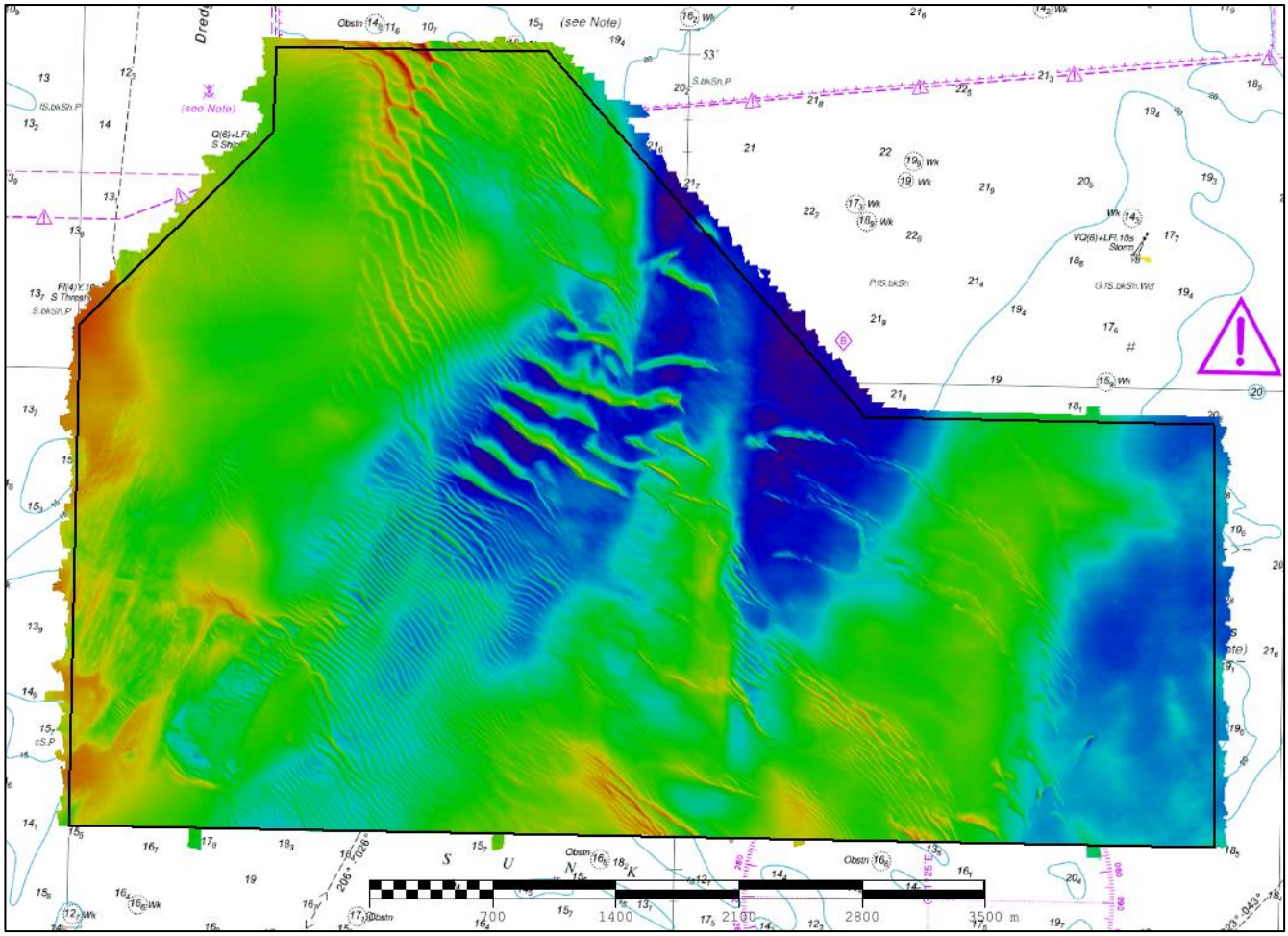
UK Hydrographic Office

THAMES ESTUARY
SUNK FULL (TE3A)
2025 ASSESSMENT

An assessment of the 2025 hydrographic survey of the area TE3A: 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).

The Admiralty Chart extracts, other graphics and tables in this Report are included for illustrative purposes only and are NOT TO BE USED FOR NAVIGATION.

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

TE3A SUNK FULL, 2025

1. SUMMARY

Changes Detected

1.1 The controlling depth for the Harwich Deep Water Route (DWR) in the TE3A area is 15.8m, 0.3m deeper than 2024. The controlling depth for the Sunk DWR is 16.5m, 0.1m deeper than the 2022 controlling depth.

1.2 Sand wave migration is prominent and as in previous years is the primary cause of bathymetric change. Observed sand wave movement varied between 10-20m since 2024, and between 10-150m since 2022.

Reasons for Continuing to Resurvey the Area

1.3 Sand wave migration has continued from previous years, meaning depths in the area remain hazardous and changeable to deep draught vessel navigating the TE3A area. With sand waves converging into the Harwich DWR, and changing morphology around the Sunk DWR, continued monitoring is advised.

1.4 The Sunk DWRs navigational significance in relation to vessels with a deep draught transiting towards London warrants continued survey, see AIS data in Figure 7.

Recommendations

1.5 Sand waves continue to migrate in both southwest and northeast directions, converging on both Deep Water Routes. Due to the observed bathymetric variability and sand wave migration, the current annual focused survey and 3-year full survey intervals should be maintained.

