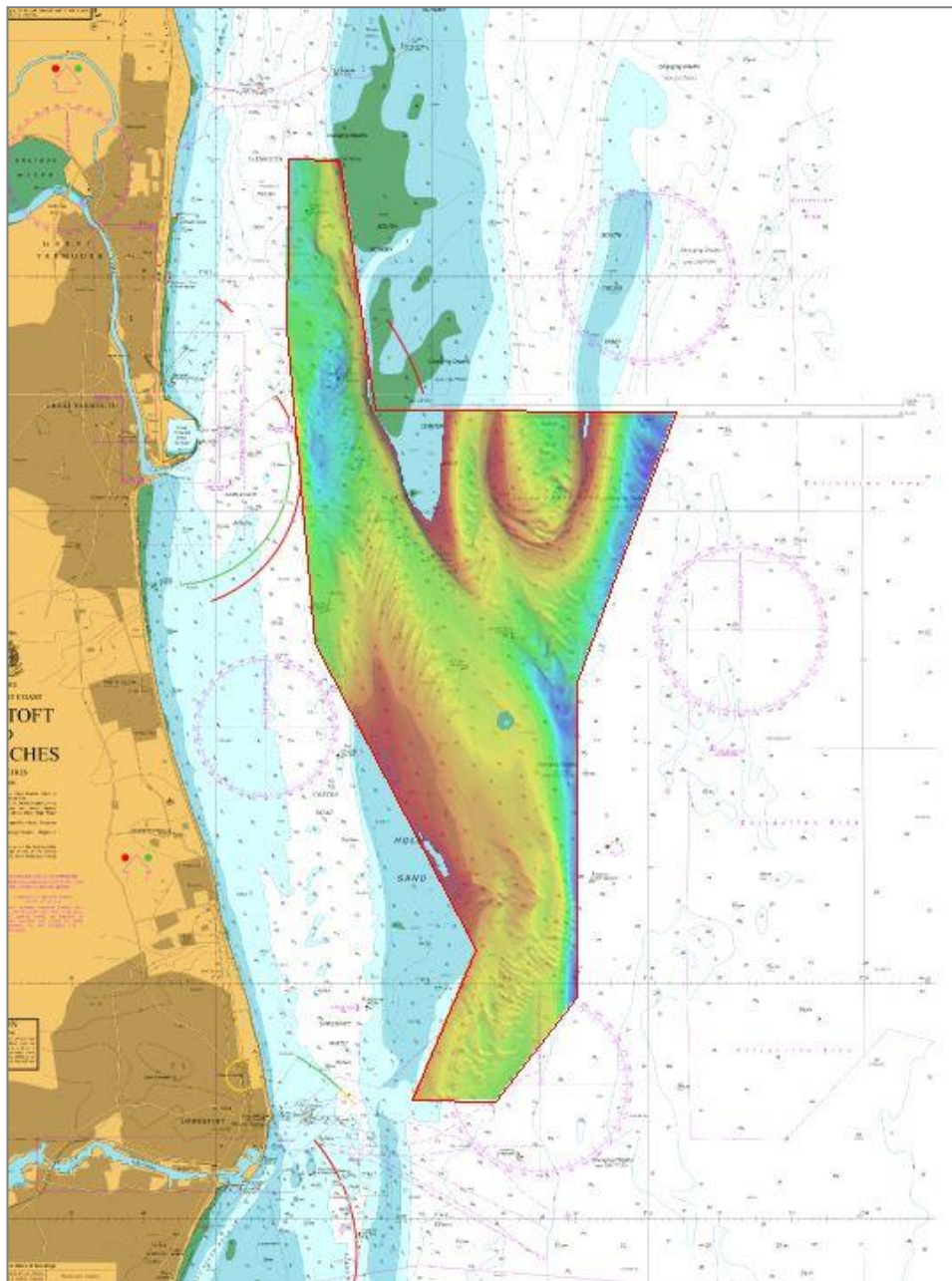




United Kingdom  
Hydrographic Office

## EAST ANGLIA HOLM CHANNEL

INCLUDING CORTON SAND, SOUTH SCROBY & HOLM SAND  
ASSESSMENT ON THE ANALYSIS OF ROUTINE RESURVEY AREA EA9  
FROM THE 2014 SURVEY



August 2015

EAST ANGLIA  
HOLM CHANNEL  
Assessment EA9/2014

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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## **HOLM CHANNEL, 2014**

### **1. EXECUTIVE SUMMARY**

#### **The Area and Recent Changes**

- 1.1 Holm Channel forms the main approach to Great Yarmouth from the south and east. It is surveyed annually under the Civil Hydrography Programme as a focused area within area EA9; the remainder of EA9, which includes the adjacent banks, is surveyed every 3 years. The 2014 survey assessed in this report was conducted as a full survey. In the past, a shoal ridge at the head of Holm Channel has linked Holm Sand, with Scroby Sands, but this has eroded away and depths in excess of 12 metres are now available through Holm Channel.
- 1.2 Changes that have occurred broadly continue trends observed in recent Assessments.
- 1.3 The eastern limits of Corton Sand and Cross Sand have migrated westwards; with the southern limit receding northwards. In the entrance to Holm Channel, the base of Holm Sand has extended northeast into the channel. This has resulted in shoaling of up to 10 metres, but with these changes taking place outside the 10-metre contour.
- 1.4 Changes do not affect use of the buoyed route through Holm Channel.

#### **Reasons for Continuing to Resurvey the Area**

- 1.5 Holm Channel provides relatively deep water for vessels approaching Great Yarmouth and Lowestoft.
- 1.6 The limits of the banks defining Holm Channel, in particular the western side of Corton Sand and northern and eastern side of Holm Sand require frequent re-surveying.
- 1.7 The remainder of the area requires less frequent surveying as it is either less dynamic, away from the buoyed channels or relatively deep water.

#### **Recommendations**

- 1.8 Changes outside the annual focused limits support the retention of a 3-year resurvey frequency across much of the full area.
- 1.9 It is recommended that the re-survey frequency of an area covering part of Corton Sand and Cross Sand is reduced, with the area transferred to areas EA5 (resurveyed every 12 years) and EA7 (fully resurveyed every 12 years with 6 year intervening checkline survey), as shown in Annex K.
- 1.10 It is recommended that the Focused Annual limits are modified slightly at the southern end of Corton Sand following continued migration of the bank, as shown in Annex K.

### **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 Department for Transport (including the MCA) and the MOD (including the UKHO).

### **3. HISTORY**

- 3.1 EA9 is one of the routine resurvey areas of the East Anglian Routine Resurvey Programme, which covers the approaches to the ports of Great Yarmouth and Lowestoft. An annual survey of Holm Channel and 3-year survey of the full area are conducted under the programme.
- 3.2 Prior to 1980, the area covered by EA9 was part of three Routine Resurvey areas. These were D, E1 and E2. In 1980, the areas were reorganised creating the annual survey area B1, which covered Holm Channel, Corton Sand and part of South Scroby.
- 3.3 In 1997, the area was given the identifier EA9, but with unchanged limits and survey frequency. Since then EA9 has undergone a number of changes to the limits. Originally surveyed annually, the policy of only surveying the full area every 3 years, with intervening annual surveys of Holm Channel, was introduced in 2003.
- 3.4 Following the 2006 Routine Resurvey Areas Working Group meeting, the limits of EA9 were extended up to the Great Yarmouth port limits, covering an area previously surveyed every 12 years under EA8. Following the 2011 survey, this area was reassigned to EA8. An area covering part of South Cross Sand and Corton Sand was transferred to adjacent areas EA5 and EA7, both of which are fully surveyed every 12 years.
- 3.5 Area specifications, including survey history, are at [Annex A](#).
- 3.6 Trinity House Lighthouse Service (THLS) conducts multibeam surveys of part of Holm Channel every 6 months to monitor positioning of the buoys in relation to the banks.

