

# Land Contamination Report

## PHASE 1 DESK STUDY



### PHASE I – LAND CONTAMINATION DESK STUDY

**Site:** 8 Nancevallon, Higher Brea, Camborne, Cornwall, TR14 9DE

**NGR:** 166613 40169

**Client:** Mr Ian Richards

**Planning Ref:** N/A

**Date:** 08 September 2023

**Author:** Mr M Sharpe, BSc (Hons) MSc MCSM FGS

**Our Ref:** MS/MS/SS/5900.DS

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### 1.3 Site Location

The site is situated within the residential curtilage of the property known as 8 Nancevallon, located in the village of Higher Brea. The site covers an area of approximately 0.09 hectares (900m<sup>2</sup>) and lies at national grid reference (NGR) 166613 40169.

A site location and boundary plan is included within Appendix A.

### 1.4 Development Proposals

The client proposes to remove the existing garage and extend the existing dwelling along with associated infrastructure. The proposed end-use will include a private garden, parking / turning area and soft landscaping. A proposed development plan is included in Appendix A.

Cornwall Mining Consultants has been informed by the client that no previous Phase I or II assessment reports have been produced for the site.

## 2.0 SITE WALKOVER

### 2.1 Site Observations

A site walkover was carried out on 6<sup>th</sup> September 2023 to confirm the current use of the site, check for visible signs of contamination and provide context for potential pollutant linkages.

Photographs taken during the site visit are presented in Appendix B and the main findings are summarised here.

The site currently comprises a residential dwelling, gravelled parking area to the north and west, a detached garage to the west of the dwelling and a garden/recreational area to the south and southwest.

Access was gained to the site from a road (Nancevallon), through a wooden gate and onto a gravel surfaced parking area for multiple vehicles.

The site is located within the residential curtilage of 8 Nancevallon and is surrounded by residential dwellings to the north, east and west and a field to the south. The red river is located approximately 10 metres west of the site. The majority of the southern area of the site is covered in rough grass and low lying vegetation, with various shrubs and young trees along the western boundary. No discernible odours or obvious signs of contamination were noted across the site.

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A garage is situated to the west of the dwelling, and contained various household and domestic items including bicycles, vehicle parts, paint and tools. The floor of the garage was constructed of concrete and was in good condition, with no cracking observed. No spillages or odours were noted within the garage.

A wooden shed was situated in the southeastern corner of the garden. Cornwall Mining Consultants were not able to access the shed however the client confirmed that the contents included office items. Either side of the shed, various inert gardening related items were observed including plastic pots and sheets.

The site has been owned by the client since 2008.

## 2.2 Topography

The site is situated on a generally level area in the flood plain of the Red River, located approximately 10 metres to the west. The valley sides steepen approximately 30 metres east of the site.

## 2.3 Surrounding Area

The features within the surrounding area are detailed below in Table 1.

**Table 1: Features within the Surrounding Area**

<i>Surrounding Land Use &amp; Receptors</i>	<i>Distance from site (m)</i>	<i>Direction</i>
Residences	Adjacent	E & W
Road (Nancevallon)	Adjacent	N
Fields	Adjacent	S
Residences	5m	N

## 3.0 HISTORICAL AND CURRENT LAND USE

### 3.1 Recorded Historic Mining Activity

A Mining Search (ref. DG/CMS/139509) was undertaken by Cornwall Mining Consultants in September 2023 and is included in Appendix C. The site is situated within an area of extensive historic metalliferous mining activity. Mining related features have been identified beneath the site. Please refer to Appendix C for full conclusions and recommendations.

### 3.2 Other Mineral Extraction

There is no evidence of any non-metalliferous mineral extraction having taken place within the site boundaries.

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### 3.3 Review of Historic Ordnance Survey Maps

A review of historical Ordnance Survey (OS) maps, from our own documentary resources, provides an overview of the status of the site over time and provides the means to identify potential contamination hazards. Extracts of these maps are provided in Appendix D.

