

Rampion 2 Wind Farm
Category 6:
Environmental Statement
Volume 4, Appendix 9.4
Geophysical survey (Part 4 of 7)
Date: August 2023
Revision A

Document Reference: 6.4.9.4
Pursuant to: APFP Regulation 5 (2) (a)
Ecodoc number: 004866474-01



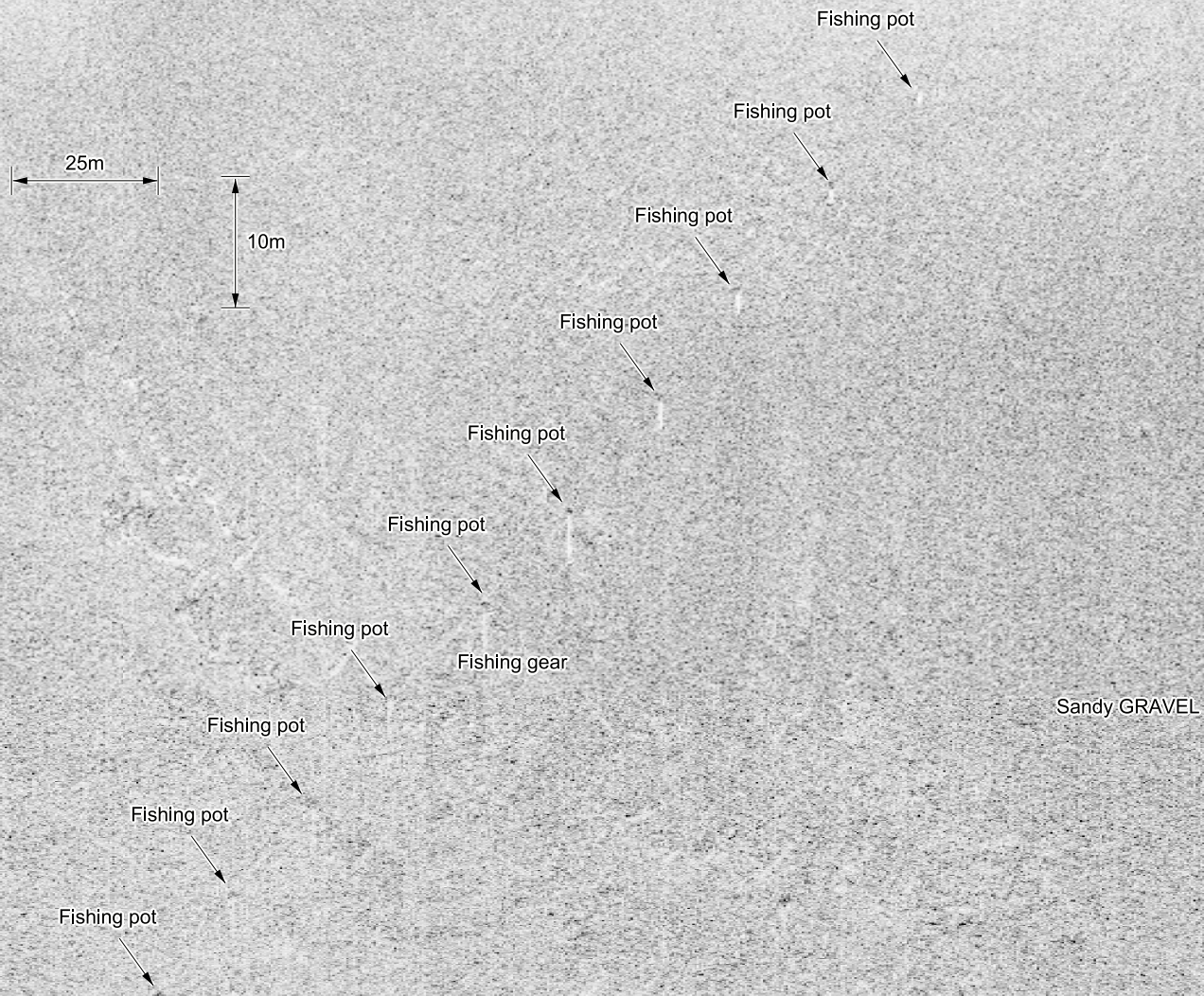
Document revisions

Revision	Date	Status/reason for issue	Author	Checked by	Approved by
A	04/08/2023	Final for DCO Application	GoBe	RED	RED

WSW

ENE

Seabed



Line B_M-5

SIDE SCAN SONAR
Illustrating fishing gear

Figure 3.10

WSW

Seabed

ENE

Sandy GRAVEL

Fishing pot

Fishing pot

Fishing pot

Fishing gear

Fishing pot

Fishing pot

Fishing pot

20m

10m

Line B_M-28A

SIDE SCAN SONAR
Illustrating fishing gear

Figure 3.11

WSW

ENE

Fishing pot

Fishing pot

Fishing pot

Fishing pot

Fishing gear

Fishing pot

Fishing pot

20m

10m

Sandy GRAVEL

Seabed

Line B_M-33

SIDE SCAN SONAR
Illustrating fishing gear

Figure 3.12

WSW

Seabed

ENE

Sandy GRAVEL

20m

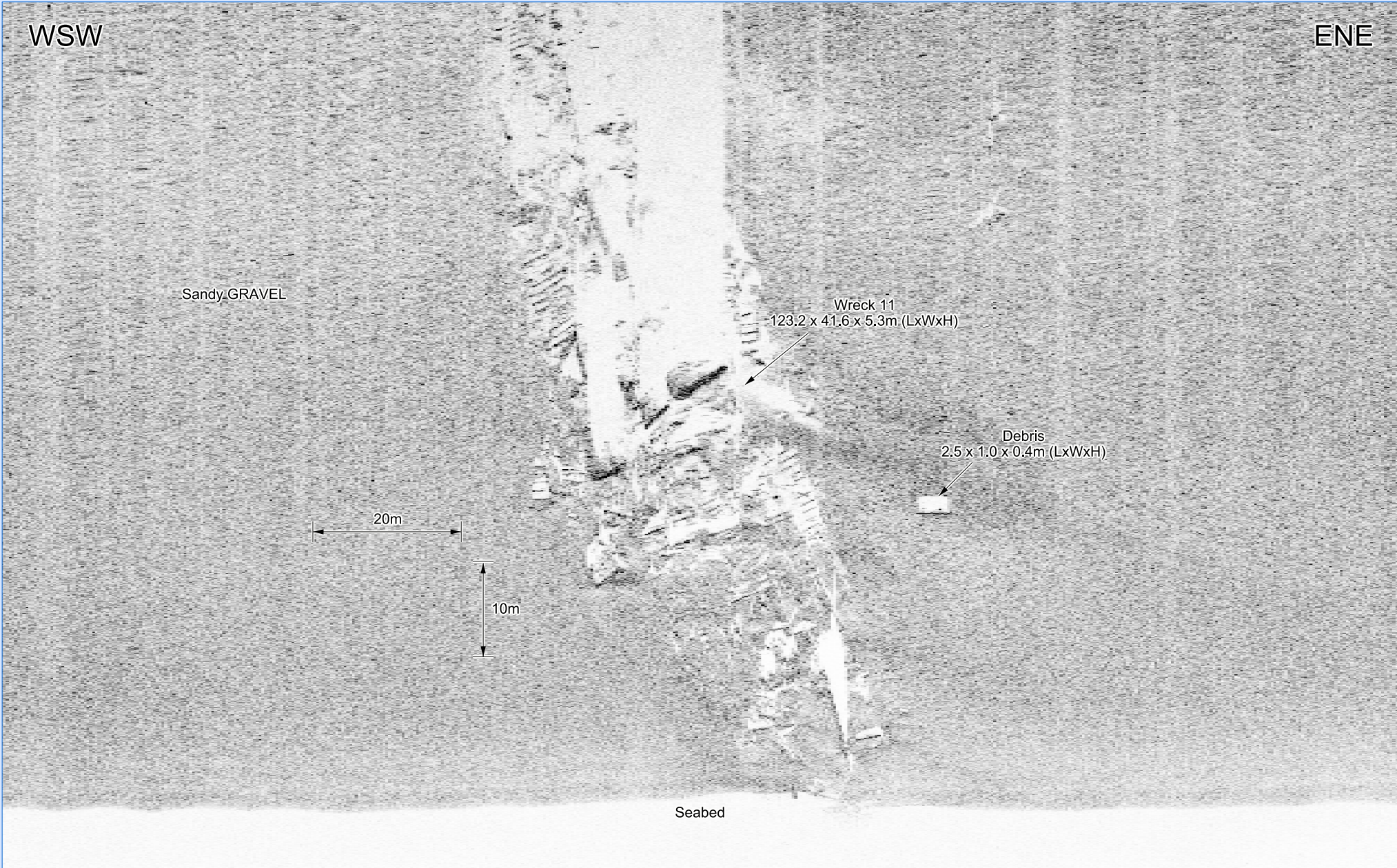
10m

Wreck 3
144.5 x 38.1 x 5.9m (LxWxH)

