

# **XLINKS' MOROCCO-UK POWER PROJECT**

## **Environmental Statement**

**Volume 3, Appendix 7.2: Archaeological Assessment of Geophysical Data**

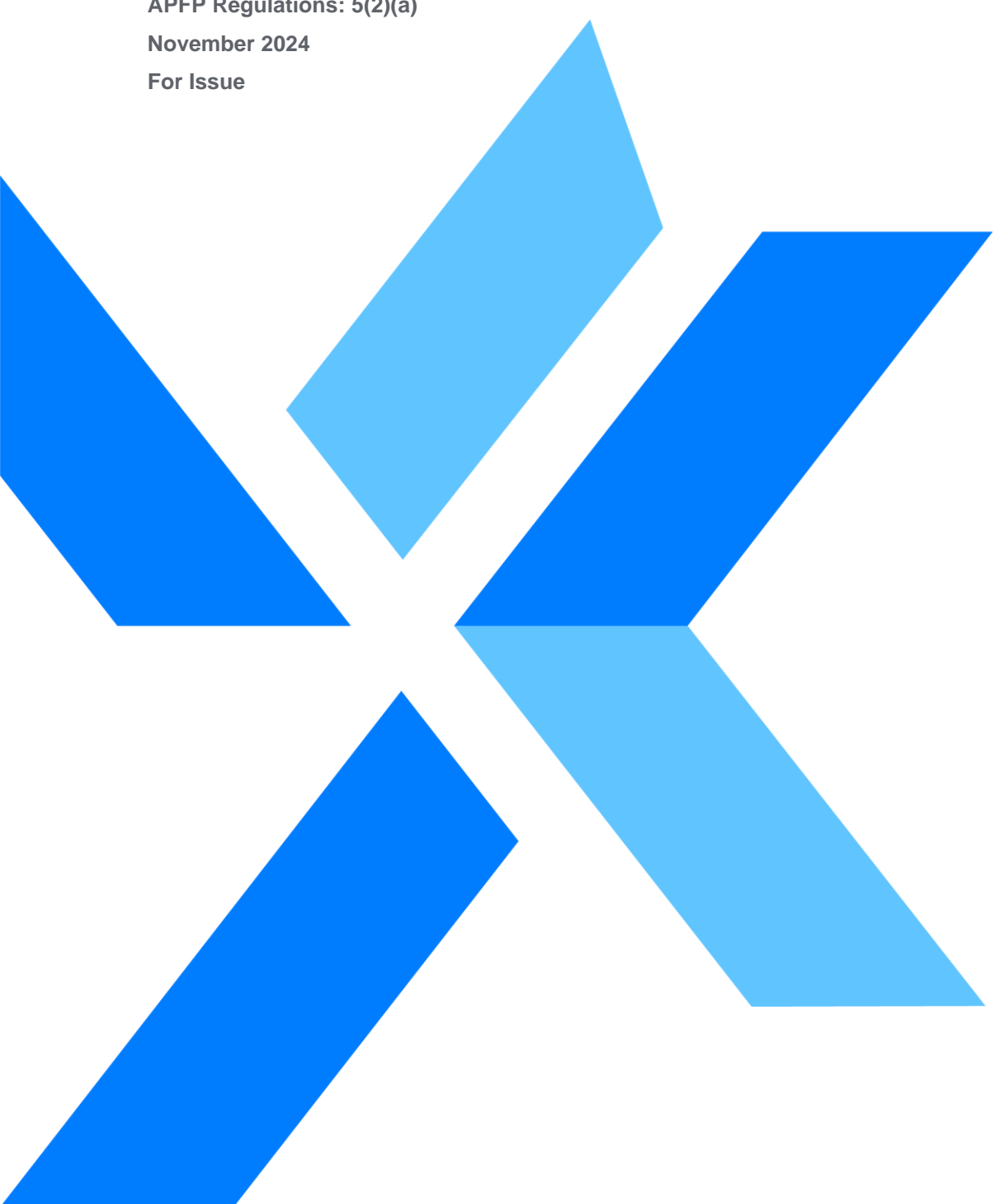
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## XLINKS' MOROCCO – UK POWER PROJECT

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# Xlinks Morocco-UK Power Project

Archaeological assessment of geophysical data

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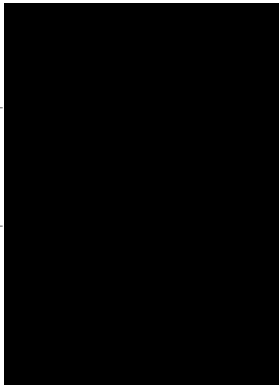
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## Summary

Wessex Archaeology was commissioned by WSP UK Limited to assess geophysical data acquired within the United Kingdom elements of the Xlinks Morocco-UK Power Project development, in advance of any proposed works.

This report consists of an assessment of marine geophysical survey data comprising sidescan sonar, multibeam echosounder and magnetometer data, acquired by GEOxyz between August and September 2022 and August and September 2023. The aim of this assessment is to identify any anomalies of archaeological potential within the study area, to further inform the planning process ahead of the proposed scheme.

A total of 218 seabed anomalies of archaeological potential were identified within the study area. These are summarised as follows:

- a total of four were assigned an A1 archaeological discrimination; anthropogenic origin of archaeological interest;
- a total of 22 were assigned an A2\_h archaeological discrimination; anomaly of likely anthropogenic origin but of unknown date; may be of archaeological interest or a modern feature;
- a total of 186 were assigned an A2\_I archaeological rating; anomaly of possible anthropogenic origin but the interpretation is uncertain; may be anthropogenic or a natural feature
- one item, a recorded wreck, was assigned an A3 archaeological discrimination; historic record of possible archaeological interest with no corresponding geophysical anomaly;
- five items were given an U3 archaeological discrimination; recorded loss.

A total five Archaeological Exclusion Zones have been recommended within the study area. These are buffers around A1 and A3 discriminated anomalies. Buffers of 30 m and 100 m have been recommended as deemed appropriate, based on how well constrained the anomaly is, confidence in positioning, and the likelihood of further buried or low-lying material that is not currently visible, being present within the vicinity. These Archaeological Exclusion Zones all have the potential to be modified and some may be able to be removed at a later date, should further information become available.

For features assigned A2\_h or A2\_I archaeological discriminations, no Archaeological Exclusion Zones are recommended at this time. However, avoidance of these features by micro-siting is recommended if they are proposed to be directly impacted by development in the future. If micro-siting is not possible, then further assessment to ascertain the nature of the features may be required in the form of groundtruthing, such as examination by diver or by Remotely Operated Vehicle (ROV).

It is recommended that if any objects of possible archaeological interest are recovered during any groundwork operations, that they should be reported using a scheme specific Protocol for Archaeological Discoveries (PAD) based on the Offshore Protocol for Archaeological Discoveries (ORPAD) (The Crown Estate 2014). This will establish whether the recovered objects are of archaeological interest and recommend appropriate mitigation measures.



## **Acknowledgements**

This assessment was commissioned by WSP UK Limited, and their assistance throughout the project is acknowledged.

The survey data were acquired by GEOxyz and provided to Wessex Archaeology by WSP UK Limited and their assistance is acknowledged in this regard.



# Xlinks Morocco-UK Power Project

## Archaeological assessment of geophysical data

### 1 INTRODUCTION

#### 1.1 Project background

- 1.1.1 This report presents an archaeological assessment of geophysical data for the UK offshore elements of Xlinks' Morocco-UK Power Project (the 'Project'). For ease of reference, the UK elements of the Project are referred to in this report as the 'Proposed Development'. The report accompanies the application to the Planning Inspectorate for development consent for the Proposed Development.
- 1.1.2 The Proposed Development forms part of the wider Project proposed by the Applicant to develop a sub-sea electricity supply project from Morocco to the UK. The Project includes an electricity generation facility entirely powered by solar and wind energy combined with a battery storage facility. Located in Morocco's renewable energy rich region of Guelmim Oued Noun, the Applicant proposes to install approximately 11.5 Gigawatts peak (GWp) of renewable energy capacity that would cover an approximate area of 1,500 km<sup>2</sup> and connect exclusively to Great Britain (GB) via four HVDC sub-sea cables, with a total offshore route between Morocco and the UK of approximately 4,000 km.
- 1.1.3 The offshore elements of the Proposed Development in UK waters that are the subject of this assessment will be undertaken within the Offshore Cable Corridor. The extent of the Offshore Cable Corridor is from the UK exclusive economic zone (EEZ) boundary to the landfall site at Cornborough Range on the north Devon coast. The total length of the Offshore Cable Corridor in UK waters is approximately 370 km. (Figure 1).
- 1.1.4 This report consists of an assessment of geophysical survey data comprising sidescan sonar (SSS), magnetometer (Mag.) and multibeam echosounder (MBES) data sets.
- 1.1.5 The study area is defined by the client supplied shapefile (5260H-837-BB-01 Offshore Block Boundaries\_Rev08) consisting of a varying corridor around the proposed route (Figure 1) which encompasses the entirety of the proposed Offshore Cable Corridor (OCC).

#### 1.2 Aims and objectives

- 1.2.1 The aims and objectives of this assessment are to:
- confirm the presence of known or previously located marine sites of archaeological potential and to comment on their apparent character;
  - identify, locate and characterise hitherto unrecorded marine sites of archaeological potential;
  - provide recommendations for archaeological mitigation.

#### 1.3 Co-ordinate system

- 1.3.1 The survey data were acquired in WGS84 UTM29N (survey blocks U1–U22) and WGS84



UTM30N (survey blocks U23–U39) and the results are presented in the same coordinate systems.

## **2 METHODOLOGY**

### **2.1 Data sources**

2.1.1 A number of data sources were consulted during this assessment, including:

- geophysical survey datasets acquired by GEOxyz;



- recorded wreck and obstruction data acquired via the United Kingdom Hydrographic Office (UKHO);
- relevant background mapping from the area (admiralty charts received from MarineFIND);
- client supplied survey reports (GEOxyz 2023a; b).

## 2.2 Geophysical data – technical specifications

2.2.1 Geophysical data were acquired by GEOxyz onboard survey vessels *Geo Surveyor XI* for the nearshore survey area between 27 August and 5 September 2022 and *Geo Ocean IV* for the offshore survey areas between 23 August 2023 and 08 September 2023. The route survey area was divided into approximately 10 km long blocks with block U01 located at the UK territorial waters border with France and U39 (nearshore) at the UK landfall (GEOxyz 2023a, b).

2.2.2 The nearshore survey line spacing was approximately 20 m with four crosslines run at maximum 625 m. The offshore survey line plans were developed to ensure the full corridor width (i.e. the full OCC) was mapped, and line spacing varied between 50 m and 175 m. The criteria used was MBES acquisition with 20 % overlap and SSS acquisition with 20 % overlap using a gap-filling dual frequency side scan sonar system; Focus 3 remotely operated towed vehicle (ROTV) (GEOxyz 2023). Crosslines were run in accordance with the Xlinks scope of works and acquired extending 500 m beyond the OCC.

2.2.3 Further details on the equipment used is presented in Table 1.

**Table 1** Summary of survey equipment

Survey Company	Survey Vessel	Data Type	Equipment	Data Format
GEOxyz	<i>Geo Surveyor XI</i>	MBES	Kongsberg EM2040 (350 kHz)	.xyz
		SSS	Edgetech 4200 (300/600 kHz, 50 m range)	.xtf
		Mag.	Geometrics G-882	.csv
		Positioning	Applied Acoustics Nexus II USBL	N/A
	<i>Geo Ocean IV</i>	MBES	Kongsberg EM2040 (400 kHz) < 250 m water depth Reson 7160 (44 kHz) >250 m water depth	.xyz
		SSS	2 x Edgetech 4205 (300/ 900 kHz, 125 m range)	.xtf
		ROTV - SSS	Edgetech 2205 (230/540kHz, 125 m range (Nadir-filling option))	.xtf
		Mag.	Geometrics G-882	.csv
		Positioning	Kongsberg HiPAP 352P	N/A

## 2.3 Geophysical data – processing

2.3.1 A number of datasets were assessed over the study area, and each dataset was processed separately using the following software (Table 2).



**Table 2** Software used for geophysical assessment

Dataset	Processing Software	Interpretation and rationalisation
MBES	QPS Fledermaus v8.5.2	ArcPro v3.3.0
SSS	CodaOctopus Survey Engine v8.7	
Mag.	In-house proprietary software	

- 2.3.2 The MBES data were analysed to identify any unusual seabed structures that could be shipwrecks or other anthropogenic debris. The data were gridded at the appropriate resolution of 1 m in the offshore area and 0.2 m in the nearshore area and analysed using QPS Fledermaus software, which enables a 3-D visualisation of the acquired data and geo-picking of seabed anomalies.
- 2.3.3 The SSS data were provided in the form of mosaic geotiffs (supplied as .tifw files). High frequency SSS mosaics were provided for the nearshore section of the route and low frequency SSS mosaics were provided for the offshore route. These mosaics were assessed using ArcPro. The provided survey company contact lists were used to mitigate the possibility of anomalies of archaeological interest being missed. The positions of contacts interpreted by the survey company as wreck, debris or suspected debris features were checked in the SSS mosaics and if they were considered to be of possible archaeological origin in the mosaic data, then they were added to the gazetteer.
- 2.3.4 The Mag. data were processed using in-house proprietary software to identify any discrete magnetic contacts which could represent buried ferrous debris or structures such as wrecks. The software enables both the visualisation of individual lines of data and gridding of data to produce a magnetic anomaly map. The data were first smoothed to try and eliminate any spiking. A trend was then fitted to the resulting data, and the trend values subtracted from the smoothed values. This was carried out to remove natural variations in the data (such as diurnal variation in magnetic field strength and changes in geology). The processed data were then gridded to produce a map of magnetic anomalies, and individual anomalies tagged based on the grid and individual profile lines.
- 2.3.5 It should be noted that the magnetometer is a passive sensor, and the effectiveness of the sensor to detect magnetic fluctuations caused by ferrous material decreases with increased distance from the target. As such, only significant ferrous objects (e.g. steel hulled wrecks) will be identified between lines of surveys with relatively large line spacings, and smaller individual pieces of ferrous debris will not be detected - these smaller items are only likely to be detected when the sensor passes much closer to, or directly over, such objects. Larger numbers of magnetic anomalies are often found during subsequent higher resolution surveys than during initial lower resolution surveys; e.g. a pre-construction UXO survey with a shorter line spacing is likely to find additional anomalies between the more widely spaced survey lines of an original EIA/scoping survey.
- 2.3.6 For the purposes of this assessment, any identified magnetic anomalies have been classified depending on their amplitude as small (25 nT to 49 nT), medium (50 nT to 99 nT), large (100 nT to 499 nT) or very large (>500 nT).
- 2.3.7 A threshold approach has been used for this assessment across all three data types. Anomalies picked from the SSS mosaic were subject to a size threshold: being over 5 m in any one direction merited inclusion in the gazetteer. As with the SSS mosaics, anomalies seen in the MBES data were also subject to a size threshold, required



to be over 5 m in any one direction to merit inclusion in the gazetteer. Any magnetic anomalies below 20 nT have been excluded based on ground-truthing information from similar large-scale sites. This has been applied to all magnetic anomalies throughout the study areas. Thresholding has been used to refine the process, facilitating identification of features of anthropogenic origin or archaeological interest, but not necessarily those with a more uncertain interpretation.

- 2.3.8 A sub-set of anomalies tagged by Wessex Archaeology in the SSS mosaics, MBES and Mag. data were further investigated in the individual line SSS data files (.*xtf*). These data are referred to in this report as 'raw SSS data' to distinguish them from the mosaics (even though some of the .*xtf* files received may have undergone some processing). These included anything with the potential to be classified as A1 - Anthropogenic origin of archaeological interest such as wreck, debris field and Mag. anomalies over 500 nT (that are not known to be modern).
- 2.3.9 Anomalies assessed in the raw SSS data were not subject to a size threshold, as this process was designed to ensure the full extents of significant anthropogenic seabed features, including adjacent related small anomalies, were recorded to ensure AEZs are as comprehensive as possible.
- 2.3.10 The high frequency .*xtf* SSS data files were processed using CodaOctopus Survey Engine Sidescan+ software. This allowed the data to be replayed with various gain settings in order to optimise the quality of the images. The data were interpreted for any objects of possible anthropogenic origin. This involves creating a database of anomalies within Coda by tagging individual features of possible archaeological potential, recording their positions and dimensions, and acquiring an image of each anomaly for future reference.
- 2.3.11 It is standard practice for a mosaic of the SSS to be produced during this process to assess the quality of the sonar towfish positioning. This process allows the position of anomalies to be checked between different survey lines and for the positioning to be further refined if necessary. For this project, the mosaics had already been created and provided by the client and these were used to finalise the positioning of anomalies from the raw SSS data.
- 2.3.12 The form, size and/or extent of an anomaly is a guide to its potential to be an anthropogenic feature and therefore of archaeological interest. A single small but prominent anomaly may be part of a much more extensive feature that is largely buried. Similarly, a scatter of minor anomalies may be unrelated individual features, define the edges of a buried but intact feature, or may be all that remains as a result of past impacts from, for example, dredging or fishing. Assessment is made of such groups of anomalies during data interpretation to determine which of these alternatives is the most likely.

## 2.4 Geophysical data – data quality

- 2.4.1 Once processed, the geophysical data sets were individually assessed for quality and their suitability for archaeological purposes, and are rated using the following criteria (Table 3).

**Table 3** Criteria for assigning data quality rating

Data quality	Description
Good	Data which are clear and unaffected or only slightly affected by weather conditions, sea state, background noise or data artefacts. Seabed datasets are suitable for the interpretation of upstanding and partially buried wrecks, debris fields, and small individual anomalies. The structure of wrecks is clear, allowing assessments on wreck condition to be made. These data provide the highest probability that anomalies of archaeological potential will be identified.



Data quality	Description
Average	Data which are moderately affected by weather conditions, sea state and noise. Seabed datasets are suitable for the identification of upstanding and partially buried wrecks, the larger elements of debris fields and dispersed sites, and larger individual anomalies. Dispersed and/or partially buried wrecks may be difficult to identify. These data are not considered to be detrimentally affected to a significant degree.
Below Average	Data which are affected by weather conditions, sea state and noise to a significant degree. Seabed datasets are suitable for the identification of relatively intact, upstanding wrecks and large individual anomalies. Dispersed and/or partially buried wrecks, or small isolated anomalies may not be clearly resolved.
Variable	This category contains datasets where the individual lines range in quality. Confidence of interpretation is subsequently likely to vary within the study area.

- 2.4.2 The offshore MBES data were rated as 'Average' using the above criteria. Some of the data have been affected by pitch and roll causing data artefacts in the data, which may be mistaken for, or obscure the interpretation of, 'real' features present on the seabed. The resolution of 1 m allows for archaeological assessment of objects and debris over 1 m in size and is deemed suitable for archaeological assessment and sufficient given the 5 m threshold of this project.
- 2.4.3 The nearshore MBES data have been rated as 'Good' using the above criteria table. The data quality and resolution of 0.2 m was found to be of a good standard and suitable for archaeological assessment of objects and debris over 0.2 m in size.
- 2.4.4 The offshore SSS mosaic has been rated as 'Average' using the above criteria table. The data were occasionally slightly affected by weather noise; however, this was minimal. Only the low frequency mosaic data was available due to the range achieved on the high frequency data and so object detail generally seen in high frequency mosaics may be missed. However, with a resolution of 0.5 m the data are suitable for archaeological assessment and sufficient given the 5 m threshold of this project.
- 2.4.5 The SSS raw data have been rated as 'Average' using the above criteria table. The low frequency files were assessed due to the range achieved on the high frequency data and so object detail generally seen in high frequency files may be missed. The data also contained some spiking. However, the data are suitable for archaeological assessment.
- 2.4.6 The nearshore SSS mosaic has been rated as 'Good' using the above criteria table. The high frequency mosaics had a resolution of 0.2 m making them suitable for archaeological assessment of objects and debris over 0.2 m in size.
- 2.4.7 The offshore Mag. data have been rated as 'Average' using the above criterial table. The data displayed some weather noise and spiking throughout. The relatively wide line spacing of between 50 m to 175 m, typical for an EIA survey, means that smaller ferrous features which aren't directly covered by a line of Mag. data may not have been picked up in the data. However, larger features such as wrecks and substantial ferrous debris were largely still identifiable in the data and, as such, the dataset was considered suitable for archaeological interpretation.
- 2.4.8 The nearshore Mag. data have been rated as 'Average' using the above criterial table. The data displayed some spiking and interference from background geology, however, the data are considered suitable for archaeological interpretation.



## 2.5 Data limitations

- 2.5.1 A number of features identified as static fishing gear were encountered within the survey corridor and adjacent to it. This prevented the achievement of full coverage in several blocks including U32, U34, U38C and U38E, in addition to the route development area north of U33, as reported in the GEOxyz survey operations report (GEOxyz 2023b).
- 2.5.2 There is a gap in the MBES data along the south-west side of blocks U01-U07 which is approximately 25 m wide, however this was fully covered by SSS mosaic data, and therefore identification and interpretation of anomalies was still possible in this area.

## 2.6 Geophysical data – anomaly grouping and discrimination

- 2.6.1 The previous section describes the initial interpretation of all available geophysical datasets which were conducted independently of one another. This inevitably leads to the possibility of any one object being the cause of numerous anomalies in different datasets and apparently overstating the number of archaeological features in the exploration area.
- 2.6.2 To address this fact the anomalies were grouped together; allowing one ID number to be assigned to a single object for which there may be, for example, a UKHO record, a MBES anomaly, and multiple SSS anomalies.
- 2.6.3 Once all the geophysical anomalies and desk-based information have been grouped, a discrimination flag is added to the record in order to discriminate against those which are not thought to be of an archaeological concern. For anomalies located on the seabed, these flags are ascribed as follows (Table 4).

**Table 4** Criteria discriminating relevance of identified features to proposed scheme

Overview classification	Discrimination	Criteria	Data type
Archaeological	A1	Anthropogenic origin of archaeological interest	MBES, SSS, Mag.
Archaeological	A2_h	Anomaly of likely anthropogenic origin but of unknown date; may be of archaeological interest or a modern feature	MBES, SSS, Mag.
Archaeological	A2_l	Anomaly of possible anthropogenic origin but the interpretation is uncertain; may be anthropogenic or a natural feature	MBES, SSS, Mag.
Archaeological	A3	Historic record of possible archaeological interest with no corresponding geophysical anomaly	MBES, SSS, Mag.
Non-archaeological	U3	Recorded loss	MBES, SSS, Mag.

- 2.6.4 The grouping and discrimination of information at this stage is based on all available information and is not definitive. It allows for all features of potential archaeological interest to be highlighted, while retaining all the information produced during the course of the geophysical interpretation and desk-based assessment for further evaluation should more information become available.
- 2.6.5 Any anomalies located outside of the defined study areas, either previously recorded in known databases (e.g. UKHO) or identified during this geophysical assessment, are



deemed beyond the scope of the current assessment and are subsequently not included in this report.

### 3 SEABED FEATURES ASSESSMENT

#### 3.1 Introduction

- 3.1.1 The geophysical data were assessed to identify features of archaeological potential relating to maritime and aviation activity.
- 3.1.2 The results are reported as one dataset but are presented as separate gazetteers within Appendices I to II in their relevant coordinate systems as described in section 1.3.
- 3.1.3 As many of the anomalies within the gazetteers were interpreted from the SSS mosaic geotiffs, height measurements will not be available. Where height measurements are present these have been taken from the SSS raw data during checks of significant anomalies, or have been taken from the MBES data. Within the gazetteer, the presence of a shadow for an anomaly seen on a SSS geotiff is mentioned in the text.
- 3.1.4 For the purposes of this assessment, we consider that magnetic anomalies closer to the flown Mag. line will have an increased likelihood of being detected. Larger or denser objects of ferrous material may be detected from further away, but smaller items may not be detected (see section 2.3.5).

#### 3.2 Seabed features assessment results

- 3.2.1 The results of this assessment are collated in gazetteer format detailed in Appendix I and II and illustrated in Figures 2a – 3w.
- 3.2.2 A total of 218 features have been identified as being of possible archaeological potential within the study area and are discriminated as shown in Table 5.

**Table 5** Anomalies of archaeological potential within the study area

Archaeological discrimination	Quantity	Interpretation
A1	4	Anthropogenic origin of archaeological interest
A2_h	22	Anomaly of likely anthropogenic origin but of unknown date; may be of archaeological interest or a modern feature
A2_l	186	Anomaly of possible anthropogenic origin but the interpretation is uncertain; may be anthropogenic or a natural feature
A3	1	Historic record of possible archaeological interest with no corresponding geophysical anomaly
U3	5	Recorded loss
<b>Total</b>	<b>218</b>	

- 3.2.3 Furthermore, these anomalies can be classified by probable type, which can further aid in assigning archaeological potential and importance (Table 6).

**Table 6** Types of anomaly identified

Anomaly classification	Definition	Number of anomalies
Wreck	Areas of coherent structure including wrecks of ships, submarines and some aircraft (where coherent structure survives)	1
Debris field	A discrete area containing numerous individual debris items that are potentially anthropogenic, and can include dispersed wreck sites for which no coherent structure remains	1
Debris	Distinct objects on the seabed, generally exhibiting height or with evidence of structure, that are potentially anthropogenic in origin	3
Seabed disturbance	An area of disturbance without individual, distinct objects. Potentially indicates wreck debris or other anthropogenic features buried just below the seabed	20
Linear debris	Distinct linear objects on the seabed, either straight or curved, generally exhibiting height or with evidence of structure, that are potentially anthropogenic in origin. May represent linear anthropogenic debris which can include, for example, lengths of rope or chain or abandoned fishing gear	8
Dark reflector	Individual objects or areas of high reflectivity, displaying some anthropogenic characteristics. Precise nature is uncertain	39
Mound	A mounded feature with height not considered to be natural. Mounds may form over wreck sites or other debris	13
Magnetic	No associated seabed surface expression, and have the potential to represent possible buried ferrous debris or buried wreck sites	125
Magnetic trend	A linear trend of individual or continuous magnetic anomalies with no associated seabed surface expression, and have the potential to represent possible buried ferrous debris	2
Recorded wreck	Position of a recorded wreck at which previous surveys have identified definite seabed anomalies, but for which no associated feature has been identified within the current data set	2
Recorded obstruction	Position of a recorded obstruction (e.g. foul ground, fisherman's fastener recorded by the UKHO), but for which no associated feature has been identified within the current data set	4
<b>Total</b>		<b>218</b>

3.2.4 A total of four anomalies have been discriminated as A1 – anthropogenic origin of archaeological interest (**7027, 7028, 7030 and 7196**).

3.2.5 Wreck **7028** is a recorded wreck visible in the SSS data as a large spread of dark reflectors, comprising multiple angular and elongate objects with shadows, measuring 105.2 x 35.7 x 1.3 m (Sheet 1). The largest dark reflectors visible are thin and elongate objects, orientated east to west and are likely pieces of surviving hull, though this is not intact. There are multiple smaller dark reflectors outside of the interpreted hull on the northern and southern sides indicating the wreck has spread and is broken up and degraded. Internally no clear superstructure is visible; however, the wreck appears upright. In the MBES data the wreck is visible as a large, compact group of distinct mounds and depressions situated at the edge of the data extents. The wreck appears to be highly broken up and degraded, with distinct scour on the northern side. The wreck has a large Mag. anomaly associated measuring 241 nT.

3.2.6 The wreck corresponds with the location of UKHO 12339, reported as the steam ship *Thistle*, which sunk in 1909 during heavy weather. The wreck was first identified in 1985 and was last surveyed in 2008, when its dimensions were found to be 108.4 x 36.5 x 3.6 m, with bows to the east. A strong magnetic anomaly was associated with this wreck and debris has been identified within the vicinity.





- 3.2.7 Debris **7027** has been discriminated as A1 due to its proximity to wreck **7028** as it is situated 6 m to the north-east. It was identified in the SSS data as a distinct, angular dark reflector with shadow measuring 6.3 x 4 x 1.2 m. In the MBES data it was visible as a distinct angular mound within scour.
- 3.2.8 Both **7027** and **7028** are situated outside of the study area, however a proposed archaeological exclusions zone (AEZ) would impact the study area and therefore, these have been retained within the gazetteer.
- 3.2.9 Two magnetic anomalies have been discriminated as A1 based on their amplitudes; anomaly **7030** measures 526 nT and anomaly **7196** measures 1840 nT. There is nothing anomalous visible on the SSS or MBES data at these positions and they have been interpreted as substantial ferrous debris which is either buried or has no surface expression.
- 3.2.10 One anomaly (**7026**) has been discriminated as A3 - historic record of possible archaeological interest with no corresponding geophysical anomaly. This is the position of UKHO record 12198, an unknown recorded wreck first reported in 1940, and later recorded as having a doubtful position in 1944. The location was last surveyed in 2008 and described as an area of disturbed seabed and the record was amended to dead. No anomalous features were identified in the 2023 geophysical datasets. As remains have been identified at this position previously, this record has been retained in this gazetteer.
- 3.2.11 A total of 22 anomalies have been discriminated as A2\_h - anomaly of likely anthropogenic origin but of unknown date; may be of archaeological interest or a modern feature.
- 3.2.12 One anomaly (**7195**) has been classified as a debris field, this has dimensions of 43.4 x 30.8 x 0.5 m and is illustrated in Figure 4.
- 3.2.13 Two anomalies (**7014** and **7102**) have been classified as debris. These have dimensions of 5 x 4 x 0.1 m (**7014**) and 5.3 x 2.5 x 0.9 m (**7102**) and are illustrated in Figure 4.
- 3.2.14 A total of five anomalies (for full list see Appendix I and II) have been classified as linear debris, with sizes between 27.6 x 1 x 0.1 m (**7072**) and 86.2 x 1 m (**7019**) (Figure 4). None have associated Mag. anomalies. These anomalies are interpreted as anthropogenic linear features and may include possible rope or chain features.
- 3.2.15 A total of 12 magnetic anomalies, which are without associated SSS or MBES anomalies, have been discriminated as A2\_h (for full list see Appendix I and II). The anomalies range in amplitude between 100 nT (**7112**) and 347 nT (**7011**). These indicate the presence of potential ferrous debris that is either buried or without surface expression at these locations.
- 3.2.16 Two magnetic trends (**7079** and **7113**) have been identified with no corresponding SSS or MBES features. Magnetic trend **7079** was visible on three lines of Mag. data with a maximum amplitude of 184 nT. It measures 335.5 m in length and is oriented NNW to SSE. Magnetic trend **7113** was visible on four lines of Mag. data with a maximum amplitude of 144 nT. It measures 366 m in length and is oriented north-west to south-east. These have the potential to represent possible buried linear ferrous debris.
- 3.2.17 A total of 186 anomalies have been discriminated as A2\_l - anomaly of possible anthropogenic origin but the interpretation is uncertain; may be anthropogenic or a natural feature.

- 3.2.18 A total of three anomalies (**7133**, **7197** and **7210**) have been classified as linear debris and discriminated as A2\_I. These are varied in size, measuring between 56.3 x 0.5 m (**7133**) and 171.4 x 2 m (**7197**) and are interpreted to be possible modern fishing gear, though this cannot be confirmed without further investigation.
- 3.2.19 In total, 20 seabed disturbances (for full list see Appendix I and II) are noted in the study area; a feature or group of features of uncertain origin. These are varied in shape, measuring in size between 6.2 x 2.7 x 0.1 m (**7009**) and 86.5 x 12.5 m (**7178**). One of these (**7178**) has an associated Mag. anomaly measuring 78 nT situated at the southern extent of the feature, and has been interpreted as a possible natural feature with some ferrous content or may be partially ferrous debris (Figure 4). These features are of uncertain origin and all could either be natural features or represent debris buried just beneath the seabed.
- 3.2.20 A total of 39 dark reflectors were identified in the study area; features of uncertain origin (see Appendix I and II for the full list). These measure between 5 x 1 m (**7111**) and 160.5 x 1 m (**7127**). Features classified as dark reflectors are interpreted as either possible individual pieces of debris or may be natural features.
- 3.2.21 A total of 39 anomalies have been classified as mounds, none of which have associated Mag. anomalies (see Appendix I and II for the full list). These vary in size between 5 x 3.5 x 0.3 m (**7150**) and 7.5 x 3 x 0.3 m (**7203**). The mounds are of uncertain origin and could represent debris covered by seabed sediment or be natural features.
- 3.2.22 A total of 111 Mag. anomalies discriminated as A2\_I have been identified in the study area, all of which are without associated SSS or MBES anomalies (see Appendix I and II for the full list). These range in amplitude from 20 nT (**7075**, **7080**, **7115**, **7148** and **7171**) to 265 nT (**7059**) and indicate potential ferrous debris that is either buried or without surface expression.
- 3.2.23 Five records (for full list see Appendix I and II) in the study area have been discriminated as U3 - recorded loss. As remains have never been identified on the seabed at these positions they are considered not to exist at these locations and have been retained in the report and gazetteer for reference.

## 4 CONCLUSIONS AND RECOMMENDATIONS

- 4.1.1 The assessment of the geophysical data within the study area resulted in a total of 218 anomalies identified as being of possible archaeological interest. These are summarised as follows:
- a total of four were assigned an A1 archaeological rating;
  - a total of 22 were assigned an A2\_h archaeological rating;
  - a total of 186 were assigned an A2\_I archaeological rating;
  - one item, a recorded wreck, was assigned an A3 archaeological discrimination; and
  - five items were given an U3 archaeological discrimination; recorded loss. They have been retained in the report and gazetteer for reference.
- 4.1.2 A total of five AEZs have been recommended within the study area, these are buffers around A1 and A3 discriminated anomalies. Buffers of 30 m and 100 m have been





recommended as deemed appropriate, based on how well constrained the anomaly is, confidence in positioning, and the likelihood of further buried or low-lying material that is not currently visible, being within the vicinity. Point anomalies with uncertain, possibly buried, extents have been attributed a 100 m buffer, which includes the A3 and two A1 Mag. anomalies.

4.1.3 The AEZs are recommended as follows (Tables 7 and 8).

**Table 7** Recommended AEZs within the study area (UTM30N area)

ID Number	Classification	Position (WGS84 UTM30N)		Status	Exclusion Zone
		Easting	Northing		
7026	Recorded wreck	401827	5658228	New	100 m buffer around recorded position
7027	Debris	401717	5658018	New	30 m buffer merged with wreck 7028
7028	Wreck	401663	5658016	New	100 m buffer around feature extent
7030	Magnetic	398469	5660373	New	100 m buffer around recorded position

**Table 8** Recommended AEZs within the study area (UTM29N area)

ID Number	Classification	Position (WGS84 UTM29N)		Status	Exclusion Zone
		Easting	Northing		
7196	Magnetic	657296	5455055	New	100 m buffer around recorded position

4.1.4 These AEZs all have the potential to be modified and some may be able to be removed at a later date, should further information become available.

4.1.5 For features assigned A2\_h and A2\_l archaeological discrimination rating, no AEZs are recommended at this time. However, avoidance of these features by micro-siting is recommended if they are proposed to be directly impacted by development in the future. If micro-siting is not possible, then further assessment to ascertain the nature of the features may be required in the form of groundtruthing, such as examination by diver or by Remotely Operated Vehicle (ROV).

4.1.6 It is recommended that if any objects of possible archaeological interest are recovered during any groundwork operations, that they should be reported using a scheme specific Protocol for Archaeological Discoveries (PAD) based on the Offshore Protocol for Archaeological Discoveries: Offshore Renewables Projects (ORPAD) (The Crown Estate 2014). This will establish whether the recovered objects are of archaeological interest and recommend appropriate mitigation measures.



## **5 REFERENCES**

GEOxyz 2023a *Xlinks Cable Project Lot1 2022 RPL MO - RPL FR - CYCB - RPL UK - GPN UK*. Unpub. report ref: 5260H-837-RIR.

GEOxyz 2023b *Offshore Cable Route Survey 2023 Operations Report - Geo Ocean VI*. Unpub. report ref: 6050H-837-OR-01.

