

# **PROPOSED DWELLING ON LAND AT THE OLD POTTERY, BOLINGEY**

FLOOD RISK ASSESSMENT

J-1467-Rev.01



# PROPOSED DWELLING ON LAND AT THE OLD POTTERY, BOLINGEY

## FLOOD RISK ASSESSMENT

Report No.	Issue Detail	Originator	Date	Checked by	Date
J-1467	01	AW	21/05/2020	EC	21/05/2020

**For:** Nigel Dutson  
The Old Pottery  
Trevellance Lane  
Bolingey  
TR6 ODH

**Job No:** J-1467  
**Date:** May 2020  
**Edition:** 01

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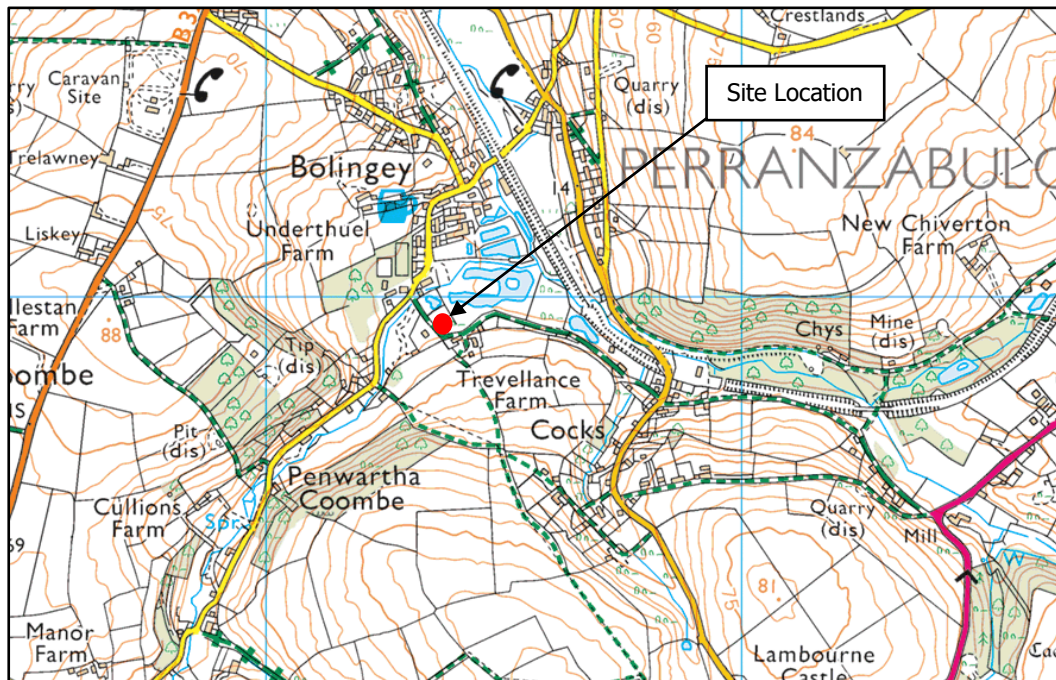
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## **APPENDICES**

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## 1.0 INTRODUCTION

Nigel Dutson is proposing to develop a plot of land south-east of the existing property The Old Pottery, to provide a single residential dwelling. The site is on Trevellance Lane, which runs between Bolingey and Cocks, as shown on the location plan and boundary plan provided as **Figures 1 & 2** below.



**Figure 1 – Location Plan**



**Figure 2 – Indicative Site Boundary**

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### **Site Description**

The site currently comprises a plot created by the subdivision of land within the curtilage of the dwelling known as The Old Pottery. The Ordnance Survey Grid Reference for the site is SW 76371 52953.

The main access for the site is from its southern boundary off Trevellance Lane, which is a Bridleway/Public Right of Way (PRoW) leading between Penwartha Road and Cocks Hill. The Bridleway also serves as vehicular access to the small number of dwellings along the lane. The northern boundary of the site is formed by a small number of trees, raised ground and grassed area within the curtilage of The Old Pottery; the western boundary is the gravel PRoW Trevellance Lane; the eastern boundary adjoins another property encompassing a number of fishing lakes and landscaped areas.

The topographic survey, included in **Appendix A**, indicates that the site slopes from an elevation of around 15.4m AOD in the eastern corner to around 11.0m AOD in the northern corner of the site.

In the wider context, Penwartha Stream runs in a north-easterly direction adjacent to Penwartha Road north-west of the site before flowing beneath Trevellance Lane and The Old Pottery dwelling. The watercourse continues in a general easterly direction towards its confluence with the Bolingey Stream around 220m from the site. The topography of the land is defined by the stream valley and wooded hills.

### **Existing Usage**

The location of the proposed development currently consists of part of the garden area for the existing residential dwelling, The Old Pottery.

### **Proposed Usage**

The proposal is to construct a new dwelling with associated infrastructure.

### **Flood Risk Context**

Reference to the Environment Agency (EA) indicative mapping (**Figure 5**) shows that the site appears to be in Flood Zone 1 (low probability) and lies adjacent to Flood Zone 2/3 extents associated with the Penwartha Stream, therefore a Flood Risk Assessment (FRA) in accordance with the National Policy Framework on Planning and Flood Risk is required to inform the application.

The primary aim of the FRA will be to investigate the extent of the floodplain on and near the site for a range of return period events and flood scenarios. This should allow any vulnerable development to be located in areas which are not at risk of flooding.

To address this requirement, Engineering & Development Solutions (EDS) have been commissioned to prepare an FRA for the proposed development, in accordance with the best practice principles of the National Planning Policy Framework (NPPF), Drainage Guidance for Cornwall (DGfC) and Planning Practice Guidance (PPG). The report details the findings of this study.

## 2.0 ASSESSMENT OF FLOOD RISKS

### Groundwater Flooding

The site is located on sloping land which falls towards the Penwartha Stream. It is expected that the watercourse will act as a sump that will drain groundwater away from the site.

