ACCIDENT REPORT

Report on the investigation of

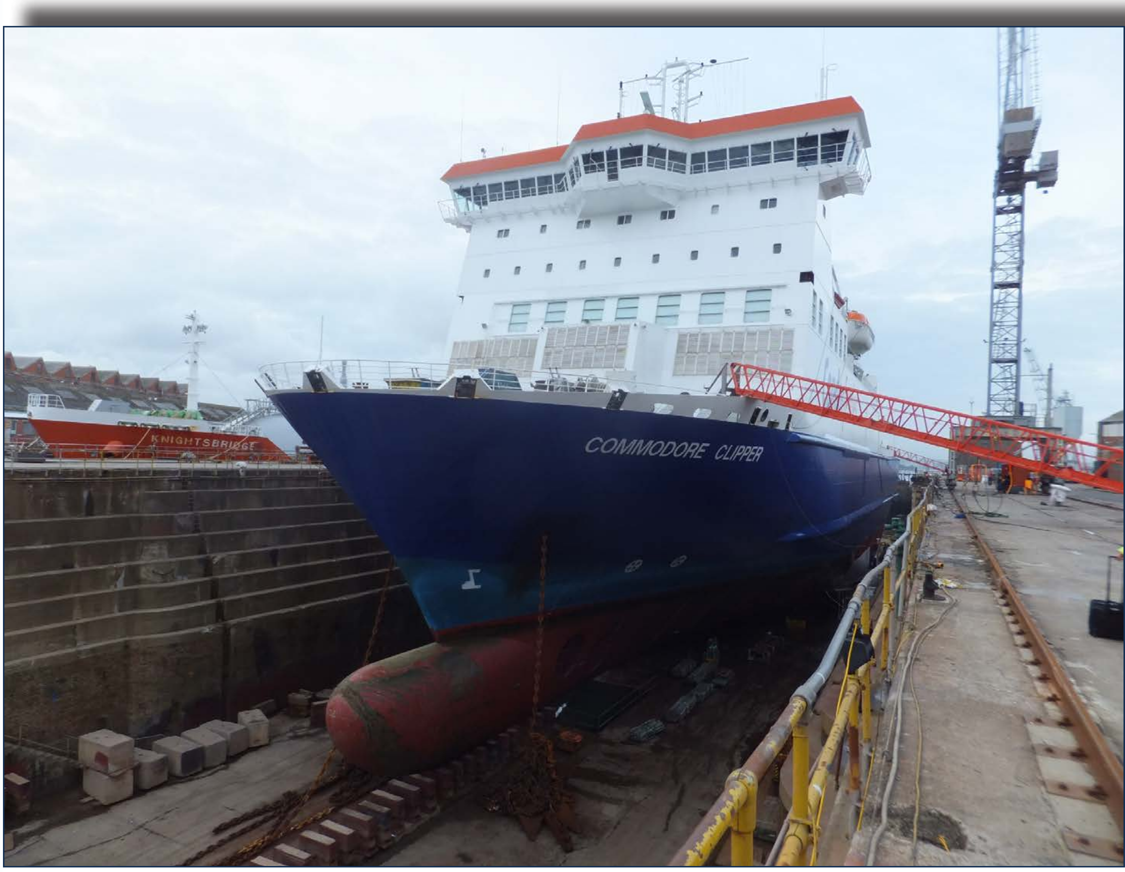
the grounding and flooding

of the ro-ro ferry

Commodore Clipper

in the approaches to St Peter Port, Guernsey

on 14 July 2014



SERIOUS MARINE CASUALTY REPORT NO 18/2015 AUGUST 2015

MAIB
MARINE ACCIDENT INVESTIGATION BRANCH

Extract from

The Merchant Shipping (Accident Reporting and Investigation)

(Bailiwick of Guernsey) Regulations 2009

Regulation 5:

"The sole objective of a safety investigation into an accident under these Regulations shall be the prevention of future accidents through the ascertainment of its causes and circumstances. It shall not be the purpose of an investigation to determine liability nor, except so far as is necessary to achieve its objective, to apportion blame."

This accident was investigated by the UK Marine Accident Investigation Branch at the request of the Government of Guernsey.

NOTE

This report is not written with litigation in mind and, pursuant to Regulation 13(9) of the Merchant Shipping (Accident Reporting and Investigation) (Bailiwick of Guernsey) Regulations 2009, shall be inadmissible in any judicial proceedings whose purpose, or one of whose purposes is to attribute or apportion liability or blame.

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GLOSSARY OF ABBREVIATIONS AND ACRONYMS

AIS	Automatic identification system
BEAMer	French Bureau of Marine Accident Investigation
BMA	Bahamas Maritime Authority
BTM	Bridge team management
CATZOC	Category of zone of confidence
cm	Centimetre
CoC	Certificate of Competency
DNV	Det Norske Veritas
DNV-GL	Det Norske Veritas-Germanischer Lloyd
DSC	Digital selective calling
ECDIS	Electronic chart display and information system
ENC	Electronic navigational chart
GPS	Global positioning system
IHO	International Hydrographic Organization
IMO	International Maritime Organization
ISM Code	International Safety Management Code
kts	Knots (1 knot = 1 nautical mile per hour)
LDL	Limiting danger line
m	metre
MCA	Maritime and Coastguard Agency
MGN	Marine Guidance Note
MRCC	Maritime Rescue and Co-ordination Centre
nm	Nautical miles
OOW	Officer of the watch
PMSC	Port Marine Safety Code
PSC	Port state control

PSD	Public Services Department
Ro-ro	Roll-on roll-off
SMS	Safety management system
SOLAS	International Convention for the Safety of Life at Sea 1974, as amended
STCW	International Convention on the Standards of Training, Certification and Watchkeepers 1978, as amended (STCW Convention)
UKC	Under keel clearance
UKHO	United Kingdom Hydrographic Office
UTC	Universal co-ordinated time
VDR	Voyage data recorder
VHF	Very High Frequency (radio)
VTS	Vessel traffic services
XTD	Cross track distance

TIMES: all times used in this report are UTC+1

SYNOPSIS

At 1515 on 14 July 2014, the Bahamas registered ro-ro passenger ferry *Commodore Clipper* grounded on a charted, rocky shoal in the approaches to St Peter Port, Guernsey. No-one was injured, there was no pollution and the vessel continued its passage into the harbour. However, there was significant raking damage including breaches of the hull resulting in flooding of double-bottom void spaces.

The grounding caused a noisy, shuddering vibration that reverberated throughout the ship, but the crew did not check for damage, no external report was made and no safety announcements were made to the passengers. Once alongside in St Peter Port, cargo discharge, reloading and a lifeboat drill went ahead as planned. However, a pre-planned divers' inspection of the hull soon discovered damage and the vessel was withdrawn from service.

The investigation found that there had been insufficient passage planning for the voyage; in particular, for the transit through the Little Russel, the extremely low tide and effect of squat were not properly considered. This resulted in the bridge team being unaware of the limits of safe water available and thus, despite their good positional awareness, they headed into danger without appreciation of the risk. Several course alterations intended to regain track were ineffective due to the tidal stream setting the vessel off course. Additionally, the absence of any alarm, steering and propulsion responding normally, and the master's conviction that there had been sufficient depth of water, led to a collective denial of the possibility that the vessel might have grounded.

The company's approved route for use through the Little Russel was not followed and the vessel's electronic chart display and information system was not utilised effectively because key safety features were either disabled or ignored. It was also established that Guernsey Harbours did not have an effective safety management system for the conduct of pilotage within its statutory area.

Safety recommendations have been made to Condor Marine Services Limited and the Government of Guernsey designed to ensure appropriate levels of proficiency in the conduct of safe navigation.

SECTION 1 – FACTUAL INFORMATION

1.1 PARTICULARS OF *COMMODORE CLIPPER* AND ACCIDENT

SHIP PARTICULARS	
Vessel's name	*Commodore Clipper*
Flag	Commonwealth of the Bahamas
Classification society	Det Norske Veritas-Germanischer Lloyd
IMO number	9201750
Type	Ro-ro passenger ferry
Registered owner	Condor Limited
Manager(s)	Condor Marine Services Limited
Construction	Steel
Year of build	1999
Length overall	129.5m
Registered length	118.7m
Gross tonnage	14,000
Minimum safe manning	29
VOYAGE PARTICULARS	
Port of departure	Portsmouth, UK
Port of arrival	St Peter Port, Guernsey
Type of voyage	Short international voyage
Cargo information	Road freight trailers, cars and passengers
Manning	39
MARINE CASUALTY INFORMATION	
Date and time	14 July 2014, 1515 UTC + 1
Type of marine casualty	Serious marine casualty
Location of incident	Little Russel, Guernsey 49°29.36'N, 002°28.73'W
Place on board	Hull
Injuries/fatalities	None
Damage/environmental impact	Hull damage, void space flooding
Ship operation	On passage
Voyage segment	Mid water
External & internal environment	Wind: south-westerly, force 5 Sea state: slight Visibility: good
Persons on board	39 crew and 31 passengers

Image courtesy of Mike Peel

Commodore Clipper

1.2 NARRATIVE

At 0900 on 14 July 2014, *Commodore Clipper* sailed from Portsmouth, UK, heading for St Peter Port, Guernsey with 39 crew, 31 passengers and 23 vehicles on board. The master had selected the company approved 'Route 06' **(Figure 1)** for the passage. At 0948, once clear of the pilotage channel, the master handed the con over to the officer of the watch[1] (OOW). During the handover, the master directed that the vessel's arrival time in St Peter Port should be advanced by approximately 30 minutes to allow more time in the port for a dive team to conduct a programmed underwater hull inspection and for the crew to carry out a lifeboat drill.

At 1030, the second officer (navigation) took over as OOW, and at 1452 the chief officer came to the bridge in preparation for the arrival into St Peter Port. Having apprised himself of the situation, the chief officer sat down in the port bridge chair **(Figure 2)**. When the master arrived on the bridge just before 1500, *Commodore Clipper* was on a heading of 220°, its engines were set at full sea speed and it was making 18 knots (kts) over the ground. The vessel was in the Little Russel and was approximately 1 cable to starboard of the 220° transit line[2]. The OOW briefed the master on the situation, including shipping traffic, weather and the time of low water. The master took the con and sat in the starboard bridge chair next to the chief officer. The OOW remained on the bridge to complete the pre-arrival checklist and the helmsman closed up at the main steering console and switched to hand steering.

At 1510, the master ordered an alteration to port to 215° in order to manoeuvre the vessel onto the 220º transit line **(Figure 3)**. At 1512:10[3] *Commodore Clipper* crossed the transit, and at 1512:44 the master ordered the helmsman to return to a heading of 220°. The vessel did not steady on this heading as, at 1513:24, a further alteration to starboard to 222° was ordered. Two further heading alterations were made to starboard; the first at 1513:47 to 224° and the second at 1514:25 to 226° **(Figure 3)**. As the master ordered the successive 2° alterations to starboard, the chief officer went to the centreline of the bridge to visually assess the vessel's position and the OOW went to the port bridge wing to monitor the bearing movement of Roustel beacon as it passed to port.

At 1515:36, on a heading of 226° and a speed of 18.2kts over the ground, a noisy and shuddering vibration lasting 9 seconds was heard and felt throughout the vessel. Immediately after the shudder, the master instructed the chief officer and the OOW to look astern. He then reduced propulsion power to 70% and altered course to port to 215º **(Figure 3)**. The chief officer and the OOW saw nothing unusual behind the vessel and, as there were no alarms, and steering and propulsion were responding normally, the master reselected full sea speed and continued the approach to the harbour.

The master then phoned the chief engineer, who was in the engine control room, to discuss what had happened. The chief engineer explained that the shudder felt below decks had been exceptional, surpassing anything he had ever experienced. However, the master reassured him that there had been sufficient depth of water where the vessel had just passed and explained that the vibration could only have

[1] The OOW was the second officer (safety)

[2] For vessels inbound to St Peter Port intending to pass west of Roustel, there are leading marks on a bearing of 220º when in transit

[3] Key timings prior to the grounding include seconds

Reproduced from Admiralty Chart BA 0002-0 by permission of the Controller of HMSO and the UK Hydrographic Office.

Figure 1: Company approved Route 06

Figure 2: Bridge central console

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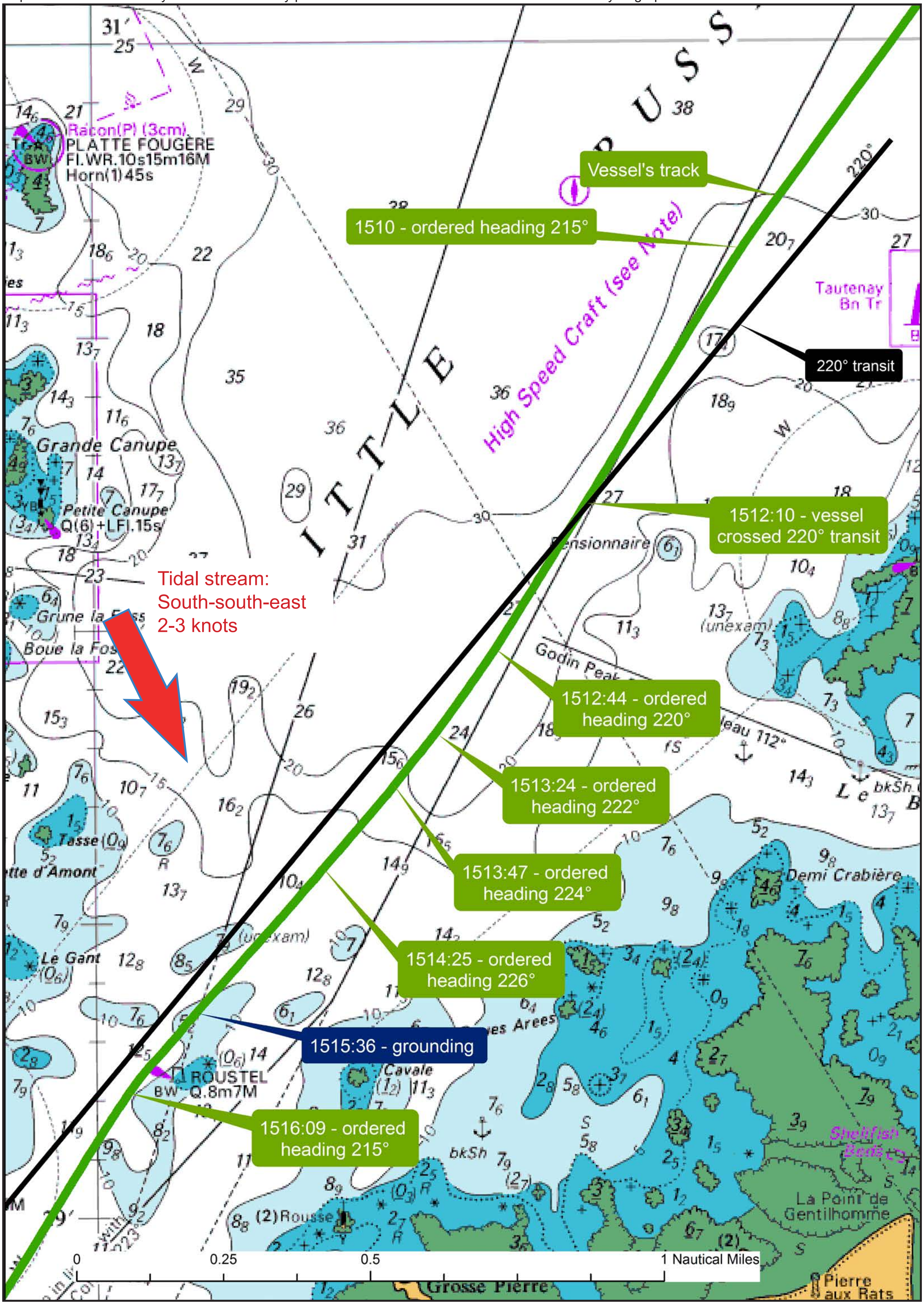

Figure 3: *Commodore Clipper*'s track in the approach to the grounding

been caused by something that the propellers had picked up, such as a string of fishing pots. The master then told the chief engineer to instruct the dive team to inspect the propellers during the planned underwater survey.

After his phone conversation with the chief engineer, the master discussed the event with the chief officer. The master restated his conviction that there had been sufficient water where the vessel had been and went on to explain his assessment that it would have been safe to have passed even closer to Roustel beacon.

Having passed the Grune au Rouge rock and Boue de la Rade shoal **(Figure 4)**, *Commodore Clipper* entered St Peter Port harbour at 1527 and proceeded alongside as planned. Once berthed, the stern door was opened and the discharge of vehicles and passengers commenced. At about 1620, the dive team arrived and the chief engineer went ashore to brief them. He explained about the earlier shudder and instructed them to inspect the propellers and to search for damage.

Once the cargo discharge was complete, the chief officer and bosun made their way to the bridge to supervise the lifeboat drill. At 1645, with the drill complete, they both returned to the vehicle deck and commenced loading the vessel in preparation for the next voyage.

At about 1700, the leader of the dive team advised the chief engineer that significant underwater damage to the hull had been observed. The chief engineer informed the master and asked him to proceed to the dockside to view the divers' video footage. Having done so, the master directed the chief officer to discharge all vehicles and passengers that had embarked. The master then returned on board and phoned the Condor Marine Services duty operations team to inform them of the situation. In the meantime, the chief engineer and chief officer instigated a thorough internal inspection of the vessel looking for damage; tank soundings of the double-bottom void spaces soon identified water ingress.

At 1730, a company representative phoned the St Peter Port harbourmaster and informed him that *Commodore Clipper* had touched the bottom and was being withdrawn from service. The harbourmaster immediately proceeded on board the vessel, where he met the master and was briefed that there were no casualties, the vessel was in a stable condition and the risk of pollution was minimal. The harbourmaster then informed the harbour director, the Chief Inspector of Marine Accidents (Guernsey) and other members of the Guernsey Pilotage Board. An immediate decision was taken by the Guernsey authorities to suspend the special pilotage licence held by *Commodore Clipper*'s master.

At 1805 the following day (15 July 2014), with all the necessary approvals in place, no cargo or passengers on board and a relief master in command, *Commodore Clipper* sailed from St Peter Port for docking and repairs in Falmouth, UK.

1.3 DAMAGE AND STABILITY

A post-accident dive survey of the seabed in the location of the grounding identified that *Commodore Clipper* had struck two granite pinnacles on a rocky shoal that was charted at a depth of 5.2m. During the grounding the tops of the two pinnacles broke away **(Figure 5)**.

Reproduced from Admiralty Chart BA 0808-0 by permission of the Controller of HMSO and the UK Hydrographic Office.