**Table 2: Review of Historic Ordnance Survey Maps**

<i>Date</i>	<i>Site</i>	<i>Surrounding area</i>
1880	Site located within part of a 2 fields which extend to the northwest and east.	Fields in all directions. A road is noted parallel to the northern boundary and a river (Red River) is located approximately 10 metres west of the site. A terrace of houses are located 15 metres northeast. An area of rough/undulating ground is shown 35 metres east and southeast and extends south and southwest. Two wells are shown, one lies 85 metres north-northwest of the site and another 127 metres south-southwest. 'Stream Works (Tin) is annotated 86 metres south, within the Red River. Large areas of mine waste are shown to lie 88 metres, 120 metres, 240 metres and 320 metres northeast of the site with another situated 164 metres west. A Bible Christian Chapel is annotated and shown 127 metres northwest. Two quarries are annotated and shown approximately 130 metres northeast and 370 metres southwest of the site. A railway line is situated 335 metres northwest.
1908	The southern-most field that the site encroaches into is now larger and extends further east and south of the site.	A building has been constructed to the east of the site. The areas of mine waste to the east of the site are no longer shown. The area of undulating/rough ground is now shown as an embankment appearing to delineate the edge of the valley floor. The terrace of houses to the northeast has increased in length, with an 'Old Shaft' annotated and shown to lie 36 metres east of the site. The well to the north-northwest of the site is now annotated as a pump. The quarry to the northeast is no longer shown. An 'Old Shaft' is now annotated and shown to lie 255 metres northeast.
1978	A building, assumed dwelling is now shown in the northeastern area of the site.	The pump previously shown to the north-northwest is no longer shown and the well formerly shown to the south-southwest is now annotated as spring. The 'Old Shaft' shown to the east of the site is now no longer shown. The other 'Old Shaft' 255 metres northeast is now no longer annotated, although the mine waste tip is still shown. All other mine waste tips are no longer shown. The building previously



		shown to the east of the site is now no longer present.
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A Landmark Envirocheck Report was commissioned and is presented in Appendix E.

### 3.4 Sensitive Land Uses

Based on the data from the Landmark Report the following sensitive land uses have been identified at the site.

**Table 3: Sensitive Land Use Data**

Sensitive Land Uses		
Distance (m)	Direction	Details
<b>World Heritage Sites:</b>		
On site	-	Cornwall and Devon Mining Landscape – Historic England

### 3.5 Recorded Industrial Land Use

The following industrial land uses recorded within 250 metres, are summarised from the Landmark report.

**Table 4: Recorded Industrial Land Use Data**

Industrial Land Use		
Distance (m)	Direction	Details
<b>Contemporary Trade Directory Entries:</b>		
53m	N	Sunshine Blinds & Awnings - 3 New Road, Higher Brea, TR14 9DD – Blinds, Awnings & Canopies (Active)
53m	N	Sunshine Window Cleaning Services - 3 New Road, Higher Brea, TR14 9DD – Cleaning Services (Inactive)
54m	N	Sunshine Blinds - 3 New Road, Higher Brea, TR14 9DD – Blinds, Awnings & Canopies (Inactive)
92m	N	L J R Refrigeration – 4 New Houses, New Road, Higher Brea, TR14 9DB – Air conditioning & refrigeration contractors (Active).

### 3.6 Hazardous Substances

Based on the data from the Landmark Report, there are no hazardous substances recorded within 250 metres.

### 3.7 Waste and Landfill

Based on the data from the Landmark Report, there are no waste or landfill sites recorded within 250 metres.

## 4.0 GEOLOGY AND GEOCHEMICAL DATA

### 4.1 Geology

British Geological Survey (BGS) open source (1:50k scale) digital data has been reviewed for the area. The site is underlain by the superficial deposits of alluvium comprising clay, silt, sand and gravel. The bedrock beneath the site is the Carnmenellis Intrusion comprising granite. No linear geological structures are recorded by the BGS beneath the site.

### 4.2 Geochemical Baseline of Metallic Elements

The 'Tellus South West' project (containing British Geological Survey materials © NERC 2018) includes geochemical sampling of soils in the South West undertaken by the BGS. Soil samples were sampled at a density of 1 sample per 2km<sup>2</sup> to one per 5km<sup>2</sup> as part of a Geochemical Baseline Survey of the Environment and concentrations between these locations were extrapolated. According to the mapping information, an arsenic concentration of 183mg/kg and a lead concentration of 87mg/kg are inferred in the vicinity of the site.

### 4.3 Radon

The Landmark Report records the following findings

**Table 5: Radon (Landmark) Data**

Public Health England		
<i>Distance (m)</i>	<i>Hazard</i>	<i>Details</i>
On site	Radon	Greater than 30% of homes are above the action level for radon. *Full radon protective measures should be installed.

