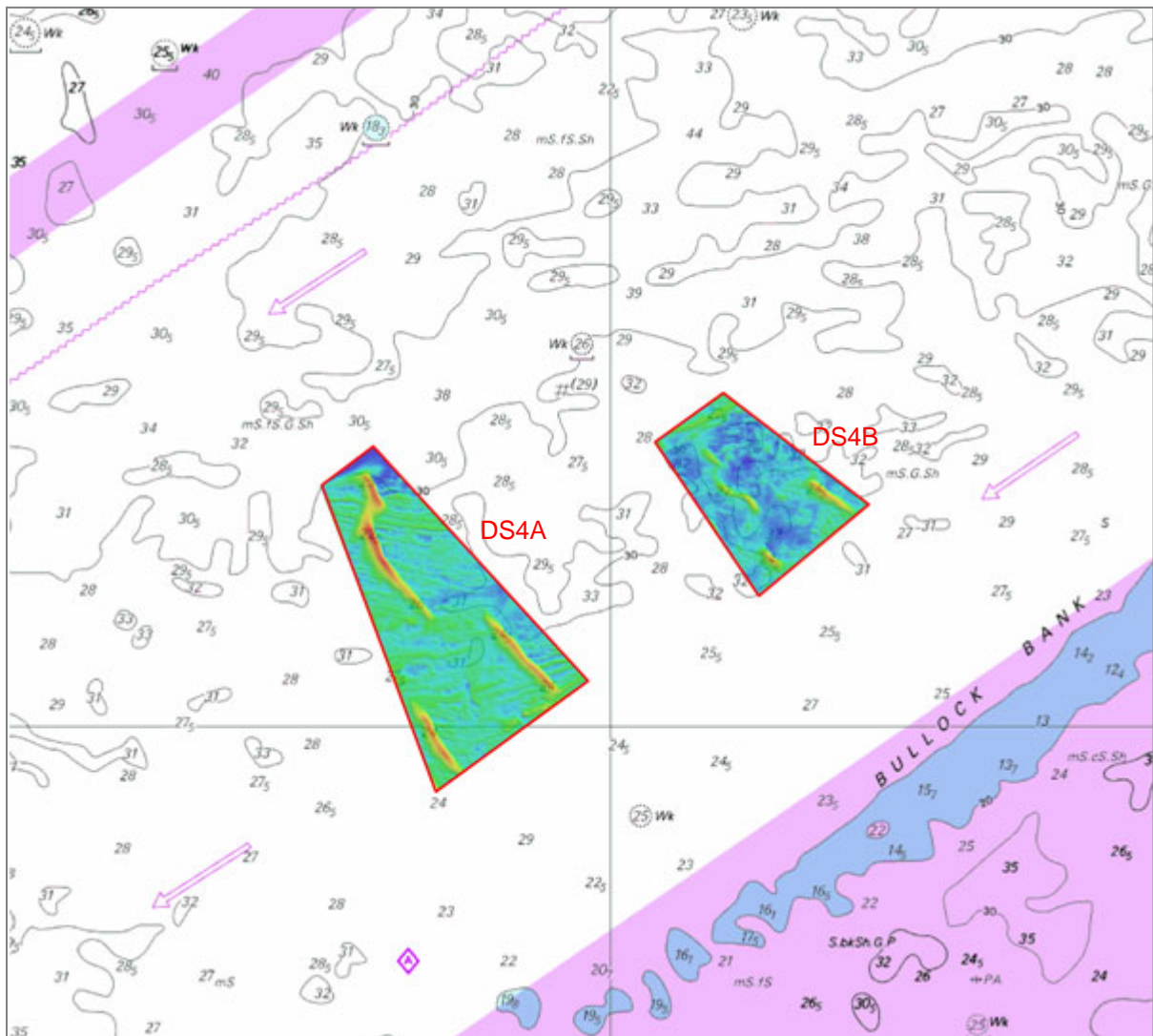




DOVER STRAIT

WEST OF BULLOCK BANK

SUMMARY ASSESSMENT ON THE ANALYSIS OF ROUTINE RESURVEY AREA DS4 FROM THE 2013 SURVEY



DOVER STRAIT

WEST OF BULLOCK BANK

Assessment DS4/2013

A summary assessment of the 2013 hydrographic survey of the area: to monitor recent seabed movement; to identify any implications for shipping; and to make recommendations for future surveys.

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WEST OF BULLOCK BANK, 2013

1 EXECUTIVE SUMMARY

The Area and Recent Changes

- 1.1 Area DS4 is currently surveyed on a 6-year cycle under the Civil Hydrography Programme. It covers part of a Deep Draught Route (DDR), for south-west bound vessels.
- 1.2 It covers two discreet areas, DS4A & B, each containing several broad widely spaced sandwaves.
- 1.3 Minimum depths over the sandwaves are similar to the 2006 survey, with little change in their positions.

Reasons for Continuing to Resurvey the Area

- 1.4 The area covers sandwaves lying in part of a south-west bound Deep Draught Route, with depths close to the draught of vessels using the route.

Recommendations

- 1.5 Although depths over the sandwaves are of potential concern to deep draught vessels using the area, the stability of the bedforms supports an extension to the re-survey frequency and it is recommended that the survey interval is extended from 6 to 12 years.

2 INTRODUCTION

- 2.1 This Assessment is produced by the United Kingdom Hydrographic Office (UKHO) for the Maritime and Coastguard Agency (MCA).
- 2.2 Analysis of the Routine Resurvey Areas forms part of the Civil Hydrography Programme and the reports are made available to members of the Committee On Shipping Hydrography (COSH) through the UKHO website, before being 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).

3 HISTORY

- 3.1 In 1998, the Committee on Shipping Hydrography (COSH) determined that potential new areas for the Routine Resurvey Programme should be investigated. DS4 was one of five areas identified covering part of a south-west bound Deep Draught Route.
- 3.2 First surveyed in 1999, it was re-surveyed again the following year after which a 6-year survey interval was approved with revised limits. The area was re-surveyed as part of the full Dover Strait survey conducted in 2006-07, following which an additional area to the east was identified for inclusion in the 2013 survey, creating areas DS4A & B.

