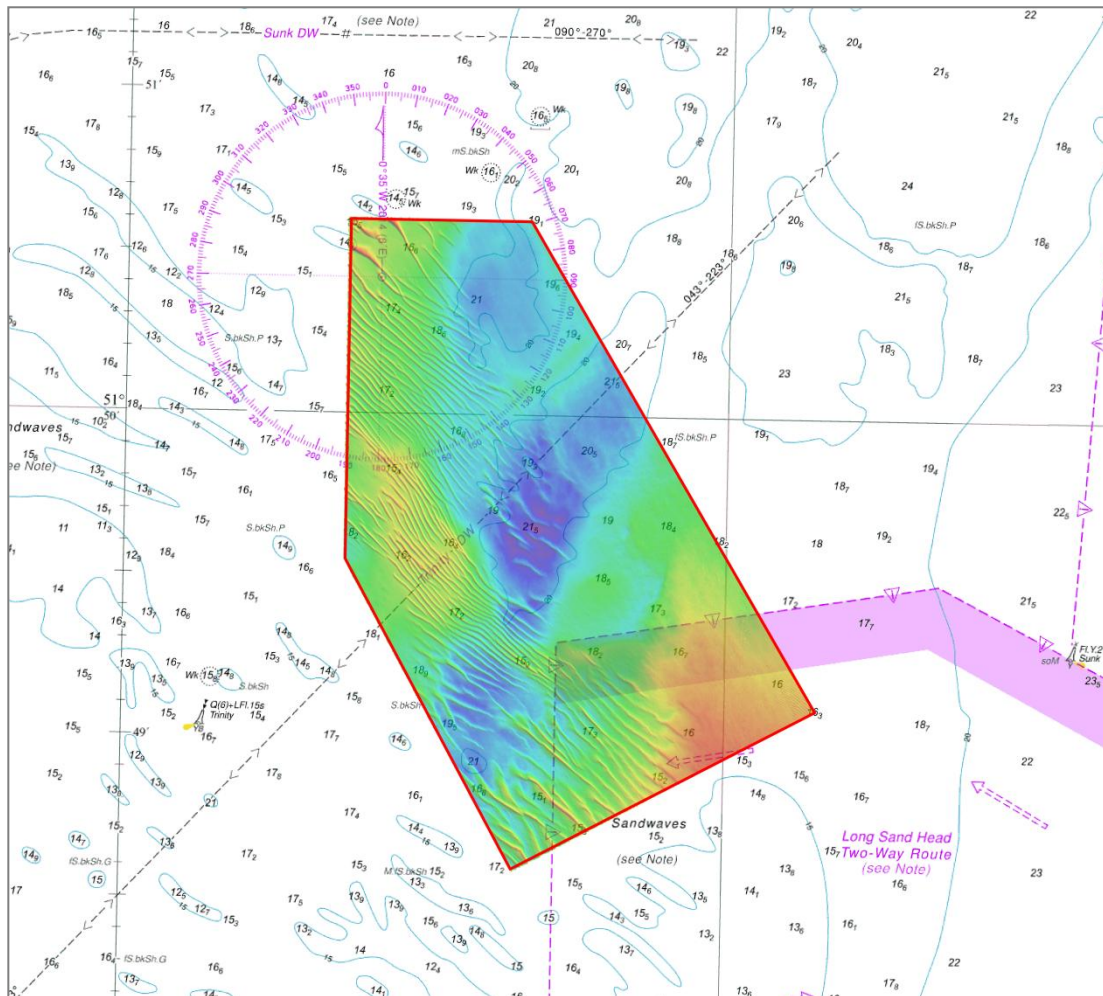




THAMES ESTUARY LONG SAND HEAD (TE5)

ASSESSMENT ON THE ANALYSIS OF ROUTINE RESURVEY AREA TE5 FROM THE 2014 SURVEY



THAMES ESTUARY

LONG SAND HEAD (TE5)

Assessment TE5/2014

An assessment of the 2014 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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LONG SAND HEAD, 2014

1. EXECUTIVE SUMMARY

The Area and Recent Changes

- 1.1 Area TE5 is currently re-surveyed every 6 years. Sandwaves up to 2 metres high lie in the west of the area, with a minimum depth of 15.3 metres. Depths less than 15 metres lie on the northern and southern boundaries.
- 1.2 Sample shipping data for 2012 shows vessels drawing up to 12.6 metres using the Trinity Deep Water track.
- 1.3 In the southeast part of the area depths have generally reduced by up to around 1 metre; this reflects changes occurring across a wider area to the northeast of Long Sand Head. Across much of the area there is generally little change, or changes reflect lateral mobility of bedforms.

Reasons for Continuing to Resurvey the Area

- 1.4 The area requires resurveying for the following reasons:
 - Mobile bedforms exist across parts of the area, although deeper in depth and lower in height than in adjacent area TE5A.
 - A northeast extension from Long Sand Head has resulted in shoaling in the south of the area.

Recommendations

- 1.5 It is recommended that the southern part of area TE5 is transferred to area TE5A, fully surveyed every 3 years, to cover shoaling that has occurred in this area. TE5A limits should be moved to the northwest to cover depths less than 16 metres observed in the 2014 survey of TE5.