\*As described in the latest Building Research Establishment guidance on radon protective measures for new buildings. Landmark also advise to check compliance on radon protection with the developer for any new builds.

In addition, Cornwall Mining Consultants checked the Ukradon maps with the findings below.

**Table 6: Radon (UKradon) Data**

UKradon		
<i>Distance (m)</i>	<i>Hazard</i>	<i>Details</i>
On site	Radon	Greater than 30% of homes are above the action level for radon. *Full radon protective measures should be installed.

\*As described in the latest Building Research Establishment guidance on radon protective measures for new buildings.

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## 5.0 AGENCY AND HYDROLOGICAL DATA

The following agency and hydrological data recorded within 250 metres is summarised from the Landmark report.

**Table 7: Agency and Hydrological Data**

Agency & Hydrological		
Distance (m)	Direction	Details
<b>Discharge Consents:</b>		
232m	NW	South West Water – Storm Tanks/Cso on sewerage network – Brea Sso, Brea – Issued 30 <sup>th</sup> October 1989, Revoked 20 <sup>th</sup> September 2000. Sewage discharges into Red River.
<b>Nearest Surface Water Feature:</b>		
13m	W	Inland River
<b>River Quality:</b>		
63m	E	Dated 2000 - Red River – Flow rate less than 0.31 cumecs

## 5.1 Hydrogeology

No detailed information regarding the depth to groundwater is available. The groundwater level is likely to be subject to seasonal variations.

The Environment Agency (EA) aquifer designation classifies the underlying rocks as Secondary A (permeable) Aquifers. Groundwater vulnerability is assessed by how easily a pollutant discharged at ground level can reach the groundwater. High vulnerability areas mean that pollution can easily transmit to groundwater and likely to be characterised by high leaching soils. The Landmark report classifies the soils with high leaching potential.

The site is not within a Groundwater Source Protection Zone.

The nearest recorded groundwater abstraction license is 790 metres north of the site for use at South Crofty Limited and Western United Mines Limited for transfer between sources.

## 5.2 Hydrology

The site is located within an Environment Agency recorded Zone 2 and Zone 3 floodplain.

The nearest recorded surface water abstraction license is 665 metres south of the site for use at Medway Tin Co Ltd for industrial processing (quarrying).



### 6.0 PRELIMINARY RISK ASSESSMENT

#### 6.1 Introduction

Part IIA of the Environmental Protection Act 1990 stipulates a risk-based approach to the identification and remediation of land where contamination poses an unacceptable risk to human health and the environment. The Land Contamination Risk Management (LCRM) guidance provided by the Environment Agency specifies a staged approach to determine if there are any potentially unacceptable risks.

The first step to the preliminary risk assessment is to derive a conceptual site model (CSM). A CSM shows the possible relationships between any contaminant sources (hazards), pathways and receptors. Source, pathway and receptor (S-P-R) are defined by the LCRM guidance as:

- **Source** – a contaminant or pollutant that is in, on or under the land and that has the potential to cause harm or pollution, for example metallic elements (arsenic, lead, cadmium).
- **Pathway** – a route by which a receptor is or could be affected by a contaminant, for example ingestion of homegrown produce.
- **Receptor** – something that could be adversely affected by a contaminant, for example a person, controlled waters, an organism, an ecosystem, or Part IIA receptors such as buildings, crops or animals.

The CSM includes the concept of a 'pollutant linkage' between a contaminant source and a receptor by means of a pathway. A linkage must be present for a risk to exist, without a linkage, there is not a risk, even if a contaminant is present.

If any linkages are identified, the associated level of risk to receptors can be assessed. This is achieved by a preliminary risk assessment, predicting the likelihood of exposure to the hazard (contaminant source) and the severity of the potential consequence.

The initial CSM, together with the results of the preliminary risk assessment, are presented in the following sections.

#### 6.2 Initial Conceptual Site Model & Pollutant Linkages

The desk study information, site walkover, environmental setting and potential on-site sources of contamination have been reviewed, with consideration to the development proposals, to construct an initial CSM.

The following potential contaminant **sources** (hazards) have been identified:

- On site natural geology - radon and metallic elements including arsenic.
- On site potential mining activities (tin streaming) – metallic elements including arsenic.