2. LOCATION

2.1 Survey interval at time of resurvey: 3 years for Full survey area, 1 year for Focused survey area.

2.2 Area Covered: 22.75 km^2

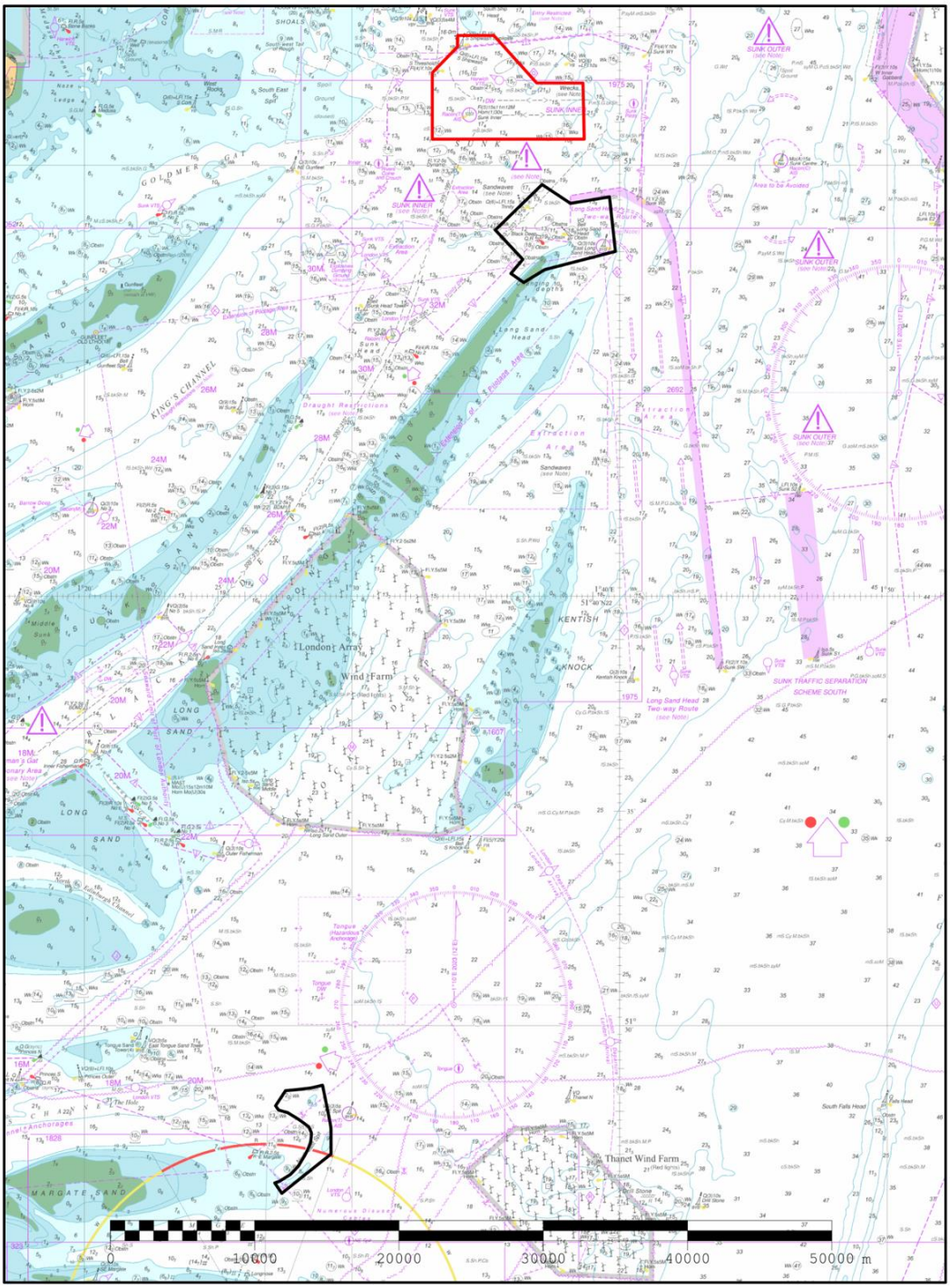

Figure 1: 2025 Thames Estuary Routine Resurvey areas overlaid on BA Chart 1183 with TE3A Sunk Full area in red.