### **4. DESCRIPTION OF THE AREA**

- 4.1 EA9 covers Holm Channel, which provides the main approach to Great Yarmouth, and the banks that delimit it. The area covers 12 SQ NM (41 SQ Km) and the limits are shown at [Annex C](#), including the 2014 survey overlaid on the largest scale charts of the area.
- 4.2 Much of the area is devoid of sandwaves, particularly over the banks, but an extensive sandwave field lies along the northeast side of Holm Sand and within Holm Channel.
- 4.3 During previous surveys, large amounts of suspended fine sediment were observed in the water column throughout the area, especially on the rise up to the banks, where the tidal streams are strongest.

### **5. SHIPPING IN THE AREA**

- 5.1 Holm Channel is used by various craft, including offshore support vessels, coasters and small fishing vessels.
- 5.2 Much of Great Yarmouth Outer Harbour has been dredged to 10 metres (2012), with the harbour concentrated on offshore support work. Vessels entering Great Yarmouth Haven are normally restricted to 6.1 metres draught, but vessels up to 6.5 metres can be accommodated, subject to constraints on vessels beam and length. Vessels drawing up to 7.8 metres have been observed using Yarmouth Road.
- 5.3 Shipping routes are shown at [Annex B](#) (based on sample shipping data for 2012).

## **6. 2011 SURVEY DETAILS**

- 6.1 The survey was conducted from 29 May to the 26 June in conjunction with other resurvey areas. Weather in the area was generally good throughout the survey period, with slight to smooth sea states.
- 6.2 Survey data was acquired using a Kongsberg Maritime EM3002D multibeam echosounder. Observations calculated from the height component of the GPS position solution were used to reduce soundings to Chart Datum. Ellipsoidal Height to Chart Datum values were taken from the Vertical Offshore Reference Framework (VORF). The survey is referred to the ETRF89 reference frame and met IHO Order 1 (S44 4<sup>th</sup> Edition) standards. The survey deliverable was in the form of a 1-metre resolution CUBE (Combined Uncertainty and Bathymetric Estimator) surface.

## **7. 2014 SURVEY DETAILS**

- 7.1 The survey was conducted from 29 June to the 06 September in conjunction with other re-survey areas. Weather in the area was variable throughout the survey period, with smooth to moderate sea states, interrupted by periods of weather down time.
- 7.2 The survey was conducted using Kongsberg Maritime EM3002D and EM2040D multibeam echosounders. Observations calculated from the height component of the GPS position solution were used to reduce soundings to Chart Datum. Ellipsoidal Height to Chart Datum values were taken from the Vertical Offshore Reference Framework (VORF). The survey is referred to the ITRF2005 reference frame and met IHO Order 1a (S44 5<sup>th</sup> Edition) standards. The survey deliverable was in the form of a 1-metre resolution CUBE surface.

## **8. DESCRIPTION OF RECENT BATHYMETRIC CHANGE**

- 8.1 Colour banded depth plots of the 2011 and 2014 surveys are at [Annexes D](#) and [E](#). A variability plot showing depth differences between the 2011 and 2014 surveys is at [Annex F](#).
- 8.2 Comparison plots of the 5, 8, 10 and 15-metre contours are at [Annexes G](#), [H](#), [I](#) and [J](#) respectively.
- 8.3 The variability plot at [Annex F](#) shows the annual focused limits and allows examination of changes that have occurred in the area surveyed every 3 years.
- 8.4 In the entrance to Holm Channel, Holm Sand has extended northeast into the channel. This has resulted in shoaling of up to 10 metres, but with these changes largely taking place outside the 10-metre contour. This change is shown in the cross-section profile C-D at [Annex C](#) and the 15-metre contour at [Annex J](#).
- 8.5 Over the shoal area of Holm Sand, along the western edge of EA9, depths of less than 2 metres are found further south than in the 2011 survey. To the south and east of this, changes are complex with both shoaling and deepening occurring across the area.
- 8.6 The southern end of South Scroby has receded, as shown by the 5-metre contour at [Annex G](#). The bank itself has reduced in width and, between Mid Corton and West Corton buoys, moved westwards into Holm Channel. This is shown in the cross-section profile A-B at [Annex C](#).
- 8.7 In the north of EA9, the deep area around Southwest Scroby buoy and to the south of it, as defined by the 20-metre contour, has continued to deepen with the maximum depth increasing from 24.6 metres to 27 metres.

## **9. IMPLICATIONS FOR SHIPPING**

- 9.1 Although there have been large changes in depth across the area, these present no new concerns to vessels using the buoyed route through Holm Channel.

## **10. RECOMMENDATIONS FOR FUTURE SURVEYS**

- 10.1 Changes outside the annual focused limits support the retention of a 3-year resurvey frequency across much of the full area.
- 10.2 An area covering part of Corton Sand and Cross Sand covers shoal water away from the buoyed route and it is recommended that the survey frequency is reduced, with the area transferred to areas EA5 (resurveyed every 12 years) and EA7 (fully resurveyed every 12 years with 6 year intervening checkline survey), as shown in [Annex K](#). This reduces the area of EA9 by 17%.
- 10.3 It is recommended that the Focused Annual limits are modified slightly at the southern end of Corton Sand following continued migration of the bank, as shown in [Annex K](#).

**AREA SPECIFICATIONS**  
(Including Survey History)

**REGION:** East Anglia**NAME:** Holm Channel**AREA:** EA9**LIMITS (ETRS89 Datum):**

1yr Interval

A	52°.61629N	1°.77388E
B	52°.61667N	1°.77870E
C	52°.58108N	1°.78700E
D	52°.56076N	1°.80378E
E	52°.56251N	1°.80786E
F	52°.54940N	1°.82305E
G	52°.54400N	1°.80970E
H	52°.52086N	1°.83333E
I	52°.49833N	1°.83333E
J	52°.49833N	1°.82583E
K	52°.51090N	1°.82614E
L	52°.54290N	1°.79597E
M	52°.54290N	1°.77800E
N	52°.57017N	1°.78442E

3yr Interval

A	52°.61667N	1°.76651E
B	52°.61664N	1°.77861E
C	52°.58118N	1°.78685E
D	52°.58095N	1°.85640E
E	52°.54260N	1°.83353E
F	52°.49822N	1°.83350E
G	52°.48348N	1°.81458E
H	52°.48365N	1°.79527E
I	52°.50498N	1°.81008E
J	52°.54825N	1°.77296E
K	52°.59294N	1°.76627E
L	52°.60638N	1°.76649E

**AREA SIZE:** 1yr: 3.6 SQ NM (12.0 SQ KM) 3yr: 12.0 SQ NM (41.0 SQ KM)**SURVEY INTERVAL:** Focused Area: 1 year. Whole Area: 3 years.