4 DESCRIPTION OF THE AREA

- 4.1 DS4A & B lie to the west of Bullock Bank in the south-west bound lane of the Dover Strait Traffic Separation Scheme and covers part of a Deep Draught Route, which comprises of a

recommended track and a safety corridor extending 0.5 nautical miles either side of the track; both areas combined form an area of 2.7 sq NM (9.2 sq km).

- 4.2 The area contains several broad, widely spaced sandwaves of predominantly sandy sediments up to 8 metres in height, with underlying erosion surfaces visible away from these features.
- 4.3 Details of the area, including the survey history, are at [Annex A](#). The limits are shown at [Annex B](#), along with implied sediment transport based on sandwave asymmetry.

5 SHIPPING IN THE AREA

- 5.1 Shipping routes, based on sample AIS data are shown at [Annex C](#). A suggested route for deep draught vessels passes to the south of The Varne and through area DS4. Although the route and 1 Nautical Mile safety corridor has no formal standing, the Department for Transport's recommended under-keel allowance is 7.3 metres for deep draught vessels using this part of the route and travelling at 12 knots when under the influence of storm waves and swell. Under-keel allowances include a combined element to allow for vessel draught uncertainties and uncertainties in seabed level due to sandwaves, tidal reduction of surveys and survey instrumentation / interpretation inaccuracies.
- 5.2 Sample AIS data indicates around 40 vessels a year transit the area drawing 20 metres or more, these vessels generally follow the suggested route. Vessels drawing up to 21.5 metres have been observed transiting across DS4 and a vessel drawing 22.5 metres passing to the north of the area. Of the deep draught vessels examined, all have transited with 2.3 metres or more of tide.

6 2006 SURVEY DETAILS

- 6.1 The area was surveyed as part of a much wider survey of the Dover Strait, commencing work in 2006 and completing in 2007. Much of the survey was run later in the year than usual and will potentially produce deeper depths over sandwaves due to the effects of winter storms.
- 6.2 Positioning was by DGPS. A tidal model was established using the Dover Tide Station supported by two independent offshore stations. One was situated near Beachy Head and the other near South Galloper Bank.
- 6.3 The assessed accuracy of depth measurements met IHO S-44 (4th Edition) Order 1.

7 2013 SURVEY DETAILS

- 7.1 The survey was conducted from 11 to 13 December, in conjunction with other areas and with some time on weather standby.
- 7.2 Depths in the survey were reduced to Chart Datum using GPS heights, with ellipsoidal height to Chart Datum taken from the Vertical Offshore Reference Framework (VORF). The survey achieved IHO S-44 (5th Edition) Order 1a standard.
- 7.3 In both surveys, full seafloor cover with multibeam was achieved.

8 DESCRIPTION OF RECENT BATHYMETRIC CHANGE

- 8.1 Colour banded depth plots of the 2006 and 2013 surveys are at [Annexes D and E](#) (DS4A) and [Annexes H and I](#) (DS4B) and allow a comparison of depth values.
- 8.2 Variability plots, at [Annexes F](#) (DS4A) and [J](#) (DS4B), show the changes in depth between the 2006 and 2013 surveys.
- 8.3 Comparison plots of the 27 metre contours are at [Annex G](#) (DS4A) and [Annex K](#) (DS4B).
- 8.4 The variability plot shows the limited change that has occurred in the area, with a slight north-east migration of the sandwaves. Cross-sections at [Annex B](#) show the slight shift in position that has occurred, which is generally around 10 metres over the 7 years. The underlying erosion surfaces that are visible suggest little or no supply of sediment in the area.

Area DS4A

- 8.5 In the 2013 survey, the minimum depth within the DDR corridor is 24.6 metres, but with a depth of 22.8 metres falling just outside the corridor.
- 8.6 Longer term variability has been examined in the four surveys of the area, as shown in figure 8.1, the location of these areas are shown at [Annex E](#). These observed depths show very limited change between surveys and fall within depth uncertainties of the surveys.

Year	Area A	Area B	Area C
1999	22.3	24.3	24.3
2000	22.2	24.7	24.5
2006	22.6	24.1	24.3
2013	22.3	24.2	24.2
Range	0.4	0.6	0.3

Figure 8.1: minimum depths found in selected areas shown at Annex E

Area DS4B

- 8.7 In the 2013 survey, the minimum depth within the DDR corridor is 27.3 metres, with a minimum depth of 24.9 metres within the survey area. Selected minimum depths shown in [Annex I](#) agree closely with the 2006 survey, with the greatest difference being 0.3 metres. As this area was added following the 2006-07 Dover Strait survey, earlier digital surveys are not available for comparison.

9 IMPLICATIONS FOR SHIPPING

- 9.1 Depths in the areas are broadly similar to those in the 2006 survey and the deepest draught vessels crossing the area require the use of tide for to achieve the recommended under-keel allowance.

- 9.2 A charted depth of 22₅ lies 1,400 metres to the north of the recommended track and 400 metres outside of the safety corridor reduces to 22 when rounding down the 2013 surveyed depth of 22.3 metres, but this depth is avoided by the very deep draught vessels.

10 RECOMMENDATIONS FOR FUTURE SURVEYS

- 10.1 Although depths over the sandwaves are of potential concern to deep draught vessels using the area, the stability of the bedforms supports an extension to the re-survey frequency and it is recommended that the survey interval is extended from 6 to 12 years.

