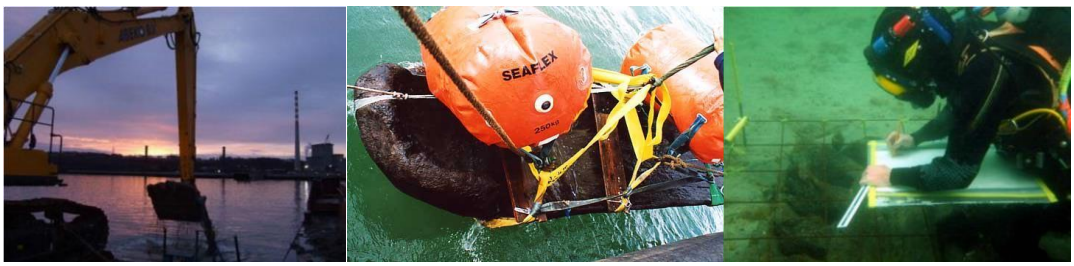
APPENDIX 17-2

SCEIRDE ROCKS OWF MARINE GEOTECH AND GEOPHYSICAL SURVEY 2023 AND 2024, 23R0366EXT 23D0088EXT ARCHAEOLOGICAL INTERPRETATION (ADCO, 2024).

Sceirde Rocks OWF

Marine Geotech and Geophysical Survey 2023 and 2024, 23R0366ext 23D0088ext

Archaeological Interpretation



Sceirde Rocks OWF

Marine Geotech and Geophysical Survey 2023 and 2024, 23R0366ext 23D0088ext

Archaeological Interpretation

Issued	09/09/2024
Client	**GDG for Fuinneamh Sceirde Teoranta**
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Abbreviations

ADCO -	Archaeological Diving Company Ltd
AEZ -	Archaeological Exclusion Zone
AIA -	Archaeological Impact Assessment
AMP -	Archaeology Management Plan
BH -	Borehole
CPT -	Cone Penetration Test
CR -	Cable Route
DDC -	Drop down camera
DEM -	Digital Elevation Model
DHLGH -	Department of Housing, Local Government and Heritage
DP -	Dynamically Positioned
E -	Easting
ECC -	Export Cable Corridor
GI -	Geotechnical Investigation
ITM -	Irish Transverse Mercator
LAT -	Lowest Astronomical Tide
MAG -	Magnetometer
MBES -	Multibeam Survey
MHW -	Mean High Water
MSBD -	Mean Seabed
N -	Northing
NGR -	National Grid Reference
NMS -	National Monuments Service
OD -	Ordnance Datum
OSS -	Offshore Sub-Station
SBP -	Sub Bottom Profile
SMR -	Sites and Monuments Record
SSS -	Side Scan Sonar
ST -	Station
T -	Transect
UAIA -	Underwater Archaeological Impact Assessment
UHRS -	Ultra High Resolution Seismic
UTM -	Universal Transverse Mercator
VC -	Vibrocore
WTG -	Wind Turbine Generator

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Executive Summary

Project:	Sceirde Rocks OWF
Location:	5km off the West Coast, northwest of the Aran Islands
UTM 29N:	435941E 5902437N (Array central point)
Consent	23R0366ext, 23D0088ext
Subject:	Archaeological review of marine geotech and geophysical survey data acquired across project area in 2023 and 2024

Introduction

The baseline archaeological information for the Sceirde Rocks Offshore Wind Farm project was presented in a report completed in 2023, which considered marine geophysical survey data acquired over the proposed array area and the export cable corridor area in 2022.

Additional data was gathered in 2023 and 2024 and is the focus of the present report, which should be read in conjunction with the 2023 archaeological report to get a full understanding of the archaeological review of the site data.

The additional data comprises marine geophysical survey and marine geotechnical investigations carried out in 2023 and in 2024 within the array area and the export cable corridor. A dropdown camera was deployed in 2023 to support a benthic survey, and that information is also reviewed in the present report.

The marine geophysical survey carried out was completed under archaeological consent 23R0366 and 23D0088, and 23R0366ext and 23D0088ext acquired for the project.

Marine data 2023

The marine geophysical survey completed in 2023 included multibeam and seismic survey, and took place within the array area.

The geotechnical work comprised cone penetration tests (CPTs) and vibrocores.

Dropdown Camera survey was included to inform a benthic survey within the array area. The dropdown camera footage provides useful ground-truthing of the seabed morphology but lacks precise positioning capability to interrogate specific locations fully.

Marine data 2024

The marine geophysical survey completed in 2024 included multibeam bathymetry, side scan sonar and magnetometry survey, conducted in the array area and at the proposed landfall location, with seismic additionally in the array area.

The geotechnical work comprised 17 boreholes and 2 CPTs.

The present report focuses on a review and interpretation of the 2023 and 2024 data sets reviewed.

The extent of surveys and geotechnical investigations completed are robust and comprehensive.

The data confirms the shallow sand and extensive exposure of bedrock.

While a series of contact features was recorded in the 2024 magnetometer data set within the array area and within the landfall area, there are no clear signs of *in situ* wreckage on the seabed.

The 2024 survey was able to reach within 100 m of the shoreline with side scan sonar, and 90 m with multibeam, which greatly increased the coverage achieved in 2022. It leaves a gap in coverage that has not been surveyed. However, as the project intends to tunnel under the foreshore via trenchless technology, with the exit pit located within the surveyed area some 500 m offshore, the remaining gap in survey coverage below the Low Water Mark should not be an issue.

The 2024 geotechnical investigations added additional locations where stratigraphy is recorded in detail, and confirms a similar sequence of sand over silty clay over bedrock, where bedrock is not exposed on the surface of the seabed. No anthropogenic indicators were recorded.

Recommendations

The principal of avoidance with known archaeological sites and sites of archaeological potential is recommended.

The following six locations, recorded in the 2024 magnetometer data, should be avoided in terms of construction phase impacts. If avoidance is not possible, additional survey may be required to help define the source of the magnetic anomaly:

Survey line Reference	DD Latitude	DD Longitude	UTM29N E	UTM29N N	AEZ (m)
AR47	53.28125	-10.01732	432172E	5904040N	50 m
AR05	53.25120	-9.91380	439031E	5900604N	50 m
AR61	53.23603	-9.97416	434981E	5898970N	50 m
LFB14.001	52.76198	-9.57968	460884E	5845950N	50 m
LFB23	52.7625	-9.57556	461162E	5846006N	50 m
LFB010	52.75880	-9.57842	460966E	5845596N	50 m

Should further marine geophysical surveys and geotechnical investigations take place in advance of construction, the data will be assessed by an appropriately qualified and experienced maritime archaeologist and, in the unlikely event that any new sites or features are identified, they will be notified to the National Monuments Service (NMS) and appropriate measures taken in discussion with NMS.

Intertidal Archaeology Survey licensed by the Department of Housing, Local Government and Heritage (DHLGH) is to take place.

An Archaeological Management Plan (AMP) has been prepared to inform the project throughout its lifetime, including construction, operation and decommissioning phases. The AMP facilitates recording and reporting procedures and establishes archaeological protocols in the event of archaeological discovery during works. Preservation by record is the last resort once all other options have been considered. The AMP will be reviewed and updated at agreed intervals.

Archaeological monitoring licensed by the DHLGH will take place of ground and seabed disturbance activities that take place during construction.

Project maritime archaeologists operating under licence from the DHLGH will be engaged by the Sceirde Rocks OWF project sponsor as part of the design team and to monitor construction activities and resolve archaeological features that may be exposed in the course of works.

Archaeological inputs are licensed by the DHLGH and consent is granted through its NMS.

The recommendations contained in this report are subject to the approval of the NMS at the DHLGH.

1.0 Introduction

The Sceirde Rocks project was successful in the first Offshore Renewables Energy Support Scheme (O-RESS 1) auction and is preparing to submit a planning application in 2024.

A marine archaeological report has informed the development of the Sceirde Rocks project, based on licensed marine geophysical survey of the array area and the export cable corridor (ECC) area (22R0105).[1] The report absorbs the archaeological observations from a marine geophysical survey completed in 2008.

There are no known shipwreck sites within the project area. The archaeological interpretation report corrected the charted location of W09419 (fishing vessel *Arosa* lost in 2000). The corrected position lies outside the works area. Nonetheless, this area will be treated with caution; both locations will be avoided for intrusive works and appropriate exclusion zones will be implemented inside which no works will be undertaken.

Additional data was gathered in 2023 and 2024 and is the focus of the present report, which should be read in conjunction with the 2023 archaeological report to get a full understanding of the archaeological review of the site data.

The additional data comprises marine geophysical survey and marine geotechnical investigations carried out in 2023 and in 2024 within the array area and the export cable corridor. A dropdown camera was deployed in 2023 to support a benthic survey, and that information is also reviewed in the present report.

The marine geophysical survey carried out was completed under archaeological consent 23R0366 and 23D0088 and 23R0366ext and 23D0088ext acquired for the project.

In advance of the programmes of work commencing in 2023 and 2024, ADCO presented an archaeological Toolbox Talk to each works crew, describing the known baseline archaeological information; advising the site teams of the requirement under the National Monuments Act to report new archaeological discoveries within four working days; and outlining the expectations with regard to receipt of project data for archaeological interpretation.

[1] Niall Brady, 'Sceirde Rocks Offshore Wind Farm. Marine Geophysical Survey, 22R0105, Archaeological Interpretation', ADCO report for Fuinneamh Sceirde Teoranta, 2023.

2.0 Marine data 2023

2.1 Marine Geophysical Survey

The 2023 marine geophysical survey was carried out by Green Rebel, and included multibeam and seismic survey, and took place within the array area as infill survey of the coverage carried out in the 2022 campaign, focused on the proposed locations of wind turbine generator (WTG) units.[2]

The survey results support the findings of the 2022 survey in terms of understanding the seafloor morphology within the array area as one of high relief topography with large expanses of bedrock through the central part of the site. Sand is the predominant sediment existing across the site. Analysis of the multibeam data for backscatter was able to refine insight to the sand sediment, with medium to coarse-grained sediment (SAND) over much of the site, and lesser amounts of finer sediment (Silty SAND). Analysis of the sub bottom profile (SBP) data and the Ultra High Resolution Seismic (UHRS) data was able to suggest that sediment occupying troughs between bedrock exposures can reach 30 m deep, where the surface sands can be up to 11 m deep and can overlie clay.

No archaeological features were noted in the survey report, which concluded that the deployment of side scan sonar could help de-risk geohazards within the survey area.

2.2 Marine Geotechnical Investigation

The geotechnical work was carried out by GEM and comprised cone penetration tests (CPTs) and vibrocores, distributed throughout the array area and the export cable corridor (Figure 1).[3]

The CPTs seek to determine the geotechnical properties of sediment and are based on applying a push pressure into the seabed, with no recovery of material and no physical logging.

A total of 34 vibrocores were attempted to a maximum depth of the 6 m below mean seabed (msbd) level. The vibrocores recovered material, and the report includes both a stratigraphic log and a photographic log of the cores, which were subject to on-site recording and off-site laboratory analysis, providing the opportunity for detailed observations.

The stratigraphy recorded consistently revealed covering sand over stiffer sand, with a mixture of sand, cobble and shell at depth, and occasionally silt. There was no record of charcoal or wood/organic remains that may indicate the presence of either cultural layers or submerged landscape elements.

While there are no known historic shipwreck sites within the survey area, the wreck of the fishing vessel *Arosa* (lost in 2000) lies within the Sceirde Rocks. The GI works maintained a distance

[2] Green Rebel, 'IRE-GRE-SIT-GS-RP-0001 – Sceirde Rocks -Green Rebel 2023, Geophysical Survey Results Report', GR report for Fuinneamh Sceirde Teoranta, 2024.
[3] GEM, 'IRE1-FST-SIT-EG-RP-0001 – Measured and derived parameters report –Factual Report' GEM report for Fuinneamh Sceirde Teoranta, 2024.

from the wreck site, with the closest CPT (WTG_15) located 100m southeast of the charted location, and the closest vibrocore (VC_WTG_15_new) located 250m east-southeast of the location. The seabed at VC_WTG_15_new lies at 43.5 m below sea level. The core achieved a depth of 8.2 m and was made up entirely of sand, which varied from light brown in colour, fine to coarse texture at the top of the core to a dark grey colour and a coarse texture at its base.

