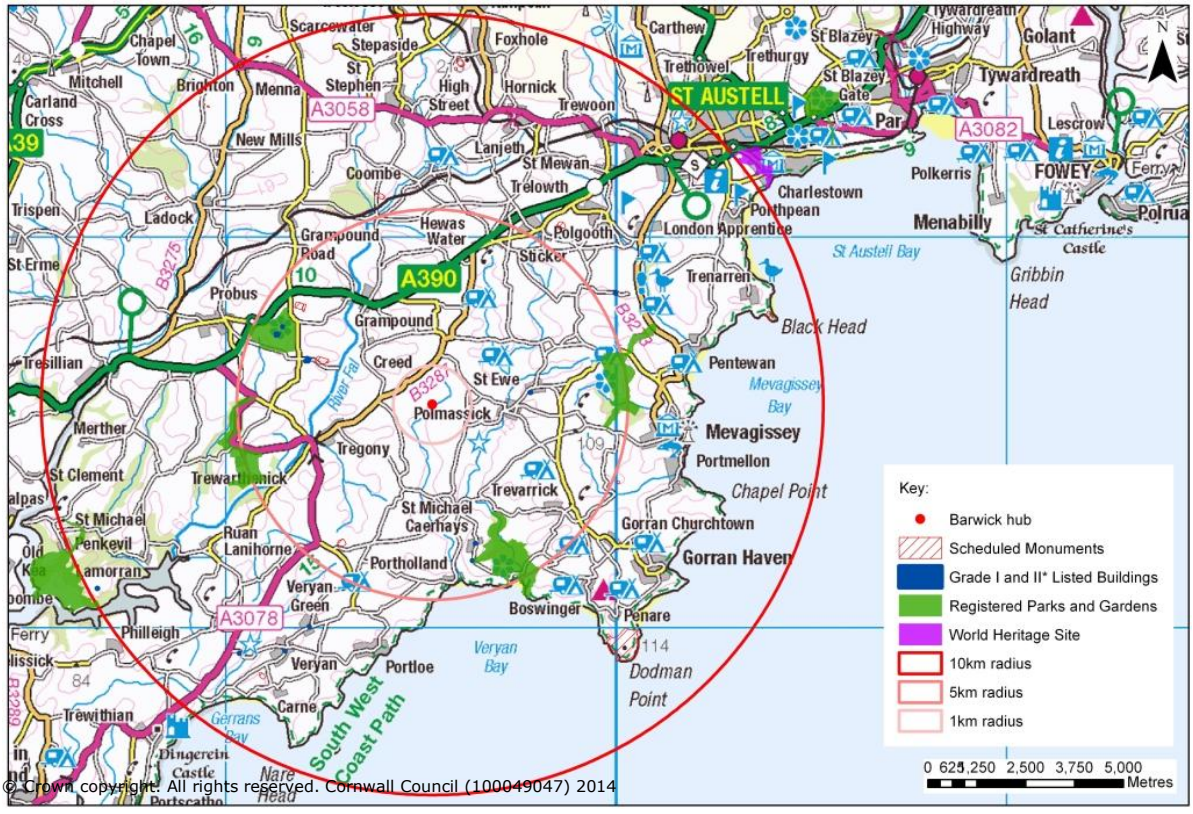

Figure 20: The 10km radius zone showing the Grade I and II Listed Buildings, Scheduled Monuments, World Heritage Site and Registered Parks and Gardens within the viewshed.*

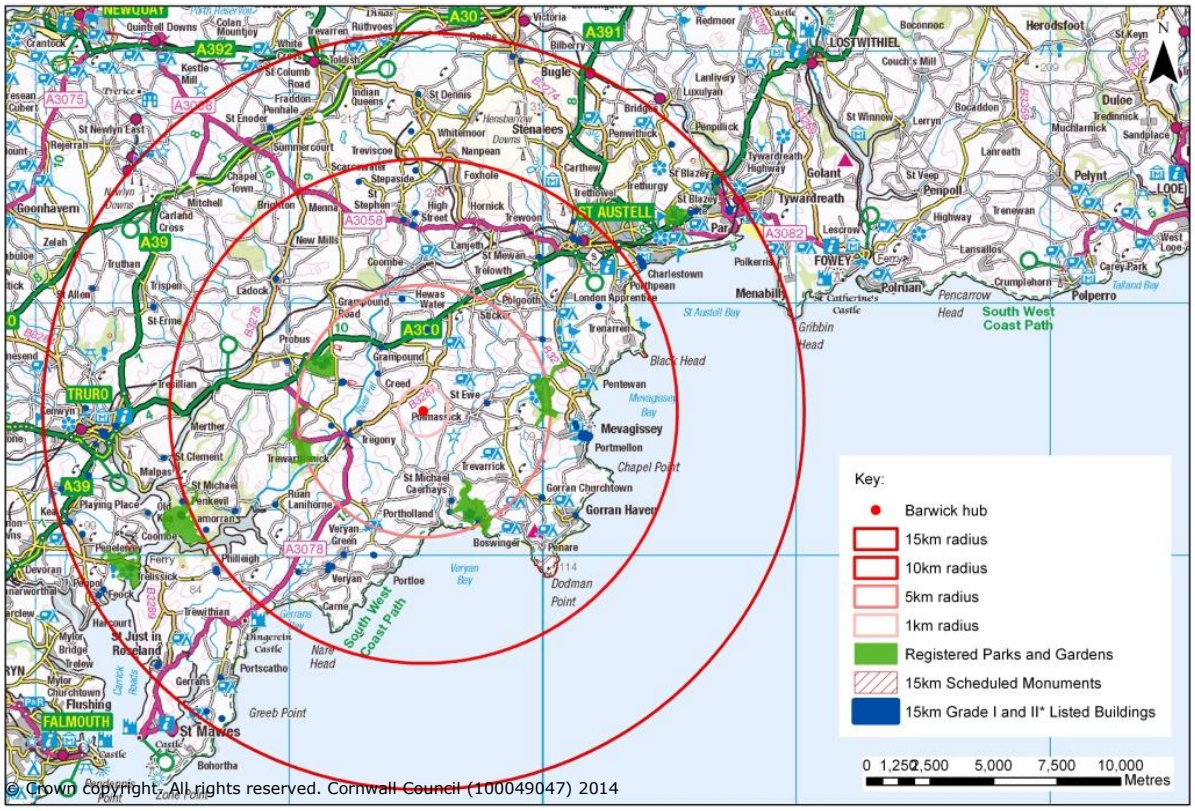

Figure 21: The Registered Parks and Gardens, Scheduled Monuments and Grade I and II Listed Buildings within a 15km radius of the proposed turbine site.*

Figure 22: Looking southeast across the proposed turbine field.

Figure 23: The view west from the proposed turbine field was more extensive from ground level than views in other directions.

Figure 24: The centre of Tregony village, a Conservation Area, looking northeast.

Figure 25: The view northwest from the edge of Caerhays Park showing the ridges and valleys that characterise the area. If erected the turbine may be visible on the extreme right of this image.

Figure 26: The view southwest from the entrance to Heligan Gardens. The turbine may become visible close to the horizon beyond the tree lined valley on the right.

Figure 27: Resugga Castle is sited in the scrub on the left, on the crest of the hill with good views to the south towards the turbine site.

Figure 28: The view east from the edge of Trewarthenick with Tregony on the right. The proposed turbine may be visible on the horizon to the left of Tregony

Figure 29: The maritime element of the setting of Veryan enclosure fort, looking southwest.

Figure 30: The view east from adjacent to the sites of Trewithen Garden, Golden Camp and Carvossa prehistoric hillfort. The proposed wind turbine would be on the far horizon right of centre if visible.

Figure 31: The centre of Charlestown where key views are south out to sea rather than west (right) towards the proposed turbine site.

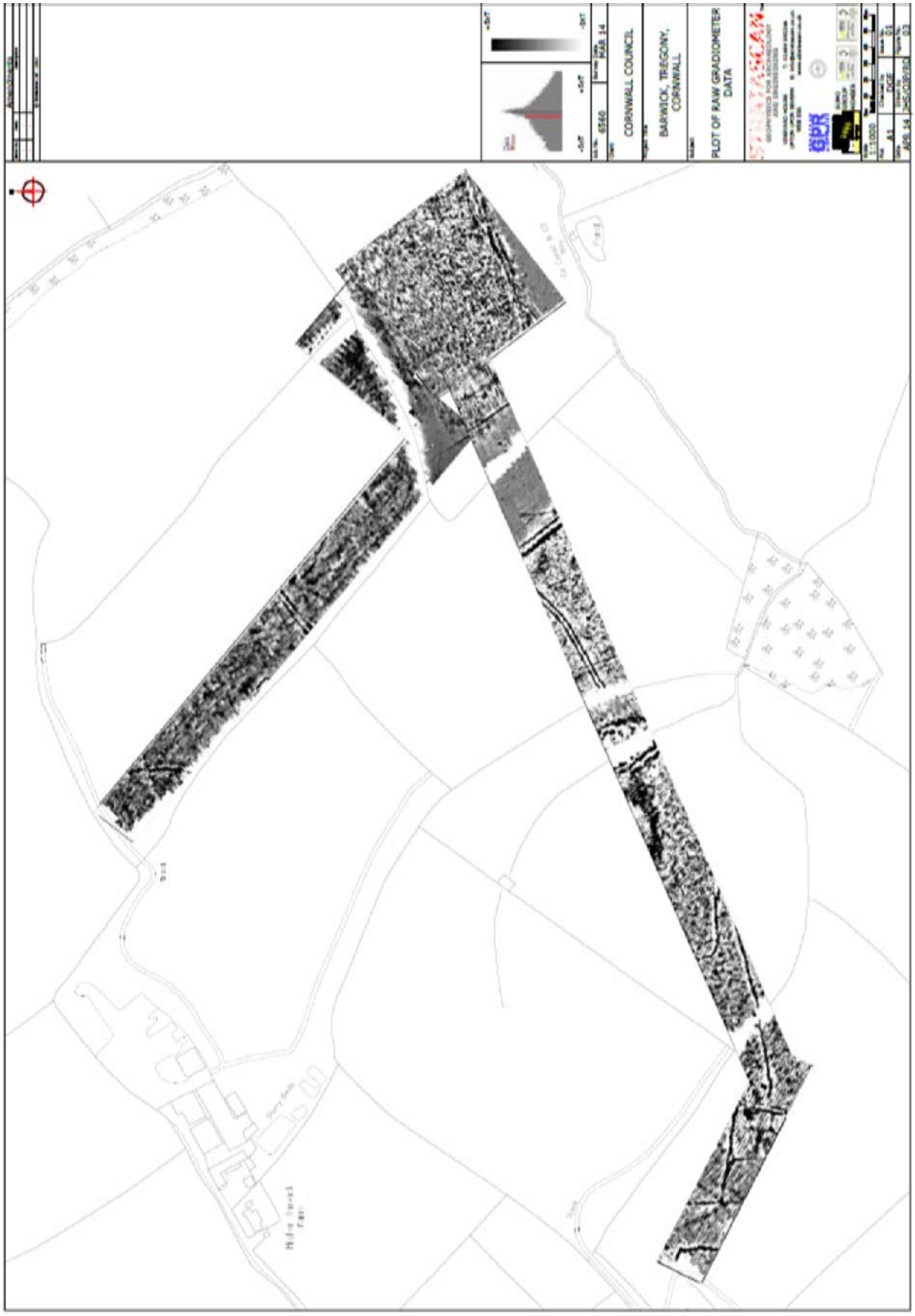

Figure 32: The geophysical survey plot of the raw data.

