REPORT OF THE INVESTIGATION INTO THE GROUNDING OF THE BARGE "SKERCHI" AT BRAY HARBOUR, CO. WICKLOW ON 03 APRIL 2000.

The Marine Casualty Investigation Board was established on the 5th, June 2002 under The Merchant Shipping (Investigation of Marine Casualties) Act 2000

CONTENTS

1. SYNOPSIS.

The non- powered steel barge "Skerchi", was involved in a project to repair and carry out remedial works to the South Pier Wall at Bray Harbour, Co. Wicklow.
On Friday 31 March 2000 the barge had been secured 100 metres off the pier for the weekend using its own anchor system.
Early on the 03 April 2000, the barge grounded on the end of the rock armour breakwater attached to the seaward side of the South Pier. The barge finally came to a rest position on the beach side of the rock armour.

2. FACTUAL INFORMATION

2.1 Description of the Barge "Skerchi"

Built:	1978
Owner:	Ascon Ltd., Kill, Co. Kildare.
Length:	60.00 Metres.
Breadth:	21.56 Metres.
Depth:	4.00 Metres.
Gross Tonnage:	1582.80 tons.
Net Tonnage:	1355.63 tons.
Port of Registry:	Willemstad-Curacao.
Flag:	Netherlands Antillies.
Register Number:	34E895.
Classification Society:	Bureau Veritas.
Machinery:	One Caterpillar 69 kva Generator. One Lister Genset 18 kva back-up Generator.
Description of Vessel:	Non-powered steel barge with 8 drum mooring winch with anchors attached to each drum. (See layout in Appendix 1)
Anchors:	Type Delta Flipper. 5 x 2500. kg and 3 x 4000 kg.
Winches:	8 drum mooring winch with line pull of 25 ton, holding load 35 ton and wire rope diameter of 36 mm.

2.2 Description of Project

2.2.1 The project was to repair and carry out remedial works to the South Pier Wall at Bray Harbour, Co. Wicklow.

2.2.2 This work generally consisted of the following:

- Steel sheet pile wall approximately 100 metres in length outside existing pier wall.
- Concrete encasement of sheet pile wall.
- Grouting of existing concrete pier wall.
- New concrete pavement slab to existing wall.

2.2.3 Prior to the commencement of the project, Ascon set up a contract with Met Eireann where weather information was to be faxed to the Bray site office. The information was delivered as follows:

- From Monday to Thursday inclusive, a 3 day fax forecast for the Bray harbour area of wind, weather, visibility and sea state by 1100 hours.
- On Friday only, a 5 day forecast of the above parameters.
- Relevant gale warnings to be faxed routinely on a 7 day basis.
- A telephone consultancy service was also set up.
  The service commenced on 30 November 1999.

2.2.4 A Contingency Plan was also drawn up for the "Skerchi" during the works at Bray and this is given at Appendix 2.

3. EVENTS PRIOR TO THE INCIDENT

3.1 The anchor wires were upgraded to 36mm wire rope with steel core and the anchor sizes were increased to 8 anchors x 4000kg x 5 anchors x 2500kg in December 1999. All anchors were certified to Lloyds Class. The winch braking systems were checked and brake bands re-lined.

3.2 On Friday 31st March 2000, the Barge Master Mr Ari de Bilde stated that there were no gales in the 5 day forecast. See Appendix 3.

3.3 The Barge Master considered normal mooring of the barge to be sufficient for the weekend. The barge was secured 100 metres off shore with the anchor layout as given in Appendix 4. Anchors 1 and 2 were chain stoppered off to take the strain off the winches.

3.4 As the barge was unmanned over the weekend, Mr. de Bilde and the site agent, Mr. Mark Phelan, organised that Mr. Trevor Cooke, who was the fitter on the barge, would check the vessel from the shore side. Mr. Cooke was also required to check the weather forecast on the RTE Aertel text as he had no means of access to the site office to view any information forwarded by Met Eireann.

3.5 Mr. Cooke recalls that he observed the barge from the shore side at about 1700 hours on Saturday and at about 1600 hours on Sunday. He noted that the barge had not moved and that the wires front and back were in place. There was a bit of a swell on the Sunday. The floodlights were on all the time and the navigation lights were on a timer.

3.6 He also recalls that on the Saturday and Sunday at about 1500 hours he checked the weather forecast on the RTE Aertel text and that it was giving a forecast wind speed NE 2/3 for both days. If there was any cause for concern about the barge, Mr. Cooke was to contact either Mr Mark Phelan, Mr. Ari de Bilde or Mr. Gerry Prendergast. Based on what he observed, Trevor Cooke deemed that he did not have a need to contact anybody.

4. THE INCIDENT

4.1 At 0630 hours on Monday 3rd April 2000, when an Ascon employee arrived on site to inspect the barge, he observed that it had moved from its anchored positioned. The Barge Master and various Ascon personnel were contacted. When these arrived on site, shortly after 0900 hours, they found the barge in Position 1 as shown in Appendix 5.

5. EVENTS FOLLOWING INCIDENT

5.1 The Irish Marine Emergency Services (now Irish Regional Coast Guard) (IRCG) were contacted and a helicopter, from Dublin Airport, arrived on site at 0930 hours to survey the scene.

5.2 Mr. Gerry Prendergast, Plant Director, Ascon Limited, requested the assistance of Dublin Port Tugs but was informed that they would not be made available. Ascon Plant Department then proceeded to locate the nearest tug of sufficient capacity to assist. Irish Lights were contacted and their vessel "Granuaile" was mobilised from Dublin Port and anchored off Bray on standby.