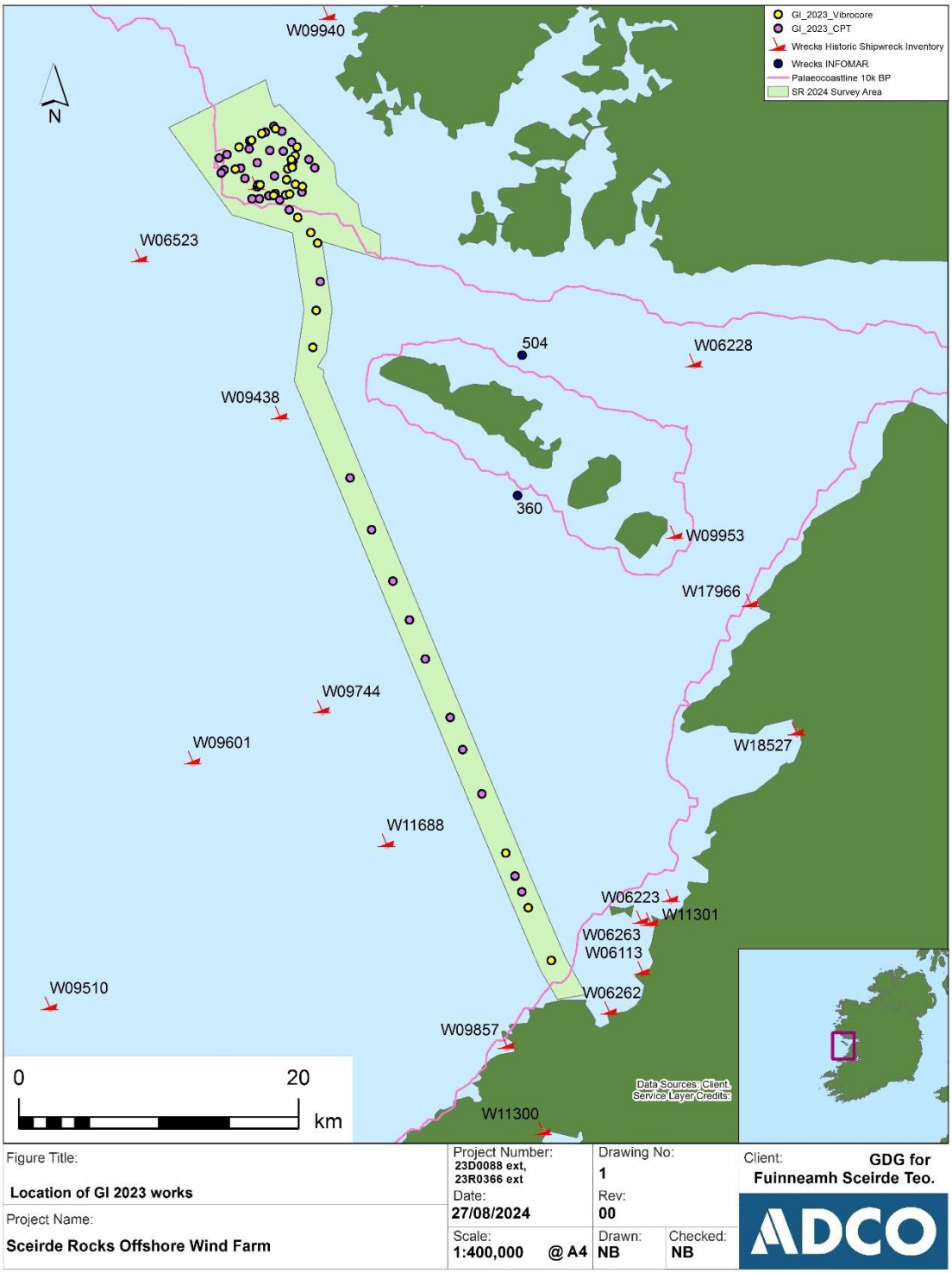


Figure 1: Location of Geotechnical Investigations (GI) 2023.

2.3 Drop down camera

The Benthic survey completed in 2023 recorded 65 station (ST) videos and 36 transect (T) videos, using a dropdown camera (DDC) across the array area and the export cable corridor (Figure 2).

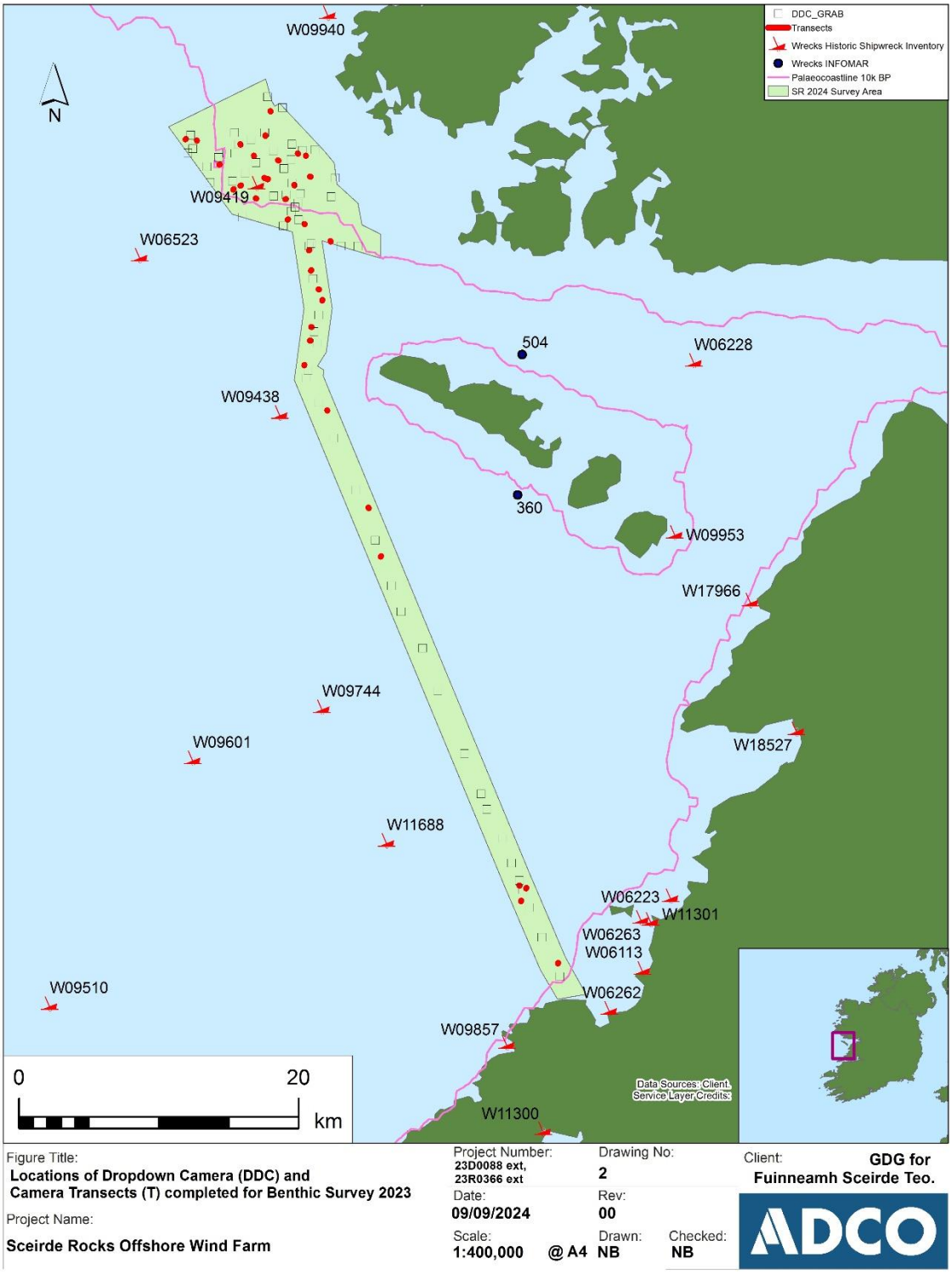


Figure 2: Locations of Dropdown Camera and Camera Transects completed for Benthic Survey 2023.

The video record was High Definition, giving clear crisp images of the seabed. The station videos typically ran for just under three minutes in length and would record several deployments in the same location. The transect videos ran for up to 10 minutes each and would seek to travel along a straight line, hovering just above the seabed, and dropping on to the seabed at intervals.

While not acquired to inform archaeology, the videos provide a useful ground-truthing of the seabed. The view-shed of any one location was small. The absence of a ruler or scale in the image, and the absence of a compass bearing and coordinate locations on the camera screen inhibits the information gain other than the recorded view at the plotted location.

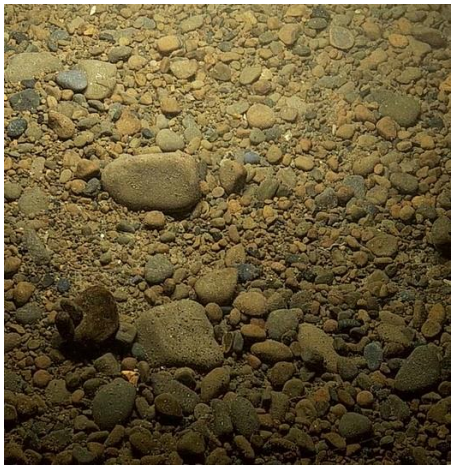
The results show a variety of seafloor topography, ranging from clear sand, to sand littered with shell fragments, to cobbles, to bedrock (Plates 1–3).

DDC ST01_1:17 (1 minute 17 seconds), showing sandy seafloor

DDC ST014_0:38, showing flat seafloor with crushed shell

Plate 1: Examples of seabed image achieved at two Drop Down Camera DDC) locations.

DDC ST055_1:02, showing an expanse of cobble on the seabed within the export cable corridor that corresponds with the 2022 geophysical survey data



DDC ST056_1:36, showing the same cobbled seabed

Plate 2: Examples of seabed image achieved at two DDC locations, showing an expanse of natural cobble that occurs within the export cable corridor.

DDC T01_6:09, showing exposed bedrock with fault lines on the seabed within the export cable corridor 2.5 km offshore. Other imaging along the transect records a sandy surface

DDC T19_2:12, showing exposed bedrock within the array area in its southwest quadrant

Plate 3: Examples of seabed image achieved at two DDC locations, showing bedrock.

There was no imaging of anything that was clearly anthropogenic in origin, such as shipwreck, individual timbers, metallic remains, or even abandoned fishing gear, and there was no recording of organic deposits indicative of submerged landscape, such as peat. There was one image, however, that recorded a feature that may be of interest (Plate 4). Transect 33 recorded a piece of olive-green coloured material that lies on an expanse of bedrock, partly populated by seaweed. The piece is the only example of this feature recorded in the transect, and while it may be another section of weed, it could also be a fragment of metal sheeting. There are no coordinates recorded at the find location, other than to note that it was recorded at 4 minutes 30 seconds in the transect video. Transect T33 was recorded within the array area, mid-way between Grid 1 and Grid 2 on the east side of the array area but outside the 2024 magnetometer survey area, so there is no cross-reference possible with the recorded magnetometer data captured that might otherwise inform whether there is a localised metallic anomaly in this location. The 2022 survey covered this area, but did not record any side scan sonar or magnetometer target at this location. One may conclude that the feature observed in T33 may be natural in origin but if it is not natural, it is small in scale and mobile.

Plate 4: DDC T33_20231012_013744_4:30, exposed bedrock with seaweed frond. An olive-green coloured feature in the upper left may be a piece of weed but is the only such coloured piece in the transect video. It may also be a piece of metal sheeting that is quite eroded and fractured. It appears in isolation on a rock ledge.

The DDC locations did not overlap with locations where geophysical survey targets were recorded in the 2022 survey or in the 2024 survey, but there were occasions where the DDC was deployed close to such locations. DDC ST055 and ST056, for example (Plate 9), were recorded within the export cable corridor in a location where the 2022 survey recorded boulders and a few pieces of debris. The DDC images confirm the cobbled nature of the seabed in this general location but did not record material of archaeological interest.

3.0 Marine data 2024

3.1 Marine Geophysical survey

The 2024 marine geophysical survey included multibeam, side scan sonar and magnetometer survey within the array area and at the landfall, with seismic additionally in the array area. The work extended the surveyed area inshore to within 100 m of the Low Water Mark (Figure 3).