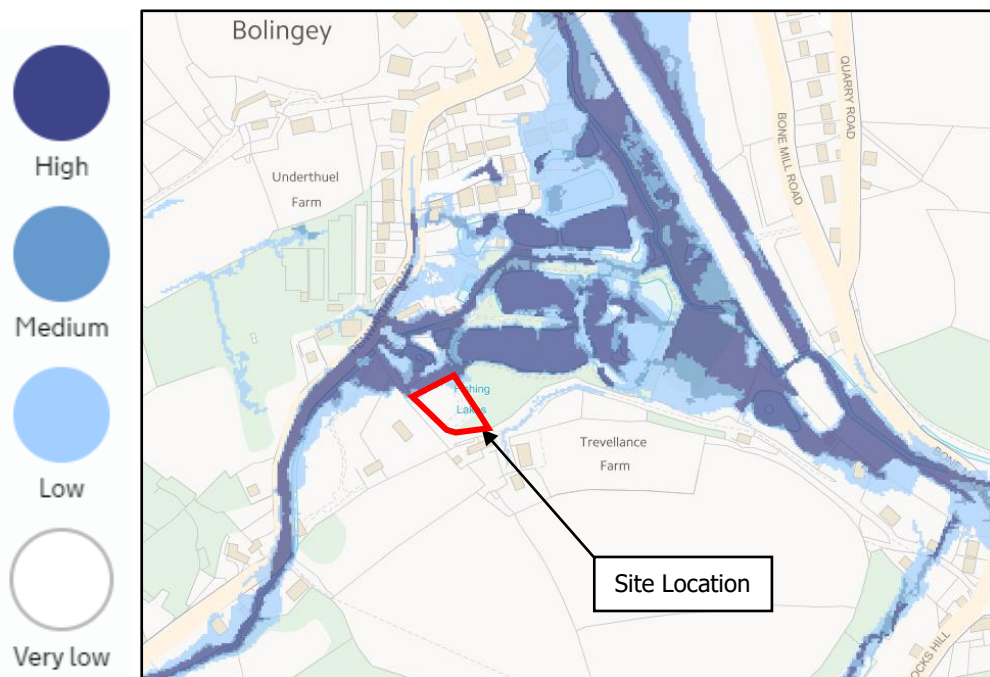
Given the above, it is considered that ground water flooding does not pose a significant risk to the development site and will not be considered further within this report.

### Overland Sheet Flow

The site is situated within a rural location, with only a few dwellings immediately upstream to the south of the site and agricultural fields/moorland beyond. It is considered that there is little potential for overland flows to originate from the south or east of the site as rainfall would infiltrate directly into the ground or be intercepted by field boundaries prior to reaching the site. Overland flows originating from the remaining directions would be intercepted by the Penwartha Stream and Penwartha Road and conveyed past the site.

The EA map extract, **Figure 3** below, shows the risk of surface water flooding for the area. It indicates that the site appears to be at very low risk from surface water flooding, whilst land adjacent to the northern boundary and the northern corner of the site are at medium/high risk.

It is conceivable that a small portion of the land in the north of the site may experience surface water flooding during extreme events, however given the proximity of the Penwartha Stream and potential for fluvial flooding, any mitigation measures against fluvial flooding would also relate to surface water flooding.



**Figure 3 – EA Flood Risk from Surface Water Map Extract**

### Flooding as a Result of Development

The development of the site will alter the nature of the surface permeability throughout the site. The development will create impermeable areas through the implementation of a

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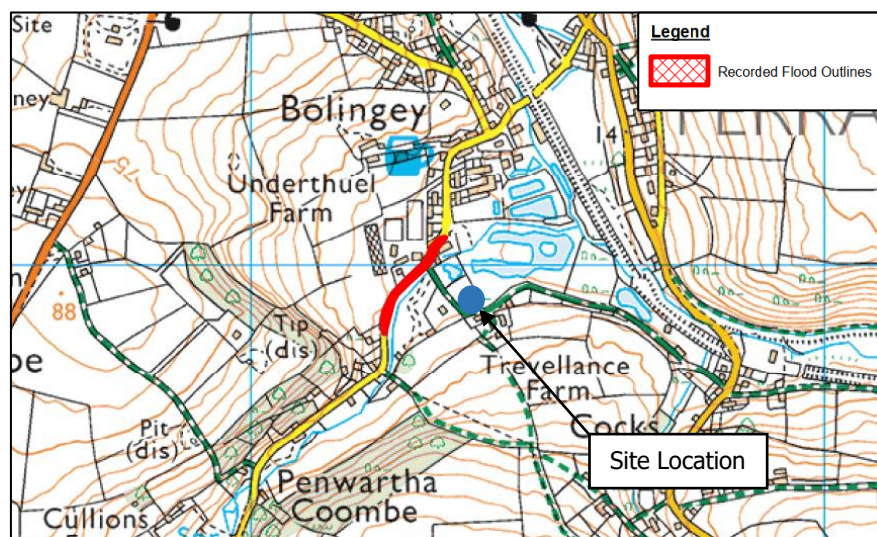
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residential unit where there are currently soft landscaped or permeable gravel areas. As a result, the rate at which water runs off these areas could increase. Consequently, it is important that surface water runoff from the development is understood and managed by means of a sustainable surface water drainage system. This will prevent any increase in the risk of flooding to areas downstream of the site.

The site drainage system should utilise SuDS drainage features designed in line with the advice given in 'Drainage Guidance for Cornwall'. Infiltration drainage is unlikely to be feasible this close to the river. Therefore, an attenuation system with a controlled discharge to the stream could be used.

### **Historic Flooding**

The EA have provided detailed flood history for the Bolingey area. The mapping indicates there have been no historic flood events recorded at the site. **Figure 4** below is an extract from the map with the site location shown. The nearest recorded flood event occurred on the Penwartha Road to the north-west of the site. Full details of the flood history provided are included in **Appendix B**.



**Figure 4 – EA Historic Flood Map Extract**

### **Tidal Flooding**

The site is well outside of any areas of tidal influence, located at a minimum elevation of around 11.0m AOD. Given the nature of the site, situated well inland from the coast, tidal flooding has not been considered further within this report.

### **Fluvial Flood Risk**

An EA Product 4 Information Request submitted to inform this flood risk assessment returned the following documents, which are included in **Appendix B**:

- Flood Map for Planning
- Flood History
- Historic Flood Map
- SFRM Fluvial Levels and Flows
- Model Node Location Map

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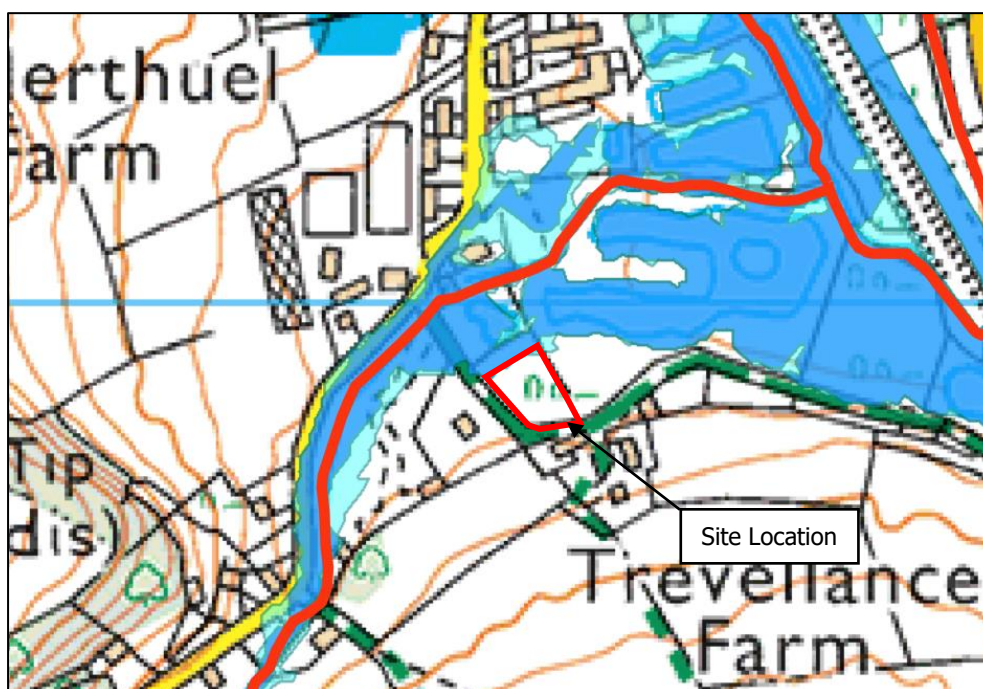
An extract from the Flood Map for Planning is presented in **Figure 5**.