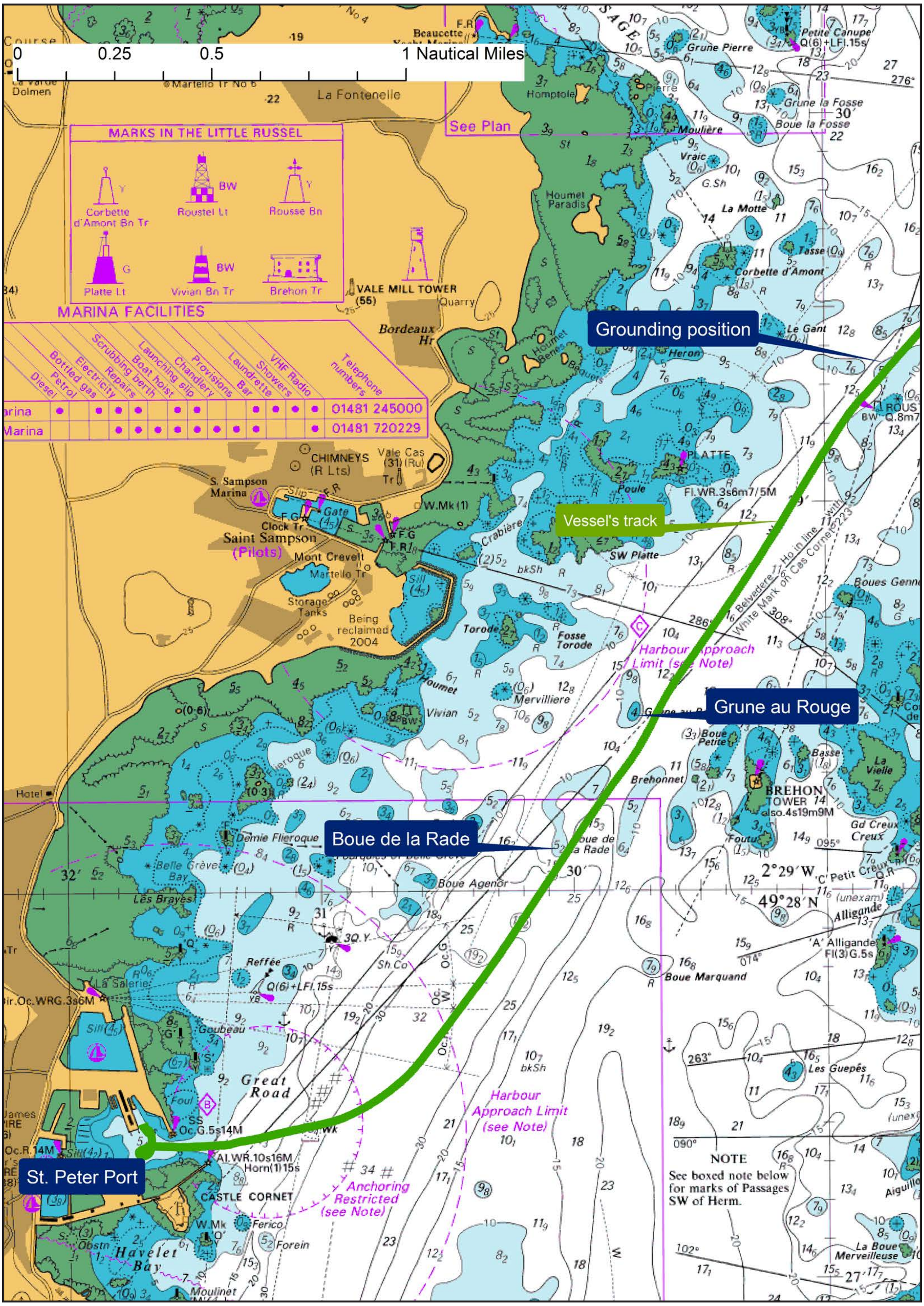

Figure 4: *Commodore Clipper*'s track from grounding to St Peter Port

Images courtesy of Captain Andy Lowe

Figure 5: Granite pinnacles struck by *Commodore Clipper*

The grounding caused significant damage **(Figure 6)** including:

- The shell plating of the hull on the port side was subject to a deep gouging distortion along approximately two thirds of its length **(Figure 7)**.
- Water ballast tank 4 was holed in two places **(Figures 8** and **9)**.
- Void space 8, void space 9 and water ballast tank 1 (port) were all breached by small holes and fracture damage to the hull **(Figure 10)**.
- Although the propellers and rudders were not struck, the skeg was damaged along its entire underside length **(Figure 11)**.

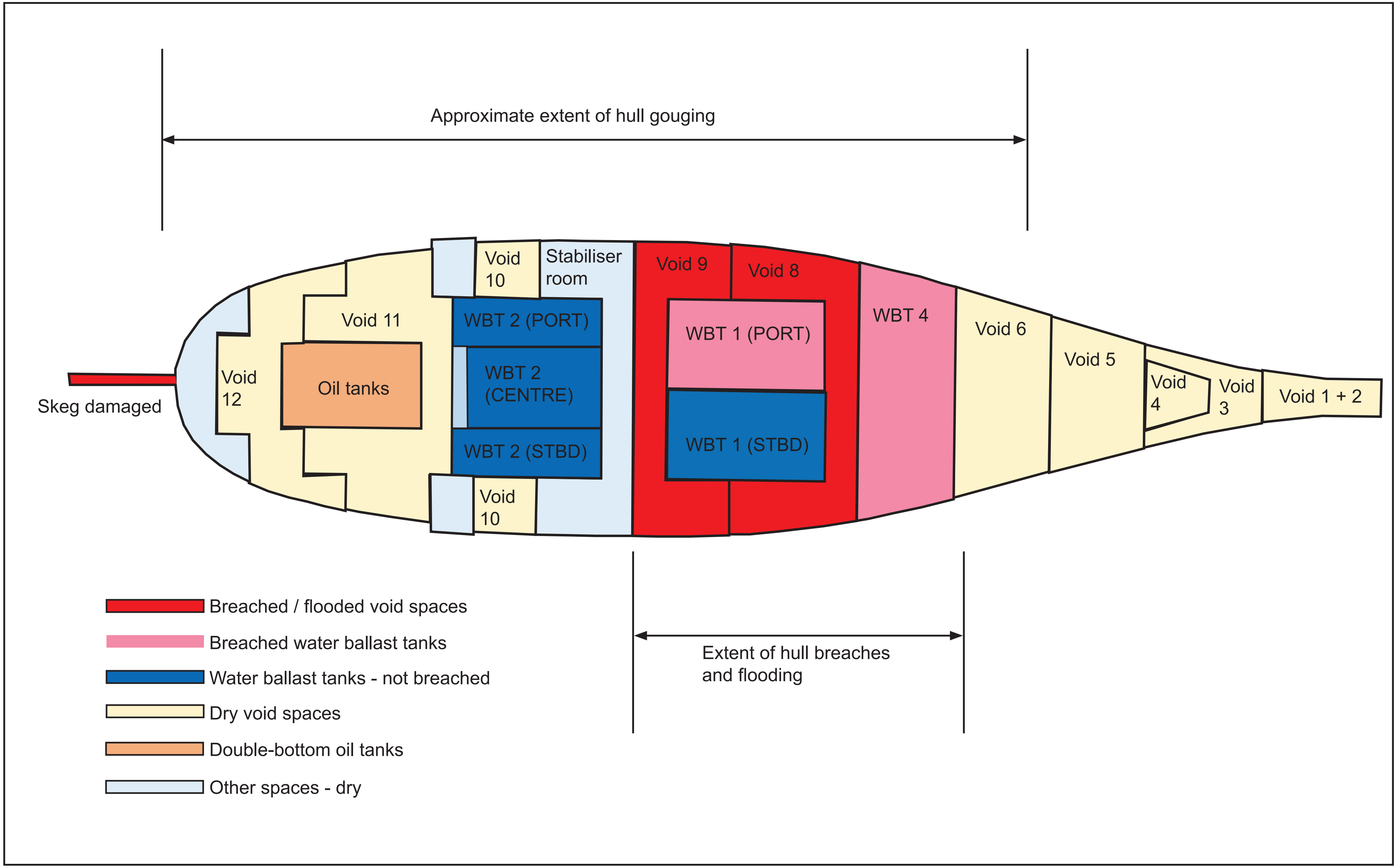

Figure 6: *Commodore Clipper*'s double-bottom general arrangement showing extent of damage (not to scale)

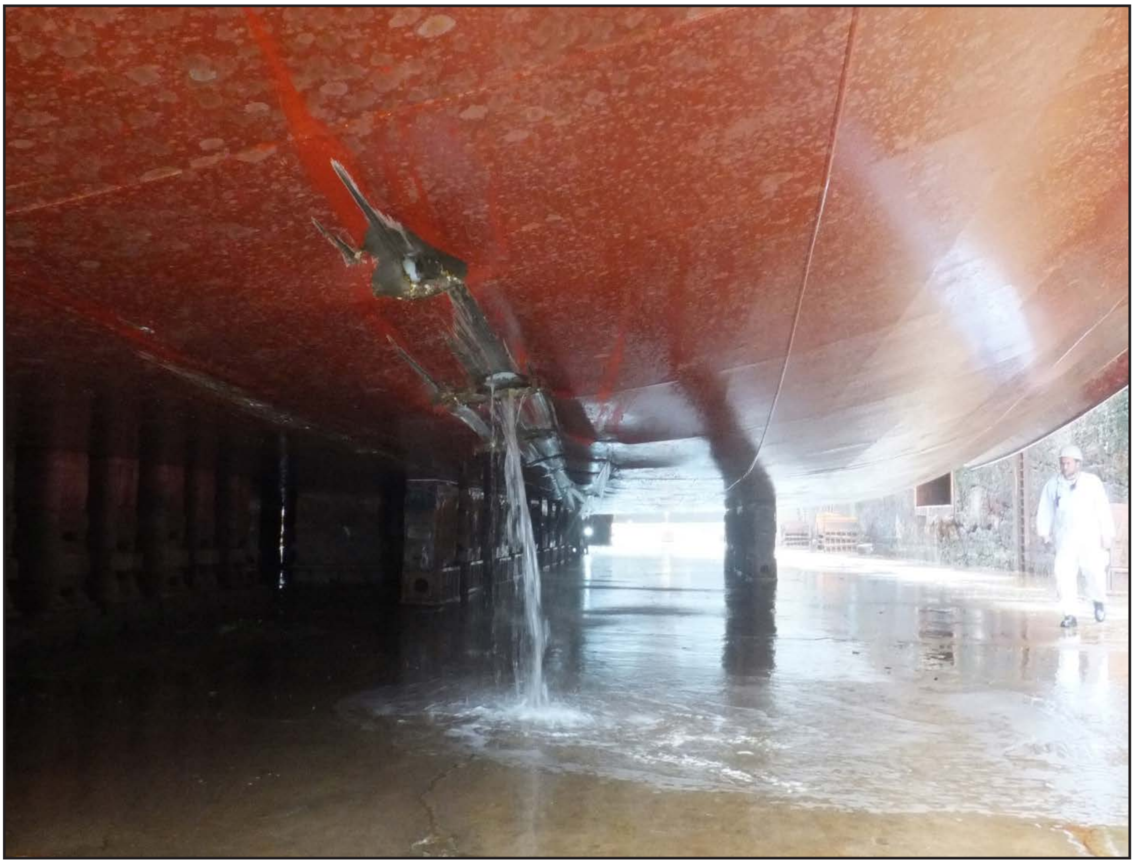

Figure 7: Hull gouging looking aft

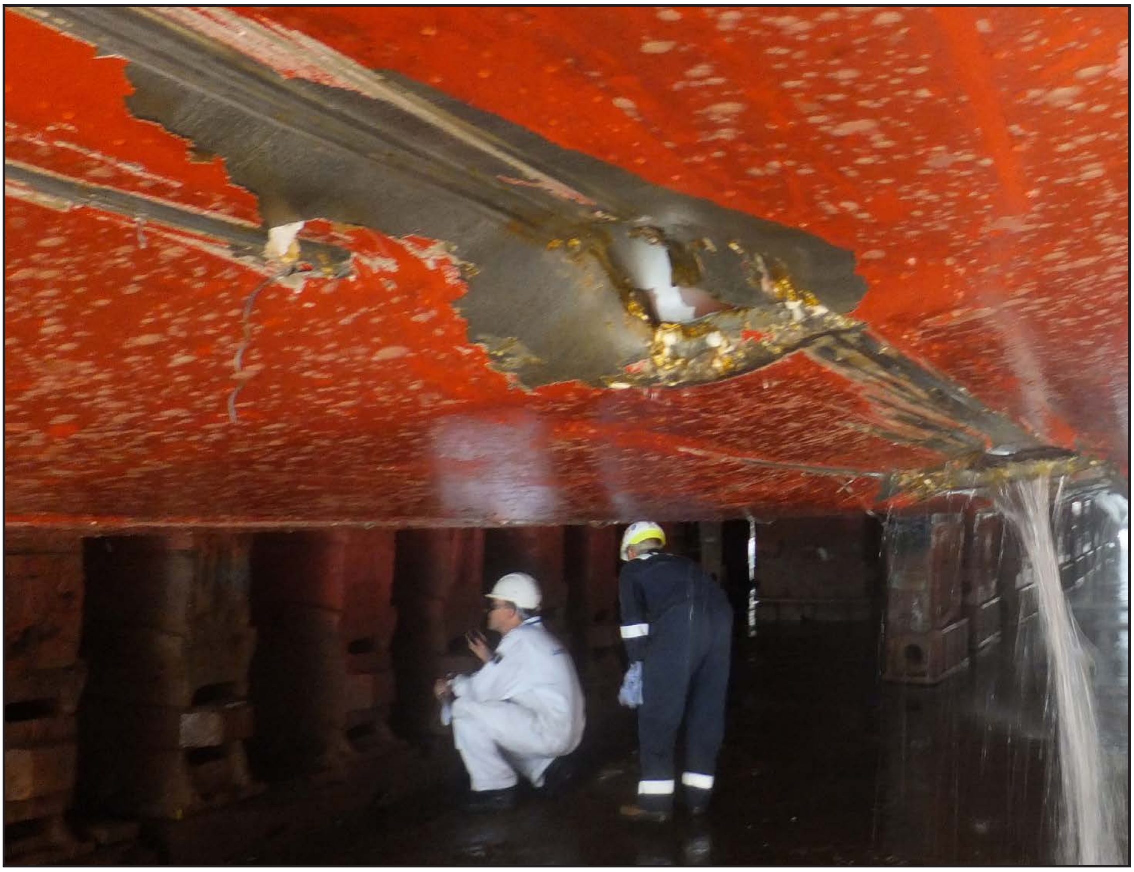

Figure 8: First hole in water ballast tank 4

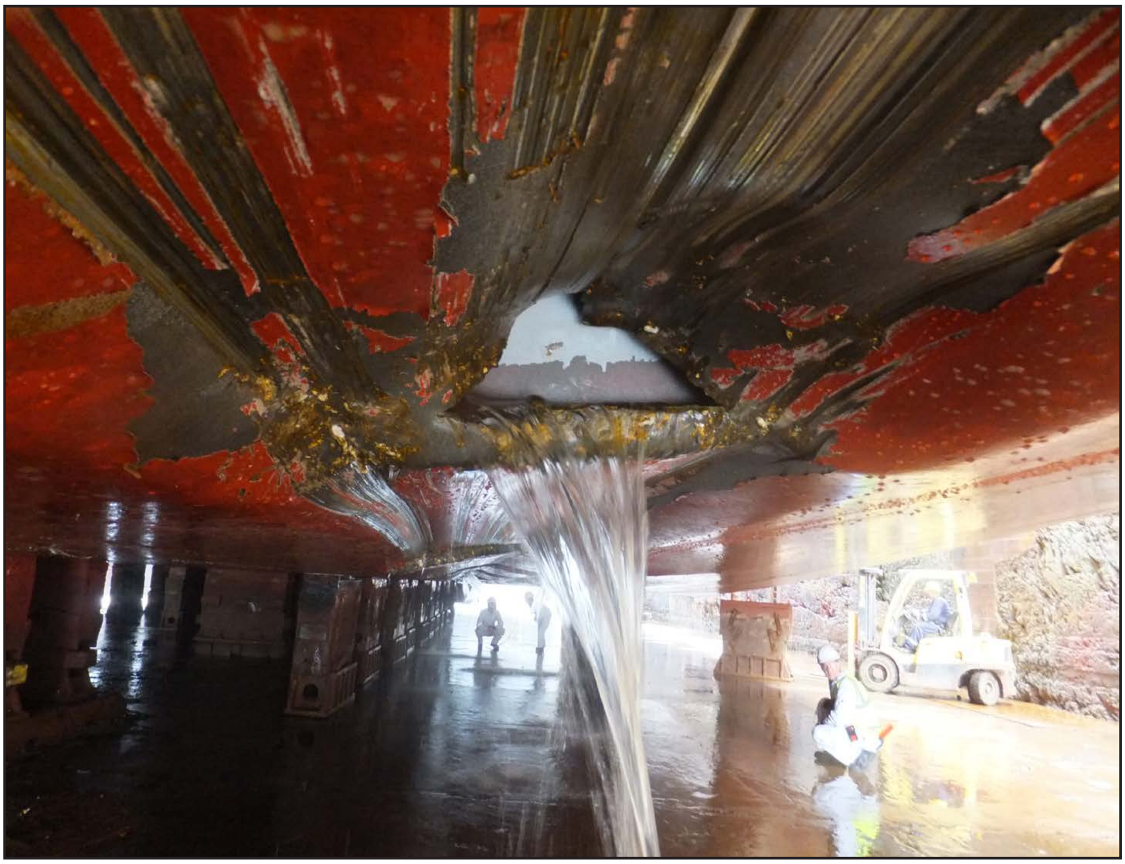

Figure 9: Second hole in water ballast tank 4

Figure 10: Detail of hull fracture damage

- Internal fixtures in affected areas were damaged resulting from the upward force of the grounding; an example was the distortion to a fixed ladder within a void space **(Figure 12)**.

After the extent of the damage had been fully established by internal and external examination of the vessel in St Peter Port, stability calculations were undertaken for a series of scenarios including the post-grounding 'actual' and 'worst case' conditions. This analysis showed that in each condition the minimum metacentric height[4] necessary for satisfactory stability of the vessel was maintained.

1.4 ENVIRONMENTAL CONDITIONS

1.4.1 Weather

Wind:	south-westerly, force 5[5]
Sea state:	slight
Visibility:	good, in daylight

1.4.2 St Peter Port tidal data for 14 July 2014

High water:	2105, 9.9m
Low water:	1509, 0.8m
Time and height at grounding:	1515, 0.9m
Tidal range:	9.1m (115% of mean spring value of 7.9m)
Tidal stream:	south-south-east, 2 – 3 kts

1.4.3 Guernsey tidal conditions

The waters around Guernsey are subject to unique and often extreme tidal conditions. Unusually, slack water does not coincide with high and low water times. This was the case during the grounding, where a significant tidal stream was flowing at low water. In the approaches to St Peter Port, such streams can also be difficult to predict. Additionally, the tidal ranges are large and therefore significant to navigation.

1.5 VESSEL

Commodore Clipper was a roll-on roll-off passenger ferry that was purpose built in 1999 for the Portsmouth to Channel Islands routes. The vessel was registered with the Commonwealth of the Bahamas, owned by Condor Limited and managed by Condor Marine Services Limited (the company). The vessel's Safety Management

[4] The calculation of the static stability of a floating object measured as the distance between the centre of gravity and the metacentre

[5] Beaufort wind scale Force 5 defined as 'fresh breeze'; wind speed of 17 - 21 knots

Figure 11: Detail of damage to keel skeg

Figure 12: Example of internal ladder damage in a void space

Certificate, confirming that its safety management system (SMS) complied with the ISM Code[6], was issued by Det Norske Veritas-Germanischer Lloyd (DNV-GL) on 3 June 2014 and was valid until 8 June 2019.