5.3 There was no evidence of oil or diesel spillage.

5.4 The diesel oil was removed from the barge over the following two low tides, on the evening of the 3rd and the morning of the 4th April 2000.

5.5 The barge "Skerchi" was secured ashore to prevent unwanted movement to sea and ashore watch maintained by Ascon personnel.

5.6 The "Skerchi" was refloated by the tug "Vanguard" on the 5th April 2000 at about 1030 hours and was towed to Dublin Port. There was extensive hull damage to the barge as shown by the photographs in Appendix 6. Repairs to the barge were carried out in Dublin.

6. CONCLUSIONS AND FINDINGS

6.1 After the grounding it was found that anchor wires 1,4 and 5 had broken, No 2 wire had pulled off the drum, No 7 and 8 wires were unbroken and Numbers 3 and 6 were not used. During the refloating No 7 anchor was recovered and No 8 wire was cut. A sketch shown the anchor wire situation after the grounding is given at Appendix 6.

6.2 Anchors Nos. 1, 2, 4 and 8 were recovered from the seabed and their positions were noted. The initial and final positions of the anchors are given in Appendix 8. The anchors were found to have been dragged in a general Southerly direction.

6.3 The barge was moored in shallow water of about 4.5 metres depth and the weather conditions experienced produced short steep waves, which were impacting against the barge and generating jerking loads on the wire ropes to the anchors. These wave forces would have also been concentrated on the barge as there was very little water underneath the barge in which to allow them to bypass it. The catenary effect of the wires would have been very small, producing little damping effect on the surging and jerking forces on the wires. This caused failure of some of the wires in the weather conditions. The catenary effect of a chain reduces the surging motions and therefore the shock loading on the anchor cables. For operational purposes the barge did not use chain link cable.

6.4 The weather forecasts were not being monitored efficiently. Nobody at Ascon seem to have been aware of the gale warning forecasts issued from 0500 hours on 02 April 2000 onwards which applied to the Bray area. Too much reliance was placed on the 5 day forecast issued on Friday 31 March 2000. It appears that even though the RTE Aertel forecast was being monitored the presence of gale warnings was not noticed.

6.5 Responsibility for the barge when it was not working was unclear.

6.6 Met Eireann records show that all gale warnings for the period were faxed to the Ascon Site Office commencing with the 1900 hours gale warning on 01 April 2000. Ascon state they did not receive this warning nor the following warning issued at 2300 hours on 01 April 2000. Ascon state that the first gale warning received was issued at 0500 hours on 02 April 2000. See Appendix 9.

The Met Eireann weather report for the sea area off Bray for 02 and 03 April 2000 clearly states "that in a North-Easterly air flow winds are known to funnel/increase along the East Coast from Wicklow to Rosslare due to the Dublin and Wicklow Mountains. This effect may also occur in the Bray area and so the winds in the Bray area in this report are increased to occasionally strong gale force 9 accordingly" See Appendix 10.

It would appear that the significance of these reports was not realized by Ascon Personnel thus resulting in the failure to properly ensure the barges safety.

6.7 Ascon Limited instructed Bridon International Limited to carry out examinations and breaking load tests on samples of the wire ropes from winches No 1, 4 and 5. The conclusions reached were:

- The ropes from winches 1 and 4 had fractured under tensile overload, the presence of shear fractures in each case being an indication that the failures most likely occurred where the ropes were bearing heavily against some other object such as a fairlead.

- The fracture of the core in the rope from winch 1 is an indication that the rope had possibly been subjected to shock loading.

- The rope from winch 5 had suffered from severe crushing damage, which had greatly influenced the failure. It had been observed during the site visit that deep rope impressions were present in at least one of the fairleads. If this rope had been around such a fairlead, it may well account for the damage to the rope under severe load conditions.

- The destruction tests showed that the ropes from winches 1 and 4 had residual strengths in excess of the minimum requirement for general purpose rope, as defined by BS302: part 2: 1987. However, there was some indication from wire test results that the rope from winch 4 may have been of a higher grade.

- Metallographic examination of wires from the ropes revealed no detrimental features to be associated with the quality of the material used in each case.

7. RECOMMENDATIONS

7.1 When a barge is operating in open sea conditions a suitably manned tug should be in attendance at all times. The tug should be sufficient to tow the barge away from the area if the weather forecast is adverse.

7.2 Responsibility for barges anchored off should be clearly defined. The Barge Master should always be nominated as the person ultimately responsible for the safety of a barge at all times.

7.3 Weather forecasts must be monitored, so that early warning can be received of any adverse weather predicted and to allow sufficient time for any necessary action to be taken.

7.4 The contingency plan indicated that a tug may be available in an emergency from Dublin Port. This was found to be not the case. It is important when drawing up a contingency plan that all aspects of it can be relied upon when the occasion demands.

7.5 It is recommended that a Marine Notice is issued highlighting the dangers involved when non-powered barges are operating in open sea conditions. A draft Marine Notice is given in Appendix 11.

