BMT SeaTech

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Responses to Written Comments on BMT Phase 2 Report

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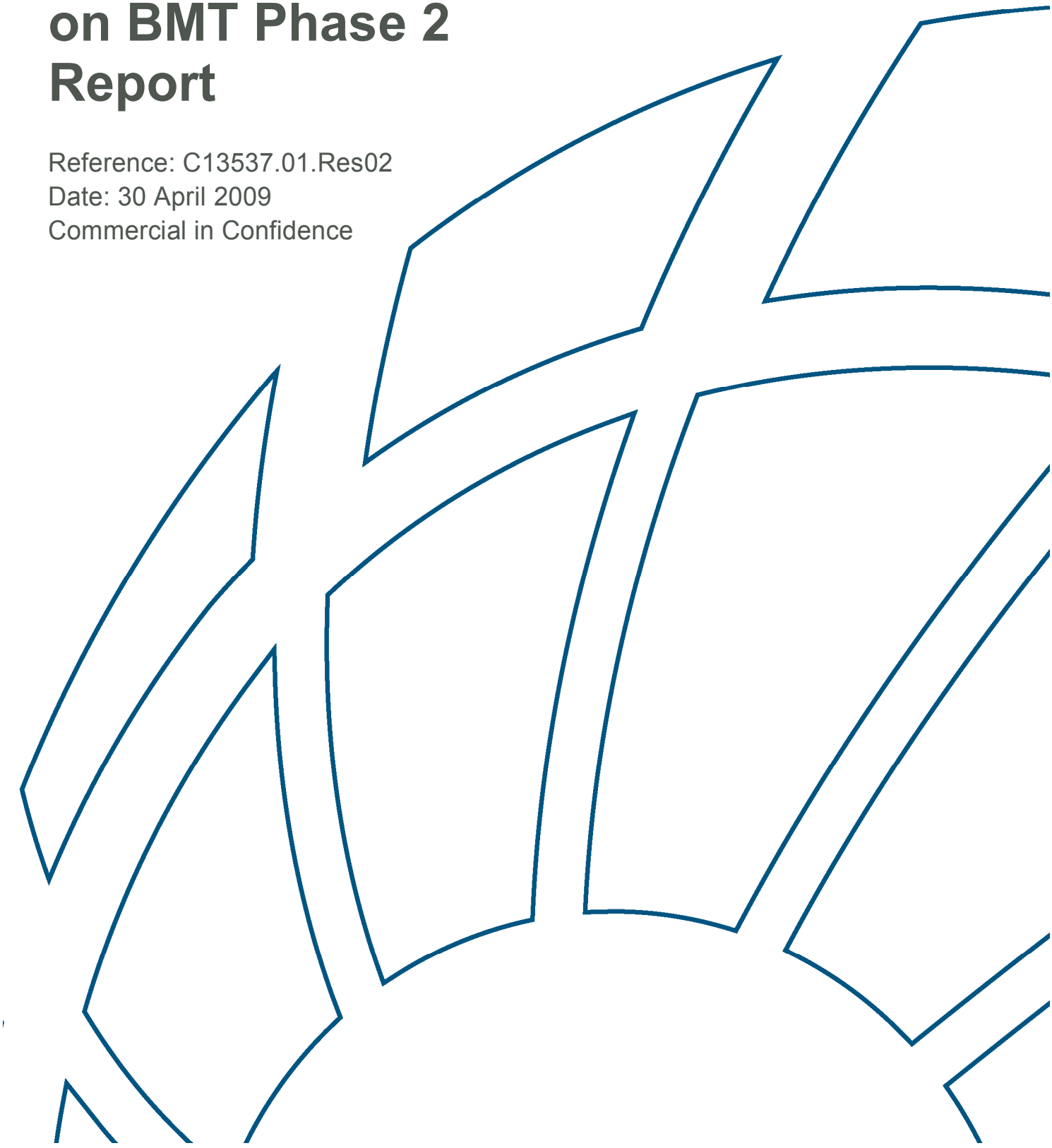

RESPONSES TO WRITTEN COMMENTS ON BMT PHASE 2 REPORT

1. Introduction

At a meeting of stakeholders held in Lymington on 2 April 2009, the BMT report on Phase 2 of their study was discussed. The minutes of the meeting describe the discussions which took place, the comments on the report from the Royal Lymington Yacht Club (RLymYC) being used as a template for stakeholder comments in general. Accordingly the comments of the RLymYC were discussed in some detail, with other stakeholders adding their own comments where appropriate.

In spite of the extent of the discussion, some stakeholders' written comments could not be accommodated due to time constraints. This note covers those written stakeholder comments not discussed at the meeting; any further discussion of issues of concern will take place in another forum.

2. Royal Lymington Yacht Club Comments

Most of the points raised in the RLymYC commentary, dated 25 March 2009, were covered in the stakeholders' meeting, particularly those in pages 3 to 15 of the document, but those that were not are dealt with here. These relate to the comments from page 16 of the RLymYC document and use the paragraph numbering system of the commentary.

Para 2 – Aims and Scope

Noted.

Para 5 - The Phase 2 Trials

Para 5.4.4 Ship Trial Condition

The deadweight shown does total 271.5 tonnes as stated in the commentary; the error in the report was that the assumption of the fuel load should have been shown as 28 tonnes (the value used for the deadweight calculations), not 56. This gives a total of 243.5 tonnes, and this was rounded to 250. The report will be adjusted accordingly.