Commodore Clipper was of a double-bottomed construction **(Figure 6)** with 12 double-bottom void spaces and 6 double-bottom water ballast tanks. The void spaces were not fitted with bilge alarms. At the time of the grounding, all the water ballast tanks were pressed full of water except tank No.2 (starboard), which was used by the crew for stability adjustments.

The bridge navigational equipment included:

- A single Transas Navi-sailor 4000 electronic chart display and information system (ECDIS). The system was loaded with a UK Hydrographic Office (UKHO) electronic navigational chart (ENC) outfit that was up to date with corrections. Paper charts were carried as a back-up to the ECDIS and this arrangement complied with the Flag State's carriage requirement.

- Two Kelvin Hughes Manta radar systems; the port display was configured to the S-band (10cm) radar and the starboard display was configured to the X-band (3cm) radar.

- A Sperry Marine ES5100 echo sounder, which was running at the time of the accident although the safety alarm depth was set to 0m.

- Two Litton Marine LMX 420 global positioning systems (GPS).

- A 'Dive Time' draught measuring system; the recorded even keel draught of the vessel on departure from Portsmouth was 5.0m.

At the time of the grounding the company approved 'Route 06' was selected for navigation in the ECDIS and both radar systems. The ECDIS display screen was located on the starboard side of the central bridge console adjacent to the master's chair **(Figure 2)**. The display was not accessible from the port chair.

1.6 CREW

Commodore Clipper's crew of 39 consisted of 20 operational and 19 cabin staff that fully met the Flag State's safe manning requirement. The master, chief officer, chief engineer and deck officers were British nationals and the second and third engineers were Ukrainian. The remainder of the crew were British or Ukrainian except for one Polish cabin crew member.

The master was 60 years old and had been regularly in command of *Commodore Clipper* since it had entered service in 1999. He was also designated as the vessel's senior master, which meant that he held responsibility for vessel standards, crew changes and general manning issues. He held an STCW[7] II/2 master's (unlimited) certificate of competency[8] (CoC) and had been a special pilotage licence holder for St Peter Port since 1991. He had a detailed working knowledge and extensive experience of navigation in the waters around Guernsey.

[6] International Management Code for the Safe Operation of Ships and for Pollution Prevention

[7] International Convention on Standards of Training, Certification and Watchkeeping for Seafarers, 1978, as amended

[8] All the crew certificates had been endorsed by the Flag State

The chief engineer was 57 years old and, like the master, had been assigned to the vessel since it entered service in 1999, thus he had a long-standing working relationship with the master. He held an STCW III/2 chief engineer (unlimited) CoC.

The chief officer was 35 years old and had been at sea for 12 years, primarily in the cruise industry, before joining Condor Marine Services in April 2012. He held an STCW II/2 master's (unlimited) CoC and a special pilotage licence for St Peter Port. He had been the chief officer of *Commodore Clipper* since November 2013.

1.7 CONDOR MARINE SERVICES LIMITED

The company was originally founded in 1964 and had ties with the Commodore Shipping Group. In 2003 the two companies merged and operated solely under the Condor name. The company operated a fleet of high speed and conventional[9] roll-on and roll-off passenger and freight ferry services on regular routes between UK, Guernsey, Jersey and France.

1.8 SAFETY MANAGEMENT SYSTEM

Condor Marine Services' Document of Compliance, confirming that the company's SMS met the requirements of the ISM Code, was issued by DNV on behalf of the Flag State on 28 May 2013 and was valid until 6 May 2018.

The company provided a generic SMS for use by all its vessels. The SMS was divided into three volumes:

- Group management manual
- Group route operational manual
- Group shipboard manual

There was also a dedicated operational procedures manual for *Commodore Clipper*.

The group management manual set out the company's policy for safety, quality management and environmental protection. It also contained detailed guidance on pilotage including the conduct of passage planning and navigation.

The group route operational manual included operational limitations and detailed guidance on company approved routes. Each of the company's routes had been certified as safe for navigation by its vessels in all states of tide. However, the routes did not contain authorised cross track distances (XTD). The operational limitations for conventional ferries included the requirement for a minimum under keel clearance (UKC) of 1m. This manual also contained guidance for the use of ECDIS.

The group shipboard manual focused on crew management, training and onboard services, including terms of reference for all staff.

Commodore Clipper's operational procedures manual provided guidance on the company's operational and engineering processes. It included the pre-arrival and departure checklists **(Annex A)** that listed a requirement for arrival and departure

[9] *Commodore Clipper* and *Commodore Goodwill* were the company's 'conventional' ferries.

briefs. It was a requirement of the grounding-raking checklist **(Annex B)** to immediately inform the coastguard, the company and passengers following such incidents.

1.8.1 Master's standing orders

The SMS was required to be supplemented by a set of master's standing orders, which had been issued dated 22 January 2007; key extracts included:

- *'The vessel's position is to be continuously monitored and plotted on the chart.*
- *Radar parallel indexing is a simple and highly effective method of monitoring the vessel's track close to land. It should always be used approaching the Big or Little Russel.*
- *The tides in the area are very strong. It is not uncommon to have to allow 20 degrees set.*
- *The whole point of increasing the bridge team in pilotage waters is so that each member monitors the others actions.'*

Given that these orders were issued prior to the ECDIS installation, no guidance on the use of this equipment was included.

1.8.2 Crew training and drills

The SMS list of emergency drills required to be conducted is at **Annex C**. This list did not specifically include a requirement for grounding or flooding training, but a damage control exercise was required every 3 months and its checklist[10] **(Annex D)** included damaged stability management, void space access and use of submersible pumps.

Commodore Clipper's log of crew training and drills undertaken between 21 April 2014 and the accident **(Annex E)** shows that, on 9 June 2014, a fire exercise was *'combined with instructions for damage control'*. Other than this, the crew training conducted in this period prior to the accident was dominated by simulated fires and abandon ship drills.

1.9 NAVIGATION THROUGH THE LITTLE RUSSEL

The Little Russel is a northern approach channel to St Peter Port between the islands of Guernsey and Herm. The primary method of navigating through the Little Russel was visual; the key reference for the passage west of Roustel was the leading marks bearing 220° when in transit **(Figure 13)**. The Roustel is a rocky shoal that dries at low water and is marked by a beacon **(Figure 14)**. There are also numerous navigational marks and transits that provide further visual references to monitor the passage through. For vessels approaching St Peter Port from the north, use of the Little Russel is 4 nautical miles (nm) shorter than using the deeper and wider approach via the Big Russel passing east of Herm **(Figure 15)**.

[10] Although titled for *Commodore Goodwill*, this list was assumed to apply to both Condor's conventional ferries.

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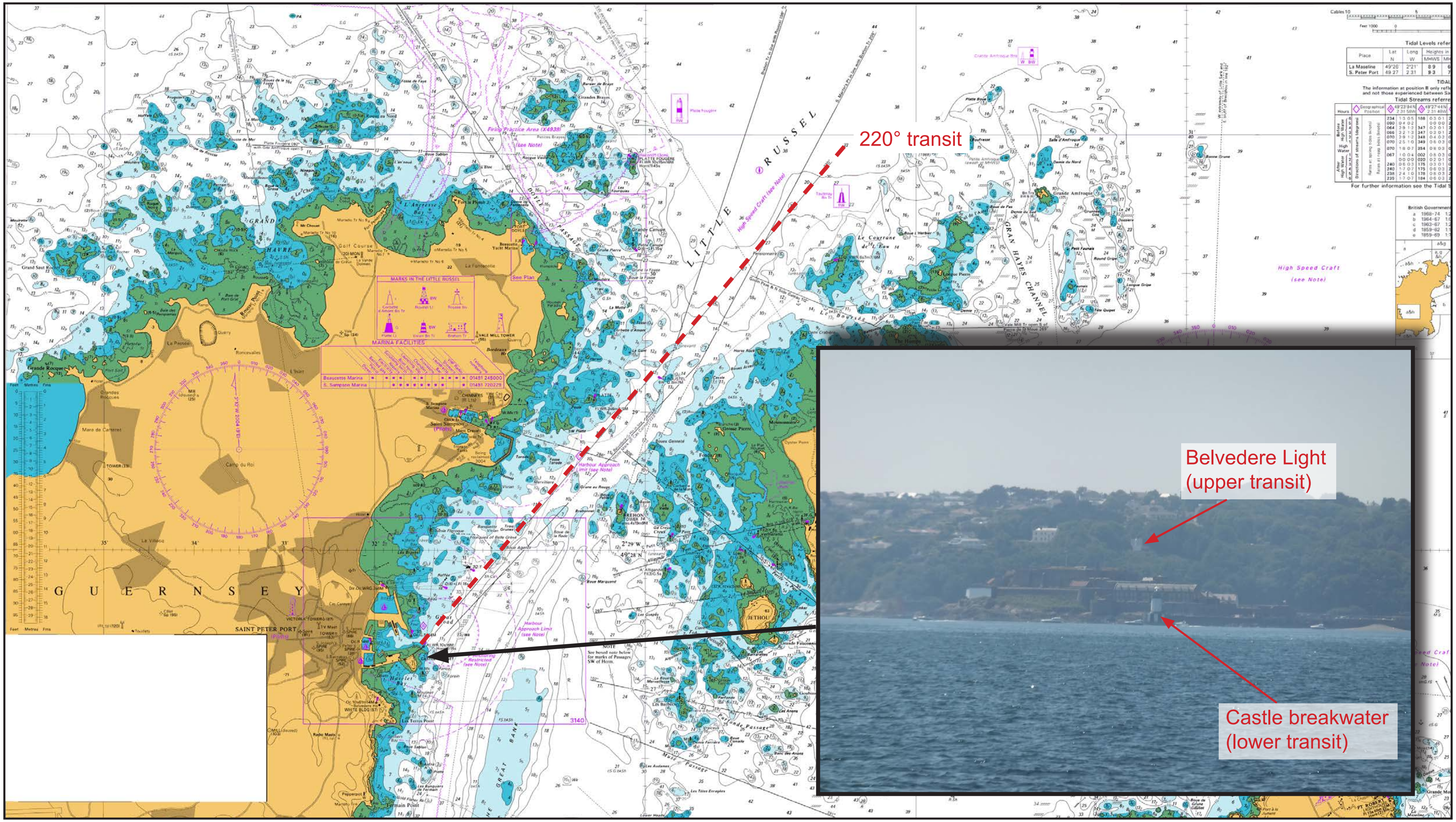

Figure 13: The 220° leading transit passing west of Roustel

Image courtesy of Captain Andy Lowe

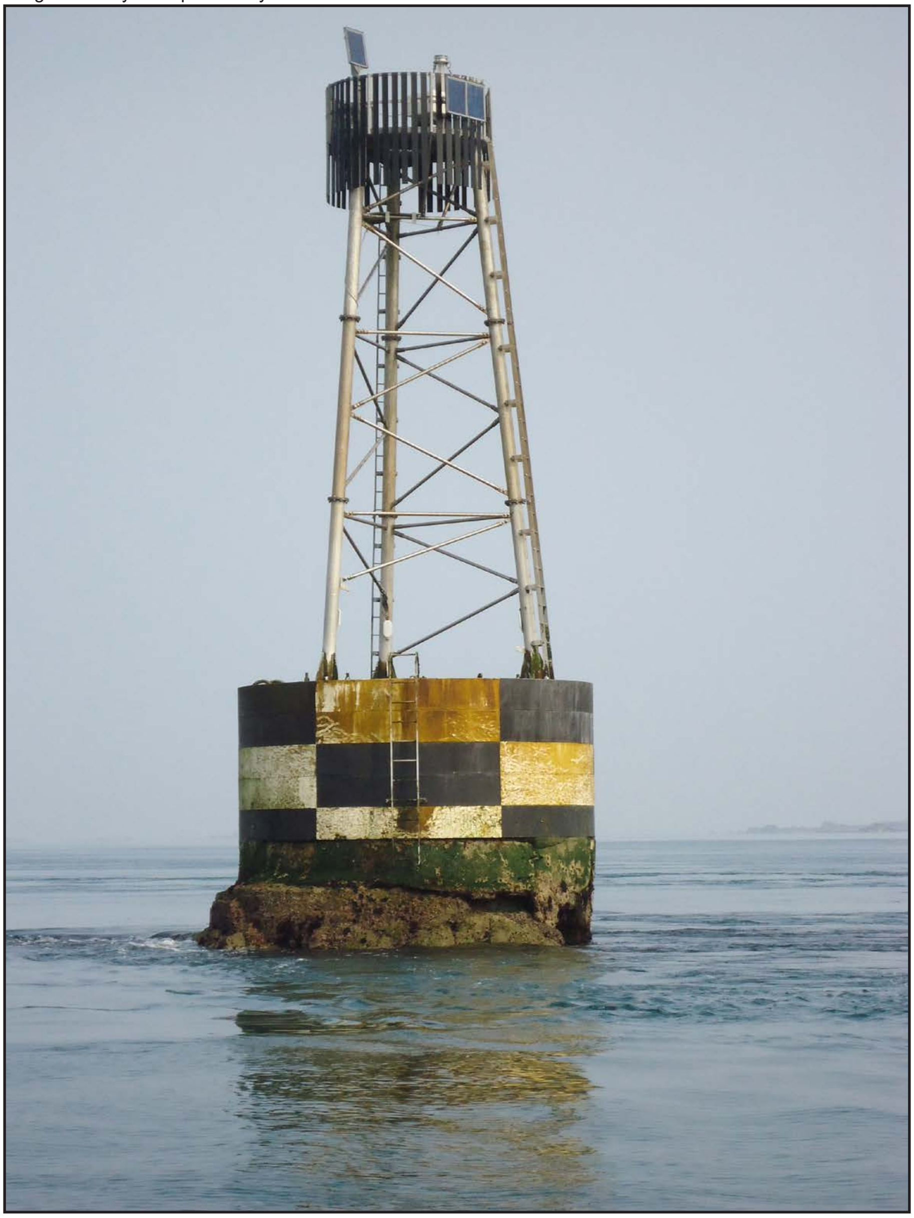

Figure 14: Roustel beacon pictured at low water

For vessels planning a passage through the Little Russel, Admiralty Sailing Directions (Channel Pilot) (NP27) contains detailed guidance on safe navigation, including the 220° leading marks. It also contains specific cautions on the rocky shoals with depths less than 10m that present a very significant hazard to navigation in this channel.

The syllabus for St Peter Port special pilotage licence training contained a route recommended by local pilots **(Figure 16)** that advised use of the 220° transit when passing west of both Roustel and Grune au Rouge, before turning south to pass west of Boue de la Rade.

The company approved route through the Little Russel **(Figure 16)** mirrored the Admiralty and Guernsey pilots' advice, passing west of Roustel and Grune au Rouge on the 220º transit. Thereafter, the company route turned to a southerly heading but passed east of Boue de la Rade.

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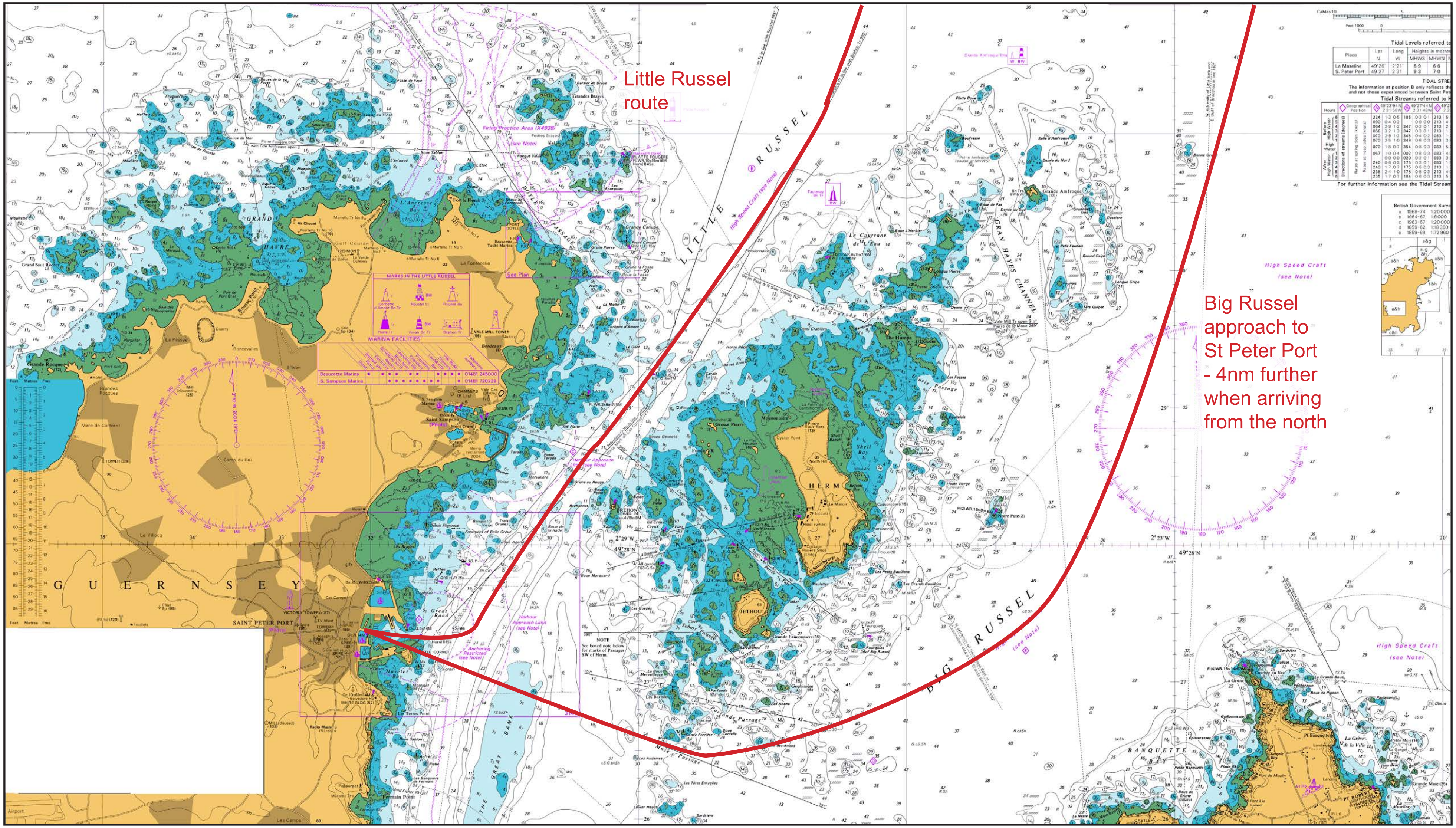

Figure 15: Comparison of Big and Little Russel routes into St Peter Port approaching from the north