**PREVIOUS SURVEYS:** (refer to 2001 Assessment for details of 1985 to 1994 surveys)  
Singlebeam surveys (prior to 2004) conducted at 1:25,000

Year	Survey	File Ref	Data	Year	Survey	File Ref	Data
1995	M2469	HH090/662/01	s.t.d.	2006	M4527	HH091/163/01	m.
1996	M2612	HH090/687/01	s.d.	2007	M4633	HH091/220/01	m.
1997	M2801	HH090/733/01	s.d.	2008	M4788	HH091/260/01	m.
1998	M2996	HH090/766/01	s.d.	2009	HI1292	2009-29527	m.*
1999	M3207	HH090/848/01	s.t.d.	2010	HI1338	2010-213940	m.*
2000	M3339	HH090/883/01	s.d.	2011	HI1367	2011-106141	m.
2001	M3536	HH090/942/01	s.d.	2012	HI1397	2012-117402	m.*
2002	M3769	HH090/989/01	s.t.d.	2013	HI1432	2013-261940	m.*
2003	M3901	HH091/019/01	s.d.	2014	HI1458	2014-142852	m
2004	M4156	HH091/075/01	m				
2005	M4267	HH091/111/01	m				

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

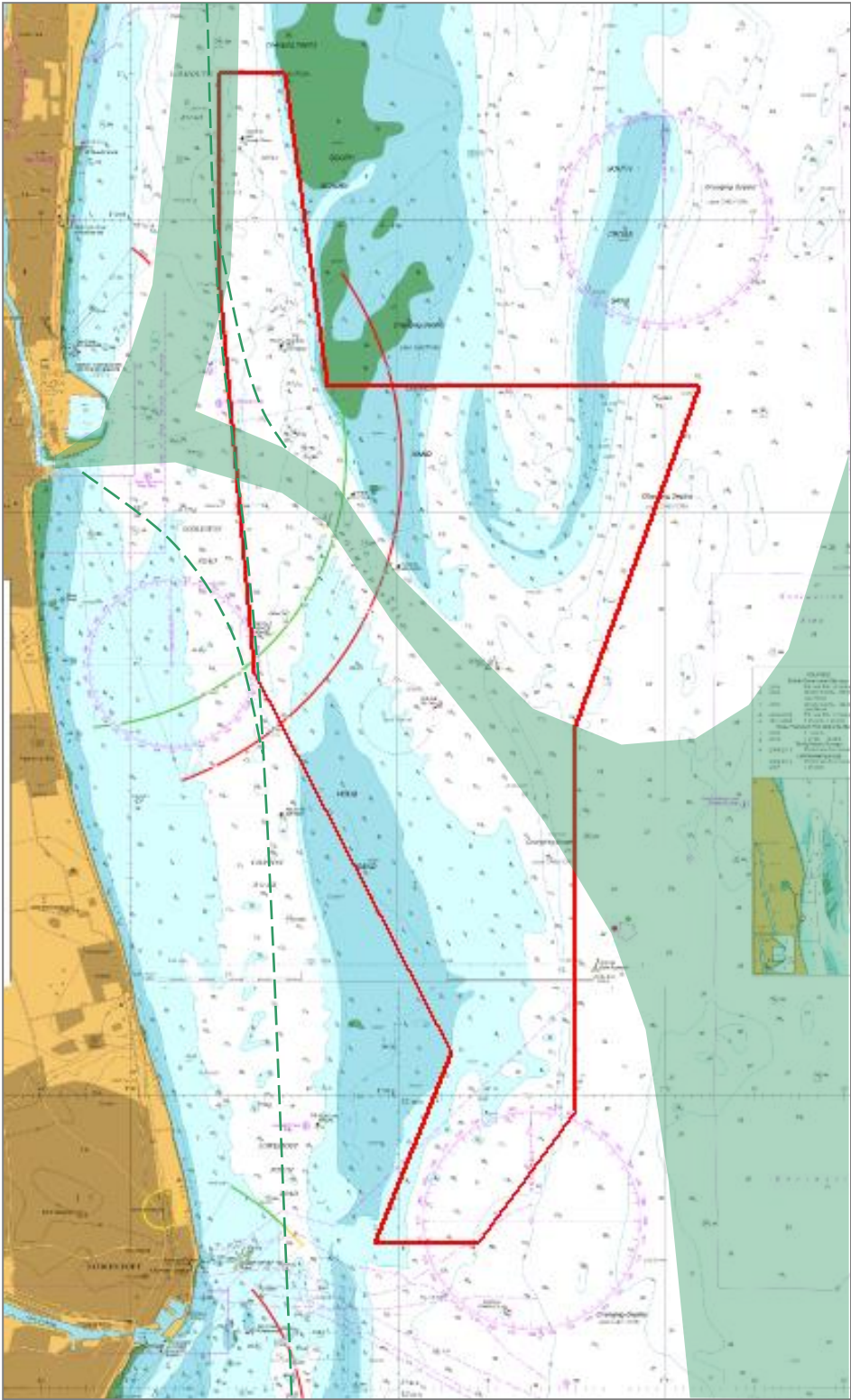




**REPORTS:** 1986 Latest survey included K9597 (H0423/86)  
1996 Latest survey included M2469 (HA145/02/03/05)

**ASSESSMENTS:** 1995 M2469 (HA145/02/03/05-E5) 2002 M3769 (HA145/010/068/01-E5)  
1996 M2612 (HA145/010/003/01) 2003 M3901 (HA145/010/078/01-E5)  
1997 M2801 (HA145/010/003/01) 2004 M4156 (HA145/010/078/01)  
1998 M2996 (HA145/010/003/01) 2005 M4267 (HA145/010/078/01)  
2000 M3339 (HA145/010/032/01-E2) 2006 M4527 (HA145/010/078/01)  
2001 M3536 (HA145/010/032/01-E7) 2007 M4633