The Crown Estate 2014 Protocol for Archaeological Discoveries: Offshore Renewables Projects. Prepared by Wessex Archaeology for The Crown Estate. Available at URL: [https://www.wessexarch.co.uk/sites/default/files/field\\_file/2\\_Protocol%20For%20Archaeological%20Discoveries.pdf](https://www.wessexarch.co.uk/sites/default/files/field_file/2_Protocol%20For%20Archaeological%20Discoveries.pdf)

## APPENDICES

### Appendix I Seabed features of archaeological potential (UTM30N area)

ID	Classification	Easting	Northing	Archaeological discrimination	Length (m)	Width (m)	Height (m)	Magnetic amplitude (nT)	Anomaly geometry	SSS	MBES	Mag.	Interpretation	Associated anomalies	Dataset	Section	External references
7000	Dark reflector	410834	5654097	A2_I	5.2	2.7	0.3	-	Point	Angular dark reflector with varying shadows, possibly multiple objects close together.	An elongate mound with uneven peak and relatively steep sides, orientated east to west. The western end is wider and may be a separate object.	-	Possible natural feature or possible debris.	-	GEOxyz 2023 SSS mosaic	U39	-
7001	Seabed disturbance	410820	5653987	A2_I	20.2	5.5	1.0	-	Area	Two parallel elongate dark reflectors with shadows within scour.	Two parallel elongate mounds aligned east to west; the southern mound is longer, northern mound is 12 m long. Both have steep sides and uneven peaks.	-	Possible natural feature or may be possible partially buried debris. May be modern as situated 64 m east of an UKHO obstruction recorded as a pipe or diffuser and may be associated.	-	GEOxyz 2023 SSS mosaic	U39	-
7002	Seabed disturbance	410798	5653987	A2_I	7.1	5.2	0.8	-	Area	Compact group of distinct dark reflectors with shadows.	A compact group of four mounds of varying sizes, largest mound measures 3.7 x 2.1.	-	Possible natural feature or may be possible partially buried debris. May be modern as situated 52 m east of an UKHO obstruction recorded as a pipe or diffuser and may be associated.	-	GEOxyz 2023 SSS mosaic	U39	-
7003	Seabed disturbance	410743	5653991	A2_I	11.7	4.9	0.4	-	Area	Compact group of distinct dark reflectors with shadows.	Seabed disturbance comprising four distinct angular mounds in a triangular alignment with smaller elongate low-lying mounds at the eastern extent. Largest mound measures 3.9 x 2.7.	-	Possible natural feature or may be possible partially buried debris. May be modern as situated 7 m south of an UKHO obstruction recorded as a pipe or diffuser and may be associated.	-	GEOxyz 2023 SSS mosaic	U39	-
7004	Magnetic	410711	5654067	A2_I	-	-	-	75	Point	-	-	A medium asymmetric dipole with peak and trough on one profile line. Also visible on other profile lines.	Possible ferrous debris either buried or with no surface expression.	-	GEOxyz 2023	U39	-



ID	Classification	Easting	Northing	Archaeological discrimination	Length (m)	Width (m)	Height (m)	Magnetic amplitude (nT)	Anomaly geometry	SSS	MBES	Mag.	Interpretation	Associated anomalies	Dataset	Section	External references
7005	Magnetic	410691	5654015	A2_h	-	-	-	117	Point	-	-	A large asymmetric dipole with peak and trough on one profile line. Also visible on other profile lines.	Possible ferrous debris either buried or with no surface expression. May be modern as situated 10 m south-east of an UKHO obstruction recorded as a pipe or diffuser and may be associated.	-	GEOxyz 2023	U39	-
7006	Magnetic	410684	5654074	A2_l	-	-	-	86	Point	-	-	A medium, sharp asymmetric dipole with peak and trough on one profile line.	Possible ferrous debris either buried or with no surface expression.	-	GEOxyz 2023	U39	-
7007	Magnetic	410664	5654065	A2_l	-	-	-	92	Point	-	-	A medium, sharp asymmetric dipole with peak and trough on one profile line.	Possible ferrous debris either buried or with no surface expression.	-	GEOxyz 2023	U39	-
7008	Magnetic	410624	5654069	A2_l	-	-	-	54	Point	-	-	A medium asymmetric dipole with peak and trough on one profile line.	Possible ferrous debris either buried or with no surface expression.	-	GEOxyz 2023	U39	-
7009	Seabed disturbance	410573	5653903	A2_l	6.2	2.7	0.1	-	Area	Compact group of elongate dark reflectors with shadows.	A slightly distinct area of uneven seabed, comprising very low-lying mounds in slight depressions.	-	Possible natural feature or may be possible partially buried debris.	-	GEOxyz 2023 SSS mosaic	U39	-
7010	Seabed disturbance	409702	5654344	A2_l	8.4	1.6	-	-	Area	A linear alignment of small angular dark reflectors with slight shadows and scour.	-	-	Possible natural feature or may be possible partially buried debris.	-	GEOxyz 2023 SSS mosaic	U39	-
7011	Magnetic	409430	5654373	A2_h	-	-	-	347	Point	-	-	A large, sharp asymmetric dipole with peak and trough over two profile lines.	Possible ferrous debris either buried or with no surface expression.	-	GEOxyz 2023	U39	-
7012	Magnetic	409400	5654349	A2_l	-	-	-	36	Point	-	-	A small asymmetric dipole with peak and trough on one profile line.	Possible ferrous debris either buried or with no surface expression.	-	GEOxyz 2023	U39	-
7013	Magnetic	408958	5654505	A2_l	-	-	-	23	Point	-	-	A small symmetric dipole with peak and trough on one profile line.	Possible ferrous debris either buried or with no surface expression.	-	GEOxyz 2023	U39	-



ID	Classification	Easting	Northing	Archaeological discrimination	Length (m)	Width (m)	Height (m)	Magnetic amplitude (nT)	Anomaly geometry	SSS	MBES	Mag.	Interpretation	Associated anomalies	Dataset	Section	External references
7014	Debris	408928	5654527	A2_h	5.0	4.0	0.1	-	Area	An area of seabed comprising an internal bright reflector, a right-angled dark reflector on the southern side and an irregular dark reflector on the northern side.	A double peaked mound measuring 2.2 x 1.2 m surrounded by scour, with an elongate mound on the eastern edge of the depression measuring 2.2 x 1 m.	-	Debris.	-	GEOxyz 2023 SSS mosaic	U39	-
7015	Magnetic	408703	5654231	A2_l	-	-	-	50	Point	-	-	A medium negative monopole with peak and trough on one profile line.	Possible ferrous debris either buried or with no surface expression.	-	GEOxyz 2023	U39	-
7016	Dark reflector	408569	5654302	A2_l	50.2	1.0	-	-	Linear	A thin linear dark reflector orientated east to west.	-	-	Possible natural feature or may be linear debris such as a length of rope or chain.	-	GEOxyz 2023 SSS mosaic	U39	-
7017	Seabed disturbance	407991	5654589	A2_l	24.3	14.0	-	-	Area	A compact group of very angular dark reflectors with shadow and within scour.	-	-	Possible natural feature or may be possible partially buried debris.	-	GEOxyz 2023 SSS mosaic	U38E	-
7018	Dark reflector	407633	5654749	A2_l	9.8	2.2	-	-	Point	An elongate dark reflector with a shadow.	-	-	Possible natural feature or possible debris.	-	GEOxyz 2023 SSS mosaic	U38E	-
7019	Linear debris	407452	5655035	A2_h	86.2	1.0	-	-	Linear	A long and thin linear dark reflector orientated ESE to WSW.	-	-	Linear debris such as a length of rope or chain.	-	GEOxyz 2023 SSS mosaic	U38E	-
7020	Dark reflector	406901	5655394	A2_l	8.0	2.2	-	-	Point	An indistinct, elongate dark reflector with a shadow, located within slight scour.	-	-	Possible natural feature or possible debris.	-	GEOxyz 2023 SSS mosaic	U38E	-
7021	Magnetic	404867	5655935	A2_l	-	-	-	29	Point	-	-	A small asymmetric dipole with peak and trough on one profile line.	Possible ferrous debris either buried or with no surface expression.	-	GEOxyz 2023	U38D	-
7022	Dark reflector	403946	5656366	A2_l	5.3	2.8	-	-	Point	A distinct sub-angular dark reflector with a shadow.	-	-	Possible natural feature or possible debris.	-	GEOxyz 2023 SSS mosaic	U38C	-
7023	Dark reflector	403791	5656567	A2_l	6.4	2.8	-	-	Point	A distinct sub-angular dark reflector with a shadow	-	-	Possible natural feature or possible debris.	-	GEOxyz 2023 SSS mosaic	U38C	-



ID	Classification	Easting	Northing	Archaeological discrimination	Length (m)	Width (m)	Height (m)	Magnetic amplitude (nT)	Anomaly geometry	SSS	MBES	Mag.	Interpretation	Associated anomalies	Dataset	Section	External references
7024	Dark reflector	403323	5657342	A2_I	14.5	1.5	-	-	Linear	A right-angled linear dark reflector with no shadow.	-	-	Possible natural feature or possible debris.	-	GEOxyz 2023 SSS mosaic	U38C	-
7025	Magnetic	401769	5658395	A2_I	-	-	-	36	Point	-	-	A small symmetric dipole with peak and trough on one profile line.	Possible ferrous debris either buried or with no surface expression.	-	GEOxyz 2023	U38B	-
7026	Recorded Wreck	401827	5658228	A3	-	-	-	-	Point	-	-	-	Position of a UKHO record for an unknown recorded wreck first reported in 1940, later recorded as having a doubtful position (1944). The location was last surveyed in 2008 and described as an area of disturbed seabed and the record was amended to dead. No anomalous features were identified in the 2023 geophysical datasets. As remains have been identified at this position previously it has been retained in this gazetteer.	-	-	U38B	UKHO 12198
7027	Debris	401717	5658018	A1	6.3	4.0	1.2	-	Point	A distinct, angular dark reflector with a shadow.	A distinct angular mound within scour at eastern end of wreck	-	Wreck debris	7028	GEOxyz 2023 SSS mosaic, SSS Raw	U38B	-



ID	Classification	Easting	Northing	Archaeological discrimination	Length (m)	Width (m)	Height (m)	Magnetic amplitude (nT)	Anomaly geometry	SSS	MBES	Mag.	Interpretation	Associated anomalies	Dataset	Section	External references
7028	Wreck	401663	5658016	A1	105.2	35.7	1.3	241	Area	A large spread of dark reflectors visible as multiple angular and elongate objects with shadows, largest is orientated east to west and is likely part of the hull, though there are smaller dark reflectors outside of this on northern and southern sides indicating the wreck has spread and is broken up and degraded. Internally no clear superstructure is visible, the wreck is within scour and sand waves.	A compact group of distinct mounds and depressions at the edge of the data extents. The wreck is orientated east to west and is broken up and degraded. There is scour on the northern side of the wreck and it is situated within mega ripples.	A large, sharp asymmetric dipole with peak and trough on one profile line.	The wreck of <i>Thistlemor</i> . See Wreck Sheet 1	7027	GEOxyz 2023 SSS mosaic, SSS Raw	U38B	UKHO 12339
7029	Recorded Wreck	400385	5659182	U3	-	-	-	-	Point	-	-	-	Position of a UKHO record for an unknown recorded wreck first reported in 1940 with a doubtful position. The area was last surveyed in 2008 and nothing was identified, and the record amended to dead. No anomalous features were identified in the 2023 geophysical datasets. It has been retained as a precaution.	-	-	U38A	UKHO 12202
7030	Magnetic	398469	5660373	A1	-	-	-	526	Point	-	-	A very large, sharp symmetric dipole with peak and trough over two profile lines.	Possible ferrous debris either buried or with no surface expression. May be modern as situated approximately 50 m south of a charted cable however this cannot be confirmed without further inspection.	-	GEOxyz 2023	U36	-





ID	Classification	Easting	Northing	Archaeological discrimination	Length (m)	Width (m)	Height (m)	Magnetic amplitude (nT)	Anomaly geometry	SSS	MBES	Mag.	Interpretation	Associated anomalies	Dataset	Section	External references
7031	Magnetic	398019	5660873	A2_h	-	-	-	222	Point	-	-	A large, sharp asymmetric dipole with peak and trough on one profile line.	Possible ferrous debris either buried or with no surface expression.	-	GEOxyz 2023	U36	-
7032	Magnetic	394937	5664191	A2_l	-	-	-	31	Point	-	-	A small negative monopole with peak and trough on one profile line.	Possible ferrous debris either buried or with no surface expression.	-	GEOxyz 2023	U34	-
7033	Magnetic	394539	5664287	A2_l	-	-	-	88	Point	-	-	A medium negative monopole with peak and trough on one profile line.	Possible ferrous debris either buried or with no surface expression.	-	GEOxyz 2023	U34	-
7034	Magnetic	394504	5664116	A2_l	-	-	-	70	Point	-	-	A medium negative monopole with peak and trough on one profile line.	Possible ferrous debris either buried or with no surface expression.	-	GEOxyz 2023	U34	-
7035	Magnetic	393812	5664635	A2_h	-	-	-	254	Point	-	-	A large asymmetric dipole with peak and trough on one profile line.	Possible ferrous debris either buried or with no surface expression.	-	GEOxyz 2023	U34	-
7036	Magnetic	392065	5664673	A2_l	-	-	-	28	Point	-	-	A small positive monopole with peak and trough on one profile line.	Possible ferrous debris either buried or with no surface expression.	-	GEOxyz 2023	U34	-
7037	Magnetic	391068	5664697	A2_l	-	-	-	50	Point	-	-	A medium asymmetric dipole with peak and trough on one profile line.	Possible ferrous debris either buried or with no surface expression.	-	GEOxyz 2023	U34	-
7038	Magnetic	390512	5664513	A2_l	-	-	-	99	Point	-	-	A medium asymmetric dipole with peak and trough on one profile line.	Possible ferrous debris either buried or with no surface expression.	-	GEOxyz 2023	U34	-
7039	Magnetic	390331	5664683	A2_h	-	-	-	292	Point	-	-	A large, sharp asymmetric dipole with peak and trough on one profile line.	Possible ferrous debris either buried or with no surface expression.	-	GEOxyz 2023	U34	-
7040	Magnetic	390247	5664851	A2_h	-	-	-	174	Point	-	-	A large, sharp asymmetric dipole with peak and trough on one profile line.	Possible ferrous debris either buried or with no surface expression.	-	GEOxyz 2023	U34	-
7041	Magnetic	389574	5664603	A2_l	-	-	-	25	Point	-	-	A small positive monopole with peak and trough on one profile line.	Possible ferrous debris either buried or with no surface expression.	-	GEOxyz 2023	U34	-





ID	Classification	Easting	Northing	Archaeological discrimination	Length (m)	Width (m)	Height (m)	Magnetic amplitude (nT)	Anomaly geometry	SSS	MBES	Mag.	Interpretation	Associated anomalies	Dataset	Section	External references
7042	Dark reflector	389257	5664761	A2_I	5.4	1.5	-	-	Point	An elongate, right-angled dark reflector with a shadow.	-	-	Possible natural feature or possible debris.	-	GEOxyz 2023 SSS mosaic	U34	-
7043	Magnetic	385997	5663809	A2_I	-	-	-	43	Point	-	-	A small negative monopole with peak and trough on one profile line.	Possible ferrous debris either buried or with no surface expression.	-	GEOxyz 2023	U34	-
7044	Magnetic	383376	5663750	A2_I	-	-	-	30	Point	-	-	A small, broad asymmetric dipole with peak and trough on one profile line.	Possible ferrous debris either buried or with no surface expression.	-	GEOxyz 2023	U34	-
7045	Magnetic	382315	5663756	A2_I	-	-	-	97	Point	-	-	A medium positive monopole with peak and trough on one profile line.	Possible ferrous debris either buried or with no surface expression.	-	GEOxyz 2023	U33	-
7046	Magnetic	382271	5663750	A2_I	-	-	-	46	Point	-	-	A small positive monopole with peak and trough on one profile line.	Possible ferrous debris either buried or with no surface expression.	-	GEOxyz 2023	U33	-
7047	Magnetic	382264	5663926	A2_I	-	-	-	57	Point	-	-	A medium positive monopole with peak and trough on one profile line.	Possible ferrous debris either buried or with no surface expression.	-	GEOxyz 2023	U33	-
7048	Magnetic	381959	5663707	A2_I	-	-	-	59	Point	-	-	A medium asymmetric dipole with peak and trough on one profile line.	Possible ferrous debris either buried or with no surface expression.	-	GEOxyz 2023	U33	-
7049	Magnetic	381868	5663871	A2_I	-	-	-	23	Point	-	-	A small, broad asymmetric dipole with peak and trough on one profile line.	Possible ferrous debris either buried or with no surface expression.	-	GEOxyz 2023	U33	-
7050	Magnetic	381352	5663614	A2_I	-	-	-	90	Point	-	-	A medium positive monopole with peak and trough on one profile line.	Possible ferrous debris either buried or with no surface expression.	-	GEOxyz 2023	U33	-
7051	Magnetic	381270	5663601	A2_I	-	-	-	70	Point	-	-	A medium positive monopole with peak and trough on one profile line.	Possible ferrous debris either buried or with no surface expression.	-	GEOxyz 2023	U33	-
7052	Magnetic	380997	5663555	A2_I	-	-	-	34	Point	-	-	A small, broad positive monopole with peak and trough on one profile line.	Possible ferrous debris either buried or with no surface expression.	-	GEOxyz 2023	U33	-
7053	Magnetic	380729	5663511	A2_I	-	-	-	46	Point	-	-	A small positive monopole with peak and trough on one profile line.	Possible ferrous debris either buried or with no surface expression.	-	GEOxyz 2023	U33	-



ID	Classification	Easting	Northing	Archaeological discrimination	Length (m)	Width (m)	Height (m)	Magnetic amplitude (nT)	Anomaly geometry	SSS	MBES	Mag.	Interpretation	Associated anomalies	Dataset	Section	External references
7054	Magnetic	380417	5663459	A2_I	-	-	-	153	Point	-	-	A large positive monopole with peak and trough on one profile line.	Possible ferrous debris either buried or with no surface expression.	-	GEOxyz 2023	U33	-
7055	Magnetic	380406	5663819	A2_I	-	-	-	54	Point	-	-	A medium asymmetric dipole with peak and trough on one profile line.	Possible ferrous debris either buried or with no surface expression.	-	GEOxyz 2023	U33	-
7056	Magnetic	380393	5663635	A2_I	-	-	-	96	Point	-	-	A medium positive monopole with peak and trough on one profile line.	Possible ferrous debris either buried or with no surface expression.	-	GEOxyz 2023	U33	-
7057	Magnetic	379297	5663456	A2_I	-	-	-	248	Point	-	-	A large, sharp positive monopole with peak and trough on one profile line.	Possible ferrous debris either buried or with no surface expression.	-	GEOxyz 2023	U33	-
7058	Magnetic	379271	5663634	A2_I	-	-	-	181	Point	-	-	A large, sharp asymmetric dipole with peak and trough on one profile line.	Possible ferrous debris either buried or with no surface expression.	-	GEOxyz 2023	U33	-
7059	Magnetic	379223	5663263	A2_I	-	-	-	265	Point	-	-	A large, sharp positive monopole with peak and trough on one profile line.	Possible ferrous debris either buried or with no surface expression.	-	GEOxyz 2023	U33	-
7060	Dark reflector	379222	5663329	A2_I	12.2	1.9	0.2	-	Area	An elongate dark reflector with a shadow.	An elongate low-lying mound with uneven peak.	-	Possible natural feature or possible debris.	-	GEOxyz 2023 SSS mosaic	U33	-
7061	Magnetic	378817	5663378	A2_I	-	-	-	61	Point	-	-	A medium positive monopole with peak and trough on one profile line.	Possible ferrous debris either buried or with no surface expression.	-	GEOxyz 2023	U33	-
7062	Magnetic	378770	5663551	A2_I	-	-	-	65	Point	-	-	A medium asymmetric dipole with peak and trough on one profile line.	Possible ferrous debris either buried or with no surface expression.	-	GEOxyz 2023	U33	-
7063	Magnetic	378143	5663084	A2_I	-	-	-	115	Point	-	-	A large positive monopole with peak and trough on one profile line.	Possible ferrous debris either buried or with no surface expression.	-	GEOxyz 2023	U33	-
7064	Magnetic	378138	5663265	A2_I	-	-	-	34	Point	-	-	A small asymmetric dipole with peak and trough on one profile line.	Possible ferrous debris either buried or with no surface expression.	-	GEOxyz 2023	U33	-
7065	Dark reflector	377899	5663179	A2_I	8.0	1.5	-	-	Point	An elongate dark reflector with a shadow.	-	-	Possible natural feature or possible debris.	-	GEOxyz 2023 SSS mosaic	U33	-



ID	Classification	Easting	Northing	Archaeological discrimination	Length (m)	Width (m)	Height (m)	Magnetic amplitude (nT)	Anomaly geometry	SSS	MBES	Mag.	Interpretation	Associated anomalies	Dataset	Section	External references
7066	Magnetic	377782	5663028	A2_l	-	-	-	37	Point	-	-	A small positive monopole with peak and trough on one profile line.	Possible ferrous debris either buried or with no surface expression.	-	GEOxyz 2023	U33	-
7067	Magnetic	377526	5663347	A2_l	-	-	-	49	Point	-	-	A small positive monopole with peak and trough on one profile line.	Possible ferrous debris either buried or with no surface expression.	-	GEOxyz 2023	U33	-
7068	Magnetic	376811	5662870	A2_l	-	-	-	75	Point	-	-	A medium asymmetric dipole with peak and trough on one profile line. There is a slight inflection between the peak and trough.	Possible ferrous debris either buried or with no surface expression.	-	GEOxyz 2023	U33	-
7069	Dark reflector	376773	5662910	A2_l	6.8	1.0	-	-	Point	An elongate dark reflector with a shadow, with a possible further curved section on the western edge measuring 5 m but unclear in data.	-	-	Possible natural feature or possible debris.	-	GEOxyz 2023 SSS mosaic	U33	-
7070	Dark reflector	376343	5662896	A2_l	6.0	2.0	-	-	Point	An elongate, slightly curved dark reflector with no shadow.	-	-	Possible natural feature or possible debris.	-	GEOxyz 2023 SSS mosaic	U33	-
7071	Seabed disturbance	376228	5662716	A2_l	9.4	8.0	-	-	Area	An indistinct seabed disturbance comprising two elongate dark reflectors with shadows within scour, with a few smaller dark reflectors at the north-west edge.	-	-	Possible natural feature or may be possible partially buried debris.	-	GEOxyz 2023 SSS mosaic	U33	-
7072	Linear debris	375290	5662844	A2_h	27.6	1.0	0.1	-	Linear	An elongate dark reflector with shadow orientated north-west to south-east.	An elongate, low-lying mound with gently sloping sides and uneven peak.	-	Linear debris such as a length of rope or chain.	-	GEOxyz 2023 SSS mosaic	U33	-
7073	Magnetic	374690	5662878	A2_l	-	-	-	30	Point	-	-	A small, broad asymmetric dipole with peak and trough on one profile line.	Possible ferrous debris either buried or with no surface expression.	-	GEOxyz 2023	U33	-



ID	Classification	Easting	Northing	Archaeological discrimination	Length (m)	Width (m)	Height (m)	Magnetic amplitude (nT)	Anomaly geometry	SSS	MBES	Mag.	Interpretation	Associated anomalies	Dataset	Section	External references
7074	Magnetic	374675	5662684	A2_l	-	-	-	56	Point	-	-	A medium asymmetric dipole with peak and trough on one profile line.	Possible ferrous debris either buried or with no surface expression.	-	GEOxyz 2023	U33	-
7075	Magnetic	372578	5661770	A2_l	-	-	-	20	Point	-	-	A small, broad asymmetric dipole with peak and trough on one profile line.	Possible ferrous debris either buried or with no surface expression.	-	GEOxyz 2023	U32	-
7076	Magnetic	372540	5661951	A2_l	-	-	-	63	Point	-	-	A medium asymmetric dipole with peak and trough on one profile line.	Possible ferrous debris either buried or with no surface expression.	-	GEOxyz 2023	U32	-
7077	Magnetic	371003	5661023	A2_l	-	-	-	28	Point	-	-	A small, broad asymmetric dipole with peak and trough on one profile line.	Possible ferrous debris either buried or with no surface expression. May be uncharted cable.	7078	GEOxyz 2023	U32	-
7078	Magnetic	370947	5661190	A2_l	-	-	-	21	Point	-	-	A small, broad asymmetric dipole with peak and trough on one profile line.	Possible ferrous debris either buried or with no surface expression. May be uncharted cable.	7077	GEOxyz 2023	U32	-
7079	Magnetic trend	370773	5661128	A2_h	335.5	-	-	184	Linear	-	-	A large asymmetric dipole with peak and trough on one profile line. Visible on three lines as a magnetic trend-oriented NNW to SSE. The largest amplitude is 184 nT and the smallest is 89 nT.	Possible ferrous debris either buried or with no surface expression. May be uncharted cable but this cannot be confirmed without further inspection.	-	GEOxyz 2023	U32	-
7080	Magnetic	361651	5657877	A2_l	-	-	-	20	Point	-	-	A small negative monopole with peak and trough on one profile line.	Possible ferrous debris either buried or with no surface expression.	-	GEOxyz 2023	U31	-
7081	Magnetic	346351	5652696	A2_l	-	-	-	63	Point	-	-	A medium negative monopole with peak and trough on one profile line.	Possible ferrous debris either buried or with no surface expression.	-	GEOxyz 2023	U29	-



ID	Classification	Easting	Northing	Archaeological discrimination	Length (m)	Width (m)	Height (m)	Magnetic amplitude (nT)	Anomaly geometry	SSS	MBES	Mag.	Interpretation	Associated anomalies	Dataset	Section	External references
7082	Recorded obstruction	344841	5650230	U3	-	-	-	-	Point	-	-	-	Position of UKHO record for foul ground, Fisherman's Fastener first reported in 1977. Not located and amended to dead in 2002. No anomalous features were identified in 2023 geophysical datasets. This record has been retained as a precaution in this gazetteer.	-	-	U29	UKHO 17275
7083	Magnetic	343332	5648778	A2_I	-	-	-	48	Point	-	-	A small asymmetric dipole with peak and trough on one profile line.	Possible ferrous debris either buried or with no surface expression.	7084	GEOxyz 2023	U29	-
7084	Magnetic	343322	5648766	A2_I	-	-	-	33	Point	-	-	A small, broad positive monopole with peak and trough on one profile line.	Possible ferrous debris either buried or with no surface expression.	7083	GEOxyz 2023	U29	-
7085	Dark reflector	342901	5648596	A2_I	5.1	4.8	1.1	-	Point	A distinct, elongate dark reflector with a bright shadow, within an area of scour.	A distinct, slightly rounded mound with a rounded peak and shallow scour on the eastern side.	-	Possible natural feature or possible debris.	-	GEOxyz 2023 SSS mosaic	U29	-
7086	Dark reflector	339844	5644824	A2_I	8.6	8.5	0.2	-	Point	An indistinct, sub-angular dark reflector with a bright shadow, varying reflectivity and may be multiple objects close together	A distinct 'V' shaped mound with a flat peak surrounded by scour.	-	Possible natural feature or possible debris.	-	GEOxyz 2023 SSS mosaic	U29	-
7087	Dark reflector	339083	5643190	A2_I	5.0	4.5	-	-	Point	A sub-angular dark reflector with a slight shadow.	-	-	Possible natural feature or possible debris.	-	GEOxyz 2023 SSS mosaic	U29	-
7088	Magnetic	338297	5642626	A2_I	-	-	-	58	Point	-	-	A medium positive monopole with peak and trough on one profile line.	Possible ferrous debris either buried or with no surface expression.	-	GEOxyz 2023	U28	-
7089	Magnetic	335179	5638567	A2_I	-	-	-	29	Point	-	-	A small asymmetric dipole with peak and trough on one profile line.	Possible ferrous debris either buried or with no surface expression.	-	GEOxyz 2023	U28	-



ID	Classification	Easting	Northing	Archaeological discrimination	Length (m)	Width (m)	Height (m)	Magnetic amplitude (nT)	Anomaly geometry	SSS	MBES	Mag.	Interpretation	Associated anomalies	Dataset	Section	External references
7090	Mound	334361	5638115	A2_I	5.5	3.0	0.6	-	Point	-	A distinct, slightly angular mound tallest at the eastern end within slight scour.	-	Possible natural feature or possible debris.	-	GEOxyz 2023	U28	-
7091	Magnetic	331832	5634799	A2_I	-	-	-	25	Point	-	-	A small asymmetric dipole with peak and trough on one profile line.	Possible ferrous debris either buried or with no surface expression.	-	GEOxyz 2023	U27	-
7092	Magnetic	330928	5633659	A2_I	-	-	-	25	Point	-	-	A small symmetric dipole with peak and trough on one profile line.	Possible ferrous debris either buried or with no surface expression.	-	GEOxyz 2023	U27	-
7093	Dark reflector	328367	5630435	A2_I	5.0	1.5	-	-	Point	-	A distinct, elongate dark reflector with a bright shadow within an area of scour.	-	Possible natural feature or possible debris.	-	GEOxyz 2023 SSS mosaic	U27	-
7094	Magnetic	326937	5629070	A2_I	-	-	-	29	Point	-	-	A small asymmetric dipole with peak and trough on one profile line.	Possible ferrous debris either buried or with no surface expression.	-	GEOxyz 2023	U27	-
7095	Magnetic	324622	5625719	A2_I	-	-	-	31	Point	-	-	A small asymmetric dipole with peak and trough on one profile line.	Possible ferrous debris either buried or with no surface expression.	-	GEOxyz 2023	U26	-
7096	Magnetic	324261	5625814	A2_I	-	-	-	33	Point	-	-	A small asymmetric dipole with peak and trough on one profile line.	Possible ferrous debris either buried or with no surface expression.	-	GEOxyz 2023	U26	-
7097	Dark reflector	322927	5623548	A2_I	9.7	4.0	-	-	Point	-	An angular dark reflector with no clear shadow.	-	Possible natural feature or possible debris.	-	GEOxyz 2023 SSS mosaic	U26	-
7098	Magnetic	322817	5623836	A2_I	-	-	-	86	Point	-	-	A medium, sharp asymmetric dipole with peak and trough on one profile line.	Possible ferrous debris either buried or with no surface expression.	-	GEOxyz 2023	U26	-
7099	Dark reflector	322815	5624182	A2_I	33.7	0.7	-	-	Linear	-	A linear dark reflector with scour, orientated north-east to south-west, more distinct at north-east end.	-	Interpreted as possible natural feature or may be linear debris such as a length of rope or chain.	-	GEOxyz 2023 SSS mosaic	U26	-





ID	Classification	Easting	Northing	Archaeological discrimination	Length (m)	Width (m)	Height (m)	Magnetic amplitude (nT)	Anomaly geometry	SSS	MBES	Mag.	Interpretation	Associated anomalies	Dataset	Section	External references
7100	Magnetic	322778	5623788	A2_l	-	-	-	29	Point	-	-	A small asymmetric dipole with peak and trough on one profile line.	Possible ferrous debris either buried or with no surface expression.	-	GEOxyz 2023	U26	-
7101	Dark reflector	322062	5622585	A2_l	5.0	4.0	-	-	Point	An angular dark reflector with no clear shadow in a slight depression.	-	-	Possible natural feature or possible debris.	-	GEOxyz 2023 SSS mosaic	U26	-
7102	Debris	319521	5620040	A2_h	5.3	2.5	0.9	-	Point	-	A distinct mound with steep sides and a double peak.	-	Debris.	-	GEOxyz 2023	U26	-
7103	Magnetic	318952	5619524	A2_l	-	-	-	24	Point	-	-	A small negative monopole with peak and trough on one profile line. Also visible on adjacent line.	Possible ferrous debris either buried or with no surface expression.	-	GEOxyz 2023	U25	-
7104	Recorded obstruction	317296	5618789	U3	-	-	-	-	Point	-	-	-	Position of a UKHO record for foul ground, two Fisherman's Fasteners first reported in 1977. Not located and amended to dead in 2002. No anomalous features were identified in 2023 geophysical datasets. This record has been retained as a precaution in this gazetteer.	-	-	U25	UKHO 16967
7105	Dark reflector	315904	5617931	A2_l	6.0	5.0	-	-	Point	An indistinct, irregular dark reflector with no shadow.	-	-	Possible natural feature or possible debris.	-	GEOxyz 2023 SSS mosaic	U25	-
7106	Magnetic	315380	5617930	A2_l	-	-	-	25	Point	-	-	A small asymmetric dipole with peak and trough on one profile line.	Possible ferrous debris either buried or with no surface expression.	-	GEOxyz 2023	U25	-
7107	Magnetic	311618	5615661	A2_l	-	-	-	55	Point	-	-	A medium, broad asymmetric dipole with peak and trough on one profile line.	Possible ferrous debris either buried or with no surface expression.	-	GEOxyz 2023	U25	-
7108	Magnetic	310011	5615908	A2_l	-	-	-	76	Point	-	-	A medium, sharp asymmetric dipole with peak and trough on one profile line.	Possible ferrous debris either buried or with no surface expression.	-	GEOxyz 2023	U25	-



ID	Classification	Easting	Northing	Archaeological discrimination	Length (m)	Width (m)	Height (m)	Magnetic amplitude (nT)	Anomaly geometry	SSS	MBES	Mag.	Interpretation	Associated anomalies	Dataset	Section	External references
7109	Dark reflector	309609	5615463	A2_l	7.6	1.0	-	-	Point	A distinct, elongate dark reflector within an area of scour.	-	-	Possible natural feature or possible debris.	-	GEOxyz 2023 SSS mosaic	U24	-
7110	Magnetic	309331	5615710	A2_l	-	-	-	36	Point	-	-	A small asymmetric dipole with peak and trough on one profile line.	Possible ferrous debris either buried or with no surface expression.	-	GEOxyz 2023	U24	-
7111	Dark reflector	308372	5614480	A2_l	5.0	1.0	-	-	Point	An indistinct, elongate dark reflector with a slight shadow.	-	-	Possible natural feature or possible debris.	-	GEOxyz 2023 SSS mosaic	U24	-
7112	Magnetic	307358	5614331	A2_h	-	-	-	100	Point	-	-	A large, sharp symmetric dipole with peak and trough on one profile line.	Possible ferrous debris either buried or with no surface expression.	-	GEOxyz 2023	U24	-
7113	Magnetic trend	306076	5613571	A2_h	366.1	-	-	144	Linear	-	-	A large, sharp asymmetric dipole with peak and trough on one profile line. Visible on four lines as a magnetic trend oriented north-west to south-east. The largest amplitude is 144 nT and the smallest is 55 nT.	Possible ferrous debris either buried or with no surface expression. May be uncharted cable but this cannot be confirmed without further inspection.	-	GEOxyz 2023	U24	-
7114	Recorded obstruction	305510	5613432	U3	-	-	-	-	Point	-	-	-	Position of a UKHO record for foul ground, Fisherman's Fastener first reported in 1977. Not located and amended to dead in 2002. No anomalous features were identified in 2023 geophysical datasets. This record has been retained as a precaution in this gazetteer.	-	-	U24	UKHO 16874
7115	Magnetic	300496	5611081	A2_l	-	-	-	20	Point	-	-	A small asymmetric dipole with peak and trough on one profile line.	Possible ferrous debris either buried or with no surface expression.	-	GEOxyz 2023	U23	-
7116	Mound	297183	5609601	A2_l	5.0	4.5	0.3	-	Point	-	A distinct mound with gently sloping sides and rounded peak.	-	Possible natural feature or possible debris.	-	GEOxyz 2023	U23	-





ID	Classification	Easting	Northing	Archaeological discrimination	Length (m)	Width (m)	Height (m)	Magnetic amplitude (nT)	Anomaly geometry	SSS	MBES	Mag.	Interpretation	Associated anomalies	Dataset	Section	External references
7117	Magnetic	293256	5607740	A2_I	-	-	-	27	Point	-	-	A small positive monopole with peak and trough on one profile line.	Possible ferrous debris either buried or with no surface expression.	-	GEOxyz 2023	U23	-
7118	Magnetic	291560	5607285	A2_I	-	-	-	38	Point	-	-	A small negative monopole with peak and trough on one profile line.	Possible ferrous debris either buried or with no surface expression.	-	GEOxyz 2023	U23	-
7119	Magnetic	290573	5606845	A2_I	-	-	-	99	Point	-	-	A medium, sharp symmetric dipole with peak and trough on one profile line.	Possible ferrous debris either buried or with no surface expression.	-	GEOxyz 2023	U23	-
7120	Magnetic	288490	5605913	A2_I	-	-	-	25	Point	-	-	A small asymmetric dipole with peak and trough on one profile line.	Possible ferrous debris either buried or with no surface expression.	-	GEOxyz 2023	U23	-

1. Co-ordinates are in WGS84 UTM30N
2. Positional accuracy estimated  $\pm 10$  m



Appendix II Seabed features of archaeological potential (UTM29N area)

ID	Classification	Easting	Northing	Archaeological discrimination	Length (m)	Width (m)	Height (m)	Magnetic amplitude (nT)	Anomaly geometry	SSS	MBES	Mag.	Interpretation	Associated anomalies	Dataset	Section	External references
7121	Mound	711562	5604984	A2_I	5.2	5.1	0.4	-	Point	-		-	A sub-angular mound with steep sides and a rounded peak	-	GEOxyz 2023	U22	-
7122	Dark reflector	711467	5604849	A2_I	16.5	0.5	-	-	Linear	Indistinct elongate dark reflector with no clear shadow	-	-	Possible natural feature or possible debris.	-	GEOxyz 2023 SSS mosaic	U22	-
7123	Magnetic	711142	5604753	A2_I	-	-	-	75	Point	-	-	A medium, sharp positive monopole with peak and trough on one profile line.	Possible ferrous debris either buried or with no surface expression.	-	GEOxyz 2023	U22	-
7124	Dark reflector	710078	5604227	A2_I	63.7	1.0	-	-	Linear	A long and thin curvilinear dark reflector with no clear shadow.	-	-	Interpreted as possible natural feature or may be linear debris such as a length of rope or chain.	-	GEOxyz 2023 SSS mosaic	U22	-
7125	Magnetic	709525	5603865	A2_I	-	-	-	60	Point	-	-	A medium negative monopole with peak and trough on one profile line.	Possible ferrous debris either buried or with no surface expression.	-	GEOxyz 2023	U22	-
7126	Recorded obstruction	709711	5603628	U3	-	-	-	-	Point	-	-	-	Position of a UKHO record for foul ground, Fisherman's Fastener first reported in 1977. Not located, disproved and described as rocky outcrop in 2002. No anomalous features were identified in 2023 geophysical datasets. This record has been retained as a precaution in this gazetteer.	-	-	U22	UKHO 16050
7127	Dark reflector	703448	5600044	A2_I	160.5	1.0	-	-	Linear	A thin, indistinct and intermittent linear dark reflector may have a shadow but unclear orientated north-east to south-west.	-	-	Interpreted as possible natural feature or may be linear debris such as a length of rope or chain.	-	GEOxyz 2023 SSS mosaic	U22	-
7128	Magnetic	699557	5598015	A2_I	-	-	-	90	Point	-	-	A medium, sharp positive monopole with peak and trough on one profile line.	Possible ferrous debris either buried or with no surface expression.	-	GEOxyz 2023	U22	-



ID	Classification	Easting	Northing	Archaeological discrimination	Length (m)	Width (m)	Height (m)	Magnetic amplitude (nT)	Anomaly geometry	SSS	MBES	Mag.	Interpretation	Associated anomalies	Dataset	Section	External references
7129	Linear debris	691761	5594217	A2_h	46.5	1.0	-	-	Linear	A thin, indistinct and slightly intermittent linear dark reflector with a shadow and/or surrounding scour.	-	-	Linear debris such as a length of rope or chain.	-	GEOxyz 2023 SSS mosaic	U21	-
7130	Dark reflector	691691	5594178	A2_l	9.8	0.7	-	-	Point	An elongate dark reflector with no shadow.	-	-	Possible natural feature or possible debris.	-	GEOxyz 2023 SSS mosaic	U21	-
7131	Seabed disturbance	691158	5594174	A2_l	16.5	11.4	-	-	Area	A compact group of very small sub-angular dark reflectors, some with shadows, all <1 m in size.	-	-	Possible natural feature or may be possible partially buried debris.	-	GEOxyz 2023 SSS mosaic	U21	-
7132	Magnetic	692168	5594160	A2_l	-	-	-	49	Point	-	-	A small negative monopole with peak and trough on one profile line.	Possible ferrous debris either buried or with no surface expression.	-	GEOxyz 2023	U21	-
7133	Linear debris	691581	5593442	A2_l	56.3	0.5	-	-	Linear	A thin, indistinct and slightly intermittent linear dark reflector within scour orientated ENE to WSW. There is a very small dark reflector with shadow at the ENE end measuring 0.5 x 0.5 m.	-	-	Possible modern feature such as fishing gear and therefore may not be of archaeological interest. However, as this cannot be confirmed without further investigation, the feature has been retained as a precaution.	-	GEOxyz 2023 SSS mosaic	U21	-
7134	Dark reflector	689910	5592798	A2_l	6.0	3.0	-	-	Point	A hollow dark reflector.	-	-	Possible natural feature or possible debris.	-	GEOxyz 2023 SSS mosaic	U20	-
7135	Magnetic	689395	5592241	A2_l	-	-	-	29	Point	-	-	A small positive monopole with peak and trough on one profile line.	Possible ferrous debris either buried or with no surface expression.	-	GEOxyz 2023	U20	-
7136	Dark reflector	687971	5592564	A2_l	5.4	1.2	-	-	Point	An elongate dark reflector with a slightly uneven shadow.	-	-	Possible natural feature or possible debris.	-	GEOxyz 2023 SSS mosaic	U20	-
7137	Dark reflector	688094	5592226	A2_l	7.8	3.2	-	-	Point	A distinct, angular dark reflector with a shadow.	-	-	Possible natural feature or possible debris.	-	GEOxyz 2023 SSS mosaic	U20	-
7138	Magnetic	685452	5590667	A2_l	-	-	-	35	Point	-	-	A small negative monopole with peak and trough on one profile line.	Possible ferrous debris either buried or with no surface expression.	-	GEOxyz 2023	U20	-



ID	Classification	Easting	Northing	Archaeological discrimination	Length (m)	Width (m)	Height (m)	Magnetic amplitude (nT)	Anomaly geometry	SSS	MBES	Mag.	Interpretation	Associated anomalies	Dataset	Section	External references
7139	Mound	681665	5588595	A2_I	6.4	4.9	0.3	-	Point	-		-	Possible natural feature or possible debris.	-	GEOxyz 2023	U20	-
7140	Dark reflector	679751	5587134	A2_I	5.0	3.5	0.9	-	Point	An angular dark reflector with shadow		-	Possible natural feature or possible debris.	-	GEOxyz 2023 SSS mosaic	U19B	-
7141	Seabed disturbance	678850	5586269	A2_I	14.4	13.6	0.3	-	Area		An area of slightly uneven seabed with low-lying mounds with uneven peaks within slight scour.	-	Possible natural feature or may be possible partially buried debris.	-	GEOxyz 2023	U19B	-
7142	Magnetic	674748	5583622	A2_I	-	-	-	23	Point			A small, broad positive monopole with peak and trough on one profile line.	Possible ferrous debris either buried or with no surface expression.	-	GEOxyz 2023	U19A	-
7143	Seabed disturbance	674899	5583426	A2_I	37.6	31.5	-	-	Area	A large spread of small angular and sub-angular dark reflectors, some with shadows within a natural depression. The largest object measures 5.7 x 1.1 m.		-	Possible natural feature or may be possible partially buried debris.	-	GEOxyz 2023 SSS mosaic	U19A	-
7144	Magnetic	670152	5579517	A2_I	-	-	-	45	Point			A small positive monopole with peak and trough on one profile line.	Possible ferrous debris either buried or with no surface expression.	-	GEOxyz 2023	U18	-
7145	Magnetic	669831	5579246	A2_I	-	-	-	25	Point			A small negative monopole with peak and trough on one profile line.	Possible ferrous debris either buried or with no surface expression.	-	GEOxyz 2023	U18	-
7146	Magnetic	665655	5576075	A2_h	-	-	-	144	Point			A large, sharp positive monopole with peak and trough on one profile line.	Possible ferrous debris either buried or with no surface expression.	-	GEOxyz 2023	U17	-
7147	Magnetic	664931	5575599	A2_I	-	-	-	69	Point			A medium, sharp asymmetric dipole with peak and trough on one profile line.	Possible ferrous debris either buried or with no surface expression.	-	GEOxyz 2023	U17	-
7148	Magnetic	664792	5575006	A2_I	-	-	-	20	Point			A small asymmetric dipole with peak and trough on one profile line.	Possible ferrous debris either buried or with no surface expression.	-	GEOxyz 2023	U17	-
7149	Magnetic	664551	5575037	A2_I	-	-	-	22	Point			A small, broad asymmetric dipole with peak and trough over two profile lines.	Possible ferrous debris either buried or with no surface expression.	-	GEOxyz 2023	U17	-