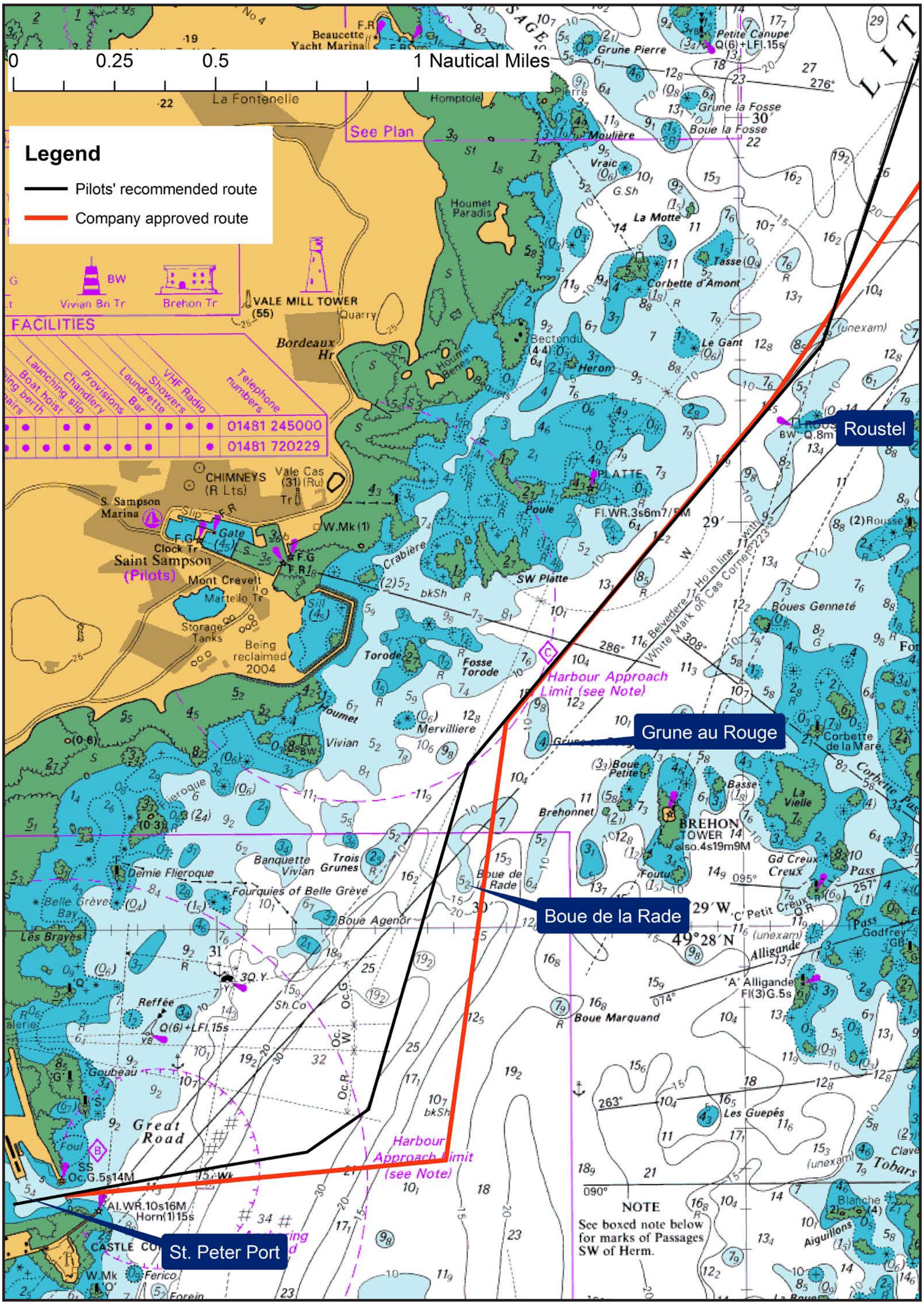

Figure 16: Pilots' recommended route and company approved route through the Little Russel

In the course of this investigation, the MAIB obtained 12 months of available[11] automatic identification system (AIS) data for *Commodore Clipper*'s southbound transits of the Little Russel prior to the grounding. This data **(Figure 17)** showed that the vessel routinely deviated from the company route by passing east of Grune au Rouge.

1.10 PASSAGE PLANNING

1.10.1 International requirement

The International Maritime Organization's (IMO) Resolution A.893(21) *Guidelines for Voyage Planning* requires masters to plan every voyage, identifying a route that takes into account all navigational hazards and ensures sufficient sea room for the safe passage of the vessel. The IMO guidelines explains that:

'The development of a plan for voyage or passage, as well as the close and continuous monitoring of the vessel's progress and position during the execution of such a plan, are of essential importance for safety of life at sea, safety and efficiency of navigation and protection of the marine environment.'

The guidance sub-divides passage planning into four key stages: appraisal, planning, execution and monitoring. The initial voyage planning **appraisal** stage involves the gathering of all information relevant to the intended voyage. The next stage requires the detailed **planning** of the whole voyage from berth-to-berth. The third and fourth stages are the effective **execution** of the plan and **monitoring** the progress of the vessel during the implementation of the plan.

1.10.2 Company guidance

Condor Marine Services' group management manual stated:

'3.2.16.7. The passage plan must take into account all the pertinent information relating to the voyage, in particular:

- *The draught of the vessel*
- *Depth of water and range of tide*
- *Tidal flow and rate, currents and swell*

All tracks laid down shall be well clear of hazards to navigation giving adequate under keel clearance at all times.

Masters have full discretionary powers to delay entry or leaving port if by reason of adverse weather or other conditions they consider it unsafe.

In general, when either entering or leaving port where the charted depth is a critical factor it is best to wait until near the time of High Water, to provide a reasonable margin of water under keel.'

[11] This data set is not a complete history of all the vessel's tracks but is sufficiently well populated to provide an overview of routes used.

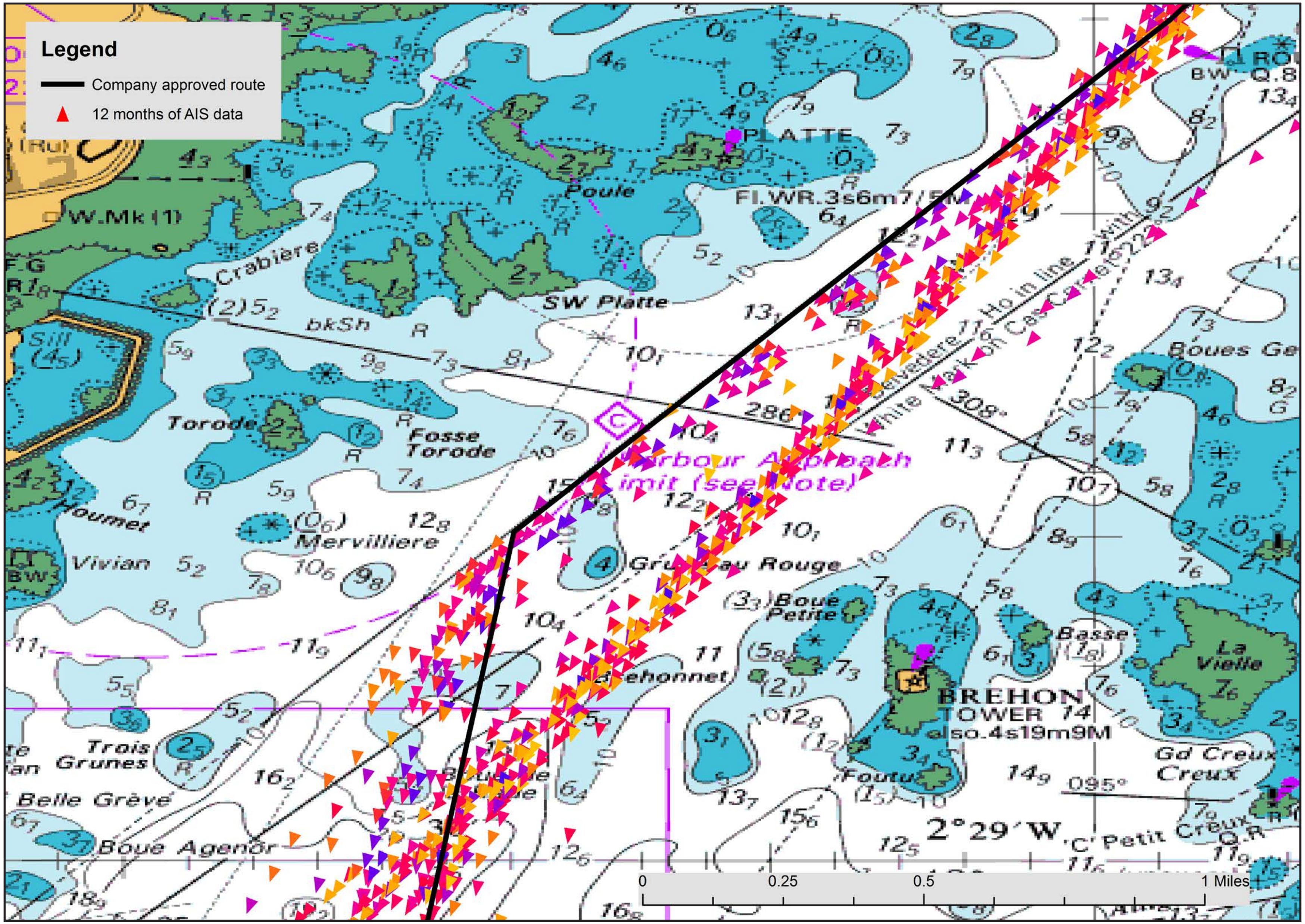

Figure 17: Twelve months AIS history of *Commodore Clipper*'s southbound passages via the Little Russel

For conventional ferries inbound to St Peter Port, the group route operations manual stated:

> *'11.8.4.2. The usual approach to Saint Peter Port is via the Little Russell. Guernsey pilots have made a recommendation that the Big Russell and a Southerly approach to St. Peter Port should be used in reduced visibility. It should be stressed however that use of the Little Russell in poor visibility is not prohibited, all hazards should be taken into account, including speed of transit, before using this approach channel'* [sic].
>
> *'14.7.3. The Little Russel Passage is not used in fog due to problems with the identification of small craft; passage is via the Big Russell'* [sic].

1.10.3 Onboard preparations

Prior to each voyage, the master chose the route to be followed, which was then selected from pre-loaded route data in the ECDIS and radar systems. The OOW was also required to update tidal data on a state-board by the chart table. No other specific passage planning actions were taken; ECDIS safety depth, safety contour and XTD settings were not adjusted to reflect the safe water, based on height of tide, available for the passage.

1.10.4 Passage execution in pilotage waters

In pilotage waters, the master, chief officer and a helmsman were required on the bridge. In addition, for inbound passages, after handing the con to the master, the OOW would routinely remain on the bridge until required to close up at a mooring station thus providing additional manpower in the approach to harbour. Having taken the con, the master would pass verbal instructions to the helmsman for required courses to steer, but operated the propulsion power levers himself. The master did not routinely vocalise his intentions or plans to the rest of the bridge team.

1.11 INTERACTION

1.11.1 Effects

Interaction between a moving vessel and the seabed takes a number of forms including squat and shallow water effect. Squat is the decrease in under keel clearance that results from the increased velocity of water flowing under a vessel's hull and, therefore, the consequent reduction in pressure underneath. Shallow water effect can cause loss of speed, vibration and sluggish handling when a vessel is in waters shallower than the onset depth[12]. Shallow water effects increase as depth reduces and becomes significant at 25-30% of the onset depth. In this case, for *Commodore Clipper* with a displacement of 7975 tonnes and a speed of 18kts, the onset depth would be 61m and the effects significant in approximately 18m or less sea depth. Interactions vary with the square of the vessel's speed through the water, therefore reducing speed is the most effective method of limiting shallow water effect.

[12] Onset depth = speed x 0.17 x cube root of displacement in tonnes

1.11.2 Topography

The seabed in the approaches to Portsmouth and St Peter Port have different topographical features. The eastern approach to the Solent consists of gently shelving mud and sandbanks; whereas the Little Russel is mainly granite with steep rocky shoals. Thus, the onset of shallow water effect in the Solent approach is gradual and easily detected by the bridge team. Conversely, the onset of interaction effects in the Little Russel will not be gradual and, therefore, much more difficult to recognise or respond to.

1.11.3 Company guidance

The group management manual discussed hydrodynamic interaction and excessive speed, and stated:

> *'3.2.14.1. The Master and Chief Officer are reminded of the hydrodynamic interaction forces between vessels and banks of channels, and 'squat' over the ground. These forces can almost be eliminated by proceeding at slow speed. No consideration of prior knowledge or experience of the pilotage waters, schedule, practice or prior instruction can justify a speed likely to cause a casualty.'*

The ECDIS section of the group route operations manual offered guidance on the calculation of safe depth taking squat into account, and the wheelhouse poster **(Figure 18)** contained estimated squat data for planning. The information on the poster showed that in approximately 10m of water and at a speed of 12kts, a 'draught increase'[13] of 1.18m should be applied.

After the grounding, the company commissioned an independent consultant to assess the effects of squat in the Little Russel; this calculation showed an estimated value for squat at the time of grounding of 1.46m.

1.12 ECDIS

1.12.1 Equipment, training and performance standards

Commodore Clipper's Transas Navi-sailor 4000 ECDIS had been approved by the Flag State for use as the primary means of navigation on board since 14 August 2013. All of the deck officers had completed the necessary generic training and type-specific familiarisation. This training had been provided by ECDIS Limited in Fareham, UK and fulfilled the requirements of the IMO Model Course 1.27 syllabus, thus meeting the requirements of the STCW Code.

The performance standards for ECDIS are detailed in IMO Resolution MSC 232(82): *Adoption of the Revised Performance Standard for Electronic Chart Display and Information Systems*, dated 5 December 2006. Appendix 5 to this Resolution mandates an alarm whenever a vessel crosses the safety contour or deviates from the selected route. An alarm is defined as '*an alarm or alarm system which announces by audible means, or audible and visual means, a condition requiring attention*.'

[13] Squat does not result in an increase in the vessel's draught; however, it is most easily considered in this way for the purpose of calculating under keel clearances.

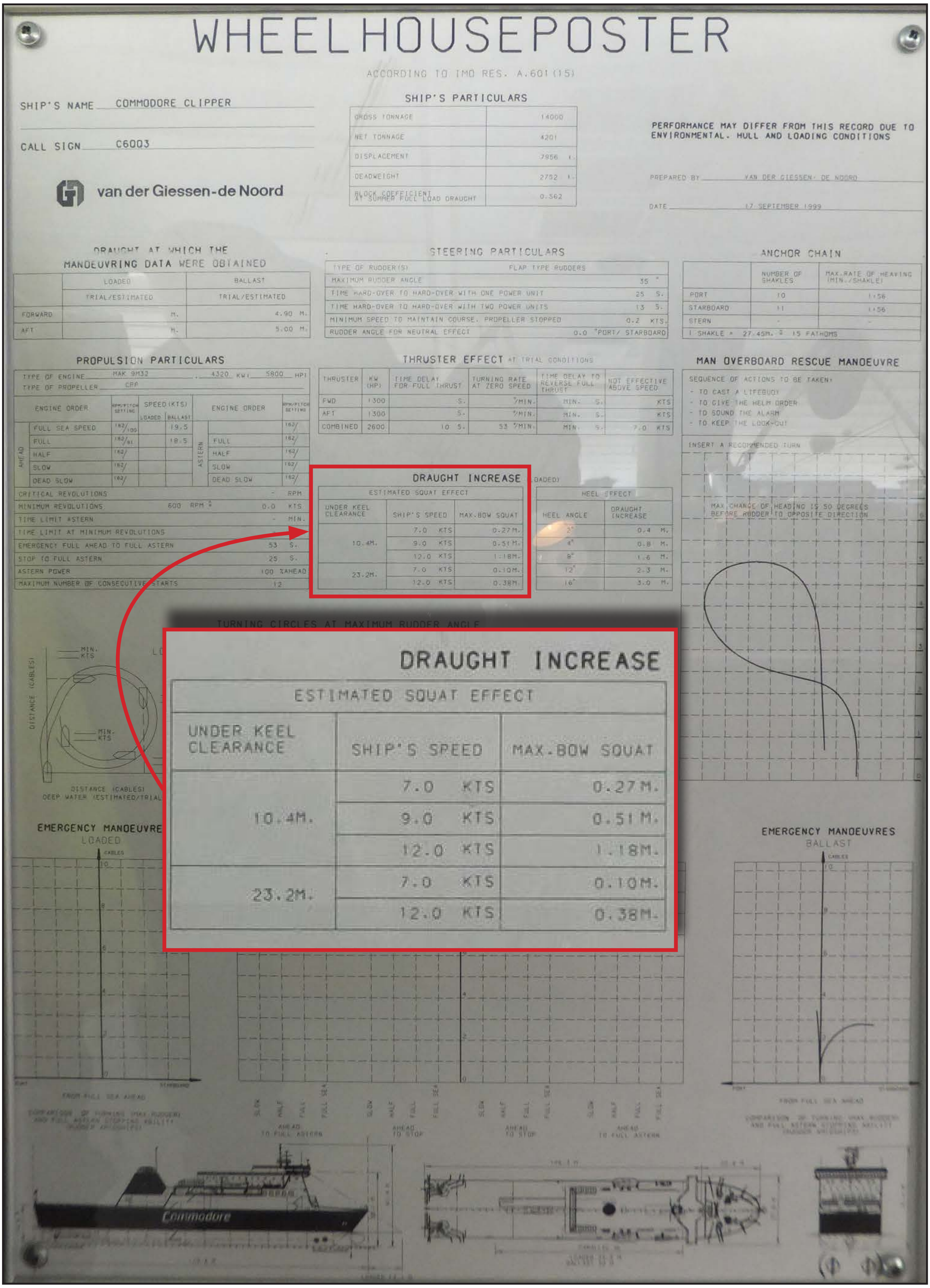

Figure 18: Wheelhouse poster showing estimated squat data for planning

1.12.2 Safety depth and safety contour

Warning of the risk of grounding is achieved using the safety depth and safety contour functions. The group route operations manual gave the following calculation for safety depth:

'Safety depth = draught + squat + minimum UKC – height of tide'

At the time of the accident, the safety depth was set at 7m.

The safety contour is intended to show the operator a clear distinction between safe and unsafe water. If there is not an ENC contour corresponding to the chosen safety contour value, ECDIS will automatically default to the next deeper contour. However, should the operator wish to use a safety contour that does not correlate with an available ENC contour, ECDIS has the capability for a limiting danger line (LDL) to be drawn manually at whatever safety contour value is required. At the time of the accident, the safety contour was set to 5m.

1.12.3 Deviation from planned route

Warning of deviation from the planned route is achieved by use of the XTD setting, which is an operator defined safety corridor either side of the planned route. If the vessel crosses outside the XTD, the system will alarm until the vessel is back inside the safety corridor. Particularly in pilotage waters, the XTD should be calculated for each leg of a passage and take into account the expected width of safe water available. For the leg of the passage plan at the time of grounding, the XTD settings were:

- XTD (port): 0.025nm (50 yards[14])
- XTD (starboard): 0.06nm (120 yards)

The XTD alarm on board *Commodore Clipper* was active from 1504 when the vessel crossed outside the safety corridor until the time of the grounding.

1.12.4 Safety frame

The safety frame feature is a look-ahead zone providing navigational safety by forewarning of a risk of grounding ahead. An anti-grounding alarm is generated when the safety frame crosses the safety contour or passes over the safety depth. The size of the safety frame ahead of the vessel's position is measured in time[15] and the width either side is defined as a distance. The available settings were:

- Ahead: 0 – 15 minutes
- Port/starboard: 0.1nm - 4nm

The group route operational manual stated:

[14] 1 yard = 0.9144m

[15] By measuring ahead in time, the distance at which a warning occurs is a function of the vessel's speed

'16.5.8.1. Turning the Safety Frame off means that the system will only alarm when the ship symbol encounters them [safety depth or safety contour]*, which in most cases will be too late.'*

On *Commodore Clipper* the safety frame feature was switched off at the time of the accident.