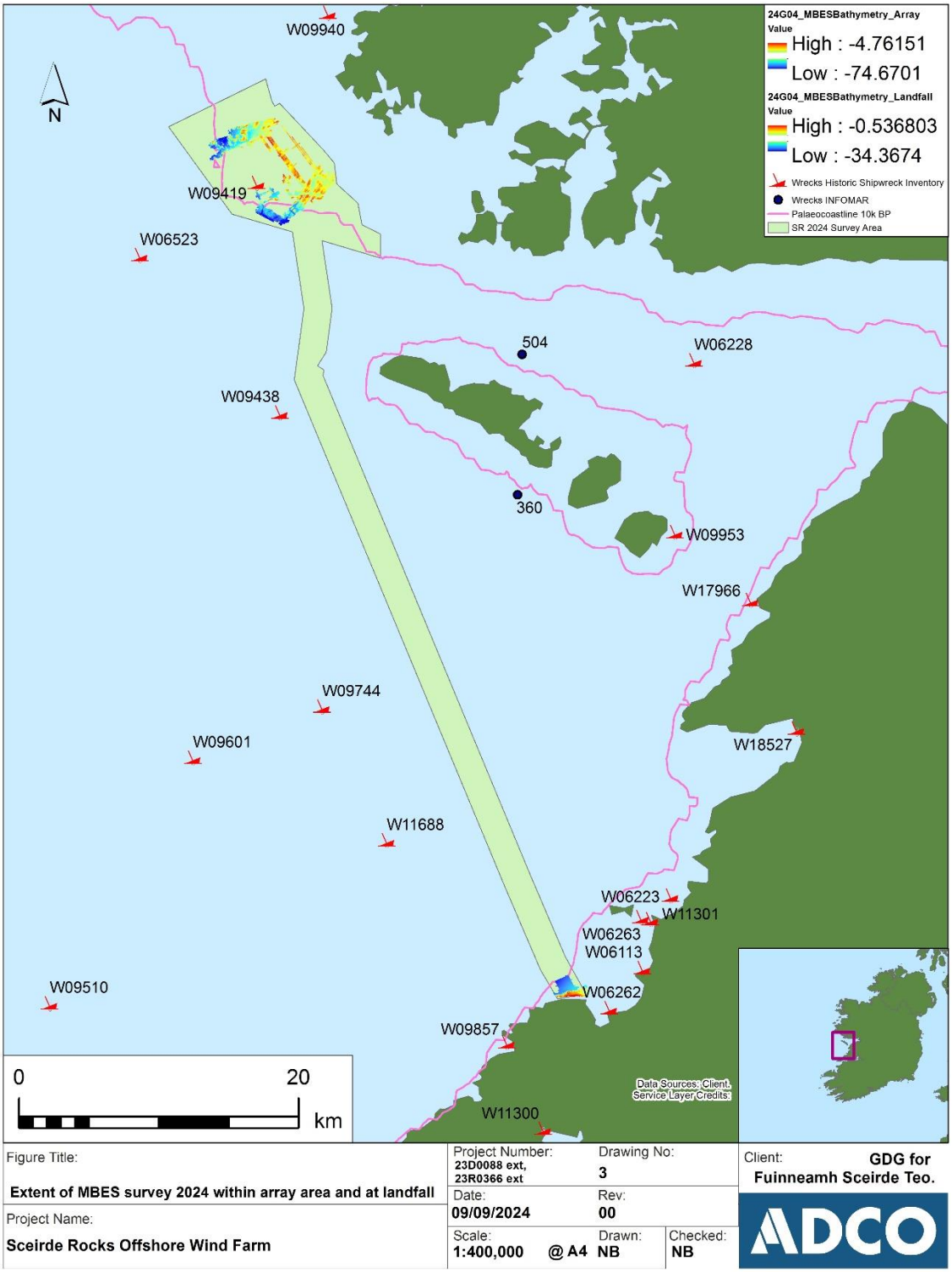


Figure 3: Extent of Multibeam survey (MBES) 2024 within array area and at landfall.

The survey was completed in May 2024 by Green Rebel, operating off the *Lady Kathleen*.

An advance data set of the 2024 survey was acquired and processed close to the proposed landfall location in Co. Clare, where shallow water had prevented the full suite of survey

instrumentation to be deployed in 2022. The advance set was reviewed archaeologically to facilitate geotechnical investigations at the landfall location.[4]

3.1.1 Array area, extent

The survey completed within the array area was to inform proposed WTG locations.

WTG locations would be subject to intensive survey at 20 m line-spacing within survey boxes that measured 400 m by 400 m in size.

Main survey lines between the WTG locations would be surveyed at 65 m line-spacing.

The actual survey completed a slightly different trackplot matrix (Figure 4). Rather than surveying WTG locations in 400 m by 400 m boxes, the survey was run along the proposed lines of WTGs at 70 m line spacing. The survey achieved comprehensive coverage of the area. The northern section is referred to by the surveyors as Grid 1, and the southern section as Grid 2. In addition, the multibeam survey, which surveyed the same area, completed a series of transverse lines that linked the two SSS/MAG survey areas Grids 1 and 2 (Figure 5).

3.1.2 Array area, observations

The side scan sonar survey completed both High Frequency and Low Frequency coverage. In other contexts, High Frequency coverage is optimal for the detection of archaeological features, yielding crisper imaging than is possible in Low Frequency survey. However, in the present case, the High Frequency survey produced quite constrained results in comparison to the Low Frequency Survey (Plate 5). The variation is a result of dramatic changes in seabed height underwater, as the exposed bedrock shelves and peaks over short distances. The High Frequency survey resulted in only a very narrow range being recorded in detail, while a much wider range was recorded in the Low Frequency survey.

In common with the 2022 survey carried out by EGS, the 2024 survey recorded exposed rock head and shelving strata, as well as exposed areas of sand and sand ripples, and it did not record any features that may be considered archaeological. The bedrock is aligned in Northeast-Southwest trends, with some lower-lying East-West troughs, and North-South troughs that cut across them.

The side scan sonar and the multibeam data sets provide similar results in terms of the exposed seabed.

[4] Niall Brady, Sceirde Rocks OWF. Marine Geophysical Survey 23R0366ext, 23D0088ext, Archaeological Interpretation', ADCO report for Fuinneamh Sceirde Teoranta, 2024.

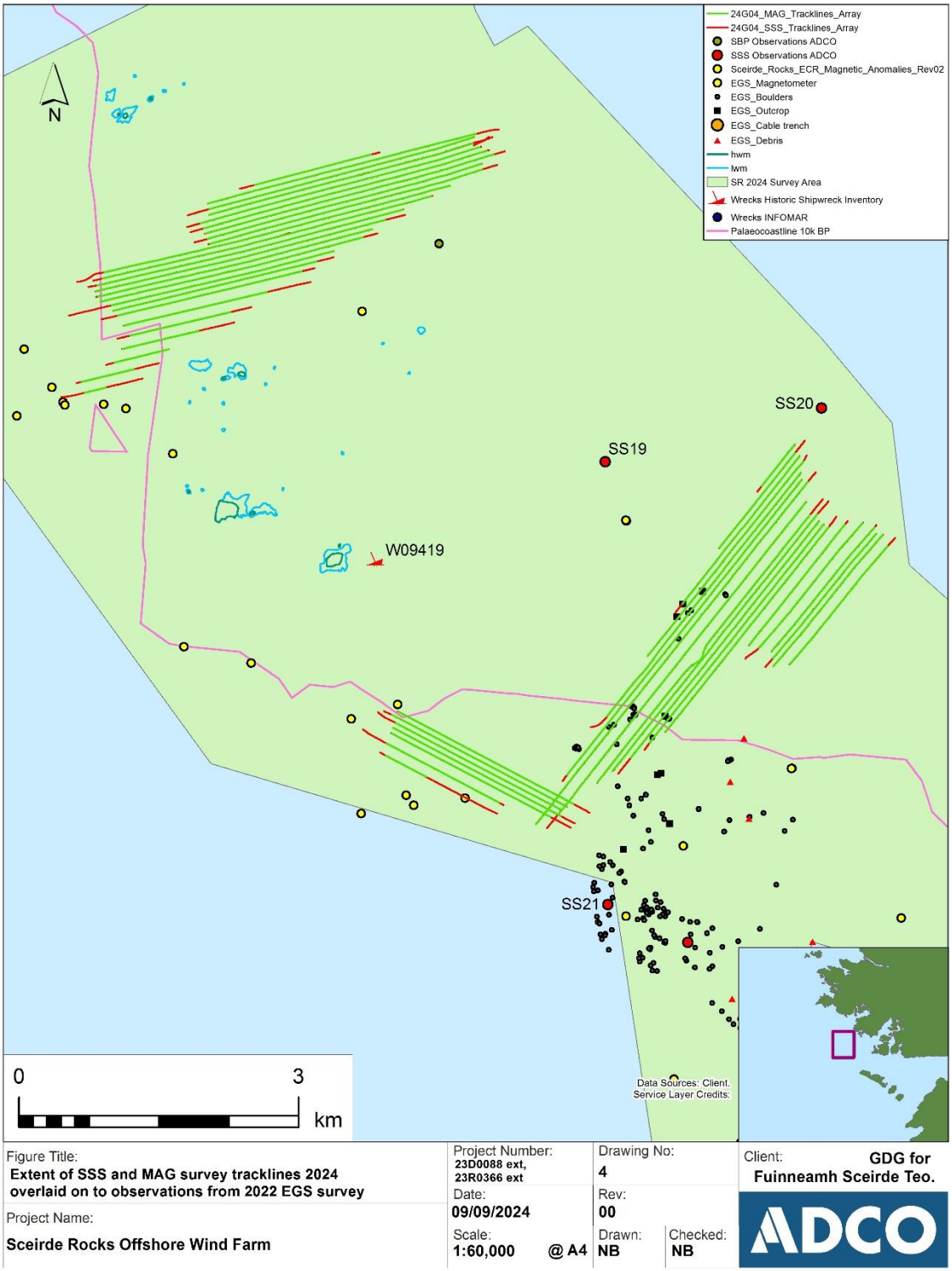


Figure 4: Extent of Side Scan Sonar (SSS) and Magnetometer (MAG) survey tracklines 2024 in array area, overlaid on to observations from 2022 EGS survey.

