

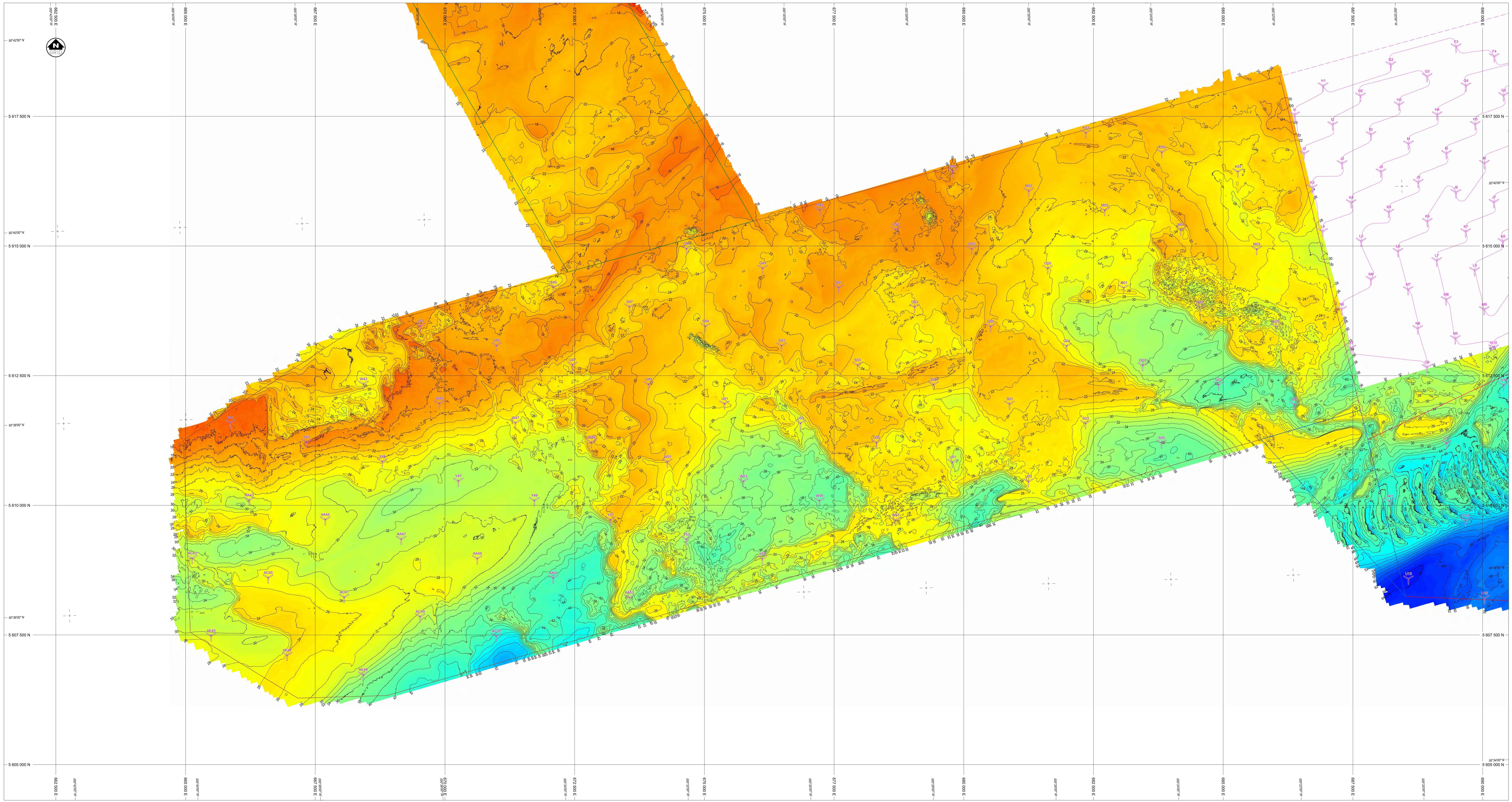
Rampion 2 Wind Farm
Category 6:
Environmental Statement
Volume 4, Appendix 9.4
Geophysical survey (Part 5 of 7)
Date: August 2023
Revision A

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

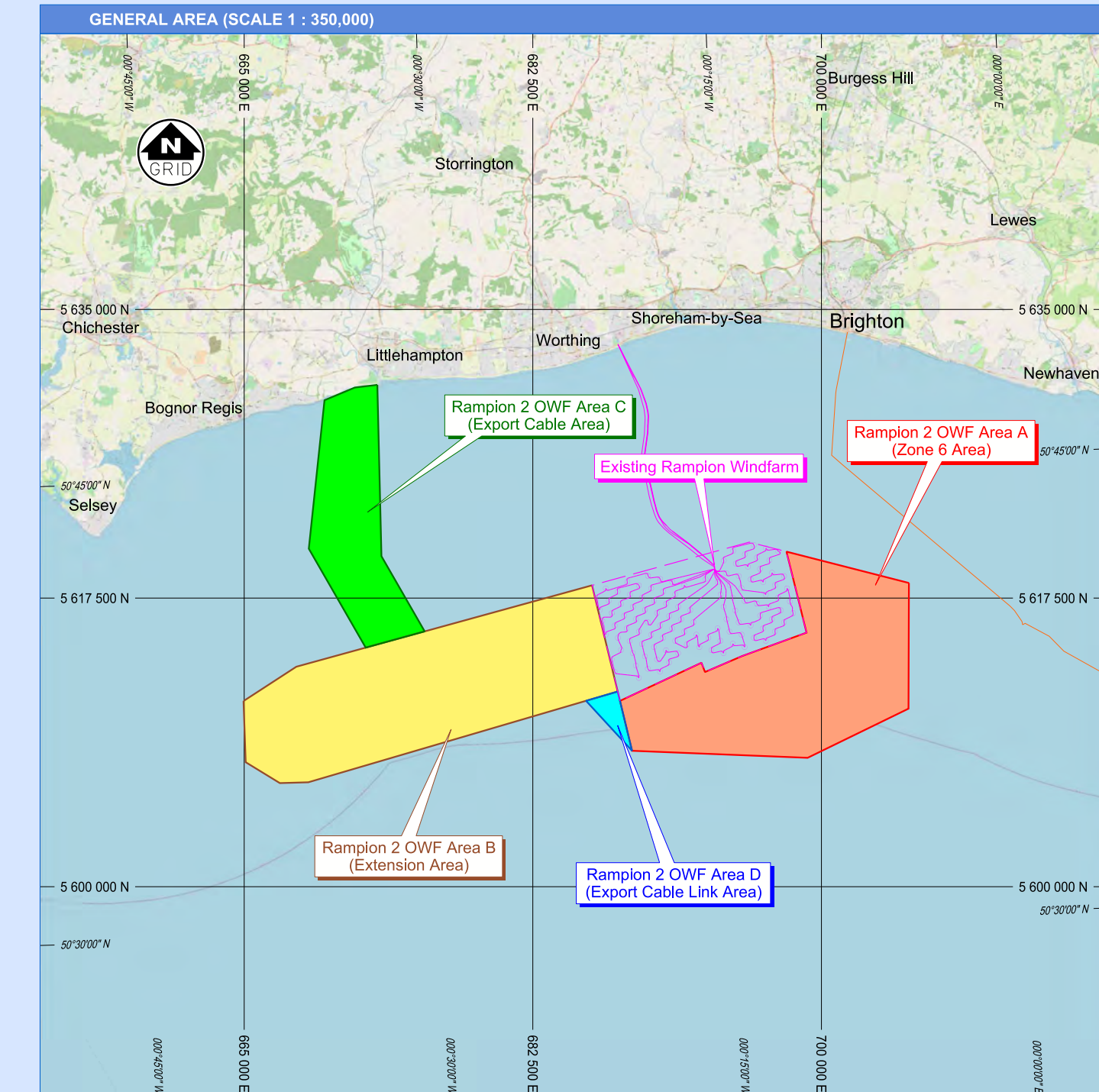


LEGEND

- 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)
- BATHYMETRIC CONTOURS SHOWN AT 10 METRE INTERVALS LAT
- BATHYMETRIC CONTOURS SHOWN AT 2 METRE INTERVALS LAT

NOTES

- OBSERVED SOUNDINGS HAVE BEEN REDUCED TO LAT TIDAL DATUM USING ONES HEIGHT DATA PROCESSED USING PPP (PRECISE POINT POSITIONING) TECHNIQUES AND THE UKHO VORF MODEL.
- THE DIFFERENCE BETWEEN LAT TO MSL IS 3.3m
- DATA GRIDDED AT 1m x 1m



GEODETIC REFERENCE SYSTEM

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

SURVEY INFORMATION

SURVEY VESSEL: M.V. WOLANT	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 CANAL DGNES	APPLANK POS BY WAVEMASTER	FLUORO STAFFIX DGNES
ECHO SCANDER (SINGLE-BEAM SYSTEM): SONARBYE RANGER USBL	SONARBYE RANGER USBL	SONARBYE RANGER USBL
NAVIGATION SYSTEM: VOYAGER 5	VOYAGER 5	VOYAGER 5
ECHO SCANDER (SINGLE-BEAM SYSTEM): SIMRAD EK600	RECON TOP DUAL HEAD	RECON TOP DUAL HEAD
ECHO SCANDER (SINGLE-BEAM SYSTEM): SIMRAD EK600	DOOM ECHOTRAC MKII	DOOM ECHOTRAC MKII
MAGNETOMETER: EDGETECH 4200FS	EDGETECH 4200FS	EDGETECH 4200FS
SUB-BOTTOM PROFILES: GEOMETRICS G82	GEOMETRICS G82	GEOMETRICS G82
ULTRA-HIGH RESOLUTION SEBIM (UHRIS): GEOMETRICS PRIMER	SURFACE TOW BOOMER	1 x 10 cm, T1 SLEEVE GUN 75m TELETYPE STREAMER

SCALE (AS ORIGNAL)

1 : 25 000 (Horizontal)

TITLE

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

RWE
 The energy to lead

PROJECT TITLE

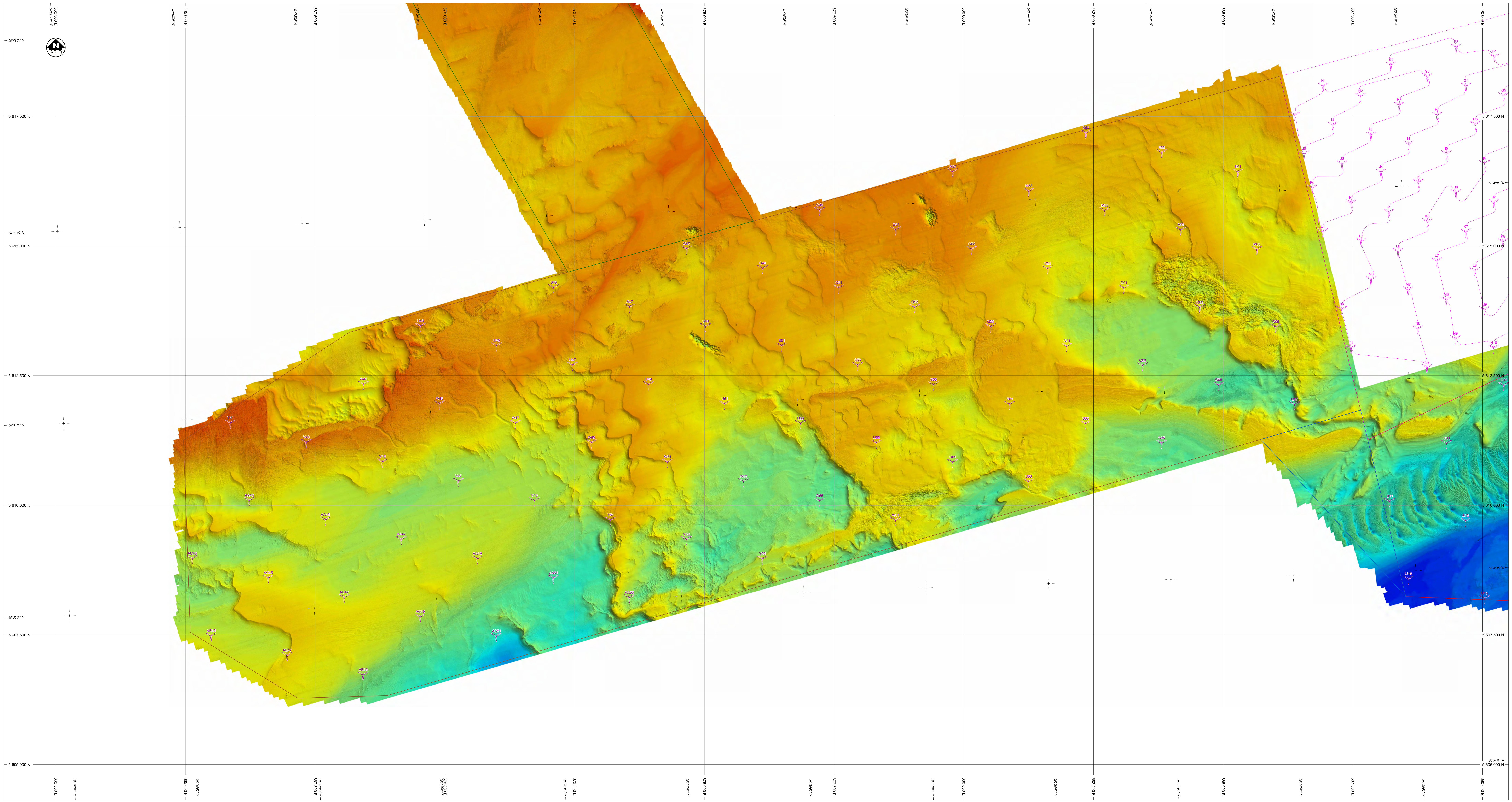
**RAMPION 2 OFFSHORE WINDFARM DEVELOPMENT
 GEOPHYSICAL SITE SURVEY FOR AREAS B & D**

