



Renewable Energy Systems Limited

Mynydd Maen Wind Farm

Phase 2 Site Investigation - Coal Mining Risk Assessment

315198-R02 (03)

RSK GENERAL NOTES

Project No.: 315198

Title: Phase 2 Site Investigation - Coal Mining Risk Assessment: Mynydd Maen Wind Farm, Cwmbran NP11 5AY

Client: Renewable Energy Systems Limited

Date: September 2023

Office: RSK Environment Limited, The Old School House, Stillhouse Lane, Bedminster, Bristol, BS3 4EB. Tel 0117 947 1006

Status: Report R02 Rev 03

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Rev 01	18/08/23	Updated drawings	RL	See above
Rev 02	11/09/23	Updated drawing	RL	See above
Rev 03	04/06/24	Updated drawing	RL	See above

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Where field investigations have been carried out, these have been restricted to a level of detail required to achieve the stated objectives of the work.

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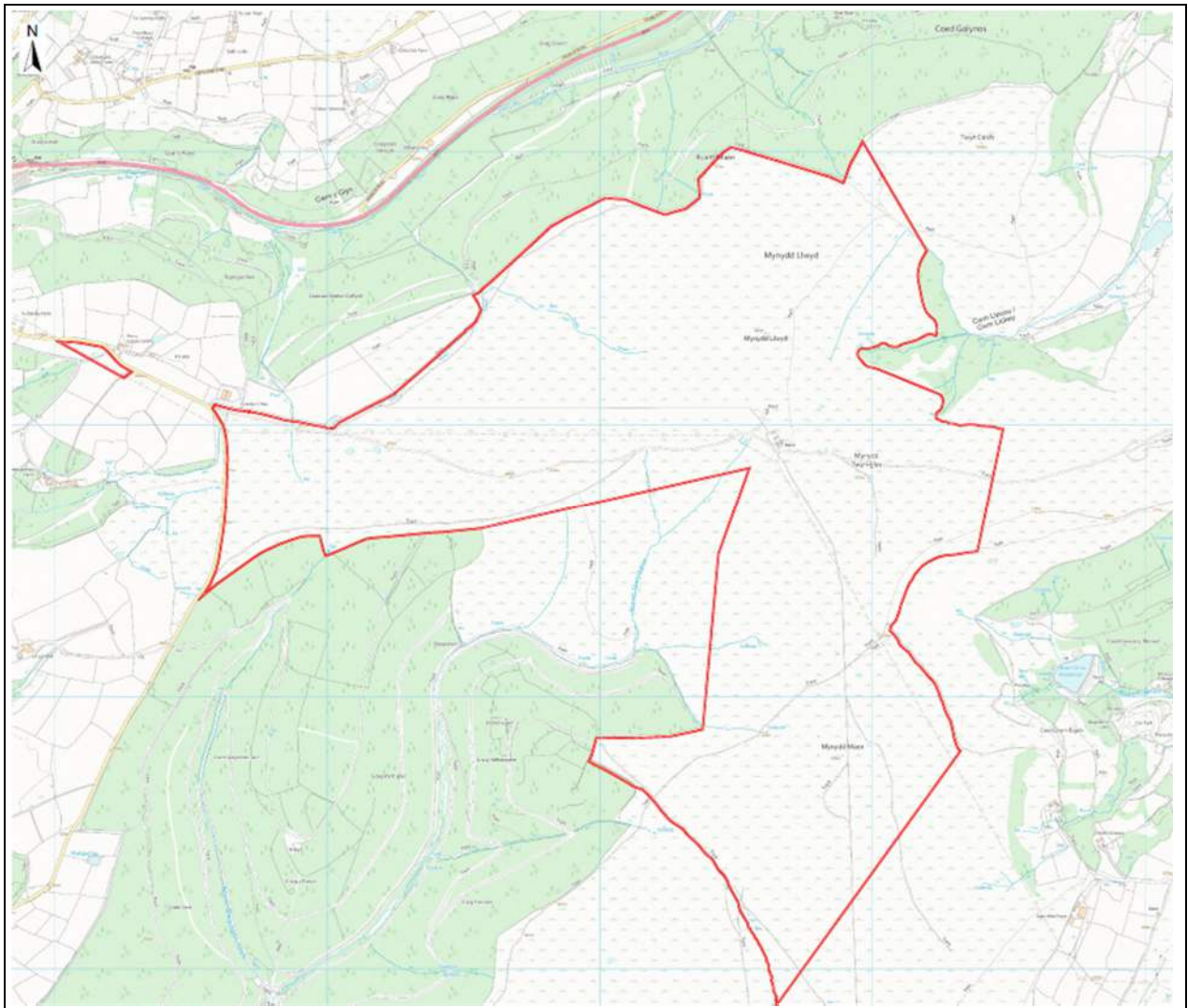
Figure 1	Site location plan
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Figure 3	Exploratory hole location plan

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Appendix A	Service constraints
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EXECUTIVE SUMMARY

Commissioning and purpose of assessment	RSK Environment Limited (RSK) was commissioned by Renewable Energy Systems Limited to carry out a Phase 2 Site Investigation - Coal Mining Risk Assessment of the land at Mynydd Maen Wind Farm, Cwmbran, NP11 5AY, grid reference ST 25754, 97735. The overall aim of this work was to assess potential coal mining risks identified in an earlier phase of work.
DESK-BASED ASSESSMENT	
Site description and proposed development	The site currently comprises of rough moorland and covers approximately 2000 hectares. The proposed development is a wind farm.
Previous site investigation (SI) reports	In March 2023, RSK undertook a desk based CMRA for Mynydd Maen based on the available data at that time. The site specific coal mining risk which required further assessment (by subsequent intrusive investigation the findings of which are presented in this report) included the possible presence of shallow underground workings in the Mynyddislwyn coal seam.
Geology and environmental setting	The site is underlain by peat, over the Hughes member sandstone according to published geological data. Records from the Coal Authority indicate the potential presence of 4 shallow coal seams across the site including the Tillery Rider No.2, Mynyddislwyn Lower Leaf, Cefn Glas and Brithdir coal seam.
INTRUSIVE INVESTIGATION & ASSESSMENT	
SI scope	Four rotary open hole boreholes and four trial pits at each of four proposed turbine locations (T3, T7, T8 and T11).
SI factual findings	The site is underlain by a layer of peat (between 0.20m to 0.6m thick) over varying amounts of clay, sands and gravels with sandstone bedrock encountered at 1.0m to 2.1m bgl. Generally groundwater was not encountered except for a small seepage found in trial pit T3(RO) at 0.6mbgl. No evidence of coal seams or workings were recorded in any of the exploratory holes.
Coal Mining Risk Assessment	Based on the exploratory findings, it is considered that there is a low or negligible risk from coal mining related hazards at the assessment site, which will have little or no effect on the proposed development.
Recommendations including issues for further assessment	No further investigation or remediation with regards to coal mining hazards is required at the assessment site.
<i>The information given in this summary is necessarily incomplete and is provided for initial briefing purposes only. The summary must not be used as a substitute for the full text of the report.</i>	



Site Name	Mynydd Maen Wind Farm	NGR	ST 25754, 97735
Site Address	Cwmbran NP11 5AY	Site area (ha.)	366

1 INTRODUCTION

1.1 Commissioning

RSK Environment Limited (RSK) was commissioned by Renewable Energy Systems Limited to carry out a Phase 2 Site Investigation - Coal Mining Risk Assessment of the land at Mynydd Maen Wind Farm, Cwmbran NP11 5AY. The project was carried out to an agreed brief as set out in RSK's proposal (reference T315198, dated 20 January 2023). This commission follows an earlier, desk-based assessment completed by RSK and presented in RSK report, Mynydd Maen Wind Farm Coal Mining Risk Assessment, document reference 315198 R01 (02), dated March 2023.

The work is subject to RSK's Service Constraints, which are included in **Appendix A**.

The site in question is being considered for development for commercial use as a wind farm.

1.2 Objectives

The objective of the work is to assess the risk of the presence of potential shallow historical coal workings, identified in the desk based study undertaken by RSK in early March 2023 (Coal Mining Risk Assessment Report ref 315198 R01), at proposed wind turbine locations T3, T7, T8 and T11.

1.3 Scope of works

The scope of this assessment has been developed in accordance with relevant British Standards and authoritative technical guidance as referenced through the report. It is also compliant with relevant planning policy and guidance.

The scope of the intrusive investigation has been designed in line with the recommendations of BS5930:2015+A1:2020 Code of practice for ground investigations (BSI, 2020), which maintains compliance with BS EN 1997-1 and 1997-2 and their related standards. It has also been developed in general accordance with BS 10175: 2011 + A2 2017.

The scope of works for the assessment has included the following:

Intrusive investigation

- design and implementation of an intrusive investigation
- interpretation of ground conditions to develop an updated risk level from coal mining
- preparation of this interpretative report.

1.4 Existing reports

The following reports detailing previous works at the site were made available for review:

- RSK report, Mynydd Maen Wind Farm Coal Mining Risk Assessment 315198 R01 (02), March 2023 (NB this included review of an earlier report carried out by Geoinvestigate Limited "Coal Mining Risk Assessment (CMRA), Mynydd Maen Wind

Farm, Torfaen, between Newbridge and Cwmbran NP4 6US. 13 November 2020.
Project ID4412, Ref. G20374")

Pertinent information from these reports has been summarised in Section 2.

1.5 Limitations

This report is subject to the RSK Service Constraints given in **Appendix A** and limitations that may be described through this document.

2 SITE DETAILS

2.1 Site location

Site location details are presented in Table 1 and a site location plan is provided on Figure 1.

Table 1 Site location details

Site name	Mynydd Maen Wind Farm
Full site address and post code	Mynydd Maen, Cwmbran NP11 5AY
National Grid reference (approximate centre of site)	ST 25754, 97735

2.2 Site description

The site is located between Newbridge and Cwmbran, south of the A472 highway. The site covers an area of approximately 366 hectares comprising rough open moorland and trackways, surrounded by a variety of woodlands and valleys. There are a number of significant watercourses running through the open moorland.

An existing telecoms mast is located roughly in the centre of site at 325660, 197923, and a number of underground services cross through the development area.

The site boundary and current layout are presented in **Figure 2**.

2.3 Surrounding land uses

The site is located on the moorland above Cwmbran. Immediate surrounding land uses are described in Table 2.

Table 2 Surrounding land uses

North	A472 road and the Tirpentwys nature reserve beyond
East	Pontypool and Cwmbran
South	Moorland, agricultural land, Cwmcarn forest
West	Fields, agricultural land, Cwmcarn forest, Newbridge and Abercarn

2.4 Development plans

The proposed layout of the site, at the time of preparing this report, is shown in **Appendix B**.

The proposed development is understood to be a wind farm comprised of up to 13 turbines, a substation and associated trackways.

2.5 Summary of previous investigations

A summary of pertinent information from previous investigations is included in Table 3.

Table 3 Summary of previous investigation reports

Report Details	RSK, 315198 R01 (02), Coal Mining Risk Assessment: Mynydd Maen Wind Farm, March 2023.
Site coverage	Entire site.
Summary scope of works	Desk based assessment of available coal mining records (including Geoinvestigate CMRA report from November 2020).
Key findings	<p>There are underground workings in a number of coal and one ironstone seams beneath the site between 171m and 627m depth.</p> <p>There are 4 coal seams at potentially shallow depth beneath parts of the site including the Tillery Rider No.2, Mynyddislwyn Lower Leaf, Cefn Glas and Brithdir coal seam. Four proposed turbines (T3, T7, T8 and T11) are located in the vicinity of the Mynyddislwyn coal seam. Although records indicate that unrecorded shallow workings (<30m) are not probable directly beneath site, the Coal Authority have indicated on their interactive viewer that parts of site are considered development high risk based on coal seam outcrops and have the potential to have been worked.</p> <p>A number of shafts are recorded around the perimeter of site, the nearest being over 300m to the north east of proposed turbine 1. Given that no entries are present in the vicinity of development, no further consideration of these features is required.</p> <p>There are a number of geological faults recorded beneath or close to the site. They are generally of limited extent and not thought to have resulted in significant structural movement.</p> <p>Given the significant depth of workings, the lack of any known potential direct migration pathway and the proposed form of development, the risk posed by mine gases is considered negligible.</p> <p>The potential presence of shallow workings in the Mynyddislwyn coal seam at the four proposed turbine locations is the only identified risk that requires further assessment.</p>

3 SITE INVESTIGATION STRATEGY & METHODOLOGY

3.1 Introduction

RSK carried out intrusive investigation works between 6 and 14 March 2023.

3.2 Objectives

The specific objective of the investigation was to establish the ground conditions and assess the identified risk from coal shallow coal workings at the four proposed turbine locations (T3, T7, T8 and T11).

3.3 Selection of investigation methods

The techniques adopted for the investigation were chosen with consideration of the objectives and site constraints, which are described below.

Mechanically excavated trial pits were chosen to allow for rapid assessment of shallow ground conditions where coal was suspected to occur near surface in the vicinity of certain turbine locations. Rotary open hole drilling was conducted following the initial trial pitting exercise in search for evidence of historical shallow mine workings in coal seams beneath the site (such as coal arisings, broken ground or voids), drilling was completed to a maximum depth of 20m bgl.

Prior to conducting intrusive works, utility service plans were obtained and buried service clearance undertaken in line with RSK's health and safety procedures. Copies of statutory service records obtained by RSK as part of the agreed scope of works are contained in **Appendix C**.

3.4 Investigation strategy

The ground investigation was carried out using intrusive ground investigation techniques in general accordance with the recommendations of BS5930:2015+A1:2020, which maintains compliance with BS EN 1997-1 and 1997-2 and their related standards. Whilst every attempt was made to record full details of the strata encountered in the boreholes, techniques of hole formation will inevitably lead to disturbance, mixing or loss of material in some soils and rocks.

The investigation strategy involved targeted boreholes and trial pits following the results of a desk based report undertaken by RSK in March 2023. The report identified that four proposed turbines (T3, T7, T8 and T11) are located in the vicinity of the Mynyddiswyn coal seam and could potentially be at risk from coal mining related hazards.

The constraints to the investigation were as follows:

- overhead and underground services
- boggy terrain
- large distances between exploratory locations

- access issues during extreme weather conditions (snow and strong winds)

Details of the investigation locations and rationale are presented in Table 4. Machine excavated trial pits were dug at each of the four proposed turbine locations (T3, T7, T8 and T11) to a maximum depth of 2.50m bgl before being backfilled with arisings. Four rotary open holes were drilled at each of the four turbine locations to a maximum depth of 20m bgl before being backfilled with bentonite. An exploratory hole location plan is shown on **Figure 3**.

Table 4 Exploratory hole and monitoring well location rationale

Investigation type	Number	Location – investigation method	Rationale
Trial-pits excavated by mechanical excavator	4	T3 - TP T7 - TP T8 - TP T11 - TP	To investigate shallow ground conditions beneath proposed turbine locations T3, T7, T8 and T11.
Boreholes by rotary open hole	4	T3 - RO T7 - RO T8 - RO T11 - RO	To prove or disprove the presence of shallow mine workings beneath proposed turbine locations T3, T7, T8 and T11.
T3 etc denotes turbine location and reference number, TP denotes mechanically excavated trial pit, RO denotes rotary open hole borehole			

3.4.1 Implementation of investigation works

The site investigation works were carried out in general accordance with the UK Specification for Ground Investigation (UKSGI), third edition (AGS, 2022).

The exploratory holes were logged by an engineer in general accordance with the recommendations of BS5930:2015+A1:2020 (which incorporates the requirements of BS EN ISO 14688-1, 14688-2 and 14689-1).

4 SITE INVESTIGATION FACTUAL FINDINGS

The results of the intrusive investigation undertaken are detailed below.

4.1 Ground conditions encountered

The descriptions of the strata encountered, notes regarding visual or olfactory evidence of contamination and field observations of soil and groundwater are included on the exploratory hole records presented in **Appendix F**.

At all trial pit and borehole locations the same sequence of lithologies were recorded which varied slightly in thickness. The exploratory holes revealed that the site is underlain by a layer of peat over varying amounts of clay, sands and gravels with sandstone bedrock encountered at relatively shallow depths.

For the purpose of discussion, the ground conditions encountered during the fieldworks are summarised in Table 5 with the strata discussed in subsequent subsections.

Table 5 General succession of strata encountered

Stratum	Exploratory holes encountered	Depth to top of stratum m bgl	Proven thickness (m)
Peat	All four trial pits All four boreholes	0.0	0.20 - 0.60
Clay/ sand/ gravel	All four trial pits All four boreholes	0.20 – 0.60	0.65 - 1.80
Sandstone bedrock (believed to be the Hughes member of the Pennant Sandstone Formation)	All four trial pits All four boreholes	1.00 - 2.10	18.60 - 19.00

4.1.1 Peat

Peat was encountered at all locations directly beneath the grass or moss at surface up to a depth of between 0.20m and 0.60m bgl. The peat was generally black in colour, amorphous, sandy or clayey, plastic or spongy and often contained rootlets.

4.1.2 Variable cohesive and granular unit

This stratum was encountered at all locations at a depth of between 0.20m and 0.6m below ground level and varied between 0.65m and 1.8m in thickness. Cohesive layers were generally orange brown slightly sandy gravelly clay. Granular layers were comprised of primarily sand or gravel with varying amounts of secondary components including clay, silt, sand or gravel. All gravel observed was comprised of sandstone.

4.1.3 Hughes Member of the Pennant Sandstone Formation

Bedrock (believed to represent the Hughes member of the Pennant Sandstone Formation) was encountered at all locations at a depth of between 1.00m and 2.10m below ground level and comprised of grey fine to coarse sandstone. The layer of sandstone had a minimum thickness of 18.6m.

4.2 Groundwater and surface water

4.2.1 Groundwater encountered during intrusive works

Groundwater was not encountered during the investigation works. A seepage of perched groundwater was encountered at the base of the peat in borehole T3 (RO) at 0.60 mbgl.

4.3 Coal Mining Hazards

Ground conditions which may be evidence of possible shallow underground coal mining, such as; intact coal seams; voids; broken or highly fractured ground; soft or backfilled materials within bedrock; or rapid drilling progress or unexpected loss of drilling flush, were **not** encountered in any of the exploratory boreholes.

In summary the boreholes recorded intact sandstone bedrock throughout and there was no evidence of any underground coal mining to the full depths of drilling.

5 CONCLUSIONS AND RECOMMENDATIONS

5.1 Coal Mining Risk Assessment

The investigation has **not** encountered **any** evidence of shallow coal seams or unrecorded shallow workings beneath site up to a maximum depth of 20m bgl in all exploratory locations.

Adequate minimum rock cover (18m to 19m) has been proved in turbine locations T3, T7, T8 and T11; should as a worst case, the seam be present immediately below the base of the borehole.

Based on the above findings, there is a **low or negligible risk** from coal mining related hazards at the assessment site and will have little/no effect on the proposed development.

5.2 Recommendations

No further investigation or remediation with regards to coal mining hazards is required at the assessment site.

REFERENCES

Previous SI reports and other site related information

RSK, 315198 R01 (02), Coal Mining Risk Assessment: Mynydd Maen Wind Farm, March 2023.

