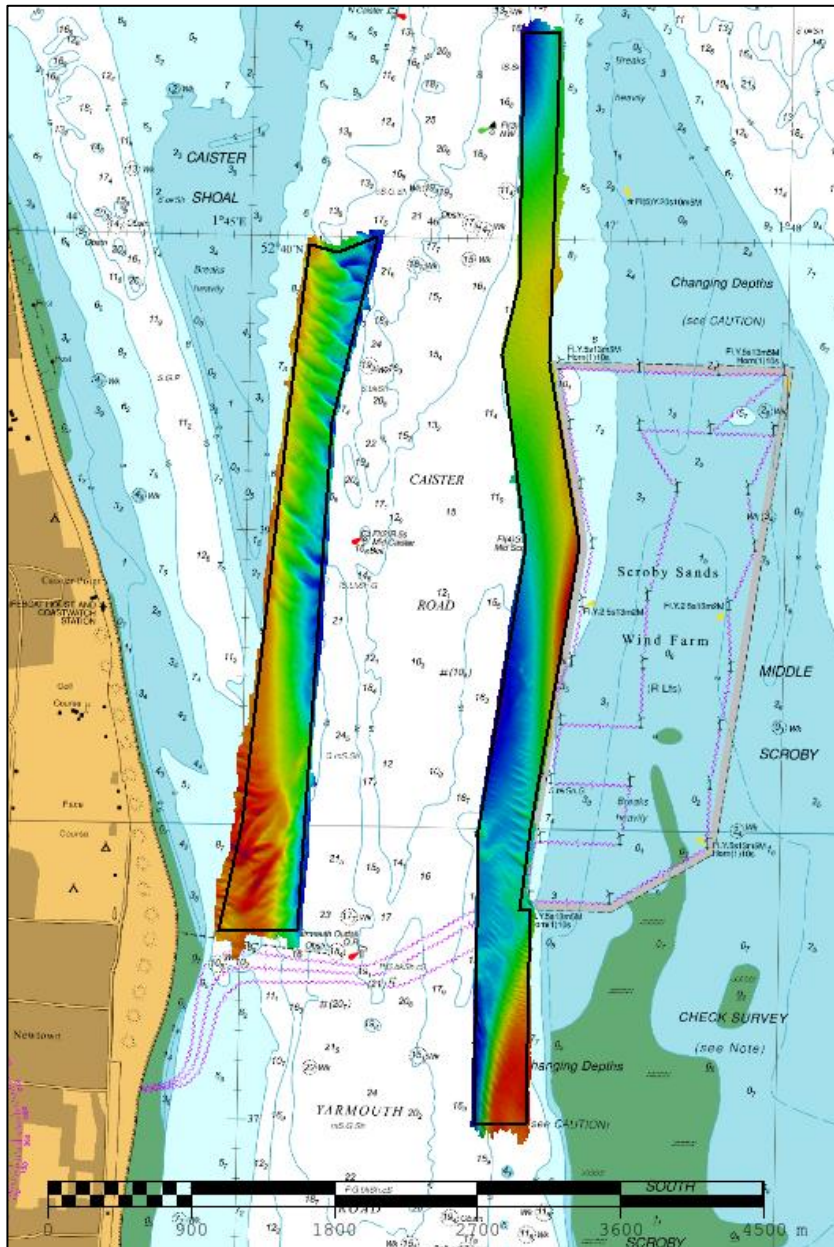




UK Hydrographic
Office

EAST ANGLIA CAISTER ROAD FOCUSED (EA4A & EA4B) 2023 ASSESSMENT

An assessment of the 2023 hydrographic survey of the area Caister Road Focused (EA4A and EA4B): to monitor recent seabed movement; to identify any implications for shipping; and to make recommendations for future surveys.



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Notes

This Assessment is produced by the UK Hydrographic Office (UKHO) for the Maritime and Coastguard Agency (MCA). Analysis of the Routine Resurvey Areas forms part of the Civil Hydrography Programme and the reports are made available through the UKHO website and are presented to the Civil Hydrography Working Group. When approved, the recommendations are incorporated into the Routine Resurvey Programme. The report is governed by a Memorandum of Understanding between the DfT (including the MCA) and the MOD (including the UKHO).

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No analysis of shipping traffic has been included within this report due to no AIS data being supplied by MCA.

All depths are to Chart Datum, defined using the UKHO Vertical Offshore Reference Frame (VORF) Model.

EA4A & EA4B CAISTER ROAD (FOCUSED), 2023

1. SUMMARY

Changes Detected

- 1.1 EA4A has seen some sandwave movement such as westward migration in the middle section of this area, but depths have mostly remained stable.
- 1.2 EA4B has seen the most change since 2020 with shoaling and seabed movement in the northern and southern parts of the area, and the 10m contour moving westward by over 200m. In the middle part of EA4B the 5m contour has also shifted westward.

Reasons for Continuing to Resurvey the Area

- 1.3 Depths in the area remain changeable and potentially hazardous to deep draught vessels navigating the area.

Recommendations

- 1.4 It is recommended to adjust the survey limits of EA4A (Focused) westwards to pick up the 5m and 10m contours adjacent to Caister Shoal.
- 1.5 It is recommended to adjust the northern and southern sections of EA4B (Focused) to follow the westward movement of Scroby Sands and monitor its impact upon Caister Road.
- 1.6 It is recommended to cut back the northwest section of the EA4 (Full) limits so that this section is subsequently only covered by the EA3 limits. Also to adjust the western edge of EA4 to match the proposed new limits of EA4A.