1.12.5 Alarm management

After ECDIS was approved for use as the primary means of navigation, its alarms activated frequently during *Commodore Clipper*'s passages. Along with the bridge teams from other vessels in the company's fleet, the crew on the bridge of *Commodore Clipper* found the constant ECDIS audible alarms a significant distraction. As a result of concerns raised by the masters of its vessels, the company allowed the audible alarms to be disabled across its fleet. Nevertheless, the visual alarms remained active and could still be observed on the ECDIS display. The company did not notify the Flag State of its decision to allow the ECDIS audible alarm to be disabled.

1.13 INSPECTIONS AND AUDITS

Between March 2013 and the accident, *Commodore Clipper* was inspected seven times in accordance with the ISM Code and the Paris Memorandum of Understanding, and no navigational non-conformities were raised. The inspections consisted of two internal ISM audits by the company, a renewal ISM audit by DNV, an annual inspection by the Flag State and three Port State Control (PSC) inspections.

The most recent external inspection prior to the accident was the renewal ISM audit conducted by a DNV surveyor on 3 June 2014. The inspection report stated that the vessel's *'bridge processes, including navigation, watchkeeping, voyage planning, equipment maintenance, and testing, communications, library and publications, etc'* had been reviewed and found to be satisfactory. The inspection did not identify that the ECDIS audible alarm had been disabled.

1.13.1 Internal audits

The report of the company's internal audit conducted on 5 - 6 May 2014 noted a *'very high level of knowledge of vessel procedures was found as was a commitment to safe operations'* and *'an inspection of operational areas of the vessel was carried out as was an informal Bridge Team Management Assessment and the standard achieved was observed to be high.'*

Condor Marine Services also had a system of conducting regular navigation and bridge team management (BTM) assessments. The assessment programme was delivered by the company's marine manager and included an annual check voyage with each vessel to assess standards and provide a training opportunity for bridge teams. The output from these assessments was a BTM evaluation checklist with comments where necessary. The marine manager also conducted random navigational data downloads from ECDIS and voyage data recorders (VDR), which were then analysed ashore and feedback provided to the bridge team concerned.

1.14 HYDROGRAPHY

1.14.1 International obligations

The International Convention for the Safety of Life at Sea (SOLAS), Chapter V, Regulation 9 requires IMO member states to provide nautical and hydrographic services that are suitable for safe navigation. Provision of such services is an obligation for the UK, its overseas territories and crown dependencies. The States of Guernsey is a self-governing crown dependency of the UK.

Responsibility for prioritising and managing civil hydrographic surveying in UK waters is held by the Maritime and Coastguard Agency (MCA) and for the Channel Islands is delegated to its local governments. Responsibility for analysis of survey data and the preparation of charts and corrections is held by the UKHO.

1.14.2 Survey data quality

Admiralty paper charts contain a source data diagram that is a scaled replica of the area covered showing the quality of the survey source. This information should be taken into consideration during the passage planning process. For ENCs, a similar system is used to categorise the accuracy of the hydrographic data. Referred to as the category of zone of confidence (CATZOC), it gives an accuracy for both positional and depth data on the ENC. The CATZOC table from the Mariners' Handbook is at **Annex F**.

The survey data for the Little Russel was based on 1960s single-beam echo soundings. Data from the ENC in use at the time showed that the position of the grounding was in an area defined as CATZOC 'B', which means that, for depths down to 10m, an error of plus or minus (+/-) 1.2m should be applied[16].

Guernsey Harbours recognised its obligation to maintain accurate hydrographic data in its territorial waters, and in March 2014 it commissioned a commercial multi-beam echo sounder survey of St Peter Port's harbour approaches. The results of this survey were completed and passed to Guernsey Harbours by the survey company at the end of June 2014; the data was then forwarded to the UKHO for analysis. After the accident, scrutiny of this new data showed the rocky shoal in the grounding position had a surveyed depth of 4.6m below chart datum **(Figure 19)**.

1.15 THE STATES OF GUERNSEY HARBOUR AUTHORITY

1.15.1 Guernsey Harbours

The States of Guernsey's Public Services Department (PSD) was responsible for the maritime environment. As a sub-department of the PSD, Guernsey Harbours undertook specific mandated functions as the island's harbour authority. These functions included: operation and management of the island's harbours, moorings, vessel registry, provision of pilotage, coastguard functions, aids to navigation and facilities maintenance.

[16] A positional error of ±50m would also apply and the absence of full seafloor coverage by the survey meant that, although not expected, uncharted features may exist.

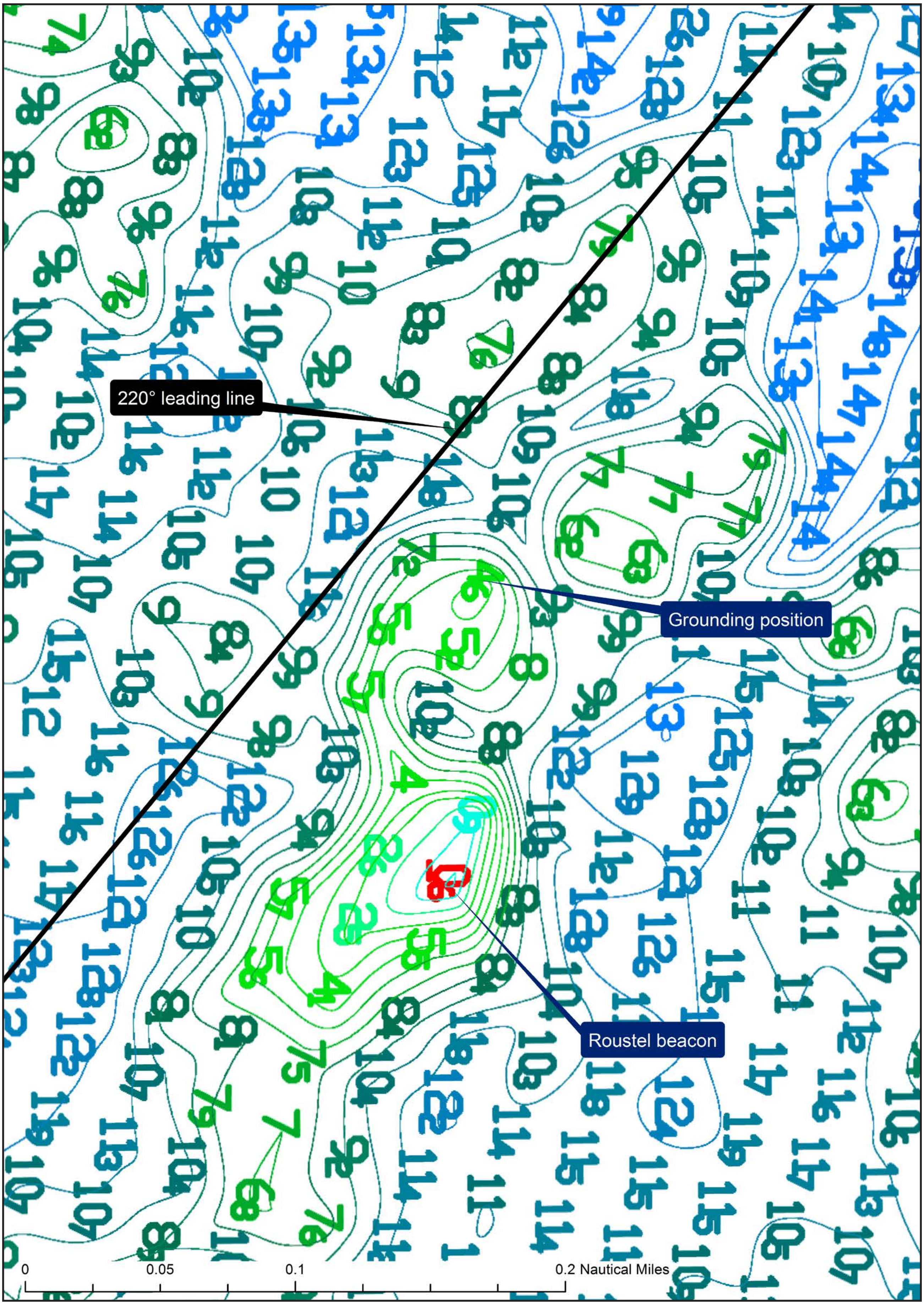

Figure 19: Extract of data from multi-beam survey conducted in March 2014 showing 4.6m sounding in grounding position (orientated north up)

Guernsey Harbours was led by a harbour director who was responsible directly to the PSD Board, and a harbourmaster who delivered the operational outputs. Although the harbourmaster had a team of assistant harbourmasters, harbour managers and operators, there was no individual member of staff assigned direct responsibility for safety management.

In 2013, Guernsey Harbours managed over 3,600 commercial shipping movements entering or departing either St Peter Port or Saint Sampson; the majority of these were ferries. Each year, St Peter Port also hosts approximately 85 cruise ship visits, landing over 100,000 visitors to the island by small boats. Cruise ships anchor outside the harbour with pilotage assistance. The island's fishing fleet consists of 165 vessels (2013 data) and Guernsey Harbours also manages significant levels of leisure vessel activity, especially in the summer months.

1.15.2 The Port Marine Safety Code and Guernsey safety management

The UK Port Marine Safety Code (PMSC) established the principle of a national standard for every aspect of marine operations in ports and pilotage areas across the UK. Although it is a voluntary code, it has been adopted by most harbour authorities that have statutory powers and duties. It applies the processes of risk assessment and safety management systems in order to ensure operations are conducted safely by trained and competent staff.

The PMSC offered guidance on the establishment of accountability for safety through the appointment of a duty holder[17] and a designated person. The duty holder is directly accountable for the safety of marine operations in its waters and approaches. The designated person provides independent assurance about the operation of the harbour authority's safety management system and has direct access to the harbour board.

In order to comply with the PMSC, the duty holder, on behalf of the harbour authority, must:

*'1. **Review and be aware** of their existing powers based on local and national legislation;*

*2. **Comply** with the duties and powers under existing legislation, as appropriate;*

*3. **Ensure all risks are formally assessed** and as low as reasonably practicable in accordance with good practice;*

*4. **Operate an effective marine safety management system** which has been developed after consultation and uses formal risk assessment;*

*5. **Use competent people** (i.e. trained, qualified and experienced) in positions of responsibility for safety of navigation;*

*6. **Monitor, review and audit** the marine SMS on a regular basis – an independent designated person has a key role in providing assurance for the duty holder;*

[17] Duty holder – for most harbour authorities this means members of the harbour board, both individually and collectively.

7. ***Publish a safety plan** showing how the standard in the Code will be met and a report assessing the performance against the plan;*

8. ***Comply with directions** from the General Lighthouse Authorities and supply information & returns as required.'*

In 2001, Guernsey Harbours commissioned an external review of its operations. The output of this work was a Marine Operations Plan for the ports of Guernsey, dated 17 April 2001. Although Guernsey Harbours were not required to apply the UK PMSC, its Marine Operations Plan was compliant with the 2001 edition of the Code. Subsequently, this plan was not updated or amended and was not in use as a safety management system for operations at the time of the grounding.

The PMSC also provided guidance for the development of a port passage plan, regarded as essential for the safe conduct of navigation and environmental protection. Guernsey Harbours did not have a port passage plan for St Peter Port.

Guernsey Harbours maintained a risk register that was managed by a risk working group; however, this process primarily considered strategic and commercial risks. **Annex G** is an extract of the risk register regarding the safe navigation at sea. There was no evidence of risk assessments for the conduct of navigation or pilotage, including supporting capabilities such as underway boat transfers.

1.15.3 Harbour control

Under the direction of the harbourmaster, Guernsey Harbours maintained a continuous watchkeeping organisation that fulfilled two functions: harbour control and the Guernsey Maritime Rescue Co-ordination Centre (MRCC). Watchkeepers kept watch in a harbour control operations room at the end of the St Peter Port breakwater; situational awareness was provided by a commercial radar, AIS data and very high frequency (VHF) radio including digital selective calling (DSC).

The watchkeepers were trained locally and were responsible for maintaining a log of events, keeping a radar lookout and approving shipping movements in the harbour. In the event of a search and rescue, the Guernsey MRCC would co-ordinate operations with the UK, Jersey and French MRCCs in Falmouth, St Helier and Jobourg respectively.

1.15.4 Vessel traffic services

SOLAS Regulation 12 Chapter V (Safety of Navigation) required contracting governments to arrange for the establishment of vessel traffic services (VTS) where the volume of traffic or the degree of risk justified such a service. The regulation also required contracting governments planning and implementing such services to follow IMO guidance[18]. The MCA's Marine Guidance Note (MGN) 401 (M + F)[19] provided the UK interpretation of VTS and offered guidance to assist statutory harbour authorities in the implementation or review of a VTS service.

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[18] IMO Resolution A.857(20) Guidelines for Vessel Traffic Services

[19] MGN 401 (M+F) – *Navigation: Vessel Traffic Services (VTS) and Local Port Services (LPS) in the United Kingdom*

The purpose of a VTS is to enhance safety of navigation and protection of the marine environment. A VTS should comprise at least an Information Service, and may also include others such as a Navigational Assistance Service or a Traffic Organisation Service, or both. An Information Service does not involve the direction of shipping movements but provides essential and timely information which may include other vessel movements, weather forecasts, notices to mariners and status of aids to navigation. The prerequisites of a VTS include: the provision of equipment appropriate for the type of service provided, and suitably qualified staff trained to IALA[20] V-103 standard. The St Peter Port harbour control watchkeepers were not V103 qualified and Guernsey Harbours was not providing a VTS.

1.15.5 Pilotage

The primary legislation for pilotage in and around St Peter Port was the States of Guernsey Pilotage Ordnance Act, 1967, as amended. It defined the Statutory Pilotage Area **(Figure 20)**, established the powers of the Pilotage Board and also set out the requirement for the granting and renewal of general and special pilotage licences. Holders of special pilotage licences were empowered to conduct pilotage of their vessels within the statutory area without a Guernsey pilot embarked.

Gaining a special pilotage licence required candidates to complete a dedicated period of self-study and practical training. The syllabus included details of the navigational hazards in the pilotage area as well as a minimum of 10 supervised entries and exits from the ports defined in the licence. Candidates were also required to be fully familiar with Guernsey pilotage and harbour laws. On completion of the training, the candidate was required to pass a practical examination.

Special pilotage licence holders were then required to complete a minimum of 20 entries and exits from designated ports every 12 months in order for their licence to be revalidated. There was no continuous professional development programme or further requirement for the periodic re-assessment of special pilotage licence holders.

1.16 SIMILAR AND PREVIOUS ACCIDENTS

1.16.1 Condor Marine Services

This is the third casualty since 2010 involving vessels managed by Condor Marine Services that has resulted in a published report.

On 16 June 2010, *Commodore Clipper* suffered a major fire on its main deck while on passage from Jersey to Portsmouth. Although the crew contained the fire, they were unable to extinguish it; damage was extensive and the fire-fighting effort also affected the vessel's stability. The accident was investigated by the MAIB and the report[21] was published in November 2011.

On 28 March 2011, the high speed craft *Condor Vitesse* collided with the French fishing vessel *Les Marquises*. *Les Marquises* was cut in two by the collision and one of the three crew was lost. The accident was investigated by both the Bahamas

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[20] IALA – The International Association of Marine Aids to Navigation and Lighthouse Authorities

[21] MAIB Report No 24/2011 – https://www.gov.uk/maib-reports/fire-started-by-unaccompanied-refrigerated-trailer-unit-on-main-vehicle-deck-of-ro-ro-passenger-ferry-commodore-clipper-in-the-english-channel-on--route-to-portsmouth-england

Figure 20: Guernsey Ordnance Act statutory pilotage area

Maritime Authority (BMA)[22] and the French Bureau of Marine Accident Investigation (BEAMer)[23]. Poor visibility and a lack of attention on the bridge of *Condor Vitesse* as well as *Les Marquises*' lack of a continuous radar lookout were identified as causal factors of the accident. BEAMer made a recommendation to *Condor Vitesse*'s owners to ensure ISM Code and company procedures were implemented on board. The BMA report concluded that the speed of *Condor Vitesse* was probably too fast for the conditions, and the bridge team's level of alertness appeared to have lapsed once the vessel had left the restrictions of the St Malo channel.

[22] The Commonwealth of the Bahamas report into the collision between the high speed ferry *Condor Vitesse* and the fishing vessel *Les Marquises* on 28 March 2011. http://www.bahamasmaritime.com/downloads/Casualty%20Reports%202001%20onwards/CONDOR%20VITESSE%20-%20March%202011.pdf

[23] The report of the safety investigation into the collision between the high speed craft *Condor Vitesse* and the potter *Les Marquises* on 28 March 2011 http://www.bea-mer.developpement-durable.gouv.fr/IMG/pdf/RET_CONDOR_VITESSE_-_LES_MARQUISES_04-2011_Site.pdf.

1.16.2 *Queen Elizabeth 2*

On 7 August 1992, *Queen Elizabeth 2* grounded whilst on passage to New York; the weather was fine and the vessel was under pilotage. The MAIB report[24] concluded that the immediate causes of the grounding were that the depth of water was less than shown on the chart, the height of tide had been over-estimated and the effect of squat was substantially greater than had been allowed for. Contributing factors included high speed and a failure to heed guidance on the planning and conduct of passages.

1.16.3 *Octopus* and *Harald* – MAIB Report 18/2007

On 8 September 2006, the jack-up barge *Octopus*, which was under tow by the tug *Harald*, grounded to the west of Green Holm Island in the Orkneys. The grounding occurred on an uncharted 7.1m patch in an area where the closest sounding indicated a depth of 26m. The area had last been surveyed in the 1840s. The MAIB report included a recommendation for relevant industry bodies to emphasise to shipmasters and navigating officers the need to carefully consider the chart source data and, in the case of electronic charts, the CATZOC when passage planning.

1.16.4 *Ovit* – MAIB Report 24/2014

On 18 September 2013, the Malta registered chemical tanker *Ovit* ran aground on the Varne Bank in the Dover Strait. The MAIB investigation report established that the passage plan was unsafe as it passed directly over the sandbank. In addition, the vessel's ECDIS, which was the primary means of navigation, gave no warning of the grounding. This was because the ECDIS was not being used effectively; safety settings were inappropriate and the audible alarm was switched off. Recommendations were made to the MCA, the Flag State, the International Chamber of Shipping and the Oil Companies International Marine Forum aimed at improving the standard of navigational inspections of vessels using ECDIS.

[24] MAIB report of the investigation into the grounding of passenger vessel *Queen Elizabeth 2* on 7 August 1992. https://www.gov.uk/maib-reports/grounding-of-passenger-cruise-ship-queen-elizabeth-2-on-uncharted-rocks-south-of-cuttyhunk-island-usa

SECTION 2 - ANALYSIS

2.1 AIM

The purpose of the analysis is to determine the contributory causes and circumstances of the accident as a basis for making recommendations to prevent similar accidents occurring in the future.

2.2 THE GROUNDING

Commodore Clipper suffered significant raking damage after grounding on a charted, rocky shoal in the Little Russel. The bridge team had good positional awareness but were not concerned as they were unaware of the limits of safe water available. Their lack of risk appreciation occurred because insufficient passage planning had taken place prior to the voyage; in particular, the extremely low tide and effect of squat were not properly assessed. The company approved route was not followed and, recognising that the vessel was to port of the leading transit line, the master made a succession of course alterations to regain track; however, this action was ineffective due to the strength of the prevailing tidal stream that was setting the vessel off course.