AREA SPECIFICATIONS
(Including Survey History)

REGION: Dover Strait**NAME:** West of Bullock Bank**AREA:** DS4 A & B**LIMITS:**

DS4A

DS4B

A	50.75491°N	1.40590°E	A	50.77446°N	1.04508°E
B	50.74262°N	1.38200°E	B	50.76433°N	1.02587°E
C	50.77661°N	1.37525°E	C	50.78138°N	1.00772°E
D	50.78089°N	1.41400°E	D	50.78682°N	1.01966°E

Area co-ordinates are referred to WGS84 Datum

AREA SIZE:

DS4A	1.8 sq NM (6.1 sq km)
DS4B	0.9 sq NM (3.1 sq km)
Total	2.7 sq NM (9.2 sq km)

SURVEY INTERVAL: 6 yr**SURVEYS:** (conducted at 1:25,000 scale (not applicable to multibeam surveys))

Year	Survey	File Ref	Data	Year	Survey	File Ref	Data
1999	HI857	-	d.s				
2000	HI899	-	d.s				
2006	HI1159	-	m				
2013	HI1434	-	m				

KEY: s = sonar sweep, d = digital data, m = multibeam digital data

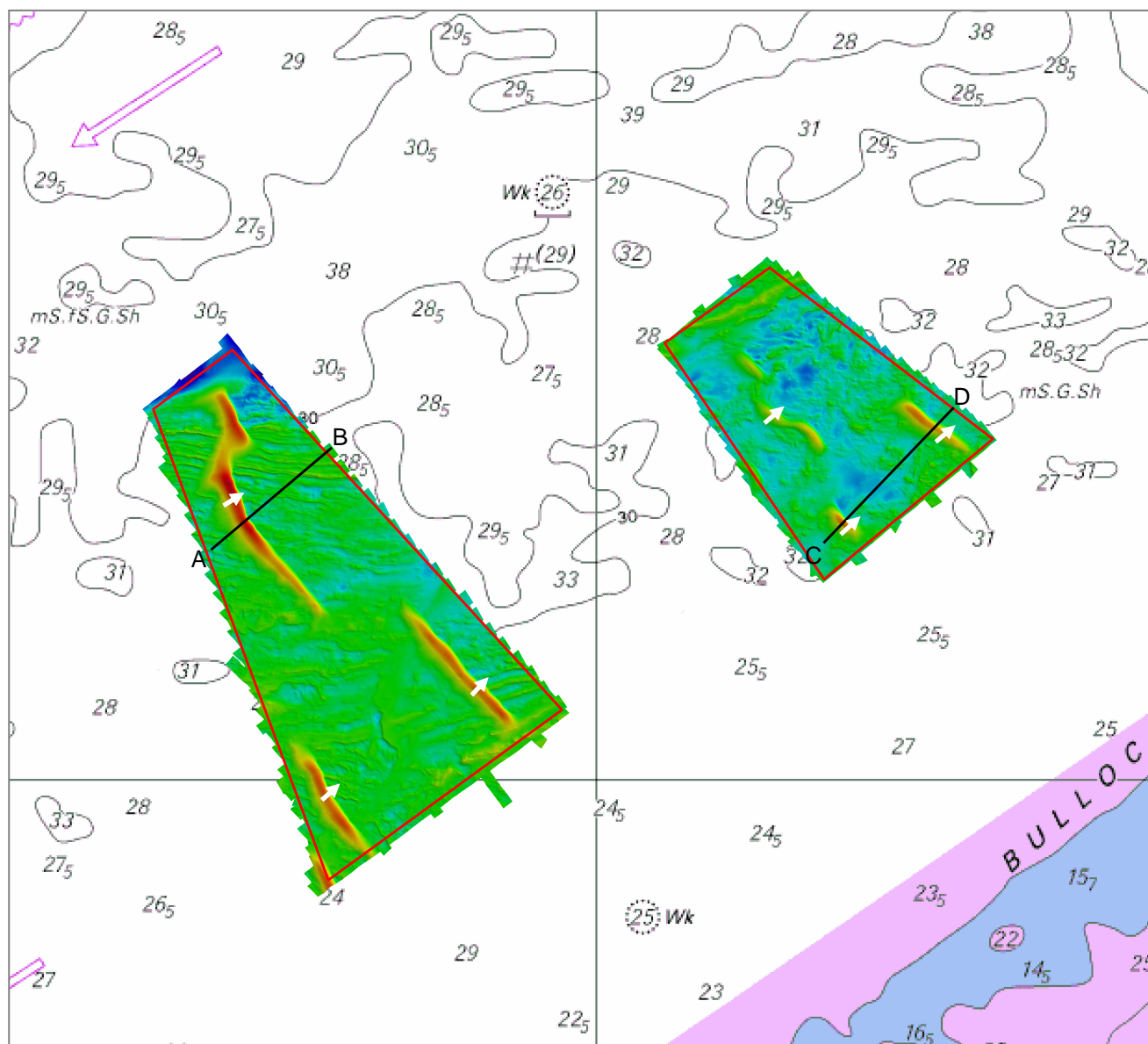
REPORTS: 2000 First survey of DS4 assessed against a 1988 analogue survey
2002 Latest survey assessed

ASSESSMENTS: none

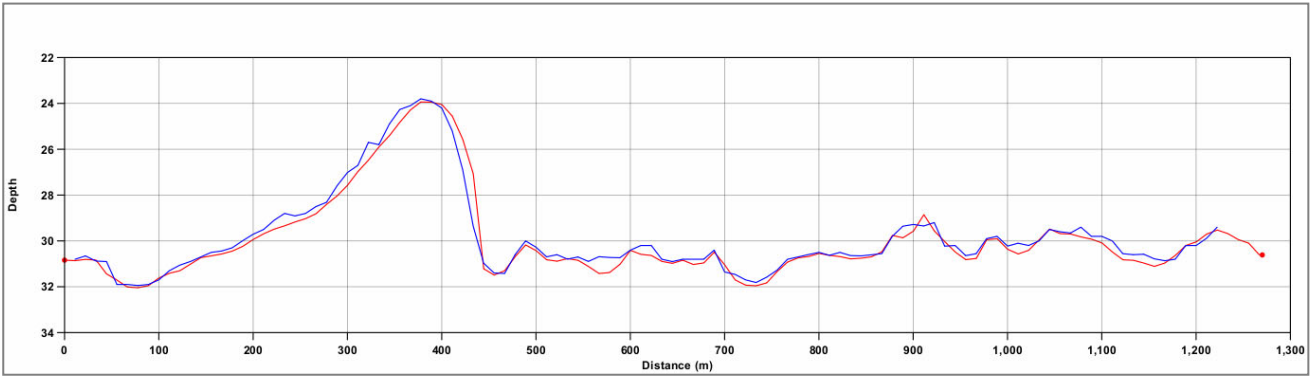
REMARKS: 1998 Area DS4 established
2002 6-year survey frequency established with revised limits
2012 Additional area to the east included, creating areas DS4 A & B