The flood information provided gives ISIS-TuFLOW model levels for a series of nodes along the watercourse. Node PW00173\_1 is located nearest to the site, therefore it is deemed appropriate to take levels from this node. PW00173\_1 outlines the following flood levels:

- 1 in 100-year fluvial level – 10.99m AOD
- 1 in 100 year + climate change – 11.02m AOD
- 1 in 1,000-year fluvial level – 11.15m AOD

The Environment Agency supplied information for a 1 in 100 fluvial event with a 20% allowance for climate change; a climate change allowance of 40% should be applied however this is not available from the EA. Nonetheless, it is anticipated that the present day 1 in 1,000-year fluvial event is a reasonable approximation for the 1 in 100-year fluvial event with a 40% allowance for climate change.

Inspection of the existing site survey, included in **Appendix A**, indicates the northern corner of the site is a low spot in the topography at around 11.00m AOD, whereas most of the site lies at levels above 11.15m AOD and rise to around 15.40m AOD. Therefore, it is predicted that during the 1 in 100-year + climate change and 1 in 1,000-year fluvial flood events, the maximum potential depth of flooding in the lowest area of the site would be up to 0.15m, whilst most of the site is predicted to remain free from flooding.



**Figure 5 – Environment Agency Flood Map for Planning (Rivers and Sea) Extract**

### **Flood Summary**

From the information provided above it is considered that fluvial flooding poses the greatest risk to the development. Most of the site is predicted to remain free from flooding during extreme fluvial events and is located within Flood Zone 1.

Information presented in **Section 3** of this report will show how flood risks for this site can be managed for fluvial flooding.

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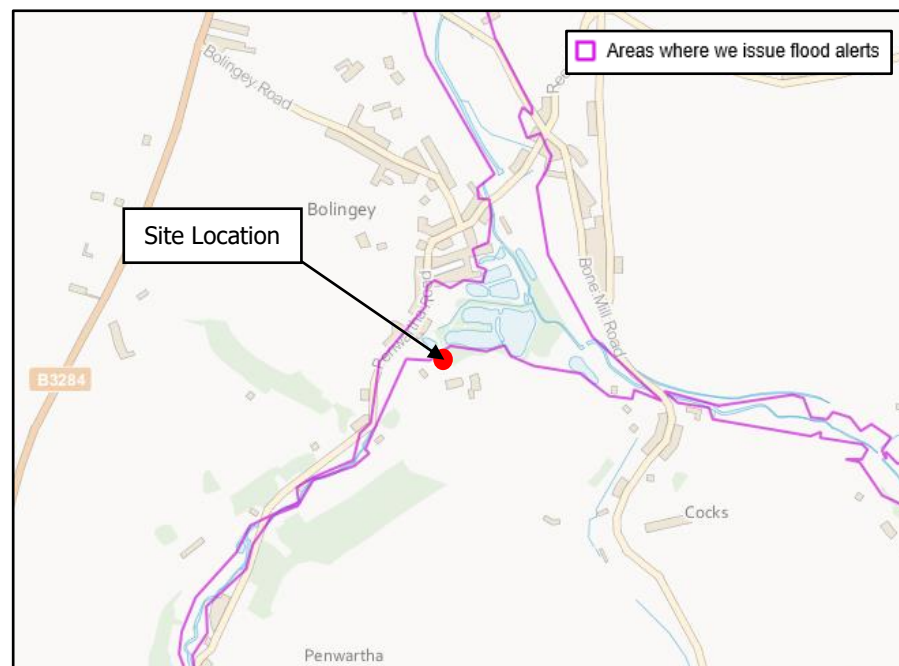


### 3.0 MITIGATION MEASURES

The following mitigation measures are recommended for the proposed development to ensure that the risk of flooding to the development is minimised.

- No new built development should be located within any area on the site with existing levels below 11.15m AOD as shown in the topographic survey in **Appendix A**. These areas should be used for less vulnerable/water compatible activities e.g. outdoor garden space.
- Finished floor levels (FFL) for the proposed dwelling should be set at a level not lower than 11.75m AOD (100-year fluvial level + 40% climate change + 600mm freeboard). As the building will be situated towards the centre/east of the site where ground elevations are over 12.00m AOD this is easily achievable.
- Residents of the site should sign up to the Environment Agency flood alert system for this area. The Environment Agency operate a countrywide flood warning system that covers both river and tidal flooding. In Bolingey, the system will provide an alert of an extreme flood event which may present a risk to the area shown in **Figure 6** below.

The flood warning system is free, and the site owner should sign up to the system as soon as the dwelling is occupied. Flood warnings can be issued by phone, text or email. Registration to receive warnings can be either by phone on 0345 988 1188 or online at [www.gov.uk/sign-up-for-flood-warnings](http://www.gov.uk/sign-up-for-flood-warnings)