OR

Standards and guidance

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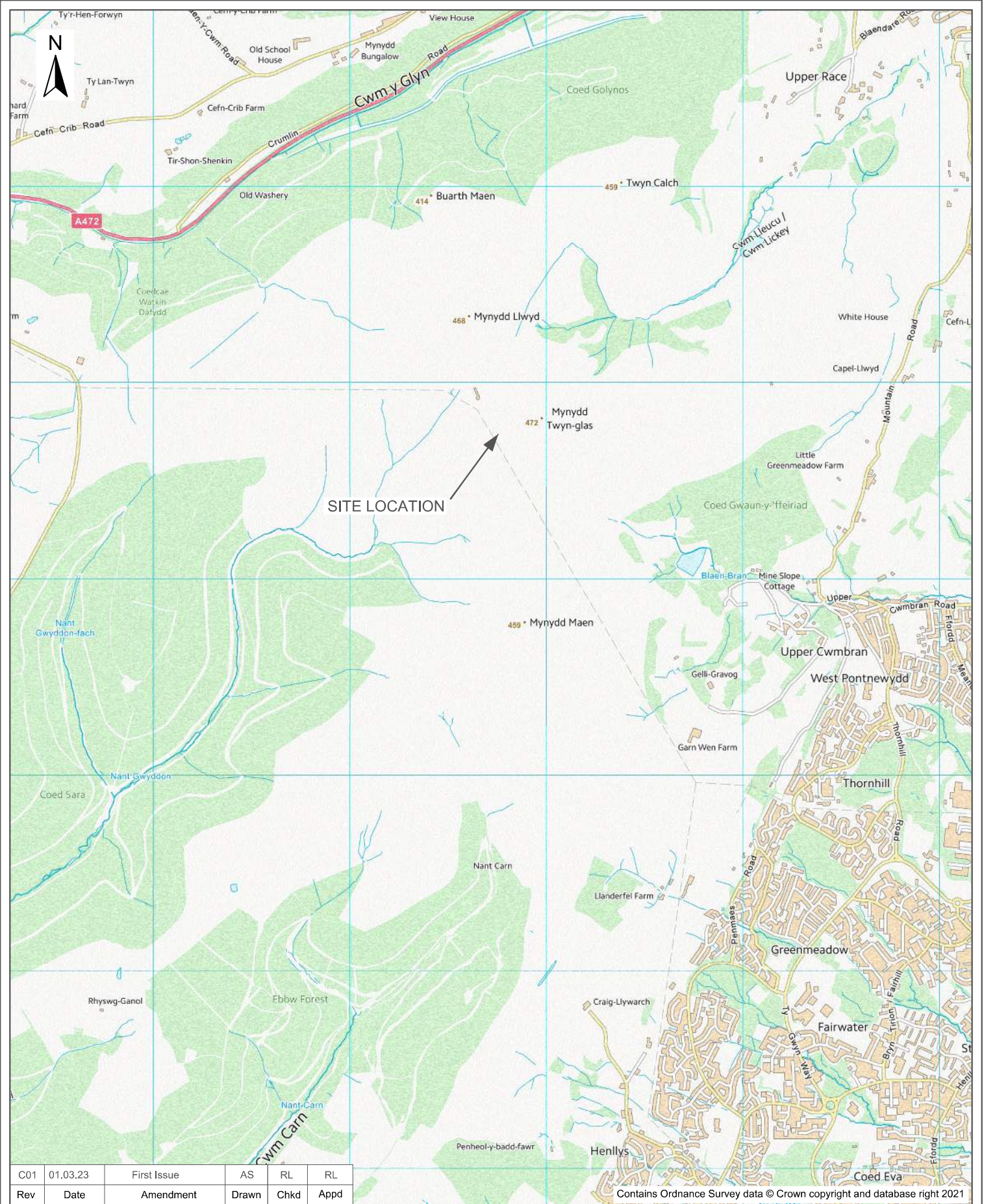
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FIGURES



FIGURE 1 SITE LOCATION PLAN



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Rev	Date	Amendment	Drawn	Chkd	Appd

Contains Ordnance Survey data © Crown copyright and database right 2021



RSK
GEOSCIENCES

The Old School
Stillhouse Lane
Bristol
BS3 4EB

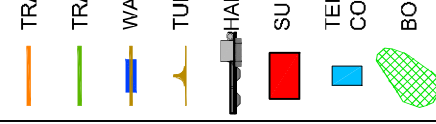
Tel: +44(0)1414 180471
Email: info@rsk.co.uk
Web: www.rsk.co.uk

Client	Renewable Energy Systems Limited				
Project Name	Mynydd Maen Wind Farm				
Description	Site Location Plan				

Dimension	Size	Scale	Geolocation	Project ID	Drawing no.	Rev	File name
m	A4	1:25,000	325754,197735	315198	11101	C01	315198-BL-111-SS-D-C-11101-C01



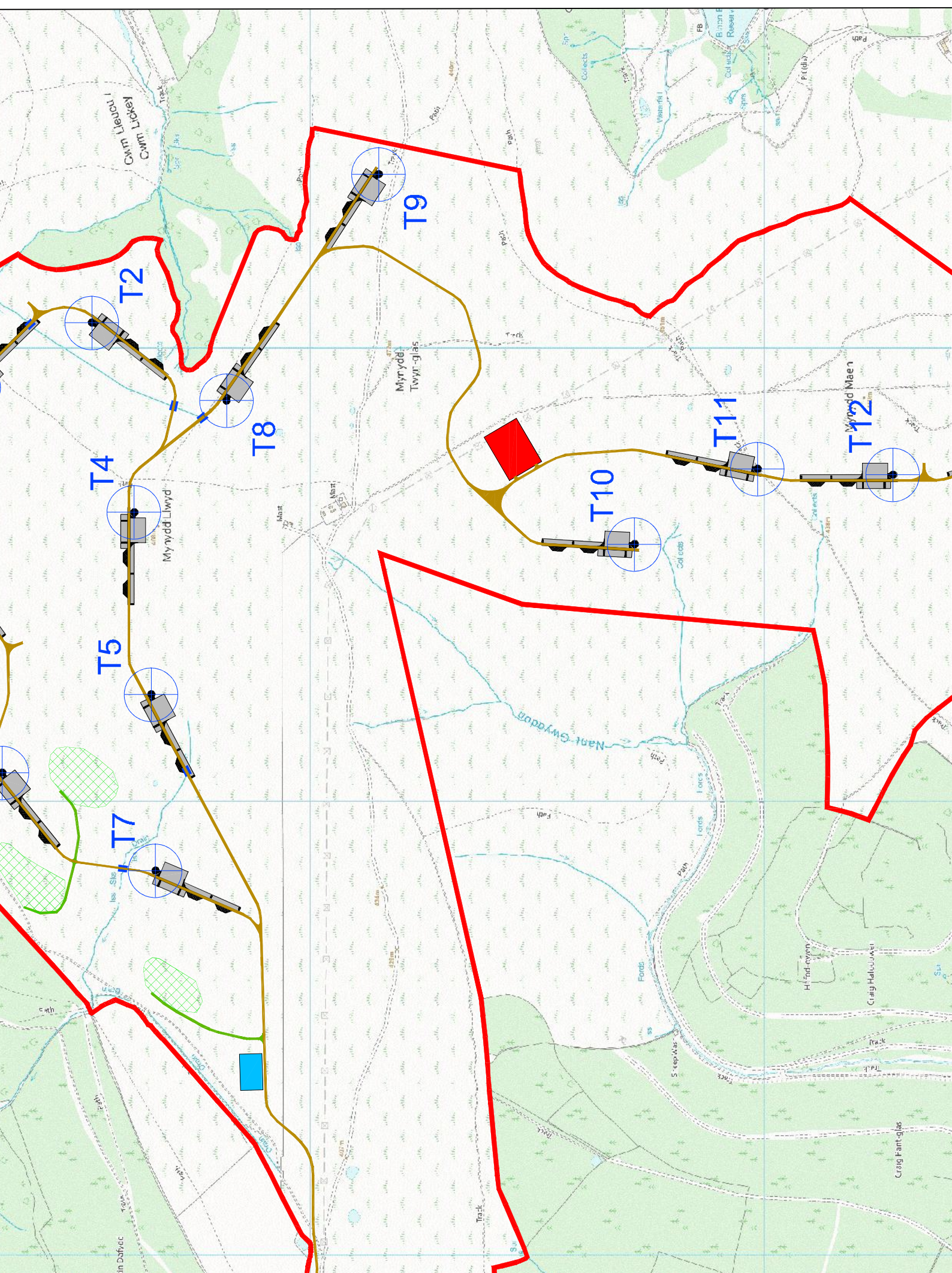
FIGURE 2 SITE LAYOUT PLAN



NOTES:

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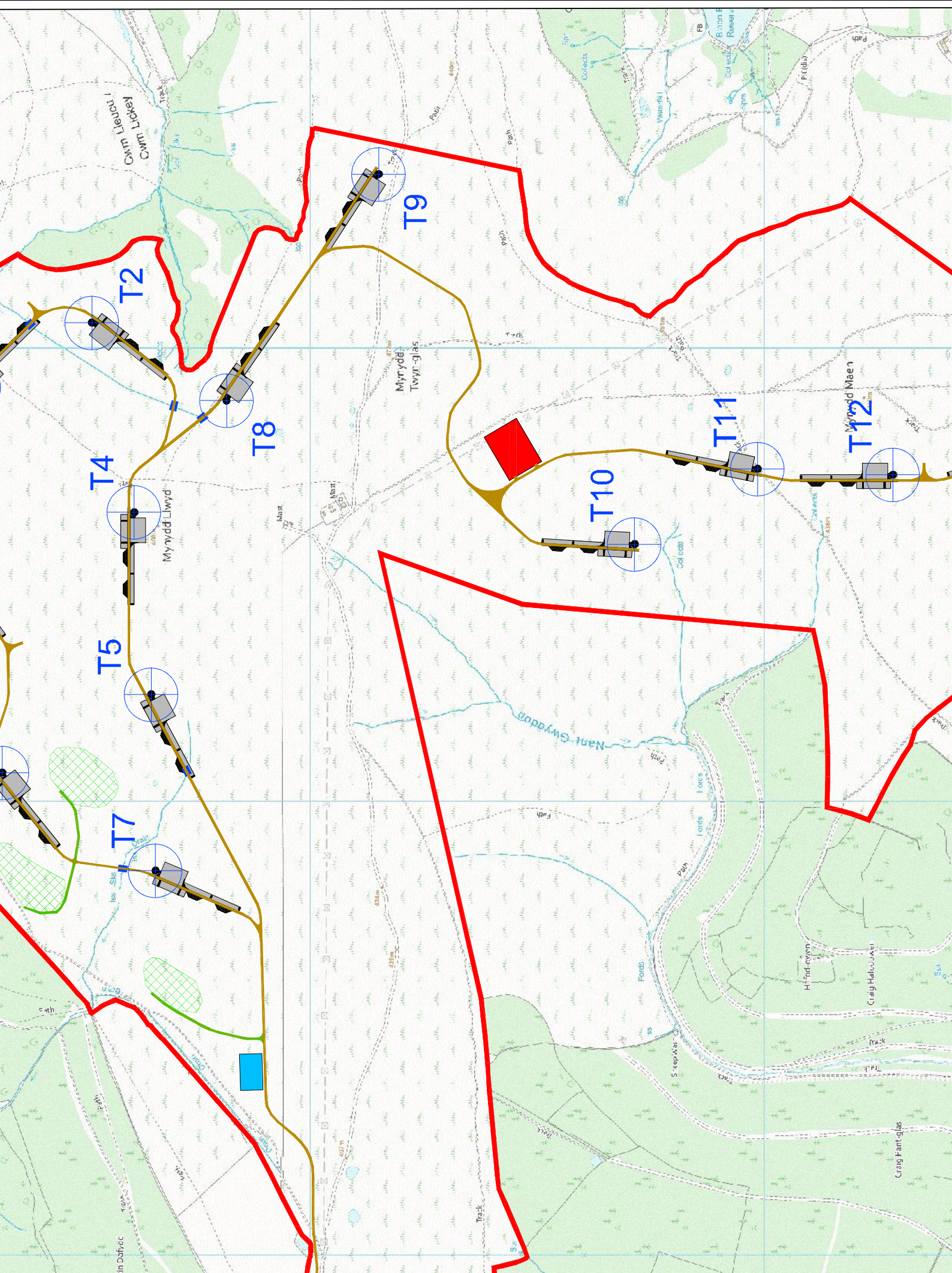
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LAYOUT DRAW		N	
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DRAWING TITL		N	



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NOTES:
1. PLANNING FROM C



Myrydd Llwyd

Myrydd Nisau

Myrydd Twm-glas

Nant Gwyddon

Myrydd Llwyd

Myrydd Nisau

Myrydd Twm-glas

T2

T4

T5

T7

T8

T9

T10

T11

T12

FIGURE 3 EXPLORATORY HOLE LOCATION PLAN



Notes:

Contains geograph

Rev	Date
C01	18.08.20



The Oil Stillhouse
Bristol
BS3 4E

Client

Renew

Project Name

Mynyd

Description

Explor

APPENDICES

APPENDIX A

SERVICE CONSTRAINTS

1. This report and the site investigation carried out in connection with the report (together the "Services") were compiled and carried out by RSK Environment Limited (RSK) for Renewable Energy Systems Limited (the "Client") in accordance with the terms of a contract [RSK Environment Standard Terms and Conditions] between RSK and the Client. The Services were performed by RSK with the reasonable skill and care ordinarily exercised by an environmental consultant at the time the Services were performed. Further, and in particular, the Services were performed by RSK taking into account the limits of the scope of works required by the client, the time scale involved and the resources, including financial and manpower resources, agreed between RSK and the Client.
2. Other than that, expressly contained in paragraph 1 above, RSK provides no other representation or warranty whether express or implied, in relation to the Services.
3. Unless otherwise agreed in writing, the Services were performed by RSK exclusively for the purposes of the Client. RSK is not aware of any interest of or reliance by any party other than the Client in or on the Services. Unless expressly provided in writing, RSK does not authorise, consent or condone any party other than the client relying upon the Services. Should this report or any part of this report, or otherwise details of the Services or any part of the Services be made known to any such party, and such party relies thereon that party does so wholly at its own and sole risk and RSK disclaims any liability to such parties. **Any such party would be well advised to seek independent advice from a competent environmental consultant and/or lawyer.**
4. It is RSK's understanding that this report is to be used for the purpose described in the introduction to the report. That purpose was a significant factor in determining the scope and level of the Services. Should the purpose for which the report is used, or the proposed use of the site change, this report may no longer be valid and any further use of or reliance upon the report in those circumstances by the client without RSK 's review and advice shall be at the client's sole and own risk. Should RSK be requested to review the report after the date of this report, RSK shall be entitled to additional payment at the then existing rates or such other terms as agreed between RSK and the client.
5. The passage of time may result in changes in site conditions, regulatory or other legal provisions, technology or economic conditions which could render the report inaccurate or unreliable. The information and conclusions contained in this report should not be relied upon in the future without the written advice of RSK. In the absence of such written advice of RSK, reliance on the report in the future shall be at the Client's own and sole risk. Should RSK be requested to review the report in the future, RSK shall be entitled to additional payment at the then existing rate or such other terms as may be agreed between RSK and the client.
6. The observations and conclusions described in this report are based solely upon the Services which were provided pursuant to the agreement between the Client and RSK. RSK has not performed any observations, investigations, studies or testing not specifically set out or required by the contract between the client and RSK. RSK is not liable for the existence of any condition, the discovery of which would require performance of services not otherwise contained in the Services. For the avoidance of doubt, unless otherwise expressly referred to in the introduction to this report, RSK did not seek to evaluate the presence on or off site of asbestos, invasive plants, electromagnetic fields, lead paint, heavy metals, radon gas, persistent, bioaccumulative or toxic chemicals (including PFAS and related compounds) or other radioactive or hazardous materials, unless specifically identified in the Services.
7. The Services are based upon RSK's observations of existing physical conditions at the Site gained from a visual inspection of the site together with RSK's interpretation of information, including documentation, obtained from third parties and from the Client on the history and usage of the site,

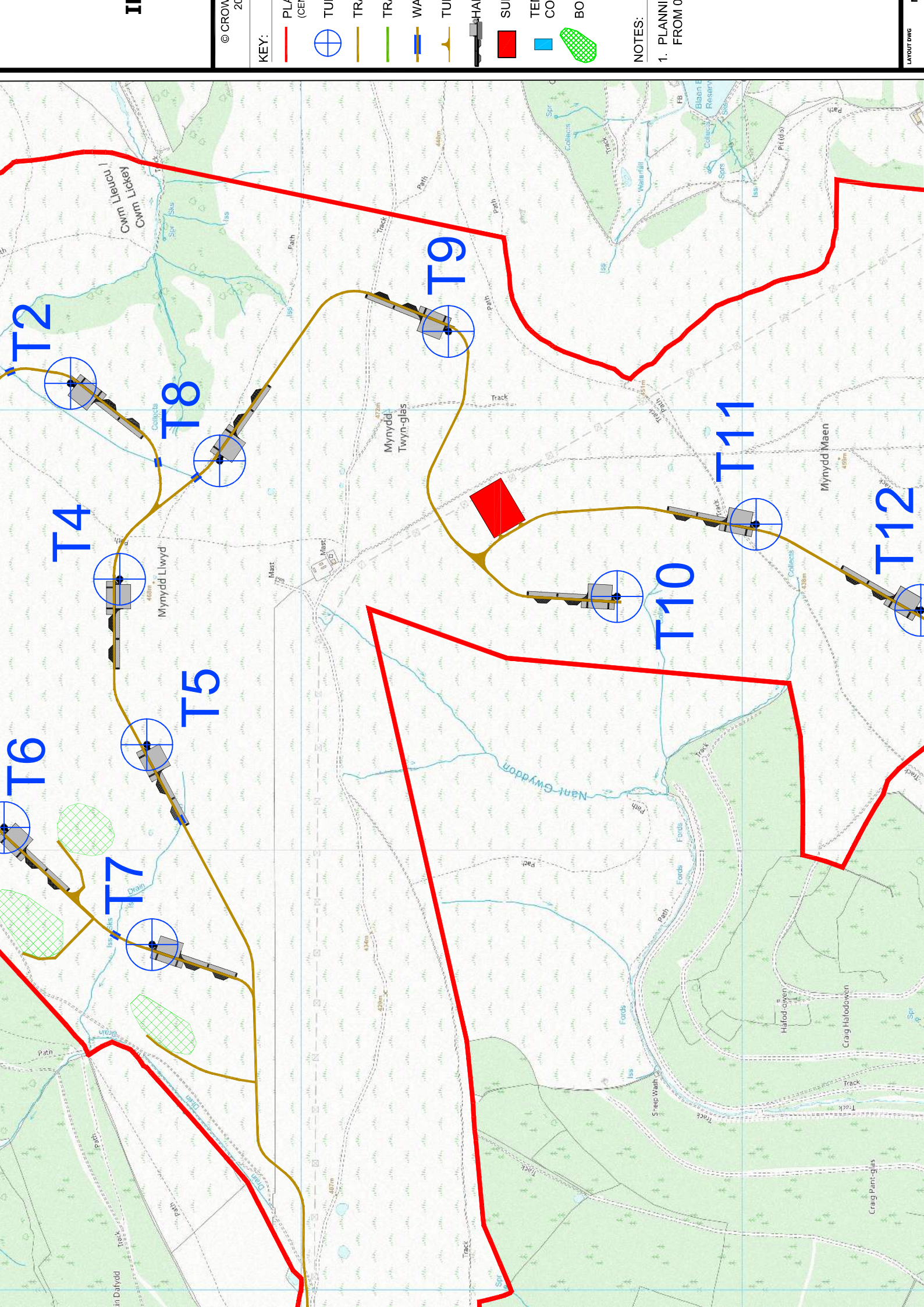
unless specifically identified in the Services or accreditation system (such as UKAS ISO 17020:2012 clause 7.1.6):

- a. The Services were based on information and/or analysis provided by independent testing and information services or laboratories upon which RSK was reasonably entitled to rely.
- b. The Services were limited by the accuracy of the information, including documentation, reviewed by RSK and the observations possible at the time of the visual inspection.
- c. The Services did not attempt to independently verify the accuracy or completeness of information, documentation or materials received from the client or third parties, including laboratories and information services, during the performance of the Services.

RSK is not liable for any inaccurate information or conclusions, the discovery of which inaccuracies required the doing of any act including the gathering of any information which was not reasonably available to RSK and including the doing of any independent investigation of the information provided to RSK save as otherwise provided in the terms of the contract between the Client and RSK.

8. The intrusive environmental site investigation aspects of the Services are a limited sampling of the site at pre-determined locations based on the known historic / operational configuration of the site. The conclusions given in this report are based on information gathered at the specific test locations and can only be extrapolated to an undefined limited area around those locations. The extent of the limited area depends on the properties of the materials adjacent and local conditions, together with the position of any current structures and underground utilities and facilities, and natural and other activities on site. In addition, chemical analysis was carried out for a limited number of parameters (as stipulated in the scope between the client and RSK, based on an understanding of the available operational and historical information) and it should not be inferred that other chemical species are not present.
9. Any site drawing(s) provided in this report is (are) not meant to be an accurate base plan but is (are) used to present the general relative locations of features on, and surrounding, the site. Features (intrusive and sample locations etc) annotated on site plans are not drawn to scale but are centred over the approximate location. Such features should not be used for setting out and should be considered indicative only.
10. The comments given in this report and the opinions expressed are based on the ground conditions encountered during the site work and on the results of tests made in the field and in the laboratory. However, there may be conditions pertaining to the site that have not been disclosed by the investigation and therefore could not be taken into account. In particular, it should be noted that there may be areas of made ground not detected due to the limited nature of the investigation or the thickness and quality of made ground across the site may be variable. In addition, groundwater levels and ground gas concentrations and flows, may vary from those reported due to seasonal, or other, effects and the limitations stated in the data should be recognised.
11. Asbestos is often observed to be present in soils in discrete areas. Whilst asbestos-containing materials may have been locally encountered during the fieldworks or supporting laboratory analysis, the history of brownfield and demolition sites indicates that asbestos fibres may be present more widely in soils and aggregates, which could be encountered during more extensive ground works.
12. Unless stated otherwise, only preliminary geotechnical recommendations are presented in this report and these should be verified in a Geotechnical Design Report, once proposed construction and structural design proposals are confirmed.

