



NOTE: The *Mariners' Guide to Bridges on the Tidal Thames* must be used in conjunction with up-to-date charts, which are available at this url:

<https://www.pla.co.uk/Safety/PLA-Hydrographic-Service-Published-Surveys>

NOTICE TO MARINERS 11 of 2015

UPDATED PLA PUBLICATION **MARINERS' GUIDE TO BRIDGES ON THE TIDAL THAMES**

In line with current Port of London Authority (PLA) policy, the PLA's publication entitled the Mariners' Guide to Bridges on the Tidal Thames (2nd Edition) is subject to a regular three-yearly review. The current publication is essentially up to date; however a few bridge lights have been removed, and due to improved survey capability the table of Bridge Clearances have been modified.

The following amendments should be made to all Mariners' Guide to Bridges on the Tidal Thames (2nd Edition) to ensure that they remain up to date:

In all sections where bridges are displayed in picture or diagram formats (particularly the Thames Bridge Photographs section and Appendix D Bridge Silhouettes), the following amendments should be noted:

Blackfriars Rail and Road Bridge's

Working Arch Lights are now also displayed above Number 4 arch

Charing Cross Rail Bridge

Working Arch Lights are now also displayed above Number 4 arch

Fulham Rail Bridge

Lights have been extinguished above Number 2 and 4 arches

Putney Bridge

Lights have been extinguished above Number 2 and 4 arches

Please also note that the picture in Appendix G should state: ARCH CLOSURE SIGN.

Please note that Appendix A – THAMES BRIDGE CLEARANCES in the Mariners' Guide to Bridges on the Tidal Thames, is no longer valid and the table below should be used in its stead.

Bridge	Individual Span Clearance Heights above MHS							Navigation Span Clearance Heights above				
	1	2	3	4	5	6	7	Chart Datum	MHWN	MLWN	MLWS	HAT
Snapper	2.7							5.4	4.0	5.4	5.4	2.3
Richmond	3.5	4.4	5.3	4.3	3.0			7.9	6.5	7.9	7.9	4.8
Richmond Railway	5.3	5.4	5.3					8.0	6.6	8.0	8.0	4.9
Twickenham	5.7	5.9	5.6					8.5	7.1	8.5	8.5	5.4
Richmond Foot		5.5	5.4	5.4	5.1			10.4	6.7	10.4	10.4	5.0
Lots At Footbridge	3.7							9.1	4.9	8.9	9.0	3.2
Kew	4.3	5.2	4.2					10.5	6.4	10.4	10.5	4.7
Kew Railway	5.3	5.3	5.3	5.5	5.5			10.9	6.7	10.8	10.9	5.0
Chiswick	6.4	6.6	6.4					12.0	7.8	11.9	12.0	6.1
Barnes Railway	5.4	5.4	5.3					10.9	6.6	10.7	10.9	4.9
Hammersmith (Sc	2.4	3.6	2.5					9.3	4.7	9.0	9.3	3.1
Putney	3.4	4.4	5.3	4.4	3.5			11.2	6.4	10.8	11.1	4.8
Fulham Railway	6.3	6.5	6.8	7.1	7.3			12.8	8.0	12.3	12.7	6.3
Wandsworth	3.1	5.8	3.1					11.9	7.0	11.4	11.8	5.3
Battersea Railway	6.0	6.0	6.0	6.0	6.0			12.1	7.1	11.5	11.9	5.5
Battersea	2.5	4.0	5.6	3.9	2.5			11.8	6.7	11.2	11.7	5.0
Albert	4.3	5.4	5.3	4.2				11.6	6.5	11.0	11.5	4.5
Chelsea	6.3	6.6	6.3					13.0	7.8	12.3	12.8	6.1
Victoria Railway	6.0	6.1	6.0	6.0				12.4	7.2	11.7	12.2	5.5
Vauxhall	3.9	5.1	5.7	5.1	3.9			12.2	6.9	11.4	12.0	5.2
Lambeth	3.2	5.2	6.4	5.2	3.4			13.1	7.6	12.2	12.8	5.9
Westminster	4.2	4.8	5.2	5.4	5.2	4.8	4.2	12.2	6.5	11.1	11.8	4.8
Charing Cross Ra	6.9	7.0	7.0	6.9	6.9			13.7	8.1	12.7	13.3	6.5
Waterloo	6.2	8.5	8.6	8.6	6.1			15.4	9.8	14.3	15.0	8.1
Blackfriars		6.1	7.0	5.9	4.5			13.9	8.1	12.7	13.5	6.5
Blackfriars Railway		7.3	7.3	7.4	7.3			14.2	8.5	13.0	13.8	6.8
Millenium Foot	8.6	8.9	6.4					15.8	10.1	14.7	15.5	8.4
Southwark	5.6	6.5	7.2	6.6	5.6			14.1	8.3	12.9	13.7	6.7
Cannon Street Ra	6.8	7.0	7.2	7.0	6.8			14.2	8.4	13.0	13.8	6.7
LondonBridge	6.6	8.7	6.7					15.8	9.9	14.5	15.4	8.2
Tower	6.8	8.5	6.8					15.6	9.7	14.3	15.2	8.0
QE2	54.1 (centre arch)							60.7	55.2	59.3	60.2	53.4

28 July 2015

Port of London Authority
London River House, Royal Pier Road,
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DAVID PHILLIPS
CHIEF HARBOUR MASTER



TO RECEIVE FUTURE NOTICES TO MARINERS BY E-MAIL,
PLEASE REGISTER VIA OUR WEBSITE www.pla.co.uk
Telephone calls, VHF radio traffic, CCTV and radar traffic images may
be recorded in the VTS Centres at Gravesend and Woolwich



FOREWORD

The tideway through central London is one of the most challenging inland waterway passages that any mariner is likely to make in the UK – if not in Europe. What makes it particularly challenging are the bridges, 7 metre tidal ranges, tidal rates over 4 knots and the traffic density – the Thames is the busiest waterway in the UK and the Tower Bridge lifeboat has more callouts than any other lifeboat station. The bridges are all different; sometimes the piers are aligned, sometimes not; some are on bends, some are not; some are close together and some far apart – you need to take care and regard the tidal Thames with proper respect.

Whether or not you are experienced in navigating your vessel through central London, this booklet will help you plan and execute your passage in greater safety – a vital objective that we all share.

Remember the old adage **‘If you are the skipper, you are responsible for the safety of your vessel and crew’**

A handwritten signature in black ink, appearing to read 'D. Phillips', with a horizontal line underneath.

David Phillips
Chief Harbour Master

“The tideway through central London is one of the most challenging inland waterway passages that any mariner is likely to make in the UK”



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INTRODUCTION

A wealth of information has been published over the years about the various bridges spanning the tidal Thames. However, it is fair to say that, in the main, that information is normally published in a wide variety of books and formats. As the navigational authority for the tidal Thames, the Port of London Authority (PLA) is very aware of the challenges and potential difficulties facing the mariner when navigating the bridges on the tideway, especially those in central London.

With the assistance of experienced local practitioners, the PLA has drawn together the relevant information likely to be of use and value to those navigating the Thames bridges, whether they be commercial or leisure users, whether they are passing through for the first time or have worked on the river for many years. Where a passage is required that has minimal headroom due to air draught then the PLA's bridge pilots should be contacted for further information and assistance with passage planning.

Layout

This book provides information and guidance on navigational issues for all the existing 29 bridges on the tidal Thames between the Queen Elizabeth II Bridge at the Dartford Crossing and Richmond Road Bridge. It also includes details of Richmond Lock and Weir, which is maintained and operated by the PLA.

Following the introductory section, which provides background information on local rules, regulations and advice, the main body of the book presents information on all the bridges on the tideway, laid out in a double page format for ease of use. The description and references to north and south shores relates to a passage from east to west i.e. up river. Each crossing is represented with a photograph (usually shown proceeding upstream), plan (charted) view (usually shown proceeding downstream), a side elevation drawing (not to scale) and descriptive text, which includes detail on working arches, bridge heights, tide sets and distances, construction and history and issues around safe navigation from the perspective of a wide range of commercial and leisure river users.

Several appendices complete the book, which include a table of bridge clearances, a set of bridge silhouettes for inward and outward passages (not to scale), bridge tidal set information and tables of tidal differences and distances within the port.

Acknowledgements

The PLA wishes to acknowledge the contributions of a number of experienced local practitioners both commercial and leisure based, its own marine staff, and also various user associations and representative bodies in the development of this publication. The guidance contained within it relates primarily to their practical experiences and we thank them for their input.

The photographs reproduced here were taken by John Nelligan and Gavin Parsons and remain subject to PLA copyright.

LOCAL RULES, ADVICE AND INFORMATION

Designation of Bridge Arches

Following long established custom and practice bridge arches on the tidal Thames are numbered from the north (Middlesex) shore. Thus, using Westminster Bridge as an example, No. 1 arch lies on the north side close by the Houses of Parliament and Westminster Pier, and No. 7 arch on the south shore adjacent to St Thomas's Hospital. Mariners should note however, that the only current exception to this convention is the Thames Barrier at Woolwich, where the piers are numbered (one to nine) from the north shore, and the barrier spans are lettered (A to K) from the south shore.

Bridge Clearances

The tidal Thames has a significant tidal range and as such, the need for proper passage planning when navigating its bridges is especially important. To assist this process, the PLA publishes a Table of Bridge Clearances, which provides the headway (in metres) of the centre arches of all the bridges. Several reference points are detailed, including Chart Datum, Mean High Water Springs, Mean High Water Neaps, Mean Low Water Springs, Mean Low Water Neaps and Highest Astronomical Tides. This Table is reproduced at Appendix A. To assist the mariner in determining safe clearances, a supporting table: Chart Datums and Standard Levels in the Port of London is included at Appendix C.

Authorised Channel

The Authorised Channel is shown on both Admiralty and PLA charts as a pair of pecked lines that mark where the majority of commercial vessels generally navigate. In the busy stretches of Central London the Authorised Channel is about 100m wide and incorporates the working arches of the bridges; at peak times the Authorised Channel can become very congested. Masters of passenger vessels needing to reduce speed in order to give sight seeing passengers a fuller commentary or photo opportunity should, where possible, keep clear of the Authorised Channel to allow other vessels to pass safely, while always obeying the Colregs etc.

Bridge Lights and Signals

Arches Open to Navigation

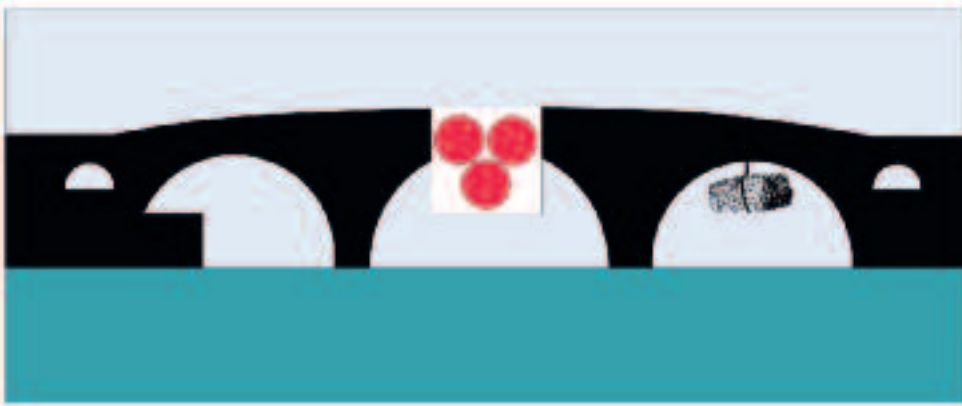
With the exception of the Queen Elizabeth II Bridge, the main working arches (those usually lying in the Authorised Channel) of bridges on the tidal Thames are identified by day and night by two orange (or amber) lights placed side by side in the centre (highest part) of each arch.

Arches Closed to Navigation

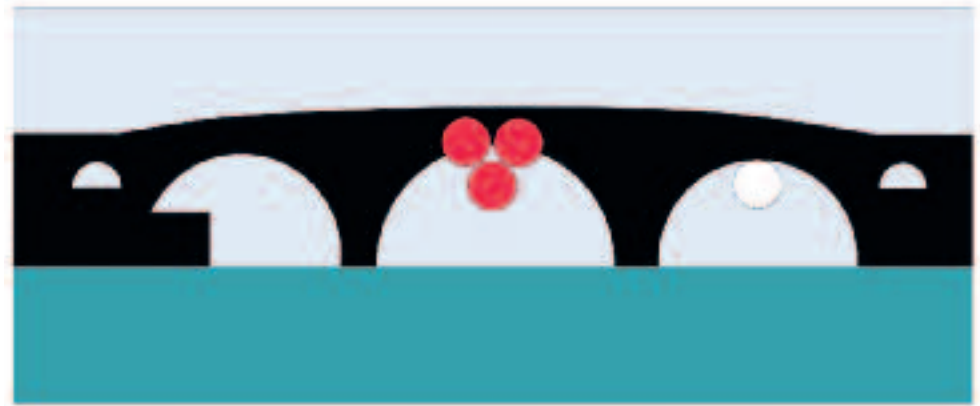
Bridge arches may be closed to navigation, either temporarily or in some cases, permanently, for a number of reasons. The most usual circumstance will be to allow essential engineering or maintenance work. However, navigation may also be temporarily suspended for navigational reasons; for example there may be an obstruction in or adjacent to the arch. When an arch is closed to navigation, the following signals will be displayed in the centre of the relevant arch:

- By Day – 3 red discs 0.6 metres in diameter at the points of an equilateral triangle with the apex downwards and the base horizontal; and
- By Night – 3 red lights in place of the discs displayed by day.

Restricted Headroom by Day:



Restricted Headroom by Night:



Restricted Headroom

When the headroom of an arch is reduced from its usual limits, most likely due to civil engineering work or maintenance, but still open to traffic, the following signals will be suspended in the centre of that arch:

- By Day – A bundle of straw large enough to be easily visible and displayed at the height of restricted headroom; and
- By Night – A white light in place of the bundle of straw.

Special Signal Lights

To assist those navigating in these busy waters and to alert mariners to the fact that larger vessels may be approaching (either from ahead or astern) and which may be temporarily obscured by bridges, piers, other traffic or obstructions, a system of warning lights known as Special Signal Lights is in operation. The Special Signal Lights are situated on both the upstream and downstream sides of the main navigable arches in relation to the Authorised Channel, which are normally used by Reporting Vessels. The lights are provided on all bridges (except the Millennium Footbridge) between and including Tower Bridge and Wandsworth Bridges.

The requirement to use the Special Signal Light system is described and enforced through the PLA's General Directions for Navigation in the Port of London.

In summary, these regulations require all Reporting Vessels (see definition below) navigating through bridges in this area to navigate through the bridge arches fitted with the Special Signal Light units (except when otherwise directed or when prudent navigation would otherwise require) and for other vessels not to obstruct their passage. In order to activate the Special Signal Lights and thus alert other river users to their presence and the fact that they are about to navigate through the arch displaying the signal, all such vessels are also required to carry on board an operational electronic keying device capable of activating the Special Signal Lights.

Each Special Signal Light consists of a high intensity white light, visible by day and by night, which is illuminated only when it has been activated by a keying device on board a Reporting Vessel, or by (London VTS) at the Thames Barrier Navigation Centre.

The characteristics of the Special Signal Lights are as follows:

1. When activated by a single Reporting Vessel – Isophase White 4 seconds (i.e. 2 seconds ON, 2 seconds OFF).
2. When activated by an additional Reporting Vessel(s) in the same vicinity – Very Quick Flash (i.e. 90 flashes per minute).

Keeping a Proper Lookout

The Thames in central London can be a very congested waterway especially during the busier summer months. Not only in terms of commercial and leisure vessel traffic (especially around the high water periods) but also due to the natural topography and course of the river (which has been compounded in some ways by the embankments) and the numerous bridges, piers and adjacent buildings and permanently moored vessels. As a result, lines of sight for the mariner are sometimes very limited, and the need for all those navigating to keep a proper and effective lookout is especially important.

Reporting Vessel

Definition:

“Reporting Vessel” means every vessel which is required by these Directions to report its position, intentions or movements, specifically:

- a) vessels of more than 40 metres in length overall,
- b) vessels of Gross Tonnage of more than 50 tons which ordinarily also navigate outside the Thames; and
- c) tugs engaged in towing, or about to tow one or more vessels.

General Directions and Thames Byelaws

As the navigational authority for the tidal Thames the PLA manages the movement of vessels on the river through local rules and regulations, in particular General Directions (see above) and Thames (previously River) Byelaws. Mariners navigating the London bridges, and especially those in charge of vessels, are urged to ensure that they are suitably familiar with the various Directions and Byelaws.

Hard copy versions of all PLA regulations, Codes of Practice, guidance for recreational users and other navigational information for recreational users are available from the PLA’s Gravesend office (Tel. 01474 562200) or can be viewed or downloaded from the PLA website: www.pla.co.uk.

Rowing in the Tideway

The upper reaches of the tidal Thames are primarily utilised by recreational and leisure users and many of these are rowers and scullers. Following an extensive and detailed risk assessment, the PLA, in association with the Thames Regional Rowing Council, introduced a comprehensive Code of Practice for Rowing on the tidal Thames above Putney entitled ‘Rowing on the Tideway’.

Not only is it important for rowers to be familiar with the established rules for general navigation in the port and the specific rowing rules and guidance contained in the Code, it is equally important for non-rowers to be aware of these special rules and arrangements in order to ensure that where rowed craft and powered vessels do interface, they do so safely and without incident.

