



Office of the Chief Investigator
Transport and Marine Safety Investigations

**Marine Safety Investigation
Report No 2007/13**

Sinking
MV Maheno
River Yarra
13 December 2007



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THE CHIEF INVESTIGATOR

The Chief Investigator, Transport and Marine Safety Investigations is a statutory position established on 1 August 2006 under Part V of the *Transport Act 1983*.

The objective of the position is to improve public transport and marine safety by independently investigating public transport and marine safety matters.

The primary focus of an investigation is to determine what factors caused the incident, rather than apportion blame for the incident, and to identify issues that may require review, monitoring or further consideration. In conducting investigations, the Chief Investigator will apply the principles of 'just culture' and use a methodology based on systemic investigation models.

The Chief Investigator is required to report the results of investigations to the Minister for Public Transport and/or the Minister for Roads and Ports. However, before submitting the results of an investigation to the Minister, the Chief Investigator must consult in accordance with section 85A of the *Transport Act 1983*.

The Chief Investigator is not subject to the direction or control of the Minister(s) in performing or exercising his or her functions or powers, but the Minister may direct the Chief Investigator to investigate a public transport safety matter or a marine safety matter.

1. EXECUTIVE SUMMARY

On 13 December 2007, the Victorian vessel MV Maheno was engaged on a cruise of the River Yarra with a master, a general purpose hand and 23 passengers, when it foundered and sank.

During the voyage the master handed over the helm to the general purpose hand and exited the wheelhouse to visit the toilet. Whilst steering the vessel, the general purpose hand reportedly attempted to avoid an object in the water and turned the vessel toward the river bank. As a result, the vessel came in contact with an underwater object outside the shipping channel, causing damage to the vessel's timber planking below the waterline.

The damage was not detected by Maheno's crew. The ingress of water through the damaged planking and progressive flooding of the vessel went undetected until the engine stopped due to it becoming partially submerged.

Despite the efforts of the master and the general purpose hand to pump out the water, Maheno sank at the edge of the shipping channel between beacons 27 and 29. Prior to sinking, all persons were safely evacuated onto attending vessels.

The investigation found that Maheno was not fitted with watertight bulkheads to limit the extent of flooding.

Following the incident Marine Safety Victoria commenced a review of vessels that do not comply with the USL Code requirements for watertight bulkheads and is developing a Standard Operating Procedure (SOP) to address equivalent solutions and exemptions to watertight bulkheads.

The investigation recommends that:

- Marine Safety Victoria ensures vessels' safety management plans include key operational and emergency procedures and reviews procedures to verify vessels' compliance with survey requirements; and
- Victoria Police, in conjunction with other agencies/waterway managers, considers conducting training exercises with River Yarra small vessels operators to improve preparedness and response to emergencies.

2. CIRCUMSTANCES

2.1 The incident

On the evening of 13 December 2007, the Victorian timber hulled passenger ferry MV Maheno was engaged in a party cruise on the River Yarra (see Appendix A).

At about 1630¹ the master and general purpose hand (GPH) arrived at the vessel and completed the pre-departure checks. By 1730, 23 passengers had boarded the vessel. The master conducted a safety briefing for all passengers and a short while later Maheno departed the wharf and commenced its cruise.

Maheno passed under the Bolte Bridge at about 1758, entering Port of Melbourne waters and proceeded down the River Yarra. The vessel turned around in the vicinity of the Williamstown piers and returned upstream, doing a short cruise within Swanson dock, before heading downstream again. The master had been steering the vessel continuously until this time.

At about 1940 when Maheno was in the vicinity of Holden Dock (see Appendix B), the master called the GPH to relieve him for a short while. After providing the GPH with heading instructions, the master exited the wheelhouse. At this time Maheno was passing beacon 41, about 560 metres upstream of the West Gate Bridge, travelling at a speed of three to four knots².

Soon after taking over the wheel, the GPH reportedly saw something in the water and turned the steering wheel to starboard. This caused Maheno to swing to starboard and head towards the river bank. The GPH reversed the engines to “full astern” but Maheno came in heavy contact with an underwater object. A few seconds later the master returned to the wheelhouse.

The master took over the conduct of the vessel and stopped the vessel once it was in safe water. The master and GPH then checked the vessel and not observing any damage, the master decided to continue with the cruise.

At about 2015 Maheno was downstream of beacon 28 and turned around to head back to Docklands. When the vessel had just passed beacon 27 the engine started spluttering, then stopped and could not be re-started.

The master steered Maheno towards the bank and dropped the anchor. He then opened the engine room hatch and saw that the engine room was flooded with water. The master started the electric pumps and attempted to operate the manual bilge pump. He could not operate the main bilge pump as it was driven off the main engine.

The vessels MV Louisiana and MV Nepean arrived on the scene and transferred their petrol driven portable pumps to Maheno. Nepean then nosed into the stern of Maheno and at 2033 commenced evacuating the passengers. At about 2038 all passengers were safely evacuated onto Nepean and returned to Docklands.

The master and GPH remained on Maheno and attempted unsuccessfully to pump out the water. At about 2058 the tug MV Gabo called Maheno and advised the

¹ All times are in Australian Eastern Daylight Saving Time (AEDST).

² One knot is 1.852 km/h.

master to abandon the vessel. The port security vessel MV Midnight Blue went alongside Maheno and took the master and GPH on board.

At 2100 Maheno foundered and sank.

2.2 Consequences

MV Maheno sank in GPS position³ 37°50.564'South 144°54.015'East in about seven metres of water. The sunken position was just outside the south side of the dredged shipping channel between beacons 27 and 29. The vessel was later declared a total loss.

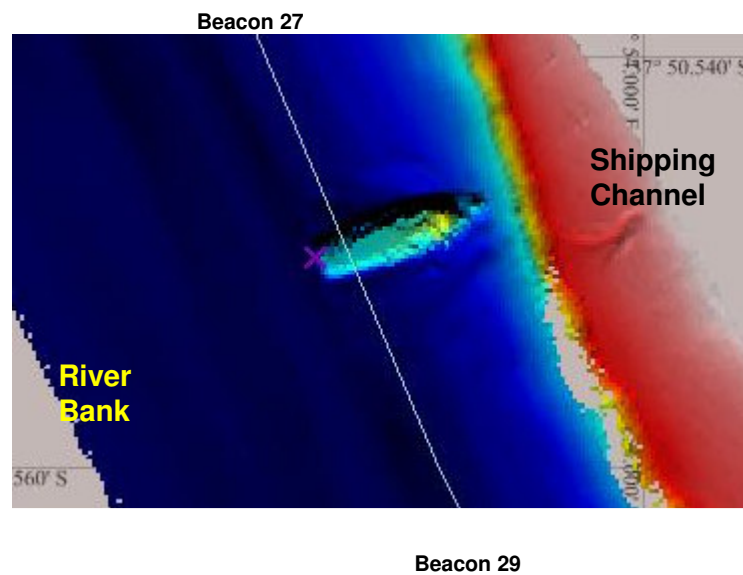


Fig 1: Sonar image of Maheno's sunken position

There were no reported injuries.

Immediately following the sinking the oil spill response vessel MV Orca mopped up slight oil spillage in the water. Other debris – life jackets, early floats and other small items were cleared by the water police boat and the other vessels in the vicinity.

³ Satellite derived Global Positioning System (GPS) recorded by MV Midnight Blue.

3. FACTUAL INFORMATION

3.1 The vessel

3.1.1 Construction and layout

MV Maheno was a passenger cruise vessel under survey with Marine Safety Victoria (MSV) and operated by Nepean Cruises, Melbourne. It arrived in Melbourne from Sydney in December 2005 and was berthed at Central Pier, Docklands.

Maheno was of carvel round bilge timber construction, built in 1922 for operations as a Sydney harbour ferry. The vessel structure was extensively overhauled in 1952 however neither the owner nor the regulator had a copy of the builders plan drawing (general arrangement plan) of the modified vessel. Maheno had an overall length of 16 metres, breadth of 4.4 metres and depth of 1.3 metres (see Appendix C).

Measurements of the markings on the hull at the midship section of the vessel indicated that Maheno had a maximum draught of about 990 mm, giving it a freeboard of about 310 mm. The water stain mark around the hull of Maheno indicated that it usually operated with a draught of about 880 mm, giving it an operating freeboard of about 420 mm.

Maheno was powered by a 56 kilowatt Gardner five cylinder diesel engine driving a right hand single screw 4-bladed propeller, giving it a service speed of about 8 knots. The vessel had a hydraulic steering system. It did not have an 'auto pilot' system. The rudder was of 'unbalanced' construction with the entire blade area aft of the rudder stock.

The vessel's electrical systems were operated by a set of batteries located in a box on the main deck under the wheelhouse. Therefore, Maheno had electrical power until the time that it sank.

Maheno had a raised wheelhouse forward (see Appendix D). The passenger deck was contained in the mid-ship section of the vessel and the toilet was situated at the stern. Access into the vessel was by means of a 1200 mm wide opening on each side of the vessel. The openings had sliding doors which were weather tight but not watertight. Maheno also had a small deck space at the stern. Egress from the passenger deck to the aft deck was by means of an 800 mm wide hinged door.

The engine was situated in the underdeck section forward of the midship. The engine room was segregated from the rest of the under deck space by bulkheads forward and aft. The forward bulkhead was located about 3.4 metres from the stem post at the waterline. The length of the engine room compartment was 3.6 metres. Further astern there was a third bulkhead, about 3.7 metres from the engine room aft bulkhead. None of the bulkheads were watertight. The underdeck space bilges did not have sounding pipes⁴.

Access to the engine space was by means of an engine room hatch cover located in the passenger space. At the time of the incident the hatch cover was being used as a dance floor. To access the engine room during a party cruise, the hatch cover needed to be cleared of party equipment before it could be opened.

⁴ A pipe leading into a compartment through which a dipstick can be lowered to check the level of liquid in that compartment.

The engine sump breather/filler was located on the port side forward end of the engine, about 400 mm above the keel.

The forward locker was fitted with bottom boards, about 600 mm above the keel. This space held fuel and water tanks. There was also a bladder tank for potable water placed on the bottom boards. At the time of the incident the bladder tank was about three quarters filled and it covered a substantial portion of the locker space.

Post incident inspection revealed that the vessel's bilge system comprised a bilge well in each under deck compartment⁵, a bilge high level alarm and three bilge pumping systems:

- Main pump: A one inch Jabsco pump driven by the main engine of rated capacity 4,000 litres per hour;
- Manual pump: A Whale Gusher Chimp manual pump of rated capacity 3,500 litres per hour; a second semi-rotary manual pump was found disused, corroded and pipe fittings removed – the pump was probably of similar capacity but could not be verified;
- Electric pumps: Three electric pumps, each of about 1500 litres per hour rated capacity, one for each underdeck space bilge well.

When the vessel was inspected for survey in January 2007 the surveyor required that prior to the issue of the Certificate of Survey the disused manual pump be made serviceable. The operator advised the surveyor, in mid-February 2007 by signed statutory declaration, that the deficiency with the pump had been rectified.

The main pump and the manual pump shared a common suction manifold. The electric pumps operated independently but shared a common discharge outlet. The electric pump in the engine room could be set to operate automatically or manually. The other two electric pumps could only be operated by manually switching them 'on'. The electric and mechanical driven pumps each had an indicator light on the wheelhouse panel to indicate when the pumps were in operation.

The bilge high level alarm consisted of a float switch located at the bottom of the engine room space. When raised approximately 100 mm, it activated an audible alarm in the wheelhouse. The engine room electric bilge pump operating switch could be set to 'automatic' such that the pump would automatically start if the high level alarm was activated. In this incident, the pump was set for manual operation. It was manually switched 'on' by the master when he discovered the accumulation of water in the engine room.

3.1.2 Certificate of Survey

At the time of the incident Maheno held a certificate of survey as a Class 1E vessel, issued by MSV on 17 October 2007, permitting it to operate with a maximum of 49 passengers within the smooth waters of Hobsons Bay (west of a line between No 21 Light and Breakwater Pier Light) and the Rivers Yarra and Maribyrnong and Victoria Harbour.

The certificate of survey exempted Maheno "from the Uniform Shipping Laws (USL) Code⁶ requirement for watertight sub-division, subject to the carriage of coastal

⁵ Compartments 3 and 4 shared a common bilge well.

lifejackets for 100 per cent complement and buoyant appliances for 100 per cent complement as per the National Standard for Commercial Vessels (NSCV)⁷ Part 7A”.

The certificate of survey also contained a number of conditions:

- As of 1 November 2007 the vessel must be operated under a safety management plan meeting the requirements of Chapters 2 and 3 of the National Standard for Commercial Vessels (NSCV) – Part E Operational Practices, a copy of which is to be lodged with MSV.
- That the structure was required to be inspected out of the water at not more than 12 month intervals.
- All lifejackets to be replaced with USL Coastal lifejackets by 16 February 2008.