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 Area TE5 was established in 1980 and covered the Sunk and Trinity Deep Water routes and Long Sand Head. Since that time, a series of sub-divisions and mergers have been made, resulting in the current area TE5 and adjacent area TE5A. TE5A covers the bulk of the original area and is fully surveyed every 3 years, with focused annual surveying of selected areas. Details on the area's history are at [Annex A](#).

4. DESCRIPTION OF THE AREA

- 4.1 TE5 covers part of the eastern approach into Black Deep, including part of the Trinity Deep Water track. Long Sand Head lies to the south and southwest. Area limits are shown on the cover of this report.
- 4.2 Closely spaced sandwaves up to 3 metres high lie in the far north of the area, with a minimum depth of 14 metres. Within the central and western area there are sandwaves up to 2.0 metres high with a minimum depth of 15.3 metres. New sandwaves up to 1.5 metres high have formed in the south of the area where sediment has been depleted.
- 4.3 Net sediment transport based on asymmetry of sandwaves is shown in [Annex C](#).

5. SHIPPING IN THE AREA

- 5.1 Sample shipping data for 2012 shows the maximum draught vessel to use the area during the periods examined was a 12.6 metres. Indicative routes are shown in [Annex B](#).
- 5.2 Revised ship routing measures in the area, introduced in 2007, may have altered the use of the Long Sand Head two-way route, which can now only be used by vessels entering or leaving Thames/Medway ports that meet certain pilotage requirements.

6. 2008 SURVEY DETAILS

- 6.1 The survey was conducted from 10 to 16 September, with sea states 2-3 generally experienced.
- 6.2 The survey data was acquired using a Kongsberg 3002D multibeam echosounder system. The primary reference position was provided by an Applanix POS MV system, supplied with GPS data from C-NAV. A combined POS MV GPS and Inertial Measurement Unit data solution was referred to the International Terrestrial Framework 2000 (ITRF2000) Datum.
- 6.3 Observations calculated from the height component of the GPS position solution were used to reduce soundings to Chart Datum. The Vertical Offshore Reference Framework (VORF) was used within POSpac to calculate the reduced vessel height, from which a filtered tidal curve was derived.
- 6.4 The survey met IHO S44 (4th Edition) Order 1 standards.

7. 2014 SURVEY DETAIL

- 7.1 The survey was conducted from 21 – 22 June under variable weather conditions.
- 7.2 The survey data was acquired using a Kongsberg 3002D multibeam echosounder system. The primary reference position was provided by an Applanix POS MV system, supplied with GPS data from C-Nav, a dynamic GPS Precise Point measuring system. The survey is referred to the International Terrestrial Reference Framework 2008 (ITRF2008) datum.
- 7.3 Observations from GPS heighting were combined with VORF to reduce depths to Chart Datum. The final deliverable was a 1 metre CUBE (Combined Uncertainty and Bathymetry Estimator) Surface.
- 7.4 The survey met IHO (S44 5th Edition) Order 1a standards. The surface overlaid on chart 2692 is shown at [Annex C](#).

8. DESCRIPTION OF RECENT BATHYMETRIC CHANGE

- 8.1 Colour banded depth plots of the 2008 and 2014 surveys are at [Annexes E](#) and [F](#) respectively and allow visual comparison.

- 8.2 A variability plot showing the depth differences between the 2008 and 2014 surveys is at [Annex G](#). A comparison plot of the 20 metre contour is at [Annex H](#).
- 8.3 The variability plot shows shoaling in the southeast part of the area; this reflects changes occurring across a wider area to the northeast of Long Sand Head. Depths in this area have generally reduced by up to around 1 metre (profile A-B [Annex D](#)) but also with some deepening in the area (profile C-D [Annex D](#)).
- 8.4 Across the remainder of the area there is generally little change, or changes reflect lateral mobility of bedforms.
- 8.5 With the exception of the northern and southern boundaries, the whole area currently remains deeper than 15 metres and much of the area is deeper than 20 metres.

9. IMPLICATIONS FOR SHIPPING

- 9.1 Depths across the area remain deeper than the draught of shipping observed using the area. The controlling depth along the Trinity Deep Water route remains outside the area, with a 13.7 metre depth found over a sandwave 1,700 metres to the southwest. However, depths over a shoal area in the southeast of TE5 have shoaled by up to around 1 metre and should this trend continue would be of potential concern to shipping.

10. RECOMMENDATIONS FOR FUTURE SURVEYS

- 10.1 It is recommended that the southern part of area TE5 is transferred to area TE5A, fully surveyed every 3 years, to cover shoaling that has occurred in this area. TE5A limits should be moved to the northwest to cover depths less than 16 metres observed in the 2014 survey of TE5. This results in TE5A fully covering the shoal area within the Long Sand Head two-way route. The proposed revised limits are shown in [Annex I](#).

