SAFETY MANAGEMENT PLAN

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Mr Andy Cooper
Technical Support Team - Coastal
Maritime and Coastguard Agency
Bay 2/01, Spring Place
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SOUTHAMPTON
SO15 1 EG

For the attention of the Chief Executive, Maritime and Coastguard Agency

Dear Sir,

PORT MARINE SAFETY CODE - STATEMENT OF COMPLIANCE

I, John P. Beevor, the Chairman on behalf of the Gloucester Harbour Trustees being the Port Marine Safety Code Duty Holder for the Gloucester Harbour, having considered all the requirements of the Port Marine Safety Code, including reviewing the risk assessment and safety management system, certify that the Gloucester Harbour Trustees meets the standards required by the Port Marine Safety Code.

Yours faithfully,

John P Beevor

Chairman of the Board and Duty Holder

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This Safety Management Plan has been endorsed by the Gloucester Harbour Trustees.

The Trustees (January 2017):	John Beevor	(Chairman)
	Derek Hughes	(Vice Chairman)
	Barry Leat	
	Mike Johnson	
	John Christie	
	Garry Strickland	
	Gordon Craig	
	Carl Merry	
	Tony Potts	
	Nigel Vaughan	
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This Revision: 1 April 2017 (amended references to Dangerous Goods in Harbour Area Regs, amended references to English Nature, added new Trustee, revised incident report form, added current Strategic Plan, amended towage guidelines and General Directions).

Port Marine Safety Code

The role of Duty Holder is undertaken by the above-named Trustees who are, collectively and individually, accountable for marine safety under the Code. The Duty Holders acknowledge that their accountability for compliance with the Code cannot be assigned or delegated.

Designated Person

The Trustees have appointed the General Manager of Sharpness Dock Ltd. (Garry Strickland) as the Designated Person to provide independent assurance directly to the Duty Holder that the marine safety management system is working effectively. The competencies of the Designated Person are in line with those recommended by the Guide to Good Practice.

Independent Audit

An assessment of compliance with the Port Marine Safety Code is carried out annually by an independent auditor and the findings provided to the Designated Person.

Gloucester Harbour Trustees
Navigation House
The Docks
Sharpness
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1 Port Marine Safety Code: Statement of Compliance

1 GHT is the statutory harbour authority for the Gloucester Harbour. GHT was constituted as such under the Pier and Harbour Orders (No. 3) Act 1890, which authorises the Trustees to exercise and perform the powers and duties of a harbour authority under the Harbours Docks and Piers Clauses Act 1847. GHT is also a competent harbour authority pursuant to the Pilotage Act 1987. Powers are defined in national and local legislation (see Appendix 6).

2 The current limits of the Gloucester Harbour are prescribed by Article 11 of the Gloucester Harbour Revision (Constitution) Order 2002.

3 Following the grounding of the Sea Empress at Milford Haven in 1996, the DETR initiated a Review of the Pilotage Act 1987 which led to the issue of the Port Marine Safety Code (PMSC) by the DETR in March 2000.

4 The aim of the PMSC is to help harbour authorities to be seen to achieve and maintain nationally agreed standards for safe marine operations within their waters. It sets down a standard to which in future they should hold themselves accountable publicly.

5 To demonstrate compliance with the PMSC, and in the interests of transparency, each harbour authority must produce a periodic statement setting out the policy it has adopted for discharging its duty to ensure that marine operations in the harbour and its approaches are properly regulated; and reporting on the effectiveness of that policy and associated systems and procedures.

6 All harbour authorities are required to develop policies and procedures in accordance with the PMSC and publish the policies and procedures they have adopted to achieve the required standard. Harbour authorities are also required to publish amendments to their plans and to publish reports of their formal periodic reviews, setting performance against their plans and against the standards set in the PMSC. Reports should be at not less than three-yearly intervals: additional reports may also be appropriate.

7 A harbour authority's policies and procedures should include a statement of policy committing the authority to undertake and regulate marine operations in a way that safeguards the harbour, its users, the public and the environment.

8 Harbour authorities are required to develop a safety policy for marine operations within their jurisdiction. This requirement itself makes a contribution to safety by obliging those responsible to consider its importance, and the need for practical and formal safety systems. The policy should be published, both to demonstrate the authority's commitment to the policy and also to ensure the involvement of harbour users. The management of any harbour under statutory powers should be based on a clear safety policy adopted by the harbour authority. Harbour authorities should make the following commitments:

- to undertake and regulate marine operations in a way that safeguards the harbour, its users, the public and the environment
- to manage the relevant assets of the authority safely and efficiently
- to discharge the duties and powers described in the PMSC
- to maintain relevant harbour equipment to agreed industry standards

- to recruit and train operational staff to nationally agreed competence levels

- to ensure that staff are properly trained for emergencies and contingencies.

9 GHT has formally resolved to meet these commitments and to that end has taken the steps and published the documents listed in the schedule attached. For full details the individual documents need to be consulted. GHT has consulted users of the Gloucester Harbour, through the former Gloucester Harbour User Forum, on the production of its documentation and copies are readily available on GHT's website at www.gloucesterharbourtrustees.org.uk. Copies are also available from the Trustees' office on request.

10 GHT is committed to reviewing its policies and procedures at regular intervals, in line with the requirements of the PMSC, to ensure that they are effective and efficient. It also has in place a system for reporting any accidents or incidents involving safety which will also trigger a review of the relevant policies and practices of GHT. The 'designated person' appointed by GHT will provide an independent audit of its documentation and procedures.

11 In accordance with the requirements of the PMSC, GHT formally announced its completion of the implementation of PMSC in December 2001.

12 In accordance with the three-yearly suggested reporting scheme, a further Statement of Compliance was provided to the Maritime and Coastguard Agency in January 2015. Further reports will be issued at regular intervals.

13 During March 2017 an independent audit of the Safety Management System and Risk Assessment concluded that the Gloucester Harbour continued to meet the standards required by the Port Marine Safety Code. The recommendations of the auditor were noted and are included in this Safety Management Plan.

14 In June 2016 the procedure used for the assessment and ranking of risk was reviewed. As a result, it was decided that the Marico 'Hazman 2' system would be adopted as a more suitable means of maintaining and reviewing the risk register. The risk assessment is now held and maintained 'on-line', where it may be accessed by authorised persons. This SMP now contains the current risk rank summary for navigational activities and for maintenance activities (section 13 – Hazard and Risk Register).