3.1.3 Issue of certificate of survey to MV Maheno

The operator of Maheno (Nepean Cruises) applied to MSV for an initial survey in November 2005. Maheno arrived in Melbourne from Sydney in December 2005 with a certificate of survey issued by New South Wales (NSW) Maritime Authority valid until 19 January 2006. Anecdotal evidence suggests that Maheno commenced operations soon after arriving in Melbourne.

Attached to the NSW certificate of survey was an exemption from complying to one compartment standard of sub-division as required by the USL Code provided that the passenger numbers were reduced to 49 and 100 per cent lifejackets and 100 per cent buoyant apparatus were carried in lieu of sub-division.

On 26 July 2006 and on 21 August 2006 the operator applied to MSV requesting a similar exemption. Prior to granting the exemption, MSV contacted NSW requesting them to provide to MSV their assessments with regard to structural information and the stability of Maheno. NSW provided MSV with information relating to the specification of scantlings and types of timber used in the construction of Maheno.

There is no record of Maheno applying for and being granted an exemption from the requirement for a collision bulkhead. Similarly, there is no record of NSW providing MSV with the reasons by which a decision was made to exempt Maheno from one compartment sub-division.

The owner and NSW did not provide MSV with any stability information however MSV conducted a basic stability test prior to issuing the certificate of survey. The test result indicated that Maheno complied with the intact stability criteria for small vessels as provided for in the USL Code.

After a number of inspections including two out of water inspections and refurbishment to the vessel, Maheno was granted a certificate of survey on 17 February 2007, with a similar exemption to one compartment sub-division as its NSW certificate of survey.

MSV stated that the decision to grant Maheno the exemption was based on the provisions of Section 5C of the USL Code which provided for the exemption to one compartment sub-division. MSV also stated that the condition imposed on Maheno in lieu of one-compartment subdivision was based on Section 1 Part 4 of the USL

⁶ The USL Code is a document which specifies the minimum standards for construction, stability, equipment and manning of small commercial vessels in Australia. It was adopted by the Australian Transport Council in December 1991.

⁷ The NSCV is a series of Standards written by the NMSC and endorsed by the Australian Transport Council with the intent to supercede the USL Code in order to better reflect current industry practices.

Code (see Appendix E) which allows exemptions and equivalent solutions; and Part C-7A of the NSCV, which required additional safety equipment to be carried on vessels which did not comply with one compartment sub-division.

The MSV decision was also based on the NSCV principle of mutual recognition of certificates of survey (see Appendix F) and the rationale that Maheno had operated without incident under similar conditions in Sydney Harbour.

3.1.4 Post incident inspection

On 29 January 2008 Maheno was raised from the bottom and transported by barge to a shipyard in Docklands. There was considerable weed and shell encrustation on the hull. The coach roof above the wheelhouse had collapsed and had fallen over the port side. There was some minor damage to the vertically planked bulwarks on the starboard quarter consistent with slinging damage from lifting the vessel.

On inspection, the scantlings of planking, frames, stringers and floors were found to comply with the requirements of the USL Code. The inspection also found that the bulkheads were non-watertight in several places where piping and electrical cables passed through them. It was also noted that Maheno was constructed without a collision bulkhead.

Maheno was found to be holed on its port side, about 1700 mm from the stem and 460 mm above the keel. The hole was about 910 mm long and 80 mm at its widest point. The holed planking would have been about 420 mm below the water line when the hull was intact and under the bottom boards in the forward locker. The holed timbers were not visible to anyone looking over the side or looking into the forward hatch through the hatch opening.



Fig 2: Location of damage on hull



Fig 3: Close up of damage

All other parts of the hull planking appeared to be intact.

An inspection of the engine found that engine lubricating oil from the dipstick aperture was emulsified and the fuel injectors were observed to have suffered severe water corrosion.

The steering gear, engine and gear box controls were tested and found to be operating normally. The propeller was undamaged and the propeller shaft turned freely both ahead and astern. The intermediate and forward shaft couplings were intact and undamaged. The electrical equipment and circuitry suffered water damage and was not tested.

The post incident inspection of the vessel also revealed that one of the portable pumps transferred to Maheno still had the cap screwed on at the discharge end.

3.2 The crew

3.2.1 Crewing requirement

The crewing requirement for the vessel was a master holding a Certificate of Competency as Master Class 5 and an engineer holding a Certificate of Competency as Marine Engine Driver Grade 3. The master was permitted to hold the engineer's qualification in which case the second crew member could be a GPH. The GPH was not required to hold a qualification. At the time of the incident the vessel was correctly manned.

The master and GPH had worked together on one previous occasion on another passenger vessel on a River Yarra cruise. This was their first time together on Maheno.

3.2.2 Master

The master of Maheno had about 10 years experience operating vessels in the Port of Melbourne, starting as a GPH. At the time of the incident he held a certificate of competency as Master Class 5 issued on 8 December 2003 and a certificate of local knowledge for the Rivers Yarra and Maribyrnong issued on 25 January 2000. He also held a Certificate of Competency as Marine Engine Driver Grade 3 issued on 15 December 2003. Both Certificates and the endorsement were issued by MSV. At the time of the incident they were current and valid.

The master also held an STCW⁸ 95 endorsement as Deck Watchkeeper issued by the Australian Maritime Safety Authority (AMSA). About two weeks prior to the incident the master had successfully completed the oral examinations conducted by MSV for issue of a Certificate of Competency as Master Class 4.

The master was employed as Able Seaman/Watchkeeper on a roster of 5-weeks on/5-weeks off on dredgers, tenders and rig supply boats. During the 5-week off period he skippered various cruise boats in the Port of Melbourne. He had skippered Maheno on a number of occasions since it commenced operations in Melbourne.

On the day of the incident he reported for duty at about 1030. His first charter on the vessel was from 1100 to 1430. Between 1430 and 1630 he involved himself with personal work and at 1630 commenced preparing for the evening charter. In the three days previous to the incident, he worked approximately the same schedule, from about 1030 to about 2130 with an afternoon break.

After the incident the master was breath tested by the water police and the result indicated zero alcohol content.

3.2.3 General Purpose Hand (GPH)

The GPH had about seven months experience as a GPH on the vessels Maheno and Nepean in the River Yarra. She did not hold any formal qualifications, having learned the GPH duties 'on-the-job'.

After the incident the GPH was breath tested by the water police and the result indicated zero alcohol content.

The GPH did not cooperate with the investigation. The investigation has not been able to establish her routine over the three days prior to the incident.

3.3 River Yarra

The River Yarra flows into the northern end of Port Phillip Bay at Williamstown and extends upstream into central Melbourne and beyond. Small domestic vessels ply between Williamstown and upstream as far as Dights Falls. The section of river downstream of the Bolte Bridge forms part of the Port of Melbourne. This section of river is shared by small domestic vessels and large commercial vessels.

The distance from the Bolte Bridge to West Gate Bridge is about 1.9 nautical miles⁹ (nm), from Swanson Dock to West Gate Bridge is about 1.0 nm and from West Gate Bridge to River Entrance is 1.5 nm.

The dredged section of River Yarra shipping channel is 153 metres wide and has a declared depth of 13.1 metres. The edges of the shipping channel are marked by beacons, which are positioned at a nominal 15 metre offset outside the dredged section. The beacons are between 15 and 60 metres from the river banks. Outside the shipping channel the depth of water reduces rapidly towards the banks.

⁸ STCW 95 = Standards of Training and Certification of Watchkeepers as amended in 1995, in accordance with the International Maritime Organisation (IMO) guidelines.

⁹ One nautical mile is 1.852 km.

The area between the beacons and the banks is not surveyed. In various sections lie debris from previous constructions and remnants of discarded jetties and wharves.

The investigation found that between 170 and 190 metres upstream of beacon 38B, in the area where Maheno diverted outside the channel, there were five stumps in the water, each of approximately 400 mm diameter, equally spaced in a line parallel to the bank. At the time of the incident, the stumps were about 400 mm to 500 mm under the water line and three to four metres off the bank. The structure and positioning of the stumps suggests that they could have been the support pilings of a now dismantled wharf or jetty.

The investigation has not found any requirement that objects outside a designated shipping channel need to be charted unless the area is navigable and is normally navigated by vessels.

3.4 Environmental conditions

At the time of the incident there was an east south-easterly wind of about 20 knots gusting to 27 knots. The sky was overcast and visibility was clear. Temperature was about 25⁰C and pressure was about 1015 hectapascals. The River Yarra was in ebb flow at about one knot and the height of tide was about 0.52 metres above the chart datum. Sunset on that day occurred at about 2036. At the time of sinking it was dusk and the light was fading.

3.5 Interviews

3.5.1 Master, MV Maheno

In his interview, the master stated that he had driven Maheno on a number of previous occasions since it commenced operating on the river.

On the day of the incident, the master commenced duty at 103010. The vessel was booked for a cruise at 1100. On this cruise the owner of Nepean Cruises (the operator) acted as the GPH. The master completed the pre-departure checks of the machinery, steering, fuel and radios and found all to be operating satisfactorily.

Maheno departed from Central Pier in Docklands, destined for Scienceworks (just downstream of the West Gate Bridge) with a group of school children. Later that day, Maheno picked up the children and returned them to Central Pier at about 1430. The entire cruise was without incident.

The master then did some personal work ashore and returned to the vessel shortly before 1630. At 1630 the GPH arrived for the evening charter which was a party cruise booked for four hours commencing at 1700. The master stated that this was the second time that they were rostered together, having worked together just once before on another vessel.

The master told the GPH to make a general inspection of the vessel to ensure everything was in order. Once again he completed the pre-departure checks. When the GPH reported that all was in order, the master went through the safety induction

¹⁰ All references to times in the Interviews Section (3.11) is the respective interviewee's best recollection.

with her. He stated that he advised the GPH of her duties as look-out and to oversee passenger safety including safety procedures in case of person overboard.

The organisers of the party (four persons) boarded the vessel first. The master and GPH had a general discussion with them regarding passenger discipline and a summary of what was to be expected during the cruise. Eighteen other passengers commenced boarding at about 1700. The vessel had to wait for about half an hour for one more passenger to arrive.

Once all 23 passengers were on board the master gave them a safety briefing. He advised them of the location of the safety equipment, how to don a lifejacket, person overboard procedures and general passenger discipline. He also informed them that in an emergency he would guide them. The master stated that during the safety briefing he had to warn a passenger to pay attention otherwise he would be forced to disembark the passenger.

At 1730 Maheno departed the wharf headed for Williamstown. The intention was to do a leisurely cruise up and down the river a few times, for the next four hours at a speed of about three to four knots. At that time the master was at the wheel and the GPH was engaged in general look-out duties and passenger control.

The master stated that as soon as Maheno departed the wharf, the music system was switched on. The volume was loud but the master could still hear the radio over the noise. The engine room hatch cover was used as the dance floor.

Just before 1800 Maheno passed under the Bolte Bridge and entered Port of Melbourne waters. The master called harbour control on VHF channel 74 and reported his entry.

Maheno arrived at Williamstown, turned around and then proceeded upstream. When Maheno was in the vicinity of Swanson Dock, the master called and was given permission by harbour control to enter Swanson dock. At about 1940 or soon thereafter Maheno exited Swanson Dock and once again proceeded downstream towards Williamstown.

The master stated that during this time the GPH intermittently came to the wheelhouse to report to him on the status of the passengers. When Maheno was in the vicinity off Holden Dock the master needed a toilet break and requested the GPH take the helm. The master stated that in his conversations with the GPH and earlier with the operator, he had formed an opinion that the GPH was proficient in steering. He also stated that his observation of her during the cruise so far indicated that she was proficient in deckhand duties.

The master pointed out to the GPH beacons 38A and 38B on the starboard side and advised the GPH to steer a course keeping Maheno two to three metres to the left of the lights. The master stated that the GPH acknowledged that she could see the beacons and took over the wheel. He did not recall the exact time but reckoned it may have been between 1940 and 1950.

The master exited the wheelhouse at about the time Maheno was abeam of beacon 41 on its port side. He stated that this was the first time during the cruise that he had relinquished the wheel. He also stated that he did not stay in the wheelhouse to watch the GPH steering.

In order to reach the toilet the master had to walk through the passenger deck where the party was in progress. He reckoned that he was in the toilet for not more than two minutes. As he was exiting the toilet, he said he could tell by the vibration of the vessel that the engines had been put into astern (reverse) propulsion. When he looked out, he noticed that Maheno was about three to four metres from the bank and was headed towards it at an angle of about 45 degrees.

