

APPENDIX 18

Navigation and Water Safety Report



5 August 2010

Barangaroo Delivery Authority
Level 3, Foreshore House, 66 Harrington Street
The Rocks NSW 2000 Sydney Australia

Attention: Fleur Mellor - Public Domain Design Project Manager

Barangaroo Headland Park – Preliminary Navigation and Water Safety Report

Dear Fleur,

This preliminary letter report has been prepared in response to Item 2.19 in Headland Park Main Works Environmental Action List dated 22nd July 2010.

1. Introduction

This preliminary Navigation and Water Safety Report provides an assessment of the issues associated with the safe navigation of vessels within and adjacent to the Barangaroo Headland Park development site. This assessment is structured as follows:

- Assess vessel access restrictions at the developed Barangaroo site and consideration in design;
- Outline existing navigation constraints at the site;
- Outline possible navigational aid requirements at the developed site;
- Responds to maritime issues identified within Item 6 of the Director General's Requirements; and
- Summarise further information, assessment and consultation requirements.

2. Barangaroo – Vessel Access Restrictions

The design considers that neither Sydney Ferries vessels, nor cruise ships that may continue to use the cruise terminal at Darling Harbour in the interim prior to completion of the entire staged Barangaroo development, will enter into the Barangaroo development site (including the Northern Cove). It is expected that these vessels will continue to navigate at some distance clear of the development site as per current harbour operations.

However, it is noted that the wake and propeller wash generated by passing vessels (including tug vessels supporting cruise ship navigation operations) has been considered in the concept design of the seawalls, rock armour and scour protection at the Barangaroo site (refer "*Barangaroo Headland Park Maritime Works Concept Design Report*" dated 15th June 2010).

It is intended that recreational craft of limited draft will be permitted to enter the Northern Cove area but not the Moore's Wharf Bay area. An assessment of predicted vessel draft limitation is provided within "*Barangaroo Headland Park Maritime Works Concept Design Report*" dated 15th June 2010. This assessment is to be updated to reflect any recent changes in Northern Cove bathymetry. All craft are expected to navigate clear of seawall and rock armour structures.

3. Existing Navigation Constraints at the Site

NSW Maritime provides boating maps online for the various waterways for which it has responsibility (refer Appendix B). Commercial shipping channels, vessel speed restrictions and navigation aids are shown on this plan. The only existing navigation mark within the development area is a fixed lit port beacon to the commercial shipping channel with no top mark. This mark is located on the existing wharf structure at the Nth Wst corner of the site.

4. Navigational Aid Requirements

As the development does not impact upon existing commercial shipping channel and ferry operations there is limited requirements for additional marks to facilitate these operations, other than the reinstatement of the fixed lit port beacon mark at the Nth Wst corner of the site with possible added top mark. This mark would likely be reinstated on a new support column fixed to the modified corner caisson structure.

Coves within Port Jackson do not typically have navigation aids indicating navigational restrictions or changes in navigable depth (e.g. Farm Cove at the Royal Botanic Gardens Est of the harbour bridge). However, the Northern Cove presents a location where there is a sudden significant decrease in navigable depth at the alignment of the modified caisson structures at the mouth of the cove (~RL-14m to ~RL-4m). At this location the establishment of special marks (yellow in colour in accordance with the requirement of the International Association of Marine Aids to Navigation and Lighthouse Authorities (or IALA for short) – refer Appendix C) could be considered so that recreational vessels of significant draft refrain from attempting to enter the cove.

Provision of a pontoon pier within the Northern Cove is currently being considered to service water taxis only. No navigational aids are considered to be required for this pontoon pier at this stage. It is envisaged that this facility will be designed in accordance with the appropriate guidelines (including any particular requirements of NSW Maritime, disabled access, provision of life saving equipment etc) and AS3962-2001: *Guidelines for Design of Marinas*. Appropriate navigable depth and berth/fairway width is to be provided to facilitate water taxis up to 8m in length and of typical draft.

Should floating markers be adopted rather than fixed marks, then the wander of the buoy(s) should be considered in their positioning so that they reasonably accurately define the location of the change in navigable depth or edge of channel.

No vessels are to enter the Moore's Wharf Bay area at the far Nth Est of the development site due to a lack of navigable depth and limited navigable width. No navigation aids are considered to be required however NSW Maritime is to be consulted to confirm any requirement for the erection of navigation signage to communicate this constraint.

A "DO NOT DRIFT OR ANCHOR" zone extends from the Nth Wst corner of the Barangaroo development site to the Opera House on the other side of the harbour bridge. Any signage associated with this restriction (or others such as speed limit zones, or no fishing etc) may need to be established in accordance with the requirements of the relevant authorities.