Schedule

1 Introduction

Actions taken by GHT since the Review of Pilotage commenced are listed below; in many instances this involved a review of procedures already in force under the relevant legislation relating to Harbour Authorities. These will continue to be reviewed in accordance with the requirements of the PMSC.

2 List

- Commissioned a hydrographic survey of the main navigation channel between the Second Severn Crossing (M4) and Hock Cliff near Fretherne on Severn in August 2000. (The results of this survey have been passed to the UK Hydrographic Office at Taunton which has issued a new edition of Chart No. 1166.)

- Commissioned a hydrographic survey of the main navigation channel and adjacent features of interest between the seaward boundary of the Trustees' jurisdiction and Sharpness Point (March 2015) the results to be passed to the UKHO for inclusion in a new edition of Chart No. 1166.

- Formalised and implemented passage planning in 2000 which includes the production of passage plans (reviewed June 2002, October 2008, April 2014)

- Carried out risk analysis and, following extensive consultation, approved a safety management plan based thereon in 2001, 2003, 2006, 2007, 2008, 2011, 2013, 2014, 2015

- Carried out additional risk analysis and revisions to passage planning relating to passenger vessel operations involving river berths at Lydney Dock and Sharpness Old Dock in November 2015

- Appointed a 'Designated Person'

- Accepted the Trustees' role as 'the Duty Holder'.

- Reviewed and revised the Authority's Pilotage Directions in 2007, 2008, 2009, 2010, 2012, 2013

- Issued General Directions in March 1999 (reviewed 2003, 2006, 2007, 2010, 2011)

- Approved a Strategic Plan for the Authority in October 2000 (reviewed 2003, 2006, 2010, 2013)

- Issued the Gloucester Harbour Management Plan in March 2000 (reviewed 2003, 2007, 2010, 2013)

- Improved the format for the monthly low water surveys carried out by the Gloucester Pilots on behalf of the Authority

- Elevated safety and PMSC compliance to the first item of business on the agenda for the Trustees' bi-monthly meetings

- Renewed the Pilot Watch Radar System intrinsic to navigational safety in the approaches to Second Severn Crossing

- Improved the provision for recording radar data displayed by the Pilot Watch Radar in December 2008 and again in 2012

- Formalised arrangements for Gloucester Pilots to report any defects in the navigation aids to the Authority's Marine Officer

- Improved the intensity and reliability of certain navigation lights

- Introduced modern solid state light sources for navigation aids

- Refined the information included in the Authority's Annual Report and Accounts

- Made the Gloucester Harbour Byelaws which were confirmed by the Secretary of State in October 1998 (amended in May 2006 to incorporate the revised harbour area)

- Suspended the provision of an emergency mooring buoy at Northwick Roadstead on safety grounds

- Replaced the Hayward Buoy with a fixed structure in June 1999

- Replaced the Bull Beacon and tide gauge with a new structure in 2005

- Replaced the Lyde Beacon with a new structure in October 2007

- Introduced a documented quality control system which includes navigation aid maintenance, purchasing, safety reporting and other activities

- Re-negotiated a new agreement with the Gloucester Pilots Partnership which operates from January 1999 relating to the provision of a pilotage service for the Gloucester Harbour. The agreement covers manning levels and working arrangements. The agreement was revised and renewed in April 2004. This was reviewed in March 2009 and again in March 2014. It is due to be reviewed again in March 2019

- In January 2010, formalised and set out the considerations pertaining to general navigation practice and to navigation during periods of restricted visibility to be observed by vessels subject to pilotage directions

- In October 2010 installed equipment to measure and display height of tide and certain meteorological information at Sharpness and made this data available on the Trustees' website

- In March 2011, formalised and set out the considerations pertaining to the circumstances (e.g. a combination of vessel dimensions, predicted tide heights and other local circumstances) which might trigger a requirement for additional local consultation and assessment of factors that may affect vessel movements

- Replaced the Hills Flats buoy with a fixed structure in May 2011

- Replaced the Counts buoy with a fixed structure incorporating a tide gauge in May 2011

- Installed a beacon onshore to indicate the presence of a submerging obstruction in August 2011

- Continued to promulgate local Notices to Mariners

2 Introduction

The Port Marine Safety Code (PMSC) was published in March 2000 by the DETR Ports Division (Reference 1). It aims to establish a standard which all harbour authorities should apply to the discharge of their statutory responsibilities.