Para 5.5.2 Tidal Streams

Tidal streams were measured as described in the report and, at certain states of the ebb spring tide the velocity consistently reached a value around 1.2 knots for a short period of time. Dropping the tolerance on the speed limit to 1 knot would result in repeated ground speed breaches for outbound vessels making the correct speed through the water at these times. At present BMT sees no justification for changing its recommendation regarding speed limit tolerance, but will consider the subject again at the time of the first review. (See below for further discussion on this topic)

In passing it may be mentioned that it has been assumed by stakeholders that the W-class ferries have a through-water speed measurement read-out displayed on the bridge; while it is true that they have a water speed log, it is affected by

thruster wake and was either not displaying at all or not displaying believable through-water speeds at any time when the BMT team was on the bridge.

Para 6 – Results Obtained

Para 6.1.2 Ferry Control

Noted

Para 6.1.3 Ferry Behaviour on the River

The Club's interpretation of the recommendations for thruster usage are correct and the report will be modified to incorporate the results from the strong wind trial of 3 March 2009, carried out after the draft report was completed. It is agreed that strong head winds reduce the speed of the W-class, as discussed in pages 39 and 40 in the Phase 2 report and observed in the strong wind trial.

Use of drift angles to counter wind and tide should not necessarily be taken as an indication of poor control. As Captain Baker said at the stakeholders' meeting, if the river is empty, use of drift angles is appropriate and uses less power than the alternative of controlling the sideslip entirely by thruster power alone. He made it clear that, in traffic, the thrusters would be used to reduce or eliminate drift angle. Due to a lack of power and poor thruster location on the hull, the C-class were unable to eliminate drift angles in strong winds and used much of the available navigable space as a consequence; this should not be the case with the W-class and observations, both on-board and at river level, confirm that W-class drift angles are much smaller than those of the C-class in the same conditions. In the final version of the report, some further discussion on this topic will be included.

In the trials conducted to date in strong winds, the BMT team is of the opinion that control is quite satisfactory with the aft thruster set to the "idle"/"slow" or "intermediate"/"half" settings (depending on wind speed) up to the "30 knot/gusting 42" condition for winds from the south-west or south. It is agreed that confirmation of this in strong winds from other directions is needed.

Regarding stop-and-hold manoeuvres in the river, it should be stressed that a key BMT recommendation is that waiting in the river is to be the exception rather than the rule. It is accepted that holding station in the river in strong winds would probably require the use of the "operational"/"full" setting on both thrusters and that this would be unacceptable.

To confirm a statement made at the stakeholders' meeting, the W-class encountered strong tail winds in the Short Reach Lay-by area during the strong wind trials and was controllable, although steps had to be taken to anticipate the increase in speed caused by the wind and adjust the thrusters accordingly. Run 88 is mentioned as giving rise to concern about control in a following wind on the approach to the Cocked Hat bend inbound. It should be stressed that this run was part of a learning sequence and, on the next inbound run, run 90, a solution had been found, control was satisfactory and the track round the bend was far superior to that of run 88.

Para 6.1.4 Effect of Ship Speed on Wind and Current Effects

It should be noted that no increase in speed limits on the river was proposed by BMT, and this will be made clear in the final version of the report.

Para 6.1.6 Passing

The act of W/W class passing has been observed in a variety of conditions and has always been straightforward and safe. However, the issue of a potentially increased wind shadow during passing, whether with C- or W-class vessels, demonstrated in the report, will be studied further in proposed observations in conditions of high river traffic density.

Para 6.1.7 Overall Impressions on Ferry Behaviour

BMT stands by the second bullet in the commentary, but will re-visit this issue after observations in higher traffic densities. However, it should be mentioned that, when traffic density is high, the speed of the ferries would be expected to be dictated by the traffic conditions and probably below the speed limit. This would ease avoidance, but increase ferry occupancy of the river.

Para 6.2 - Wash and Drawdown

Para 6.2.1 Wash

The "operational"/"intermediate" thruster combination is a tolerable setting, bearing in mind it will be used only in those wind conditions when natural conditions on the river will be more challenging. It is agreed that when the "operational" setting on the aft thruster is used, thruster slipstream effects are intolerable; that is why the BMT recommendations do not include an "operational" setting on the aft thruster.

Regarding the extent of wake to be avoided, BMT did in fact give pointers as to the extent of the area to be avoided; attention is drawn to the second paragraph on page 56 of the Phase 2 report where it is recommended that small craft should avoid an area of the wake from the transom to about a ship's length astern, while in Section 7.2.10 the width of the wake is given (penultimate bullet), as is wake avoidance advice.

The "Sweya" incident occurred outside of the harbour area and after the draft report was ready for issue. It is understood from the report that a mechanical problem with the engines contributed to the incident.

Para 6.2.2 Drawdown

The incidents listed in Appendix 2 of the commentary have been read and in none of them can be found behaviour of small craft on the move which can be ascribed unequivocally to drawdown. Movement of moored boats due to interaction certainly stems from the same hydrodynamic cause as drawdown, but this is covered in the BMT report, as noted in the commentary. It would appear that the effects that have been attributed to drawdown in the commentary Appendix are in fact due to thruster slipstream effects in the wake, and/or wind shadow.

