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NATURAL ENVIRONMENT RESEARCH COUNCIL

Surface Tow Boomer Survey around the Isle of Sheppey

Coastal Programme

Open Report OR/09/014



BRITISH GEOLOGICAL SURVEY

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D.G.Wallis

Keywords

Boomer, Sheppey, Thames,
Medway, Peel Ports.

Contributor/editor

P S Balson

National Grid Reference

SW corner 57000,160000
NE corner 605000,195500

Map

Sheet 178, 1:50,000 scale,
Thames Estuary

Front cover

BGS Surface Towed Boomer
Catamaran

Bibliographical reference

BALSON, P; WALLIS, D. 2026.
Surface Tow Boomer Survey
around the Isle of Sheppey.
*British Geological Survey Open
Report*, OR/09/014. 25pp.

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British Geological Survey offices

BGS Central Enquiries Desk

Tel 0115 936 3143 Fax 0115 936 3276
email enquiries@bgs.ac.uk

Kingsley Dunham Centre, Keyworth, Nottingham NG12 5GG

Tel 0115 936 3241 Fax 0115 936 3488
email sales@bgs.ac.uk

Murchison House, West Mains Road, Edinburgh EH9 3LA

Tel 0131 667 1000 Fax 0131 668 2683
email scotsales@bgs.ac.uk

Natural History Museum, Cromwell Road, London SW7 5BD

Tel 020 7589 4090 Fax 020 7584 8270
Tel 020 7942 5344/45 email bgs-london@bgs.ac.uk

Columbus House, Greenmeadow Springs, Tongwynlais, Cardiff CF15 7NE

Tel 029 2052 1962 Fax 029 2052 1963

Forde House, Park Five Business Centre, Harrier Way, Sowton EX2 7HU

Tel 01392 445271 Fax 01392 445371

Maclean Building, Crowmarsh Gifford, Wallingford OX10 8BB

Tel 01491 838800 Fax 01491 692345

Geological Survey of Northern Ireland, Colby House, Stranmillis Court, Belfast BT9 5BF

Tel 028 9038 8462 Fax 028 9038 8461

www.bgs.ac.uk/gsni/

Parent Body

Natural Environment Research Council, Polaris House, North Star Avenue, Swindon SN2 1EU

Tel 01793 411500 Fax 01793 411501
www.nerc.ac.uk

Website www.bgs.ac.uk

Shop online at www.geologyshop.com

Foreword

This report is the Operations Report for the Surface Towed Boomer survey undertaken by BGS on the M/V Medway Surveyor in March 2009. The BGS staff working on the project were Peter Balson, David Wallis and David Baxter.

Acknowledgements

In addition to the BGS staff acknowledged above, the following individuals also helped and assisted in the project:-

Medway Surveyor Crew

Survey Coxswain	Mr Barry Ellis
Coxswain	Mr Trevor Massey
Coxswain	Mr Nigel Mills
Trainee Coxswain	Miss Jade Johnson
Surveyor	Mr Tom Ochman

Peel Ports Office Staff

Mr Paul Sands
Mr Phil Woodgate
Mr Guy Peto

Contents

Foreword	2
Acknowledgements.....	2
Contents.....	3
1 Introduction	3
2 Narrative	4
2.1 Monday 9 th March	5
2.2 Tuesday 10 th March	5
2.3 Wednesday 11 th March	6
2.4 Thursday 12 th March.....	6
3 Equipment.....	8
4 Navigation	8
5 Conclusion.....	8
Appendix 1 Layback Diagram	17
Appendix 2 Line Plan North of the Isle of Grain in the Thames Estuary	18
Appendix 3 Line Plan for Medway Estuary	19
Appendix 4 Line Plan for Western Swale Estuary.....	20
Appendix 5 Line Plan for Eastern Swale Estuary.....	21

Photographs

1. M/V Medway Surveyor in Sheerness Docks.....	4
2. Kingsnorth Power Station.....	5
3. Kingsferry Bridge	6
4. West end of Swale with Sheppey Crossing in background	7

1 Introduction

In order to advance BGS knowledge of the Medway and Swale Estuaries, the Medway Surveyor was hired from Peel Ports in March 2009 and a surface towed boomer seismic reflection survey was undertaken. The project was heavily constrained by tides; it being essential that certain survey lines were run at high water spring tides, preferably at midday to assure confidence in navigation.