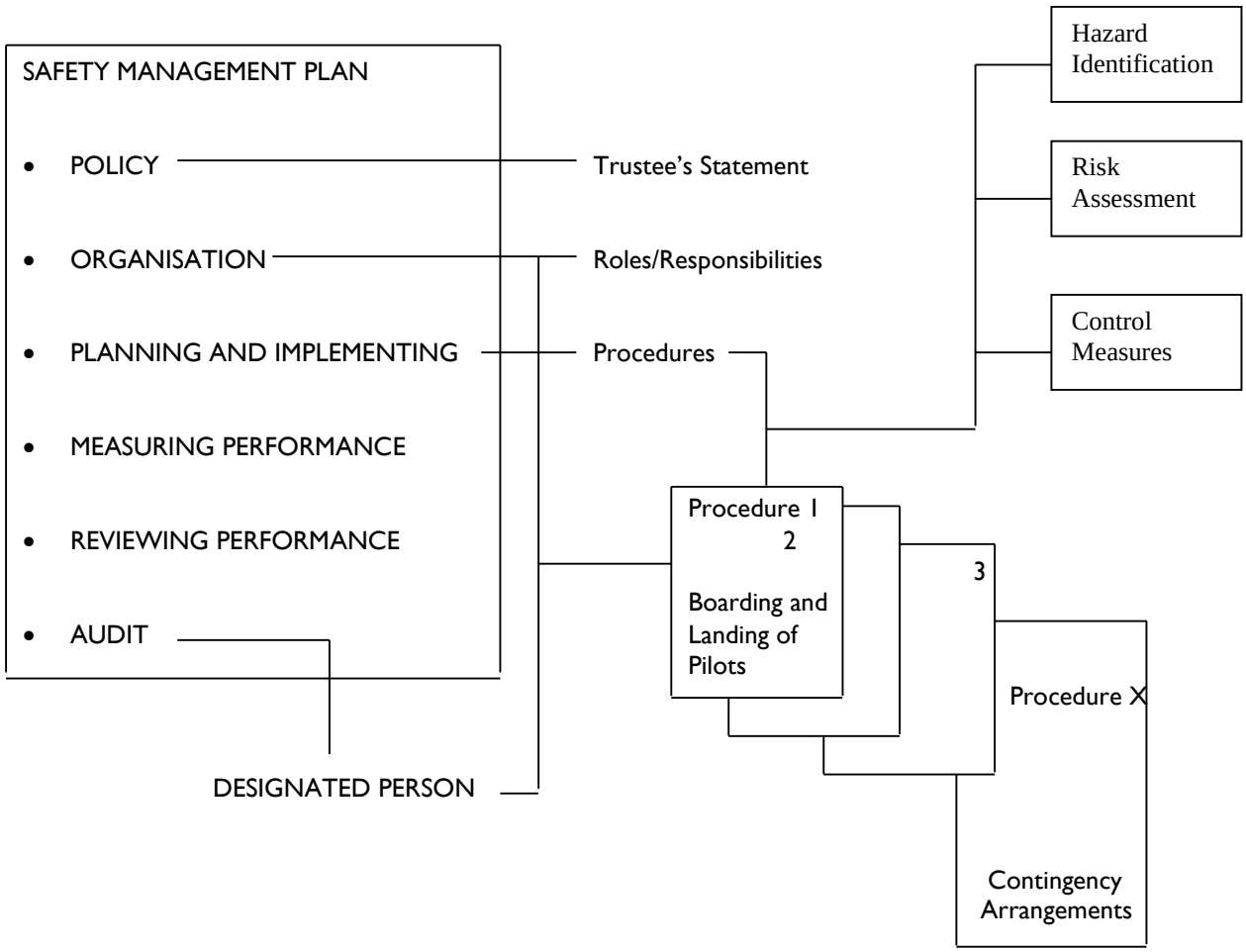
The Gloucester Harbour Trustees (GHT) is a safety conscious and publicly accountable authority and is accountable to its stakeholders and the Secretary of State. The means by which it discharges its responsibilities to meet the standards of the PMSC are set out within this document – the Gloucester Harbour Trustees Safety Management Plan.

The structure of the Plan broadly follows that suggested by the HSE guidance document 'Successful Health and Safety Management' – HSG65 (Reference 2). A model of the safety management 'system' is shown in Figure 1 (below)

The promulgation of this plan and its contents to external stakeholders is principally through the Gloucester Harbour Advisory Body.

Some background to the Harbour and its environs is given in Section 9. Conservancy duties are covered in Section 10. Regulations and compliance requirements relating to the navigation and passage of vessels through the Harbour are covered in Section 11.

Figure 1 – Safety Management System



3 Policy

The Gloucester Harbour Trustees (GHT) is committed to achieving and maintaining the highest standards of health and safety in its activities and operations. Matters of health and safety will not be overridden by any other priorities.

GHT assesses the risks to everyone who may be affected by its activities or operations under its control with the aim of removing hazards. If this cannot be achieved, GHT aims to reduce the risk to a level, which is as low as reasonably practicable.

GHT has appointed a designated person to be responsible for reporting on health and safety standards.

These standards of health and safety apply to GHT employees, contractors and any other third party operating within the Harbour area engaged in activities over which GHT has jurisdiction.

GHT employees will be adequately trained and instructed and provided with suitable equipment to conduct their activities in a safe manner. Contract staff are required to work to the same standards. Events will be promptly reported and followed up.

GHT is committed to full compliance with all relevant health and safety legislation.

GHT will continue to develop policies and procedures in response to changing trends in traffic and operations to ensure exposure to risk by harbour users is kept as low as reasonably practicable.

GHT will publish the adopted policies and procedures, together with plan amendments and reports of formal performance reviews.

4 Organisation

The overall responsibility for health and safety lies with the Trustees. The responsibility for executing the policy, however, rests with the Officers.

Employees and contracted staff are recruited and selected on their suitability for the work to be undertaken. Each position has a job description, which describes jobholder's responsibilities and duties.

Training is provided and instructions are given by way of Standing Instructions (Reference 9). The level of supervision provided is dependent on the complexity of the task and the experience of the individual.

The "Designated Person" (as described in the PMSC) is an independent person with appropriate qualifications and experience in safety management. The Designated Person reports on matters of safety to the Trustees who, collectively, are the "Duty Holder".

For commercial vessels, safe navigation is the responsibility of their Masters and the Pilots as well as GHT, who authorise the Pilots and provide information (from, for example, surveys (Reference 4) and Notices to Mariners (Reference 5)) and navigation aids.