Para 6.3 - Wind Shadow

It is the case that wind shadow effects are greater with the W-class than the C-class, but from observations of significant numbers of sailing vessels passing the W-class ferries on the river during the trials period, the inconvenience can be dealt with satisfactorily in most cases. For the particular case of the Wednesday Junior Sailing activities, it is understood that when the ferries pass the sailing area, the children's boats are escorted safely to the sides of Horn Reach until the

ferry has passed. In such circumstances it is difficult to see how they could suffer from wind shadow effects.

The effect of wind shadow when there is a high traffic density still has to be observed and it is planned to do this over the next sailing season.

Para 6.4 - River Space Availability with C- and W-class

As discussed above there is no reason to suppose that the W-class will drift more in strong winds than the C-class; in fact the opposite will probably be the case due to the thrust and control available.

It may be noted that some time was taken in the study (and discussed in the report) to find ways of increasing space for small craft in the river, and Sections 6.1.6, 6.4 and 6.6 refer. The recommendation for the ferries to keep on the leading line transits was made with the goal of increasing space in the river for small boats.

Para 6.6 - Effects of Tidal State

As mentioned above, it did not prove possible to obtain direct readings of speed through the water from the W-class vessels.

BMT stands by its advice in the paragraph following the bullet points on page 75; it seems to us to be common-sense advice, not a way of penalising leisure users.

Para 6.8 - Effects of Ferry Speed

Para 6.8.1 Ferry Speed

It is well-known that increasing forward speed reduces drift angle; it is not necessarily a sign of loss of control, although on the C-class it was a sign of lack of power. The W-class is perfectly capable of safe navigation within the bye-laws in strong winds and tides and will do so rather better than the C-class. However, it is recognised that masters must first achieve further experience and helm time in testing conditions.

The safe operating profile has been set to ensure good control and track-keeping in stronger winds.

Para 6.8.2 Monitoring and Enforcing Speed on the River

The W-class ferry is not "excused from the damage it may do by referring to damage done by 'wash of vessels smaller than the ferries'". It should be noted that the connection between wash and damage is being made by the Club, not BMT who simply compared the free wave component of wash from the ferries, small craft and natural waves. This is a reasonable comparison to make, and it is for others to draw conclusions about any damage caused; in so doing it is also perfectly reasonable to show that the amplitude of the free wave wash of some small vessels, and natural wave action, is greater than that of the ferries.

Any speed in excess of the statutory speed limit is a breach. Tolerances are set, as for speed limits on the road, to determine the amount, or type, of penalty to be enforced; they are not a means of giving a speed bonus to craft on the river. While the amount of tolerance to set is a matter for LHC, the 2 knot value seems reasonable to BMT, but, as mentioned above, it can be reviewed once the first 6

month period has elapsed. However, it should be remembered that times when the ground speed limit would be breached in the Short Reach Lay-by area is when an outbound ship is making the correct speed through the water, but subject to a following ebb current. Inbound in the same current the ship could be observing the speed limit overground (as seen by the AIS), but exceeding it through the water. In this case, the tolerance is of no help. If there is a valid need to increase speed above the statutory limit (for safety reasons), then LHC Bye-laws cater for this and the ship must enter reasons for the breach in its deck log.

As mentioned above, BMT has seen no evidence that the water speed logs on the W-class display correct values, or any values at all. Ground speed is displayed, however; it has been checked and found correct and is used continually by the bridge team during river passage. It would seem sensible in due course to modify the byelaws to reflect speed over the ground (as opposed to through the water) and to formalise the 4 knot limit above the wave-screen under the byelaws.

The further comments on the Sweya incident are noted, but it is understood from Appendix 2 in the commentary that the ferry had been having engine problems. The nature of these is unknown, but the incident occurred outside the harbour area. It is assumed that Wightlink have undertaken an investigation into the cause.

Para 6.9 - Effects of Traffic

A review specification is being prepared. This will cover activities on the river during the 2009 sailing season.

Para 6.10 - Waiting in the River; Thruster Slipstreams

The wording regarding waiting in the river was chosen to allow for those occasions when waiting is inevitable, such as when standing by someone in the water, engine failure etc. However, BMT is happy to strengthen the recommendation.

Para 6.12 - Behaviour on the River.

The remark about partiality is unnecessary and, without supporting information, unfounded. The Section will remain in the report as it represents the considered views of the BMT team in general and their independent master mariners in particular.

We fail to see the relevance to river safety of speed limit breaches by another class of ferry in the past, at a time before the present speed limits were set and AIS monitoring implemented. We note, however, that no serious incidents were recorded on the river during that period; indeed historic incident records confirm an excellent safety record.

The Club's recommendation that the advisory 4 knot speed limit be monitored is a matter for LHC. Monitoring compliance with the safe operating profile is also a matter for LHC, and, as the profile is related to wind measurements at the RLymYC starting platform, checking on compliance is a straightforward matter for all parties. It is understood that LHC is carrying out this monitoring, in conjunction with the normal speed monitoring with AIS.

Para 6.13 – Other Observations

Wednesday Junior Sailing

The WJS and wind shadow issues have been dealt with above. Questions of time-tabling are the province of Wightlink.