**Figure 6 – EA Flood Alert Areas**

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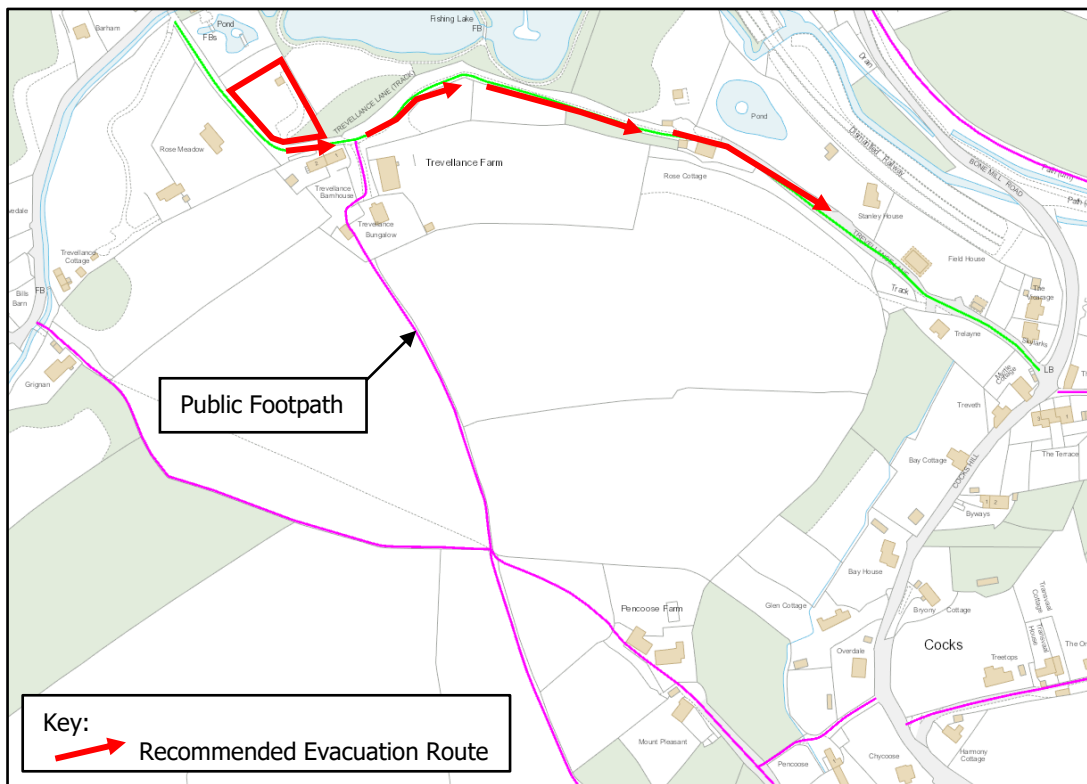
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#### 4.0 ACCESS/EGRESS

The main access and egress for the site is proposed to be retained, from the existing access track on the southern boundary, then leading north-west along Trevellance Lane for approximately 100m onto Penwartha Road as can be seen on the topographic survey in **Appendix A**.

Penwartha Road is shown to be located within Flood Zone 3 and is known to experience flooding near the junction with Trevellance Lane, therefore it is predicted that access and egress from the site in this direction would be restricted during extreme flood events. As such, site occupants would be able to take an alternative route from the site leading eastwards along Trevellance Lane; in addition, a public footpath leads from Trevellance Lane and rapidly increases in elevation in a southerly direction and well away from the flood zone.

If flooding is observed on the primary access route, residents should use an alternative route. The secondary route would lead along the existing Trevellance Lane PRoW and on to Cocks Hill, as indicated in **Figure 7** below.



**Figure 7 – Safe Access and Egress Route During Flood Events**

Both Trevellance Lane and the public footpath are located in Flood Zone 1, at low risk of fluvial flooding. Given the above, it is fair to conclude that access to and from the site is safe for all events. Any development proposals should seek to re-use the current access point and ensure that the development has a direct access on to Trevellance Lane leading in a south-easterly direction towards Cocks.

### 5.0 FLOOD RISK POLICY

Based on the findings of this study, the area proposed for development is within Flood Zone 1 (low probability). The dwelling will be situated away from the lowest elevations in the north of the site where levels are below 11.15m AOD as shown on the topographic survey in **Appendix A**. The lowest part of the site, in the northern corner where elevations are less than 11.15m AOD, will be used for less vulnerable/water compatible activities such as garden space. Safe access and egress is available for the site during all flood events considered.

Residential dwellings are classified as 'More Vulnerable' under 'Buildings used for dwelling houses' according to the Planning Practice Guidance (PPG) Table 2.

Referring to Table 3 of PPG shown in **Figure 8** below, the proposed development is deemed to be appropriate on a flood risk basis.

Flood risk vulnerability classification (see table 2)		Essential infrastructure	Water compatible	Highly vulnerable	More vulnerable	Less vulnerable
Flood zone (see table 1)	Zone 1	✓	✓	✓	✓	✓
	Zone 2	✓	✓	Exception Test required	✓	✓
	Zone 3a	Exception Test required	✓	x	Exception Test required	✓
	Zone 3b functional floodplain	Exception Test required	✓	x	x	x

Key: ✓ Development is appropriate.  
 x Development should not be permitted.

**Figure 8 – Extract from PPG - Flood risk vulnerability and flood zone 'compatibility'**

## 6.0 SUMMARY

This report has shown that the proposed dwelling on land at The Old Pottery, Bolingey is situated in Flood Zone 1. The proposed dwelling will be situated above all extreme fluvial levels at present and including an allowance for climate change. Safe access/egress for the property would be possible during all extreme fluvial flood events, as the existing track adjacent to the site is in Flood Zone 1 leading in a south-easterly direction towards Cocks.

Fluvial data provided by the Environment Agency outline the present day 1 in 100-year fluvial flood level to be 10.99m AOD; the 1 in 1,000-year level is 11.15m AOD. It is proposed that all vulnerable parts of the development will be situated towards the central/eastern portion of the site, where ground levels are higher than 11.15m AOD. The lowest part of the site, in the northern corner will be used for less vulnerable/water compatible activities e.g. outdoor garden space.