ID	Classification	Easting	Northing	Archaeological discrimination	Length (m)	Width (m)	Height (m)	Magnetic amplitude (nT)	Anomaly geometry	SSS	MBES	Mag.	Interpretation	Associated anomalies	Dataset	Section	External references
7150	Mound	659626	5570662	A2_I	5.0	3.5	0.3	-	Point	-	An elongate mound with steep sides and uneven peak.	-	Possible natural feature or possible debris.	-	GEOxyz 2023	U17	-
7151	Seabed disturbance	658016	5569408	A2_I	29.2	5.7	-	-	Area	An area of seabed disturbance visible as an irregular bright reflector, possibly scour within mega ripples but unclear.	-	-	Possible natural feature or may be possible partially buried debris.	-	GEOxyz 2023 SSS mosaic	U16	-
7152	Magnetic	657809	5569367	A2_I	-	-	-	37	Point	-	-	A small asymmetric dipole with peak and trough on one profile line.	Possible ferrous debris either buried or with no surface expression.	-	GEOxyz 2023	U16	-
7153	Seabed disturbance	657659	5568114	A2_I	16.8	12.6	0.4	-	Area	A square bright reflector	A large, angular mound with steep sides and uneven peak	-	Possible natural feature or possible debris.	-	GEOxyz 2023 SSS mosaic	U16	-
7154	Seabed disturbance	654115	5559425	A2_I	15.2	7.4	0.6	-	Area	A group of angular dark reflectors with shadows within an area of scour and mega ripples. The largest object measures 8.5 x 2 m.	An angular mound with steep sides and a pointed peak	-	Possible natural feature or may be possible partially buried debris.	-	GEOxyz 2023 SSS mosaic	U15	-
7155	Seabed disturbance	654150	5559342	A2_I	11	10.8	0.5	-	Area	An uneven area of seabed with indistinct elongate dark reflectors around the outer edges	A large, angular mound with steep sides and flat peak	-	Possible natural feature or may be possible partially buried debris.	-	GEOxyz 2023 SSS mosaic	U15	-
7156	Mound	653822	5557956	A2_I	5.1	3.5	0.7	-	Point	An angular dark reflector with shadow	A distinct diamond-shaped mound with a slight pointed peak and gently sloping sides.	-	Possible natural feature or possible debris.	-	GEOxyz 2023 SSS mosaic	U15	-
7157	Magnetic	648684	5544638	A2_I	-	-	-	21	Point	-	-	A small asymmetric dipole with peak and trough on one profile line.	Possible ferrous debris either buried or with no surface expression.	-	GEOxyz 2023	U14	-
7158	Magnetic	647388	5541677	A2_I	-	-	-	23	Point	-	-	A small asymmetric dipole with peak and trough on one profile line.	Possible ferrous debris either buried or with no surface expression.	-	GEOxyz 2023	U13	-
7159	Magnetic	644739	5531709	A2_I	-	-	-	39	Point	-	-	A small positive monopole with peak and trough on one profile line.	Possible ferrous debris either buried or with no surface expression.	-	GEOxyz 2023	U12	-



ID	Classification	Easting	Northing	Archaeological discrimination	Length (m)	Width (m)	Height (m)	Magnetic amplitude (nT)	Anomaly geometry	SSS	MBES	Mag.	Interpretation	Associated anomalies	Dataset	Section	External references
7160	Magnetic	644371	5529403	A2_l	-	-	-	24	Point	-	-	A small asymmetric dipole with peak and trough on one profile line.	Possible ferrous debris either buried or with no surface expression.	-	GEOxyz 2023	U12	-
7161	Magnetic	644090	5528065	A2_l	-	-	-	31	Point	-	-	A small asymmetric dipole with peak and trough on one profile line.	Possible ferrous debris either buried or with no surface expression.	-	GEOxyz 2023	U12	-
7162	Magnetic	644241	5527398	A2_l	-	-	-	37	Point	-	-	A small, sharp asymmetric dipole with peak and trough on one profile line.	Possible ferrous debris either buried or with no surface expression.	-	GEOxyz 2023	U12	-
7163	Magnetic	643699	5525138	A2_l	-	-	-	46	Point	-	-	A small, sharp asymmetric dipole with peak and trough on one profile line.	Possible ferrous debris either buried or with no surface expression.	-	GEOxyz 2023	U12	-
7164	Magnetic	644051	5525121	A2_l	-	-	-	22	Point	-	-	A small, broad asymmetric dipole with peak and trough on one profile line.	Possible ferrous debris either buried or with no surface expression.	-	GEOxyz 2023	U12	-
7165	Magnetic	642946	5520338	A2_l	-	-	-	41	Point	-	-	A small negative monopole with peak and trough on one profile line.	Possible ferrous debris either buried or with no surface expression.	-	GEOxyz 2023	U11	-
7166	Magnetic	642938	5520274	A2_h	-	-	-	150	Point	-	-	A large negative monopole with peak and trough on one profile line.	Possible ferrous debris either buried or with no surface expression.	-	GEOxyz 2023	U11	-
7167	Magnetic	643133	5519291	A2_l	-	-	-	27	Point	-	-	A small asymmetric dipole with peak and trough on one profile line.	Possible ferrous debris either buried or with no surface expression.	-	GEOxyz 2023	U11	-
7168	Magnetic	642505	5517559	A2_l	-	-	-	33	Point	-	-	A small, sharp asymmetric dipole with peak and trough on one profile line. Also visible on other profiles	Possible ferrous debris either buried or with no surface expression.	-	GEOxyz 2023	U11	-
7169	Magnetic	642335	5516466	A2_l	-	-	-	54	Point	-	-	A medium, sharp asymmetric dipole with peak and trough on one profile line. Also visible on other profiles	Possible ferrous debris either buried or with no surface expression.	-	GEOxyz 2023	U11	-
7170	Seabed disturbance	642589	5515446	A2_l	7.8	6.0	0.3	-	Area	-	A compact group of approximately four low-lying sub-angular mounds, the largest of which measures 2.8 x 2.5 m.	-	Possible natural feature or may be possible partially buried debris.	-	GEOxyz 2023	U11	-





ID	Classification	Easting	Northing	Archaeological discrimination	Length (m)	Width (m)	Height (m)	Magnetic amplitude (nT)	Anomaly geometry	SSS	MBES	Mag.	Interpretation	Associated anomalies	Dataset	Section	External references
7171	Magnetic	641183	5509211	A2_I	-	-	-	20	Point	-	-	A small negative monopole with peak and trough on one profile line.	Possible ferrous debris either buried or with no surface expression.	-	GEOxyz 2023	U10	-
7172	Magnetic	641484	5508807	A2_I	-	-	-	21	Point	-	-	A small negative monopole with peak and trough on one profile line.	Possible ferrous debris either buried or with no surface expression.	-	GEOxyz 2023	U10	-
7173	Magnetic	641137	5507693	A2_I	-	-	-	27	Point	-	-	A small positive monopole with peak and trough on one profile line.	Possible ferrous debris either buried or with no surface expression.	-	GEOxyz 2023	U10	-
7174	Magnetic	641282	5507539	A2_I	-	-	-	49	Point	-	-	A small, sharp asymmetric dipole with peak and trough on one profile line.	Possible ferrous debris either buried or with no surface expression.	-	GEOxyz 2023	U10	-
7175	Magnetic	640563	5503022	A2_h	-	-	-	134	Point	-	-	A large, sharp symmetric dipole with peak and trough on one profile line.	Possible ferrous debris either buried or with no surface expression.	-	GEOxyz 2023	U10	-
7176	Magnetic	639963	5500279	A2_I	-	-	-	48	Point	-	-	A small, sharp asymmetric dipole with peak and trough on one profile line.	Possible ferrous debris either buried or with no surface expression.	-	GEOxyz 2023	U10	-
7177	Dark reflector	639915	5498927	A2_I	7.7	1.6	-	-	Point	An elongate dark reflector within slight scour.	-	-	Possible natural feature or possible debris.	-	GEOxyz 2023 SSS mosaic	U09	-
7178	Seabed disturbance	640507	5497222	A2_I	86.5	12.5	-	78	Area	An elongate area of disturbed seabed comprising a cluster of dark reflectors.	-	A medium, sharp asymmetric dipole with peak and trough on one profile line.	Possible natural feature or may be possible partially buried ferrous debris.	-	GEOxyz 2023 SSS mosaic	U09	-
7179	Magnetic	640510	5497141	A2_I	-	-	-	49	Point	-	-	A small, sharp symmetric dipole with peak and trough on one profile line.	Possible ferrous debris either buried or with no surface expression.	-	GEOxyz 2023	U09	-
7180	Dark reflector	641189	5493109	A2_I	8.0	3.3	-	-	Point	A distinct, angular dark reflector with a short shadow.	-	-	Possible natural feature or possible debris.	-	GEOxyz 2023 SSS mosaic	U09	-
7181	Magnetic	641977	5489613	A2_I	-	-	-	25	Point	-	-	A small asymmetric dipole with peak and trough on one profile line.	Possible ferrous debris either buried or with no surface expression.	-	GEOxyz 2023	U08	-
7182	Magnetic	642201	5487552	A2_I	-	-	-	59	Point	-	-	A medium negative monopole with peak and trough on one profile line.	Possible ferrous debris either buried or with no surface expression.	-	GEOxyz 2023	U08	-



ID	Classification	Easting	Northing	Archaeological discrimination	Length (m)	Width (m)	Height (m)	Magnetic amplitude (nT)	Anomaly geometry	SSS	MBES	Mag.	Interpretation	Associated anomalies	Dataset	Section	External references
7183	Dark reflector	642661	5487454	A2_l	97.3	1.0	-	-	Linear	A thin, indistinct linear dark reflector with slight shadow orientated north-east to south-west	-	-	Interpreted as possible natural feature or may be linear debris such as a length of rope or chain.	-	GEOxyz 2023 SSS mosaic	U08	-
7184	Magnetic	642764	5486450	A2_l	-	-	-	43	Point	-	-	A small asymmetric dipole with peak and trough on one profile line.	Possible ferrous debris either buried or with no surface expression.	-	GEOxyz 2023	U08	-
7185	Seabed disturbance	642821	5485239	A2_l	20.6	19.8	0.4	-	Area	-	A rounded area of uneven seabed comprising small mounds and depressions.	-	Possible natural feature or may be possible partially buried debris.	-	GEOxyz 2023	U08	-
7186	Dark reflector	646206	5477726	A2_l	7.6	6.4	-	-	Point	A very distinct, angular dark reflector with a bright shadow within scour, possibly multiple objects.	-	-	Possible natural feature or possible debris.	-	GEOxyz 2023 SSS mosaic	U07	-
7187	Magnetic	648345	5473159	A2_h	-	-	-	108	Point	-	-	A large negative monopole with peak and trough on one profile line.	Possible ferrous debris either buried or with no surface expression.	-	GEOxyz 2023	U06	-
7188	Linear debris	651243	5467857	A2_h	68.4	0.7	-	-	Linear	A long, thin linear dark reflector with slight shadow orientated NNE to SSW.	-	-	Linear debris such as a length of rope or chain.	-	GEOxyz 2023 SSS mosaic	U06	-
7189	Linear debris	651193	5467257	A2_h	61.2	0.5	-	-	Linear	A long, thin linear dark reflector with slight shadow orientated north to south.	-	-	Linear debris such as a length of rope or chain.	-	GEOxyz 2023 SSS mosaic	U06	-
7190	Dark reflector	652146	5465092	A2_l	9.6	1.3	-	-	Point	A distinct, elongate dark reflector within scour.	-	-	Possible natural feature or possible debris.	-	GEOxyz 2023 SSS mosaic	U06	-
7191	Seabed disturbance	652861	5463886	A2_l	20.3	19.0	-	-	Area	A rounded area of disturbed seabed visible as dark and bright reflectors within scour.	-	-	Possible natural feature or may be possible partially buried debris.	-	GEOxyz 2023 SSS mosaic	U05	-
7192	Dark reflector	653449	5463203	A2_l	5.0	3.5	0.8	-	Point	A dark reflector with shadow	A distinct mound with a slightly rounded peak and gently sloping sides.	-	Possible natural feature or possible debris.	-	GEOxyz 2023 SSS mosaic	U05	-
7193	Dark reflector	656325	5457254	A2_l	7.3	7.2	-	-	Point	Large, distinct and isolated dark reflector with scour.	-	-	Possible natural feature or possible debris.	-	GEOxyz 2023 SSS mosaic	U05	-





ID	Classification	Easting	Northing	Archaeological discrimination	Length (m)	Width (m)	Height (m)	Magnetic amplitude (nT)	Anomaly geometry	SSS	MBES	Mag.	Interpretation	Associated anomalies	Dataset	Section	External references	
7194	Magnetic	656587	5456094	A2_l	-	-	-	21	Point	-	-	-	A small, broad positive monopole with peak and trough on one profile line.	Possible ferrous debris either buried or with no surface expression.	-	GEOxyz 2023	U05	-
7195	Debris field	657109	5455368	A2_h	43.4	30.8	0.5	-	Area	A group of at least four angular and rounded dark reflectors with varying shadows. Largest object measures 4.2 x 1.3 m.	A distinct raised area of seabed within mega ripples. The south-east end of the feature has a steep side, and the north-west edge is possibly buried in sand waves with indistinct small mounds.	-	Debris	-	GEOxyz 2023 SSS raw, SSS mosaic	U04	-	
7196	Magnetic	657296	5455055	A1	-	-	-	1840	Point	-	-	-	A very large, sharp asymmetric dipole with peak and trough over two profile lines.	Possible ferrous debris either buried or with no surface expression.	-	GEOxyz 2023	U04	-
7197	Linear debris	657205	5454740	A2_l	171.4	2.0	-	-	Linear	A long, thin and slightly curvilinear dark reflector with a slight shadow in places, orientated north-west to south-east. The is a possible object at the north-west end measuring 4.3 x 2 m.	-	-	Possible modern feature such as fishing gear and therefore may not be of archaeological interest. However, as this cannot be confirmed without further investigation, the feature has been retained as a precaution.	-	GEOxyz 2023 SSS mosaic	U04	-	
7198	Mound	660201	5449631	A2_l	6.9	4.0	0.2	-	Point	-	An angular mound with gently sloping sides and two peaks in a large depression.	-	Possible natural feature or possible debris.	-	GEOxyz 2023	U04	-	
7199	Mound	661418	5447035	A2_l	7.0	3.0	0.3	-	Point	-	An angular mound with steep sides and an uneven peak.	-	Possible natural feature or possible debris.	-	GEOxyz 2023	U03	-	
7200	Seabed disturbance	661897	5445682	A2_l	9.2	6.4	-	-	Area	An irregular area of seabed disturbance with indistinct dark and bright reflectors.	-	-	Possible natural feature or may be possible partially buried debris.	-	GEOxyz 2023 SSS mosaic	U03	-	
7201	Mound	662269	5445331	A2_l	7.0	3.4	0.3	-	Point	-	An elongate mound with steep sides and a double peak	-	Possible natural feature or possible debris.	-	GEOxyz 2023	U03	-	
7202	Dark reflector	663532	5442804	A2_l	5.0	3.0	0.3	-	Point	An angular dark reflector with shadow	An angular mound with steep sides and a double peak.	-	Possible natural feature or possible debris.	-	GEOxyz 2023 SSS mosaic	U03	-	



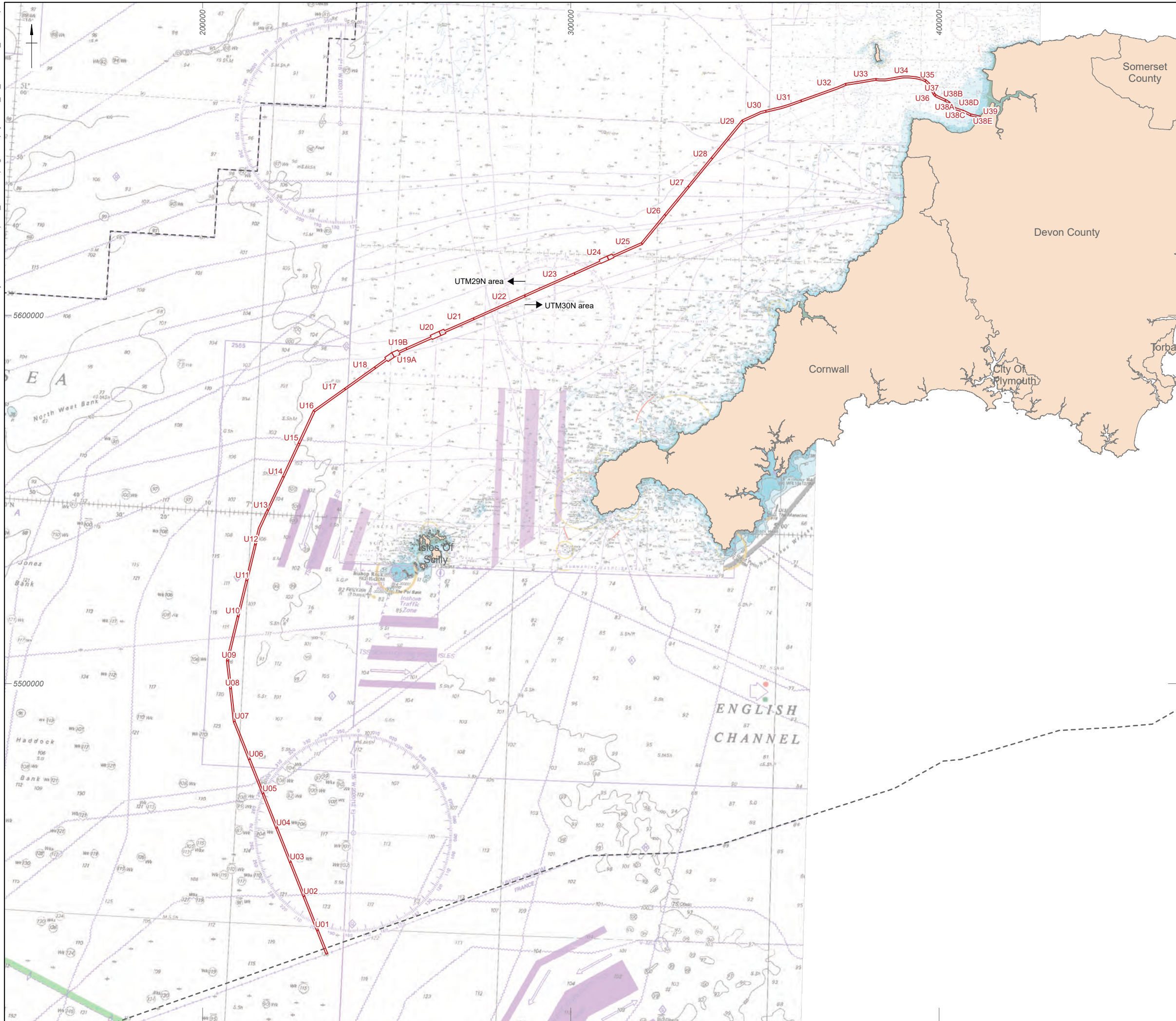
ID	Classification	Easting	Northing	Archaeological discrimination	Length (m)	Width (m)	Height (m)	Magnetic amplitude (nT)	Anomaly geometry	SSS	MBES	Mag.	Interpretation	Associated anomalies	Dataset	Section	External references
7203	Mound	664216	5441346	A2_I	7.5	3.0	0.3	-	Point	-		-	An elongate mound with steep sides and uneven peak.	-	GEOxyz 2023	U03	-
7204	Seabed disturbance	665464	5439058	A2_I	24.0	4	-	-	Area		An elongate group of dark reflectors with a shadow within scour.	-	Possible natural feature or may be possible partially buried debris.	-	GEOxyz 2023 SSS mosaic	U03	-
7205	Dark reflector	665385	5438877	A2_I	134.7	1.6	-	-	Linear		An elongate thin dark reflector on a north-east to south-west alignment with a shadow within sand waves.	-	Linear debris such as a length of rope or chain or modern cable or pipeline. Situated 400 m north of charted cable and may be related.	-	GEOxyz 2023 SSS mosaic	U03	-
7206	Magnetic	665956	5437513	A2_I	-	-	-	21	Point	-		-	A small, broad asymmetric dipole with peak and trough on one profile line.	-	GEOxyz 2023	U02	-
7207	Magnetic	666352	5437103	A2_h	-	-	-	142	Point	-		-	A large, sharp asymmetric dipole with peak and trough on one profile line. A slight inflection is visible between the peak and trough.	-	GEOxyz 2023	U02	-
7208	Magnetic	667318	5435152	A2_I	-	-	-	44	Point	-		-	A small, sharp asymmetric dipole with peak and trough on one profile line.	-	GEOxyz 2023	U02	-
7209	Magnetic	667419	5434947	A2_I	-	-	-	73	Point	-		-	A medium asymmetric dipole with peak and trough on one profile line.	-	GEOxyz 2023	U02	-
7210	Linear debris	668697	5431368	A2_I	62.6	1.2	-	-	Linear		Intermittent curvilinear dark reflector with shadows, the eastern end has small sub-angular dark reflectors with shadows. Largest object measures 3.3 x 1.2 m	-	Possible modern feature such as fishing gear and therefore may not be of archaeological interest. However, as this cannot be confirmed without further investigation, the feature has been retained as a precaution.	-	GEOxyz 2023 SSS mosaic	U02	-
7211	Mound	669818	5430074	A2_I	5.2	3.6	0.5	-	Point	-		-	A distinct mound with a flat peak and gently sloping sides.	-	GEOxyz 2023	U02	-
7212	Magnetic	669944	5429824	A2_I	-	-	-	74	Point	-		-	A medium, sharp asymmetric dipole with peak and trough on one profile line.	-	GEOxyz 2023	U02	-



ID	Classification	Easting	Northing	Archaeological discrimination	Length (m)	Width (m)	Height (m)	Magnetic amplitude (nT)	Anomaly geometry	SSS	MBES	Mag.	Interpretation	Associated anomalies	Dataset	Section	External references	
7213	Mound	670179	5429387	A2_I	6.0	3.9	0.8	-	Point	-		-	A distinct mound with rounded peak and steep sides within scour.	Possible natural feature or possible debris.	-	GEOxyz 2023	U02	-
7214	Mound	671019	5427738	A2_I	5.0	4.3	0.3	-	Point	-		-	An angular mound with steep sides and a pointed peak.	Possible natural feature or possible debris.	-	GEOxyz 2023	U01	-
7215	Magnetic	670659	5427594	A2_I	-	-	-	24	Point	-		-	A small symmetric dipole with peak and trough on one profile line.	Possible ferrous debris either buried or with no surface expression.	-	GEOxyz 2023	U01	-
7216	Magnetic	670832	5427241	A2_I	-	-	-	34	Point	-		-	A small asymmetric dipole with peak and trough on one profile line.	Possible ferrous debris either buried or with no surface expression.	-	GEOxyz 2023	U01	-
7217	Magnetic	671602	5426471	A2_I	-	-	-	36	Point	-		-	A small, sharp symmetric dipole with peak and trough on one profile line.	Possible ferrous debris either buried or with no surface expression.	-	GEOxyz 2023	U01	-

1. Co-ordinates are in WGS84 UTM29N
2. Positional accuracy estimated  $\pm 10$  m





Study area  
 - - - United Kingdom exclusive economic zone



Coordinate system: WGS 1984 UTM Zone 30N  
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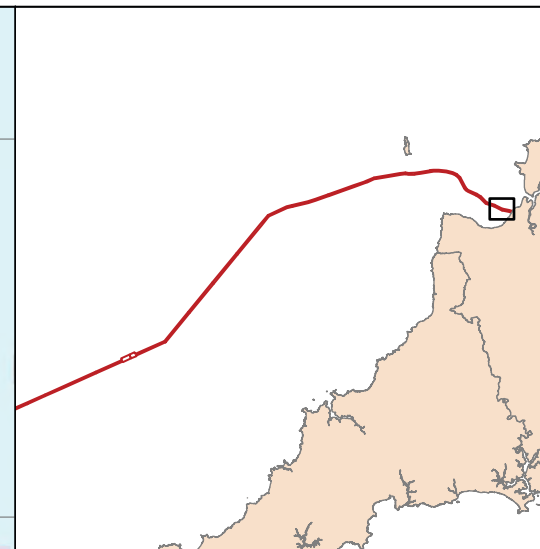
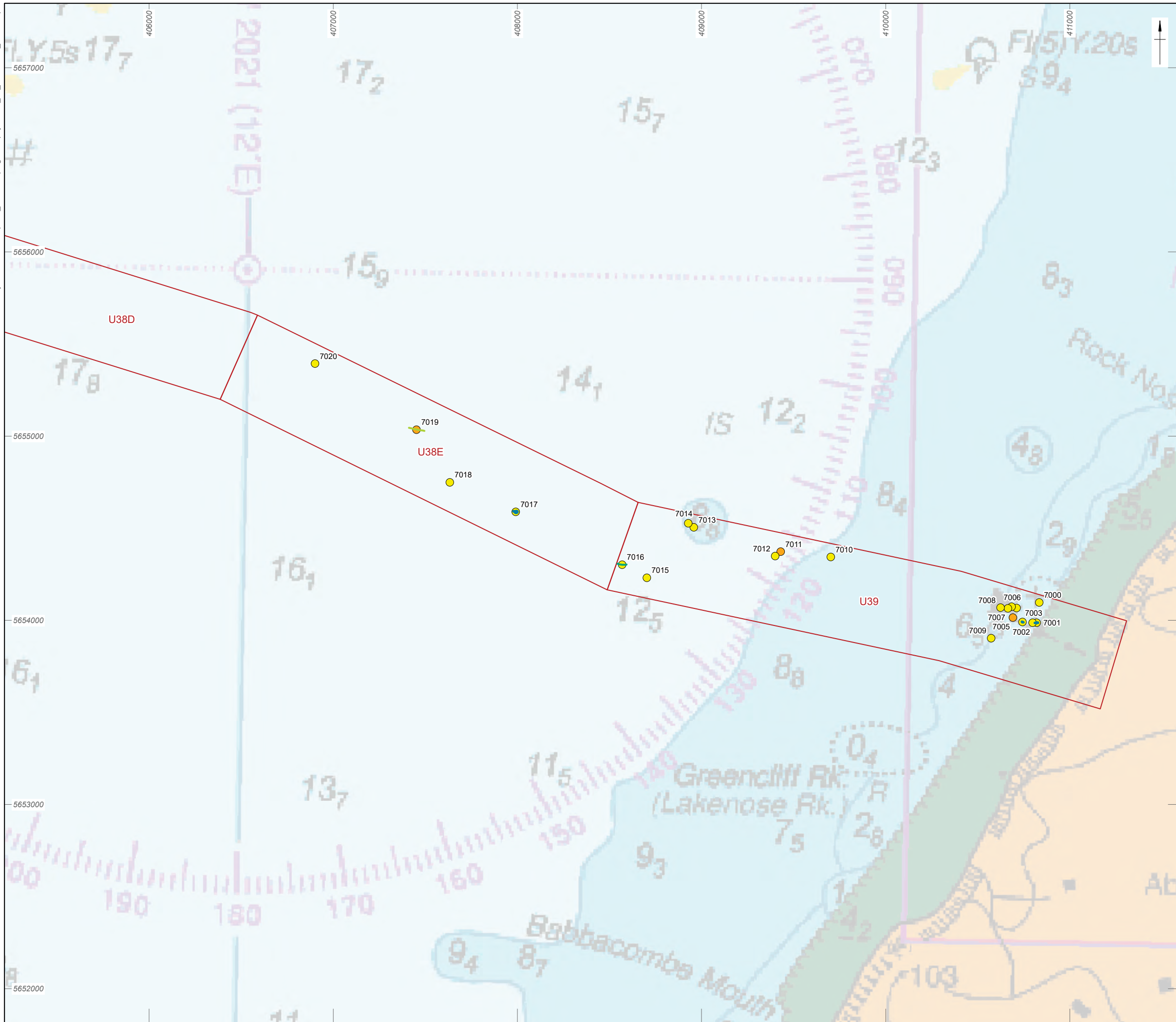
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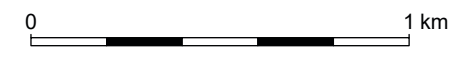
Figure 1: Location map







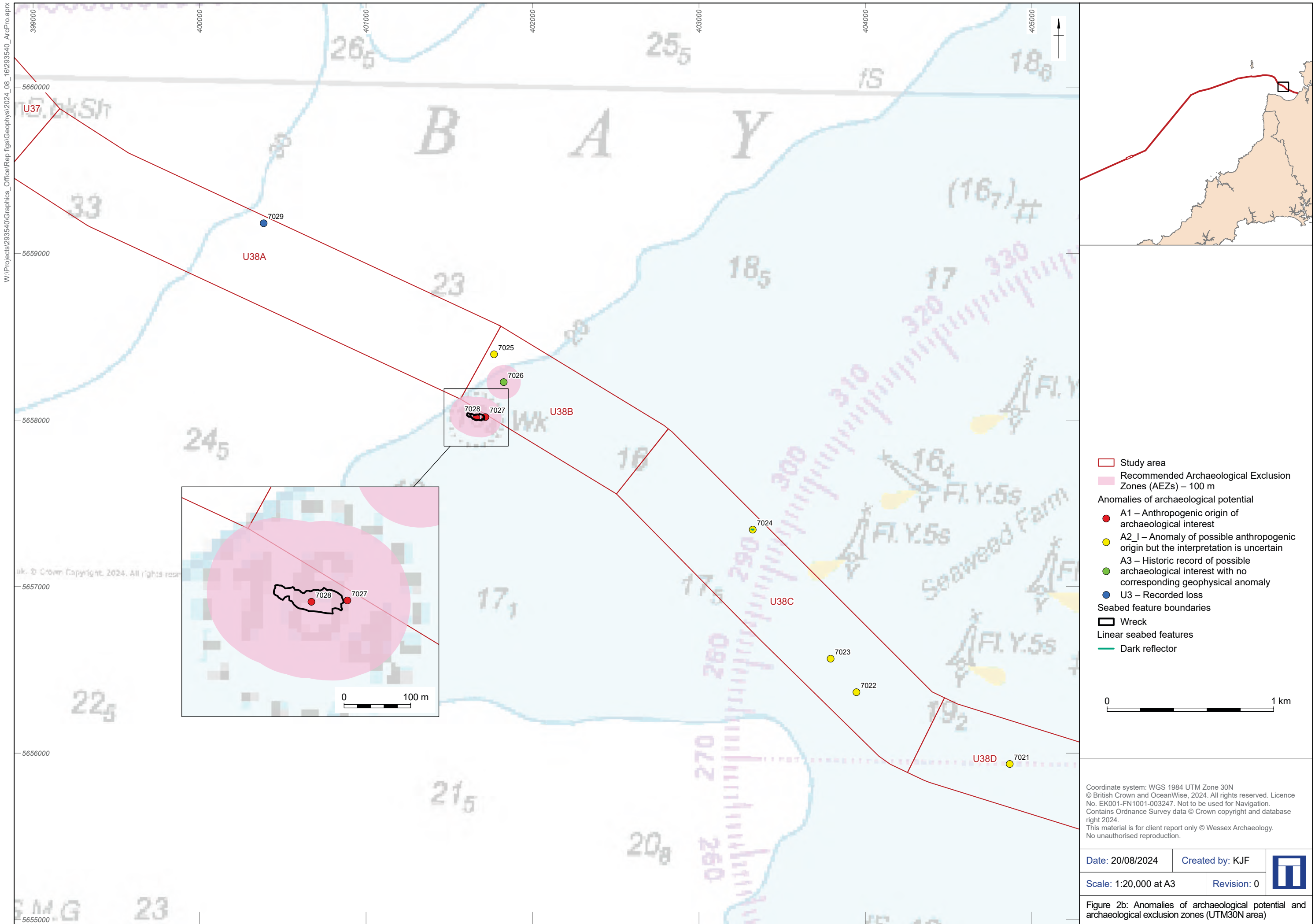
- Study area
- Anomalies of archaeological potential
  - A2\_h – Anomaly of likely anthropogenic origin but of unknown date
  - A2\_l – Anomaly of possible anthropogenic origin but the interpretation is uncertain
- Seabed feature boundaries
  - Seabed disturbance
  - Linear seabed features
    - Dark reflector
    - Linear debris



Coordinate system: WGS 1984 UTM Zone 30N  
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Figure 2a: Anomalies of archaeological potential and archaeological exclusion zones (UTM30N area)



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- Study area
- Recommended Archaeological Exclusion Zones (AEZs) – 100 m
- Anomalies of archaeological potential**
- A1 – Anthropogenic origin of archaeological interest
- A2\_I – Anomaly of possible anthropogenic origin but the interpretation is uncertain
- A3 – Historic record of possible archaeological interest with no corresponding geophysical anomaly
- U3 – Recorded loss
- Seabed feature boundaries**
- Wreck
- Linear seabed features
- Dark reflector

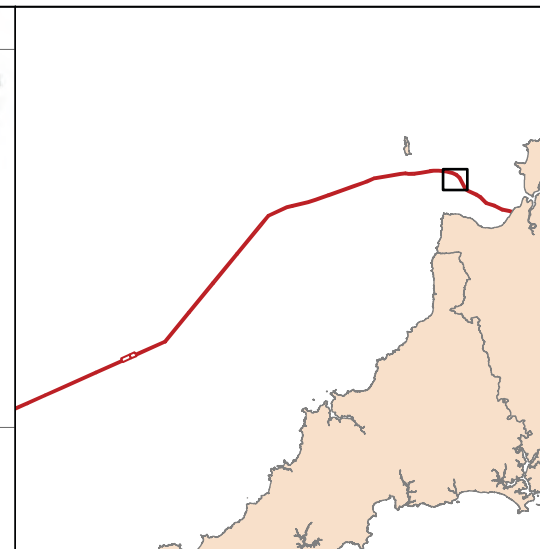
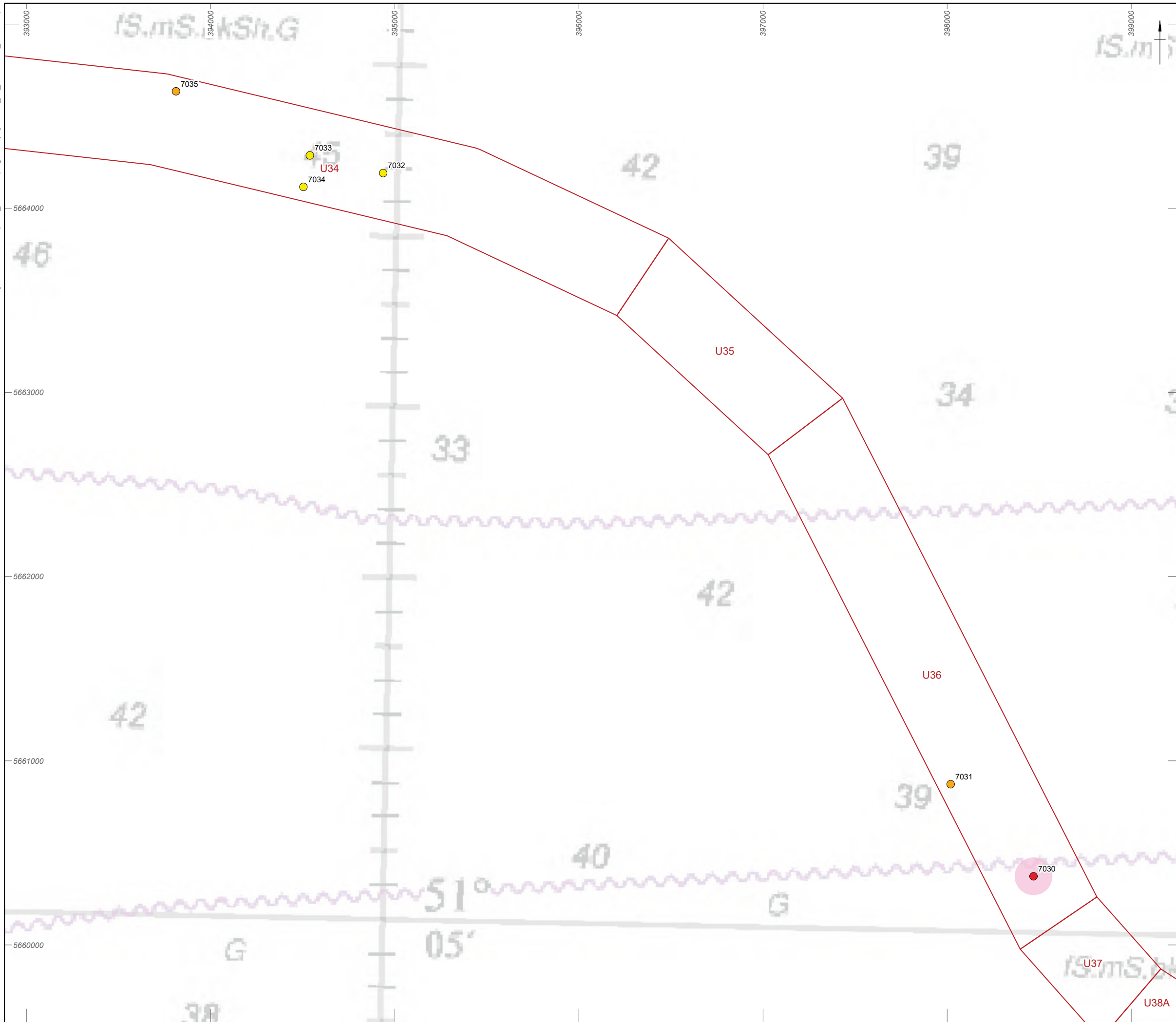
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<b>Scale:</b> 1:20,000 at A3	<b>Revision:</b> 0	

Figure 2b: Anomalies of archaeological potential and archaeological exclusion zones (UTM30N area)





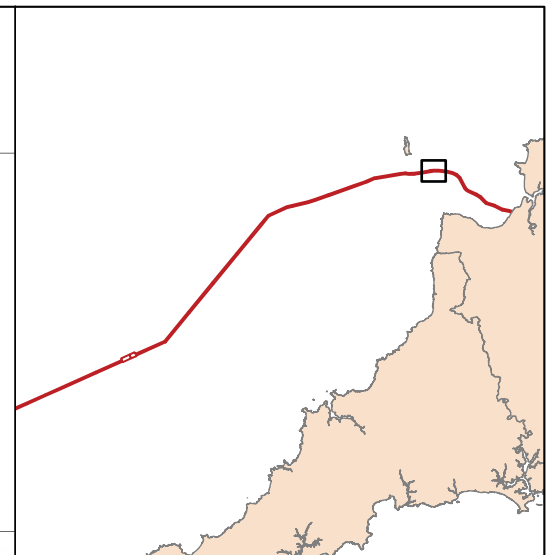
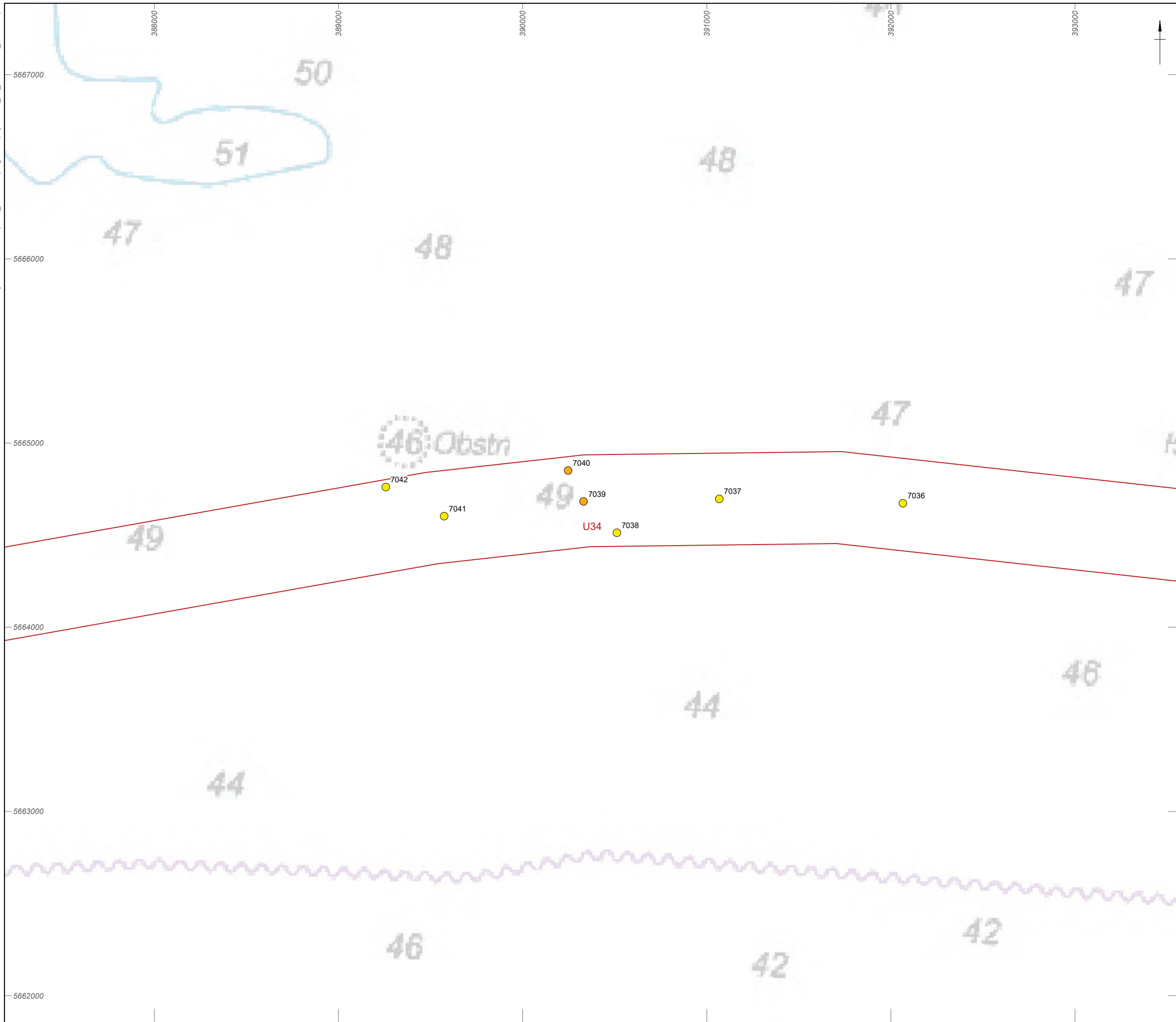
- Study area
- Recommended Archaeological Exclusion Zones (AEZs) – 100 m
- Anomalies of archaeological potential**
- A1 – Anthropogenic origin of archaeological interest
- A2\_h – Anomaly of likely anthropogenic origin but of unknown date
- A2\_l – Anomaly of possible anthropogenic origin but the interpretation is uncertain