Communication of Intent

Noted; this observation would appear to be addressed to Wightlink, rather than BMT.

Para 7 - Discussion

Para 7.1 – Marine Risk with the C- and W-class Ferries

Whether the BMT statements in relation to wind shadow are "understated", as is the opinion of the Club, remains to be seen and tested during the sailing season. However, BMT has based its views on the direct observation of the wind shadow effects on a large number of sailing boats of different types and design over the trials period and stands by its statement based on the evidence seen to date.

It is agreed, however, that this should be kept under review as the sailing season progresses.

Para 7.2 – Risk Control Measures for the W-class Ferries

Para 7.2.4 – Ferry Passing and Waiting

The points made are noted. The interaction between ferry and racing schedules, including the effect of waiting will be observed in the review process taking place during the 2009 sailing season.

Para 7.2.8 – Communication of Intent

The points made by the Club are noted with interest.

Para 7.3 – Risk Assessment

It is alleged that several of the scenarios in the Risk Assessment show that the river users bear the brunt of the increased risk. This assertion is based on the relative risks before risk control measures are applied and would certainly be true if no further action were to be taken. However, a major point of the exercise is not only to identify relative risk, but to recommend practical risk control measures which, when implemented, reduce the risk to tolerable levels. Figures 81 and 82 (the latter wrongly labelled 83 in the draft report) show that this was achieved with the remaining increased relative risks confined to wind shadow effects and control hand-over on the bridge. After risk control measures are applied, the professional judgement of the BMT master mariners agrees with the overall risk analysis. It should also be noted that all risks are at a very low absolute level, as shown by the analysis of reported incidents in Section 7.1 of the BMT Phase 2 report.

As already noted, it is proposed that wind shadow effects be monitored during the 2009 sailing season and it is understood that Wightlink are addressing the control hand-over problem on the bridge.

Again it must be stressed that, in BMT's opinion, control of the W-class ferries is good and superior to that of the C-class. This was emphasised again in the strong wind trials when the masters were all of the opinion that they were able to maintain control, even though in one case the master was undergoing self-familiarisation in strong winds, conditions which would have been much more difficult in a C-class.

BMT is accused of "second-guessing" the effects of congestion because, it is asserted, such conditions have not been trialled. This is untrue; some idea of congestion was obtained in the trial held on September 28, 2008, the results from which, and observations made, should not simply be ignored. Members of the BMT team have also witnessed C-class operation on peak holiday dates last summer before the arrival of the W-class so do have an awareness of peak travel levels. It is agreed, however, that further observations need to be made in other traffic densities during which the issue of effective river space available to small craft can also be addressed further.

Too low a speed does result in loss of control. This is not at odds with the fact that low speed control of the W-class is very good, especially so in benign conditions. However, in a strong cross wind, maintenance of control at low speed will either require large drift angles or the use of excessive power, not to mention increased occupancy of the river; at higher speeds (but within the speed limit) less power or drift angle magnitude would be required.

It is agreed that ColReg Rule 9 is important in the river, Rules 9(b) and 9(d) being especially relevant to the behaviour of small craft in relation to the ferries. It is therefore contended that it is quite acceptable to suggest that small craft stay out of the main channel if possible.

Regarding use of the "operational" setting on the aft thruster in the river, it must be stressed that nowhere in the safe operating profile is such use allowed; if ever used on the river it must be at the master's discretion and only when to do otherwise would endanger the ship, other users or property.

Regarding risk scenario 15, the lower risk to anyone in the river with the W-class is due to the thruster location, the absence of the dangerous deck overhang of the C-class just above the water, better control, general visibility from the bridge (and with the ramp blind spot covered by someone posted on the "focsle" as expected if someone is in the water) and the shape of the hull at the ends of the ship. Assuming the unlikely event that the ship has not stopped, the shape of the hull at the ends, contrary to assertions made elsewhere, will tend to deflect casualties in the water along the sides of the hull, unless they are hit around their "centre of lateral resistance", as happened in the final MOB trial. The wording of the Risk Register for scenario 15 will therefore remain unchanged.

Bearing in mind that reported MOB incidents are comparatively rare on the river, it is difficult to understand the assertion that there is an "increased probability of a man overboard near a W-class", unless it is an assumption that the greater wind shadow effect is the cause. This wil be observed during the 2009 sailing season, and should be checked in any review process.

The suggestion regarding sound signals to indicate thruster engagement is noted and was discussed at the 2 April stakeholders' meeting. Similar remarks apply with respect to the important point made regarding the awareness of all users of

the ColRegs, and this was also discussed. However, other suggestions as to how all users could be made aware of the ColRegs would be very useful.

3. Lymington Town Sailing Club Comments

Many of the LTSC comments were covered at the 2 April Meeting and in the response to the RLymYC given above. However, some additional points were made by the Club and these are now addressed.

The position of the Club, listed at the head of their document is noted. Regarding the additional safe operating procedures, the BMT study identified where the risk controls are most appropriate, but it may be mentioned that of the 14 risk control measure headings in Section 7.2 of its Phase 2 report, 10 relate in whole, or part, to Wightlink and the W-class ferries. Of those controls remaining, one in particular – that relating to wind shadow – will undoubtedly cause more inconvenience to leisure users, but the magnitude of this inconvenience has still to be proved. Observation and experience of operations on the river during the forthcoming sailing season will help considerably in identifying the magnitude of the effect of wind shadow on river users.