LARGEST SCALE CHART: BA 1892

SUN ILLUMINATED VIEW OF THE 2013 SURVEY OVERLAID ON CHART 1892
AND CROSS SECTION COMPARISONS



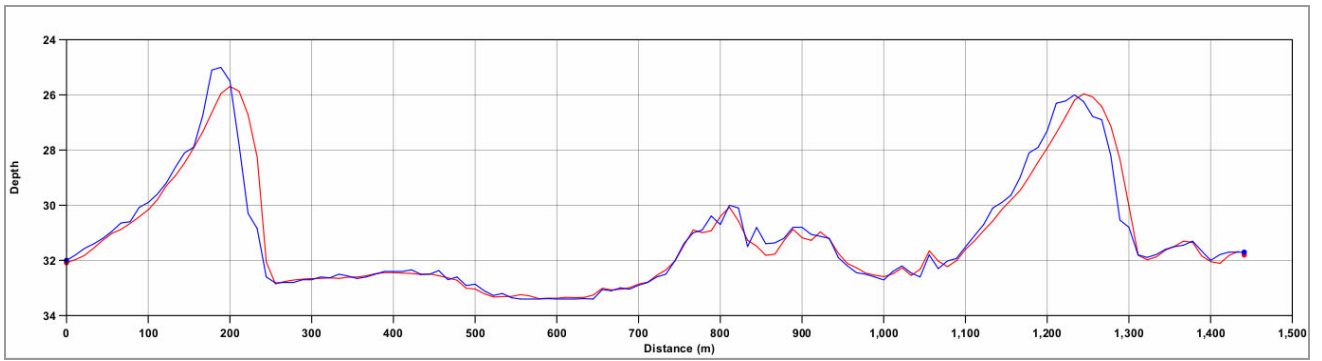
→ Sediment transport based on sandwave asymmetry