2.3 PASSAGE PLANNING

Prior to sailing, the master selected the company ‘Route 06’ for the voyage between Portsmouth and St Peter Port but no detailed planning was undertaken. Passage planning factors not properly taken into account by the bridge team of *Commodore Clipper* were the height of tide, squat and accuracy of survey data.

For mariners planning passages through unfamiliar waters, consideration of the height of tide, interaction and the calculation of UKC and LDLs are no more than the application of basic navigation principles. However, where the passage is through familiar waters navigated daily all year round for many years by special pilotage licence holders, such planning action may not appear necessary. As the vessel approached the Roustel, both the master and the chief officer recognised that it was off track to port; indeed the chief officer stepped out of his chair to check the position visually from the bridge centreline just before the grounding. However, without knowledge of the available width of safe water, neither of them appreciated that the vessel was beyond the limit of navigational safety.

Irrespective of a vessel’s size, its operational function or, in some cases, the repetitive nature of its journeys, it is imperative that every voyage is properly planned taking into account all relevant factors necessary to ensure that hazards are avoided. Complacency can be defined as ‘repeated exposure to risk without consequence’, and the evidence in this case clearly indicates that the repetitive nature of the task was a causal factor.

2.4 HEIGHT OF TIDE

The mean spring range of 7.9m in St Peter Port is significant and requires awareness of its applicability to each passage; specifically, how the height of tide affects the width of safe water available. The grounding occurred 6 minutes after low water on a 115% spring tide, causing an unusually low value of just 0.9m height of tide. Although the bridge team were aware of the time and height of low water, no action was taken to assess its significance.

Figure 21 is a comparison of the ECDIS display showing safety contours set at 2m and 10m; a difference of 8m, which is effectively the mean spring range. These two images offer a visual comparison of the difference and significance that 8m height of tide makes to the width of navigable water in the Little Russel channel. For *Commodore Clipper*, the importance of this planning consideration is reinforced by the fact that several of the shoals in the Little Russel are hazardous at low water but perfectly safe to pass over at high water. Any of the OOW, chief officer or the master could have made an assessment of the effect on navigational safety resulting from such a low tide.

2.5 INTERACTION

Although the bridge team were aware of the effects of interaction and had routinely experienced it during their approaches to Portsmouth, squat was not considered by the crew when approaching St Peter Port. A post-grounding assessment indicated that the vessel was squatting by 1.46m, and data available on the bridge prior to the accident suggested that at least 1.18m of squat should be applied.

Interaction between a moving vessel and the seabed is a dynamic feature and effects of topography can be difficult to assess. Nevertheless, it is ever-present in shallow water and the speed of the vessel is the most significant factor in managing the effects.

When approaching Portsmouth, vibration experienced from shallow water effect acted as a cue to slow down; however, the rocky shoals in the approaches to St Peter Port meant the onset of squat was faster and not apparent to the crew in the same way as when approaching Portsmouth. This induced a situation where masters and watchkeepers of *Commodore Clipper* took account of, and responded to, shallow water effect when approaching Portsmouth, but did not consider it when approaching St Peter Port.

2.6 ACCURACY OF HYDROGRAPHIC SURVEY DATA

The vessel grounded on a rocky shoal charted at 5.2m. This depth was based on 1960's data, and the information on the ENC defined it as CATZOC B, which meant an error of +/- 1.2m should have been applied. While the March 2014 survey established a depth of 4.6m in the area of the grounding, this was within the tolerance denoted by the CATZOC.

Modern, colour UKHO paper charts or ENCs can give a misleading impression of accuracy. In ENCs, the CATZOC information can either be displayed in a symbolic form or found in the system's menu pages. The key point is that masters and navigating officers must take this information into account when passage planning.

Had the bridge team produced a berth to berth voyage plan, taking the chart accuracy into consideration, a worst case depth of 4.0m (5.2m – 1.2m) for the rocky shoals adjacent to Roustel and Boue de la Rade would have been applied. Had this been the case, the area where the vessel grounded and the Boue de la Rade would have been identified as unsafe, and avoided.

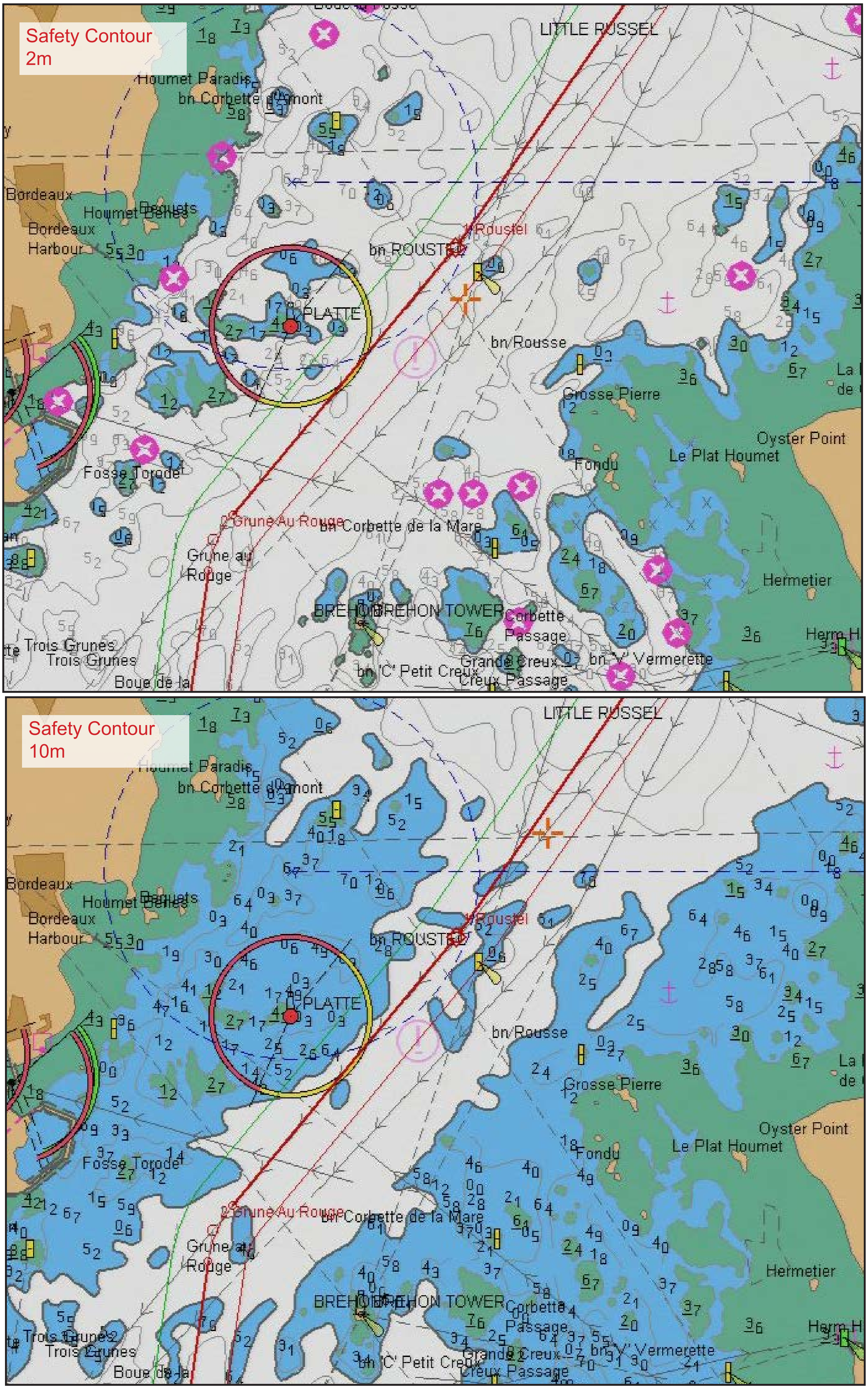

Figure 21: Comparison of ECDIS 2m and 10m safety contour lines in the Little Russel

2.7 CALCULATING THE SAFETY DEPTH

The master was aware of the charted 5.2m shoal patch and the company's requirement for a minimum UKC of 1.0m. He was also aware of the height of tide of approximately 1.0m. Thus his planning appreciation of the navigational situation was:

- Draught + minimum UKC = 6.0m
- Charted depth + height of tide = 6.2m

Having made this mental appraisal, the master assessed that the vessel could pass safely over the 5.2m shoal and thus no danger was associated with it, both before and after the grounding. However, had squat been taken into account, calculation of a safety depth would have been:

- Draught + minimum UKC + allowance for squat – height of tide
- 5.0m + 1.0m + 1.2m[25] – 0.9m = 6.3m

Thus, the vessel should not have passed over any charted depth of 6.3m or less. Furthermore, if the +/- 1.2m source data accuracy of the chart is added to this equation then, for assurance of maintaining the minimum UKC, the vessel should not have passed over any charted depth of less than 7.5m in the Little Russel. **Figure 22** is an illustration of the assessed values for the moment of grounding.

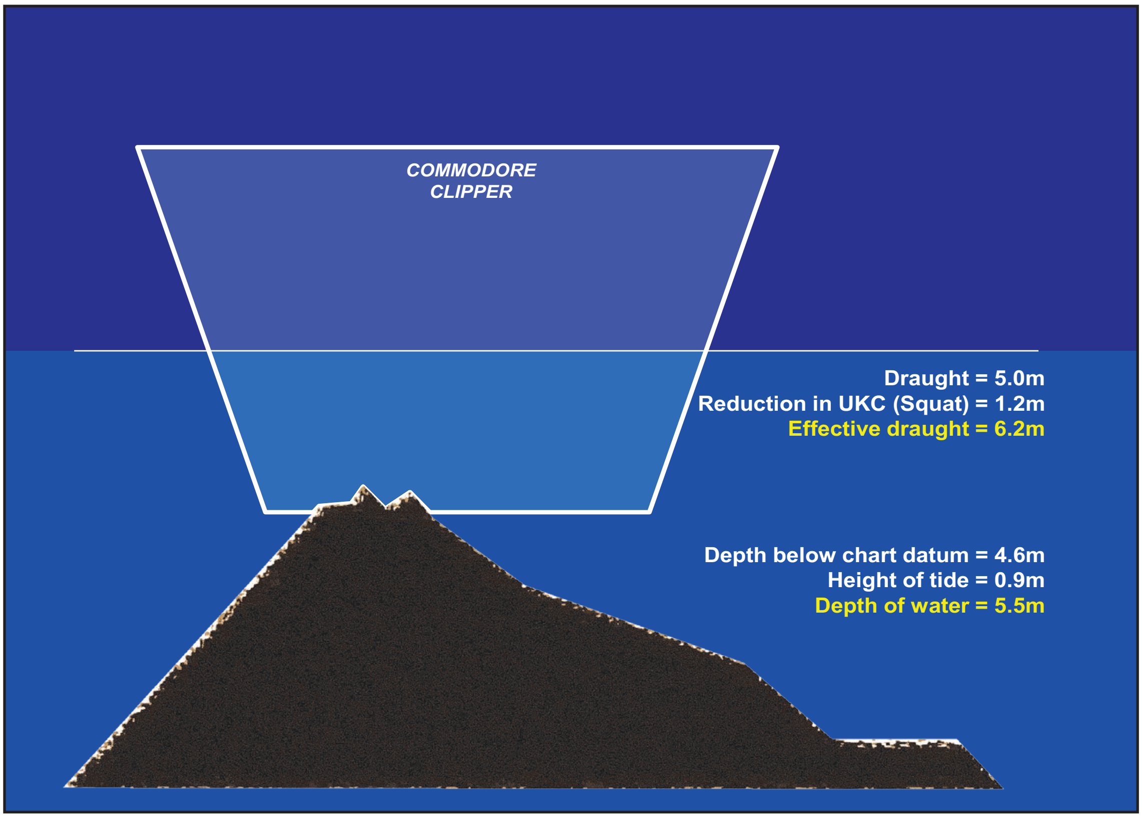

Figure 22: Assessment of actual values of draught and depth during grounding

[25] Value used is taken from data available on board at the time, rounded to nearest 10cm.

Had an accurate assessment of the safety depth been made prior to the voyage, alternative plans, such as approaching St Peter Port through the Big Russel or adjusting the time of arrival to coincide with a greater height of tide, would have been considered. Even a simple calculation, taking squat into account, might have led to such a decision.

2.8 PASSAGE EXECUTION AND MONITORING

2.8.1 Route

Admiralty sailing directions, Guernsey pilots' and the company's approved route through the Little Russel all converge on a track which passes west of Roustel and Grune au Rouge on the 220º transit. Thereafter, the recommended tracks diverge with the company approved route passing east of Boue de la Rade, but the Guernsey pilots' route passing west of it. Having selected the company's generic route for the Portsmouth to St Peter Port crossing, which had been authorised by the company for all states of tide, the master did not follow it through the Little Russel.

Figure 23 shows the company approved route and the actual route taken by the vessel. In the approach to the grounding, *Commodore Clipper* was always to the east of the approved track. The vessel then passed under 100 yards to the east of Grune au Rouge **(Figure 24)** and over the eastern side of the Boue de la Rade shoal **(Figure 25)**.

The absence of leading transit marks when passing Grune au Rouge and Boue de la Rade meant that it would not be possible visually to assess the vessel's position (or the drift) to the accuracy required given the very close proximity of danger. Therefore, the Guernsey pilots' recommended route passing west of Grune au Rouge and Boue de la Rade utilising the 220° transit would be safer.

In addition, given that the Boue de la Rade is charted at the same depth as the grounding position (5.2m), and subject to the same survey accuracy of +/- 1.2m, then passing over this shoal created a similar navigational hazard to the grounding. This event reinforces the analysis that the crew were unaware of the limits of safe water in the Little Russel.

Reproduced from Admiralty Chart BA 0808-0 by permission of the Controller of HMSO and the UK Hydrographic Office.

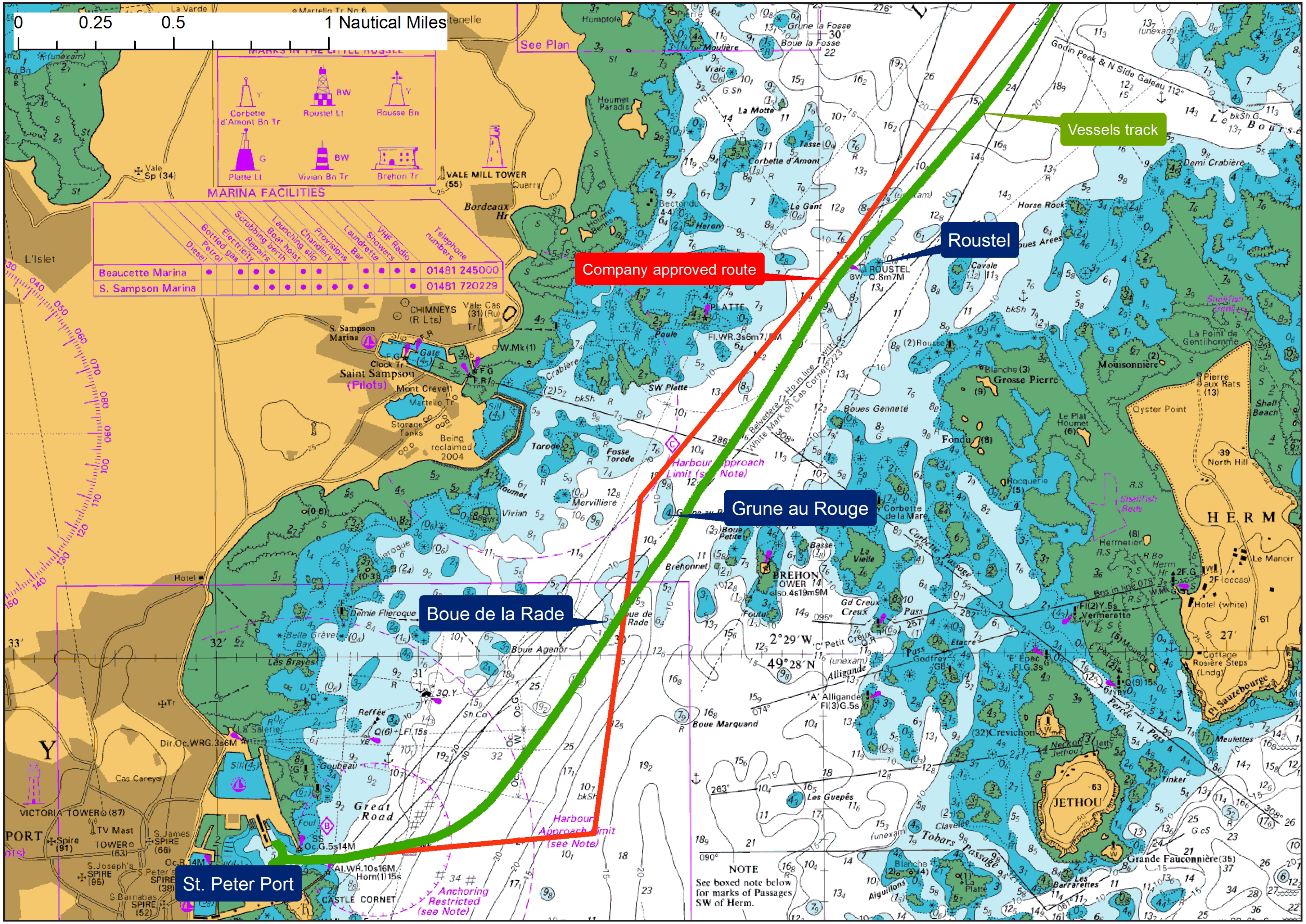

Figure 23: Comparison of company approved route and *Commodore Clipper*'s actual track

Reproduced from Admiralty Chart BA 0808-0 by permission of the Controller of HMSO and the UK Hydrographic Office.