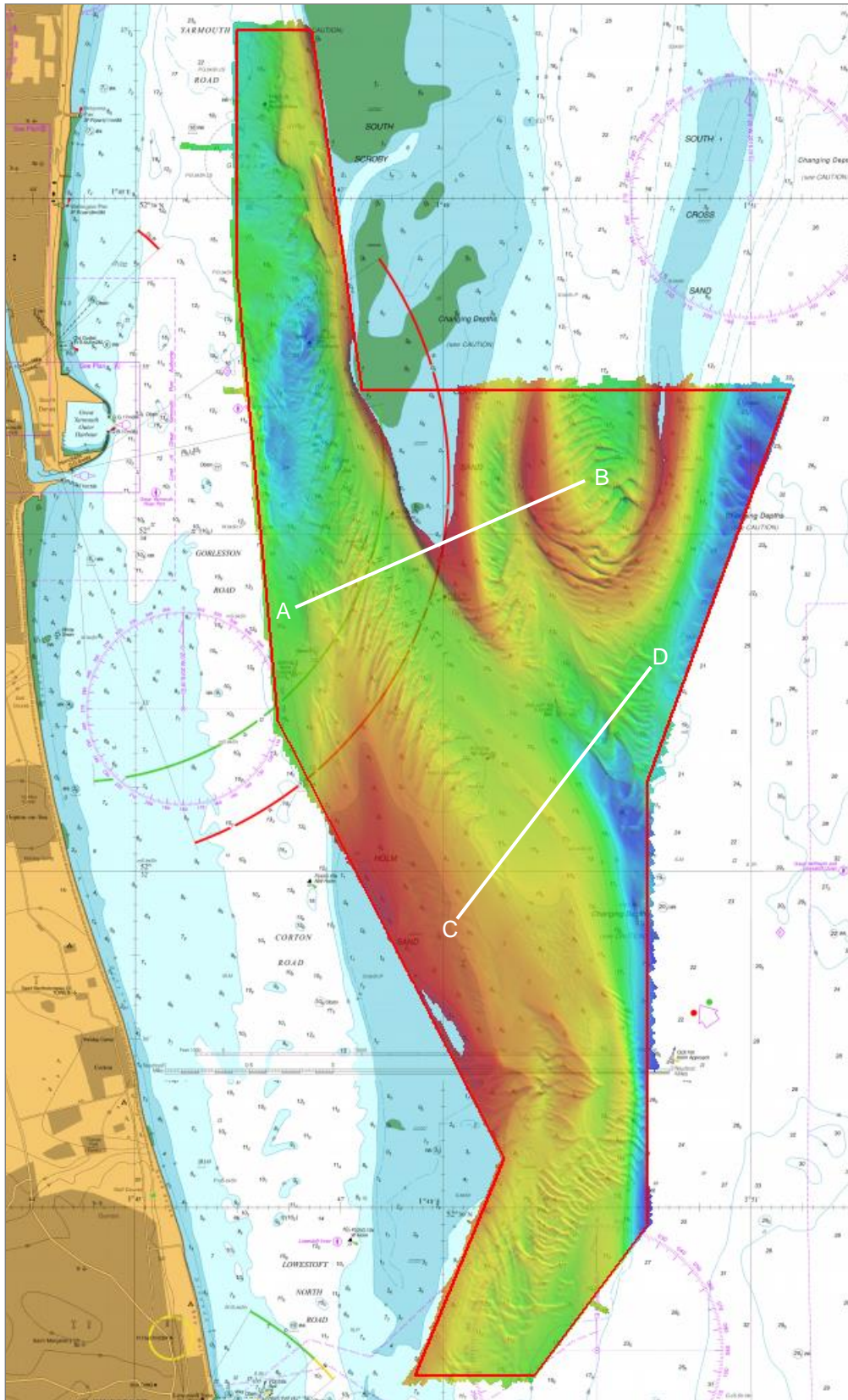
**REMARKS:** 1980 Area B1 established. Part of old areas D and E2 (H3912/80).  
1992 Amendment to NW limit to encompass westerly movement of Corton Sand (HH090/570/01).  
1994 HI662 Amendment to west limit to encompass westerly movement of Corton Sand (HH090/662/01); see also recommendation in 1995 Report of area B6.  
1997 Amendment to limits. Identifier changed to EA9. See East Anglian Summary Report (HA145/002/001/03).  
2000 Northward extension of area to cover exit from Holm Channel into Barley Picle (East Anglia Review 2000 (HA145/010/041/01)).  
2002 Amendment to limits to compensate for sediment movement.  
2003 Recommended focusing effort on surveying channels.  
2006 Revised limits.  
2008 Revised focus limits.  
2011 Revised limits.

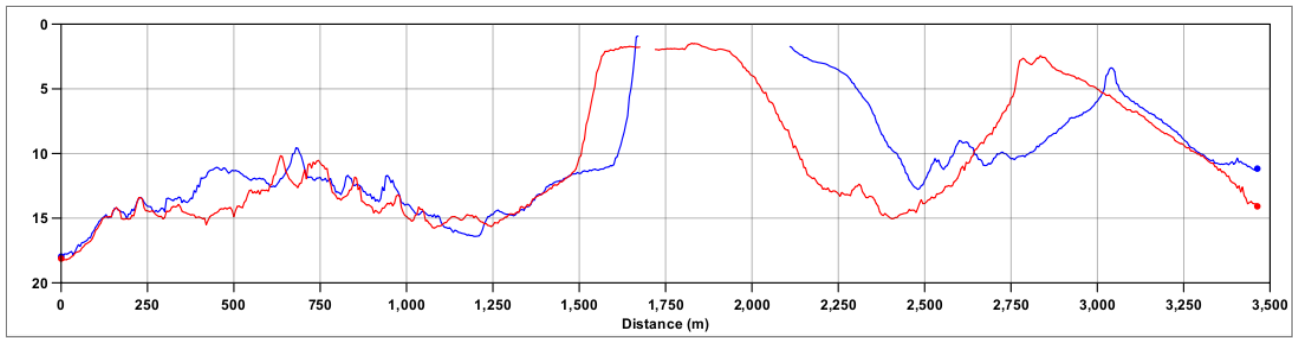
**LARGEST SCALE CHART:** 1534 and 1535 (1:25,000)