A

Profile A-B



B



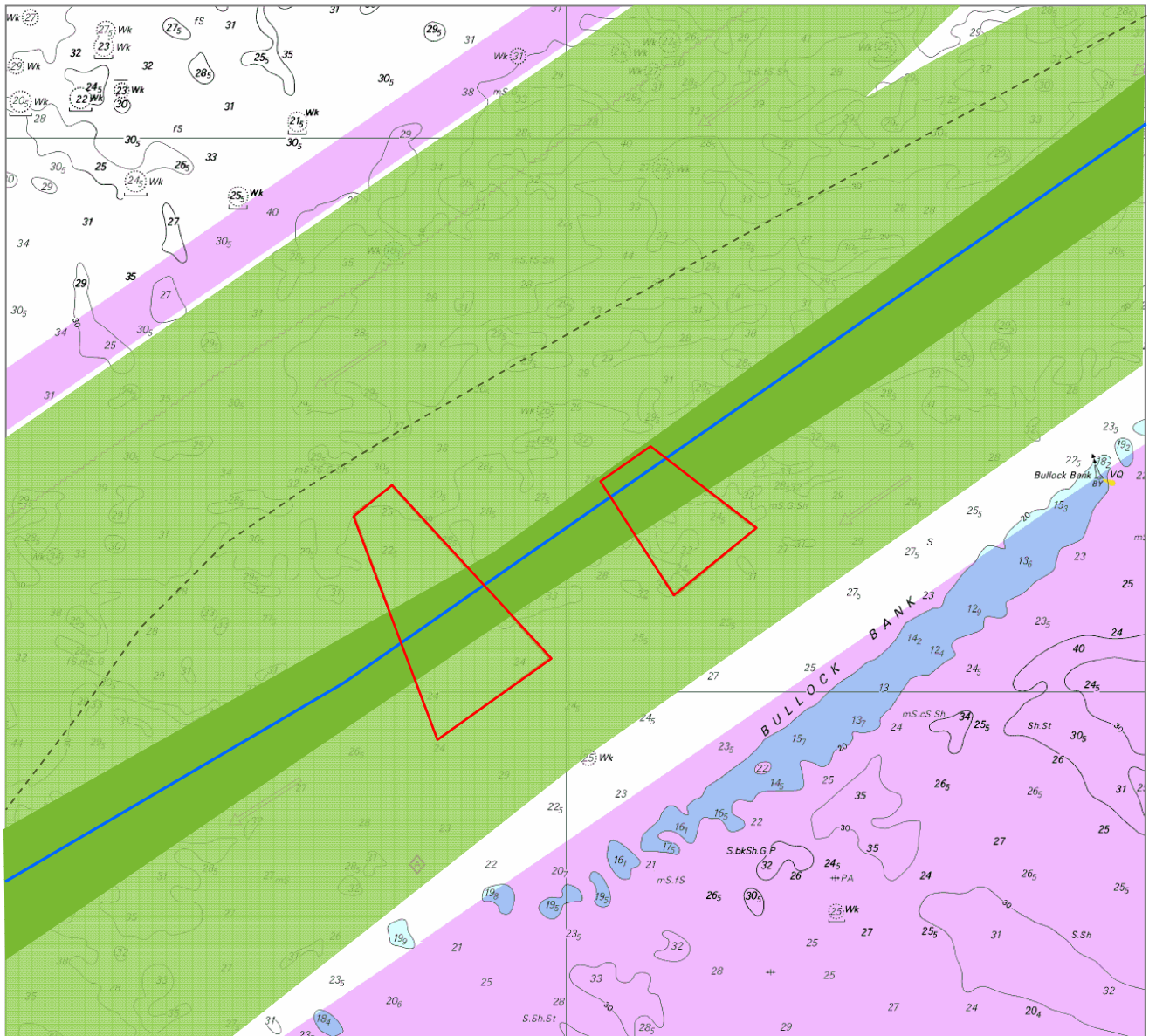
C

Profile C-D

D

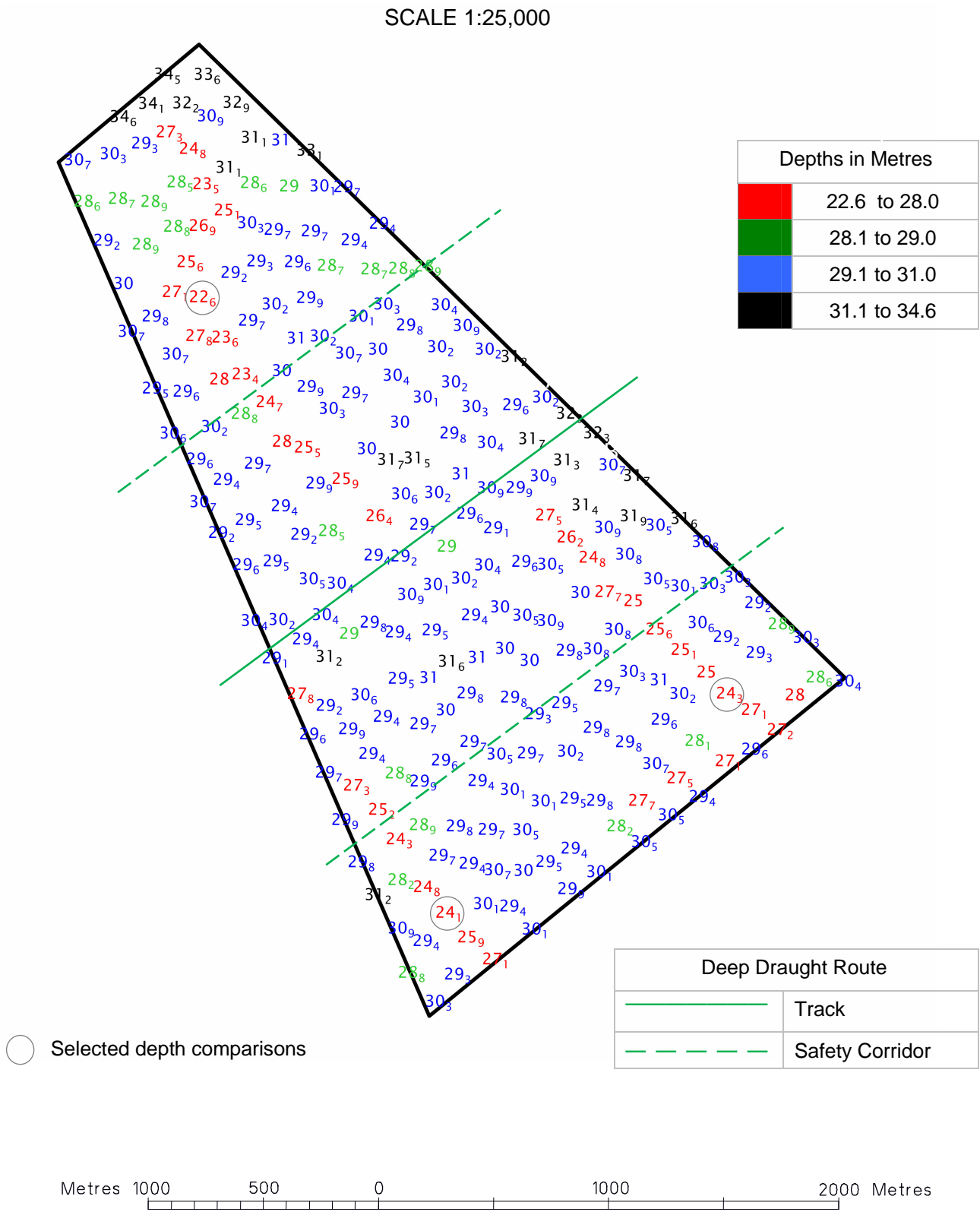
	2006
	2013

SHIPPING ROUTES

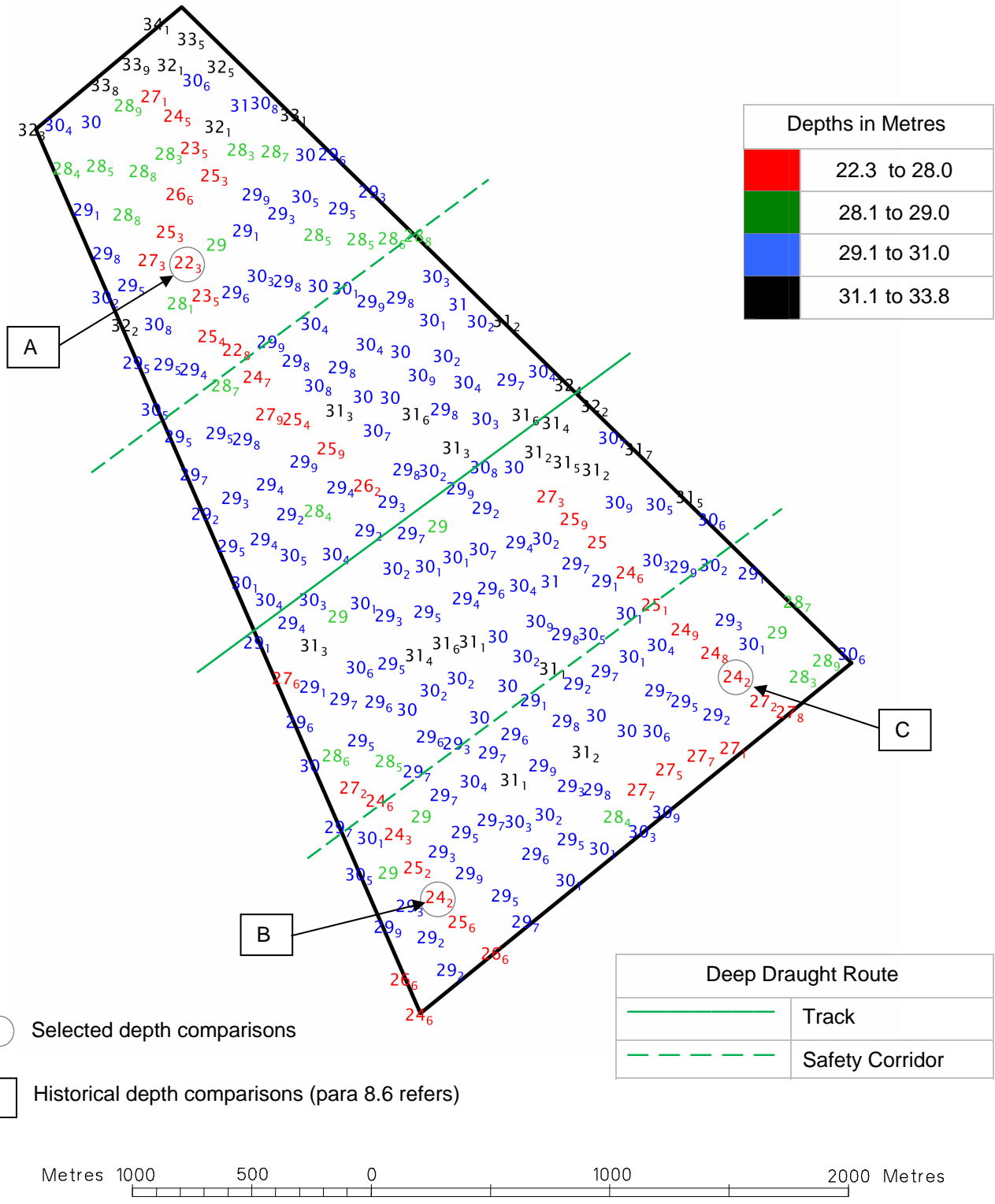


- Main shipping routes based on sample AIS data