DRAWING TITLE

**BATHYMETRY
 CHART 5**

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

CLIENT REFERENCE **REPORT REFERENCE** 11521.3 **DRAWING NUMBER** 11521.3.05

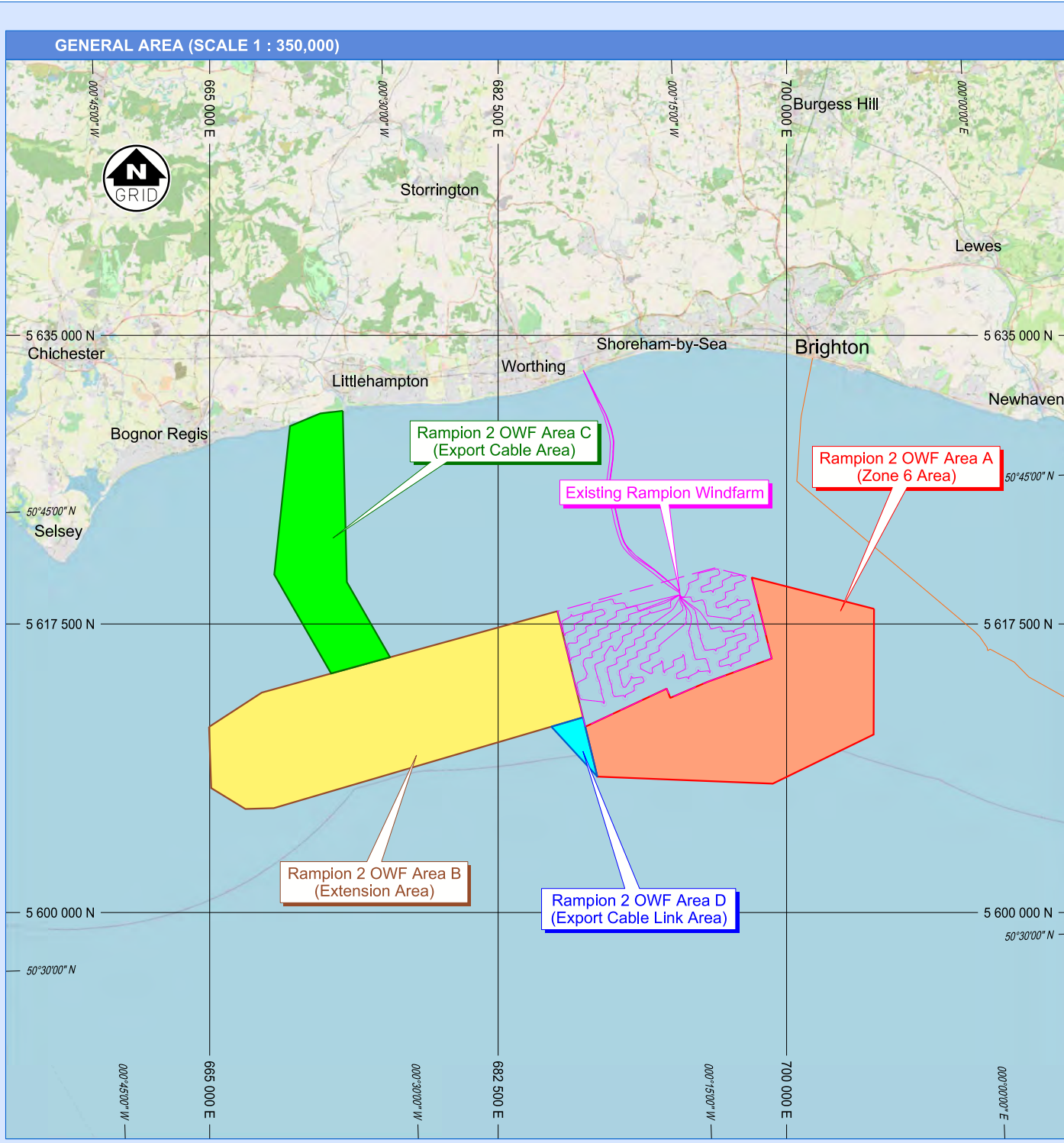


LEGEND

- PROPOSED RAMPION 2 OVF AREA A (ZONE A 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)

NOTES

- OBSERVED SOUNDINGS HAVE BEEN REDUCED TO LAT TIDAL DATUM USING ONES HEIGHT DATA PROCESSED USING PPP (PRECISE POINT POSITIONING) TECHNIQUES AND THE UKHO VORF MODEL.
- THE DIFFERENCE BETWEEN LAT TO MSL IS 3.3m
- DATA GRIDDED AT 1m x 1m
- SHADED RELIEF IMAGE - AZMUTH=45°, ELEVATION=45°



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	APPLANK POS BY WAVEMASTER	FUGRO STAFFIX DGNES
SONAR/SWATH RANGE/SYSTEM: SONAR/SWATH RANGER USBL	SONAR/SWATH RANGER USBL	SONAR/SWATH RANGER USBL
VOYAGER 5	VOYAGER 5	VOYAGER 5
ECHO SCANDER (SINGLE-BEAM SYSTEM): SIMRAD EK600	RECON TOP DUAL HEAD	RECON TOP DUAL HEAD
MAGNETOMETER: SIMRAD EK400	EDGE TECH 4200FS	EDGE TECH 4200FS
SUB-BOTTOM PROFILES: GEOMETRICS G82	GEOMETRICS G82	GEOMETRICS G82
ULTRA-HIGH RESOLUTION SEISMIC (UHRIS): GEODACUSTICS PRINGER	SURFACE TOW BOOMER	1 x 10 cm, T1 SLEEVE GUN 75m TELEIDNE STREAMER

SCALE (AS ORIGNAL)

1 : 25 000 (Horizontal)

TITLE

Gardline
 GAROLINE LIMITED
 ENDEAVOUR HOUSE, ADMIRALTY ROAD, GREAT YARMOUTH, NORFOLK, ENGLAND
 TELEPHONE: +44 (0) 1493 846000 FAX: +44 (0) 1493 846116 WEBSITE: WWW.GARDLINE.COM

RWE
 The energy to lead

PROJECT TITLE

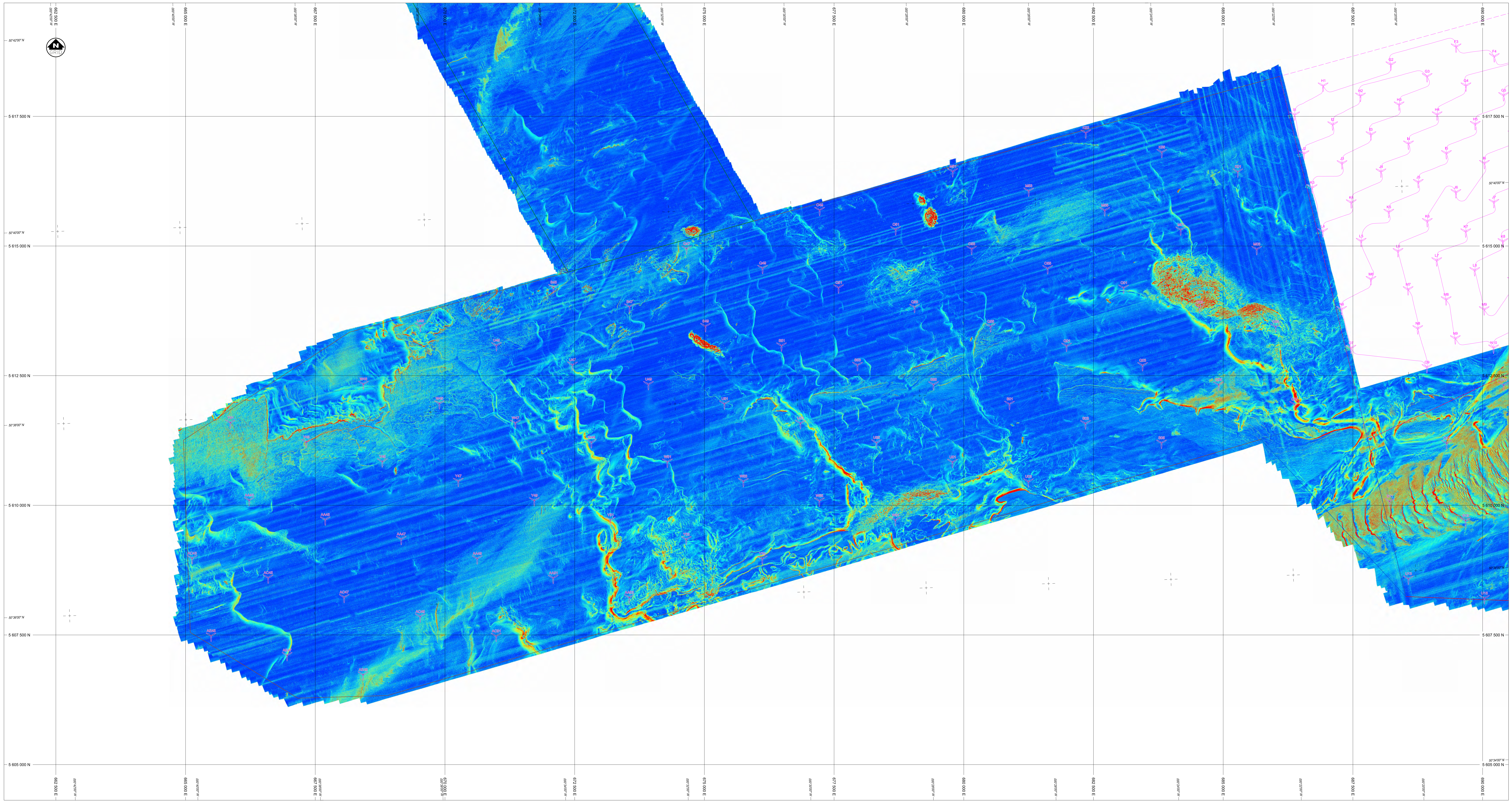
**RAMPION 2 OFFSHORE WINDFARM DEVELOPMENT
 GEOPHYSICAL SITE SURVEY FOR AREAS B & D**

DRAWING TITLE

**SEABED SHADED RELIEF
 CHART 6**

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** 11521.3.06

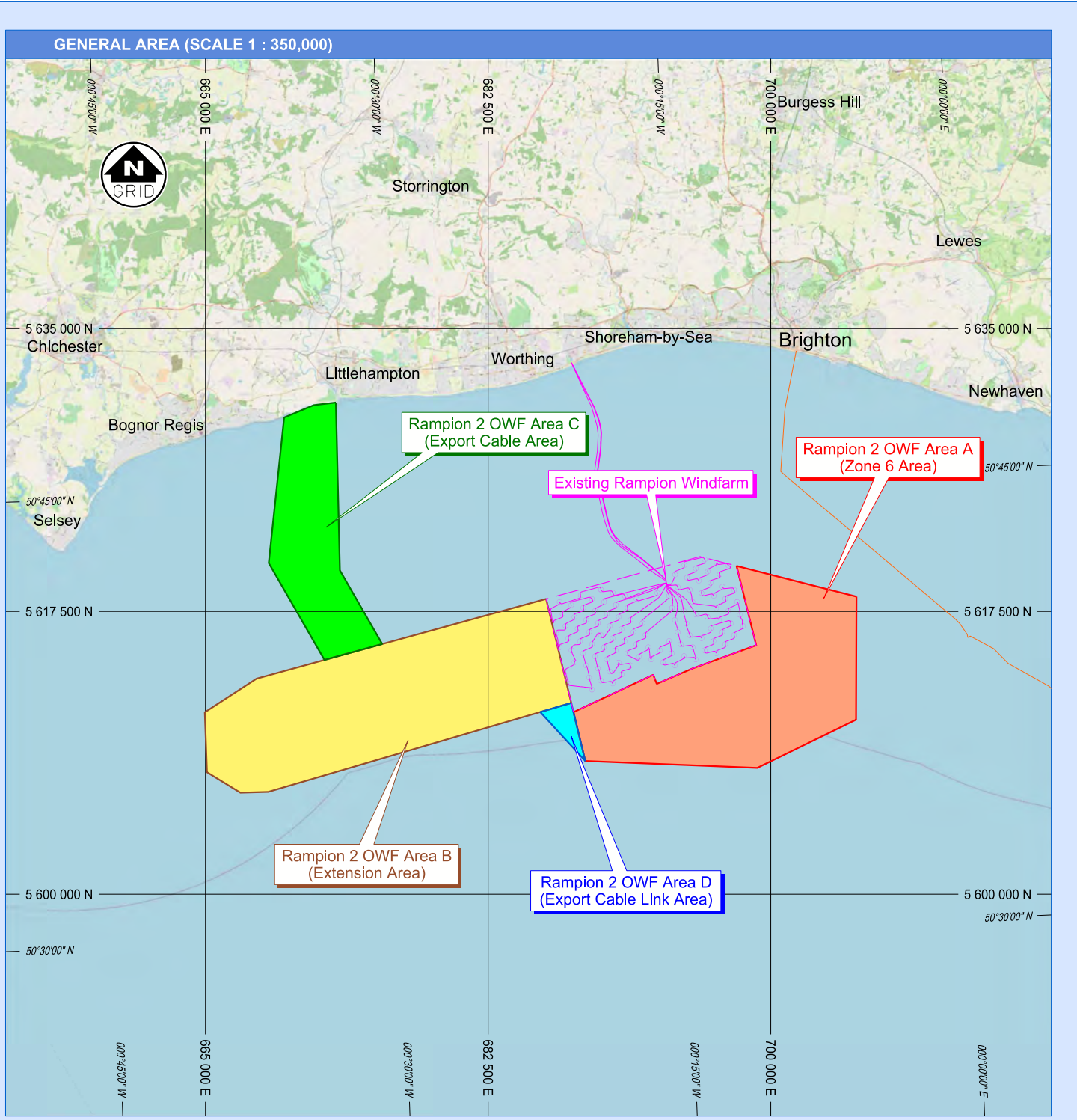


LEGEND

- 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 TURBINE GENERATOR LAYOUT (SOURCE: CLIENT PROVIDED)
- EXISTING RAMPION WIND FARM CABLE (SOURCE: CLIENT PROVIDED)
- EXISTING RAMPION SURVEY AREA (SOURCE: CLIENT PROVIDED)