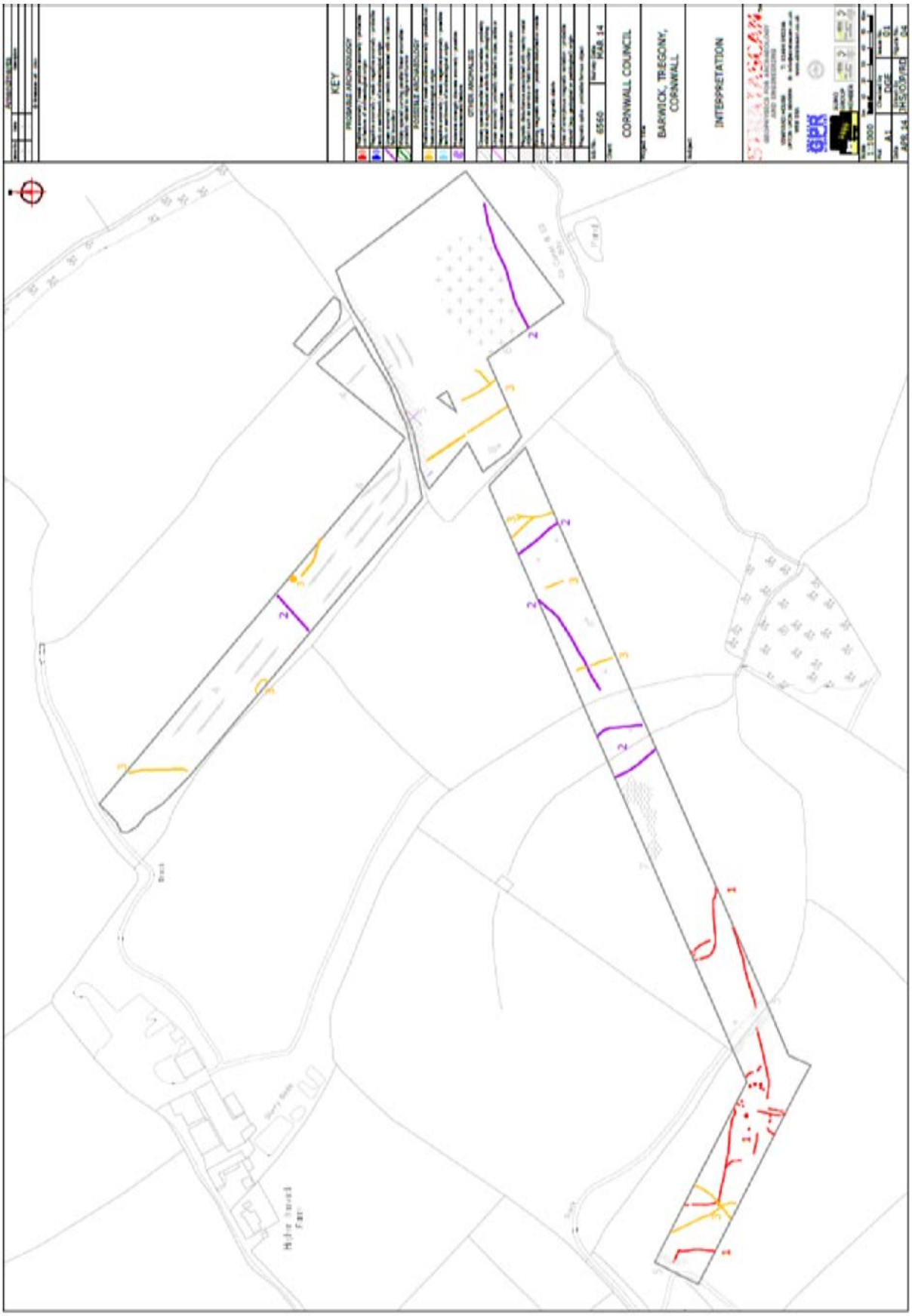

Figure 33: The interpretation of the geophysical survey results derived from the raw data plot shown above.

9.0 ARCHAEOLOGY AND THE HISTORIC ENVIRONMENT ASSESSMENT

Introduction

9.1 Cornwall Archaeological Unit (formerly Historic Environment Projects Cornwall Council) was commissioned to provide an assessment of the potential impacts of a proposed development for a single wind turbine on land at Barwick Farm in respect of archaeology and the historic environment. The assessment considers designated and undesignated heritage assets within a 15 km radius of the application site together with sub surface archaeology within the application area.

9.2 The Chapter provides a baseline description of heritage assets and assesses the potential impacts of the proposed development during construction and operation. Cumulative impacts of the proposed development are assessed together with mitigation measures to reduce the significance of any adverse direct and indirect impact on heritage assets.

9.3 Direct impacts are considered to constitute physical damage or removal of the asset. Indirect impacts are those that affect its setting (the area within which the asset is experienced or within which it influences the character of its surrounding landscape) including the visual, audible or contextual appreciation of the asset.

Planning Policy Context

9.4 The section provides an overview of the statutory and non-statutory planning legislation and policies relevant to the archaeology and historic environment.

National Planning Policy Framework

9.5 Paragraph 128 of the NPPF states that; 'In determining applications, local planning authorities should require an applicant to describe the significance of any heritage assets affected, including any contribution made by their setting. The level of detail should be proportionate to the assets' importance and no more than is sufficient to understand the potential impact of the proposal on their significance. As a minimum the relevant historic environment record should have been consulted and the heritage assets assessed using appropriate expertise where necessary. Where a site on which development is proposed includes or has the potential to include heritage assets with archaeological interest, local planning authorities should require developers to submit an appropriate desk-based assessment and, where necessary, a field evaluation.'

9.6 Paragraph 129 of the NPPF states that; 'Local planning authorities should identify and assess the particular significance of any heritage asset that may be affected by a proposal (including by development affecting the setting of a heritage asset) taking account of the available evidence and any necessary expertise. They should take this assessment into account when considering

the impact of a proposal on a heritage asset, to avoid or minimise conflict between the heritage asset's conservation and any aspect of the proposal.'

9.7 Paragraph 132 of the NPPF states that; 'When considering the impact of a proposed development on the significance of a designated heritage asset, great weight should be given to the asset's conservation. The more important the asset, the greater the weight should be. Significance can be harmed or lost through alteration or destruction of the heritage asset or development within its setting. As heritage assets are irreplaceable, any harm or loss should require clear and convincing justification. Substantial harm to or loss of a grade II listed building, park or garden should be exceptional. Substantial harm to or loss of designated heritage assets of the highest significance, notably scheduled monuments, protected wreck sites, battlefields, grade I and II* listed buildings, grade I and II* registered parks and gardens, and World Heritage Sites, should be wholly exceptional.'

9.8 Paragraph 133 of the NPPF states that; 'Where a proposed development will lead to substantial harm to or total loss of significance of a designated heritage asset, local planning authorities should refuse consent, unless it can be demonstrated that the substantial harm or loss is necessary to achieve substantial public benefits that outweigh that harm or loss, or all of the following apply:-

- the nature of the heritage asset prevents all reasonable uses of the site; and
- no viable use of the heritage asset itself can be found in the medium term through appropriate marketing that will enable its conservation; and
- conservation by grant-funding or some form of charitable or public ownership is demonstrably not possible; and
- the harm or loss is outweighed by the benefit of bringing the site back into use.'

9.9 Paragraph 134 of the NPPF states that; 'Where a development proposal will lead to less than substantial harm to the significance of a designated heritage asset, this harm should be weighed against the public benefits of the proposal, including securing its optimum viable use.'

9.10 Paragraph 135 of the NPPF states that; 'The effect of an application on the significance of a non-designated heritage asset should be taken into account in determining the application. In weighing applications that affect directly or indirectly non designated heritage assets, a balanced judgement will be required having regard to the scale of any harm or loss and the significance of the heritage asset.'

9.11 Paragraph 139 of the NPPF states that; 'Non-designated heritage assets of archaeological interest that are demonstrably of equivalent significance to

scheduled monuments, should be considered subject to the policies for designated heritage assets.'

Planning Practice Guidance – Covering the Historic Environment (March 2014)

9.12 Relevant guidance in Policy Practice Guidance (PPG) considered relevant to the proposed development is provided as follows:-
In Section 3, paragraph 2, of the PPG Decision Taking – Historic Environment it asks the question:-

- Why is 'significance' important in decision-taking?

9.13 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 to understanding the potential impact and acceptability of development proposals.

In section 3, paragraph 6, of the PPG it asks the question:-

- What is the setting of a heritage asset and how should it be taken into account?

9.14 A thorough assessment of the impact on setting needs to take into account, and be proportionate to, the significance of the heritage asset under consideration and the degree to which proposed changes enhance or detract from that significance and the ability to appreciate it.

9.15 Setting is the surroundings in which an asset is experienced, and may therefore be more extensive than its curtilage. All heritage assets have a setting, irrespective of the form in which they survive and whether they are designated or not.

9.16 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 from other land uses in the vicinity, and by our understanding of the historic relationship between places. For example, buildings that are in close proximity but are not visible from each other may have a historic or aesthetic connection that amplifies the experience of the significance of each.

9.17 The contribution that setting makes to the significance of the heritage asset does not depend on there being public rights or an ability to access or experience that setting. This will vary over time and according to circumstance.

9.18 When assessing any application for development which may affect the setting of a heritage asset, local planning authorities may need to consider the

implications of cumulative change. They may also need to consider the fact that developments which materially detract from the asset's significance may also damage its economic viability now, or in the future, thereby threatening its ongoing conservation.

In section 3, paragraph 12, of the PPG it asks the question:-

- How can proposals avoid or minimise harm to the significance of a heritage asset?