APPENDIX B
DEVELOPMENT DRAWINGS



KEY:

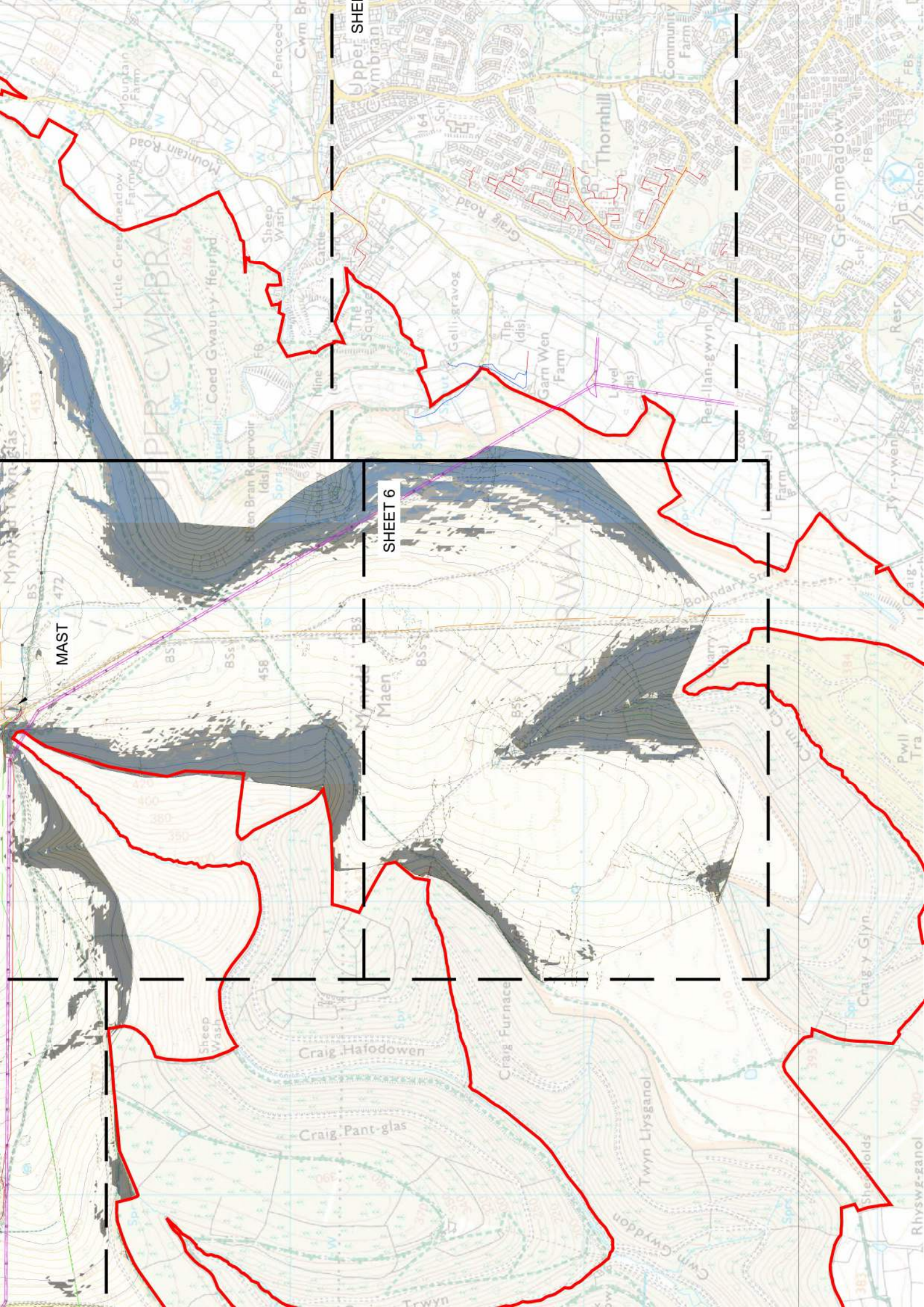
	PL (CE)		TU		TR		TR		WA		TU		SHA		SU		TE	CO		BO
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NOTES:
1. PLANNI
FROM 0



APPENDIX C

UTILITY SERVICE PLANS



UPPER CWMBRAN

UPPER SHEET

SHEET 6

Maen

Craig Hafodowen

Craig Pant-glas

Twyn Llysganol

Gwm Gwyddon

Craig Furnace

Garn Wen Farm

Level (dis)

Tip (dis)

Gelli-gravog

Mine

Pen Bran Reservoir

Pen Bran Reservoir (dis)

Coed Gwaun-y-Heirnod

Little Greenmeadow Farm

Mountain Road

Mountain Farm

Pencoed

Cwm Br

Upper She

ymbran

Thornhill

Community Farm

Greenmeadow

MAST

BS 472

BS 458

BS 458

BS 458

BS 458

BS 458

400

380

350

400

380

350

400

380

350

400

380

350

400

380

350

395

385

383

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383

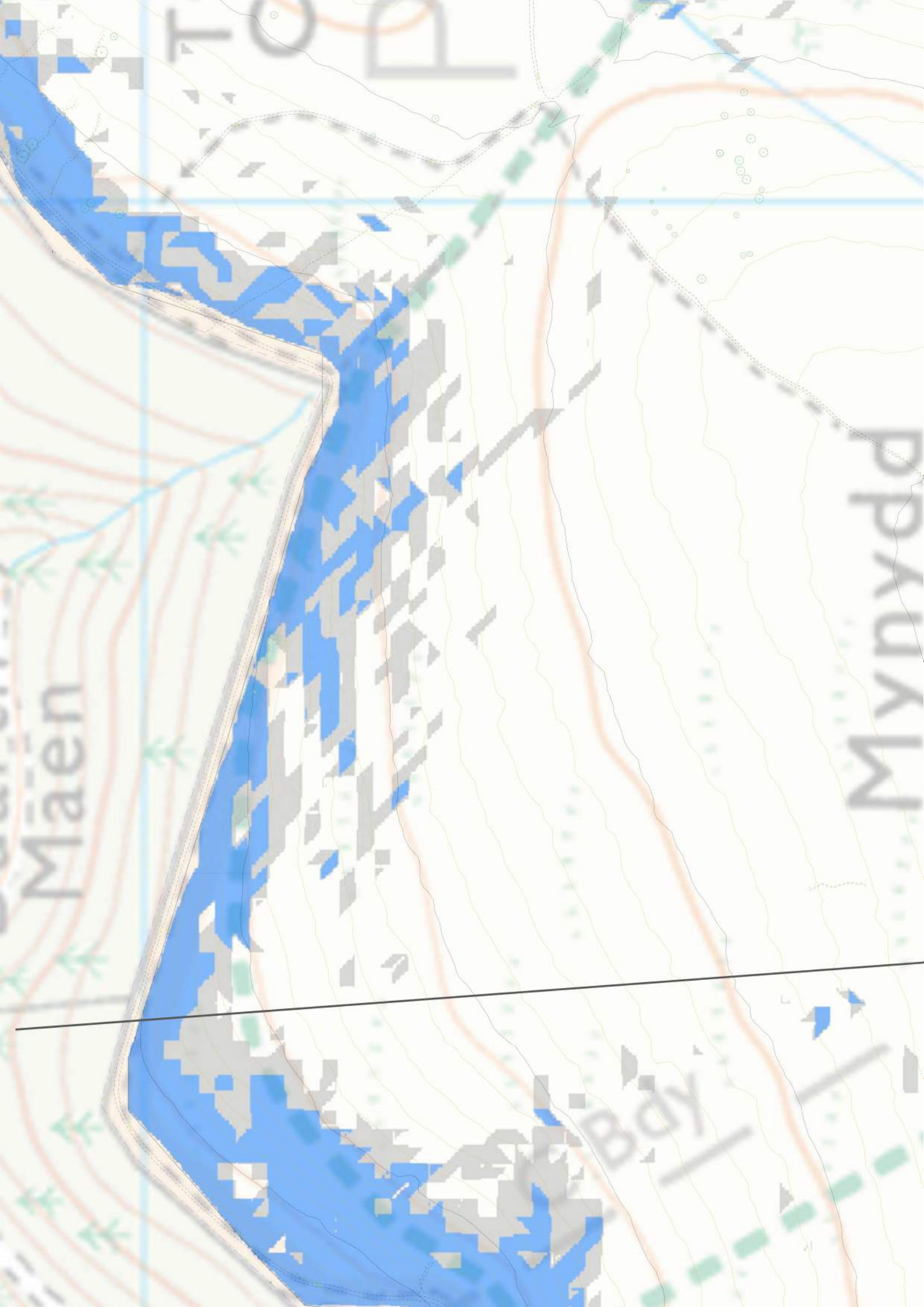
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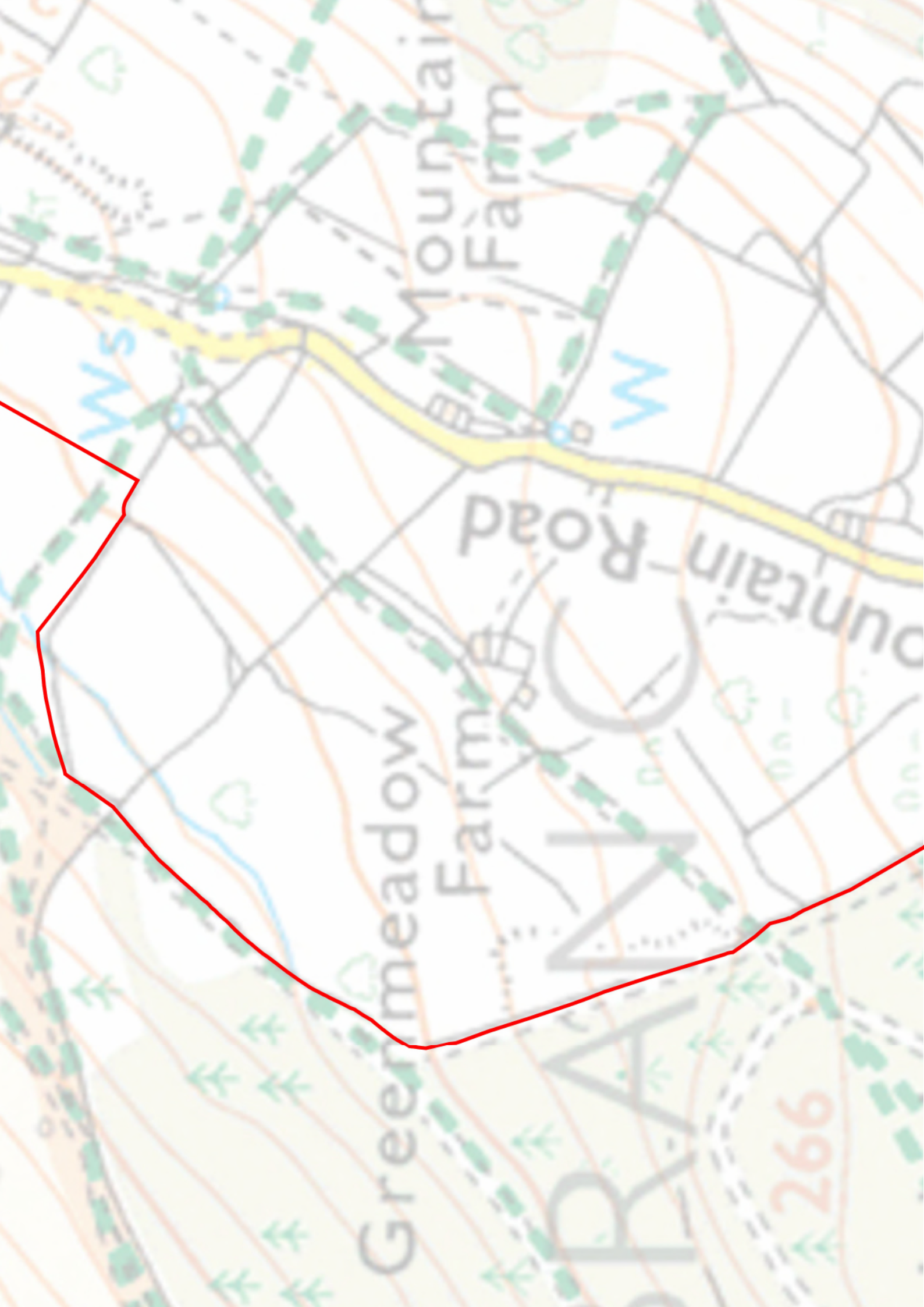
Coedcae Watkin
Dafydd