-  Main traffic routes
-  Other traffic routes

2014 SURVEY DATA OVERLAID ON CHARTS 1534 AND 1535  
AND CROSS-SECTION PROFILES

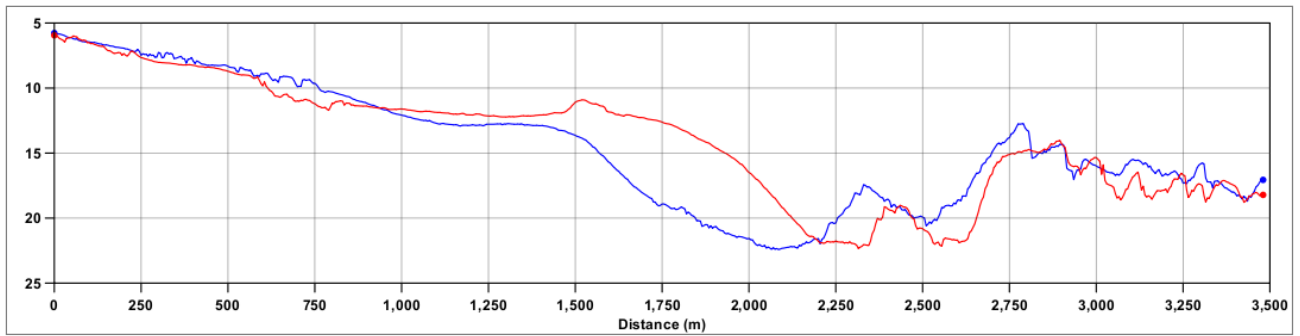




A

Profile A-B


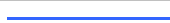
B



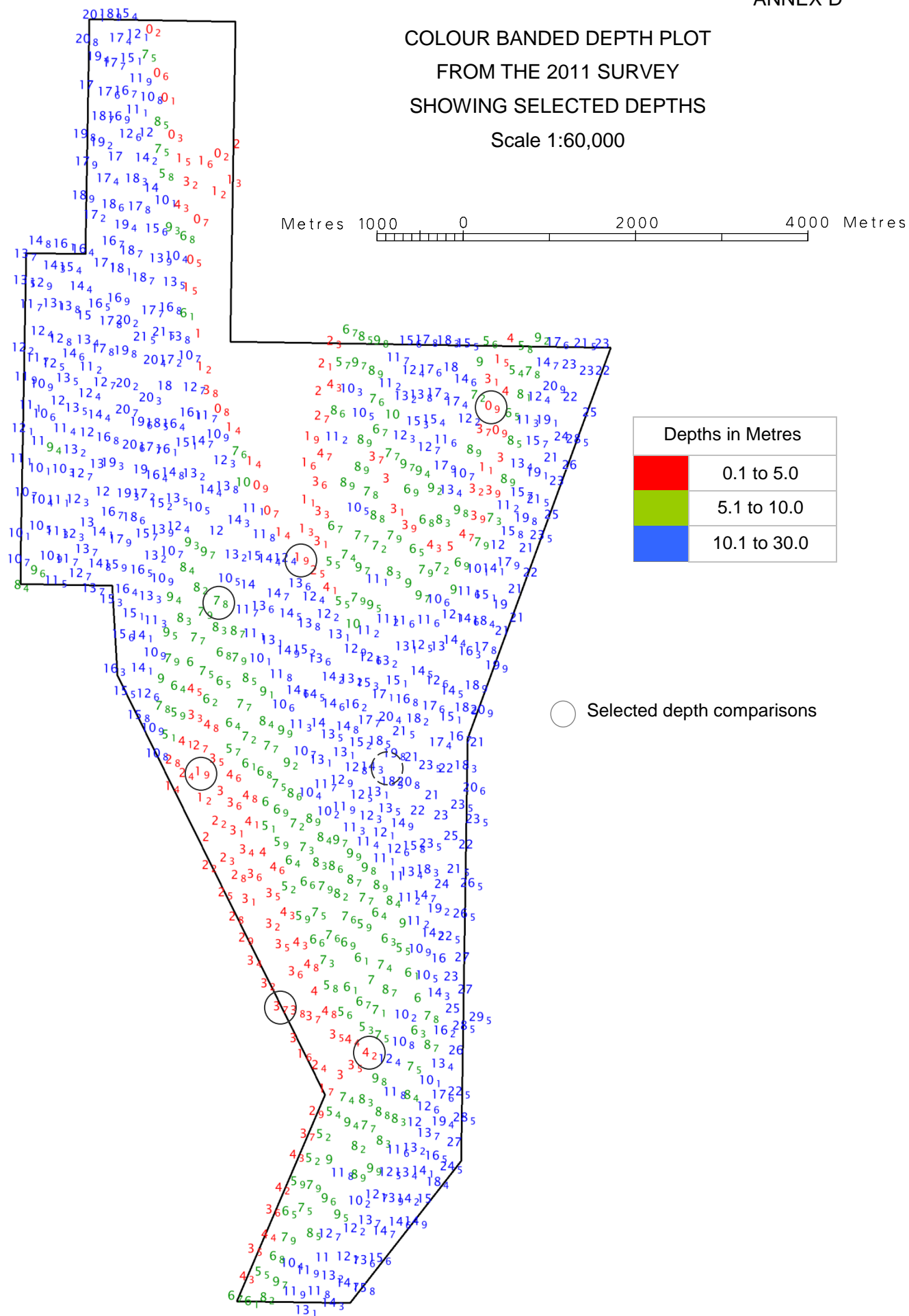
C

Profile C-D

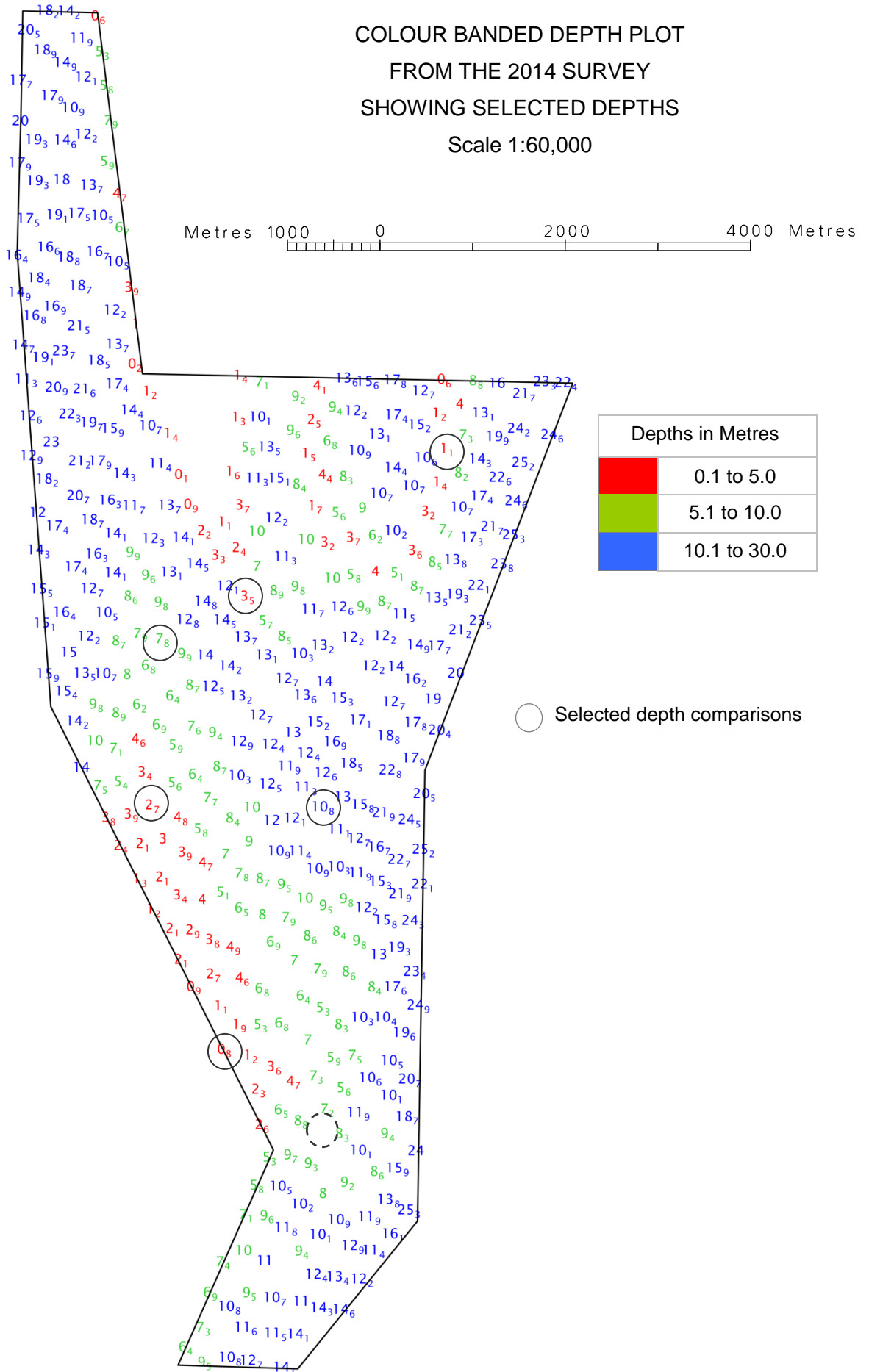
D

	2014
	2011

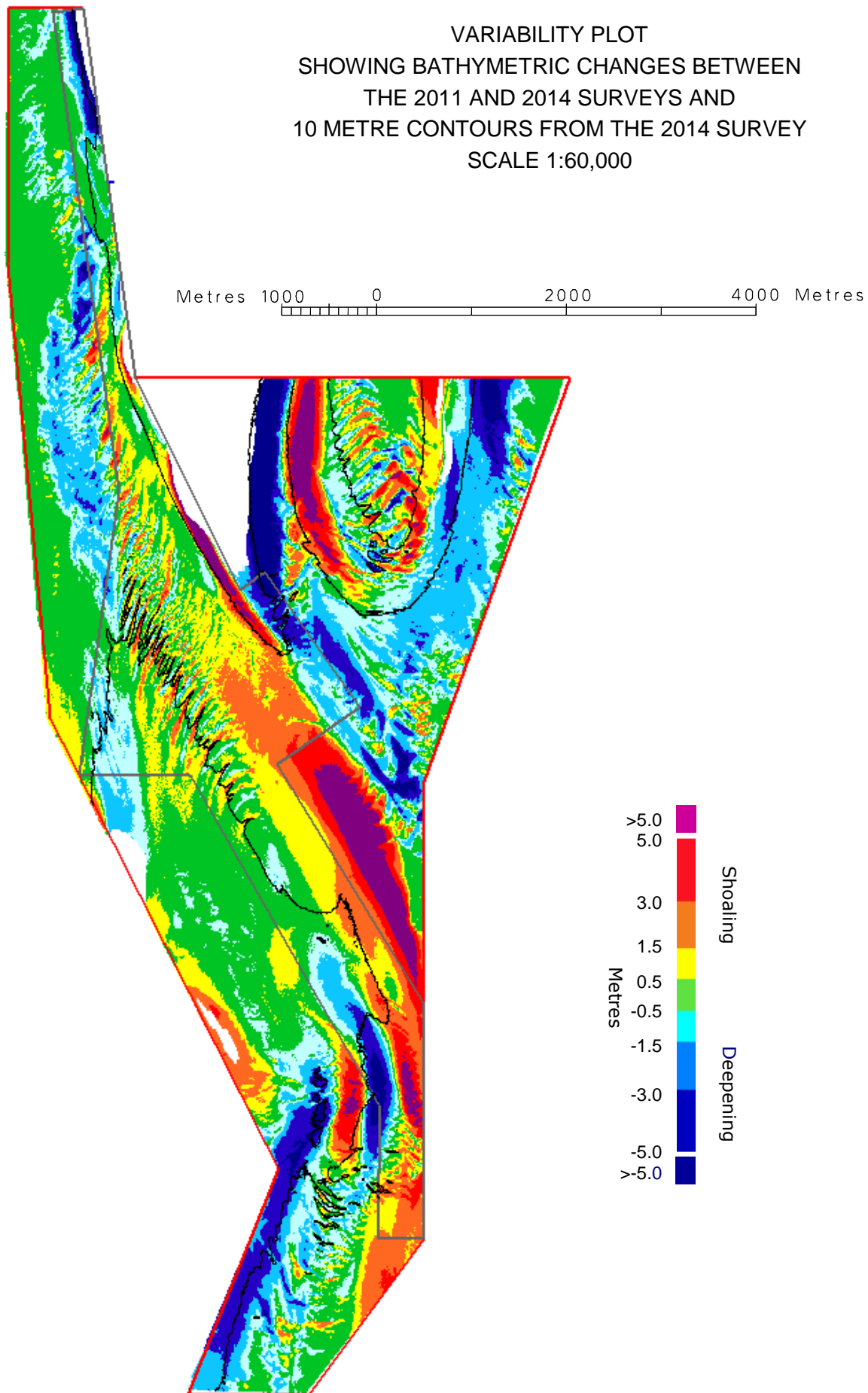