Refer to sketch SK21-AA003264-A enclosed within Appendix A for illustration of possible navigational aid requirements.



5. Item 6 of Director General's Requirements

Our response to the issues raised in Item 6 of the Director General's Requirements is given in the table below:

Issue Identified within Item 6 of the Director General's Requirements	Maritime Designer's Response
Details of any proposed transportation of waste materials via the Harbour and proposed locations for handling materials.	All waste materials are to remain within the site with any materials received via land based access.
Navigation and safety impacts on other water based traffic and ferry commuter services from any barging of contaminated materials, including navigation in and around Darling Island, King Street Wharf, Johnstons Bay and White Bay.	No barging of contaminated materials is proposed.
Impact of shoreline works (particularly the creation of the Northern Cove) on navigation in Sydney Harbour.	Navigation impacts of shoreline works shall be reasonably minimised. The design of silt curtain arrangements and temporary aids to navigation shall be developed in consultation with SPC, NSW Maritime and other relevant authorities.
Potential provision for a water taxi stop.	A water taxi stop is proposed at a pontoon pier located within the Northern Cove. The facility shall be designed in accordance with the relevant guidelines and Australian Standards.

6. Yet to Be Addressed

The following further information, assessment and consultation requirements are to be considered in finalising the Navigation and Water Safety report:

- Nav aids are to be consistent with the navigational aids already in place in the harbour to avoid confusion. Therefore the requirements of SPC's harbour master, NSW Maritime and Sydney Ferries need to be confirmed through consultation with these parties;
- Navigation impacts associated with the construction of the Barangaroo development have not been considered as part of this preliminary assessment and will need to be addressed at a later stage in consultation with the relevant authorities;
- Any other features that may emerge through the finalisation of the design of the development, that could pose a hazard to safe navigation, will need to be considered in finalising this assessment.

Yours sincerely,

A handwritten signature in black ink, appearing to be "SH", with a horizontal line extending from the end.

Sam Harris

Manager - Ports and Maritime NSW

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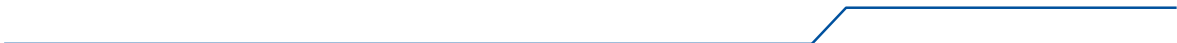
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Enclosed Appendices:

- Appendix A – SK31-AA003264-A Aids to Navigation
- Appendix B – NSW Maritime Boating Map: Port Jackson Western Area
- Appendix C – IALA Navigation Mark Guidance Extract