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**Figure 2c: Anomalies of archaeological potential and archaeological exclusion zones (UTM30N area)**



- Study area
- Anomalies of archaeological potential**
- A2\_h – Anomaly of likely anthropogenic origin but of unknown date
- A2\_l – Anomaly of possible anthropogenic origin but the interpretation is uncertain



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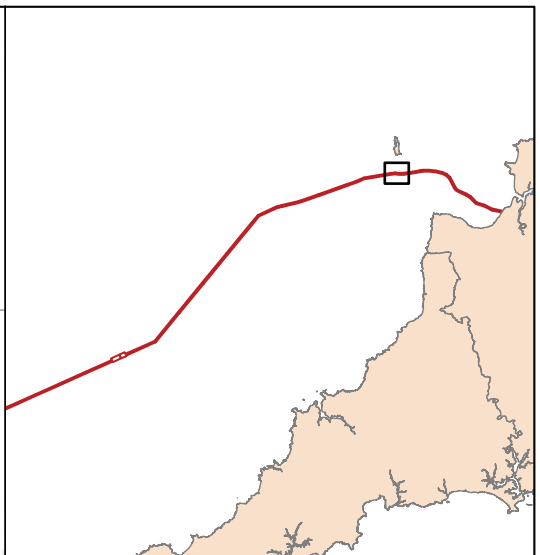
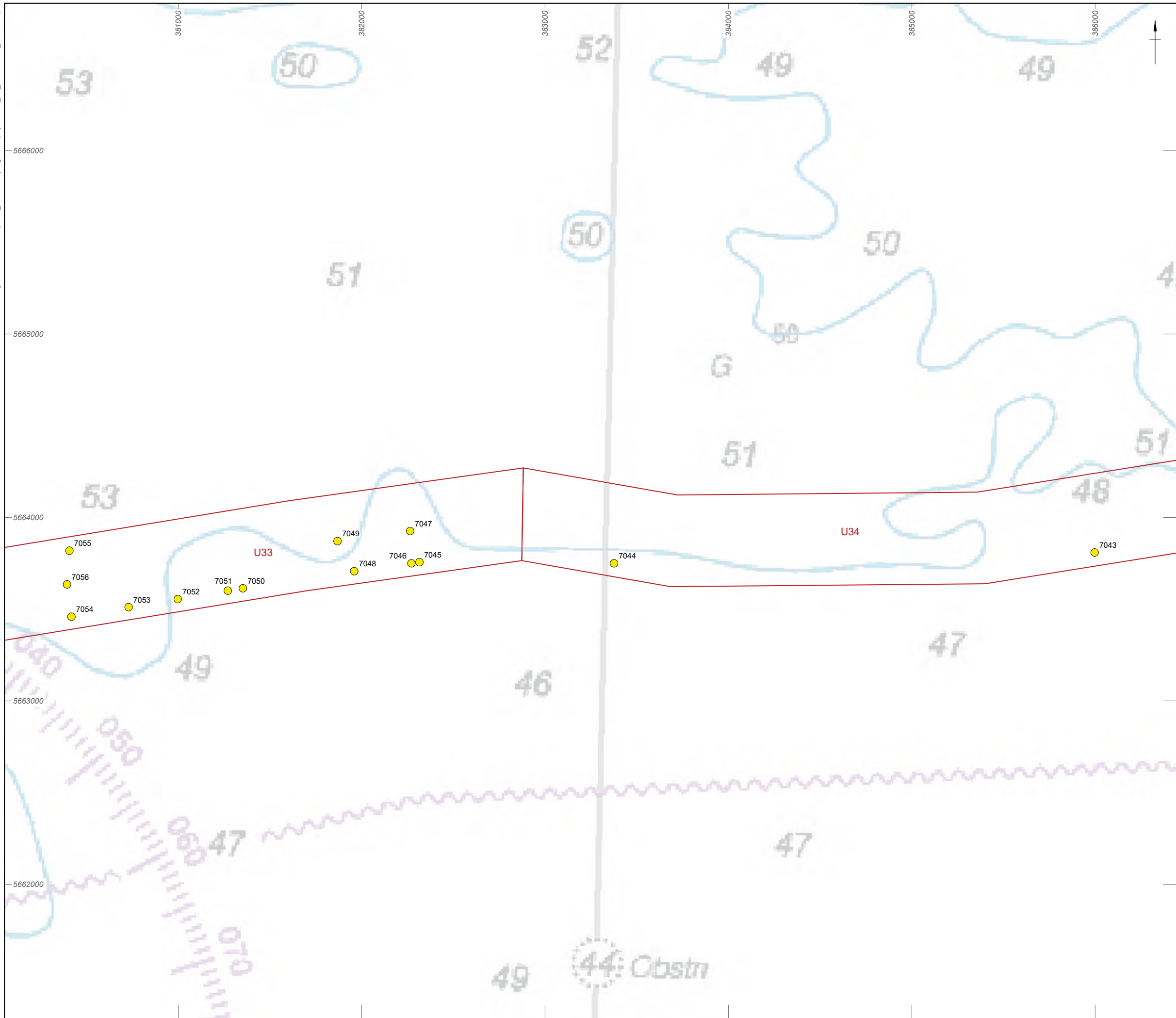
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Figure 2d: Anomalies of archaeological potential and archaeological exclusion zones (UTM30N area)





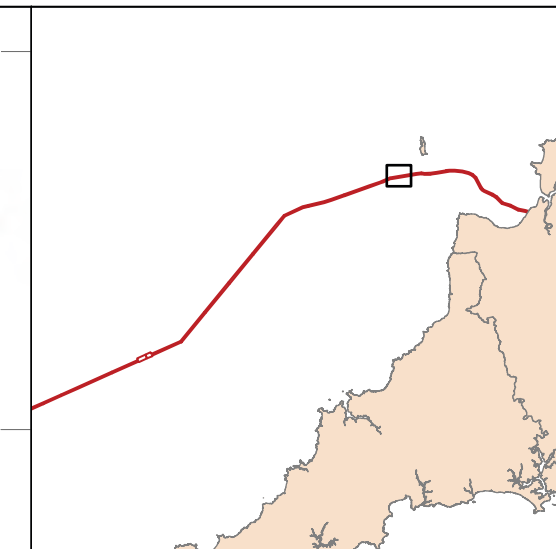
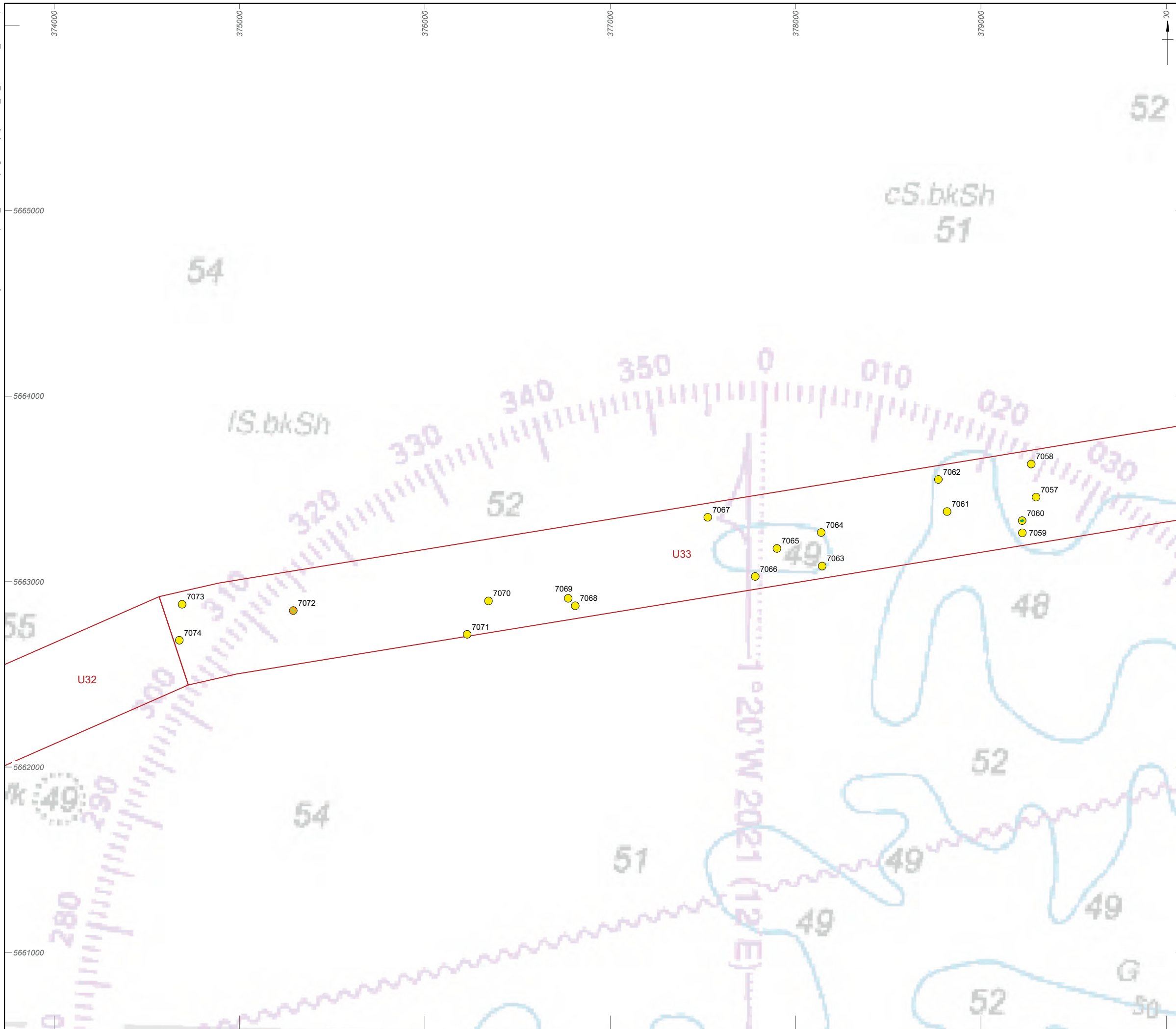
Study area  
 Anomalies of archaeological potential  
● A2\_I – Anomaly of possible anthropogenic origin but the interpretation is uncertain

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 1 km

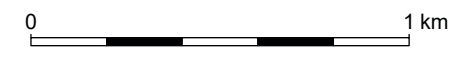
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Figure 2e: Anomalies of archaeological potential and archaeological exclusion zones (UTM30N area)



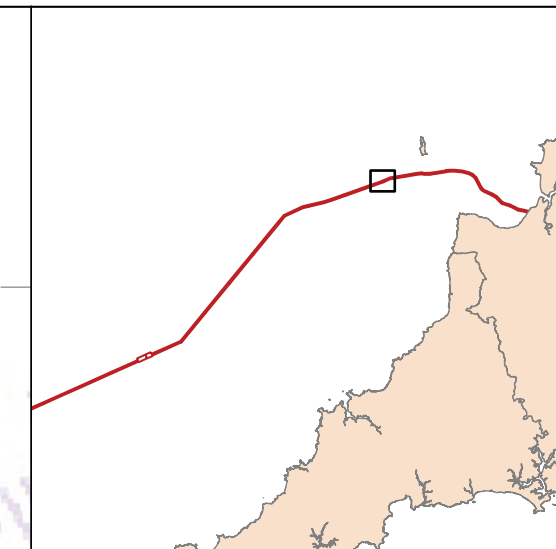
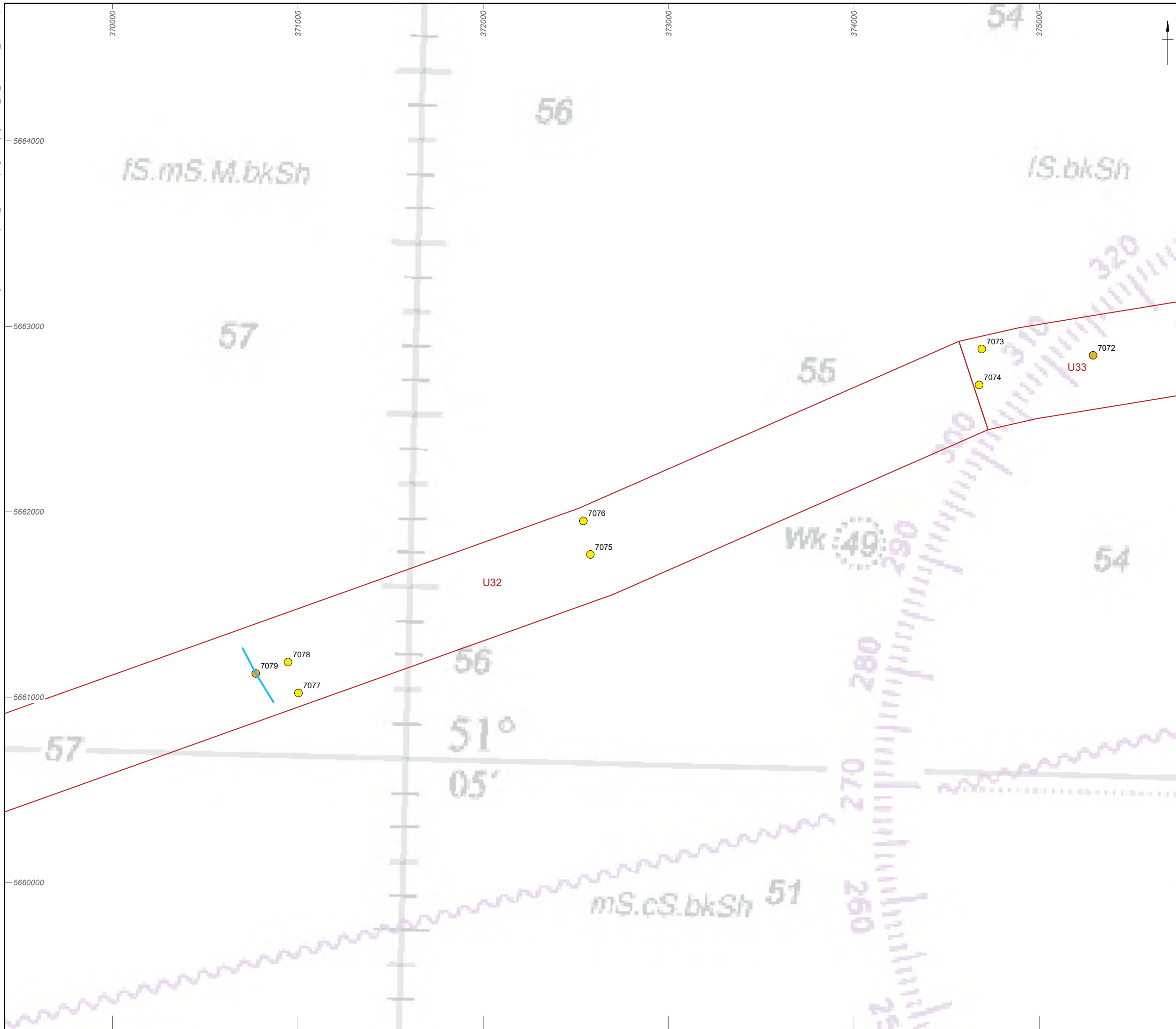
- Study area
- Anomalies of archaeological potential
- A2\_h – Anomaly of likely anthropogenic origin but of unknown date
- A2\_l – Anomaly of possible anthropogenic origin but the interpretation is uncertain
- Seabed feature boundaries
- Dark reflector
- Linear seabed features
- Linear debris



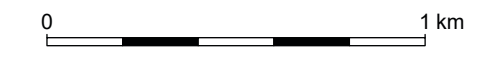
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Figure 2f: Anomalies of archaeological potential and archaeological exclusion zones (UTM30N area)



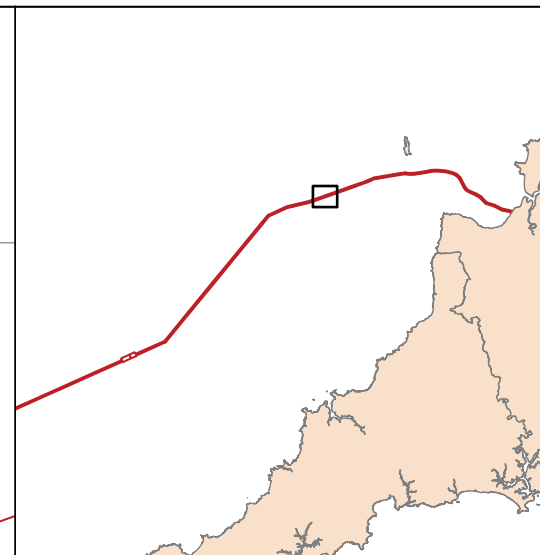
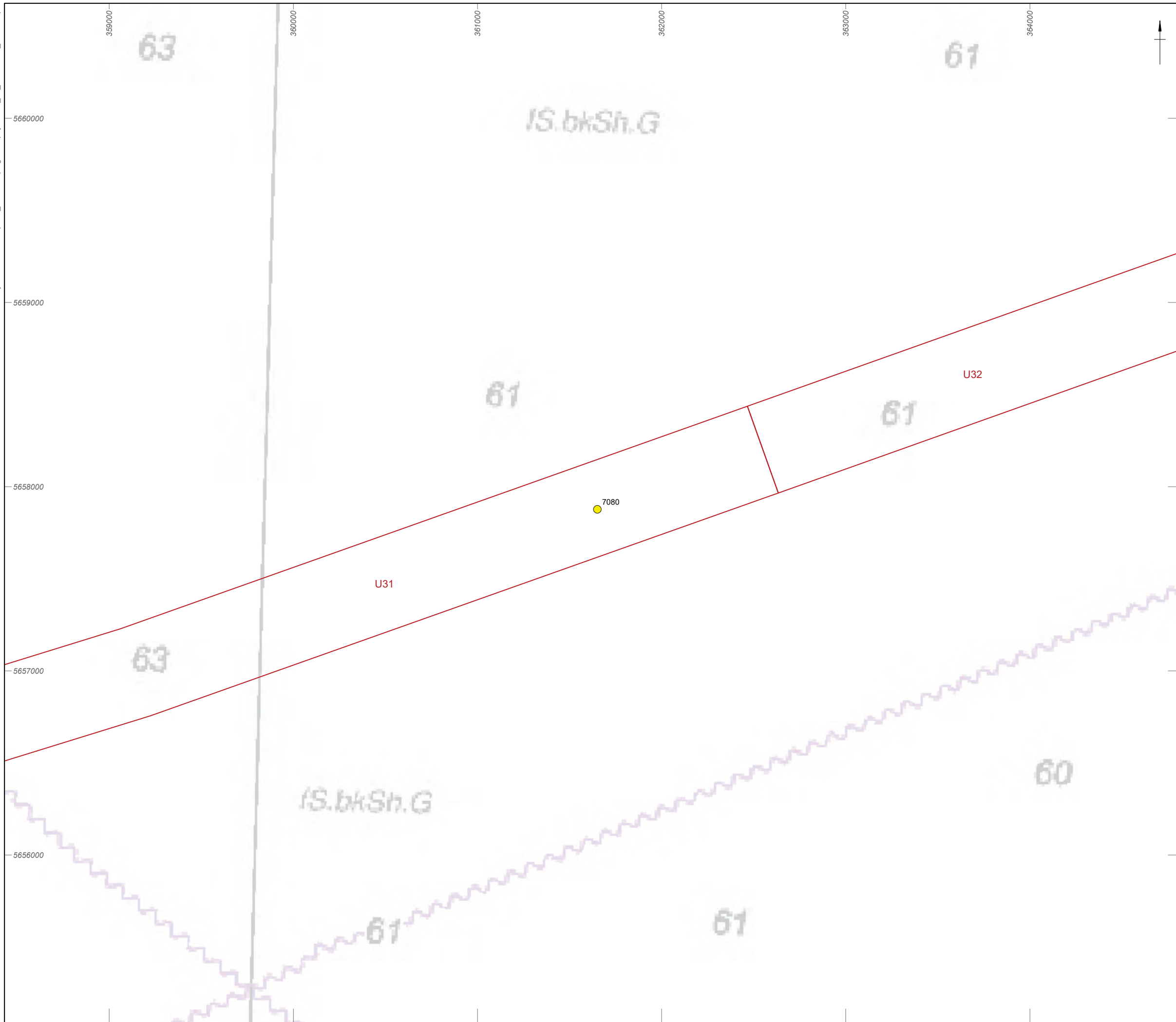
- Study area
- Anomalies of archaeological potential**
- A2\_h – Anomaly of likely anthropogenic origin but of unknown date
- A2\_l – Anomaly of possible anthropogenic origin but the interpretation is uncertain
- Linear seabed features**
- Linear debris
- Magnetic trend



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Figure 2g: Anomalies of archaeological potential and archaeological exclusion zones (UTM30N area)



Study area  
 Anomalies of archaeological potential  
● A2\_1 – Anomaly of possible anthropogenic origin but the interpretation is uncertain

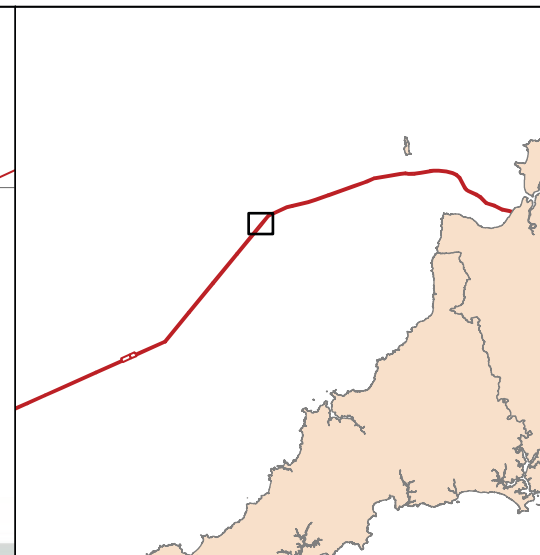
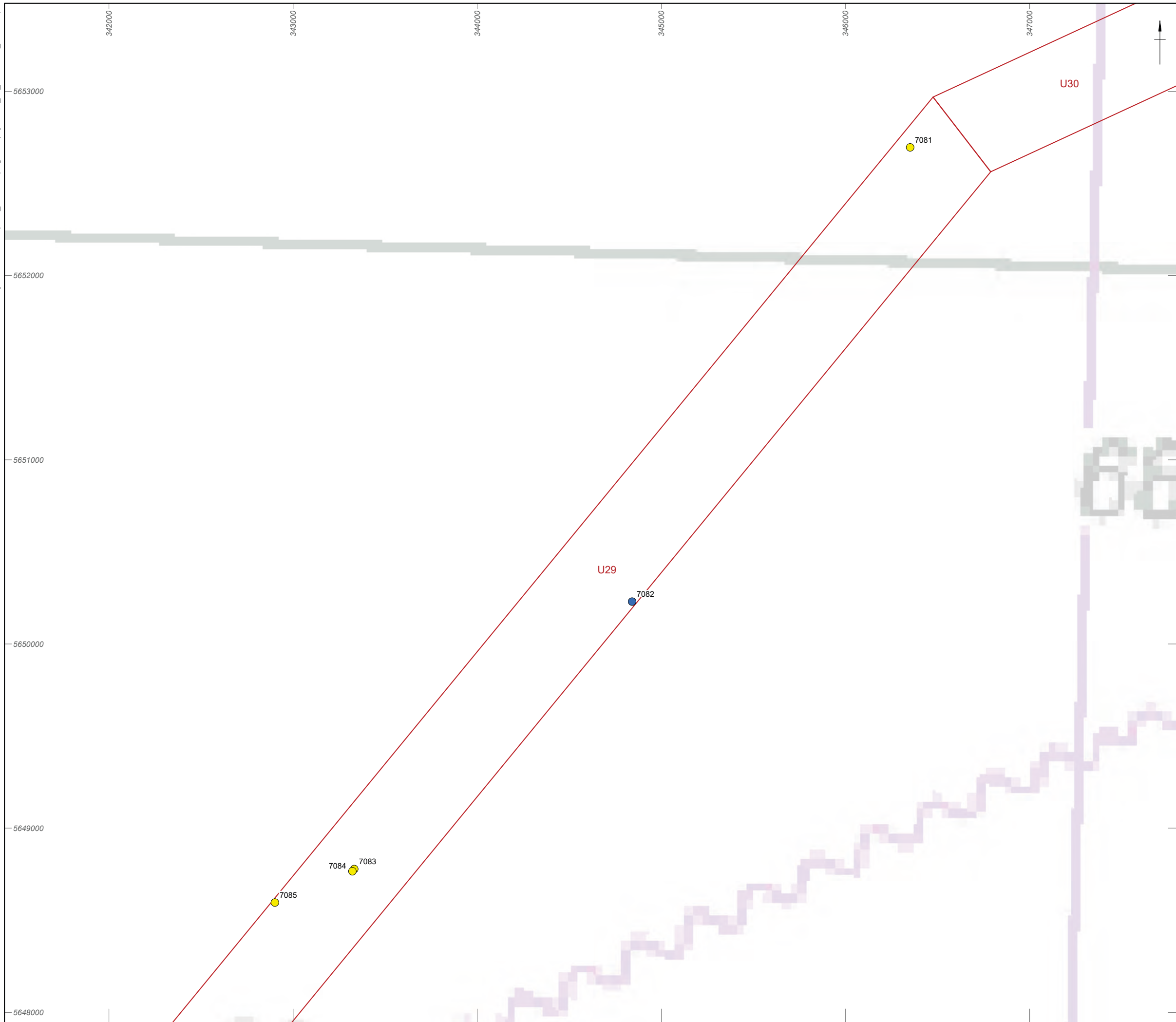
0  1 km

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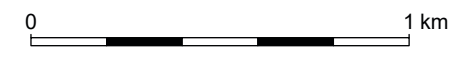
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Figure 2h: Anomalies of archaeological potential and archaeological exclusion zones (UTM30N area)





- Study area
- Anomalies of archaeological potential
- A2\_1 – Anomaly of possible anthropogenic origin but the interpretation is uncertain
- U3 – Recorded loss



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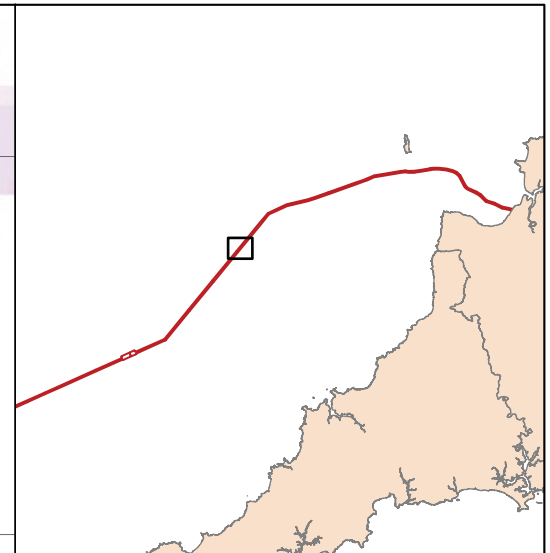
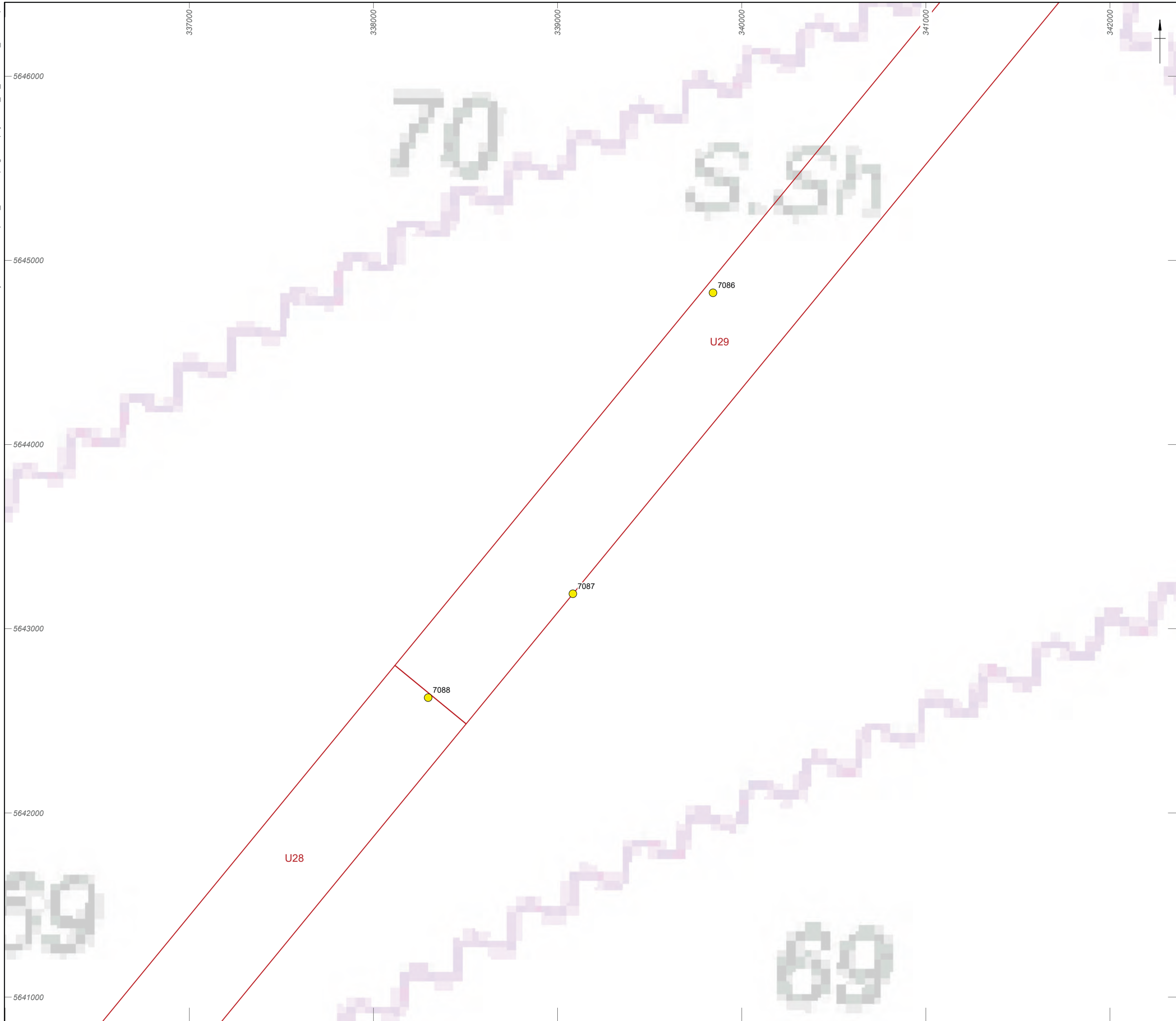
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Figure 2i: Anomalies of archaeological potential and archaeological exclusion zones (UTM30N area)



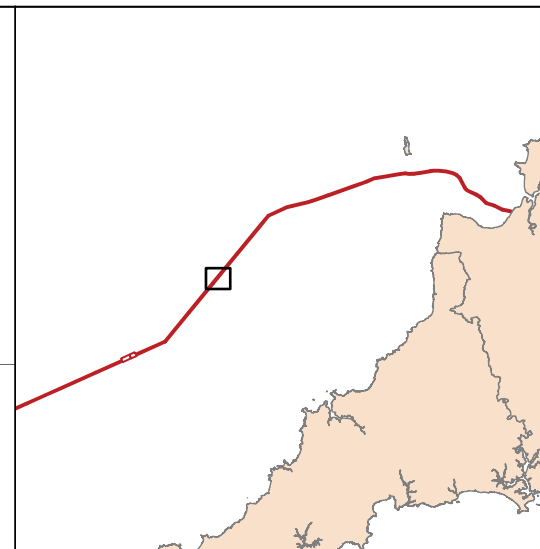
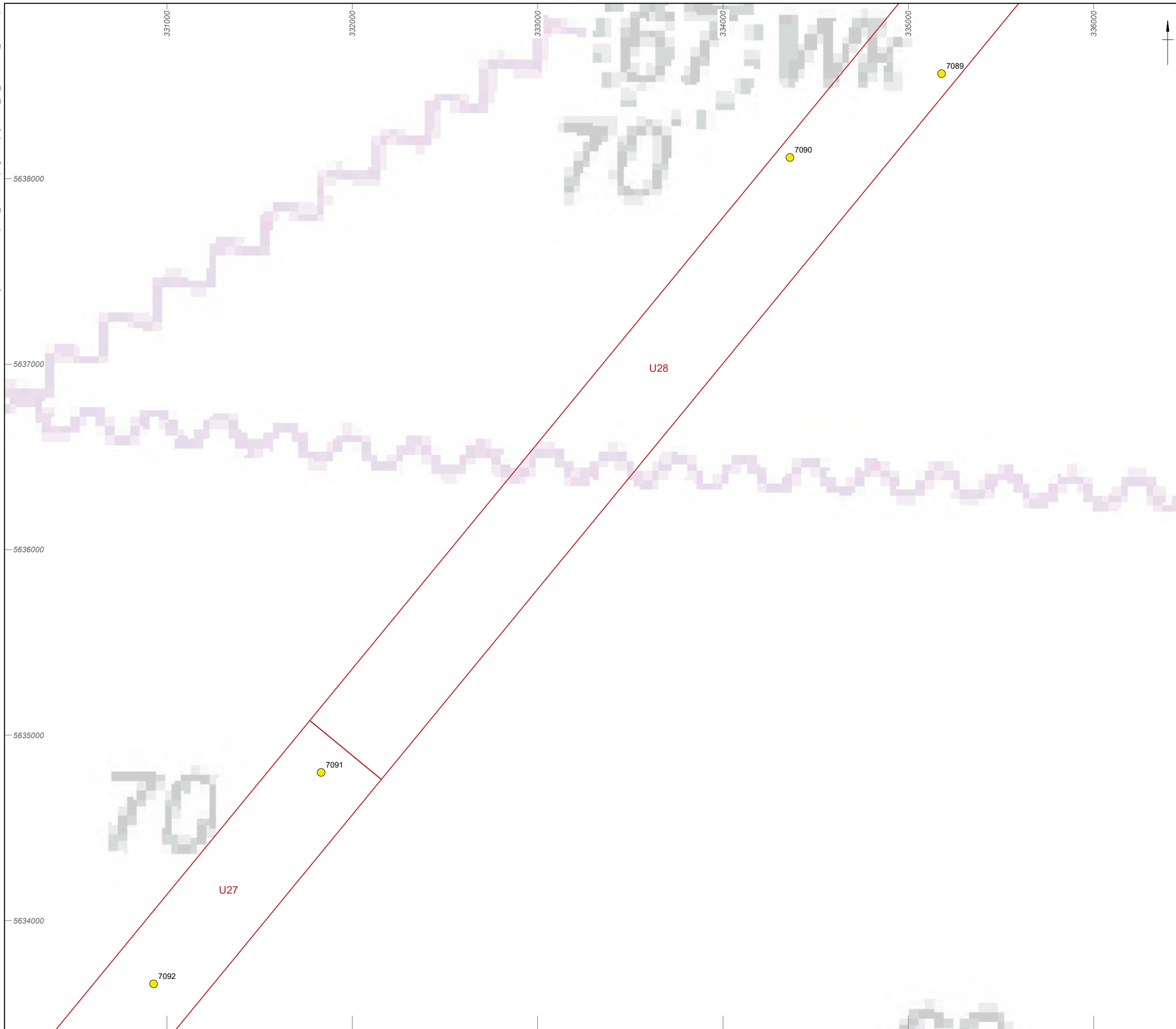
Study area  
 Anomalies of archaeological potential  
● A2\_I – Anomaly of possible anthropogenic origin but the interpretation is uncertain

0  1 km

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Figure 2j: Anomalies of archaeological potential and archaeological exclusion zones (UTM30N area)



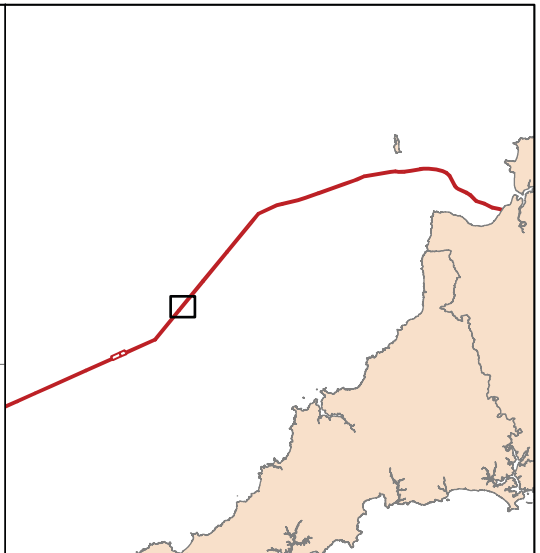
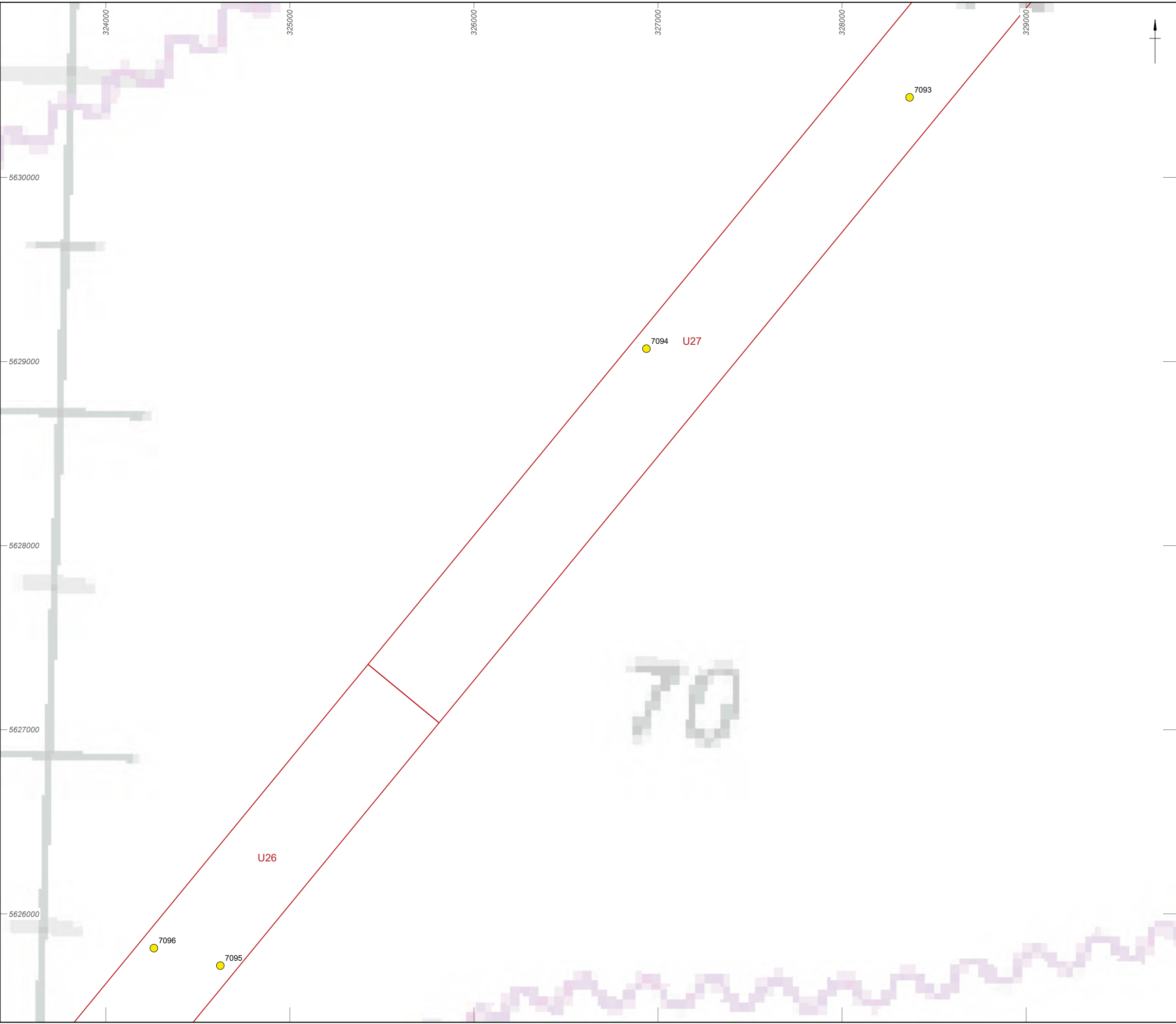
- Study area
- Anomalies of archaeological potential
- A2\_1 – Anomaly of possible anthropogenic origin but the interpretation is uncertain