The master rushed back to the wheelhouse. He was about two steps from the wheelhouse when he felt Maheno colliding with some object. He entered the wheelhouse, took over the wheel and asked the GPH what had happened. He recalled that the GPH seemed to be in panic and that she mentioned that she saw something in the water and swung the vessel to starboard to avoid it.

When the vessel re-entered the channel, the master stopped the engines and handed the wheel back to the GPH. He then inspected the shipside all around the vessel by looking over the gunwale. The master did not detect any damage so he went back to the wheelhouse and sent the GPH to inspect the forward hatch. He stated that the GPH looked into the hatch and reported back that there was a little water in the hatch.

The master stated that he assumed that the water accumulation was due to slight seepage through the caulks, which timber hulled vessels usually experience. He also stated that the collision impact did not feel as strong as when the vessel sometimes collided with tree branches which float down the river. The master assumed that there was no damage to Maheno and therefore he decided to continue with the cruise.

Maheno traversed down river at a speed of about three to four knots. During that time, a passenger on the forward deck remarked to the master that the anchor lashed on the side was getting wet, which the passenger said was not happening earlier. The master checked the bow but said that could not make out any difference in the condition of the vessel.

He stated that Maheno normally lies very low in the water so he assumed that the water washing over the anchor was caused by the slight increase in wind and river ripples. He also stated that the vessel's steering was handling normally so he was not alarmed.

Maheno was then called by a cruise vessel MV Mandalay on VHF radio, to enquire if everything was alright. The master replied in the affirmative. When Maheno reached beacon 26 the master decided to turn back to return to Docklands. During the turn Mandalay called again to enquire if everything was alright. The master again acknowledged that everything was alright.

Just after Maheno completed the turn, another cruise vessel MV Louisiana also called Maheno enquiring whether everything was alright. The master started to reply to Louisiana in the affirmative when the engine started spluttering. He attempted to revive the engine using the engine choke but was unsuccessful.

The engines stalled when Maheno was just upstream of beacon 27. The master stated that he steered the vessel towards the south bank to try and keep clear of the shipping channel. When Maheno appeared to be outside the shipping channel, he went to the bow and lowered the anchor.

He then called harbour control to advise them that his engine had stalled and that he had to drop the anchor. He gave harbour control his approximate position. Then with the help of the GPH they opened the engine room hatch to inspect the engine. That is when the master saw that the engine room was flooded with water and that the engine was partly submersed. He estimated that the water in the compartment may have been slightly over two feet (about 600 mm).

The master immediately phoned the owner of Nepean Cruises to inform him of the situation and that he had to get the passengers off the vessel. He then started the electric bilge pumps and set the bilge manifold outlet to connect to the manual bilge pump. The master stated that the operator phoned back and informed him that the vessel Nepean would come alongside to disembark the passengers.

The master and GPH took turns trying to operate the manual bilge pump. They could not operate the main bilge pump as it was driven by the main engine.

The vessel Louisiana came over and asked if they could assist. The master asked Louisiana for a portable bilge pump. Louisiana passed petrol driven portable pump. The master stated that he managed to start the pump but he could not prime the suction pipe. He tried repeatedly, but unsuccessfully.

A short time later Nepean arrived alongside and also passed a portable pump to Maheno. Maheno and Nepean then discussed the procedure to transfer the passengers from Maheno to Nepean. The masters decided that they would do so via the aft deck of Maheno. Nepean nosed into the stern of Maheno.

The master of Maheno informed all passengers that they had to abandon the vessel via the aft deck and that they could take with them only those belongings that could fit in their pockets. He said that he did not insist on them wearing lifejackets as at that time he believed that the vessel was not in danger of sinking. Furthermore, the master stated that egress through the narrow aft door with a life jacket donned would have been cumbersome for most of the passengers.

The master stated that he was aware some passengers had consumed significant amounts of alcohol. In the master's opinion, some of them appeared to be affected by the alcohol and did not take the incident seriously. With the help of the GPH the master disembarked all passengers safely on to the Nepean. The master stated that some of the passengers were a bit rowdy and needed to be subdued in a polite manner.

The master then continued his attempts to start the portable pumps with the help of the GPH. He stated that during this time there were a number of vessels calling him on the VHF radio and on his mobile phone. He was harried trying to answer calls and at the same time trying to save the vessel. In the master's opinion there did not appear to be anyone controlling radio traffic. He stated that he tried calling Harbour Control however on several occasions the radio channel was blocked by other vessels talking on the same channel.

The master recalled that the police vessel arrived but did not have a portable pump so the vessel went back to its Williamstown base to get a portable pump for the vessel. At around this time it started getting dark. The master kept trying to start the pumps but without success.

Some time later the master of the tug Gabo called Maheno and told the master that Maheno was in danger of sinking and that he must abandon the vessel immediately.

The vessel Midnight Blue went alongside Maheno and disembarked the master and GPH. About a minute later Maheno foundered and sank.

The master and GPH were transferred from Midnight Blue to the police vessel and were taken to Water Police headquarters at Williamstown where he made his Statement for the police.

In his interview the master provided information regarding the operation of vessel. He stated that the company did not have a safety management plan or any guidelines to masters and crew. He usually conducted the vessel based on his knowledge and experience.

When questioned about the machinery, the master stated that the pre-departure checks indicated all systems were operating normally and during the voyage there was no indication that there was a malfunction. On this occasion the master said he was conscious to set the engine room electric bilge pump switch to 'manual' because he did not want to inadvertently pump pollutants overboard, if in case there was a fuel leak or such that caused the high level alarm to activate.

When questioned about the bilge high level alarm, the master stated that he did not check the alarm prior to departure. He assumed that it was working because on some previous occasions he had heard it start up when water seeped into the engine room. The master stated that he was sure that he did not hear the bilge high level alarm during this voyage. Therefore, he had no indication that the engine room was flooding with water until he opened the engine room hatch.

When asked about Maheno's manoeuvring characteristics, the master stated that Maheno was very sensitive to wheel movements. He had to operate the vessel with very small movements of the wheel otherwise Maheno would swing quite rapidly.

The master also stated that after the initial checks following the collision he did not attempt to make any further checks during the remainder of the voyage. Since Maheno sits very low in the water he could not make out whether the vessel was sinking lower in the water.

The master mentioned that the GPH appeared to panic at the time of collision so he gave her some tasks to do (check the forward locker and check on the passengers) to help her get over her panic. He stated that after that initial panic, the GPH resumed her deckhand duties in a proficient manner and was efficient when assisting him to disembark the passengers.

When questioned about seeking assistance or whether assistance was offered by other parties, the master stated that right until the time he was told to abandon Maheno, his only thoughts were to pump the water out and keep Maheno afloat. He stated that until the time he abandoned Maheno, he had not considered the possibility that Maheno was in danger of sinking.

3.5.2 General purpose hand Statement

The general purpose hand (GPH) did not cooperate with the investigation. However, in her statement to the police immediately following the incident, the GPH stated that when Maheno was approaching the West Gate Bridge, the master called her to take over the wheel as he needed to go to the toilet and would be back in one minute.

The GPH stated that the master asked her if she had steered before, to which she answered “several times before”. The GPH stated that soon thereafter, another vessel was running exactly side by side (sic) on her port side when she thought she saw something in the water just in front of the bow so she steered to the right so that she would not hit it or the other boat.

Once she steered to the right, the GPH stated that it felt like the vessel had hit something so she powered down and steered back to the left. By that stage the master was behind the GPH so he took over the helm. The GPH then went and checked on the passengers and made sure everything was okay.

In her statement the GPH also corroborated the master’s evidence that they attempted to pump out the water with Maheno’s manual pump as well as two pumps transferred from other vessels, that all passengers were evacuated onto Nepean and that the master and GPH transferred to the port security vessel just before Maheno sank.

3.5.3 Passenger Statements

The organiser of the party provided evidence to the investigation and other passengers made statements to the police. They corroborated the evidence that the master held a safety briefing before the trip and that the passengers noted that the master did not leave the wheelhouse at any time until he handed over to the GPH to visit the toilet.

The passengers stated that soon after the GPH took the helm, Maheno appeared to head towards the rock bank and that the GPH was trying to turn the wheel frantically one way and then the other.

One of the passengers standing on the bow stated that he noticed some mooring posts that the boat appeared to be heading towards. The posts were located just off from the bank.

A number of passengers stated that the impact was quite hard and several mentioned getting a jolt. They also stated that they heard a big bang and saw crockery and other objects at the bar thrown around the boat. Some passengers inside the vessel also noted that at about the time of the impact they saw the master come out of the toilet and run to the wheelhouse.

The passengers who were standing on the bow stated that as the cruise progressed they observed that the anchor lashed to the side of the boat was beginning to submerge in the water which was not happening earlier and they informed the master about it. They stated words to the effect that the master had a quick look and did not take their observation seriously.

3.5.4 Duty shipping control officer

In his interview the shipping control officer stated that he commenced his duties on the day of the incident at about 1730 at Harbour Control. In his opinion all shipping was operating normally and without any cause for alarm.

His first knowledge of Maheno was at 1927 when the vessel called harbour control on VHF channel 12, to request permission to enter Swanson Dock for about 10 minutes. After granting permission, the shipping control officer did not have any further communication with Maheno until about 2020 when Maheno called harbour

control on VHF radio to inform them that the engines had stalled between buoys 27 and 29.

The officer enquired whether Maheno needed assistance to which Maheno replied that assistance at that time was not required. The officer then focussed the Web Dock camera (CCTV) on Maheno to monitor the situation. He stated that the camera image was not very clear but he could make out the outline of Maheno and later, the attending vessels.

A short while later harbour control tried to raise Maheno on the radio to obtain a situation report but there was no reply from Maheno. The officer stated that another vessel Nepean reported to harbour control that the master of Maheno was in the vessel's engine room, therefore he could not reply to their calls.

At about 2033 harbour control was called by Nepean to inform them that they would be transferring the passengers from Maheno onto Nepean. The officer replied "affirmative as long as you are happy" or words to that effect. At that point the shipping control officer activated incident reporting procedures in accordance with the Melbourne Port Emergency Management Plan (MPEMP) and the Harbour Master's Instructions.

The officer then contacted the owner of the tug Gabo and requested them to deploy Gabo to proceed to the incident site and render assistance as necessary. Harbour control continued to monitor the situation on the CCTV. Shortly thereafter the officer made contact with the port security vessel Midnight Blue, who confirmed it was proceeding to the incident site. In his interview the shipping control officer stated that he was under the impression that Midnight Blue and the water police would take charge of activities at the site.

The officer stated that there was a lot of radio traffic on VHF channel 12 and of vessels calling each other and calling Maheno on VHF channel 68. At one time he considered ordering all vessels to observe radio protocol and maintain communication only on VHF channel 13. However, he thought it would cause further confusion so he abandoned the idea.

He also stated that whilst harbour control continued to monitor the incident, there were no formal arrangements for attending vessels to keep harbour control updated regarding the situation at the site.

The officer recalled that Gabo called Maheno to inform the master that Maheno was sinking and that he should abandon Maheno immediately. Shortly thereafter the officer noted on CCTV that Maheno had sunk, followed by a call from Gabo confirming that the vessel had sunk.

The officer requested and obtained the GPS position of Maheno from Midnight Blue. The Water Police vessel reported to harbour control that Maheno had dropped its anchor before sinking. The shipping control officer then mobilised the PoMC survey vessel Shearwater to survey the position of the wreck and to mark it with a buoy. After it deployed the buoy, the officer ordered Shearwater to station itself at the incident site and monitor Maheno's sunken position to ensure that it did not slide into the shipping channel.

The officer stated that there were a number of vessels in the vicinity who assisted in picking up debris that floated to the surface. The oil spill vessel Orca cleaned the slight traces of oil that were seen on the water.

At about 2120 Midnight Blue reported to the shipping control officer that the channel was clear. The shipping control officer made a decision at that time that normal shipping operations could resume. He continued to monitor Maheno's position via the CCTV and maintained a communication line with Shearwater in case Maheno slipped into the channel.

3.5.5 Master, MV Mandalay

The vessel Mandalay was also on a river cruise at the time of the incident, proceeding down stream. At about 1945, when in the vicinity of Holden Dock the master observed the vessel Maheno ahead of his. He noticed that Maheno was very close to the edge of the channel.

The master noted that Mandalay was overtaking Maheno and accordingly when approximately in the vicinity of beacon 40 he called Maheno on VHF radio to advise them that his vessel was overtaking Maheno. Maheno did not reply to Mandalay's call. The master stated that he knew the master of Maheno personally and deduced that he was not at the wheel as he knew that master always returned radio calls.

Mandalay overtook Maheno keeping Maheno about 30 metres on its starboard side and continued on passage. Mandalay was somewhere just past the West Gate Bridge when one of the passengers told the master to observe Maheno as it appeared to have run into the riverbank. The master stated that by the time he turned around he observed Maheno moving astern into the channel. It stopped when it was in the channel. A short while later the master stated that he observed Maheno start moving down stream again.