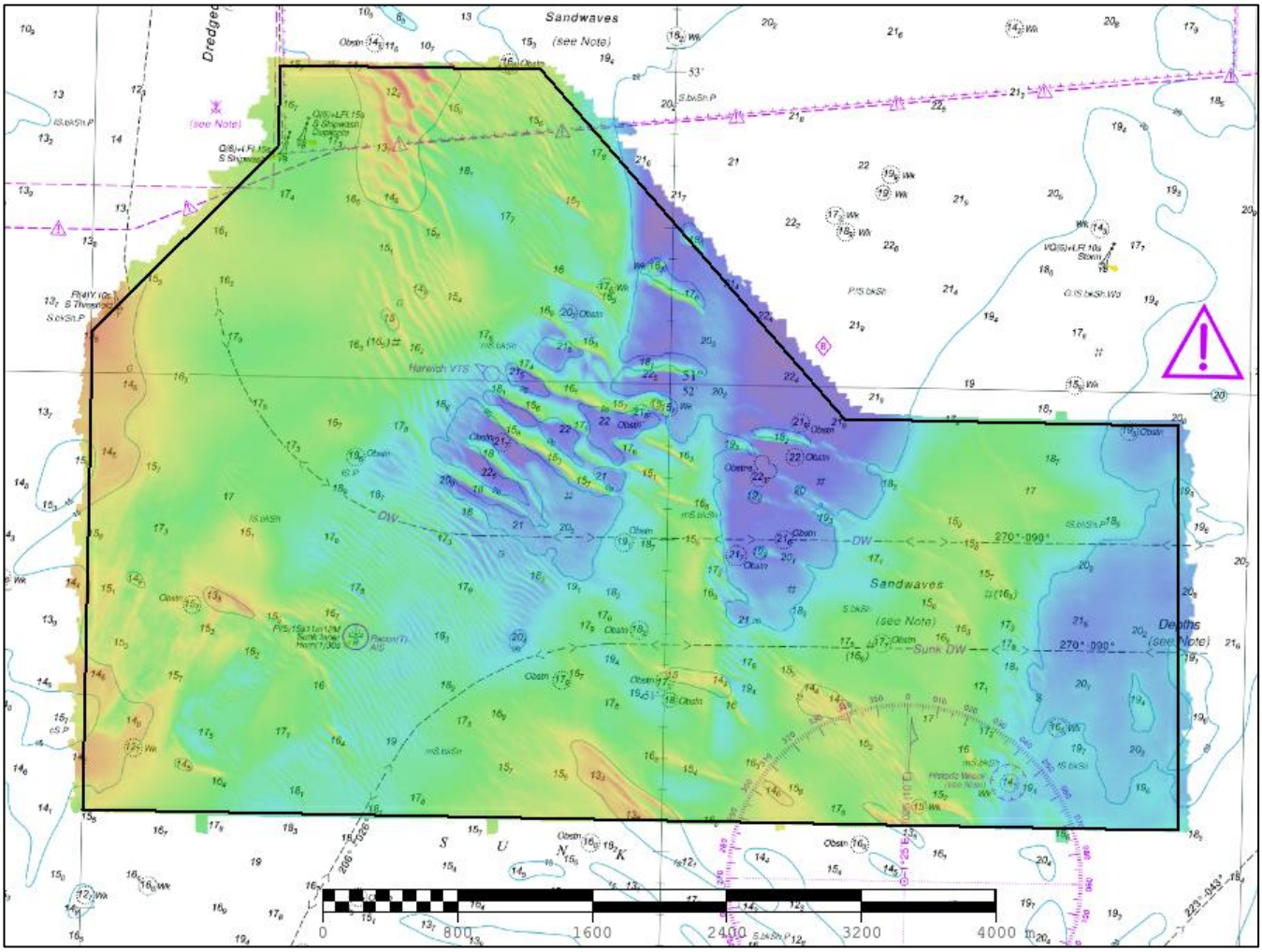

Figure 2: 2025 survey data overlaid on BA Chart 2692.

3. REFERENCE SURVEY DETAIL

3.1 The previous focused surveys HI1861 and HI1831 were conducted as part of the 2024 and 2023 Routine Resurvey Programme in July 2024 and August 2023 respectively. The latest full survey HI1763 was conducted in June 2022.

3.2 The Report of Survey for these surveys is available upon request, and the validated bathymetric surfaces are available to download from the Admiralty Marine Data Portal.

4. NEW SURVEY DETAIL

4.1 The latest survey is HI1896, surveyed in April 2025 as part of the 2025 Routine Resurvey Programme.

4.2 The Report of Survey for this survey is available upon request, and the validated bathymetric surface is available to download from the Admiralty Marine Data Portal.

5. DESCRIPTION OF RECENT BATHYMETRIC CHANGE

5.1 Figure 3 shows that the Harwich DWR controlling depth in the 2025 survey is 15.8 meters, which has deepened by 0.3m since the 2024 survey and shoaled by 0.4m since the 2022 survey. The Sunk DWR controlling depth in the 2025 survey is 16.5 meters, which has shoaled by 0.3m in place since the 2022 survey, but is 0.1m deeper than the controlling depth in 2022.

5.2 The difference surfaces in Figures 4a and 4b show prevalent sand wave migration, the main cause of changeable depths across the survey area. Figure 4a shows sandwaves shifting northeast towards the Harwich DWR while Figure 4b shows sandwaves shifting southwest towards to Harwich DWR. This contradiction implies general movement but not in a consistent direction. Movement is typically between 10-20m per year, although some sand waves show considerable movement up to 150m, particularly across the wider survey interval of the full TE3A area. This movement magnitude and direction is consistent with previous years.

5.3 Figures 4c-e show detailed profile comparisons between the 2025 and 2024 TE3A surveys, highlighting sand wave migration. Most sand waves generally maintain their height within 1m, although a smaller proportion of sand waves show more significant shallowing or deepening of their crests.

5.4 Figure 5 shows a contour plot tracking the movement of the 20m contour across the 2025 and 2022 surveys, highlighting movement in a southwest direction towards the Harwich DWR. Movement is typically between 5-10m.

5.5 Figure 6 shows a colour banded depth plot of the TE3A survey area, depicting bathymetric changes. The greatest changes were observed along the central and eastern regions of the survey area due to sand wave migration. Away from the sandwave areas, the majority of the TE3A area sees little to no depth change.

5.6 Consistent with previous years surveys at this location, the primary cause of bathymetric variation is sand wave migration. Since the previous focused survey in 2024 the largest change, as shown in Figure 6, is the shoaling of a sand wave within the Harwich DWR by 0.5m (from 21.5m in 2024). The most significant change, however, is the deepening of the Sunk DWR and Harwich DWR controlling depths, as covered in section 5.1 (Figure 3).