Appendix A – SK31-AA003264-A Aids to Navigation

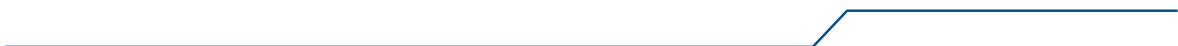


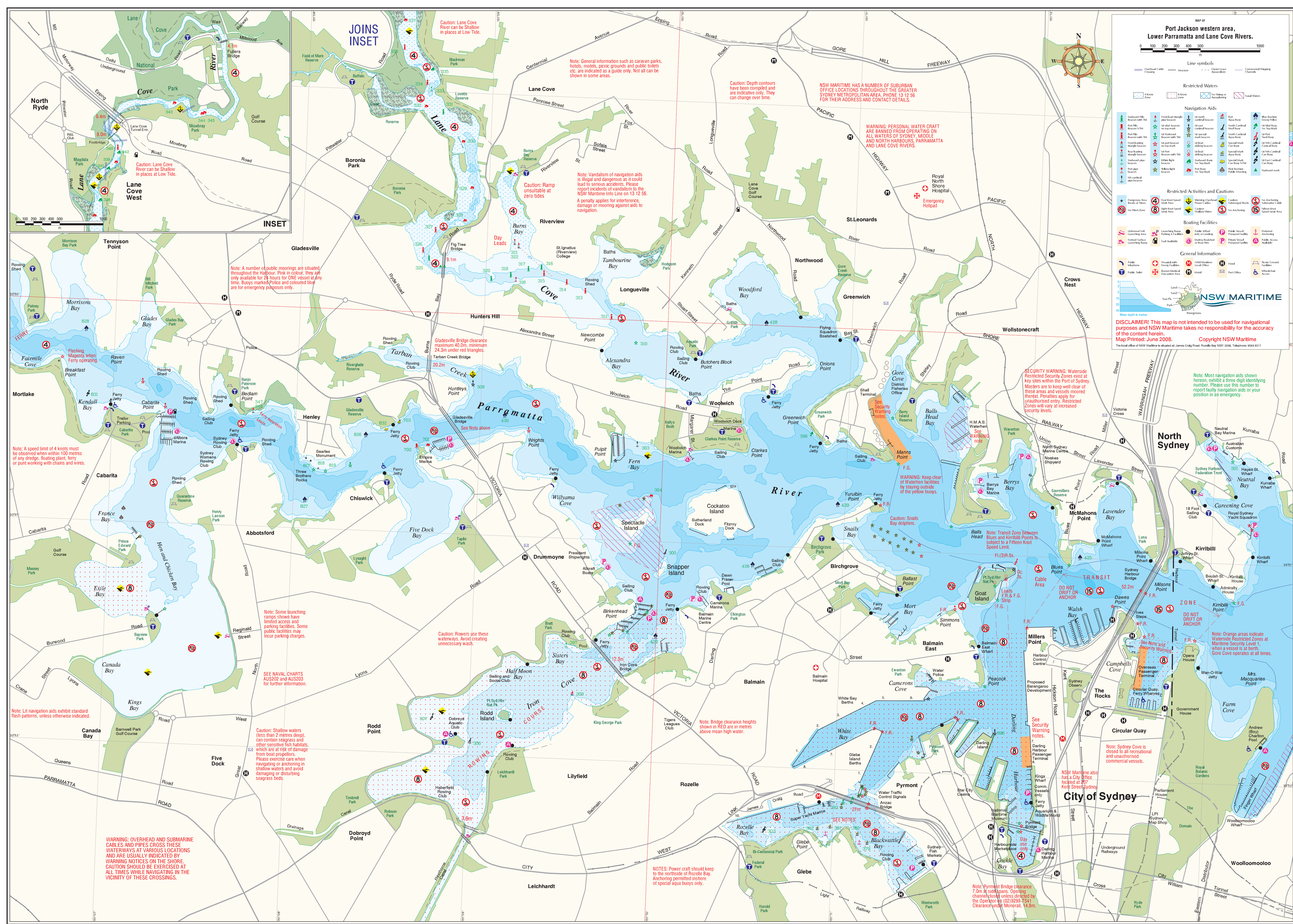


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1. CONSISTENCY WITH EXISTING NAVAIDS AND SIGNAGE IN THE HARBOUR IS REQUIRED.
2. NAVAID AND SIGNAGE REQUIREMENTS TO BE CONFIRMED THROUGH DISCUSSIONS WITH NSW MARITIME, SPC AND OTHER RELEVANT AUTHORITIES.
- POSSIBLE "DO NOT DRIFT OR ANCHOR" AND SPEED ZONE SIGNAGE
- POSSIBLE NO NAVIGABLE ACCESS SIGNAGE
- POSSIBLE SPEED ZONE SIGNAGE
- SPECIAL MARKS WITH TOP MARK
- SPECIAL MARKS WITH TOP MARK
- PONTON PIER FOR WATER TAXI
- DARLING HARBOUR

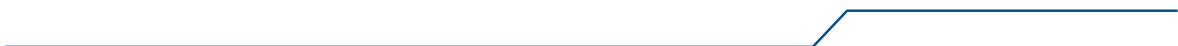
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Appendix B – NSW Maritime Boating Map: Port Jackson Western Area





Appendix C – IALA Navigation Mark Guidance Extract



3. CARDINAL MARKS

3.1. Definition of Cardinal quadrants and marks

3.1.1. The four quadrants (North, East, South and West) are bounded by the true bearings NW-NE, NE-SE, SE-SW, SW-NW, taken from the point of interest.