AREA SPECIFICATIONS
(Including Survey History)

REGION: Thames Estuary**NAME:** Long Sand Head**AREA:** TE5**LIMITS:**

A	51° .84333N	1° .61833E
B	51° .84333N	1° .63333E
C	51° .81833N	1° .65750E
D	51° .81000N	1° .63250E
E	51° .82583N	1° .61833E
A	51° .84333N	1° .61833E

Area co-ordinates are referred to WGS84

AREA SIZE: 8.04 SQ NM (27.59 SQ KM)**SURVEY INTERVAL:** 6 yr**SURVEYS:** (conducted at 1:25,000 scale (not applicable to multibeam surveys))

Year	Survey	File Ref	Data
1980	K8361*	H1936/78	
1981	K8760*	H1953/80	
1982	K9001*	H2043/81	
1983	K9255*	H2039/82	
1984	K9563*	H2911/83	s.t.
1986	K9848*	H2342/85	s.
1992	M1913	HH090/549/01	s.t.d
1996	M2671	HH090/690/01	s.d
2002	M3739	HH090/993/01	s.t.d
2008	HI1265	2008-26409	m
2014	HI1459	2014-153152	m

KEY: s = sonar sweep, t = seabed texture tracing, d = digital data, m = multibeam digital data

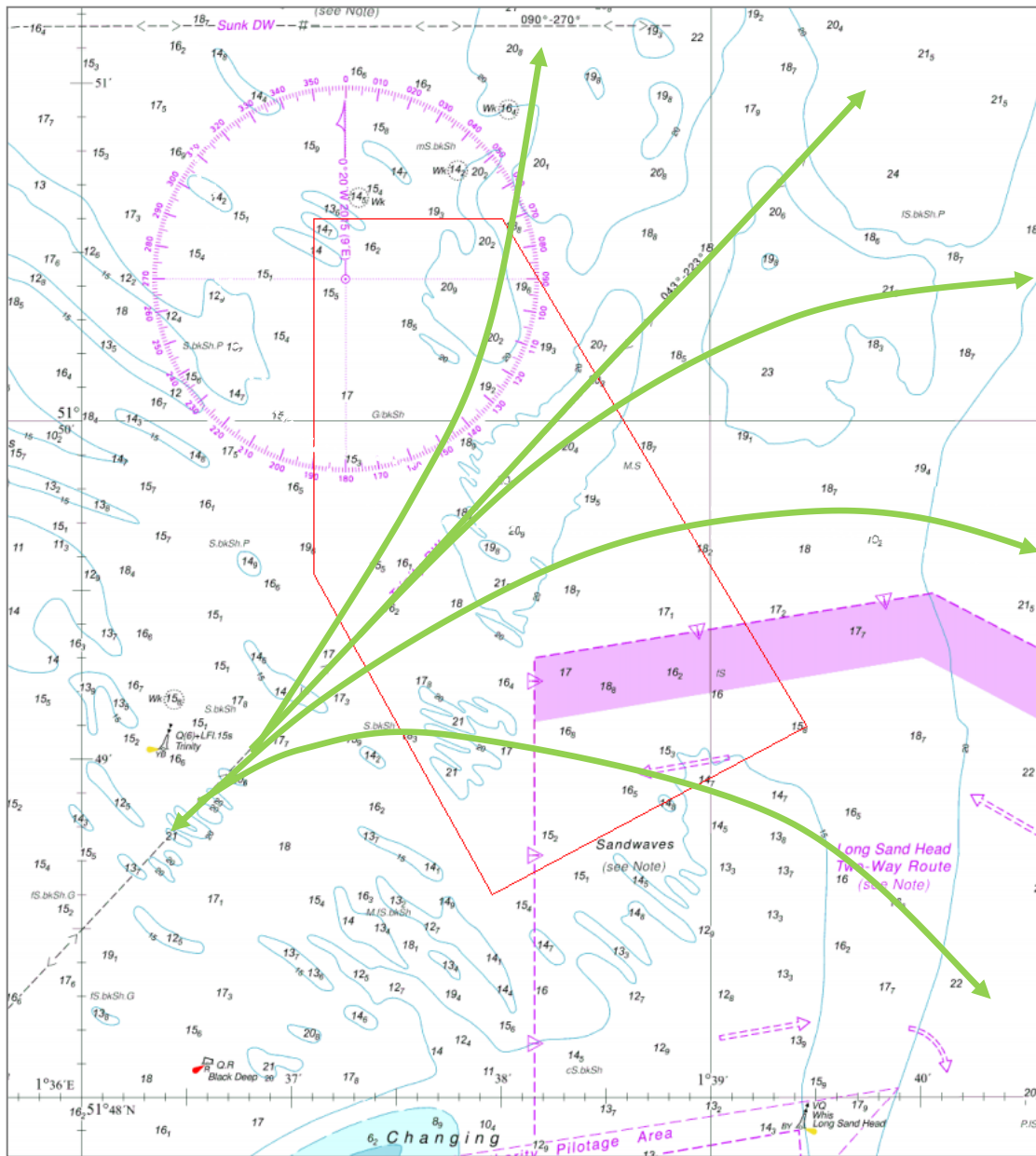
REPORTS: 1985 Latest survey included K9563 (H423/85-E 8)
1997 Latest survey included M2671 (HA145/002/003/06)

ASSESSMENTS: 2003 Latest survey included M3739

REMARKS: 1977 Report on old are I (H4823/75)
1980 Area 5 established (H3911/80-E17)
1985 Report sub divided area with 1 and 6 yrs survey intervals (H423/85-E8)
1995 1998 brought forward to 1996 (HA145/002/003/05-E5a)
1996 Area east of 20m line removed (HA145/002/003/07-E3)
1998 Report of 1998 on 3 & 3A, established area 5C from part of TE5 North (HA145/002/003/07 E-27)
2002 Limits of TE5 North revised and renamed TE5. TE5 South removed