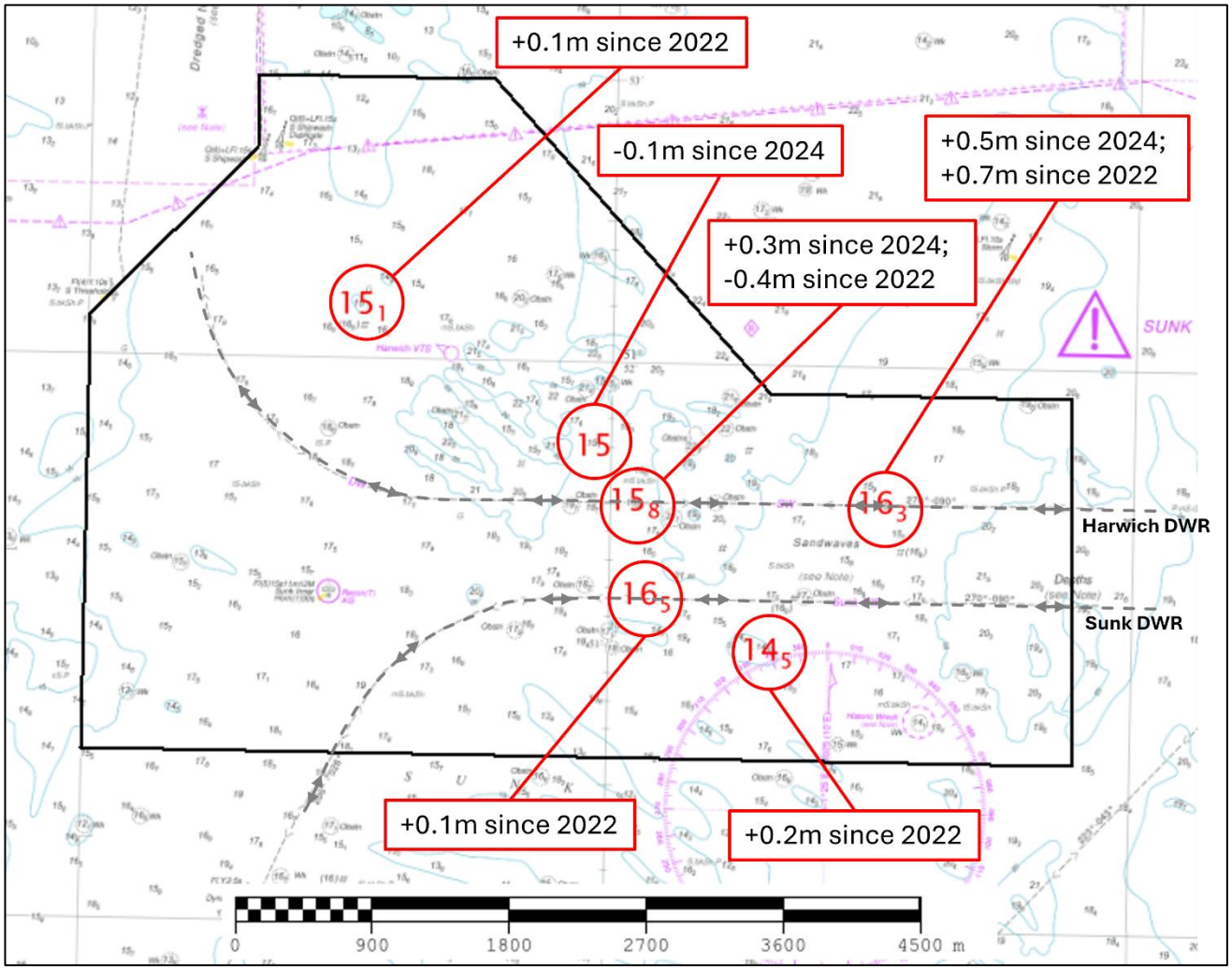

Figure 3: Controlling and Significant Depth soundings highlighted, overlaid on BA Chart 2692. (Positive values represent deepening; Negative values represent shoaling).

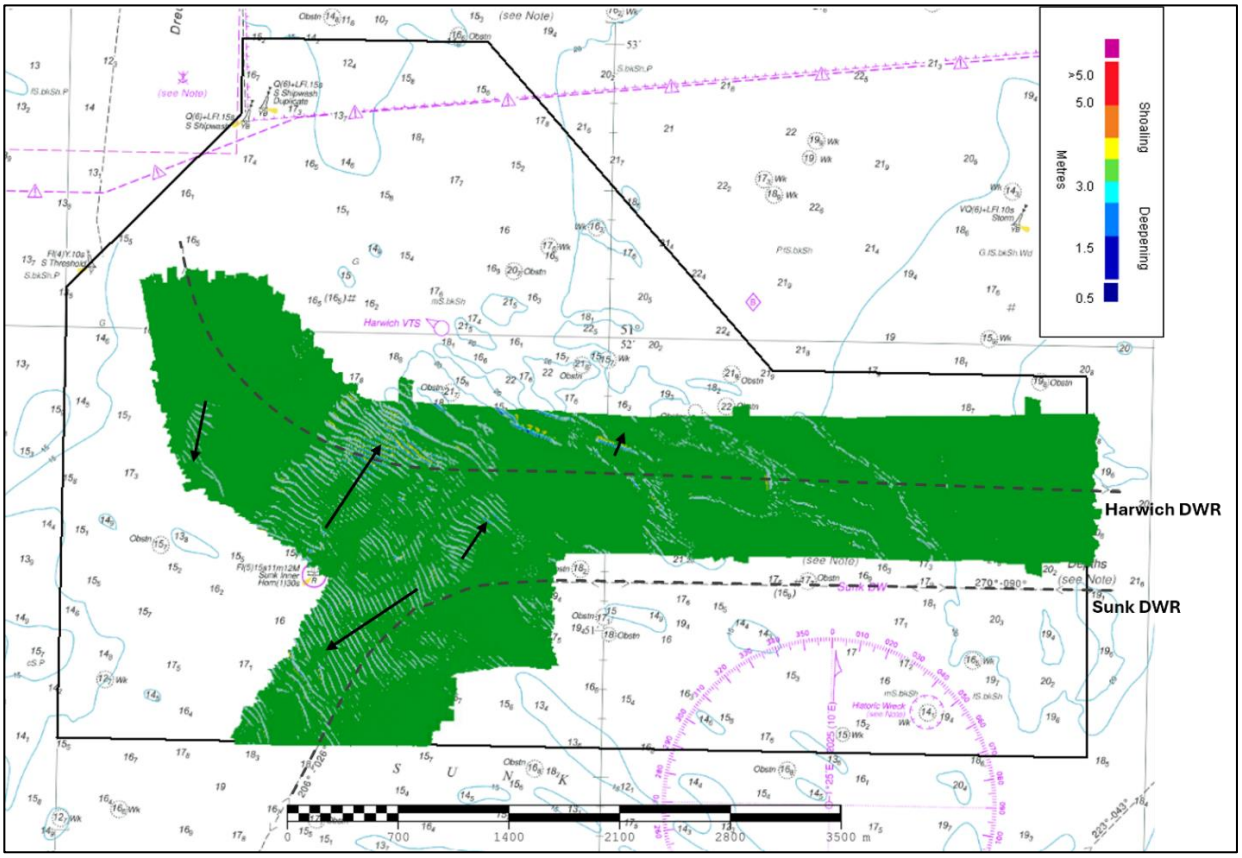

Figure 4a: Difference surface showing bathymetric changes between the 2025 and 2024 surveys overlaid on BA Chart 2692 (Black arrows represent sandwave migration since 2024 survey)