The master stated that he felt uncomfortable with what he saw so when Mandalay was about halfway between West Gate Bridge and the river mouth he called Maheno to ask if everything was alright. He stated that his question was based only on the fact that he had seen Maheno appear to run into the river bank. At that time observing Maheno from some distance ahead, there was nothing to indicate that Maheno was in trouble.

Maheno replied words to the effect that "all was OK". The master of Mandalay did not query the master of Maheno about what he had just seen.

When Mandalay was in the vicinity of the river mouth, the master noticed Maheno turning around. He stated that the wind was gusting over 15 knots creating a slight chop in the water. The master noticed that waves were overlapping Maheno's sponson¹¹. He thought that Maheno may have suffered impact damage based on what he saw earlier.

Mandalay called Maheno once again to ask if everything was okay and again received a reply in the affirmative. Soon after, he heard another vessel calling and heard Maheno stating words to the effect that everything was not okay. The master immediately turned Mandalay around and followed Maheno to offer assistance if required.

Since Mandalay is a comparatively large vessel it could not get too close to Maheno so the master could not clearly observe the sequence of events on Maheno. He stationed Mandalay close by in the vicinity, ready to offer assistance. When the

¹¹ The rigid rubber buffer fitted around the vessel freeboard deck.

master was satisfied that there were other more appropriate vessels offering assistance, he continued on his cruise.

3.5.6 Master, MV Louisiana

On the evening of the incident the master of Louisiana was boarding passengers at Pier D (at Pier 35) at about 1830 when he noticed Maheno sailing upstream. Louisiana departed its wharf at 1845 and proceeded upstream past Swanson Dock. He did not observe Maheno passing him going downstream. Louisiana spent some time in the upper reaches of the Yarra before heading downstream.

At about the time that Louisiana was passing under the West Gate Bridge, the master heard the vessel Mandalay call Maheno asking if everything was all right and he heard Maheno reply “yes, all fine” or words to that effect. The master of Louisiana stated that he was a bit concerned as this was not normal conversation between vessels and asked his GPH to keep a watch in case he saw Maheno.

Louisiana was in the vicinity of beacon 28 when the master noticed Maheno near beacon 25 and travelling upstream. He looked through his binoculars and noticed that Maheno did not have much freeboard. He called Maheno on VHF radio and asked if everything was alright to which Maheno started to reply in the affirmative then suddenly commented “No, I don’t think so, I got to go (sic)”.

Louisiana immediately turned around and followed Maheno. The master observed Maheno stopped and saw the master preparing the anchor. Louisiana called Maheno once again and was told that Maheno’s engine room was flooded. At about that time the owner of Nepean Cruises called the master of Louisiana by mobile phone and requested him to assist Maheno.

Louisiana offered Maheno assistance and Maheno requested a portable bilge pump. Louisiana went near Maheno and passed a rope across and then transferred its pump. The pump had a rated capacity of about 4,000 litres per hour. The master stated that Louisiana being a large vessel, it was not possible for them to go alongside Maheno. Louisiana drifted a short distance off Maheno and stood by to assist if required.

In his interview the master of Louisiana stated that he observed Nepean pass a pump across to Maheno, then nose around its stern and start disembarking the passengers. At one point harbour control called his vessel to ask for an update and he heard harbour control also call Gabo to assist. The master also observed Midnight Blue and the water police vessel in the vicinity.

The master of Louisiana stated that he heard Gabo advising the master of Maheno to abandon ship and observed the master and GPH disembarking on to Midnight Blue. Soon after that Maheno sank and he noted in his log book that Maheno sank at 2058 (according to his ship clock). At 2110 Louisiana resumed its cruise.

3.5.7 Master, MV Nepean

At around the time of the incident the vessel MV Nepean was also engaged in a river cruise. In his interview the master stated that Nepean was heading downstream and was in the vicinity of beacon 30 when he heard the vessel Mandalay call Maheno and ask if they required assistance. He stated that he heard Maheno reply “No, I am okay”.

The master stated that shortly after that he saw Maheno about 100 metres ahead of him and heading upstream. He stated that he observed Maheno to be down by the head¹². He called Maheno on VHF channel 68 to let the master know that Maheno looked down by the head. The master of Maheno replied to Nepean that he was okay.

At that time Maheno had a number of persons standing on the bow. The master of Nepean stated that since he knew Maheno to normally lie very low in the water, he assumed that the weight of those persons standing on the forward deck caused Maheno's head to sink lower in the water. He did not consider anything was wrong, but he stated that he was a bit 'uneasy' because of Mandalay's call to Maheno asking if they required assistance.

Nepean continued downstream and had passed Maheno going upstream when the master received a call on his mobile phone from the owner of Nepean Cruises requesting that he lend Maheno a portable bilge pump and to offer assistance to Maheno as required. The owner also requested that Nepean transfer the passengers from Maheno to his vessel.

The master immediately turned Nepean around and proceeded to meet up with Maheno. When he arrived at where Maheno was stopped he noted that the vessel Louisiana had arrived there and was in the process of transferring a portable pump to Maheno. Maheno called Nepean and requested a portable bilge pump and for Nepean to transfer the passengers from Maheno to Nepean.

Nepean pulled alongside Maheno and passed a pump across. The pump had a rated capacity of about 4,000 litres per hour. The master stated that he observed Maheno now had about 20 centimetres of freeboard. The police vessel and the tug Gabo also arrived around that time along with a few other charter vessels.

The master then called harbour control to inform them that they would be transferring passengers. Nepean nosed into the stern of Maheno and assisted the passengers to disembark Maheno. The master stated that some of the passengers appeared to be under the influence of alcohol. Some of them were boisterous and did not seem to take the situation seriously, but all 23 passengers disembarked safely.

Nepean stood by for around 10 to 15 minutes before the master decided to head back to Dockland to drop off Maheno's passengers.

On the way back the master of Nepean could hear a lot of radio communication between the police vessel, Gabo and Maheno and heard Maheno mention that both portable pumps were running but would not prime. He also overheard radio communications regarding Maheno's imminent sinking and the transfer of the master and GPH.

The master stated that he had often skippered Maheno since its arrival in Melbourne and said that to the best of his knowledge, the bilge high level alarm was working, approximately three weeks prior. He also stated that he knew that the bilge pumping systems were operable and that the electric bilge pumps were used very often to drain out water seeping in through the timbers.

¹² A condition when the bow of the vessel is lower in the water than the stern.

When asked about Maheno's manoeuvring characteristics the master stated that Maheno had a tendency to 'fish tail'¹³ if oversteered. He stated that usual practice when navigating the River Yarra is to remain at least 10 metres from the channel beacons. He has about 15 years experience operating on the River Yarra.

The master of Nepean stated that he had worked with the GPH of Maheno on a number of occasions but on other vessels and in his opinion the GPH seemed capable and was fine when taking the wheel for short periods.

3.5.8 Master, MV Midnight Blue

Midnight Blue is the port security vessel. At the time of the incident the vessel was patrolling the port waters and was on passage from Gellibrand to Station Pier when the master stated that he heard Maheno call harbour control to inform them that its engine had stalled.

A short while later, the master of Midnight Blue heard Maheno report that it intended to transfer passengers to another vessel. At that point Midnight Blue turned back and headed to the River Yarra to investigate the incident.

Whilst travelling back, Midnight Blue made contact with harbour control by VHF radio and confirmed that it would stand by in attendance. The master stated that there was a lot of chatter on the VHF radio. Midnight Blue did not have a dedicated channel for private communication with harbour control.

When Midnight Blue arrived at the scene, the master noted that the tug Gabo and the water police vessel were in attendance. The master of Gabo advised Midnight Blue to get close to Maheno and 'nudge' it to shallow water outside the channel. Midnight Blue attempted to do this but as Maheno had dropped its anchor, the vessel could not be shifted further inshore.

The master proceeded to check the depth of water under Maheno on his vessel's echo sounder. He noted that the depth of water under Maheno's bow was about three metres and that the after part of the vessel was jutting into the shipping channel.

The master stated that he was not asked to take charge of rescue activities so he stood by and monitored the passengers being disembarked. The tug Gabo called him to discuss Maheno's imminent sinking and then Gabo called Maheno to inform the master that he must abandon his vessel immediately. Midnight Blue went alongside Maheno and took the master and GPH on board. Soon after, Maheno foundered and sank.

Midnight Blue transferred the master and GPH to the police vessel, then stood by at the incident site to monitor 'clean-up' operations. At about 2120 the shipping channel was cleared. Midnight Blue informed harbour control and then resumed normal duties.

¹³ Fish tail is the marine term when the vessel slews from side to side.

3.5.9 Master, tug 'Gabo'

At about 2020 on the night of the incident the tug Gabo had just completed assisting the berthing of a vessel in Webb Dock and was proceeding back to its dock at South Wharf. At about that time, the master heard Maheno calling harbour control to advise that its engines had stalled.

Gabo passed Maheno in the vicinity of beacon 27. The master noted that Maheno was at the river's edge. The vessel Nepean was alongside Maheno and was in the process of passing a portable pump across. The master stated that from a distance of about 50 to 60 metres off, it appeared that Maheno had a freeboard of about six inches (about 150 mm). There were also a few small vessels standing by in the vicinity.

A little later, the master of Gabo received a call from his head office advising Gabo to return to the stricken vessel and render whatever assistance was necessary. A little later the master of Gabo got another call from his head office, to advise that harbour control had given permission for Gabo to exceed the river channel speed limits.

The master monitored VHF channels 12 and 74. He heard over the radio the discussion between the owner of Nepean Cruises and the master of Maheno about the water in the engine room and that "things needed to be done". Gabo returned to where Maheno lay stricken, arriving there at about 2040.

The master stated that he called Maheno and offered assistance. Maheno requested a pump from Gabo but Gabo did not have a pump or hoses to pass across. The master stated that Gabo was not configured to be able to pump out water from another vessel as it was not fitted with the appropriate deck couplings and hoses to facilitate connection of its pumps to another vessel.

When questioned about Gabo's pumping capacity, the master stated that Gabo had two fire pumps of capacity 10,000 litres per minute and 6,000 litres per minute respectively and two general service and bilge pumps having a combined pumping capacity of about 2,940 litres per minute.

Gabo remained a short distance away from Maheno as the master was concerned that Gabo's wash would swamp Maheno if he got any closer. The master stated that he noted Maheno was lying very low in the water. It was down by the head and water was washing over the forward gunwale. The master also considered using Gabo to push Maheno further inshore but again, he was concerned that the tug might further damage Maheno's timber planking.

The master stated that whilst he stood by to assist, he noted that there was a lot of communication on the VHF radios between several vessels. He could see the master and GPH of Maheno constantly moving between the radio in the wheel house and the engine room. There was a combination of radio channels being used, which made it difficult for him to determine which radio channels he should monitor on the tug.

The master also stated that during the incident, he could not determine who was in charge of emergency procedures or radio traffic. At about 2052 the master called Midnight Blue and suggested to that master to take charge of the situation and attempt to push Maheno further inshore as it was in imminent danger of sinking.

At about 2057 the master of Gabo observed that water was now washing through the side doors. He advised the master of Maheno to abandon his vessel immediately and advised Midnight Blue to disembark the crew from Maheno.

Once Midnight Blue confirmed that the master and GPH had disembarked Maheno, Gabo attempted to go alongside Maheno with the intention to push it into shallower water however, before Gabo could reach it, Maheno foundered and sank.

During the interview the master of Gabo also stated that he was not aware if any formal protocol or agreement existed between the tugs and the water police, especially with regard to coordinated actions in case of emergency. He stated that he was particularly concerned of the repercussions had Maheno broken down in the middle of the shipping channel when a large commercial vessel was approaching.

3.6 Nepean Cruises

At the time of the incident Nepean Cruises operated a fleet of three vessels on the River Yarra engaged in sight-seeing cruises, school group excursions and party functions. The owner of Nepean Cruises has not made himself available to assist with the investigation. Enquiries indicate that the company has ceased operating and has closed its office.

The investigation has not been provided with any evidence of documented policies, company operating procedures, guidelines to masters and crew, a safety management plan being implemented in the operation of their vessels or a periodic maintenance plan for the upkeep of the vessels. Anecdotal evidence from masters who have served on Maheno indicates that none exists. Each master of Maheno applied their individual experience, knowledge and skills to operate and maintain the vessel.

3.7 Victoria Water Police

3.7.1 Rescue coordination

Victoria Water Police (VWP) is the control agency for marine incidents including search and rescue. The rescue coordination centre (RCC) is located at Williamstown, at the mouth of the River Yarra.