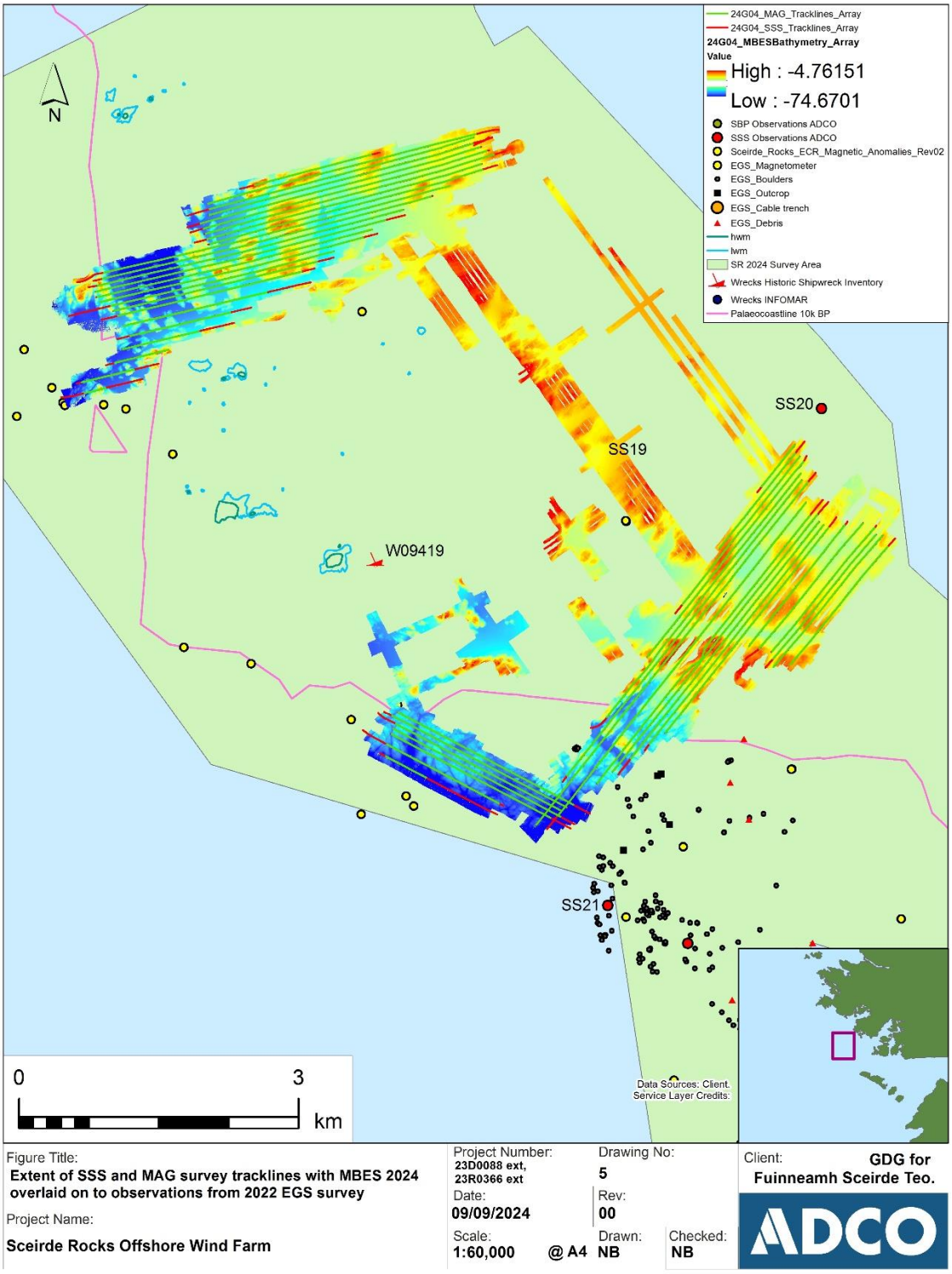
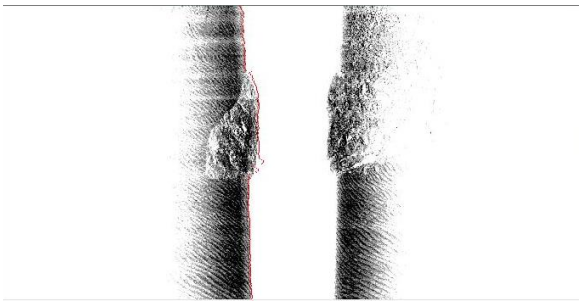
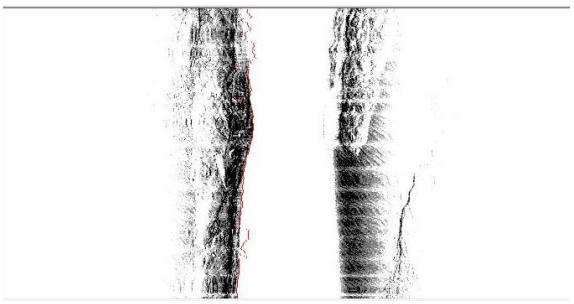


Figure 5: Extent of SSS and MAG survey tracklines with MBES results 2024 in array area, overlaid on to observations from 2022 EGS survey.

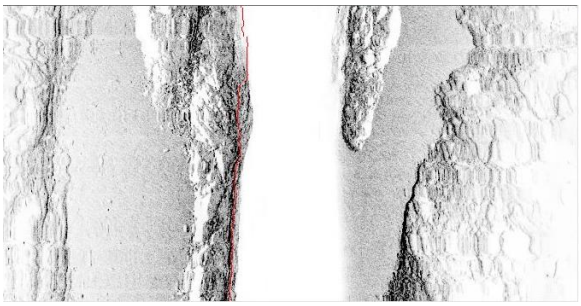


Survey Line AR04 High Frequency side scan sonar data trace showing exposed bedrock and adjacent sand ripples, the detail of which is only captured within c. 20 m of the survey centreline

Survey Line AR04 Low Frequency side scan sonar data trace showing exposed the same location, where the imaging is less crisp but the range of the data recorded extends much further out from the survey centreline



Survey Line AR20 High Frequency side scan sonar data trace showing again shows limited coverage of the seabed. In addition, the horizontal lines crossing the data trace reflect distortion caused by a turbulent sea state



Survey Line AR20 Low Frequency side scan sonar data trace recorded a much clearer image of the same seabed area and extended the range of coverage significantly in both directions from the survey centreline

Plate 5: Example of sonar data traces showing the difference in data imaging based on High Frequency and Low Frequency settings. The two frequencies are recorded simultaneously.

The magnetometer data shows a series of localised intensities across the surveyed area (Figure 6). For the most part, the anomalies are small scale and correspond with exposed bedrock, and there is nothing clearly evident in the side scan sonar traces that suggests the presence of debris at these locations.

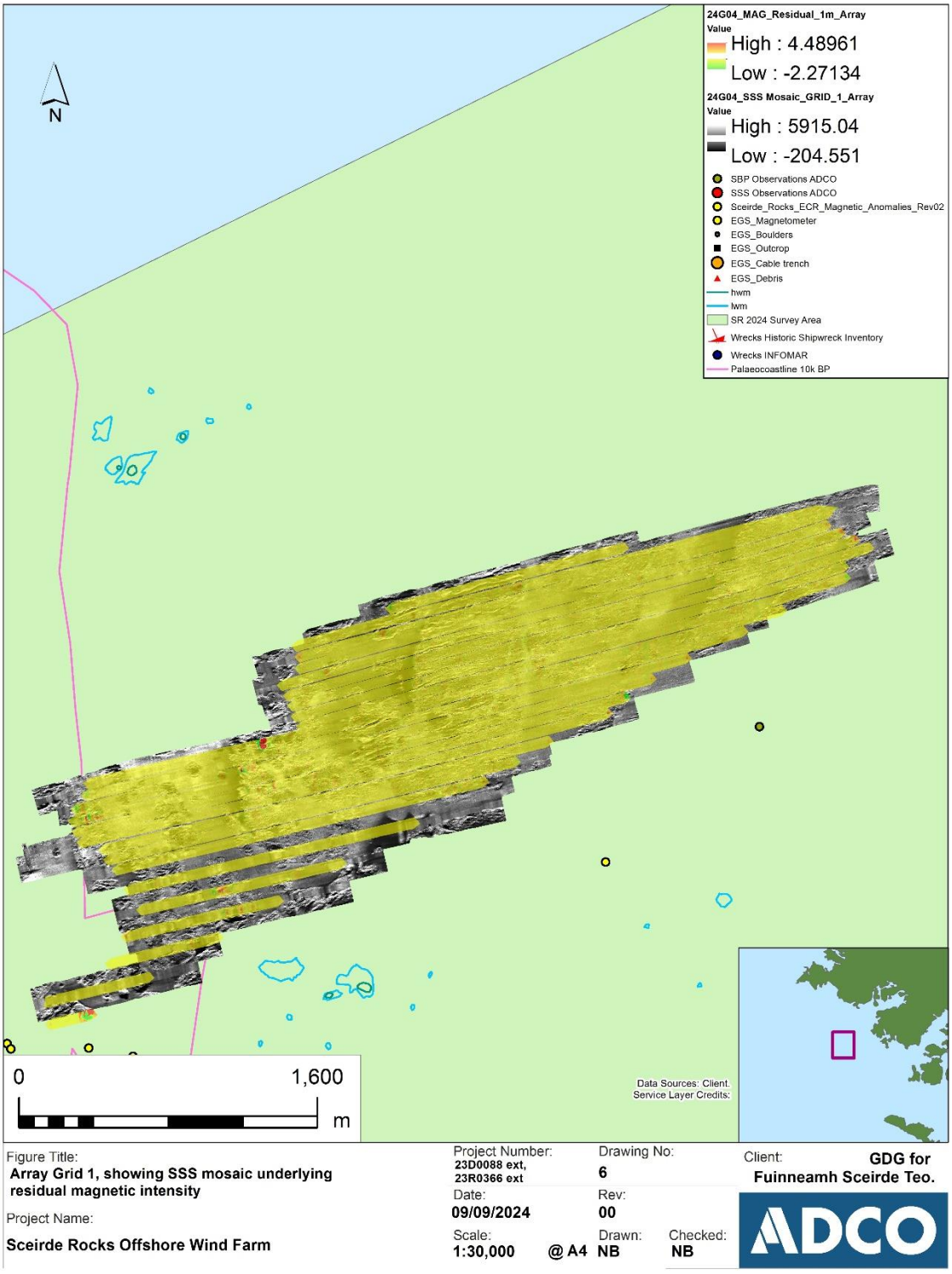


Figure 6: Array area Grid 1, showing SSS mosaic underlying residual magnetic intensity data.

Survey in Grid 1 along survey line AR47 highlighted a localised magnetic anomaly at Decimal Degree 53.28125 Latitude -10.01732 Longitude (UTM29N 432172E 5904040N) (Plates 6–7). It is the most intense of the localised magnetic anomalies in Grid 1. The location records no obvious side scan sonar feature despite the bedrock being clearly visible. It is possible that the location retains a piece of debris that could be caught in a rock crevice and consequently be not

visible. The location should be avoided in terms of proposed construction phase impacts. If avoidance is not possible, additional survey may be required to help define the source of the magnetic anomaly.

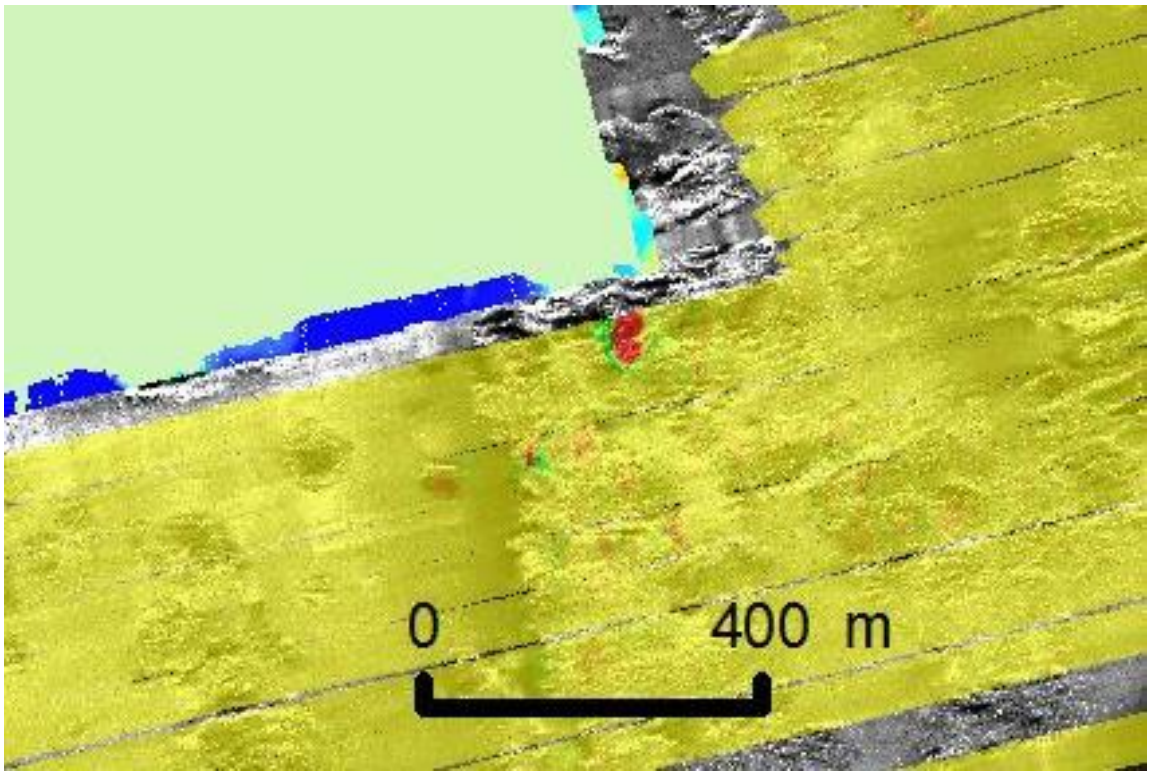
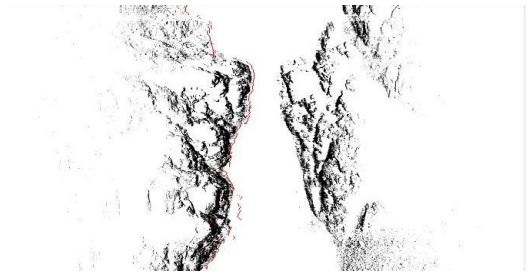
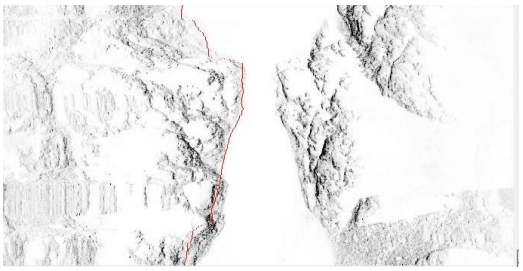


Plate 6: Detail from Array area Grid 1, showing SSS mosaic underlying residual magnetic intensity data. The red and green highlights the localised magnetic anomaly recorded on survey line AR47 at Latitude 53.28125, Longitude -10.01732.