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Figure 2k: Anomalies of archaeological potential and archaeological exclusion zones (UTM30N area)



- Study area
- Anomalies of archaeological potential
- A2\_I – Anomaly of possible anthropogenic origin but the interpretation is uncertain



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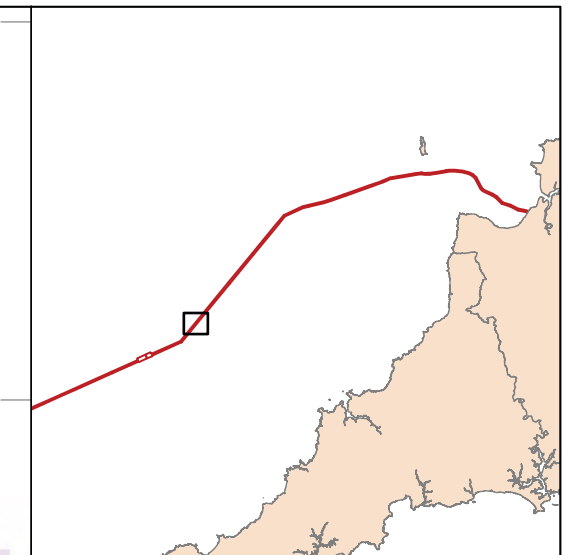
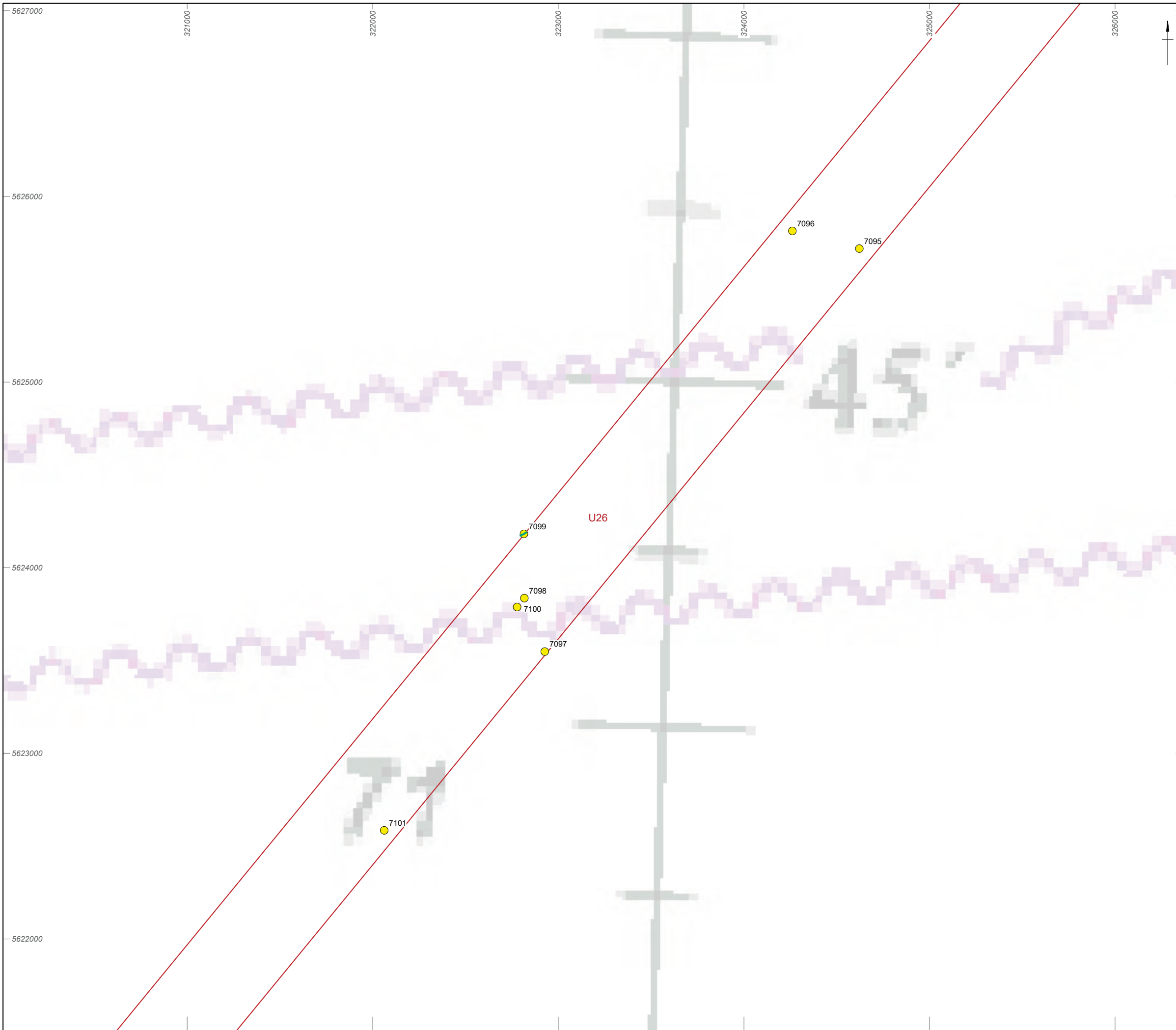
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Figure 2i: Anomalies of archaeological potential and archaeological exclusion zones (UTM30N area)





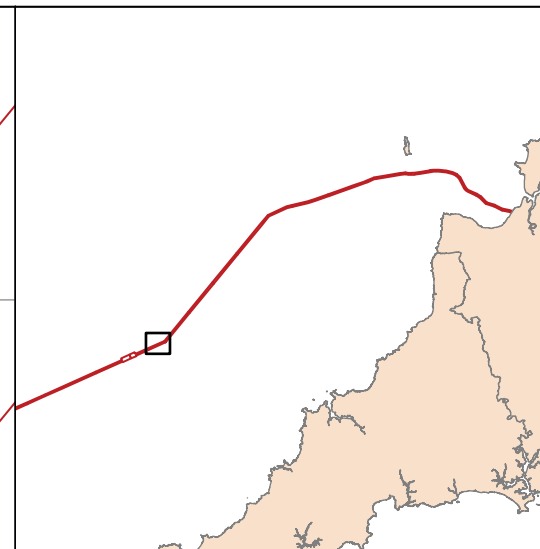
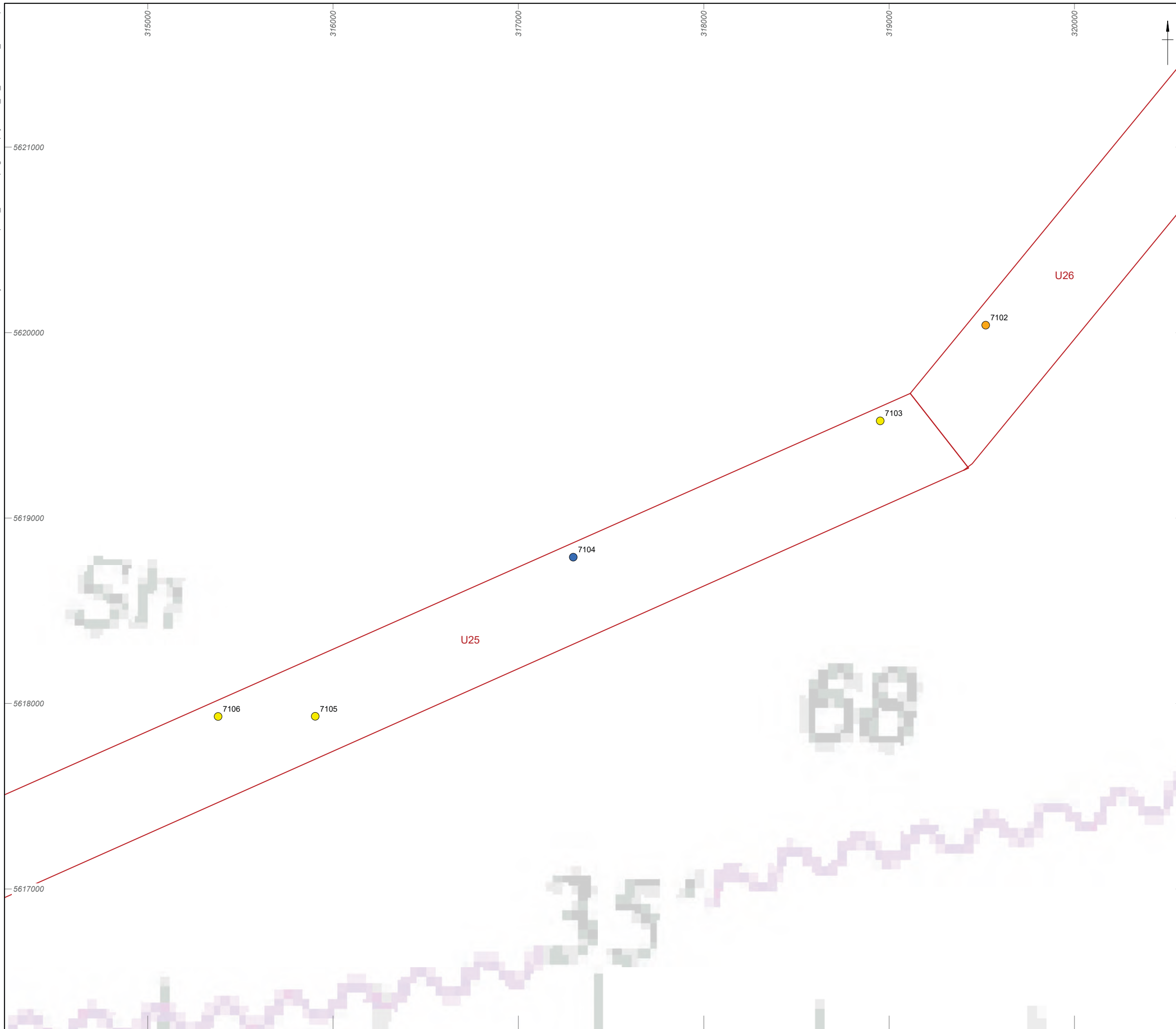
- Study area
- Anomalies of archaeological potential
- A2\_1 – Anomaly of possible anthropogenic origin but the interpretation is uncertain
- Linear seabed features
- Dark reflector



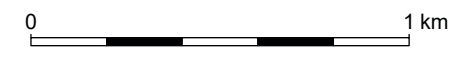
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Figure 2m: Anomalies of archaeological potential and archaeological exclusion zones (UTM30N area)



- Study area
- Anomalies of archaeological potential**
- A2\_h – Anomaly of likely anthropogenic origin but of unknown date
- A2\_I – Anomaly of possible anthropogenic origin but the interpretation is uncertain
- U3 – Recorded loss



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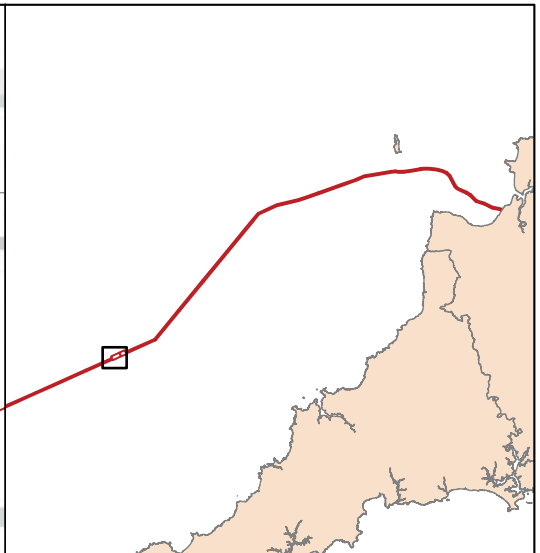
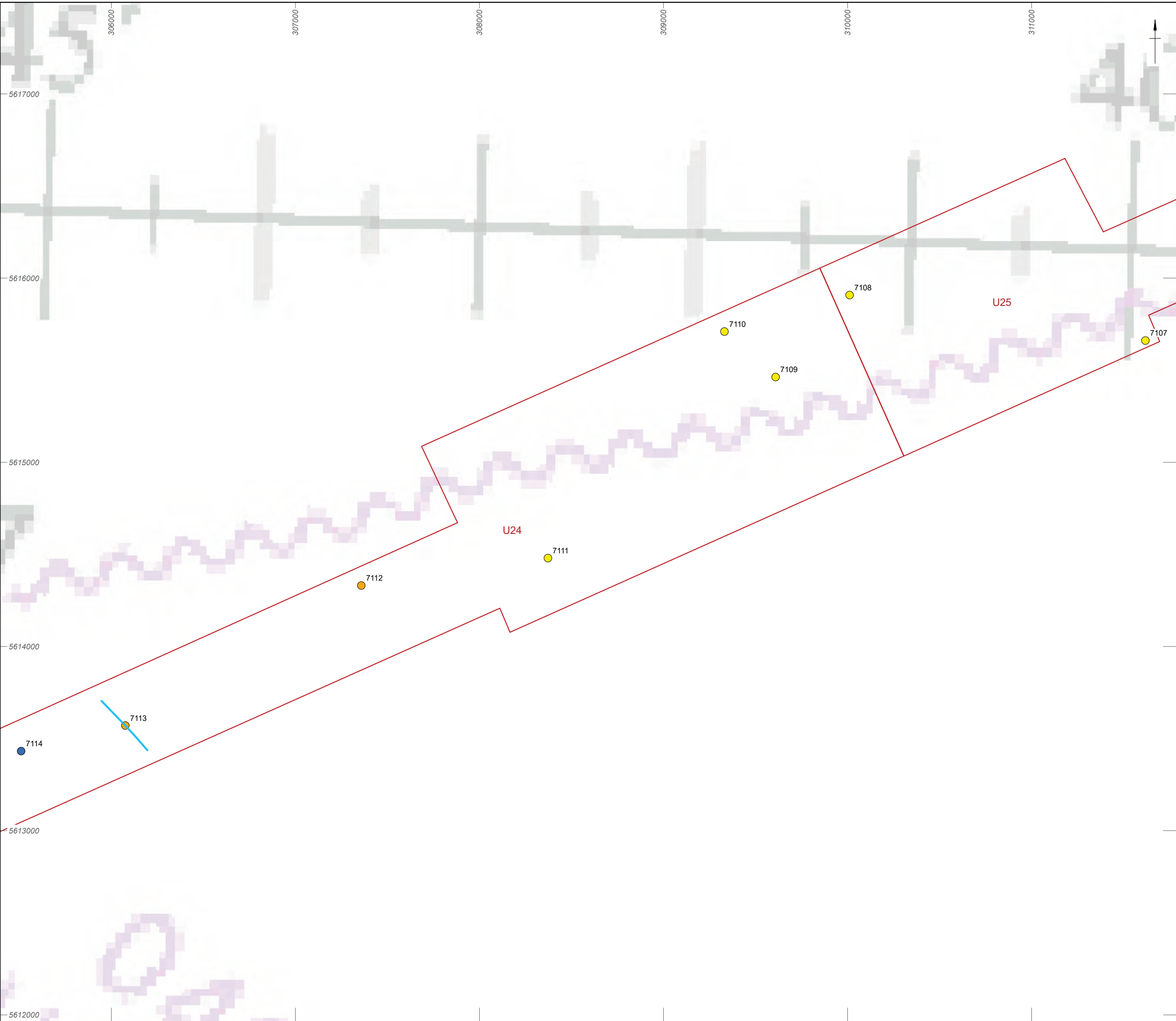
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Figure 2n: Anomalies of archaeological potential and archaeological exclusion zones (UTM30N area)



**Study area**

**Anomalies of archaeological potential**

- A2\_h – Anomaly of likely anthropogenic origin but of unknown date
- A2\_I – Anomaly of possible anthropogenic origin but the interpretation is uncertain
- U3 – Recorded loss

**Linear seabed features**

- Magnetic trend

0  1 km

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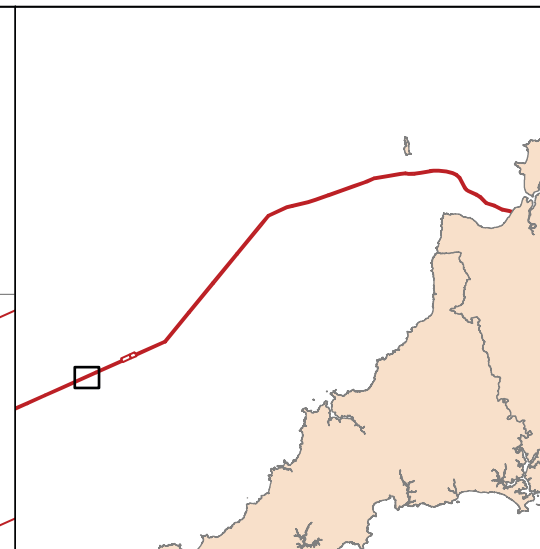
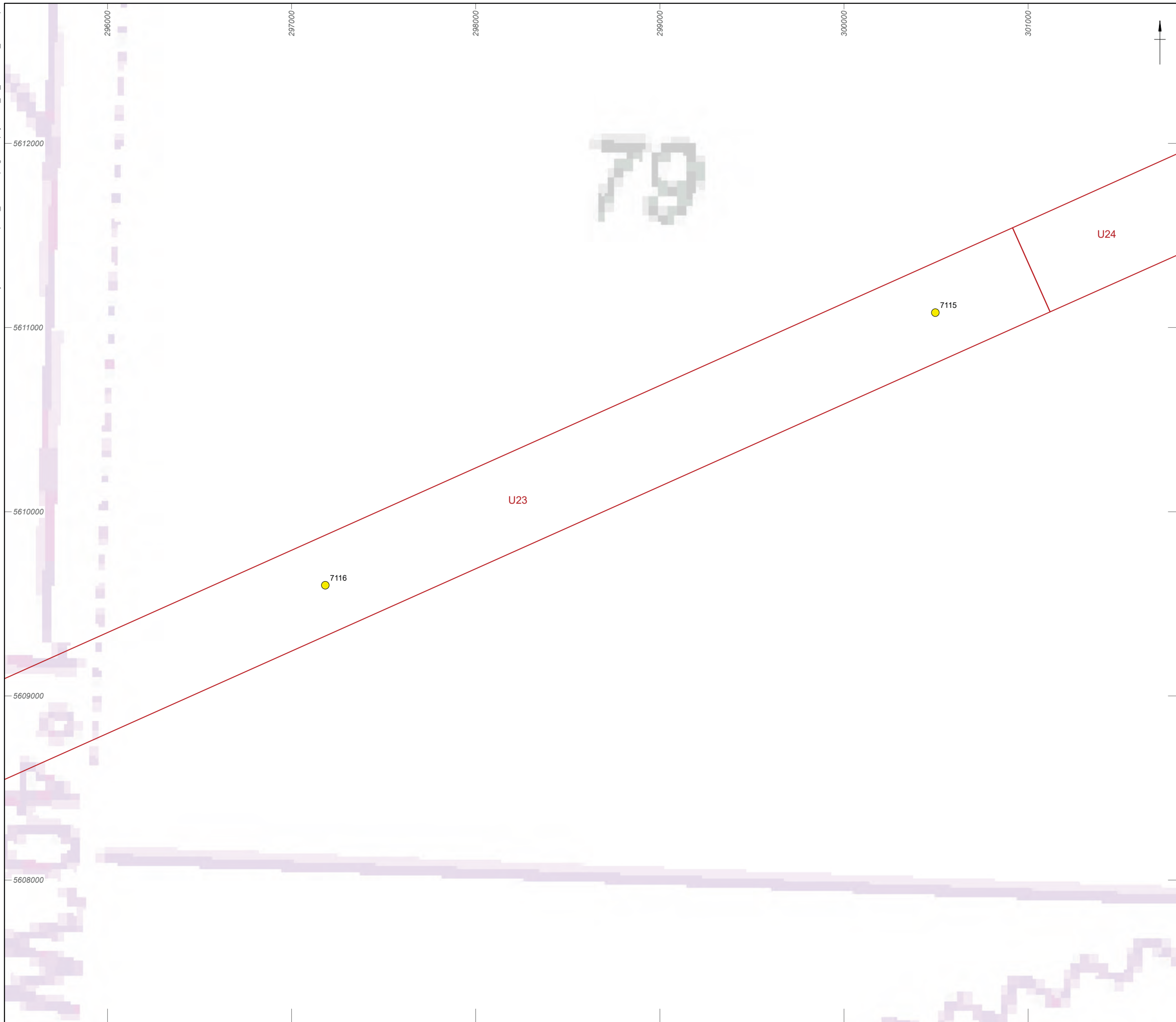
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Figure 2o: Anomalies of archaeological potential and archaeological exclusion zones (UTM30N area)



- Study area
- Anomalies of archaeological potential
- A2\_1 – Anomaly of possible anthropogenic origin but the interpretation is uncertain



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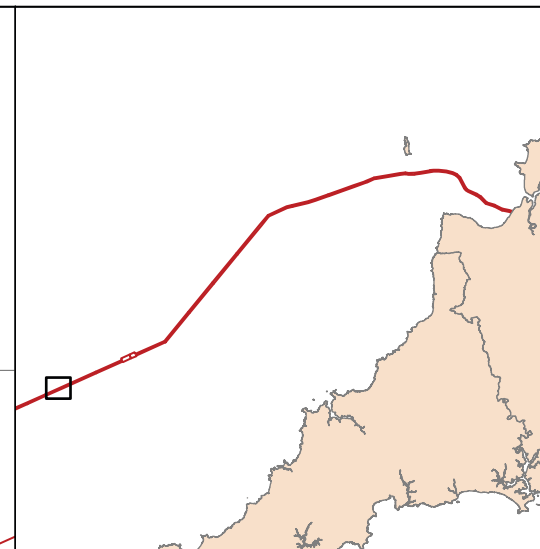
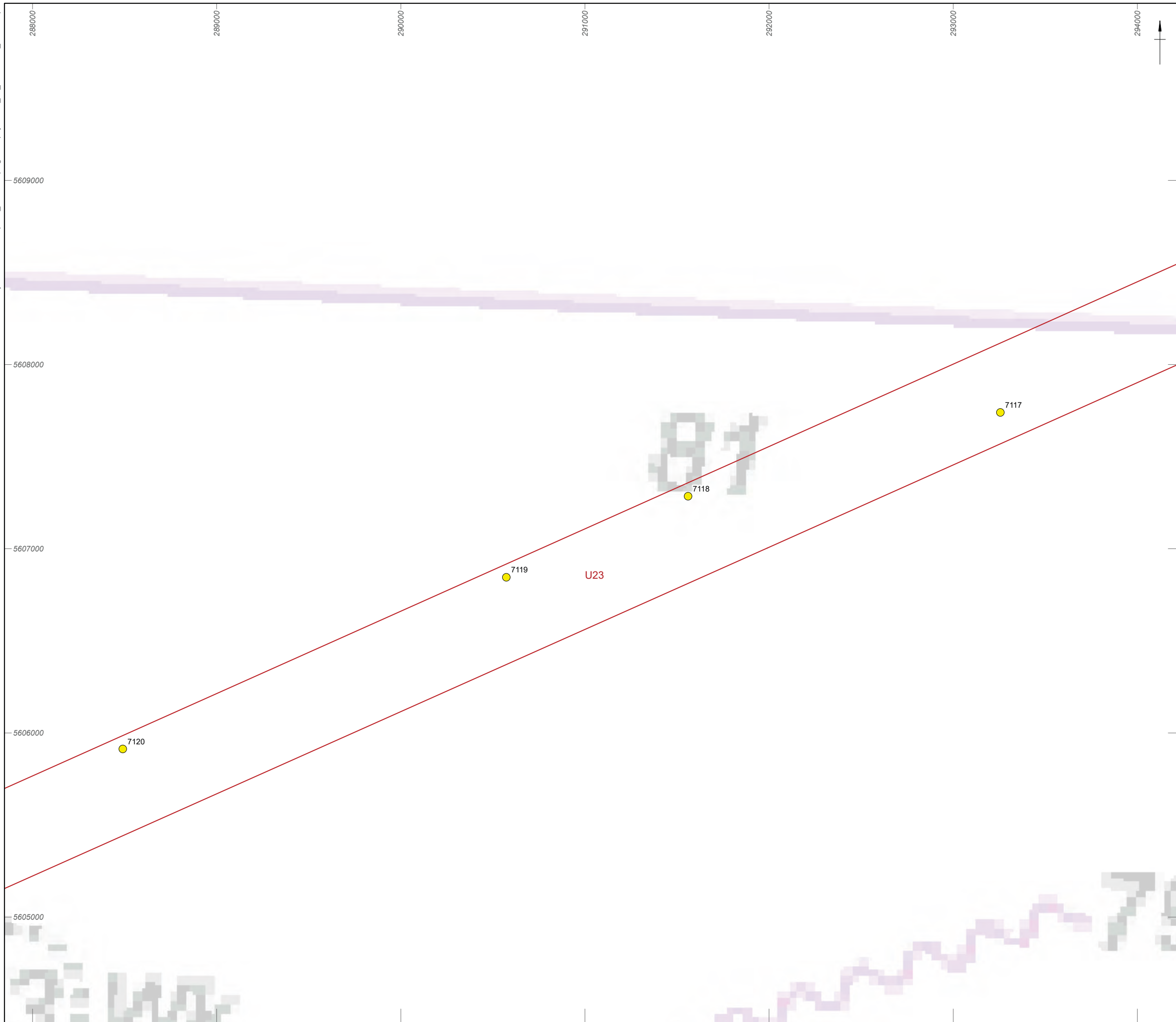
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Figure 2p: Anomalies of archaeological potential and archaeological exclusion zones (UTM30N area)



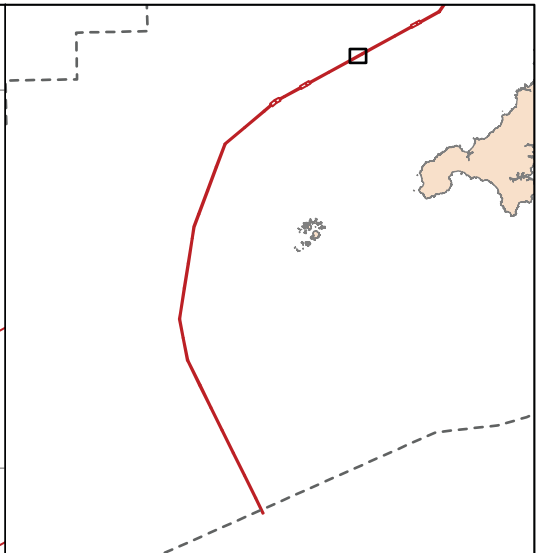
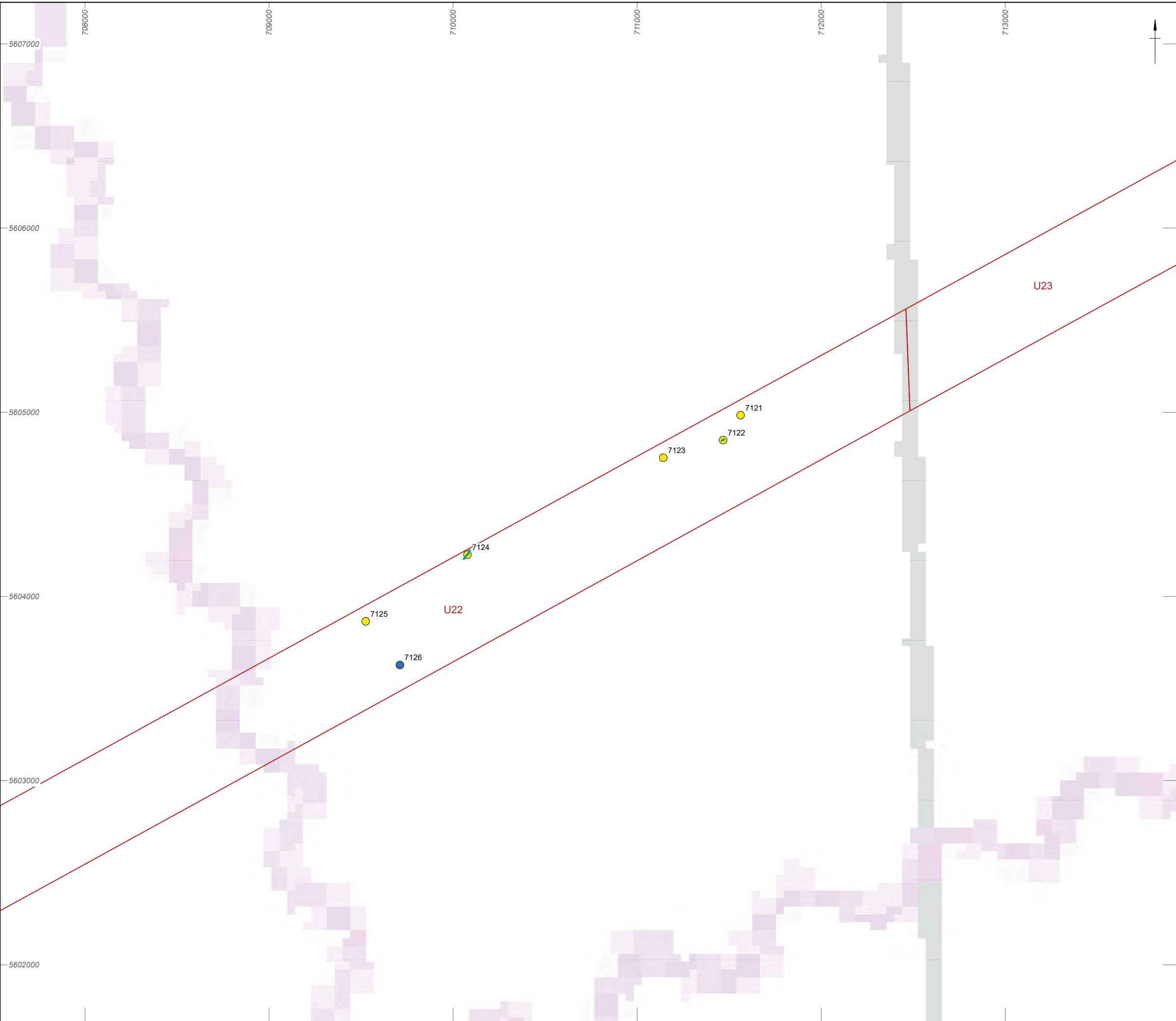
Study area  
 Anomalies of archaeological potential  
● A2\_1 – Anomaly of possible anthropogenic origin but the interpretation is uncertain

0  1 km

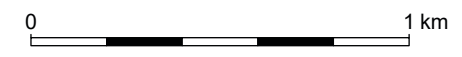
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Figure 2q: Anomalies of archaeological potential and archaeological exclusion zones (UTM30N area)



- Study area
- Anomalies of archaeological potential
- A2\_I – Anomaly of possible anthropogenic origin but the interpretation is uncertain
- U3 – Recorded loss
- Linear seabed features
- Dark reflector

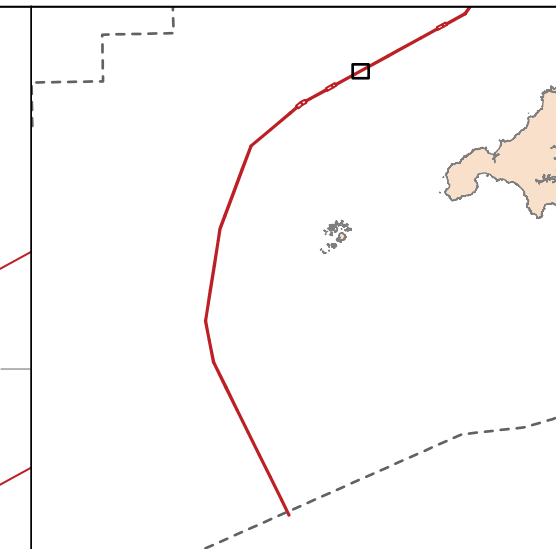
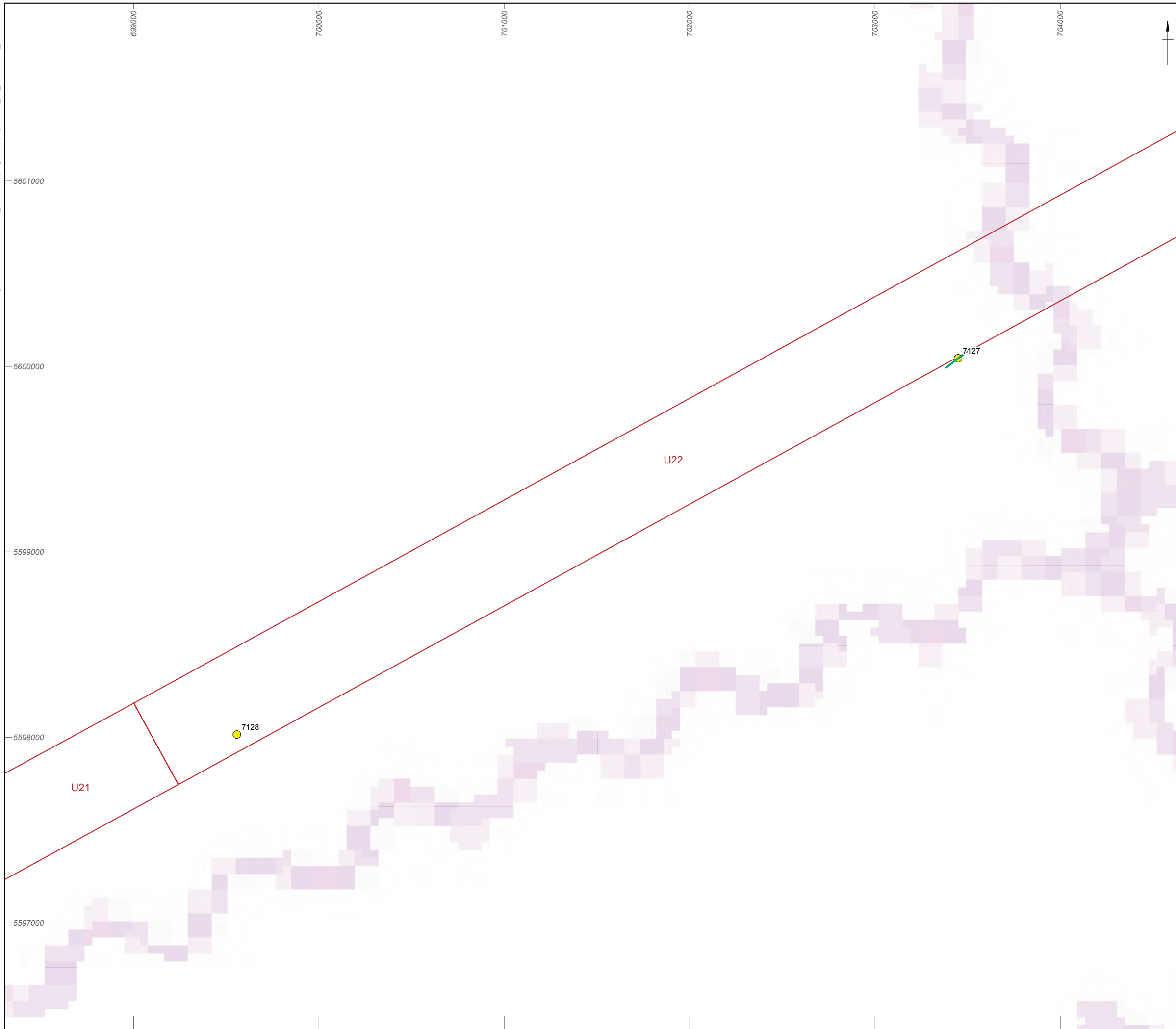


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Figure 3a: Anomalies of archaeological potential and archaeological exclusion zones (UTM29N area)





**Study area**

**Anomalies of archaeological potential**

- A2\_I – Anomaly of possible anthropogenic origin but the interpretation is uncertain

**Linear seabed features**

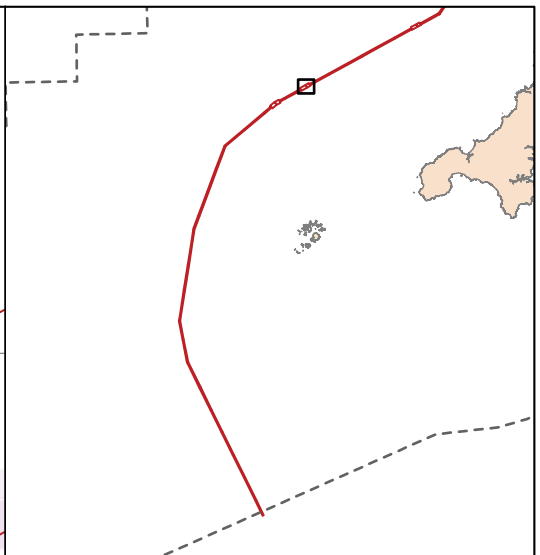
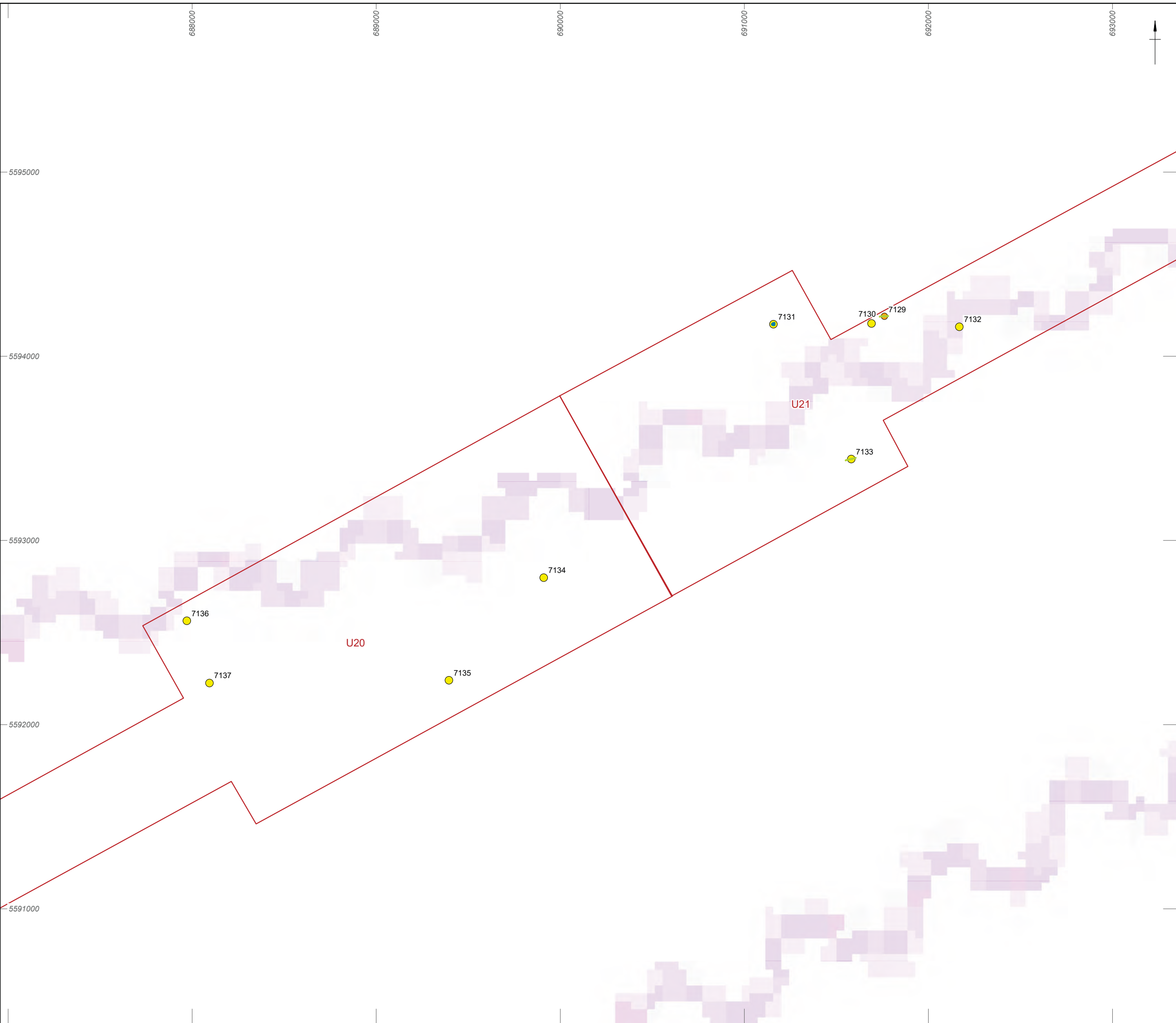
- Dark reflector