On the evening of the incident the RCC received a phone call from harbour control informing them that the vessel Maheno was stalled in the river and needed to disembark its passengers. The RCC immediately deployed a patrol vessel to attend at the scene. When the police vessel arrived at the scene, the officers supervised the disembarking of passengers from Maheno onto Nepean.

During this time the police vessel contacted Maheno and enquired whether a tow or other assistance was required. Maheno replied that it was taking on water but did not require a tow. The patrol boat did not have a portable pump or hoses to pass to Maheno. It radioed the RCC to advise them of the situation and the need for a pump. The RCC advised the patrol boat to return to base to pick up the pump, which was housed on a larger search and rescue vessel. Soon after the passengers were disembarked Maheno, the patrol vessel departed for Williamstown.

The RCC duty officer then realised that the pump was too big for the patrol boat and that the officers on the patrol boat were not qualified to operate the larger vessel. He therefore deployed another crew on the larger search and rescue vessel equipped with pumping capability to attend Maheno. The pump could be connected to Maheno by hoses and had a capacity of about 200 litres per minute.

There being no other recognised search and rescue agencies/vessels in attendance, the police patrol vessel departing the scene was unable to delegate control during the intervening period. Maheno sank at about the same time that the search and rescue vessel arrived.

The RCC informed the investigation that during the incident they did not receive situation updates from Maheno and therefore initially had no reason to believe that Maheno was in grave and imminent danger of sinking. The RCC advised that there was significant radio traffic from vessels in the area which made communication with Maheno difficult. Once the tug Gabo arrived it provided the RCC with regular updates.

3.7.2 Emergency Management Manual Victoria

In accordance with the *Emergency Management Act 1986*, there is to be a Victorian Emergency Management Council (EMC) to co-ordinate the activities of government and non-government agencies, relating to the prevention of, response to and recovery from emergencies. The EMC has prepared the Emergency Management Manual Victoria (EMMV) to respond to and control various emergencies within the State, where more than one organisation is involved.

The EMMV specifies that the control agency for marine emergencies is the Victoria Water Police. VWP in turn have developed an Emergency Response Guide which addresses emergency response for various marine incidents. The authority to control also carries with it the responsibility for tasking other agencies to assist, in accordance with the needs of the situation. Accordingly, PoMC was nominated as a support agency and was required to provide marine and port operations expertise, as and when requested by the control agency.

As part of its emergency preparedness, the EMMV requires the control agency to conduct appropriate emergency response, control and recovery training exercises in conjunction with the support agencies. Whilst VWP regularly conducts various emergency exercises, they have not conducted a specific exercise regarding a small vessel sinking.

3.8 Port of Melbourne Corporation

3.8.1 Overview

The Port of Melbourne Corporation (PoMC) is the port manager for the Port of Melbourne. PoMC is the owner of all land within port boundaries and is responsible for the port waters of Melbourne, pursuant to the *Port Services Act 1995* (Vic).

The port manager must appoint a harbour master licenced by MSV and if required, deputy and/or assistant harbour masters (also known as shipping control officers) with the harbour master delegating his powers and functions to them to carry out the day-to-day functions of the port.

The *Marine Act 1988* provides the harbour master with a broad range of powers so that he can carry out his functions, with regard to the safe navigation of vessels entering, leaving and transiting port waters including the time and manner in which it is done.

In accordance with the EMMV, PoMC was the support agency to the water police and had the role of providing essential services, personnel or material to support the rescue operation and to nominate a person as Emergency Management Coordinator (EMC). PoMC stated that in September 2007 they conducted an emergency exercise involving the collision and subsequent sinking of a small commercial vessel in the River Yarra.

In this incident, the duty shipping control officer in coordination with the EMC monitored the incident site, commissioned other vessels to attend, suspended shipping movements in the channel and directed or redirected radio communications as required.

3.8.2 Radio communications

Radio communications within Port of Melbourne waters are carried out on designated VHF marine radio channels. The designated calling and working channel for shipping operations is VHF channel 12, which is monitored by harbour control. Communications on this channel are also recorded. Small domestic vessels must maintain a listening watch on VHF channel 12 but their designated working channel is VHF channel 74 which is not monitored by harbour control but is recorded.

Harbour control also monitors and records channel 16 (international calling and distress frequency) and channel 67 (the supplementary Australian calling and distress frequency).

Historically, small domestic vessels often divert their communications to VHF channel 68, which is neither monitored nor recorded. Perusal of the electro-data voice recorder indicates that on a number of occasions the vessels concerned with the incident and harbour control diverted to VHF channel 68. Therefore, the content of their communications could not be reviewed.

An extract of relevant VHF radio communications recorded by harbour control's electro-data voice recorder is detailed in Appendix G.

3.9 Regulatory governance of vessels

3.9.1 Marine Safety Victoria

Marine Safety Victoria is the State regulatory authority responsible for the efficient and safe operation of vessels on State waters by coordinating waterway management, developing and implementing vessel standards and operator competencies, protecting the marine environment and by funding the improvement and development of associated infrastructure.

With regard to commercial vessel operations, MSV has a responsibility to ensure that the design, construction and equipment of new and existing commercial vessels meet the minimum standards as specified in the USL Code and that the persons who operate them are appropriately qualified.

3.9.2 Survey procedures

Vessels entering Victoria are surveyed in accordance with MSV's 'Quality Procedure for the Issue of Certificates of Survey (Initial Survey)'. The procedure provides guidance to surveyors on the processes to be followed and required documentation when vessels initially apply for a certificate of survey. It also provides guidance on inspection of vessels, exemptions and equivalents and mutual recognition.

If the vessel meets the requirements, MSV will issue a certificate of survey, usually valid for one year. At least once a year thereafter, the vessel is surveyed by MSV to ensure that it complies with the minimum standards; on successful completion of which a new certificate of survey is issued.

Between surveys, MSV inspects vessels on a random basis or on complaint to confirm that the vessel is being operated and maintained within the requirements of its certificate of survey. However, when setting time limits for vessels' compliance to specific conditions, as in the case where Maheno was required to submit a safety management plan by 1 November 2007, MSV does not have specific procedures to verify compliance by the due date.

In some instances, where the surveyor recommends that repairs be carried out to the vessel or the equipment, MSV will accept the owner's signed statutory declaration stating that those repairs have been carried out, in lieu of physically verifying the repair.

MSV also has a Standard Operating Procedure (SOP) for the mutual recognition of commercial vessels transferring from another State. The SOP lists the procedures to be followed from the time a vessel applies to MSV to be surveyed, until the time that MSV issues a certificate of survey. At the time of the incident MSV did not have an SOP for granting exemptions to one compartment sub-division.

3.9.3 Quality procedure regarding exemption

MSV's quality procedure for initial surveys addresses the procedure to be followed when granting exemptions and equivalents to vessels. On receipt of an application for general exemption from the owner of a vessel, the procedure requires the appointed surveyor to make recommendations for the approval or disapproval of the exemption before submitting the application to the technical committee. The procedure states that "the technical committee may approve an application for exemption or equivalent provided that the safety of the vessel is no less than if the prescriptive requirement of the USL Code was met in full according to USL Code Section 1 clause 8 (sic)".

In the case of Maheno, the operator requested an exemption to one compartment sub-division, which the technical committee granted. In their evidence, MSV has stated that procedures requiring the surveyor's recommendations and the approval details of the technical committee were not documented. Furthermore, the application form does not document the reasons why compliance with one compartment sub-division was unreasonable or impracticable or how the prescriptive requirement of the USL Code was met in full.

3.9.4 National Marine Safety Committee

The National Marine Safety Committee (NMSC) was established in late 1996 as part of the Australian Transport Council (ATC) strategic response to address the lack of consistency between the jurisdictions in the application and administration of standards for commercial vessels, and the lack of marine safety data. The aim was to improve marine safety outcomes by developing and implementing the National Standard for Commercial Vessels (NSCV), approved by the ATC.

At the time of the incident, the ATC had endorsed several sections of the NSCV to replace the corresponding sections of the USL Code. In the State of Victoria where the sections of the NSCV can replace the USL Code only by an amendment to the *Marine Act 1988* and *Marine Regulations 1999*, MSV referred to those sections of the NSCV as an 'equivalent solution' in accordance with the provisions in Section 1 Paragraph 8 of the USL Code.

3.9.5 Mutual recognition of certificates of survey

The NMSC, in accordance with the Inter Government Agreement has developed the "*Administrative Protocol for the Mutual Recognition of Vessel Certificates of Survey*". The purpose of mutual recognition is to allow vessels to move between States and the Northern Territory, and to operate (sic).

In effect, the protocol advises each jurisdiction to recognise a certificate of survey issued by another jurisdiction provided that such certificate was issued in accordance with the requirements of the USL Code. One of the principles to be applied to mutual recognition is that the receiving jurisdiction will not go behind the certificate of survey issued by another jurisdiction and shall recognise that certificate at face value.

However, if any operating limitations or conditions are different to those of the USL Code, the protocol advises that the issuing jurisdiction should provide a brief statement regarding the basis on which they were given and shall keep proper records of the reason for the departure.

The protocol also advises that departures from the USL Code may be permitted by a jurisdiction but may not be acceptable by or transferable to other jurisdictions unless the receiving jurisdiction is satisfied that the mentioned condition will not impose a safety risk on the vessel or the environment and that the receiving jurisdiction should discuss these departures from the USL Code with the original jurisdiction to resolve all safety issues pertaining to the condition of the vessel and its departure from the USL Code.

3.10 Governing rules, regulations and legislation

3.10.1 Vessel standards

USL Code Section 5 Subsection C Part 2 C62 – Watertight Bulkheads

This paragraph of the USL Code states in effect that the location of the watertight bulkheads to achieve one compartment sub-division is determined by an empirical formula that takes into account the freeboard, length and depth of the compartment and a "Floodable length factor" based on the location of the compartment from the forward end of the vessel.

The bulkhead is required to be watertight by the use of appropriate material and constructed such that it remains watertight against a head of water to the top of the bulkhead plus any additional head which may arise due to flooding or heeling.

C62 .3 states that “All vessels 12.5 metres in length and over shall have 2 machinery space bulkheads, except where the machinery space is located at one end of the vessel then only the after or forward machinery space bulkhead as appropriate is required.”

C62.1 states that “Vessels shall comply with one compartment sub-division standards, provided that the Authority, taking into consideration the size, area and duration of operations may exempt a passenger vessel operating solely on smooth water from the requirements of this clause.”

USL Code Section 5 Subsection C Part 2 C65 – Collision Bulkhead

This paragraph of the USL Code states in effect that every passenger vessel of 15 metres and over in length (measured at the waterline) must have a collision bulkhead, located not less than five per centum of the length or 750 mm, whichever is the greater, and not more than 15 per centum of the length abaft the stem measured at the designed load waterline.

USL Code Section 9 Part 3 Paragraph 17 – Bilge Pumping Arrangements

C17.2 states in effect that vessels of measured length 12.5 metres and over but less than 17.5 metres shall be provided with one power pump of 11,000 litres/hour discharge capacity and one manual pump of 5,500 litres/hour discharge capacity.

3.10.2 Safety management plan

MSV required Maheno to lodge a safety management plan meeting the requirements of Chapters 2 and 3 of the NSCV Part E Operational Practices by 1 November 2007.

Chapter 2 specifies guidelines for operational practices on vessels to ensure that vessels are operated in a manner that avoids exposure of the vessel, persons on board, persons not on board, and the environment to unacceptable risks. The chapter provides direction for the training of crew in operational, administrative and emergency procedures.

Chapter 3 specifies guidelines for pre-planning for emergency situations and the maintenance of emergency preparedness on vessels to ensure that appropriate measures are put in place before an emergency to limit the consequences of an emergency should one occur. This chapter provides direction for the vessel to prepare emergency plans and to review whether the safety equipment carried on board will mitigate a shipboard emergency.

At the time of the incident Maheno had not lodged a safety management plan with MSV.

3.10.3 One compartment sub-division and equivalence

The USL Code does not prescribe equivalent solutions to vessels granted an exemption to one compartment sub-division. A notation in Table 2 of NSCV Part C Section 7 Subsection 7A Key (B3) “Scales of safety equipment” states that vessels that do not conform to damaged stability requirements and single compartment sub-division shall be limited to 49 passengers – buoyant appliances for 100 per cent complement.

The NMSC later advised the investigation that when the Standard was being drafted, it had determined that the carriage of additional safety equipment was not meant to be an equivalent solution but could be applied to whatever equivalent solution an Authority applied to a particular vessel.

With regard to such vessels being limited to 49 passengers, the NMSC stated that the number of 49 persons arose from the provisions of the intact stability requirements of the USL Code that provided for simplified stability calculations on certain vessels up to 49 passengers and a full stability assessment for vessels carrying 50 or more passengers. Therefore Maheno was only required to comply with the basic intact stability requirement and did not have to undergo the full (including damaged) stability assessment.