Line B_M-29

SIDE SCAN SONAR
Illustrating Wreck 3

Figure 3.13



Line B_M-59

SIDE SCAN SONAR
Illustrating Wreck 11

Figure 3.14

WSW

Seabed

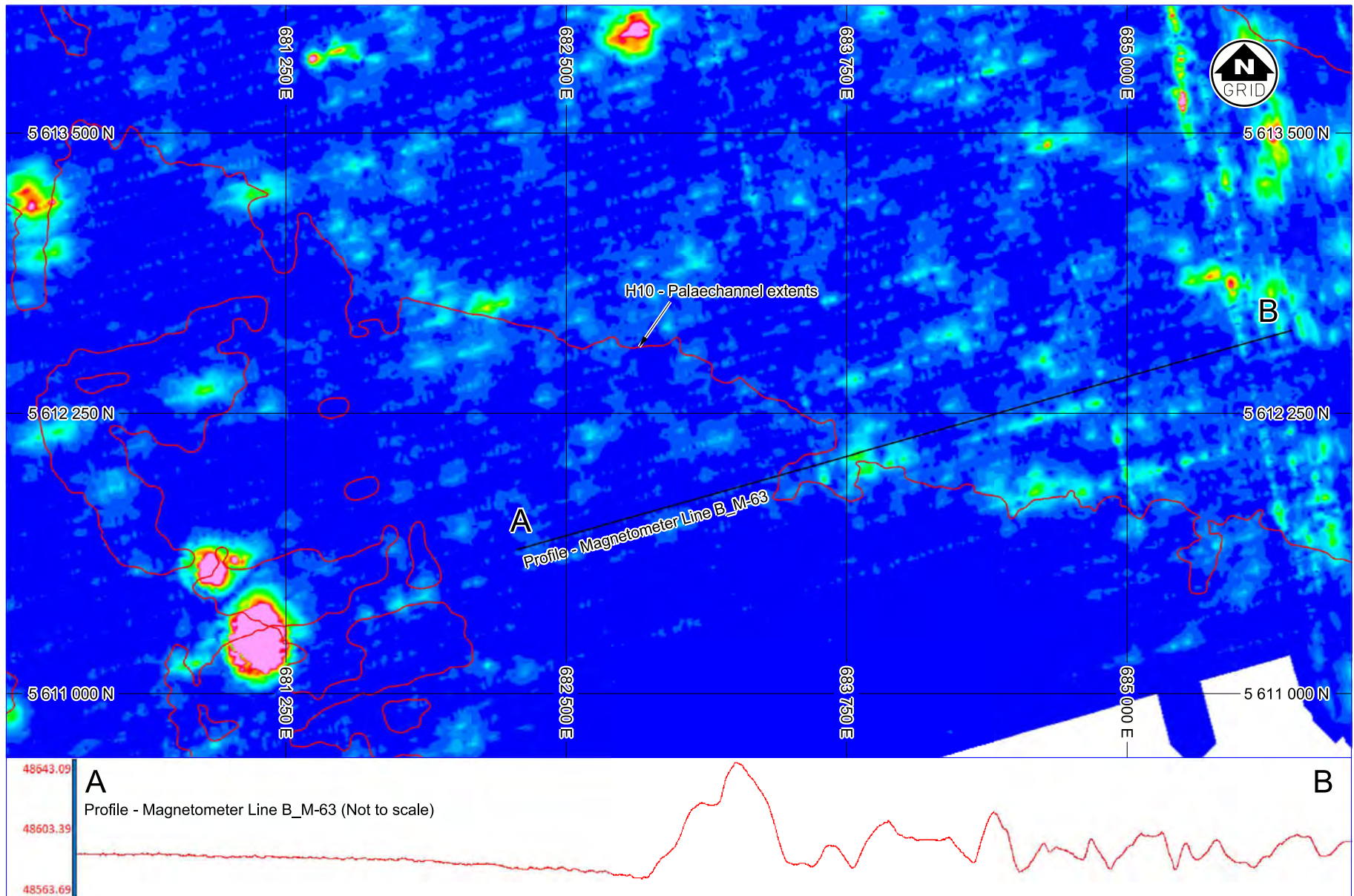
ENE



Line B_M-36

SIDE SCAN SONAR
Illustrating Wreck 6

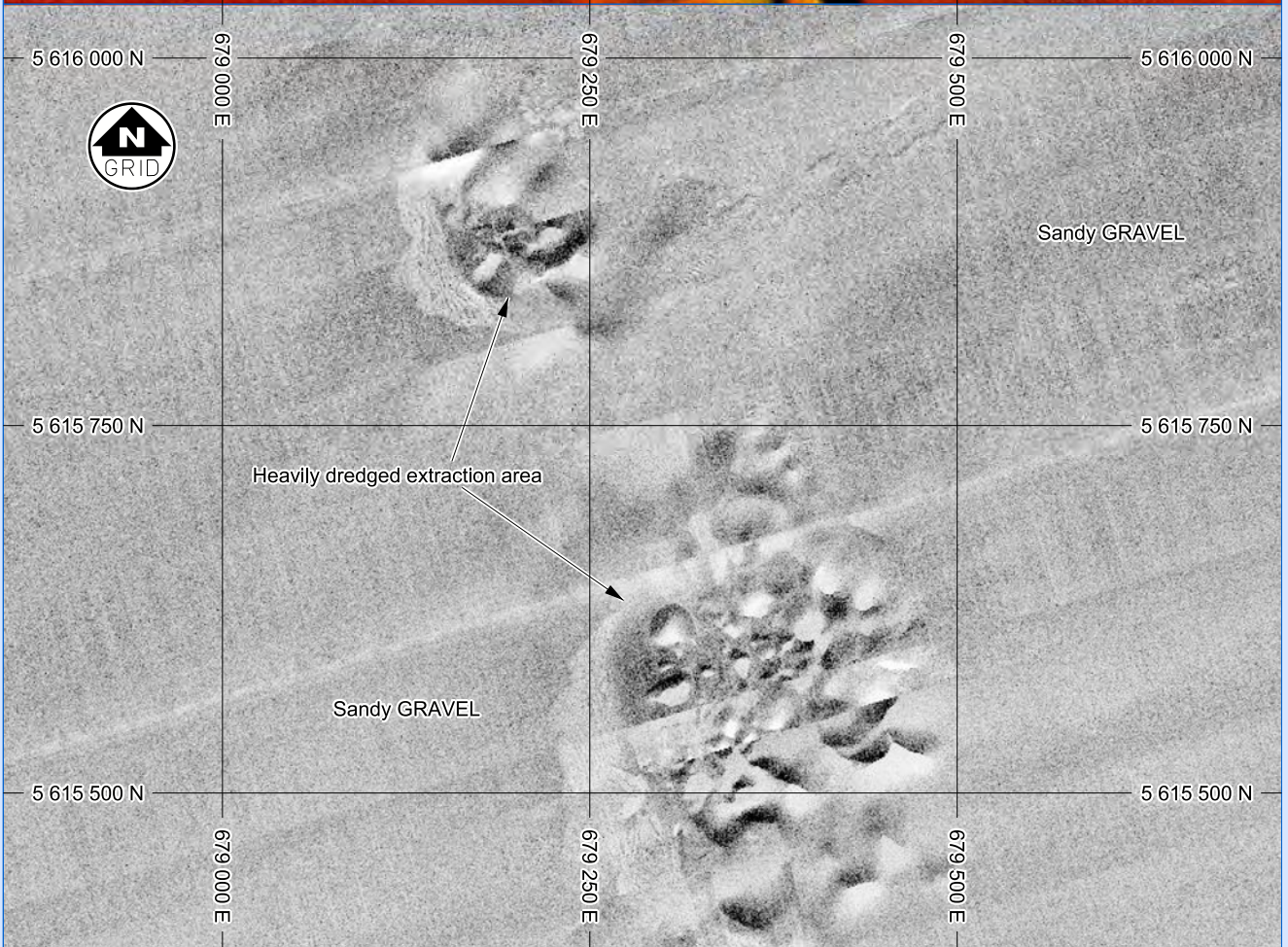
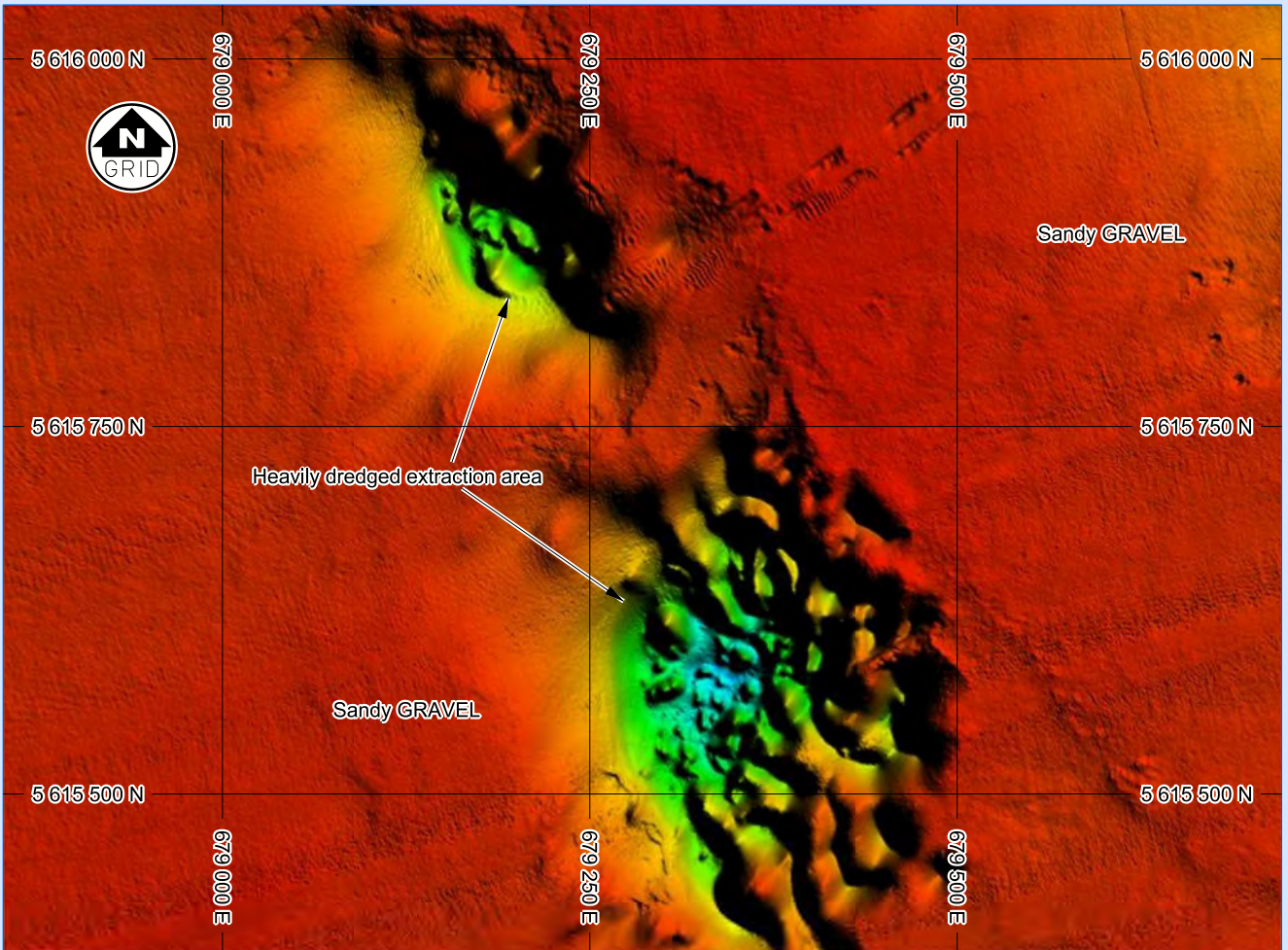
Figure 3.15



Scale 1 : 25 000
WGS84/UTM Zone 30N (3°W)

Palaeochannels identified on magnetometer data

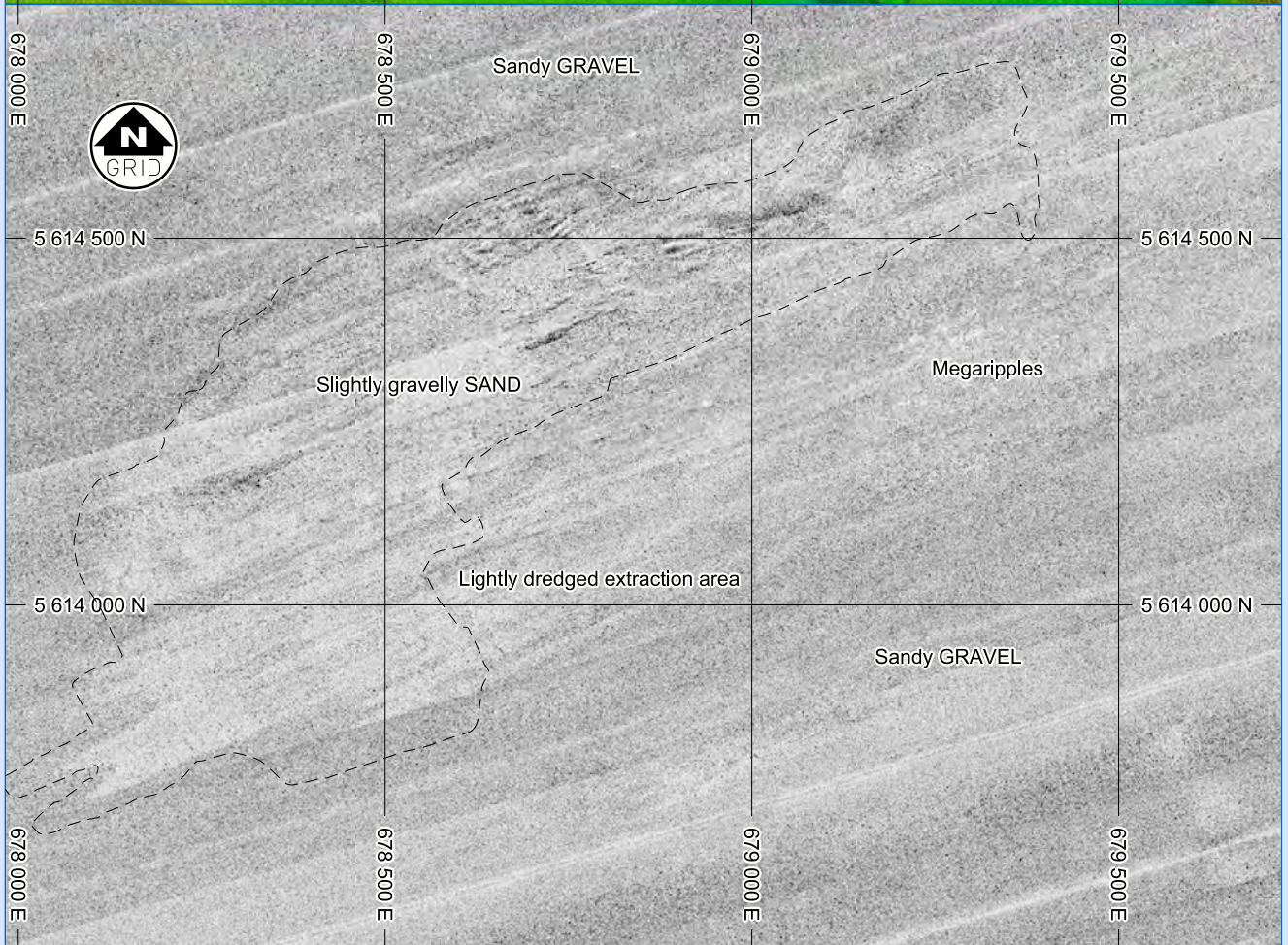
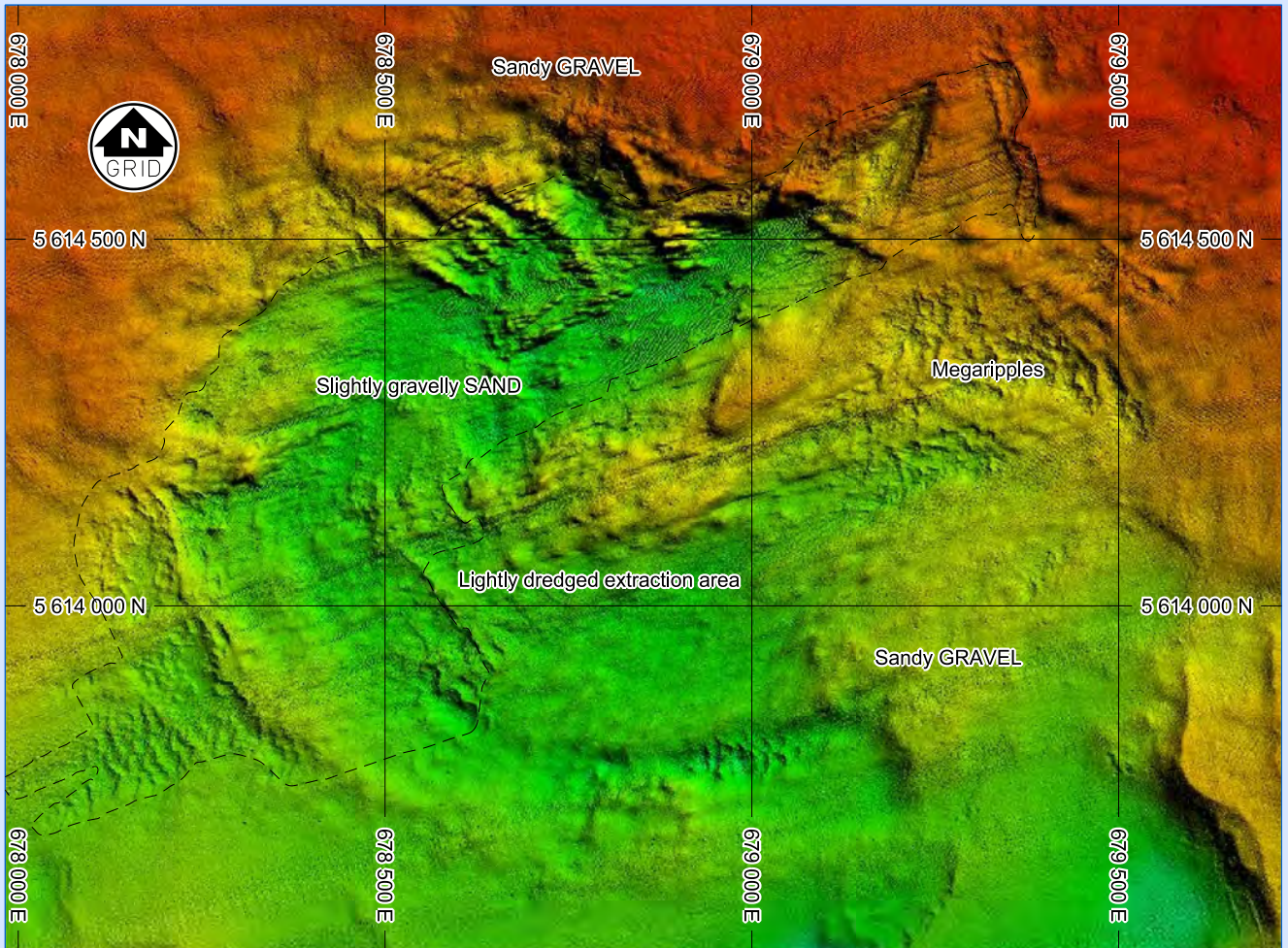
Figure 3.16



Scale 1 : 5 000
WGS84/UTM Zone 30N (3°W)

MBES/SIDE SCAN SONAR
Illustrating heavily dredged extraction area

Figure 3.17



Scale 1 : 10 000
WGS84/UTM Zone 30N (3°W)

MBES/SIDE SCAN SONAR
Illustrating lightly dredged extraction area

Figure 3.18

NNW

SSE

Sandy GRAVEL

Seabed

Seabed

Spudcan depressions

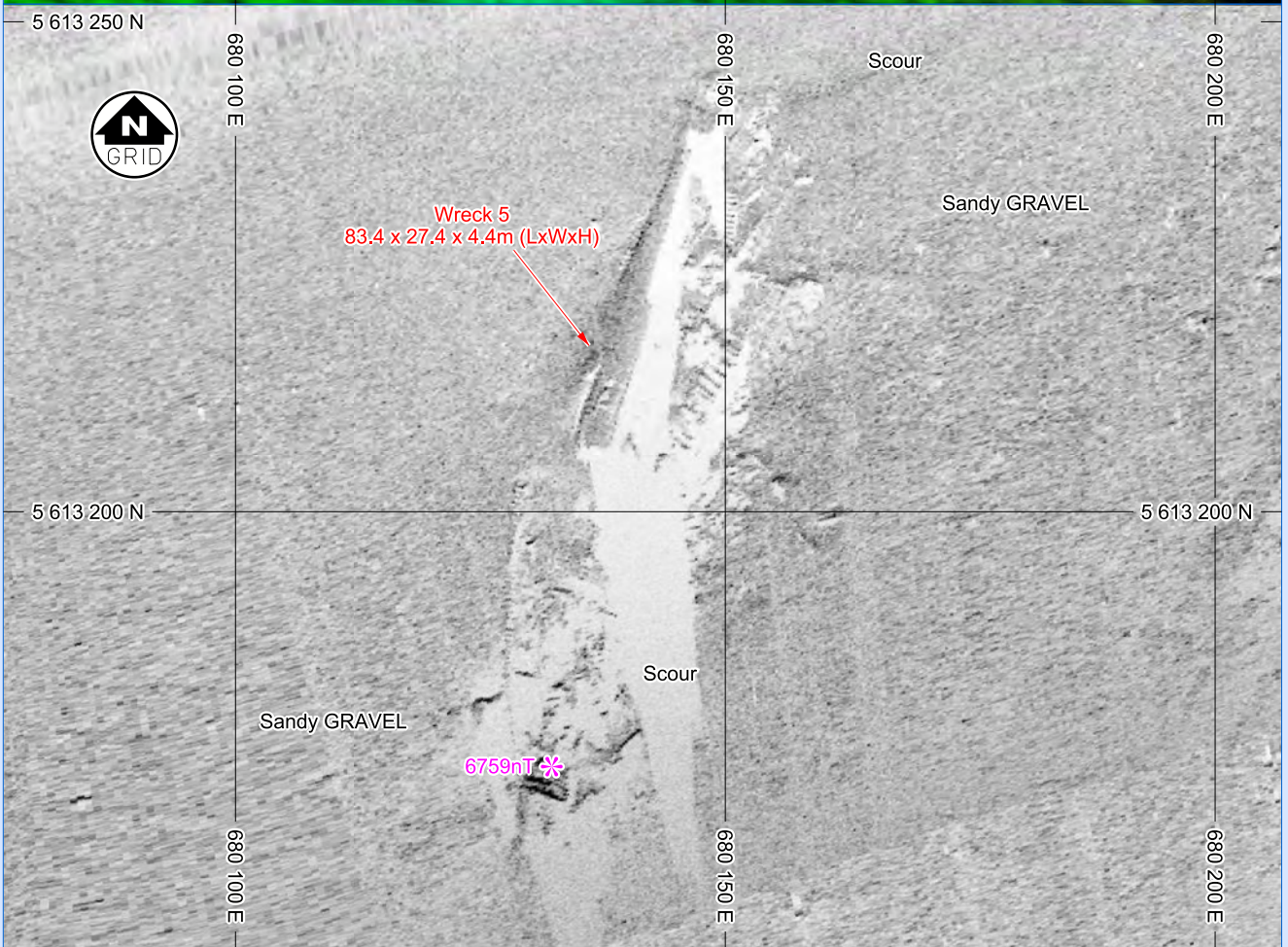
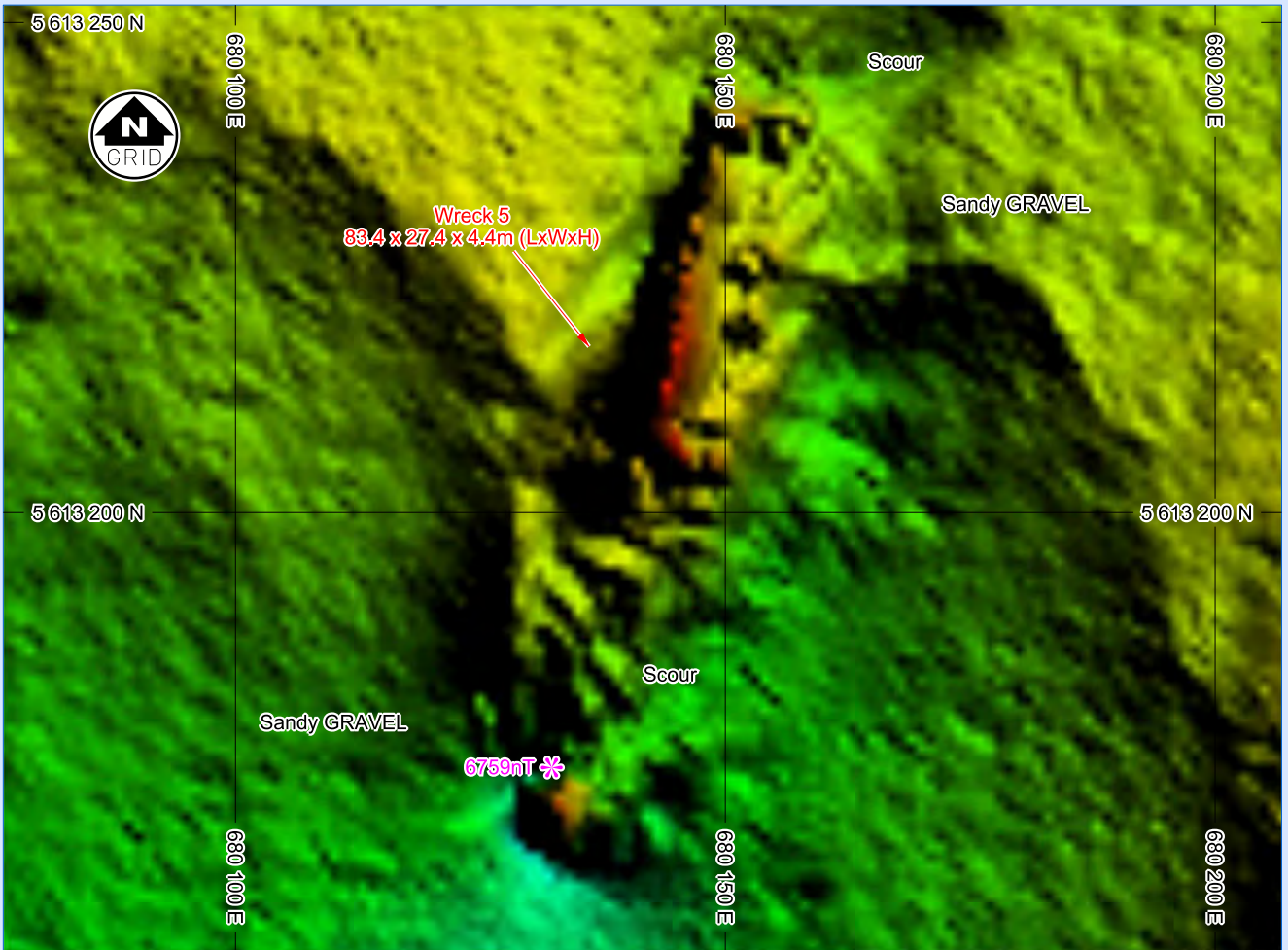
20m