DEPTH TO SEABED

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
POSITIONING SYSTEM: OCEANERRING CANAL DGNS	APPLANK POS BY WAVEMASTER	FLUGRO STAFFIX DGNS
ECHO SCANNER (SINGLE-BEAM SYSTEM): SONARBYNE RANGER USBL	SONARBYNE RANGER USBL	SONARBYNE RANGER USBL
ECHO SCANNER (DUAL-BEAM SYSTEM): VOYAGER 5	RECON TOP DUAL HEAD	VOYAGER 5
SIDE SCAN SONAR: SIMRAD EK600	DOOM ECHOTRAC MKII	DOOM ECHOTRAC MKII
MAGNETOMETER: EDGETECH 4200FS	GEOMETRICS GMR2	GEOMETRICS GMR2
SUB-BOTTOM PROFILER: GEOMETRICS GMR2	GEOMETRICS GMR2	GEOMETRICS GMR2
ULTRA-HIGH RESOLUTION SEISMIC (UHRIS):	GEOMETRICS GMR2	GEOMETRICS GMR2
	SURFACE TOW BOOMER	1 x 10 cm, T1 SLEEVE GUN 75m TELEPHONE STREAMER

SCALE (AS ORIGNAL)

1 : 25 000 (Horizontal)

TITLE

Gardline
 GARDFINE LIMITED
 ENDEAVOUR HOUSE, ADMIRALTY ROAD, GREAT YARMOUTH, NORFOLK, NR31 3JG, ENGLAND
 TELEPHONE: 144 (0) 1493 84600 FAX: 44 (0) 1493 84616 WEBSITE: WWW.GARDFINE.COM

RWE
 The energy to lead

PROJECT TITLE

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

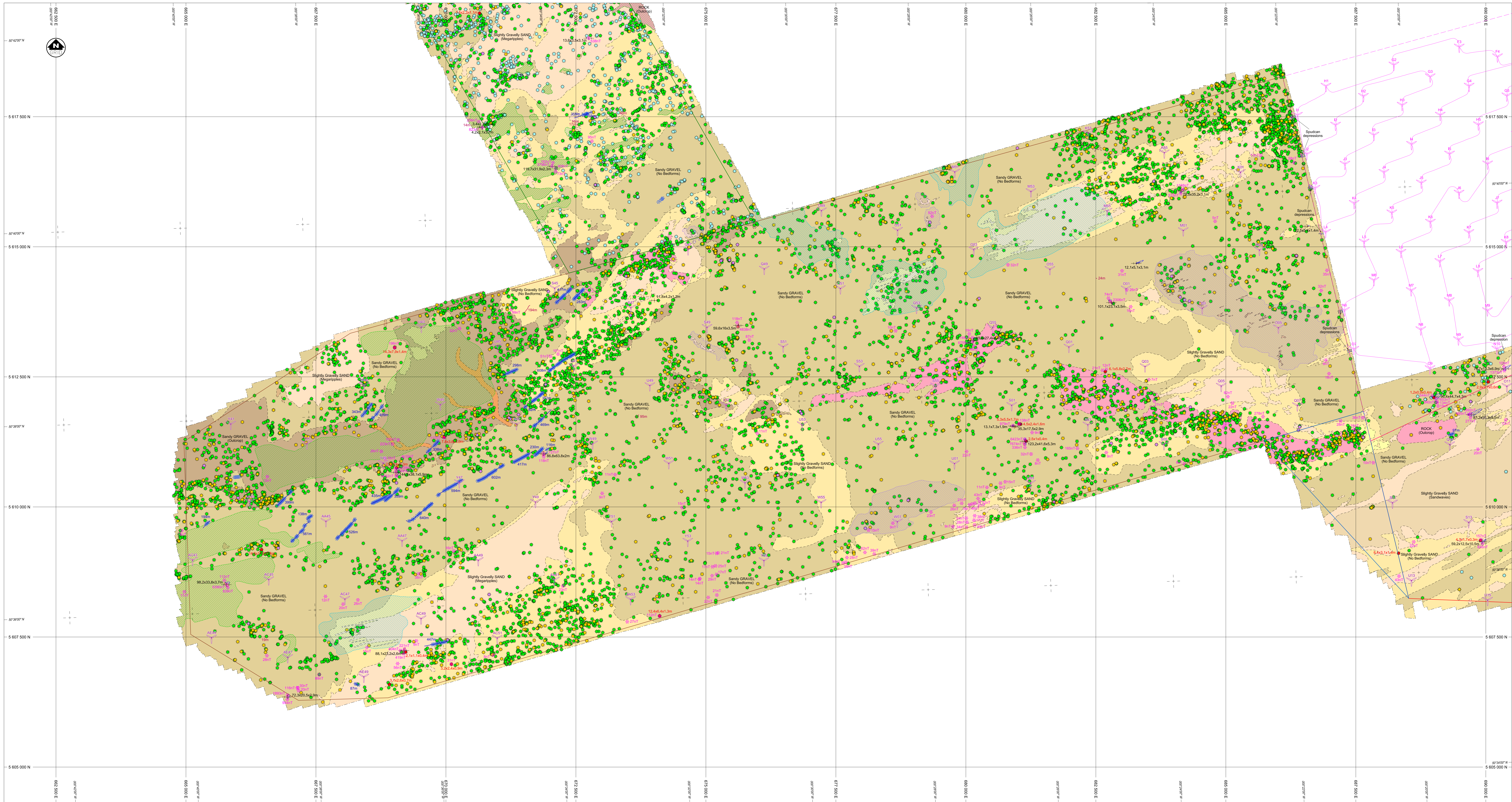
DRAWING TITLE

**SEABED GRADIENT
 CHART 7**

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** 11521.3.07



LEGEND

	PROPOSED RAMPION 2 OWF AREA A (ZONE 6 AREA)		AREA OF NUMEROUS BOULDERS
	PROPOSED RAMPION 2 OWF AREA B (EXTENSION AREA)		AREA OF WRECK
	PROPOSED RAMPION 2 OWF AREA C (EXPORT CABLE AREA)		AREA OF SCOUR
	PROPOSED RAMPION 2 OWF AREA D (EXPORT CABLE LINK AREA)		AREA OF POSSIBLE LIGHTLY SCARRED DREDGING EXTRACTION
	PROPOSED RAMPION 2 OWF AREA E (EXPORT CABLE LINK AREA)		AREA OF POSSIBLE HEAVILY SCARRED DREDGING EXTRACTION
	EXISTING RAMPION WIND TURBINE GENERATOR LAYOUT (SOURCE: CLIENT PROVIDED)		BOULDER WITH HEIGHT 0.1-0.2 METRES
	EXISTING RAMPION WIND FARM CABLE (SOURCE: CLIENT PROVIDED)		BOULDER WITH HEIGHT 0.3-0.5 METRES
	EXISTING RAMPION SURVEY AREA (SOURCE: CLIENT PROVIDED)		BOULDER WITH HEIGHT 0.6-1.0 METRES
	SAND (MEGARIPPLE)		BOULDER WITH HEIGHT GREATER THAN 1.0 METRES
	SLIGHTLY GRAVELLY SAND (NO BEDFORMS)		DEBRIS WITH DIMENSIONS IN METRES (LxWxH)
	SLIGHTLY GRAVELLY SAND (MEGARIPPLE)		MAGNETOMETER ANOMALY WITH FIELD STRENGTH IN nT
	SLIGHTLY GRAVELLY SAND (SAND WAVES)		WRECK WITH DIMENSIONS IN METRES (LxWxH)
	SLIGHTLY GRAVELLY SAND (NO BEDFORMS)		LINEAR DEBRIS WITH LENGTH IN METRES
	SANDY GRAVEL (NO BEDFORMS)		SPUDCAN DEPRESSION
	SANDY GRAVEL (MEGARIPPLE)		FISHING POT
	SANDY GRAVEL (SAND WAVES)		LINEAR FISHING GEAR WITH LENGTH IN METRES
	SANDY GRAVEL (NO BEDFORMS)		LIMIT OF SIDE SCAN SONAR COVERAGE
	SANDY GRAVEL (OUTCROP)		
	SANDY GRAVEL (CHANNELLING)		
	ROCK (OUTCROP)		

NOTES

AREA OF NUMEROUS BOULDERS

AREA OF WRECK

AREA OF SCOUR

AREA OF POSSIBLE LIGHTLY SCARRED DREDGING EXTRACTION

AREA OF POSSIBLE HEAVILY SCARRED DREDGING EXTRACTION

BOULDER WITH HEIGHT 0.1-0.2 METRES

BOULDER WITH HEIGHT 0.3-0.5 METRES

BOULDER WITH HEIGHT 0.6-1.0 METRES

BOULDER WITH HEIGHT GREATER THAN 1.0 METRES

DEBRIS WITH DIMENSIONS IN METRES (LxWxH)

MAGNETOMETER ANOMALY WITH FIELD STRENGTH IN nT

WRECK WITH DIMENSIONS IN METRES (LxWxH)