4. ANALYSIS

4.1 The collision

4.1.1 The incident

The sinking of Maheno resulted from a collision with underwater objects outside the marked channel in the River Yarra. At the time, the vessel was being steered by a GPH who had only limited experience in handling the vessel.

4.1.2 Master's actions

When the master had to leave the wheelhouse for a short period he handed over steering duties to the GPH. He later commented that he had formed an opinion that the GPH was a proficient deckhand but he had never observed her steering a vessel and was not aware if she had steered Maheno previously.

Under the circumstances, it would have been prudent of him to have placed the vessel further to the centre of the river before handing over to the GPH. He should also have advised the GPH of Maheno's manoeuvring characteristics and then satisfied himself that she was proficient in handling Maheno, before leaving the wheelhouse.

Following the collision, the master and GPH checked the hull externally above the waterline and in the forward locker. As the damaged section was below the waterline and under the bottom boards in the forward locker, it would not have been visible within the extent of the post collision check carried out. Additionally, the bladder tank in the forward locker blocked from view a substantial part of the hull and bottom boards in that compartment.

After a collision, the recommended safety procedure is for the crew to make a full and thorough inspection of the vessel including sighting or sounding all compartments, to check for water ingress. Where damage is not detected after the first inspection, such checks must be continued at regular frequent intervals until the completion of the voyage or until the master has satisfied himself that the vessel has not been breached.

Calls from other vessels enquiring about the condition of Maheno as well as passenger observation of Maheno's changed condition, should have alerted the master to conduct a further more thorough inspection of the vessel.

The master did not consider inspecting the engine room space at any time prior to the engine stopping. Maheno did not have sounding pipes leading into the underdeck spaces. Therefore, other than the bilge alarm, the only other way for the master to verify whether the engine room was not flooding was to temporarily stop the party and clear the hatch cover of party equipment before opening it.

It is likely that commercial pressure to complete the cruise influenced the master's decision not to conduct an inspection of the engine compartment or to return directly to Docklands.

4.1.3 GPH actions

The inexperience of the GPH was evidenced by both the action she took to avoid the reported object in the river and then by her actions as the Maheno approached the river bank (see paragraph 4.2.4 vessel handling characteristics).

It appears that the GPH used more helm than would ordinarily be required, as the vessel was observed to veer about 45° off course in a very short period of time. She then put the engines into astern movement and whilst doing this was seen to turn the wheel one way and then the other, as Maheno headed towards the bank.

In such a situation, it is reasonable to attempt to take all way off the vessel. However, had the GPH only stopped the engines and applied opposite helm, it is possible that Maheno would have swung back into the channel under its own forward momentum and thus may have avoided a collision.

4.1.4 Other issues affecting swing to starboard

In the absence of cooperation from the GPH, the investigation has not been able to establish what she saw in the water that caused her to swing Maheno to starboard. It is also not reported in her statement to the police. Therefore, the investigation has not been able to conclude whether an initial alteration of course was appropriate in the circumstances.

The investigation has also not been able to determine whether the vessel Mandalay, a comparatively much larger vessel overtaking about 30 metres off, influenced the GPH to swing Maheno further to starboard than she normally would have, to stay out of the way of Mandalay; or whether the wash from Mandalay accentuated Maheno's swing to starboard. However, these influences would in all probability be minimal.

4.1.5 Detection of water ingress

The bilge high level alarm speaker and the bilge pump switches were located on the aft bulkhead of the wheelhouse, behind the helmsman. If the alarm was activated, it would have sounded continuously until it was acknowledged by depressing the 'acknowledge' button.

Neither crew member nor any of the passengers reported hearing the alarm. Had the master or GPH heard the alarm it is reasonable to assume that they would have investigated the cause of the alarm and probably detected the water ingress.

An inspection of the bilge alarm found that the entire unit had been earthed by corrosion probably due to the time it spent in water after the vessel sunk and thus its operation prior to the vessel sinking was not established.

When water seeped into the forward locker, Maheno would have trimmed by the head¹⁴. As the water spread through the rest of the underwater space, Maheno's trim by the head would have been reduced and replaced by body sinkage. If the forward bulkhead had been watertight, water ingress would have been restricted to the forward hatch only, causing Maheno to have a conspicuous trim by the head, a condition which would have in all probability led to detection of water filling the forward hatch.

¹⁴ A term indicating that a vessel's bow was lower in the water than the stern.

In any case, had the ingress of water been contained in the forward locker, it is very unlikely that Maheno would have foundered.

4.2 The vessel

4.2.1 Sub-division

The vessel had previously been given an exemption to the USL Code for watertight sub-division when it was in survey in New South Wales. The reasons for the exemption being approved in Victoria were not recorded in the survey documentation.

Small domestic vessels are fitted with watertight bulkheads to sub-divide the floodable volume of the vessel into smaller watertight compartments such that the vessel will remain afloat with the largest compartment fully flooded. In order to comply with the provisions of the USL Code for watertight sub-division, Maheno should have had a watertight bulkhead at each end of the engine room and another two watertight bulkheads further aft. Maheno was built with three bulkheads separating the underdeck spaces but none were watertight.

4.2.2 Collision bulkhead

In the absence of an application for exemption, Maheno should also have had a collision bulkhead located in a position between 800 mm and 2400 mm from the stem post, measured at the waterline, as required by the USL Code. In this incident however, the lack of a collision bulkhead may not have been a factor as the damaged section of the hull planking was from 1700 mm to 2610 mm from the stem post.

4.2.3 Bilge pumps

The state of disrepair/disuse of the semi-rotary manual pump at the post incident inspection suggests that it could not have been operational 10 months earlier when the operator signed a statutory declaration stating that it had been made operational.

The USL Code required Maheno to have a bilge pumping capacity of not less than 16,500 litres per hour (275 litres per minute). However, because one of the manual pumps was out of service, the available total bilge pumping capacity of Maheno was about 12,000 litres per hour, significantly less than the required minimum. When Maheno's engine stopped the main pump was not available leaving the vessel with a pumping capacity of about 8,000 litres per hour (about 130 litres per minute).

The investigation estimated that between 20 and 24 tonnes of water entered Maheno at the rate of over 300 litres per minute from the time of the collision with the under water object until it foundered. Therefore, because the available pumping capacity was less than the intake of water, Maheno could not have stayed afloat without external assistance.

Incidental to this issue, the investigation noted that MSV permitted Maheno to have two manual pumps to comply with the legislated total pumping capacity and still operate with two crew members. If for some reason all the pumps needed to be operated, the two crew members would be required to operate the two manual pumps leaving no crew member to oversee the other aspects of vessel and passenger safety.

4.2.4 Vessel handling characteristics

Maheno was fitted with an unbalanced rudder making the vessel very sensitive to helm movements. Such vessels should be controlled with very small movements of the steering wheel. If the vessel is 'over-steered', it will swing rapidly. An inexperienced helmsman could quite easily lose control of the vessel, as appeared to have happened in this incident.

Additionally, when a vessel with propeller and rudder configuration like Maheno has forward momentum and the engines are put into astern propulsion, the rudder becomes less effective because the flow induced by the propeller is significantly reduced. This probably explains why Maheno continued to head towards the bank despite the GPH turning the wheel.

4.2.5 Safety management plan

The evidence indicates that the operator of Maheno did not provide any guidelines or instruction to the master and crew regarding operating procedures and safety requirements. Had a safety management plan been prepared for the vessel it may have assisted the master's and the GPH's awareness of the procedures to follow when handing over the helm, especially to an unqualified or inexperienced crew member, as well as the actions to take following a collision/grounding/flooding.

Currently there is no legislated requirement for providing training to a GPH. It is left to the operator of a vessel to determine the level of training to be imparted to a GPH. Having a safety management plan assists crew with procedures to be taken during the operation of a vessel and provides a basis for their training in routine vessel operations and emergency procedures.

4.3 Emergency management

4.3.1 Master, Maheno

Following the engine stopping, the master requested portable bilge pumps and arranged for the transfer of passengers to another vessel. In his evidence, the master stated that his only thoughts were to pump out the water and that he had not considered that Maheno could be in danger of sinking.

In an emergency situation, it is not unusual for single minded intent to exclude all other probabilities or solutions and may explain why the master refused offers of a tow, did not make a full appraisal of the condition of the vessel and therefore did not request further assistance from the RCC, other vessels or harbour control.

The master was seen to be frequently moving between the engine room and answering radio calls in the wheelhouse as well as on his mobile phone. This distraction may account for him being unable to carry out an otherwise routine job of priming the portable pumps or to notice that one of the pumps still had the screw cap fixed to the discharge end.

4.3.2 Disembarkation of passengers

The evacuation of passengers from Maheno to Nepean was organised by the respective masters. It was carried out without the passengers having to enter the water and without injury. The decision not to don life jackets was reasonable, otherwise

there would have been a delay whilst passengers donned their life jackets and there was the possibility of the lifejackets interfering with passenger egress through Maheno's aft door and when stepping over the gunwale from one vessel to the other.

4.3.3 Assistance provided

In accordance with the EMMV, the control agency in this incident was the water police and PoMC was the support agency. A number of other vessels stood by to assist.

After checking with the master of Maheno that he did not require assistance, the water police departed the scene to collect an additional pump.

The actions of the master of Gabo to provide regular updates to RCC and harbour control and in advising the Maheno crew to abandon the vessel were not only timely but may have assisted in the crew not being injured.

4.3.4 Radio communications

At no stage during the emergency did the master of Maheno issue a distress or urgency call. Possibly as a result radio communications did not comply with normal radio protocol.

Emergency communications continued mainly on VHF channel 12, which was also being used for normal radio traffic. The recordings indicate that channel 12 was overused, at times causing incomprehensible noise over the air waves. On a number of occasions harbour control and vessels privately transferred to VHF channel 68, which was not being recorded.

In an emergency and after a distress or urgency signal, the vessel in danger controls radio traffic unless it is incapable of doing so or hands over control to another station. In this incident, had the master of the Maheno declared an emergency then it is probable that radio communications may have been better controlled with either the RCC, Harbour Control or an attending vessel taking control of communications.

4.4 Regulatory system

4.4.1 Mutual recognition

Maheno arrived in Melbourne with a valid certificate of survey issued by NSW. The NSCV guidance manual for mutual recognition suggests that the Authority in one State should recognise the certificate of survey issued by another State at face value, without investigating the processes leading to the issue of the certificate. This may explain why MSV did not request a general arrangement plan for the vessel, accepted Maheno's bilge pumping system and overlooked the requirement of a collision bulkhead, whilst retaining the existing exemption and proviso to one compartment sub-division.

The guidelines also suggest that the reasons for any operating limitations or conditions noted on a certificate of survey must be recorded and maintained.

While the intent of the guidelines is to ease the administrative process for vessels transferring and operating inter-State, the guidelines do not safe-guard against a decision made by one jurisdiction being accepted by another jurisdiction without

conducting its own risk assessment. Therefore, it may therefore be necessary for the receiving jurisdiction to undertake its own survey of the vessel.

4.4.2 Compliance with survey conditions

MSV inspects vessels between surveys on a random basis to verify that the vessel is being operated and maintained in accordance with its certificate of survey. However, they do not have a specific process to ensure compliance with requirements from initial survey inspections. If such a process were in place MSV would have found that Maheno had not repaired its second manual pump and would likely have become aware that the safety management plan had not been submitted by the due date.

5. CONCLUSIONS

5.1 Findings

1. Maheno was appropriately manned and the master was appropriately qualified.
2. A GPH in Victoria is not required to have any formal training or qualification.
3. Maheno was found to meet the provisions of the USL Code with regard to vessel construction for frames, stringers, floors and planking.
4. Maheno did not have a collision bulkhead and lacked watertight sub-division.
5. At the time of the collision the navigational, steering and engine equipment was operating normally.
6. Maheno did not have a safety management plan.
7. The master of Maheno did not confirm that the GPH was proficient in steering the vessel prior to leaving the wheelhouse.
8. The GPH was not experienced in steering Maheno.
9. Maheno's bilge pumping capacity did not comply with the USL Code minimum standards.
10. The evacuation of passengers from Maheno to Nepean was conducted without compromising their safety.
11. The master of Maheno did not declare an emergency.
12. It is unlikely that Maheno would have foundered had it complied with one compartment sub-division.

5.2 Contributing Factors

1. Maheno was navigated too close to the outer edge of the channel to allow adequate water to manoeuvre to starboard.
2. The GPH oversteered the vessel when turning it to starboard.
3. Maheno came in heavy contact with an underwater object outside the normal shipping channel, thereby damaging the hull planking.
4. Initial inspection by Maheno's crew did not detect the damage and follow-up inspections were not carried out.
5. The bilge alarm did not activate or was not heard by any person on board Maheno.
6. The lack of watertight bulkheads allowed the water to progressively flood the vessel.