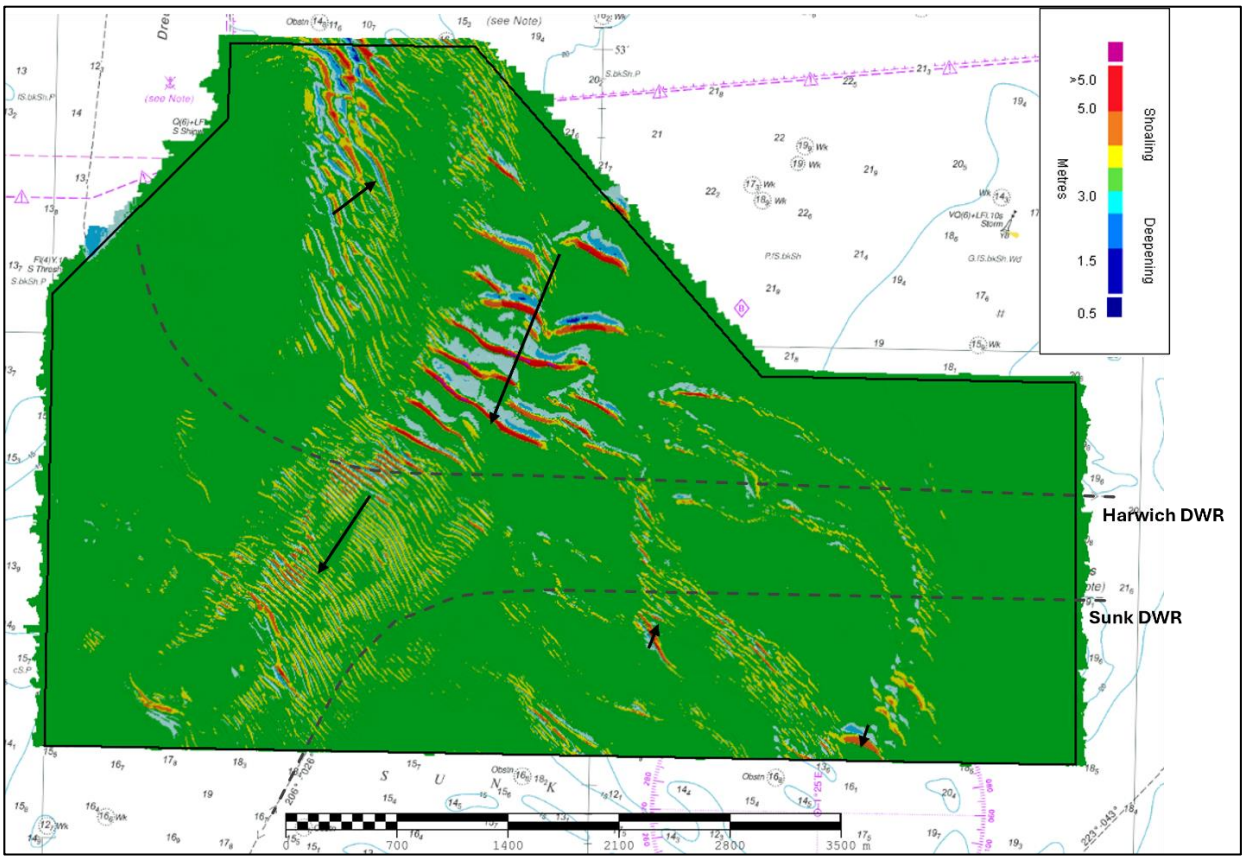

Figure 4b: Difference surface showing bathymetric changes between the 2025 and 2022 surveys overlaid on BA Chart 2692 (Black arrows represent sandwave migration since 2022 survey)