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- Off site quarries – various contaminants, potentially including metallic elements, hydrocarbons and ground gasses
- Off site railway line – various contaminants, potentially including metallic elements and hydrocarbons

Potential **receptors** relevant to the site based on the proposed end use include:

- Future site users: Human health and ecology
- Controlled waters: Underlying aquifer and nearby river
- Built environment: Water pipes and buried concrete

Potential **pathways** relevant to the site based on the proposed end use include:

- Ingestion, dermal contact & inhalation
- Migration: laterally or vertically
- Surface water run off: leaching
- Direct contact

Pollutant linkages have been assessed in Table 8.

**Table 8: Pollutant Linkage Assessment**

Potential Hazard		Comments	Pollutant Linkage?
Sources	Contaminants of Concern		
On site: Natural Geology	<b>Radon gas</b>	Area where the radon action level may be exceeded, and harmful radon concentrations can accumulate in buildings.	Yes
	<b>Metallic elements, including arsenic</b>	Metalliferous mineralisation recorded to traverse the site. Tellus dataset implies elevated soil arsenic concentrations in the area. Proposal includes the retention of some soft landscaped areas, therefore there is a pathway. Red River situated approximately 10 metres west.	Yes
On site: potential mining activities (tin streaming)	<b>Metallic elements, including arsenic</b>	The site is recorded to be situated upon alluvium material deposited by the red river to the west. The records indicate that this area of alluvium has been streamered for tin. Therefore, elevated levels of heavy metals may be present within the soils. The proposal includes the retention of some soft landscaped areas. Therefore there is a pathway.	Yes
Off site: quarries	<b>Various, potentially including metallic elements, hydrocarbons and ground gasses</b>	The quarry to the northeast appears to have been infilled for over 100 years. Due to the small size of the quarry and local topography, it is unlikely that any contaminants will enter the site. Therefore there is no pathway. Due to the time since infilling, it is considered unlikely that any ground gasses would still be being produced. No source.	No

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Potential Hazard		Comments	Pollutant Linkage?
Sources	Contaminants of Concern		
		The quarry to the southeast lies at sufficient distance such that any contaminants would not affect the site. No pathway.	
Off site: Railway Line	<b>Various, potentially including metallic elements and hydrocarbons</b>	The railway line lies at a sufficient distance that any contaminants are unlikely to enter the site (over 300 metres). No pathway.	No

### 6.3 Preliminary Risk Assessment

The identified pollutant linkages have been subject to a qualitative (preliminary) risk assessment to determine the likelihood and severity of the potential for significant harm from exposure to contaminated land. The risk assessment has been carried out in accordance with statutory guidance on contaminated land and in line with the National House Building Council (NHBC) risk categorisation methodology, presented in Appendix F.

The results of the preliminary risk assessment are summarised in Table 9.

**Table 9: Initial Conceptual Site Model & Preliminary Risk Assessment**

Sources	Pathway	Receptor	Probability	Consequence	Risk
<b>Radon gas</b>	Inhalation	Future site users	High Likelihood	Medium	High
<b>Metallic elements, including arsenic</b>	Ingestion, dermal contact & inhalation	Future site users	Likely	Medium	Moderate
	Migration & surface water runoff	Environment	Likely	Medium	Moderate
	Direct contact	Built Environment	Likely	Medium	Moderate

The risk from exposure to potentially contaminated land at the site has been designated as **MODERATE to HIGH**.

### 7.0 CONCLUSIONS AND RECOMMENDATIONS

In summary, the desk study and preliminary risk assessment have identified the following potential Moderate to High risks of potential harm to end-users of the site, and any other receptors identified, arising from contaminated land:

- **Radon gas** – underlying geology – high risk
  - Full radon protective measures should be installed within the new extension to mitigate this risk.
- **Metallic elements** – underlying geology and potential tin streaming activities – moderate risk
  - Initial intrusive investigation required including soil sampling and chemical analysis.

The risk of ground contamination across the site will need to be investigated in the form of an initial Phase II Quantitative Risk Assessment and may require subsequent stages of assessment and remediation as part of any proposed residential development.

Recommendations for the Phase II Quantitative Risk Assessment for the site include:

A representative soil sampling regime and chemical analyses to gain a general understanding of the soil concentrations across the site,  
Contaminant analyses should include a general/suitable suite including metallic elements and pH; and  
A quantitative assessment using analysis data, to assess the potential risk to end-users of the site.

Depending on the findings of the initial Phase II, further assessment may be required including additional soil sampling including additional chemical analysis in the form of bioaccessibility testing.