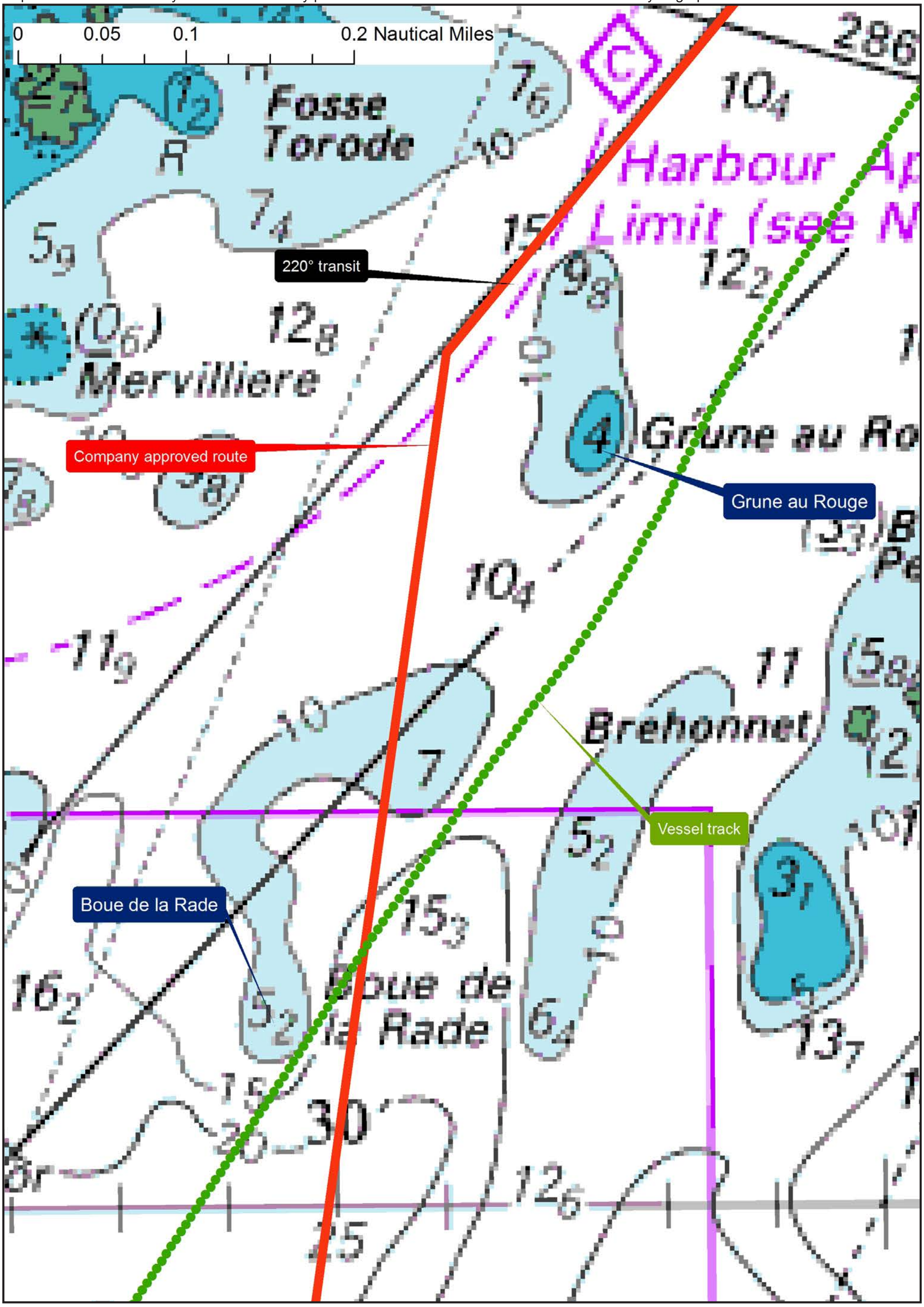

Figure 24: Detail of passage past Grune au Rouge and Boue de la Rade

Figure 25: Details of ECDIS display as vessel crossed Boue de la Rade shoal

2.8.2 Countering the tidal stream

As *Commodore Clipper* made its approach to the grounding position, the south-south-easterly tidal stream was setting the vessel off course to port. In the 2 minutes prior to the grounding, and appreciating the set, the master made a series of heading alterations intended to offset the effects of the stream and regain track. However, comparison of *Commodore Clipper*'s heading and the course over the ground **(Table 1)** shows that after the alterations to 222º and 224º, the vessel was still opening away from the leading transit. It was not until 226º was being steered that the course over the ground was 222º and thus the vessel was finally regaining the transit. However, this heading was insufficient to avoid danger; a larger and earlier alteration of course would have been necessary to get *Commodore Clipper* back into safe water.

Time	Helmsman reported steady on heading	True heading	Course over the ground
1513:40	222	221.8	218.0
1514:06	224	224.2	220.0
1514:36	226	225.8	**222.0**

Table 1: Comparison of heading being steered and course over the ground immediately prior to grounding

2.8.3 Monitoring

Positional awareness in the Little Russel was primarily achieved visually using the 220º transit; however, the margins of safety were extremely limited. At the point of grounding, the vessel was 100 yards to port of the intended track where only about 50 yards of safe water existed. Such distances require highly accurate levels of situational awareness to remain on track; there is also effectively no sea-room to allow for other vessels. Nevertheless, had the master followed, with precision, the company route through the Little Russel, *Commodore Clipper* would not have grounded.

Teamwork on a bridge is vital, especially in pilotage waters where maintaining continuous, high levels of situational awareness is required and frequent decisions relating to navigational safety are being made. Key to this is a common understanding of the plan. Pre-departure and pre-arrival briefings, both of which were required by the vessel's SMS, provide one method of delivering this. This was particularly important on board *Commodore Clipper* as evidence from its AIS history **(Figure 17)** indicated that its masters routinely deviated from the recommended route.

Had the master briefed the bridge team on his intentions prior to *Commodore Clipper* entering the Little Russel, he would have improved the capability of the chief officer and OOW to monitor his subsequent actions. Absence of this insight hampered the chief officer and OOW's ability to assist the master by monitoring his actions and providing timely inputs to the command decision making process.

2.8.4 Use of electronic navigational aids

Although the primary means of maintaining track in the Little Russel was visual, electronic navigation aids can provide vital additional data, aiding the bridge team. The master's radar and ECDIS displays at the time of grounding **(Figures 26** and **27)** both showed the company approved route and the vessel's position relative to track. The radar display showed a digital readout of the distance off track of 0.05nm (100 yards). However, given the setting on a 3nm range scale, it would be difficult to use this information for navigational safety. The ECDIS display showed the vessel's course over the ground, which took tidal stream into account and therefore provided an immediate assessment of drift.

Although good visual situational awareness was available to both the chief officer and the master from their seated positions **(Figure 2)**, the layout of the bridge console prevented the chief officer having ready access to the ECDIS. This restricted his ability to gain situational awareness from the system and, in turn, adversely affected the level of support he could give to the master.

The echo sounder's safety alarm depth was set to 0m so the alarm feature was not effective. However, the system was switched on and the display was visual to all on the bridge. Use of an echo sounder as a safety barrier during pilotage can be effective but relies on two conditions: the expectation of danger, and seabed contours that would show reducing soundings in sufficient time to react. In this case, neither of these conditions were present; the bridge team were unaware of the approaching hazard and the steep sided nature of the rocky pinnacles in the area would not have provided sufficient forewarning that the vessel was about to run aground.

2.9 EXTENT OF THE DAMAGE

The grounding caused significant hull damage along two thirds the length of the vessel. The hull was holed in several places and internal structural damage was caused by the upwards forces acting on the transverse frames. Seawater flooded into two void spaces but was contained by the vessel's double-bottom construction. The ballast tanks that were holed were already full of water and therefore there was no adverse effect on the vessel's stability. However, this was an extremely fortunate outcome because if the vessel had been damaged in more vulnerable areas such as stabilisers, steering or propellers, the situation could have posed a serious hazard to the vessel, its crew, passengers and the environment.

2.10 EMERGENCY RESPONSE AND DAMAGE ASSESSMENT

2.10.1 Denial

The severity of the noise and vibration during the grounding alarmed many of the crew. The fact that the master immediately reduced power and directed both of the other officers on the bridge to look astern is evidence that he knew something significant had happened. However, the master was convinced that there had been sufficient water where the vessel had passed and concluded that the vibration had probably been caused by a string of fishing pots becoming snagged around the propellers.

Even the chief engineer, who described to the master the severity of the shudder experienced in the engine control room, could not influence the master's view that the vessel had not grounded. After their phone conversation, the chief engineer trusted the master's judgment and advice, and took no further immediate action. Additionally, soon after passing Roustel, the vessel was in the final approaches to St Peter Port and the bridge team's focus was on safely negotiating the harbour entrance; this deflected their attention from analysing the event further.

The master's firm conviction was underpinned by the absence of alarms and the normal functioning of the vessel's steering and propulsion systems. However, there was no evidence of fishing pots being snagged; nothing had been seen astern and the shafts were not fouled. This should have led to consideration being given to alternative possibilities for the cause of the vibration, particularly raking over the ground given the vessel was in shallow water.

2.10.2 Appropriate response

In the event of such a loud and shuddering vibration, it is vital that action is taken immediately to identify any damage that might have been suffered. The grounding and raking checklists **(Annex B)** included requirements to search for and assess damage as well as taking tank soundings. Notwithstanding the command priority to enter harbour safely, action should have been taken by the crew to check for damage. Had such an effort commenced immediately after the event, it is likely that the water ingress would have been identified earlier. This would then have triggered a more prompt assessment of the situation, including a stability assessment, and any damage control action necessary. Had the damage to the hull been more severe, such delays could have led to the loss of the vessel or the loss of life.

2.11 USE OF ECDIS

2.11.1 Audible alarms

ECDIS audible alarms on board *Commodore Clipper* and the rest of the Condor vessels had been disabled. However, the audible alarm is a mandated feature of an ECDIS; therefore, disabling it meant that the system was not compliant with IMO performance standards.

After the installation of ECDIS in Condor's vessels, the audible alarm was reported as sounding frequently, causing a distraction on the bridge particularly in pilotage waters. As a result, the company took the decision to disable the ECDIS audible alarms based on its assessment that this would improve safety by reducing this persistent distraction. However, the audible alarm was permanently disabled, so could not have audibly alerted watchkeepers under any circumstances.

Persistent ECDIS audible alarms are recognised as a significant distraction to bridge teams and there are evidently situations, such as operating in pilotage waters with enhanced bridge teams at high readiness, where silencing the audible alarm would be helpful. Furthermore, the disabling of ECDIS audible alarms is increasingly apparent in MAIB investigations[26]. However, accidents investigated by MAIB where bridge alarms were silenced have, unlike this accident, occurred outside pilotage waters and often with a lone watchkeeper. In such circumstances, audible alarms

[26] MAIB Report 24/2014 (grounding of *Ovit*) and MAIB Report 02/2012 (grounding of *CSL Thames*) both identified and assessed the consequences of the ECDIS audible alarm being disabled.

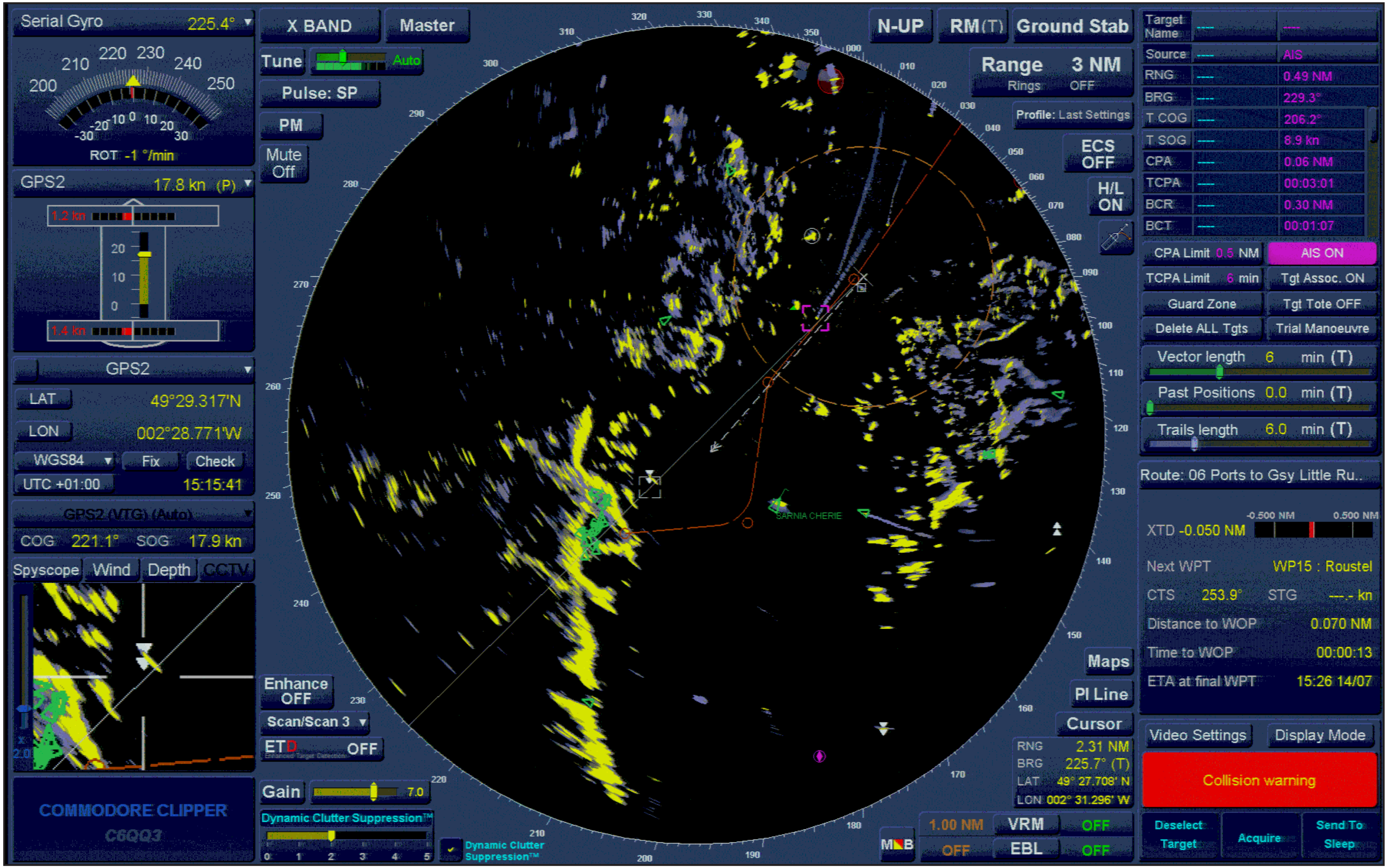

Figure 26: Master's radar display when grounding

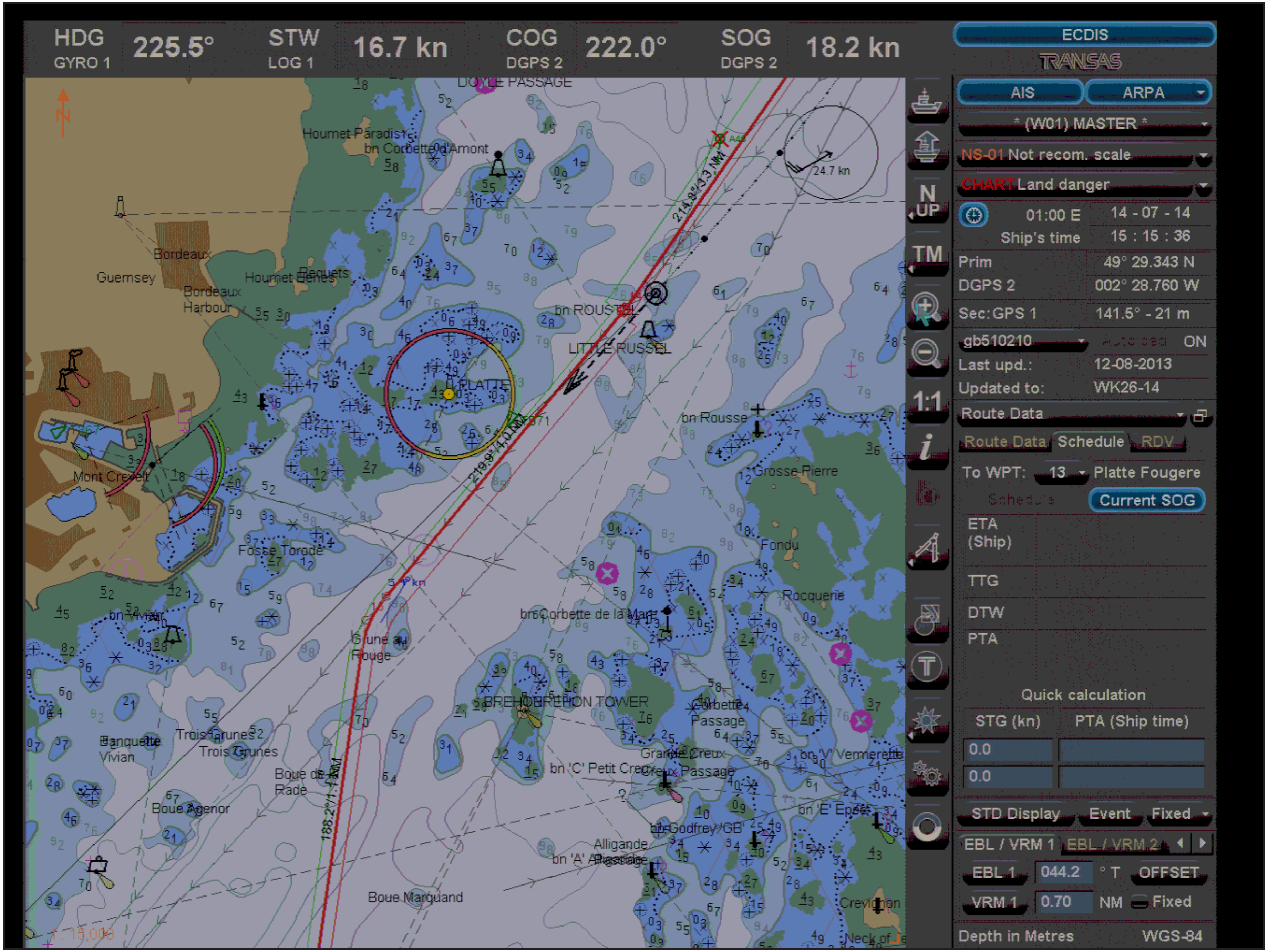

Figure 27: Master's ECDIS display when grounding

are critical and will alert fatigued or distracted watchkeepers to danger. Thus, improving the management of ECDIS alarms needs to be addressed through future developments of the system, delivering an alarm capability that only activates when there is a genuine danger and gives the operator sufficient time to react.

2.11.2 Safety planning

The master had selected company 'Route 06' for *Commodore Clipper*'s voyage to St Peter Port, but neither the track nor the ECDIS safety features were checked as safe. While the exact track itself was inherently safe, the ECDIS safety contour, safety depth and XTD should have been adjusted for each passage taking the local conditions into account.

The ECDIS safety depth setting of 7m was appropriate for the voyage, but the safety contour value of 5m was not. The safety contour could have been set at a minimum value of 6.3m (see Section 2.7) and the ECDIS would have defaulted to the next deeper ENC contour of 10m. However, a 10m safety contour would have given the impression that the Little Russel was impassable. It would have been possible to draw an LDL in ECDIS at 6.3m, which would have given the most accurate electronic picture of the safe water available. An illustration of such a manually constructed ECDIS LDL is at **Figure 28**. Although this facility was available and the crew had been trained in its use, it was not practiced on board. Whilst this method could have provided a more realistic ECDIS picture of the available safe water, it is a method that carries significant risk as the LDL value is unique to a specific height of tide value and would need to be adjusted if the planned time of the passage changed. Nevertheless, on board *Commodore Clipper* the safety depth and safety contour settings were never routinely adjusted for the local conditions.

2.11.3 Cross track distance errors

Although the company's approved route did not specify XTD values for use in ECDIS, the settings at the time of the accident were appropriate. **Figure 29** is a detail of the ECDIS picture in the vicinity of the grounding position where it is evident that, had the vessel remained within the XTD, the grounding would have been avoided. The XTD error alarm (visual on the display, but not audible) was active in the final approach to the grounding, but the bridge team did not respond. Had the bridge team appreciated the significance of crossing outside the XTD then this alarm could have acted as a trigger to indicate that the vessel was heading into danger.

2.11.4 Safety frame

The ECDIS safety frame is a feature that offers forewarning of danger, primarily intended to prevent grounding, but this feature was switched off. However, the minimum width setting for the safety frame was 0.1nm (200 yards); this meant that the safety frame feature would have raised an alarm when the vessel was on track and in safe water as well as when it was unsafe (off-track). **Figure 30** shows a reconstructed ECDIS display with the vessel on the 220º transit approaching Roustel and the safety frame active - a 6.3m LDL is also drawn around the grounding position. It can be seen from this image that the safety frame would have activated an alarm with the vessel on the 220º transit. Thus, the safety frame feature would have been unable to discriminate between safety and danger when passing Roustel.