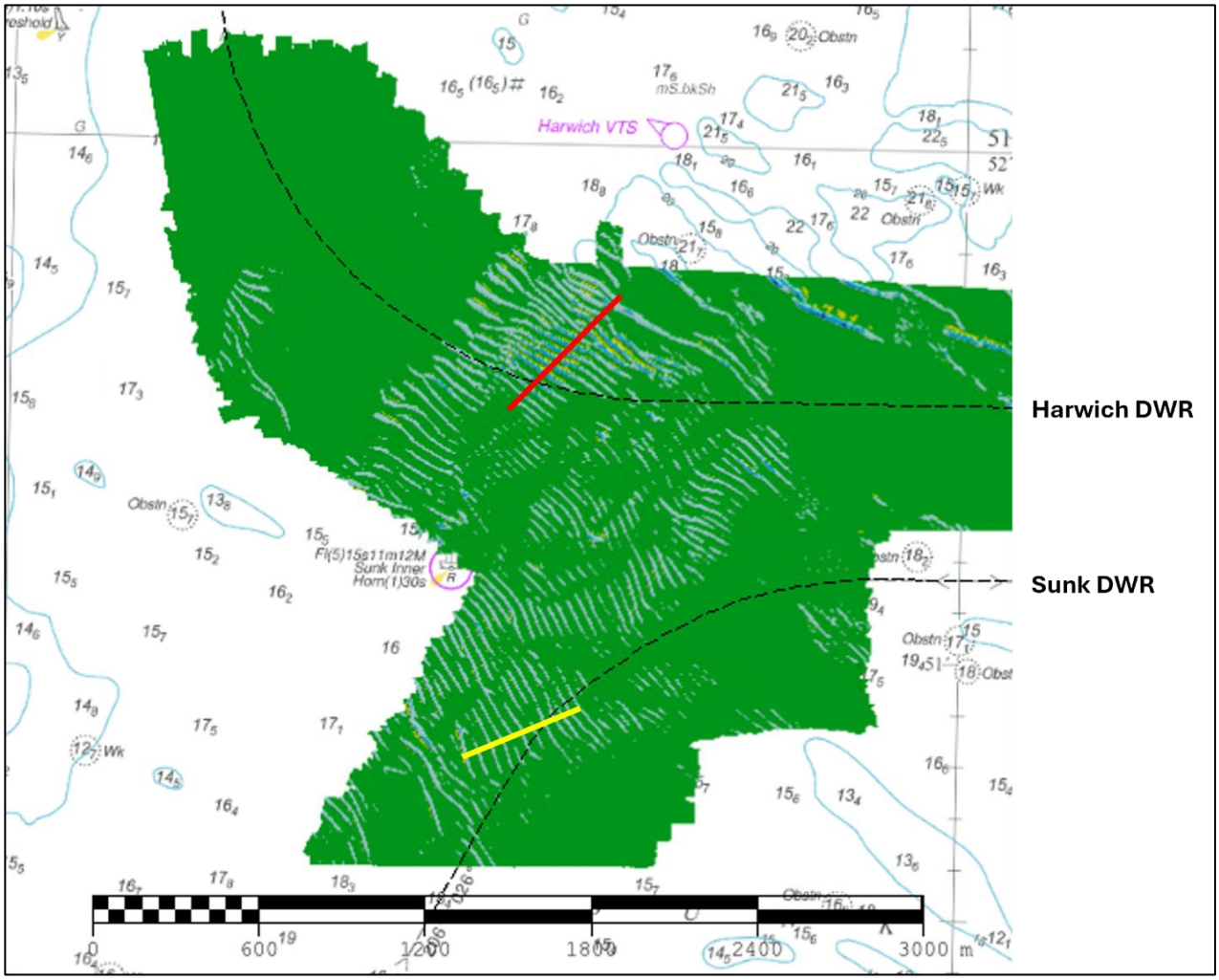

Figure 4c: Focused difference surface showing bathymetric changes between the 2025 and 2024 surveys overlaid on BA Chart 2692. Red and Yellow lines depict profile comparisons as in Figures 4d and 4e respectively.

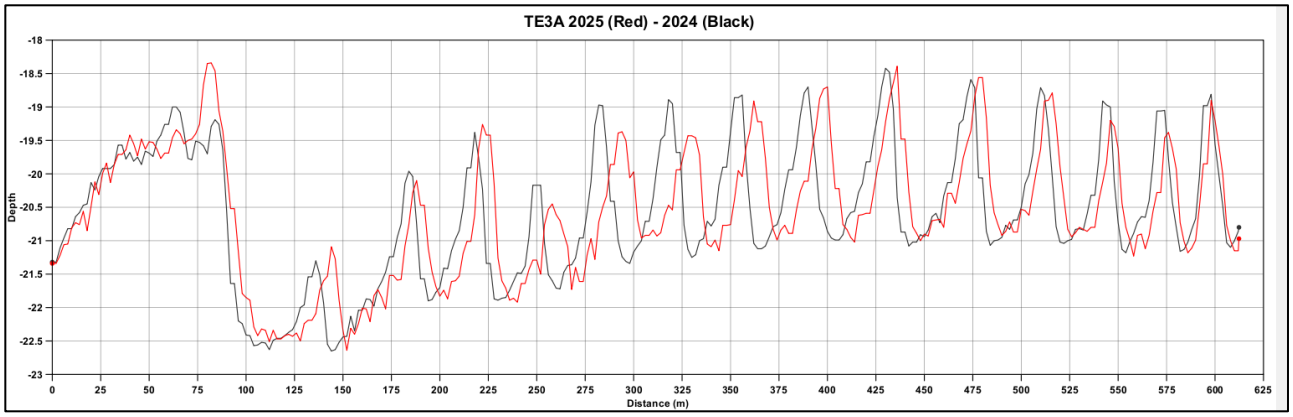

Figure 4d: Profile comparison between 2025 (Red) and 2024 (Black) surveys. Profile depicted by red line in Fig 4c.

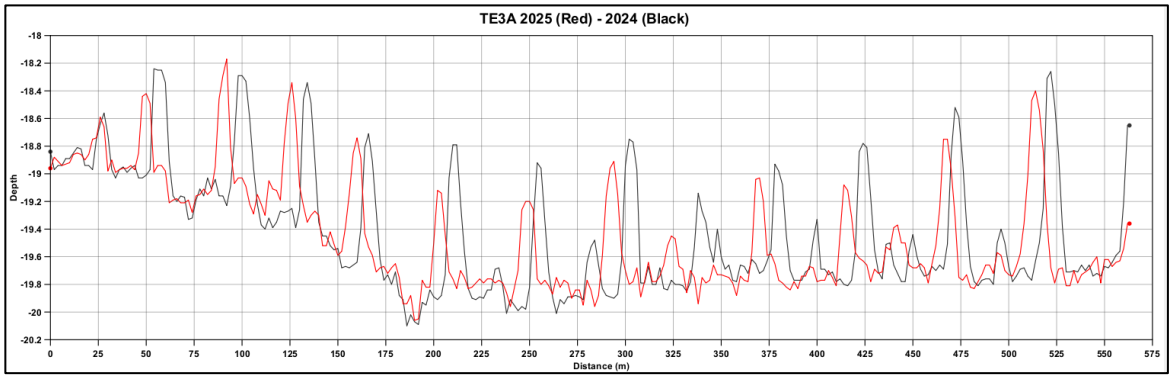

Figure 4e: Profile comparison between 2025 (Red) and 2024 (Black) surveys. Profile depicted by yellow line in Fig 4c.