Survey Line AR47 High Frequency side scan sonar data trace at Latitude 53.28125, Longitude -10.01732 showing bedrock but nothing clearly defined as archaeological



Survey Line AR47 Low Frequency side scan sonar data trace at Latitude 53.28125, Longitude -10.01732 showing bedrock but nothing clearly defined as archaeological.

Plate 7: Survey Line AR47 High and Low Frequency side scan sonar data trace at Latitude 53.28125, Longitude -10.01732.

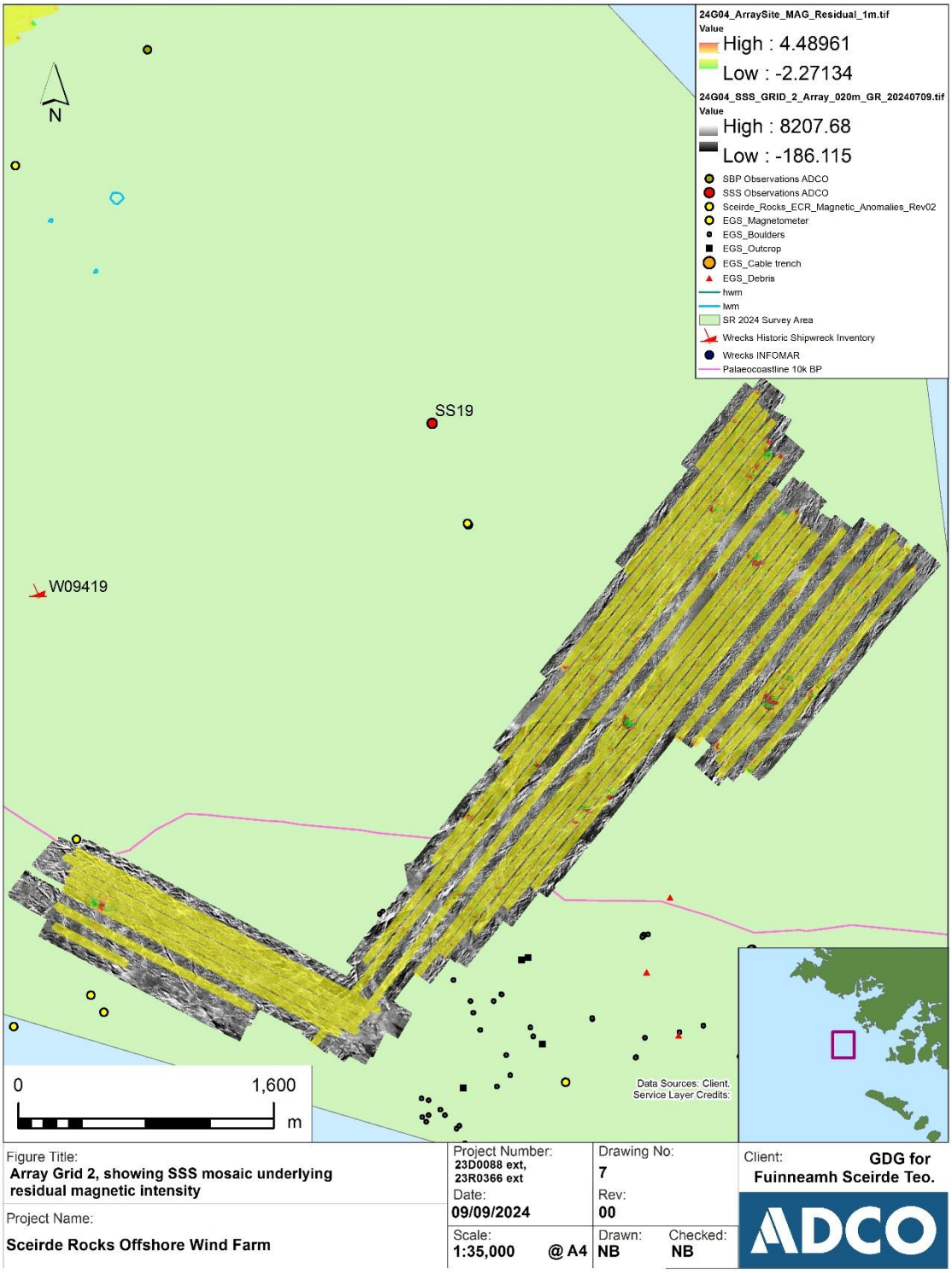


Figure 7: Array area Grid 2, showing SSS mosaic underlying residual magnetic intensity data.

Survey in Grid 2 along survey line AR05 highlighted a similar localised magnetic anomaly, at Decimal Degree 53.25120 Latitude -9.91380 Longitude (UTM29N 439031E 5900604N) (Figure 6, Plates 8–9). Again, the location records no obvious side scan sonar feature despite the bedrock being clearly visible, although in this instance, there are acoustic shadows, which may suggest there is metallic debris lying on the rock surface. The location should be avoided in

terms of proposed construction phase impacts. If avoidance is not possible, additional survey may be required to help define the source of the magnetic anomaly.

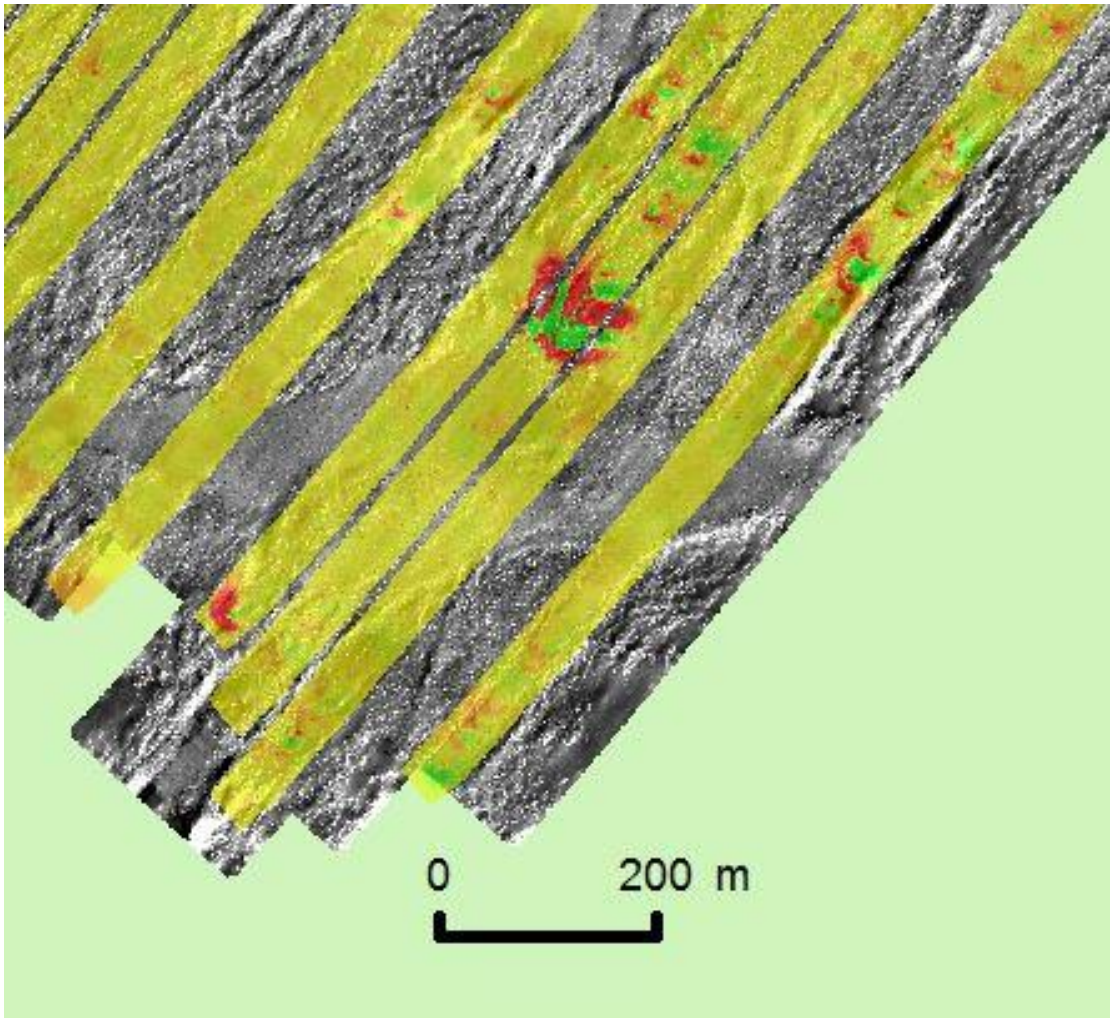
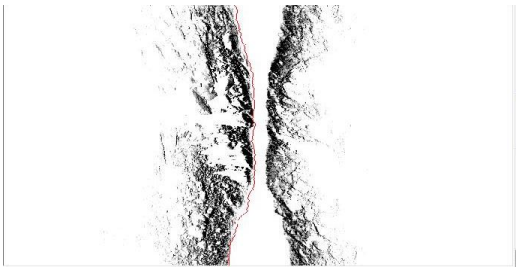
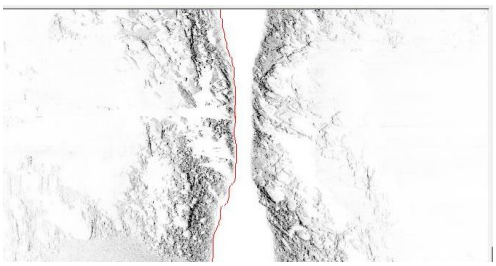


Plate 8: Detail from Array area Grid 2, showing SSS mosaic underlying residual magnetic intensity data on survey line AR05 at Latitude 53.25120, Longitude -9.91380.



Survey Line AR05 High Frequency side scan sonar data trace at Latitude 53.25120, Longitude -9.91380 showing bedrock. The acoustic shadows may indicate the presence of debris but the distinction is not clear



Survey Line AR05 Low Frequency side scan sonar data trace at Latitude 53.25120, Longitude -9.91380 showing bedrock. The acoustic shadows may indicate the presence of debris but the distinction is not clear

Plate 9: Survey Line AR05 High and Low Frequency side scan sonar data trace at Longitude 53.25120, Latitude -9.91380.

Survey in Grid 2 along survey line AR61 highlighted a localised magnetic anomaly, at Decimal Degree 53.23603 Latitude -9.97416 Longitude (UTM29N 434981E 5898970N) (Plates 10–11). On this occasion, the side scan sonar mosaic is less informative than the MBES underlay, which shows the magnetic anomaly lying within a deep channel. While there is no indication in the side scan sonar data traces of any feature here, the absence of such in an area of siltation suggests, if it is a feature, that it is buried within the channel sediment. The location should be avoided in terms of proposed construction phase impacts. If avoidance is not possible, additional survey may be required to help define the source of the magnetic anomaly.