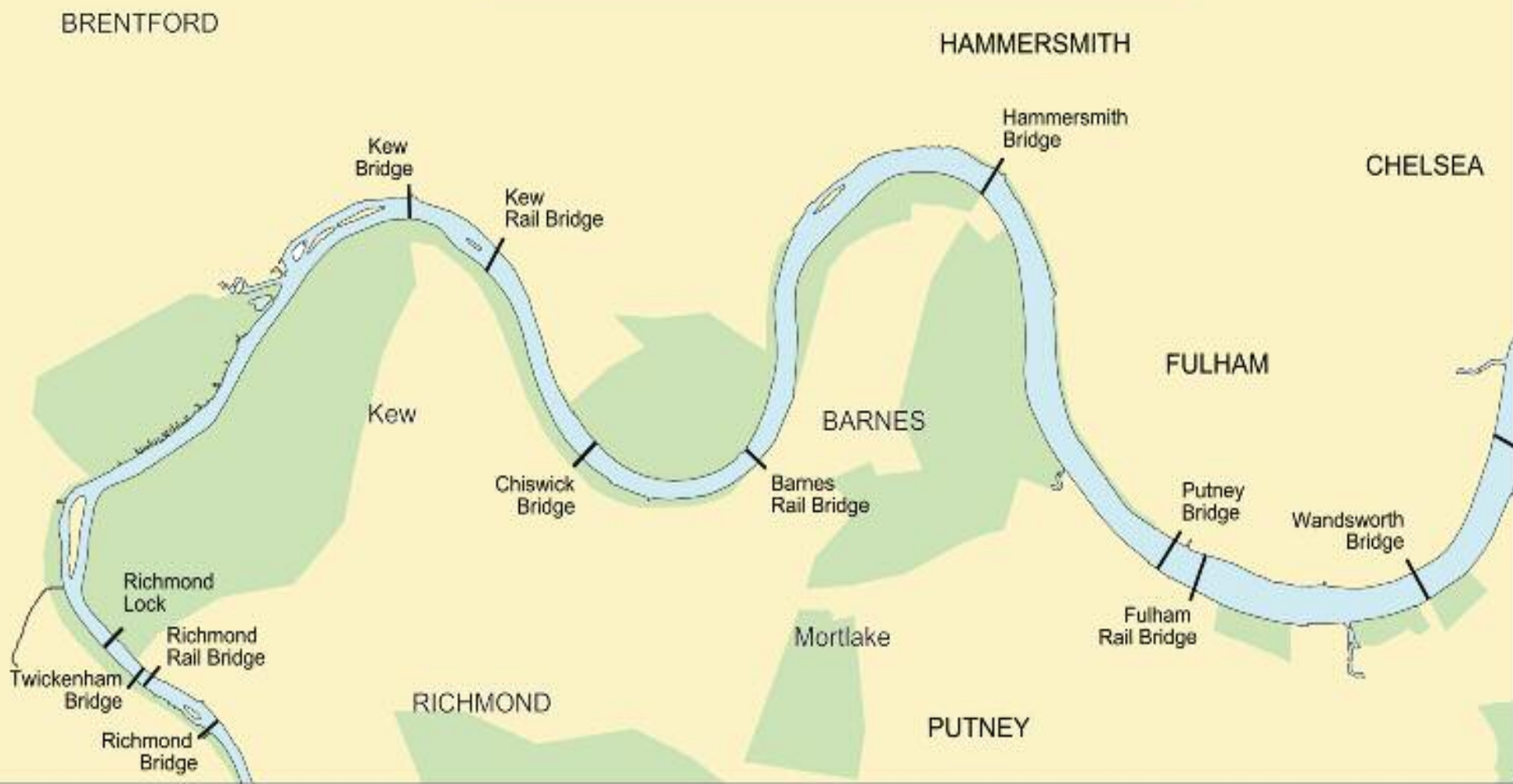
The Code of Practice can also be viewed or downloaded from the Thames Regional Rowing Council website: www.thames-rrc.org.

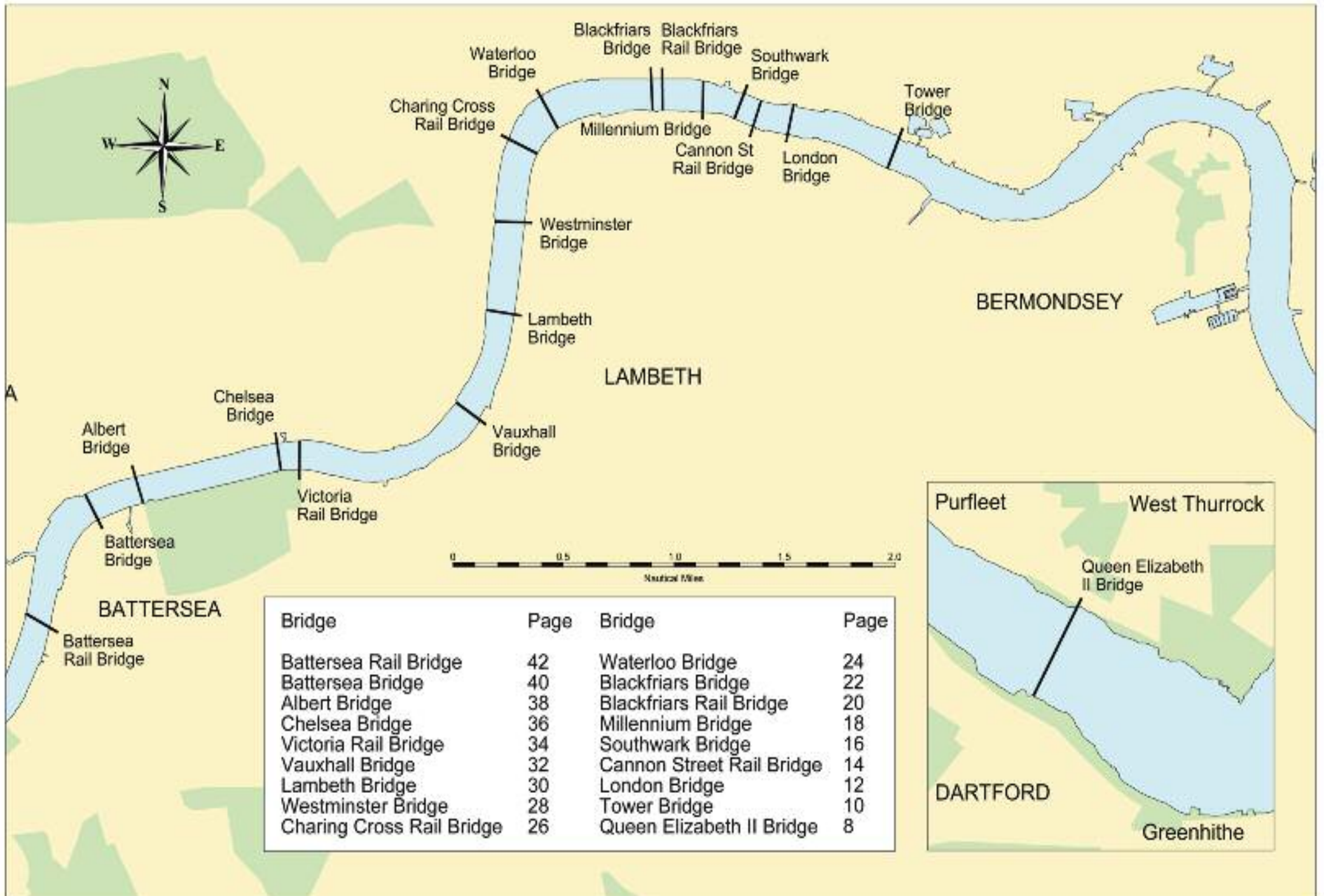
THAMES BRIDGES

PHOTOGRAPHS, PLANS AND GUIDANCE TO NAVIGATORS

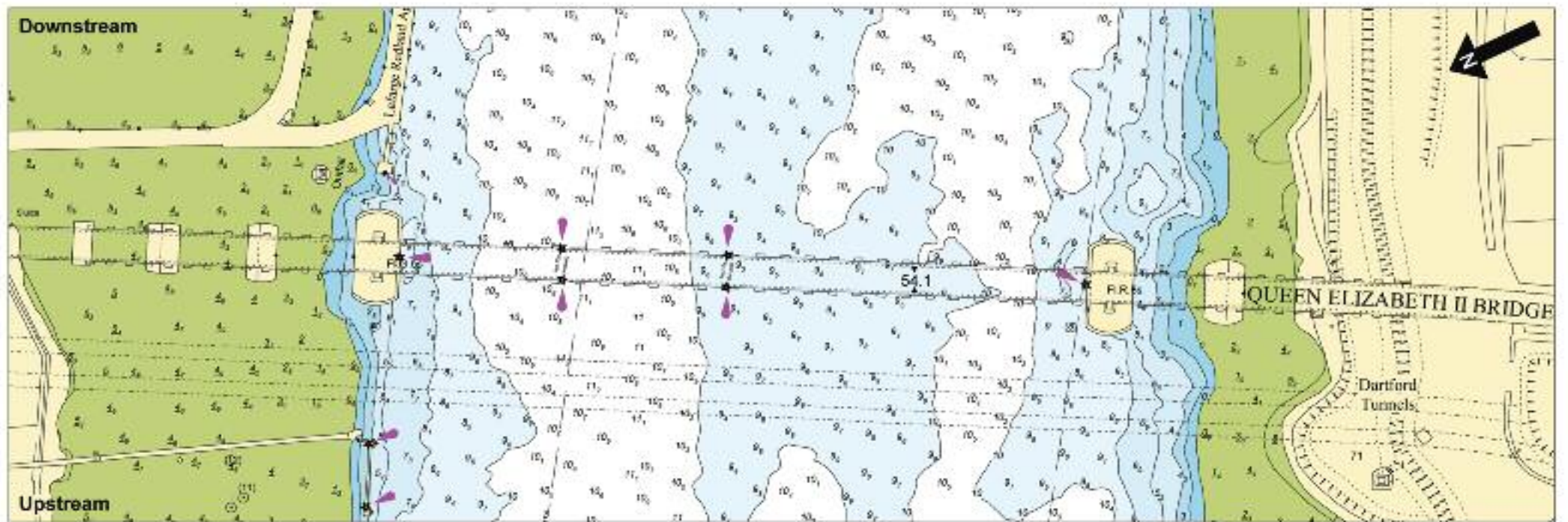
Bridge Location Map & Index

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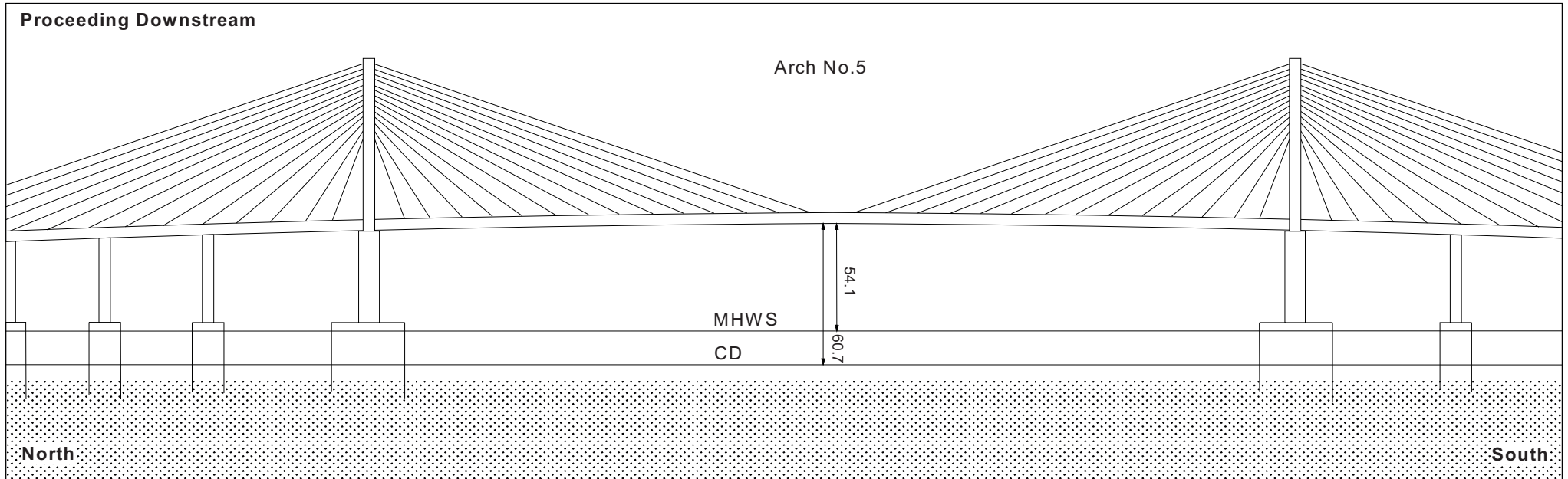




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QUEEN ELIZABETH II BRIDGE



Working Arches	Centre	Distance below London Bridge	17.7nm	Height in Main Navigable Arch	60.7m above CD	Distance above Gravesend	5.45nm
					54.1m above MHWS	White Isophase Lights	Yes

Brief Description

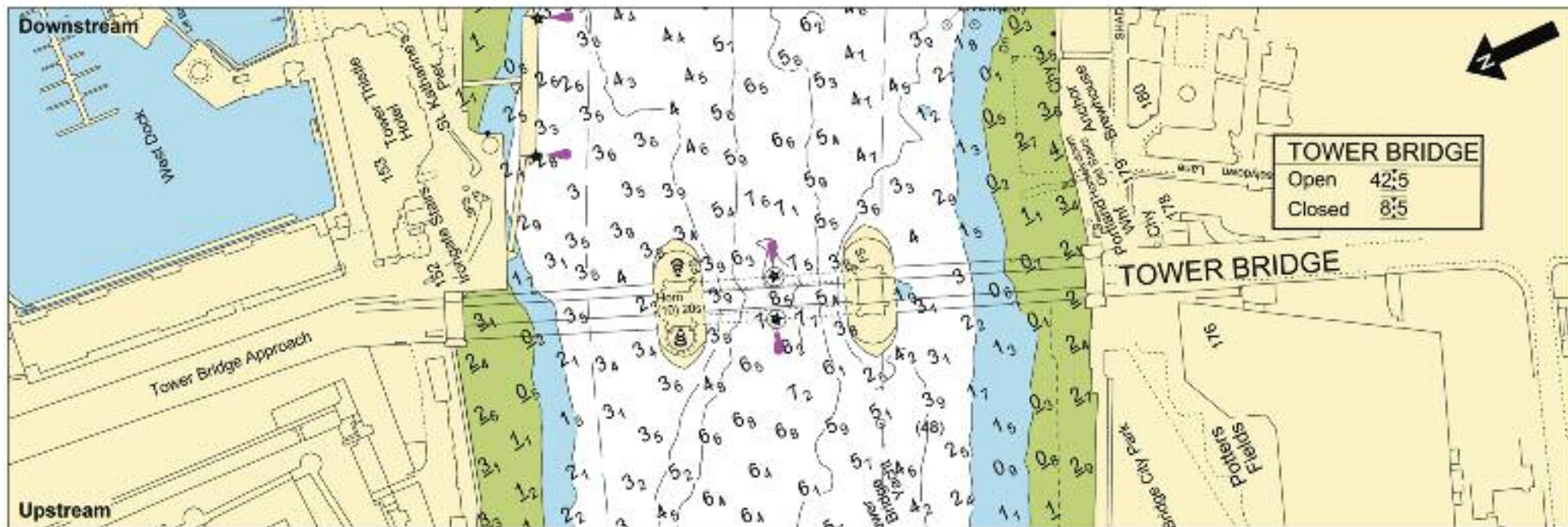
A road bridge with a single navigable arch, which is situated approximately one third of the way up Long Reach.

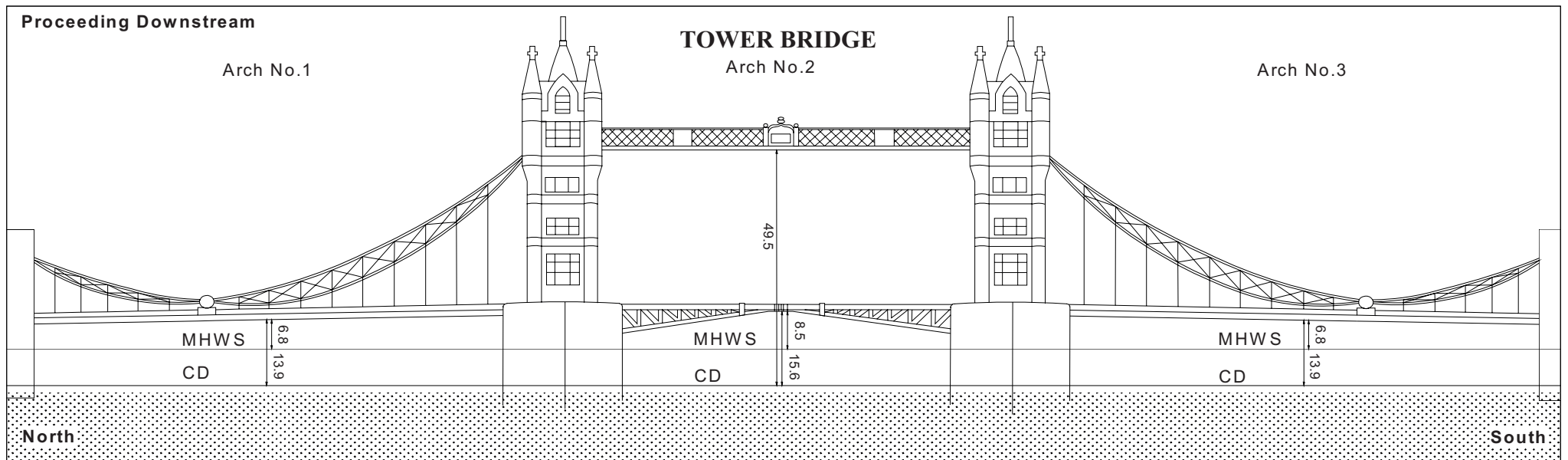
When it was opened in 1991, this was the largest cable stayed bridge in Europe. Twin concrete towers at each end of the 450 metre main arch support the cables holding the deck. Concrete viaducts form the approaches to both the north and south side arches.