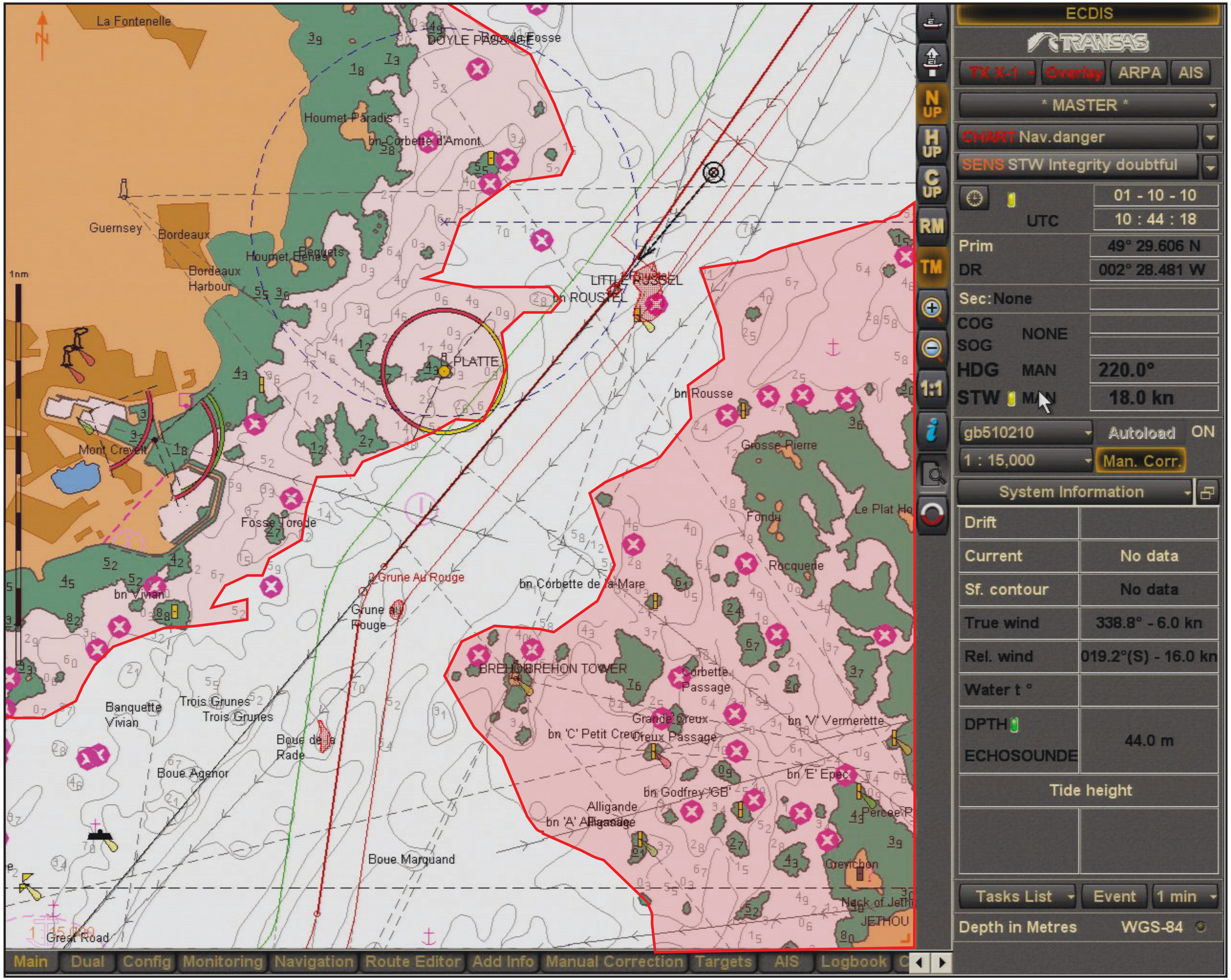

Figure 28: Reconstructed ECDIS display showing manually constructed LDL at 6.3m

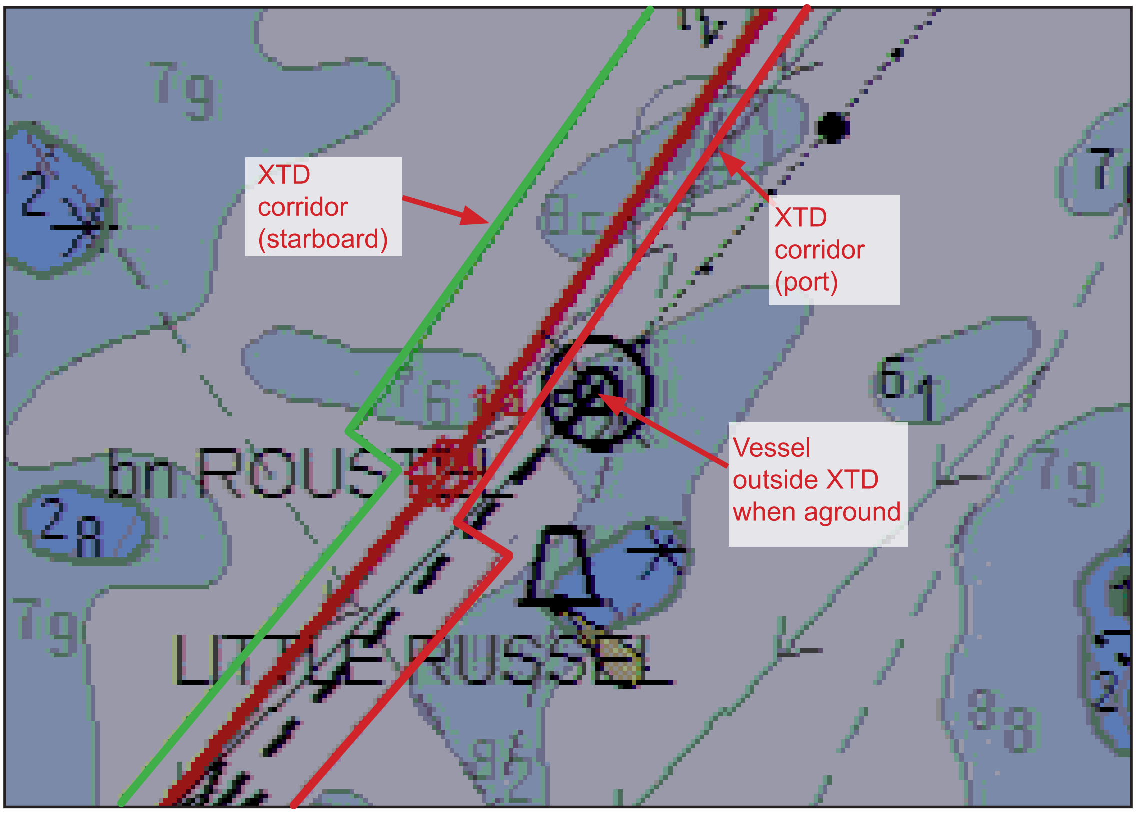

Figure 29: Detail of ECDIS display when grounding showing cross track distances

Figure 30: Reconstructed ECDIS display showing safety frame crossing 6.3m LDL

2.12 SAFETY MANAGEMENT

2.12.1 Onboard guidance

Although spread across all four manuals, *Commodore Clipper*'s SMS contained extensive guidance on navigational safety, bridge procedures and passage planning. Also embedded within the various manuals was some guidance on controlling interaction effects and the application of squat values to ECDIS formulas. There was, however, some contradictory advice in the SMS such as whether or not the Little Russel could be used by conventional ferries in poor visibility.

As a supplement to the SMS, the master's standing orders should provide further guidance on the conduct of navigation and safe operation of the vessel. The orders on board *Commodore Clipper* did offer some advice but it was evidently not followed; for example, parallel indexing was not applied and the effects of the tidal stream were underestimated. In addition, the orders had not been updated following the introduction of ECDIS, which was unhelpful as this document could have been used to establish advice or best practice in the use of this primary navigational aid.

2.12.2 Audits and inspections

The degree of navigational risk routinely being taken on board *Commodore Clipper* and highlighted in this investigation had not been identified as a concern by any of the recent internal or external audits or inspections of the vessel. Additionally, Condor Marine Services did not consult the Flag State before deactivating the ECDIS audible alarms on its vessels and none of the four inspections of *Commodore Clipper* undertaken after ECDIS had become the primary means of navigation identified the audible alarm non-conformity.

Audits and inspections are recognised as a sampling process, and it is not possible to check every facet of a vessel's navigational safety and compliance. Nevertheless, *Commodore Clipper*'s ECDIS alarm deactivation was a non-conformity that ought to have been detected by audits and inspections. However, many of the auditors and inspectors used by Flag States or their recognised organisations, may have limited experience with ECDIS. It is also more challenging for them to scrutinise the performance of a bridge team using ECDIS compared to one that uses paper charts.

The MAIB report into the grounding of *Ovit*[27] has already addressed this issue through a safety recommendation intended to improve understanding of ECDIS knowledge and enhance questions used by auditors and inspectors.

2.12.3 Training and readiness

It is evident from *Commodore Clipper*'s internal training records that the response to grounding was not routinely rehearsed. Despite the requirement for damage control training, onboard drills were dominated by fire exercises and crew musters. Fire may be a significant risk, but so too is the possibility of grounding when operating close to the coast as frequently as *Commodore Clipper* was required to. Thus, if grounding or damage control had been strong themes in the programme of internal training, then tasking the crew to search for damage would potentially have been more instinctive.

[27] MAIB Report 24/2014

2.13 GUERNSEY HARBOURS

2.13.1 Notification and emergency response

Guernsey Harbours' staff were unaware of the incident until a call made by the company to the harbourmaster over 2 hours after the grounding. Even then, the severity of the matter was not fully understood and the harbourmaster was initially only informed that the vessel had touched the bottom. Given this brief and the evidence from his visit on board, which established that the situation was stable and there were no casualties, it is understandable that no emergency response reactions were taken by the harbourmaster or his team.

Nevertheless, had the harbour authority been informed of the grounding at the time of the accident, there would have been an opportunity to consider the full range of potential emergency responses and, where necessary, prepare for a contingency response such as pollution containment or casualty management that may have been required.

2.13.2 Risk assessments and safety plans

It was apparent in the course of this investigation that some operational aspects of Guernsey Harbours' work had not been subject to a formal risk assessment or were not undertaken in accordance with an endorsed safety plan. In particular, the conduct of pilotage and boat transfers had not been risk assessed and the safety plan prepared in 2001 had not been updated. The risk assessment that did exist for navigation **(Annex G)** was strategic in nature and therefore did not seek to mitigate operational risks.

The UK PMSC offers guidance on the development of risk-based safety management of pilotage and harbour services. Developing a safety management system employing such principles would highlight where risk was present and the actions necessary to mitigate. In particular, the development of a port passage plan would serve as a guide for pilots, vessels and shore authorities to safely manage the conduct of navigation in the statutory pilotage area.

2.13.3 Special pilotage licences

The special pilotage licence training process was comprehensive, thorough and provided candidates with the knowledge and competence necessary to pilot their vessels in the waters approaching St Peter Port. The training documentation also provided a useful guide to the pilotage area after the training was complete. However, once a candidate was qualified, the only further requirement was evidence of 20 entries and exits from St Peter Port in order for the licence to be revalidated annually. Over time, it is inevitable that changes in best practice will be made and new surveys will highlight changes to the local environment. As a result, there is a strong case for delivery of a continuous professional development programme for special pilotage licence holders; this could take the form of 'check rides' by Guernsey pilots or written/classroom updates for licence holders.

2.13.4 Harbour control

The operations room watchkeepers in St Peter Port were fulfilling the roles of both an MRCC and harbour control with radar, visual, AIS and VHF/DSC equipment for situational awareness. However, important information such as tidal and weather data was not routinely transmitted to approaching vessels. Given the critical importance of the height of tide, it is reasonable to conclude that, had *Commodore Clipper* been reminded of the extremely low water before entering the Little Russel, this information might have been considered more carefully on board. Although only strictly applicable to UK ports, upgrading the arrangements in St Peter Port to meet the requirements of an information level VTS would deliver an improved service.

2.13.5 Hydrographic data

SOLAS requires that governments make every effort to ensure that hydrographic surveying is carried out, adequate to the requirements of safe navigation. Given the nature of shipping traffic in St Peter Port, particularly cruise ships and ferries, it is important for Guernsey Harbours to sustain a programme of prioritised survey effort to meet users' requirements.

At the time of the grounding, data from the survey conducted in March 2014, which showed a depth of 4.6m in the grounding location, was still being processed by UKHO[28]. If this data met the criteria for CATZOC A1, then the depth accuracy to be applied would be +/- 0.6m and, therefore, navigators should have expected a 'worst case' depth of 4.0m below chart datum. However, the source data of the ENC in use by *Commodore Clipper* at the time of the grounding was based on 1960s surveys, and the feature that was struck fell within the source data accuracy, and this also gave a worst case minimum depth of 4.0m.

Therefore, in both cases of the 1960s data (charted depth 5.2m) and the March 2014 information (surveyed depth 4.6m), applying the source data accuracy to the position of the grounding gave the same worst case minimum depth value of 4.0m. This is the figure that should have been used for passage planning.

[28] The March 2014 survey data had only been held by the UKHO for 2 weeks prior to the grounding; this was less than the minimum time, agreed between all concerned parties, that the UKHO needs to assess such complex data, and prepare and quality assure any navigational corrections that may be required.

SECTION 3 - CONCLUSIONS

3.1 SAFETY ISSUES DIRECTLY CONTRIBUTING TO THE ACCIDENT THAT HAVE BEEN ADDRESSED OR RESULTED IN RECOMMENDATIONS

1. *Commodore Clipper* grounded on a charted, rocky shoal in the Little Russel because insufficient passage planning had been undertaken. In particular, the extremely low tide and the effect of squat had not been properly taken into account. [2.3, 2.4, 2.5]

2. Had all the factors affecting under keel clearance been accurately assessed, it would have been apparent that it was potentially unsafe to pass over any charted depth less than 7.5m in the Little Russel. [2.6, 2.7]

3. The absence of sufficient passage planning meant that the bridge team was unaware of the limits of safe water so approached danger without appreciating the hazard. Furthermore, a safer course of action was available - use of the wider Big Russel channel. [2.3, 2.7]

4. Course alterations intended to regain track were insufficient given the strength of the tidal stream setting *Commodore Clipper* off course. [2.8.2]

5. The highly repetitive nature of *Commodore Clipper*'s schedule induced a degree of planning complacency. [2.3]

6. Although the primary method of navigating in the Little Russel was visual, ECDIS was not utilised effectively as a navigation aid. In particular, the safety contour value was inappropriate, the cross track error alarm was ignored and the audible alarm was disabled. [2.11]

7. The layout of the central bridge console prevented the chief officer from utilising the ECDIS display to support the master during pilotage. [2.8.4]

8. The significant navigational risk routinely being taken by the crew of *Commodore Clipper* and the ECDIS non-conformity went undetected by audits and inspections. [2.12.2]

3.2 SAFETY ISSUES NOT DIRECTLY CONTRIBUTING TO THE ACCIDENT THAT HAVE BEEN ADDRESSED OR RESULTED IN RECOMMENDATIONS

1. After the accident, *Commodore Clipper* passed within 100 yards of the Grune au Rouge rock and over the Boue de la Rade shoal; both events created an unnecessarily high risk of further groundings. These events reinforced the analysis that the bridge team was not distinguishing between safe and unsafe water. [2.8.1]

2. The grounding caused significant damage, including flooding; however, it was extremely fortunate that this was contained within double-bottom void spaces. [2.9]

3. Despite a noisy, shuddering vibration, the crew did not immediately search for damage or follow the grounding-raking checklist. [2.10.1]

4. The possibility that the vessel had grounded was denied; this was reinforced by the absence of alarms, the steering and propulsion responding normally, and the master's conviction that there had been sufficient depth of water where the vessel had passed. [2.10.1]

5. No contingency planning or emergency response measures were activated by Guernsey Harbours' staff as they were unaware of the grounding until over 2 hours after the incident. [2.13.1]

6. As the responsible authority, Guernsey Harbours did not have an effective risk assessment or safety management plan for the conduct of navigation in the statutory pilotage area. [2.13.2]

7. Special pilotage licence holders were thoroughly trained; however, there was no provision for continuous professional development after their initial qualification. [2.13.3]

8. Guernsey harbour control was not routinely transmitting important navigational safety information to approaching vessels. [2.13.4]

9. The grounding position was charted at 5.2m; however, it was subsequently established as being 4.6m below chart datum. Nevertheless, the difference between the charted and actual depths in the grounding position was within the source data accuracy for the quality of the survey of the area. [2.13.5]

SECTION 4 – ACTIONS TAKEN

Condor Marine Services Limited has:

- Conducted an investigation into the grounding, identified the causal factors and circulated its report to other command teams.
- Imposed a minimum 4.0m height of tide restriction for conventional vessels using the Little Russel.
- Undertaken a study of the interaction characteristics of all its vessels, leading to publication of advice to masters on the calculation and application of squat.
- Fitted an ECDIS repeater display at the chief officer’s position on board *Commodore Clipper.*
- Included a plan to install bilge alarms into *Commodore Clipper*'s double-bottom void spaces during the next refit period.
- Provided additional bridge team management training for all command teams, using a refreshed training syllabus taking into account the lessons identified in the accident, in particular the utility of ECDIS.
- Updated the safety management system to include:
  - Additional guidance on application of survey data accuracy
  - Additional advice for all company approved routes to include options for secondary routes and to ensure that these plans provide appropriate margin for error
  - A revision of random voyage data recorder review processes.

Guernsey Harbours has:

- Committed to delivering a safety management system for pilotage and navigation operations, adopting the principles of the UK Port Marine Safety Code where applicable.
- Secured additional resources for the provision of an assistant harbourmaster with specific responsibility for implementation of the Port Marine Safety Code.
- Enhanced knowledge of port management by the harbourmaster attending UK MCA approved training in National Occupational Standards and the Port Marine Safety Code.
- Established a routine for St Peter Port harbour control watchkeepers to transmit tidal and weather information by VHF radio to inbound vessels prior to entering the pilotage area.
- Procured and installed a new remote tide gauge system.

SECTION 5 - RECOMMENDATIONS

Condor Marine Services Limited is recommended to:

2015/144 Continue to improve the standard of passage planning by its bridge teams through implementing measures to ensure that:

- Proper account is taken of all factors affecting draught and available depth of water; in particular, an assessment of how such factors affect the width of safe water available.

- Use of ECDIS safety features is improved, including adjustment of the safety contour relevant to the local conditions and observation of all alarms.

The Government of Guernsey is recommended to:

2015/145 Improve the standard of vessel traffic services within the Guernsey Ordnance statutory pilotage area by implementation of an information level service to shipping as guided by the applicable elements of the Maritime and Coastguard Agency's Marine Guidance Note 401.

2015/146 Implement measures designed to provide assurance that, post-qualification, its Special Pilotage Licence holders continue to demonstrate the required level of proficiency when conducting acts of pilotage.

Safety recommendations shall in no case create a presumption of blame or liability

Marine Accident Report

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