COLOUR BANDED DEPTH PLOT  
FROM THE 2011 SURVEY  
SHOWING SELECTED DEPTHS  
Scale 1:60,000



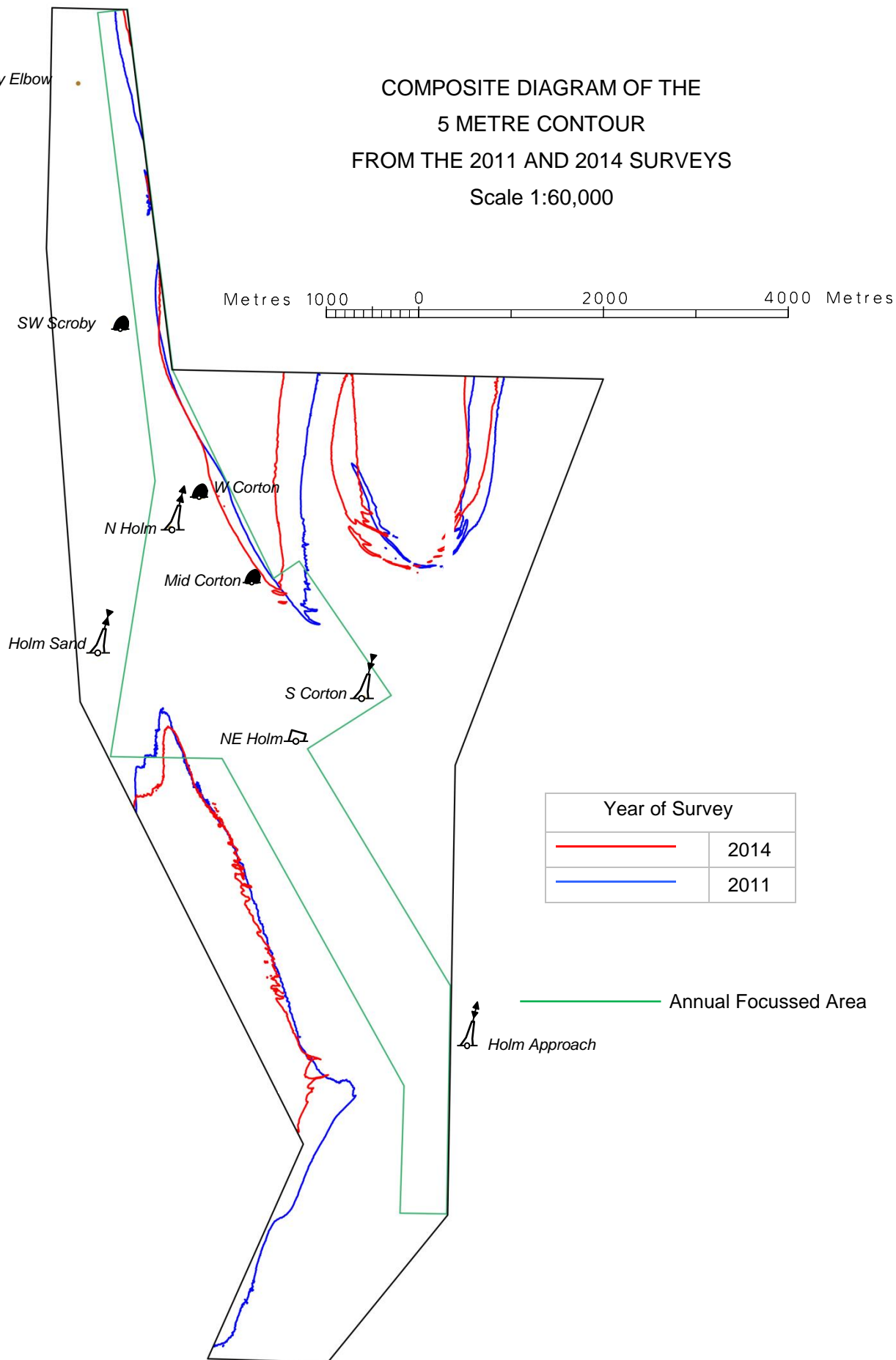
COLOUR BANDED DEPTH PLOT  
FROM THE 2014 SURVEY  
SHOWING SELECTED DEPTHS  
Scale 1:60,000



VARIABILITY PLOT  
SHOWING BATHYMETRIC CHANGES BETWEEN  
THE 2011 AND 2014 SURVEYS AND  
10 METRE CONTOURS FROM THE 2014 SURVEY  
SCALE 1:60,000