9.19 A clear understanding of the significance of a heritage asset and its setting is necessary to develop proposals which avoid or minimise harm. Early appraisals, a conservation plan or targeted specialist investigation can help to identify constraints and opportunities arising from the asset at an early stage. Such studies can reveal alternative development options, for example more sensitive designs or different orientations, that will deliver public benefits in a more sustainable and appropriate way.

Hedgerow Regulations

9.20 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.

9.21 Cornwall Council Historic Environment Planning Advice Officer's further advice dated late May 2013 states the current guidance for large-sized wind turbines (100-150m) is:-

- All proposals will require an archaeological assessment. Those with HER sites within 500m will also require a geophysical survey.

- An assessment of the settings of designated heritage assets will be required when Scheduled Monuments, Listed Buildings, Conservation Areas, the World Heritage Site, Registered Battlefields or Registered Parks and Gardens lie within 15km (100m to tip) or 20km (150m to tip).

Designations and Their Significance

World Heritage Site

These sites are designated and defined by UNESCO (UNESCO website)

9.22 The United Nations Educational, Scientific and Cultural Organization (UNESCO) seeks to encourage the identification, protection and preservation of cultural and natural heritage around the world considered to be of outstanding value to humanity. This is embodied in an international treaty

called the Convention concerning the Protection of the World Cultural and Natural Heritage, adopted by UNESCO in 1972.

9.23 Sites inscribed on the World Heritage List benefit from the elaboration and implementation of a comprehensive management plan that sets out adequate preservation measures and monitoring mechanisms. In support of these, experts offer technical training to the local site management team.

9.24 The inscription of a site on the World Heritage List brings an increase in public awareness of the site and of its outstanding values, thus also potentially increasing tourist activities at the site. When these are well planned for and organized respecting sustainable tourism principles, they can bring important funds to the site and to the local economy.

Scheduled Monuments

9.25 Scheduled Monuments have Statutory Protection under the Ancient Monuments and Archaeological Areas Act 1979. These are sites that have been identified by English Heritage, the Government's archaeological advisory body, as being of national importance, and are included in the County Lists maintained by the Secretary of State for Culture, Media and Sport. A schedule has been kept since 1882 of monuments whose preservation is given priority over other land uses. The current legislation, the Ancient Monuments and Archaeological Areas Act 1979, supports a formal system of Scheduled Monument Consent for any work to a designated monument (English Heritage Website).

Registered Parks and Gardens

9.26 Registered Parks and Gardens are described and defined by English Heritage (English Heritage Website). The English Heritage 'Register of Historic Parks and Gardens of special historic interest in England', established in 1983, currently identifies over 1,600 sites assessed to be of national importance The emphasis of the Register is … on 'designed' landscapes; … gardens, grounds and other planned open spaces, such as town squares … rather than on planting or botanical importance.

9.27 Historic parks and gardens are a fragile and finite resource: they can easily be damaged beyond repair or lost forever … The main purpose of this Register is to celebrate designed landscapes of note, and encourage appropriate protection. It is hoped that, by drawing attention to sites in this way, English Heritage will increase awareness of their value and encourage those who own them, or who otherwise have a role in their protection and their future, to treat these special places with due care.

9.28 Registration is a 'material consideration' in the planning process, meaning that planning authorities must consider the impact of any proposed development on the landscapes' special character.

Listed Buildings

9.29 Sites are Listed to mark their special architectural and historical interest; they are protected by law, and Listed Building Consent must be granted for any alterations to a designated building. Some sites, such as the Church of St Hermes, have been given Grade II* status, which means they are considered 'particularly important...of more than special interest.' The remaining sites are designated as Grade II listed and are therefore considered 'nationally important and of special interest' (English Heritage Website).

Conservation Areas

9.30 Conservation areas are designated for their special architectural and historic interest. They are designated by the local planning authority and comply with national standards. Designations of Conservation Areas were first made in 1967 and typically include town or city centres, fishing and mining villages, historic estates, housing and transport links (English Heritage Website).

Regional and Local Significance

9.31 These remains are considered of regional significance because of their rarity, setting and upstanding evidence but are otherwise undesignated assets.

Consultation

9.32 To inform the Environmental Statement a pre-application consultation process has been undertaken. This included:-

- A Scoping Opinion, received April 2014, including responses from English Heritage and the Cornwall Council Historic Environment Advice team.

- English Heritage, in their response of 23rd April 2014, recognised the need for wind energy but expressed concerns regarding the proximity of designated heritage assets and required an Environmental Impact Assessment and a study area of a 15km radius from the site for the assessment of heritage assets and impacts in line with their published guidance.

- The response from the Cornwall Council Historic Environment Advice team, dated 7th April 2014, supported and emphasised the English Heritage advice.

- An archaeological assessment was undertaken by Historic Environment Projects, Cornwall Council in May 2014 of the proposed development site and surrounding area (Appendix 9.1). The impacts identified from the results of the assessment are described below.

- A geophysical survey of the development area was undertaken by Stratascan Ltd in April 2014. The results are included in the

Archaeological Assessment (Appendix 1) and the impacts identified from the results are discussed below.

- Further consultation with other specialists contributing to the Environmental Statement was undertaken on a formal and informal basis.

Methodology

9.33 A detailed methodology for the Archaeological Assessment and Geophysical Survey can be found in Appendix 9.1. In summary the Assessment included:-

- Desk-based assessment – a consultation of historical databases, published sources, archives, maps and databases to obtain information about the history of the site, its surroundings and any features or structures of historical or archaeological interest within the assessment area boundaries.

- The historical and landscape context of the site were also considered during the desk-based stage in order to establish the nature of the heritage assets, the Historic Landscape Character of the area and the nature of any existing or planned power generation infrastructure within the landscape in which the development is proposed.

- Viewshed analysis – Using ArcGIS software and a Digital Terrain Model, a surface model of potential intervisibility between the proposed wind turbine and key heritage assets within the surrounding landscape was created. This provided the baseline 3D mapping from which setting impacts which might result from the construction of the proposed wind turbine could be quantified. Viewsheds or Zones of Theoretical Visibility were generated for an 'observer point' based on the location of the proposed wind turbine (Figure 9.1).

- Heritage assets were identified using intersections between this digital model and Historic Environment Record GIS layers; these were filtered to produce data sub-sets based on likely sensitivity, setting, intervisibility between heritage assets and the proposed turbine and other factors. This filtered group of sites was assessed to determine the nature and extent of any potential impacts (Figures 9.2 and 9.3).

- Fieldwork – In order to check the validity of the Zone of Theoretical Visibility and to field check the extent and nature of potential impacts on the identified heritage assets, site visits were made to selected key locations and heritage assets within the landscape surrounding the proposed development (Table 9.4). A visual check and photographic record were made.

- A walkover survey of the proposed wind turbine site and cabling route was undertaken to examine the site for upstanding archaeology and to

record the nature of the boundary types which might be impacted upon during the development.

- Geophysical Survey – A magnetometer survey was carried out using a dual sensor Bartington Grad601-2 Magnetic Gradiometer. Readings were taken at 0.25m centres along traverses 1m apart to identify potential sub-surface archaeological features.

Assessment of Significance

9.34 Two general types of archaeological impact associated with development are relevant during both the construction and operational phase of the development. The impacts of a development on archaeology and the historic environment may be either positive or negative. For the purposes of this assessment the significance of the impacts is set out in Tables 9.1, 9.2 and 9.3.

9.35 The assessment also distinguishes where possible between “permanent” or “temporary” and between “reversible” or “irreversible” as appropriate, in the determination of the scale of impacts. From the data collected above, the potential impacts and significance of effects upon the identified heritage assets were assessed taking into account the nature and significance of each asset. Significance and impact were determined using the following criteria:

The significance of each historic asset is graded as follows:

WHS - World Heritage Site
S - Scheduled Monument
L - Listed Building
A - Site of National Importance
B - Site of Regional Importance
C - Site of Local Importance
D - Natural Feature or non-antiquity

The condition of each historic asset was assessed where possible during the walkover survey and was graded from 1-4:

1 - No surviving remains evident above ground
2 - Poor preservation
3 - Fair preservation
4 - Good preservation

The sites have been given one of four Overall Impact grades; from Major, which (where negative) approximates to damage and loss of the site's integrity and which represents a key factor in the decision-making process, to negligible, which equates to no perceptible effects. The full scale is:

Impact Category	**Typical Descriptors of Effect**
Major	Only adverse effects are normally assigned this level of significance. They represent key factors in the decision-making process. These effects are generally, but not exclusively, associated with sites or features of international, national or regional importance that are likely to suffer a most damaging impact and loss of resource integrity. However, a major change in a site or feature of local importance may also enter this category.
Moderate	These beneficial or adverse effects are considered to be very important considerations and are likely to be material in the decision-making process.
Minor	These beneficial or adverse effects may be important, but are not likely to be key decision-making factors. The cumulative effects of such factors may influence decision-making if they lead to an increase in the overall adverse effect on a particular resource or receptor.
Negligible	These beneficial or adverse effects may be raised as local factors. They are unlikely to be critical in the decision-making process, but may be important in influencing the subsequent design of the project.

Table 9.1: Overall Impact descriptors

In addition to the above descriptors the Overall Impact is determined using the combined result of the Sensitivity rating and the Magnitude of Impact rating (DMRB Vol.11; 2/1-5).

The Sensitivity ratings are:

Sensitivity Rating	**Typical Descriptors**
High	High or very high importance and rarity, national or international scale and very limited potential for substitution. Equates to World Heritage Sites, Scheduled Monuments, Listed Buildings and other Sites of National or International Importance.
Medium	High or medium importance and rarity, regional scale, limited potential for substitution. Equates to Sites of Regional Importance and selected undesignated heritage assets.
Low	Low or medium importance and rarity, local scale. Equates to Sites of Local Importance and undesignated heritage assets.

Table 9.2: Sensitivity Rating descriptors

The Magnitude of Impact ratings are:

Magnitude of Impact rating	**Typical Descriptors**
Major	Loss of resource and/or quality and integrity of resource; severe damage to key characteristics, features or elements.
Moderate	Loss of resource, but not adversely affecting the integrity; partial loss of/damage to key characteristics, features or elements.
Minor	Some measurable change in attributes, quality or vulnerability; minor loss of, or alteration to, one (maybe more) key characteristics, features or elements.
Negligible	Very minor loss or detrimental alteration to one or more characteristics, features or elements.