Coetgae
hen

Sheepfold







Mountain Farm

Mountain Road

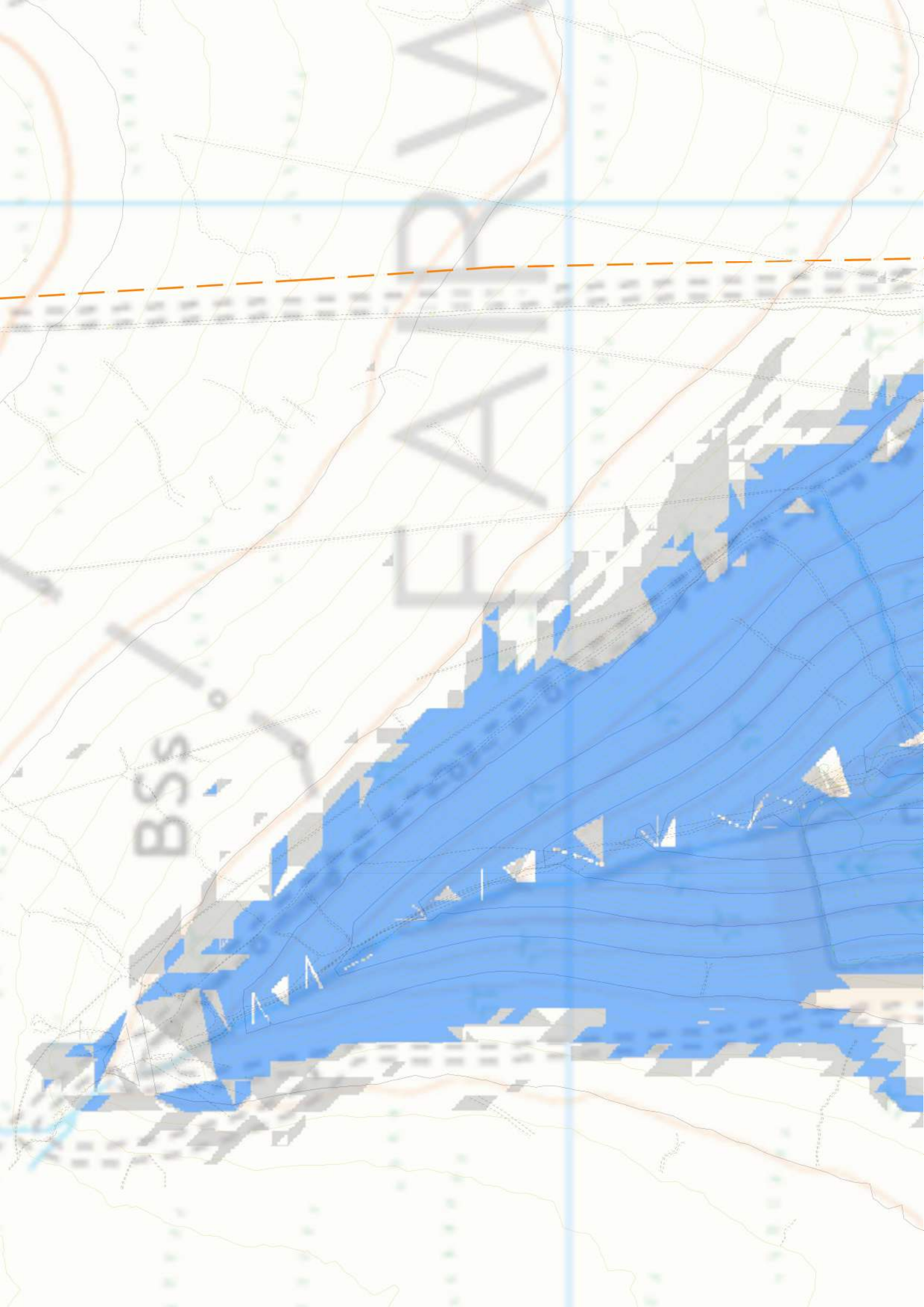
Greenmeadow Farm

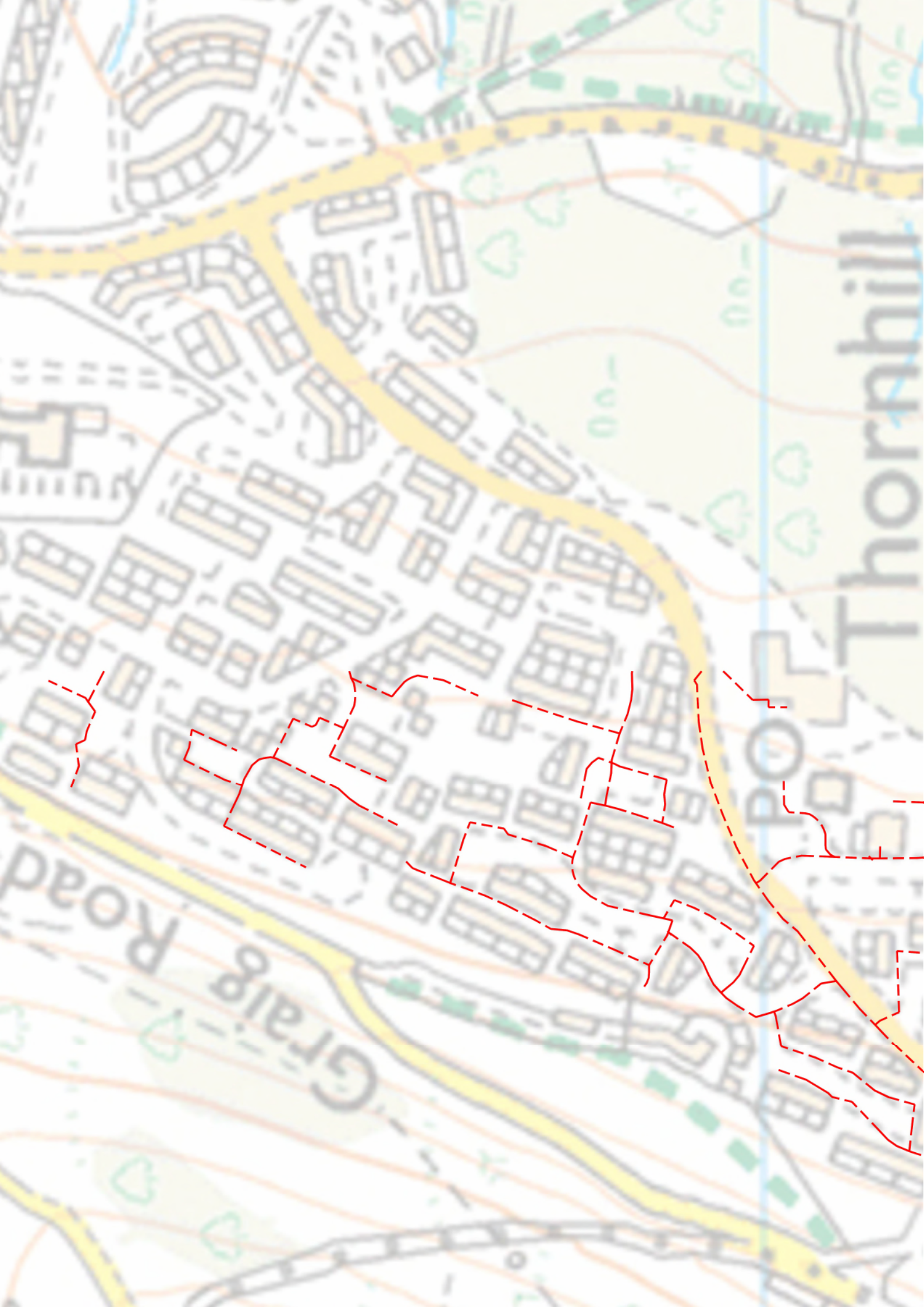
BRANK

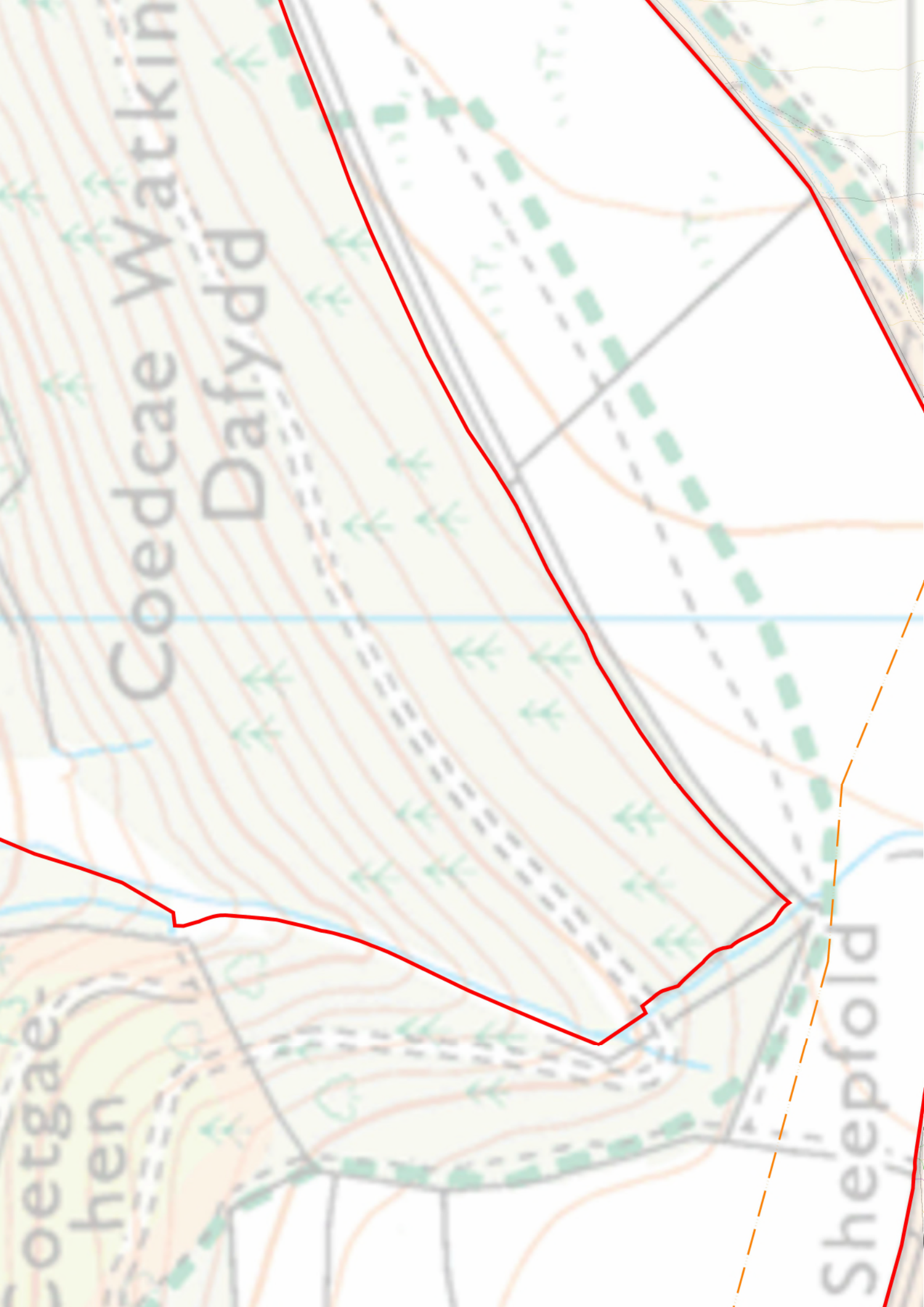
266

WS

W







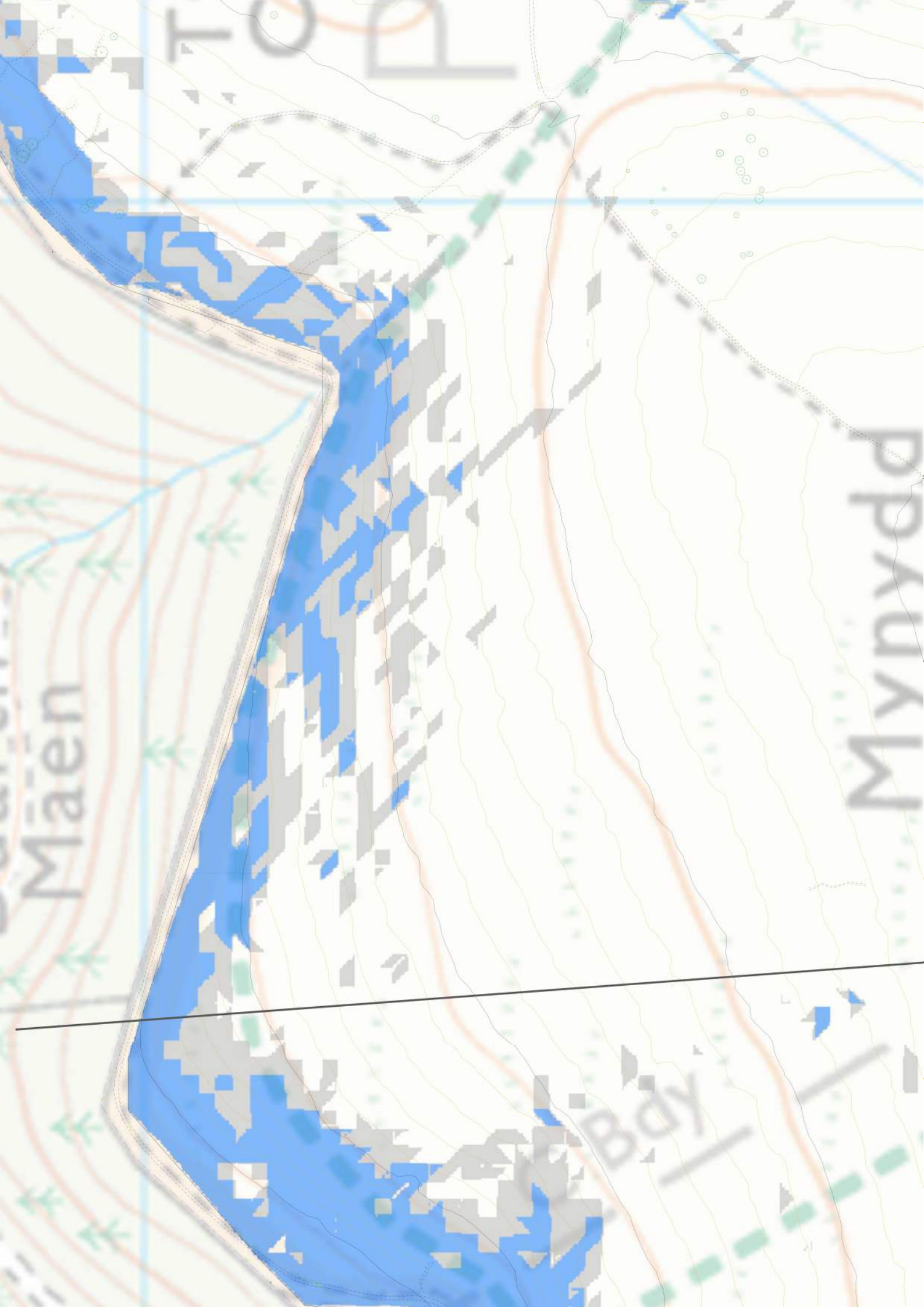
Coedcae Watkin

Dafydd

Coetgae

hen

Sheepfold



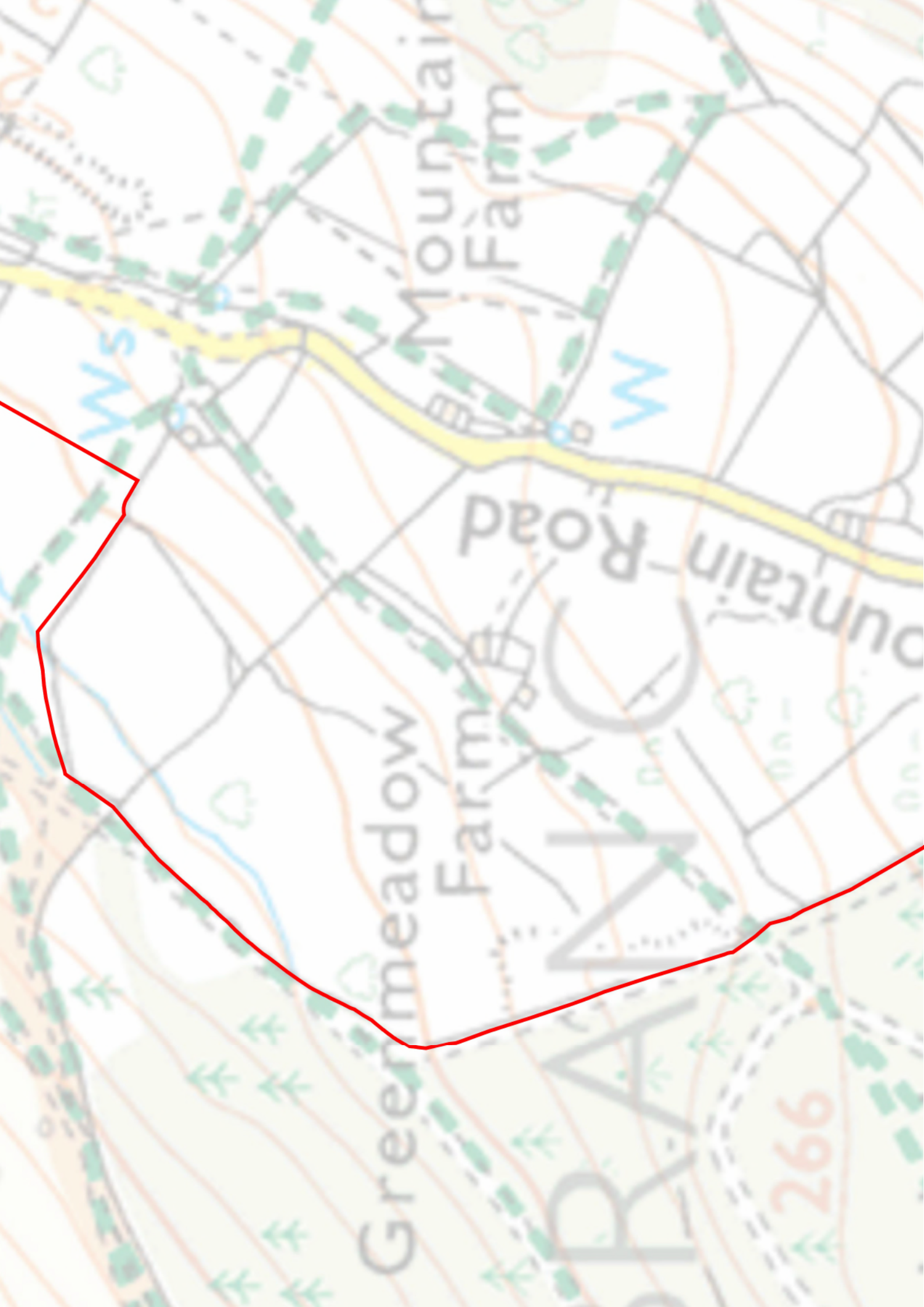
TOP

Mäen

Mynydd

Bay





Mountain Farm

Mountain Road

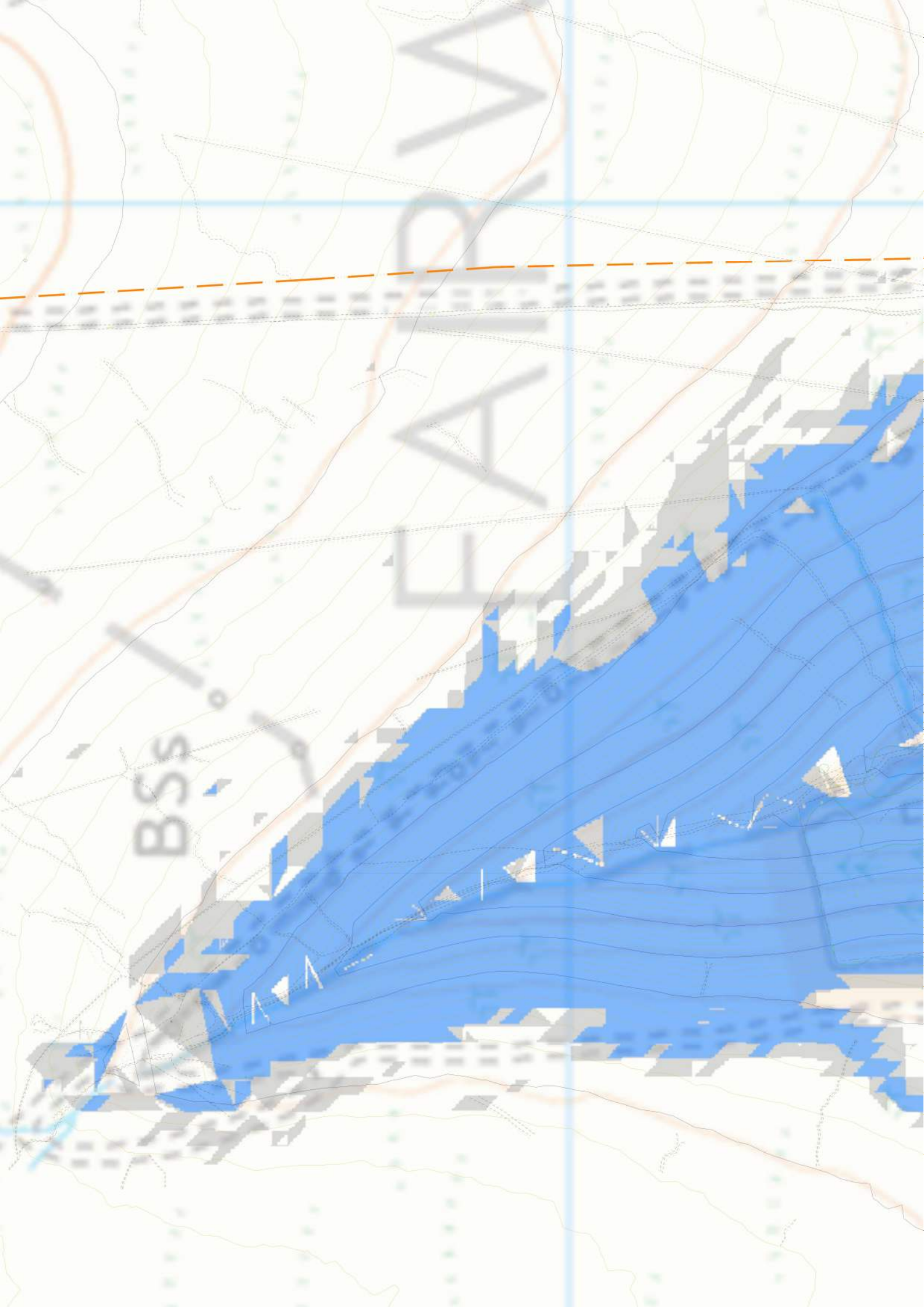
Greenmeadow Farm

BRA

266

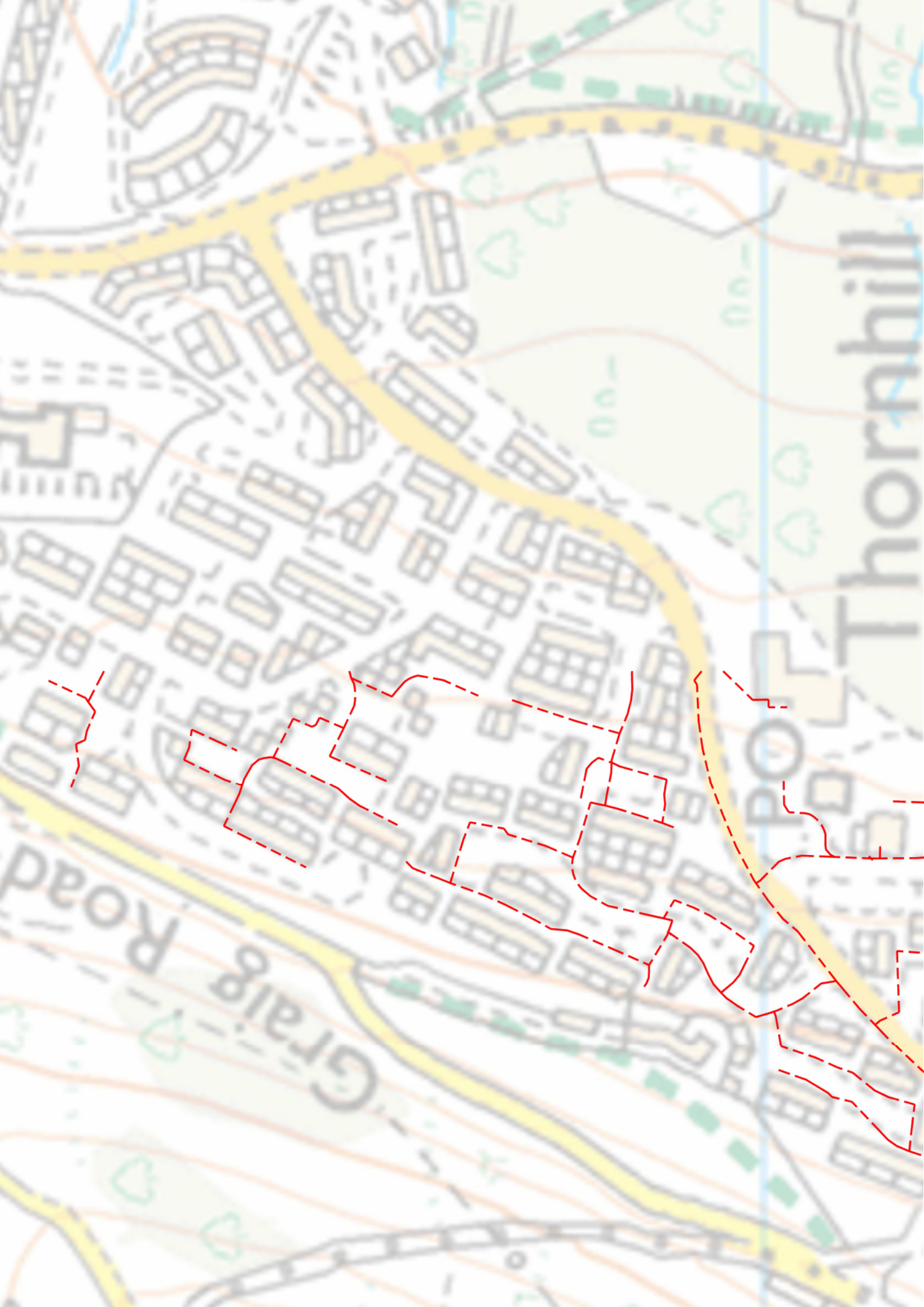
WS

W



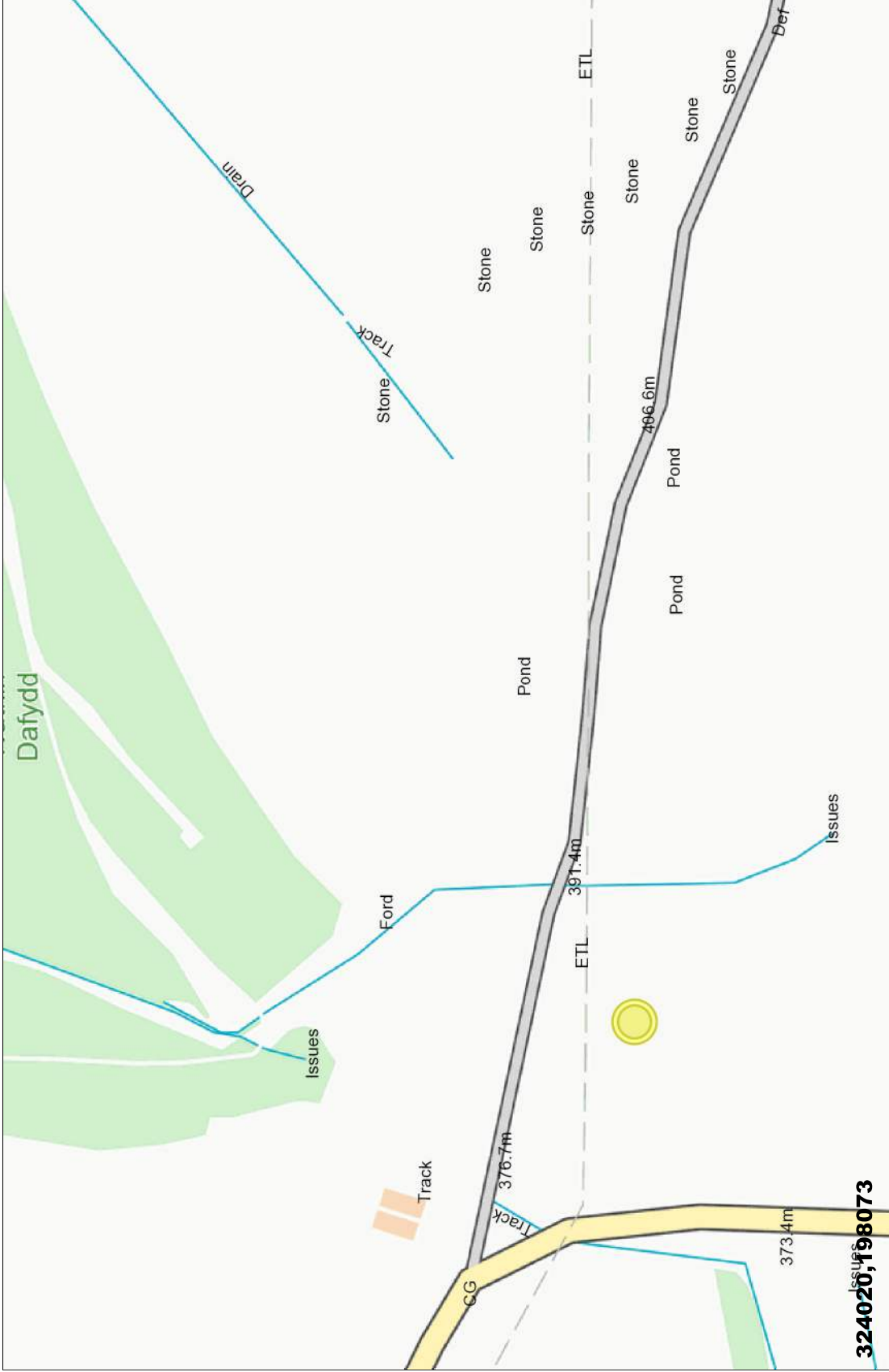
BSS

FAIRWAY



Grain Road

POT Thornhill



LEGEND

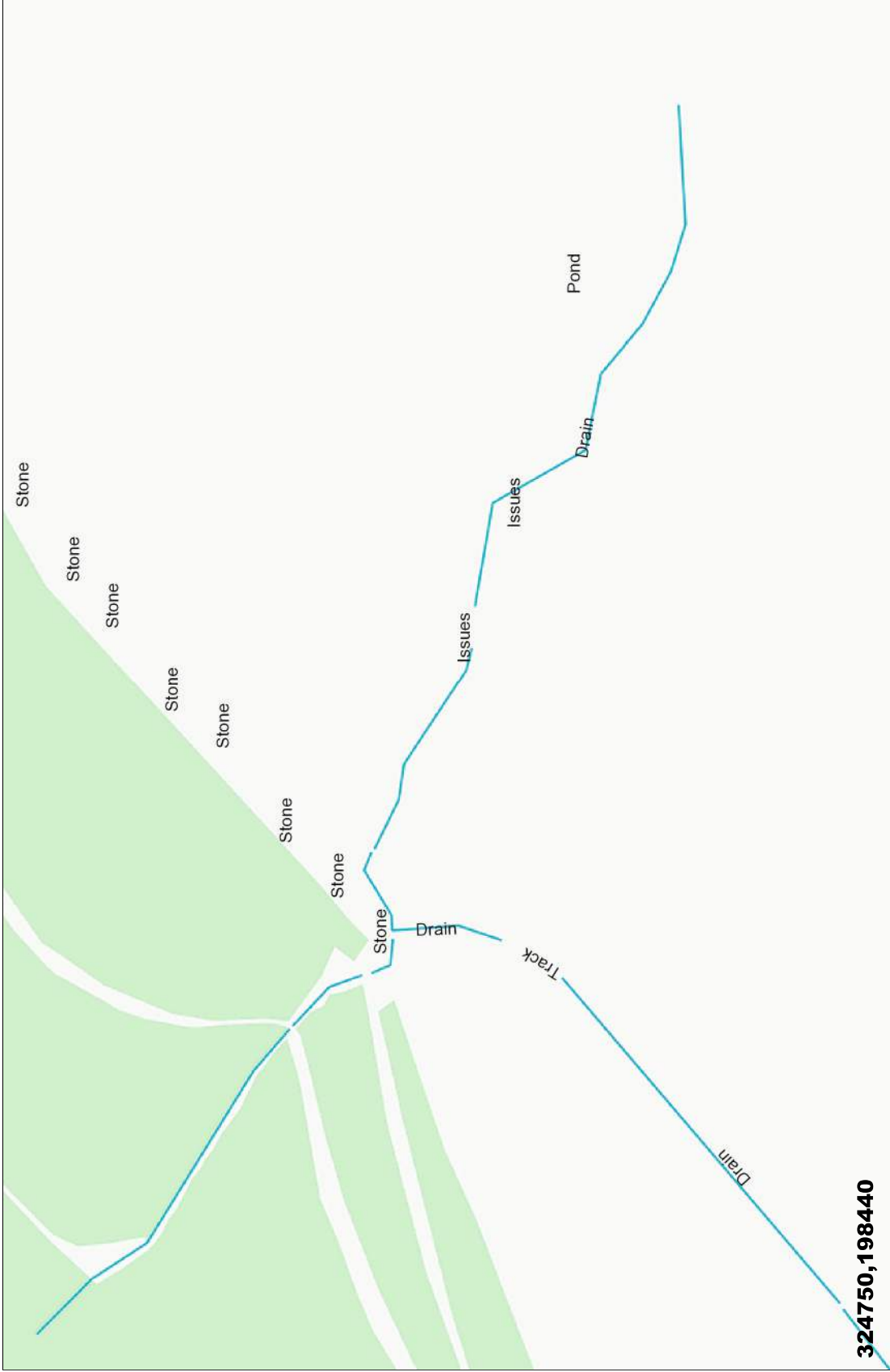
	Clean Water		Foul
	Sluice Val		Surface Water
	Air Val, SINGLE		Combined
	Tap		Rising Main
	Pressure Reducing Valve		Private
	Meter		Treatment Works
	BULK Meter		Pumping Station
	FH		Special Purpose
	Cap		Unknown End
	Existing Main		Change, Combined Overflow
	NON COMPANY		Outfall, FOUL
	Sewerage External		Lamp Hole, Foul
			Private Sewer Transfer
			Lateral Drain
			Inspection Chamber