**Water Pipes:** Water suppliers sometimes request sampling and specific chemical analysis within the proposed trenched excavations of water pipes to identify the most appropriate pipe material. No sources of organic contaminants were identified and therefore any pipe material will be suitable for this site. Based on the findings of our desk study and the guidance provided by Water UK, (Contaminated Land Assessment Guidance) dated January 2014, no further assessment should be requested. We would recommend contacting your water supplier to confirm.

**Construction workers:** Construction workers have not been considered as part of this assessment. Occupational exposure to soil contaminants should be included in construction health and safety risk assessment and method statements.

**Asbestos:** An asbestos survey should be undertaken prior to the demolition of any onsite buildings, to confirm if asbestos is present and how to dispose of it safely and in line with current asbestos and waste regulations.

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**Unexploded Ordnance:** A preliminary risk assessment has been undertaken by a third party with the following recommendation: A detailed desk study, whilst always prudent, is not considered essential in this instance.

Following your review of this document, we would recommend that a copy of the report should be submitted, as part of the planning application, to the Planning Department of Cornwall Council for comment and approval.

Yours faithfully

for **Cornwall Consultants Limited, trading as Cornwall Mining Consultants**

Mr M Sharpe, BSc (Hons) MSc MCSM FGS  
Geologist

Mr A Botterell, BSc (Hons) MSc MCSM FGS  
Senior Geologist

## 8.0 LIMITATIONS

This Phase I Desk Study undertaken on this site was in respect of contamination only and the observations reported do not purport to constitute a full survey of ground conditions and should not be used as a basis for foundation or other structural design. This report is not an assessment of mining subsidence or ground instability and provides no assurances against these risks if provided or implied. The site area is defined by the client and indicated in the plan supplied. It is the client's responsibility to divulge any previous environmental assessments for the subject site. No samples are collected in a Phase I Desk Study. This report is based specifically on information provided by the client at the time of the site visit. Any amendments to the development plan must be reported to us immediately for this may result in changes to the conclusions of the above report. This report may make reference to invasive species, flood risk and/or the presence of suspected asbestos containing materials (ACMs), however this report does not constitute an invasive species survey, flood risk assessment or asbestos survey. Cornwall Mining Consultants are unable to provide asbestos survey, handling, testing or disposal related services. This report is confidential to the client and the client's solicitor and/or mortgage lender. It may not be reproduced or further distributed without the permission of Cornwall Mining Consultants. We shall not be under any liability to any person who has not been party to the commissioning and fee paid for this report. The report may be reissued to a new client by ourselves, on payment of an appropriate fee, but will not be reissued within 28 days without approval from the current client.