- Indicative route of deep draught vessels (>20m)
- Observed track by deep draught vessel outside of the Deep Draught Route
- Suggested Deep Draught Track

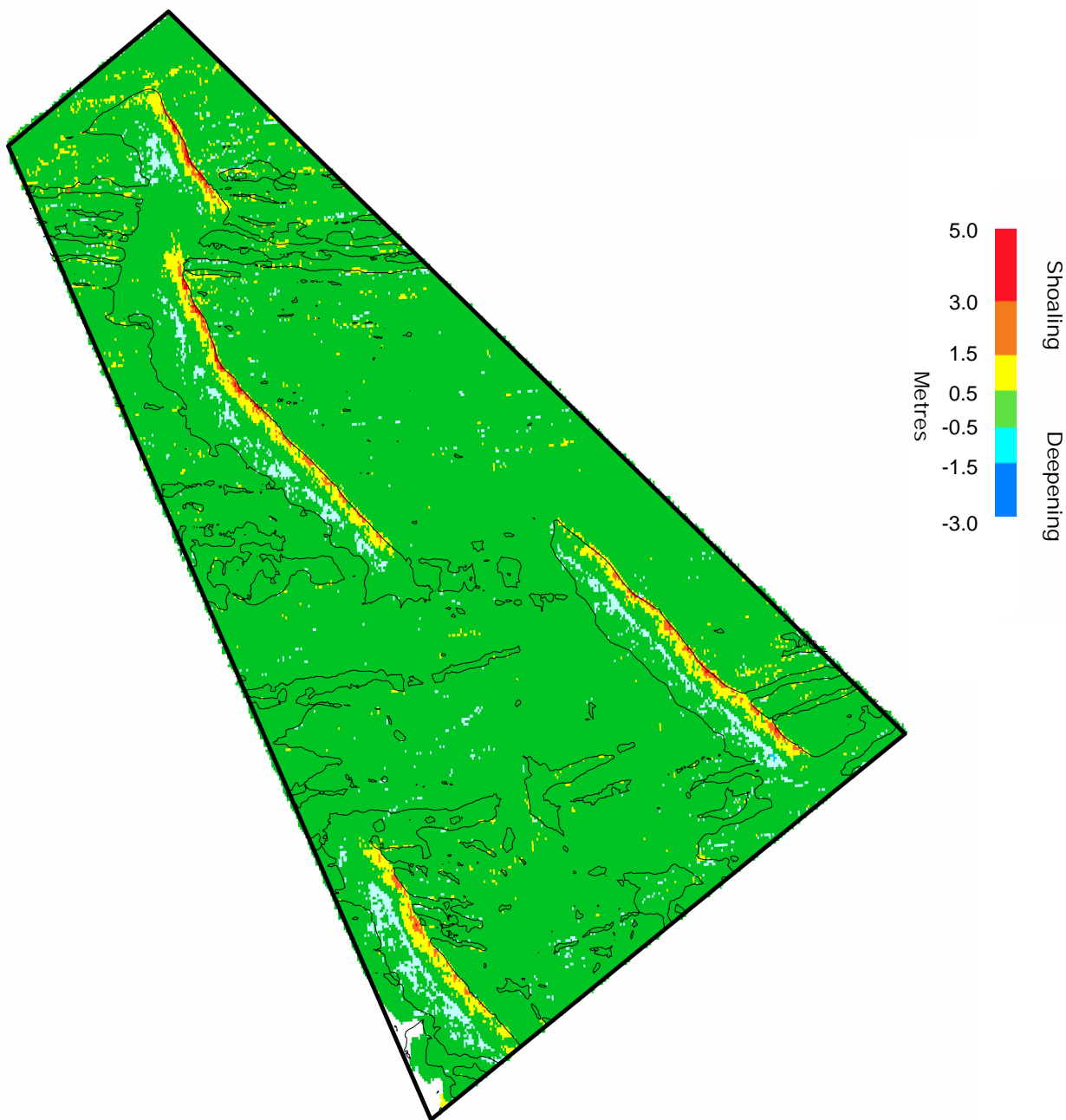
DS4A COLOUR BANDED DEPTH PLOT
 FROM THE 2006 SURVEY
 SHOWING SELECTED DEPTHS
 SCALE 1:25,000