3.1.2. A Cardinal mark is named after the quadrant in which it is placed.

3.1.3. The name of a Cardinal mark indicates that it should be passed to the named side of the mark.

3.2. Use of Cardinal Marks

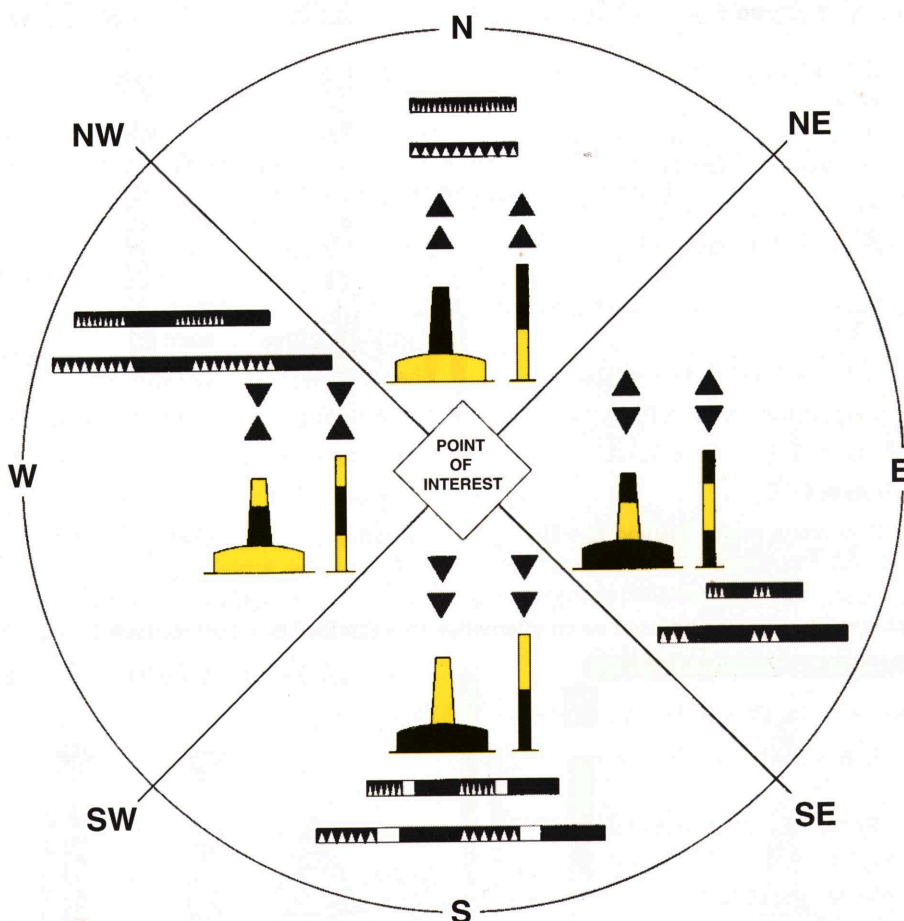
A Cardinal mark may be used, for example:

3.2.1. To indicate that the deepest water in that area is on the named side of the mark.

3.2.2. To indicate the safe side on which to pass a danger.

3.2.3. To draw attention to a feature in a channel such as a bend, a junction, a bifurcation or the end of a shoal.

3.3. Description of Cardinal Marks



3.3.1. North Cardinal Mark

Topmark^(a) : 2 black cones, one above the other, points upward

Colour : Black above yellow

Shape : Pillar or spar

Light (when fitted) :

Colour : White

Rhythm : VQ or Q

3.3.2. East Cardinal Mark

Topmark^(a) : 2 black cones, one above the other, base to base

Colour : Black with a single broad horizontal yellow band

Shape : Pillar or spar

Light (when fitted) :

Colour : White

Rhythm : VQ(3) every 5s or Q(3) every 10s

3.3.3. South Cardinal Mark

Topmark^(a) : 2 black cones, one above the other, points downward
 Colour : Yellow above black
 Shape : Pillar or spar
 Light (when fitted):
 Colour : White
 Rhythm : VQ(6) + Long flash every 10s or Q(6) + Long flash every 15s

3.3.4. West Cardinal Mark

Topmark ^(a) : 2 black cones, one above the other, point to point
 Colour : Yellow with a single broad horizontal black band
 Shape : Pillar or spar
 Light (when fitted):
 Colour : White
 Rhythm : VQ(9) every 10s or Q(9) every 15s

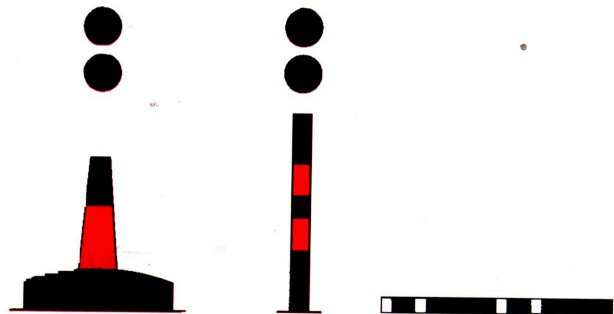
4. ISOLATED DANGER MARKS

4.1 Definition of Isolated Danger Marks

An Isolated Danger mark is a mark erected on, or moored on or above, an isolated danger which has navigable water all around it.