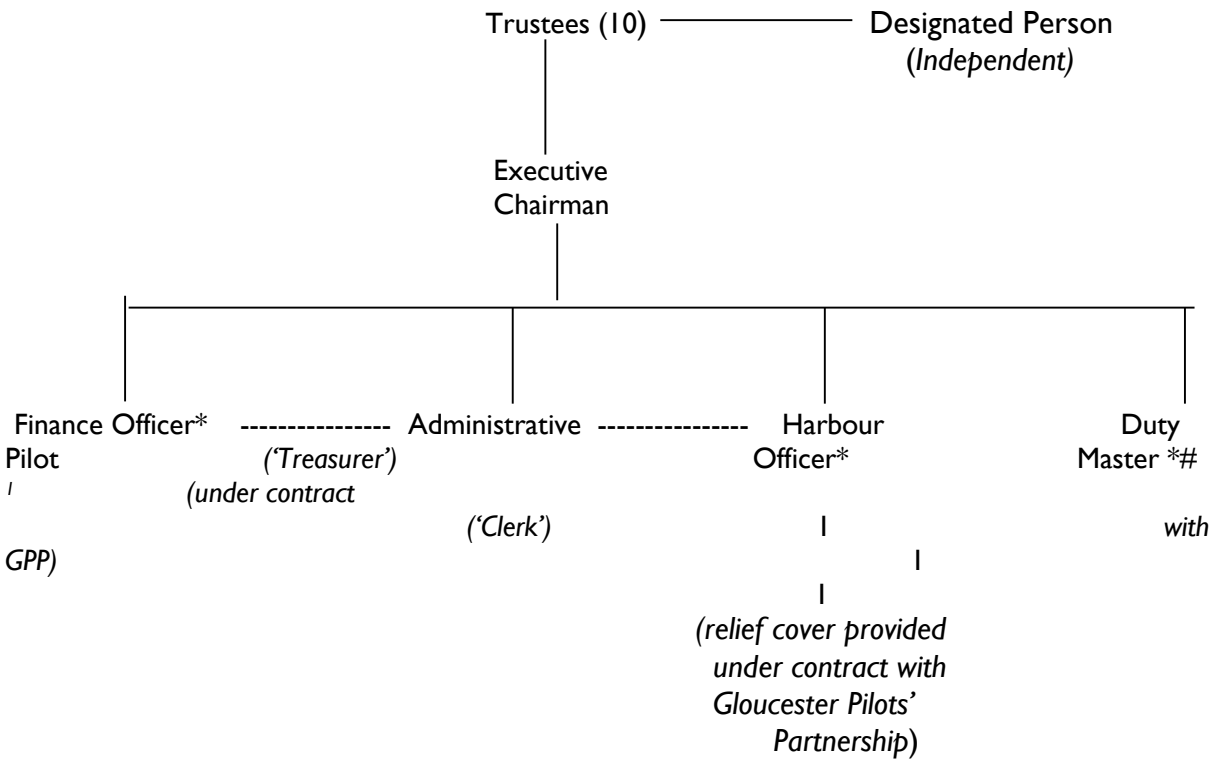
For leisure craft, safe navigation is the responsibility of the person in charge of the craft. GHT provides information (from, for example, surveys (Reference 4) and Notices to Mariners (Reference 5)) and

navigation aids. GHT has recently produced safety guidance notes for users of small craft in the estuary. This may be obtained, along with many other documents, directly from GHT's website.

An advisory body has been set up in accordance with the provisions of the Gloucester Harbour (Constitution) Revision Order 2002.

The structure of the organisation is shown in Figure 2 (below). The job descriptions may be found in Appendix 9.

Figure 2 – Organisational Structure



* *employed staff*

\# *reports directly to the Trustees on safety matters*

[1] *Harbour Master as GHT's principal operational officer is ex officio a Trustee*

---- *Administrative Officer reports to Finance Officer on financial matters and to Marine Officer on pilotage matters*

5 Implementation

5.1 Definitions

A **HAZARD** is an event with the potential to cause harm.

The **RISK** from an event is the product of the consequences of the event and the likely frequency of occurrence.

The Marico 'Hazman II' system of risk analysis is used to produce a risk score for each hazard.

5.2 Procedures

The procedures to be followed for all work activities are set out in Standing Orders (Reference 3). The principal work activities are:

- Boarding and Landing of Pilots
- Maintenance of Navigation Aids (onshore)
- Maintenance of Navigation Aids (offshore)

5.3 Risk Assessment

Each activity is subject to risk assessment. This process begins with hazard identification and, where possible, hazards are eliminated. Where hazards cannot be wholly or partly eliminated, an assessment of the likelihood (frequency) of a hazard causing an incident and consideration of the possible consequences of the incident are made within the 'Hazman II' system. The quantified values of frequency and consequence are combined to produce a risk score for each hazard. A ranked hazard list is then produced, from which the need for possible additional mitigation may be reviewed.

The following tables show the consequence and frequency categories and criteria used for the purposes of this risk assessment.

Scale	Description	Definition	Operational Interpretation
F5	Frequent	An event occurring in the range once a week to once an operating year.	One or more times in 1 year
F4	Likely	An event occurring in the range once a year to once every 10 operating years.	One or more times in 10 years 1 - 9 years
F3	Possible	An event occurring in the range once every 10 operating years to once in 100 operating years.	One or more times in 100 years 10 – 99 years
F2	Unlikely	An event occurring in the range less than once in 100 operating years.	One or more times in 1,000 years 100 – 999 years
F1	Remote	Considered to occur less than once in 1,000 operating years (e.g. it may have occurred at a similar site, elsewhere in the world).	Less than once in 1,000 years >1,000 years

Cat.	People	Property	Environment	Business
C1	**Negligible** Possible very minor injury (e.g. bruising)	**Negligible** Costs <10k	**Negligible** No effect of note. Tier1 may be declared but criteria not necessarily met. Costs <10k	**Negligible** Costs <10k
C2	**Minor** (single minor injury)	**Minor** Minor damage Costs 10k – 100k	**Minor** Tier 1 – Tier 2 criteria reached. Small operational (oil) spill with little effect on environmental amenity Costs 10K–100k	**Minor** Bad local publicity and/or short-term loss of revenue Costs 10k – 100k
C3	**Moderate** Multiple minor or single major injury	**Moderate** Moderate damage Costs 100k - 1M	**Moderate** Tier 2 spill criteria reached but capable of being limited to immediate area within site Costs 100k -1M	**Moderate** Bad widespread publicity Temporary suspension of operations or prolonged restrictions Costs 100k - 1M
C4	**Major** Multiple major injuries or single fatality	**Major** Major damage Costs 1M -10M	**Major** Tier 3 criteria reached with pollution requiring national support. Chemical spillage or small gas release Costs 1M - 10M	**Major** National publicity, Temporary closure Costs 1M -10M
C5	**Catastrophic** Multiple fatalities	**Catastrophic** Catastrophic damage Costs >10M	**Catastrophic** Tier 3 oil spill criteria reached. International support required. Widespread shoreline contamination. Serious chemical or gas release. Significant threat to environmental amenity. Costs >10M	**Catastrophic** International media publicity. Operations and revenue seriously disrupted for more than two days. Ensuing loss of revenue. Costs >10M

5.4 Incident Reporting and Investigation

All events affecting or with implications for the health and safety of persons shall be promptly reported and investigated. Actions to prevent a recurrence shall be implemented and lessons learnt shall be promulgated to staff and contractors.

A reporting regime which draws any unsafe act or condition to the attention of the Officers shall be promoted and feedback given.

Following a report of an incident involving one or more vessels, the Harbour Master will undertake an investigation. This will establish whether there has been a failure to comply with local byelaws or national legislation, and whether further action is required. The Harbour Master will also investigate the circumstances of the incident with regard to the Safety Management Plan and associated risk assessments and establish whether there is a need to review the relevant hazard and its associated control measures. This review will involve the Designated Person, pilots and other river users. The outcome will be reported to the board and to the Advisory Body.