0 1 km

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Figure 3b: Anomalies of archaeological potential and archaeological exclusion zones (UTM29N area)



- Study area
- Anomalies of archaeological potential**
- A2\_h – Anomaly of likely anthropogenic origin but of unknown date
- A2\_l – Anomaly of possible anthropogenic origin but the interpretation is uncertain
- Seabed feature boundaries**
- Seabed disturbance
- Linear seabed features**
- Linear debris

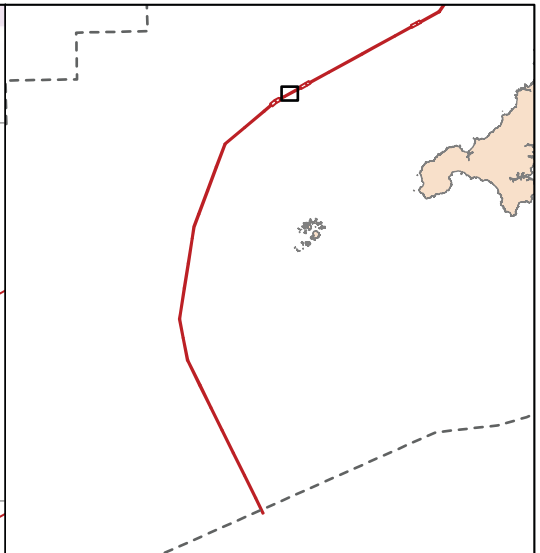
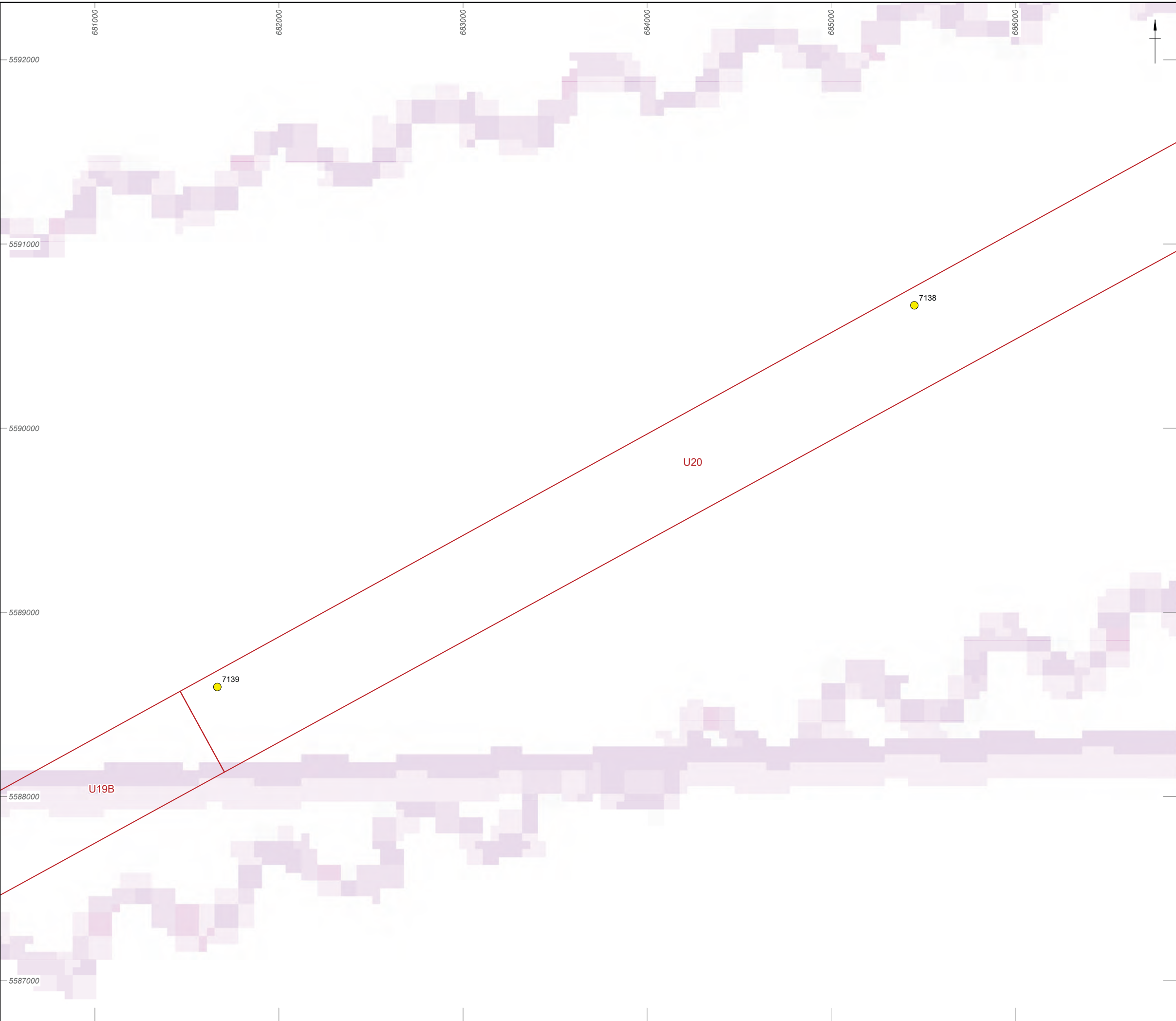


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Figure 3c: Anomalies of archaeological potential and archaeological exclusion zones (UTM29N area)





- Study area
- Anomalies of archaeological potential
- A2\_I – Anomaly of possible anthropogenic origin but the interpretation is uncertain



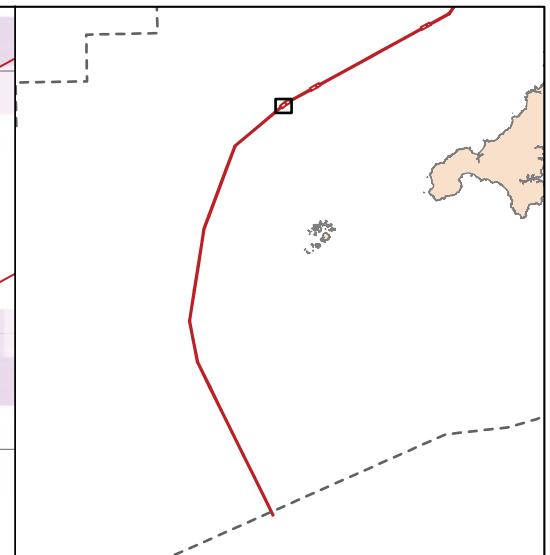
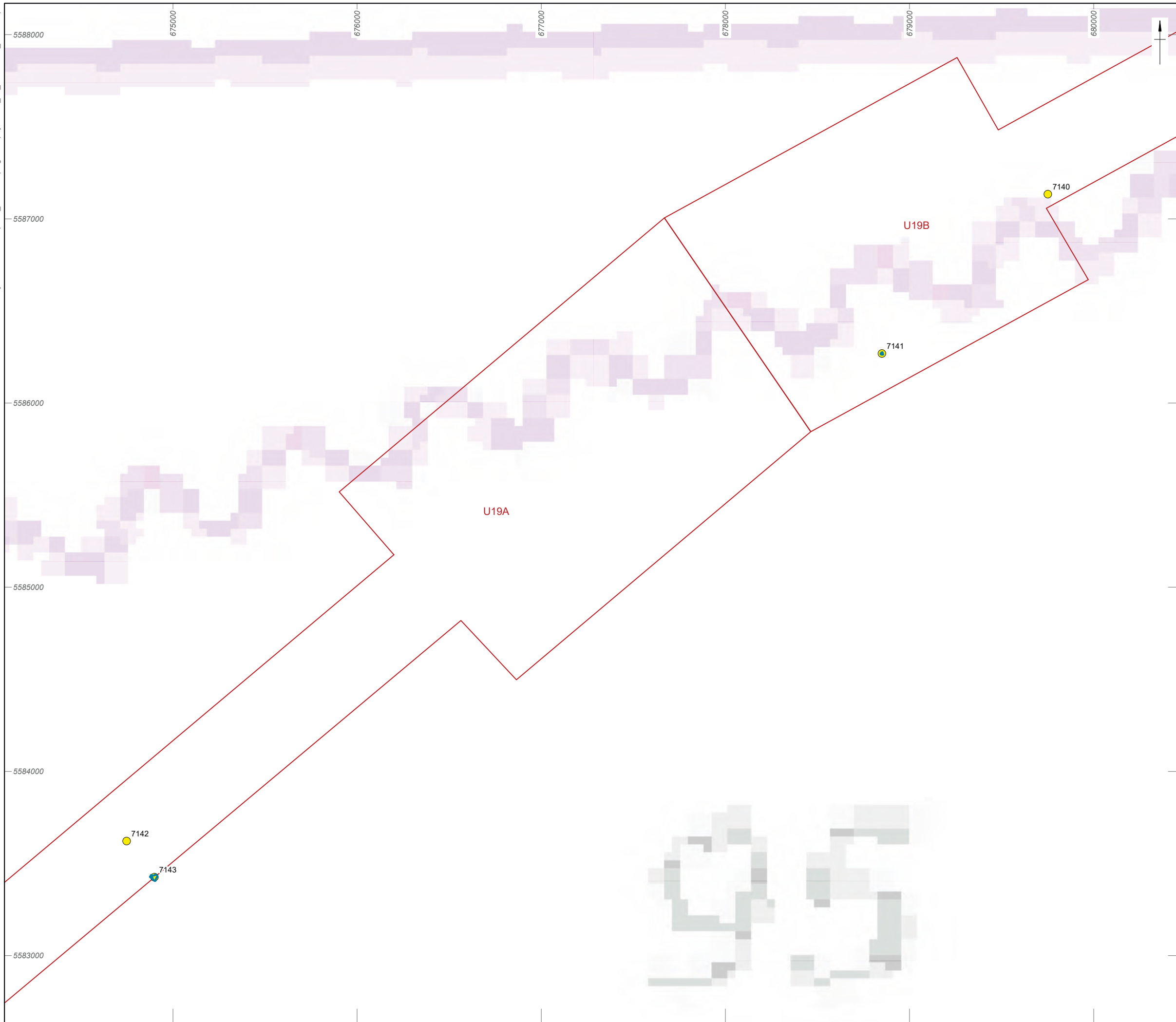
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Figure 3d: Anomalies of archaeological potential and archaeological exclusion zones (UTM29N area)



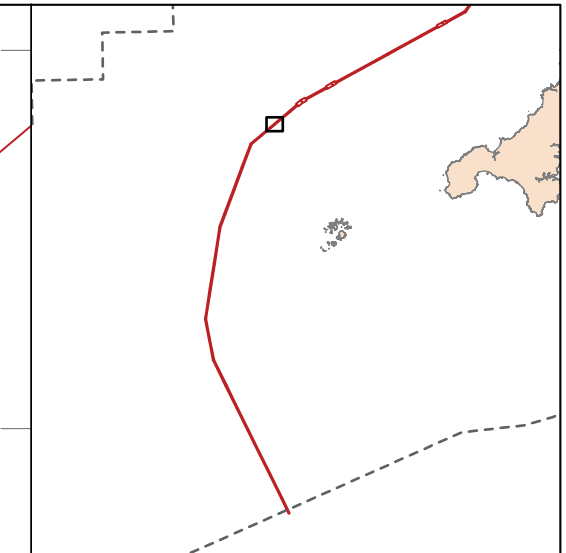
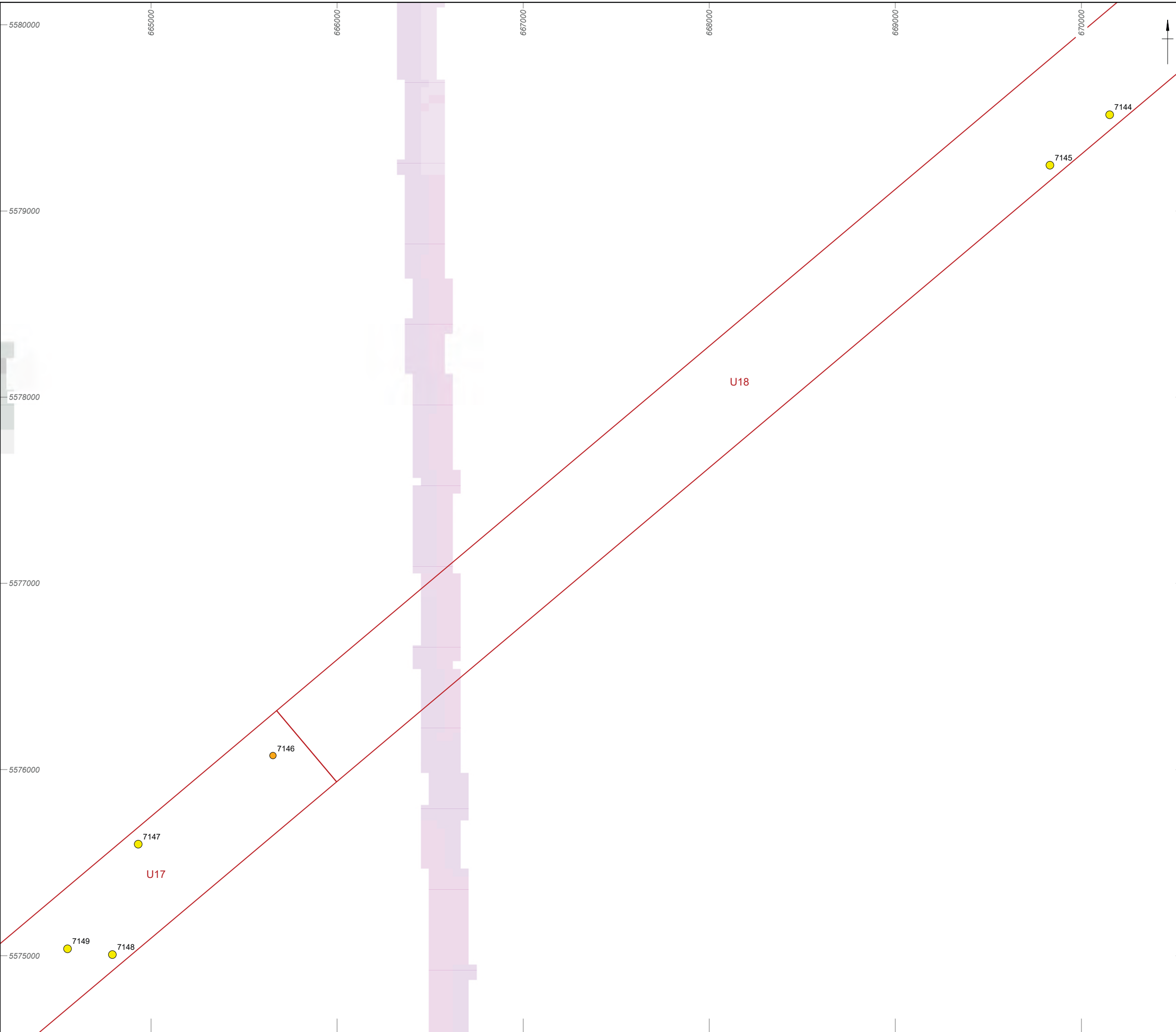
- Study area
- Anomalies of archaeological potential
- A2\_1 – Anomaly of possible anthropogenic origin but the interpretation is uncertain
- Seabed feature boundaries
- Seabed disturbance



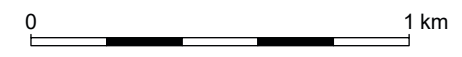
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Figure 3e: Anomalies of archaeological potential and archaeological exclusion zones (UTM29N area)



- Study area
- Anomalies of archaeological potential**
- A2\_h – Anomaly of likely anthropogenic origin but of unknown date
- A2\_l – Anomaly of possible anthropogenic origin but the interpretation is uncertain



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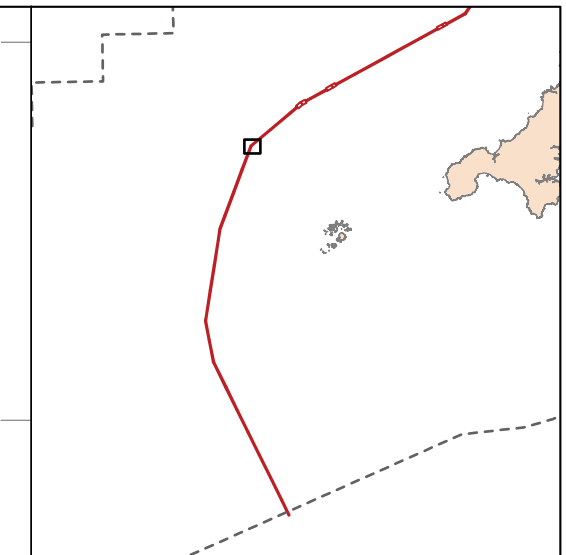
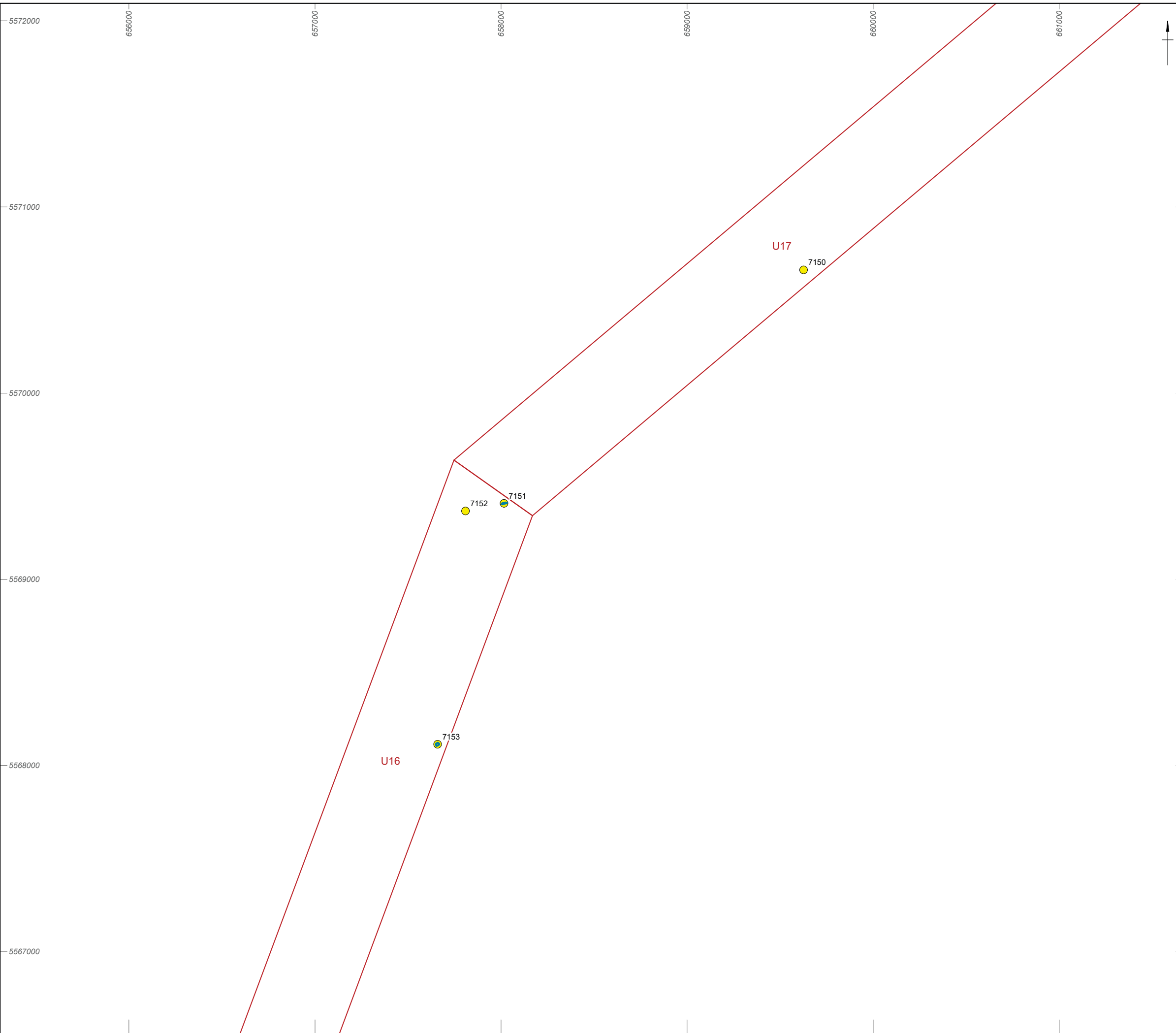
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Figure 3f: Anomalies of archaeological potential and archaeological exclusion zones (UTM29N area)



- Study area
- Anomalies of archaeological potential
- A2\_1 – Anomaly of possible anthropogenic origin but the interpretation is uncertain
- Seabed feature boundaries
- Seabed disturbance



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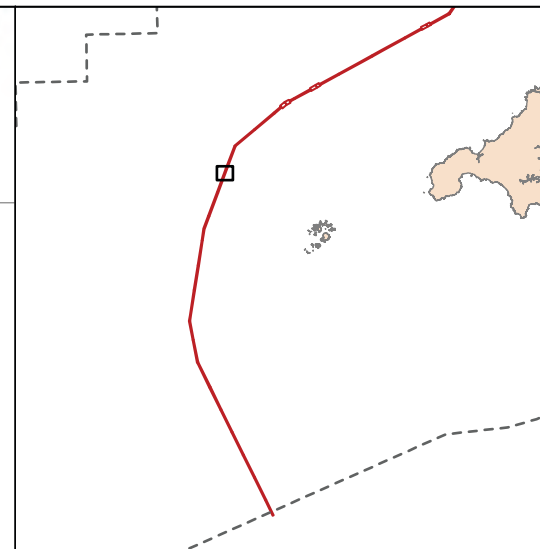
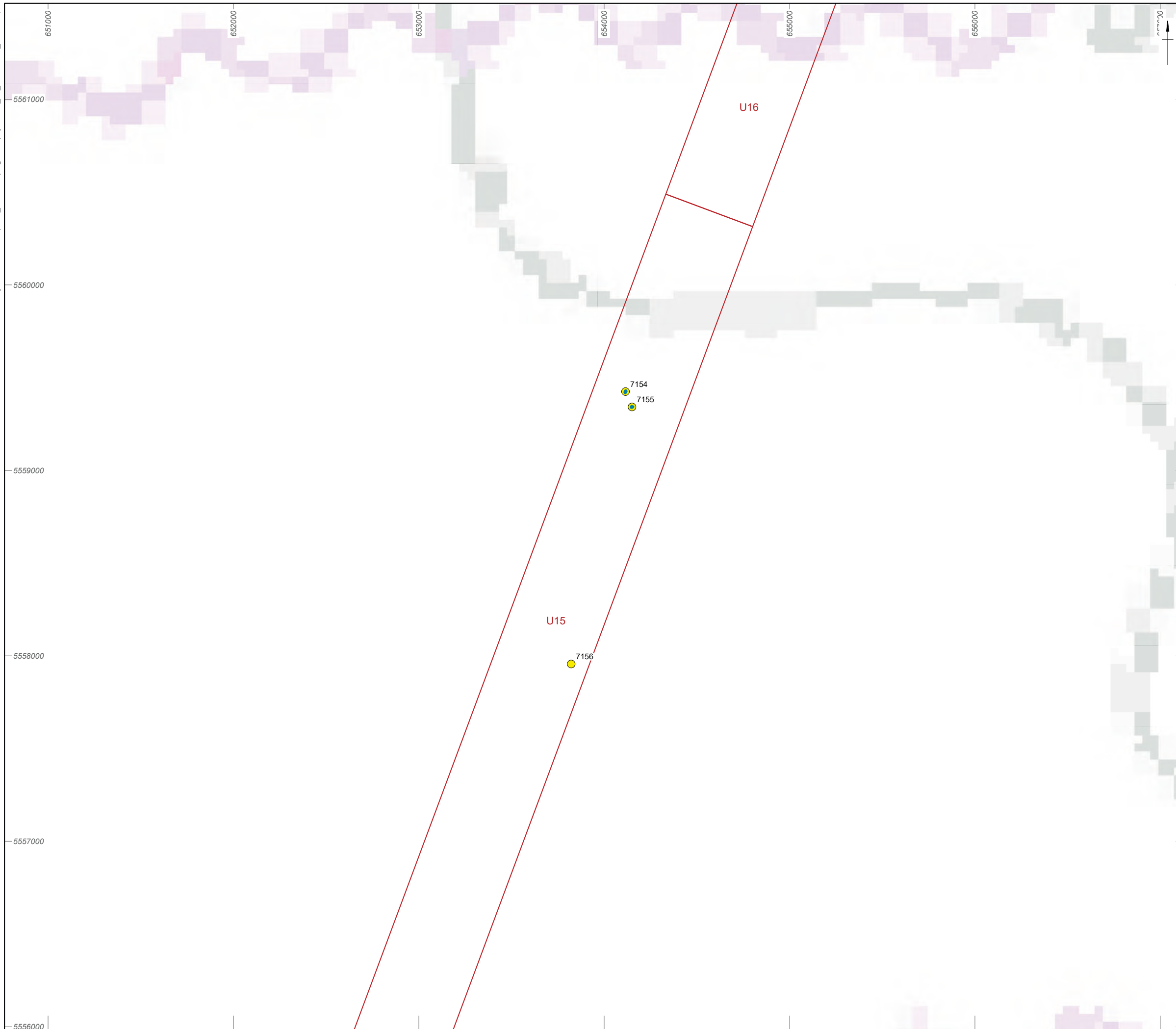
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Scale: 1:20,000 at A3	Revision: 0	

Figure 3g: Anomalies of archaeological potential and archaeological exclusion zones (UTM29N area)



**Study area**

Anomalies of archaeological potential

- A2\_I – Anomaly of possible anthropogenic origin but the interpretation is uncertain

Seabed feature boundaries

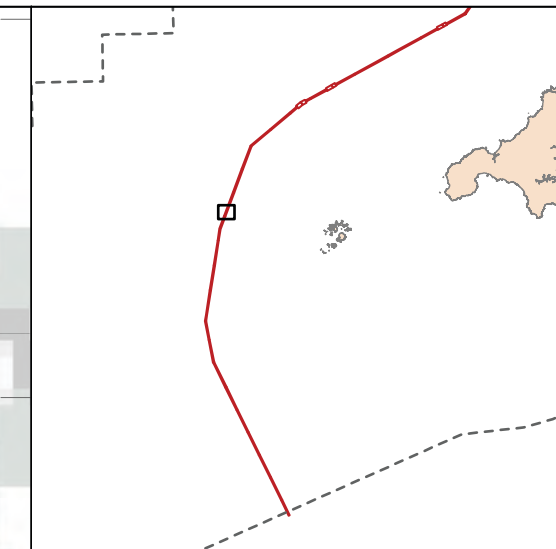
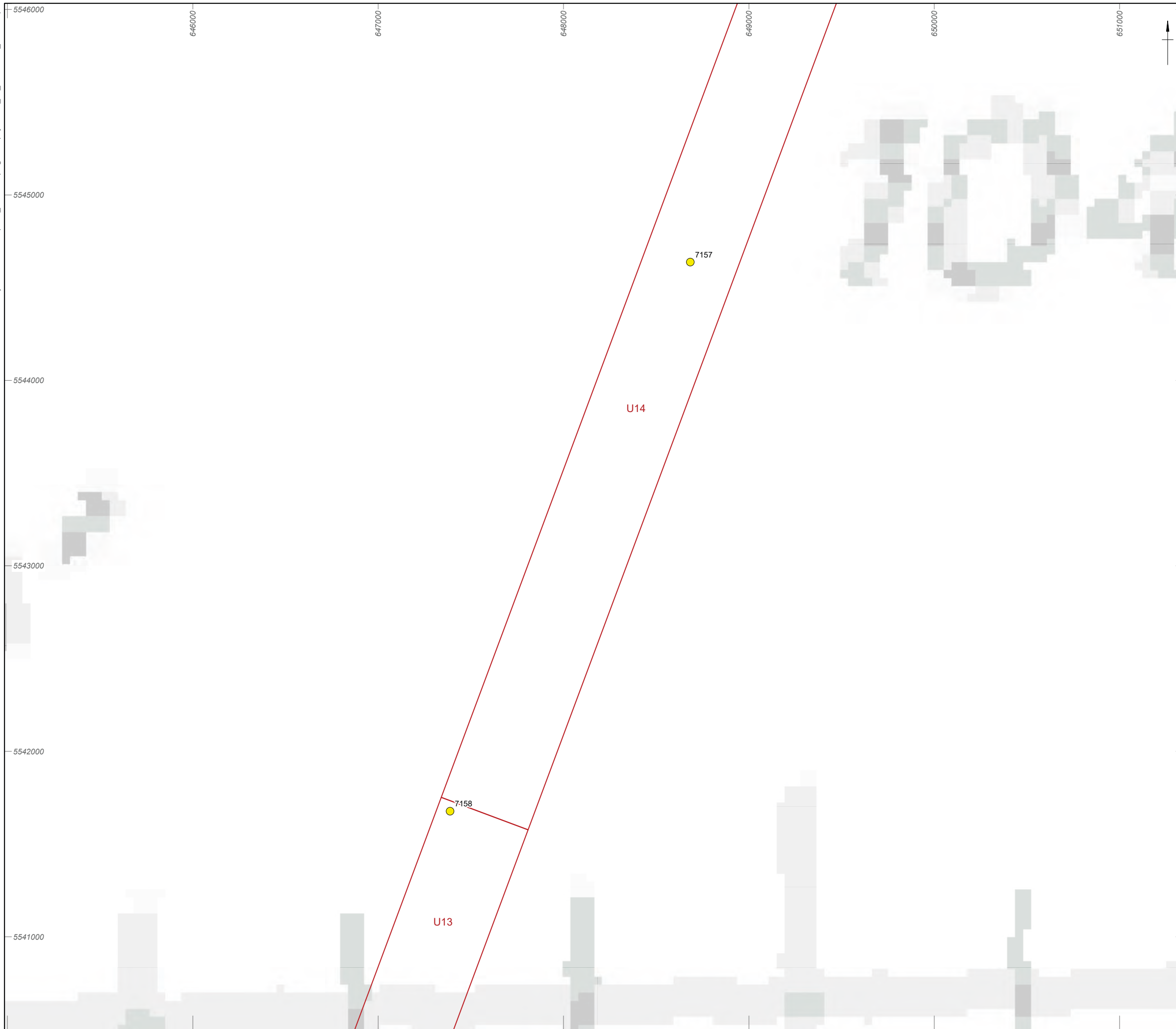
Seabed disturbance


0 1 km

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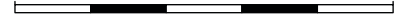
Figure 3h: Anomalies of archaeological potential and archaeological exclusion zones (UTM29N area)



 Study area

Anomalies of archaeological potential

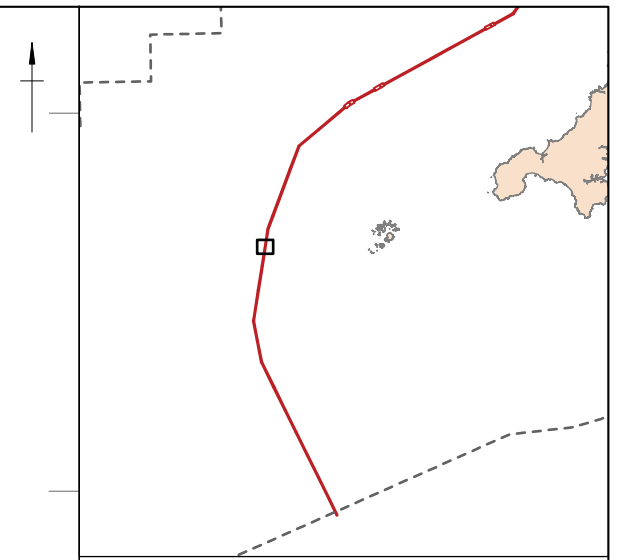
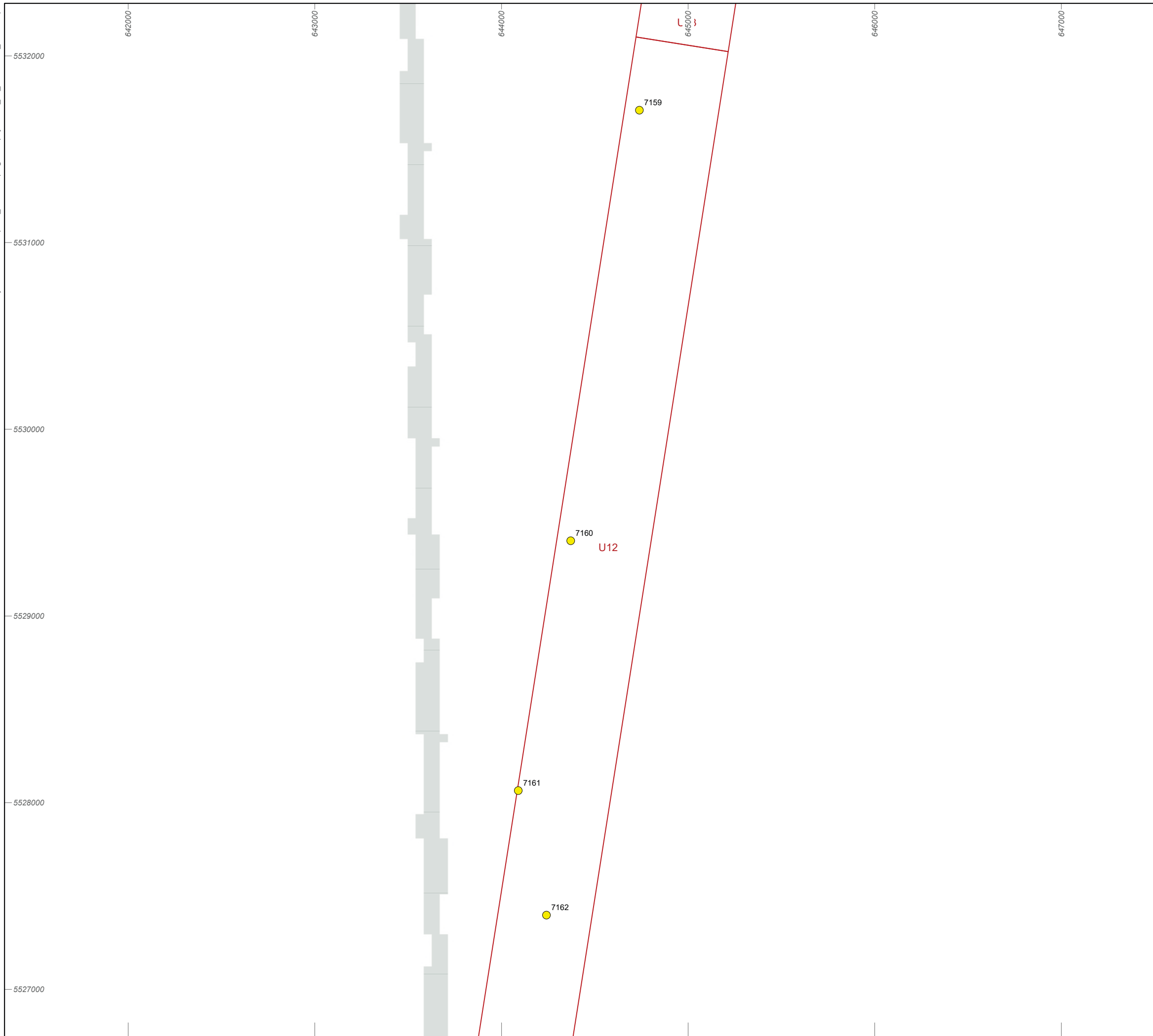
 A2\_1 – Anomaly of possible anthropogenic origin but the interpretation is uncertain

0  1 km

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Figure 3i: Anomalies of archaeological potential and archaeological exclusion zones (UTM29N area)



- Study area
- Anomalies of archaeological potential
- A2\_1 – Anomaly of possible anthropogenic origin but the interpretation is uncertain



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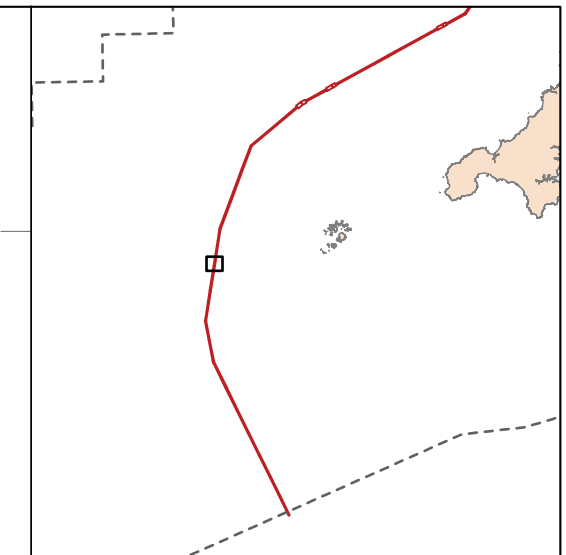
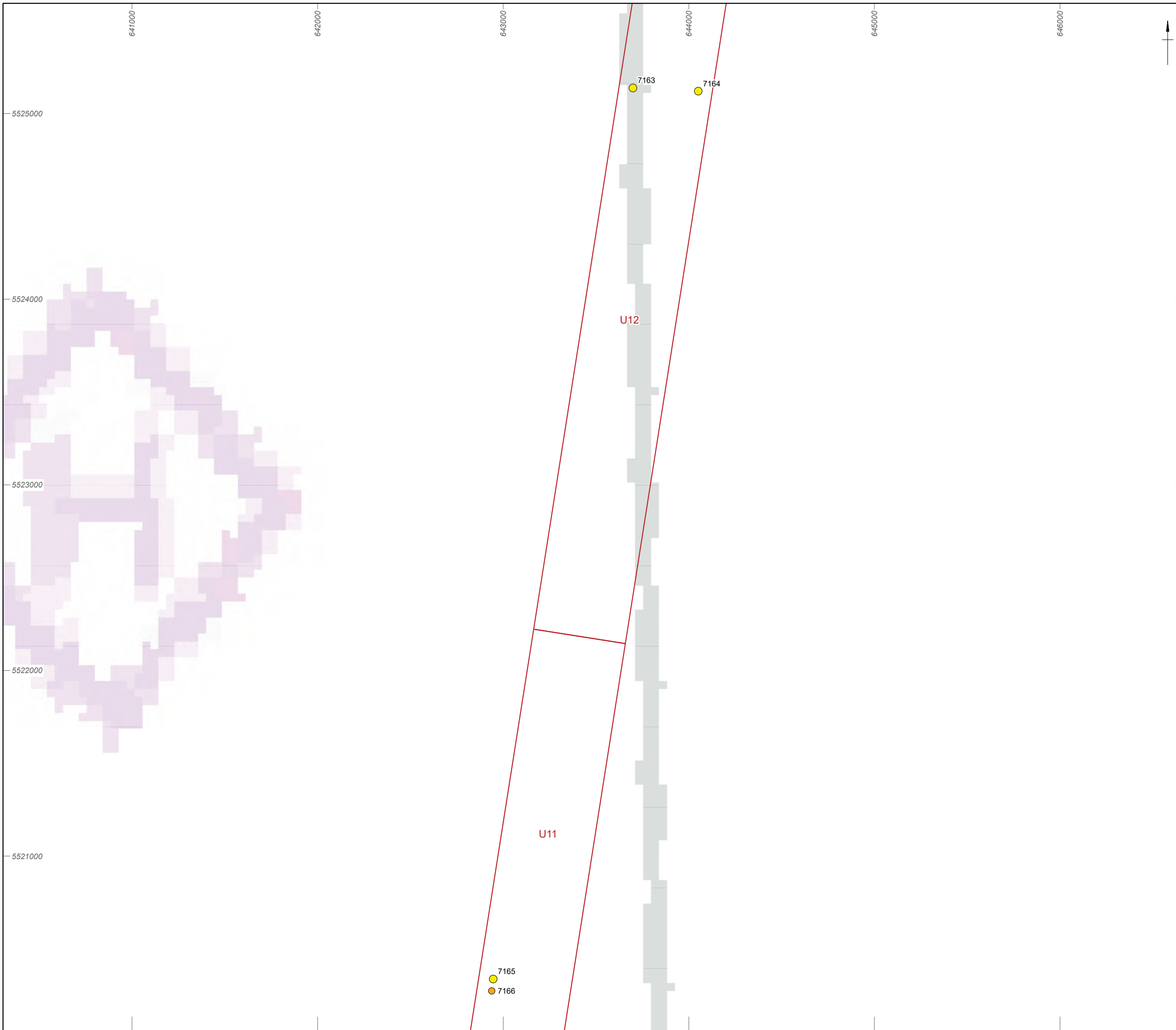
Date: 20/08/2024	Created by: KJF	
Scale: 1:20,000 at A3	Revision: 0	