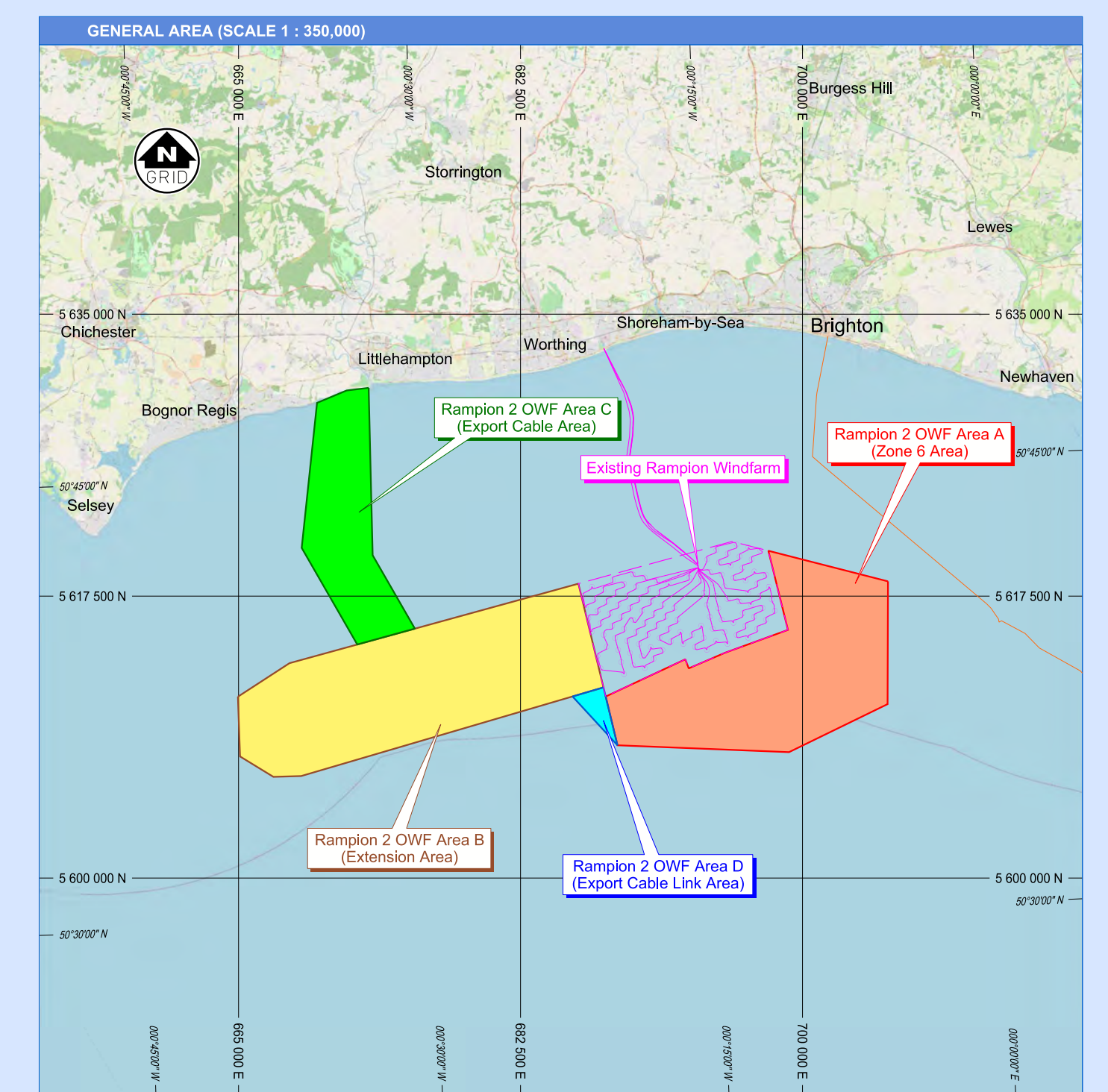
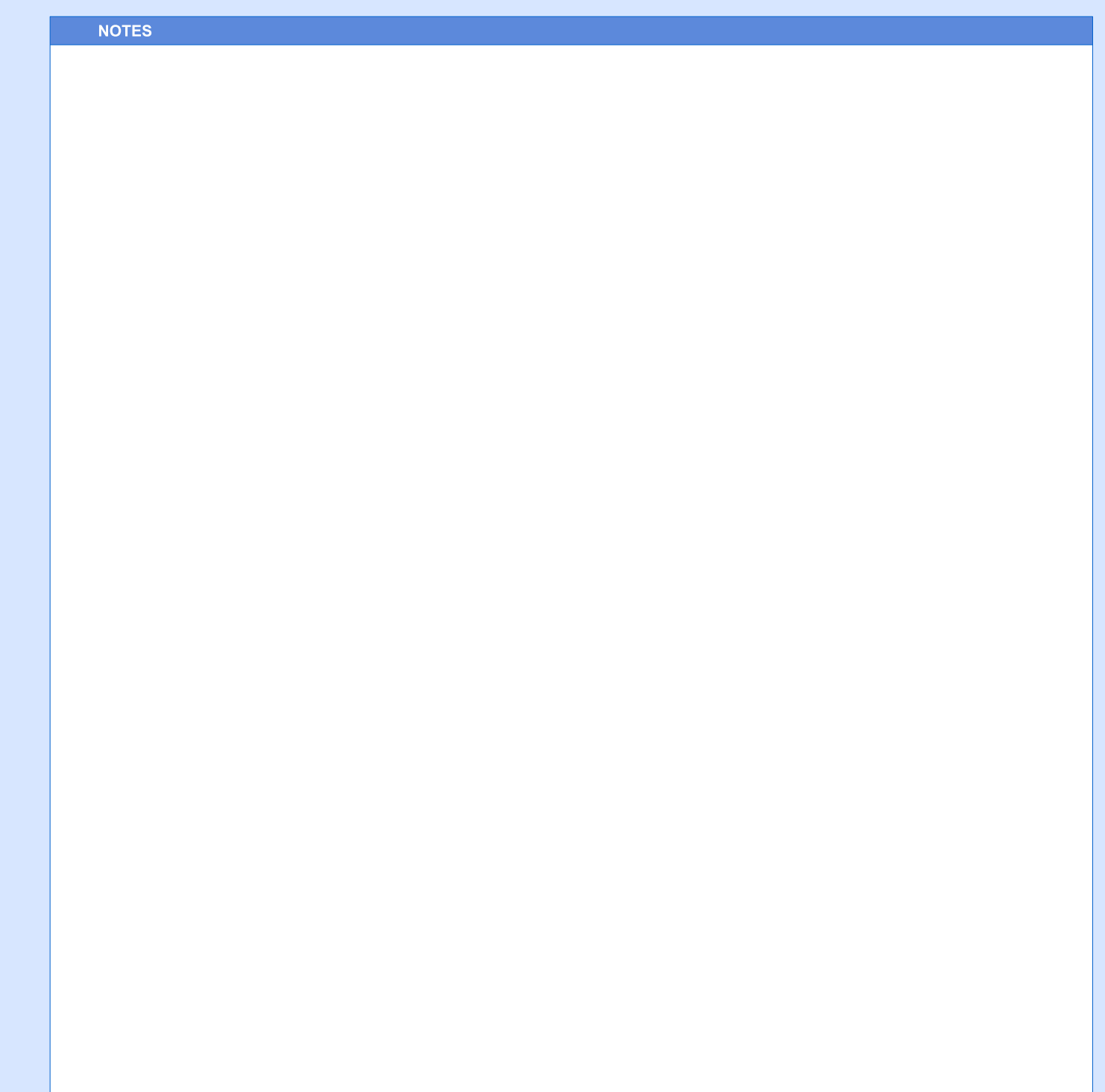
LINEAR DEBRIS WITH LENGTH IN METRES

SPUDCAN DEPRESSION

FISHING POT

LINEAR FISHING GEAR WITH LENGTH IN METRES

LIMIT OF SIDE SCAN SONAR COVERAGE



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
NAVIGATION SYSTEM	OCEANERRING CHAY DONES	APPLARK POS BY WAVEMASTER	FUGRO STARFIX DONES
ECHO SCANNER (SINGLE-BEAM SYSTEM)	SONARBYNE RANGER USBL	SONARBYNE RANGER USBL	SONARBYNE RANGER USBL
ECHO SCANNER (DUAL-BEAM SYSTEM)	VOYAGER 5	VOYAGER 5	VOYAGER 5
SIDE SCAN SONAR	SEIRAD E4000	SEIRAD E4000	SEIRAD E4000
MAGNETOMETER	EDGETECH 4200FS	EDGETECH 4200FS	EDGETECH 4200FS
SUB-BOTTOM PROFILES	GEOMETRICS G82	GEOMETRICS G82	GEOMETRICS G82
ULTRA-HIGH RESOLUTION SEISMIC (UHRIS)	GEODACUSTICS PRINGER	SURFACE TOW BOOMER	75m TELETYPE STREAMER

TITLE

Gardline
GARDLINE LIMITED
ENDAVOUR HOUSE, ADMIRALTY ROAD, GREAT WYRMOUTH, NORFOLK, NR3 3NG, ENGLAND
TELEPHONE: +44 (0) 1493 84500 FAX: +44 (0) 1493 82716 WEBSITE: WWW.GARDLINE.COM

RWE
The energy to lead.

PROJECT TITLE

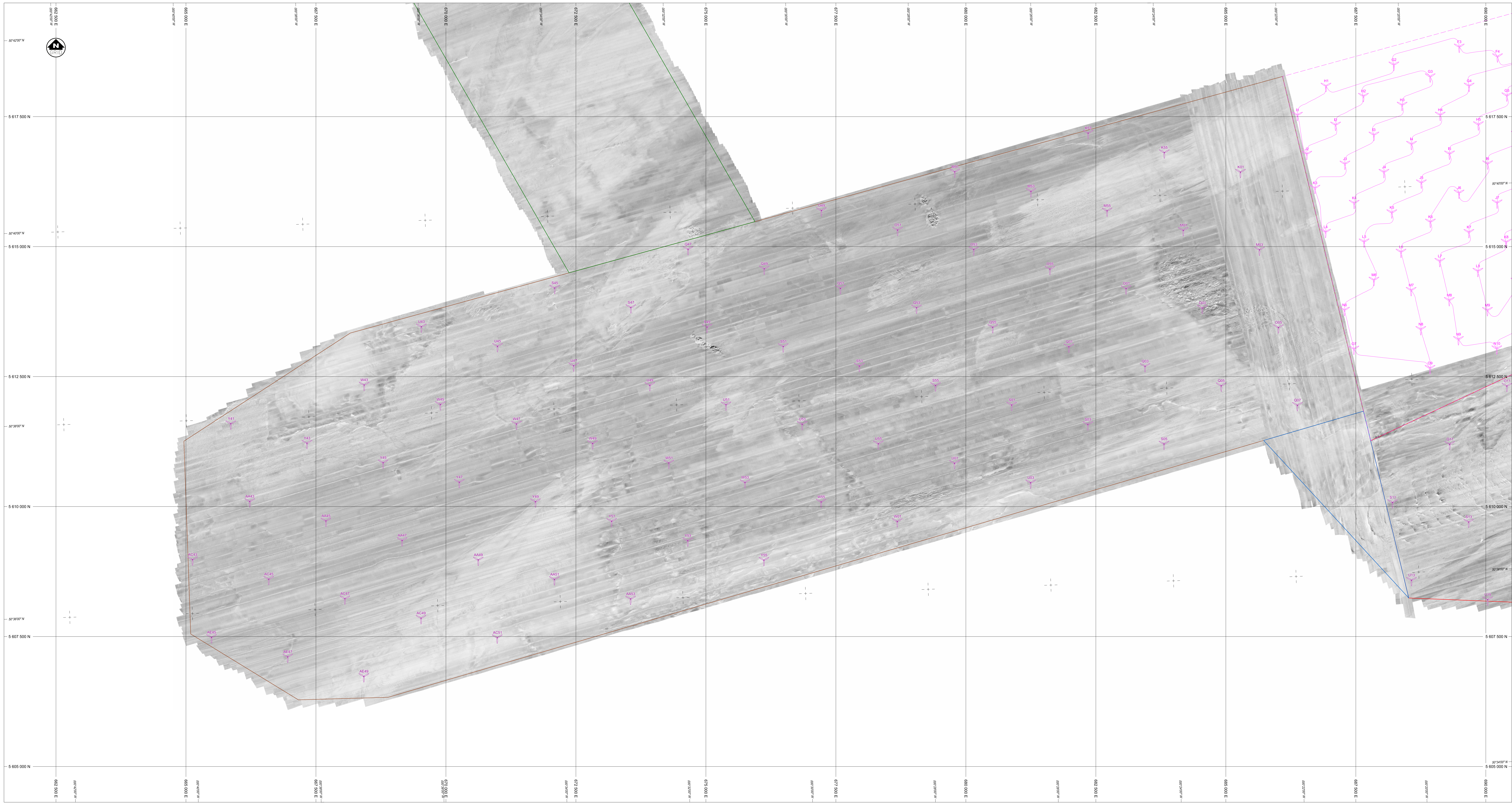
**RAMPION 2 OFFSHORE WINDFARM DEVELOPMENT
GEOPHYSICAL SITE SURVEY FOR AREAS B & D**

DRAWING TITLE

**SEABED FEATURES
CHART 8**

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

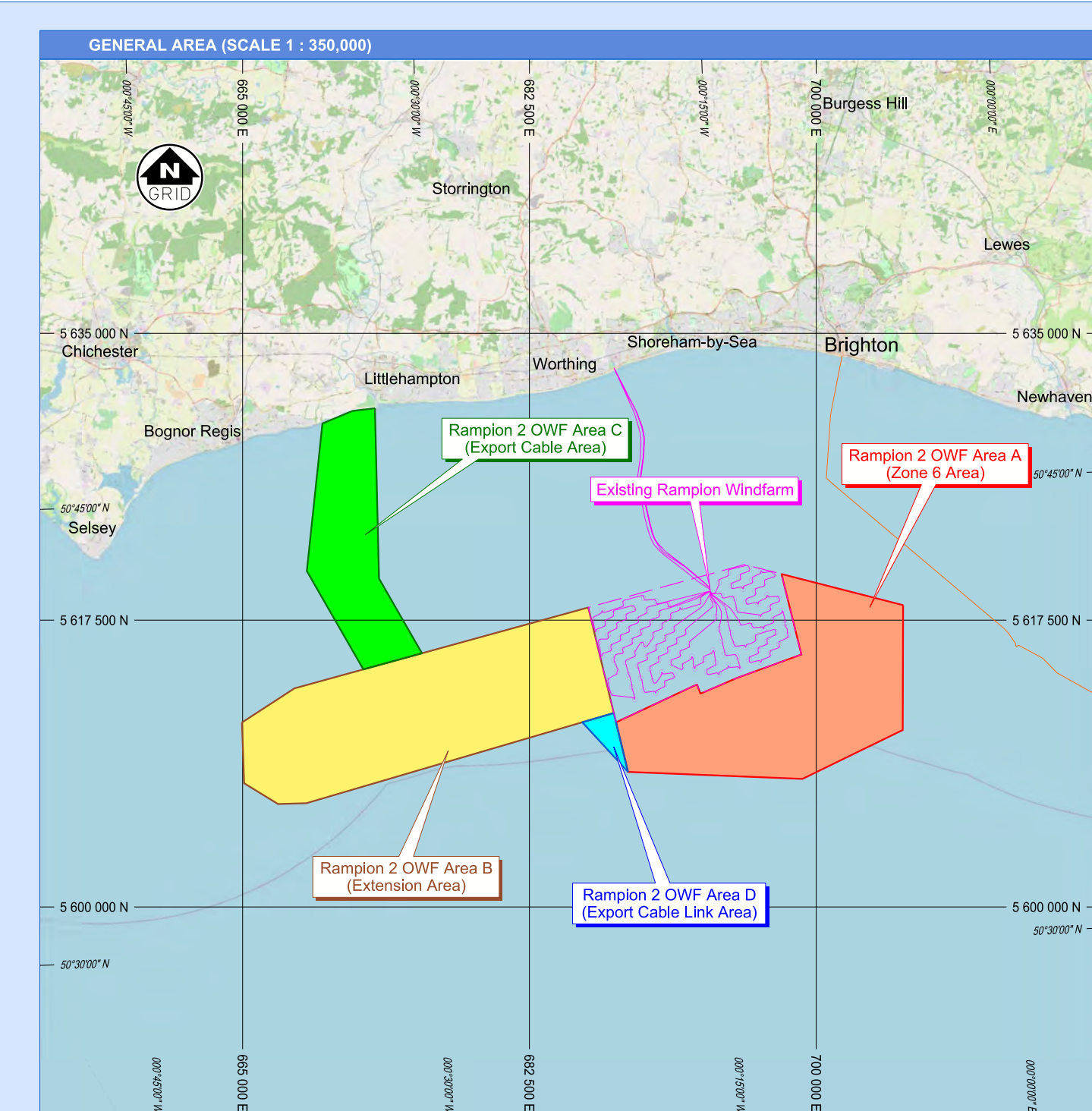
CLIENT REFERENCE **REPORT REFERENCE** 11521.3 **DRAWING NUMBER** 11521.3.08