Similar remarks apply to the effects of ferry wake; a deal of effort was expended during the study in making its effects as small as possible and the effect on users of all abilities will become apparent as the sailing season progresses.

The effects of the perceived size of the ferries and any adverse effects on the status of Lymington as an internationally recognised centre of dinghy sailing are matters more for LHC than BMT, but can also be reviewed after the forthcoming sailing season. However, it should be mentioned that these issues have not been found in river incidents reported so far to LHC.

It is not the case that the feedback from the participants in the December sailing trials was not taken into account. It certainly was and excerpts are summarised on pages 65 and 70 of the BMT report.

Regarding the Specific Points raised by LTSC:

- The first point is noted and understood. In spite of no significant problems experienced from the wind shadow in the sailing trials, it would be useful to observe the effects on a wider cross-section of users during the forthcoming sailing season.
- The information on space required by a medium-sized sailing dinghy is most useful and will be borne in mind. The space available when the ferries use the leading lines is discussed in Section 6.1.6 of the BMT report (pages 48 to 50) from which it is seen that, at MLWS, about 23 metres space is made available for a craft with a 2 metre draught on the eastern side of an inbound ferry, but only about 11.5 metres on the western side of an outbound ferry.
- The third and fourth points are noted and provide useful information. A W-class ferry following a sailing craft with a following wind will take its wind and the sailor should be aware that this may happen when the ferry is still some way astern.
- Regarding the fifth point which appears to be about wind shadow as well as available space on the river, Appendix 5 of the Phase 2 report gives some measurements of the loss in wind speed and change in wind direction as two ferries pass.

- The sixth point is a useful observation and will be borne in mind. Presently available information is insufficient to provide the diagram requested.
- Although agreeing that the Lymington River can get crowded and this, together with wind shadow, may cause problems, the wind shadows from large tankers in ballast, or cruise liners are just as inconvenient for sailors in other waters, especially when they become congested with other sailing events. We do not therefore agree that the BMT statement on page 93 of our report is "extremely misleading"
- The point about risk associated with certain combinations of conditions not occurring is well made. It was not the intention to discount the risk, but to acknowledge that the "probability" component of that risk is small.
- We cannot find a statement in the BMT report which recommends changing swinging moorings to fore-and-aft moorings. It is possible that this has been assumed because of a statement in Scenario 9 of the Risk Register; if this is so, the assumption is incorrect. The intention was to remove boats from vulnerable moorings which would create more space for small craft to navigate outside of the channel and is in line with the points made in the Harbour Users Safety Committee meeting of the 1st December. (see also the response to the LHAG point 2 below).
- Regarding interaction effects mentioned in Section 6.5.2 of the report, it is believed that interaction between the moving ferry and small craft may be small, but this can be investigated further during the 2009 sailing season prior to the review.
- Regarding thruster action swamping small boats, the risk is there, but it should be reduced considerably as the masters and crew of the ferries become more proficient in their handling, especially when berthing and unberthing at the terminal. As mentioned above, use of "operational" power on both thrusters should never be used on the river, except when the ferry, other users or property is in danger.
- As mentioned above, the purpose of the report was not to put "the major onus of taking avoiding action" on leisure users. In many cases, leisure users will be able to take avoiding action more quickly than the ferries, and Rule 9(b) of the ColRegs requires them not to impede the ferries. However, the ferries themselves can stop rapidly or reduce speed, if required, to defuse a potentially dangerous situation, and BMT observations suggest that they do so when necessary. The point about speed and course predictability is well made, as is that regarding scheduling.
- The comments on perceived risk are noted. Keeping well clear of the ferries, whether due to perceived risk or prudence, is a good policy; whether more collisions and groundings "are likely" remains to be seen.

Regarding the final three points in the LTSC document:

- We see no reason why the new ferries should use additional power at the expense of the environment; a large amount of time has been spent on determining suitable power levels consistent with weather conditions, and for safe operations without causing excessive disturbance in the river.

- The second point is for LHC to answer, not BMT. However, the recommendations regarding moorings are made on the grounds of safety; it is an issue that has been raised before and is not connected with the arrival on the river of the W-class ferries. In fact it is known that the area in the river where most incidents occur is in the vicinity of the Cocked Hat bend, and that few of these incidents involve ferries. Moored boats swinging in to the navigation channel in this region will increase risk to all users, not just the ferries.
- Additional harbour patrols were recommended to, among other things, police navigation in the river.

On the final point, it is certainly not agreed that the tone of the report is to favour the ferries while other river users are reluctantly tolerated. Such a suggestion is an affront to the independent stance carefully taken by the BMT team throughout.