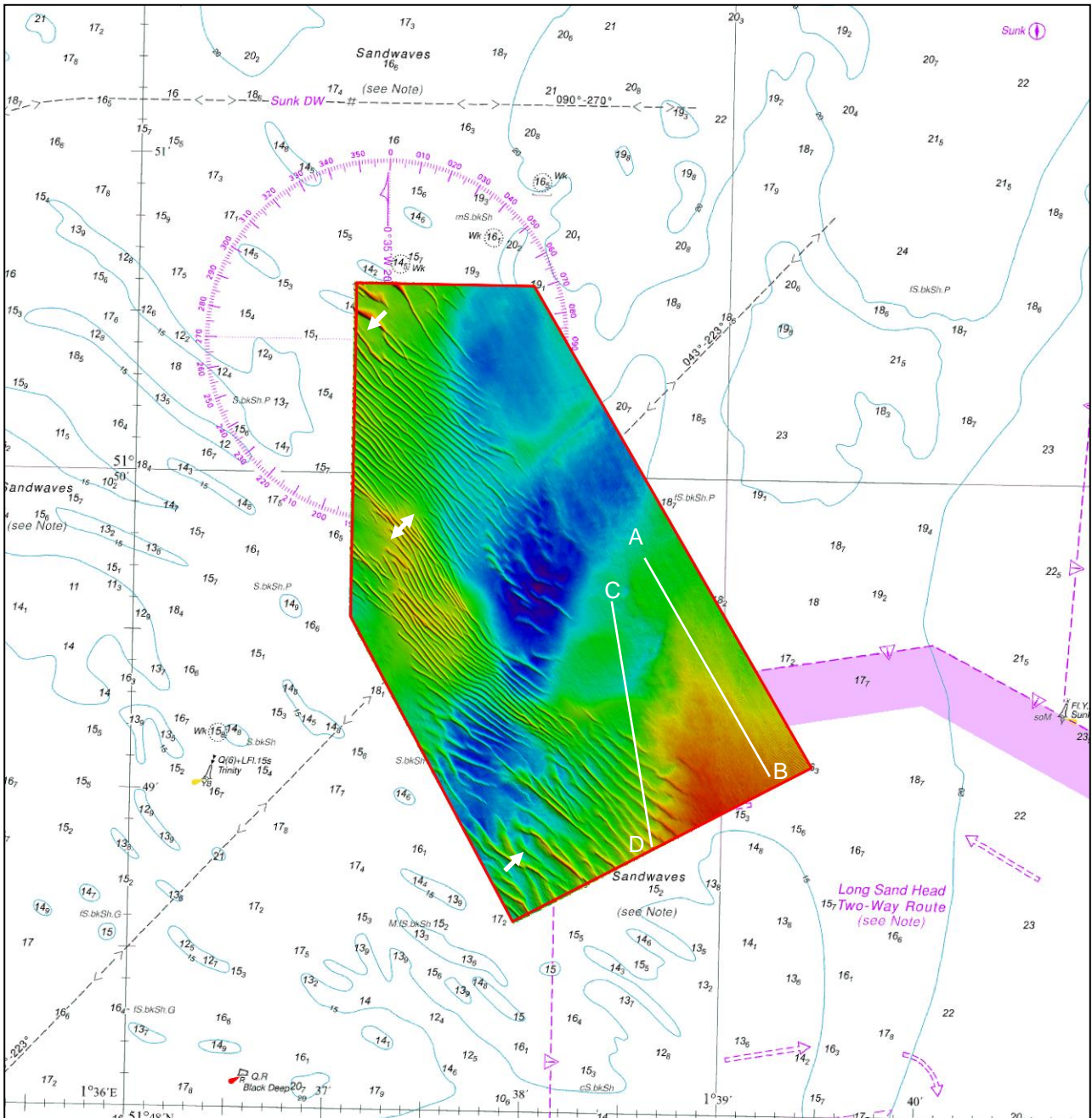
LARGEST SCALE CHART: BA 2692 (1:25,000)

SHIPPING ROUTES



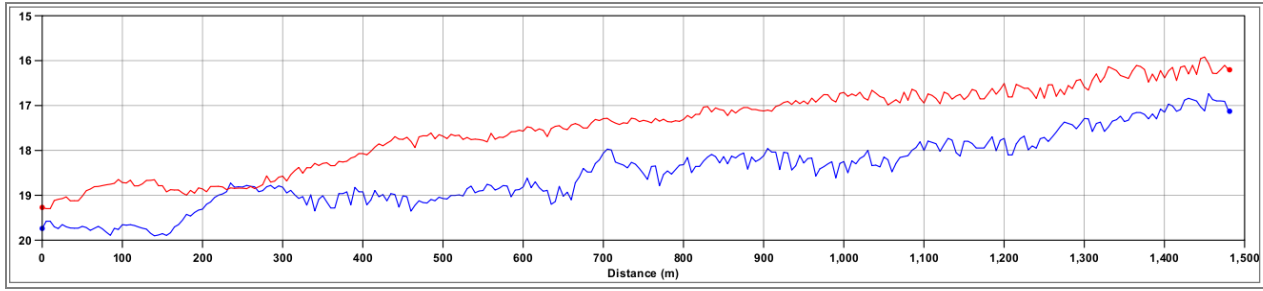
←→ Indicative shipping routes through area TE5