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 TURBINE GENERATOR LAYOUT (SOURCE: CLIENT PROVIDED)
- EXISTING RAMPION WIND FARM CABLE (SOURCE: CLIENT PROVIDED)
- EXISTING RAMPION SURVEY AREA (SOURCE: CLIENT PROVIDED)

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 DGNS	APPLANK POS BY WAVEMASTER	FLUORO STAFFIX DGNS
SONAR/BEAM RANGER USE:	SONAR/BEAM RANGER USE:	SONAR/BEAM RANGER USE:
VOYAGER 5	VOYAGER 5	VOYAGER 5
ECHO SCANDER (SINGLE-BEAM SYSTEM): SIMRAD EK600	RECON TOP DUAL HEAD	SIMRAD EK600
MAGNETOMETER: EDGETECH 4200FS	EDGETECH 4200FS	EDGETECH 4200FS
SUB-BOTTOM PROFILES: GEOMETRICS G82	GEOMETRICS G82	GEOMETRICS G82
ULTRA-HIGH RESOLUTION SEISMIC (UHRIS):	GEODACUSTICS PRINGER	SURFACE TOW BOOMER
		1 x 10 cm H. T1 SLEEVE GUN 75m TELEDRIVE STREAMER

SCALE (AS ORIGINAL)

1 : 25 000 (Horizontal)

TITLE

Gardline
 GARDLINE LIMITED
 ENDEAVOUR HOUSE, ADMIRALTY ROAD, GREAT FARMOUTH, NORFOLK, NR3 3NG, ENGLAND
 TELEPHONE: 144 (0) 1483 84600 FAX: 44 (0) 1463 85216 WEBSITE: WWW.GARDLINE.COM

CLIENT

RWE
 The energy to lead

PROJECT TITLE

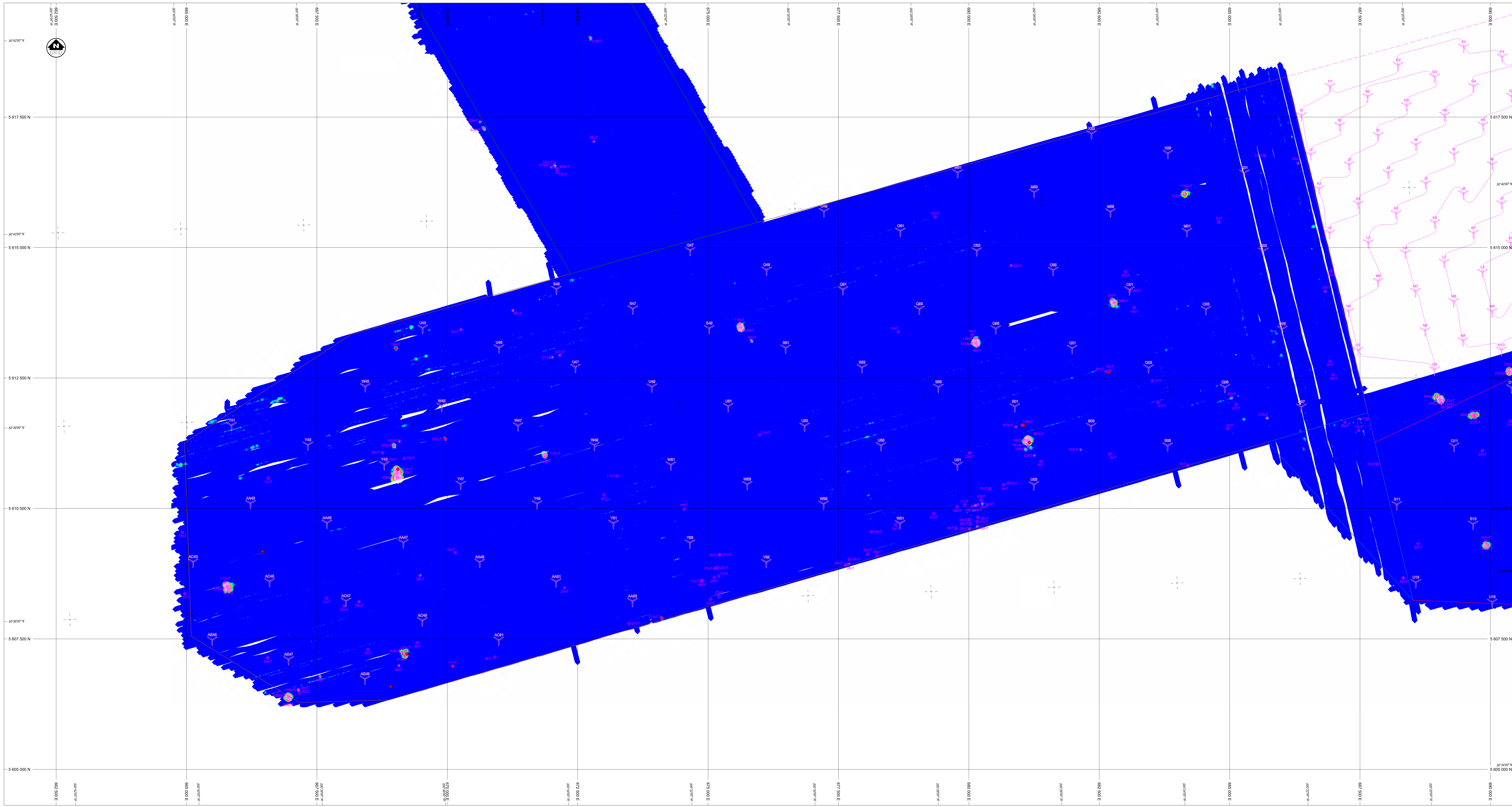
**RAMPION 2 OFFSHORE WINDFARM DEVELOPMENT
 GEOPHYSICAL SITE SURVEY FOR AREAS B & D**

DRAWING TITLE

**SIDE SCAN SONAR MOSAIC
 CHART 9**

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

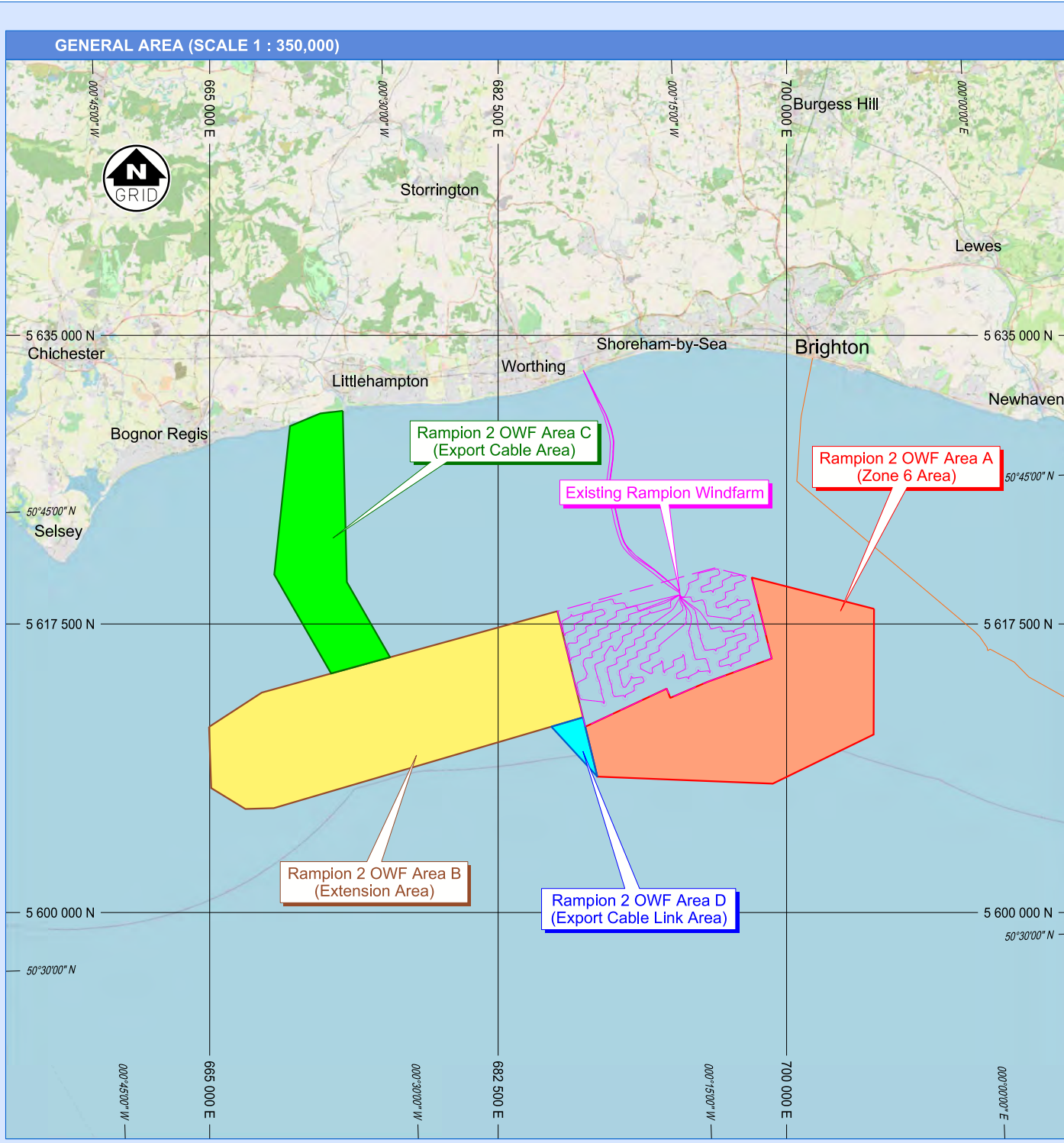
CLIENT REFERENCE **REPORT REFERENCE** 11521.3 **DRAWING NUMBER** 11521.3.09



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 TURBINE GENERATOR LAYOUT (SOURCE: CLIENT PROVIDED)
- EXISTING RAMPION WIND FARM CABLE (SOURCE: CLIENT PROVIDED)
- EXISTING RAMPION SURVEY AREA (SOURCE: CLIENT PROVIDED)
- MAGNETOMETER ANOMALY WITH FIELD STRENGTH IN nT

NOTES



GEODETIC REFERENCE SYSTEM

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

SURVEY INFORMATION

SURVEY VESSEL: M.V. VOGLANT	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 DGNS	APPLANK POS BY WAVEMASTER	FLUGRO STAFFIX DGNS
SONAR: SONARBYNE RANGER USBL	SONARBYNE RANGER USBL	SONARBYNE RANGER USBL
NAVIGATION SYSTEM: VOYAGER 5	VOYAGER 5	VOYAGER 5
ECHO SCANNER (SINGLE-BEAM SYSTEM): ECHOSWATH	RECON TOPAL HEAD	RECON TOPAL HEAD
ECHOSWATH (SINGLE-BEAM SYSTEM): SIMRAD EK400	SI-MEADOW EK400	SI-MEADOW EK400
SIDE SCAN SONAR: SIMRAD EK400	EDGETECH 4000S	EDGETECH 4000S
MAGNETOMETER: GEOMETRICS GMR2	GEOMETRICS GMR2	GEOMETRICS GMR2
SUB-BOTTOM PROFILES: GEOMETRICS GMR2	GEOMETRICS GMR2	GEOMETRICS GMR2
ULTRA-HIGH RESOLUTION SEISMIC (UHRIS): SURFACE TOW BOOMER	SURFACE TOW BOOMER	SURFACE TOW BOOMER

SCALE (AS ORIGNAL)

1 : 25 000 (Horizontal)

TITLE

Gardline
 GARDLINE LIMITED
 ENDEAVOUR HOUSE, ADMIRALTY ROAD, GREAT YARMOUTH, NORFOLK, NE5 3NG, ENGLAND
 TELEPHONE: +44 (0) 1493 84600 FAX: +44 (0) 1493 84616 WEBSITE: WWW.GARDLINE.COM

CLIENT

RWE
 The energy to lead.