2 Narrative

The dates for this survey were constrained between 9th and 13th March 2009 in order to satisfy the need for high water spring tides at or about midday. BGS provided a team of three, comprising:

Peter Balson Geologist

David Wallis Engineer/Surveyor

David Baxter Engineer

The motor vessel Medway Surveyor was hired from Peel Ports through the intermediaries of Guy Peto, Phil Woodgate and Paul Sands who operate from Peel Ports Sheerness Docks office.

The vessel is the survey vessel fitted with differential GPS and single beam echosounder attached to Sheerness Docks. Normally it is moored at the western end of the dock complex with quick and easy access to the Medway Estuary.



1. M/V Medway Surveyor in Sheerness Docks

Access to the vessel is restricted to descending a steel ladder from the dock edge and this limited loading the equipment onto the vessel. The boomer and the rest of the BGS survey equipment was loaded onboard the vessel on the Monday morning using the dockside crane and a cargo net.

The navigation laptop had a Helmsman's Display as part of the program and it was possible to connect this to the screen already mounted in front of the Coxswain, allowing him to run the

lines selected from the QINSy survey package. This proved extremely advantageous as it had been envisioned that the separate display screen brought along for the purpose would need linking up somewhere in the front of the wheelhouse.

2.1 MONDAY 9TH MARCH

The mobilisation took most of the first day to complete and the vessel was only able to sail at 1520 to run some test/shakedown lines before finishing for the day before 1900.

The first line was run westwards from just outside the harbour mouth, heading up the Medway towards the Kingsnorth power station. This allowed the testing of the boomer and hydrophone as well as the helmsman display for the coxswain. At this point all the survey equipment was being run from an Uninterruptible Power supply (UPS), with little sign of the problems which were to plague the survey on the following morning.



2. Kingsnorth Power Station

2.2 TUESDAY 10TH MARCH

The following day, the vessel sailed at 0845 and proceeded out into the Thames to the north of the Isle of Sheppey where the lines were started by running back towards the Medway. As the weather proved somewhat rougher than hoped for, the line plan for the day was constrained to running up and down within the Medway Estuary. Operations were interrupted with increasing frequency by the UPS dropping out and this was only resolved by disconnecting the UPS and running all the equipment directly from the onboard generator. It turned out that the UPS was unable to charge itself at a sufficient rate to cope with the demand from the equipment onboard. Although, once charged it could supply the required current until its batteries were exhausted.

Once the power problems were corrected at 1540, operations continued with little difficulty. Lines 11 and 12 were run up and down the Swale, as far as the lifting bridge, after the power problems were fixed. The day finished with the vessel tying up just before 1800.

2.3 WEDNESDAY 11TH MARCH

The weather being almost calm, the vessel proceeded out into the Thames Estuary to the north of the Isle of Grain to collect data in the main shipping channel. As this was in constant use by large cargo vessels the linearity of the survey lines was occasionally affected as the launch was required to keep out of their way if possible. A major advantage of using the dock authority survey launch became apparent at this point as the launch was known to the regular channel users and able to obtain frequent updates to shipping movements before they occurred.

No further problems occurred with the power supply and the fair weather allowed the completion of the offshore section of the survey.

2.4 THURSDAY 12TH MARCH

The weather was forecast to deteriorate so this day was to be dedicated to the sheltered passage through the Swale with hopes to accomplish as much coverage at the eastward end as the sea state allowed.

Due to an exceptionally low tide (Equinoctial Springs) the vessel could not sail till 0920, however this proved advantageous as the high tide allowed access to more of the Swale Estuary.

As the western end of the Swale had been surveyed on the Tuesday, the vessel steamed up beyond the lifting bridge where line 32 was started heading east towards the other entrance. This line started in very sheltered water and the hope was to get as far east as possible before the weather created too much noise for usable data. In the event, survey continued to just opposite Seasalter where a small cross line was surveyed before turning and heading back up the Swale while high water allowed easy passage.