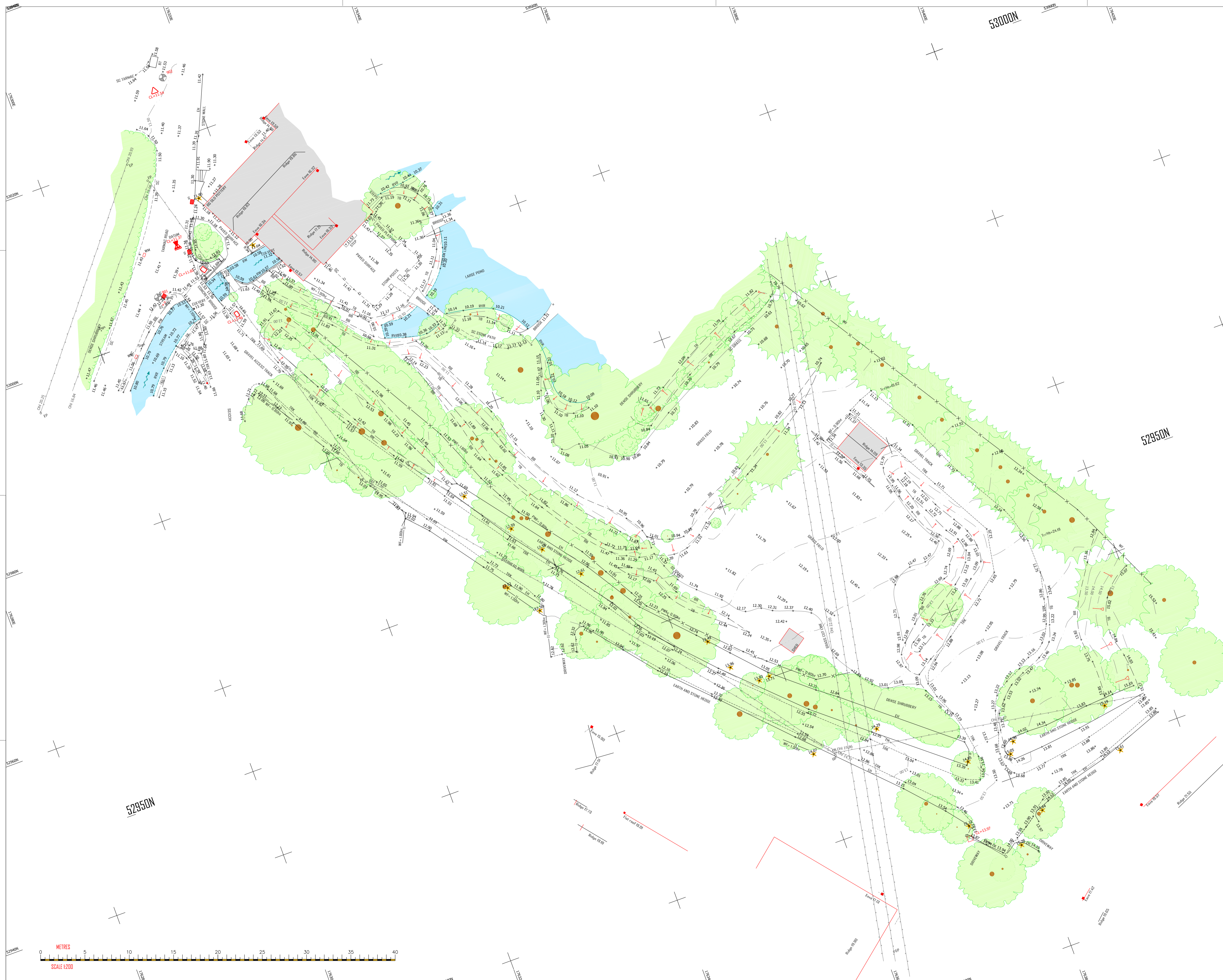
Flood mitigation measures have been presented in this report, which include siting Finished Floor Levels (FFL) no lower than 11.75m AOD, which provides a minimum 600mm freeboard above all fluvial flood events considered.

Safe access and egress for the site is available at all times via the adjacent track (Trevellance Lane) and Public Footpath travelling in a south-easterly direction away from the flood zone towards higher ground at Cocks.

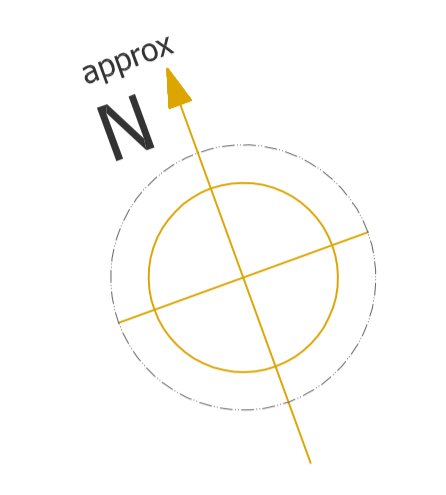
Considering the findings of this study, the area proposed for development can be concluded as being situated within Flood Zone 1, providing development is excluded from the lowest part of the site with levels below 11.15m AOD in the north corner of the site. NPPF states that 'More Vulnerable uses of land are appropriate in this zone' from a flooding perspective. Consequently, with regards to flood risk, the proposed development is entirely appropriate in this zone, in line with advice given in NPPF.

**APPENDIX A**

**TOPOGRAPHIC SURVEY**



- Notes:
1. COPYRIGHT OF THIS PLAN IS HELD BY PRIME SURVEYS. NO RESPONSIBILITY IS TAKEN FOR AMMENDMENTS BY OTHERS. DO NOT SCALE FROM COPIES.
  2. THE ORIGIN & ORIENTATION OF THE SURVEY GRID IS ARBITRARY.
  3. LEVELS ARE RELATED TO OFF SITE MANHOLE AT 11.37M
  4. LEVELS AT KERB RELATE TO ROAD CHANNEL.
  5. PIPE DIAMETERS ARE ESTIMATED BY SURFACE INSPECTION.



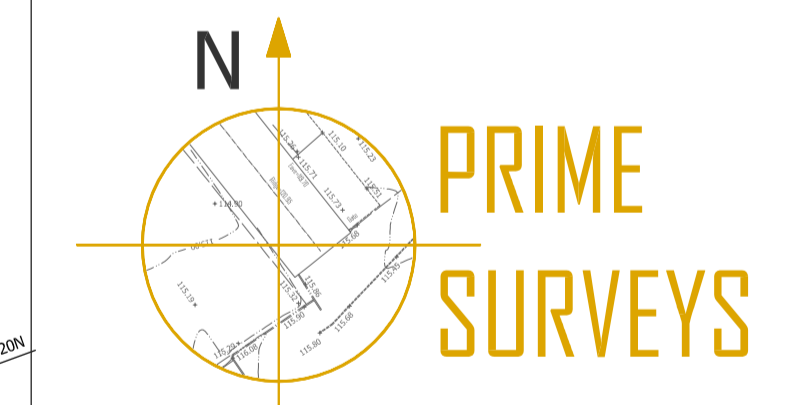
**SURVEY STATIONS**

Name	Easting	Northing	Height
901	176308.233	53003.918	11.416
902	176317.204	53027.031	11.532

- KEY:
- |     |                      |   |                 |
|-----|----------------------|---|-----------------|
| AV  | AIR VENT             | ▲ | DATUM           |
| BG  | BUILDING             | ▭ | SCRUB/HEDGE     |
| BT  | TELECOMS INSP. COVER | ○ | TREE CANOPY     |
| CL  | COVER LEVEL          | — | BANK DROP       |
| SC  | SURFACE CHANGE       | ~ | BUSH            |
| DK  | DROP KERB            | ▬ | TREE            |
| EP  | ELECTRICITY POLE     | ⊕ | CONIFEROUS TREE |
| FFL | FINISH FLOOR LEVEL   | ○ | SURVEY STN      |
| FH  | FIRE HYDRANT         | ⊕ | WALL LEVEL      |
| G   | GULLY                | ⊕ | EAVES POINT     |
| GC  | GULLY CHANNEL        | — | FLAT ROOF FT    |
| EH  | EARTH/STONE HEDGE    | — |                 |
| IL  | INVERT LEVEL         | ○ |                 |
| KB  | KERB                 | — |                 |
| LP  | LAMP POST            | ⊕ |                 |
| MH  | MANHOLE              | ⊕ |                 |
| OHB | OVERHEAD BUILDING    | ▭ |                 |
| OHL | OHEAD LINES          | — |                 |
| PWF | POST & WIRE FENCE    | — |                 |
| RL  | ROAD LINES           | — |                 |
| RW  | RETAINING WALL       | — |                 |
| SV  | STOP VALVE           | ⊕ |                 |
| TB  | TOP OF BANK          | ⊕ |                 |
| TK  | TRACK LINE           | — |                 |
| TP  | TELEPHONE POLE       | ⊕ |                 |
| UP  | UTILITY POLE         | ⊕ |                 |
| WF  | WOODEN FENCE         | — |                 |
| WL  | WALL                 | — |                 |
| WM  | WATER METER          | ⊕ |                 |