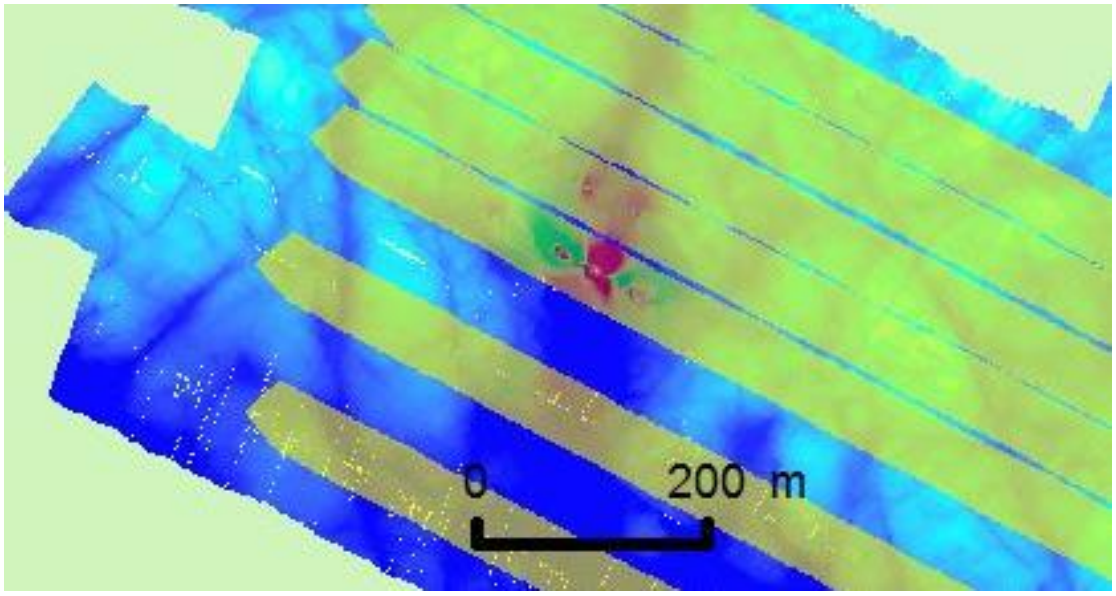
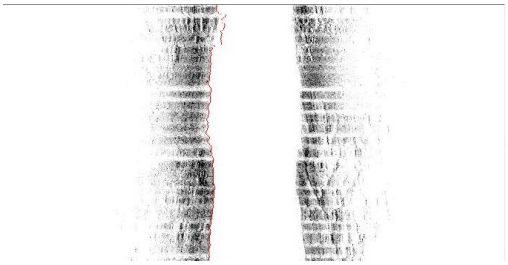
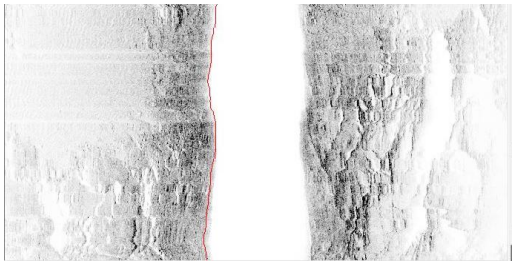


Plate 10: Detail from Array area Grid 2, showing MBES Digital Elevation Model (DEM) underlying residual magnetic intensity data on survey line AR61 at Latitude 53.23603, Longitude -9.97416, highlighting magnetic anomaly within channel feature.



Survey Line AR61 High Frequency side scan sonar data trace at Latitude 53.23603, Longitude -9.97416 showing a sandy area with rock adjacent. The distortion indicates a turbulent sea state when survey was being carried out but there is no indication of archaeological features



Survey Line AR61 Low Frequency side scan sonar data trace at Latitude 53.23603, Longitude -9.97416 showing a sandy area with rock adjacent. While the image is clearer, there is no indication of archaeological features

Plate 11: Survey Line AR61 High and Low Frequency side scan sonar data trace at Longitude 53.23603, Latitude -9.97416.

3.1.3 Landfall area, extent and observations

The survey completed within the landfall area was to inform proposed geotechnical investigations and to extend the 2022 survey footprint closer inshore.

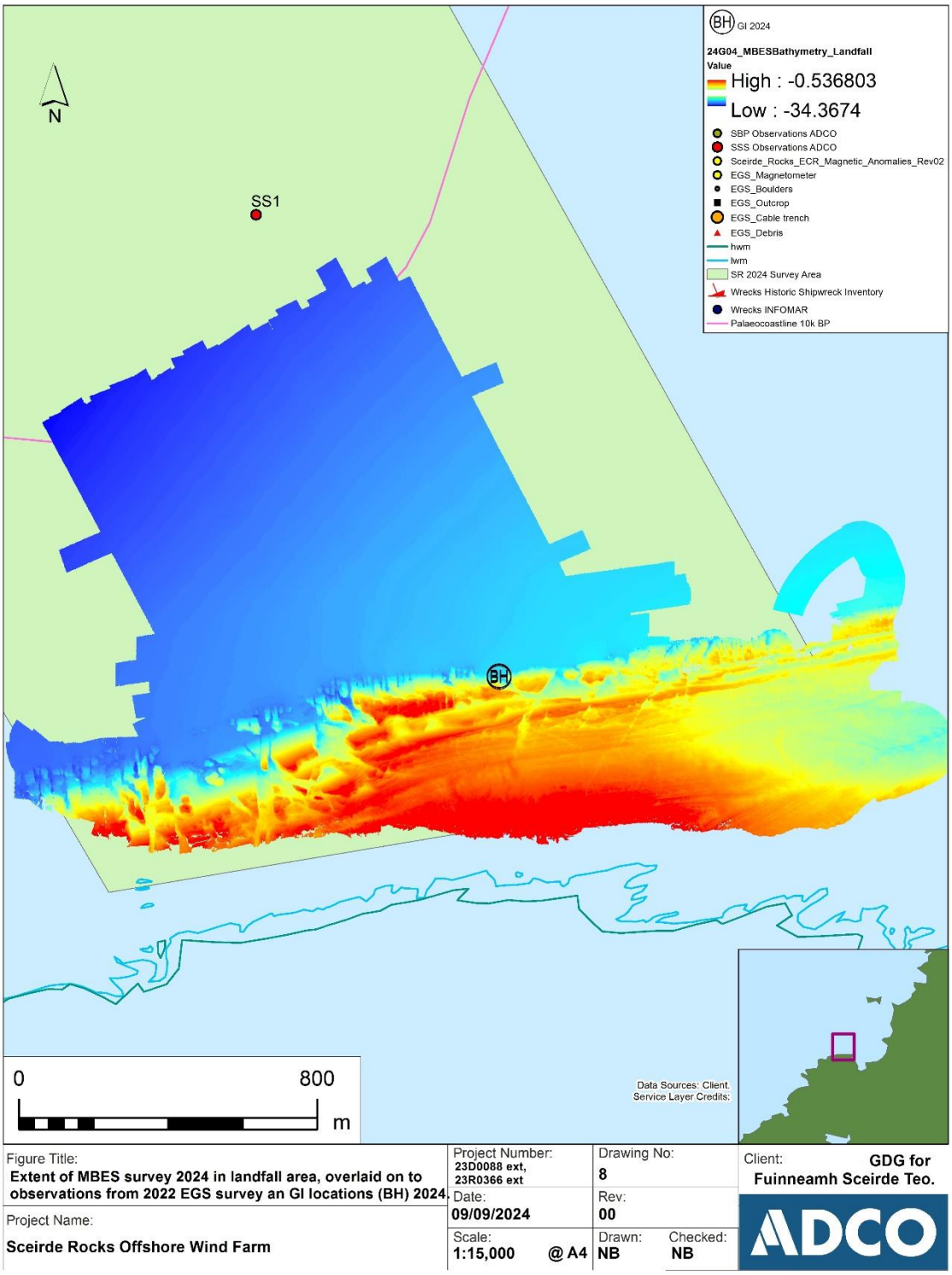


Figure 8: Extent of MBES survey 2024 in landfall area, overlaid on to observations from 2022 EGS survey, and GI locations (BH) 2024.

The survey completed a series of closely-spaced tracklines that ran parallel with the shoreline across the increasing shallow portion, and at right angles to the shoreline off the bedrock. Line spacing was achieved at 30 m separations, providing an intensive and comprehensive surveyed area reaching to within 100 m of the Low Water Mark (Figures 8–9).

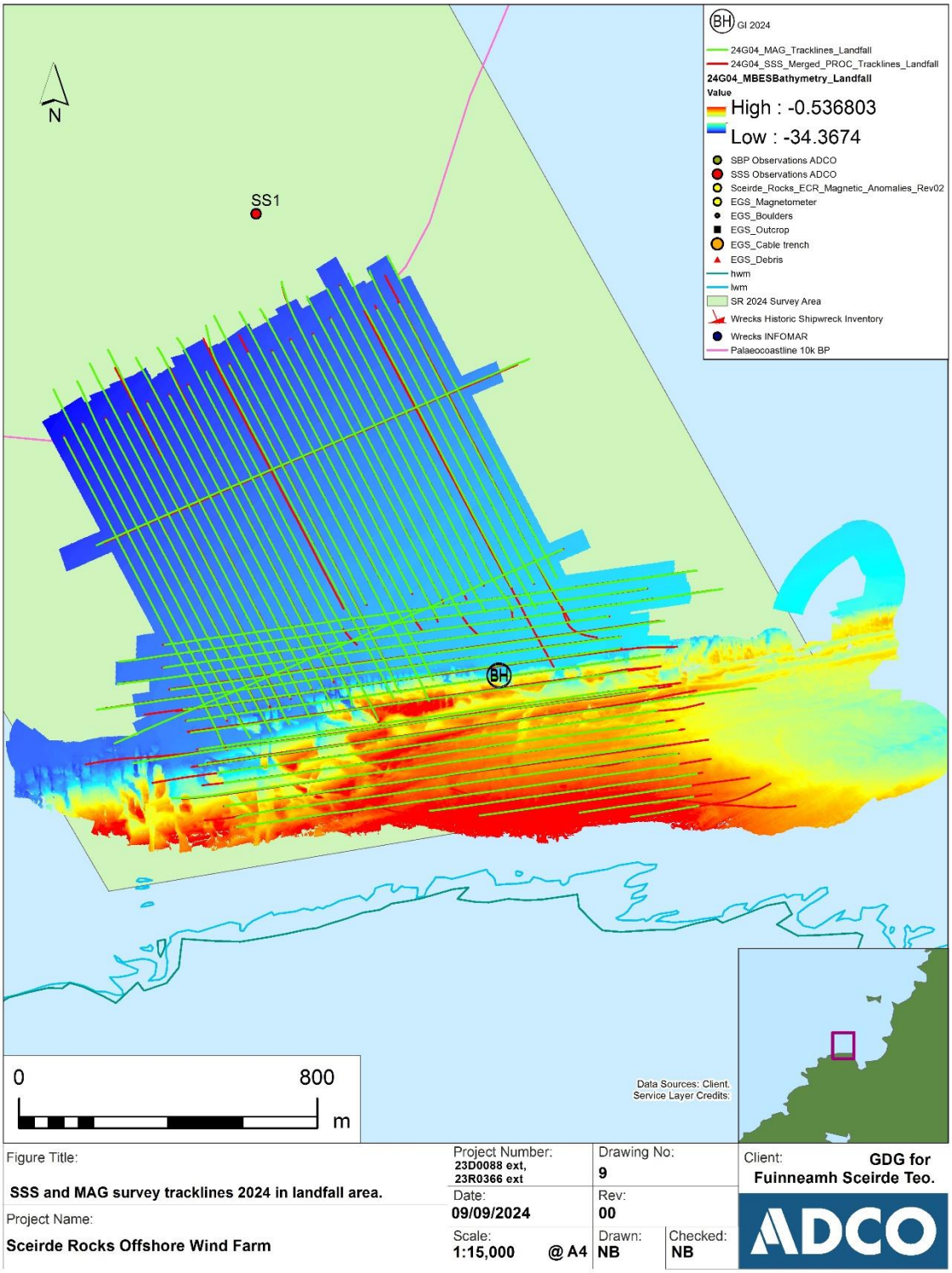


Figure 9: SSS and MAG survey tracklines 2024 in landfall area with MBES results 2024, overlaid on to observations from 2022 EGS survey, and GI locations (BH) 2024.

As with the data set reviewed in advance of the geotechnical investigations, the larger data set for the landfall area records a shelf of exposed bedrock running across the southern expanse of the survey corridor.