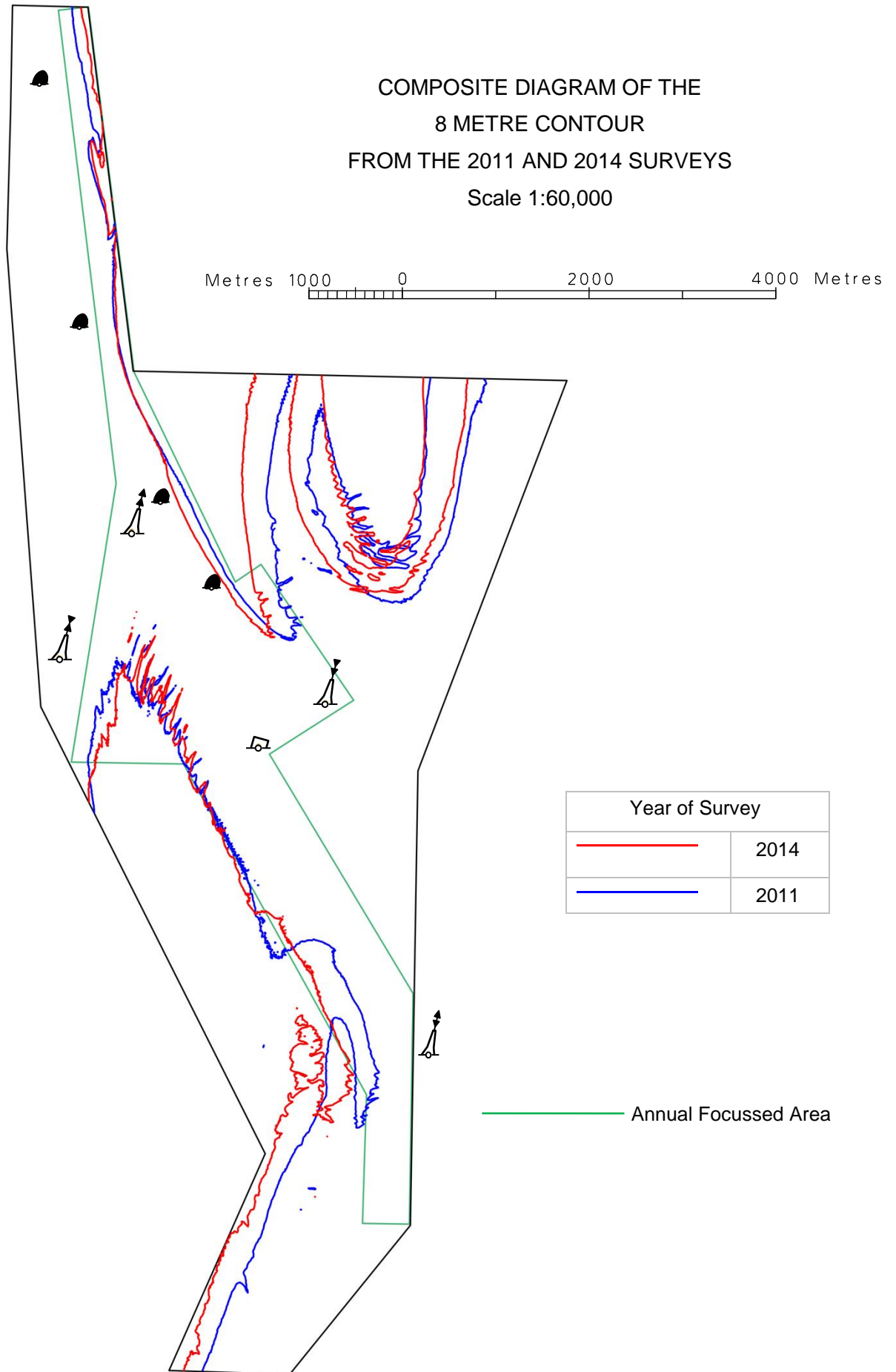


COMPOSITE DIAGRAM OF THE  
5 METRE CONTOUR  
FROM THE 2011 AND 2014 SURVEYS  
Scale 1:60,000



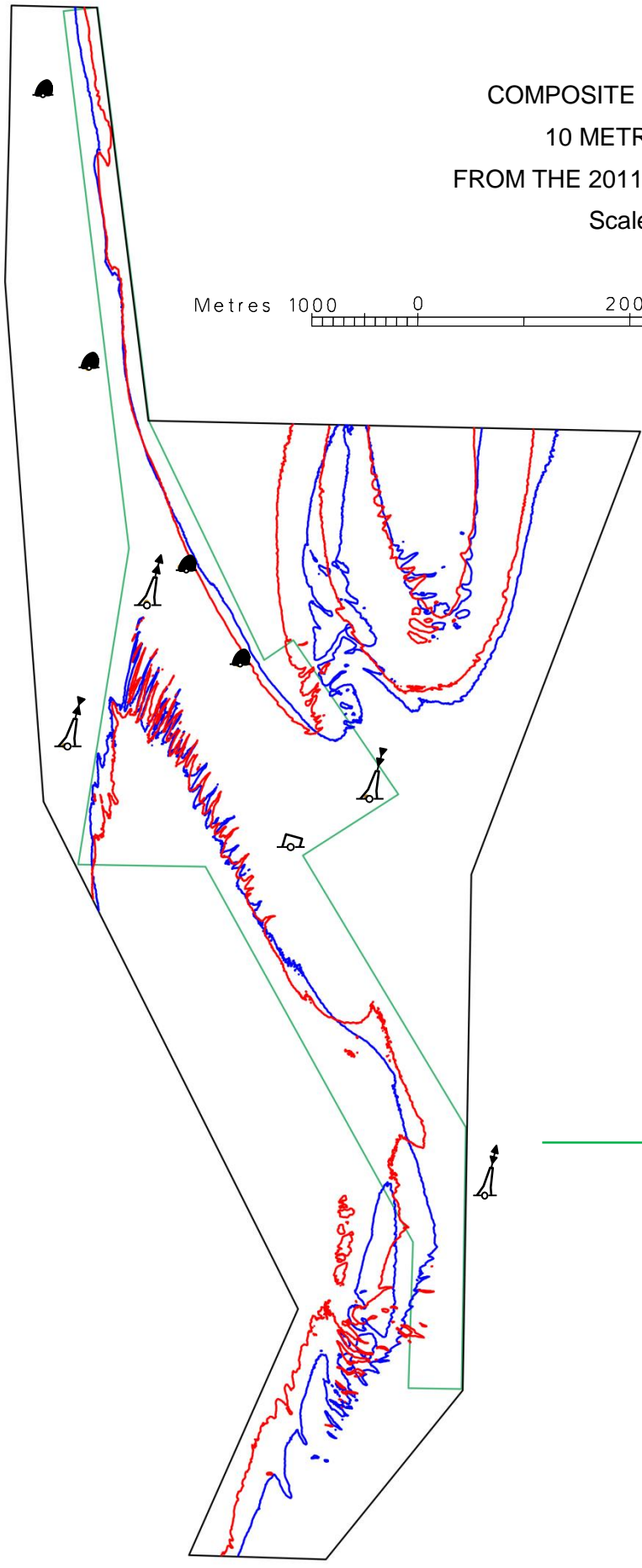


COMPOSITE DIAGRAM OF THE  
8 METRE CONTOUR  
FROM THE 2011 AND 2014 SURVEYS  
Scale 1:60,000



COMPOSITE DIAGRAM OF THE  
10 METRE CONTOUR  
FROM THE 2011 AND 2014 SURVEYS  
Scale 1:60,000

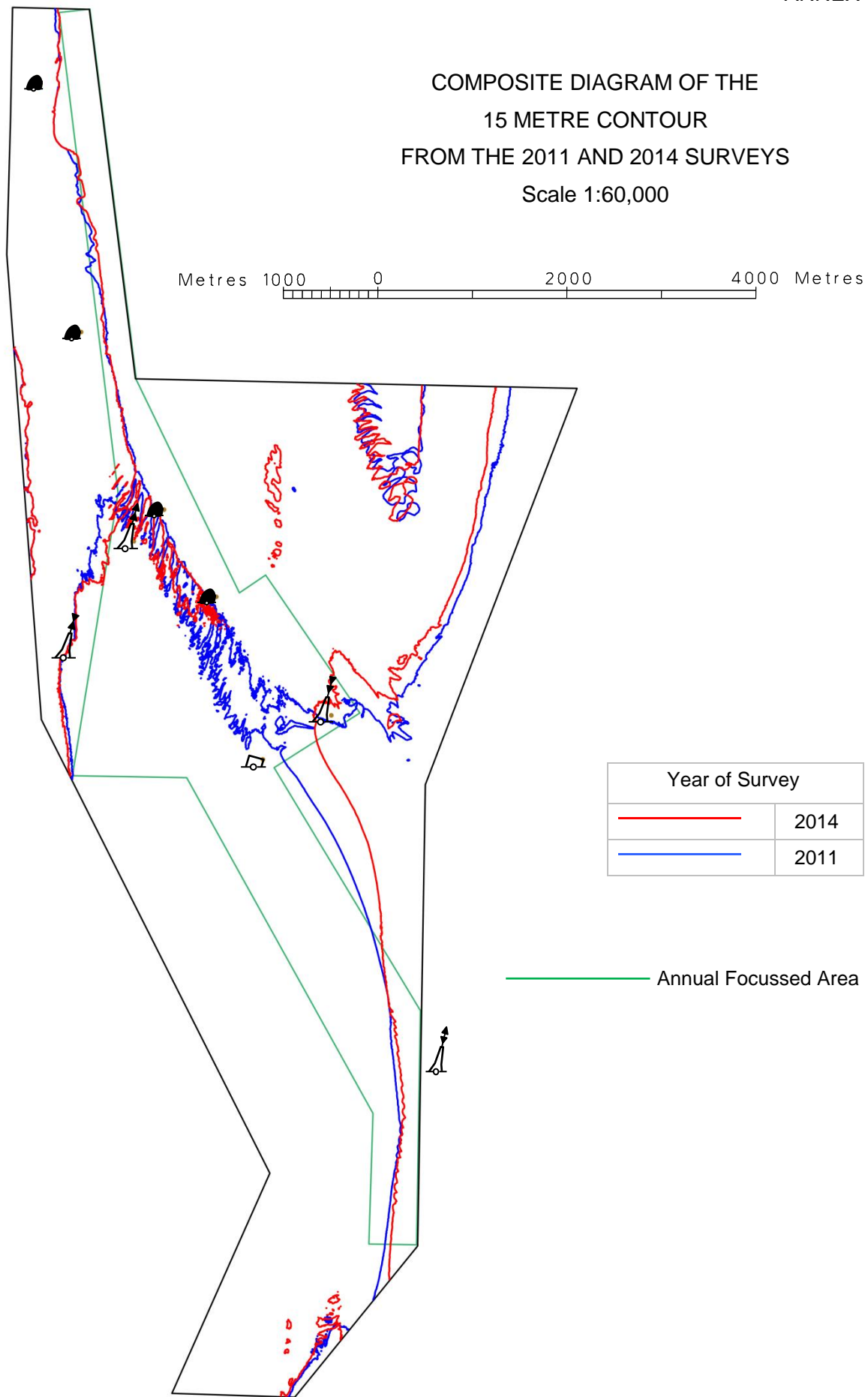