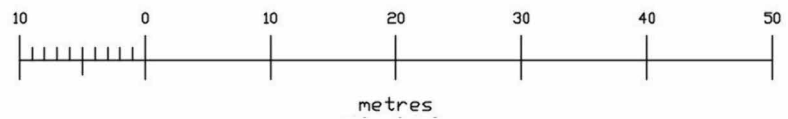
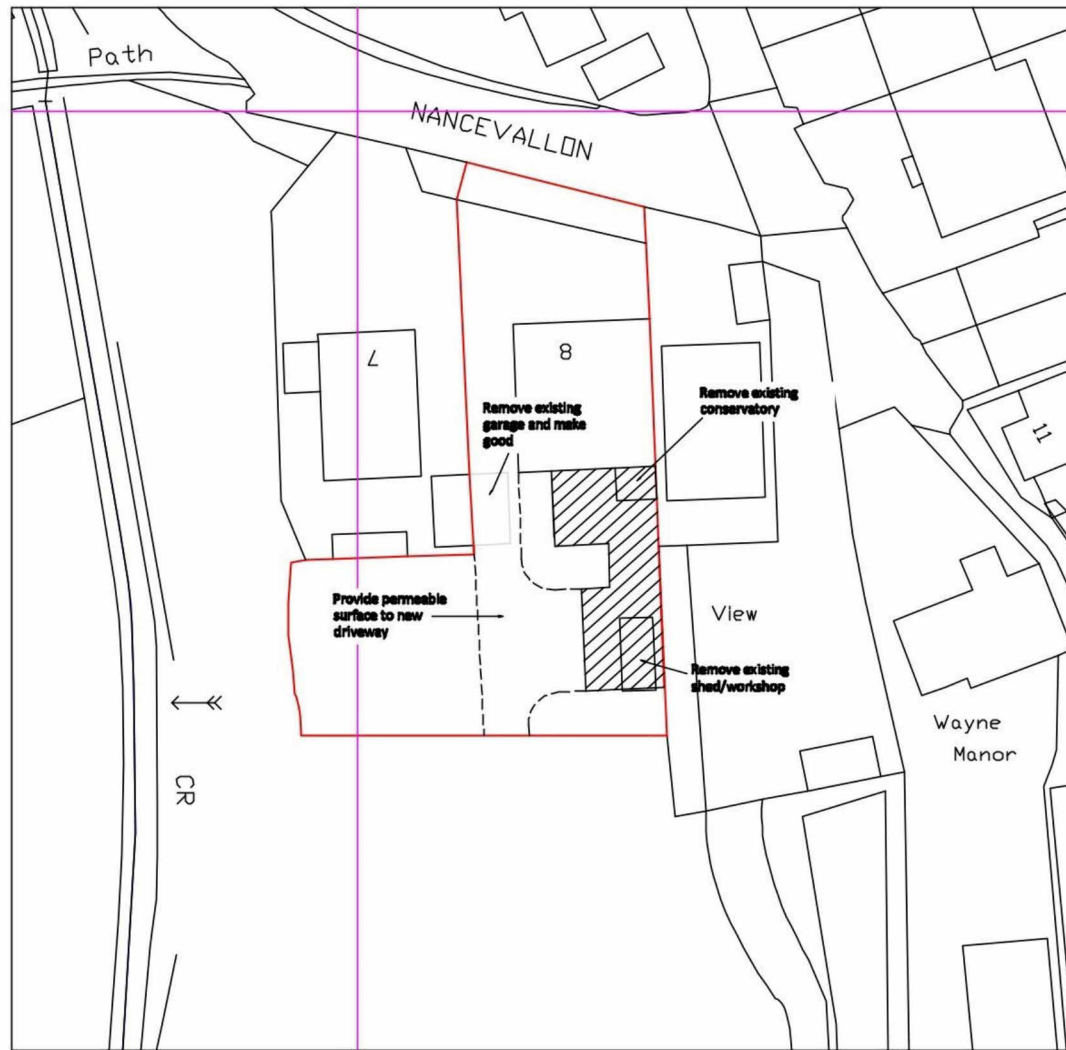
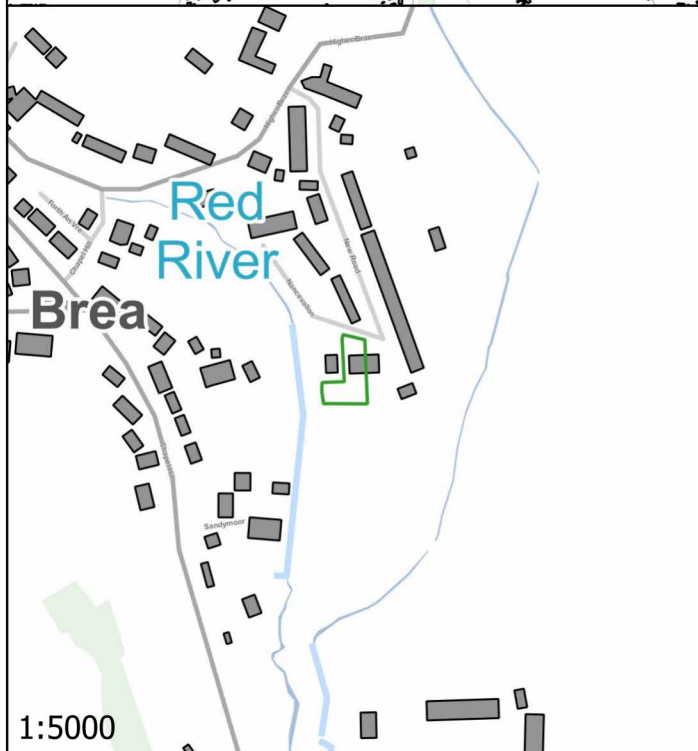
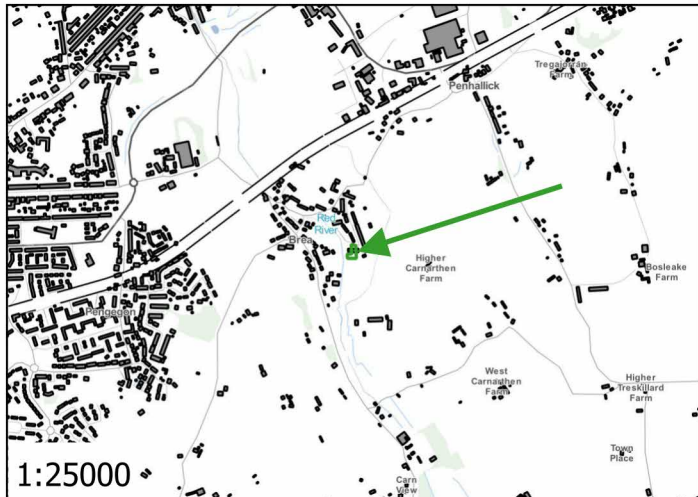
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**APPENDIX A: Site Location & Proposed Development Plan**