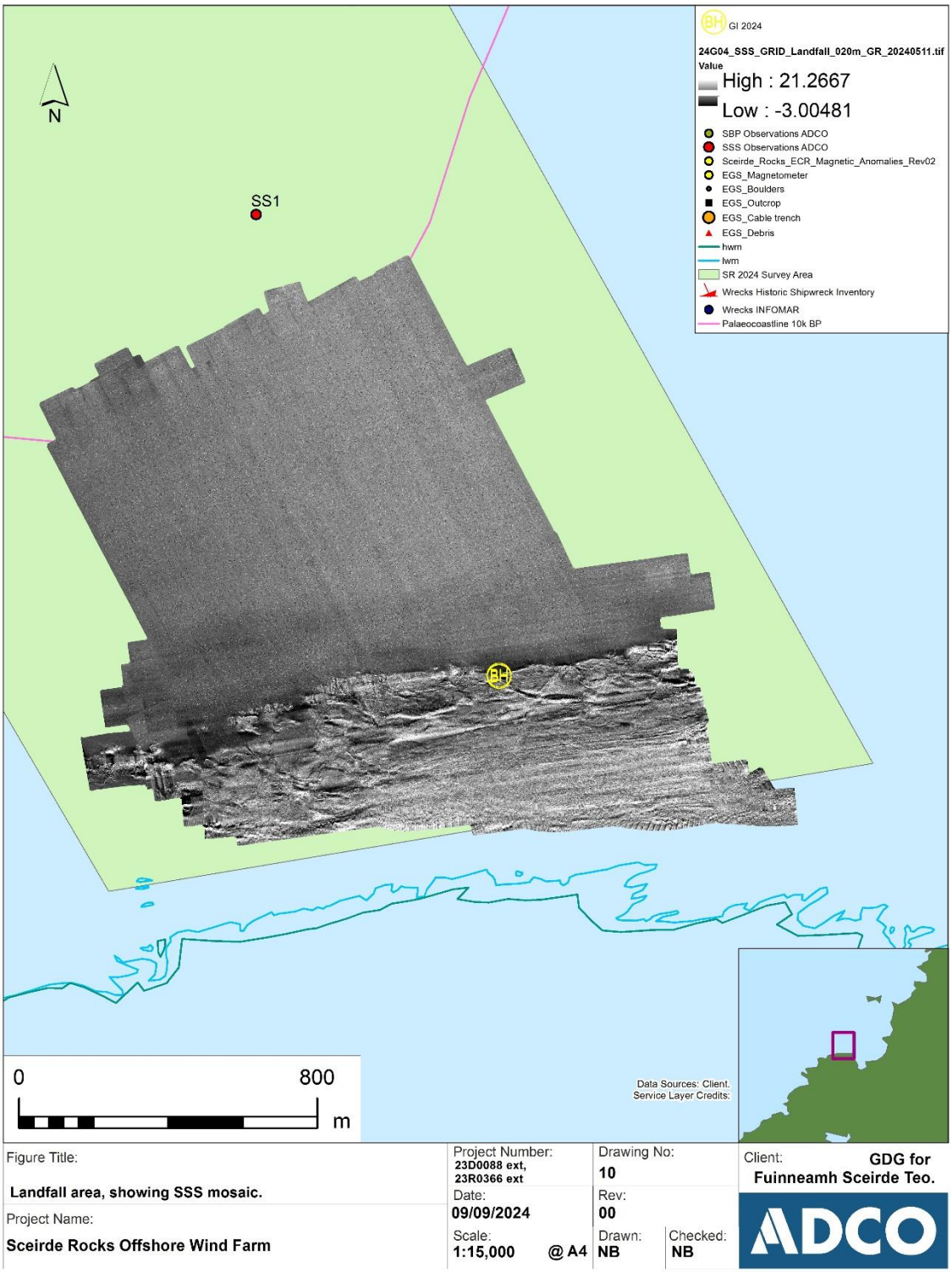


Figure 10: Extent of side scan sonar survey 2024 in landfall area, showing sss data as a mosaic image, and GI location (BH) 2024.

The sharp declination of the contours once again meant that the High Frequency side scan sonar data traces were less informative than the Low Frequency traces.

The seabed off the exposed rock shelf is a flat sand; this is in keeping with the results recorded in the 2022 marine geophysical survey.

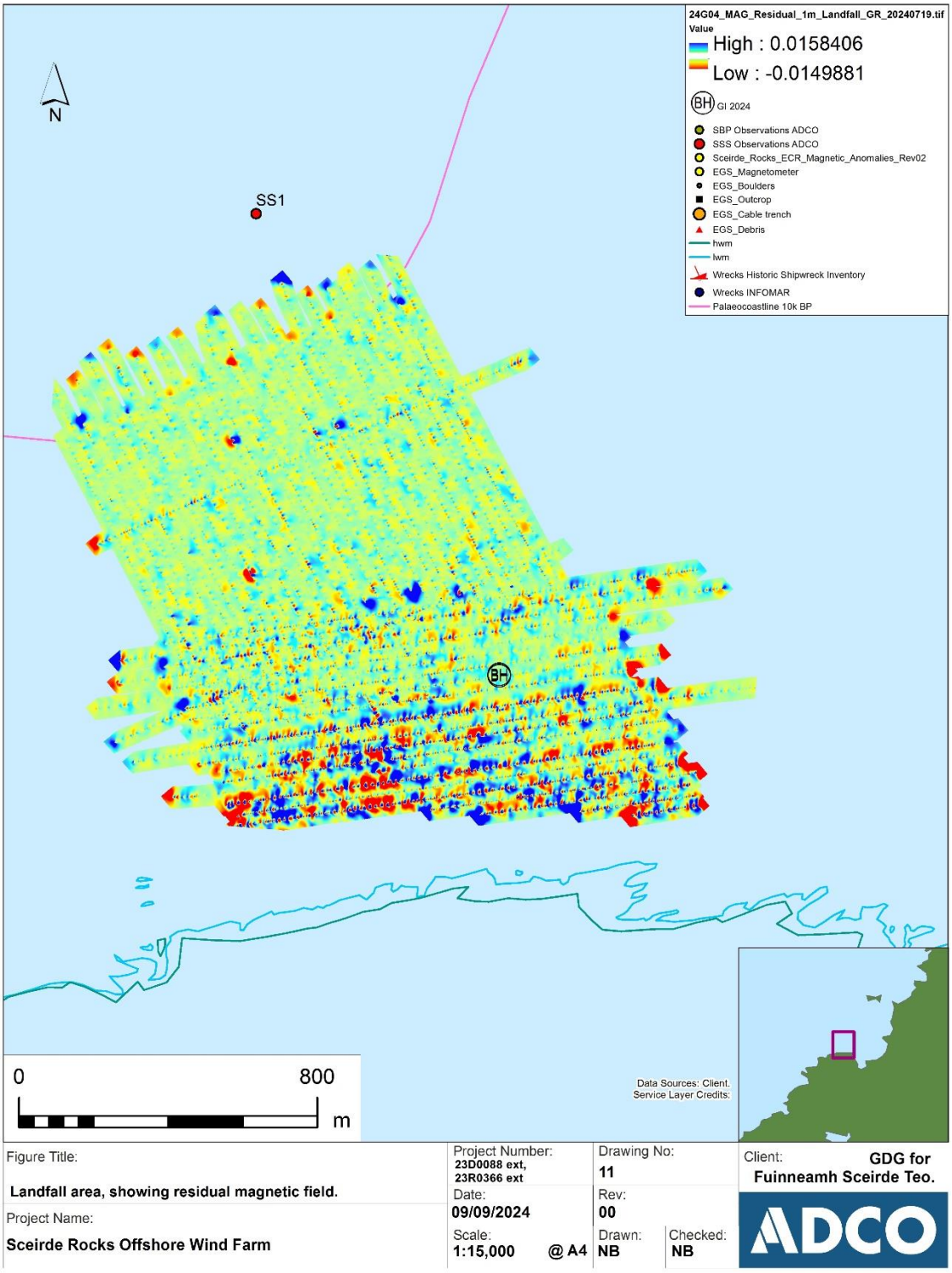
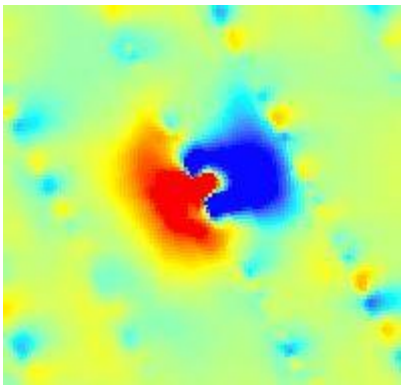


Figure 11: Extent of magnetometer survey 2024 in landfall area, showing residual magnetic field, and GI location (BH) 2024.

The residual magnetic field extends the area reported on in the focused survey at the landfall GI location (Figure 11). There is a range of fluctuations across the exposed bedrock, which more probably reflects natural variation in the underlying rock rather than the presence of small-scale ferrous metal debris caught in the clefts of the rock. However, two areas present themselves along the western side of the rock face where the residual field is pronounced (Figure 7, expanses of red). In each instance, the variation extends over a *c.* 100 m-wide area. The closest of these two locations is 320 m southwest of the proposed landfall impact area, and should not be affected by the development works,

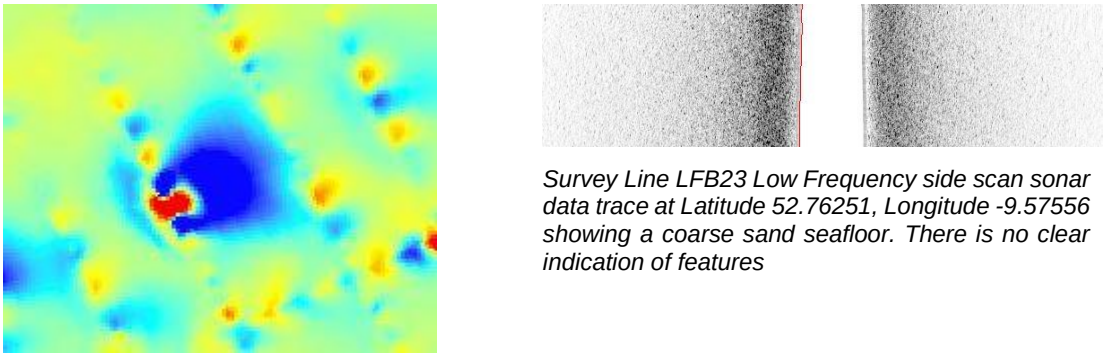
Off the rock shelf, there are three instances of localised variation consistent with a magnetic target. Green Rebel reported isolated boulders within 50 m of each of the magnetic targets, but there does not appear to be a defined target at the locations. The first instance is located at Decimal Degree 52.76198 Latitude -9.57968 Longitude (UTM29N 461162E 5846006N). The location records no obvious side scan sonar feature on what is a coarse sand seabed surface (Plate 12). The coarse texture of the sand may disguise the presence of a small object on the surface but would not disguise the presence of any large object. It is therefore likely that the target feature is buried in the substrate. The location should be avoided in terms of proposed construction phase impacts. If avoidance is not possible, additional survey may be required to help define the source of the magnetic anomaly.



Survey Line LFB14.001 Low Frequency side scan sonar data trace at Latitude 52.76198, Longitude -9.57968 showing a coarse sand seafloor. There is no clear indication of features

Plate 12: Magnetometer target recorded in the export cable corridor off the rock outcropping, with corresponding side scan sonar data trace for the same location that shows no obvious target feature on the seabed surface.

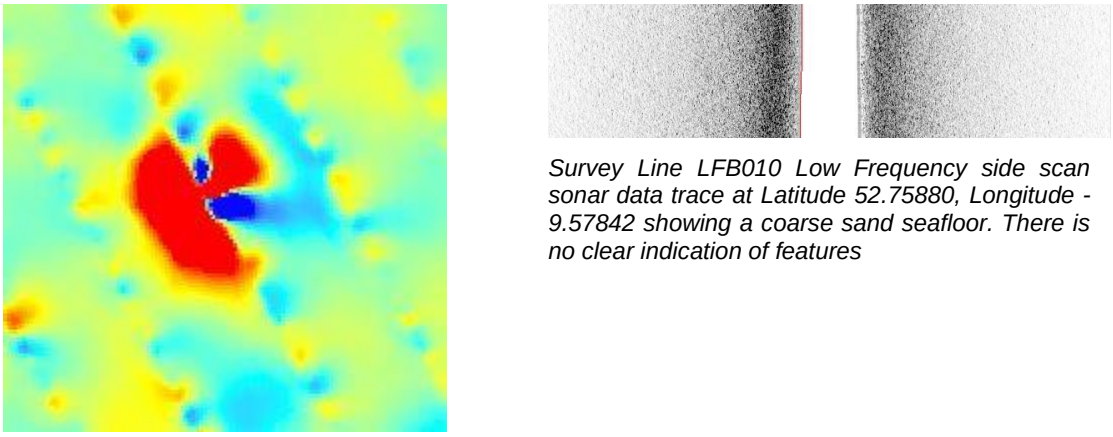
The second instance of localised variation occurs at Decimal Degree 52.7625 Latitude -9.57556 Longitude (UTM29N 461162E 5846006N). Once again, the location records no obvious side scan sonar feature on what is a coarse sand seabed surface (Plate 13). In this instance the location is aligned with the landfall location. If avoidance during construction is not possible, additional survey may be required to help define the source of the magnetic anomaly.