8. Appendices

8.1. Layout of barge "Skerchi".

8.2. Contingency plan for works at Bray.

8.3. Met Eireann 5 day forecast of 31 March 2000.

8.4. Barge and anchor layout on 31 March 2000 in preparation for advised forecast.

8.5. Different barge positions during 03 April 2000.

8.6. Photographs showing damage suffered by the barge.

8.7. Sketch showing the anchor wire situation after the grounding.

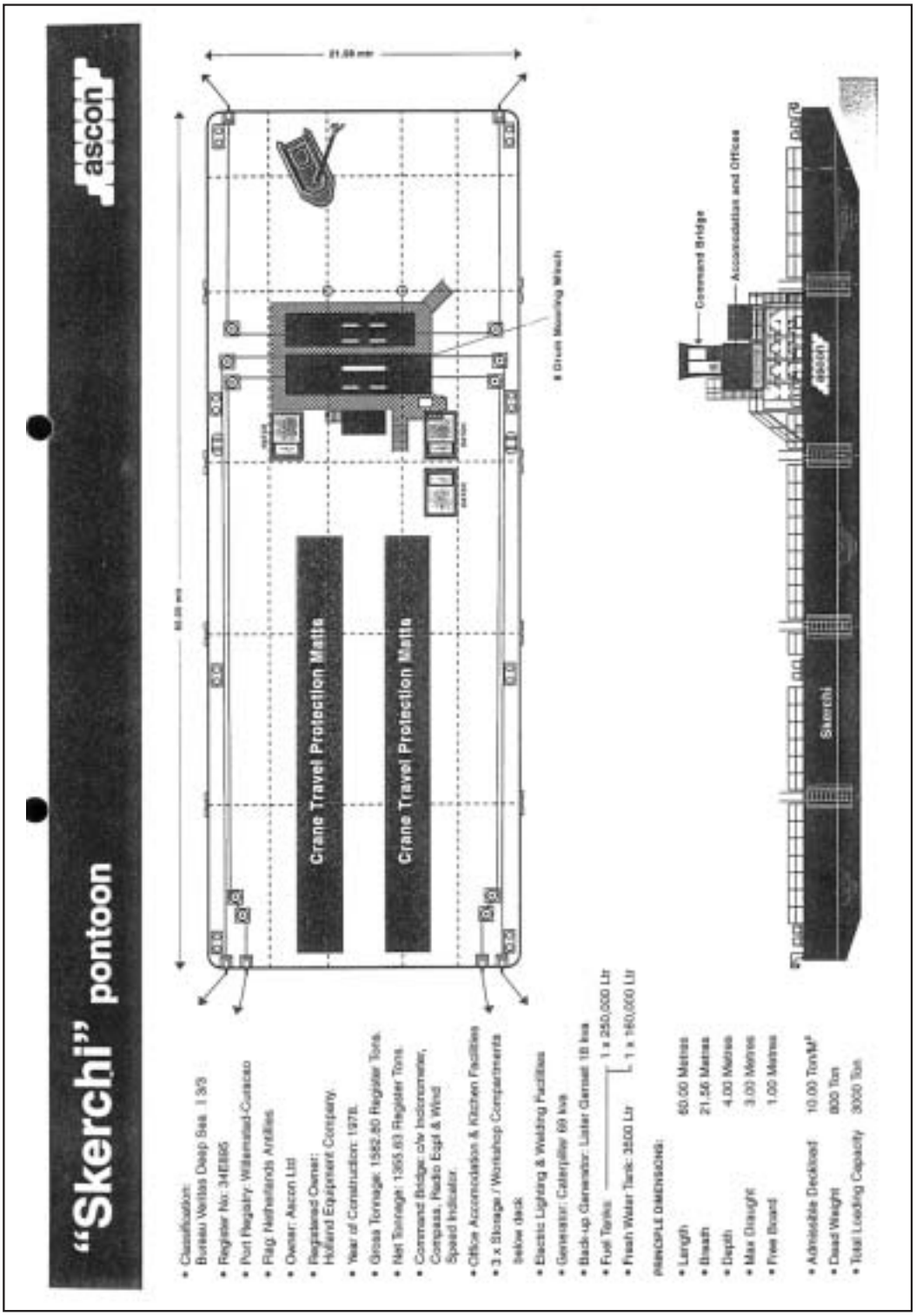
8.8. Diagram showing the initial and final positions of the anchors.

8.9 Met Eireann gale warning issued at 0500 hours on 02 April 2000.

8.10 Met Eireann weather report for the sea area off Bray for the 02 and 03 April 2000.

8.11 Proposed Marine Notice.

8.1. Layout of barge "Skerchi".



APPENDIX 8.2

8.2. Contingency plan for works at Bray.

ascon

Contingency Plan

Due to the fact that the barge is working in sea conditions at Bray Pier, a contingency plan has been developed to ensure the safety of the barge crew on board and the barge itself. This plan is for the evacuation of the crew on board and/or removal of the barge to a sheltered port in the event of severe storm conditions.

1. The weather forecast is faxed directly to the Site Agent every morning from the Met. Office with a three-day forecast Monday to Thursday and a five-day forecast on a Friday. In addition to that we have been put on the emergency gale warning listing which in the event of gale warnings is updated every 6 hours and we also have access to the Met. Office on an on-going basis.

2. The forecasts are discussed between the Site Agent and the Barge Master on a daily basis to ascertain working times and if storm conditions are forecasted what action may be required, to prepare for the severity of the storm being forecast.

3. When the barge is not working it is pulled out from the harbour pier and secured for sea conditions. The crane should be fastened to handle unexpected storms or gales. The two main anchor wires should be fitted with chain stoppers so as to avoid any slippage from their respective winch drums.