2014 SURVEY DATA OVERLAID ON CHART 2692
 (see Annex D for cross-section profiles)



→ Sediment transport based on sandwave asymmetry

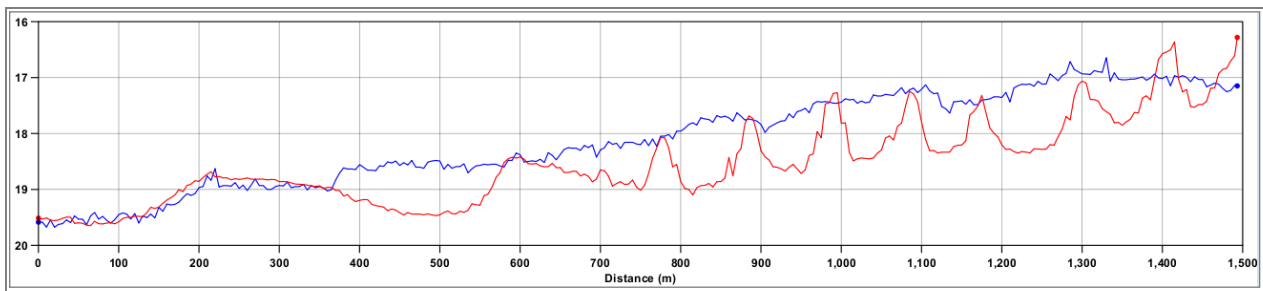
PROFILE COMPARISONS FROM THE 2008 AND 2014 SURVEYS
 (see Annex C for locations)