Amendments:

Rev	Date	Description



No. 3, RIVERSIDE  
 NANPEAN, ST AUSTELL  
 CORNWALL, PL26 7YJ  
 tel: 01726 87 81 48

e-mail:  
 primelandsurveys@gmail.com

Drg. No: 01

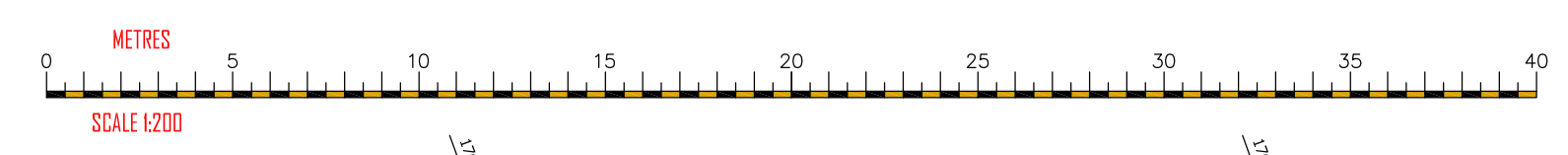
Client:  
 CAD ARCHITECTS

Title / Location:  
 THE OLD POTTERY, TREVELLANCE LANE,  
 PENWARTHA RD, BOLINGEY. TR6 0DH

Description:  
 TOPOGRAPHIC SURVEY

Scale: 1:200 at A1

Surveyor: ANH      Job ref: PS19163  
 Date: 15/10/19

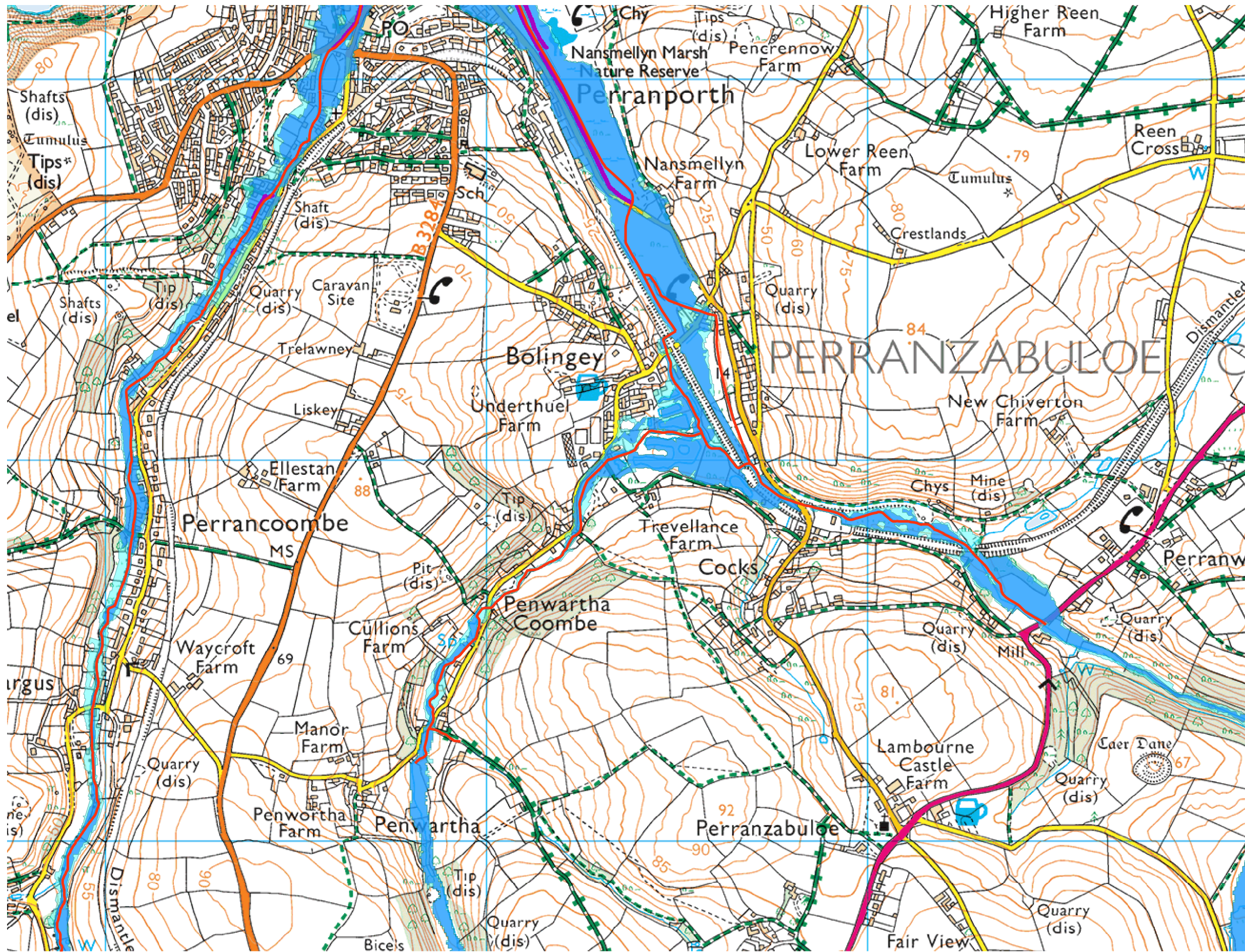


## **APPENDIX B    EA INFORMATION**

# ENQ20/DCIS/170530 - Flood Map for Planning (Rivers & Sea) centred on Penwartha Road, Bolingey



Please note this map is intended only as a guide - it is not accurate at individual property level



### Legend

- main river
- Defences
- Flood Zone 3
- Flood Zone 2

Flood Zones are areas, also known as the floodplain, which could be affected in the event of flooding from rivers and the sea. Flood Zones provide a good indication of land at flood risk. Flood Zones are not sufficiently detailed to show whether an individual property is at risk, for example it does not take into account flood defences. Please note that the likelihood of flooding is an assessment based on the information currently available and may change in future due to climate change or other factors. Flood Zone 3 shows the area that could be affected by flooding, either from rivers or the sea, if there were no flood defences. This area could be flooded from the sea by a flood that has a 0.5 per cent (1 in 200) or greater chance of happening each year; or from a river by a flood that has a 1 per cent (1 in 100) or greater chance of happening each year.