3. Kingsferry Bridge

On return to the Medway, lines were surveyed up and down Stanegate Creek and a final attempt to collect data was made just outside the dock entrance.



4. West end of Swale with Sheppey Crossing in background

3 Equipment

The M/V Medway Surveyor came ready fitted with an Odom EchotracIII echosounder and a Trimble 4000 GPS set. The GPS set utilised the differential corrections available from the IALA (International Association of Lighthouse Authorities) MSK (Medium Shift Keying) beacons. The Echo sounder values in the data sets have been corrected for the location within the vessel hull **but not for Tide.**

In addition BGS provided the following equipment which was easily interfaced to the onboard gear mentioned above.

Surface Towed Boomer	AAE catamaran and AA300 plate
QINSy survey package	ERGO laptop
Hydrophone	EG&G 265 single channel, 8 element

4 Navigation

This was achieved using DGPS using the GPS fitted to the Medway Surveyor. The data were recorded in OSGB36 datum using the QINSy navigation package. The position was transmitted to the CODA DA system and recorded there as well, however due to incomplete understanding of how these systems should work together, the time on the CODA is not quite the same as that on the QINSy. The positions recorded with the seismic data on the CODA are correct.

The recorded position was the GPS antenna on the vessel at all times. No correction has been made for the offset to the stern or tow position behind the vessel. See the layback diagram in Appendix 1.

5 Conclusion

The Friday at the end of the week saw the demobilisation of equipment and return to Edinburgh and Keyworth for the BGS team. Tide data was collected from the Peel Ports authority tide gauge. Once again the crane was essential to lifting equipment off the vessel and the assistance of the vessel crew and dock side personnel were gratefully appreciated.

Daily Summary Log

Date: 09 March 2009**JD: 68**

Time	
0805	Depart Premium Inn, Bobbing.
0830	Arrive Sheerness Dock.
0835	Commence loading Medway Surveyor and mobilisation for survey.
1155	All interfaces working correctly.
1520	Mobilisation finished. Sail for first line in Medway.
1638	SOL 1, Fix 109. Boomer firing at 300J at 300ms.
1711	Past end of survey line, drop energy from 300J to 200J.
1713	EOL1 Fix 127.
1720	All gear inboard, sailing for dock.
1735	Tied up, Sheerness Dock.
1755	Depart vessel for Hotel.

Total km of completed lines:

	Today (hours)	Total (hours)
Setting up	6h50	6h50
On Line	0h35	0h35
Steaming	0h33	0h33
Deploying/Recovering/Docking	0h27	0h27
Weather Downtime	0	0
Vessel Downtime	0	0
Equipment Downtime	0	0
Total	8h25	8h25

Date: 10 March 2009**JD: 69**

Time	
0745	Depart Hotel
0810	Arrive at Medway Surveyor
0845	Cast off
0925	SOL Line 2 Fix 130. No Echosounder
0935	Echosounder Switched on.
0936	EOL Line2 Fix 134
0942	SOL Line 3 Fix 135
0953	Power Fail. EOL Line 3 Fix 140.
1000	Change to different power source for Coda
1018	SOL Line 4 Fix 141
1049	EOL Line 4 Fix 157
1054	SOL Line 5 Fix 158
1101	EOL Line 5 Fix 162
1105	SOL Line 6 Fix 165
1115	Nav dropout
1116	Nav back again Fix 169. Problem with UPS
1125	EOL Line 6 Fix 175
1129	SOL Line 7 Fix 176
1138	EOL Line 7 Fix 181
1141	SOL Line 8 Fix 184
1147	EOL Line 8 Fix 185. Nav dropout again. Pause operations to resolve. UPS problems.
1208	SOL Line 9 Fix 186
1219	Fix 192 Turn on dogleg
1303	EOL Line 9 Fix 215
1326	SOL Line 10 Fix 217
1332	Coda 'hang'. Resolved with Stop/start of recording. Line continued. Some small loss of data.
1447	EOL Line 10 Fix 258
1450	SOL Line 11 Fix 260
1515	Nav system and Echosounder resetting more often as UPS continues to reset without reason.
1531	EOL Line 11 Fix 281. Pause in operations to try to resolve UPS problem. UPS disconnected and switched off. Now all systems operating direct from ship generator with UPS protection.
1547	SOL Line 12 Fix 282