20m

Line B_M-93

SIDE SCAN SONAR
Illustrating spudcan depressions

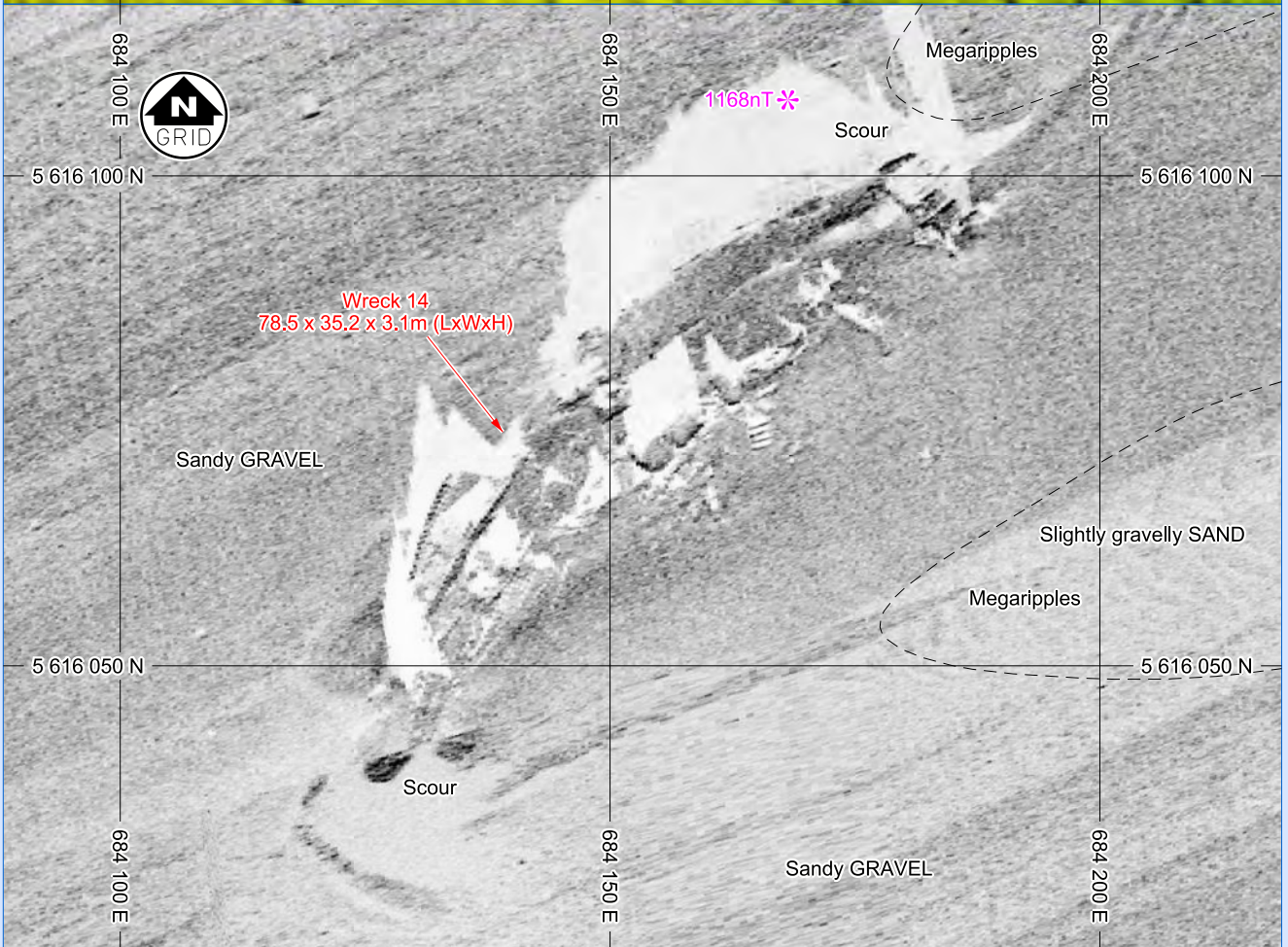
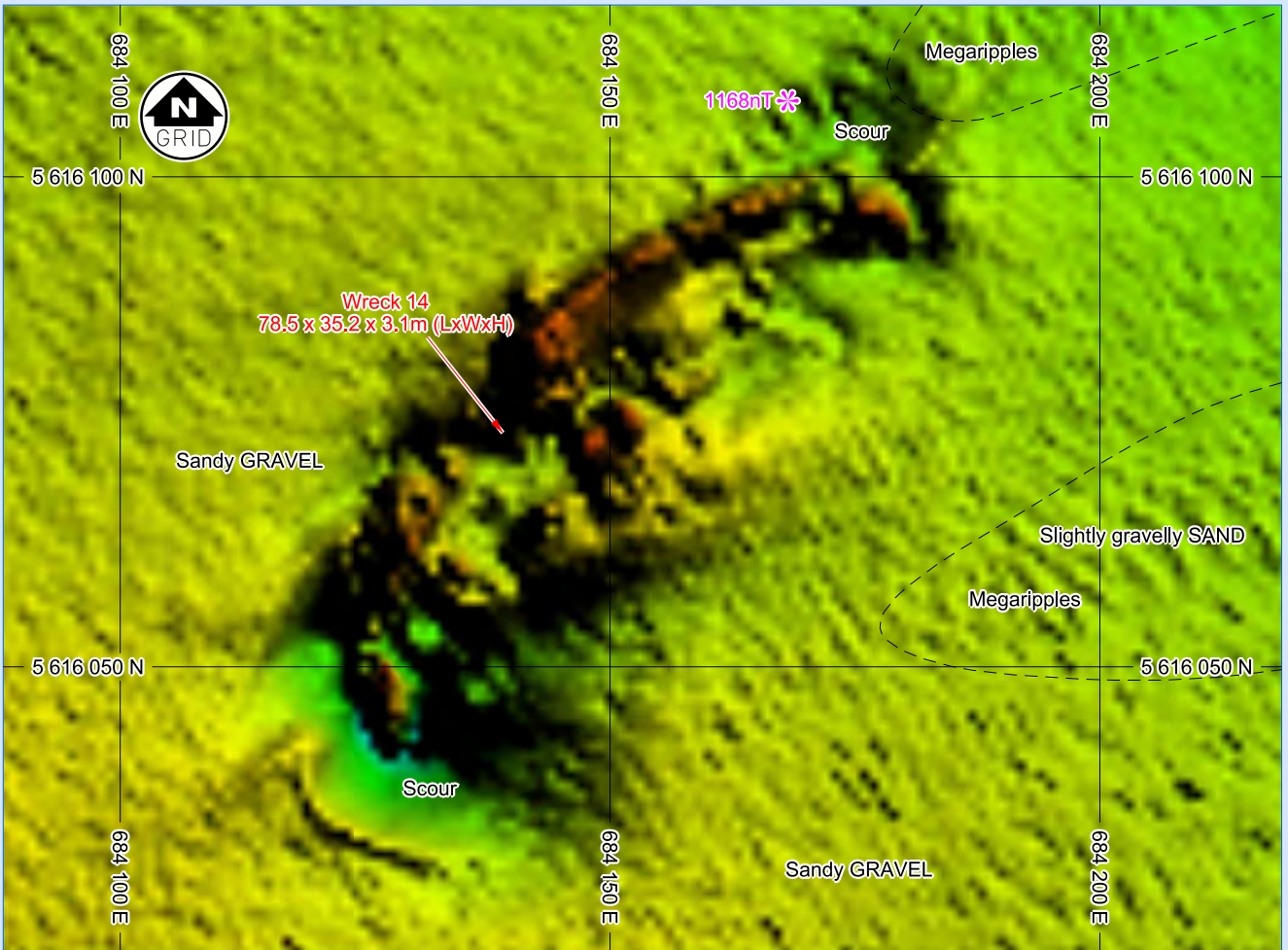
Figure 3.19



Scale 1 : 750
WGS84/UTM Zone 30N (3°W)

MBES/SIDE SCAN SONAR
Illustrating overview of Wreck 5

Figure 3.20



Scale 1 : 750
WGS84/UTM Zone 30N (3°W)

MBES/SIDE SCAN SONAR
Illustrating overview of Wreck 14

Figure 3.21

3.3 Sub-Surface Geology

Pinger and UHRS Sparker data were acquired on Area B. The Pinger and UHRS data were in good agreement with the bathymetry and side scan sonar data and hence aided the interpretation of both the seabed sediments and shallow soils. Penetration of greater than 50m was achieved on the UHRS data as specified in the scope of work. Correlation with previous reports allows for the previously acquired ground truthing results. It should be noted that previously acquired ground truthing results are not covered by the current 2020 survey data.

Referenced reports include:

- RAM-GAR-SIF-REP-0003_00--Geophysical Investigations Additional Areas Report, Gardline ref: 9370, 2013
- RAM-GAR-SMG-REP-0002_00--Export Cable Routes Report, Gardline ref: 9371, 2013
- RAM-OSI-SMG-SUR-0001_01-at02--Definitive Geophysical Survey Volume 2 Section 1 Report, 2010
- ATKINS_5124296_RampionOWF_KingdomModel

Within Area B three units have been identified and mapped. The base and distribution of each are presented on [Chart 9](#) and [Chart 10](#). An overview is illustrated in [Figure 3.22](#) and [Figure 3.23](#).

Table 3.2 Summary of Interpreted Horizons within Area B

Horizon	Phase	Description	Expected Geological Conditions
H05	Holocene Sediments	Found In the western part of Area B, ranging from seabed to 3m depth BSB. Characterised as largely homogeneous and acoustically transparent with faint, discontinuous internal horizons.	Unconsolidated sediments, predominantly sand and gravel. Potentially mobile in places.
H07	Quaternary Sediments	Found largely in the southeast of Area B, ranging from seabed to 9m depth BSB, is characterised as largely homogeneous and acoustically transparent with faint internal horizons.	Consolidated sediments, predominantly sand and gravel.
H10	Palaeochannels	Found throughout Area B. A channel infill sequence ranging from seabed to 32m depth BSB. Layered sediments, transparent facies are common, with higher amplitudes sometimes blanking the base.	Fluvial, estuarine and marine deposits. Predominantly sands and gravels overlying normally consolidated sands and clays, with some peat layers and basal gravels.
Bedding Strata	Tertiary and Cretaceous bedrock	Found throughout Area B. Tertiary Claystones to Cretaceous Chalk strata. Simply layered and often gently folded creating dipping beds.	Tertiary bedrock strata consist of softer rocks, comprising mainly sands, gravels and clays, with the older Cretaceous strata comprising typically limestone.

3.3.1 Geological Background

The Rampion 2 windfarm is located offshore Brighton, on the West Sussex coast. The Rampion 2 windfarm survey area lies within the English Channel and contains a variable sequence of Cretaceous and Tertiary bedrock, palaeochannels and younger Quaternary sediments. The general stratigraphy in this section is expected to be bedrock cut through by palaeochannels, all overlain by Pleistocene and Holocene deposits.

During the Pleistocene the English Channel comprised shallow marine environments periodically drying associated with glacial advances and retreats. Extensive fluvial delta systems were able to develop during this period. These rivers cut into the underlying bedrock.

At the end of the Pleistocene, marine conditions returned, infilling the river channels with estuarine then marine sediments. This led to extensive terrace deposits in the region and localised head deposits. During this transgression period sediments were reworked into lag sediments covered the majority of the seabed and subsequent marine deposits.

Throughout the Holocene, marine sediments have begun to build up in some areas of the seabed, covering the Pleistocene sediments and Bedrock outcrops. These deposits are more extensive and thicker further offshore.

BGS information for the area has no quaternary geology information and describes the bedrock as Chalk and interbedded tertiary strata.

A full description is listed in [Table 3.2](#), detailing the horizons mapped and expected geological conditions for the units bounded by them.

3.3.2 Geological Overview

Quaternary deposits are interpreted as comprising predominantly gravel and sand, deposited during open marine environments. These deposits are sometimes too thin to map using the sub-bottom data. Quaternary deposits overlie palaeochannels where present and bedrock is interpreted to comprise Tertiary Claystones to Cretaceous Chalk strata. The strata are simply layered and often gently folded creating dipping beds. These bedding planes subcrop the majority of the survey area, occasionally outcropping.

The Quaternary deposits represented by H05 and H07 are found throughout much of the survey area, although are often too thin to identify on seismic data. Where these are absent, bedrock bedding plain are observed to outcrop and tie with bathymetric data. Areas of increased seafloor boulders are also associated with thinning Quaternary deposits. The younger Holocene deposits, represented by H05 have sandwaves and megaripples associated with them, illustrated in [Figure 3.24](#). H07 unit overlies the Palaeochannels or bedrock, however has no bedforms associated with it, illustrated in [Figure 3.25](#).