Figure 3j: Anomalies of archaeological potential and archaeological exclusion zones (UTM29N area)



- Study area
- Anomalies of archaeological potential**
- A2\_h – Anomaly of likely anthropogenic origin but of unknown date
- A2\_l – Anomaly of possible anthropogenic origin but the interpretation is uncertain



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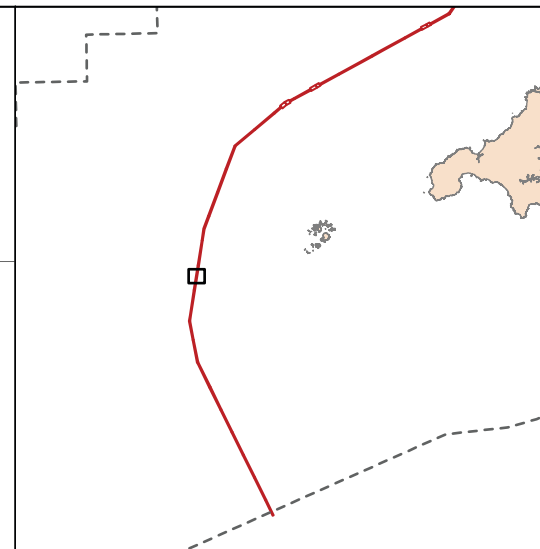
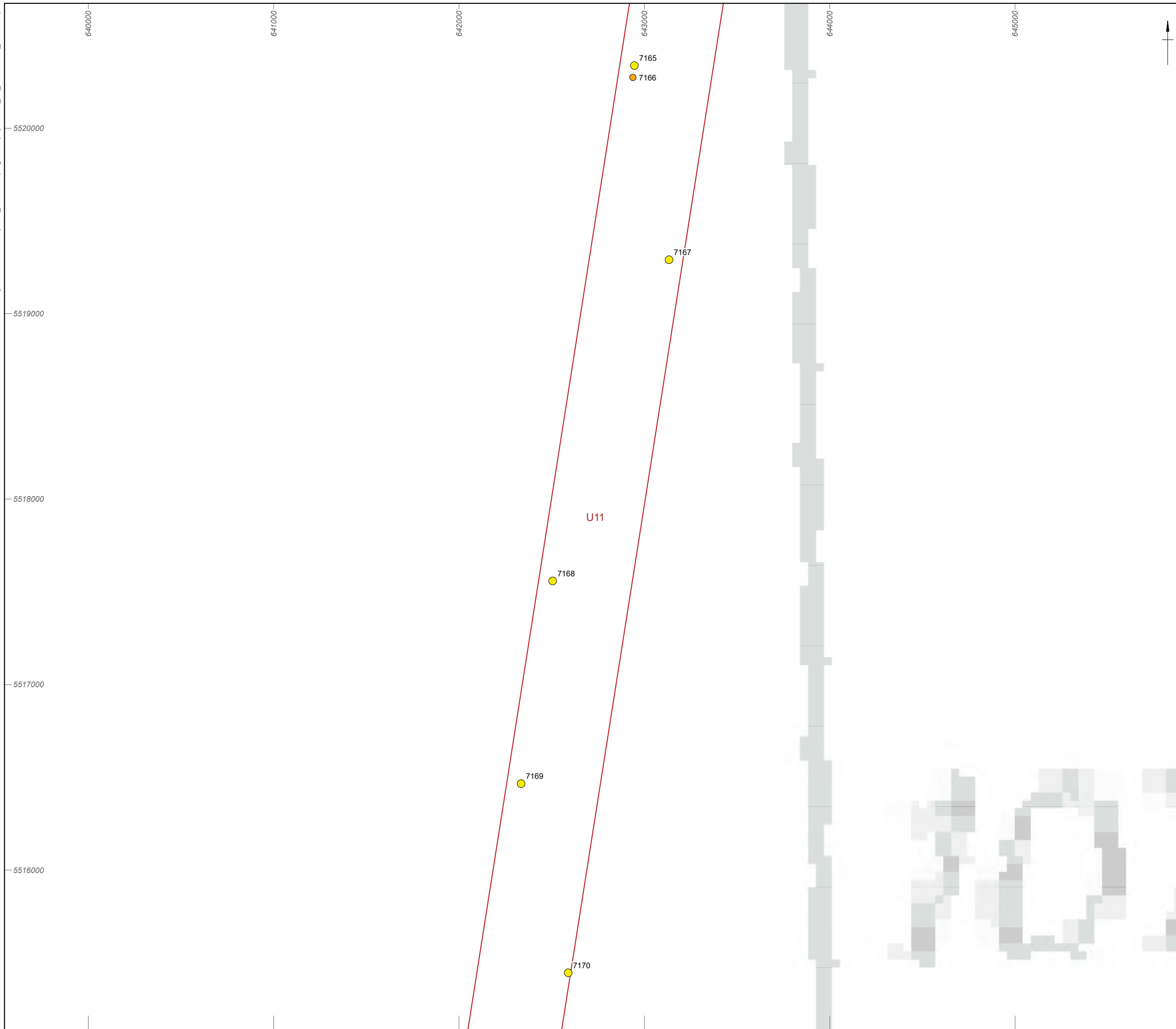
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Scale: 1:20,000 at A3	Revision: 0	

Figure 3k: Anomalies of archaeological potential and archaeological exclusion zones (UTM29N area)





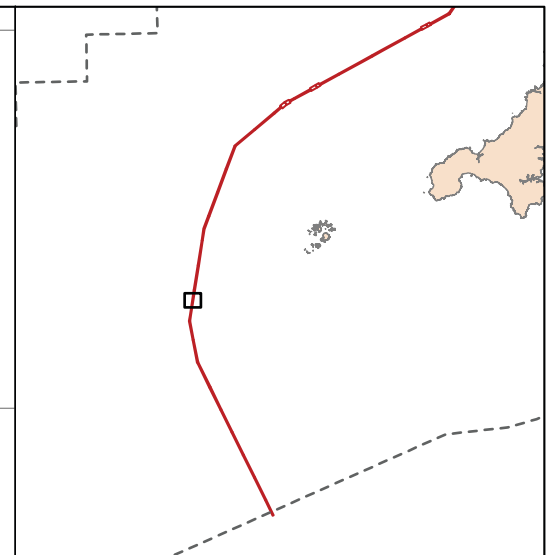
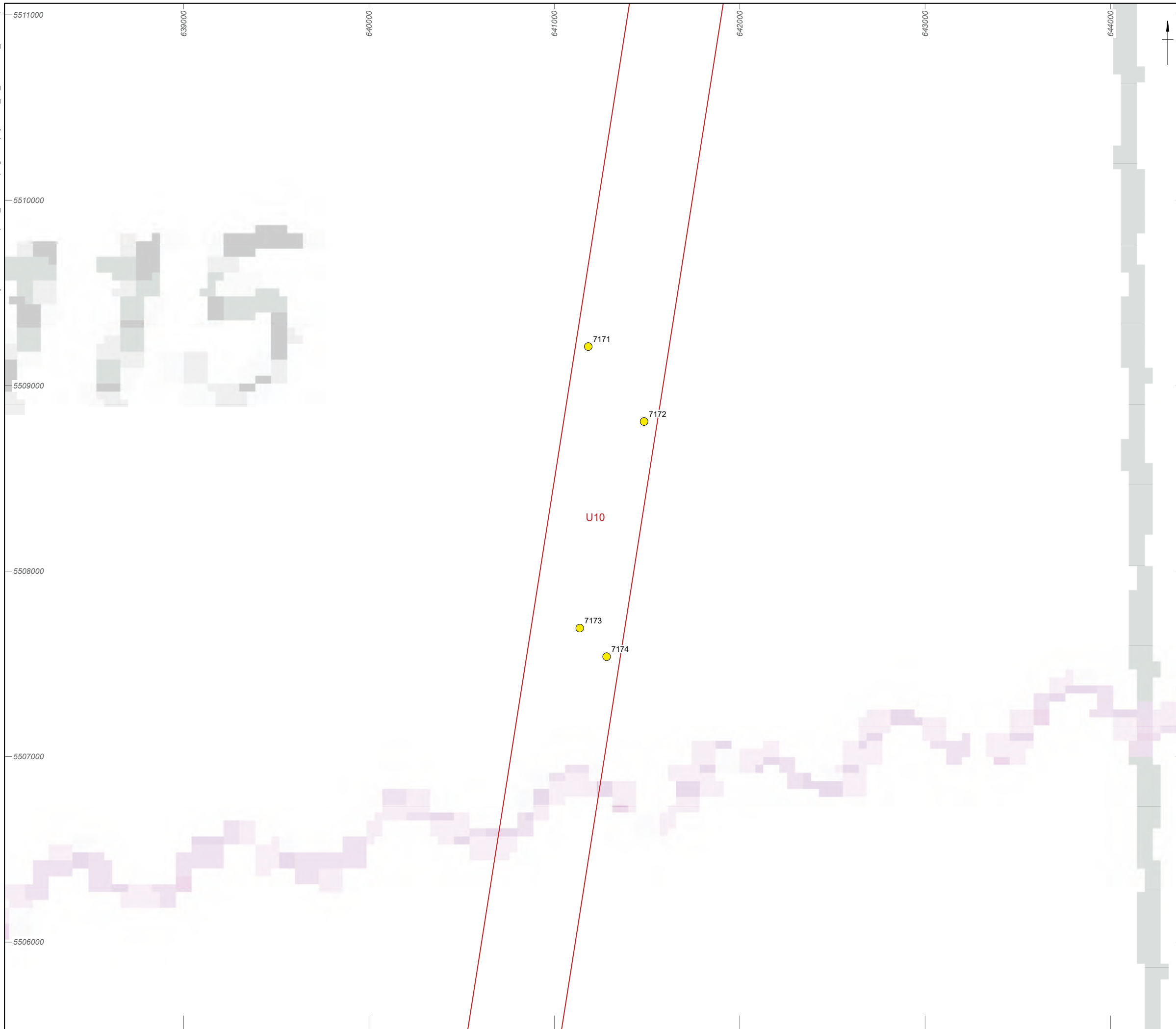
Study area  
**Anomalies of archaeological potential**  
● A2\_h – Anomaly of likely anthropogenic origin but of unknown date  
● A2\_l – Anomaly of possible anthropogenic origin but the interpretation is uncertain

0  1 km

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Figure 3i: Anomalies of archaeological potential and archaeological exclusion zones (UTM29N area)



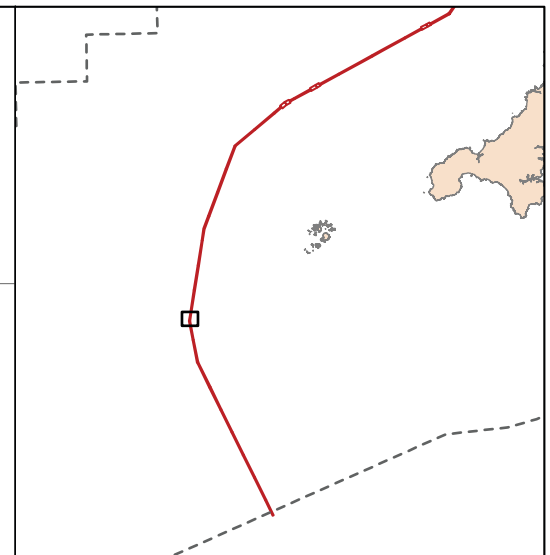
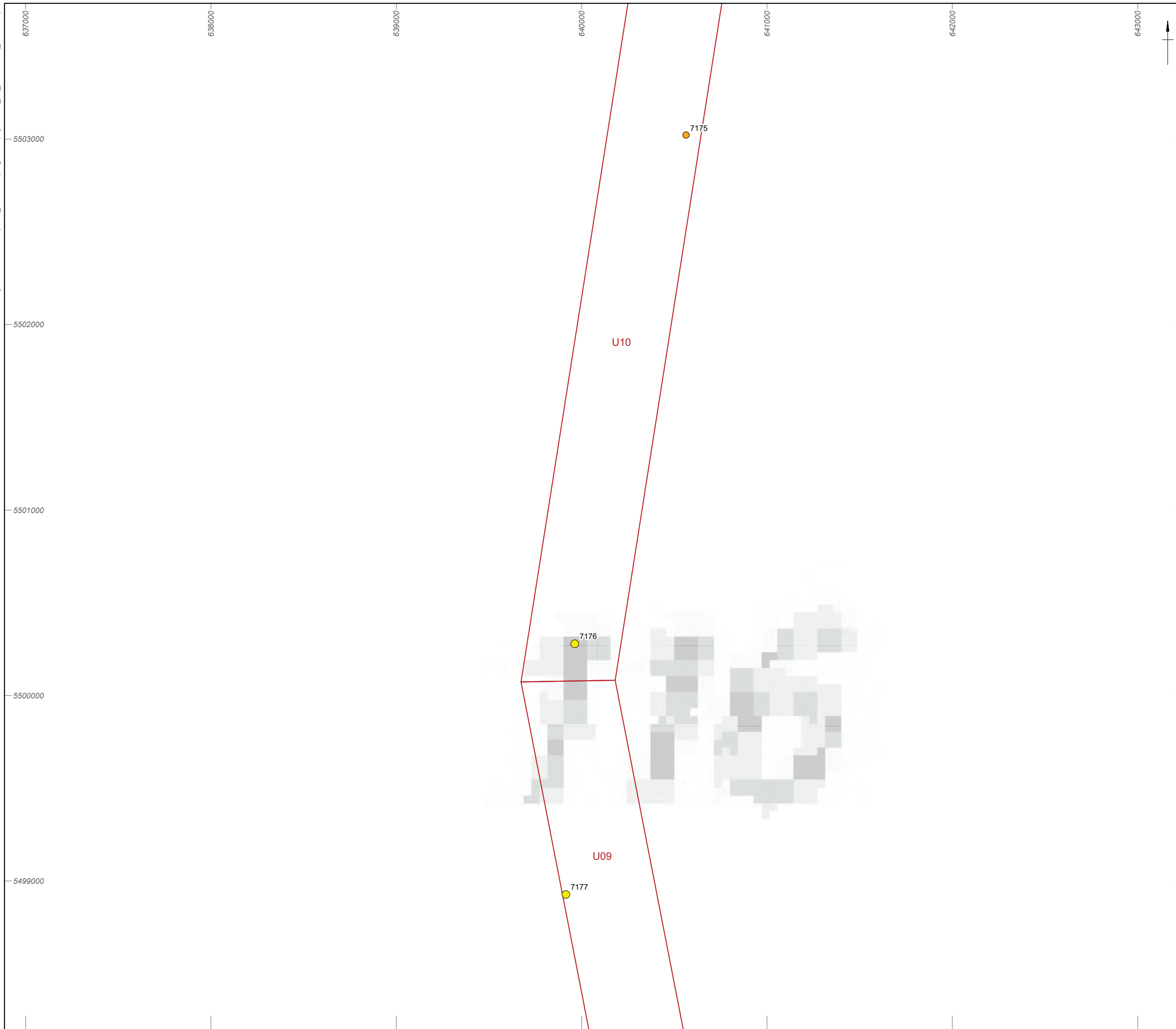
Study area  
 Anomalies of archaeological potential  
● A2\_I – Anomaly of possible anthropogenic origin but the interpretation is uncertain

0  1 km

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Figure 3m: Anomalies of archaeological potential and archaeological exclusion zones (UTM29N area)



**Study area**

**Anomalies of archaeological potential**

- A2\_h – Anomaly of likely anthropogenic origin but of unknown date
- A2\_l – Anomaly of possible anthropogenic origin but the interpretation is uncertain

0  1 km

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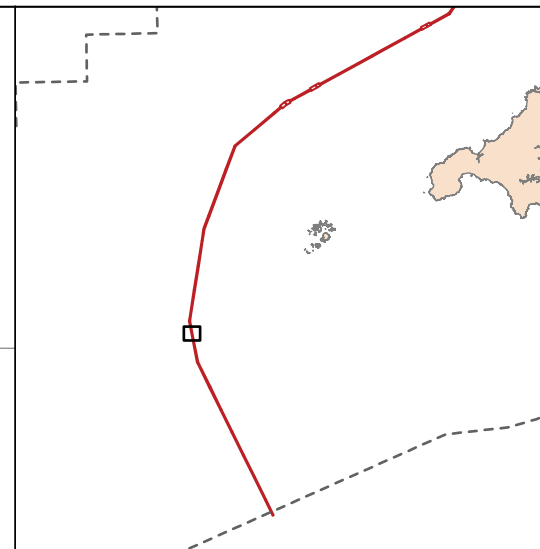
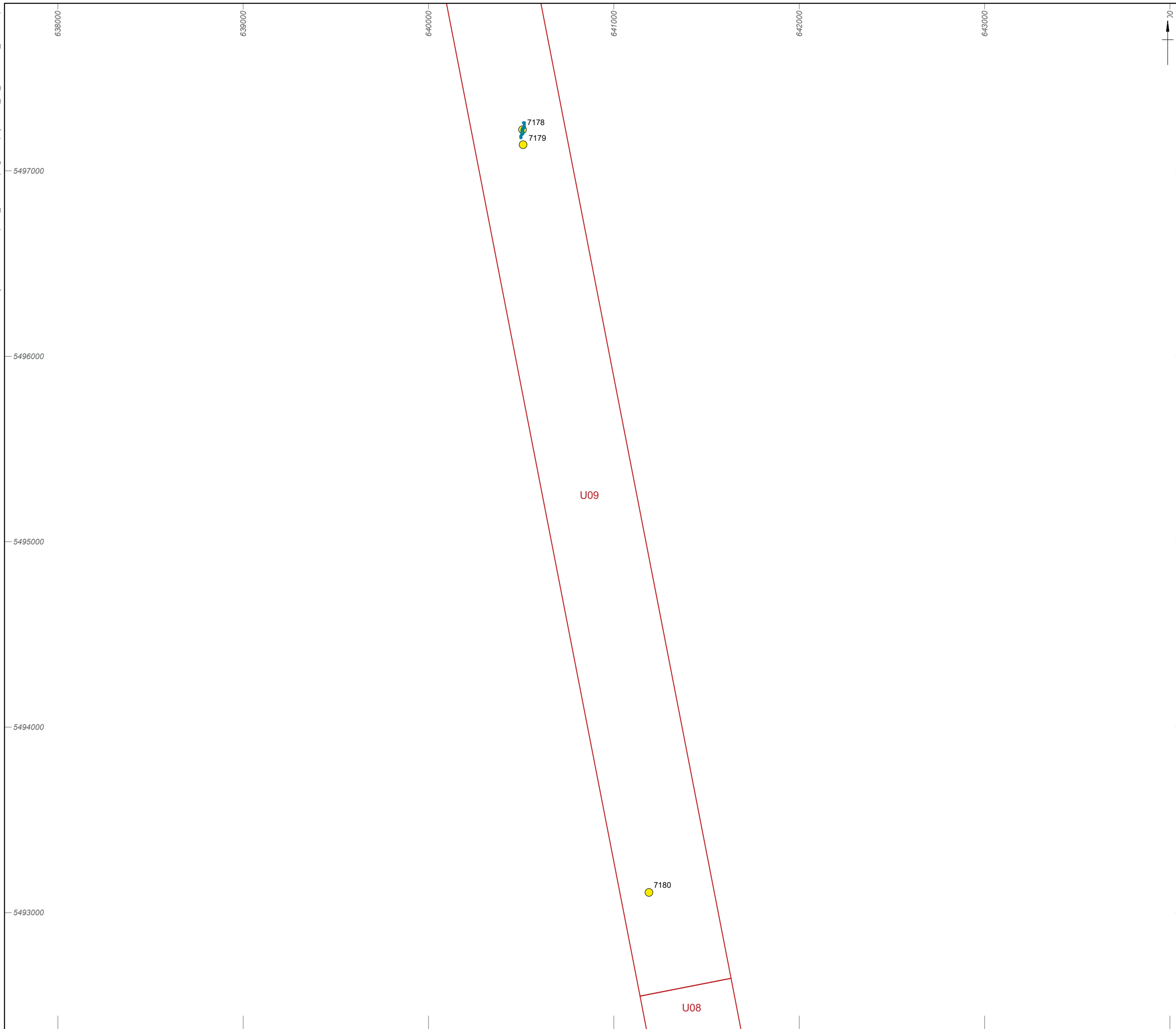
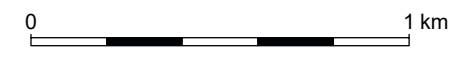
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Figure 3n: Anomalies of archaeological potential and archaeological exclusion zones (UTM29N area)



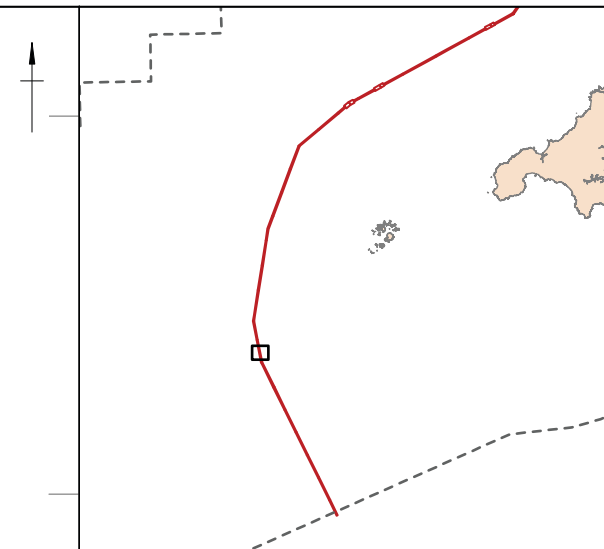
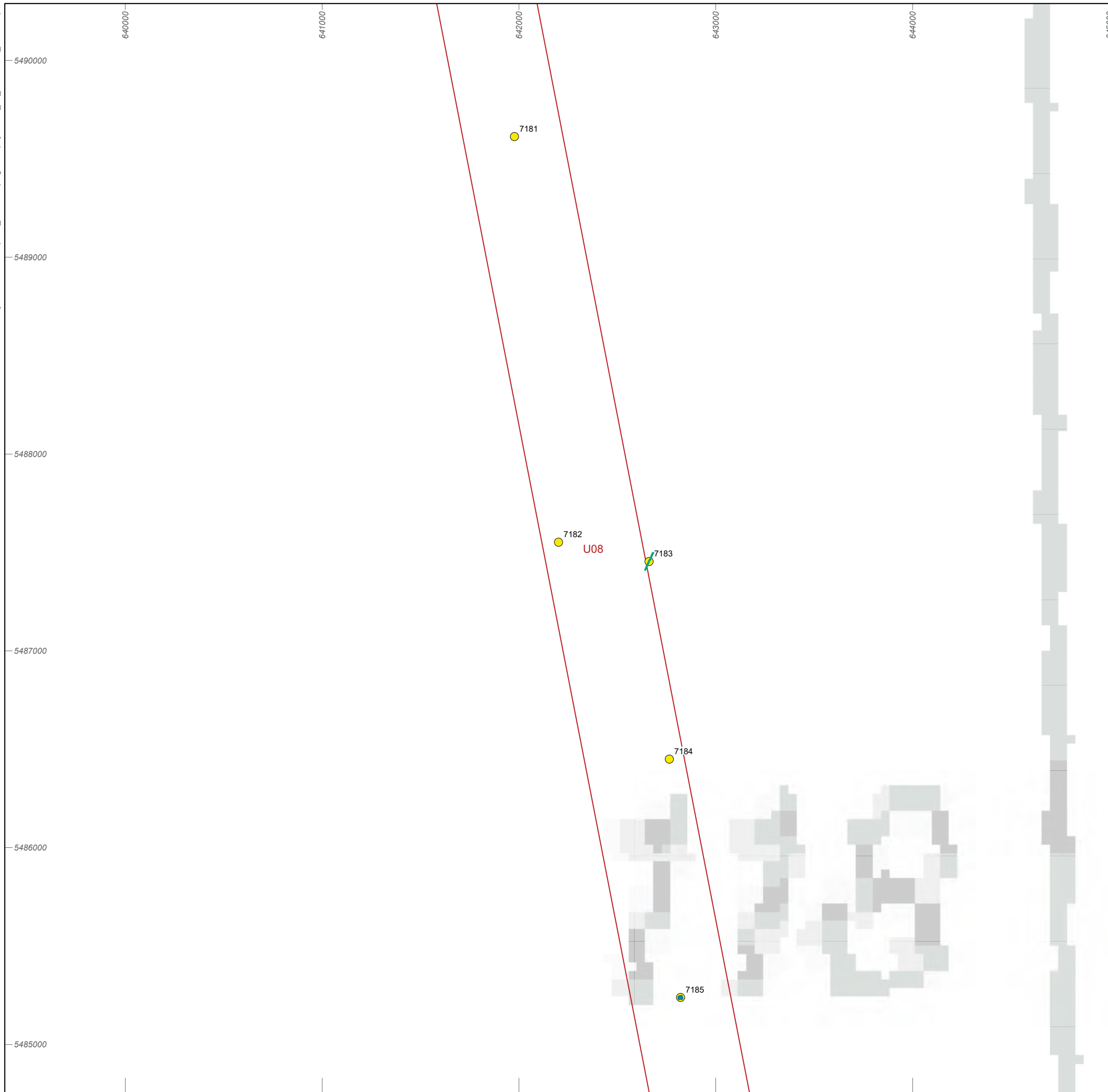
- Study area
- Anomalies of archaeological potential
- A2\_1 – Anomaly of possible anthropogenic origin but the interpretation is uncertain
- Seabed feature boundaries
- Seabed disturbance



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Figure 3o: Anomalies of archaeological potential and archaeological exclusion zones (UTM29N area)



Study area

Anomalies of archaeological potential

- A2\_I – Anomaly of possible anthropogenic origin but the interpretation is uncertain

Seabed feature boundaries

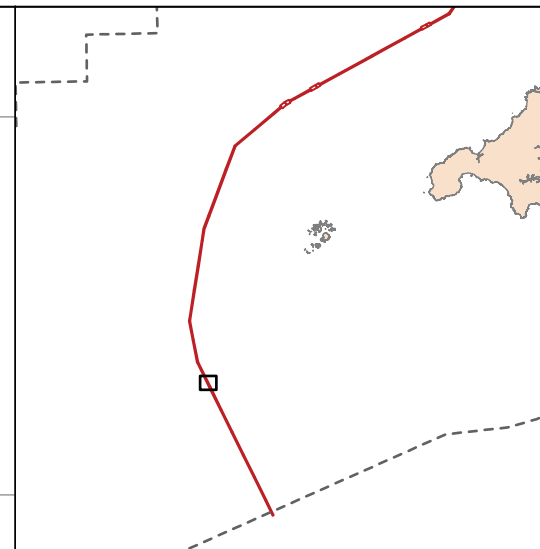
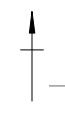
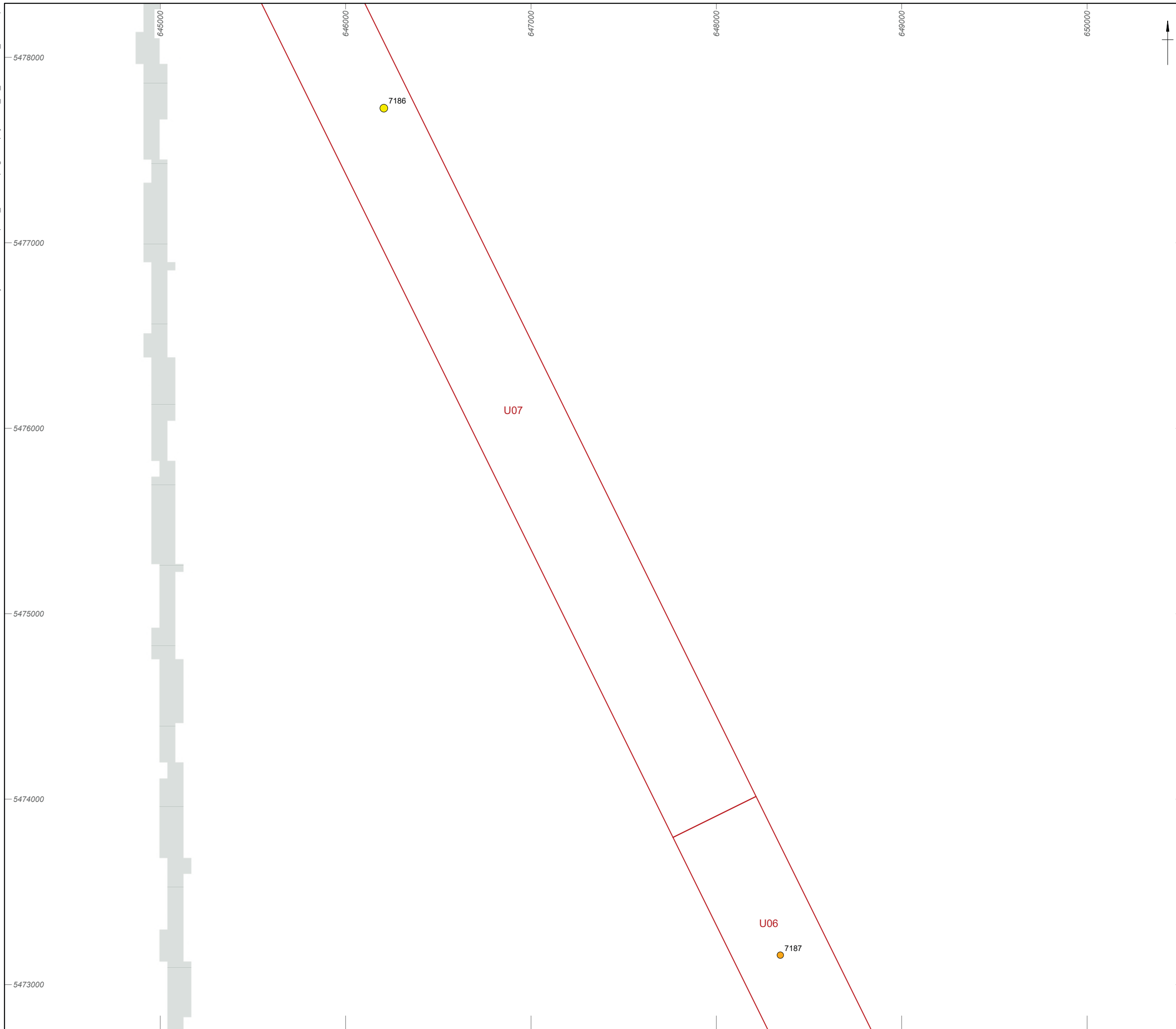
- Seabed disturbance
- Linear seabed features
- Dark reflector

0 1 km

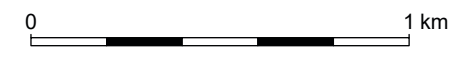
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Figure 3p: Anomalies of archaeological potential and archaeological exclusion zones (UTM29N area)



- Study area
- Anomalies of archaeological potential**
- A2\_h – Anomaly of likely anthropogenic origin but of unknown date
- A2\_l – Anomaly of possible anthropogenic origin but the interpretation is uncertain



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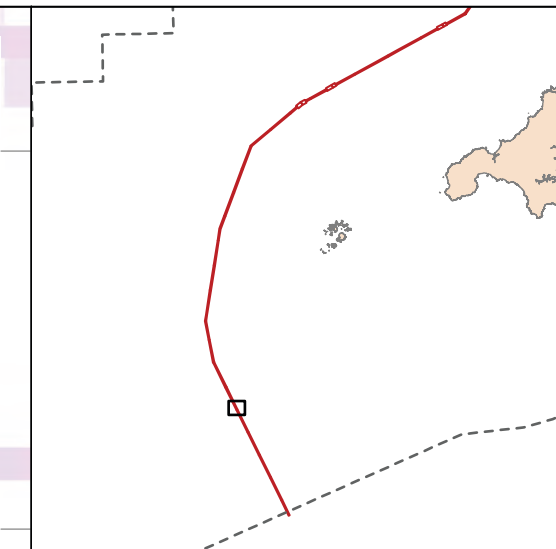
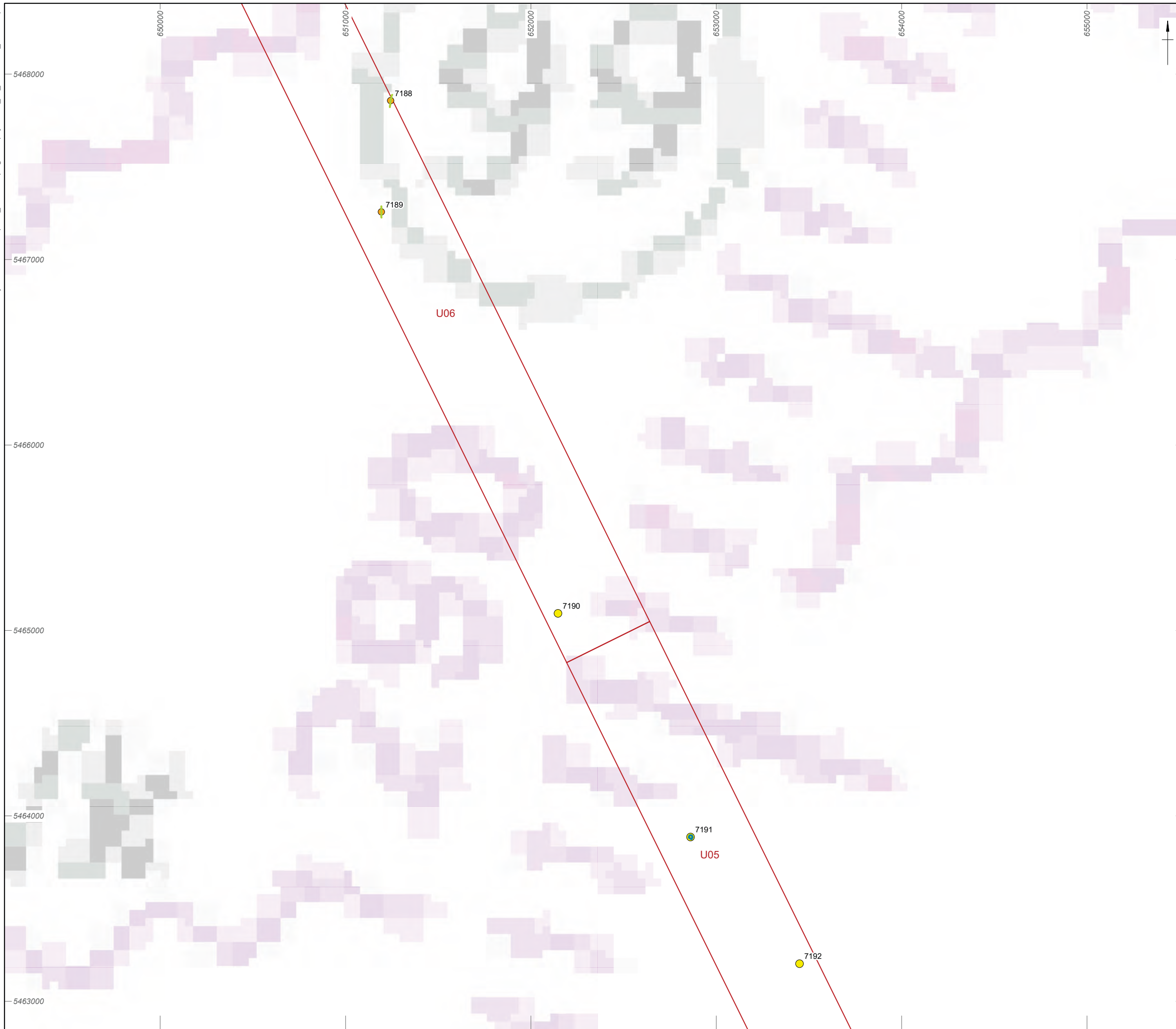
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Figure 3q: Anomalies of archaeological potential and archaeological exclusion zones (UTM29N area)





**Study area**

**Anomalies of archaeological potential**

- A2\_h – Anomaly of likely anthropogenic origin but of unknown date
- A2\_l – Anomaly of possible anthropogenic origin but the interpretation is uncertain

**Seabed feature boundaries**

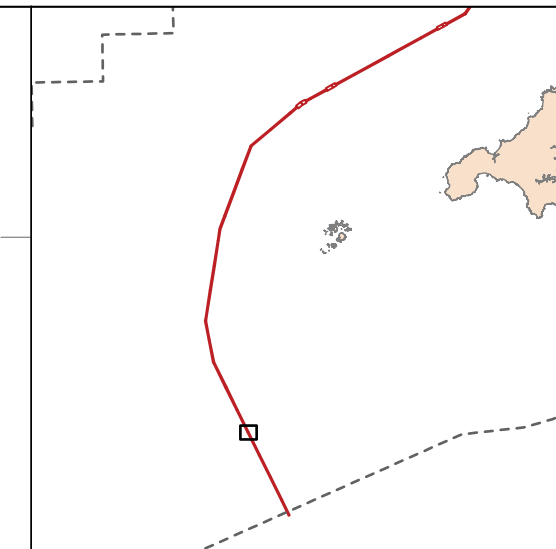
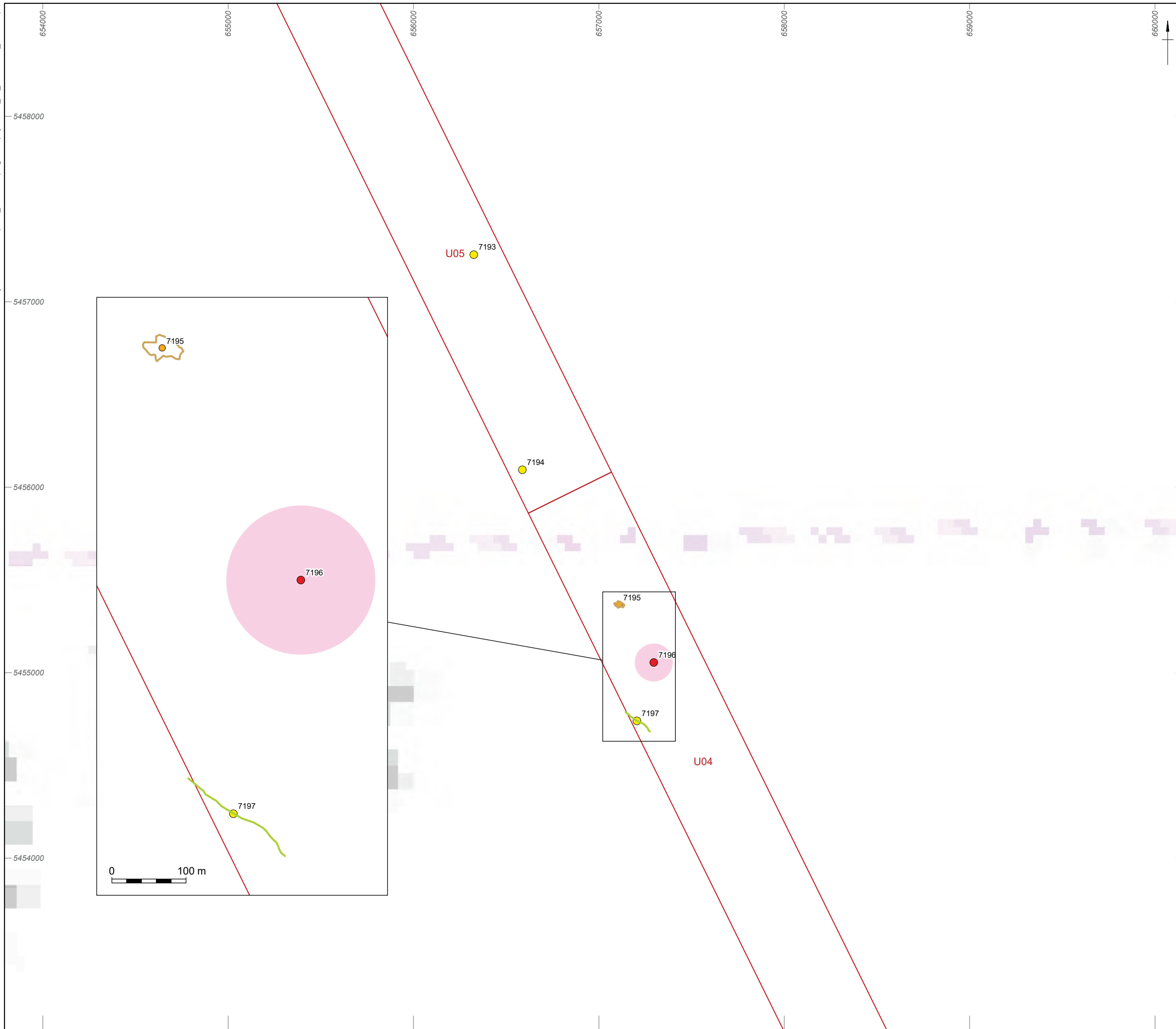
- Seabed disturbance
- Linear seabed features
- Linear debris