2. LOCATION

- 2.1 Survey interval at time of resurvey: 3 years (focused). It also has a full survey interval of 12 years.
- 2.2 Area Covered: 4.19 km²

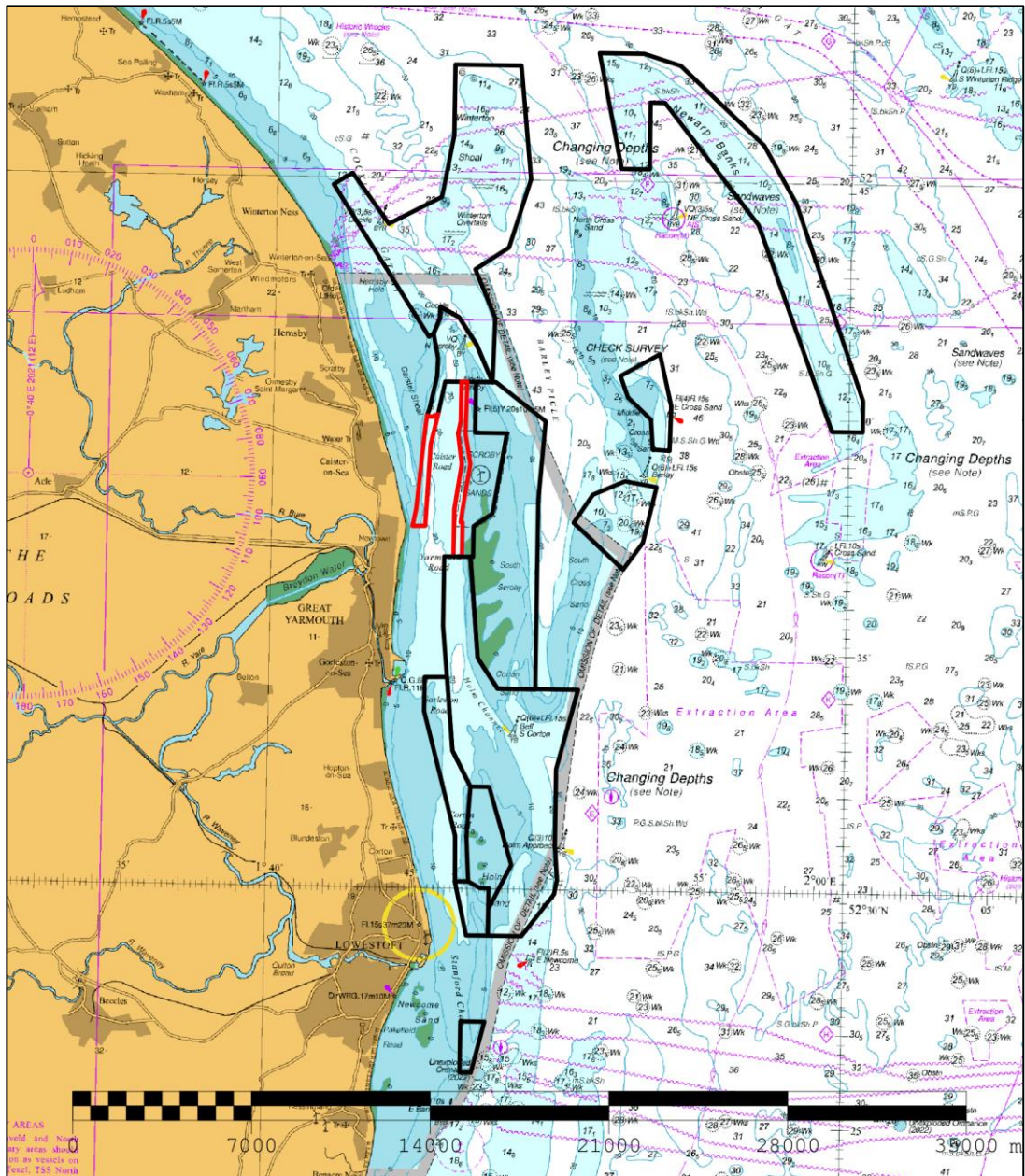


Figure 1: 2023 East Anglia Routine Resurvey areas overlaid on BA Chart 1543 with areas EA4A and EA4B in red