Within Area B there are four main Palaeochannels with smaller tributary channels all trending NNW to SSW towards the Palaeo-basin found in Area A, illustrated in [Figure 3.23](#). Palaeochannels, represented by H10, cut through the bedrock and are interpreted to comprise interbedded clay, sands and gravels, with peat layers and basal gravels. [Figure 3.26](#) illustrates these channels. They are associated with glacial advances and the associated falls in sea level. This allowed for an extensive river delta system to develop. At the end of the Pleistocene, marine conditions returned, infilling the channels with estuarine then marine sediments. Within Area B these channels extend up to 32m below seabed, however the base of channels are often blanked by what is likely to be peat or gravel layers, illustrated in [Figure 3.27](#).

Bedrock is interpreted throughout Area B close to seafloor except when cut through by channel systems. These strata cause ridges to be seen at seafloor associated with firmer layers within the bedrock more resistant to erosion. [Figure 3.28](#) and [Figure 3.29](#) illustrate these strata interacting with the seabed. Tertiary rock to Cretaceous Chalk strata, are simply layered and often gently folded creating bedding plains dipping downwards towards the southwest. Tertiary bedrock strata are

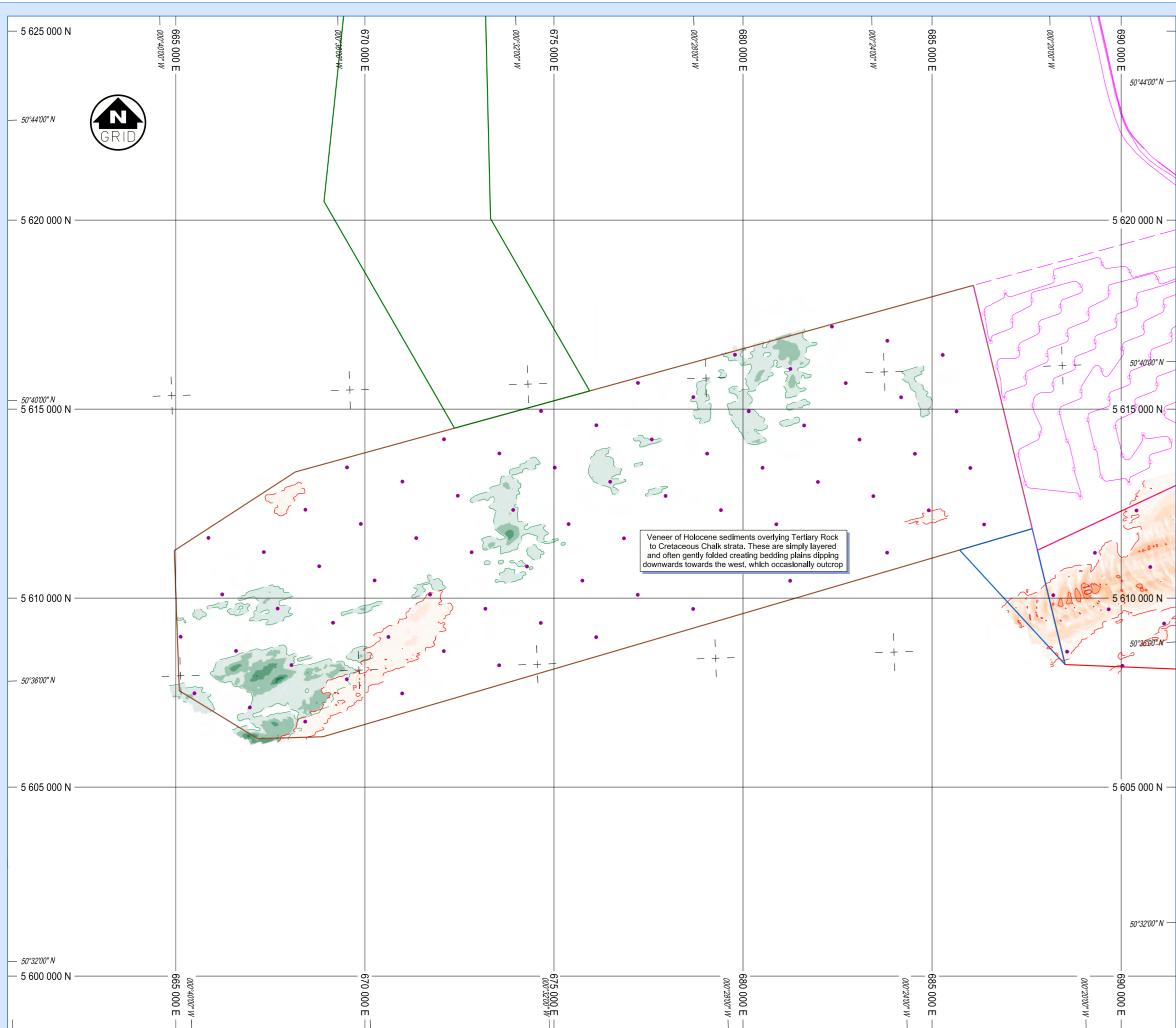
interpreted to consist of sandstone and claystone. Older Cretaceous strata comprise typically of limestone.

Table 3.3 shows a summary of the bedrock strata interpreted by Atkins and created using:

- RAM-ATK-SIF-DWG-0001_01--Rampion Site Terrain Unit Map Update 2014.pdf

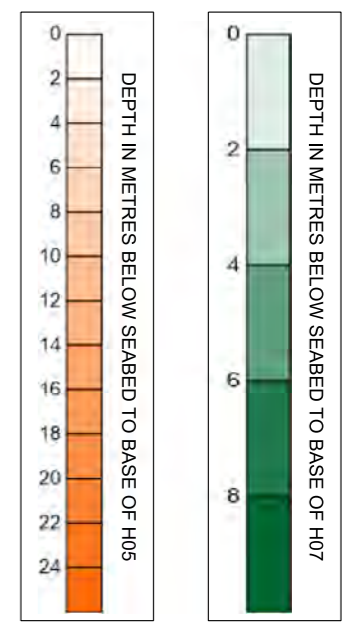
Table 3.3 Summary of Bedrock Strata

Chrono-stratigraphic Name	Stratum Code	Summary Description	
Unknown	H	Unknown. Not identified in Atkins report	
Bracklesham Group	G	Variable deposit comprising SAND, SILT, and CLAY in beds and channels. Not identified in Area B	
UNCONFORMITY			
Thames Group (London Clay Formation)	F	Thinly interlaminated to medium interbedded silty fine to medium SAND and CLAY.	
	E	Dense to very dense SAND. Commonly fine sand with beds of silt.	
	D	Very dark grey sandy CLAY with extremely closely spaced thin laminae of sand. Also contains cobble beds and/or nodules.	
	C	C2	Dense SAND.
		C1	Very dark grey slightly sandy CLAY with beds of sand.
Lambeth Group	B	B2	Mottled and thinly interlaminated grey, brown and red CLAY with beds of sand and organic materials.
		B1	Greyish green glauconitic SAND.
UNCONFORMITY			
Chalk	A	CHALK.	



SOILS (H05 & - H07) OVERVIEW FOR RAMPION 2 OWF AREAS B & D

- PROPOSED RAMPION 2 OWF AREA A (ZONE 6 AREA)
- PROPOSED RAMPION 2 OWF AREA B (EXTENSION AREA)
- PROPOSED RAMPION 2 OWF AREA C (EXPORT CABLE AREA)
- PROPOSED RAMPION 2 OWF AREA D (EXPORT CABLE LINK AREA)
- PROPOSED RAMPION 2 WIND TURBINE GENERATOR LAYOUT (SOURCE: CLIENT PROVIDED)
- EXISTING RAMPION WIND TURBINE GENERATOR LAYOUT (SOURCE: CLIENT PROVIDED)
- EXISTING RAMPION WIND FARM CABLE (SOURCE: CLIENT PROVIDED)
- - - EXISTING RAMPION SURVEY AREA (SOURCE: CLIENT PROVIDED)
- 10 DEPTH IN METRES BELOW SEABED TO BASE OF H10 - PALAEOCHANNEL, CONTOURED AT 10 METRE INTERVALS
- - - LIMIT OF BASE OF H05
- - - LIMIT OF BASE OF H07

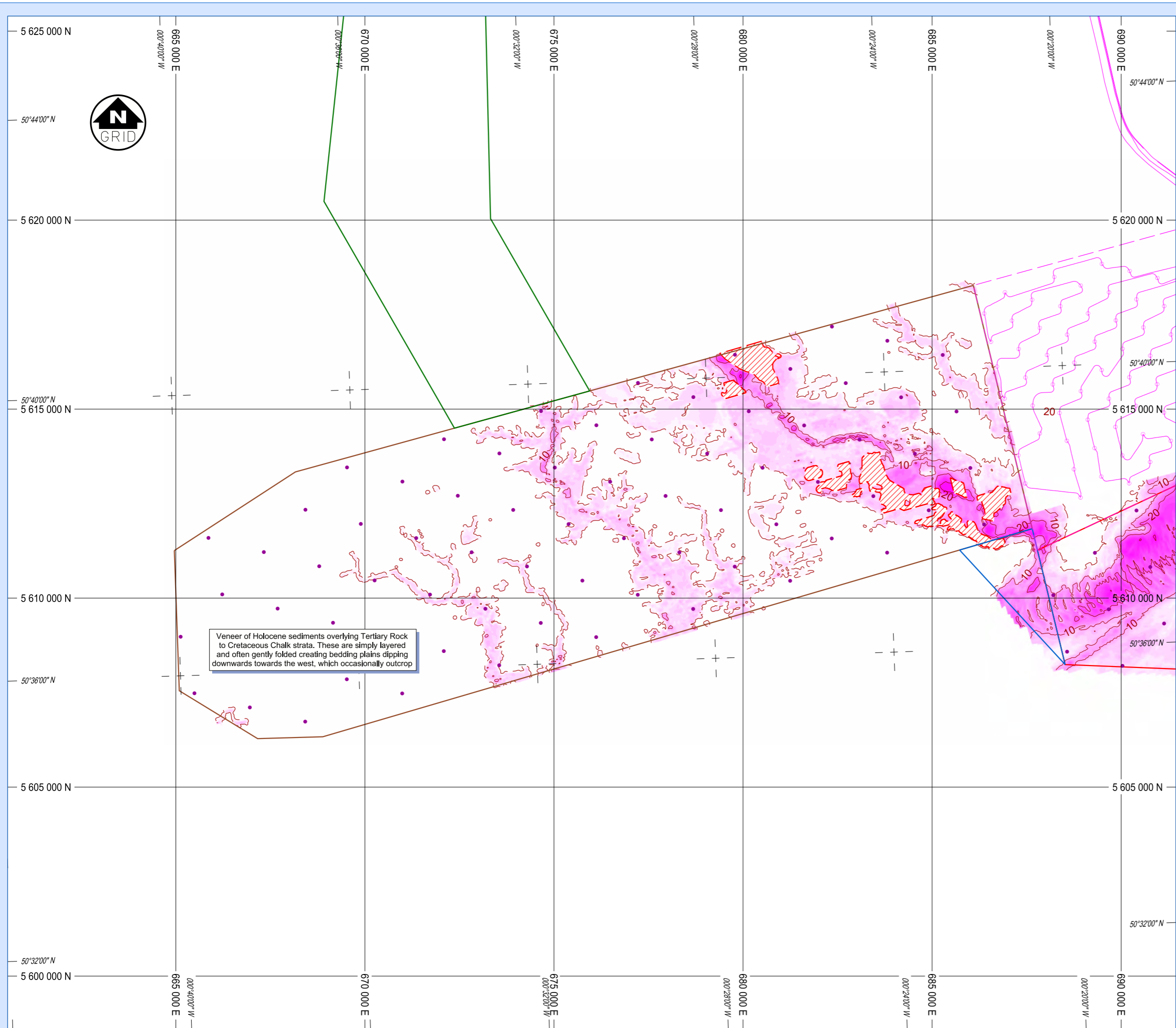


NOTES:

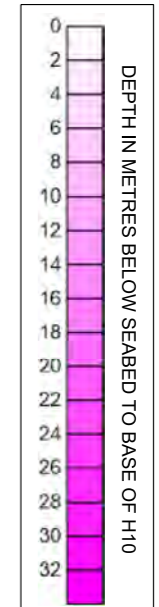
H05 = YOUNGER HOLOCENE DEPOSITS COMPRISING UNCONSOLIDATED SEDIMENTS, LARGELY SAND AND GRAVEL. POTENTIALLY MOBILE IN PLACES

H07 = QUATERNARY DEPOSITS COMPRISING CONSOLIDATED SEDIMENTS, LARGELY SAND AND GRAVEL

SOILS (H10 - PALAEOCHANNEL) OVERVIEW
FOR RAMPION 2 OWF AREAS B & D



- PROPOSED RAMPION 2 OWF AREA A (ZONE 6 AREA)
- PROPOSED RAMPION 2 OWF AREA B (EXTENSION AREA)
- PROPOSED RAMPION 2 OWF AREA C (EXPORT CABLE AREA)
- PROPOSED RAMPION 2 OWF AREA D (EXPORT CABLE LINK AREA)
- PROPOSED RAMPION 2 WIND TURBINE GENERATOR LAYOUT (SOURCE: CLIENT PROVIDED)
- EXISTING RAMPION WIND TURBINE GENERATOR LAYOUT (SOURCE: CLIENT PROVIDED)
- EXISTING RAMPION WIND FARM CABLE (SOURCE: CLIENT PROVIDED)
- - - EXISTING RAMPION SURVEY AREA (SOURCE: CLIENT PROVIDED)
- 10 DEPTH IN METRES BELOW SEABED TO BASE OF H10 - PALAEOCHANNEL, CONTOURED AT 10 METRE INTERVALS
- - - LIMIT OF BASE OF H10
- / / / AREA OF BLANKING

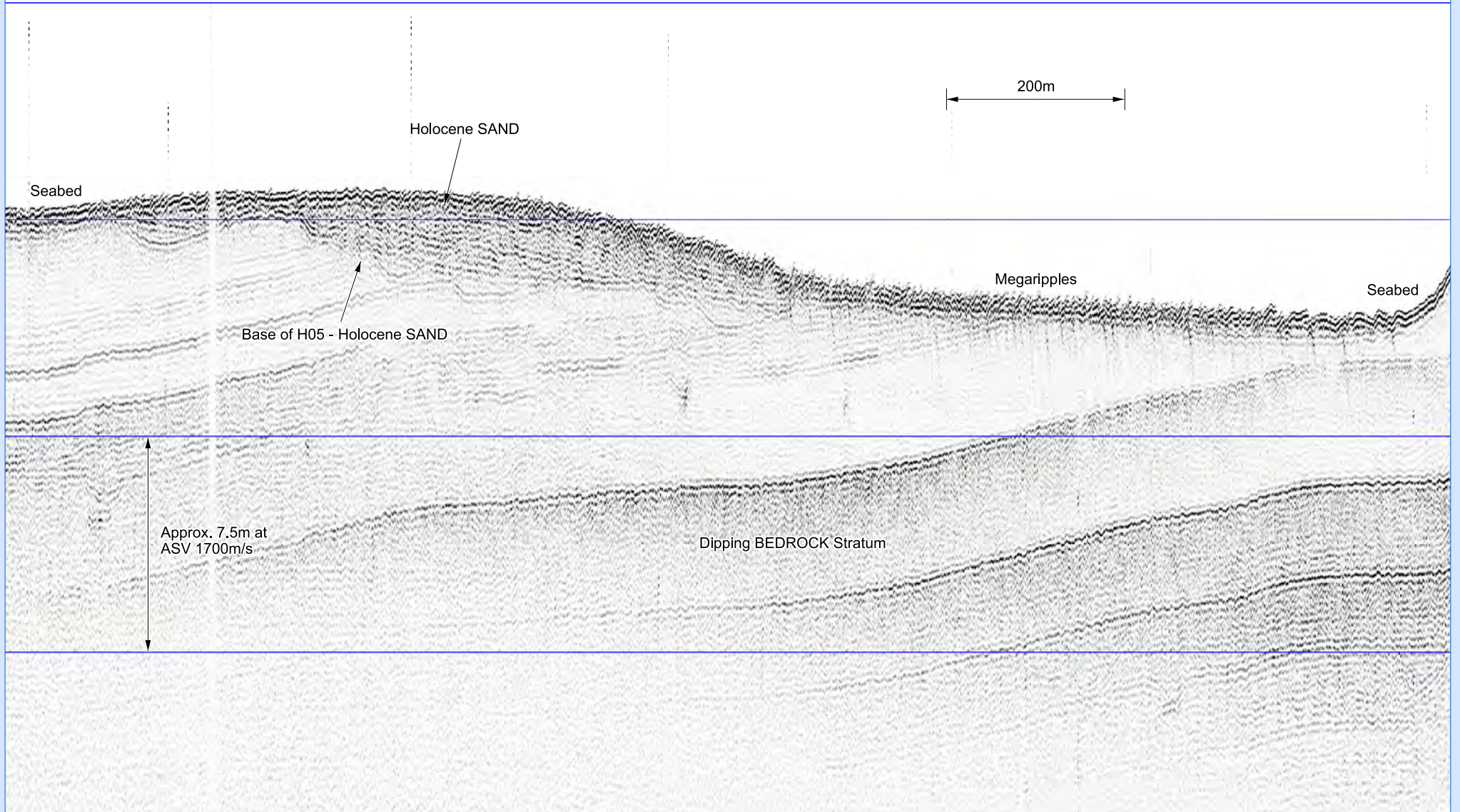


Veneer of Holocene sediments overlying Tertiary Rock to Cretaceous Chalk strata. These are simply layered and often gently folded creating bedding plains dipping downwards towards the west, which occasionally outcrop