4. In addition to the above, when outside the working hours i.e. (Monday to Friday) the barge should be inspected daily by site personnel to see if any creep of the barge location has occurred.

5. If the contingency plan is activated in respect of a severe gale the Plant Manager will call in a tug to get the barge removed from Bray to the shelters of Dunlaoghaire Harbour or Dublin Port.

6. The Barge Master to secure the barge for transport.

7. Barge is moved to Dunloaghaire or Dublin Port and tied up fully and security details discussed between the Plant Manager and Site Agent.

8. If there is a severe gale warning received any less than 14 hours before the storm, then the barge is secured and permanent watch is maintained on the barge until the storm has blown over.

9. If the situation becomes urgent the Dublin Port tugs may assist the barge to a sheltered port, and "IMES" notified.

8.3. Met Eireann 5 day forecast of 31 March 2000.

MET

Central Analysis and Forecasting Office

Fax : (01) 8064275 Tel : (01) 8064255

Forecast for Ascon works, Bray Harbour

SEA STATE:
Calm: 0 - 0.1m
Wavelets: 0.1 - 0.5m
Slight: 0.5 - 1.25m
Moderate: 1.25 - 2.5m
Rough: 2.5 - 4m
Very Rough: 4 - 6m

Fax to: 2860558

Issued at 04:26 Friday, 31-Mar-00

Today 31-Mar-2000

Wind	Westerly or Variable Force 1 or 2.
Weather	Cloudy and predominantly dry; chance of some misty drizzle.
Visibility	Good.
Sea State	Calm.

Saturday 01-Apr-2000

Wind	Southeast Force 2 or 3, increasing Force 3 or 4.
Weather	Patches of light rain and drizzle.
Visibility	Good, becoming moderate.
Sea State	Slight.

Sunday 02-Apr-2000

Wind	Northeast Force 5 or 6, possibly Force 7.
Weather	Rain and sleet; possibly turning to snow.
Visibility	Moderate or poor.
Sea State	Moderate, later rough.

Monday 03-Apr-2000

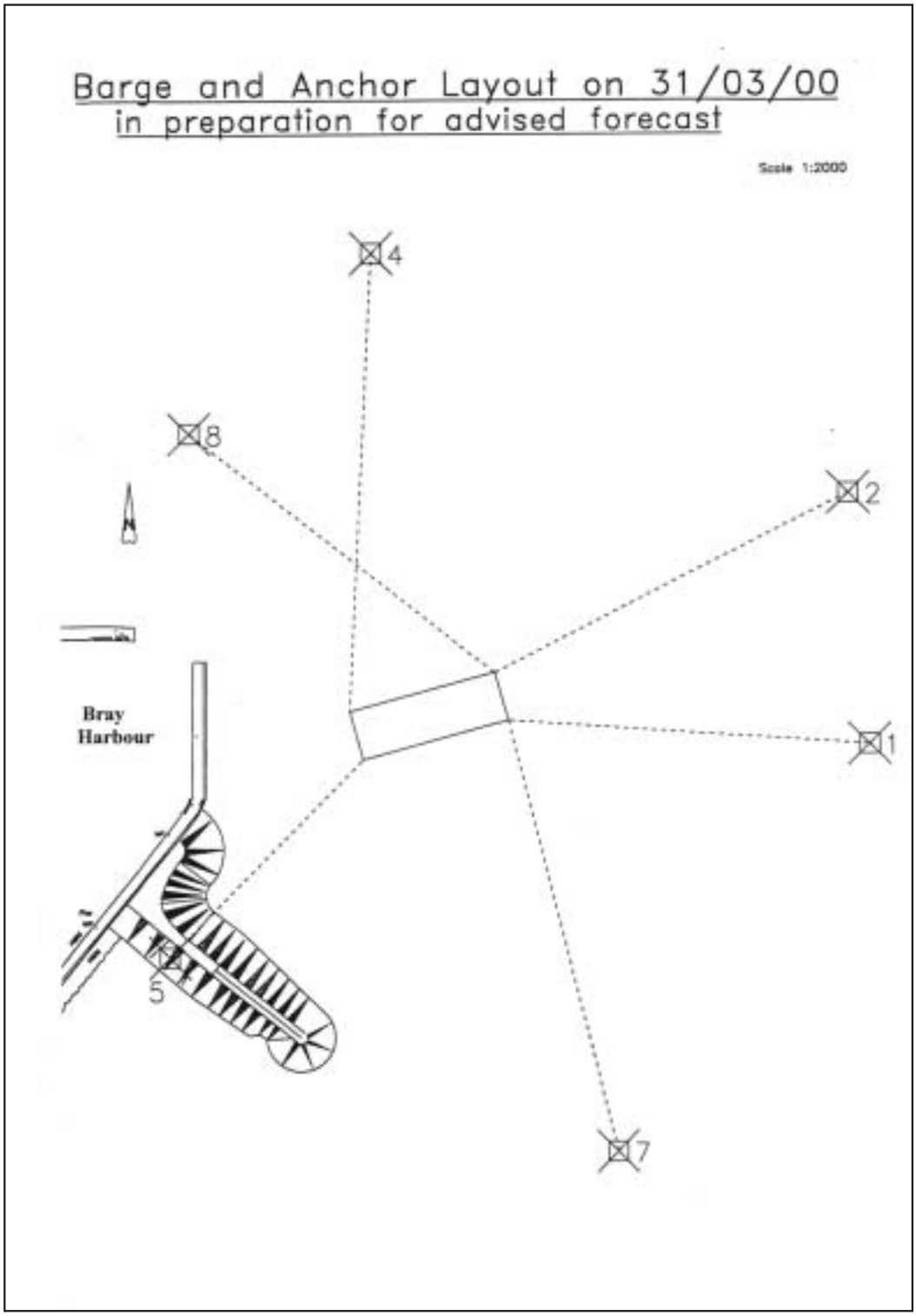
Wind	Northeast Force 5 or 6, possibly Force 7.
Weather	Rain and sleet, possibly falling as snow; clearing later.
Visibility	Moderate or poor; later becoming good.
Sea State	Rough.