Where appropriate the requirements of the Merchant Shipping (Accident Reporting and Investigation) Regulations 2012 (as summarised in MGN 458 (M+F) Accident Reporting and Investigation) will inform the reporting and investigation process.

A local record of an incident involving vessels (both commercial/piloted) and private/leisure should be made using a pro-forma 'Incident Form'. An example is attached at Appendix 1.

5.5 Contingency and Emergency Arrangements

The procedures to follow for contingencies and emergencies are set out in:

- Contingency and Emergency Arrangements (Reference 6)

This document specifies the actions to be taken to ensure a timely and effective response to a range of possible events within the powers of the organisation.

Note: An OPRC-compliant Oil Spill Contingency Plan (Reference 7) is maintained separately.

6 Audit

An audit programme is established to ensure that procedures and practices are periodically reviewed for compliance. The "Designated Person" is responsible for audit.

Full records are maintained and aids to navigation are inspected annually by Trinity House.

7 Review

All procedures are reviewed at least every three years. All legislation, byelaws and directions are reviewed on a regular basis to ensure they are fit for purpose (see s.5 Strategic Plan).

The person generally responsible for the review of marine procedures is the Harbour Master. Those responsible for the review of other procedures are identified in those procedures.

8 References

1 Port Marine Safety Code (PMSC) and Guide to Good Practice (GTGP)
2 Successful Health and Safety Management – HSG65
3 GHT Standing Orders
4 Low Water Survey and reports (monthly)
5 GHT Notices to Mariners (issued as necessary)
6 GHT Emergency Procedures/Arrangements
7 GHT Oil Spill Contingency Plan
8 British Admiralty Chart No. 1166
9 QA Manual - Standing Instructions
10 The Gloucester Harbour Management Plan
11 GHT Byelaws (1997 and 2006))
12 General Directions to Shipping
13 Passage Plan Information
12 Pilotage Directions
13 HSE 'Reducing Risks, Protecting People'

Other documents to which reference may be made but which are not specified above include:

Gloucester Harbour Revision Orders (1889 to 2002)
The Gloucester Harbour Strategic Plan
GHT Annual Report and Accounts (latest)

9 Background

9.1 Location and Description:

The Gloucester Harbour includes the estuarial waters of the River Severn upstream of a line joining Goldcliff on the Welsh shore, Denny Island and a point south of Severn Beach on the English shore to Llanthony and Maisemore Weirs at Gloucester and the River Wye downstream of Bigsweir Bridge. This involves some 50 nautical miles of tidal waters.

These waters are part of a large estuary system formed following marine inundation of a former river valley system. Tidally generated and maintained sandbanks over which there are continually changing depths are found within the shallow waters. The bed of the narrow navigable channel is of hard consolidated sand with occasional rock outcrops.

The Severn Estuary has one of the largest tidal ranges in the world, with currents of up to 8 knots being noted in certain locations under appropriate conditions. In general, the high tidal velocities inhibit permanent deposition over most of the estuary. Maintenance dredging within the harbour has not been required, although levelling of the rock bed in one section of the harbour was carried out in the past.

The effects of the Severn Bore, which occurs regularly within the harbour, may be experienced between Sharpness and Gloucester.

The tides in the Gloucester Harbour are uniformly diurnal, with a mean range of 7.2m at Sharpness and 9.6m at Beachley. The area has an annual average temperature of 10°C. Periods of fog and mist which significantly affect visibility are usually temporary, affecting an average of 12 days annually. Southwesterly winds prevail with an average strength of 12 knots. Ice does not affect navigation within the Gloucester Harbour.

A comprehensive system of aids to navigation serves the mariner.

9.2 Bridges

The River Severn is crossed by two major road bridges. The Second Severn Crossing (M4) and Severn Bridge (M48) have, respectively, 35m and 34m vertical clearance above HAT.

Close to Beachley Point, the River Wye is crossed by the Wye Bridge (M48), having a vertical clearance of 13m above HAT. At Chepstow and beyond, several further road and rail bridges cross the river, but limited vertical clearance restricts the type of craft which may navigate to small leisure craft.

9.3 Overhead Cables

Power Cables: An overhead power cable with a safe vertical clearance (as defined by the responsible authority) of 39m above HAT crosses the River Severn between Beachley Point and Aust Cliff. The same cable crosses the River Wye with a safe vertical clearance of 16m. Between Beachley Point and Chepstow, the River Wye is spanned by two further overhead cables, the safe vertical clearance being 32m above HAT. The River Severn above Sharpness is spanned by two further overhead cables, the safe vertical clearance being 19m above HAT. St Pierre Pill is spanned by a power cable having a safe vertical clearance of 7.3m.

Telephone Cables: An overhead telephone cable with a safe vertical clearance (as measured) of 5m above HAT crosses the River Severn between Minsterworth stone chute and Elmore Back.

9.4 Anchorages

There are no formally-designated anchorages within the harbour.

9.5 Environmental factors

Included within the area of the Gloucester Harbour are the Severn Estuary SSSI, the Upper Severn SSSI, River Wye (Lower Wye) SSSI, a RAMSAR site and SPA. The harbour also falls within the Severn Estuary SAC and includes the River Wye SAC.

9.6 Harbour Users

The products moved within the Gloucester Harbour consist mostly of dry bulk cargo, including cement, scrap, cereals, fertiliser and feed stuffs. There is no movement of crude oil or petroleum products. With the exception of a small local trade in dredged sand, all cargoes are moved through the port of Sharpness.

The current commercial traffic comprises bulk carriers engaged in the European coastal trade having an average size of 3,500 DWT. Drafts of most vessels are less than 6 metres. The least depths within the marked navigation channel are between 5.5m (MHWN) and 8.8m (MHWS). Other users include recreational craft based at several sailing clubs on the estuary. Motor cruisers and canal craft regularly transit the area to/from the inland canal network.

9.7 Traffic Patterns

The traffic in the harbour is two-way day and night with no vessel traffic control. Pilotage is compulsory for the majority of commercial vessels using the harbour. The marked channel is formally designated a narrow channel, requiring all vessels to heed the appropriate rules concerning collision avoidance. Unless exceptional circumstances dictate, commercial vessels do not deviate from the marked channel. To avoid conflict, vessels departing Sharpness generally do so prior to the arrival of inbound traffic. Vessel movements are timed to avoid passing or grouping of vessels where the channel narrows.