NOTE:
H10 = PALAEOCHANNELS ARE SEEN CUTTING THROUGH THE BEDROCK. THESE CHANNELS ARE INTERPRETED TO COMPRISE INTERBEDDED CLAY, SANDS AND GRAVELS, WITH PEAT LAYERS AND BASAL GRAVELS AND ARE ASSOCIATED WITH GLACIAL ADVANCES AND THE ASSOCIATED FALLS IN SEA LEVEL

WSW

ENE



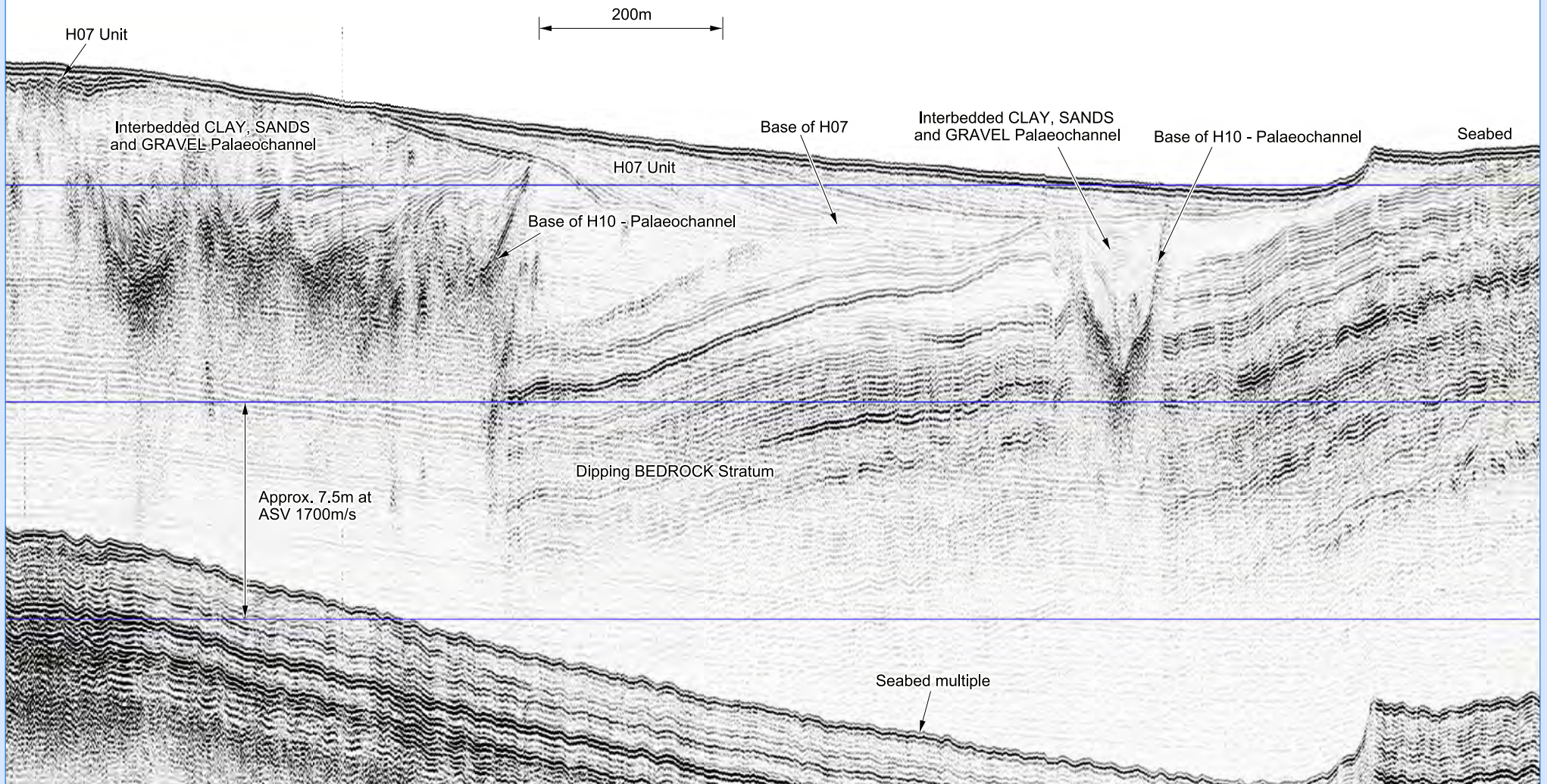
Line B_M-48

PINGER
Illustrating sandwaves and megaripples associated with H05

Figure 3.24

WSW

ENE



Line B_M-6

PINGER
Illustrating H07 overlying palaeochannels and bedrock

Figure 3.25

WSW

ENE

200m

H07 Unit

Base of H07

Base of H07

H07 Unit

Seabed

Interbedded CLAY, SANDS
and GRAVEL Palaeochannel

BEDROCK Stratum

BEDROCK Stratum

Base of H10 - Palaeochannel

Approx. 7.5m at
ASV 1700m/s

Base of H10 - Palaeochannel

Seabed multiple

Line B_M-24

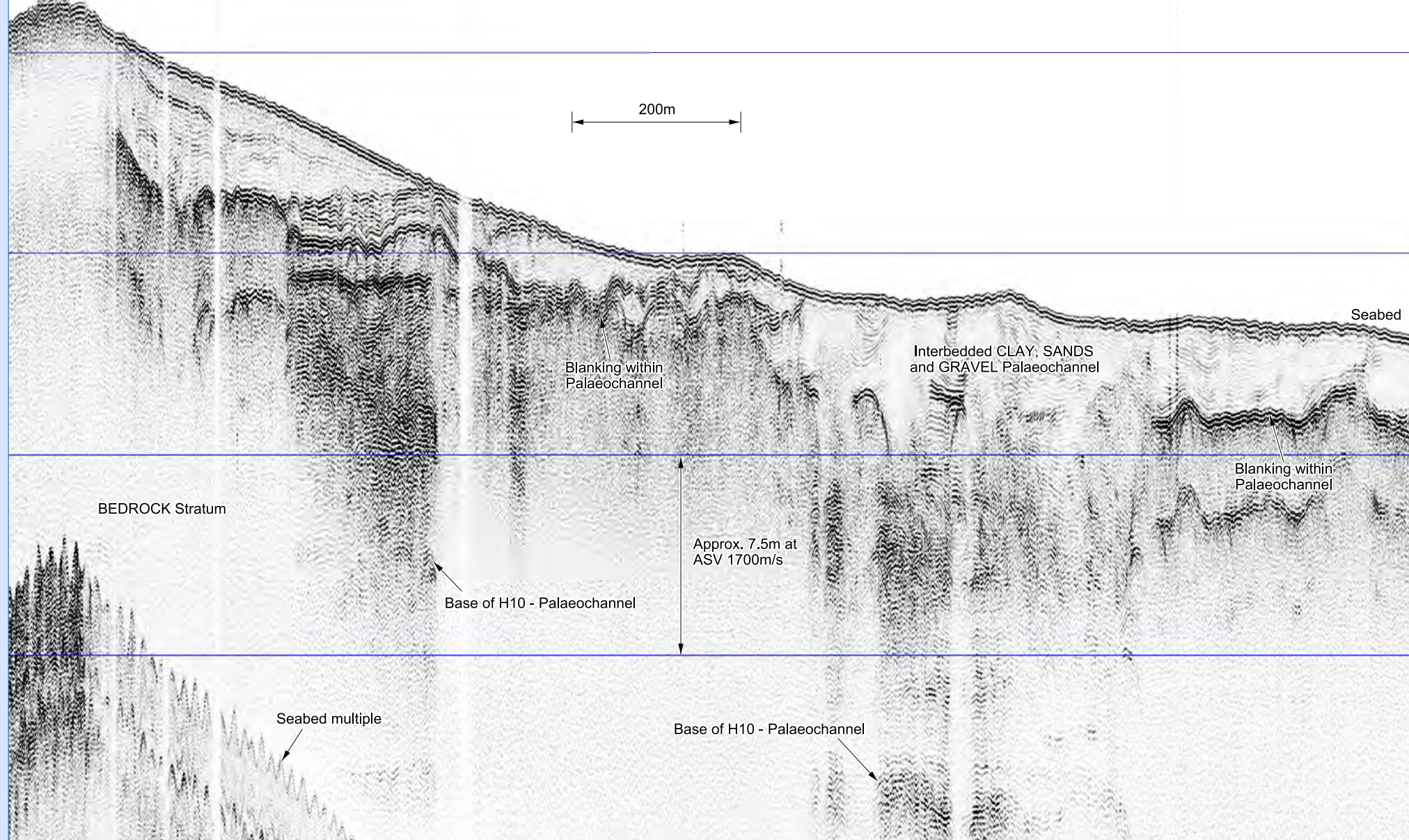
PINGER

Illustrating palaeochannels within the bedrock stratum

Figure 3.26

WSW

ENE



Line B_M-47

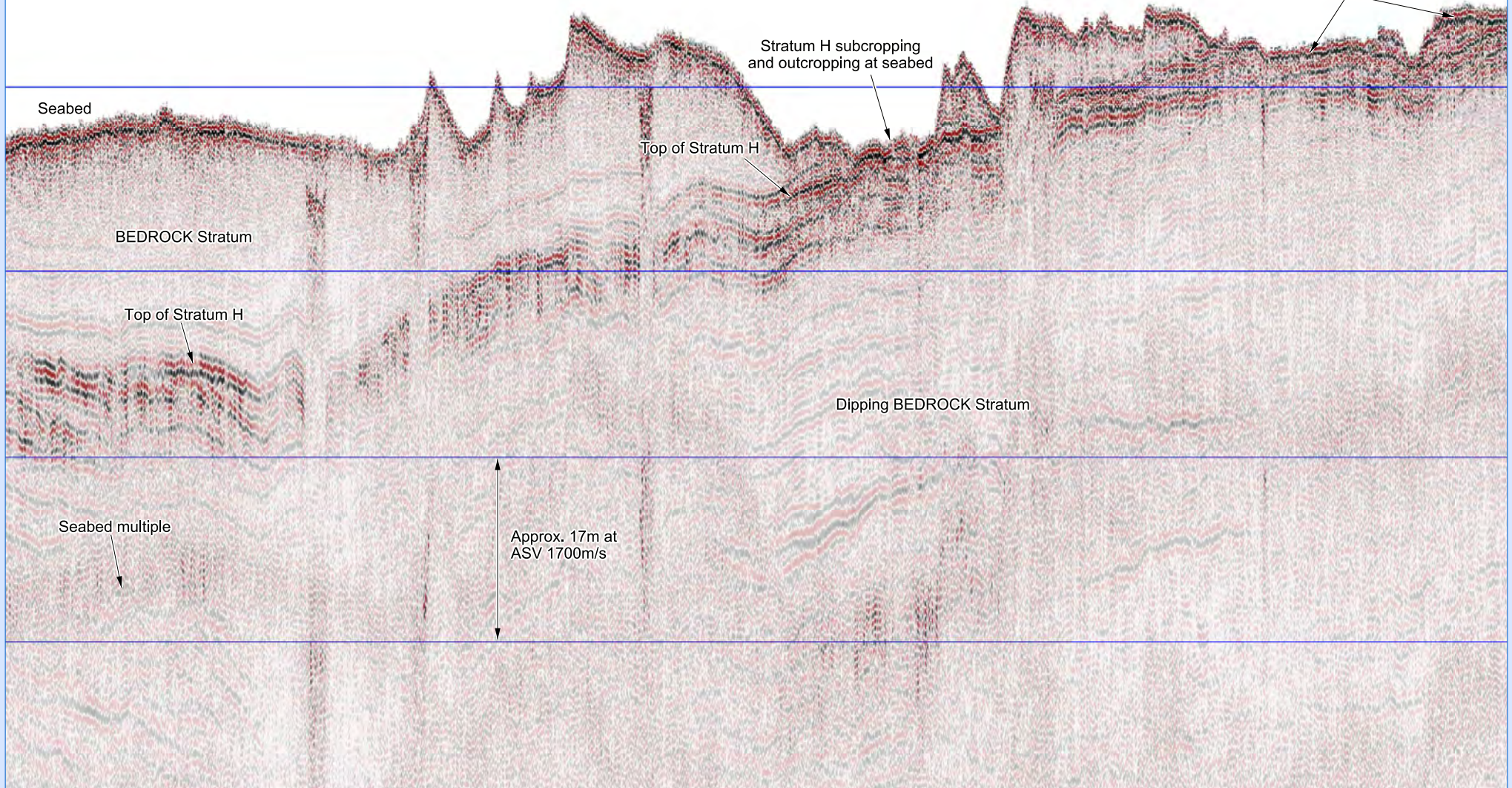
PINGER
Illustrating blanking within the palaeochannels

Figure 3.27

WSW

ENE

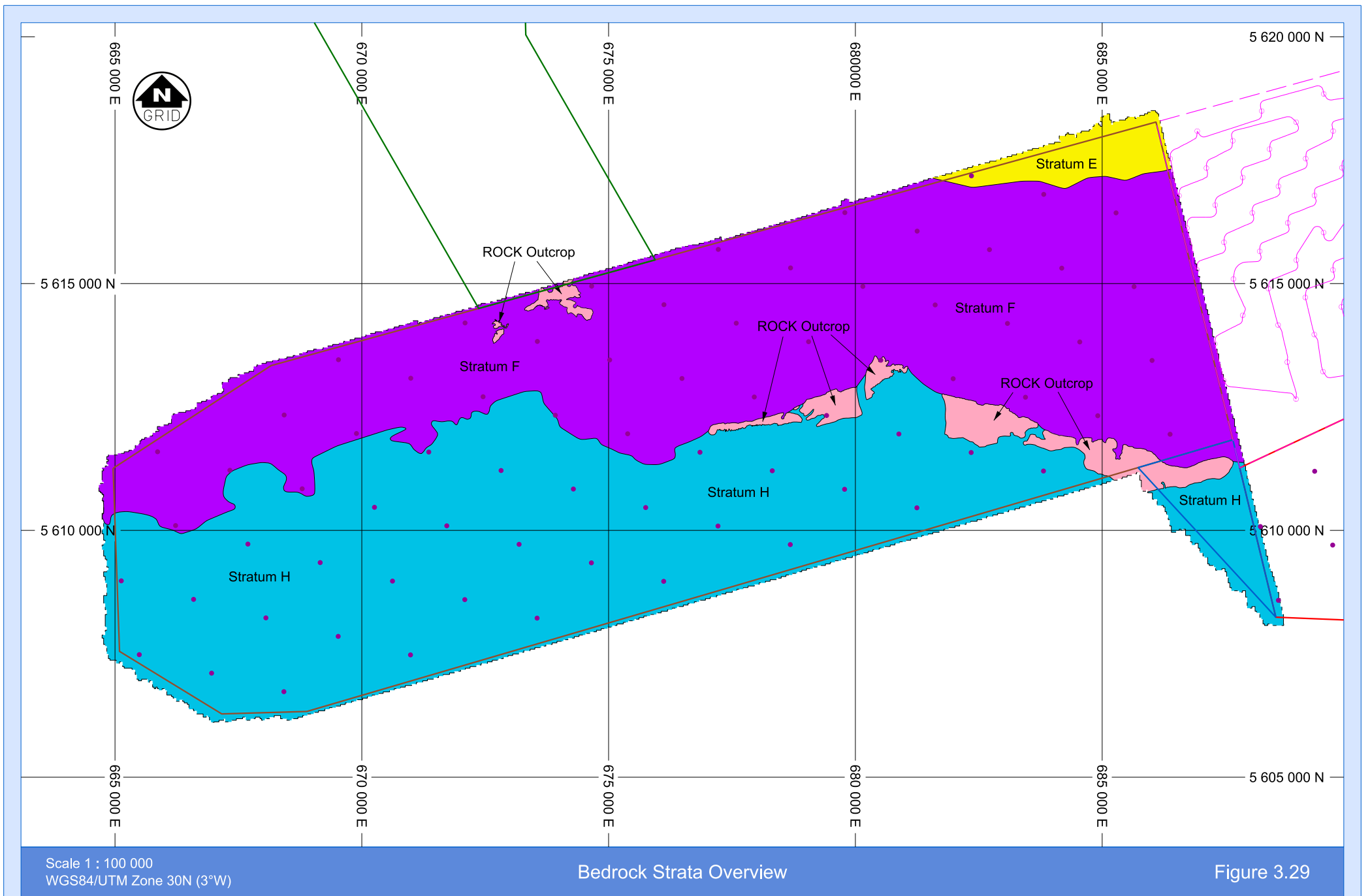
1500m



Line B_UHRS_11

ULTRA HIGH RESOLUTION SEISMIC
Illustrating bedrock strata at seabed

Figure 3.28



4. BACKGROUND INFORMATION

Geophysical data have been interpreted with reference to BGS charting for the area as follows:

Wight BGS Chart, Sheet 50°N - 02°W,
British Geological Survey, 1:250,000 Series,
Published by Ordnance Survey.