Tuesday 04-Apr-2000

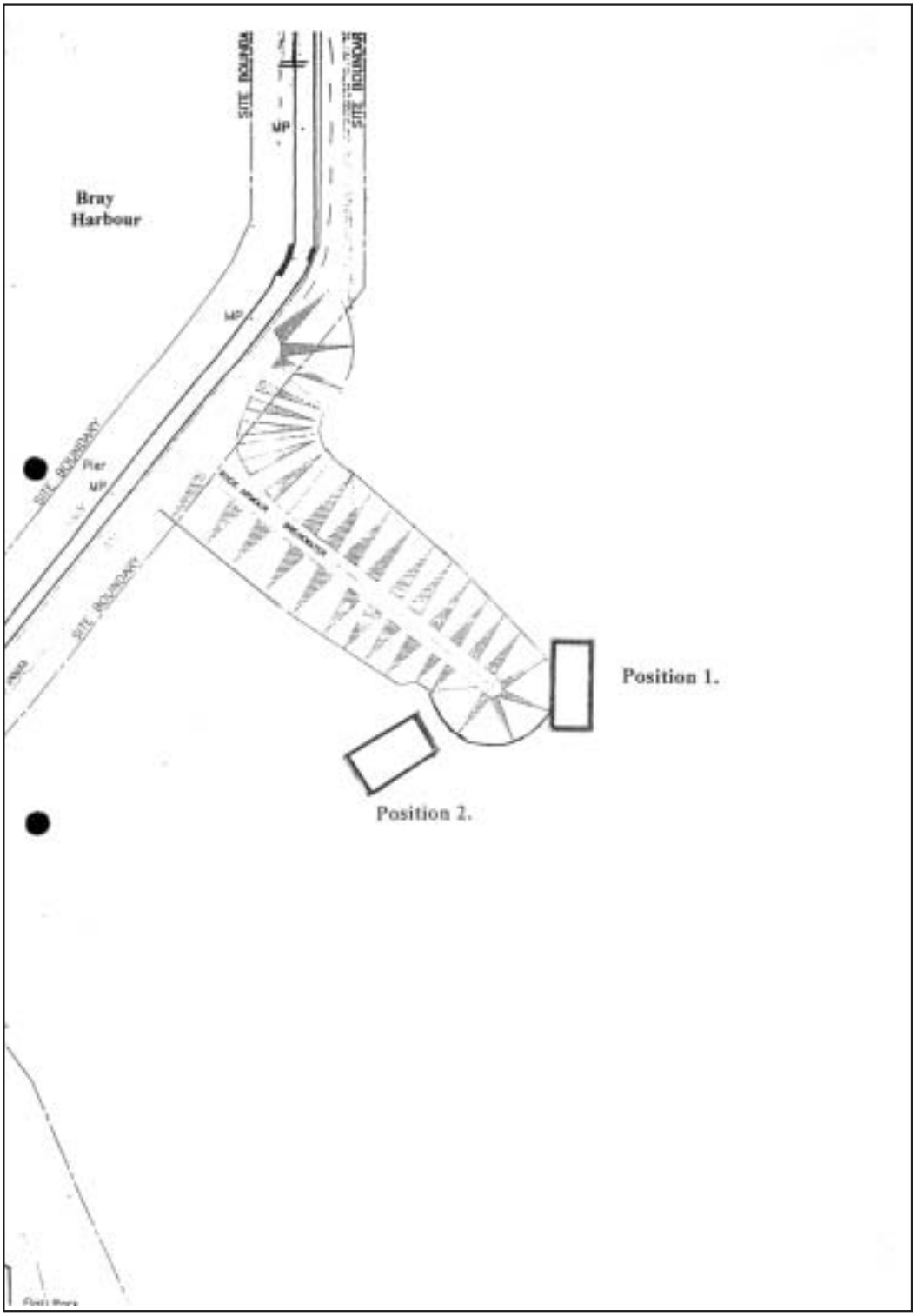
Wind	Northeast Force 3 or 4, possibly Force 5.
Weather	Dry, Some sunny spells.
Visibility	Good.
Sea State	Moderate.