9.8 Towage

Under normal operational circumstances there is no specified requirement for towage or tug assistance to be applied to any particular vessel. No tugs are provided by the harbour authority, but are available for use from commercial service providers if required. Only registered tugs and bona-fide tug operators will normally be permitted to undertake towage or tug services within the harbour. The occasional use of non-coded vessels for towage purposes will be subject to local risk assessment (see Appendix 4: Towage Guidelines and requirements for the Gloucester Harbour).

The need for towage is a matter for the master to consider in conjunction with advice from the pilot.

The harbour authority can, however, require towage to be taken in any circumstance in the interests of port safety. Such a requirement may be imposed after an assessment of the particular circumstances with the pilot. Factors which may be taken into account include, but are not limited to, vessel draft,

vessel defects/damage, vessel length, vessel manoeuvring characteristics, manoeuvring room available, pilot experience and reduction of risk.

These factors are set out in Appendix 4: Towage Guidelines and requirements for the Gloucester Harbour.

10 Activities and Duties

The following is a list of the principal activities and duties and the actions taken by GHT in accordance with the statutory powers under which they operate.

10.1 Pilotage and Pilot Authorisation

The Trustees will keep under consideration whether any, and, if so, what, pilotage services need to be provided to secure the safety of ships navigating in or near the approach to the harbour, and whether in the interests of safety, pilotage should be compulsory for ships navigating in any part of the harbour or its approaches and, if so, for which ships and in which circumstances pilotage services need to be provided for those ships.

Should the use of the harbour change in such a way so as to affect the requirements of the service provided, the Trustees will review the situation and ensure that the appropriate level of pilotage service is provided.

Pilot training and authorisation criteria are regularly reviewed and are set out in the current Pilotage Directions.

Pilotage services for the Gloucester Harbour are presently provided under contract by the Gloucester Pilots' Partnership in accordance with the provisions of the Pilotage Act 1987.

10.2 Hydrographic Survey

A full survey of the harbour was conducted in 2000 and repeated in detail during 2015. Low water inspections and monitoring of the channels and shoal areas are carried out monthly (Reference 4) and the results distributed internally. Local Notices to Mariners (Reference 5) are promulgated in the event of navigational hazards being identified.

Major surveys are required to be carried out in accordance with the Hydrographic Code of Practice, unless otherwise agreed with the UKHO.

10.3 Information to Mariners

The UK Hydrographic Office receives all hydrographic information and any Local Notices to Mariners promulgated by the Trustees. Chart BA1166 (River Severn – Avonmouth to Sharpness) (Reference 8) is thereby kept up to date. Notices are published on the Trustees' website.

10.4 Prevailing Conditions

Harbour users are at liberty to obtain weather forecasts from the great number of usual official sources.

10.5 Provision of Aids to Navigation

The harbour is marked by a comprehensive, well-maintained and modern system of navigation aids, the characteristics and availability of which comply with internationally agreed guidelines. The routine inspection and maintenance regime is set out in Standing Instructions (Reference 9).

10.6 Anchorages

There are no formally-designated anchorages within the harbour.

10.7 Wrecks

There are currently no wrecks of any significance to navigation within the Gloucester Harbour. The Trustees will exercise their powers to deal appropriately with any wreck that is, or is likely to become, a danger to navigation.

10.8 Works Licenses

The Trustees' regulations and conditions for the issue and control of works and dredging licences is contained in the Management Plan (Reference 10).

11 Regulations and Compliance

11.1 Byelaws

The Gloucester Harbour Byelaws (Reference 1) are based on practical experience and are intended to enhance the safety of navigation and protect the environment. They are subject to periodic review.

11.2 General Directions

The Trustees have issued General Directions (Reference 12) to all vessels.

11.3 Port Passage Guidance

Vessels are required by law to produce passage plans. Port Passage Guidance (Reference 13) is provided by Pilots to augment and enhance passage plans.

11.4 Pilotage Directions

The Trustees have issued Pilotage Directions (Reference 14). With limited exceptions, all vessels operating in the harbour are subject to compulsory pilotage. GHT authorises pilots and issues Pilotage Exemption Certificates where appropriate.

In any case, the Trustees will ensure that the pilotage directions define the circumstances in which pilotage is to be compulsory, how and to which vessels they apply, and in what circumstances.

11.5 Collision Regulations

The Collision Regulations apply to all vessels navigating within the harbour

11.6 Enforcement

The policy regarding prosecution may be found in the Management Plan (Reference 10). The Trustees will monitor and, where appropriate, actively enforce compliance with the Gloucester Harbour bye-laws and directions. An apparent contravention of such bye-laws or directions may result in the prosecution of the offender.

12 Marine Services

12.1 Embarkation and Disembarkation of Pilots

The boarding and landing of Pilots is carried out in accordance with the provisions of statutory legislation and relevant Codes of Practice and with due regard to matters of health and safety. The current Code of Practice is set out at Appendix 5.

12.2 Maintenance of Navigation Aids

Aids to navigation are maintained to a level consistent with the availability criteria laid down by the General Lighthouse Authority (Trinity House). Defect reporting and rectification notices are submitted to Trinity House using the on-line "PANAR" system. This system may be used to produce a variety of reports relating to the status of the Aids to Navigation.

Characteristics of the aids to navigation comply with the recommendations and guidelines as set down by IALA.

Orders for the safe operation of the workboat and maintenance procedures are contained in Standing Instructions (Reference 9). These measures, together with the availability of data from channel monitoring, will assist a competent helmsman to navigate safely within the harbour.

12.3 Provision of Pilots

GHT recognises that the Pilots play a pivotal role in the safe navigation of the harbour by commercial craft. Manning levels are regularly reviewed to ensure that sufficient authorised pilots are available.

Pilot training is monitored and future training requirements will take the relevant National Occupational Standards into account. Generic ECDIS training is undertaken by pilots as required.

13 Hazard and Risk Register

The relevant principal accident categories listed in Annexe B of the International Maritime Organisation document "Formal Safety Assessment" (IMO MSC 69/INF.14 12.02.98) are used in this hazard and risk register.