The following versions are available:

Sea Bed Sediments
Quaternary Geology
Solid Geology

Useful information was also obtained from the following sources:

Osiris Hydrographic & Geophysical Projects Ltd. 2010. E.ON Climate & Renewables, Rampion Offshore Wind Farm, Definitive Geophysical Survey.

Osiris Hydrographic & Geophysical Projects Ltd. 2011. E.ON Climate & Renewables, Rampion Offshore Wind Farm, Extension and BH13 UXO Survey.

Fugro GeoConsulting Ltd. 2013. E.ON Climate & Renewables, Rampion Offshore Wind Farm, Geotechnical Investigation Quadrant 99.

Gardline Ltd. 2013. E.ON Climate & Renewables, Rampion Offshore Wind Farm, Additional Areas Geophysical Survey.

APPENDICES

APPENDIX A. GEODETIC REFERENCE SYSTEM

Geodetic Datum	
Geodetic Datum	World Geodetic System 1984
EPSG Code	6326

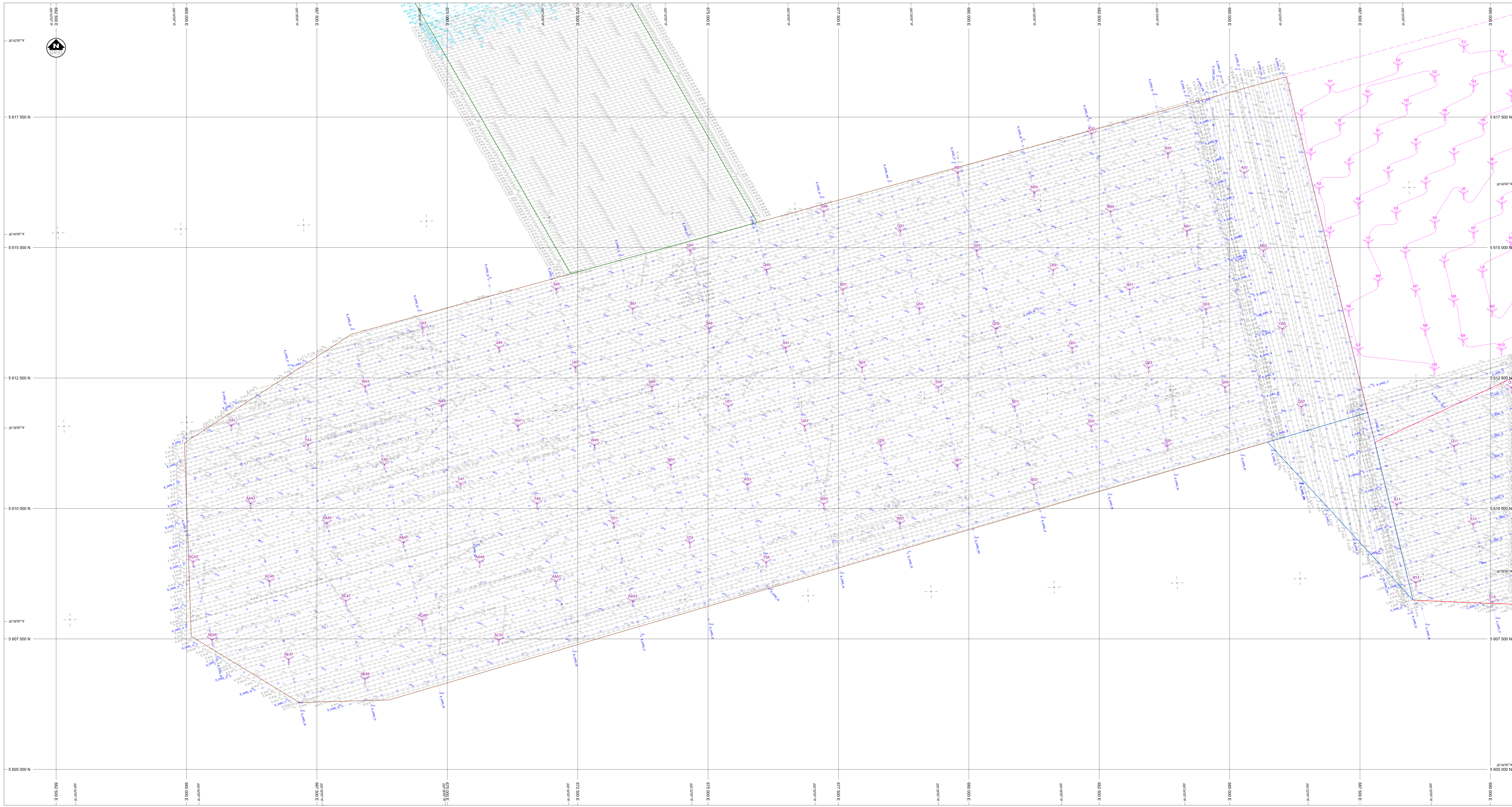
Ellipsoid	
Ellipsoid	WGS 84
EPSG Code	7030
Semi-major Axis (a)	6 378 137.000m
Semi-minor Axis (b)	6 356 752.314m
Inverse Flattening (1/f)	298.257 223 560
Eccentricity sq. (e ²)	0.006 694 379 990

Projection	
Projection	UTM Zone 30N
Projection Type	Transverse Mercator
EPSG Code	16030
Origin Latitude	00° 00' 00.000" North
Origin Longitude	003° 00' 00.000" West
Origin False Easting	500 000.000
Origin False Northing	0.000
Scale Factor	0.9996
Grid Unit	Metres
EPSG Code	9001

Source of Information: EPSG geodesy parameters dataset version 9.9.

ENCLOSURES

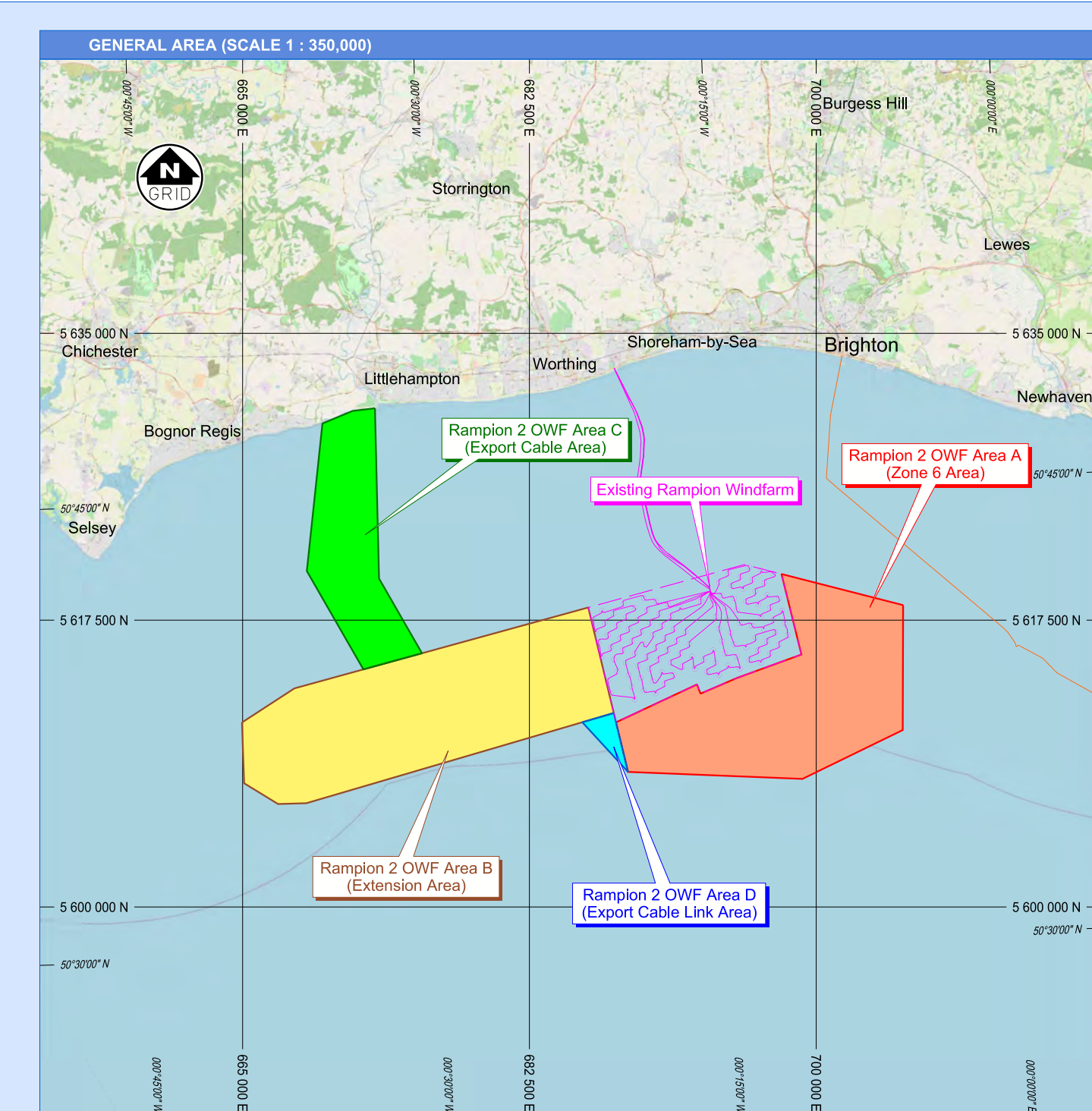
CHARTS 11521.3.01 –11521.3.14



LEGEND

- PROPOSED RAMPION 2 OWF AREA A (ZONE 6 AREA)
- PROPOSED RAMPION 2 OWF AREA B (EXTENSION AREA)
- PROPOSED RAMPION 2 OWF AREA C (EXPORT CABLE AREA)
- PROPOSED RAMPION 2 OWF AREA D (EXPORT CABLE LINK AREA)
- PROPOSED RAMPION 2 WIND TURBINE GENERATOR LAYOUT (SOURCE: CLIENT PROVIDED)
- EXISTING RAMPION WIND FARM CABLE (SOURCE: CLIENT PROVIDED)
- EXISTING RAMPION SURVEY AREA (SOURCE: CLIENT PROVIDED)
- REFERENCE POINT TRACK - SHALLOW GEOPHYSICAL LINES (M.V. VIGILANT)
- REFERENCE POINT TRACK - SHALLOW GEOPHYSICAL LINES (M.V. TITAN DISCOVERY)
- REFERENCE POINT TRACK - ULTRA-HIGH RESOLUTION SEISMIC (SHRS) LINES (M.V. OCEAN OBSERVER)

NOTES



GEODETIC REFERENCE SYSTEM

GEODETIC DATUM: WGS84
 ELLIPSOID: WGS84
 PROJECTION: UTM ZONE 30 N (CENTRAL MERIDIAN 3° W)

SURVEY INFORMATION

SURVEY VESSEL: M.V. VIGILANT	M.V. TITAN DISCOVERY	M.V. OCEAN OBSERVER
SURVEY DATE: 30-JUN-2020 TO 01-AUG-2020	01-JUL-2020 TO 12-AUG-2020	16-SEP-2020 TO 13-OCT-2020
OCEANERRING CHAIN: DGNES	APPLANK POS BY WAVEMASTER	FLIGHT STAFFIX: DGNES
SONAR/SWATH RANGER USEL:	SONAR/SWATH RANGER USEL:	SONAR/SWATH RANGER USEL:
VOYAGER 5	VOYAGER 5	VOYAGER 5
ECHO SCANDER (SINGLE-BEAM SYSTEM): SIMRAD EK400	RECON TOP DUAL HEAD: SIMRAD EK400	RECON TOP DUAL HEAD: SIMRAD EK400
EDGE TECH 4000S	EDGE TECH 4000S	EDGE TECH 4000S
MAGNETOMETER: GEOMETRICS GMR2	GEOMETRICS GMR2	GEOMETRICS GMR2
SUB-BOTTOM PROFILES: GEODACUSTICS PRINGER	GEODACUSTICS PRINGER	GEODACUSTICS PRINGER
ULTRA-HIGH RESOLUTION SEISMIC (UHRIS):	GEODACUSTICS PRINGER	SURFACE TOW BOOMER

SCALE (AS ORIGINAL)

1 : 25 000 (Horizontal)

TITLE

Gardline
 SURVEY CONTRACTOR

GARDLINE LIMITED
 ENDEAVOUR HOUSE, ADMIRALTY ROAD, GREAT YARMOUTH, NORFOLK NE63 3NG, ENGLAND
 TELEPHONE: +44 (0) 1493 846000 FAX: +44 (0) 1493 821616 WEBSITE: WWW.GARDLINE.COM

RWE
 The energy to lead

CLIENT

PROJECT TITLE

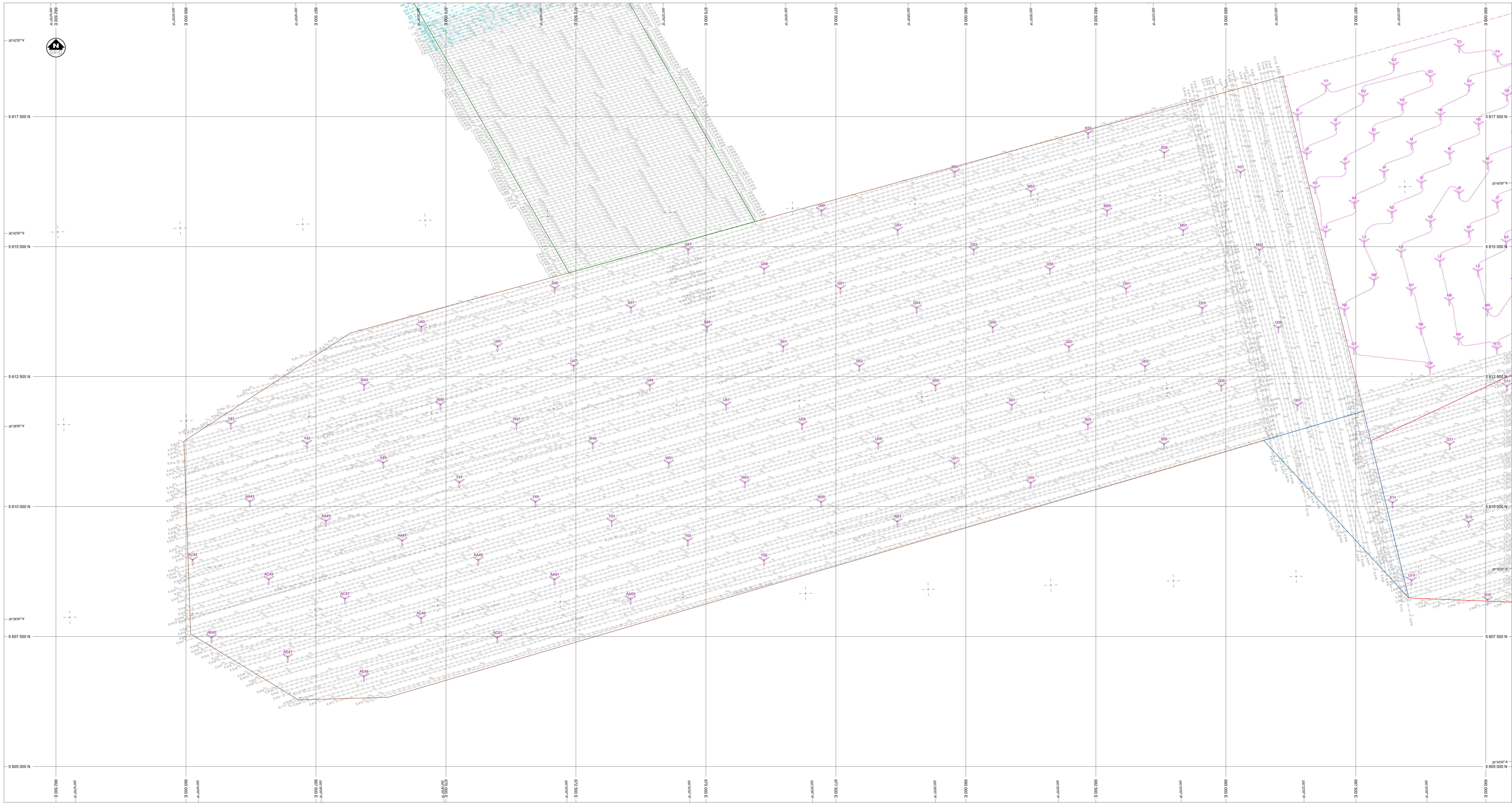
**RAMPION 2 OFFSHORE WINDFARM DEVELOPMENT
 GEOPHYSICAL SITE SURVEY FOR AREAS B & D**