PROJECT TITLE

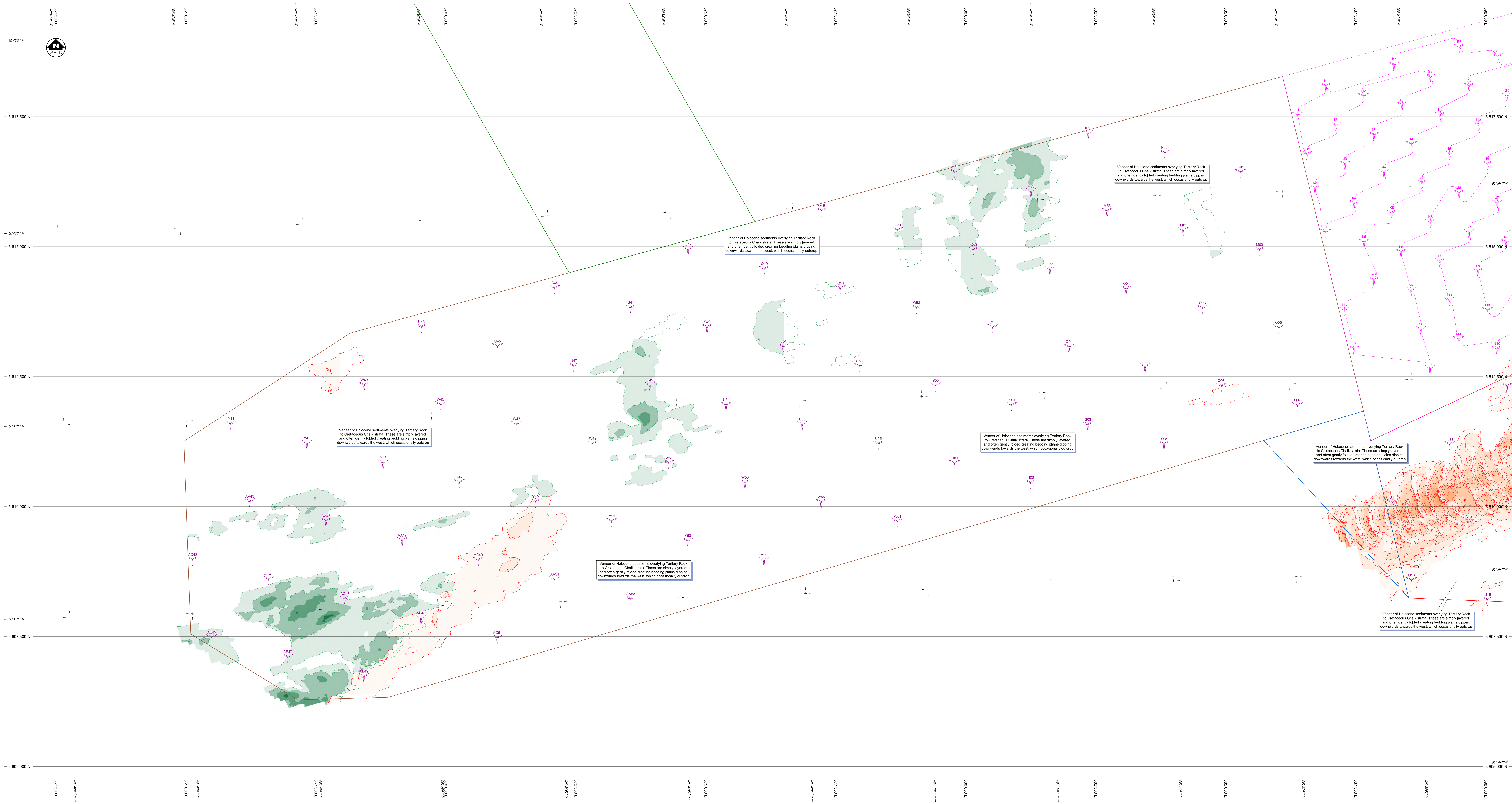
**RAMPION 2 OFFSHORE WINDFARM DEVELOPMENT
 GEOPHYSICAL SITE SURVEY FOR AREAS B & D**

DRAWING TITLE

**MAGNETOMETER RESIDUAL GRID
 CHART 10**

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

CLIENT REFERENCE **REPORT REFERENCE** 11521.3 **DRAWING NUMBER** 11521.3.10

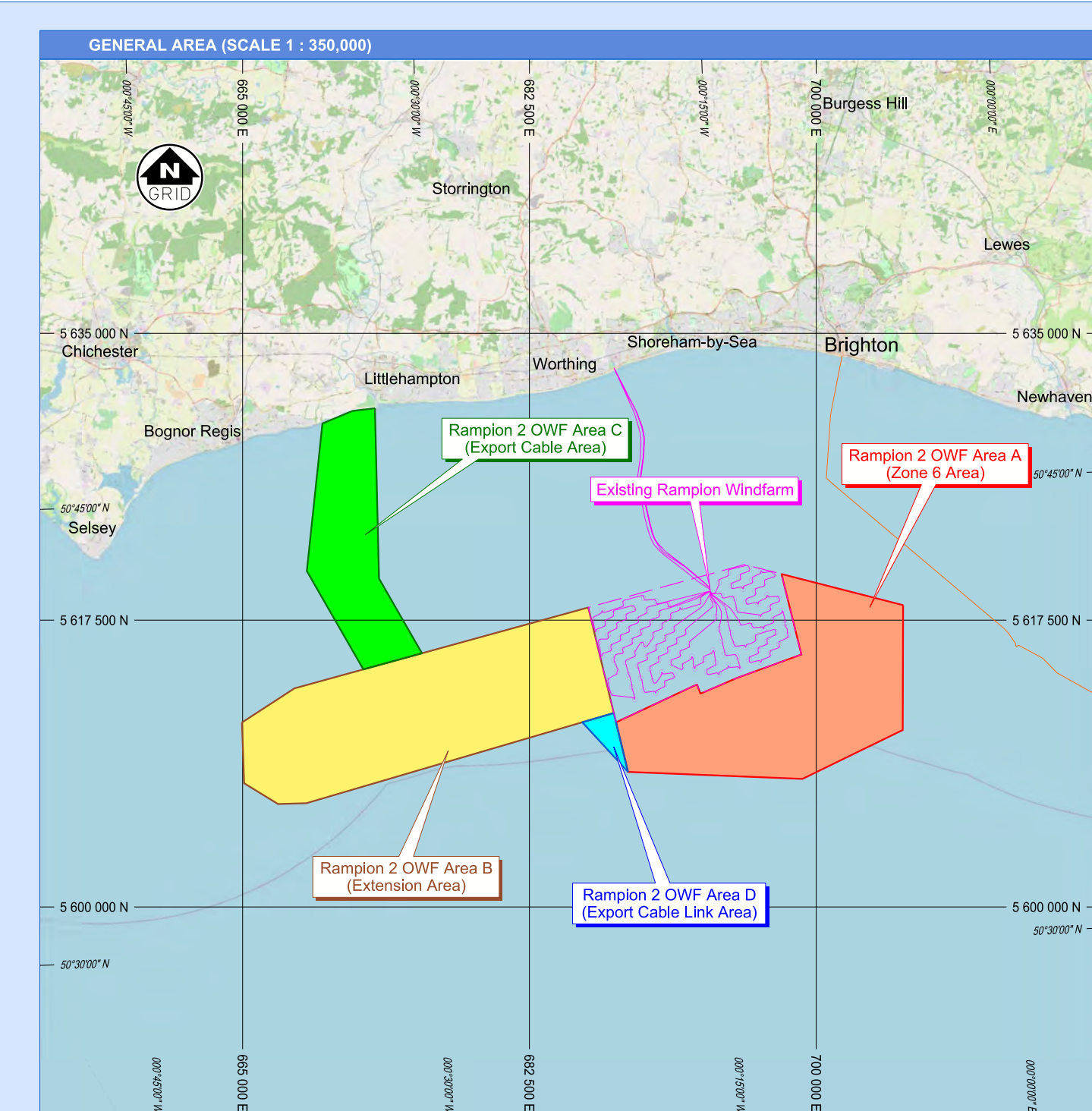


LEGEND

- 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)
- DEPTH IN METRES BELOW SEABED TO BASE OF H05, CONTOURED AT 2 METRE INTERVALS
- LIMIT OF BASE OF H05
- DEPTH IN METRES BELOW SEABED TO BASE OF H07, CONTOURED AT 2 METRE INTERVALS
- LIMIT OF BASE OF H07

NOTES

1. ASSUMED SEISMIC VELOCITY = 1700m/s
2. H05 = YOUNGER HOLOCENE DEPOSITS COMPRISING UNCONSOLIDATED SEDIMENTS, LARGELY SAND AND GRAVEL, POTENTIALLY MOBILE IN PLACES
3. H07 = QUATERNARY DEPOSITS COMPRISING CONSOLIDATED SEDIMENTS, LARGELY SAND AND GRAVEL



GEODETTIC REFERENCE SYSTEM

GEODETTIC 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 DGNS	APPLARK POS BY WAVEMASTER	FLUGRO STAFFIX DGNS
NAVIGATION SYSTEM: ECHO SCANDER INS/BEAM SYSTEM	SONARBYNE RANGER USEL	SONARBYNE RANGER USEL
ECHO SCANDER (SINGLE-BEAM SYSTEM): VOYAGER 5	VOYAGER 5	VOYAGER 5
SIDE SCAN SONAR: SIMRAD EK600	RECON TOPAL HEAD	RECON TOPAL HEAD
MAGNETOMETER: SIMRAD EK400	DOOM ECHOTRAC MKII	DOOM ECHOTRAC MKII
SUB-BOTTOM PROFILES: EDGETECH 4200FS	EDGETECH 4200FS	EDGETECH 4200FS
ULTRA-HIGH RESOLUTION SEISMIC (UHRIS): GEOMETRICS GMR2	GEOMETRICS GMR2	GEOMETRICS GMR2
	SURFACE TOW BOOMER	SURFACE TOW BOOMER
	1 x 10 cm H. T1 SLEEVE GUN	1 x 10 cm H. T1 SLEEVE GUN
	75m TELETYPE STREAMER	75m TELETYPE STREAMER

SCALE (AS ORIGINAL)

1 : 25 000 (Horizontal)

TITLE

Gardline
 GAROLINE LIMITED
 ENDEAVOUR HOUSE, ADMIRALTY ROAD, GREAT YARMOUTH, NORFOLK, NE63 3NG, ENGLAND
 TELEPHONE: +44 (0) 1493 846000 FAX: +44 (0) 1493 846108 WEBSITE: WWW.GAROLINE.COM