APPENDIX 8.4

8.4. Barge and anchor layout on 31 March 2000 in preparation for advised forecast.



8.5. Different barge positions during 03 April 2000.



APPENDIX 8.6

8.6. Photographs showing damage suffered by the barge.

PHOTOGRAPH NO. 1 SIDE SHELL

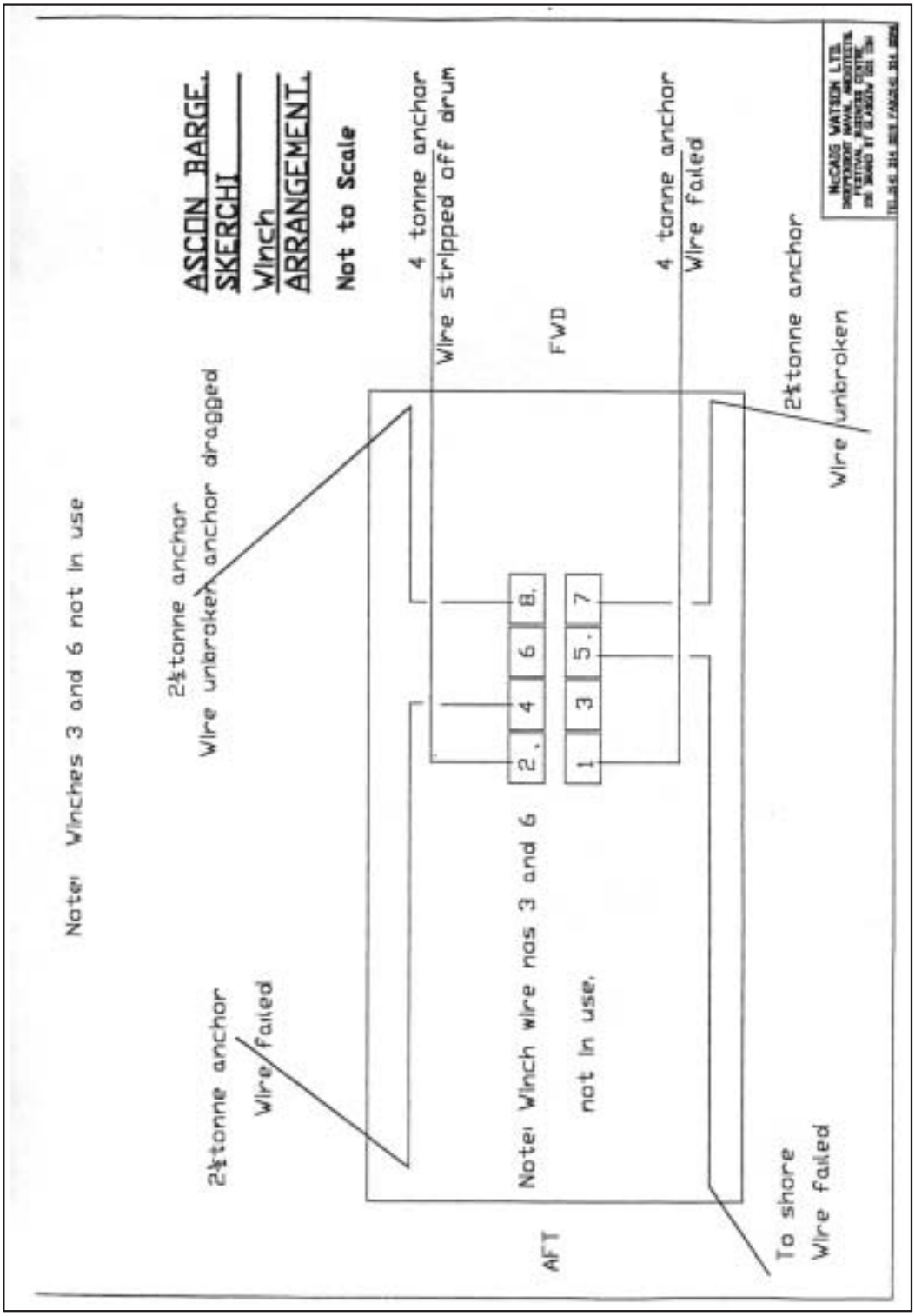
PHOTOGRAPH NO. 2 SIDE SHELL

PHOTOGRAPH NO. 3 BOTTOM SHELL

PHOTOGRAPH NO. 4 SIDE SHELL

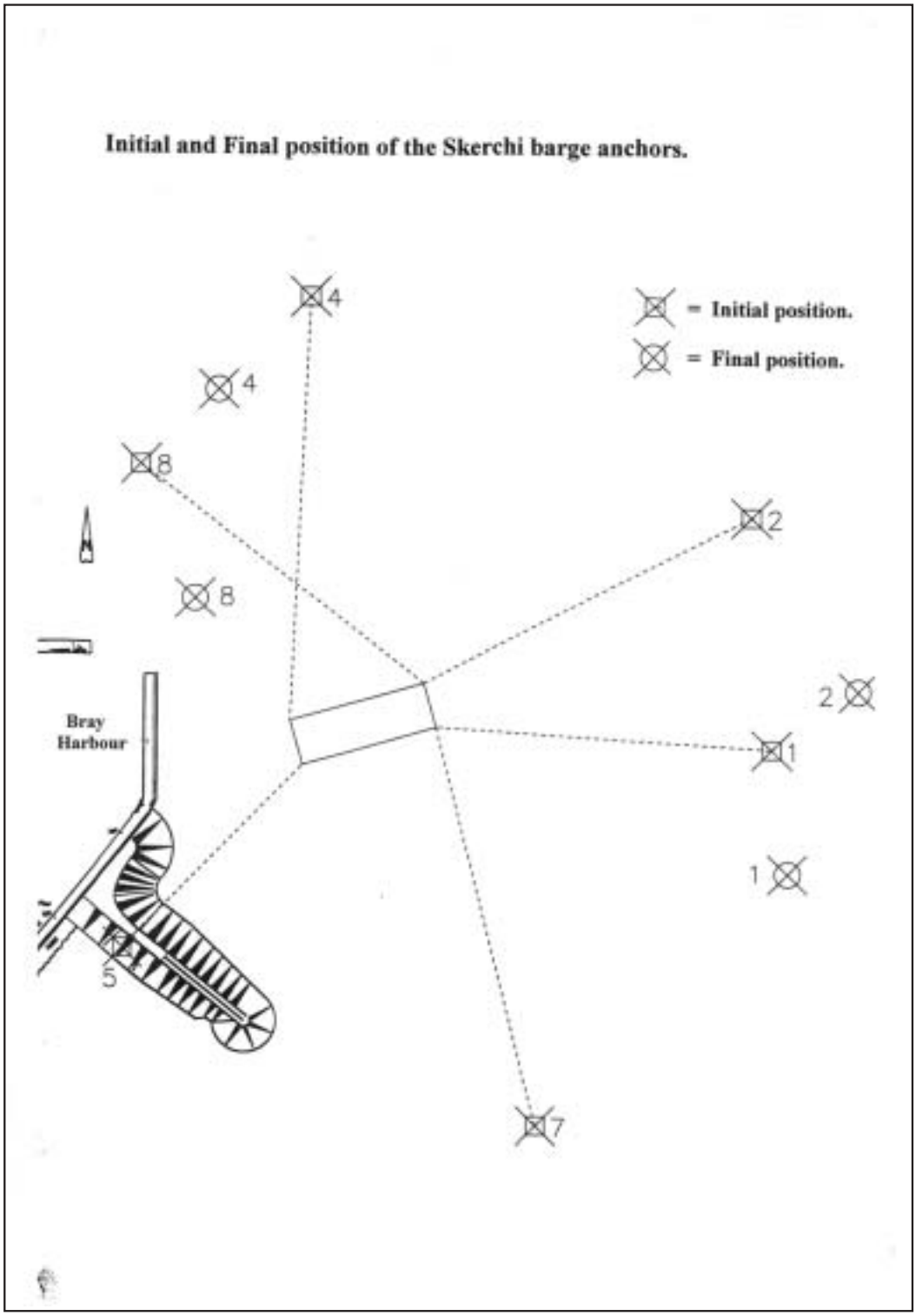
PHOTOGRAPH NO. 5 BOTTOM SHELL

8.7. Sketch showing the anchor wire situation after the grounding.



APPENDIX 8.8

8.8. Diagram showing the initial and final positions of the anchors.



8.9 Met Eireann gale warning issued at 0500 hours on 02 April 2000.

MET éireann

Central Analysis and Forecasting Office

Fax : (01) 8064275 Tel : (01) 8064255

Gale Warning

Gale warning issued by Met Éireann at 2300 hours on 1-April-2000 should be withdrawn and the following substituted :

Quote
The following Gale Warning has been issued by Met Éireann at 0500 hours on 2-April-2000

Gale force or strong gale force northeasterly winds, on coasts from Slyne Head to Rossan Point to Fair Head, this morning, later extending to all Irish Coastal Waters and to the Irish Sea.

Ends++

APPENDIX 8.10

8.10 Met Eireann weather report for the sea area off Bray for the 02 and 03 April 2000.

Weather Report for the sea area off Bray, Co. Wicklow from Sunday 2nd to Monday 3rd April 2000

Sunday 2/4/00

00 - 06 hours
Winds: Variable Force 1 to 3
Seastate: Calm (rippled)

06 - 12 hours
Winds: Variable mainly easterly Force 1 to 3