Navigating the Bridge

There are no particular issues in navigating this bridge, providing that traffic keeps to the correct (starboard) side of the channel. There are operational berths close above and below the bridge and passing traffic should be aware of regular vessel movements on or off these berths. Shipping movements are predominantly on the north shore, but large tankers also serve Littlebrook Power Station on the south side just above the bridge.

Headroom is significant, but is a limiting factor on the larger 'super' yachts and sail training ships. Two white isophase lights mark the highest point of the bridge deck over the river. The least headroom is on the south side adjacent to the southern pier. The greatest headroom is between the isophase lights, on the north side of the channel, and not in mid-arch. Headroom is reduced by up to 3.5m when maintenance gantries are in place. PLA Permanent Notices to Mariners refers.





Working Arches	1, 2 & 3	Distance below London Bridge	0.49nm	Height in Main Navigable Arch	15.6m above CD - Closed	Distance above Gravesend	22.65nm
					49.5m above CD - Open	Special Signal Light	Yes

Brief Description

A road bridge with three arches, all of which are navigable, dependent upon the height of tide and the vessel involved. The Special Signal Light is sited above the centre arch. When the bascules are open, a green light is shown, by day and by night, both up and downstream from the piers on each side of the bascules. When the bascules are closed, the green light is replaced by a red light.

Situated in the Upper Pool, Tower Bridge is the only lifting bridge on the tidal Thames and was completed in 1894. The double-leaf bascules to the centre span are now operated electrically. Each bascule weighs over 1,000 tonnes. The abutments and intermediate support towers are stone clad with suspension type arches to each side of the main arch itself.

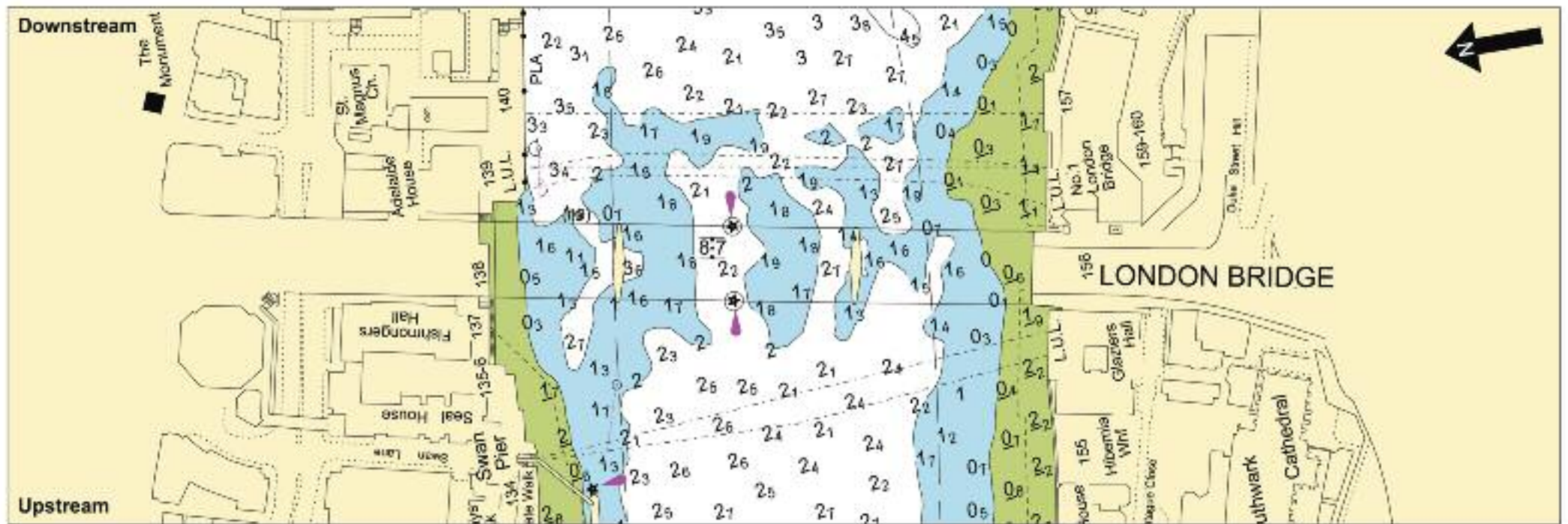
Navigating the Bridge

Always take great care in this area, and reduce your speed. Watch for the unexpected. Special procedures apply for large (high air draught) vessels wishing to navigate Tower Bridge – See PLA General Directions. Tower Bridge is also a reporting point for outward bound reporting vessels.

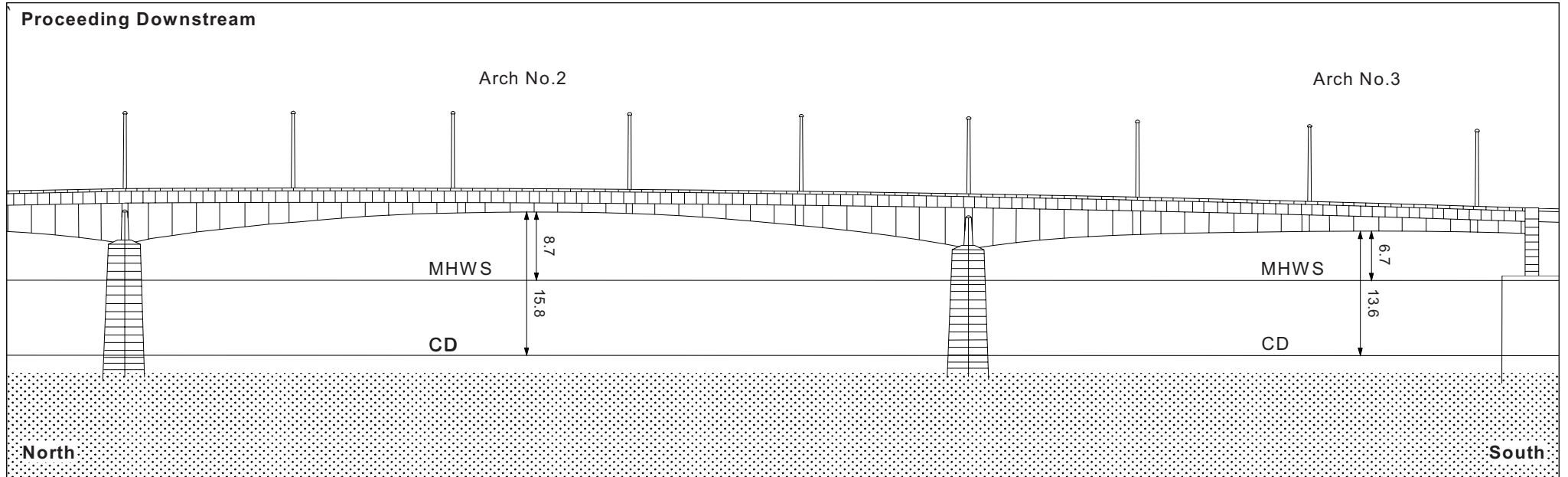
There is frequently heavy congestion at all states of the tide with commercial pleasure vessels and fast ferries plying to and from the various berths in the area, including: Tower Pier, Butlers Wharf Pier and St Katharine's Pier. In addition, there is usually a steady stream of through traffic. This includes tugs towing barges and self-propelled ballast barges proceeding upriver through Tower Bridge between 3½ to 2 hours before high water. The same craft may also be transiting outward bound at anytime between 2½ before and 1 hour after high water. The smaller self-propelled barges may also be departing outward bound on the ebb tide between 1½ and 3 hours after high water.

During the summer months cruise ships may be manoeuvring for Tower Bridge Upper Tier (HMS Belfast). Vessels up to 90m in length may swing in the Upper Pool on the flood tide in order to berth head down alongside HMS Belfast.

No. 1 arch should be used by smaller vessels inward bound, if the way is clear to navigate. Outward bound smaller vessels should use No. 3 arch if they are able to manoeuvre safely around the moorings between HMS Belfast and Tower Bridge. Occasionally, outward bound Class V passenger vessels use No. 1 arch when moving from Tower Pier to St Katharine's Pier. St Katharine's Marina lock is operational for 2 hours either side of high water. During this period the area becomes very congested, with private cruisers and yachts, wishing to enter or exit the marina lock.



LONDON BRIDGE



Working Arches	2 & 3	Distance above London Bridge	0.0nm	Height in Main Navigable Arch	15.8m above CD	Distance above Gravesend	23.13nm
					8.7m above MHWS	Special Signal Light	Yes

Brief Description

The site of the first bridge over the Thames, the current structure was built in 1970's. The three arched spans, piers and abutments are faced in pre-cast concrete panels.

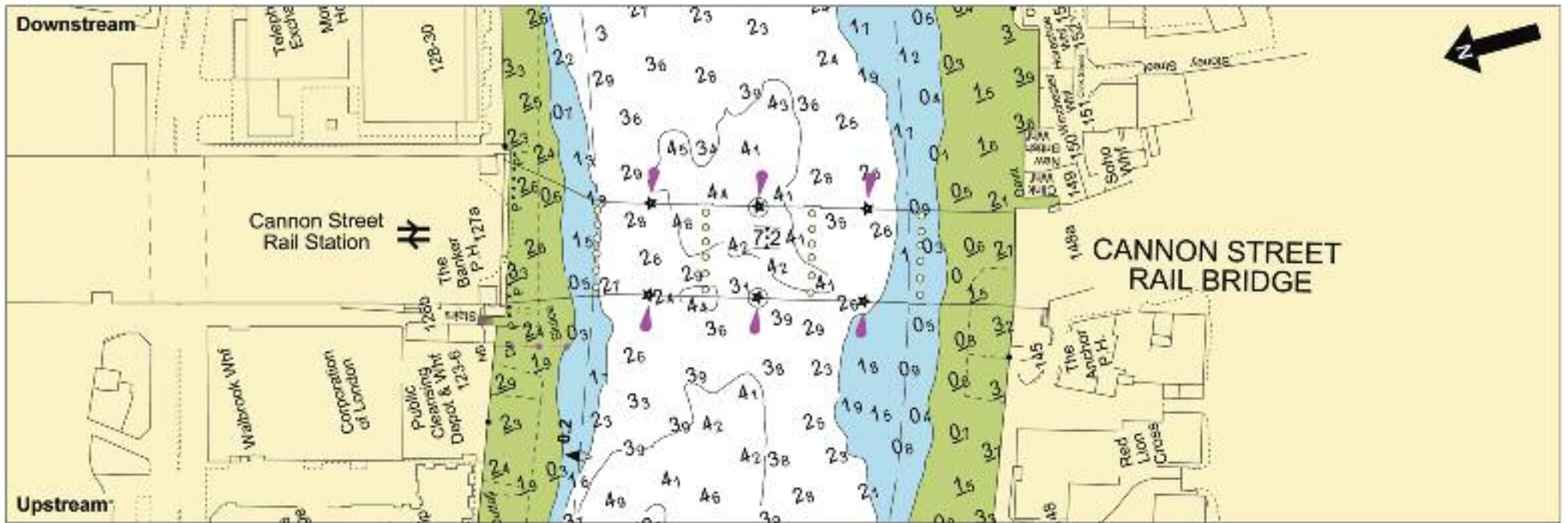
Navigating the Bridge

This bridge has three navigable arches. However, No. 2 arch is used by the majority of traffic, both inward and outward bound, and carries the Special Signal Light. All smaller, outward bound vessels should use No. 3 arch whenever possible. Shoal areas exist on the lower side of the bridge, which can cause problems for mariners at low tide.

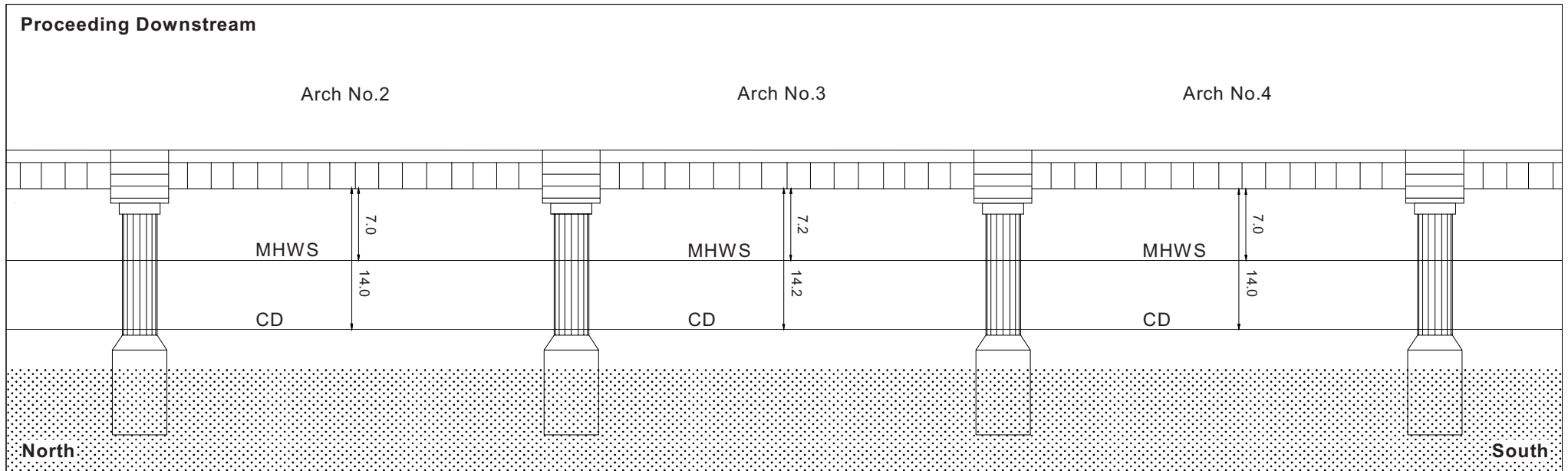
Regular crossing, passing and manoeuvring traffic in the area includes vessels calling at and leaving London Bridge City Pier and Swan Pier at all states of the tide. Traffic should also be aware of the commuter vessels travelling on the river between Chelsea and all destinations down river to Greenwich.

London Bridge leads into Kings Reach, a long and sinuous reach, which winds ultimately to the south through to Westminster Bridge.

All small craft and vessels with low freeboard, navigating on the ebb tide especially with the wind blowing from the easterly quarter, should be aware that there is an area of rough water immediately downstream of the bridge, with a standing wave that can reach a metre in height.



CANNON STREET RAIL BRIDGE



Working Arches	2, 3 & 4	Distance above London Bridge	0.16nm	Height in Main Navigable Arch	14.2m above CD 7.2 m above MHWS	Distance above Gravesend	23.29nm
					Special Signal Light		Yes

Brief Description

A rail bridge with five square arches, with the centre three being lit for navigation. The centre arch No. 3 carries the Special Signal Light.

Four intermediate supports each comprising six circular cast iron cylinders support the five wrought iron beam spans of the railway bridge which was opened in 1866 and widened in the 1890's. It was originally known as Alexandra Bridge.

Navigating the Bridge

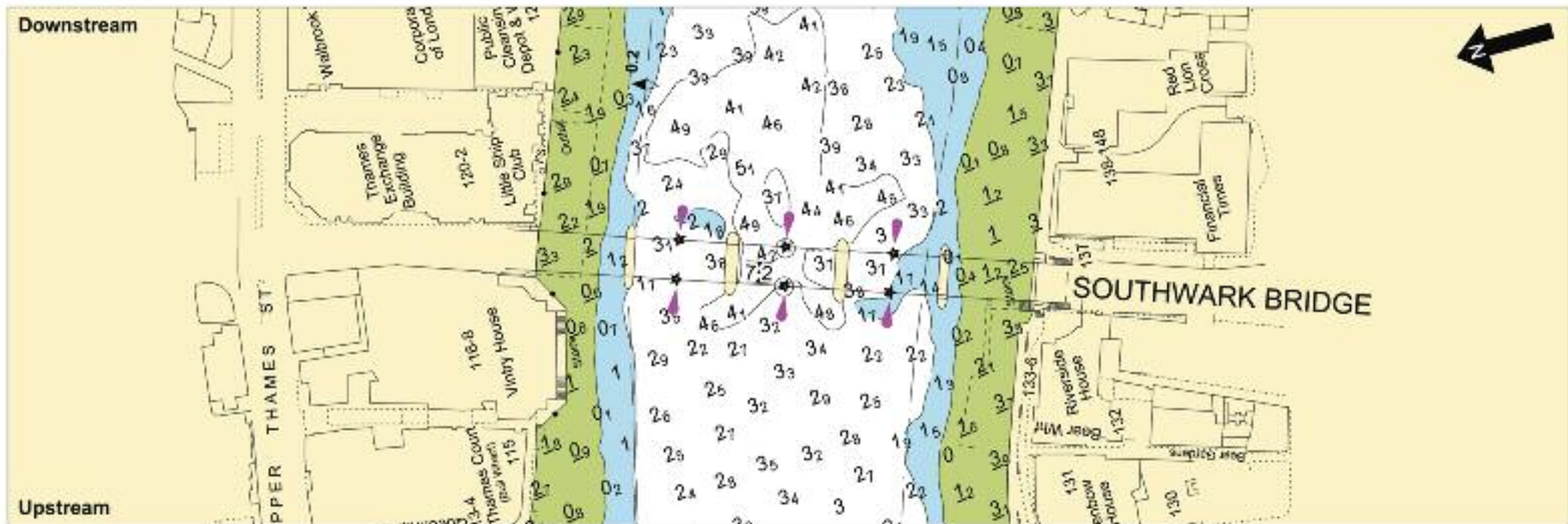
Cannon Street Bridge and the next bridge to the west; Southwark Bridge, are close together. Cannon Street Bridge presents a dog-leg approach to Southwark Road Bridge and as such should be approached with caution with due consideration being given to the tidal set and the effect of this on the vessel. Between these bridges, on the north bank, is Walbrook Wharf. This is a waste transfer station and is serviced by tugs and barges on the flood tide. To manoeuvre their barges safely on and off the berth, tugs need to navigate on the 'wrong' side of the channel, against the in-coming tide. During this operation No. 2 arch of Southwark Bridge is restricted to navigation. Prior to these operations the tug concerned will call London VTS at the Thames Barrier Navigation Centre and report its intentions. Details will be repeated by London VTS in a general navigational broadcast.