1615	Dogleg at entrance to Swale to run across Medway again.
1620	EOL Line 12 Fix 300
1622	SOL Line 13 Fix 301
1633	EOL Line 13 Fix 307
1635	SOL Line 14 Fix 308
1637	EOL Line 14 Fix 309
1643	SOL Line 15 Fix 310
1650	EOL Line 15 Fix 314
1656	SOL Line 16 Fix 315
1659	EOL Line 16 Fix 317
1703	SOL Line 17 Fix 318
1708	EOL Line 17 Fix 321
1713	Gear inboard
1725	Tied up at Sheerness Dock
1750	Depart Vessel for hotel
1800	Arrive at Hotel

Total km of completed lines:

	Today (hours)	Total (hours)
Setting up	0	6h50
On Line	3h51	4h26
Steaming	2h21	2h54
Deploying/Recovering/Docking	1h05	1h32
Weather Downtime	0	0
Vessel Downtime	0	0
Equipment Downtime	1h23	1h23
Total	8h40	17h05

Date: 11 March 2009**JD: 70**

Time	
0750	Depart hotel
0805	Visit Tesco for stationery
0815	Arrive Medway Surveyor
0835	Cast off. Sailing for line 18 on south side of Thames
0914	Equipment deployed
0917	SOL 18 Fix 322 Heading West
1012	EOL 18 Fix 350
1022	SOL 19 Fix 352 Heading North
1034	EOL 19 Fix 358
1040	SOL 20 Fix 359 Heading East
1103	Passing vessel, slight disturbance of record
1234	EOL 20 Fix 414
1243	SOL 21 Fix 415. New line between existing lines, heading West
1309	EOL 21 Fix 426
	Turning to run Line 22 across Swatch (Sheerness Middle Sand)
1314	SOL 22 Fix 429 Heading South
1339	EOL 22 Fix 442
1343	SOL 23 Fix 443 Heading North
1416	EOL 23 Fix 460
1426	SOL 24 Fix 461 Heading West
1527	EOL 24 Fix 490
1533	SOL 25 Fix 491 Heading North
1542	EOL 25 Fix 498
1608	SOL 26 Fix 499 Heading North
1626	EOL 26 Fix 508
1642	SOL 27 Fix 509 Heading South
1705	EOL 27 Fix 521
1712	SOL 28 Fix 522 Heading West
1744	EOL 28 Fix 538
1748	Gear onboard. Heading for dock.
1753	Tied up.
1759	Depart vessel for hotel
1815	Arrive hotel

Total km of completed lines:

	Today (hours)	Total (hours)
Setting up	0	6h50
On Line	6h48	11h14
Steaming	2h23	5h17
Deploying/Recovering/Docking	0h33	2h05
Weather Downtime	0	0
Vessel Downtime	0	0
Equipment Downtime	0	1h23
Total	9h44	26h49