Risk Rank Summary : Gloucester Harbour Trustees (13 March 2017)

Navigation

Rank	Reference	Title	Hazard Detail	Overall	Most Likely Risk				Worst Credible Risk			
					Environment	People	Property Vessels and Structures	Stakeholders	Environment	People	Property Vessels and Structures	Stakeholders
1	10	Collision between large vessel and recreational craft	Recreational craft navigating or anchored in main channel whilst large vessel is also navigating in main channel. Main channel is designated a "narrow channel" for the purposes of COLREGS.	4.35	0	5.92	3.5	0	0	5.92	2.43	4.43
2	11	Collision between recreational craft	Recreational/leisure craft collide with each other	4.01	0	5.92	0	0	0	5.92	2.43	2.43
3	18	A Passenger Vessel collides with a Small Vessel	A Passenger Vessel collides with a Small Vessel	3.91	0	4.43	0	2.43	0	5.92	2.43	5.92
4	16	Commercial Vessel collides with a Passenger Vessel	Commercial Vessel collides with a Passenger Vessel	3.87	0	3.5	3.5	3.5	3.5	4.85	4.85	4.85
5	17	A Passenger Vessel collides with another Passenger Vessel	A Passenger Vessel collides with another Passenger Vessel	3.81	0	3.5	3.5	3.5	2.87	5.09	4.08	4.08
6	23	Stranding - Passenger Vessel	Passenger vessel becomes fixed on an underwater feature or object, e.g. rock outcrop or sandbank such that the vessel cannot readily be moved by lightening, floating off or with assistance from other vessels.	3.28	0	2.43	2.43	2.43	4.43	4.43	4.43	4.43

Rank	Reference	Title	Hazard Detail	Overall	Most Likely Risk				Worst Credible Risk			
					Environment	People	Property Vessels and Structures	Stakeholders	Environment	People	Property Vessels and Structures	Stakeholders
7	12	Grounding - commercial vessel	A vessel coming to rest on or riding across underwater features or objects due to being out of position or attempting to navigate at an inappropriate time.	3.25	3.5	0	0	3.5	4.43	4.43	0	4.43
8	9	Collision between large (commercial) vessels	Commercial ships colliding at port entrance or en-route; same or opposite directions.	3.08	0	0	2.43	2.43	3.5	3.5	4.85	3.5
9	4	Commercial vessel or Passenger vessel making contact with a buoy or beacon	A commercial vessel or a passenger vessel transiting the harbour area contacts a fixed or floating aid to navigation	3	0	0	3.5	3.5	0	2.43	4.43	2.43
10	22	Grounding - Passenger Vessel	The vessel comes to rest or rides across underwater features or objects due to being out of position or attempting to navigate at an inappropriate time.	2.88	0	2.43	2.43	0	2.43	4.43	4.43	2.43
11	5	Commercial vessel contacts Severn Road Bridge or Second Severn Crossing	A commercial vessel makes contact with one of the road bridges during a passage through the harbour area	2.87	0	2.43	2.43	2.43	2.87	2.87	4.08	2.87
12	8	Small craft contact fishery structures	Small craft may come into contact with the submerged remains of old fishery structures (rows of wooden stakes) or current (steel) structures used for fishing purposes.	2.78	0	3.5	0	0	0	4.43	2.43	2.43
13	19	A large vessel contacts the Second Severn Crossing, the Severn Bridge, the Wye Bridge or Chepstow Bridge	Commercial vessel or passenger vessel makes contact with bridge piers/buttresses/caissons during navigation or as a result of a breakdown.	2.57	0	0	2.43	0	0	2.43	4.43	4.43
14	6	Commercial vessel makes heavy contact with the piers at the entrance to the dock	Vessel makes contact with a pier whilst approaching the entrance to Sharpness Dock	2.52	0	0	0	0	2.43	5.92	5.92	2.43

Rank	Reference	Title	Hazard Detail	Overall	Most Likely Risk				Worst Credible Risk			
					Environment	People	Property Vessels and Structures	Stakeholders	Environment	People	Property Vessels and Structures	Stakeholders
15	13	Stranding of a commercial vessel	Commercial vessel becomes fixed on an underwater feature or object, e.g. rock outcrop or sandbank such that the vessel cannot readily be moved by lightening, floating off or with assistance from other vessels.	2.42	0	0	0	2.43	4.43	0	0	4.43
16	7	Passenger vessel contacts pier at Sharpness Old Dock or at Lydney Dock	Passenger vessel makes heavy contact with the pier during berthing manoeuvres at Sharpness Old Dock or at Lydney Dock	2.09	0	0	0	0	2.43	4.43	4.43	4.43
17	20	A small craft (leisure/recreational) contacts a navigation aid	Small craft may contact an aid to navigation, causing damage to hull and/or rigging; vessel may get caught in structure due to strength of tide/wind.	1.69	0	0	0	0	0	4.43	2.43	2.43
18	14	Stranding of a recreational/leisure vessel	Recreational/leisure vessel becomes fixed on an underwater feature or object, e.g. rock outcrop or sandbank such that the vessel cannot readily be moved by lightening, floating off or with assistance from other vessels.	0.91	0	0	0	0	0	2.43	0	2.43
19	21	Grounding of a recreational/leisure vessel	A vessel coming to rest on or riding across underwater features or objects due to being out of position or attempting to navigate at an inappropriate time.	0.76	0	0	0	0	0	2.43	0	0
20	15	Contact with small craft mooring buoy or racing mark and chain	Unregulated moorings and buoy installations may present a hazard to small craft navigating in the harbour area, particularly if unlit or partially/completely submerged due to strength of tide or length of mooring chain. Unlikely to damage hull but could present a tangle hazard for propellors and fixed keel craft.	0.76	0	0	0	0	0	2.43	0	0

Risk Rank Summary : Gloucester Harbour Trustees (13 March 2017)