Smaller Vessels Inward Bound

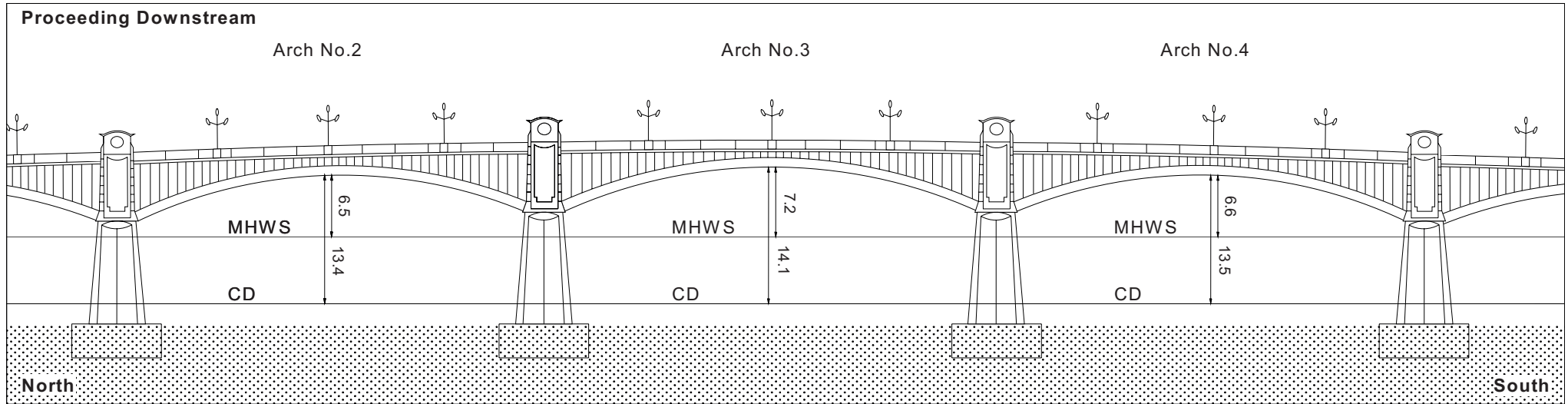
No. 2 arch should always be used by smaller commercial and leisure inbound traffic whenever safe and possible, leaving the centre arch clear for larger and Reporting Vessels.

Smaller Vessels Outward Bound

When possible, No. 4 arch should normally be used by smaller outbound traffic, leaving the centre arch clear for larger and Reporting Vessels.



SOUTHWARK BRIDGE



Working Arches	2, 3 & 4	Distance above London Bridge	0.25nm	Height in Main Navigable Arch	14.1m above CD	Distance above Gravesend	23.37nm
					7.2m above MHWS	Special Signal Light	Yes

Brief Description

A road bridge with five curved arches, with the three centre arches being lit for navigation. The centre arch No. 3 carries the Special Signal Light.

The bridge was rebuilt in 1921 and comprises four intermediate stone faced piers supporting five steel arches.

Navigating the Bridge

Southwark and Cannon Street Bridges are close together. Southwark Bridge presents a dog-leg approach to Cannon Street Bridge when navigating downstream and as such should be approached with caution with due consideration being given to the tidal set and the effect of this on the vessel. Between the bridges, on the north bank, is Walbrook Wharf. This is a waste transfer station and is serviced by tugs and barges on the flood tide. To manoeuvre their barges safely, tugs need to navigate on the wrong side of the channel, against the in-coming tide. During this operation No. 2 arch of Southwark Bridge will be restricted to navigation. Prior to these operations the tug concerned will call London VTS at the Thames Barrier Navigation Centre and report its intentions. Details will be repeated by London VTS in a general navigational broadcast.

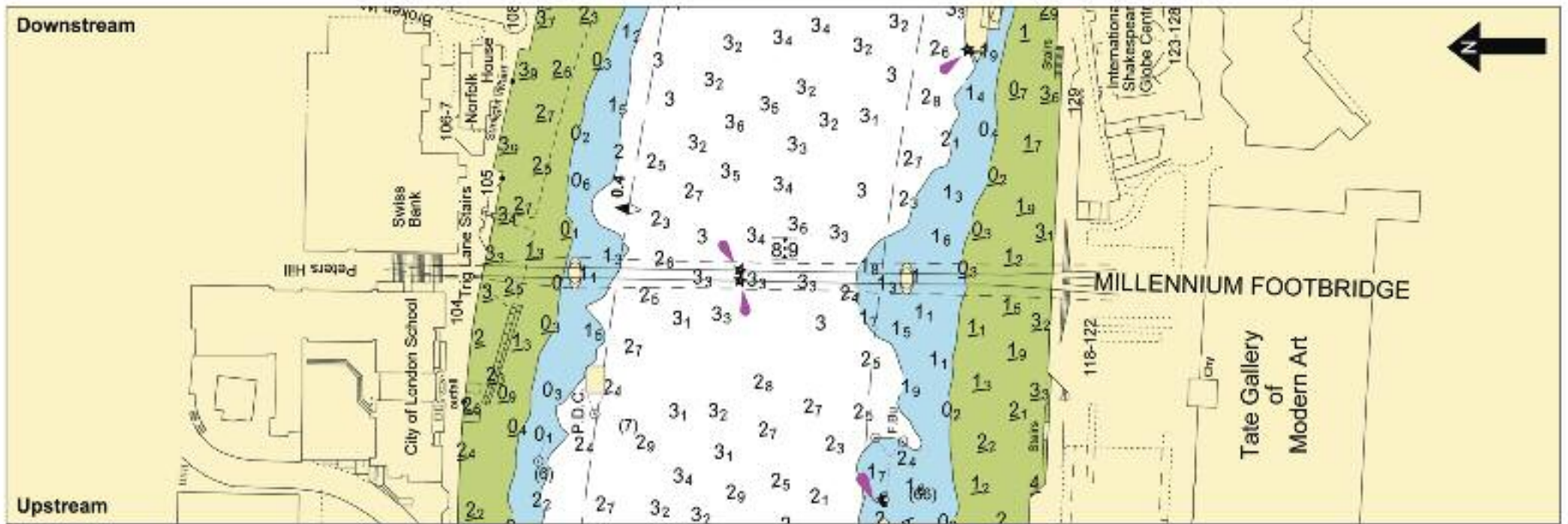
Just upriver from the bridge, located on the south side, is Bankside Pier (which also services the Globe Theatre). This pier is in constant use by commercial pleasure craft and fast passenger vessels. The services from this pier operate in both directions, up and downriver. Always listen for sound signals, and keep a good lookout, watching for vessels turning.

Smaller Vessels Inward Bound

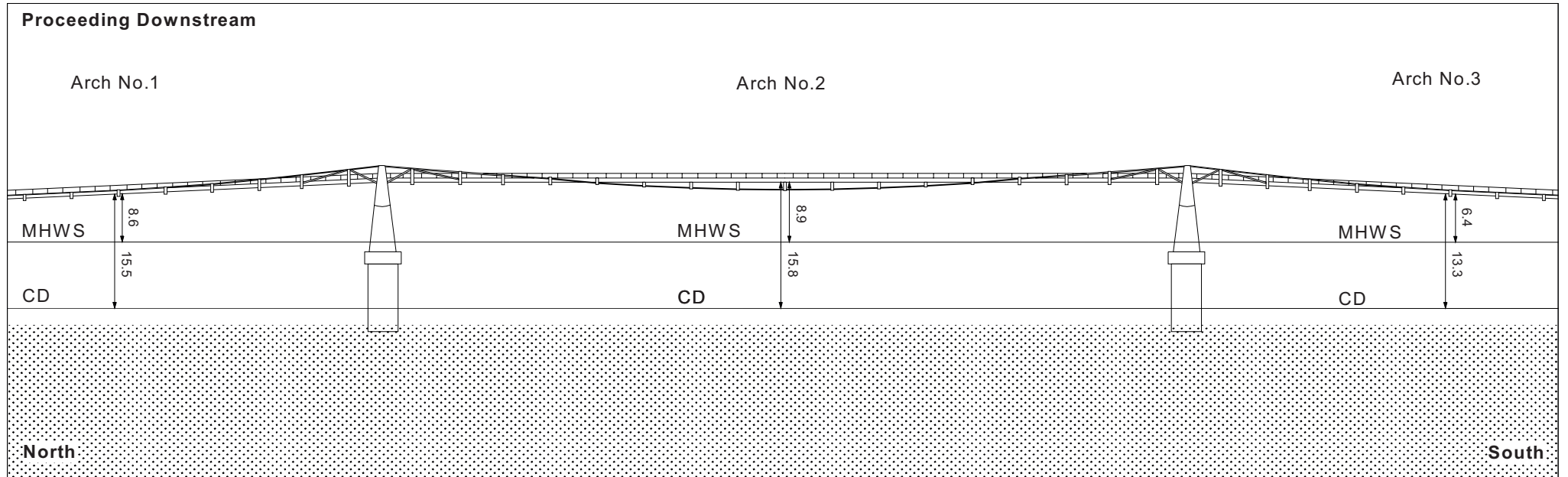
No. 2 arch should always be used by smaller commercial and leisure inbound traffic whenever safe and possible, leaving the centre arch clear for larger and Reporting Vessels. If tugs are servicing Walbrook Wharf, be cautious and use the centre arch, if it is clear.

Smaller Vessels Outward Bound

No. 4 arch should normally be used by smaller outbound traffic, leaving the centre arch clear for larger and Reporting Vessels.



MILLENNIUM FOOT BRIDGE



Working Arches	1, 2 & 3	Distance above London Bridge	0.41nm	Height in Main Navigable Arch	15.8m above CD	Distance above Gravesend	23.54nm
					8.9m above MHWS	Special Signal Light	No

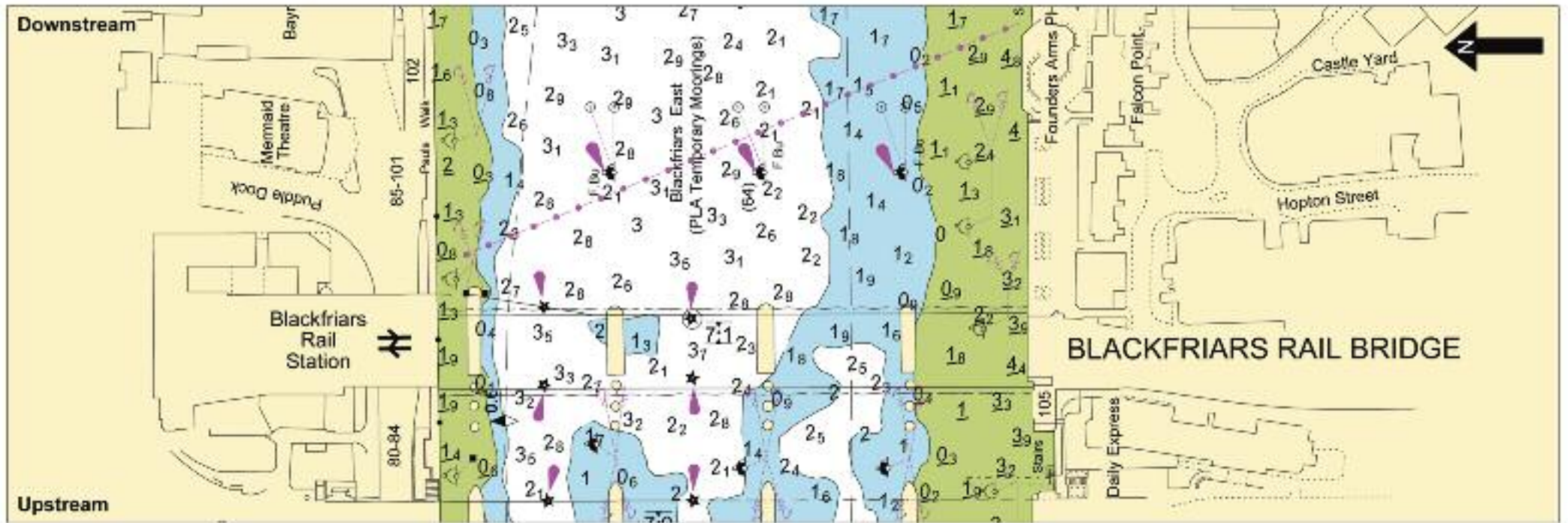
Brief Description

The only freestanding footbridge in central London – there are footbridges either side of Charing Cross rail Bridge. The bridge consists of three arches; only the centre arch is normally used for navigation.

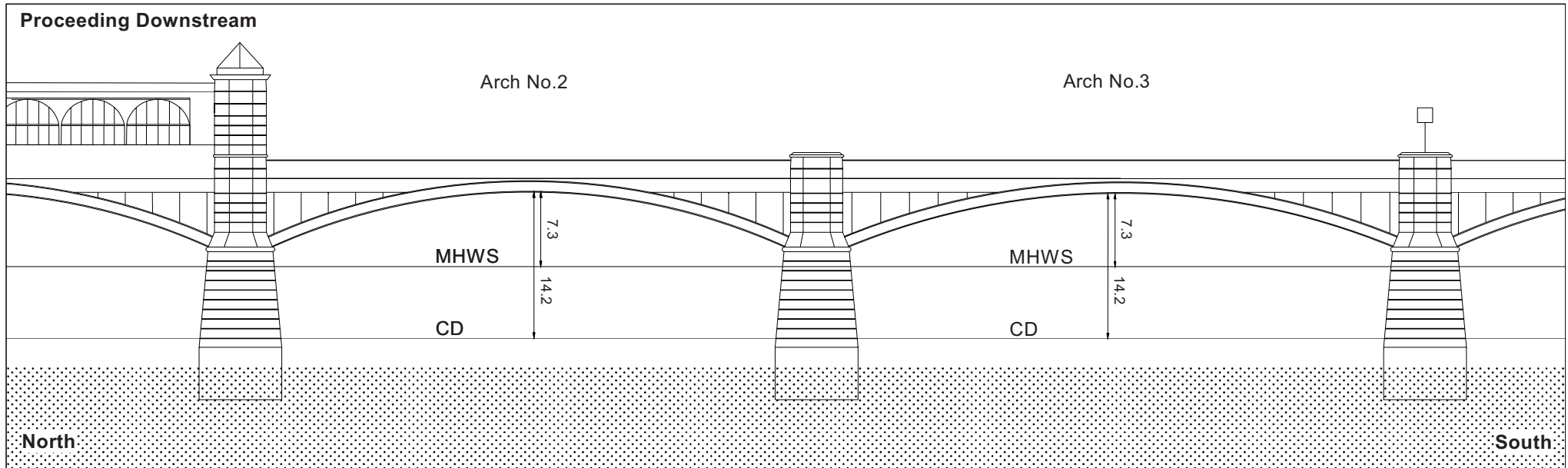
Opened in 2002 this is a suspension bridge with a steel deck and concrete intermediate piers.

Navigating the Bridge

Vision up and down Kings Reach is not usually impaired by the bridge structure.



BLACKFRIARS RAIL BRIDGE



Working Arches	2, 3 & 4	Distance above London Bridge	0.6nm	Height in Main Navigable Arch	14.0m above CD	Distance above Gravesend	23.75nm
					7.1m above MHWS	Special Signal Light	Yes

Brief Description

A rail bridge with five curved arches, three of which are navigable. The first bridge was completed in 1864 and only the four sets of cast iron piers remain on the upriver side, from this original bridge. The second bridge built in 1886 again has four intermediate piers and stone faced abutments supporting the arched spans. A major redevelopment of the bridge started in 2009, which will include the construction of a station on the bridge.

Blackfriars Rail and Road Bridges are close together with the remaining caissons from the original Blackfriars Rail Bridge, sandwiched between them. Both bridges have two main working arches No. 2 and 3 arches. The Special Signal Lights are sited above the centre arch in each case.