4. Lymington Harbour Advisory Group Comments

The LHAG paper is clear and to the point. In answer to its key issues:

1. It is agreed that waiting in the river should be the exception rather than the norm; this was recommended in the BMT Phase 1 report and remains a key BMT recommendation. The LHAG recommendation for a no-waiting area is noted.
2. The recommendations regarding moorings are made on the grounds of safety; it is an issue that has been raised before and is not connected with the arrival on the river of the W-class ferries. In fact it is known that the area in the river where most incidents occur is in the vicinity of the Cocked Hat bend, and that few of these incidents involve ferries. Moored boats swinging in to the navigation channel in this region will increase risk to all users, not just the ferries.
3. As mentioned several times above, there was no intention by BMT to increase speed limits. The existing bye-laws and the reporting method mentioned by LHAG are satisfactory in this regard.
4. Noted, but not within the BMT brief.
5. Noted and agreed.
6. Noted and a preliminary proposal has been drafted by BMT.
7. Noted, but not within the BMT brief.

5. Lymington River Association Comments

The Lymington River Association Comments start with a statement of its position that, in its opinion, "the W-class ferries are simply too large to be safely accommodated in the narrow confines of the Lymington River such that leisure users, both experienced and novice, can safely use the river in all conditions."

The Association then goes on to assert that "The BMT Report does nothing to assure us that this opinion is not the case"

The Association then comments on the BMT Conclusions, followed by comments on what they refer to as "significant issues which have been omitted from the Conclusions and need to be included". Many of these points have been alluded to in the comments of the two sailing clubs.

There then follows some comments on the Risk Register, thruster control and the strong wind trials.

These are now considered in turn.

5.1 LRA Opinion

The LRA opinion has been well promulgated in a variety of ways and is well-known. It is no surprise to BMT that their report has done nothing to change that opinion, but they would commend to the LRA the fact that the team, having travelled extensively on the ferries and many times ridden close to them on the river, has shown that, given the right risk control measures, the ferries can operate safely in a range of conditions, ranging from flat calm to strong winds from the south or south west.

The experience gained, and data collected, is showing that, whereas the increase in size of the vessels is agreed, that in itself does not directly lead to a shortfall in safety if the right risk control measures are used. The BMT approach has been to test the safety of the new ferries, rather than make unfounded assertions based on their perceived risk. It is agreed that this testing has not included cases where the traffic density in the river is high (and this is to be remedied), but it remains our belief that collection of factual and unbiased information to inform our opinion is of prime importance in this study. So far this has shown that the main correlation between size and safety lies in the increased windage of the new vessels, increasing the effect of wind shadow; we are aware that historically, no safety-related incidents attributed to wind shadow have been reported on the river in the ten years from 1998 to 2008. (Figure 80 of the draft BMT report refers).

5.2 Comments on BMT Conclusions

Comment 8.1.3 appears to be connected with LRA Comment 3 which discusses the power used by the bow thruster. This will be discussed below in its turn, but suffice it to say here that both the bow and stern thrusters drive the vessel, the majority of the thrust coming from the bow thruster. This form of tractor propulsion is common in other forms of vehicles and vessels, notably cars, lorries, aircraft and tugs. For the W-class, it helps, among other things, to improve directional stability when required (because of the centre-mounted thrusters), something which would not have been possible with the C-class due to their thruster locations on the hull.

Comment 8.1.4: As stated elsewhere in these notes, the speed limits on the river are 6 knots (statutory) and 4 knots (advisory); any speeds above these are in breach of the limit. Tolerances are set for enforcement purposes and, as stated above, BMT can see no reason at present to relax the tolerances; however, they can be included in the 6 month review after the 2009 sailing season is completed. For information, and as the LRA raised the issue, the ACPO enforcement tolerance guidelines on road speed limits is +10% plus 2 mph for a fixed penalty and a more complex guidance for a summons, although the tolerances are not to replace the discretion of a police officer's who has witnessed the breach. Similarly on the river, enforcement and penalties remain at the discretion of the LHC.

Although it is agreed that, on the face of it, increases in kinetic energy of the ship from a 0.5 knot increase over the 4 and 6 knot limits are 25% and 17% respectively, it will also depend on the relative depth of water. Moreover the additional energy will be dissipated only on collision or grounding. However, similar percentage increases would be expected in squat and drawdown.

Comment 8.1.5: Originating from Voith, and courtesy of Wightlink, BMT has in its possession some CFD estimates of flow around a Voith Thruster in deep water in the absence of a hull. These were useful in estimating flow attenuation in the Phase 1 report, but are not helpful in mapping the flow around the hull in shallow water with the thruster running. Although the LRA dismisses the BMT work in this regard as "limited tests", it is wrong for them to imply that flow in the region of the thrusters was not studied in some detail. It was, and a number of tests and observations were carried out with the thrusters operating and the vessel stationary as well as when the ferry was under way. Our observation of what actually happens is that there is no obvious suction from the thruster which would draw a person under the bow. The flow around the hull at river speeds tends to spread round the sides of the hull and, in two of the three MOB dummy tests, the dummy drifted past the forebody without showing the slightest sign of being drawn into the bow thruster. As described in the BMT report, on the run when the dummy was dismembered, it was initially hit in such a way that it was held on to the bow, just at the waterline, by the stagnation pressure there; it was not drawn in to the thruster. Only when the ferry began to turn was the dummy released from this pressure, after which it was swept in to one or other of the thrusters, *as the ship was turning*. This was, of course, serious, but ultimate contact with a thruster in this case was due to the behaviour of the ship, rather than any inherent feature of the flow around the hull in normal steaming. The likelihood of such an event, bearing in mind the training of the masters and the precepts of safe operations on the river, was dealt with in the Phase 2 report.