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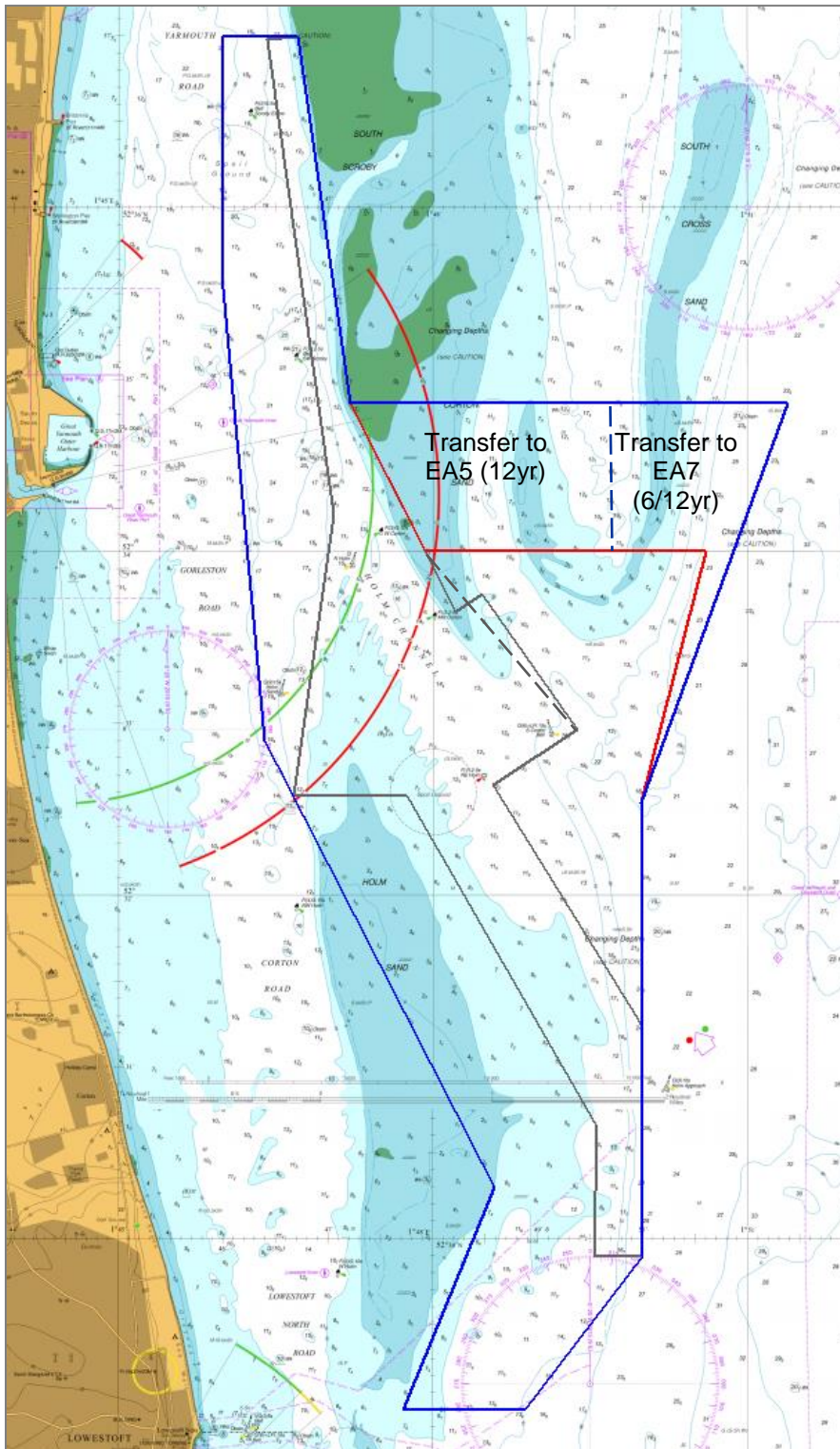
Year of Survey	
<span style="color: red;">—</span>	2014
<span style="color: blue;">—</span>	2011





— Annual Focussed Area

COMPOSITE DIAGRAM OF THE  
15 METRE CONTOUR  
FROM THE 2011 AND 2014 SURVEYS  
Scale 1:60,000



PROPOSED REVISION TO EA9 LIMITS



	Current 3 Year EA9 Limits
	Proposed 3 Year EA9 Limits
	Focused Annual EA9 Limits
	Proposed change to Focused Annual EA9 Limits