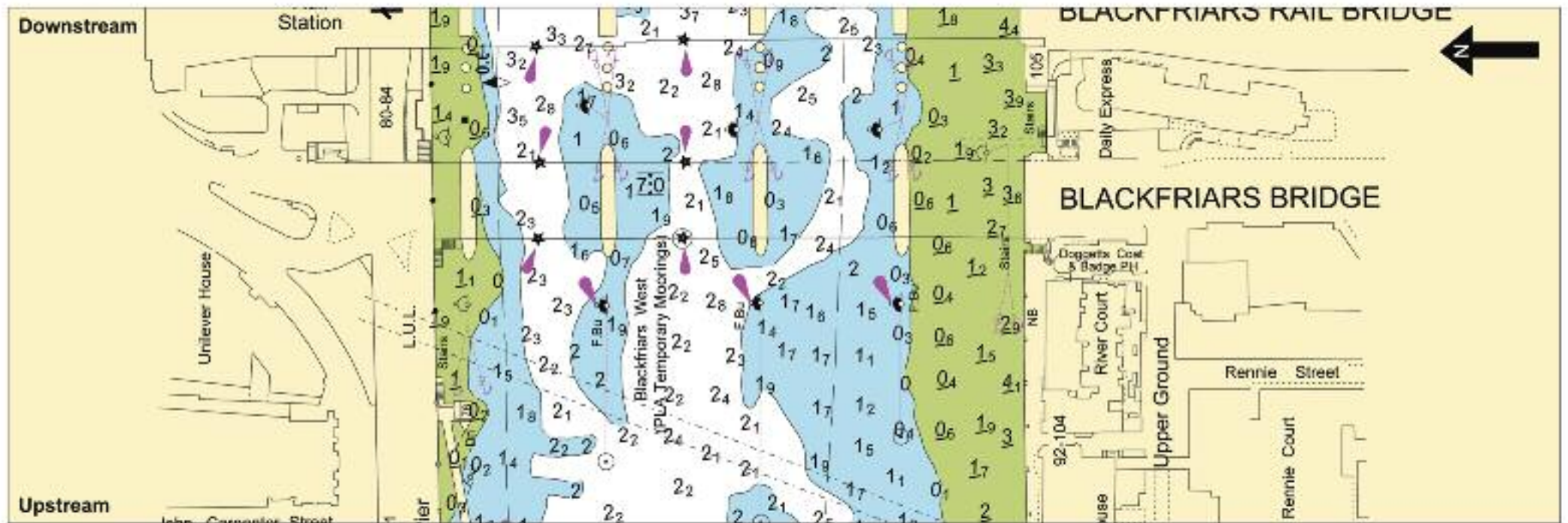
Navigating the Bridge

No. 4 arch is also navigable and should normally be used by outward bound smaller craft. Just upstream of the bridges, situated on the north side is Blackfriars Pier, this pier is in constant use by fast ferries, plying services, both up and down river.

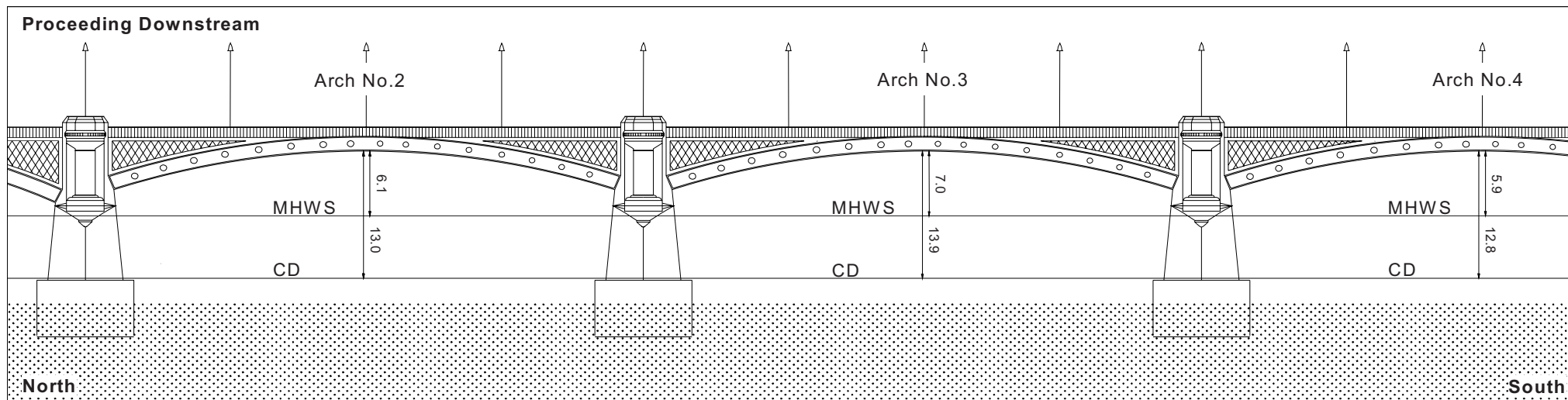
Outward Bound – No. 4 arch should normally be used by smaller outbound traffic if safe to do so, leaving the centre arch clear for the larger, and Reporting Vessels.

Inward Bound – No. 2 arch should normally be used by smaller inbound traffic, leaving the centre arch clear for the larger, and Reporting Vessels.

Due to the close proximity of the road and rail bridges, very strong currents and eddies may be encountered by vessels transiting this area, particularly on the ebb tide. Between 3 hours and 2 hours before high water, tugs towing waste barges may be rounding to port to leave or collect barges from the mooring off Coin Street at Blackfriars. In addition, Class V passenger vessels moored on tiers to the south side of the channel may be leaving or manoeuvring in the area. Vessels proceeding upstream through the reach should be aware of these and other vessels coming and going from Blackfriars and Temple Piers.



BLACKFRIARS ROAD BRIDGE



Working Arches	2 & 3	Distance above London Bridge	0.64nm	Height in Main Navigable Arch	13.9m above CD	Distance above Gravesend	23.76nm
					7.0m above MHWS	Special Signal Light	Yes

Brief Description

A road bridge with five curved arches, two of which are lit for navigation.

This bridge was rebuilt in 1869 as a five arched steel bridge supported on four stone faced intermediate supports.

Blackfriars Rail and Road Bridges are close together with the remaining caissons of a previous rail bridge, sandwiched between them. Both bridges have two main working arches No. 2 and 3 arches. The Special Signal Lights are sited above the centre arch in each case.

Navigating the Bridge

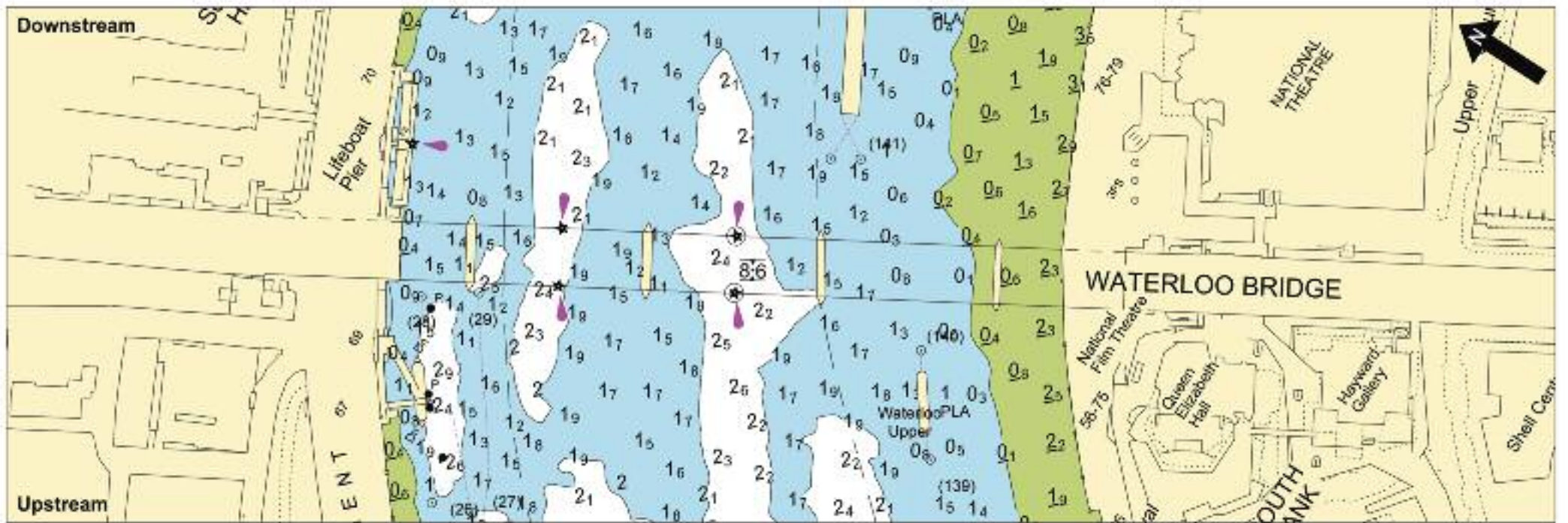
Due to the close proximity of the road and rail bridges, very strong currents and eddies may be encountered by vessels transiting this area, particularly on the ebb tide. No. 4 arch is also navigable and should normally be used by outward bound smaller craft. Just upstream of the bridges, situated on the north side is Blackfriars Pier, this pier is in constant use by fast ferries, plying services, both up and down river.

Outward Bound – No. 4 arch should normally be used by outbound traffic, leaving the centre arch clear for the larger, and Reporting Vessels.

Inward Bound – No. 2 arch should normally be used by inbound traffic, leaving the centre arch clear for the larger, and Reporting Vessels.

Between 3 hours and 2 hours before high water, tugs towing waste barges may be rounding to port to leave or collect barges from the mooring off Coin Street at Blackfriars. In addition, Class V passenger vessels moored on tiers to the south side of the channel may be leaving or manoeuvring in the area. Vessels proceeding upstream through the reach should be aware of these and other vessels coming and going from Blackfriars and Temple Piers.

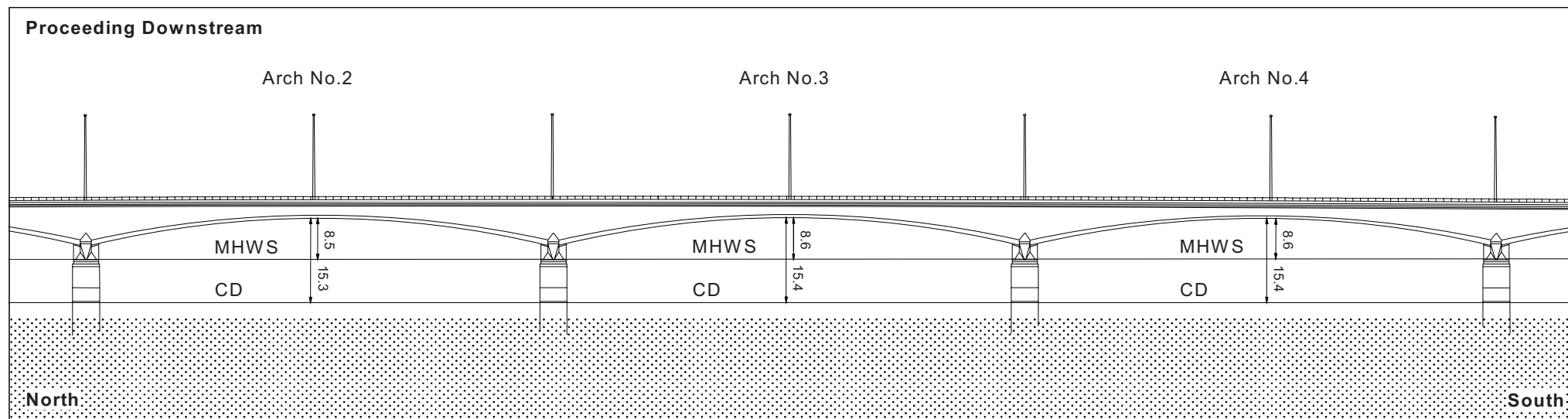
The next two bridges upstream, Waterloo and Charing Cross are situated on a tight 90° bend in the river. Visibility for the mariner is very restricted by the bend of the river and the bridges crossing at this point. Great caution must be exercised when negotiating this area. The tide sets heavily to the north, on both flood and ebb tides.



Proceeding Downstream



WATERLOO BRIDGE



Working Arches	2, 3 & 4	Distance above London Bridge	1.13nm	Height in Main Navigable Arch	15.4m above CD	Distance above Gravesend	24.25nm
Tidal Set Flood Tide	Strong Set North Shore	Tidal Set Ebb Tide	Strong Set North Shore		8.6m above MHWS	Special Signal Light	Yes

Brief Description

A road bridge with five gently curved arches, three of which are navigable. It was rebuilt and completed in 1944, the concrete bridge consists of five arches and four intermediate supports have been incorporated in the façade at each pier.

This bridge has two main working arches No. 2 and 3. The Special Signal Light is sited above the centre arch No. 3. Waterloo Bridge is a charted VHF Waypoint, for both inward and outward bound Reporting Vessels.

Navigating the Bridge

The bridge is situated on a 90° bend in the river, which causes the tide to set heavily to the north, on both flood and ebb tides. Vision between Lambeth Reach and Kings Reach is obscured to a degree by the structure of the bridge itself. Visibility for the mariner is very restricted by the bend of the river and the bridges crossing at this point. Great caution must be exercised when negotiating this area. Waterloo Bridge is also a reporting point for all reporting vessels.

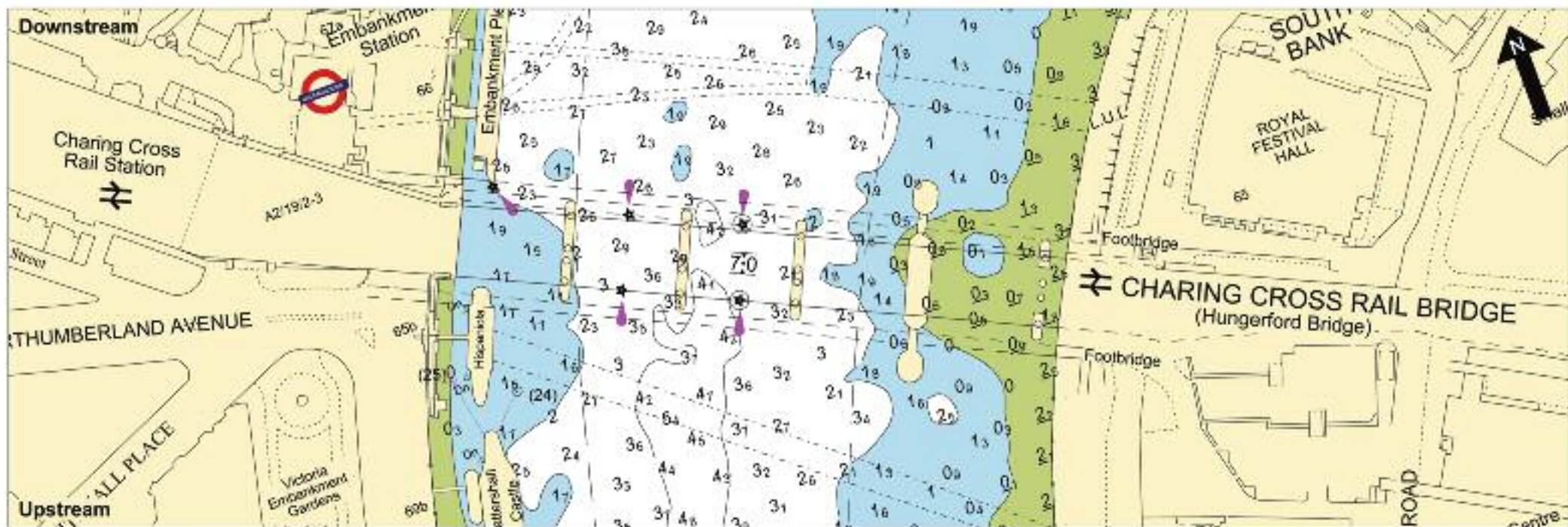
Be particularly aware of tugs and tows that are proceeding with the flow of the tide in this area, as the tide will cause the towed vessels to slew to the north, dramatically.

Inward Bound - No. 2 arch should always be used by inbound traffic, leaving No. 3 arch clear for the larger, and Reporting Vessels.

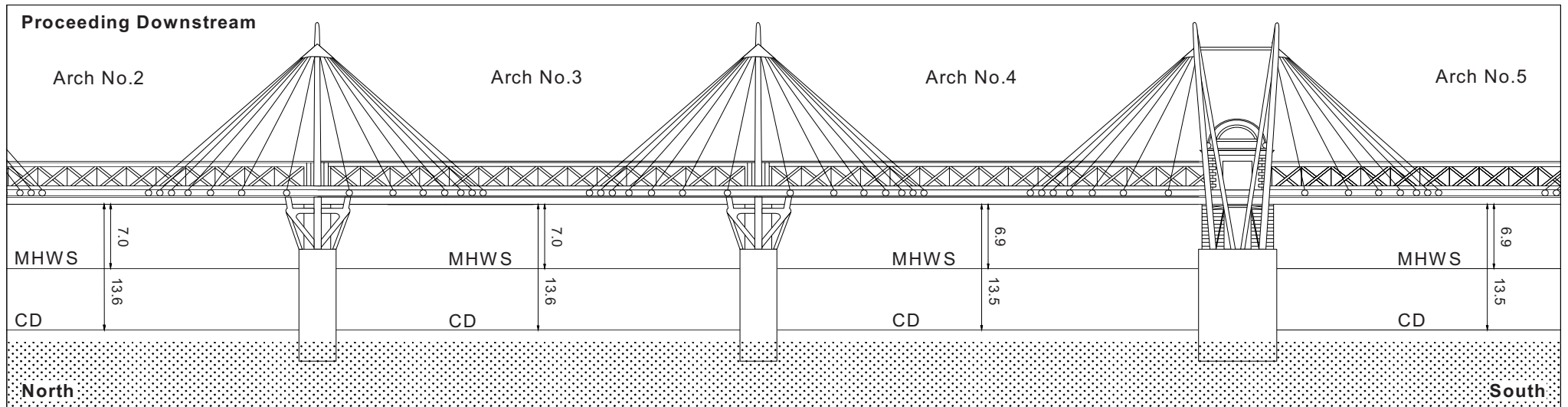
Outward Bound - No. 4 arch should normally be used by smaller outbound vessels.

There are three piers between the two bridges, Savoy and Embankment Piers, on the north side, and Festival Pier on the south side. When navigating in this area be aware of vessels leaving these piers. All three can be very busy with commercial passenger vessels and other craft. Listen for sound signals, and watch for vessels turning, manoeuvring and crossing in this area.

Smaller non-Reporting Vessels, especially leisure craft should pay particular attention to the Special Signal Lights.