Table 9.3: Magnitude of Impact Rating descriptors

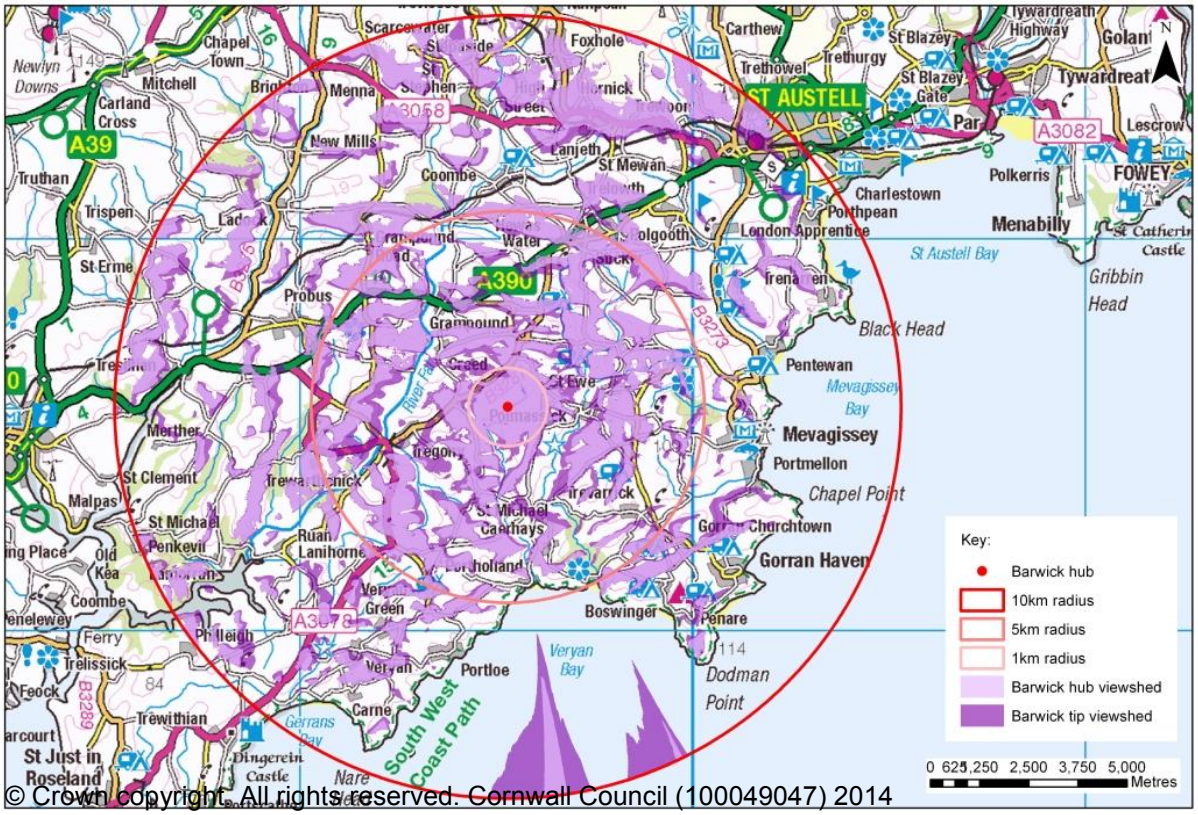

Figure 9.1: Combined tip and hub viewshed for the proposed wind turbine.

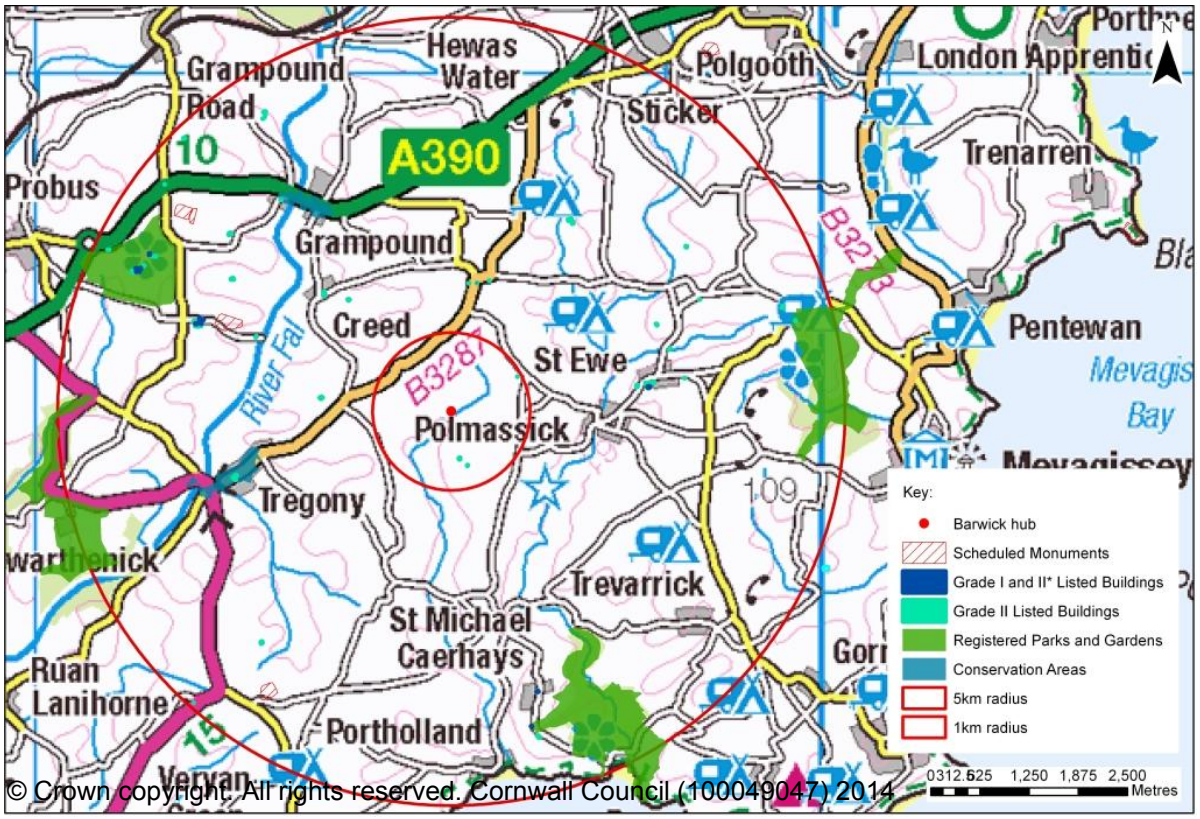

Figure 9.2: Heritage assets within the viewshed and within 5km of the proposed turbine site.

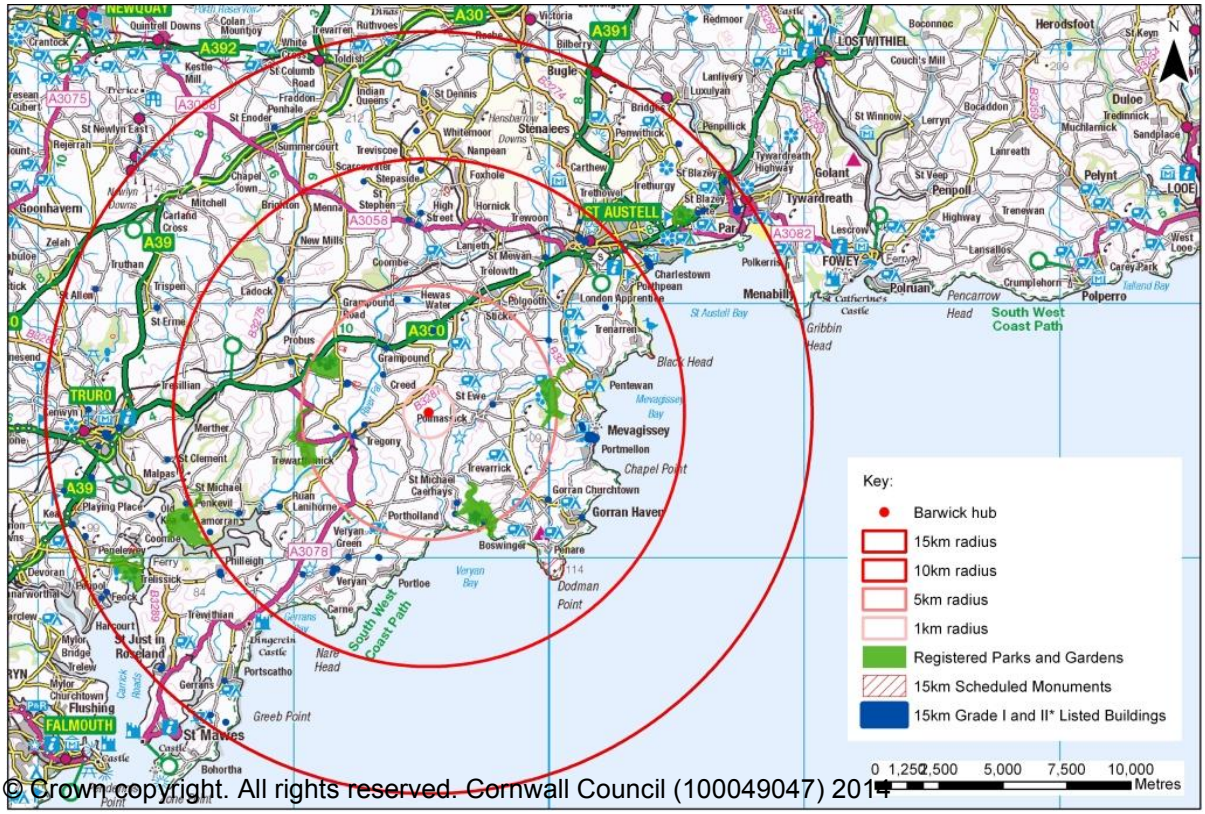

Figure 9.3: Heritage assets within the viewshed and within 15km of the proposed turbine site.

Baseline Conditions

Location and Topography

9.36 The proposed wind turbine is located at approximately 70m above Ordnance Datum (OD) at SW 95290 45799 (NGR). The application site is approximately 12km east of Truro and 2.5km north-east of the village of Tregony (Figure 9.1). Topographically the site is on the south facing slope of a shallow valley surrounded by ridge-tops that form a truncated plateau. Given the height of the wind turbine, this development is likely to be visible from a considerable distance away in the surrounding landscape.

Geology

9.37 The bedrock geology in this location consists of sandstone and argillaceous rocks of the Portscatho Formation. This is a sedimentary bedrock formed approximately 375-392 million years ago in the Devonian Period in a deep sea environment. No superficial deposits are recorded (British Geological Survey website). This bedrock type is judged to be favourable to archaeological magnetometer surveys.

Historic Landscape Characterisation

9.38 The Historic Landscape Characterisation (HLC) of the turbine site is recorded as Farmland, Medieval (Anciently Enclosed Land). This HLC Type forms Cornwall's agricultural heartlands, and contains farming settlements documented before the 17th Century set within morphologically distinct field patterns of Medieval or Prehistoric origins, and is likely to contain archaeological evidence for early settlements and associated features.