Seastate: Calm (rippled)

12 - 18 hours
Winds: East to north-east Force 3 to 5
Sea state: Slight

18 - 24 hours
Winds: North-east Force 4 to 6.
Sea state: Slight to Moderate

Monday 3/4/00

00 - 06 hours
Winds: North to north-east Force 6 to Gale Force 8, occasionally Strong Gale Force 9
Sea state: Rough

06 - 12 hours
Winds: North to north-east Force 6 to Gale Force 8, occasionally Strong Gale Force 9
Sea state: Rough.

12 - 18 hours
Winds: North - north-east Force 6 to Gale Force 8
Sea state: Rough

18 - 24 hours
Winds: North to north-east Force 6 to Gale Force 8
Weather: Rough.

Note: There were no observations in the Bray area. The winds above are interpolated from the routine charts drawn up by this office.

Wave Heights:

The wave height is the vertical distance between the crest and the preceding or following trough. The table below gives a description of the wave systems associated with a range of significant wave heights. The significant height is defined as the average height of the highest one-third of the waves. It is very close to the value of wave height given by an experienced seaman when making visual observations of wave height.

Individual waves in the wave train will have heights in excess of the significant height. The highest wave of all will have a height about twice the significant height.

STATE OF SEA

Descriptive terms	Height* in metres
Calm	0 - 0.1
Wavelets	0.1 - 0.5
Slight	0.5 - 1.25
Moderate	1.25 - 2.5
Rough	2.5 - 4
Very rough	4 - 6
High	6 - 9
Very high	9 - 14
Phenomenal	Over 14

APPENDIX 8.10

CONTD.