4.2. Description of Isolated Danger Marks

Topmark ^(b) : 2 black spheres, one above the other
 Colour : Black with one or more broad horizontal red bands
 Shape : Optional, but not conflicting with lateral marks; pillar or spar preferred
 Light (when fitted) :
 Colour : White
 Rhythm : Group flashing (2)



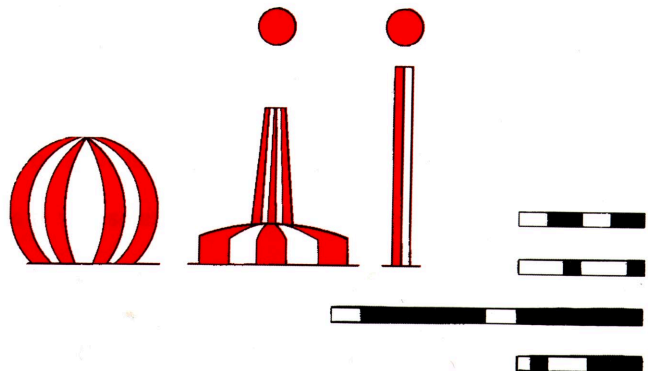
5. SAFE WATER MARKS

5.1. Definition of Safe Water Marks

Safe Water marks serve to indicate that there is navigable water all round the mark; these include centre line marks and mid-channel marks. Such a mark may also be used as an alternative to a Cardinal or a Lateral mark to indicate a landfall.

5.2. Description of Safe Water Marks

Colour : Red and white vertical stripes
 Shape : Spherical ; pillar or spar with spherical topmark
 Topmark (if any) : Single red sphere
 Light (when fitted) :
 Colour : White
 Rhythm : Isophase, occulting, one long flash every 10s or Morse "A"



^(a) The double cone topmark is a very important feature of every Cardinal mark by day, and should be used wherever practicable and be as large as possible with a clear separation between the cones.

^(b) The double sphere topmark is a very important feature of every Isolated Danger mark by day, and should be used wherever practicable and be as large as possible with a clear separation between the spheres.

6. SPECIAL MARKS

6.1. Definition of Special Marks

Marks not primarily intended to assist navigation but which indicate a special area or feature referred to in appropriate nautical documents, for example:

6.1.1. Ocean Data Acquisition Systems (ODAS) marks.

6.1.2. Traffic separation marks where use of conventional channel marking may cause confusion.

6.1.3. Spoil Ground marks.

6.1.4. Military exercise zone marks.

6.1.5. Cable or pipeline marks.

6.1.6. Recreation zone marks.

6.2. Description of Special Marks

Colour : Yellow

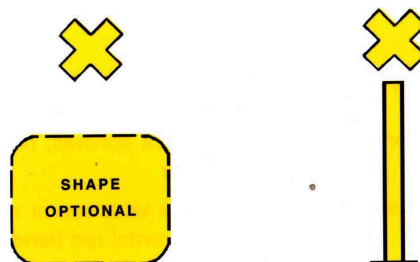
Shape : Optional, but not conflicting with navigational marks

Topmark (if any) : Single yellow 'X' shape

Light (when fitted) :

Colour : Yellow

Rhythm : Any, other than those described in sections 3, 4 or 5



6.3. Additional Special Marks

Special marks other than those listed in paragraph 6.1 and described in paragraph 6.2 may be established by the responsible administration to meet exceptional circumstances. These additional marks shall not conflict with navigational marks and shall be promulgated in appropriate nautical documents and the International Association of Lighthouse Authorities notified as soon as practicable.

7. NEW DANGERS

7.1. Definition of New Dangers

The term "New Danger" is used to describe newly discovered hazards not yet indicated in nautical documents. "New Dangers" include naturally occurring obstructions such as sandbanks or rocks or man made dangers such as wrecks.

7.2. Marking of New Dangers

7.2.1. "New Dangers" shall be marked in accordance with these rules. If the appropriate Authority considers the danger to be especially grave at least one of the marks shall be duplicated as soon as practicable.

7.2.2. Any lighted mark used for this purpose shall have an appropriate Cardinal or Lateral VQ or Q light character.

7.2.3. Any duplicate mark shall be identical to its partner in all respects.

7.2.4. A "New Danger" may be marked by a racon, coded Morse "D" showing a signal length of 1 nautical mile on the radar display.

7.2.5. The duplicate mark may be removed when the appropriate Authority is satisfied that information concerning the "New Danger" has been sufficiently promulgated.

8. INTERNATIONAL BUOYAGE REGIONS A AND B

There are two international Buoyage Regions A and B where Lateral marks differ as described in Section 2. The geographical divisions of these two Regions are indicated in the Annex which will, if necessary, be updated from time to time.

IALA MARITIME BUOYAGE SYSTEM

Buoyage Regions A and B, November 1980