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324020,198073



LEGEND

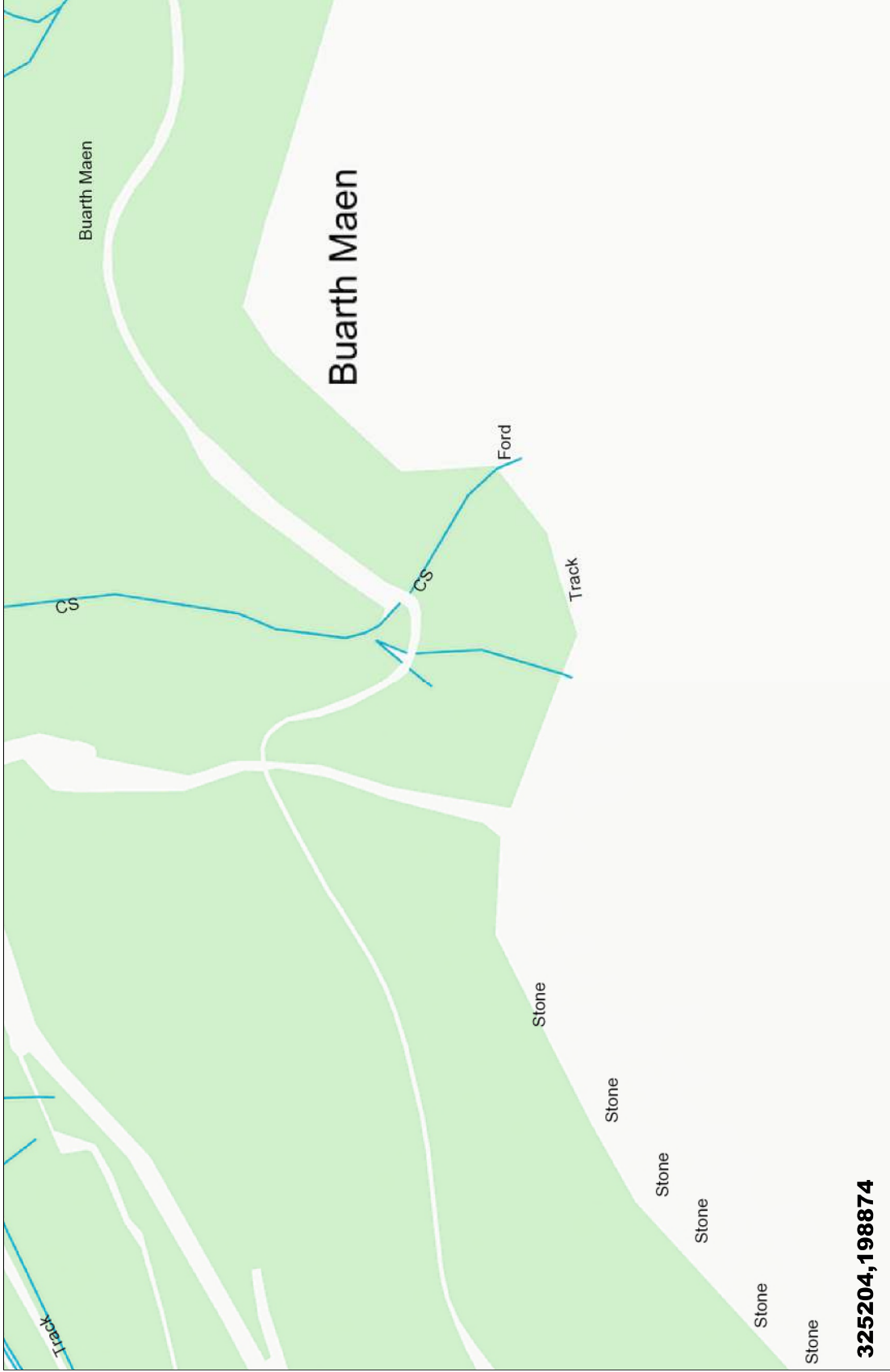
	Clean Water		Foul
	Sluice Val		Surface Water
	Air Val, SINGLE		Combined
	Tap		Rising Main
	Pressure Reducing Valve		Private
	Meter		Treatment Works
	BULK Meter		Pumping Station
	FH		Special Purpose
	Cap		Unknown End
	Existing Main		Change, Combined Overflow
	NON COMPANY		Outfall, FOUL
	Sewerage External		Lamp Hole, Foul
			Private Sewer Transfer
			Lateral Drain
			Inspection Chamber

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324750,198440



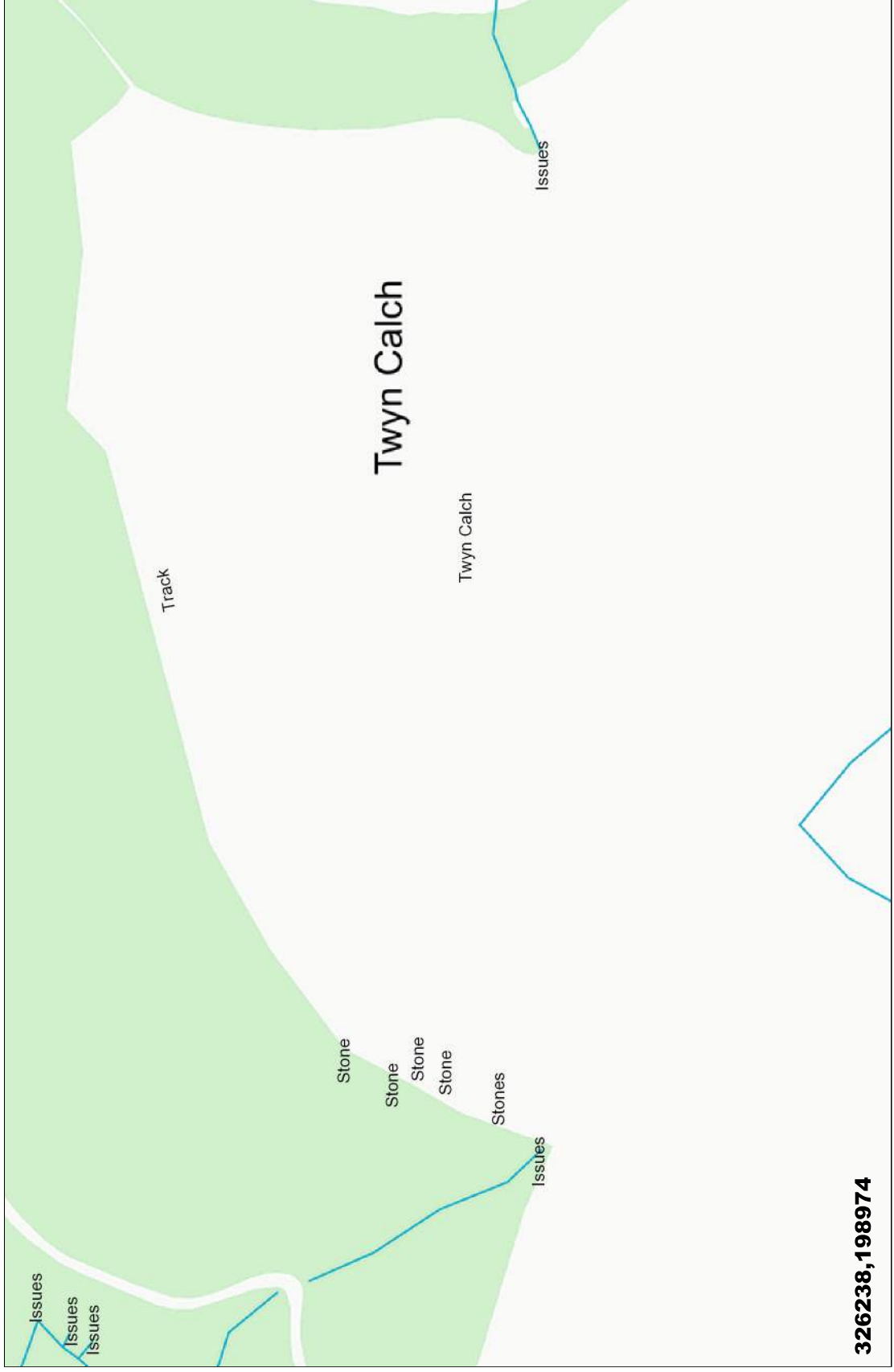
- LEGEND**
- Clean Water
 - Sluice Val
 - Air Val, SINGLE
 - Tap
 - Pressure Reducing Valve
 - Meter
 - BULK Meter
 - FH
 - Cap
 - Existing Main
 - NON COMPANY
 - Sewerage External
 - Foul
 - Surface Water
 - Combined
 - Rising Main
 - Private
 - Treatment Works
 - Pumping Station
 - Special Purpose
 - Unknown End
 - Change, Combined Overflow
 - Outfall, FOUL
 - Lamp Hole, Foul
 - Private Sewer Transfer
 - Lateral Drain
 - Inspection Chamber

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325204,198874

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LEGEND

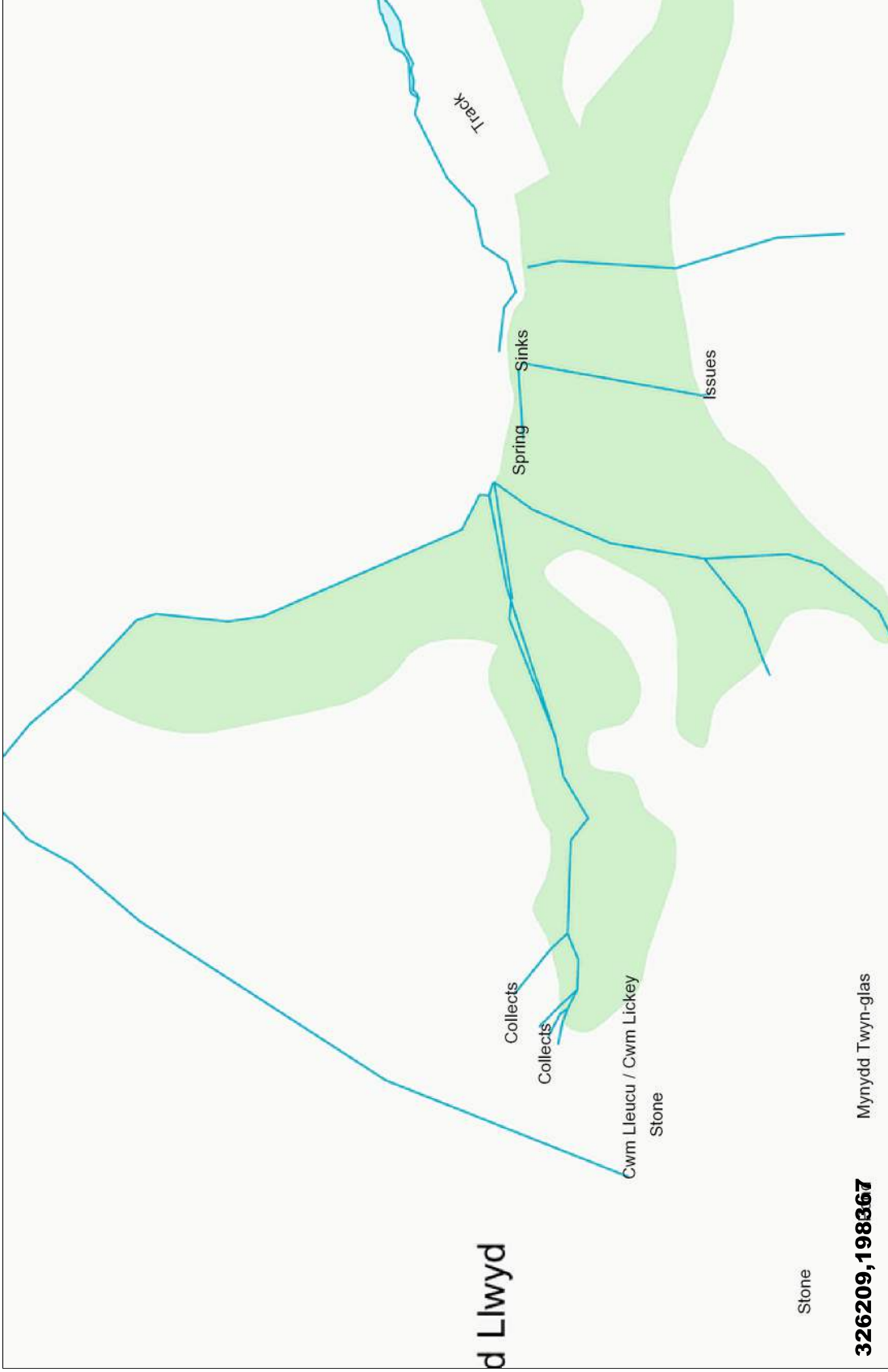
Clean Water	Sluice Val	Air Val, SINGLE	Trap	Pressure Reducing Valve	Meter	BULK Meter	FH	Cap	Existing Main	NON COMPANY	Sewerage External	Foul	Surface Water	Combined	Rising Main	Private	Treatment Works	Pumping Station	Special Purpose	Unknown End	Change, Combined Overflow	Outfall, FOUL	Lamp Hole, Foul	Private Sewer Transfer	Lateral Drain	Inspection Chamber

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326238,198974



LEGEND

Clean Water	Sluice Val	Air Val, SINGLE	Tap	Pressure Reducing Valve	Meter	BULK Meter	FH	Cap	Existing Main	NON COMPANY	Sewerage External	Foul	Surface Water	Combined	Rising Main	Private	Treatment Works	Pumping Station	Special Purpose	Unknown End	Change, Combined Overflow	Outfall, FOUL	Lamp Hole, Foul	Private Sewer Transfer	Lateral Drain	Inspection Chamber
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326209,198367

Mynydd Twyn-glas

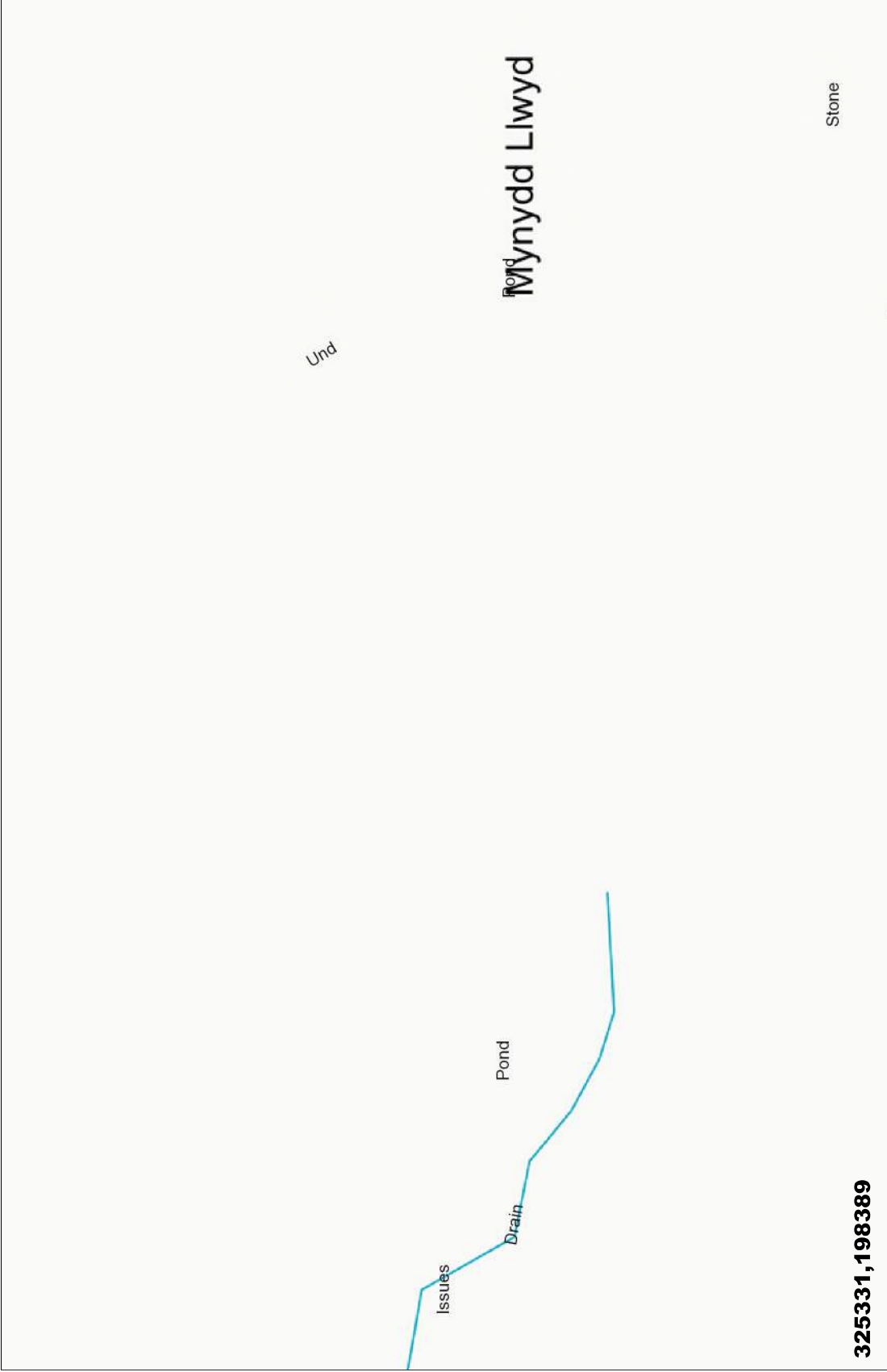
Stone

d Llwyd



LEGEND

	Clean Water		Foul
	Sluice Val		Surface Water
	Air Val, SINGLE		Combined
	Tap		Rising Main
	Pressure Reducing Valve		Private
	Meter		Treatment Works
	BULK Meter		Pumping Station
	FH		Special Purpose
	Cap		Unknown End
	Existing Main		Change, Combined Overflow
	NON COMPANY		Outfall, FOUL
	Sewerage External		Lamp Hole, Foul
			Private Sewer Transfer
			Lateral Drain
			Inspection Chamber