- Boundary (as supplied)



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**PHASE 1 – Land Contamination Desk Study**

Reference: SS/5900

8 Nancevallon, Higher Brea, Camborne, Cornwall, TR14 9DE.

Date: 01/09/2023

Scale: Refer to Scale

**Proposed Development, Location and Site Plan**

Drawn By: MS

**APPENDIX B: Site Walkover Photos**





Photograph 1 - View of the entrance to the site, looking south.

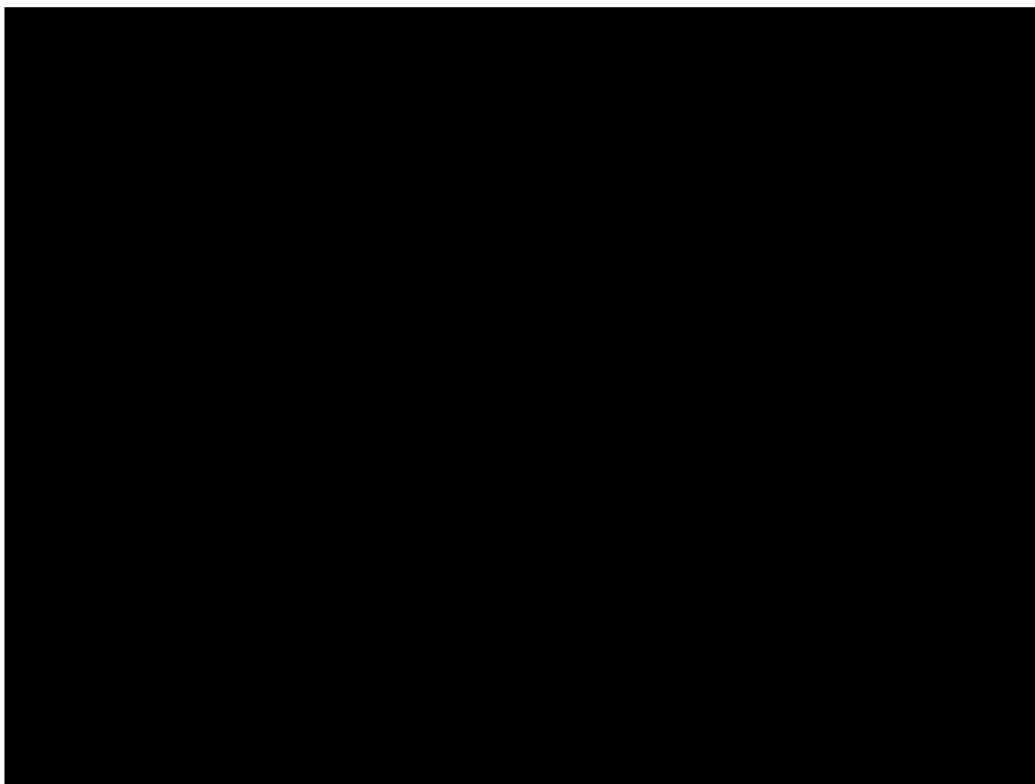


Photograph 2 - View from the northeastern area of the site.





Photograph 3 - View taken from the northern area of the site, looking south-southwest.



Photograph 4 – Internal view of the garage.





Photograph 5 - View of the amenity area to the south of the dwelling, looking northwest.



Photograph 6 - View from the southwestern corner of the site, looking northeast.





Photograph 7 - View from the southern boundary of the site, looking north.



Photograph 8 - View of the southern area of the site, looking east-southeast.





Photograph 9 - View of the shed in the southeastern corner of the site.



Photograph 10 - View of various gardening-related items including plastic sheeting and plastic pots, west of the shed.