CHARING CROSS RAIL BRIDGE



Working Arches	2 & 3	Distance above London Bridge	1.38nm	Height in Main Navigable Arch	13.6m above CD	Distance above Gravesend	24.45nm
Tidal Set Flood Tide	Strong Set North Shore	Tidal Set Ebb Tide	Strong Set North Shore		7.0m above MHWS	Special Signal Light	Yes

Brief Description

This rail bridge combines with the Golden Jubilee Footbridges (previously named Hungerford) on either side of the main structure. The main bridge has six arches, four of which are navigable.

The bridge uses the brick piers of the original pedestrian suspension bridge as support on the second intermediate pier from the south bank and at the northern bank. The iron girder railway bridge superstructure is also supported on four other intermediate supports in the river each consisting of four cast iron cylinders. Footbridges have been added to both sides of the railway bridge. The concrete faced steel deck of the footbridge is supported by cables from steel towers set on extended concrete foundations around the existing piers.

The Special Signal Light is sited above the No. 3 arch.

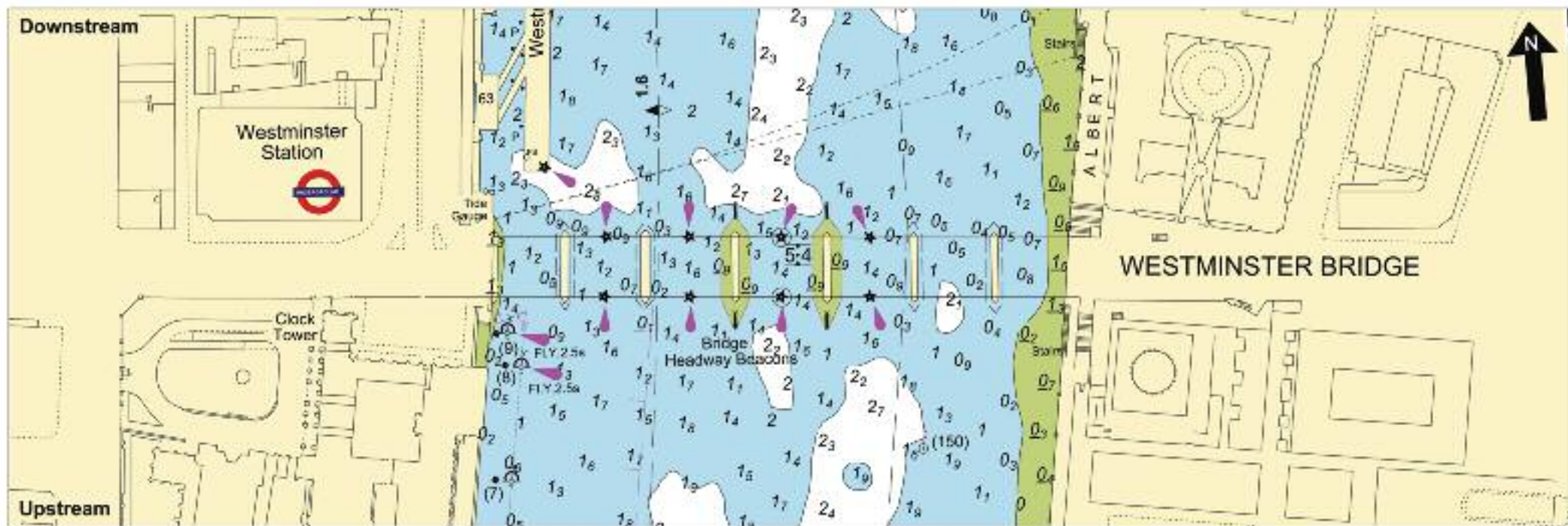
Navigating the Bridge

Waterloo Pier, (the London Eye) lies on the south side, up stream of Charing Cross Bridge. This pier is usually very busy with commercial pleasure craft. Another busy pier in the area is Embankment Pier – on the north side just below the bridge. On the north shore is Westminster Pier used regularly for Class V passenger vessels running services both down river to the Tower and Greenwich, and upstream to Kew and Richmond. The tide sets heavily to the north, on both flood and ebb tides.

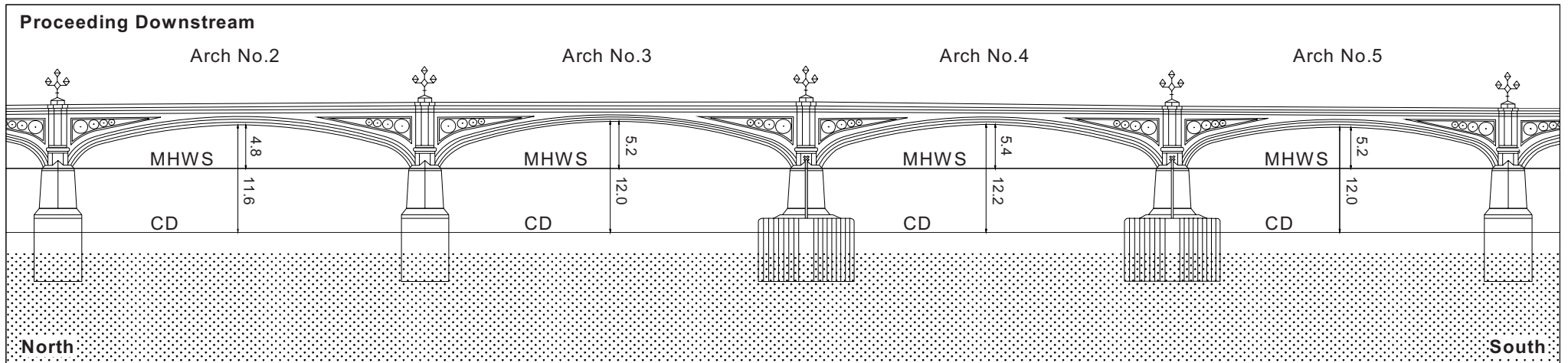
Inward Bound – No. 2 arch should normally be used by inbound traffic, leaving No. 3 arch clear for the larger, and Reporting Vessels.

Outward Bound – No. 4 arch should normally be used by smaller outbound vessels at most states of tide. Beware! No. 3 arch is used by the large Reporting Vessels travelling both up and down stream.

Once through Charing Cross Bridge outward bound, vessels are in the busiest reach in central London. There are numerous vessel moorings on both sides of the river, where vessels may be manoeuvring on or off the mooring at any time of the day or night.



WESTMINSTER BRIDGE



Working Arches	2, 3, 4, & 5	Distance above London Bridge	1.72nm	Height in Main Navigable Arch	12.2m above CD	Distance above Gravesend	24.77nm
					5.4m above MHWS	Special Signal Light	Yes

Brief Description

A road bridge with seven curved arches, all of which are navigable, at appropriate states of the tide, with the exception of No. 1 arch. The Special Signal Light is situated above No. 4 arch.

Opened in 1862 this was the site of the second bridge across the Thames. The seven span iron arched bridge is supported on stone faced abutments and piers.

Navigating the Bridge

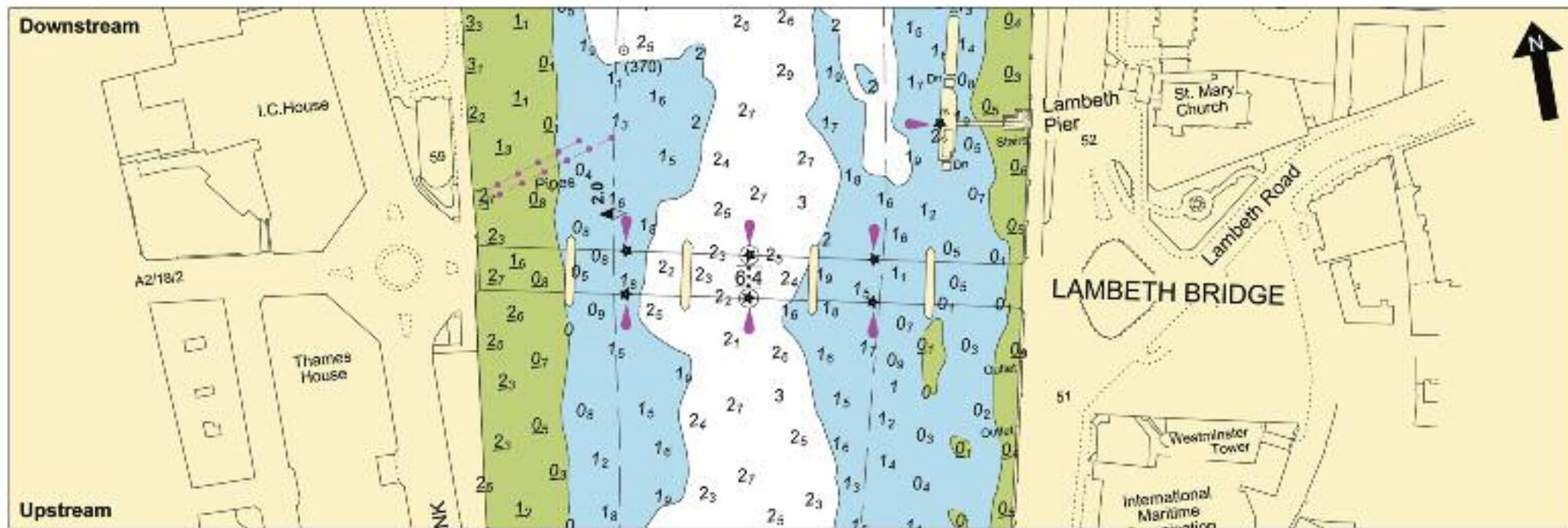
This bridge has seven arches, four of which are working arches, Nos. 2, 3, 4, and 5 with No. 4 arch being provided with Air Draught boards. Westminster Pier is situated down stream of the bridge on the north shore. There is a lot of commercial passenger vessel activity at this pier, and in the area. Above the bridge, there is a Security Exclusion Zone on the north side, alongside the Houses of Parliament. This area extends 70 metres riverwards from the river wall. **NOTE** that no unauthorised vessels are allowed to enter this zone.

Inward Bound - All smaller inbound traffic should normally use No. 3 arch, or No. 2 arch, but beware of the Exclusion Zone. No. 4 arch should be kept clear for the larger Reporting Vessels.

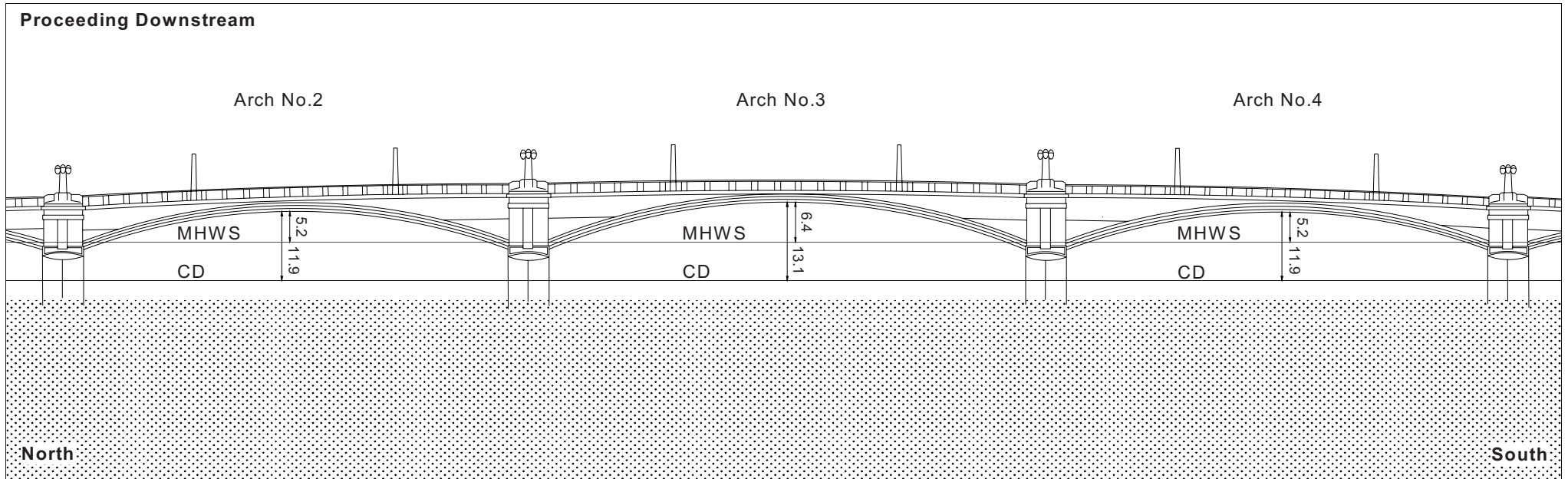
Outward Bound - All non-Reporting Vessel outbound traffic should normally use No. 5 arch (although No. 6 arch may also be used by outbound vessels).

Once through Westminster Bridge into Lambeth Reach, proceed in midstream outside of the 70 metre Exclusion Zone on the north shore. Also on the south side of the channel are several commercial passenger boat moorings where vessels can be arriving and leaving at anytime during the day or night. On the south shore immediately downstream of Lambeth Bridge is Lambeth Pier which is used solely by passenger vessels operating parties during the day and the night.

Approaching any of the seven arches of Westminster Bridge around 2 hours before high water a vessel can expect any one of the various vessels proceeding outward bound for different reasons. Through No. 2 arch there could be a passenger vessel intending to proceed into Westminster Pier. No. 3 & 4 arches are normally used by Reporting Vessels of over 40 metres in length that have right of way and will trigger the Special Signal Lights. No. 5 & 6 arches will provide safe passage for small passenger or private vessels proceeding downstream against the tide. At this time, tugs and tows will be proceeding outward bound through No. 4 arch. Vessels navigating the bridge close to Low Water should keep clear of the curved 'shoulders' at the base of each bridge pier. Mariners should note the unusual tidal set downstream of No. 2 arch, which sets vessels towards the pier.



LAMBETH BRIDGE



Working Arches	2, 3 & 4	Distance above London Bridge	2.11nm	Height in Main Navigable Arch	13.1m above CD	Distance above Gravesend	25.15nm
					6.4m above MHWS	Special Signal Light	Yes

Brief Description

A road bridge with five curved arches, three of which are lit for navigation. The bridge was rebuilt in 1932; this five span steel arched bridge is supported on stone faced intermediate piers.

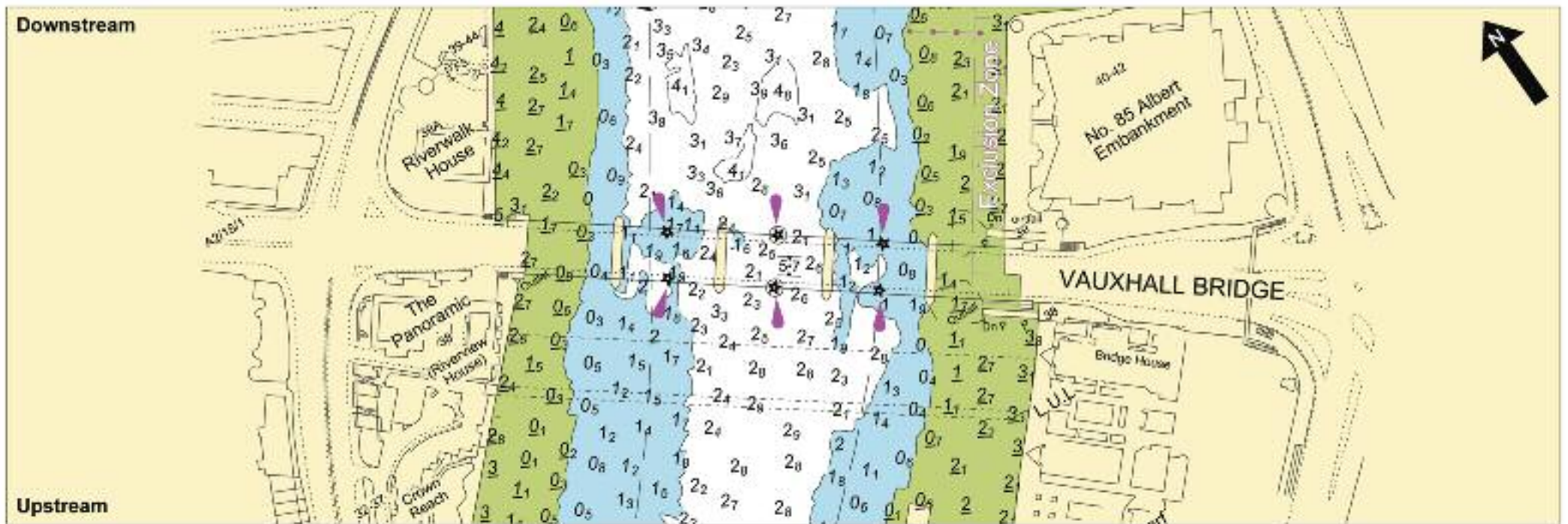
Navigating the Bridge

This bridge has three working arches, Nos. 2, 3 and 4. No. 3 arch is the centre arch and has the Special Signal Light and is normally used by Reporting Vessels.