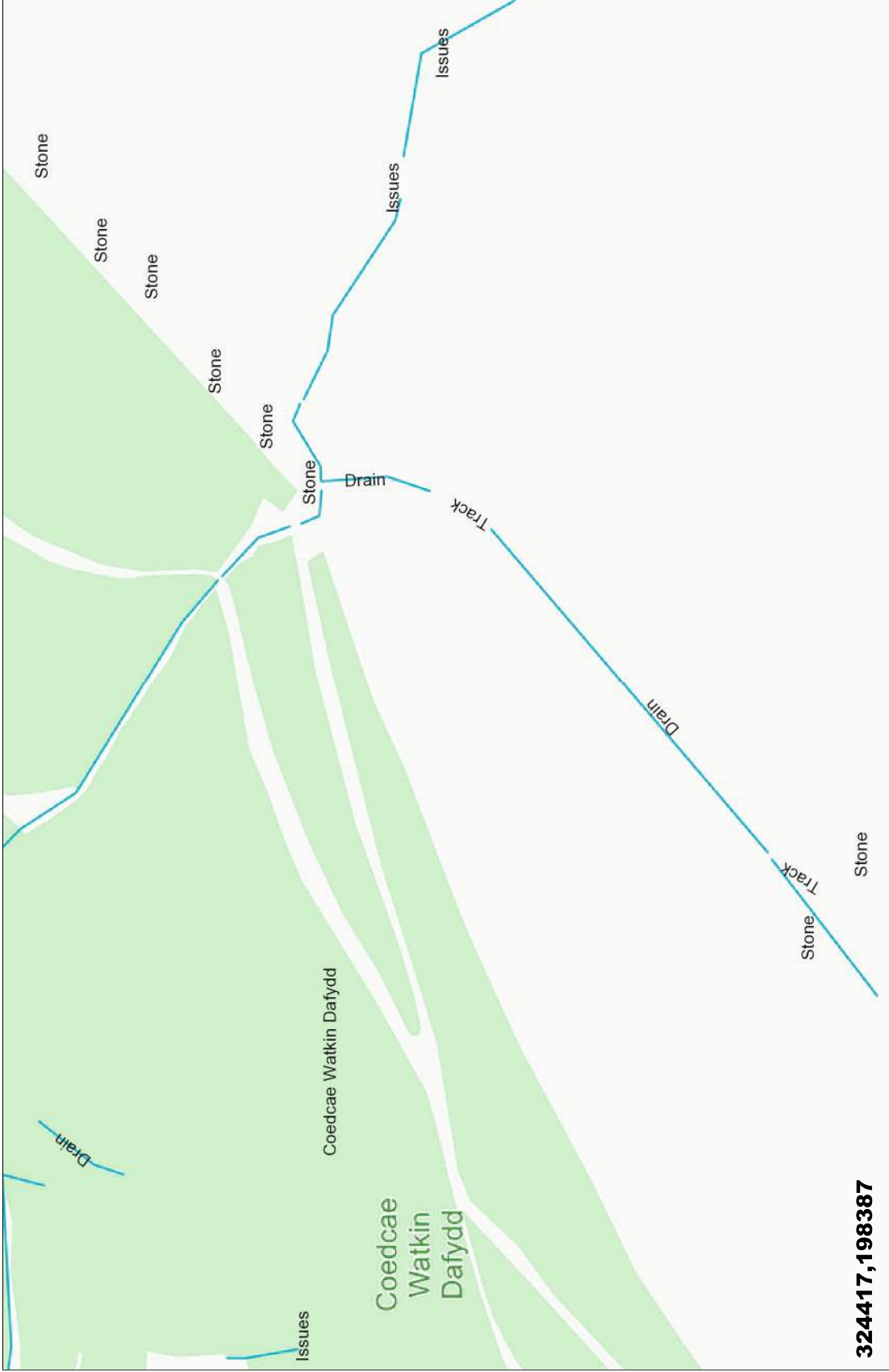


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325331,198389



LEGEND

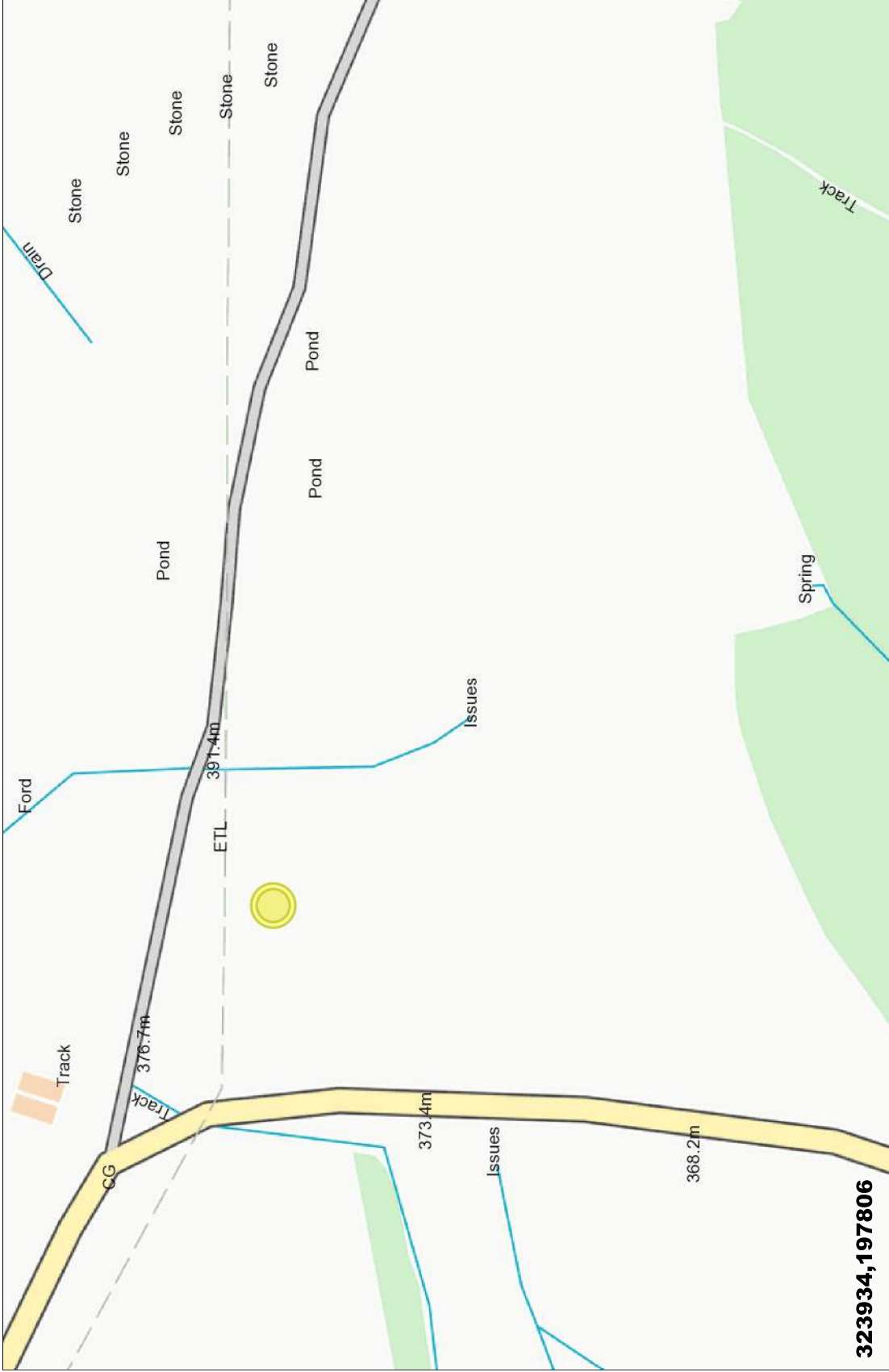
	Clean Water
	Sluice Val
	Air Val, SINGLE
	Tap
	Pressure Reducing Valve
	Meter
	BULK Meter
	FH
	Cap
	Existing Main
	NON COMPANY
	Sewerage External
	Foul
	Surface Water
	Combined
	Rising Main
	Private
	Treatment Works
	Pumping Station
	Special Purpose
	Unknown End
	Change, Combined Overflow
	Outfall, FOUL
	Lamp Hole, Foul
	Private Sewer Transfer
	Lateral Drain
	Inspection Chamber

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324417,198387



LEGEND

Clean Water	Sluice Val	Air Val, SINGLE	Tap	Pressure Reducing Valve	Meter	BULK Meter	150mm FH	Cap	Existing Main	NON COMPANY	Sewerage External			
Foul	Surface Water	Combined	Rising Main	Private	Treatment Works	Pumping Station	Special Purpose	Unknown End	Change, Combined Overflow	Outfall, FOUL	Lamp Hole, Foul	Private Sewer Transfer	Lateral Drain	Inspection Chamber

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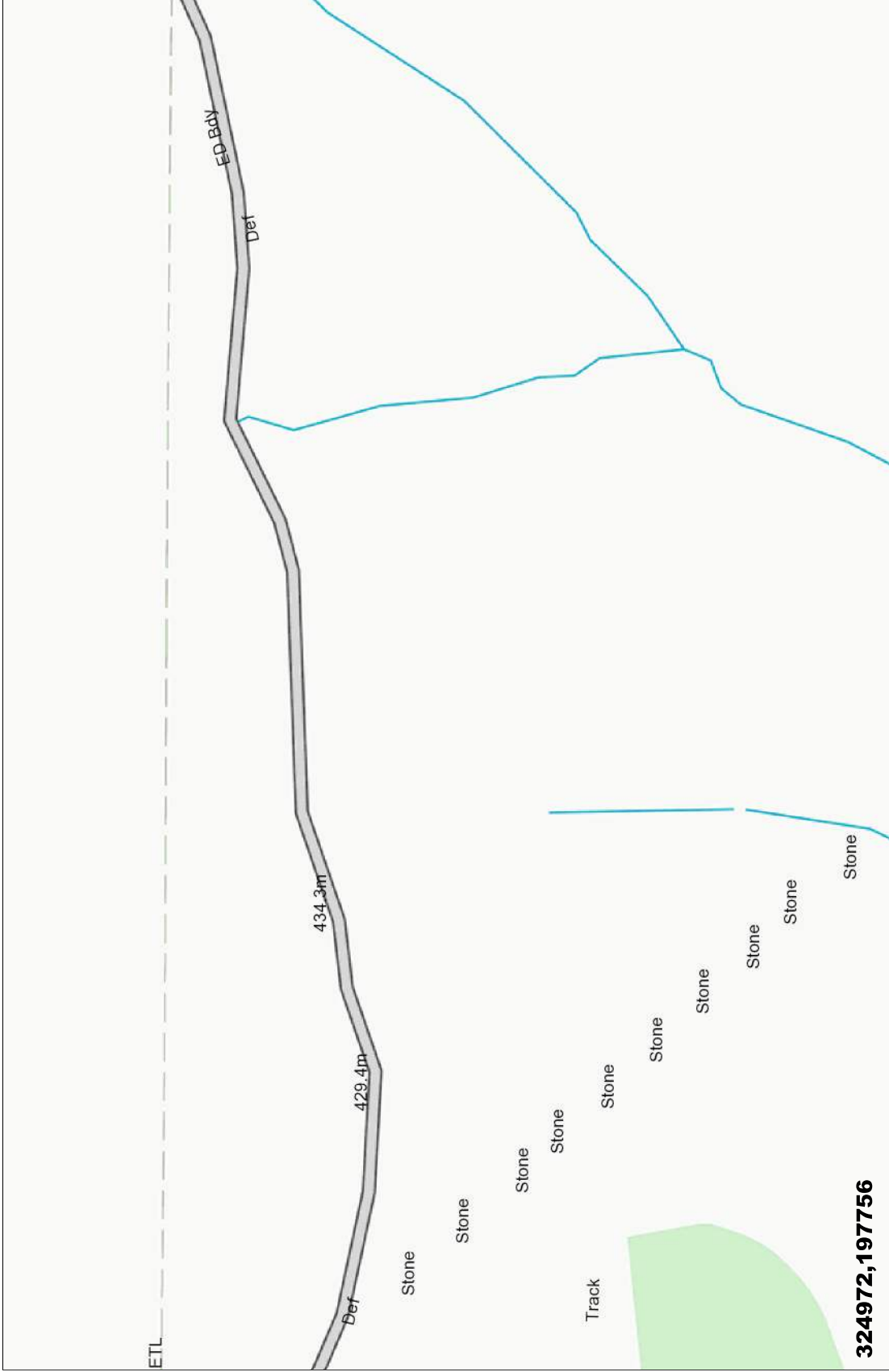
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LEGEND

Clean Water	Sluice Val	Air Val, SINGLE	Tap	Pressure Reducing Valve	Meter	BULK Meter	FH	Cap	Existing Main	NON COMPANY	Sewerage External	Foul	Surface Water	Combined	Rising Main	Private	Treatment Works	Pumping Station	Special Purpose	Unknown End	Change, Combined Overflow	Outfall, FOUL	Lamp Hole, Foul	Private Sewer Transfer	Lateral Drain	Inspection Chamber
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324972,197756



LEGEND

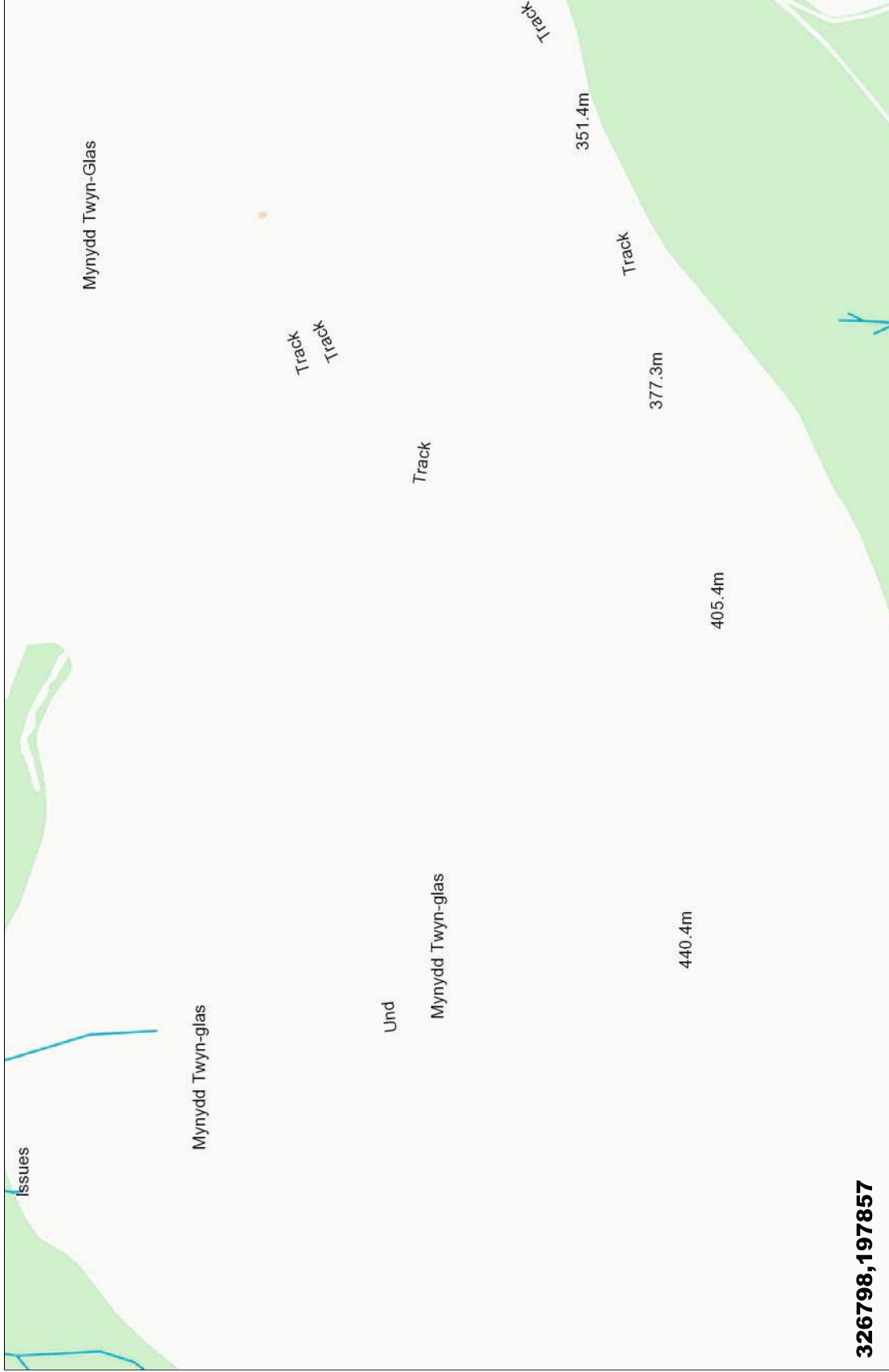
Clean Water	Sluice Val	Air Val, SINGLE	Tap	Pressure Reducing Valve	Meter	BULK Meter	M FH	Cap	Existing Main	NON COMPANY	Sewerage External	Foul	Surface Water	Combined	Rising Main	Private	Treatment Works	Pumping Station	Special Purpose	Unknown End	Change, Combined Overflow	Outfall, FOUL	Lamp Hole, Foul	Private Sewer Transfer	Lateral Drain	Inspection Chamber
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EXACT LOCATION OF ALL APPARATUS TO BE DETERMINED ON SITE

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326002,197851



LEGEND

	Clean Water		Sluice Val		Air Val, SINGLE
	Tap		Pressure Reducing Valve		Meter
	BULK Meter		FH		Cap
	Existing Main		NON COMPANY		Sewerage External
	Foul		Surface Water		Combined
	Rising Main		Private		Treatment Works
	Pumping Station		Special Purpose		Unknown End
	Change, Combined Overflow		Outfall, FOUL		Lamp Hole, Foul
	Private Sewer Transfer		Lateral Drain		Inspection Chamber

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326798,197857



325623,197404

NOC/KHBPR961 Water & Sewers

Scale: 1:4500

03/09/2021

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LEGEND

- Surface Valve
- Air Valve SINGLE
- Tap
- Pressure Reducing Valve
- Meter
- Bulk Meter
- Fire Hydrant
- Cap
- Non Dwr Cymru
- Existing Distributor Main
- Insect or Chamber
- Openly Sewer
- Rising Main
- Outfall
- Pumping Station
- Lamp pole
- Combined Sewer Overflow
- Special Purpose Chamber
- Treatment Works
- Private Sewer Transfer
- Lateral Drain
- High Capacity Inlet to Sewer
- Sewer Catchment
- Surface Water
- Trench



325805,196805 |

NOC/KHBPR961 Water & Sewers

Scale: 1:4500

03/09/2021

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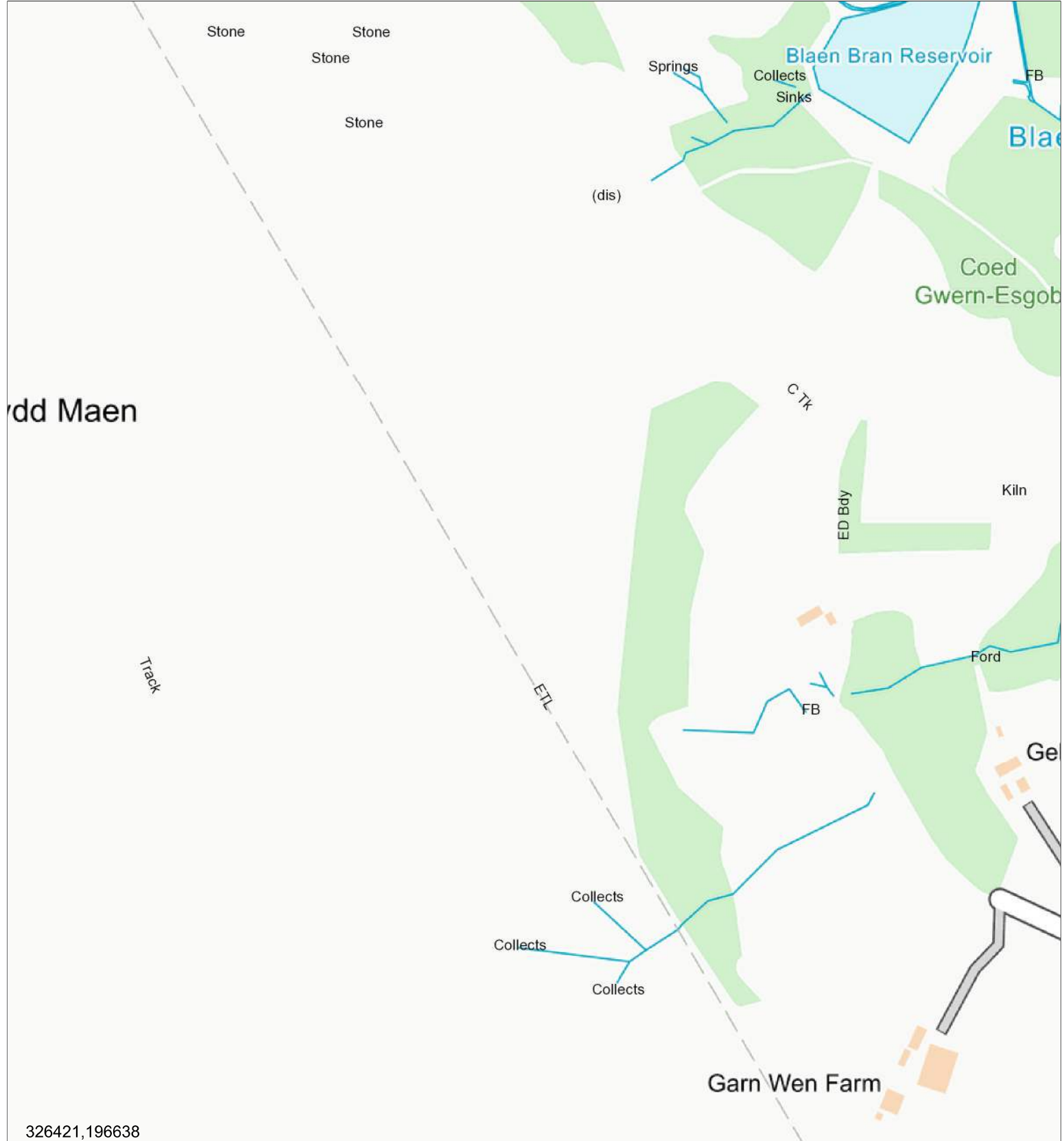
EXACT LOCATION OF ALL APPARATUS TO BE DETERMINED ON SITE

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LEGEND

- | | | | |
|--|-------------------------|--|-------------------------|
| | Surface Valve | | Openly Sewer |
| | Air Valve SINGLE | | Rising Main |
| | Tap | | Outlet |
| | Pressure Reducing Valve | | Pumping Station |
| | Meter | | Lamp pole |
| | Bulk Meter | | Combined Sewer Overflow |
| | Fire Hydrant | | Special Purpose Chamber |
| | Cap | | Treatment Works |
| | Non Dwr Cymru | | Private Sewer Transfer |
| | Existing Dwr Cymru Main | | Lateral Drain |
| | Insect or Chamber | | Redundant Sewer |
| | | | Surface Water |
| | | | Trench |



326421,196638

NOC/KHBPR961 Water & Sewers

Scale: 1:4500

03/09/2021

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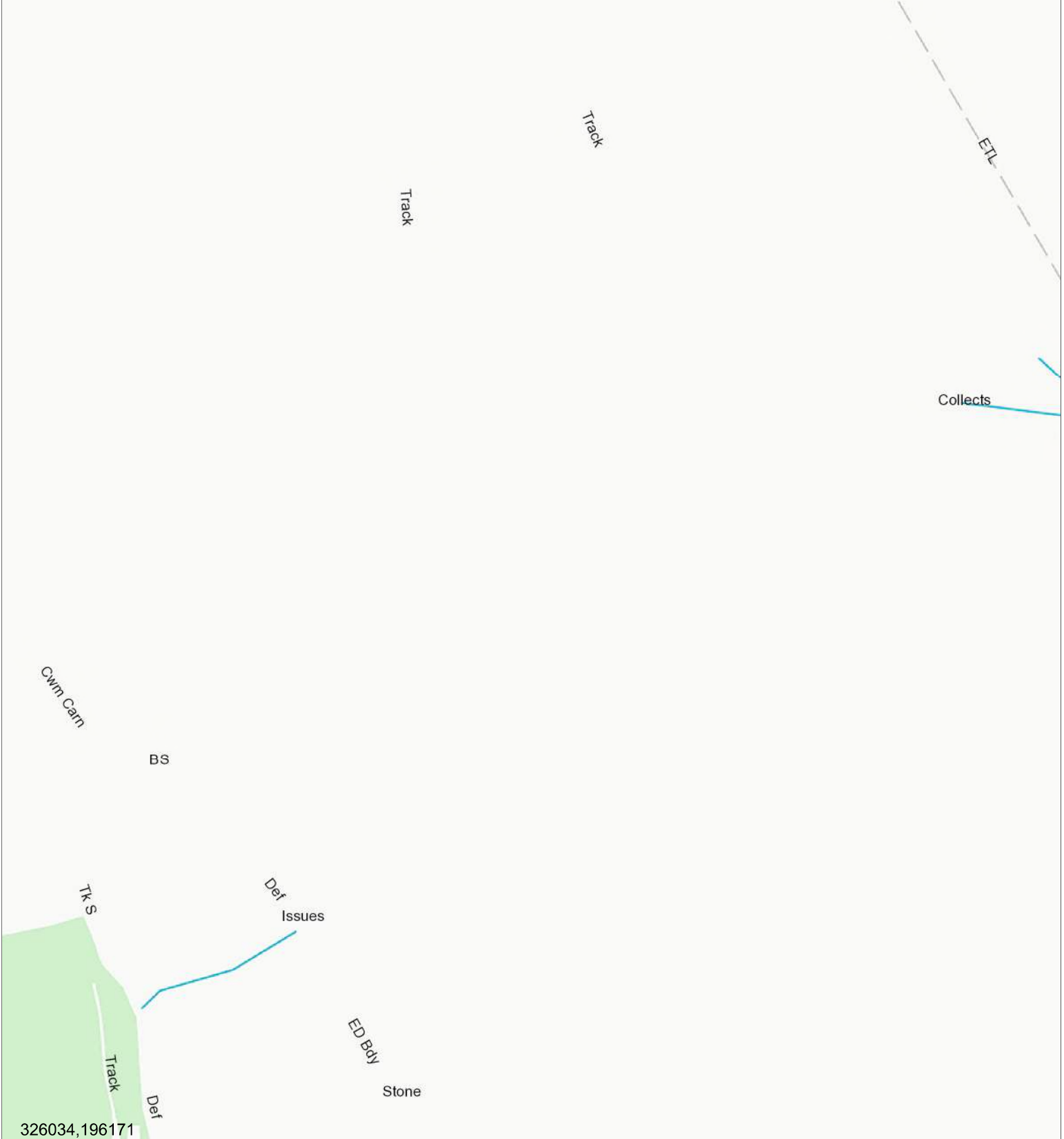
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LEGEND