DS4A COLOUR BANDED DEPTH PLOT
 FROM THE 2013 SURVEY
 SHOWING SELECTED DEPTHS
 SCALE 1:25,000



DS4A VARIABILITY PLOT SHOWING
BATHYMETRIC CHANGES BETWEEN THE 2007 AND 2013 SURVEYS
AND CHARTED CONTOURS FROM THE 2013 SURVEY
SCALE 1:25,000

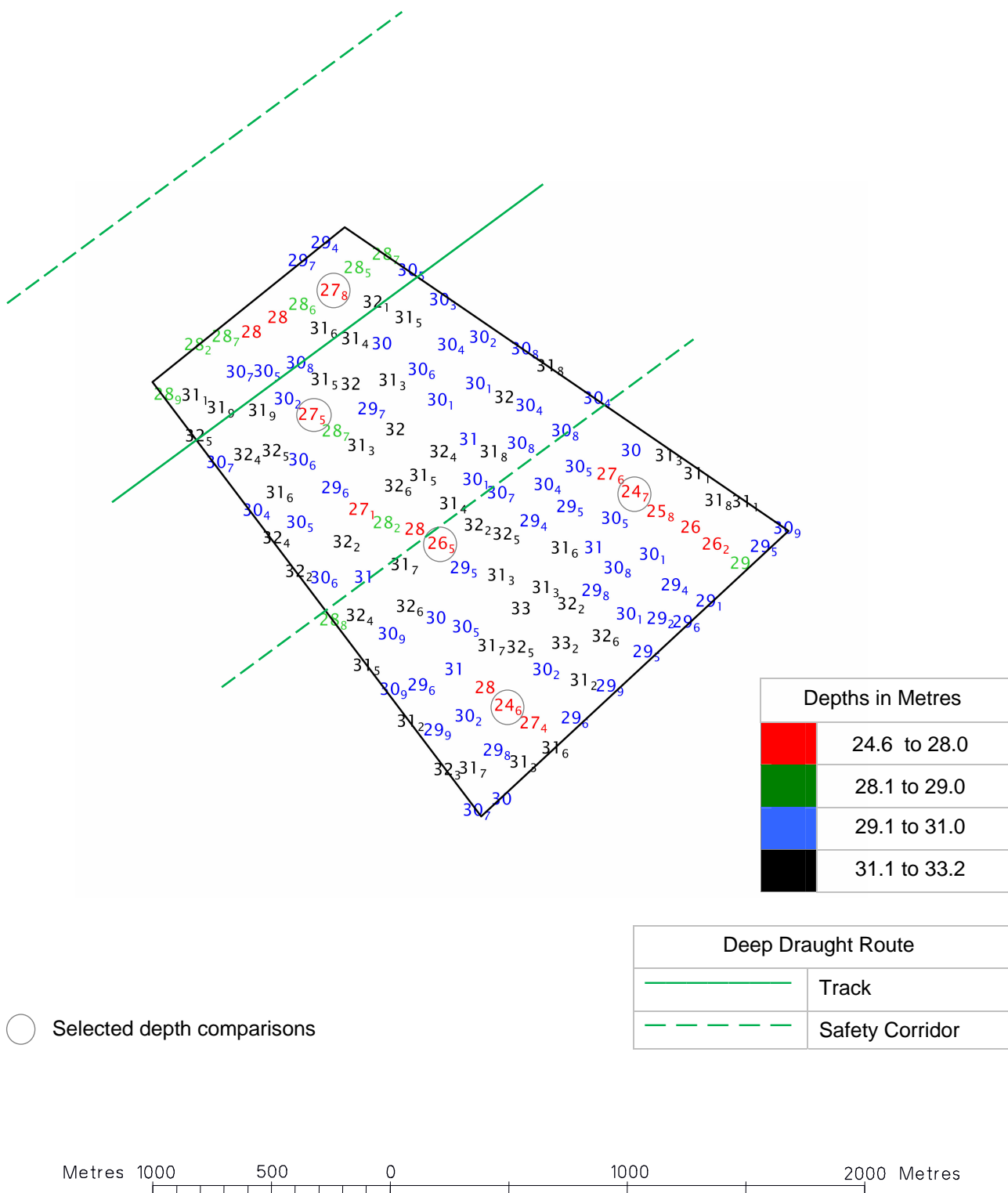


Metres 1000 500 0 1000 2000 Metres

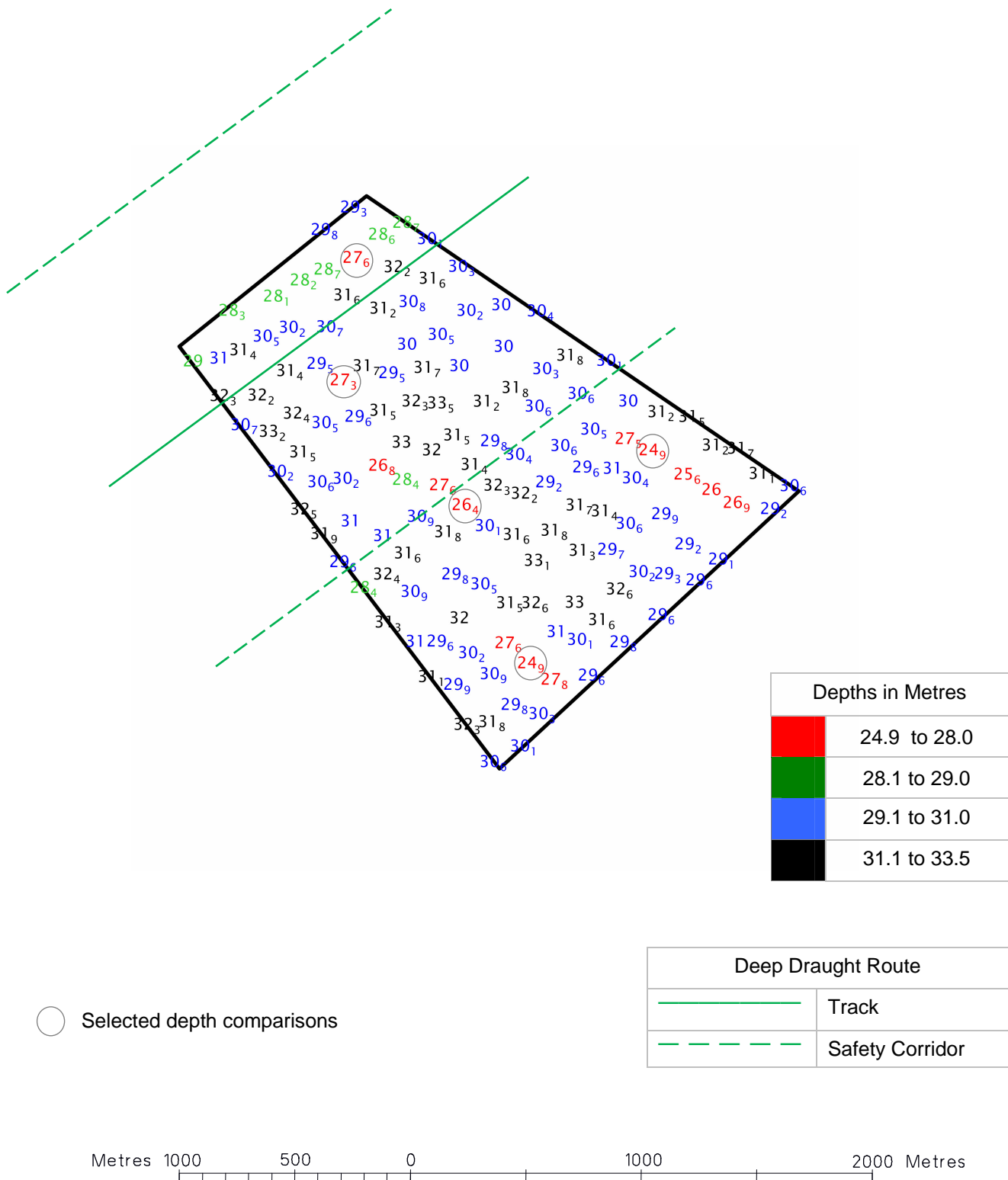
DS4A COMPOSITE DIAGRAM OF THE
27 METRE CONTOUR FROM THE 2006 AND 2013 SURVEYS
SCALE 1:25000