In answer to the LRA assertion that some of the bow thruster slipstream "exits from the side of the hull as a function of water depth", (they claim "about 1/3 aft from the ferry bow"), observations have not shown any evidence that this happens in normal passage along the river, unless the bow thruster is used for steering, when slipstream flow exits in the vicinity of the thruster location. The relevance of this to safety and the point LRA appear to be making, is presumably that nearby leisure vessels will be affected by such flows. This is true, but in reality most steering is done using the stern thruster, as explained in the BMT report, with the bow thruster used occasionally for adjustments. However, it should be mentioned that, if, as advocated several times by LRA and others, the alternative to using drift angles to counter cross winds and currents is to use only thrust vectors, then slipstream efflux from the side of the hull will be more frequent and stronger. It would have been the same on the C-class ferries had they had enough power, but, as they did not, they had to resort to the use of large drift angles to counter cross winds and currents.

We take issue with the LRA's comment that BMT did not take full account of thruster flows. It is not valid to suggest that some sort of computer model of flow is superior to observations of thruster and hull flow effects in the real world. We repeat that no evidence has been found to support the LRA contention that the thrusters induce some sort of low pressure field around the hull which draws river users toward, especially, the bow thruster. Flow into the bow thruster arises from the forward motion of the ferry and, while we entirely accept that there is a risk that a casualty in the river could be drawn into a thruster if run down by a ferry (see scenarios 14 and 15 in our Risk Register) we would refer the LRA to the fact that this has never happened, as far as records show, on the Lymington River and that, in any case, risk control measures are in place to prevent run-downs happening.

Comment 8.1.10: The LRA contend that "the facts are totally at odds" with the duration and frequency of wind shadow effects increasing slightly. They also

accuse BMT of choosing to disregard them. This comment is unsubstantiated by LRA and we do not accept it. A good deal of time and effort went in to observing and measuring wind shadow and its effect, as well as running sailing trials for this purpose and this is fully reported. A fact the LRA chooses to ignore is that there has been no reported incident involving wind shadow in the 10 years from 1998 to 2008 in the Lymington River.

Comment 8.1.11: The LRA accuses BMT of not adequately considering the implications of thruster slipstream when waiting in strong winds. This again is incorrect; a good deal of time was taken considering them, as evidenced by our recommendation to avoid waiting in the river. There is no intention of repeating the waiting trials in strong winds; the effects in what the LRA is pleased to call a "moderate" wind were quite enough to show that they were unacceptable.

Both thrusters would not, of course, have been linked while holding station in a cross wind; linking them in such an exercise would have been pointless.

The point about speeding up and slowing down on wash is well-made and was taken into account when the "intermediate" setting on the aft thruster was being trialled. Paragraphs on page 32 of the draft BMT Phase 2 report refer.

Comment 8.1.13: We do not agree that visibility from the W-class bridge is "considerably poorer than the C-class vessels". By moving around the bridge, or posting lookouts, a very good all-round view is obtained (provided window misting and washing/wiping problems are resolved) except, as identified in the BMT report, for the blind spot under the bow. Risk control measures to overcome this have been listed on pages 84 and 85 of the draft report.

The LRA then go on to list "significant issues which have been omitted from the Conclusions and which need to be included". These are now considered in turn.

1. Loss of Control Incidents. It is true that the LRA sent BMT a list of incidents which they describe as "significant and disturbing". If they were included in the official reported incident records complied by LHC, they will have been considered by BMT. The LRA reports were incomplete in that there was no information of any enquiry or follow-up and, as most of them were in the words of one individual, there was no independent corroboration. Official records were used for the BMT report and are discussed in Section 7.1 of its draft Phase 2 report.
2. Uncertain Speed Control. This is a good point and the need to maintain a constant speed on the river (traffic and weather permitting) is agreed. It appears, however, that this point should be addressed to Wightlink rather than BMT, although some acknowledgement of uncertain manoeuvres while waiting was made on page 88 of the BMT report.
3. As mentioned above, the forward thruster still shares the power load with the aft thruster, the latter still playing a role in maintaining speed, as demonstrated in one trial where its drive thrust vector was deliberately reduced to zero. Regarding the LRA estimates of the amount of power used by the forward thruster, BMT estimate that to maintain a steady speed of 6 knots in 5.7 metres water depth in benign conditions with the "operational"/"idle" settings, the power from the forward thruster is about 3.4 times that of one C-class thruster and that of the aft about 0.6, in broad agreement with the LRA estimate. However, both W-class thruster engines would be running at powers well below their rating. The LRA concludes this paragraph by stating that consideration should be given to installing protective grids ahead of the W-class thrusters, presumably on

the basis that the Association considers that these are required and form an appropriate means of preventing people in the water being sucked in to the thrusters. This risk control measure has not been recommended by BMT because:

- The grids themselves could cause serious injury if a casualty was run down. Without the grids there is a good chance the casualty would drift down the side of the on-coming hull
- The grids, if fitted at the ends of the ship, could trap the casualty under water or direct the casualty into the thrusters
- The grids would affect the performance and handling of the ferries, almost certainly in a detrimental manner.