Flood Zone 2 shows the additional extent of an extreme flood from rivers or the sea. These outlying areas are likely to be affected by a major flood, with up to a 0.1 per cent (1 in 1000) chance of occurring each year.

Flood defences, were built in the last five years to protect against river floods with a 1% (1 in 100) chance of happening each year, or floods from the sea with a 0.5% (1 in 200) chance of happening each year, together with some, but not all, older defences and defences which protect against smaller floods.

Flood defences that are not yet shown, and the areas that benefit from them, will be gradually added.

1:10,000 Correct as of the 12<sup>th</sup> May 2020

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**ENQ20/DCIS/170530 - Records of flooding in the Bolingey area.**

Date	Location	Detail	Cause	Estimated Number of Properties Flooded	Flood Source
12/11/1894	Bolingey	Bolingey. Reported that a number of properties were flooded, and the "valley was a lake from Bolingey to Perranporth".	Assumed fluvial - Bolingey River		Fluvial
02/01/1900	Perranporth	Perranporth. Photograph shows flooding to the road in the St Pirans Road area. No further details.	Unknown.		Unknown
01/11/1954	Perranporth	Perranporth. The Perranporth - Bolingey road was flooded from the Bolingey River, and a council depot was flooded by water backing up through surface water drainage pipes which connect to the river.	Drainage pipes under building were not fitted with clappers enabling river water to enter pipes and come up through gratings into the building	1	Fluvial & Surface Water Runoff
26/11/1954	Bolingey	Bolingey - The Perranporth to Bolingey road was flooded to a depth of 18 inches, with side roads in the area being flooded to a depth of two feet. Through the Bolingey Valley as far as Cox the countryside had turned to a lake with flood waters three feet	Heavy rainfall		Surface Water Runoff
01/01/1974	Bolingey	Bolingey. One commercial property and road flooded.	Channel capacity exceeded	1	Fluvial

Date	Location	Detail	Cause	Estimated Number of Properties Flooded	Flood Source
27/12/1979	Bolingey	Bolingey. A dozen houses at Bolingey were flooded to a foot deep, and the water surged on down the Ponsmere Valley.	Surface water and Fluvial flooding	11	Fluvial & Surface Water Runoff
24/02/1989	Bolingey	Bolingey. One property on Cox Hill flooded to a depth of three feet, as a result of a culvert becoming blocked.	A culvert on a minor watercourse blocked.	1	Fluvial
12/08/2004	Bolingey	Bolingey. The garden of one property flooded from surface water runoff.	Blocked drains.	1	Surface Water Runoff
06/02/2016	Perranporth	Perranporth. Localised surface water flooding behind defences along Station Road.	Heavy rainfall	0	Surface Water Runoff

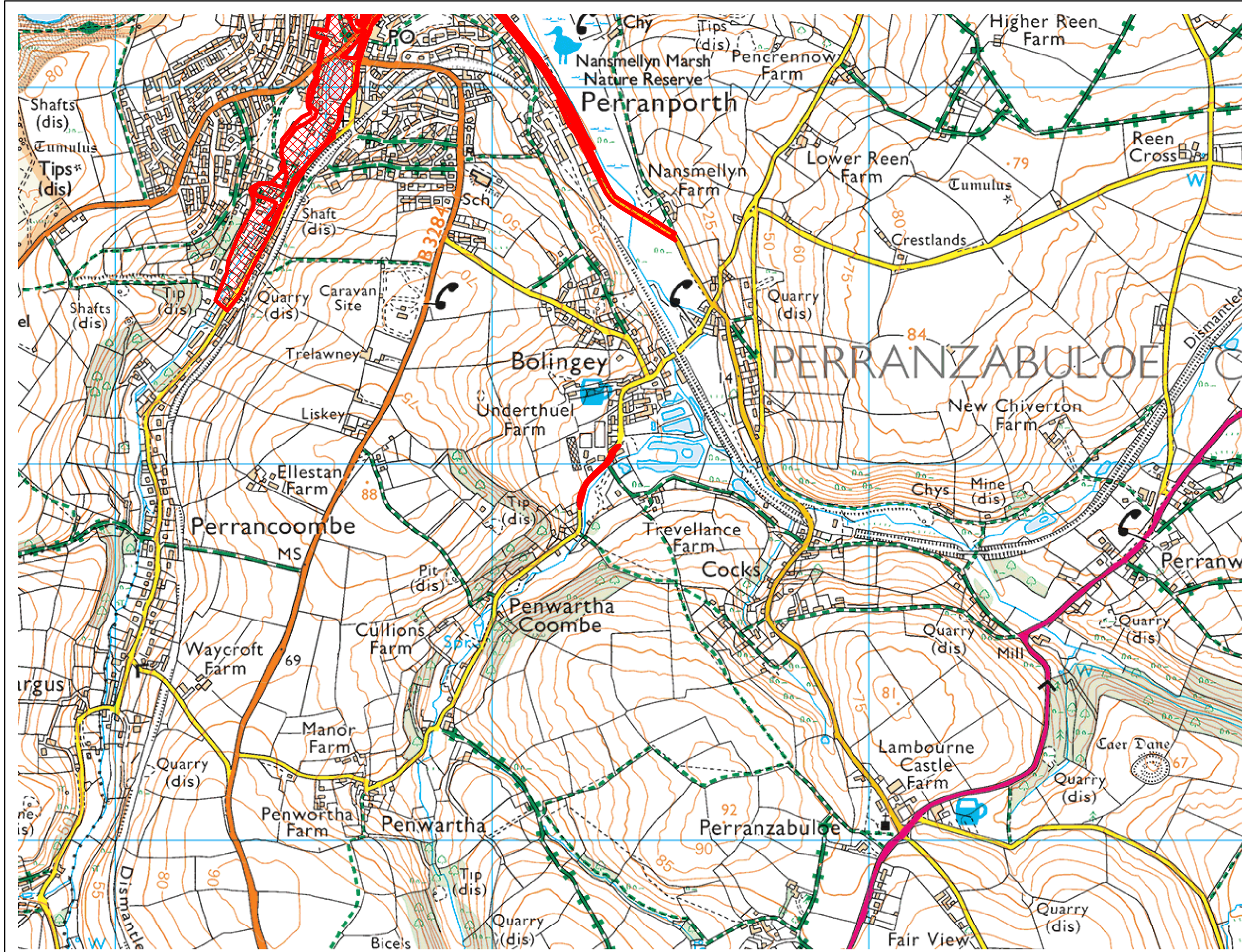
This list contains all the records of flooding we hold, in a 1km radius of the specified location. Although this information is compiled to the best of our knowledge, the absence of flooding does not mean that an area has not flooded in the past, nor guarantee it will not flood in the future. Our records are updated as more information comes to light, and as flood incidents occur.