A

Profile A – B



B



C

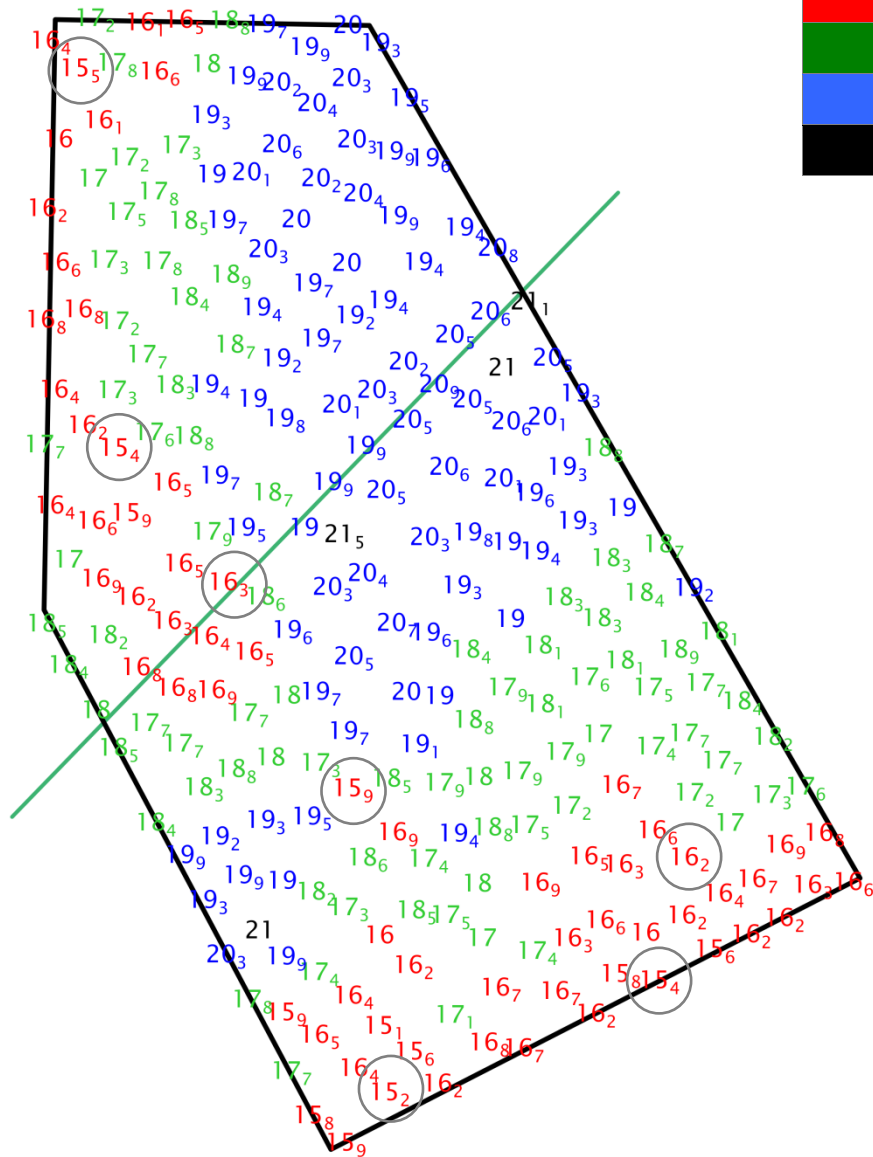
Profile C – D

D

Year of Survey	
	2014
	2008

COLOUR BANDED DEPTH PLOT
 FROM THE 2008 SURVEY
 SHOWING SELECTED DEPTHS
 SCALE 1:25,000

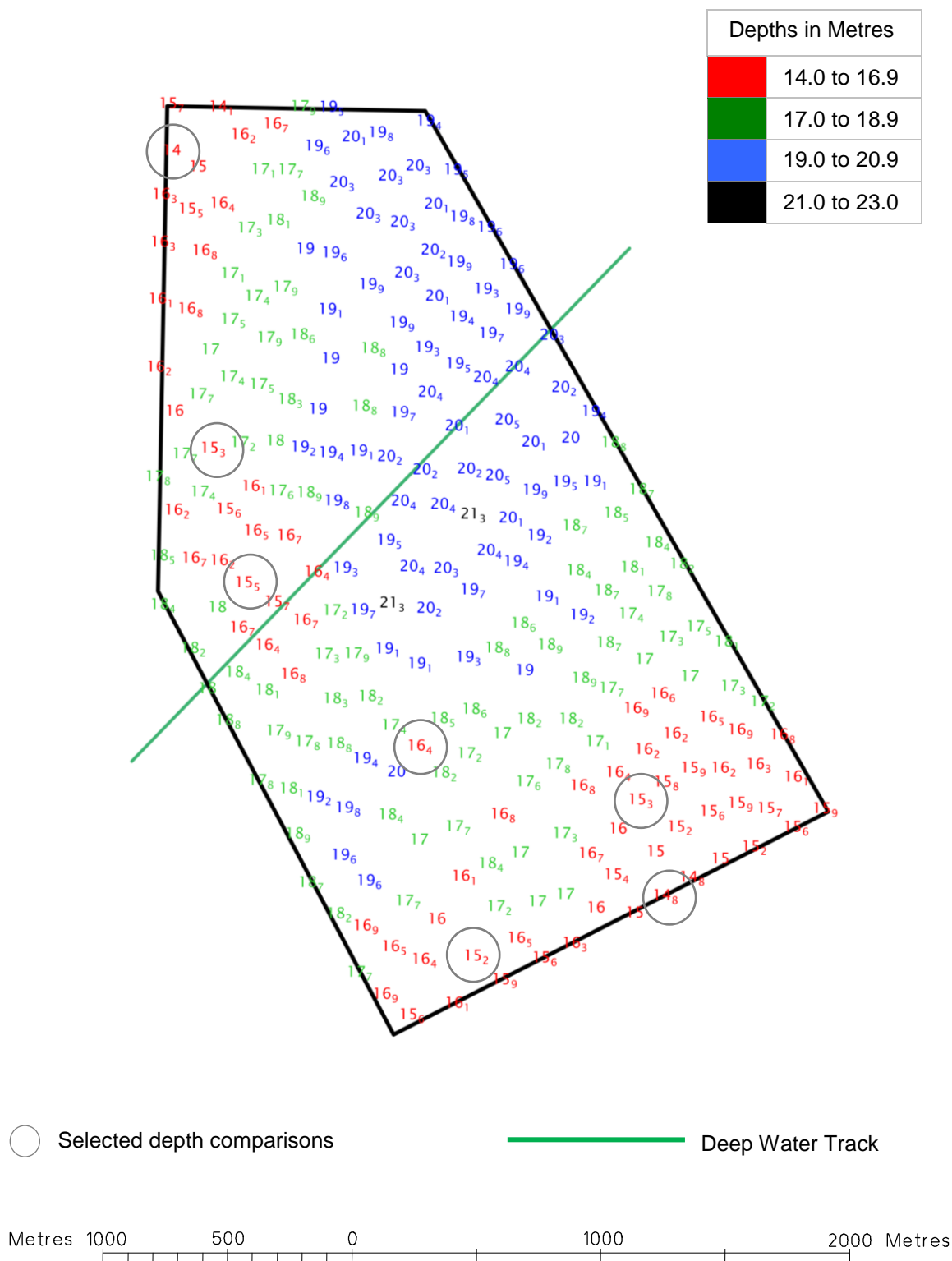
Depths in Metres	
	15.4 to 16.9
	17.0 to 18.9
	19.0 to 20.9
	21.0 to 22.0