DRAWING TITLE

**REFERENCE POINT TRACK
 CHART 1**

REV.	DATE	TITLE	DESCRIPTION	AUTHOR	DRAWN	CHECKED	APPROVED
0	16-DEC-2020	DRAFT	FIRST ISSUE FOR CLIENT REVIEW, PDF ONLY	MC	JS	MC	CHG

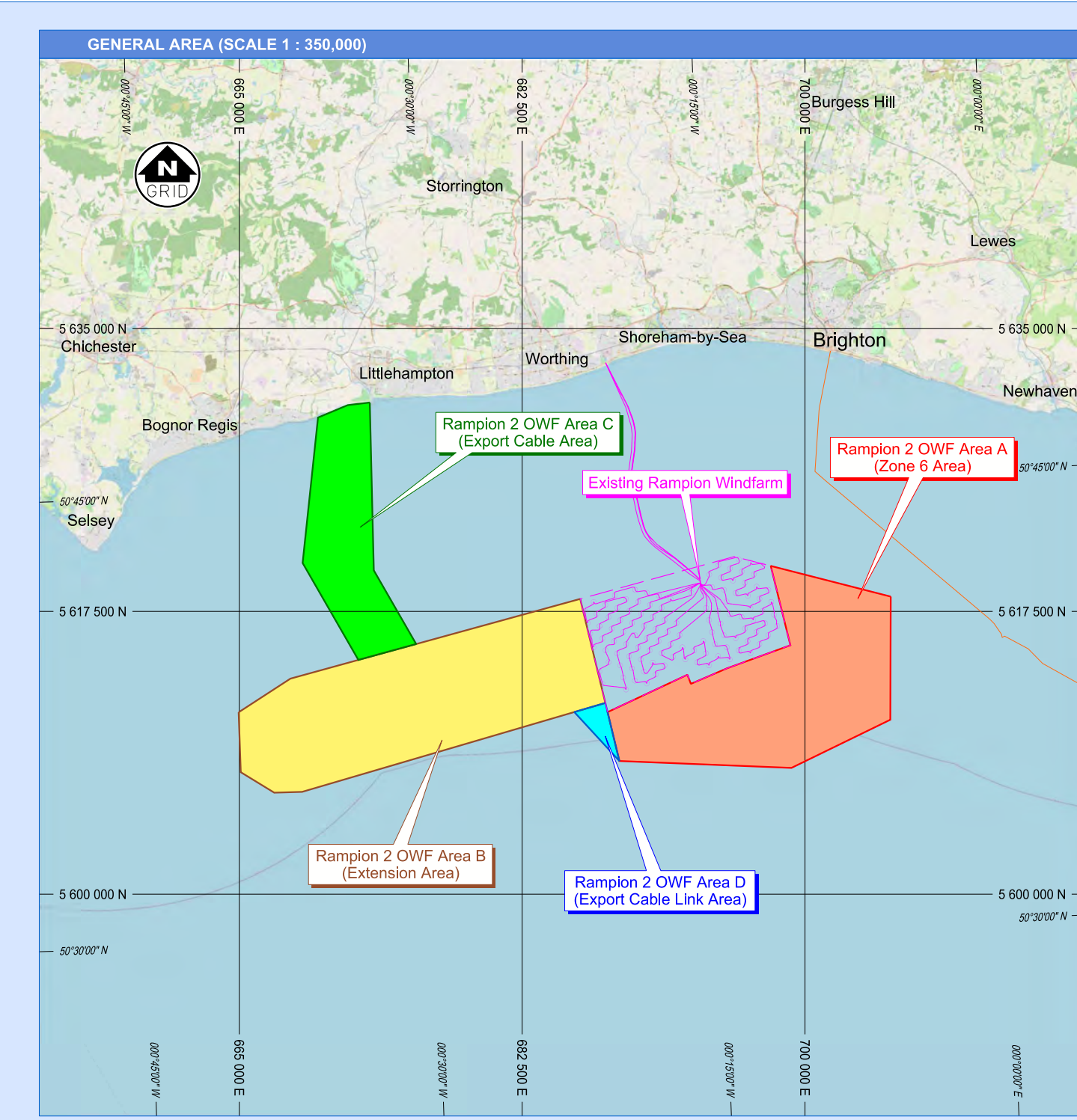
CLIENT REFERENCE **REPORT REFERENCE** 11521.3 **DRAWING NUMBER** 11521.3.01



LEGEND

- PROPOSED RAMPION 2 OWF AREA A (ZONE 6 AREA)
- PROPOSED RAMPION 2 OWF AREA B (EXTENSION AREA)
- PROPOSED RAMPION 2 OWF AREA C (EXPORT CABLE AREA)
- PROPOSED RAMPION 2 OWF AREA D (EXPORT CABLE LINK AREA)
- PROPOSED RAMPION 2 WIND TURBINE GENERATOR LAYOUT (SOURCE: CLIENT PROVIDED)
- EXISTING RAMPION WIND FARM CABLE (SOURCE: CLIENT PROVIDED)
- EXISTING RAMPION SURVEY AREA (SOURCE: CLIENT PROVIDED)
- EXISTING RAMPION WIND TURBINE GENERATOR LAYOUT (SOURCE: CLIENT PROVIDED)
- EXISTING RAMPION WIND FARM CABLE (SOURCE: CLIENT PROVIDED)
- EXISTING RAMPION SURVEY AREA (SOURCE: CLIENT PROVIDED)
- SIDE SCAN SONAR TRACK - SHALLOW GEOPHYSICAL LINES (M.V. VIGLANT)
- SIDE SCAN SONAR TRACK - SHALLOW GEOPHYSICAL LINES (M.V. TITAN DISCOVERY)

NOTES



GEODETIC REFERENCE SYSTEM

GEODETIC DATUM: WGS84
 ELLIPSOID: WGS84
 PROJECTION: UTM ZONE 30 N (CENTRAL MERIDIAN 3° W)

SURVEY INFORMATION

SURVEY VESSEL: M.V. VIGLANT	M.V. TITAN DISCOVERY	M.V. OCEAN OBSERVER
SURVEY DATE: 30-JUN-2020 TO 01-AUG-2020	01-JUL-2020 TO 12-AUG-2020	16-SEP-2020 TO 13-OCT-2020
OCEANERRING CHAIN DGNES	APPLANK POS BY WAVEMASTER	FLURO STAFFIX DGNES
SONAR/SYNE RANGER USBL	SONAR/SYNE RANGER USBL	SONAR/SYNE RANGER USBL
VOYAGER 5	VOYAGER 5	VOYAGER 5
ECHO SCANDER (SINGLE-BEAM SYSTEM)	RECON TOP DUAL HEAD	RECON TOP DUAL HEAD
SRIRAD EK400	DOOM ECHOTRAC MKII	SRIRAD EK400
EDGE TECH 4000S	EDGE TECH 4000S	EDGE TECH 4000S
MAGNETOMETER: GEOMETRICS GM2	GEOMETRICS GM2	GEOMETRICS GM2
SUB-BOTTOM PROFILER: GEOTECHNICS PRINGER	GEOTECHNICS PRINGER	GEOTECHNICS PRINGER
ULTRA-HIGH RESOLUTION SEISMIC (UHRIS):	GEOTECHNICS PRINGER	GEOTECHNICS PRINGER
	SURFACE TOW BOOMER	75m TELETYPE STREAMER

SCALE (AS ORIGINAL)

1 : 25 000 (Horizontal)

TITLE

Gardline
 GARDFINE LIMITED
 ENDEAVOUR HOUSE, ADMIRALTY ROAD, GREAT WYRMOUTH, NORFOLK NR3 3NG, ENGLAND
 TELEPHONE: 144 (0) 1483 84600 FAX: 144 (0) 1483 84616 WEBSITE: WWW.GARDFINE.COM

CLIENT

RWE
 The energy to lead

PROJECT TITLE

**RAMPION 2 OFFSHORE WINDFARM DEVELOPMENT
 GEOPHYSICAL SITE SURVEY FOR AREAS B & D**

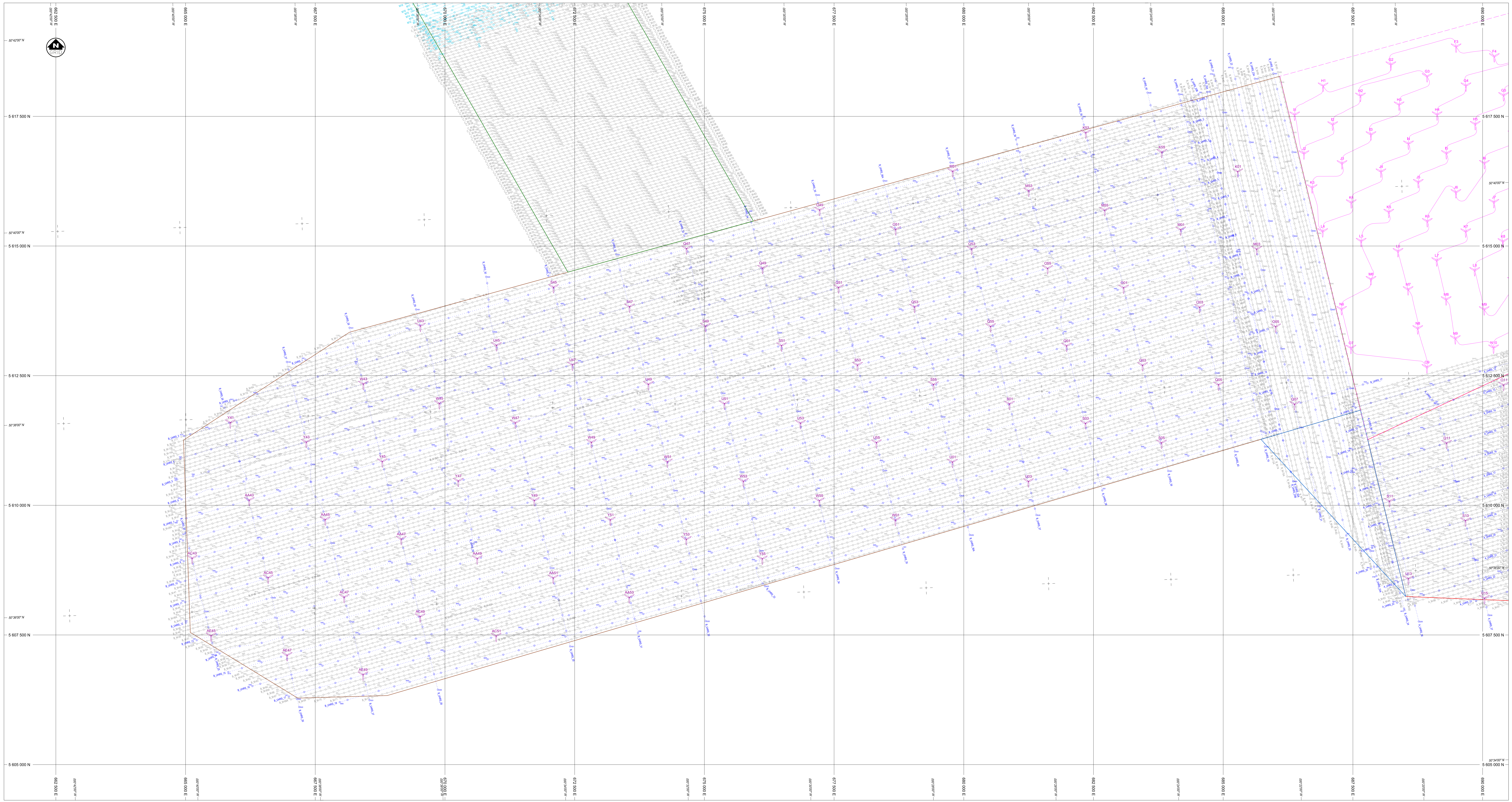
DRAWING TITLE

**SIDE SCAN SONAR TRACK
 CHART 2**

REVISION

REV.	DATE	TITLE	DESCRIPTION	AUTHOR	DRAWN	CHECKED	APPROVED
0	16-DEC-2020	DRAFT	FIRST ISSUE FOR CLIENT REVIEW. PDF ONLY	MC	JS	MC	CHG

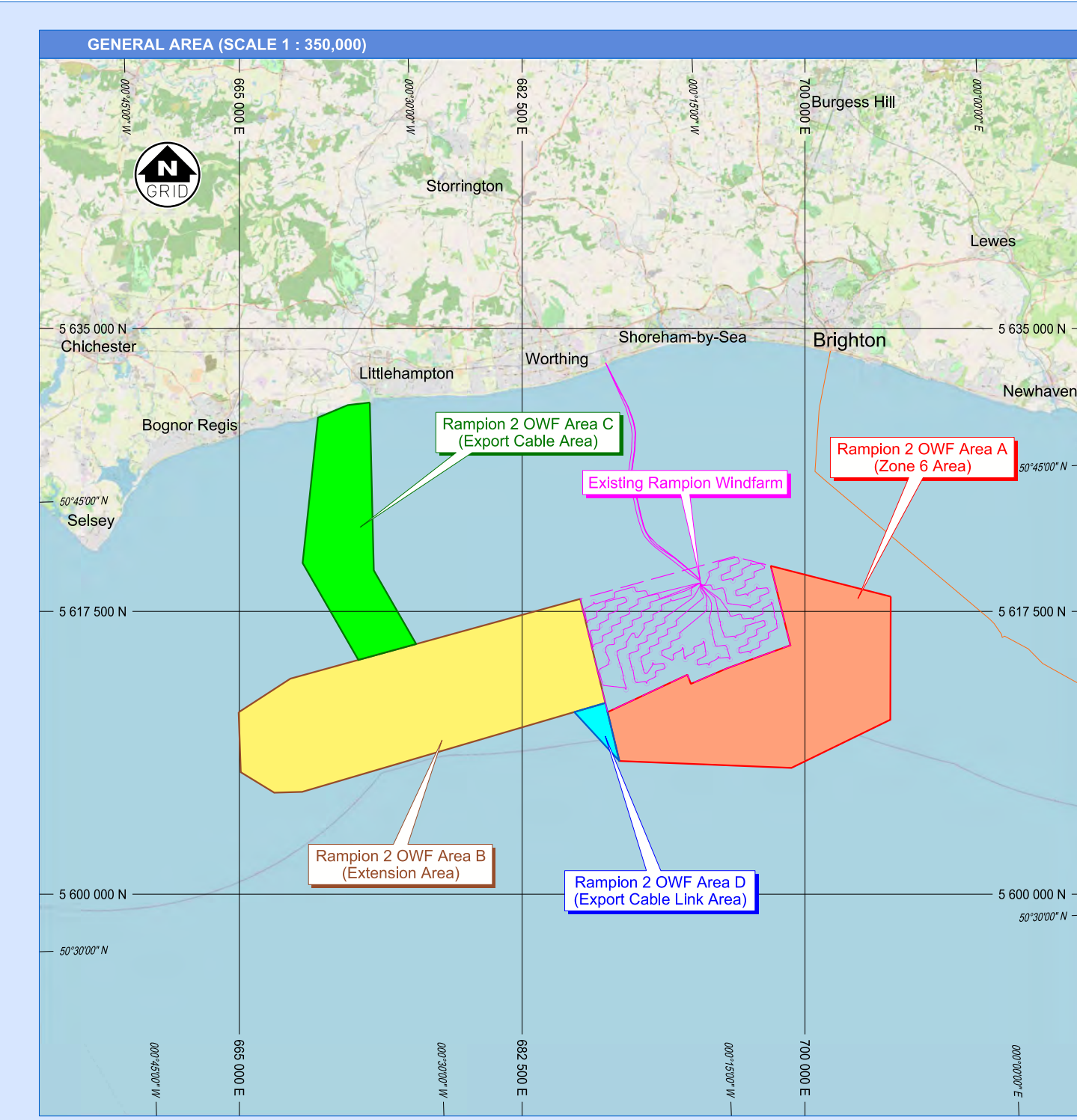
CLIENT REFERENCE **REPORT REFERENCE** 11521.3 **DRAWING NUMBER** 11521.3.02