Date: 12 March 2009**JD: 71**

Time	
0745	Depart hotel
0802	Arrive Medway Surveyor. Pause to allow very, very low tide to build a little more water to let vessel leave dock. Meantime data replayed from Line 11 of Tuesday. (Up the Swale with GPS in and out due to UPS failure.)
0920	Cast off
0925	Boomer deployed
0932	SOL 29 Fix 539 Heading SW
0945	EOL 29/SOL 30 Fix 545 Heading West
1014	EOL 30 Fix 559
1023	SOL 31 Fix 560 Heading East. South side of Medway cross Stanegate Creek.
1043	EOL31 Fix 570
1047	All gear inboard. Steaming for Swale
1122	Gear deployed at Swale Bridge
1124	SOL 32 Fix 572 Heading SE
1304	Data showing slight deterioration as we leave sheltered channel
1317	EOL 32 Fix 628
1319	SOL 33 Fix 629 Heading SE
1323	EOL 33 Fix 632
1325	SOL 34 Fix 633 Heading SW
1415	EOL 34 Fix 658
1418	Gear recovered
1445	Gear deployed
1446	SOL 35 Fix 660. Heading North
1518	EOL 35 Fix 677 Awaiting Bridge
1520	Marking time at Ridham Dock until Bridge across Swale opens
1544	SOL 36 Fix 678. Heading North
1559	EOL 36 Fix 686. Recovering gear
1602	Gear recovered. Steaming for Stanegate Creek.
1632	Gear deployed
1635	SOL 37 Fix 687 Heading South
1700	EOL 37 Fix 700
1704	Gear recovered. Steaming for line 38 across the Medway
1716	Gear deployed
1720	SOL 38 Fix 701 Heading N

1725	EOL 38 Fix 704
1732	SOL 39 Fix 705 Heading SE
1737	EOL 39 Fix 708. End of Survey
1742	Tied up
1800	Depart Dock
1815	Return to Hotel

Total km of completed lines:

	Today (hours)	Total (hours)
Setting up	0	6h50
On Line	5h18	16h32
Steaming	2h40	7h57
Deploying/Recovering/Docking	2h00	4h05
Weather Downtime	0	0
Vessel Downtime	0	0
Equipment Downtime	0	1h23
Total	9h58	36h47

Date: 13 March 2009**JD: 72**

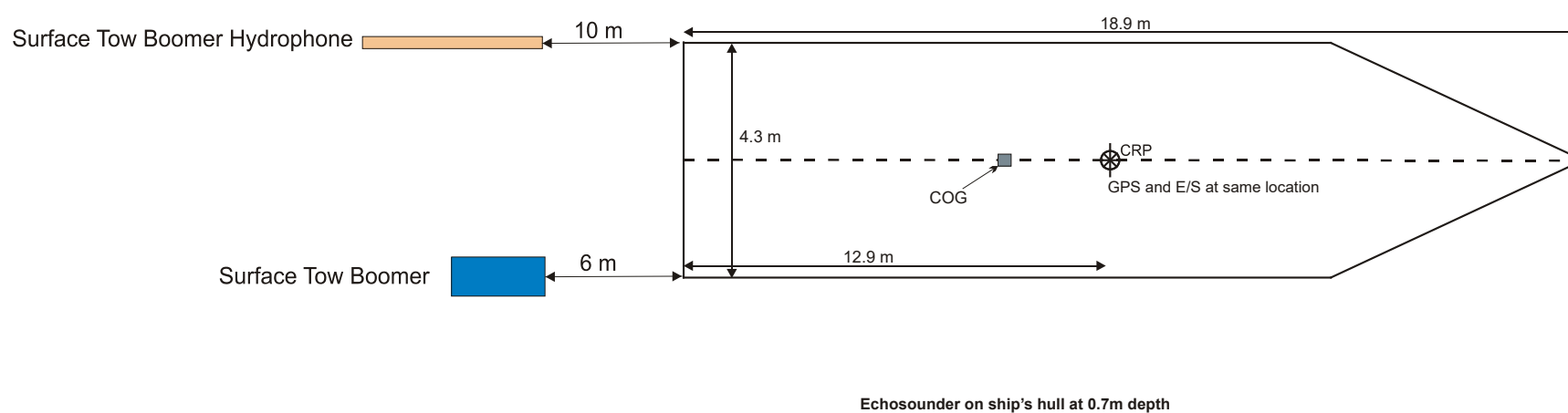
Time	
0745	Depart hotel
0805	Arrive Medway Surveyor
	Proceed to demobilise equipment
0930	Depart Sheerness docks
1830	Arrive Loanhead. Van unloaded.