-
7. The bilge pumping capacity of Maheno was inadequate to stop the vessel foundering.

6. SAFETY ACTIONS

6.1 Safety Actions taken since the Event

1. Marine Safety Victoria is currently reviewing vessels that do not comply with the USL Code requirements for one compartment sub-division with the intent that vessels must either comply or present a safety case why such compliance would be impractical or unreasonable.
2. Marine Safety Victoria is in the process of developing a Standard Operating Procedure (SOP) to address equivalent solutions and exemptions to one compartment sub-division.
3. Marine Safety Victoria is currently undertaking an audit of the safety management plans of passenger vessels operating on the River Yarra.

6.2 Recommended Safety Actions (RSA)

Issue 1

Having a safety management plan could have assisted awareness of the requirements when handing over the steering, the special characteristics of the vessel and the procedures to follow after grounding/flooding/collision.

Nepean Cruises has closed down but this issue is relevant to all other passenger vessels operating in Victoria. Therefore the investigation makes this recommendation to Marine Safety Victoria.

RSA 20080040

That Marine Safety Victoria ensures vessels' safety management plans contain instructions/guidelines to masters and crew regarding crew training in routine navigational and engineering duties and emergency procedures, the operational parameters of navigational systems and any special characteristics of the vessel.

Issue 2

Marine Safety Victoria does not have procedures to verify whether vessels comply with the conditions specified on the certificate of survey, by the due date specified on that certificate.

RSA 20080041

That Marine Safety Victoria implements a system for verifying whether conditions on a certificate of survey and initial survey requirements are complied with by the due date.

Issue 3

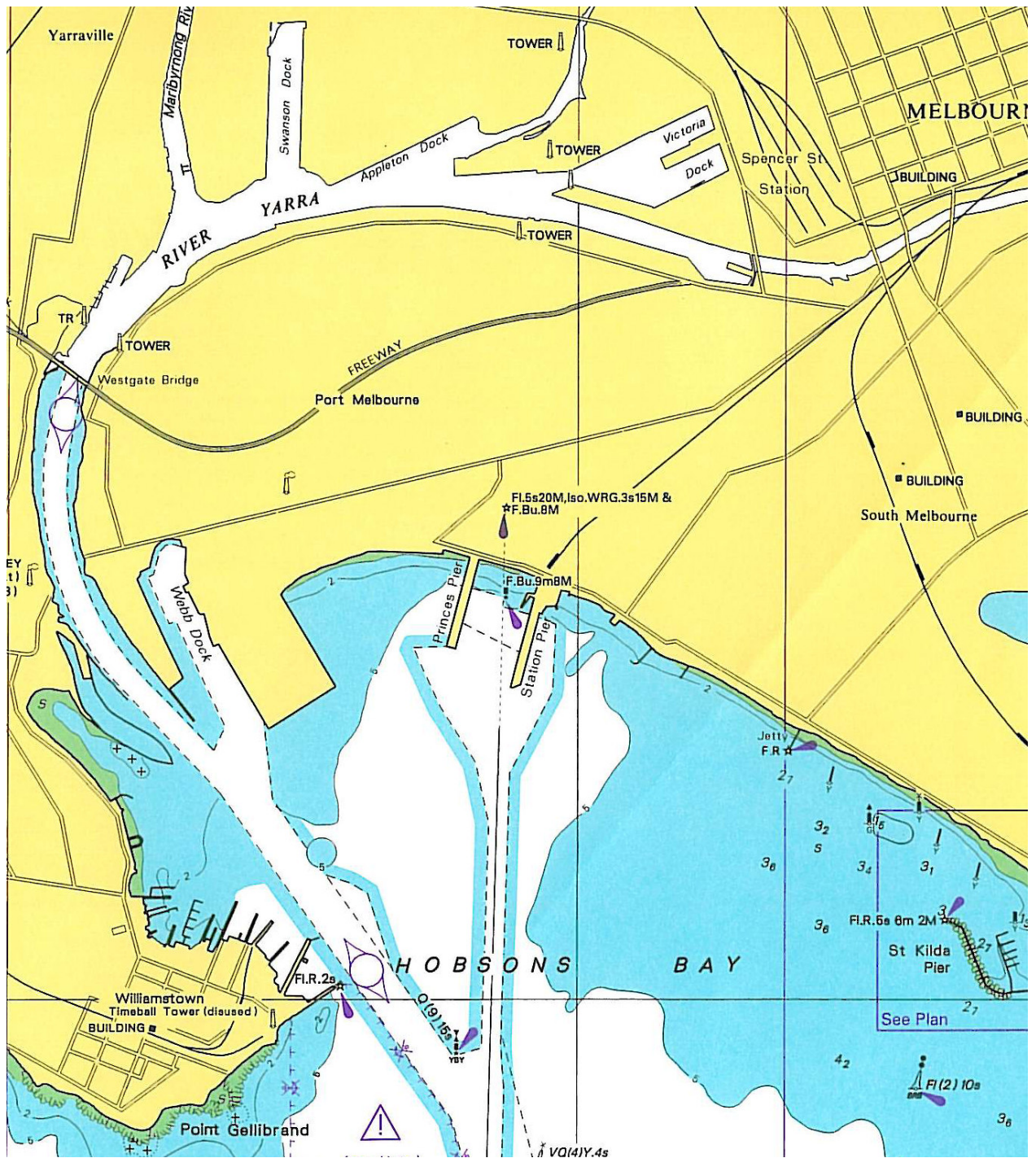
During the incident the master of Maheno could have made better use of resources available on the scene, a number of vessels stood by but were not advised how they could assist and radio protocol was not observed. It was also noted that specific emergency exercises involving a small vessel sinking have not been carried out.

RSA 20080042

That Victoria Police, in conjunction with other agencies/waterway managers, considers conducting exercises with River Yarra small vessels operators to improve preparedness and response to emergencies.

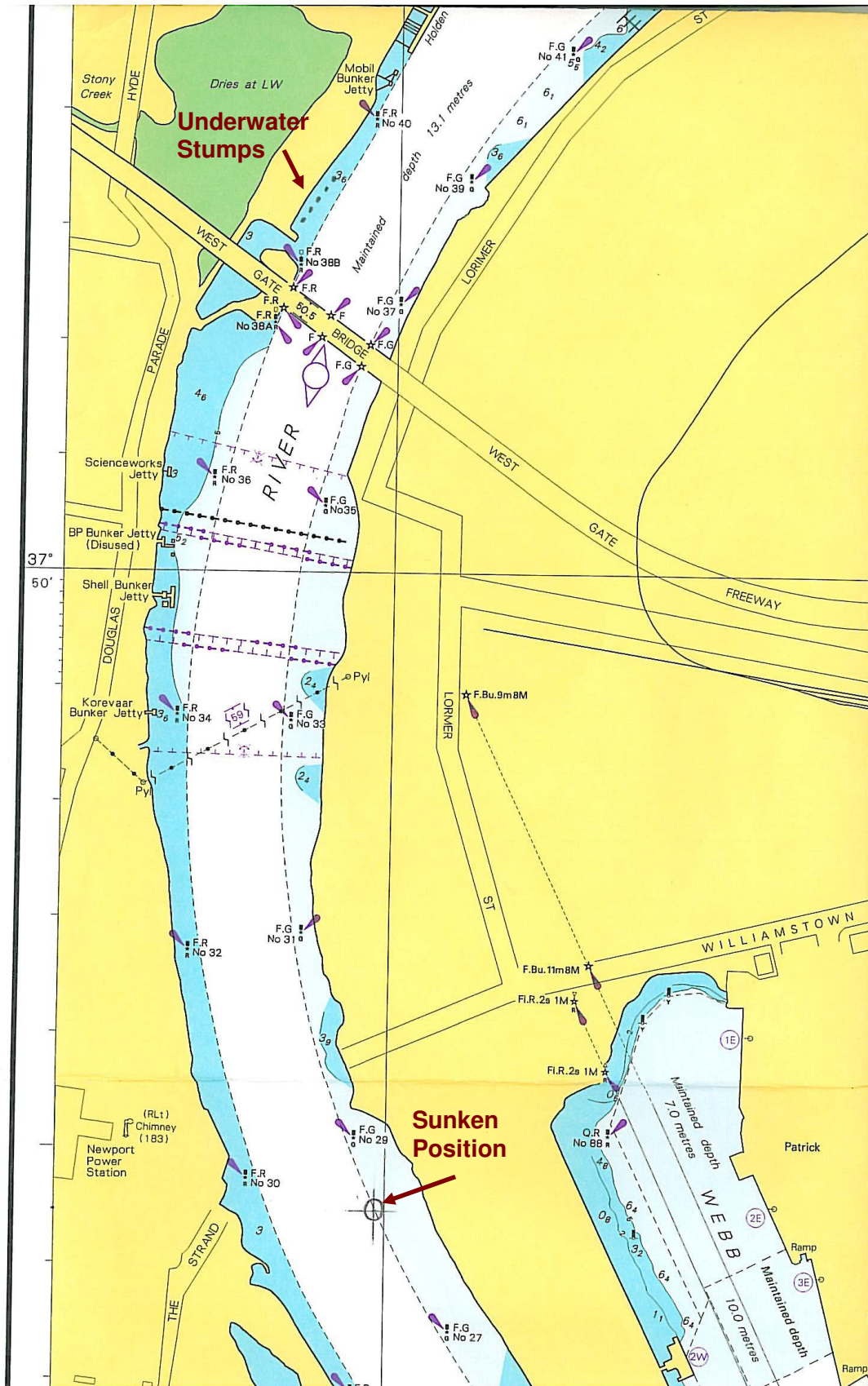
7. APPENDIXES

Appendix A River Yarra



Appendix B

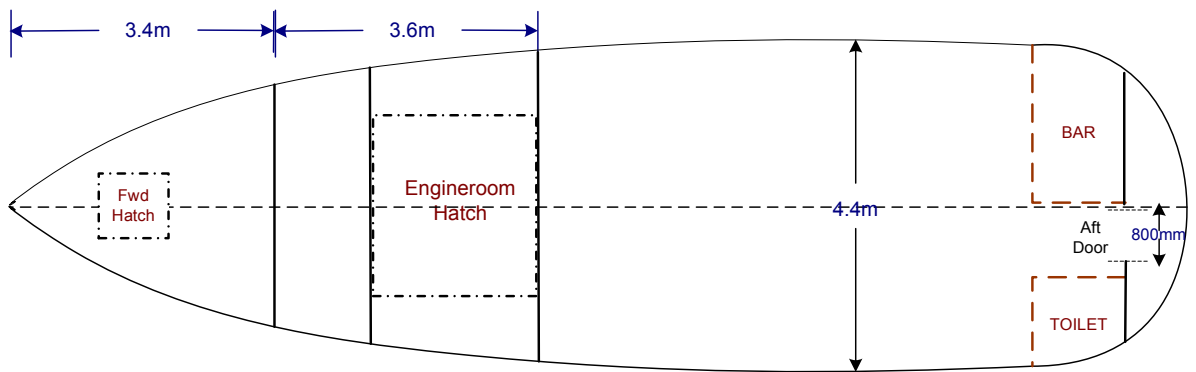
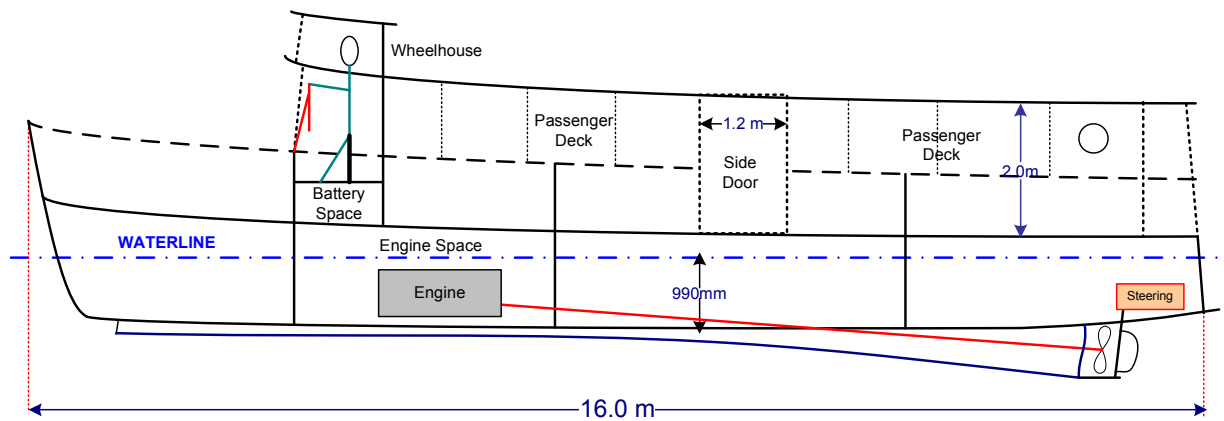
River Yarra beacons 27 to 41