0 1 km

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Figure 3r: Anomalies of archaeological potential and archaeological exclusion zones (UTM29N area)



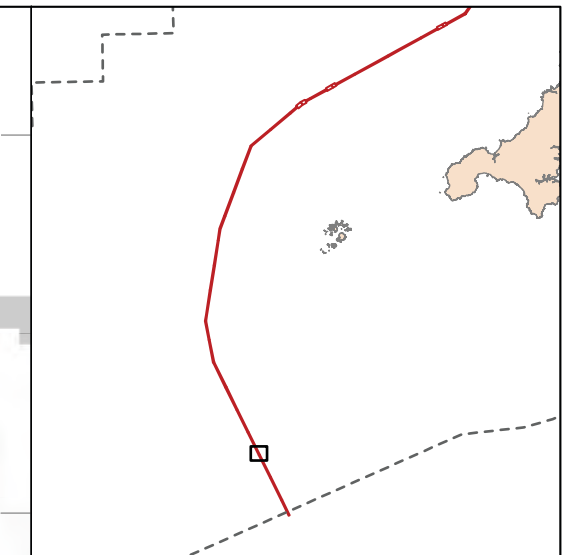
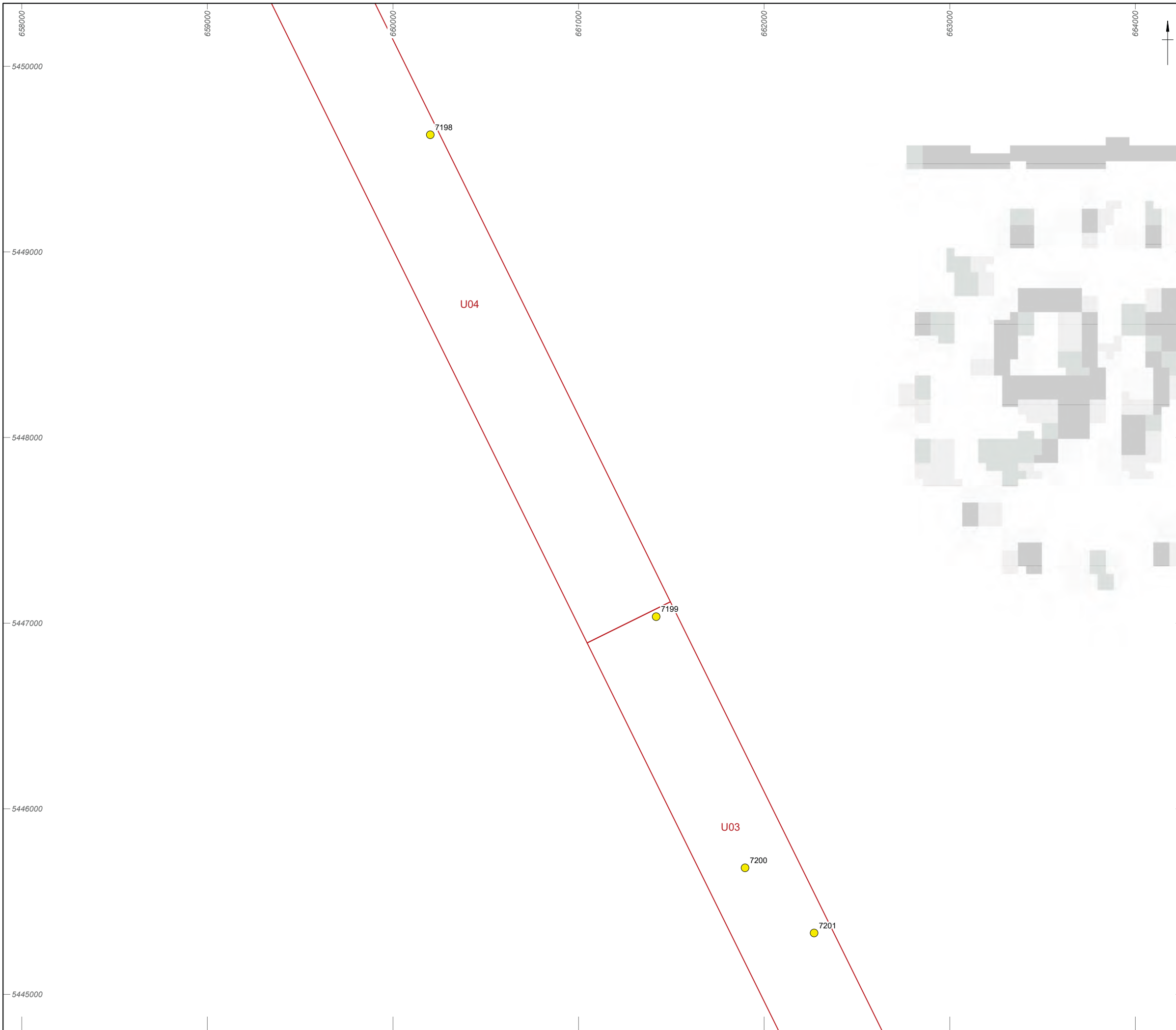
- Study area
- Recommended Archaeological Exclusion Zones (AEZs) – 100 m
- Anomalies of archaeological potential**
- A1 – Anthropogenic origin of archaeological interest
- A2\_h – Anomaly of likely anthropogenic origin but of unknown date
- A2\_l – Anomaly of possible anthropogenic origin but the interpretation is uncertain
- Seabed feature boundaries**
- Debris field
- Linear seabed features**
- Linear debris



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Figure 3s: Anomalies of archaeological potential and archaeological exclusion zones (UTM29N area)



Study area  
 Anomalies of archaeological potential  
● A2\_I – Anomaly of possible anthropogenic origin but the interpretation is uncertain

0 


 1 km

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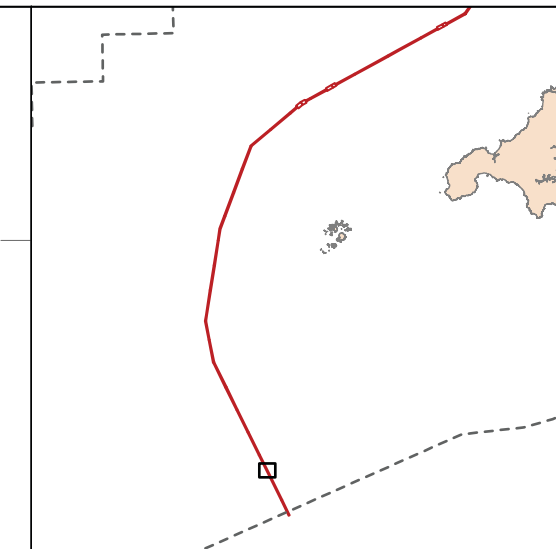
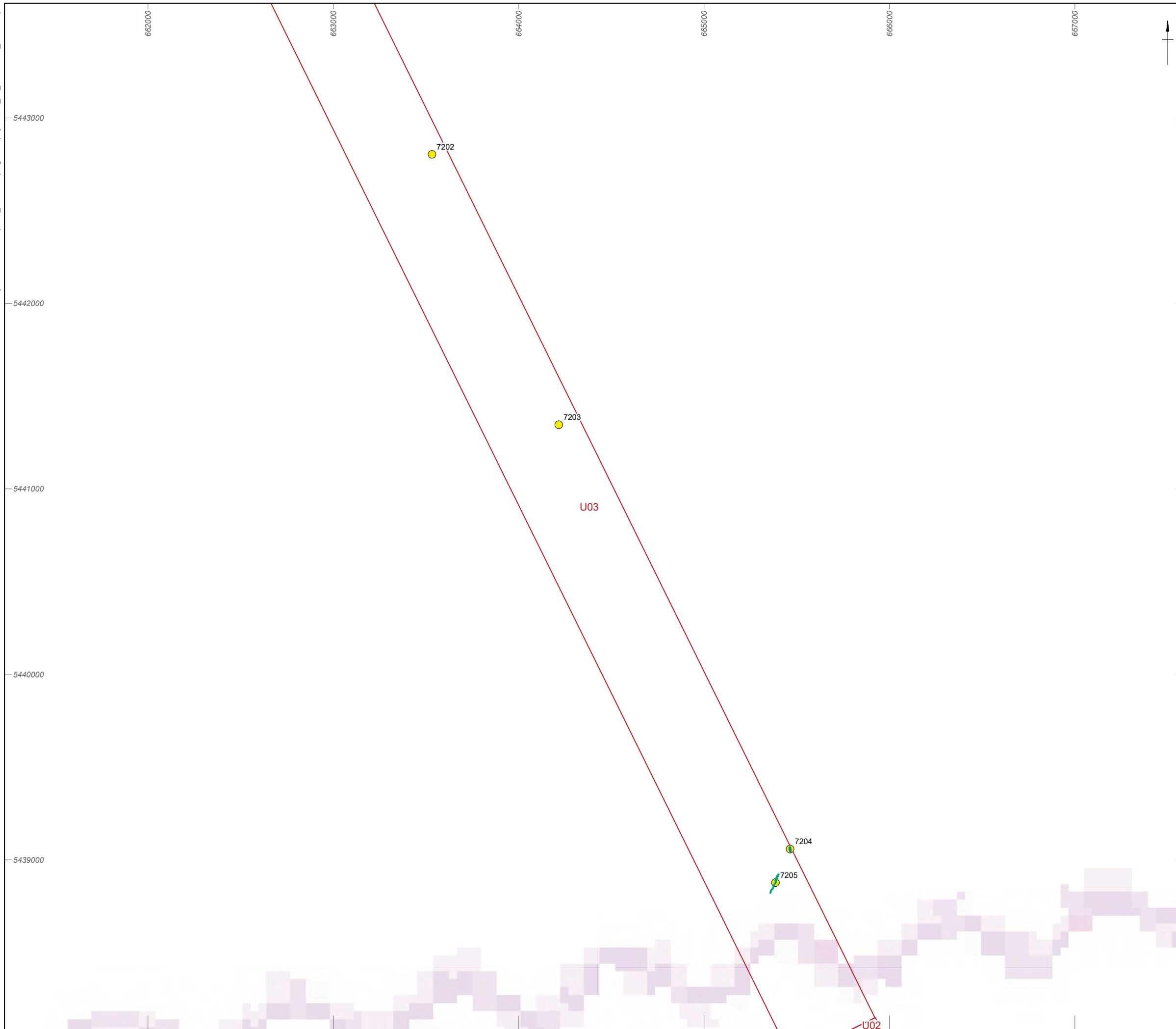
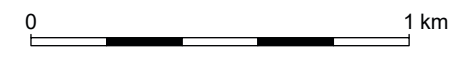
Date: 20/08/2024	Created by: KJF	
Scale: 1:20,000 at A3	Revision: 0	

Figure 3t: Anomalies of archaeological potential and archaeological exclusion zones (UTM29N area)



- Study area
- Anomalies of archaeological potential
- A2\_I – Anomaly of possible anthropogenic origin but the interpretation is uncertain
- Seabed feature boundaries
- Seabed disturbance
- Linear seabed features
- Dark reflector



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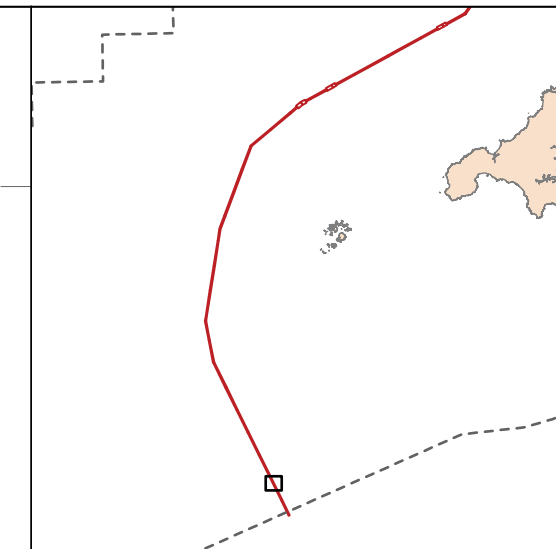
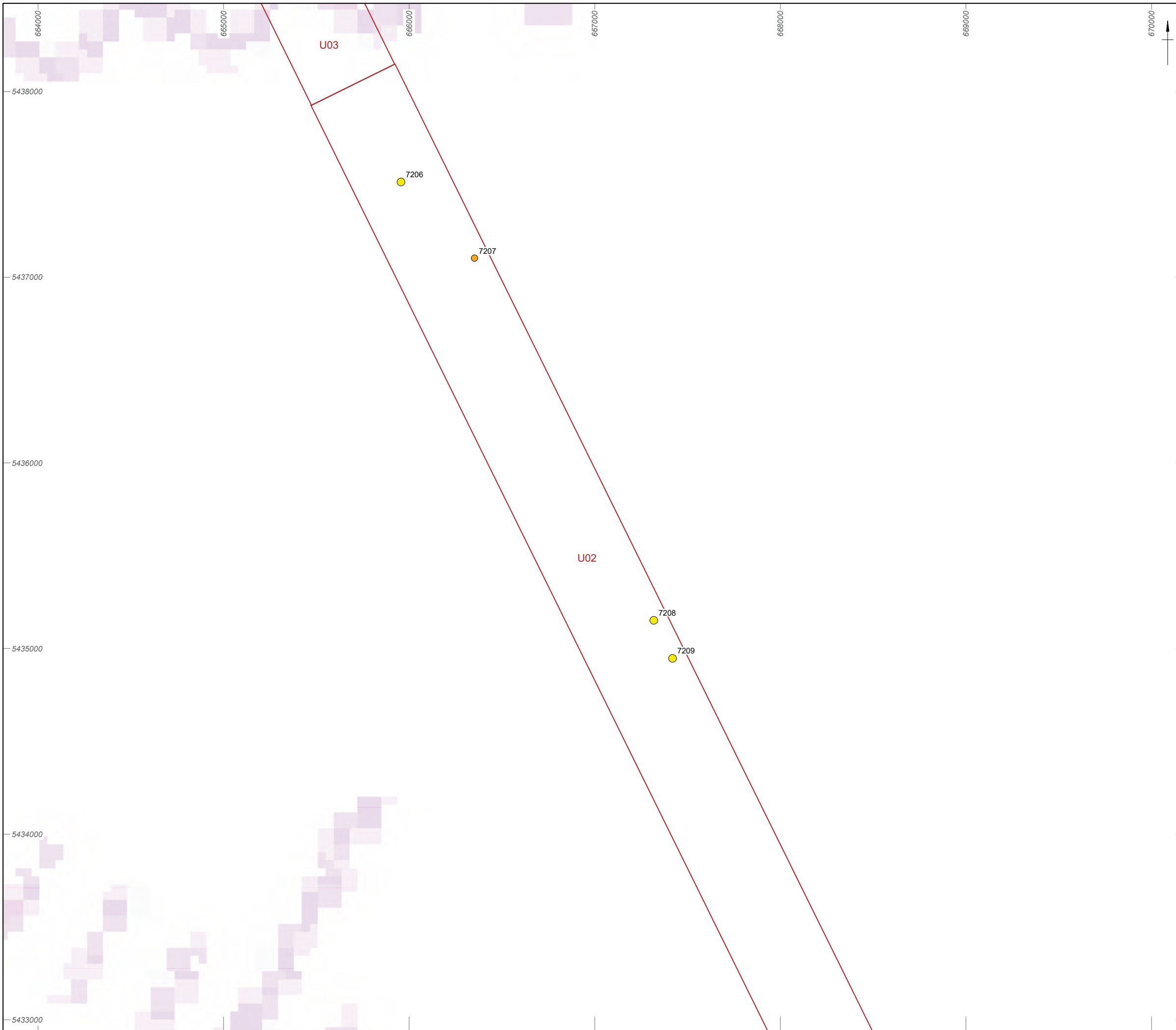
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Figure 3u: Anomalies of archaeological potential and archaeological exclusion zones (UTM29N area)



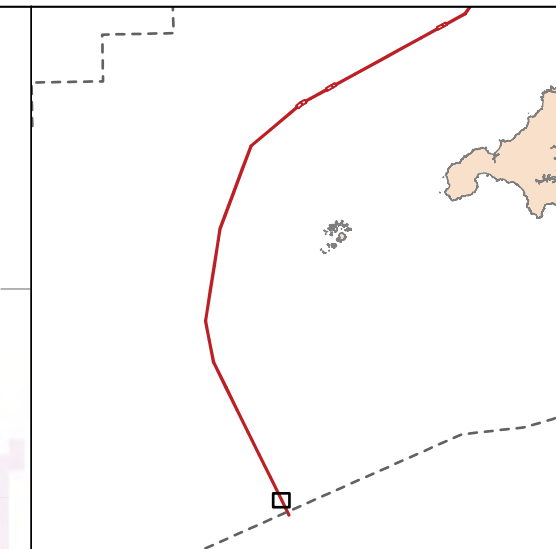
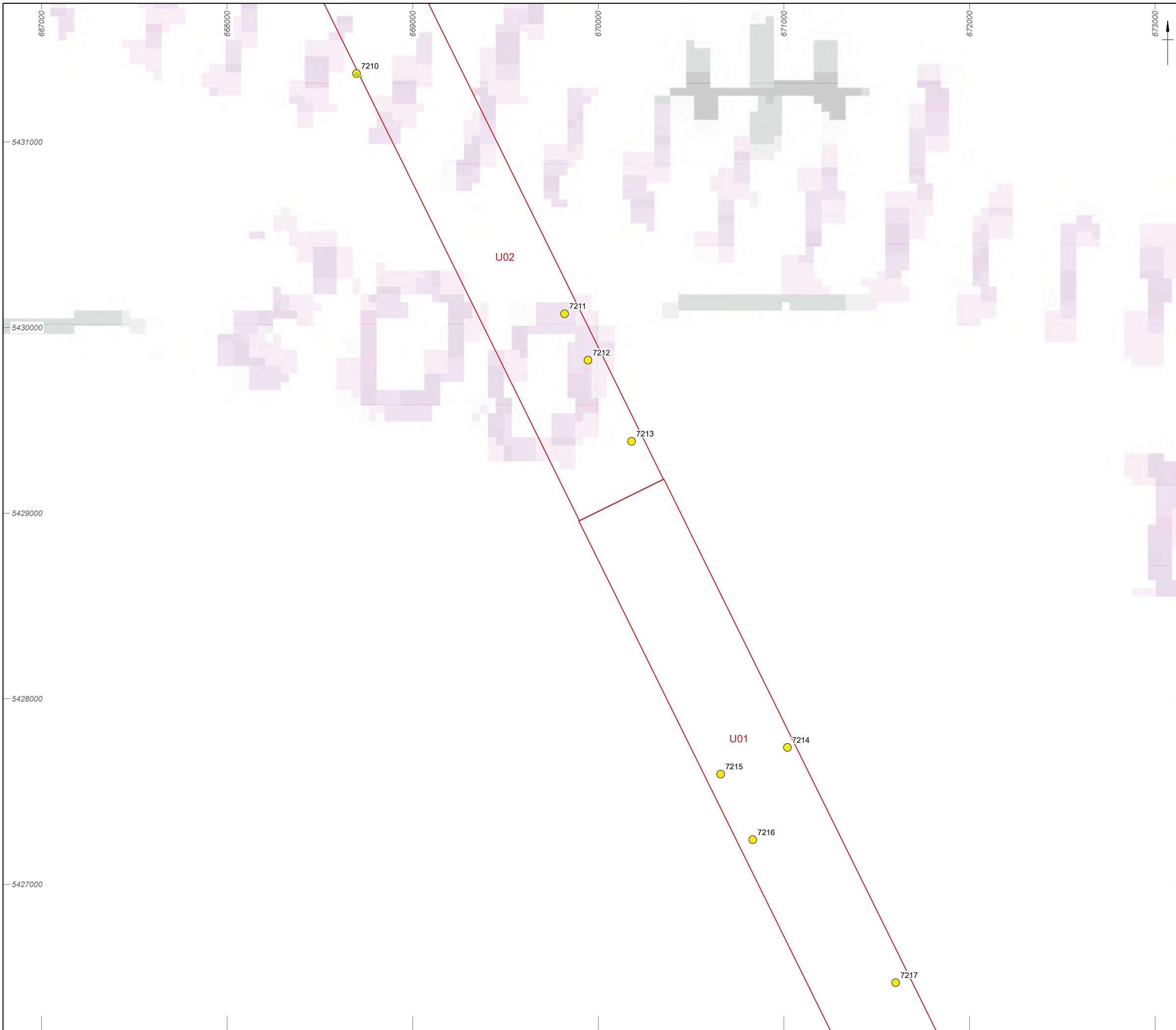
Study area  
**Anomalies of archaeological potential**  
● A2\_h – Anomaly of likely anthropogenic origin but of unknown date  
● A2\_l – Anomaly of possible anthropogenic origin but the interpretation is uncertain

0  1 km

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Figure 3v: Anomalies of archaeological potential and archaeological exclusion zones (UTM29N area)



**Study area**

**Anomalies of archaeological potential**

- A2\_I – Anomaly of possible anthropogenic origin but the interpretation is uncertain

**Linear seabed features**

- Linear debris

0  1 km

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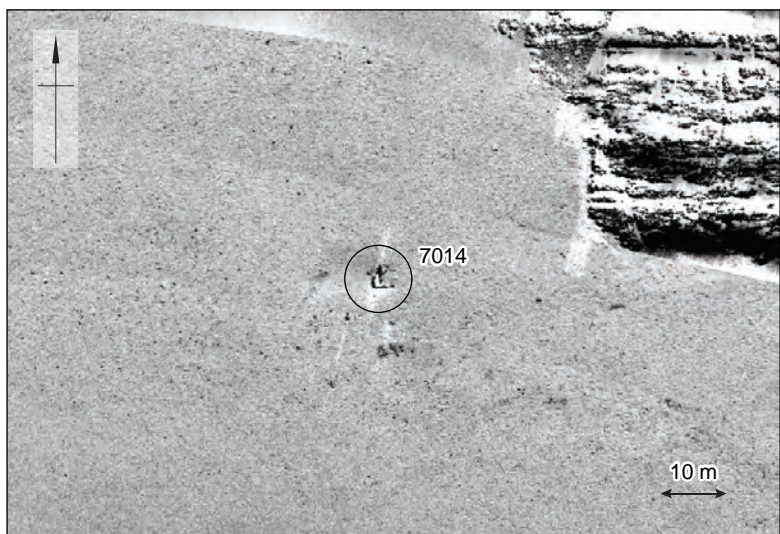
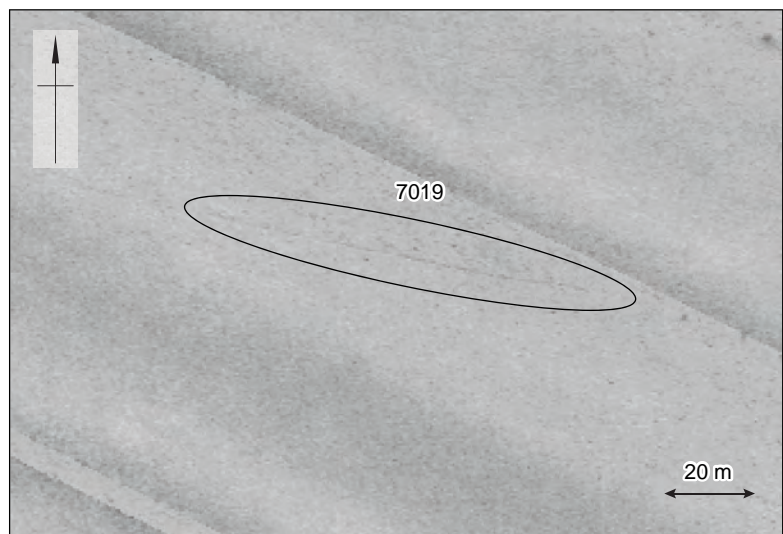
Date: 20/08/2024	Created by: KJF	
Scale: 1:20,000 at A3	Revision: 0	

Figure 3w: Anomalies of archaeological potential and archaeological exclusion zones (UTM29N area)

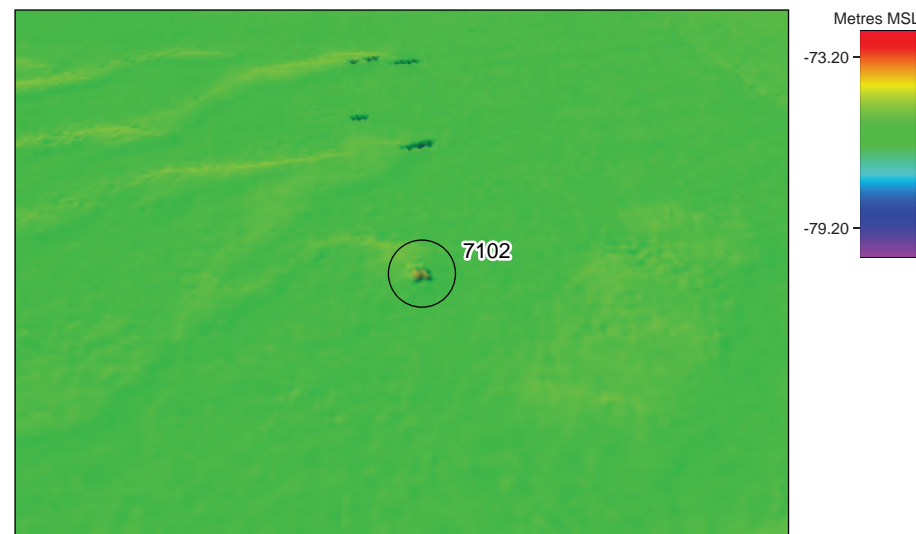




Sidescan mosaic image of debris **7014**, measuring 5.0 x 4.0 x 1.3 m



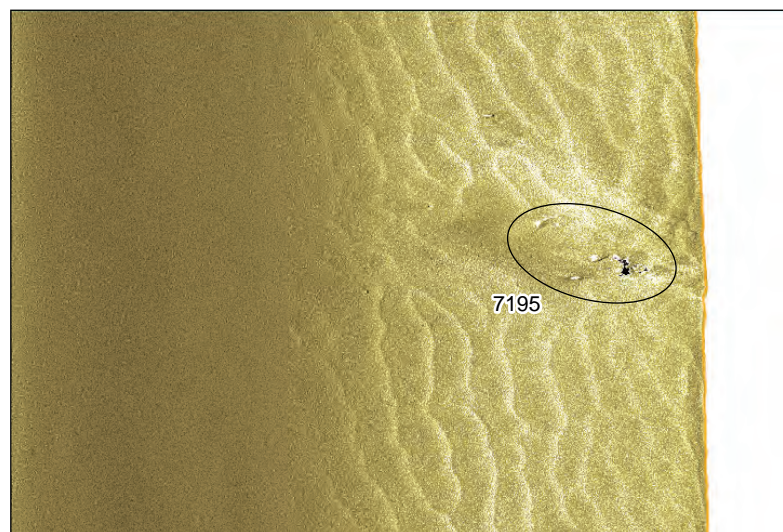
Sidescan mosaic image of linear debris **7019**, measuring 86.2 x 1.0 m



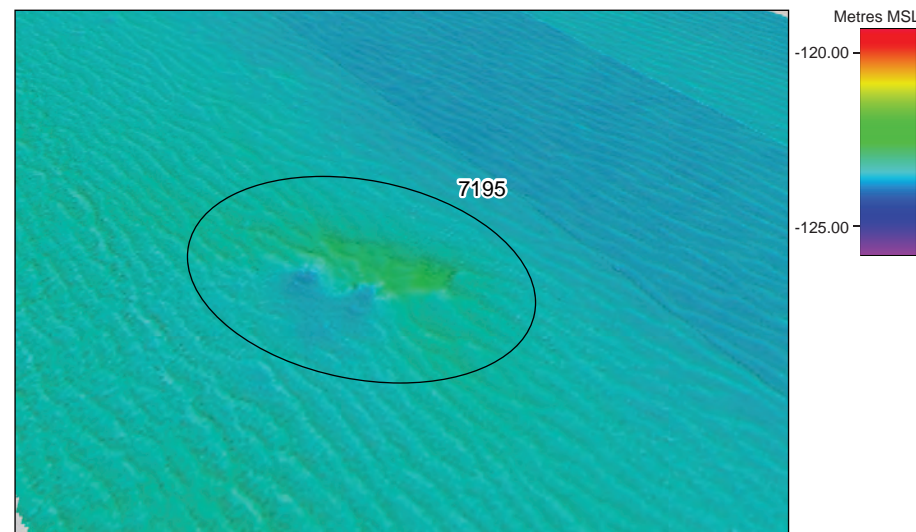
Multibeam echosounder image of debris **7102**, measuring 5.3 x 2.5 x 0.9 m, x1 vertical exaggeration, looking north-east



Sidescan mosaic image of seabed disturbance **7178**, measuring 86.5 x 12.5 m



Sidescan waterfall image of debris field **7195**, measuring 43.4 x 30.8 x 0.5 m



Multibeam echosounder image of debris field **7195**, measuring 43.4 x 30.8 x 0.5 m, x1 vertical exaggeration, looking north

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Date: 28/06/2024 Created by: KJF Revision: 0 Scale: NTS at A3

Figure 4: Data Examples





Replace with filepath

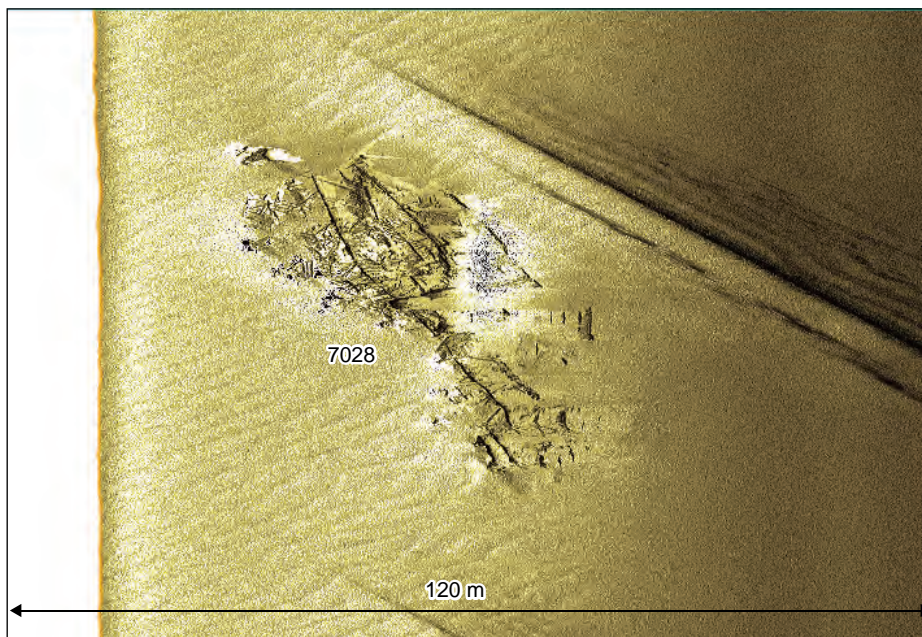
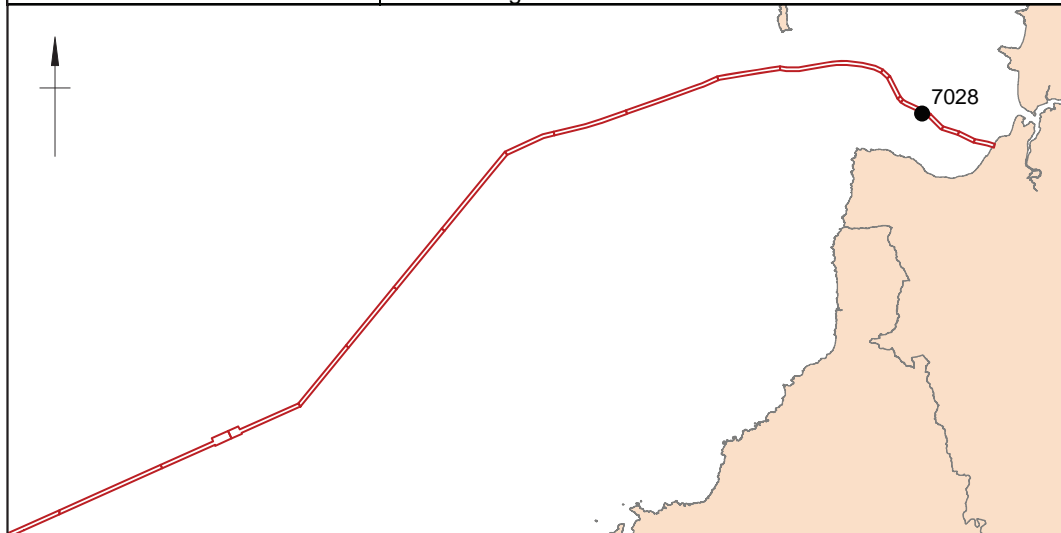
<b>Location</b>	401663 E 5658016 N (WGS84 UTM30N)	<b>Area</b>	U38B
<b>Archaeological Importance</b>	High		
<b>Geophysical survey dimensions and notes</b>	<p><b>7028</b> is a wreck situated 12 m outside block U38B, lying on an east to west alignment. The wreck is recorded by the UKHO (12339) as that of the steam ship <i>Thistlemor</i>, categorised as a dangerous wreck.</p> <p>In the SSS data the wreck is visible as a large spread of dark reflectors comprising multiple angular and elongate objects with shadows measuring 105.2 x 35.7 x 1.3 m. The largest dark reflectors visible are thin and elongate objects, orientated east to west and are likely surviving hull, though not intact. There are multiple smaller dark reflectors outside of the interpreted hull on the northern and southern sides indicating the wreck has spread and is broken up and degraded. Internally no clear superstructure is visible; however, the wreck appears upright. The wreck is situated within scour and sand waves.</p> <p>In the MBES data the wreck is visible as a large, compact group of distinct mounds and depressions situated at the edge of the data extents. The wreck is highly broken up and degraded, with distinct scour on the northern side.</p> <p>There is a large magnetic response of 241 nT associated with the wreck on the closest Mag. line (approximately 20 m north-east) indicating the presence of ferrous material or construction.</p>		

<b>Build</b>	<b>Type</b>	Steam ship
	<b>Construction</b>	Unknown, likely steel
	<b>Dimensions (m)</b>	106.7 x 15.5 x 7.6 m
	<b>Shipyard</b>	Craig, Taylor & Co, Stockton-on-Tees
<b>Loss</b>	<b>Cause</b>	Foundered during heavy weather on 2 <sup>nd</sup> December 1909

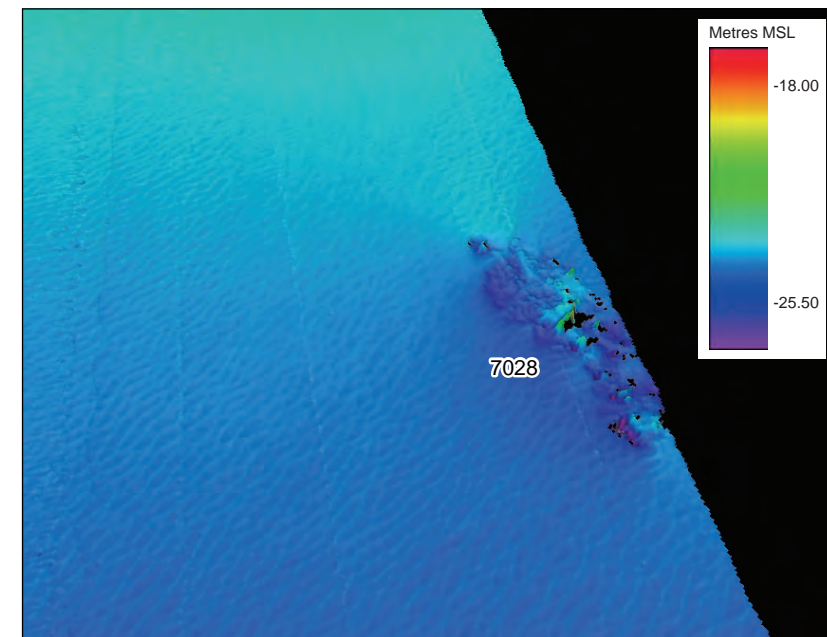
**Extent of Survival**

Recorded by the UKHO (12339) as the steam ship *Thistlemor*, built in 1906 with two boilers, a 316 hp triple expansion engine and a single prop shaft. The vessel was carrying a cargo of coal while making passage from Cardiff to Cape Town when it sunk in 1909. The wreck was first identified in 1985 and last surveyed in 2008. Its dimensions were found to be 108.4 x 36.5 x 3.6 m with bows to the east, a strong magnetic anomaly associated and debris in the vicinity.

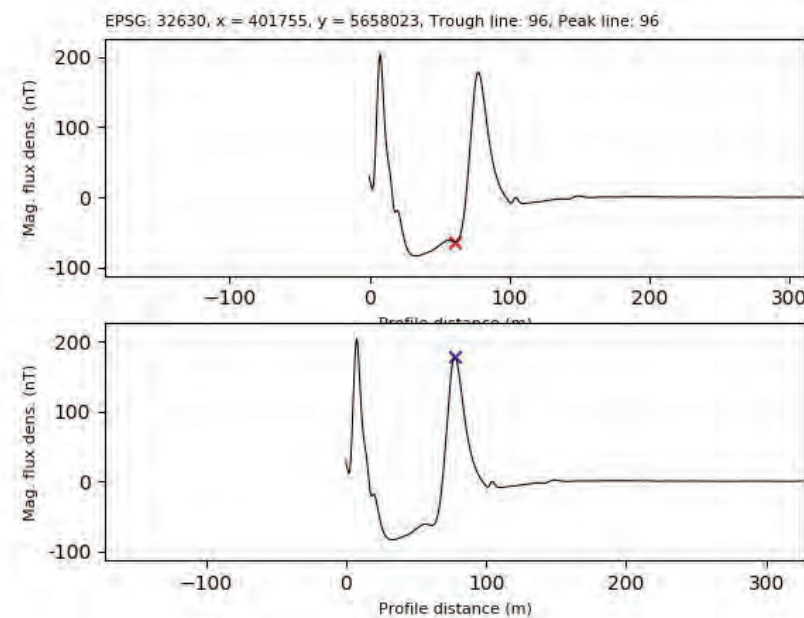
In the 2023 geophysical data the wreck appears highly degraded with associated debris identified in the vicinity. The difference in height recorded since the 2008 survey suggests the wreck has degraded significantly or it is now more buried. Any further outlying debris may also be buried in the surrounding mobile sediments.



Sidescan sonar waterfall image, 120 m range per channel



Multibeam echosounder grid image, x2 vertical exaggeration, looking east



Profile image of magnetic anomaly associated with **7028**, measuring 241 nT

Coordinate system: WGS 1984 UTM Zone 30N

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**Date:** 01/07/2024 **Created by:** KJF **Revision:** 0 **Scale:** Location inset 1:1,000,000 at A3





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