Total km of completed lines:

	Today (hours)	Total (hours)
Demob	1h25	
Travel time	9h20	

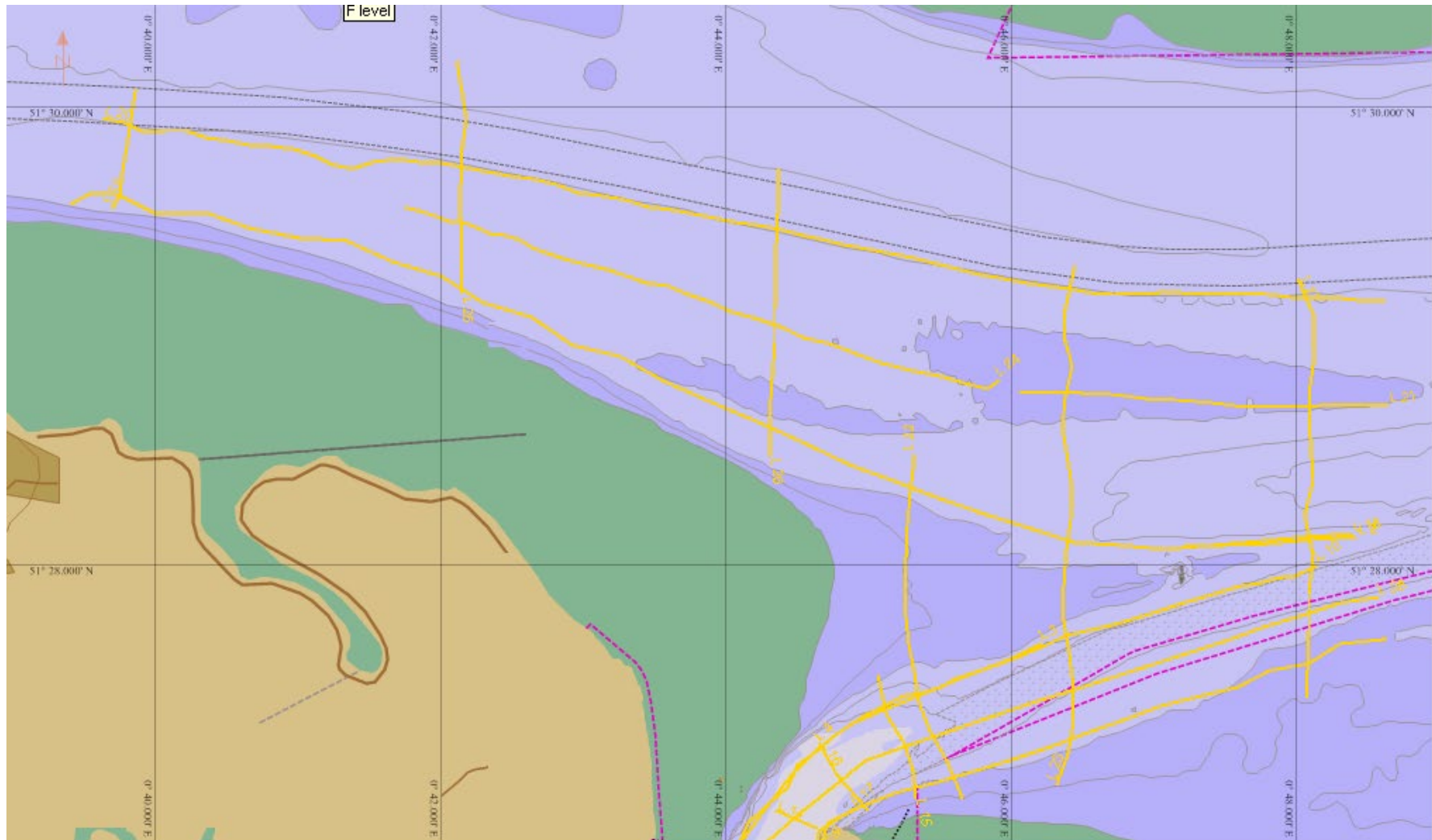
Appendix 1 Layback Diagram

Medway Surveyor Layback Diagram

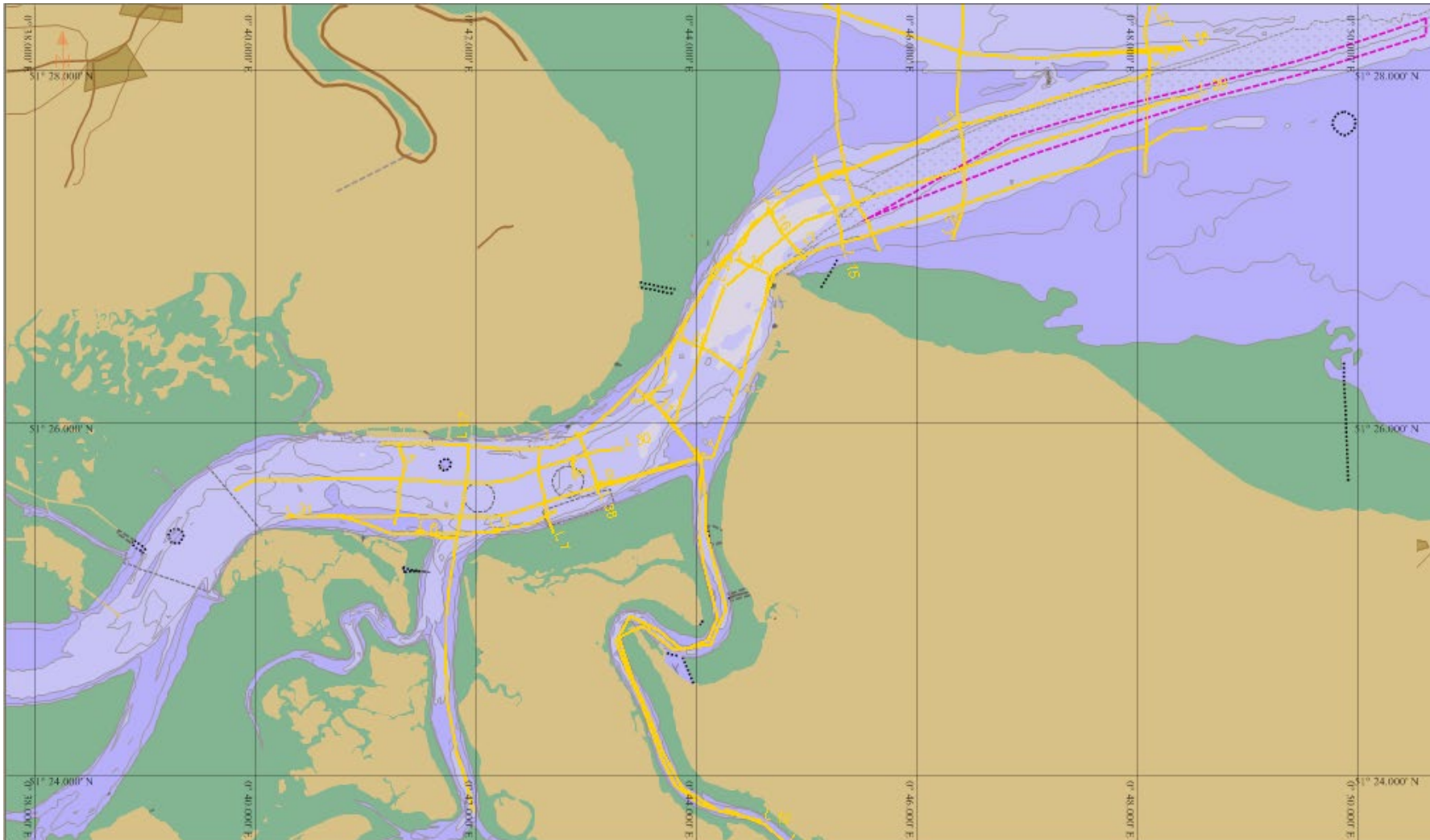


Ship - Survey BGS2009/01

Appendix 2 Line Plan North of the Isle of Grain in the Thames Estuary



Appendix 3 Line Plan for Medway Estuary



Appendix 4 Line Plan for Western Swale Estuary

Appendix 5 Line Plan for Eastern Swale Estuary