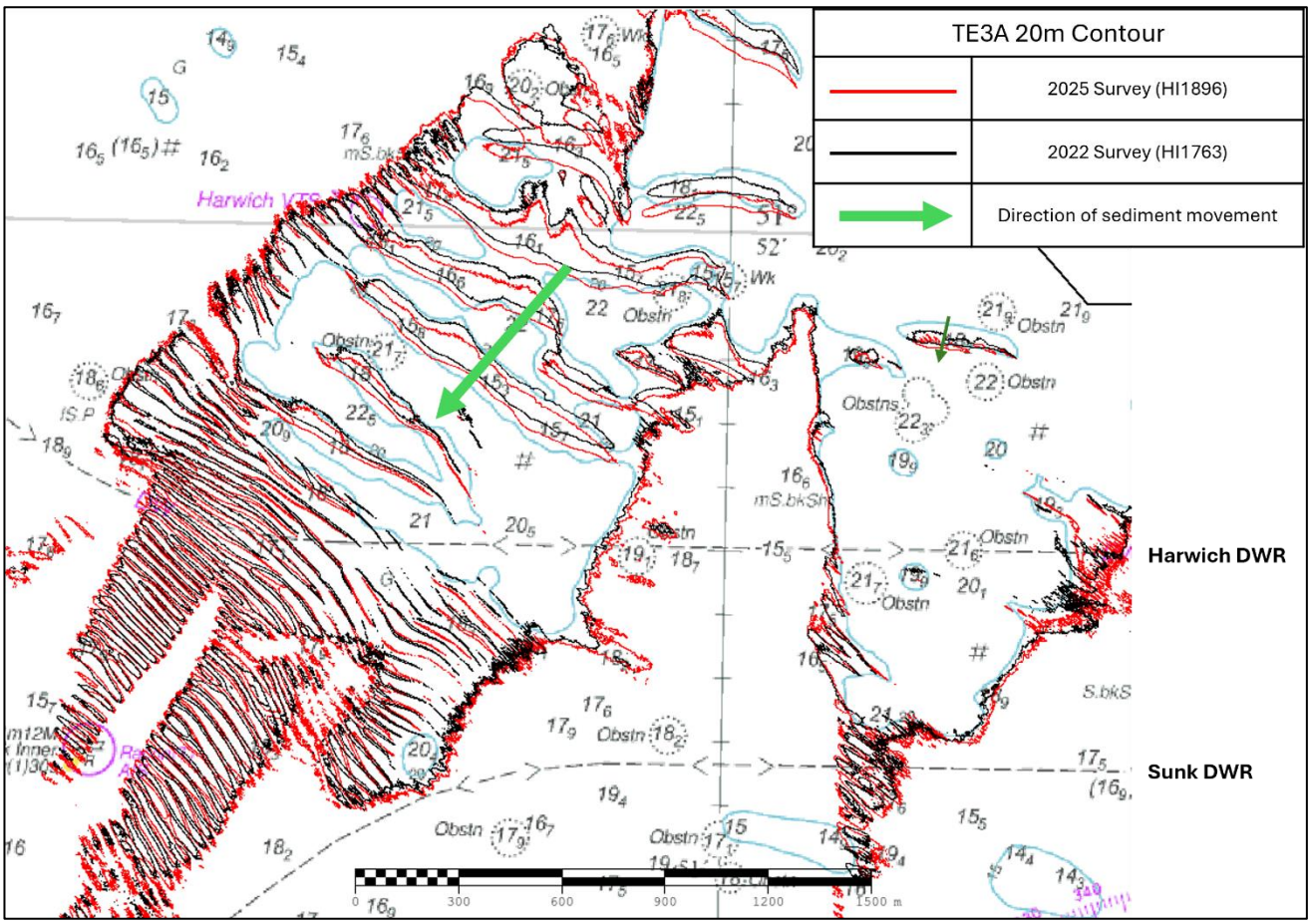

Figure 5: Focused Contour plot showing changes in the 20m contour between 2022 and 2025 surveys overlaid on BA Chart 2692. (Green arrow represents feature migration since 2022 survey).