Site Description

9.39 The application site is located in a shallow valley and is approximately rectangular. The field is gently sloping to the south with a series of small flatter areas, eventually flattening out along the southern boundary close to the stream that runs along the valley bottom (Figure 9.4). No upstanding archaeological features were visible within the site, which at the time of the survey, was grass pasture. The field boundaries are low, approximately one metre high, Cornish hedges topped with a further metre of vegetation including hawthorn, blackthorn and brambles. The views from the site covered an agricultural landscape. To the east the views were quite restricted by the topography of the field but from ground level beyond the boundary they extended to the next ridge top. To the north and south the views from ground level were up the valley sides to the top of the ridges only. Views to the west were the most extensive along the valley bottom. No turbines are currently visible from the site.

Figure 9.4: The view west from the proposed turbine field across the surviving prehistoric and medieval field systems was more extensive from ground level than views in other directions. Tregonan Farmhouse is likely to experience some of this view from its location on the hill just out of sight to the left of the image.

Archaeological and Historical Context

Prehistoric

9.40 The prehistoric remains in this area are concentrated into a series of hilltop enclosures, several sites of this type also being recorded by the NMP mapping around the proposed turbine site. There are barrows in elevated locations such those at Carnwinnick, Bodrugan and on the Dodman.

9.41 The majority of the hilltop enclosures overlook the multiple river and stream valleys in this area. Castle Hill is one of the most typical of these, sited at a confluence of three valleys and overlooking a small cove, it also commands good views inland. Resugga, Carvossa and Golden Camp all overlook, from west to east, the upper reaches of the Fal River, thought in the past to have been navigable as far as Grampound. Dodman Point is the most impressive of the sites of this type within this area. At 34ha it dwarfs the other promontory fort of Black Head close by to the northeast. It encloses a long history of use physically represented by Bronze Age barrows, an Iron Age enclosure and occupation and medieval field systems.

Medieval

9.42 The earliest record of Barwick is not clear, however the prefix ‘bar’ means top or summit in Cornish whilst the suffix ‘wick’ probably derives from an Old English word ‘wíc’ meaning settlement. This therefore lends a medieval or earlier origin for the name that directly refers to the geographic location of the settlement.

9.43 The Domesday Book reveals no direct evidence. The closest recorded Domesday manor is Tucoyse, around 1km to the east, which was held by Richard and valued at 20s.

Post Medieval

9.44 Barwick is depicted on the detailed Martyn’s Map of 1748 and is referred to on the 1807 OS map.

9.45 From the Cuby Parish Tithe Map of 1841, and the adjacent St Ewe Tithe Map of 1839, the field patterns can be seen to have changed little in the immediate area. Many of the fields are quite large and rectangular and may be a product of the Enclosure Acts that were enacted from the 17th century onwards. Barwick was listed on the Tithe Apportionment of 1841 as being owned by the Earl of Falmouth and leased to the occupier Thomas Harris.

9.46 The Ordnance Survey Maps of 1875 and 1908 indicate few changes were made to the landscape during the late 19th and early 20th centuries. Only a few field boundaries close to the turbine site are shown to have been removed since the making of the Tithe Map, probably a continuation of the enclosure process creating larger fields suitable for modern farming methods.

9.47 Between the making of the 1908 OS map and modern OS mapping, a field boundary has been added to the west of the turbine site and a further field boundary has been removed to its south. More extensive changes have been made around Vose and Pencoise almost 1km to the east where formerly small fields have been opened out into significantly larger enclosures by the removal of a considerable number of boundaries.

9.48 The post medieval period in Cornwall and elsewhere saw the development of large estates with country houses, designed landscapes and significant collections of plants. Heligan, Caerhays, Trewarthenick and Trewithen almost equidistantly surround Barwick. Heligan was part of the Arundell estate during the 12th century and was sold to Sampson Tremayne in the late 16th century. The house was developed from the 17th century, with the garden undergoing several remodelling phases in the 17th-18th centuries and extensive planting of exotic species in the 19th century. These gardens have now been restored after they became derelict following World War II.

9.49 Caerhays was also part of the early medieval estate of the Arundell family, passing by marriage into the Trevanion family c1379. Improvements to the house and garden were made throughout the 18th and 19th centuries with input from John Nash and possibly Humphry Repton. The estate was sold to the Williams family in 1853 and c1885 John Charles Williams began the woodland garden that features the camellias and rhododendrons that Caerhays is now noted for.

9.50 Trewarthenick was purchased by John Gregor, a wealthy Truro merchant, in 1640. His grandson John 'the giant' Gregor built a new house by 1680 in the latest Palladian style. In the late 18th century Humphry Repton was invited to draw up proposals for improvements to the house and landscape, many of which were undertaken, followed by a similar invitation to Henry Harrison in the early 1800s. Further changes were made in the early 20th century by owner Paul Welman, though the estate was largely broken up following his death and the house was converted into flats in the 1960s.

9.51 Trewithen was purchased in 1715 by Philip Hawkins of Pennans who made improvements to the existing house and grounds. In 1766 Sir Christopher Hawkins inherited the estate and extended the property, commissioning its picturesque circuit ride. During World War I the government requisitioned timber from the park opening up space within which the current collections of rhododendrons and camellias were planted.

9.52 The wider landscape to the north has been significantly altered by china clay extraction, an industry which continues to significantly alter the appearance this part of the landscape. The resultant pits and spoil dumps are clearly visible and the ports and coastal villages around St Austell Bay contain many related industrial features. Charlestown, a component of the Cornish Mining World Heritage Site, is the prime example.

Modern

9.53 In the modern period few changes have been made to the immediate surroundings of Barwick; the small farming settlements and fields remain, many structures being protected by Listed Building status; the estates remain largely intact and maritime activities are still pursued from the coastal settlements.

No	Site Name & Reference	Grid Ref. SW/SX	Description	Probable Date	Significance	Condition	Sensitivity	Magnitude of Impact
1	Barwick Field Systems MCO20546 / MCO20545	SW 95000 46120 / 94990 45320	The extant prehistoric to post medieval field systems were not easily discernible from ground level at or close to the turbine site. However walking through the fields it was clear that many are irregular in shape. The fields will all be highly intervisible with the turbine which will also probably be audible from them. The field systems are set within a wider historic agricultural landscape context.	Prehistoric - post medieval	C	3	Low	Minor
2	Tregony Conservation Area DCO40	SW 92534 44873	The Tregony Conservation Area also includes many listed buildings. The village has a well preserved historic character, though is a busy modern settlement with a quite well-used road through its centre. The majority of its buildings face in towards this central street. There is no intervisibility with the turbine site from the centre of the village; however from the rear of these properties views of the turbine may be possible. Most of the outskirts of the village appear to be screened by mature deciduous trees, though this is not a substantial block in winter months. The village is set within an agricultural landscape.	Medieval - modern	A	3	Medium	Negligible
3	Caerhays Castle 1000448 / 1327073	SW 97160 41109	The grounds of Caerhays are a Registered Park and Garden whilst St Michael's Church and Higher Lodge are high grade Listed Buildings. The main aspect of the Castle is out to sea over the lawns in front of it, however the majority of the garden and protected landscape extends north behind the house. This designed landscape is set within a wider agricultural environment with roads cut into the bedrock or surrounded by woodland, controlling views of the estate. Although the Church is small, it is in a	Medieval or Post Medieval	A Grade II* (RPG) L Grade I (buildings)	4	High	Minor

No	Site Name & Reference	Grid Ref. SW/SX	Description	Probable Date	Significance	Condition	Sensitivity	Magnitude of Impact
			prominent hilltop location and, significantly, is intervisible with Gorran church tower. The Park and Listed Buildings are on high ground with generally good views inland. Due to the 2m high hedges on parts of the western boundary, intervisibility from ground level was severely restricted. However from areas where the hedges are low or absent intervisibility with the turbine site is likely to be possible, though at a fair distance and the undulating topography will probably obscure much of the turbine or allow for intermittent views only. There is very little intervening screening. At least two small existing turbines are visible within these views.					
4	Tregonan Cottage Barrow MCO3645	SW 95870 44930	A Bronze Age barrow surviving as a low earthen mound, though not visible behind a hedgerow which is greater than 2m in height. It is located on high ground and is likely to experience good intervisibility with the turbine dependant on the extent of any intervening screening. The barrow is set in an upland agricultural landscape.	Bronze Age	C	2	Low	Minor
5	Tregonan Farmhouse 1144803	SW 95387 45133	A 17th-18th century farmhouse with 19th century alterations located on high ground on a north facing slope in a slight valley almost overlooking the turbine field. It is very likely to have good views of at least the upper parts of the turbine unless any intervening screening from the associated farm buildings, hedges and trees is particularly substantial. An audible impact is also a possibility. The farmhouse is in quite an isolated location and set within a very agricultural upland landscape.	Post medieval	L Grade II	3	High	Minor

No	Site Name & Reference	Grid Ref. SW/SX	Description	Probable Date	Significance	Condition	Sensitivity	Magnitude of Impact
6	Church of All Saints, St Ewe village 1137082	SW 97791 46044	The village includes the Grade I Listed Church of All Saints, the Grade II Crown Inn, the undesignated Schoolmaster's House and adjacent School and multiple Grade II Listed houses. The village is located in a slight hollow facing in towards the church. The small Church spire is not a significant landmark. The village is set in a rural environment and retains its historic character with few overtly modern intrusions. The proposed turbine is unlikely to be visible from much of the village. However the western extent of the village has more open views towards the site, with screening provided only by garden hedges.	Medieval or Post Medieval	L Grades I and II	4	High	Minor
7	Castle Hill Camp 1004256	SX 00045 43740	The remains of this site are located on a prominent hilltop overlooking river valleys and Portmellon Cove. Although the valley sides are quite densely wooded, the hillcrest on which the camp is sited is largely devoid of trees and is thus exposed to a high possibility of intervisibility with the proposed turbine site 5km away. The typically prominent location of this prehistoric asset is set within a relatively undisturbed rural environment, although there is significant modern intrusion nearby at Portmellon and Mevagissey, and as a result of the two turbines already constructed to the southwest.	Prehistoric	S	3	High	Minor
8	Heligan 1000538	SX 00316 45854	The gardens of Heligan predominantly occupy a valley and south facing slope, however there are upland areas to the north and northwest, including the main visitor entrance. Heligan is a designed landscape set within a wider agricultural and rural	Post Medieval	A Grade II	4	High	Minor