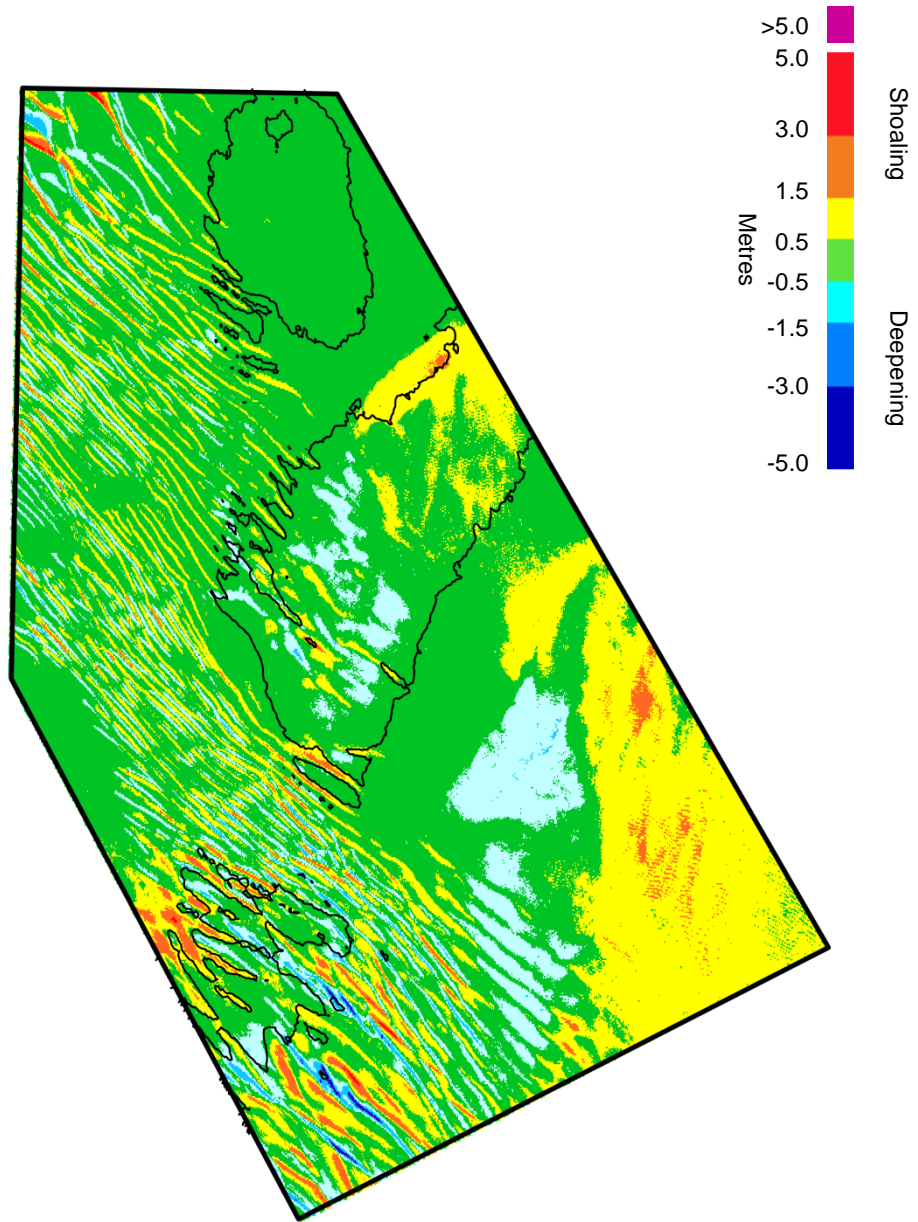
○ Selected depth comparisons — Deep Water Track



COLOUR BANDED DEPTH PLOT
 FROM THE 2014 SURVEY
 SHOWING SELECTED DEPTHS
 SCALE 1:25,000





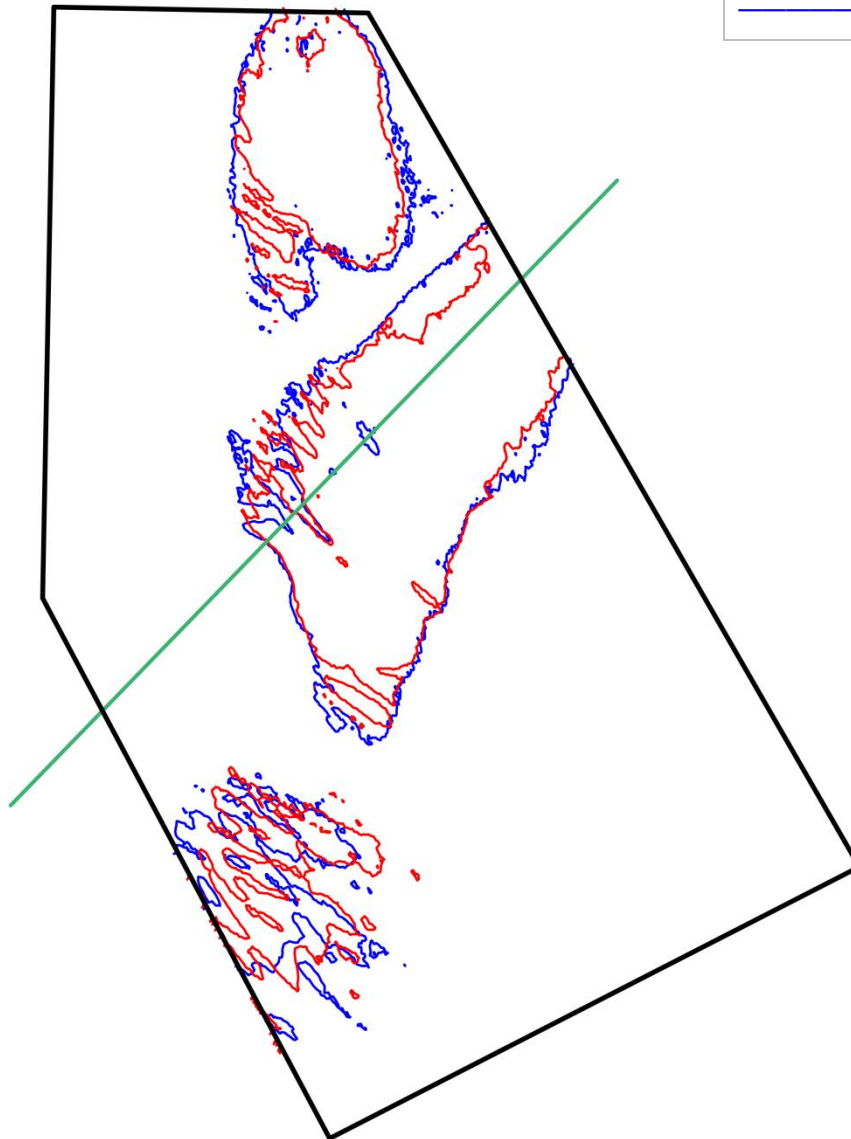
VARIABILITY PLOT SHOWING
BATHYMETRIC CHANGES BETWEEN THE 2008 AND 2014 SURVEYS
AND CHARTED CONTOURS FROM THE 2014 SURVEY
SCALE 1:25,000