Survey Line LFB23 Low Frequency side scan sonar data trace at Latitude 52.76251, Longitude -9.57556 showing a coarse sand seafloor. There is no clear indication of features

Plate 13: Magnetometer target recorded in the export cable corridor off the rock outcropping, with corresponding side scan sonar data trace for the same location.

The third instance occurs at Decimal Degree 52.75880 Latitude -9.57842 Longitude (UTM29N 460966E 5845596N), and the same absence of any target feature in the side scan sonar data suggests that the target is buried (Plate 14). The location should be avoided in terms of proposed construction phase impacts. If avoidance is not possible, additional survey may be required to help define the source of the magnetic anomaly.



Survey Line LFB010 Low Frequency side scan sonar data trace at Latitude 52.75880, Longitude -9.57842 showing a coarse sand seafloor. There is no clear indication of features

Plate 14: Magnetometer target recorded in the export cable corridor off the rock outcropping, with corresponding side scan sonar data trace for the same location.

3.3 Marine Geotechnical Investigation

The geotechnical work was carried out by Geoquip aboard their dynamically positioned (DP) vessel *Geoquip Saentis*, and comprised 17 boreholes (BH) and 2 cone penetration tests (CPTs). The majority were located at proposed WTG sites, with one at the proposed Offshore Sub-Station (OSS) located within the array area in Grid 2; two within the export cable corridor, and one at the proposed landfall where it is intended to excavate a trenchless technology (HDD) exit pit (Figure 12).[5]

[5] Geoquip, 'IRE1-GEM-SIT-EG-RP-0001 – Volume 1 – Field operations and preliminary results', Geoquip report for Fuinneamh Sceirde Teoranta, 2024.

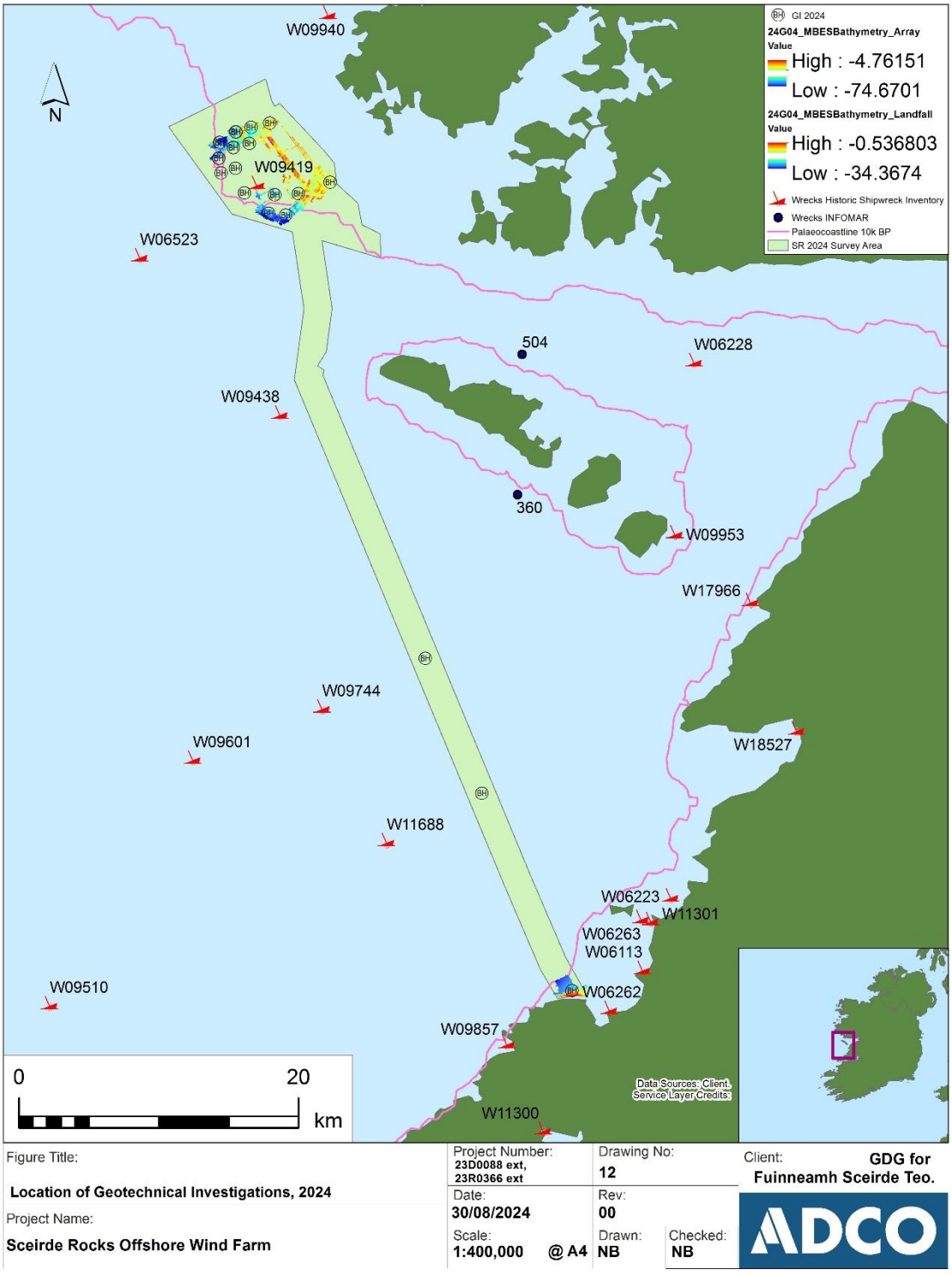


Figure 12: Location of Geotechnical Investigations 2024.

The boreholes achieved depths of between 5 and 30 m below seabed, and CPTs achieved between 15 and 20 m below seabed.

The borehole located at the landfall (reference HDD001 and HDD001A) was positioned within 1.46 m and 2.78 m of the proposed location respectively, and this variation of the actual location compared to the proposed location was typically experienced at all locations, with the greatest

variation being at WTG20A, where the actual distance was 4.28 m from that proposed, and was least at WTG20, where the actual distance was 19 cm from the proposed location.

The observations confirmed those of previous GI campaigns, reporting a stratigraphy of covering sand of various thickness over silty clay over bedrock, where bedrock was not already fully exposed on the seabed.

The observations at HDD001 encountered seabed at -29 m and reached the target depth of –48 m. Covering sand extended 3 m in depth and overlay cobble that extends to 8.9 m in depth and sits directly on shale rock, which extends beyond the target depth.

There was no record of anthropogenic indicators in the GI logs, such as charcoal, wood/organic or metal remains that may indicate the presence of either cultural layers or submerged landscape elements.

3.4 Conclusions

The 2023 marine geophysical survey confirmed the essential seabed morphology of the array area, while the vibrocore logs permitted some insight to the buried strata across the array and area and the export cable corridor.

The 2024 marine geophysical survey data sets provide better opportunity for archaeological interpretation and the side scan sonar and magnetometer data sets are robust, providing comprehensive insight to the nature of the seabed and its underlying strata within the surveyed areas of the array area and landfall area.

The data confirms the striking nature of the exposed bedrock seascape at both locations, and the contrasting featureless sandy bed off shelf at the landfall area.

While a series of contact features was recorded in the 2024 magnetometer data set within the array area and within the landfall area, there are no clear signs of *in situ* wreckage on the seabed.

The 2024 side scan sonar survey was able to reach within 100 m of the shoreline approaching the landfall area, and within 90 m using the multibeam. This improves greatly the coverage achieved within the shallow shelving foreshore area. It leaves a gap in coverage that has not been surveyed. However, as the project intends to tunnel under the foreshore via trenchless technology, with the exit pit located within the surveyed area some 500 m offshore, the remaining gap in survey coverage below the Low Water Mark should not be an issue.

The dropdown camera footage provides useful ground-truthing of the seabed morphology but lacks precise positioning capability to interrogate specific locations fully.

The 2024 geotechnical investigations added additional locations where stratigraphy is recorded in detail and confirms a similar sequence of sand over silty clay over bedrock, where bedrock is not exposed on the surface of the seabed. No anthropogenic indicators were recorded.

4.0 Recommendations

The principal of avoidance with known archaeological sites and sites of archaeological potential is recommended.

Six locations, recorded in the 2024 magnetometer data, should be avoided in terms of construction phase impacts (Table 1). An Archaeological Exclusion Zone (AEZ) of 50 m radius is applied to each location, within which no impact works can take place without prior consent of the NMS at the DHLGH. If avoidance is not possible, additional survey may be required to help define the source of the magnetic anomaly:

Survey line Reference	Latitude	Longitude	UTM29N E	UTM29N N	AEZ (m)
AR47	53.28125	-10.01732	432172E	5904040N	50 m
AR05	53.25120	-9.91380	439031E	5900604N	50 m
AR61	53.23603	-9.97416	434981E	5898970N	50 m
LFB14.001	52.76198	-9.57968	460884E	5845950N	50 m
LFB23	52.7625	-9.57556	461162E	5846006N	50 m
LFB010	52.75880	-9.57842	460966E	5845596N	50 m

Table 1: List of locations for which an AEZ is recommended

Should further Marine geophysical surveys, and geotechnical investigations take place in advance of construction, the data will be assessed by an appropriately qualified and experienced maritime archaeologist and, in the unlikely event that any new sites or features are identified, they will be notified to the National Monuments Service (NMS) and appropriate measures taken in discussion with NMS.

Intertidal Archaeology Survey licensed by the Department of Housing, Local Government and Heritage (DHLGH) is to take place.

An Archaeological Management Plan (AMP) has been prepared to inform the project throughout its lifetime, including construction, operation and decommissioning phases. The AMP facilitates recording and reporting procedures and will establish archaeological protocols in the event of

archaeological discovery during works. Preservation by record is the last resort once all other options have been considered. The AMP will be reviewed and updated at agreed intervals.

Archaeological monitoring licensed by the DHLGH will take place of ground and seabed disturbance activities that take place during construction.

Project maritime archaeologists operating under licence from the DHLGH will be engaged by the Sceirde Rocks OWF project sponsor as part of the design team and to monitor construction activities and resolve archaeological features that may be exposed in the course of works.

Archaeological inputs are licensed by the DHLGH and consent is granted through its National Monuments Service (NMS).

The recommendations contained in this report are subject to the approval of the NMS at the DHLGH.

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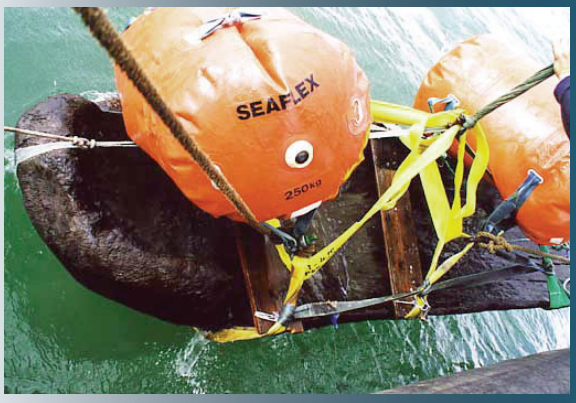

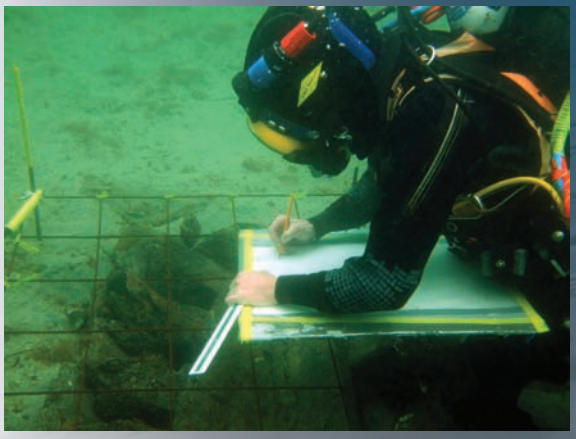

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