No	Site Name & Reference	Grid Ref. SW/SX	Description	Probable Date	Significance	Condition	Sensitivity	Magnitude of Impact
			environment with few modern incursions nearby. It is a significant visitor attraction in this area. From the upland areas of the park there are extensive views to the west and northwest, with little intervening vegetation, and it is probable that some parts of the turbine will be visible. Two small existing turbines are visible to the south.					
9	Tregrehan 1000545	SX 05192 53547	The Registered Park and Garden of Tregrehan is located in a hollow and on a west facing slope between St Austell and St Blazey Gate. It is set within the urbanised area of St Austell, close to busy roads and housing, although to the north the generally rural environment is partly occupied by features associated with the china clay industry and mineral extraction. The garden has a mix of open areas and mature trees, potentially allowing some views towards the proposed turbine site though at a great distance.	Post Medieval	A Grade II*	4	High	Negligible
10	Charlestown	SX 03760 51785	The internationally important area of Charlestown is located in a valley leading to the sea. Within the settlement the eye is directed down the main street with a view of the sea to the south. To the west, in the intervening space between Charlestown and the proposed turbine site is occupied by a significant hill obscuring any view of the proposed turbine completely. Charlestown has a maritime and coastal setting on the fringes of the conurbation of St Austell. It includes many modern amenities, tourist features and a high proportion of new houses which are not particularly sympathetic to the original cottages in the centre of the	Post Medieval	WHS	3	High	Negligible

No	Site Name & Reference	Grid Ref. SW/SX	Description	Probable Date	Significance	Condition	Sensitivity	Magnitude of Impact
			settlement. The density of housing, garden vegetation and topography taken together obscure any views of the turbine site.					
11	Sticker Camp 1011994	SW 98579 50327	The later prehistoric-Roman round at Sticker is on a hilltop with good views of the surrounding landscape, although is adjacent to the village and a busy road. Its setting is generally rural though industrial remains of mineral extraction to the north and an engine house to the south are included. There is little substantial screening provided by vegetation and it is possible that the top of the turbine will be visible.	Prehistoric-Roman	S	3	High	Minor
12	Grampound Conservation Area DCO102	SW 93648 48252	Grampound village contains a number of Listed Buildings and its character is quite well preserved. However there is an extremely busy road running through its centre with associated modern street furniture. The buildings which make the principal contribution towards its Conservation Area status generally face inwards towards this road. The village is set within a rural environment. Topographically the village is located on a west facing slope and in a valley bottom. A significant quantity of trees and vegetation surrounds the settlement, particularly around the base of the valley, which provides substantial screening from the rest of the landscape. It is unlikely that any sections of the turbine will be visible from any part of the village or will intrude into its immediate setting.	Post Medieval	A	3	Medium	Negligible
13	Resugga Castle 1017685	SW 93961 51064	Resugga is a later prehistoric univallate hillfort located on the crest of a ridge which is covered in scrub vegetation. It is adjacent to	Later prehistoric	S	3	High	Negligible

No	Site Name & Reference	Grid Ref. SW/SX	Description	Probable Date	Significance	Condition	Sensitivity	Magnitude of Impact
			the village of Coombe in a rural setting. To the south of Coombe is a larger ridge developed by the railway with bridges and a nearby viaduct. It is possible that some of the upper parts of the turbine will be visible at a distance, but any views may include the railway infrastructure.					
14	St Stephen's Beacon Hillfort 1003091	SW 96009 54490	The hillfort is located on top of a substantial hill covered only with grass and scrub vegetation and has good landscape views. It has a mixed setting of past and present mineral extraction activity, agricultural and semi-urban landscapes. At least one turbine is already visible from the Beacon and it is likely that the proposed turbine will also be visible, though at quite a distance away.	Prehistoric	S	2	High	Negligible
15	Penhale Round 1020752	SW 88495 51023	The prehistoric round is 330m southeast of Penhale and located on a hilltop with good landscape views to the south and southeast. There is little screening in the vicinity except for 1-2m high Cornish hedges. The round has a rural agricultural setting with Ladock village forming part of the wider landscape. Two small existing turbines are located approximately 500m to the southwest. It is unlikely that much, if any, of the proposed turbine will be visible due to the distance and the undulating nature of this landscape.	Prehistoric	S	3	High	Negligible
16	Trewithen 1000510	SW 91172 47510	Trewithen is a Registered Park and Garden which includes Listed barns, farmhouses and other buildings. The majority of the garden is located in a hollow and its perimeter is quite densely wooded. Although a modern visitor attraction, Trewithen is a designed landscape in a highly rural setting. It is possible that some sections of the turbine may be visible	Post Medieval	A Grade II* (RPG) L Grades I and II (buildings)	4	High	Minor

No	Site Name & Reference	Grid Ref. SW/SX	Description	Probable Date	Significance	Condition	Sensitivity	Magnitude of Impact
			from the majority of the protected area.					
17	Carvossa 1016890	SW 91879 48266	The prehistoric settlement is located in quite open farmland with some hedgerows and wooded valleys between it and the turbine site. Carvossa is on a hilltop overlooking the Fal river in a rural setting containing sporadic farm settlements. Views from it to the east are quite extensive and it is possible that at least the top of the turbine will be visible. This will be dependent on weather conditions and vegetation density, and the turbine will be at quite a distance from the site.	Prehistoric	S	2	High	Minor
18	Golden Camp and Golden Manor 1016889 / 1141132	SW 92454 46853 / SW 92045 46847	The hillfort is situated on high ground close to the Fal river valley in a rural setting. Its ridge-top location affords it potentially good landscape views however the intervening space to the proposed turbine site includes areas of woodland which may block intervisibility. It is, however, possible that part of the turbine may be visible from this site.	Prehistoric	S	3	High	Minor
19	Trewarthenick 1000658	SW 90415 44098	The Registered Park and Garden surrounding the east-facing house is quite open on the east side but densely wooded to the west and north and around much of the perimeter. Trewarthenick is a designed landscape within a woodland and agricultural setting. Although unlikely, it is possible that the turbine will be visible from parts of the gardens, though it will be a very minor feature within such views.	Post Medieval	A Grade II	3	High	Negligible
20	Veryan Enclosure Fort 1019746	SW 90927 38786	Veryan Castle is a prehistoric multiple enclosure fort with an annex in an elevated location overlooking a steep valley leading to the sea. Its setting is predominantly rural though it also has a wider maritime setting. Though there is little substantial vegetation	Prehistoric	S	3	High	Negligible

No	Site Name & Reference	Grid Ref. SW/SX	Description	Probable Date	Significance	Condition	Sensitivity	Magnitude of Impact
			screening the ridge-top, topography closes off views towards the proposed turbine site. It is unlikely that any part of the turbine will be visible.					
21	Trelissick 1000656	SW 83325 39051	The Registered Park and Garden is situated to the west of the River Fal with the main aspect of the house and grounds facing south towards the Carrick Roads. Parts of the Park are densely wooded. Trelissick is a designed landscape within a woodland, agricultural and maritime setting. Due to distance and topography, it is very unlikely the turbine will be visible from the Park.	Post Medieval	A Grade II*	4	High	Negligible
22	Tregothnan 1000655	SW 85876 41258	The Registered Park and Garden is located on undulating land on a spur between the Truro and Fal rivers. The surrounding landscape is highly wooded and often low-lying close to the river banks. The north-eastern parts of the Park are more elevated with more extensive views. The Park is set within an agricultural, wooded and marine environment. It is unlikely that the turbine will be visible due to distance from the site and undulating landscape obscuring views.	Post Medieval	A Grade II*	4	High	Negligible

Table 9.4: Fieldwork Impact Assessment Results

Impact Assessment during construction

Indirect Impacts

9.54 The construction of the wind turbine at Barwick will create some minor setting impacts to surrounding heritage assets, though as these impacts will be temporary and potentially reversible they are assessed as **negligible negative** in scale.

9.55 An assessment of the likely noise impact due to the construction phase of the proposed turbine has been undertaken by an appropriate specialist. The assessment indicates that heritage assets close to the receptors at Tregonan Farm and Higher Barwick Farm may experience audible impacts from construction activities. However these are considered to be below the guideline levels and temporary in duration and are therefore assessed as insignificant.

Direct Impacts

9.56 The construction of the wind turbine, specifically the excavations for the foundations and the cable route, has the potential to cause irreversible physical impacts upon any upstanding or sub-surface archaeology in these locations.

9.57 The geophysical survey results indicate that the construction of the turbine will have little or no direct impact, as there appears not to be any subsurface archaeology around its immediate location. However it is still possible that sub-surface remains or artefacts not identifiable through geophysical survey may be impacted as a result of the development. It is difficult to assess the significance or sensitivity on unknown or potential archaeology, however any such remains are likely to be small, ephemeral or artefactual given they were not identified by the geophysical survey. If such archaeology is found it is likely to be considered as having up to regional importance, though national or greater importance remains a slight possibility. Direct impacts on such archaeology would probably mean at least partial loss or alteration to any such remains resulting in an at least a moderately negative impact if this scenario occurred. Although dependant on the extent, survival and significance of any archaeological remains given the geophysical survey results, the overall direct and irreversible impacts are most likely to be **minor negative**.

9.58 Within the preferred cable route, to the north of the wind turbine, there are linear anomalies considered likely to be historic field boundaries. Direct impacts would most probably cause the partial loss or alteration to any such remains. The excavation of the cable route also has the potential to reveal archaeology associated with the anomalies not identified by the geophysical survey. The unknown significance of any such archaeology and the direct and irreversible impacts of excavating the cable route have some potential to result in significant negative impacts, but given the

geophysical survey results this is considered very unlikely and the overall impact of the cable route is therefore assessed as **minor negative**.

9.59 Provision of a works compound or additional access routes are likely to have scales of impact similar to those identified in paragraphs 9.57 and 9.58 above. However the widening of existing gateways and the removal of existing hedgerows has the potential to expose archaeological remains which may be of at least local significance. The alteration of historic hedgerows will also result in a change to attributes which contribute to their local importance. The upstanding preservation of the hedgerow, the likely low sensitivity of any remains and the localised though direct impacts from widening or removal result in a **minor negative** overall impact.

Impact Assessment during operation

9.60 During the operational phase, setting impacts will arise. These will vary in scale of impact according to weather, season, distance from the turbine, intervisibility between the proposed wind turbine site and key heritage assets, the degree to which the wind turbine intrudes into views of them and the sensitivity and significance of the heritage assets. Such impacts will be temporary, though long-lasting, and would continue until the turbine is eventually dismantled, as required by the planning conditions applying to such installations.

9.61 An assessment of the likely noise impact during the operational phase of the proposed turbine has been undertaken by an appropriate specialist. The assessment indicates that there is potential for recommended noise limits to be exceeded in a worst case scenario by the operational wind turbine at the receptor site of Higher Barwick Farm, which may impact on heritage assets closest to it, namely the Barwick Field Systems. However the assessment demonstrates that overall the turbine will operate within the relevant ETSU-R-97 noise limits and the residual noise impacts are considered to be insignificant.