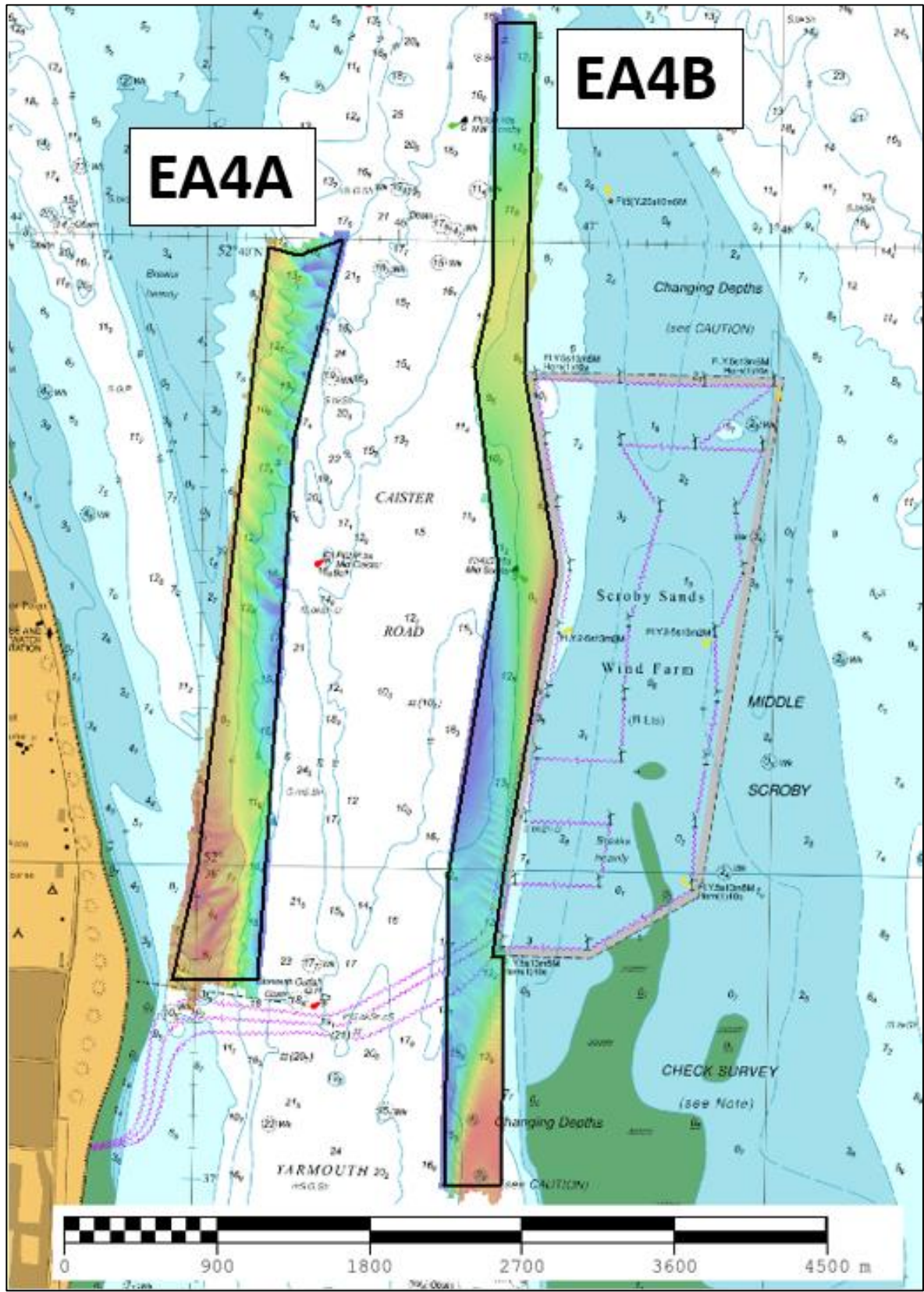


Figure 2: EA4A and EA4B 2023 survey data overlaid on BA Chart 1534

3. REFERENCE SURVEY DETAIL

- 3.1 As part of the Routine Resurvey (Civil Hydrography Programme) the previous focused survey in EA4A and EA4B was HI1685, conducted in June 2020. The previous full EA4 survey was HI1545, conducted in July and September to November 2017.
- 3.2 The Report of Survey for this survey is available upon request from the UKHO and the validated bathymetric surfaces are available to download from the Admiralty Marine Data Portal.

4. NEW SURVEY DETAIL

- 4.1 The current survey was part of HI1824 EA4A and EA4B Caister Road Focused, surveyed between September and October 2023.
- 4.2 The Report of Survey for this survey is available upon request from the UKHO and the validated bathymetric surfaces are available to download from the Admiralty Marine Data Portal.

5. DESCRIPTION OF RECENT BATHYMETRIC CHANGE

EA4A

- 5.1 In Area EA4A Figure 3 shows that the controlling depth from the 2023 survey is 5.3m, located in the south of the area. This has shoaled slightly by 0.4m since 2020.
- 5.2 Figure 5 shows that for the most of EA4A the 10m contour has not significantly changed between 2023, 2020 and 2017, except in the middle where it has moved westward by up to 75m. Due to this movement Figure 3 shows that the least depth in the middle part of EA4A is now 8.1m (2.9m deeper than in the 2020 survey).
- 5.3 The Difference Plot in Figure 4 shows some shoaling and deepening in different parts of EA4A due to some shifting sands since 2020. However, general depths have remained stable, as supported by the contour in Figure 5.

EA4B

- 5.4 In Area EA4B the most significant change between the 2020 and 2023 surveys has been shoaling in the south of the area (see Figure 4). This is due to the western edge of South Scroby Sands migrating westward (see Figure 5, where the 10m contour has moved by over 200 metres from the charted contour). Figure 3 also shows that the controlling depth is now 4.4m (8m shoaler than in 2020) due to this movement. This is unlike the previous comparison between the 2017 and 2020 surveys, where the seabed largely remained stable.
- 5.5 Figures 3, 4 and 5 also show shoaling and contour movement in the northern part of EA4B, again due to the westward movement of Scroby Sands, north of the wind farm.
- 5.6 In the middle part of EA4B (to the west of the wind farm) the 5m contour is now extending outside the windfarm to the southeast of Mid Scroby buoy. The least depth surveyed in 2023 is about 160m west of the charted 5m contour. Figure 3 shows the shoalest depth in 2023 in this vicinity is 3.3m, which is 2.4m shoaler than in 2020.