CLIENT

RWE
 The energy to lead

PROJECT TITLE

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

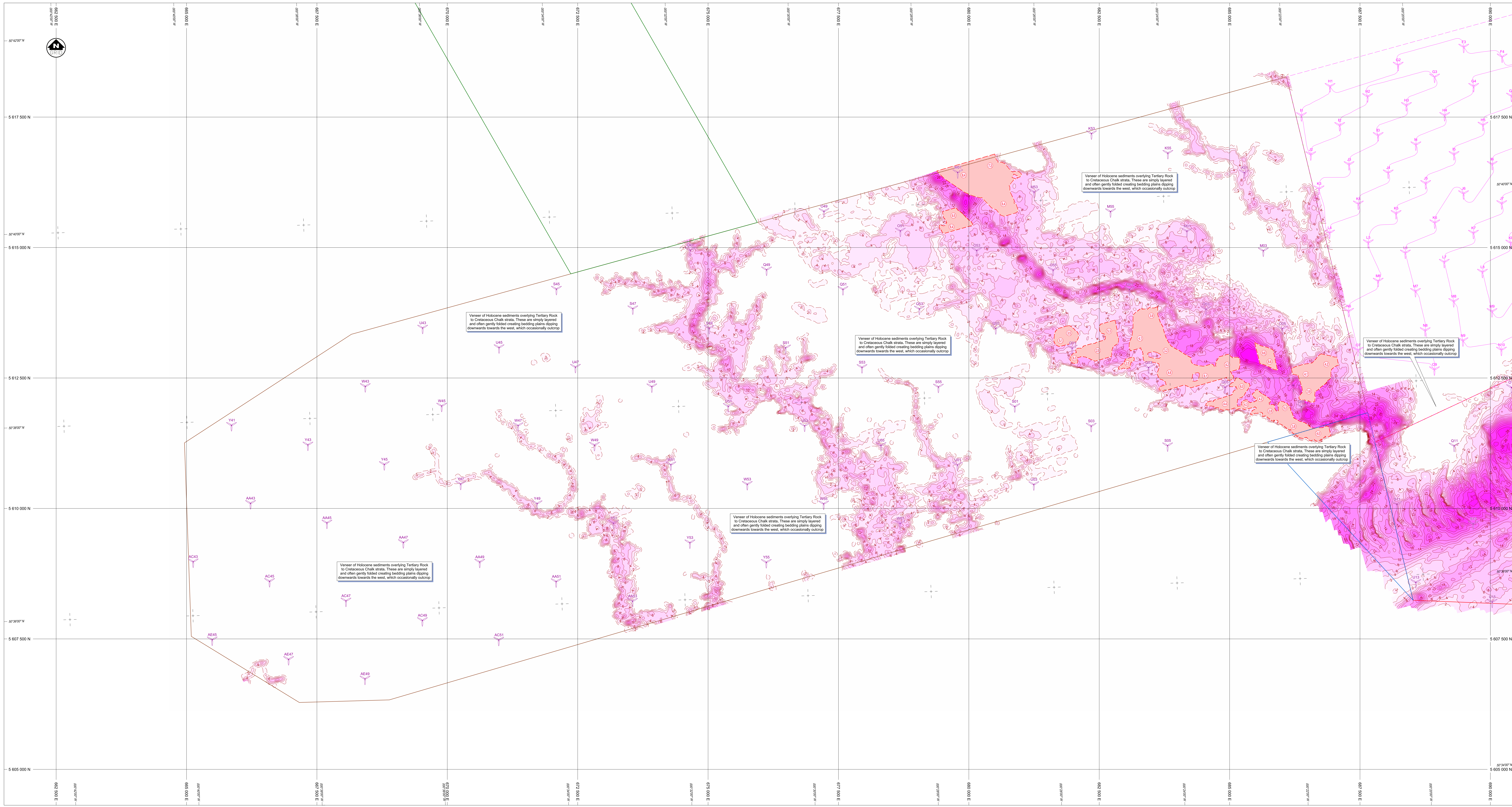
DRAWING TITLE

**SHALLOW SOILS
 (BASE OF H05 & H07)
 CHART 11**

REVISION

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

CLIENT REFERENCE REPORT REFERENCE 11521.3 DRAWING NUMBER 11521.3.11

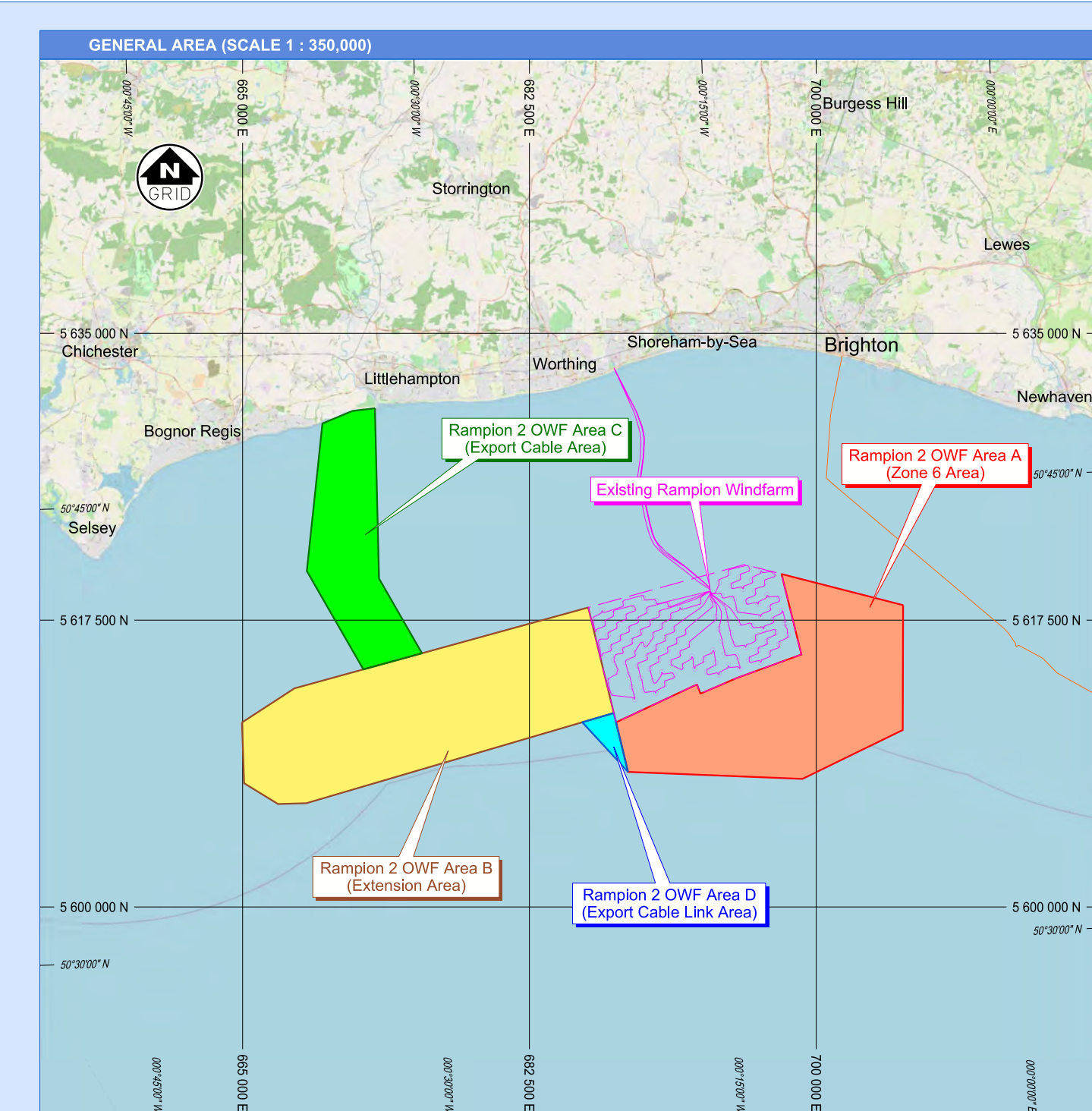


LEGEND

- PROPOSED RAMPION 2 OWF AREA A (ZONE A 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)
- DEPTH IN METRES BELOW BEARED TO BASE OF H10 - PALAEOCHANNEL, CONTOURED AT 2 METRE INTERVALS
- LIMIT OF BASE OF H10
- AREA OF BLANKING WITH SPOT DEPTHS IN METRES BELOW BEARED

NOTES

1. ASSUMED SEISMIC VELOCITY = 1700m/s
2. H10 - PALAEOCHANNELS ARE SEEN CUTTING THROUGH THE BEDROCK. THESE CHANNELS ARE INTERPRETTED 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.



GEODETTIC REFERENCE SYSTEM

GEODETTIC 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
GEAR/ENGINEERING: OCEAN SURVEY SYSTEM	APPLIXANT POS BY WAVEMASTER	FLUORO STARFIX DGNES
ECHO SCANNER: SIMRAD EK60	SONAR/SYNE RANGER USBL	SONAR/SYNE RANGER USBL
VOYAGER 5	VOYAGER 5	VOYAGER 5
RECON TOP DUAL HEAD	RECON TOP DUAL HEAD	RECON TOP DUAL HEAD
DOOM ECHOTRAC MKII	DOOM ECHOTRAC MKII	DOOM ECHOTRAC MKII
EDGE TECH 4200FS	EDGE TECH 4200FS	EDGE TECH 4200FS
GEOMETRICS GMR2	GEOMETRICS GMR2	GEOMETRICS GMR2
GEODACUSTICS PRINGER	GEODACUSTICS PRINGER	GEODACUSTICS PRINGER
ULTRA HIGH RESOLUTION SEISMIC (UHRIS)	ULTRA HIGH RESOLUTION SEISMIC (UHRIS)	ULTRA HIGH RESOLUTION SEISMIC (UHRIS)
	SURFACE TOW BOOMER	75m TELETYPE STREAMER

SCALE (AS ORIGINAL)

1 : 25 000 (Horizontal)

TITLE

Gardline
 GARDLINE LIMITED
 ENDEAVOUR HOUSE, ADMIRALTY ROAD, GREAT YARMOUTH, NORFOLK NE63 3NG, ENGLAND
 TELEPHONE: 144 (0) 1493 84500 FAX: 144 (0) 1493 82176 WEBSITE: WWW.GARDLINE.COM

RWE
 The energy to lead

PROJECT TITLE

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

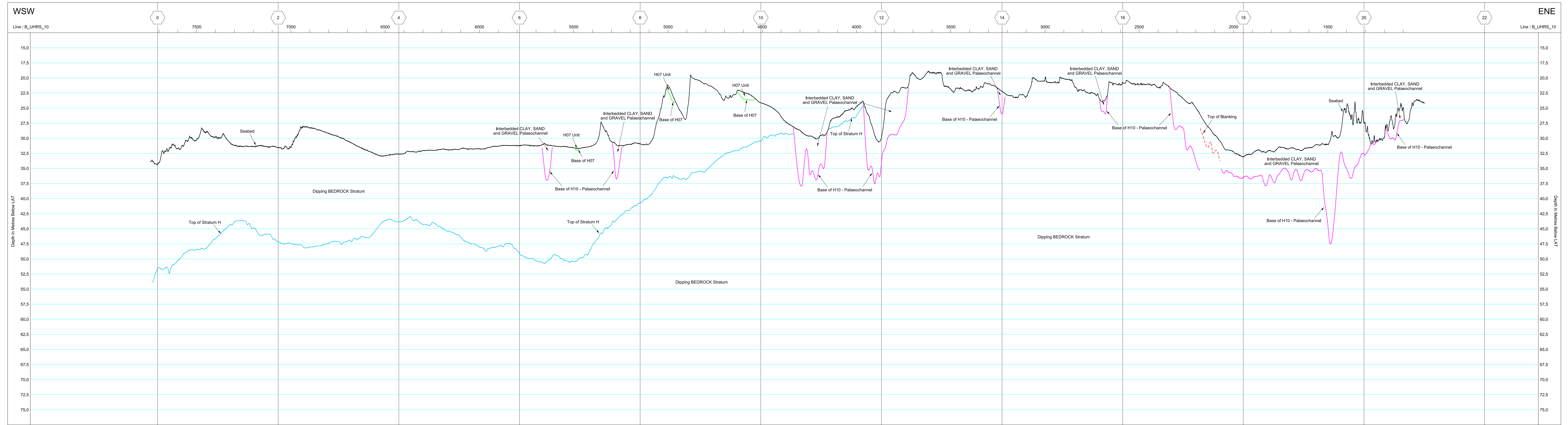
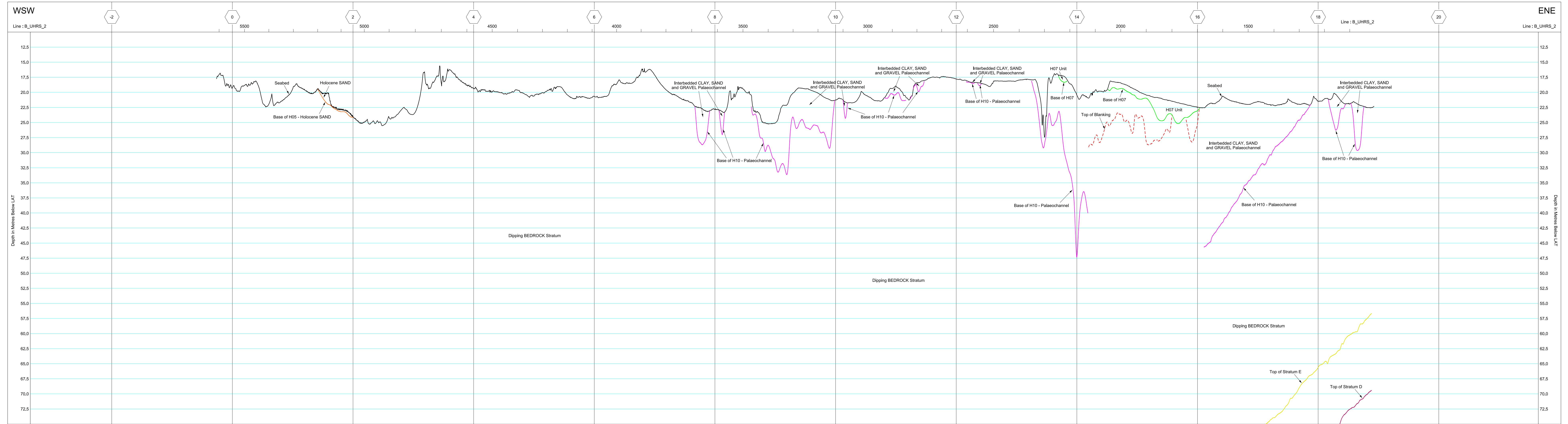
DRAWING TITLE

**SHALLOW SOILS
 (BASE OF H10)
 CHART 12**

REVISION

REV.	DATE	TITLE	DESCRIPTION	AUTHOR	DRAWN	CHECKED	APPROVED
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CLIENT REFERENCE **REPORT REFERENCE** 11521.3 **DRAWING NUMBER** **11521.3.12**



LEGEND

- SEABED
- BASE OF H05 - HOLOCENE SAND
- BASE OF H07 - UNIT 7
- BASE OF H10 - PALAEOCHANNEL
- TOP OF BLANKING
- TOP OF STRATUM D
- TOP OF STRATUM E
- TOP OF STRATUM H

NOTES

1. ASSUMED SEISMIC VELOCITY = 1700m/s
2. VERTICAL SCALE = 1 : 200
3. VERTICAL EXAGGERATION = 100 : 1

GENERAL AREA (SCALE 1 : 350,000)

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 CNAV DGNS	APPLANK POS BY WAVEMASTER	FUGRO STAFFIX DGNS
ECHO SOUNDER (SINGLE-BEAM SYSTEM): ECHOSOUND	SONAR/BE RANGER USBL	SONAR/BE RANGER USBL
ECHO SOUNDER (DUAL-BEAM SYSTEM): SIMRAD EK600	VOYAGER 5	VOYAGER 5
SIDE SCAN SONAR: SIMRAD EK600	RECON TOP DUAL HEAD	RECON TOP DUAL HEAD
MAGNETOMETER: GEOMETRICS G82	GEOMETRICS G82	GEOMETRICS G82
SUB-BOTTOM PROFILER: GEOMETRICS PRIMER	GEOMETRICS PRIMER	GEOMETRICS PRIMER
ULTRA-HIGH RESOLUTION SEISMIC (UHRS):	SURFACE TOW BOOMER	1 x 10 cm, T1 SLEEVE GUN 75m TELETYPE STREAMER

SCALE (AS ORIGINAL)

1 : 25 000 (Horizontal)

TITLE

Gardline
 GARDLINE LIMITED
 ENDEAVOUR HOUSE, ADMIRALTY ROAD, GREAT FARMINGTUN, NORFOLK NES 3NG, ENGLAND
 TELEPHONE: 144 (0) 1483 84600 FAX: 144 (0) 1483 84610 WEBSITE: WWW.GARDLINE.COM