- | | |
|-------------------------|-------------------------|
| Blue Valve | Sewer |
| Air Valve SINGLE | Rising Main |
| Tap | Outfall |
| Pressure Reducing Valve | Pumping Station |
| Meter | Lamp Pole |
| Bulk Meter | Combined Sewer Overflow |
| Fire Hydrant | Special Purpose Chamber |
| Cap | Treatment Works |
| Non DCWW | Private Sewer Transfer |
| Existing DCWW | Lateral Drain |
| Main | Fire Hydrant |
| Insect Chamber | Surface Water |
| | Foul |





326034,196171

NOC/KHBPR961 Water & Sewers

Scale: 1:4500

03/09/2021

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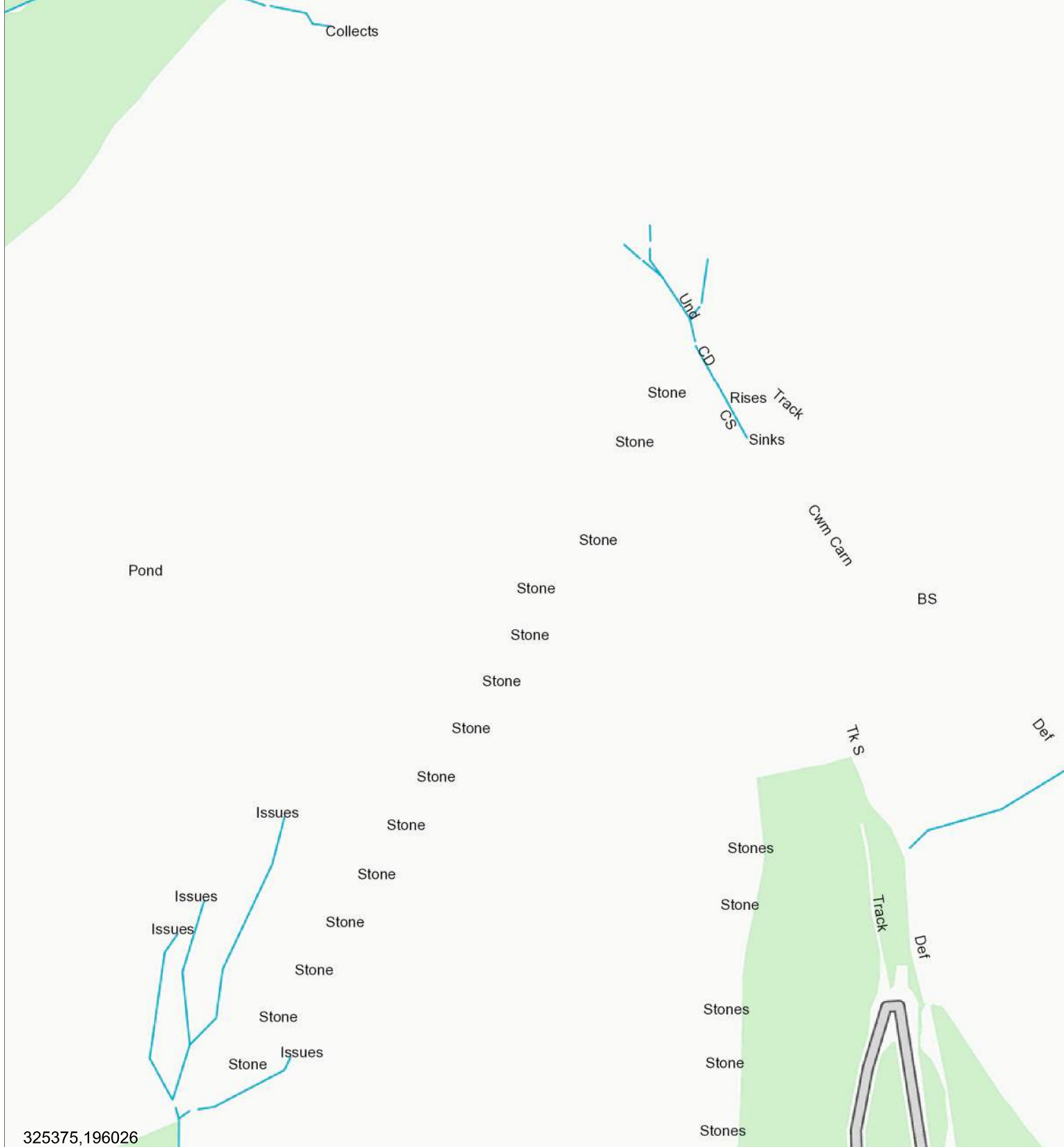
EXACT LOCATION OF ALL APPARATUS TO BE DETERMINED ON SITE

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LEGEND

Blue Valve	Openly Sewer
Air Valve SINGLE	Rising Main
Tap	Outfall
Pressure Reducing Valve	Pumping Station
Meter	Lamp pole
Bulk Meter	Combined Sewer Overflow
Fire Hydrant	Special Purpose Chamber
Cap	Treatment Works
Non-Defectivity	Private Sewer Transfer
Existing Distribution Main	Lateral Drain
Insect or Chamber	Red - Combined Sewer
	Green - Surface Water
	Brown - Trench



325375,196026

NOC/KHBPR961 Water & Sewers

Scale: 1:4500

03/09/2021

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LEGEND	
	Surface Valve
	Air Valve SINGLE
	Tap
	Pressure Reducing Valve
	Meter
	Bulk Meter
	Fire Hydrant
	Cap
	Non-DCW Cymru
	Existing Distribution Main
	Insect or Chamber
	Openly Sewer
	Rising Main
	Outfall
	Pumping Station
	Lamp pole
	Combined Sewer Overflow
	Special Purpose Chamber
	Treatment Works
	Private Sewer Transfer
	Lateral Drain
	Not Recorded in this information
	RED - Sewer
	GREEN - Surface Water
	BLACK - Trench

APPENDIX D PHOTOGRAPHS

PHOTOGRAPHIC LOG		
Photo no. 1	Date: 09/03/23	
T3(TP)		
Description: Before		


Photo No. 2	Date: 09/03/23	
T3(TP)		
Description:		


Photo No. 3	Date: 09/03/23	
T3(TP)		
Description:		


Photo No. 4	Date: 09/03/23	
T3(TP)		
Description:		


Photo No. 5	Date: 09/03/23	
T3(TP)		
Description:		

Photo No. 6	Date: 09/03/23	
T3(TP)		
Description: After		


Photo No. 7	Date: 07/03/23	
T7 (TP)		
Description:		


Photo No. 8	Date: 07/03/23	
T7 (TP)		
Description:		

Photo No. 9	Date: 07/03/23	
T7 (TP)		
Description:		

Photo No. 10	Date: 07/03/23	
T7 (TP)		
Description:		

Photo No. 11	Date: 07/03/23	
T7 (TP)		
Description: After		

Photo No. 12	Date: 07/03/23	
T7 (RO)		
Description:		

Photo No. 13	Date: 09/03/23		
T8 (TP)			
Description: Before			


Photo No. 14	Date: 09/03/23		
T8 (TP)			
Description:			

Photo No. 15	Date: 09/03/23		
T8 (TP)			
Description:			


Photo No. 16	Date: 09/03/23		
T8 (TP)			
Description:			


Photo No. 17	Date: 09/03/23	
T8 (TP)		
Description:		


Photo No. 18	Date: 09/03/23	
T8 (TP)		
Description:		

Photo No. 19	Date: 09/03/23	
T8 (RO)		
Description: BEFORE		


Photo No. 20	Date: 09/03/23	
T8 (RO)		
Description:		

Photo No. 21	Date: 09/03/23	
T8 (RO)		
Description:		

Photo No. 22	Date:	
T11 (TP)		
Description: Before		


Photo No. 23	Date: 07/03/23	
T11 (TP)		
Description:		


Photo No. 24	Date: 07/03/23	
T11 (TP)		
Description:		

Photo No. 25	Date: 07/03/23	
T11 (TP)		
Description:		

Photo No. 26	Date: 07/03/23	
T11 (TP)		
Description:		

Photo No. 27	Date: 07/03/23	
T11 (RO)		
Description:		

Photo No. 28	Date: 07/03/23	
T11 (RO)		
Description:		

APPENDIX E

TECHNICAL BACKGROUND

H1 Desk Study

Aquifer designation and Source protection zones

Principal aquifer: layers of rock or drift deposit that have high intergranular and/or fracture permeability (usually providing a high level of water storage). They may support water supply and/or river base flow on a strategic scale.

Secondary A aquifer: permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers.

Secondary B aquifer: predominantly lower permeability layers that may store and yield limited amounts of groundwater due to localised features such as fissures, thin permeable horizons and weathering.

Secondary undifferentiated aquifer: it has not been possible to attribute either a category A or B to a rock type. In most cases this means that it was previously designated as both a minor and non-aquifer in different locations owing to the variable characteristics.

Unproductive' strata: low permeability with negligible significance for water supply or river base flow.

The EA generally adopts a three-fold classification of source protection zones (SPZ) surround abstractions for public water supply. The Site is situated in an area defined as follows:

- Zone 1 or the 'inner protection zone' is located immediately adjacent to the groundwater source and is based on a 50-day travel time from any point below the water table to the source. It is designed to protect against the effects of human activity and biological/chemical contaminants that may have an immediate effect on the source
- Zone 2 or the 'outer protection zone' is defined by a 400-day travel time from a point below the water table to the source. The travel time is designed to provide delay and attenuation of slowly degrading pollutants
- Zone 3 or the 'total catchment' is the area around the source within which all groundwater recharge is presumed to be discharged at the source.

Preliminary risk assessment methodology

LCRM outlines the framework to be followed for risk assessment in the UK. The framework is designed to be consistent with UK legislation and policies including planning. An outline conceptual model should be formed at the preliminary risk assessment stage that collates all the existing information pertaining to a site in text, tabular or diagrammatic form. The outline conceptual model identifies potentially complete (termed possible) contaminant linkages (contaminant–pathway–receptor) and is used as the basis for the design of the site investigation. The outline conceptual model is updated as further information becomes available, for example as a result of the site investigation.

Production of a conceptual model requires an assessment of risk to be made. Risk is a combination of the likelihood of an event occurring and the magnitude of its consequences. Therefore, both the

likelihood and the consequences of an event must be taken into account when assessing risk. RSK has adopted guidance provided in CIRIA C552 for use in the production of conceptual models.

The likelihood of an event can be classified on a four-point system using the following terms and definitions based on CIRIA C552:

- highly likely: the event appears very likely in the short term and almost inevitable over the long term or there is evidence at the receptor of harm or pollution
- likely: it is probable that an event will occur or circumstances are such that the event is not inevitable, but possible in the short term and likely over the long term
- low likelihood: circumstances are possible under which an event could occur, but it is not certain even in the long term that an event would occur and it is less likely in the short term
- unlikely: circumstances are such that it is improbable the event would occur even in the long term.

The severity can be classified using a similar system also based on CIRIA C552. The terms and definitions relating to severity are:

- severe: short term (acute) risk to human health likely to result in ‘significant harm’ as defined by the Environment Protection Act 1990, Part IIA. Short-term risk of pollution of sensitive water resources. Catastrophic damage to buildings or property. Short-term risk to an ecosystem or organism forming part of that ecosystem (note definition of ecosystem in ‘Draft Circular on Contaminated Land’, DETR 2000)
- medium: chronic damage to human health (‘significant harm’ as defined in ‘Draft Circular on Contaminated Land’, DETR 2000), pollution of sensitive water resources, significant change in an ecosystem or organism forming part of that ecosystem
- mild: pollution of non-sensitive water resources. Significant damage to crops, buildings, structures and services (‘significant harm’ as defined in ‘Draft Circular on Contaminated Land’, DETR 2000). Damage to sensitive buildings, structures or the environment
- minor: harm, not necessarily significant, but that could result in financial loss or expenditure to resolve. Non-permanent human health effects easily prevented by use of personal protective clothing. Easily repairable damage to buildings, structures and services.

Once the probability of an event occurring and its consequences have been classified, a risk category can be assigned according to the table below.

		Consequences			
		Severe	Medium	Mild	Minor
Probability	Highly likely	Very high	High	Moderate	Moderate/low
	Likely	High	Moderate	Moderate/low	Low
	Low likelihood	Moderate	Moderate/low	Low	Very low
	Unlikely	Moderate/low	Low	Very low	Very low

Definitions of these risk categories are as follows together with an assessment of the further work that may be required:

- very high: there is a high probability that severe harm could occur or there is evidence that severe harm is currently happening. This risk, if realised, could result in substantial liability; urgent investigation and remediation are likely to be required
- high: harm is likely to occur. Realisation of the risk is likely to present a substantial liability. Urgent investigation is required. Remedial works may be necessary in the short term and are likely over the long term
- moderate: it is possible that harm could arise, but it is unlikely that the harm would be severe and it is more likely that the harm would be relatively mild. Investigation is normally required to clarify the risk and determine the liability. Some remedial works may be required in the longer term
- low: it is possible that harm could occur, but it is likely that if realised this harm would at worst normally be mild
- very low: there is a low possibility that harm could occur and if realised the harm is unlikely to be severe.

H2 Site Investigation Methodology

Ground gas monitoring

An infrared gas meter was used to measure gas flow, concentrations of carbon dioxide (CO₂), methane (CH₄) and oxygen (O₂) in percentage by volume, while hydrogen sulphide (H₂S) and carbon monoxide (CO) were recorded in parts per million. Initial and steady state concentrations were recorded. In addition, during the first monitoring round, all wells were screened with a PID to establish if there are any interferences and cross-sensitivity of other hydrocarbons with the infrared gas meter.

Low flow groundwater sampling

Groundwater samples were retrieved using a low-flow purging and sampling methodology

The low-flow method relies on moving groundwater through the well screen at approximately the same rate as it flows through the geological formation. This results in a significant reduction in the volume of water extracted before sampling and significantly reduces the amount of disturbance of the water in the monitoring well during purging and sampling. Drawdown levels in the monitoring well and water quality indicator parameters (pH, temperature, electrical conductivity, redox potential and dissolved oxygen) are monitored during low-flow purging and sampling, with stabilisation indicating that purging is complete and sampling can begin. As the flow rate used for purging, in most cases, is the same or only slightly higher than the flow rate used for sampling, and because purging and sampling are conducted as one continuous operation in the field, the process is referred to as low-flow purging and sampling.

Reuse of suitable materials

The Definition of Waste: Development Industry Code of Practice (CL:AIRE, 2011) (CoP) was developed in consultation with the Environment Agency and development industry to enable the

re-use of materials under certain scenarios and subject to demonstrating that specific criteria are met. The current reuse scenarios covered by the CoP comprise

- reuse on the site of origin (with or without treatment)
- direct transfer of clean and natural soils between sites
- use in the development of land other than the site of origin following treatment at an authorised Hub site (including a fixed soil treatment facility).

The importation of made ground soils (irrespective of contamination status) or crushed demolition materials is not permitted currently under the CoP and requires either a standard rules environmental permit or a U1 waste exemption (see below).

In the context of excavated materials used on-sites undergoing development, four factors are considered to be of particular relevance in determining if the material is a waste or when it ceases to be waste:

- the aim of the Waste Framework Directive is not undermined, i.e. if the use of the material will create an unacceptable risk of pollution of the environment or harm to human health it is likely to be waste
- the material is certain to be used
- the material is suitable for use both chemically and geotechnically
- only the required quantity of material will be used.

The CoP requires the preparation of a materials management plan (MMP) that confirms the above factors will be met. This plan needs to be reviewed by a 'Qualified Person' (QP) who will then issue a declaration form to the EA. As the project progresses, data must be collated and on completion a verification report produced that shows the MMP was followed and describes any changes.

The MMP establishes whether specific materials are classified as waste and how excavated materials will be treated and/or reused in line with the CoP. The MMP is likely to form part of the site waste management plan.







APPENDIX F EXPLORATORY HOLE RECORDS

KEY TO EXPLORATORY HOLE LOGS - SUMMARY OF ABBREVIATIONS**ADDITIONAL NOTES**


















1. All soil and rock descriptions and legends in general accordance with BS EN ISO 14688-1:2018, 14688-2:2018, 14689:2018, and BS5930:2015+A1:2020.
2. Material types divided by a broken line (- - -) indicates an unclear boundary.
3. Fracture spacings (If) quoted in the Description of Strata for specific strata or specific fracture sets are also quoted in mm, e.g. (25/80/230) referring to (Min/Avg/Max).
4. The data on any sheet within the report showing the AGS icon is available in the AGS format.
5. Weathering descriptions in accordance with CIRIA Report C570 Engineering in Mercia Mudstone, CIRIA Report C574 Engineering in Chalk (2002), London Clay (King 1981), BS 5930:2015 Code of practice for ground investigations - Figure 9 - Approach 4, BS EN ISO 14689:2018 Geotechnical Investigation and testing - Identification, Description and Classification of Rock - Table 13, BS EN ISO 14689-1 2003 Geotechnical Investigation and testing - Identification and Classification of Rock - Part 1 - Identification and Description - Table 13, BS5930 (1999).

KEY TO EXPLORATORY HOLE LOGS - SUMMARY OF GRAPHIC SYMBOLS

WATER COLUMN SYMBOLS

-  First water strike, second water strike etc.
-  Standing water level following first strike, standing water level following second strike etc.
-  Seepage.
-  Standing water level recorded at documented date.

MATERIAL GRAPHIC LEGENDS

	Clayey GRAVEL		COBBLES		Clayey PEAT		Clayey SAND
	Clayey SAND with COBBLES		GRAVEL with COBBLES		PEAT		SAND
	SAND with COBBLES		Sandstone		Sandy CLAY		Gravelly sandy CLAY
	Sandy gravelly CLAY		Sandy PEAT		Silty PEAT		Sandy gravelly COBBLES
	Sandy COBBLES						

INSTRUMENTATION SYMBOLS

	Backfill		Bentonite cement pellets
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BOREHOLE LOG

Contract: Mynydd Maen		Client: Renewable Energy Systems Limited		Borehole: T3-RO
Contract Ref: 315198	Start: 13.03.23 End: 13.03.23	Ground Level: 436.89	National Grid Co-ordinate: E:325494.1 N:198822.1	Sheet: 1 of 3

Drilling Progress Log		Backfill	Water	Description of Strata	Depth (Thickness)	Material Graphic Legend	
Depth	Drill Time (hh:mm)						
			~	Grass over black amorphous peat with rootlets. (PEAT)	(0.60)		
					Brown sandy slightly gravelly silty clay. Gravel is angular fine to coarse of sandstone. Sand is fine to coarse. (Weathered Hughes Member) (HUGHES BEDS - UPPER PENNANT MEASURES)	(0.80)	
					Highly weathered greyish brown SANDSTONE. (Weathered Hughes Member) (HUGHES BEDS - UPPER PENNANT MEASURES)	(0.80)	
					Greyish brown SANDSTONE. (Hughes Member) (HUGHES BEDS - UPPER PENNANT MEASURES)	2.20	

GINT_LIBRARY_V10_01.GLB LibVersion: v8.07 | Log ROTARY OPENHOLE LOG - A4P | 315198 - MYNYDD MAEN, WIND FARM, GPJ - V10_01. RSK Environment Ltd, The Old School, Stillhouse Lane, Bedminster, Bristol, BS3 4EB. Tel: 0117 947 1009 Web: www.rsk.co.uk | 03/05/23 - 11:48 | SB5 |

Drilling Progress and Water Observations						General Remarks	
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth		
						1. Position checked with Ground Penetrating Radar, CAT and Genny prior to excavation. 2. Water seepage at 0.60m depth. 3. Inspection pit hand dug to 1.20m depth. 4. On completion, borehole backfilled with bentonite pellets.	
				All dimensions in metres		Scale:	1:50
Method Used:	Rotary openhole drilling		Plant Used:	Comacchio GEO 305		Drilled By:	Ben Mitchell
						Logged By:	KBancroft
						Checked By:	<i>JB</i>



BOREHOLE LOG

Contract: Mynydd Maen		Client: Renewable Energy Systems Limited		Borehole: T3-RO
Contract Ref: 315198	Start: 13.03.23 End: 13.03.23	Ground Level: 436.89	National Grid Co-ordinate: E:325494.1 N:198822.1	Sheet: 2 of 3

Drilling Progress Log		Backfill	Water	Description of Strata	Depth (Thickness)	Material Graphic Legend
Depth	Drill Time (hh:mm)					
				Greyish brown SANDSTONE. (Hughes Member) (HUGHES BEDS - UPPER PENNANT MEASURES) <i>(stratum copied from 2.20m from previous sheet)</i>	(17.80)	

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Drilling Progress and Water Observations						General Remarks
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth	

All dimensions in metres Scale: **1:50**

Method Used: Rotary openhole drilling	Plant Used: Comacchio GEO 305	Drilled By: Ben Mitchell	Logged By: KBancroft	Checked By: JB	
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BOREHOLE LOG

Contract: Mynydd Maen		Client: Renewable Energy Systems Limited		Borehole: T3-RO
Contract Ref: 315198	Start: 13.03.23 End: 13.03.23	Ground Level: 436.89	National Grid Co-ordinate: E:325494.1 N:198822.1	Sheet: 3 of 3