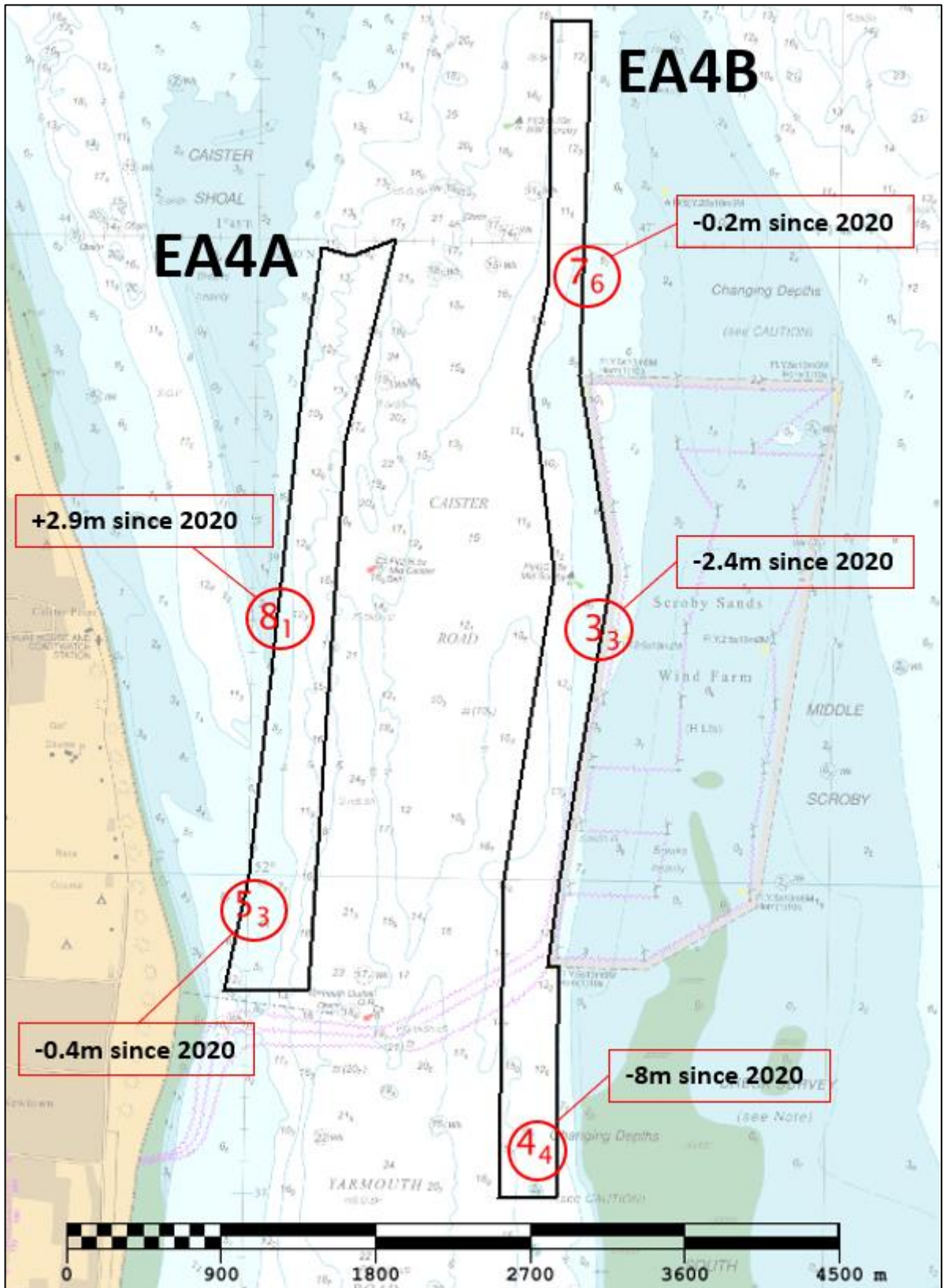


Figure 3: Controlling and significant depth soundings highlighted, overlaid on BA Chart 1534
 Positive (+) represents deepening. Negative (-) represents shoaling.