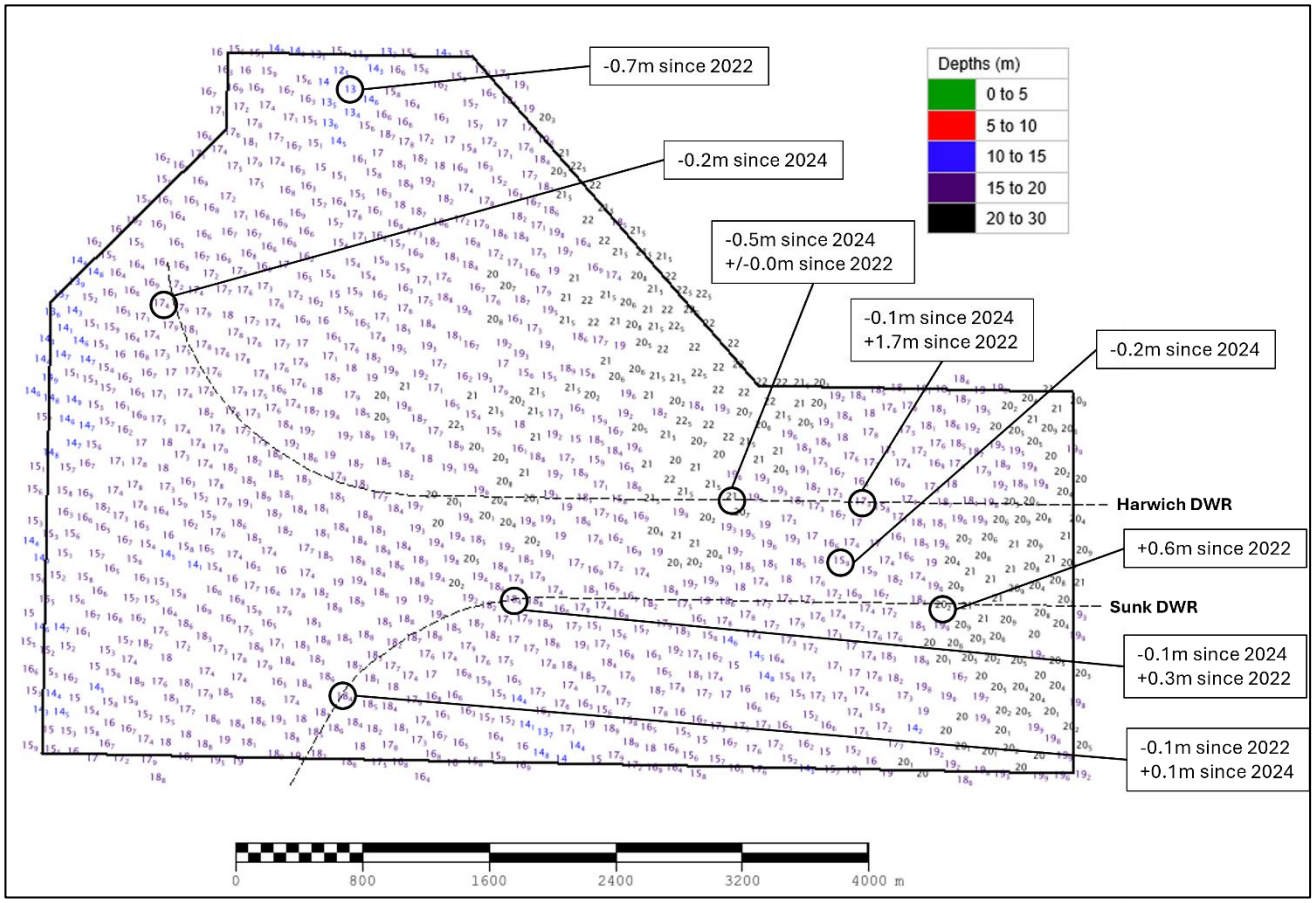

Figure 6: Colour banded depth plot from the 2025 survey with selected depth changes since the 2024 and 2022 surveys. Positive values (+) represent deepening. Negative values (-) represent shoaling.

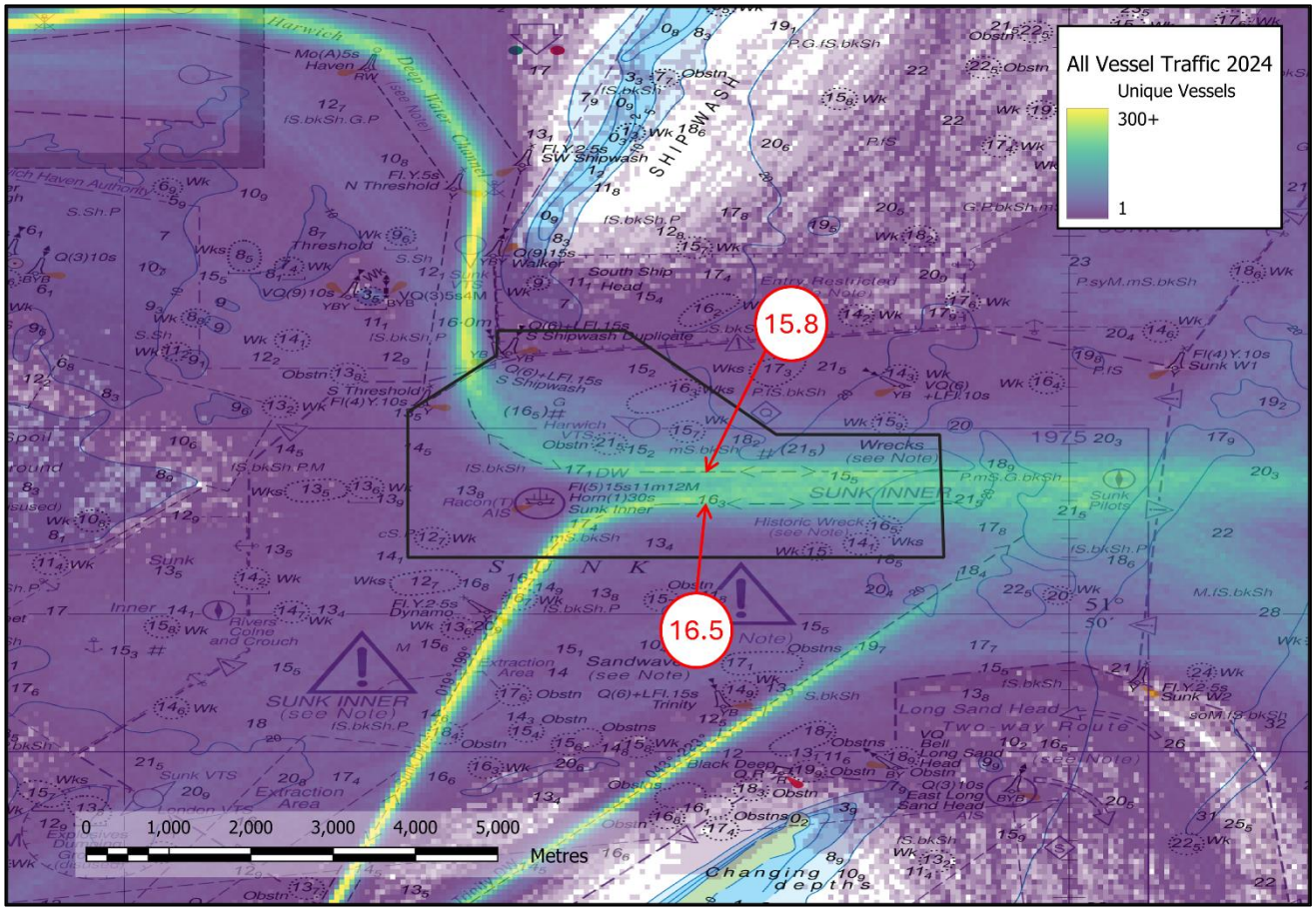

Figure 7: AIS heatmap at 100m resolution grid size. Density unit is unique vessels within the grid square within 2024. TE3A area in black and controlling depth soundings (m) overlaid on chart 1183.

6. RECOMMENDATIONS FOR FUTURE SURVEYS

Survey Interval

6.1 The prevalence of sand wave mobility and annual bathymetric variation across the Harwich and Sunk DWRs warrants the current interval of annual focused surveys, and subsequent full surveys every 3 years, to be maintained. Regular survey by the Port of London Authority covers the controlling depth on Sunk DWR between the 3 yearly full CHP surveys.

Survey Area

6.2 Due to the changeability of the seabed at this location, the current full and focused limits should be retained to ensure that any sand wave movement does not threaten the navigational safety of the Harwich and Sunk DWRs. There are no further area recommendations resulting from this survey.