Drilling Progress Log		Backfill	Water	Description of Strata	Depth (Thickness)	Material Graphic Legend
Depth	Drill Time (hh:mm)					
				Greyish brown SANDSTONE. (Hughes Member) (HUGHES BEDS - UPPER PENNANT MEASURES) <i>(stratum copied from 2.20m from previous sheet)</i>		
				Borehole terminated at 20.00mbgl.	20.00	

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 RSK Environment Ltd, The Old School, Stillhouse Lane, Bedminster, Bristol, BS3 4EB. Tel: 0117 947 1006 Fax: 0117 947 1009 Web: www.rsk.co.uk | 03/05/23 - 11:48 | SB5 |


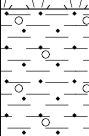

Drilling Progress and Water Observations						General Remarks
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth	

All dimensions in metres Scale: **1:50**


Method Used: Rotary openhole drilling	Plant Used: Comacchio GEO 305	Drilled By: Ben Mitchell	Logged By: KBancroft	Checked By: <i>JB</i>	
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BOREHOLE LOG

Contract: Mynydd Maen		Client: Renewable Energy Systems Limited		Borehole: T7-RO
Contract Ref: 315198	Start: 09.03.23 End: 09.03.23	Ground Level: 443.25	National Grid Co-ordinate: E:324780.1 N:198334.6	Sheet: 1 of 3

Drilling Progress Log		Backfill	Water	Description of Strata	Depth (Thickness)	Material Graphic Legend	
Depth	Drill Time (hh:mm)						
				Grass over black amorphous peat with rootlets.	0.30		
					Brown slightly gravelly sandy clay. Gravel is angular fine to coarse of sandstone. Sand is fine to coarse. (Weathered Hughes Member) (HUGHES BEDS - UPPER PENNANT MEASURES)	(0.90)	
					Grey SANDSTONE. (Hughes Member) (HUGHES BEDS - UPPER PENNANT MEASURES)	1.20	

GINT_LIBRARY_V10_01.GLB LibVersion: v8.07 | Log ROTARY OPENHOLE LOG - A4P | 315198 - MYNYDD MAEN, WIND FARM, GPJ - V10_01.
 RSK Environment Ltd, The Old School, Stillhouse Lane, Bedminster, Bristol, BS3 4EB. Tel: 0117 947 1006 Fax: 0117 947 1009 Web: www.rsk.co.uk | 03/05/23 - 11:48 | SB5 |

Drilling Progress and Water Observations						General Remarks
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth	
						1. Position checked with Ground Penetrating Radar, CAT and Genny prior to excavation. 2. Inspection pit terminated at 1.20m depth. 3. On completion, borehole backfilled with bentonite pellets.
All dimensions in metres Scale: 1:50						
Method Used:	Rotary openhole drilling	Plant Used:	Comacchio GEO 305	Drilled By:	Ben Mitchell	Logged By: RLockyer Checked By: 



BOREHOLE LOG


Contract: Mynydd Maen		Client: Renewable Energy Systems Limited		Borehole: T7-RO
Contract Ref: 315198	Start: 09.03.23 End: 09.03.23	Ground Level: 443.25	National Grid Co-ordinate: E:324780.1 N:198334.6	Sheet: 2 of 3

Drilling Progress Log		Backfill	Water	Description of Strata	Depth (Thickness)	Material Graphic Legend
Depth	Drill Time (hh:mm)					
				Grey SANDSTONE. (Hughes Member) (HUGHES BEDS - UPPER PENNANT MEASURES) <i>(stratum copied from 1.20m from previous sheet)</i>	(18.80)	

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Drilling Progress and Water Observations						General Remarks
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth	

All dimensions in metres Scale: **1:50**

Method Used: Rotary openhole drilling	Plant Used: Comacchio GEO 305	Drilled By: Ben Mitchell	Logged By: RLockyer	Checked By: JB	
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BOREHOLE LOG


Contract: Mynydd Maen		Client: Renewable Energy Systems Limited		Borehole: T7-RO	
Contract Ref: 315198	Start: 09.03.23 End: 09.03.23	Ground Level: 443.25	National Grid Co-ordinate: E:324780.1 N:198334.6	Sheet: 3 of 3	

Drilling Progress Log		Backfill	Water	Description of Strata	Depth (Thickness)	Material Graphic Legend
Depth	Drill Time (hh:mm)					
				Grey SANDSTONE. (Hughes Member) (HUGHES BEDS - UPPER PENNANT MEASURES) <i>(stratum copied from 1.20m from previous sheet)</i>		
				Terminated at 20.0mbgl	20.00	

GINT_LIBRARY_V10_01.GLB LibVersion: v8.07 | Log ROTARY OPENHOLE LOG - A4P | 315198 - MYNYDD MAEN, WIND FARM.GPJ - V10_01.
 RSK Environment Ltd, The Old School, Stillhouse Lane, Bedminster, Bristol, BS3 4EB. Tel: 0117 947 1006 Fax: 0117 947 1009 Web: www.rsk.co.uk | 03/05/23 - 11:48 | SB5 |


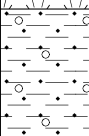

Drilling Progress and Water Observations						General Remarks
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth	

All dimensions in metres Scale: **1:50**


Method Used: Rotary openhole drilling	Plant Used: Comacchio GEO 305	Drilled By: Ben Mitchell	Logged By: RLockyer	Checked By: JB	
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BOREHOLE LOG

Contract: Mynydd Maen		Client: Renewable Energy Systems Limited		Borehole: T8-RO
Contract Ref: 315198	Start: 07.03.23 End: 07.03.23	Ground Level: 463.41	National Grid Co-ordinate: E:325881.9 N:198182.0	Sheet: 1 of 3

Drilling Progress Log		Backfill	Water	Description of Strata	Depth (Thickness)	Material Graphic Legend
Depth	Drill Time (hh:mm)					
				Grass over black plastic/sponges amorphous PEAT.	0.30	
				Soft orange brown slightly sandy gravelly CLAY. Gravel is angular medium and coarse of sandstone. Sand is fine to coarse. (HUGHES BEDS - UPPER PENNANT MEASURES)	(0.90)	
				Grey SANDSTONE. (HUGHES BEDS - UPPER PENNANT MEASURES)	1.20	

GINT_LIBRARY_V10_01.GLB LibVersion: v8.07 | Log ROTARY OPENHOLE LOG - A4P | 315198 - MYNYDD MAEN, WIND FARM, GPJ - V10_01.
 RSK Environment Ltd, The Old School, Stillhouse Lane, Bedminster, Bristol, BS3 4EB. Tel: 0117 947 1006 Fax: 0117 947 1009 Web: www.rsk.co.uk | 03/05/23 - 11:48 | SB5 |

Drilling Progress and Water Observations						General Remarks
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth	
						1. Position checked with Ground Penetrating Radar, CAT and Genny prior to excavation. 2. Inspection pit terminated at 1.2m depth. 3. On completion, borehole backfilled with bentonite pellets.
Method Used: Rotary openhole drilling				Plant Used: Comacchio GEO 305	Drilled By: Ben Mitchell	All dimensions in metres Scale: 1:50 Logged By: RLockyer Checked By:  AGS

BOREHOLE LOG


Contract: Mynydd Maen		Client: Renewable Energy Systems Limited		Borehole: T8-RO
Contract Ref: 315198	Start: 07.03.23 End: 07.03.23	Ground Level: 463.41	National Grid Co-ordinate: E:325881.9 N:198182.0	Sheet: 2 of 3

Drilling Progress Log		Backfill	Water	Description of Strata	Depth (Thickness)	Material Graphic Legend
Depth	Drill Time (hh:mm)					
				Grey SANDSTONE. (HUGHES BEDS - UPPER PENNANT MEASURES) <i>(stratum copied from 1.20m from previous sheet)</i>	(18.80)	

GINT_LIBRARY_V10_01.GLB LibVersion: v8.07 | Log ROTARY OPENHOLE LOG - A4P | 315198 - MYNYDD MAEN, WIND FARM.GPJ - v10_01.
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Drilling Progress and Water Observations						General Remarks
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth	

All dimensions in metres Scale: **1:50**

Method Used: Rotary openhole drilling	Plant Used: Comacchio GEO 305	Drilled By: Ben Mitchell	Logged By: RLockyer	Checked By: <i>JB</i>	
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BOREHOLE LOG

Contract: Mynydd Maen		Client: Renewable Energy Systems Limited		Borehole: T8-RO	
Contract Ref: 315198	Start: 07.03.23 End: 07.03.23	Ground Level: 463.41	National Grid Co-ordinate: E:325881.9 N:198182.0	Sheet: 3 of 3	

Drilling Progress Log		Backfill	Water	Description of Strata	Depth (Thickness)	Material Graphic Legend
Depth	Drill Time (hh:mm)					
				Grey SANDSTONE. (HUGHES BEDS - UPPER PENNANT MEASURES) <i>(stratum copied from 1.20m from previous sheet)</i>		
				Terminated at 20.0mbgl	20.00	

GINT_LIBRARY_V10_01.GLB LibVersion: v8.07 | Log ROTARY OPENHOLE LOG - A4P | 315198 - MYNYDD MAEN, WIND FARM.GPJ - V10_01.
 RSK Environment Ltd, The Old School, Stillhouse Lane, Bedminster, Bristol, BS3 4EB. Tel: 0117 947 1006 Fax: 0117 947 1009 Web: www.rsk.co.uk | 03/05/23 - 11:48 | SB5 |



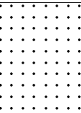
Drilling Progress and Water Observations						General Remarks
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth	

All dimensions in metres Scale: **1:50**



Method Used: Rotary openhole drilling	Plant Used: Comacchio GEO 305	Drilled By: Ben Mitchell	Logged By: RLockyer	Checked By: <i>JB</i>	
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BOREHOLE LOG

Contract: Mynydd Maen		Client: Renewable Energy Systems Limited		Borehole: T11-RO
Contract Ref: 315198	Start: 06.03.23 End: 06.03.23	Ground Level: 453.96	National Grid Co-ordinate: E:325741.0 N:196965.9	Sheet: 1 of 3

Drilling Progress Log		Backfill	Water	Description of Strata	Depth (Thickness)	Material Graphic Legend
Depth	Drill Time (hh:mm)					
				Moss over organic black plastic/spongey, clayey amorphous PEAT.	0.20	
				Orange brown silty clayey angular fine to coarse GRAVEL of sandstone. (Weathered Hughes Member) (HUGHES BEDS - UPPER PENNANT MEASURES)	(0.80)	
				Grey SANDSTONE. (Hughes Member) (HUGHES BEDS - UPPER PENNANT MEASURES)	1.00	

GINT_LIBRARY_V10_01.GLB LibVersion: v8.07 | Log ROTARY OPENHOLE LOG - A4P | 315198 - MYNYDD MAEN, WIND FARM, GPJ - V10_01.
 RSK Environment Ltd, The Old School, Stillhouse Lane, Bedminster, Bristol, BS3 4EB. Tel: 0117 947 1006 Fax: 0117 947 1009 Web: www.rsk.co.uk | 03/05/23 - 11:48 | SB5 |

Drilling Progress and Water Observations						General Remarks
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth	
						1. Position checked with Ground Penetrating Radar, CAT and Genny prior to excavation. 2. Inspection pit hand dug to 1.0m depth. 3. On completion, borehole backfilled with bentonite pellets.
All dimensions in metres						
Method Used: Rotary openhole drilling	Plant Used: Comacchio GEO 305	Drilled By: Ben Mitchell	Logged By: RLockyer	Checked By: 		

BOREHOLE LOG


Contract: Mynydd Maen		Client: Renewable Energy Systems Limited		Borehole: T11-RO
Contract Ref: 315198	Start: 06.03.23 End: 06.03.23	Ground Level: 453.96	National Grid Co-ordinate: E:325741.0 N:196965.9	Sheet: 2 of 3

Drilling Progress Log		Backfill	Water	Description of Strata	Depth (Thickness)	Material Graphic Legend
Depth	Drill Time (hh:mm)					
				Grey SANDSTONE. (Hughes Member) (HUGHES BEDS - UPPER PENNANT MEASURES) <i>(stratum copied from 1.00m from previous sheet)</i> ... Becoming stronger	(19.00)	

GINT_LIBRARY_V10_01.GLB LibVersion: v8.07 | Log ROTARY OPENHOLE LOG - A4P | 315198 - MYNYDD MAEN, WIND FARM.GPJ - v10_01.
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Drilling Progress and Water Observations						General Remarks
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth	

All dimensions in metres Scale: **1:50**

Method Used: Rotary openhole drilling	Plant Used: Comacchio GEO 305	Drilled By: Ben Mitchell	Logged By: RLockyer	Checked By: JB	
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BOREHOLE LOG

Contract: Mynydd Maen		Client: Renewable Energy Systems Limited		Borehole: T11-RO
Contract Ref: 315198	Start: 06.03.23 End: 06.03.23	Ground Level: 453.96	National Grid Co-ordinate: E:325741.0 N:196965.9	Sheet: 3 of 3

Drilling Progress Log		Backfill	Water	Description of Strata	Depth (Thickness)	Material Graphic Legend
Depth	Drill Time (hh:mm)					
				Grey SANDSTONE. (Hughes Member) (HUGHES BEDS - UPPER PENNANT MEASURES) <i>(stratum copied from 1.00m from previous sheet)</i>		
				Terminated at 20mbgl.	20.00	

GINT_LIBRARY_V10_01.GLB LibVersion: v8.07 | Log ROTARY OPENHOLE LOG - A4P | 315198 - MYNYDD MAEN, WIND FARM.GPJ - V10_01.
 RSK Environment Ltd, The Old School, Stillhouse Lane, Bedminster, Bristol, BS3 4EB. Tel: 0117 947 1006 Fax: 0117 947 1009 Web: www.rsk.co.uk | 03/05/23 - 11:49 | SB5 |

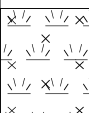

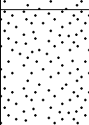
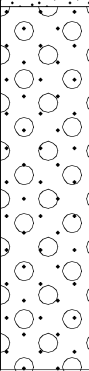
Drilling Progress and Water Observations						General Remarks
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth	

All dimensions in metres Scale: **1:50**

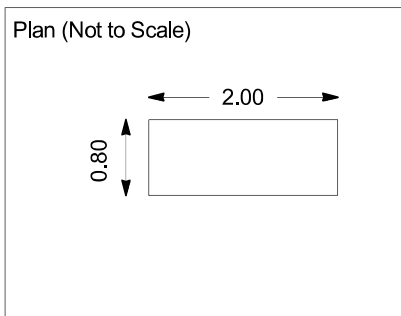
Method Used: Rotary openhole drilling	Plant Used: Comacchio GEO 305	Drilled By: Ben Mitchell	Logged By: RLockyer	Checked By: <i>JB</i>	
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TRIAL PIT LOG

Contract: Mynydd Maen		Client: Renewable Energy Systems Limited		Trial Pit: T3-TP	
Contract Ref: 315198	Start: 09.03.23 End: 09.03.23	Ground Level: 436.89	National Grid Co-ordinate: E:325494.1 N:198822.1	Sheet: 1 of 1	

Samples and In-situ Tests				Water	Backfill	Description of Strata	Depth (Thickness)	Material Graphic Legend
Depth	No	Type	Results					
						Dark brown spongy to firm sandy amorphous PEAT contains frequent roots.	(0.35)	
						Brown clayey fine to coarse SAND	0.35	
						Yellowish brown mottled greenish grey gravelly fine to coarse SAND. Gravel is Sub angular to sub angular fine to coarse sandstone (Weathered Hughes Member)	(0.40)	
						Wethered bedrock recovered as yellowish brown gravelly sandy COBBLES of sandstone . Gravel is angular to Sub angular fine to coarse sandstone (Weathered Hughes Member)	1.00	
						Terminated on hard bedrock	2.20	

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General Remarks



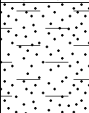



1. Position checked with Ground Penetrating Radar, CAT and Genny prior to excavation.

All dimensions in metres Scale: **1:25**

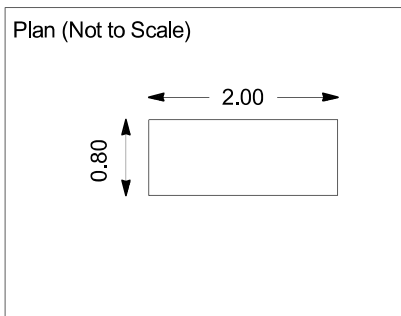
Method Used: Machine dug	Plant Used: Tracked excavator	Logged By: Clrwin	Checked By: 	
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TRIAL PIT LOG

Contract: Mynydd Maen		Client: Renewable Energy Systems Limited		Trial Pit: T7-TP	
Contract Ref: 315198	Start: 07.03.23 End: 07.03.23	Ground Level: 443.25	National Grid Co-ordinate: E:324780.1 N:198334.6	Sheet: 1 of 1	

Samples and In-situ Tests				Water	Backfill	Description of Strata	Depth (Thickness)	Material Graphic Legend
Depth	No	Type	Results					
						Black slightly sandy amorphous spongy to plastic PEAT.	(0.30) 0.30	
						Soft brown sandy CLAY. Sand is fine to coarse.	0.50	
						Brown mottled yellowish brown very clayey fine to coarse SAND. (Weathered Hughes Member)	(0.40) 0.90	
						Yellowish brown slightly gravelly fine to coarse SAND contains sandstone cobbles. Gravel is angular to sub angular fine to coarse sandstone. (Weathered Hughes Member)	(0.40) 1.30	
						Yellowish brown sandy angular to sub angular fine to coarse GRAVEL of sandstone contains frequent cobbles of sandstone. Sand is fine to coarse. (Weathered Hughes Member)	(0.80) 2.10	
						Greenish grey COBBLES of sandstone. (Weathered Hughes Member)	(0.40) 2.50	
						Terminated on hard bedrock		

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General Remarks





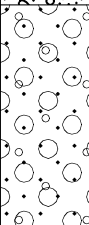


1. Position checked with Ground Penetrating Radar, CAT and Genny prior to excavation.

All dimensions in metres Scale: **1:25**

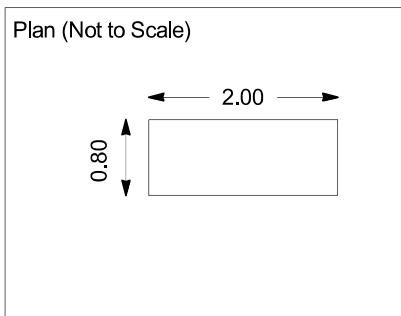
Method Used: Machine dug	Plant Used: Tracked excavator	Logged By: Clrwin	Checked By: 	
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TRIAL PIT LOG

Contract: Mynydd Maen		Client: Renewable Energy Systems Limited		Trial Pit: T8-TP	
Contract Ref: 315198	Start: 09.03.23 End: 09.03.23	Ground Level: 463.41	National Grid Co-ordinate: E:325881.9 N:198182.0	Sheet: 1 of 1	

Samples and In-situ Tests				Water	Backfill	Description of Strata	Depth (Thickness)	Material Graphic Legend
Depth	No	Type	Results					
						Black sandy spongy to firm amorphous PEAT contains frequent roots	(0.30)	
						Brown clayey fine to coarse SAND	0.30	
						Yellowish brown mottled orangeish brown very gravelly clayey fine to coarse SAND contains cobbles of sandstone. Gravel is angular to sub angular sandstone. (Weathered Hughes Member)	0.40	
						Yellowish brown sandy gravelly COBBLES. Gravel is angular to sub angular fine to coarse sandstone. Contains Infrequent boulders upto 60 cm . Becoming more cobbley with depth (Weathered Hughes Member)	(0.85)	
						Yellowish brown sandy gravelly COBBLES. Gravel is angular to sub angular fine to coarse sandstone. Contains Infrequent boulders upto 60 cm . Becoming more cobbley with depth (Weathered Hughes Member)	1.25	
						Terminated due to hard bed rock	(0.75)	
							2.00	

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General Remarks



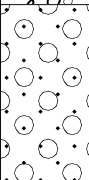
1. Position checked with Ground Penetrating Radar, CAT and Genny prior to excavation.

All dimensions in metres Scale: **1:25**

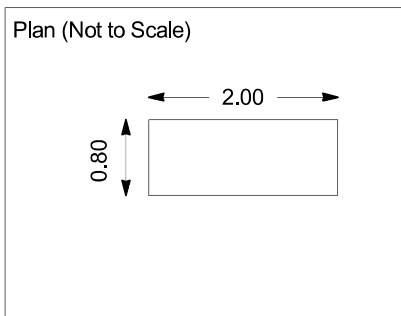
Method Used: Machine dug	Plant Used: Tracked excavator	Logged By: Clrwin	Checked By: 	
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TRIAL PIT LOG

Contract: Mynydd Maen		Client: Renewable Energy Systems Limited		Trial Pit: T11-TP	
Contract Ref: 315198	Start: 07.03.23 End: 07.03.23	Ground Level: 453.96	National Grid Co-ordinate: E:325741.0 N:196965.9	Sheet: 1 of 1	

Samples and In-situ Tests				Water	Backfill	Description of Strata	Depth (Thickness)	Material Graphic Legend
Depth	No	Type	Results					
						Black Spongy to firm sandy amorphous PEAT	0.20	
						Yellowish brown slightly clayey sandy fine to coarse angular to sub angular GRAVEL contains sandstone cobbles. Sand is fine to coarse. (Weathered Hughes Member)	(1.20)	
						Greenish grey slightly sandy gravelly COBBLES of sandstone. Gravel is angular fine to coarse sandstone. Sand is fine to coarse. (Weathered Hughes Member)	(0.60)	
						Hole terminated due to hard bedrock	2.00	

GINT_LIBRARY_V10_01.GLB LibVersion: v8.07 | Log TRIAL PIT LOG - A4P | 315198 - MYNYDD MAEN, WIND FARM.GPJ - v10_01.
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General Remarks

1. Position checked with Ground Penetrating Radar, CAT and Genny prior to excavation.

All dimensions in metres Scale: **1:25**

Method Used: Machine dug	Plant Used: Tracked excavator	Logged By: Clrwin	Checked By: 	
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