CLIENT

RWE
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PROJECT TITLE

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

DRAWING TITLE

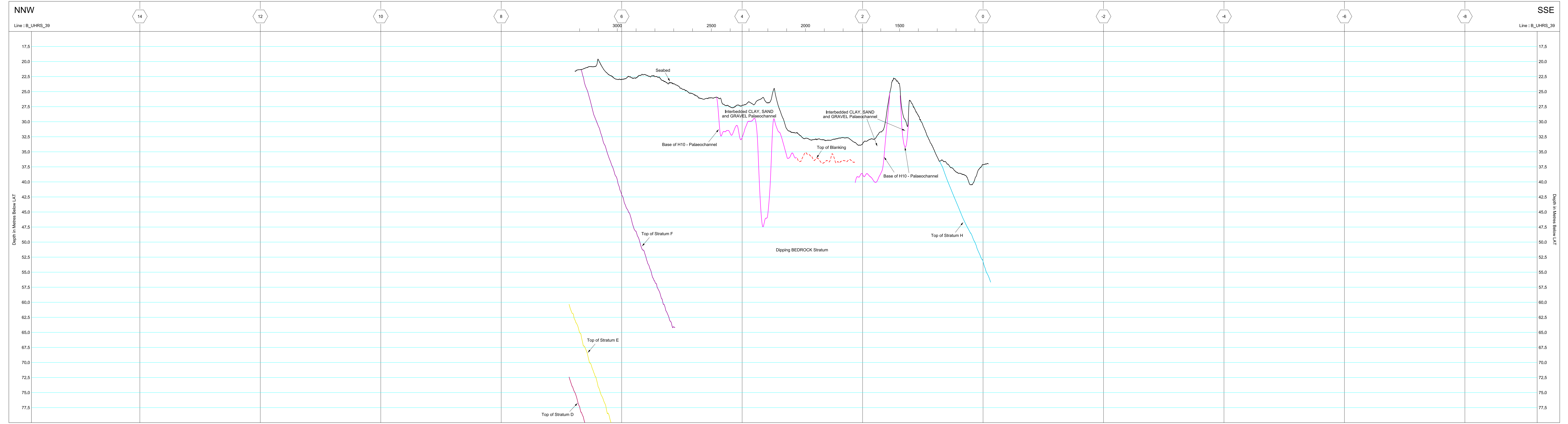
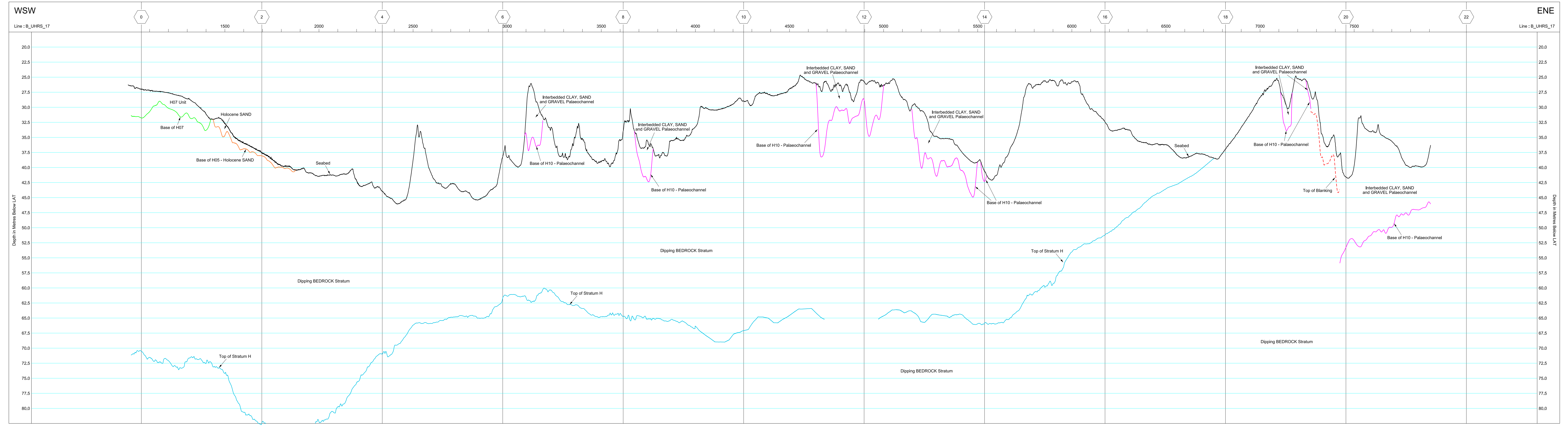
**GEOLOGICAL PROFILES - 2D UHRS
 (LINES B_UHRS_2 AND B_UHRS_10)
 CHART 13**

REVISION

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

CLIENT REFERENCE

REPORT REFERENCE: 11521.3 DRAWING NUMBER: 11521.3.13

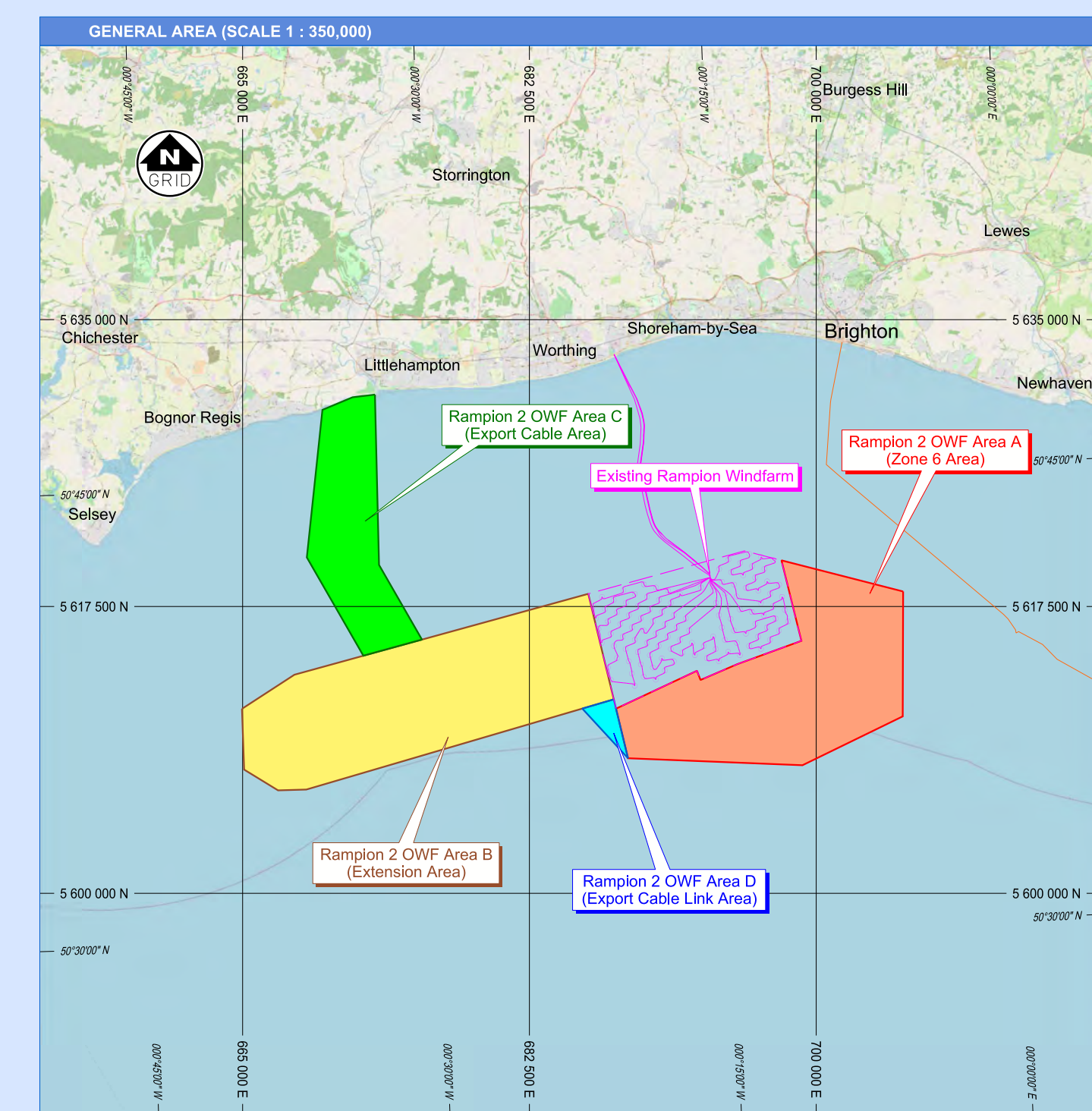


LEGEND

- SEABED
- BASE OF H05 - HOLOCENE SAND
- BASE OF H07 - UNIT 7
- BASE OF H10 - PALAEOCHANNEL
- TOP OF BLANKING
- TOP OF STRATUM D
- TOP OF STRATUM E
- TOP OF STRATUM F
- TOP OF STRATUM H

NOTES

1. ASSUMED SEISMIC VELOCITY = 1700ms
2. VERTICAL SCALE = 1 : 200
3. VERTICAL EXAGGERATION = 100 : 1



GEODETIC REFERENCE SYSTEM

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

SURVEY INFORMATION

SURVEY VESSEL: M.V. WOLANT	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 DGNS	SONAR/RYNE RANGER USBL	FLUGRO STAFFIX DGNS
NAVIGATION SYSTEM: ECHO SOUNDER (SINGLE-BEAM SYSTEM)	SONAR/RYNE RANGER USBL	SONAR/RYNE RANGER USBL
ECHO SOUNDER (SINGLE-BEAM SYSTEM): VOYAGER 5	SONAR/RYNE RANGER USBL	SONAR/RYNE RANGER USBL
SIDE SCAN SONAR: SIMRAD EK600	RECON TOP DUAL HEAD	RECON TOP DUAL HEAD
MAGNETOMETER: SIMRAD EK400	DOOM ECHOTRAC MP18	DOOM ECHOTRAC MP18
SUBBOTTOM PROFILER: EDGETECH 400FS	EDGETECH 400FS	EDGETECH 400FS
ULTRA-HIGH RESOLUTION SEISMIC (UHRS): GEOMETRICS GMR2	GEOMETRICS GMR2	GEOMETRICS GMR2
	SURFACE TOW BOOMER	75m TELETYPE STREAMER

SCALE (AS ORIGINAL)

1 : 25 000 (Horizontal)

TITLE

Gardline
 GARDLINE LIMITED
 ENDEAVOUR HOUSE, ADMIRALTY ROAD, GREAT YARMOUTH, NORFOLK, ENGLAND
 TELEPHONE: 144 (0) 1493 84600 FAX: 144 (0) 1493 85150 WEBSITE: WWW.GARDLINE.COM

CLIENT

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PROJECT TITLE

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

DRAWING TITLE

**GEOLOGICAL PROFILES - 2D UHRS
 (LINES B_UHRS_17 AND B_UHRS_39)
 CHART 14**

REV.	DATE	TITLE	DESCRIPTION	AUTHOR	DRAWN	CHECKED	APPROVED
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CLIENT REFERENCE REPORT REFERENCE 11521.3 DRAWING NUMBER 11521.3.14



Survey Report for
RWE Renewables UK Ltd

Project:
**Rampion 2 Offshore Windfarm
Development**

Description:
Area C Geophysical Survey

Survey Date:
March to May 2020

Project Number:
11521.4

Report Status:
Draft



REPORT AUTHORISATION AND DISTRIBUTION

Compilation	Geophysics	C Buckmaster / C Thacker / M Naulls
	Surveying	T Stynes
Authorisation	Checked	M Kingston
	Approved	D I Gordon

Revision	Date	Title	Description
0	03-Nov-2020	Draft	Draft Report PDF only

Distribution

1 copy

RWE Renewables UK Ltd
Greenwood House
Westwood Way
Westwood Business Park
Coventry
CV4 8TT

For attention of
Naren Mistry

SURVEY OVERVIEW

Gardline Limited was contracted by RWE Renewables UK Ltd to acquire shallow geophysical and UHRS data across areas being considered for development at the Rampion 2 Offshore Windfarm and associated export cable route corridor.

The offshore portion of the survey was undertaken predominantly by M.V. Vigilant, mobilising in Hull on 30-Jun-2020 and demobilising in Hull on 19-Aug-2020 after completion of the shallow geophysical data acquisition. The M.V. Ocean Observer carried out the UHRS portion of the survey including acquiring SBP and magnetometer data infilling the planned gaps in the geophysical survey including all crosslines. It mobilised in Lowestoft on 21-Sept-2020 and demobilised in Great Yarmouth on 13-Oct-2020. The M.V. Titan Discovery and Titan owned Unmanned Aerial Vehicle carried out the nearshore acquisition, mobilising on 01-Jul-2020 and demobilising 12-Aug-2020.

Report volumes are as follows:

Report	Report No.
Operations Report	11521.1
Rampion 2 OWF Area A Survey Report	11521.2
Rampion 2 OWF Area B Survey Report	11521.3
Rampion 2 OWF Area C Survey Report	11521.4

This report is the Rampion 2 OWF Area C survey report.

USE OF THIS REPORT

This report has been prepared with due care and diligence and with the skill reasonably expected of a reputable contractor experienced in the types of work carried out under the contract and as such the findings in this report are based on an interpretation of data which is a matter of opinion on which professionals may differ and unless clearly stated is not a recommendation of any course of action.

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GARDLINE LIMITED

Endeavour House, Admiralty Road, Great Yarmouth, Norfolk, NR30 3NG, England
Telephone +44 (0) 1493 845600 Fax +44 (0) 1493 852106

www.gardline.com