Maintenance activities ashore and afloat

Rank	Reference	Title	Hazard Detail	Overall	Most Likely Risk				Worst Credible Risk			
					Environment	People	Property	Stakeholders	Environment	People	Property	Stakeholders
1	3	Personal Injury (ashore)	Slips, trips, falls, exposure, cuts, grazes, falling items. All encountered during routine maintenance activities.	3.1	0	3.5	0	0	0	5.92	0	2.43
2	4	Large tidal range, strong tidal flows	Can affect work at sites of all offshore aids to navigation accessible on foot or by boat; could result in loss of or injury to personnel, trips and falls, loss of equipment if cut off by tide.	3.1	0	3.5	0	0	0	5.92	0	2.43
3	5	Working on, or close to, water.	Large tidal range and strong currents may be encountered whilst travelling to and working on aids to navigation (offshore) and when launching/recovering the workboat. Water may be contaminated (sewage, Weils Disease).	3.1	0	3.5	0	0	0	5.92	0	2.43
4	1	Fall from mast (onshore)	Falling from height whilst carrying out maintenance activities at onshore aids to navigation, e.g. changing light units, painting, cleaning.	2.89	0	2.43	0	0	0	5.92	0	4.43
5	2	Fall from mast (offshore)	Falling from height whilst carrying out maintenance activities at offshore aids to navigation.	2.63	0	3.5	0	0	0	4.43	0	2.43

GENERAL OPERATIONAL PROCEDURES AND ASSOCIATED LEVELS OF RISK

The 'Generic' Maritime Accident Categories which are assessed in the hazard and risk register are all pertinent to the operational procedures associated with the movement of craft throughout the Gloucester Harbour, and reference should be made to the register when considering the following commentaries on operational procedures.

1. Tug Availability

Tug and towage facilities are available from Royal Portbury, Avonmouth and Newport docks. The fleet (Portbury) is not permanently manned but the duty crew would expect to have a tug in the lock within one hour of call-out. Movement through the Royal Portbury Lock is possible from 4h before HW to 3h after HW. The tugs available draw between 3.5 and 5 metres. HW Avonmouth is approx. 45 minutes before HW Sharpness. Depending upon tidal levels and timing, it may be possible to provide tug assistance to disabled outbound vessels in the lower section of the Gloucester Harbour between Inward Rocks and the seaward limit, and for inbound vessels between the seaward limit and Sharpness. It is not anticipated that a permanent tug presence at Sharpness would fulfil any useful purpose given the constraints imposed by the tidal regime and the operation of the lock and basin gates at the entrance to Sharpness Docks.

Probability of successfully recovering a disabled vessel with tug assistance: 'high', provided that the vessel has been able to anchor in an appropriate location. Otherwise, 'moderate', but depending on circumstances.

2. Failure of Navigational Equipment in Poor Visibility

When navigational equipment aboard a vessel subject to compulsory pilotage fails in poor visibility such that the standard onshore lights and marks cannot be seen, the Pilot will advise the Master on the practicalities of continuing the voyage. A Pilotwatch Radar system provides independent radar coverage of the lower section of the Gloucester Harbour, specifically in the vicinity of the two Severn road bridges, thereby assisting the vessel to either continue on its voyage or be guided to a suitable location**.**

Overall probability of the equipment being inadequate or failing as described above is considered to be low. There are highly redundant navaids in the passage-critical areas.

3. Underkeel Clearance within the Gloucester Harbour

The point at which least underkeel clearance may be found is the outer sill at Sharpness Docks (0.5m above Chart Datum). The published Canal & River Trust minimum underkeel clearance required before vessels will be permitted to cross the sill varies from 0.61m to 0.91m. The sill is 0.5m above local chart datum.

The Pilot ensures, through continual assessment of the prevailing conditions, the time of high water, the characteristics of the vessel and adjustment of speed, that adequate underkeel clearance is maintained throughout the passage. For normal operations this is unlikely to be less than 1 metre west of the Bull Channel with the vessel in the deep water channel.

4. When the Required Minimum Underkeel Clearance for Entry to Sharpness Docks is Not Reached

Under certain conditions, it has been known for the tide to fall short of the predicted rise, leaving a vessel with insufficient clearance to enter Sharpness Docks. In this circumstance, the vessel would be expected to depart to a safe anchorage and resume the passage on a subsequent tide. Provided that the vessel is free from any defects in navigation, propulsion or manoeuvring equipment and departs promptly, adequate and safe underkeel clearance will be maintained throughout the Gloucester Harbour as the tide ebbs. The return voyage should not be undertaken in conditions of deteriorating weather or visibility.

Monitoring of tide heights and meteorological conditions enables an assessment of the likelihood of the predicted tide height being reached prior to a vessel entering the harbour area.

Probability of successfully undertaking the return voyage: 'high'.

5. Normal Navigation

Within the Gloucester Harbour, the tracks to be followed are indicated by a series of regularly inspected and maintained shore-based marks and transits, as well as several buoys and beacons adjacent to the channel. These are visible at appropriate distances and in the normally-prevailing conditions of visibility. Standard navigational procedures are set out in Appendix 7.

Probability of significant failure of GHT navaids during passage: 'low'.

6. Failure of GHT Navigation Aids

Offshore buoys and beacons are lit by solar/battery power and lamps with built-in redundancy. Onshore marks are lit by mains electricity. Offshore buoys and beacons are securely fastened to the river bed and are not subject to periodic shift in position. Onshore marks carry distinctive daymarks.

Availability of navigations aids (typically 99.99%) well exceeds IALA and Trinity House availability criteria. Risk of failure: 'low'.

7. Compulsory Pilotage

Most commercial vessels are subject to compulsory pilotage.

8. Use of Helmsman

It is the practice, when considered necessary by the Pilot and/or Harbour Master, for a second Pilot to be embarked to act as helmsman and assistant. (Refer to Pilotage Directions).

9. Passage Plan

Masters of vessels are required by international law to prepare passage plans and to declare any defects which may affect the safe conduct of the vessel. Pilotage passage plans are also prepared by the Pilots and discussed with the Master prior to and during the voyage. A pilotage passage plan specific to passenger vessel operations is provided for the use of such vessels.

11. Pilot Embarkation and Disembarkation Areas

Pilot embarkation and disembarkation areas are clearly defined on the appropriate chart, and particular reference is made through local Notices to Mariners and in Admiralty List of Radio Signals Vol. 6 to the usual embarkaton/disembarkation point to be used by Sharpness bound vessels. The use of alternative areas in the event of adverse weather or other factors is to be agreed by the Master and/or pilot and the pilot boat.

12. Pilot Boat

Pilot embarkation and disembarkation is currently carried out using properly manned and certificated boats and crew under an arrangement with an adjoining harbour authority (the Bristol Port Company). The Trustees do not operate or maintain craft for this purpose.