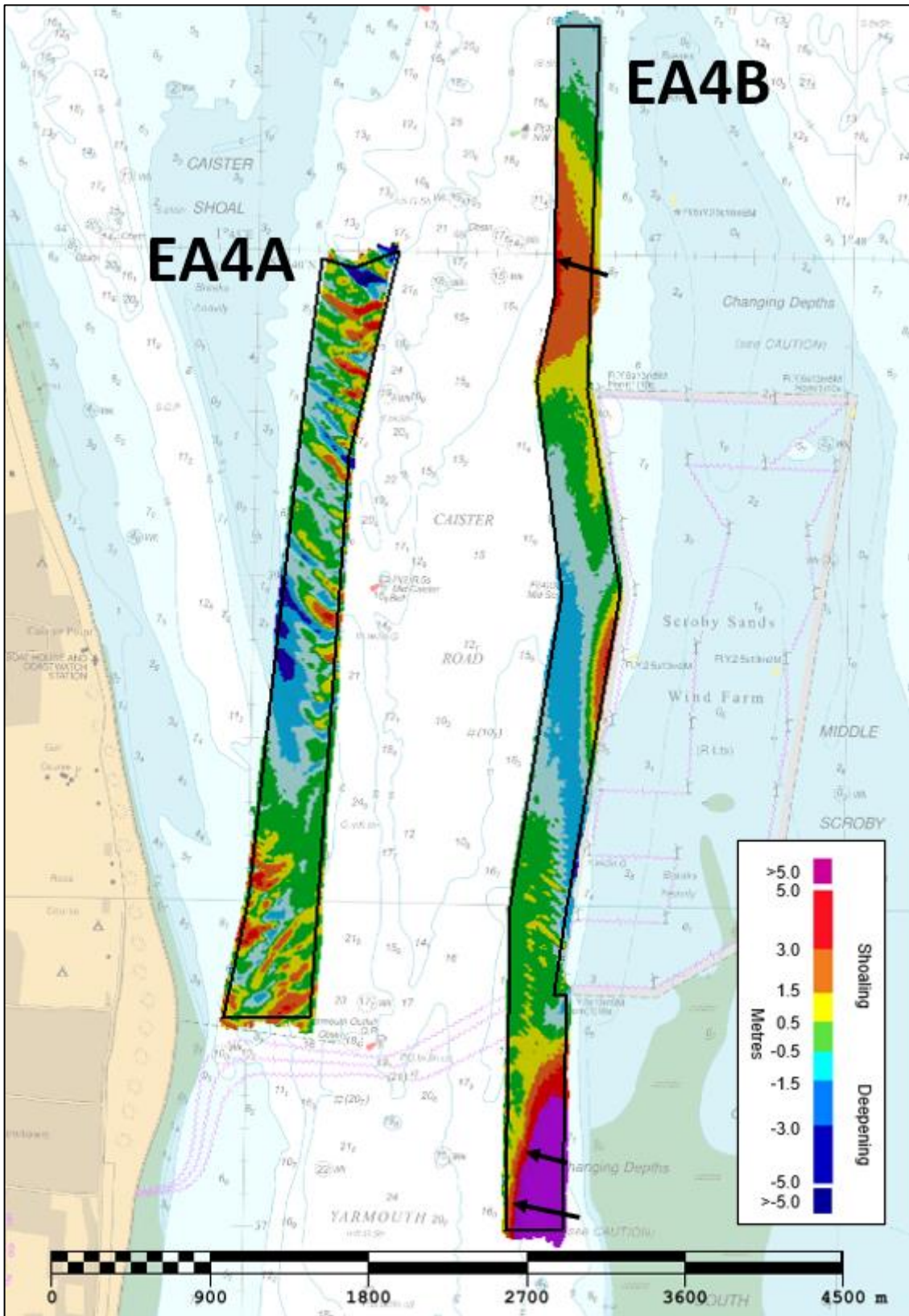


Figure 4: Difference surface showing bathymetric changes between the 2023 and 2020 surveys overlaid on BA Chart 1534. Black arrows represent sandwave migration since 2020.