BEAUFORT SCALE OF WIND

Beaufort number	Descriptive term	Velocity equivalent at a standard height of 10 metres above open flat ground				Specifications			Probable wave height* in metres	Probable wave height* in feet
		Mean velocity in knots	m s⁻¹	km h⁻¹	m.p.h.	Land	Sea	Coast		
0	Calm	< 1	0–0.2	< 1	< 1	Calm; smoke rises vertically	Sea like a mirror	Calm	—	—
1	Light air	1–3	0.3–1.5	1–5	1–3	Direction of wind shown by smoke drift but not by wind vanes	Ripples with the appearance of scales are formed, but without foam crests	Fishing smack just has steerage way	0.1 (0.1)	¼ (¼)
2	Light breeze	4–6	1.6–3.3	6–11	4–7	Wind felt on face; leaves rustle; ordinary vanes moved by wind	Small wavelets, still short but more pronounced; crests have a glassy appearance and do not break	Wind fills the sails of smacks which then travel at about 1–2 knots	0.2 (0.3)	½ (1)
3	Gentle breeze	7–10	3.4–5.4	12–19	8–12	Leaves and small twigs in constant motion; wind extends light flag	Large wavelets; crests begin to break; foam of glassy appearance; perhaps scattered white horses	Smacks begin to careen and travel about 3–4 knots	0.6 (1)	2 (3)
4	Moderate breeze	11–16	5.5–7.9	20–28	13–18	Raises dust and loose paper; small branches are moved	Small waves, becoming longer; fairly frequent white horses	Good working breeze, smacks carry all canvas with good list	1 (1.5)	3½ (5)
5	Fresh breeze	17–21	8.0–10.7	29–38	19–24	Small trees in leaf begin to sway; crested wavelets form on inland waters	Moderate waves, taking a more pronounced long form; many white horses are formed (chance of some spray)	Smacks shorten sail	2 (2.5)	6 (8½)
6	Strong breeze	22–27	10.8–13.8	39–49	25–31	Large branches in motion; whistling heard in telegraph wires; umbrellas used with difficulty	Large waves begin to form; the white foam crests are more extensive everywhere (probably some spray)	Smacks have double reef in mainsail; care required when fishing	3 (4)	9½ (13)
7	Near gale	28–33	13.9–17.1	50–61	32–38	Whole trees in motion; inconvenience felt when walking against wind	Sea heaps up and white foam from breaking waves begins to be blown in streaks along the direction of the wind	Smacks remain in harbour and those at sea lie to	4 (5.5)	13½ (18)
8	Gale	34–40	17.2–20.7	62–74	39–46	Breaks twigs off trees; generally impedes progress	Moderately high waves of greater length; edges of crests begin to break into the spindrift; the foam is blown in well-marked streaks along the direction of the wind	All smacks make for harbour, if near	5.5 (7.5)	18 (25)
9	Strong gale	41–47	20.8–24.4	75–88	47–54	Slight structural damage occurs (chimney pots and slates removed)	High waves; dense streaks of foam along the direction of the wind; crests of waves begin to topple, tumble and roll over; spray may affect visibility	—	7 (10)	23 (32)
10	Storm	48–55	24.5–28.4	89–102	55–63	Seldom experienced inland; trees uprooted; considerable structural damage occurs	Very high waves with long overhanging crests; the resulting foam, in great patches, is blown in dense white streaks along the direction of the wind; on the whole, the surface of the sea takes on a white appearance; the tumbling of the sea becomes heavy and shock-like; visibility affected	—	9 (12.5)	29 (41)
11	Violent storm	56–63	28.5–32.6	103–117	64–72	Very rarely experienced; accompanied by widespread damage	Exceptionally high waves (small and medium-sized ships might be for a time lost to view behind the waves); the sea is completely covered with long white patches of foam lying along the direction of the wind; everywhere the edges of the wave crests are blown into froth; visibility affected	—	11.5 (16)	37 (52)
12	Hurricane	64 and over	32.7 and over	118 and over	73 and over	—	The air is filled with foam and spray; sea completely white with driving spray; visibility very seriously affected	—	14 [—]	45 [—]

* This table is only intended as a guide to show roughly what may be expected in the open sea, remote from land. It should never be used in the reverse way; i.e., for logging or reporting the state of the sea. In enclosed waters, or when near land, with an off-shore wind, wave heights will be smaller and the waves steeper. Figures in brackets indicate the probable maximum height of waves.

8.11 Proposed Marine Notice.

Proposed Marine Notice

Attention: All Owners, Contractors and Masters of Non-Powered Barges.

RE: GROUNDINGS OF NON-POWERED BARGES.

There have been a number of recent incidents where non-powered barges have grounded during adverse weather conditions. Fortunately there has been no loss of life or danger to the environment arising from these incidents.

However, the Department of the Marine and Natural Resources wishes to bring to your attention the following factors which should be borne in mind when these non-powered barges are operating and anchored off.

1. When the barge is operating in open sea conditions a suitably manned tug should be in attendance at all times. The tug should be sufficient to tow the barge away from the area if the weather forecast is adverse.

2. It should be clearly understood that the barge master is the person responsible for the barge **at all times.**

3. Weather forecasts must be closely monitored by a competent person, so that early warning can be received of any adverse weather predicted and to allow sufficient time for any necessary action to be taken.

4. Account should be taken of the depth of water underneath the vessel. When anchored off in shallow water and in bad weather, the force of the waves will have a greater concentration on the barge and the waves produced will be shorter and steeper than in deeper water.

5. For operational purposes these barges do not use chain link cable on the anchors. Wire ropes are attached to the anchors. However it must be recognised that the catenary effect of wire rope is very small, producing little damping effect on the surging and jerking forces in comparison with the effect of chain link cable.

6. It is important when drawing up a contingency plan that all aspects of it can be relied upon when the occasion demands.