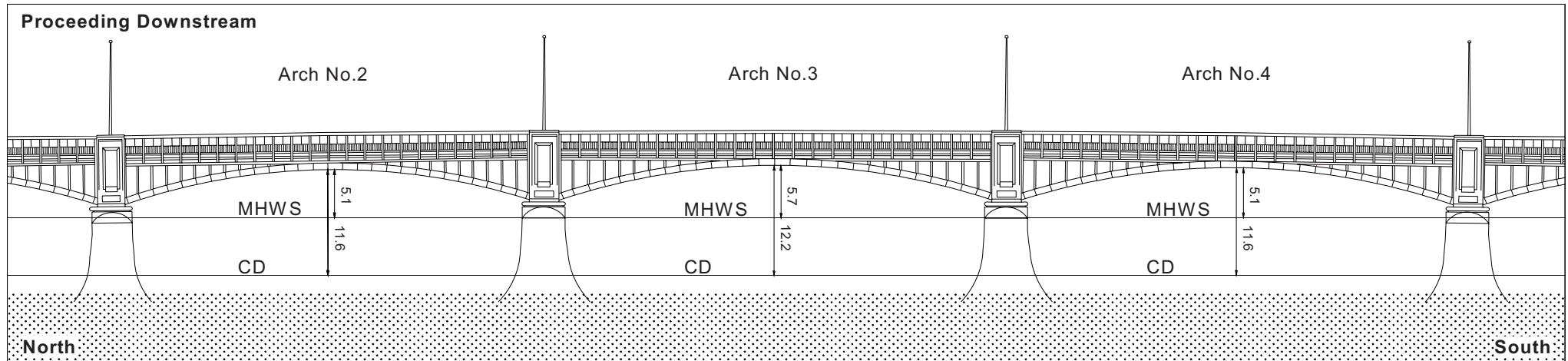
All inbound traffic should normally use No. 2 arch. Vessels should use No. 3 arch, only if it is clear to do so and does not impede the progress of larger Reporting Vessels. Outward bound traffic should normally use No. 4 arch.

Immediately upstream of Lambeth Bridge on the south shore is the marine base for the London Fire Brigade where high-speed quick response vessels may be exercising from or responding to an emergency call. On the north shore is Millbank Pier which has a passenger ferry link to Bankside Pier and other sight-seeing vessels by appointment.

Lambeth Pier is situated to the south side of the river, downstream of the bridge. This pier is operated by a passenger vessel company with passengers embarking and disembarking. Some way upstream of the bridge on the south side is Lacks Dock. This draw dock is currently a launch and recovery site for amphibious passenger vessels.



VAUXHALL BRIDGE



Working Arches	2, 3 & 4	Distance above London Bridge	2.46nm	Height in Main Navigable Arch	12.2m above CD	Distance above Gravesend	25.59nm
Tidal Set Flood Tide	Moderate Set South Shore	Tidal Set Ebb Tide	Moderate Set South Shore		5.7 above MHWS	Special Signal Light	Yes

Brief Description

A road bridge with five curved arches, three of which are lit for navigation. The Special Signal Light is sited above the centre arch.

Rebuilt in 1904 and 1906 the five steel arches sit on stone faced intermediate supports. A statue has been incorporated in the façade at each pier depicting the Arts and Sciences.

The bridge is situated on a bend in the river which causes the tide to set to the south, on both flood and ebb tides. Vision between Lambeth Reach and Nine Elms Reach is obscured to a degree by the structure of the bridge itself.

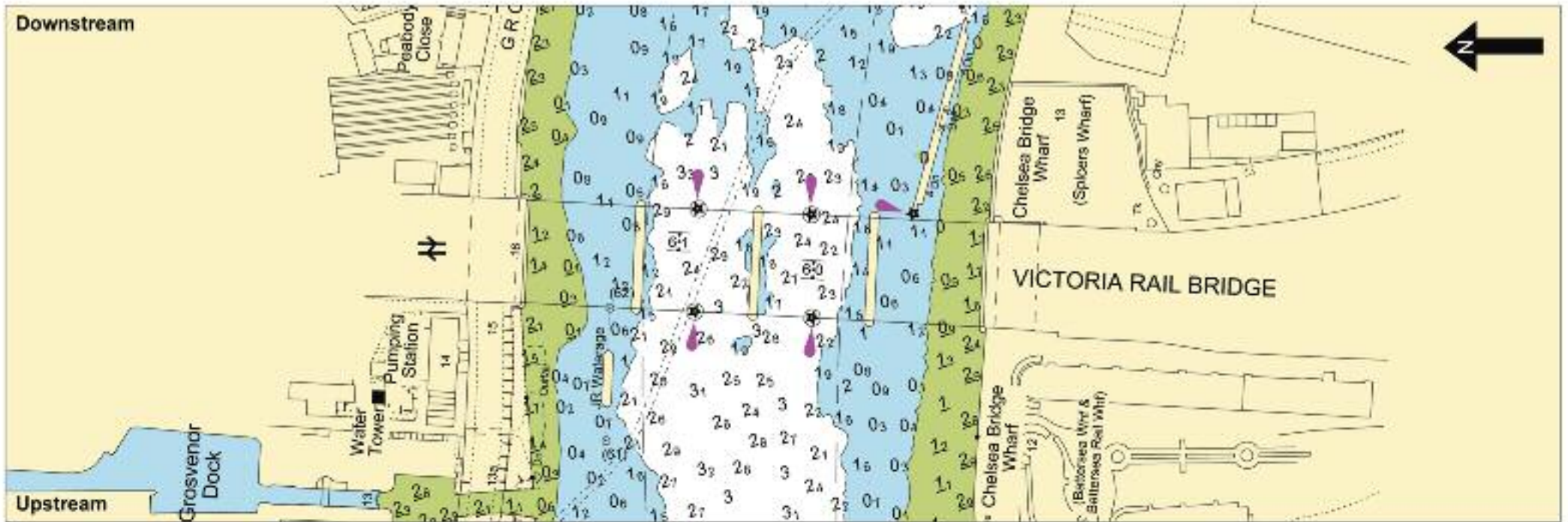
Navigating the Bridge

The bridge is a charted VHF reporting waypoint, for both inward and outward bound Reporting Vessels. There are three working arches, Nos. 2, 3 and 4. Smaller inward bound traffic should use No. 2 arch, and use No. 3 arch only if it is clear to do so and does not impede the progress of larger Reporting Vessels, which will normally use the centre arch. Outward bound smaller vessels should normally use No. 4 arch if the tide allows, and use No. 3 arch, only if it is clear to do so and again, does not impede the progress of larger Reporting Vessels.

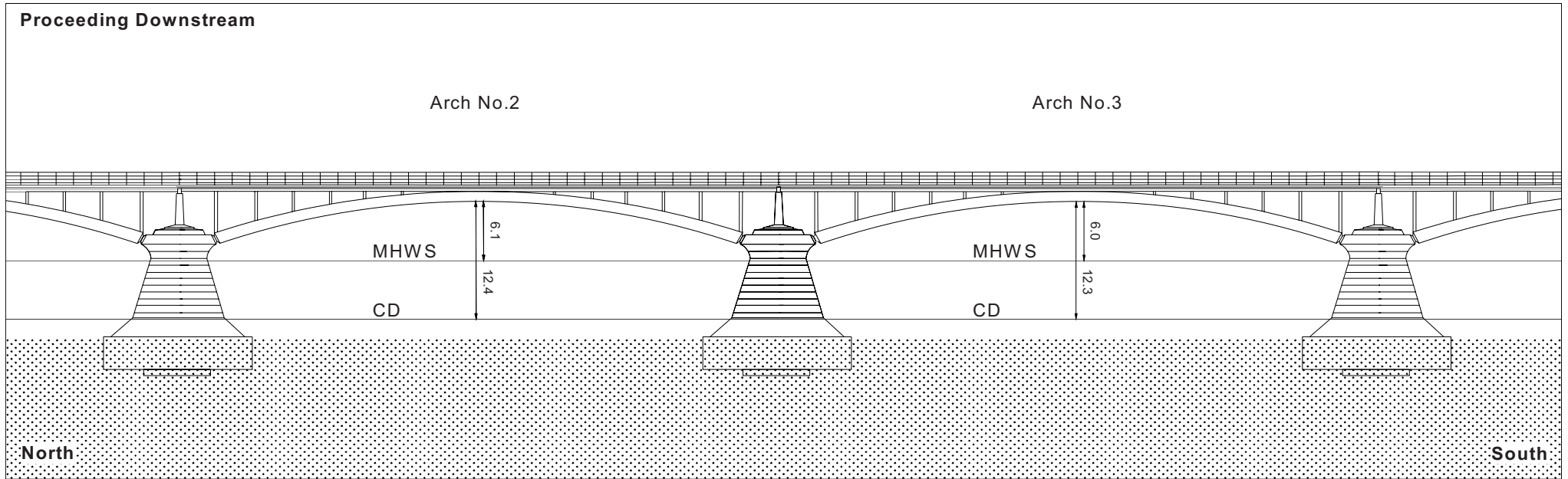
Once through the Vauxhall Bridge the river bears to the right into Nine Elms Reach with barge moorings on the south side of the channel. Westminster Boating Base Pier on the north side making it quite narrow for two large vessels to pass. There is a 15 metre Exclusion Zone established in the vicinity of Albert Embankment, which extends between the upstream side of Vauxhall Bridge and the lower side of Lacks Dock. PLA Permanent Notices to Mariners refer.

There are three busy commercial berths in Nine Elms Reach – Middle Wharf, Vauxhall, Cringle Wharf, Battersea and Cringle Dock. London VTS will broadcast details of vessel movements in this area as and when required.

Between 4 and 3 hours before high water tugs towing barges loaded with containers are shunting between Nine Elms and Battersea barge roads. Between 3 hours before and 1 hour before high water, tugs and barges may also be navigating in the area to service these berths.



VICTORIA RAIL BRIDGE



Working Arches	2 & 3	Distance above London Bridge	3.31nm	Height in Main Navigable Arch	12.4m above CD 6.1m above MHWS	Distance above Gravesend	26.44nm
					Special Signal Light		Yes

Brief Description

Also known as Grosvenor Bridge, this railway bridge serving the nearby Victoria Station has four curved arches, two of which are lit for navigation.

This bridge was built in three stages. The first bridge was built in 1860; it was then widened in 1866 and 1907. The whole bridge was again rebuilt between 1964 and 1966 with steel arched beams and concrete intermediate supports and abutments.

The Special Signal Lights are sited above No. 2 and No. 3 arches.

Navigating the Bridge

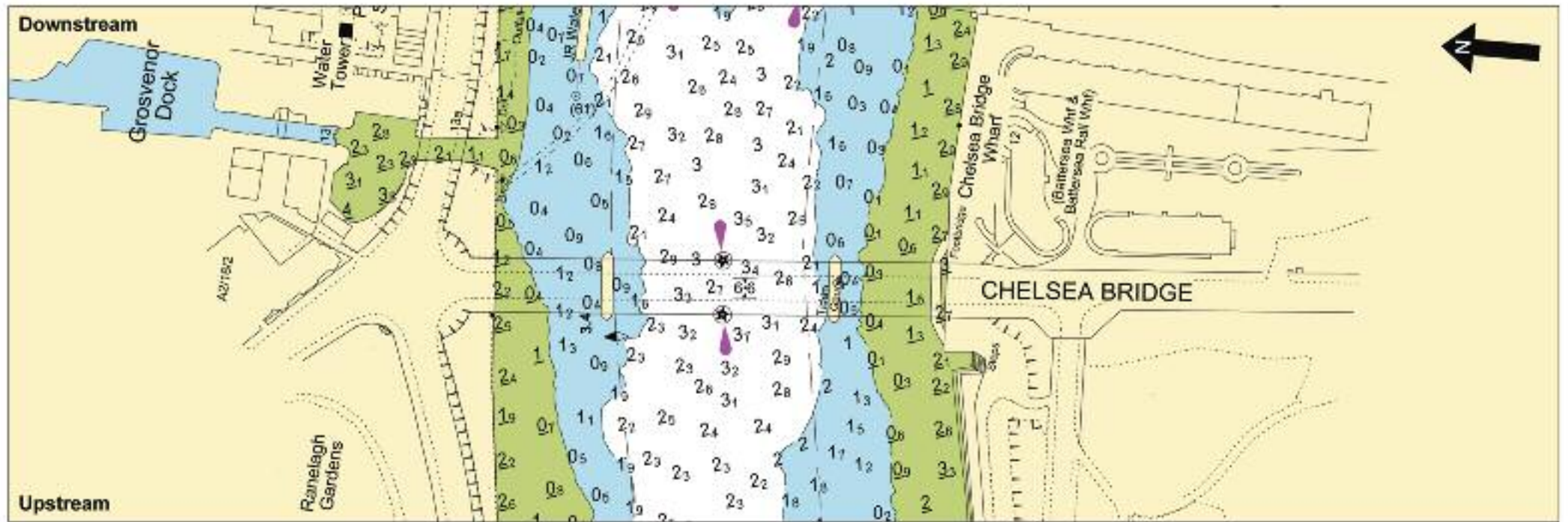
No. 2 and 3 arches are the working arches and will be used by the larger Reporting Vessels.

Inward Bound – All smaller inbound traffic should normally use No. 2 arch.

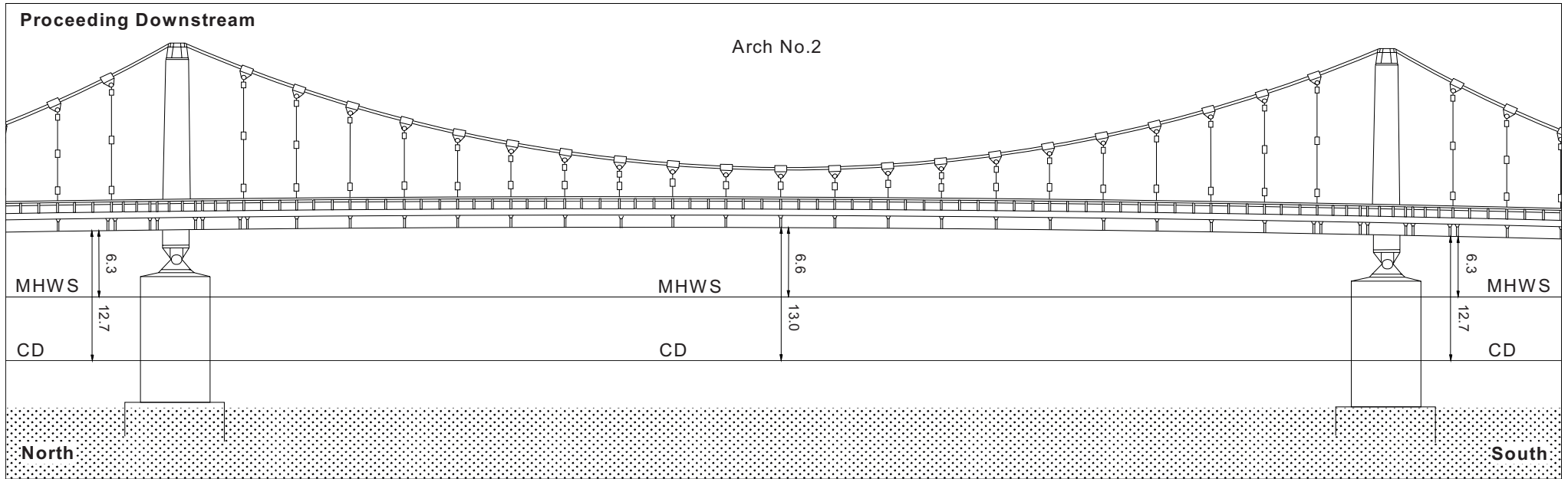
Outward Bound - All smaller outbound traffic should normally use No. 3 arch.

Navigation through No. 1 arch is obstructed by a barge mooring, therefore navigation is not recommended through this arch and No. 4 arch is closed to navigation.

On the north side between Victoria Rail and Chelsea Bridges there are barge moorings and the entrance to Grosvenor Dock. Small craft may be manoeuvring in this area at any state of the tide.



CHELSEA BRIDGE



Working Arches	2	Distance above London Bridge	3.40nm	Height in Main Navigable Arch	13.0m above CD	Distance above Gravesend	26.55nm
					6.6m above MHWS	Special Signal Light	Yes

Brief Description

A road bridge with three navigable arches, the centre of which is the main navigable arch.

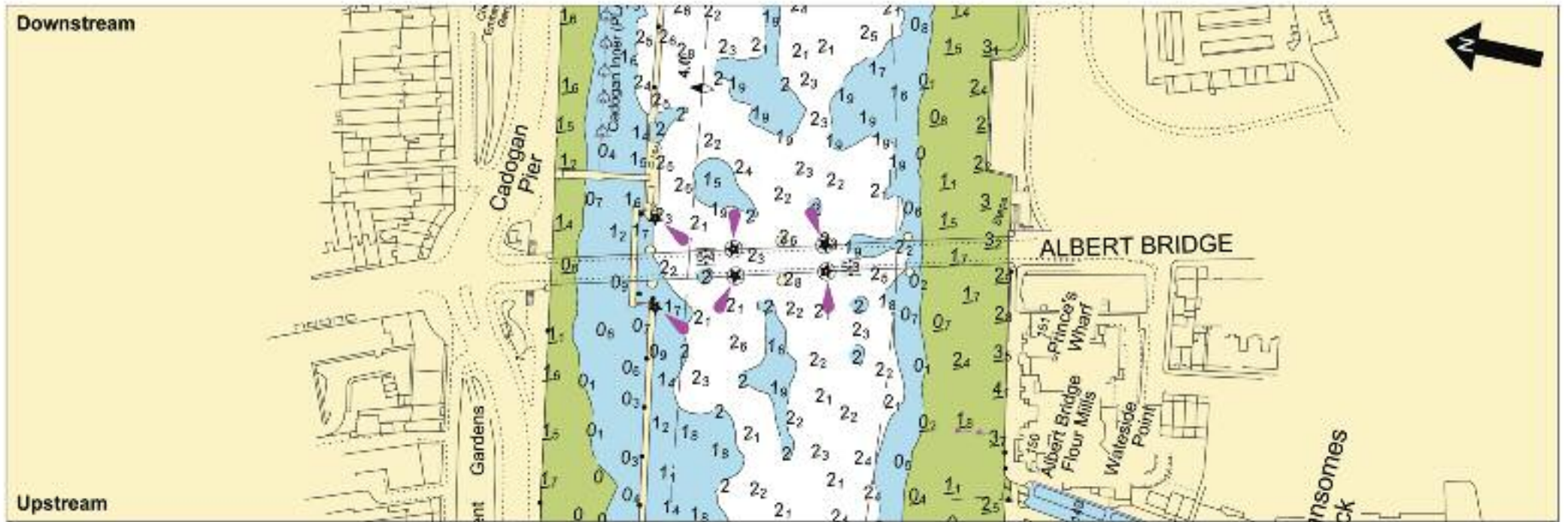
The present suspension bridge was opened in 1937 with twin concrete towers at each end of the main span.