Metres 1000 500 0 1000 2000 Metres

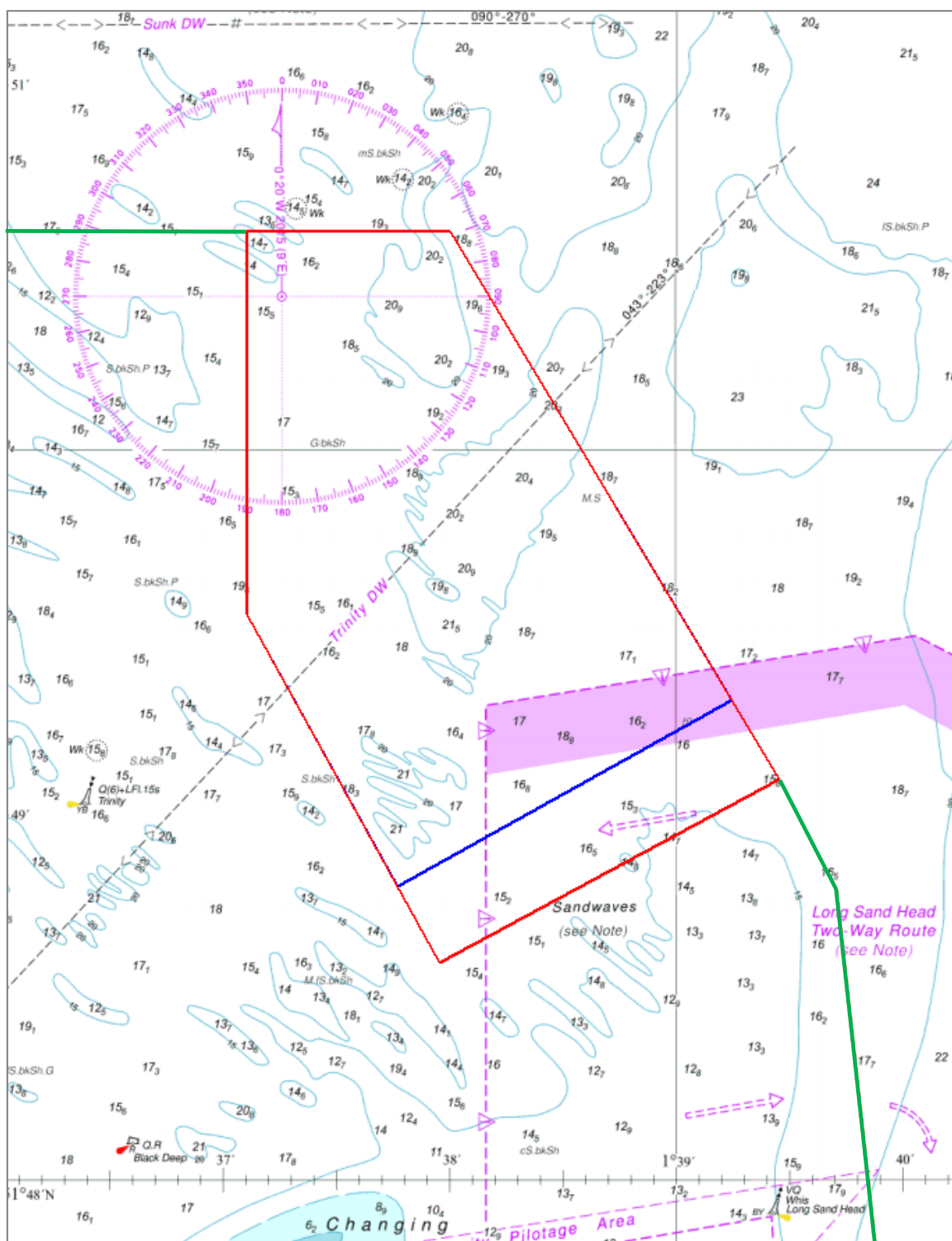
COMPOSITE DIAGRAM OF THE
20 METRE CONTOUR FROM THE 2008 AND 2014 SURVEYS
SCALE 1:25,000




Year of Survey	
	2014
	2008



 Deep Water Track

PROPOSED REVISED LIMITS



	Existing limits TE5 (6 yrs)
	Proposed southeast limit TE5
	TE5A full area limits (3 yrs)