LEGEND

- PROPOSED RAMPION 2 OVF AREA A (ZONE 6 AREA)
- PROPOSED RAMPION 2 OVF AREA B (EXTENSION AREA)
- PROPOSED RAMPION 2 OVF AREA C (EXPORT CABLE AREA)
- PROPOSED RAMPION 2 OVF AREA D (EXPORT CABLE LINK AREA)
- PROPOSED RAMPION 2 WIND TURBINE GENERATOR LAYOUT (SOURCE: CLIENT PROVIDED)
- EXISTING RAMPION WIND FARM CABLE (SOURCE: CLIENT PROVIDED)
- EXISTING RAMPION SURVEY AREA (SOURCE: CLIENT PROVIDED)
- PINGER TRACK - SHALLOW GEOPHYSICAL LINES (M.V. VIGILANT)
- SURFACE TOW BOOMER TRACK - SHALLOW GEOPHYSICAL LINES (M.V. TITAN DISCOVERY)
- PINGER TRACK - ULTRA HIGH RESOLUTION SEBIMC (UHRS) LINES (M.V. OCEAN OBSERVER)

NOTES



GEODETIC REFERENCE SYSTEM

GEODETIC DATUM: WGS84
 ELLIPSOID: WGS84
 PROJECTION: UTM ZONE 30 N (CENTRAL MERIDIAN 3° W)

SURVEY INFORMATION

SURVEY VESSEL: M.V. VIGILANT	M.V. TITAN DISCOVERY	M.V. OCEAN OBSERVER
SURVEY DATE: 30-JUN-2020 TO 01-AUG-2020	01-JUL-2020 TO 12-AUG-2020	16-SEP-2020 TO 13-OCT-2020
GEOPHYSICAL SYSTEM: OCEANERRING CHANV DGNES	APPLANK POS BY WAVEMASTER	FLUGRO STAFFIX DGNES
ECHO SCANNER (SINGLE-BEAM SYSTEM): SONARBYNE RANGER USBL	SONARBYNE RANGER USBL	SONARBYNE RANGER USBL
NAVIGATION SYSTEM: VOYAGER 5	VOYAGER 5	VOYAGER 5
ECH0 SCANDER (SINGLE-BEAM SYSTEM): SIMRAD EK600	RECON TOP DUAL HEAD	RECON TOP DUAL HEAD
MAGNETOMETER: SIMRAD EK400	EDGETECH 4200FS	EDGETECH 4200FS
SUB-BOTTOM PROFILER: GEOMETRICS G82	GEOMETRICS G82	GEOMETRICS G82
ULTRA HIGH RESOLUTION SEBIMC (UHRS): GEODACUSTICS PRINGER	GEODACUSTICS PRINGER	GEODACUSTICS PRINGER
	SURFACE TOW BOOMER	SURFACE TOW BOOMER

SCALE (AS ORIGINAL)

1 : 25 000 (Horizontal)

TITLE

Gardline
 GARDFINE LIMITED
 ENDEAVOUR HOUSE, ADMIRALTY ROAD, GREAT YARMOUTH, NORFOLK NE5 3NG, ENGLAND
 TELEPHONE: +44 (0) 1493 84600 FAX: +44 (0) 1493 82176 WEBSITE: WWW.GARDFINE.COM

RWE
 The energy to lead

PROJECT TITLE

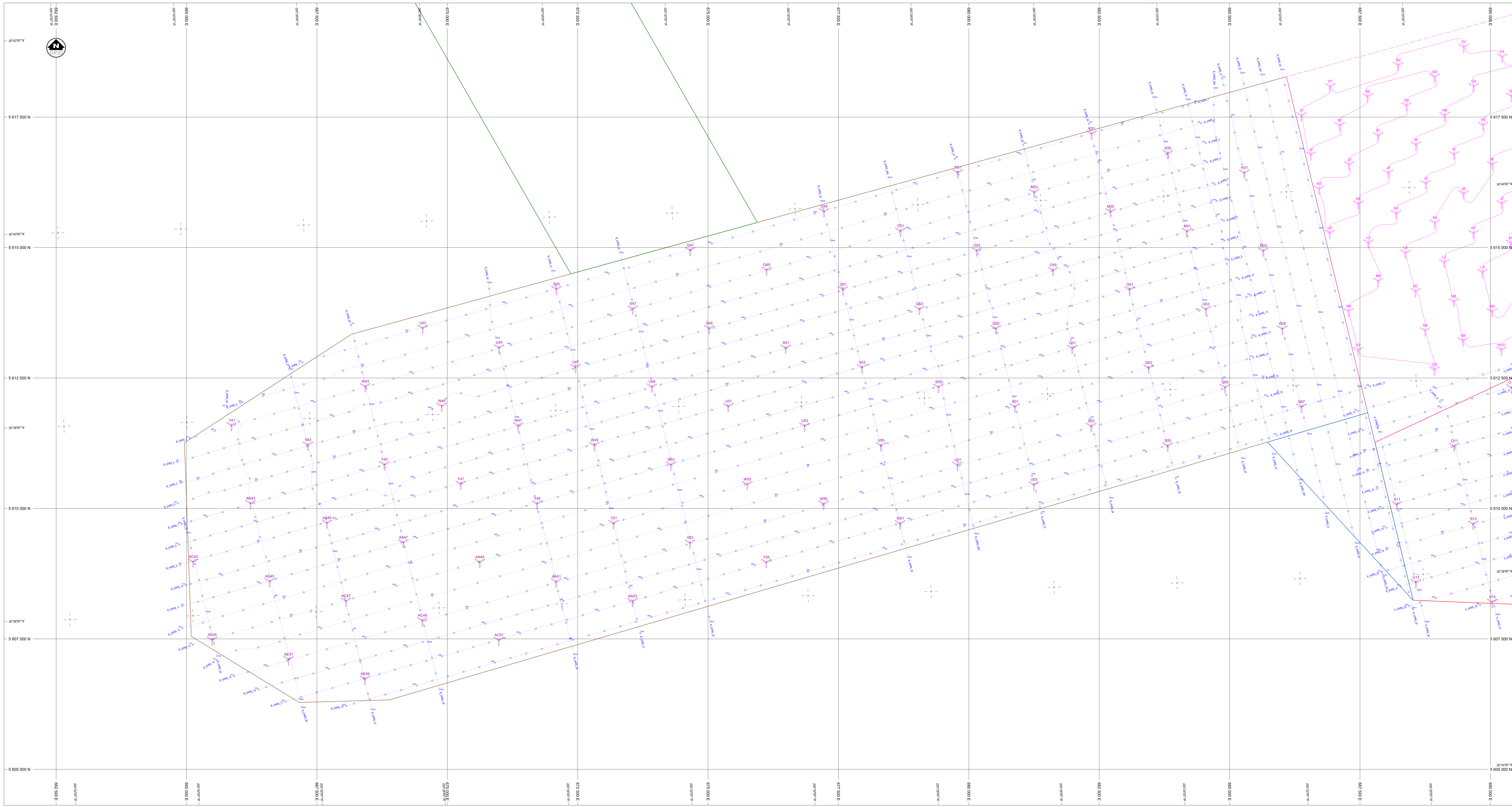
**RAMPION 2 OFFSHORE WINDFARM DEVELOPMENT
 GEOPHYSICAL SITE SURVEY FOR AREAS B & D**

DRAWING TITLE

**SUB-BOTTOM PROFILER TRACK
 CHART 3**

REV.	DATE	TITLE	DESCRIPTION	AUTHOR	DRAWN	CHECKED	APPROVED
0	16-DEC-2020	DRAFT	FIRST ISSUE FOR CLIENT REVIEW, PDF ONLY	MC	JS	MC	CHG

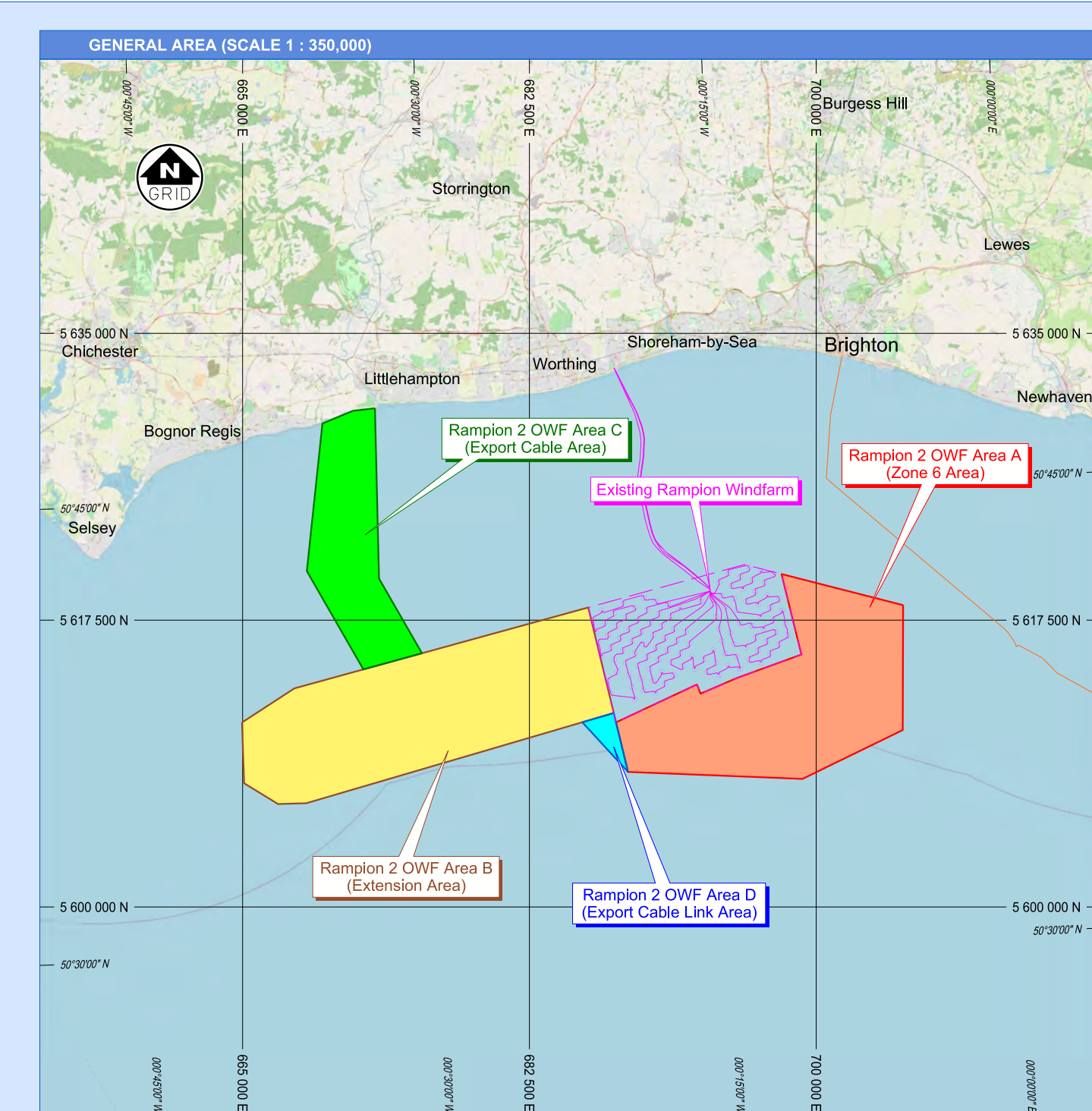
CLIENT REFERENCE **REPORT REFERENCE** 11521.3 **DRAWING NUMBER** 11521.3.03



LEGEND

- PROPOSED RAMPION 2 OVF AREA A (ZONE 6 AREA)
- PROPOSED RAMPION 2 OVF AREA B (EXTENSION AREA)
- PROPOSED RAMPION 2 OVF AREA C (EXPORT CABLE AREA)
- PROPOSED RAMPION 2 OVF AREA D (EXPORT CABLE LINK AREA)
- PROPOSED RAMPION 2 WIND TURBINE GENERATOR LAYOUT (SOURCE: CLIENT PROVIDED)
- EXISTING RAMPION WIND TURBINE GENERATOR LAYOUT (SOURCE: CLIENT PROVIDED)
- EXISTING RAMPION WIND FARM CABLE (SOURCE: CLIENT PROVIDED)
- EXISTING RAMPION SURVEY AREA (SOURCE: CLIENT PROVIDED)
- ULTRA HIGH RESOLUTION SEISMIC TRACK - FIRST CMP POSITION (M.V. OCEAN OBSERVER)

NOTES



GEODETIC REFERENCE SYSTEM

GEODETIC DATUM: WGS84
 ELLIPSOID: WGS84
 PROJECTION: UTM ZONE 30 N (CENTRAL MERIDIAN 3° W)

SURVEY INFORMATION

SURVEY VESSEL: M.V. WGLANT	M.V. TITAN DISCOVERY	M.V. OCEAN OBSERVER
SURVEY DATE: 30-JUN-2020 TO 01-AUG-2020	01-JUL-2020 TO 12-AUG-2020	16-SEP-2020 TO 13-OCT-2020
POSITIONING SYSTEM: OCEANERRING CHAIN DGNES SONARBYNE RANGER USBL	APPLANK POS BY WAVEMASTER SONARBYNE RANGER USBL	FLUGRO STAFFIX DGNES SONARBYNE RANGER USBL
NAVIGATION SYSTEM: VOYAGER 5	VOYAGER 5	VOYAGER 5
ECHO SCANNER (SINGLE-BEAM SYSTEM): ECHOSWATH	RECON TOP DUAL HEAD	RECON TOP DUAL HEAD
SIDE SCAN SONAR: SIMRAD EK400	SI-MEADOW EK60	SI-MEADOW EK60
MAGNETOMETER: EDGETECH 4200S	EDGETECH 4200S	EDGETECH 4200S
SUB-BOTTOM PROFILES: GEOMETRICS G82	GEOMETRICS G82	GEOMETRICS G82
ULTRA-HIGH RESOLUTION SEISMIC (UHRIS): GEODACUSTICS PRINGER	GEODACUSTICS PRINGER	GEODACUSTICS PRINGER
	SURFACE TOW BOOMER	SURFACE TOW BOOMER
	1 x 10 cm, T1 SLEEVE GUN	1 x 10 cm, T1 SLEEVE GUN
	75m TELETYPE STREAMER	75m TELETYPE STREAMER

SCALE (AS ORIGINAL)

1 : 25 000 (Horizontal)

TITLE

Gardline
 GARDLINE LIMITED
 ENDEAVOUR HOUSE, ADMIRALTY ROAD, GREAT FARMOUTH, NORFOLK NE33 3NG, ENGLAND
 TELEPHONE: +44 (0) 1493 84500 FAX: +44 (0) 1493 82718 WEBSITE: WWW.GARDLINE.COM

CLIENT

RWE
 The energy to lead.

PROJECT TITLE

**RAMPION 2 OFFSHORE WINDFARM DEVELOPMENT
 GEOPHYSICAL SITE SURVEY FOR AREAS B & D**

DRAWING TITLE

**ULTRA HIGH RESOLUTION SEISMIC TRACK
 (FIRST CMP POSITION)
 CHART 4**

REVISION

REV.	DATE	TITLE	DESCRIPTION	AUTHOR	DRAWN	CHECKED	APPROVED
0	16-DEC-2020	DRAFT	FIRST ISSUE FOR CLIENT REVIEW. PDF ONLY	MC	JS	MK	DIG

CLIENT REFERENCE **REPORT REFERENCE** 11521.3 **DRAWING NUMBER** 11521.3.04