4. Noted and agreed. See BMT Phase 2 report page 85, fourth paragraph
5. Recommendations for the removal of boats from moorings in the Cocked Hat and Short Reach Lay-by areas are nothing to do with the ability of the ferries to pass safely; trials have shown that passing is carried out safely and BMT has no reason to ban passing in the river. The recommendations are more to do with the safety of the area itself; the area in the region of the Cocked Hat bend is known to be that where many reported incidents occur, the majority of which involve only leisure users. The intrusion of moored vessels, when wind- or tide-rode, into this navigation space is clearly an unnecessary additional marine risk, as identified by ELP and BMT. The removal of boats from the moorings is therefore not to accommodate the W-class.

The LRA comments conclude with items on the Risk Register, Thruster Control and the Strong Wind Trials. These are considered in turn.

Risk Register

The LRA comments open with an unsubstantiated, general and gratuitous remark which is neither correct nor helpful. The comments (some of which on occasion could be read as threats) made to BMT by LRA regarding the previous version of the Risk Register in the Phase 1 report were absorbed by BMT and as a result the Risk Register in the Phase 2 report was re-designed, populated with much more supportive detail, and dealt with the relative risk between C-class and W-class operations. To state that comments made previously by LRA to BMT have been "totally disregarded" is utterly untrue. The comment is completely unspecific and does not allow or warrant a more specific response.

The initial comment is then followed by an assertion, with no supporting evidence, that "the practical realism of the "risk control measures" is often not evident". This is refuted entirely; each control measure was considered carefully by the BMT team and checked by practitioners. The LRA should have provided evidence to support contentious assertions of this type.

The second paragraph in this section states the obvious and it is, of course, the goal of this or any other safety study to seek to ensure that incidents do not occur, where possible, and otherwise recommend means to reduce their risk. The need for on-going continuous assessment of risk on the river is recognised in the Port and Marine Safety Code and BMT have endorsed this by recommending continuous review of river safety. To date, the safety record on the river has been excellent; the risk control measures proposed by BMT are aimed at ensuring that this remains the case.

While any undertakings made in the past about the burden of risk control measures being shouldered by one party or another are nothing to do with BMT,

it is worth remarking that river safety must be the concern and responsibility of *all* river users; leisure users cannot be exempt from this.

This section closes with yet another unsubstantiated assertion where the LRA refers to "issues…omitted" from the risk Register. This is a serious, yet unsubstantiated, allegation and BMT believes it has no basis in fact. In the absence of any substantiation, the comment is not accepted.

Thruster Control

There are misunderstandings in this section. As explained and discussed several times above, use of the thrusters to avoid the use of large drift angles is possible and, as Captain Baker pointed out at the 2 April stakeholders' meeting, Wightlink are fully aware of this facility and use it. However, by countering drift angles, it will inevitably mean that more power will have to be used to provide the necessary thrust. Setting a drift angle is a well-known method of using the ship speed and that of the drift induced by wind or current, to provide a resultant speed and direction along the desired track. If done properly, this technique can counter quite large side forces from wind and current, even at a quite modest power outlay, as demonstrated by the under-powered C-class.

It should be noted that synchronisation was mentioned in the Phase 2 report in two contexts:

1. Possible synchronisation of all control locations on the bridge
2. An option of ganging together both thrusters for certain manoeuvres.

Neither have any relevance to use of thrusters to hold station while stopped in a cross wind.

The first concerns hand-over of control from one location to another on the bridge while the second would be not be used for station-keeping and would be deactivated. The LRA claim that "It is essential that further trials with this mode of operation are introduced before the ferries are given permission to enter service", but they do not clarify which mode of operation, or why such trials are "essential". No "ganging" trials are envisaged unless the option is provided on the ferries; the option is not essential and can be mimicked manually, but it has some advantages and is liked by some shiphandlers, as discussed in the Phase 2 report. Holding station in the river was adequately trialled in a range of conditions and, as waiting in the river is to be the exception rather than the rule, there is no need for additional trials. If a stop-and-hold situation occurs in the normal course of operations during the review period while a BMT team is on board, it will be recorded and assessed.

Strong Wind Trials

Comment 6.1.1: BMT has produced an unbiased and professional report, as clearly recognised by other river user groups.

Comment 6.1.4: The statement in inverted commas is true. It is a consequence of the high windage and shallow underwater hull and is a feature which has to be taken into account in handling these vessels in strong winds. The report describes how the Wightlink masters dealt with this key aspect of behaviour in strong winds and showed that they were able to overcome it satisfactorily. The channel was empty for the trials so reasonable drift angles were used, not

because of any loss of control, but because a perfectly valid shiphandling technique was adopted (in Long Reach, for example) in the conditions. However, it should be noted that lateral drift from cross wind occurred, not just in straight line running, but also during turning, especially at Cocked Hat, and the report discusses this as well. Thrusters and heading were both used to counter the northwards drift at this turn.

Comment 6.1.6: Agreed, especially as it is incorporated in a BMT recommendation.

Comment 6.2.6: This has been discussed extensively above.

Observations

1) The first sentence is not true for those passing trials when BMT personnel were on both vessels. During the strong wind trials, communication with the other ship was maintained to get their experiences; this was also the case with those passing trials when only one ship carried BMT personnel.
2) BMT is a fully independent and unbiased organisation, not a duty holder. As such, our study makes recommendations to those in a position to influence or manage risk; it is not our role or brief to issue commands.