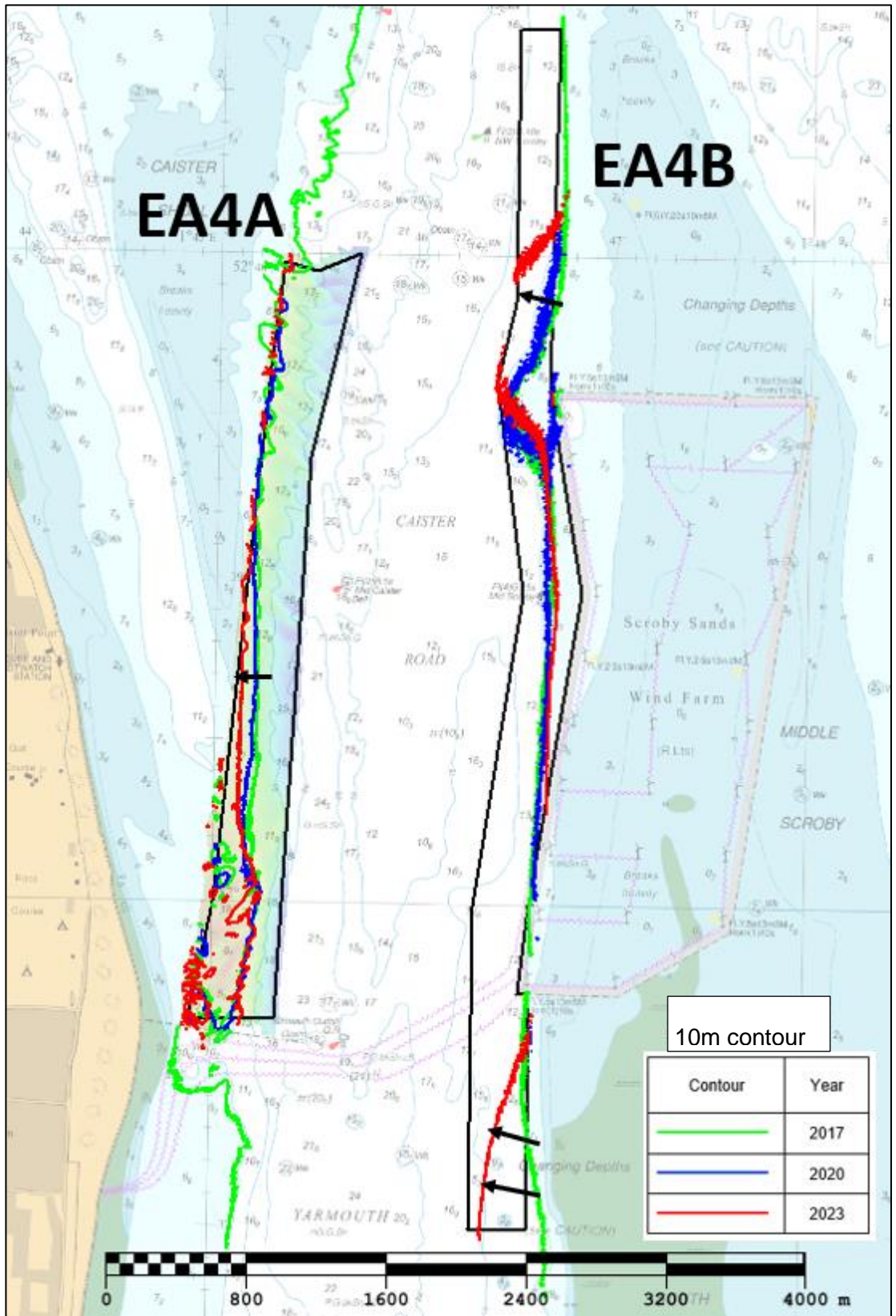


Figure 5: Contour plot showing changes in the 10m contours between 2023 (red), 2020 (blue and 2027 (green). Black arrows represent direction of seabed migration.

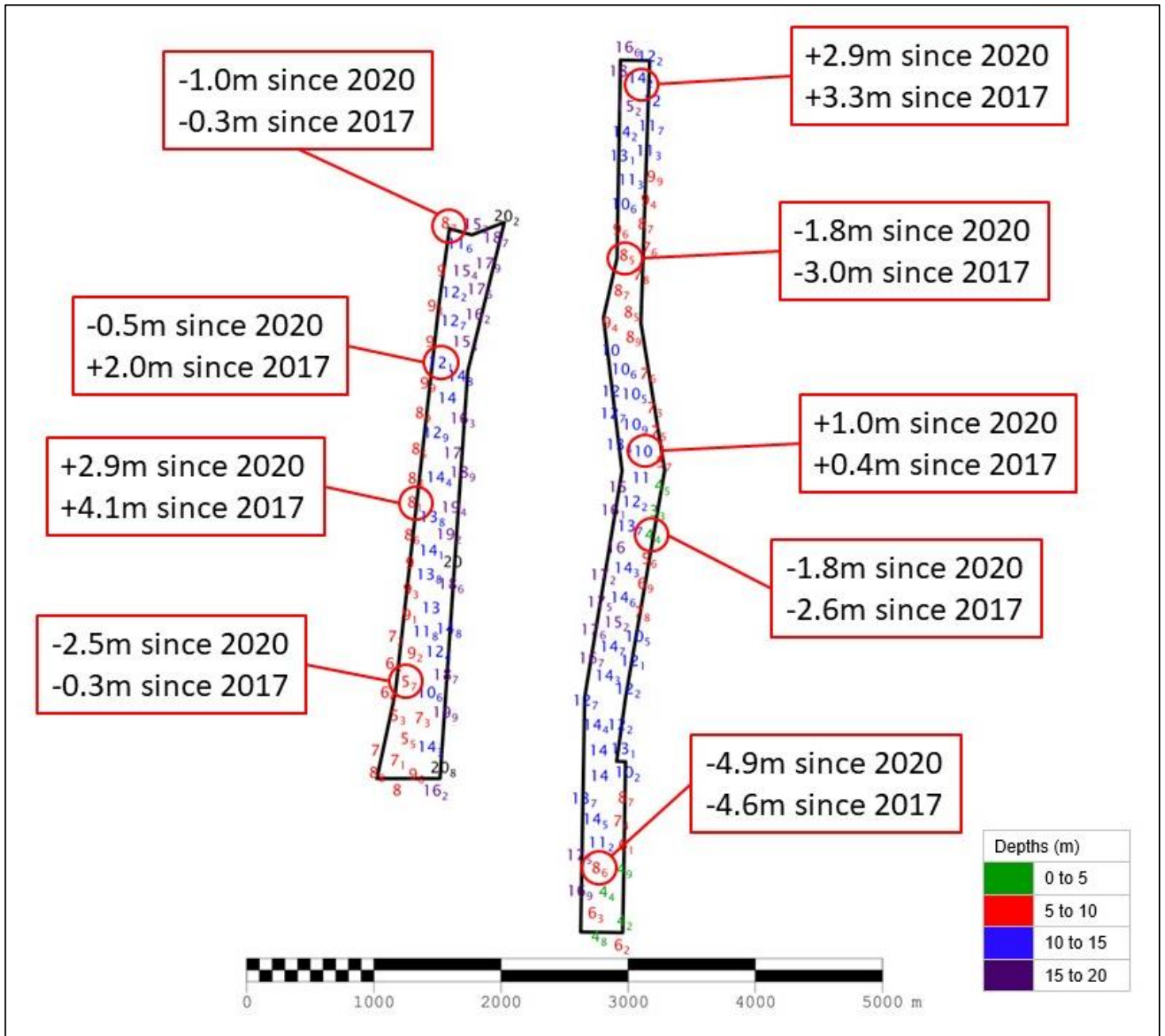


Figure 6: Colour-Banded Depth Plot from 2023 survey

6. RECOMMENDATIONS FOR FUTURE SURVEYS

Survey Interval

- 6.1 The 3-year focused areas and 12-year full area should remain as the seabed remains mobile, which could potentially have an impact on shipping in this area.

Survey Area

- 6.2 **EA4A (Focused)** – It is recommended to adjust the survey limits of EA4A westwards to pick up the 5m and 10m contours adjacent to Caister Shoal.