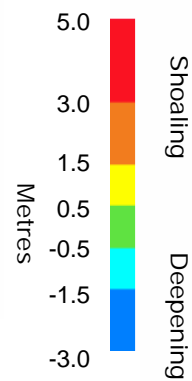
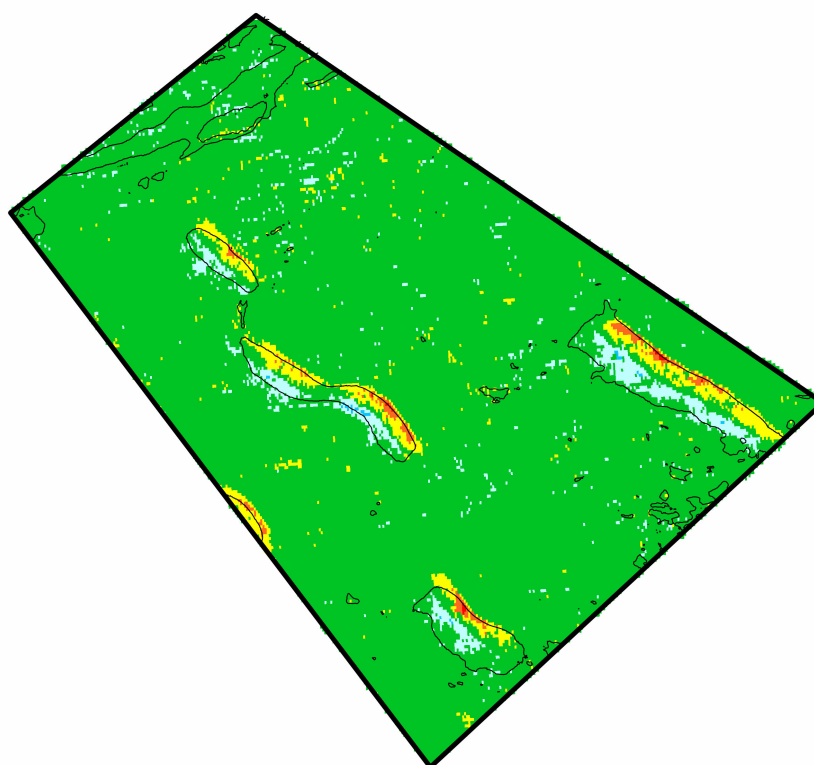
DS4B COLOUR BANDED DEPTH PLOT
 FROM THE 2006 SURVEY
 SHOWING SELECTED DEPTHS
 SCALE 1:25,000



DS4B COLOUR BANDED DEPTH PLOT
 FROM THE 2013 SURVEY
 SHOWING SELECTED DEPTHS
 SCALE 1:25,000



DS4B VARIABILITY PLOT SHOWING
BATHYMETRIC CHANGES BETWEEN THE 2007 AND 2013 SURVEYS
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DS4B COMPOSITE DIAGRAM OF THE
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