Impacts on the Cornish Mining World Heritage Site

9.62 The Charlestown World Heritage Site area is located to a very minimal extent within the viewshed. The area will not be physically impacted upon and there will be no visual and audible impacts as a result of the construction, operation and decommissioning activities because potentially intervisible areas are substantially obscured by housing and associated vegetation including the conurbation of St Austell. The addition of the proposed turbine has the potential to alter the setting of the World Heritage Site area, though at a distance of approximately 10km this will be negligible. Any setting impact will only be perceived from a viewpoint out to sea where the turbine and Charlestown could potentially be seen in the same view. The overall impact is rated as **negligible negative**.

Impacts on Scheduled Monuments

9.63 No Scheduled Monuments will be physically impacted upon by the proposal.

9.64 Due to their close proximity to the proposed turbine site, Carvossa, Golden Camp and Castlezens may experience visual and setting impacts during all three phases (Figure 9.5). Slightly further afield, Sticker, Castle Hill Camp and Resugga may also experience visual and setting impacts though these will be dependent on how much of the proposed turbine will be visible from the assets and the degree to which views of the assets will include the wind turbine as a significant feature. All of these have prominent locations and extensive settings vulnerable to intrusion. The impacts to these Scheduled Monuments are assessed as **minor negative**.

Figure 9.5: The view east from adjacent to the sites of Trewithen Garden, Golden Camp and Carvossa prehistoric hillfort. The proposed wind turbine would be on the far horizon right of centre if visible.

9.65 The promontory fort on Dodman Point and nearby Veryan Fort occupy prominent locations with significant views inland and out to sea. Their settings are rural and maritime and it is likely that there will be visual and setting impacts perceptible when the assets are viewed from locations out to sea as well as on land, particularly during the operational phase. The impacts of these Scheduled Monuments are assessed as **negligible negative**.

9.66 Overall the impacts on Scheduled Monuments can be rated as **minor negative**.

Impacts on Listed Buildings – Grade I and II*

9.67 The wind turbine will have no impact on those Listed Buildings which do not fall within the viewshed, except in the cases of those where the turbine will appear as a prominent feature in key views of them. There may be a **minor negative** visual impact for all Listed sites closer than 5km to the proposed site during all three phases; this will, however, attenuate as the distance from the site increases.

9.68 Those Grade I and II* Listed Buildings within the quiet and historic village of St Ewe, with the exception of the church, will potentially experience negative setting impacts from all three stages. However this will be dependent on the extent of intervisibility, the degree of screening afforded by vegetation and topography and the extent to which the turbine will appear in key views of the village and its setting. This particularly applies to the Listed Buildings on the west side of the village where there is more limited screening and clearer views towards the turbine. The impacts on the Listed Buildings in St Ewe are rated as at least **negligible negative**.

9.69 The setting of the Grade I Church of All Saints in St Ewe is quite extensive, extending beyond its churchyard and the village. The surrounding mature trees do not provide substantial screening, particularly to the west where the church and turbine are most likely to be visible in the same view. The impact to the setting of the church is assessed as **minor negative**.

9.70 St Michael's Church and Higher Lodge at Caerhays, approximately 4km to the south of the application site, are Grade I Listed, with extensive views northwards (Figure 9.7). Their settings mainly relate to the formal grounds of Caerhays but they also interact with the wider rural landscape, as the estate farms much of this land and the church is intervisible with the church at Gorran to the east. Although the turbine will be quite distant from features at Caerhays, visual and setting impacts will occur, but are rated as **negligible negative**.

9.71 The Grade I and II* buildings in Grampound and Tregony, such as the Dolphin Inn, the Church of St Cuby and the Alms-houses, are very unlikely to experience negative impacts as their locations in the centre of the villages obscure most views out, and their settings already incorporate modern semi-urban features (Figure 9.6).

9.72 The overall impact on Grade I and II* Listed Buildings is assessed as **minor negative**.

Impacts on Listed Buildings – Grade II

9.73 No Listed Buildings will be physically impacted upon and only those within the viewshed are likely to experience a visual impact during all three phases.

9.74 Due to its very close proximity Tregonan Farmhouse may experience visual and setting impacts. The turbine is likely to be included in key views of the farmhouse, however a direct line of sight between the farmhouse and turbine was difficult to establish from publicly accessible locations; intervisibility is thought likely to be intermittent. The impact on Tregonan farmhouse is considered to be **minor negative** (Figure 9.4).

9.75 The settings of the Crown Inn at St Ewe and Creed, Carveth and Golden Manor farmhouses are rural. The views from them are quite limited and include the china clay waste dumps but currently few, if any, wind turbines. It is possible that the proposed wind turbine will be visible to some extent in these views. The impact on these Listed Buildings is rated as **negligible negative**.

9.76 The overall impact for Grade II Listed Buildings is assessed as **minor negative**.

Figure 9.6: The centre of Tregony Conservation Area, which includes multiple Listed Buildings. Note the inward looking aspect of the buildings so that views of the turbine from the village will be very limited.

Impacts on Conservation Areas

9.77 The Conservation Areas of Grampound and Tregony are within 5km of the proposed turbine site and partially within the viewshed. Those parts outside the ZTV will not experience any visual impacts though wider setting impacts from views including both the turbine and the Conservation Areas in their rural setting may occur. The topography of the landscape

and central-facing aspect of the buildings within Tregony and Grampound greatly restricts views out from the villages towards the proposed turbine (Figure 9.6).

9.78 The overall impact on Conservation Areas is therefore assessed as **negligible negative**.

Impacts on Registered Parks and Gardens

9.79 The settings of these parks are simultaneously formal and deliberately natural and include historically related and unrelated surrounding agricultural land. Setting impacts are likely to be limited by the density of vegetation making up these designated landscapes; however many views across the parks from the Listed houses or from features within the parks were specifically designed. These elements of Heligan are mostly located in a valley with only the modern park entrances and woodland on higher ground. Although there are views west, most importantly towards St Ewe, there are few, if any, formal walks, rides or designed vistas from the upslope parts towards the turbine site and, whilst the setting of the garden is extensive, it includes the coastal and maritime environment to at least a similar extent as the rural setting. The RPGs of Tregothnan and Tregrehan appear not to have specifically designed features or views towards the wind turbine and Trelissick, which does have northwest facing features, is largely screened by topography from the proposed turbine and the house has a southerly principal aspect. These four RPGs all have areas within their wider parkland from which intervisibility remains a possibility and where setting impacts may occur however their distances from the proposed site will significantly diminish the prominence of the turbine in any such views and therefore the impacts to these RPGs is considered to be **negligible negative**.

9.80 Trewithen and Trewarthenick feature eastward views from rides and walks across the formal gardens and from parkland extending out on east facing slopes and may experience greater setting impacts. Trewithen Garden includes lawns on its east facing slope, an east terrace walk and a secondary entrance drive from the eastern boundary. These were designed to create or reveal views east across the park which include the church at Creed and are likely to include the proposed wind turbine (Figure 9.5). Similarly the circuit walk around Trewarthenick features deliberately designed ‘burst’ views inwards towards the house and out to the surrounding landscape. The principal aspect of the house is to the east, from which views are across the lawn that slopes down to the pasture beyond, including wide-ranging views to Tregony that may include the proposed wind turbine. The impact to these two RPGs is rated as at least **minor negative** as a result.

9.81 The northern extent of Caerhays RPG is only 3km from the proposed turbine site. The mains aspect of the Listed house and formal gardens is to the south and east and is unlikely to experience setting impacts. However the northern half of the park includes the main entrance drive and a

network of walks and rides through the park's woodland. There are on north facing slopes, which along with the adjacent coastal headlands, have extensive views inland across the rural setting of the park, within which the proposed turbine is likely to be a small component (Figure 9.7). The impact on Caerhays is therefore assessed as **minor negative**.

Figure 9.7: The view northwest from the edge of Caerhays Park showing the ridges and valleys that characterise the area. If erected the turbine may be visible on the extreme right of this image.

9.82 The overall impact on Registered Parks and Gardens is assessed as **minor negative**.

Impacts on Undesignated Historic Assets

9.83 The settings of all undesignated historic assets within the viewshed will be visually impacted to some degree during all three phases, though for the more prominently positioned, extant or closest sites such as the Barwick field systems this is assessed as **minor negative**.

9.84 Pencoose Castle is located just beyond the 1km radius zone and therefore impacts on it would not normally be considered. However Pencoose is a substantial bivallate round on the crest of a spur with good views to the southwest along the valley below and is potentially of the quality to be designated as a Scheduled Monument. This asset is located within the viewshed and is very likely to be fully intervisible with the proposed wind turbine. It has a very rural setting and views of the landscape from high vantage points are very likely to include the proposed turbine and Pencoose Castle. The impact on Pencoose Castle is considered to be at least **minor negative** and possibly greater.

9.85 The majority of the undesignated sites are known from documentary sources, are cropmarks sites or consist of signposts, crosses, milestones or find-spots with very limited settings and little or no potential for setting impacts.

9.86 The overall impact on such sites is therefore assessed as **minor negative.**

Impacts on Historic Landscape Character

9.87 The landscape surrounding the proposed wind turbine site is dominated by extensive areas characterised as Farmland: Medieval interspersed with tracts of later enclosed land. The land has been farmed since at least the medieval period, in some places long before, as is indicated by the surviving place names and prehistoric remains, and specifically by the features revealed by the geophysical survey in the field immediately to the south east of Barwick Farm.

9.88 From the 17th Century onwards, parts of this area were subjected to enclosure under the Enclosure Acts with the imposition of larger, more regularly shaped fields and intensive farming methods that reduced some archaeological sites to below ground remains only. In places this is highlighted by the use of block-work walls as field boundaries instead of the more traditional Cornish hedges, some of these being visible from several main roads. The seven Registered Parks and Gardens in the vicinity also influenced (and continue to influence) the layout and character of the land. The survival of the post medieval enclosures still preserves much of the original open character of the landscape, with small farming settlements scattered throughout it.

9.89 With the exception of the growth of the St Austell conurbation some distance away, the overall character of this landscape has changed little in many centuries. The elevated nature of the area is clearly ideal for generating electricity from wind power. The construction of the proposed wind turbine will inevitably contribute to the erosion of the coherency and legibility of the surviving historic landscape character of this area. The presence of a wind turbine at Barwick will materially change the character of the surrounding landscape within which there is a lack of similarly modern and intrusive infrastructure. The impact on the HLC is therefore considered to be **minor negative**.

Mitigation Measures

9.90 A range of means to mitigate the impacts of this wind turbine are proposed within the environmental assessment. The mitigation measures are aimed at reducing any adverse impacts of the proposal during the construction and operational stages. A summary of likely mitigation measures is provided below.