- 6.3 **EA4B (Focused)** – It is recommended to adjust the northern and southern sections of EA4B to follow the westward movement of Scroby Sands and monitor its impact upon Caister Road. Extending the northern section into the channel would allow the 10m contour to be surveyed in 3 years' time - If the current trend continues it will likely encroach the buoy line.
- 6.4 **EA4 (Full)** – Currently the limits of both EA4 Full and EA3 Full overlap in the northwest section of EA4 Full (just south of N Caister buoy). It is therefore recommended that the northwest section of EA4 Full is cut back so that this section will only be covered by EA3. It is also recommended to adjust the western edge of EA4 so it lines up with the proposed new western and northern limits of EA4A. See Figures 7 and 8 for more detail.
- 6.5 Revised limits of the recommended adjusted survey area are shown in Figure 7 and coordinates are listed in Tables 1-3 below:

Revised EA4A Focused Area: 2.08 km²

Revised EA4B Focused Area: 2.30 km²

Revised EA4 Full Area: 13.72 km²

Table 1: Revised limits for area EA4A (Focused)

| | Latitude | Longitude |
|---|------------|-------------|
| 1 | 52.627340N | 001.755360E |
| 2 | 52.627263N | 001.748026E |
| 3 | 52.633347N | 001.749998E |
| 4 | 52.666622N | 001.749848E |
| 5 | 52.665759N | 001.757957E |
| 6 | 52.656150N | 001.757763E |

Table 2: Revised limits for area EA4B (Focused)

| | Latitude | Longitude |
|----|------------|-------------|
| 1 | 52.633260N | 001.772005E |
| 2 | 52.649300N | 001.775900E |
| 3 | 52.658221N | 001.773864E |
| 4 | 52.661455N | 001.769953E |
| 5 | 52.672458N | 001.774900E |
| 6 | 52.678330N | 001.774900E |
| 7 | 52.678330N | 001.778300E |
| 8 | 52.659764N | 001.777800E |
| 9 | 52.649397N | 001.780855E |
| 10 | 52.633326N | 001.776768E |
| 11 | 52.628770N | 001.775839E |
| 12 | 52.628750N | 001.776884E |
| 13 | 52.624823N | 001.776885E |
| 14 | 52.616670N | 001.776885E |
| 15 | 52.616670N | 001.770240E |
| 16 | 52.624792N | 001.772003E |

Table 3: Revised limits for area EA4 (Full)

| | Latitude | Longitude |
|----|------------|-------------|
| 1 | 52.678330N | 001.783330E |
| 2 | 52.660400N | 001.786455E |
| 3 | 52.660430N | 001.778300E |
| 4 | 52.649300N | 001.780675E |
| 5 | 52.628611N | 001.775932E |
| 6 | 52.628311N | 001.783330E |
| 7 | 52.616670N | 001.783330E |
| 8 | 52.616670N | 001.744170E |
| 9 | 52.633330N | 001.750000E |
| 10 | 52.666622N | 001.749848E |
| 11 | 52.665759N | 001.757957E |
| 12 | 52.666665N | 001.761655E |
| 13 | 52.678252N | 001.765522E |