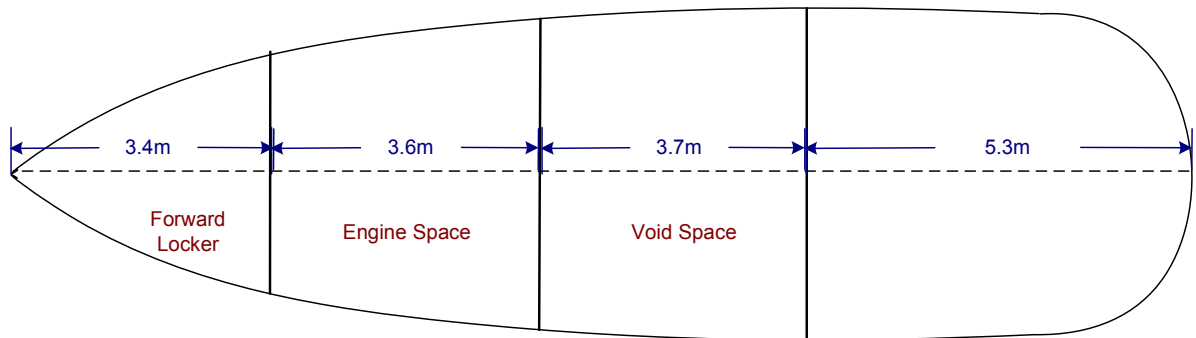
Appendix C Maheno Ship Particulars

Name	MAHENO	
Home Port	Melbourne	
ID Mark	MSV 11188	
Year of Build	1922	
Construction	Timber	
Vessel Type	Passenger Charter	
Vessel Class	1 E	
Operator	Nepean Cruises	
Passengers	49 (maximum)	
Crew	2	
Length	16.00 metres	
Breadth	4.40 metres	
Depth	1.30 metres	
Maximum Draught	0.990 metres	
Engine	1 x Gardner 5LW20 5 Cylinder Diesel 41kW at 1,500 RPM	
Speed	8 knots	
Certificate of Survey	Issued	16/02/2007
	Expiry	16/02/2008
Survey Authority	Marine Safety Victoria	

Appendix D Maheno sketch plan



Passenger Deck



Under Deck

Not to Scale
All Dimensions Approximate

Appendix E USL Code Exemptions and Equivalents

Section 1 Part 4 - General

8. Exemptions and Equivalents

- 8.1 The Authority may, subject to the principles embodied in these Uniform Requirements, exempt a vessel, or vessels included in a specified class of vessel, from the application of any of the provisions of these Uniform Requirements to the extent that the Authority is satisfied that compliance with such provision or provisions is unreasonable or impracticable in relation to that vessel or those vessels.
- 8.2 Where these Uniform Requirements provide that a particular fitting, material, appliance or apparatus, or type thereof, shall be fitted or carried in a vessel, or that any particular provision shall be made, the Authority may allow any other fitting, material, appliance or apparatus, or type thereof, to be fitted or carried, or any other provision to be made to that vessel, if it is satisfied by trial thereof, or otherwise, that such fitting, material, appliance or apparatus, or type thereof, or provision, is at least as effective as that required by these Uniform Requirements.
- 8.3 The Authority will exercise its power under this clause only after receipt of a written application from the owner of the vessel, or the owner of a vessel in the specified class of vessel, which sets out the grounds of the application and which is supported by such evidence as the Authority may, at or after the time of application, require in order to enable it adequately to investigate the application.
- 8.4 The Authority may grant an exemption or make an allowance under this clause upon such conditions as it thinks fit.
- 8.5 Upon the granting of an exemption or making of an allowance under this clause the Authority will, to the extent that it considers necessary or desirable in the interest of uniformity, furnish to each of the other Authorities particulars of the application and supporting evidence provided by the owner and of any tests or trials made by the Authority and a copy of the instrument of exemption or allowance.

Appendix F NMSC Guidance Manual

Extract from the Administrative Protocol for The Mutual Recognition of Vessel Certificates of Survey

BACKGROUND

Although the Inter Government Agreement requires NMSC to develop model legislation for mutual recognition, NMSC has agreed that while the goal of consistent legislation is to be pursued, it may take some time to achieve. In the interim, however, administrative relief for industry members presently affected by obstacles to mutual recognition is to be implemented from 1 September 1998.

POLICY

The following policy statements have been endorsed by all participating jurisdictions:

- the purpose of mutual recognition is to allow vessels to move between States and the Northern Territory, and to operate;
- certificate of survey issued by an administration in accordance with the Uniform Shipping Laws (USL) Code shall be recognised according to its purpose;
- local safety and pollution control arrangements should not impact on mutual recognition but may be an additional requirement on vessels; and
- consistent with this, departures from the USL Code representing low risks to safety are not to be permitted to be obstacles to mutual recognition, and a consistent risk management approach focussed on safety and pollution prevention outcomes is desirable.
- an application for a State or Northern Territory certificate of survey to be recognised by the Commonwealth will be considered on a case by case basis in accordance with Australian Maritime Safety Authority policy.

PRINCIPLES TO APPLY TO MUTUAL RECOGNITION OF CURRENT CERTIFICATES OF SURVEY

NMSC has agreed that the following principles apply to the mutual recognition of current certificates of survey:

1. Recognition is to be based upon the requirements of the USL Code.
2. While the completeness with which administrations have called up the USL Code varies, in general these differences do not pose insuperable obstacles to mutual recognition provided the USL Code is used as the standard document.
3. Mutual recognition is to be facilitated by an agreed format of survey documentation that details operational limits, any variations from the USL Code, and any special conditions. These are to be referenced to the USL Code in its standard format as opposed to the way in which particular States/Territory might have called up any provision.
4. A certificate of survey issued by and under the specific authority of an administration in accordance with the USL Code shall be recognised at face value without inquiry about the administration's processes leading to, or persons involved in, its issue.
5. When a vessel, to which this policy and associated administrative process applies, is identified by a receiving administration as having a deficiency that has major safety implications, the deficiency will be discussed and, where possible, resolved with the original administration whilst keeping the owner of the vessel notified of the situation.

PART 2 - ADMINISTRATIVE PROCESSES PRINCIPLES

Recognition of Certificates of Survey

1. Where an owner decides to operate a vessel out of a State or Territory, other than the jurisdiction in which the vessel's certificate of survey was issued, the certificate of survey will be recognised by the receiving administration provided that all the following principles apply:
 - a. the vessel has been assessed as complying with the USL Code, and any departures from the USL Code and operating limitations are documented on the certificate of survey;
 - b. the vessel has a valid certificate of survey issued by a State or Territory marine safety agency;
 - c. the owner or master of a vessel notifies the receiving administration of the presence of the vessel prior to commercial operations, and provides certified copies of the vessel's certificate of survey; and
 - d. the proposed commercial operation of the vessel, and the area in which it is to operate, is compatible with the plying limits as provided in the USL Code for that class of vessel, and conditions shown on the certificate of survey.
2. The receiving administration will not go behind the certificate of survey issued by another administration to investigate the process or persons involved in its issue. Additional operating conditions may, however, be imposed to address local safety, crewing and pollution issues.
3. The receiving administration may not allow a vessel to operate, even though it has a current certificate of survey, if the vessel is considered to be unseaworthy.

Appendix G Extract of radio recording

Following is an extract of communications obtained from harbour control's electro-data voice recorder:

HC = Harbour Control

Time	VHF Channel	From	To	Extracts of Communication
1758	74	Maheno	HC	Maheno entered PoMC waters under the Bolte Bridge with 25 persons on board.
1927	12	Maheno	HC	Maheno requested and obtained permission to enter Swanson Dock.
1945	74	Mandalay	Maheno	Maheno did not reply to Mandalay's call.
2011	12	Mandalay	Maheno	Mandalay called Maheno and requested shift to Ch 68.
2018	12	Louisiana	Maheno	No reply from Maheno.
2020	12	Maheno	HC	Maheno reported it had engine trouble, its position and that there was no emergency.
2020	12	Privateer	Maheno	Garbled call.
2022	74			Garbled conversation between Yarra Duchess, Louisiana, Nepean and Maheno, all talking at the same time.
2028	12	HC	Maheno	Maheno did not answer. Louisiana advised HC that Maheno master was busy below decks. Harbour Control requested Louisiana to shift to Ch 68.
2030	12	Nepean	HC	Nepean requested and obtained permission to transfer passengers from Maheno.
2131	12	HC	Nepean	Request shift to Ch 68 – request repeated at 2132.
2034	12	Privateer	HC	Request to shift to Ch 68.
2038	12	Maheno	HC	Maheno advised that all passengers had disembarked; vessel may have sprung a plank and was taking on water; requested a tow to a safe point.

2040	74	Magic	Sea Melbourne	Vessels discussed they would standby but did not know what Maheno wanted.
2046	12	HC	Maheno	HC requested status, Maheno replied they could not get the pumps to work.
2046	12	Maheno	Gabo	Request to shift to Ch 68.
2048	12	Maheno	All Ships	The master advised all ships that he would be away from the radios for some time.
2052	12	Gabo	Midnight Blue	Gabo advised Midnight Blue to take charge and push Maheno further up the bank.
2057	12	Gabo	Midnight Blue	Discussed Maheno was going down very fast, they should remove people from the accommodation.
2058	12	Gabo	Maheno	Gabo advised Maheno master to abandon.
2059	12	Gabo	HC	Gabo advised HC that Maheno crew disembarked onto Midnight Blue and that Gabo would try to push Maheno's stern away from the channel.
2100	12	Gabo	HC	Maheno has sunk on the edge of the tow line before Gabo could reach it.

Appendix H Sequence of Events

- 1630 Master and GPH arrive on Maheno.
- 1700 Passengers commence boarding Maheno.
- 1730 Maheno departs Docklands destined for Williamstown (speed about six knots).
- 1758 Maheno passes under Bolte Bridge and reports to harbour control on entering PoMC waters.
- 1815 Maheno arrives at Williamstown, turns around and returns upstream.
- 1923 Louisiana departs its berth at Pier 35 and proceeds upstream.
- 1927 Maheno enters Swanson Dock.
- 1940 Maheno exits Swanson Dock and proceeds downstream.
- 1941 Mandalay passes under Bolte Bridge and enters PoMC waters.
- 1942 Master calls GPH to wheelhouse.
- 1943 Nepean passes under Bolte Bridge and enters PoMC waters.
- 1944 GPH takes over steering and master goes to toilet.
- 1945 Mandalay calls Maheno to advise overtaking – no reply from Maheno.
- 1947 (approximate time) Maheno has a collision. Passenger on Mandalay witnesses Maheno veering to starboard. Master returns to wheelhouse.
- 1955 Maheno resumes voyage. Mandalay observes Maheno resume voyage.
- 2011 Mandalay calls Maheno to confirm if “everything was alright”.
- 2015 Maheno is at beacon 28 and decides to turn back and head to wharf.
- 2017 Mandalay again calls Maheno to confirm if “everything was alright”.
- 2018 Louisiana calls Maheno to confirm if “everything was alright”. Maheno engine stalls.
- 2019 Louisiana turns around and follows Maheno.
- 2020 Maheno informs owner of Nepean Cruises. Maheno then calls harbour control to report engine failure.
- 2021 Owner of Nepean cruises calls master of Nepean to provide assistance.
- 2022 Maheno drops anchor between beacons 27 and 29.
- 2024 Louisiana passes a portable bilge pump to Maheno.
- 2027 Nepean passes a portable bilge pump to Maheno.
- 2030 Nepean informs harbour control that passengers will be disembarked from Maheno.
- 2032 Harbour control requests Gabo and Midnight Blue to attend scene.
- 2033 Passenger evacuation commences.
- 2034 Water police vessel arrives at scene.
- 2038 Passenger evacuation completed.
- 2045 Gabo and Midnight Blue arrive at the scene.

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- 2046 Water police vessel departs to Williamstown to bring additional portable pumps.
- 2052 Gabo advises Midnight Blue to “take charge of the situation and push Maheno further inshore”.
- 2054 Midnight Blue advises Maheno cannot be pushed further inshore as it has its anchor down.
- 2057 Midnight Blue and Gabo discuss “Maheno is going down pretty fast” and that the crew should abandon Maheno.
- 2058 Gabo advises master of Maheno to abandon the vessel.
- 2059 Master and GPH abandon Maheno onto Midnight Blue. Water police vessel arrives.
- 2100 Gabo attempts to push Maheno further inshore. At that moment Maheno founders and sinks.