Micrositing

9.91 Mitigating any potential impacts on heritage assets is sometimes possible through the micrositing of the wind turbine and the redirecting of cabling routes to reduce direct physical impacts on sub-surface archaeological remains within the proposal site which have been demonstrated through geophysical survey. Micrositing may also reduce setting impacts on sensitive assets within the landscape surrounding the proposed turbine site. However given the topography, the substantial height of the turbine and the minimal nature of the surrounding vegetation screens, such an approach would seem unlikely to be able to achieve any substantial diminution of setting impact.

9.92 In addition to careful siting of the turbine base and cabling trench, consideration of the access route and its construction could prevent or avoid direct physical impacts from rutting or compression resulting from the use of heavy vehicles during construction and decommissioning activities.

Archaeological recording

9.93 In a case where the finalised site design would seem likely to result in unavoidable physical impacts on sub-surface archaeology, a brief for work to mitigate these impacts would need to be produced. A Written Scheme of Investigation (WSI) to meet the brief would need to be prepared and agreed to establish and direct a programme of mitigating archaeological work as part of the planning decision-making process.

9.94 Further archaeological evaluation to provide a level of information sufficient to determine the potential and scale of sub-surface impacts on archaeological features identified by the geophysical survey might be required in advance of a recommendation for a grant of planning permission.

9.95 Further archaeological recording works could comprise a watching brief (observation by an archaeologist during mechanical ground reduction activities) or full excavation and recording of some areas of the site prior to construction works. This would be likely to target areas where significant features had been identified through geophysical survey, or where the balance of probability suggests that sub-surface archaeology might survive. This approach provides for preservation by record of buried archaeological features or artefacts, reduces any impacts on the archaeology of the sites to minor, and provides positive benefits from the development in the form of increased knowledge and understanding of Cornwall's archaeological heritage.

9.96 It should be noted that the form of any mitigation applied to the site would be determined by the Senior Development Officer (archaeology), who might require studies additional to those identified above in order to determine appropriate recommendations.

Cumulative Impacts

9.97 The brief for this Impact Assessment requires the inclusion of an assessment of cumulative impacts of the development proposal.

9.98 No operational wind turbines are visible from the proposed site. From the majority of the historic assets visited either no turbines, or only one or two installations, can currently be seen. Additional wind turbines proposed or granted planning permission within a 10km radius of Barwick create the potential for cumulative impacts to be experienced by individual heritage assets and by the Historic Landscape Character of the surrounding landscape.

9.99 Wind farms, where multiple turbines of similar sizes are installed in close proximity, can have a visual coherency which, despite the size and quantity of the wind turbines making them up, may limit the negative impacts they might otherwise impose on their surroundings. Conversely the placement of individual wind turbines, such as at Barwick, of varying heights and designs sporadically across the landscape is unlikely to result in any degree of coherency, and will therefore have a potentially greater impact on the appreciation of the historic landscape or of the settings of heritage assets.

9.100 Few of the heritage assets highlighted in this assessment are significant landmarks although many have extensive and sensitive settings, most specifically the multiple Registered Parks and Gardens and the Scheduled Monuments. The prehistoric Scheduled Monuments deliberately occupy prominent hilltop or ridge-top locations, command significant landscape views and have a degree of intervisibility with other approximately contemporary sites. They are important features that are often still discernible within the landscape. From the sea, a wider viewpoint of multiple heritage assets and their relationships would be appreciated, and views will incorporate the existing and proposed turbines.

9.101 The Listed Buildings within settlements have relatively localised settings, though many of the settlements have landscape views and a degree of visual prominence with the surrounding agricultural countryside. The settings of some individual or grouped buildings may well be adversely affected to some degree by the visual and setting impacts resulting from the construction of one or more wind turbines in the surrounding landscape.

9.102 Such adverse visual impacts are, given the 25 year lifetime of any specific wind turbine, judged to be temporary in nature, though long-lived, and would be reversed on their decommissioning removing any visual or setting impacts. Although 25 years is a fraction of the lifetime of a heritage asset, it makes up a far greater part of an individual's lifetime. For sites with limited settings, alterations to historic landscape character will not be particularly noticeable to the observer; from sites with extensive or sensitive settings the changes resulting from cumulative impacts are likely

to be greater. Given the current absence of any wind turbines within this area of Cornwall, the construction of the wind turbine at Barwick, and of others currently within the planning system in the adjacent landscape, the potential overall cumulative impact is assessed as **moderate negative**.

Residual Effects

9.104 The residual effects of the proposal on archaeology are summarised in Table 9.5 below. The potential impacts and significances are based on those identified in the assessment and summarised in the results table above. It should be noted that the form of any mitigation applied to the site would be determined by the Senior Development Officer (archaeology), who may choose to recommend one or more of the options or impose other measures.

Feature	Potential Impacts	Significance before mitigation	Mitigation	Significance of residual impact	Overall Impact
Sub-surface archaeology (construction)	Loss of buried archaeology on application site (including anomalies identified by geophysical survey and unknown remains)	Moderate negative if the northern cable route is used. Major negative if the western cable route is used. Permanent.	Evaluation to assess archaeological potential and/or watching brief to preserve archaeology by record. Micrositing of the cable route to avoid potential archaeology highlighted by the geophysical survey.	Minor negative dependent on archaeology identified. Permanent	Minor negative.
Identified heritage assets (construction and end of life)	Setting, visual and audible impacts from machinery and infrastructure	Minor negative though this is dependent on the distance from and intervisibility with the turbine site and the significance and sensitivity of each asset. Temporary	None possible given location and height of turbine	Minor negative. Temporary	Minor negative
Sub-surface archaeology (operational)	None unless additional infrastructure or maintenance is required	Negligible though potentially major negative if infrastructure or intrusive activities required. Permanent	None unless additional infrastructure or further intrusive activities required in which case a watching brief may be required.	Negligible or minor negative if further work is required. Permanent	Negligible negative
Identified heritage assets (operational)	Setting, visual and audible impacts	Negligible to moderate negative though this is dependent on the distance from and intervisibility with the turbine site and the significance and sensitivity of each asset. Temporary	None possible given location and height of turbine.	Negligible to moderate negative though this is dependent on the distance from and intervisibility with the turbine site and the significance and sensitivity of each asset. Temporary	Negligible to moderate negative
Identified heritage assets (operational)	Cumulative impacts	Moderate negative though this is dependent on the distance from and intervisibility with the turbine site, and the	None available.	Moderate negative though this is dependent on the distance from and intervisibility with the turbine site, the	Moderate negative

		significance and sensitivity of each asset. Temporary		significance and sensitivity of each asset. Temporary	
Historic Landscape Character	Erosion of the setting, coherency and legibility of surviving prehistoric, medieval and designed landscape features	Minor negative. Temporary	Retention of historic hedgerows	Minor negative. Temporary	Minor negative
Sub-surface archaeology (end of life)	Loss of buried archaeology if there are sub-surface works to remove infrastructure. Permanent	Minor to major negative dependent on archaeology identified	Avoidance of sub-surface works Watching brief to record any archaeology	Minor negative dependent on archaeology identified and the degree to which this is archaeologically recorded. Permanent	Minor negative

Table 9.5: Residual impacts upon archaeology and identified heritage assets.

9.105 The implementation of the mitigation measures detailed above should ensure the preservation by record of any sub-surface archaeology. However as archaeology is a finite resource and cannot be replaced, at least a residual minor negative direct impact will remain. The linear anomalies identified by the geophysical survey are likely to be of minimal significance if, as has been predicted, they represent evidence for historic field boundaries and if impacted there will be a minor to moderate negative residual impact, dependant on the degree of their preservation and to which this impact can be successfully mitigated through micrositing and archaeological investigation. Some mitigation of setting impacts may be possible though the height and high degree of visibility of the wind turbine make this unlikely.

9.106 Assuming the proposed turbine is not re-powered or replaced, the end of life impacts will be as a result of excavation activity to remove the turbine components. It is anticipated that foundations will be removed to a depth of 1m below grade and the soil profile restored. Access tracks will either be removed or retained, depending on the landowner's preference. The associated noise impacts are considered by the specialist's assessment to as likely to be insignificant and there will be negligible but temporary visual impacts resulting from the use of machinery during this phase. The partial removal of the foundations and possibly also the access track and cabling, may result in further physical, irreversible impacts on surrounding subsurface archaeology but this is considered likely to be a **minor negative** impact and should be capable of mitigation.

Summary

9.107 An assessment of archaeological sites and heritage assets has been undertaken within a 15km radius of the proposed wind turbine for which the overall impacts vary from negligible to moderate according to distance from and likely intervisibility with the turbine and the degree of impact on their settings. The overall impact on Scheduled Monuments is considered to be minor negative. A similar range of impacts will affect Registered Parks and Gardens; in particular Caerhays, Trewithen and Trewarthenick will be impacted to a minor negative extent, whilst those beyond 10km will experience negligible negative impacts. For the Listed Buildings and Conservation Areas negligible or minor negative setting impacts may occur though the range and severity of the impacts varies depending upon proximity and screening factors. The combination of proximity, prominence and intervisibility upon the Listed Tregonan Farmhouse results in an impact rating of minor negative for this particular designated asset.

9.108 There will be high potential for cumulative impacts to arise on Historic Landscape Character from the construction of this proposed turbine. The effect of this proposal combined with the lack of modern infrastructure and the cumulative effect of future similar proposals will become an increasingly negative impact as the historic character of the landscape is increasingly eroded.

9.109 Due to the topography and the locations of the heritage assets considered in this assessment, the adoption of a micrositing mitigation strategy is unlikely to achieve any positive change in the impacts which have been identified. The geophysical survey identified several linear anomalies within the north cable route. Further archaeological investigation into the existence and nature of the subsurface archaeology in the development area may enhance our understanding of the archaeology of this site and the surrounding area and would help to mitigate direct impacts on archaeology.

9.110 Residual impacts will occur despite any imposed mitigation measures. These include the potential for the permanent loss of any subsurface archaeology at the application site during the construction and decommissioning phases. This can be mitigated to an extent by archaeological recording options but a potential minor negative or greater impact will remain due to the possible loss of the resource and degree of the success of the mitigation measures. Impacts to the heritage assets and the HLC such as setting and cumulative effects are temporary and generally minor negative in severity but will remain throughout the operation of the turbine.

9.111 The impacts of the construction, operation and decommissioning activities of the wind turbine are all reversible, with the exception of those on the sub-surface archaeology; it is likely that these can be mitigated through a planning condition requiring some degree of archaeological recording either prior to or during the construction phase, and possibly also during decommissioning activities.

Appendices

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