*Correct as of 12 May 2020*

# ENQ20/DCIS/170530 - Historic Flood Map centred on Penwartha Road, Bolingey




Please note this map is intended only as a guide - it is not accurate at individual property level



**Legend**  
 Recorded Flood Outlines

The Recorded Flood Event Outline, shows the extent of known flooding from rivers and the sea. This outline is indicative of the flood extent, and does not necessarily confirm that a property has flooded internally. If an area is outside the extent of recorded flooding, it does not mean it has never flooded. This will be updated as more data comes to light, and as flood incidents occur.

1:10,000 Correct as of the 12<sup>th</sup> May 2020 

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### ENQ20/DCIS/170530 - Modelled flood levels and flows

This data is taken from the Perranporth ISIS-TuFLOW Model 2010. Please refer to the attached caveat when considering modelled data.

\* For climate change scenarios, 20% has been added to the 1% AEP flows.

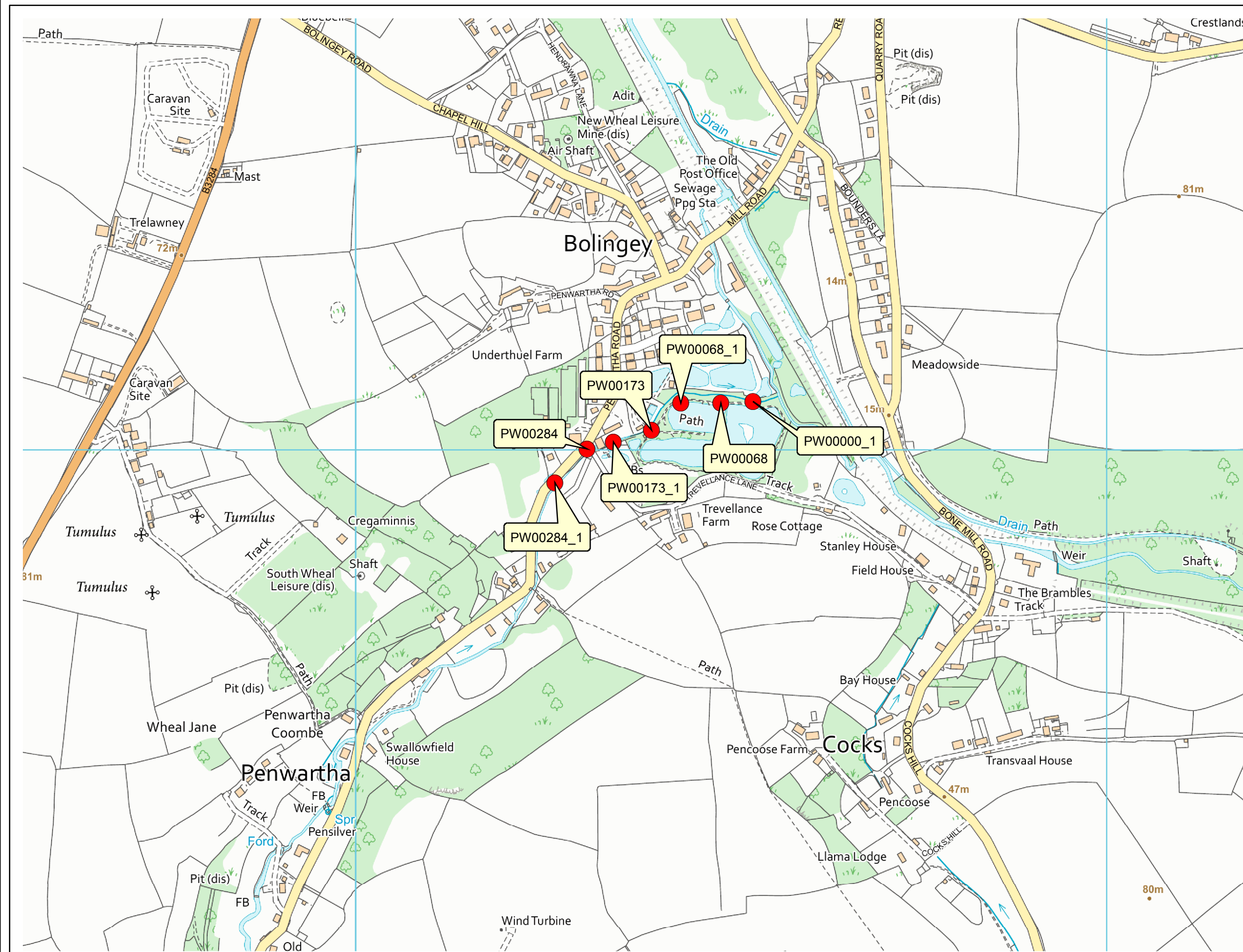
Node Reference	Easting	Northing	Flood levels, in mAOD (undefended model run)			Modelled Flood Flows, in m <sup>3</sup> /s (undefended model run)		
			1% AEP (1 in 100 year)	1% AEP + climate change*	0.1% AEP (1 in 1000 year)	1% AEP (1 in 100 year)	1% AEP + climate change*	0.1% AEP (1 in 1000 year)
PW00284_1	176265.00	52956.00	12.15	12.19	12.31	3.26	3.38	4.40
PW00284	176308.00	53001.00	11.62	11.67	11.75	2.76	2.78	2.77
PW00173_1	176343.00	53010.00	10.99	11.02	11.15	4.38	4.79	5.80
PW00173	176394.00	53026.00	10.00	10.03	10.18	5.09	5.65	7.26
PW00068_1	176433.00	53062.00	9.45	9.49	9.57	4.12	4.30	5.80
PW00068	176486.00	53062.00	8.55	8.75	8.97	4.12	4.45	5.30
PW00000_1	176529.00	53064.00	8.30	8.60	8.86	4.15	4.44	5.75

Correct as of 12 May 2020

# ENQ20/DCIS/170530 - Model Node Location Map



Please note this map is intended only as a guide - it is not accurate at individual property level



### Legend

● Model Node Location

Please refer to the enclosed table, for modelled water level data, and the enclosed caveat when considering modelled levels.

**1:5,000** Correct as of the 12<sup>th</sup> May 2020

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**Engineering and Development Solutions Ltd**

Registered Office: Unit 10 | Penstraze Business Centre | Truro | Cornwall | TR4 8PN

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