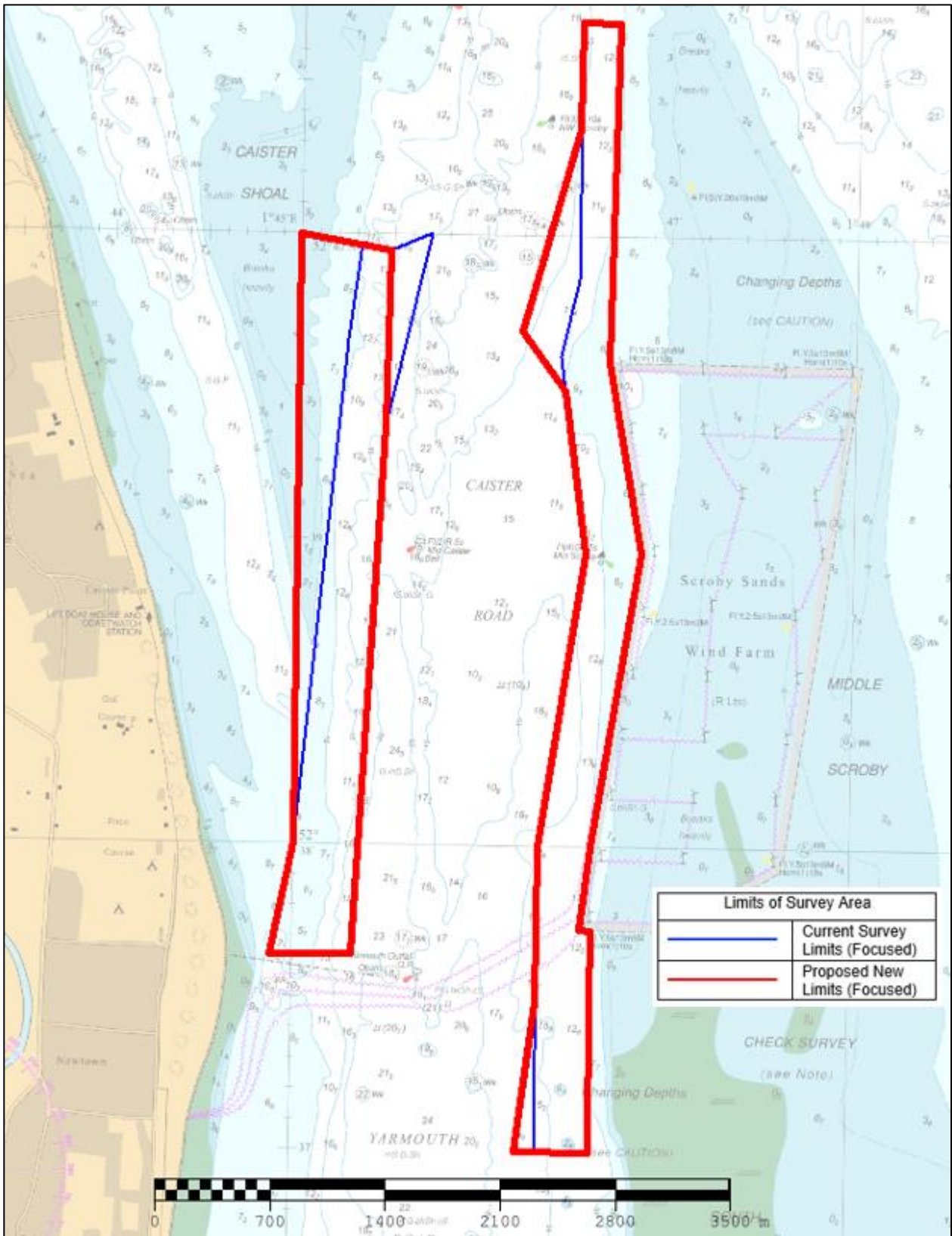


Figure 7: Recommended changes to survey limits of areas EA4A and EA4B (Focused)

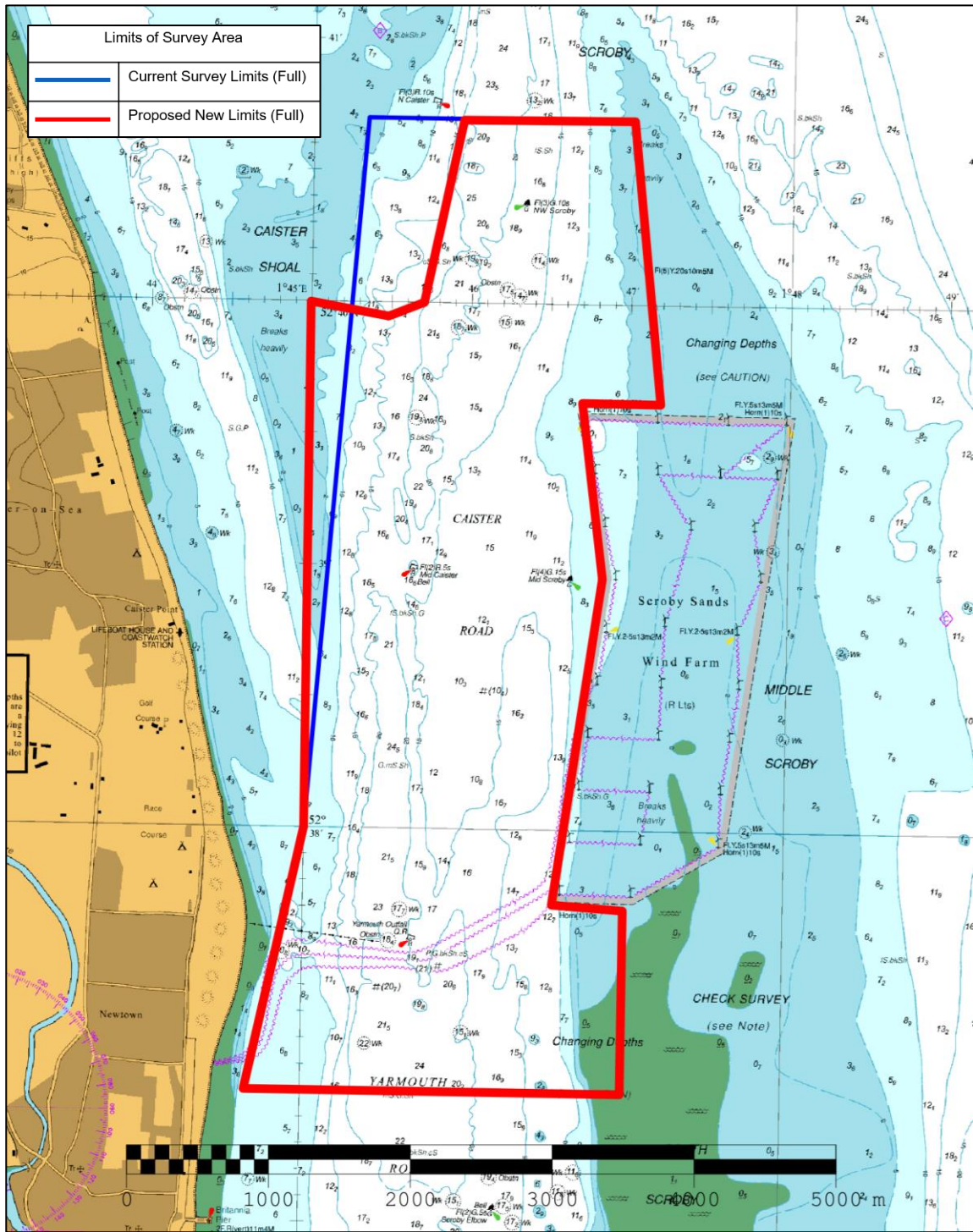


Figure 8: Recommended changes to survey limits of area EA4 (Full)