The Special Signal Light is sited above the centre arch.

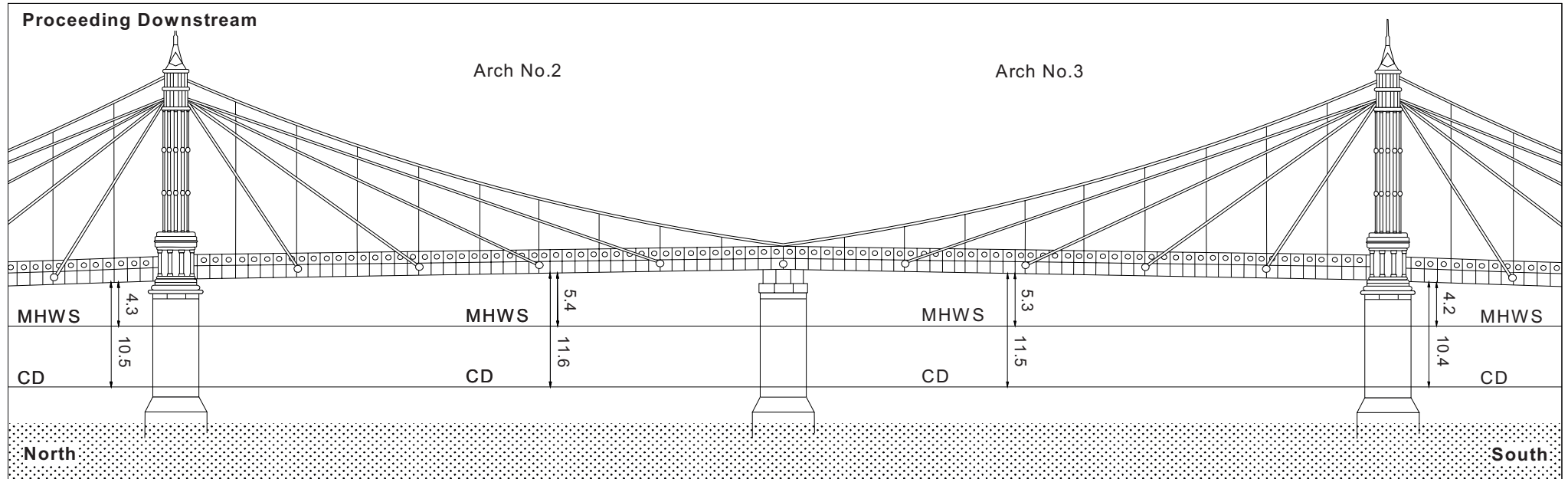
Navigating the Bridge

The centre arch No. 2 is the main working arch for all vessels.

The bridge leads in to Chelsea Reach - a long, straight reach with small boat moorings on either side of the navigation channel. On the north side immediately below Albert Bridge is Cadogan Pier, which is not only a regular stopping off point for river craft but is also an active marina accommodating a variety of craft from offices built on barges to motor yachts.



ALBERT BRIDGE



Working Arches	2 & 3	Distance above London Bridge	4.04nm	Height in Main Navigable Arch	11.6m above CD 5.4m above MHWS	Distance above Gravesend	27.19nm
						Special Signal Light	Yes

Brief Description

A road bridge with four arches, two of which are lit for navigation.

Originally built in 1873, the bridge was strengthened in 1884 and 1973. Ornate iron towers founded on twin cast iron cylinders support the suspension wires at each end of the main span. Two additional steel cylinders were installed at the centre of the main span to strengthen the bridge in 1973.

The Special Signal Lights are sited above both No. 2 and 3 arches.

Navigating the Bridge

This bridge is a suspension bridge that has been strengthened by adding a buttress beneath the centre of the main arch to support it.

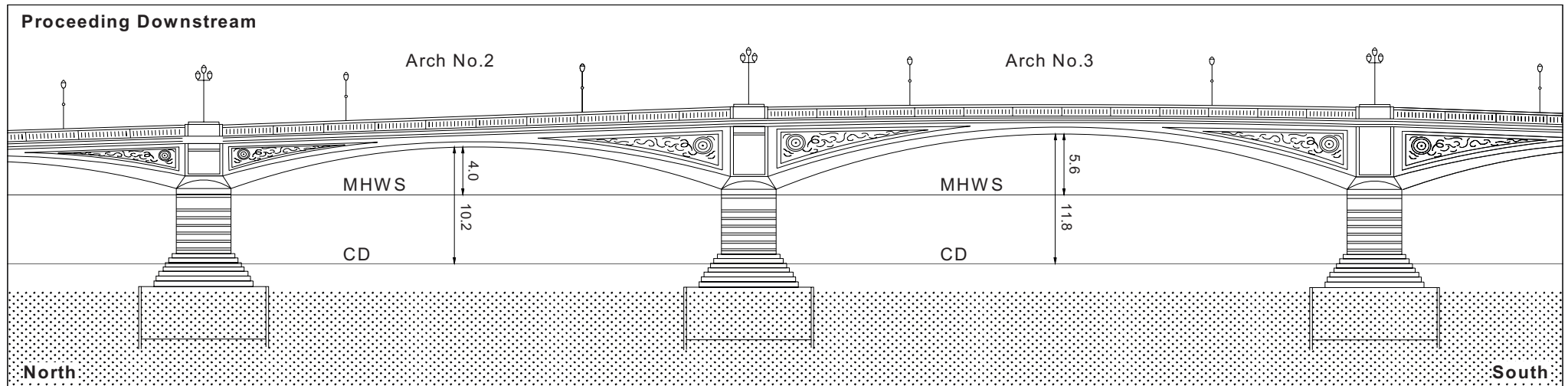
The bridge has four arches; No. 1 arch is permanently blocked to navigation. No. 2 and 3 arches are the working arches that all vessels use, with the horizontal amber lights displayed above the arch that should be used, for navigation.

Inward Bound - All inbound traffic should normally use No. 2 arch.

Outward Bound - All outbound traffic should use No. 3 arch.

At any point on the flood tide between Chelsea and Putney there can be racing, sculling and rowing craft practicing on the tideway and powered vessels should proceed with caution when passing. Users should also be aware of vessels manoeuvring on and off Cadogan Pier, just above and below the bridge on the north shore.

BATTERSEA ROAD BRIDGE



Working Arches	2 & 3	Distance above London Bridge	4.27nm	Height in Main Navigable Arch	11.8m above CD	Distance above RTP Gravesend	27.42nm
Tidal Set Flood Tide	Slight Set North Shore	Tidal Set Ebb Tide	Moderate Set North Shore		5.6m above MHWS	Special Signal Light	Yes

Brief Description

A road bridge with five curved arches, two of which are lit for navigation.

The original timber bridge was rebuilt as a five span arched iron bridge on stone faced supports in 1890.

The Special Signal Light is sited above the centre arch (No.3).

Navigating the Bridge

This bridge is located on an acute bend in the river, which causes the tide to set heavily towards the north bank on both flood and ebb spring tides. Allowance should always be made for this when transiting the bridge. The design and structure of the bridge obscures the vision, to some extent, above and below the bridge.

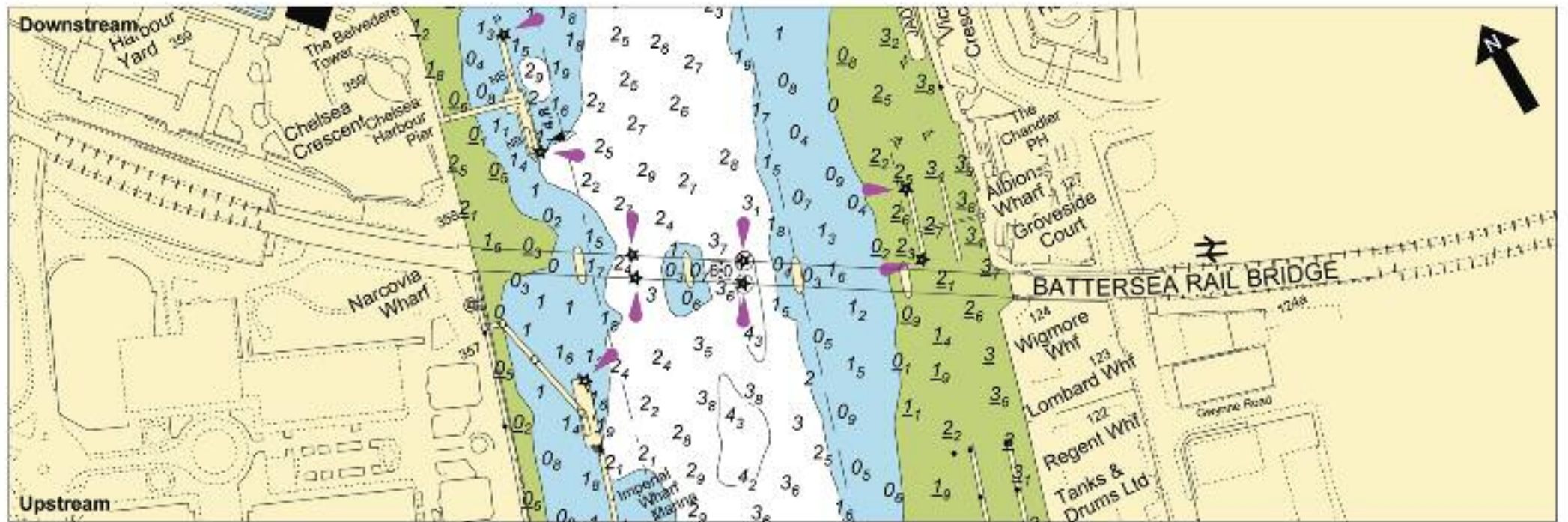
No. 1 arch is permanently closed to navigation. No. 2 and 3 arches are the normal working arches and are indicated by the usual pair of horizontal amber lights. No. 4 arch should be used by smaller outward bound vessels, always making an allowance for height of tide.

Inward Bound – All inbound traffic should normally use No. 2 or No. 3 arches.

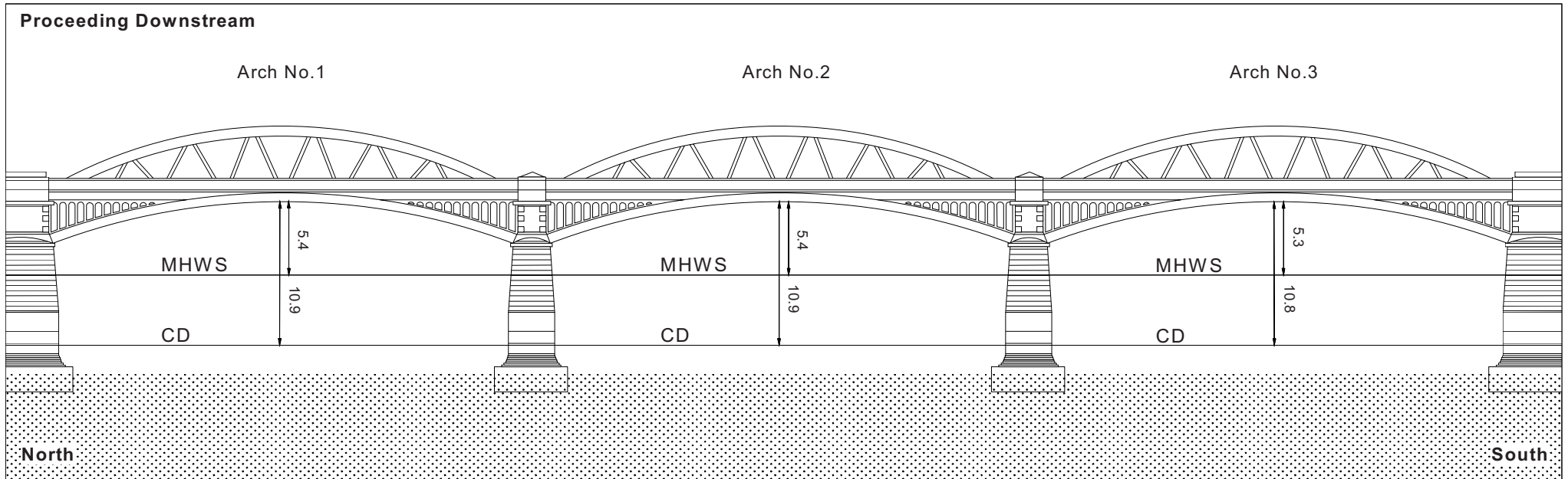
Outward Bound – All outbound traffic should use No. 3 or No. 4 arches.

The Bridge leads into Battersea Reach and immediately through the bridge on the north shore are the Chelsea Yacht and Boat Company where there is a concentration of residential homes converted from Thames barges and other such vessels. On the south side of the channel are barge moorings where tugs will be assembling flotillas to proceed upstream on the flood tide to their destination at Wandsworth. Also on the north side, regular passenger services are operated from Chelsea Harbour Pier.

Various motor yachts and other small craft can be expected going into and leaving the yacht basin and pier at Chelsea Harbour, immediately downstream of Battersea Rail Bridge at anytime from 2 hours before high water until high water.



BARNES RAIL BRIDGE



Working Arches	2 & 3	Distance above London Bridge	4.83nm	Height in Main Navigable Arch	12.1m above CD	Distance above RTP Gravesend	27.98nm
					6.0m above MHWs	Special Signal Light	Yes

Brief Description

A rail bridge with five curved arches, two of which are lit for navigation.

Built in 1863 the bridge is a five arched iron bridge on stone piers and abutments.

The Special Signal Light is sited above the centre arch (No.3).

Navigating the Bridge

The bridge is skewed slightly across the river. It has five arches; Nos. 1 and 5 are permanently closed to navigation. No. 2 and 3 are the main working arches with horizontal amber lights above the arches. No. 4 arch can also be used by smaller vessels, always making allowance for the tide.

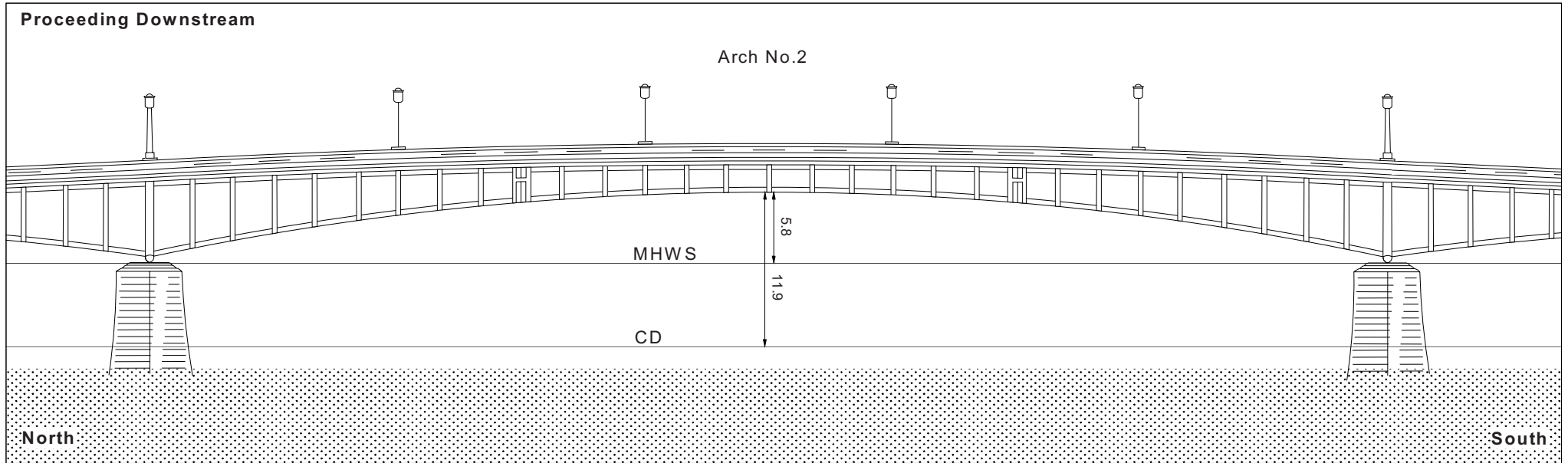
Inward Bound – All inbound traffic should normally use No. 2 or 3 arches.

Outward Bound – All outbound traffic should use No. 3 or 4 arches.

On the North bank immediately upstream of a jetty structure and close to Wandsworth Bridge is Comley's Wharf where small ships and barges loaded with aggregates and cement in bulk arrive and leave 2½ hours before and 1 hour after high water.

Passing through No. 3 arch the river bears to the right past Battersea Heliport on the south bank, where helicopters are landing and taking off during daylight hours and are extremely noisy, and may cause alarm if they appear without warning.

WANDSWORTH BRIDGE



Working Arches	2	Distance above London Bridge	5.74nm	Height in Main Navigable Arch	11.9m above CD	Distance above RTP Gravesend	28.89nm
Tidal Set Flood Tide	Moderate Set South Shore				5.8m above MHWS	Special Signal Light	Yes

Brief Description

A road bridge with three gently curved arches, the centre arch (No.2) being lit for navigation.

First opened in 1873 the bridge was rebuilt in 1940 as a three span concrete arched bridge with concrete intermediate supports.

The Special Signal Light is sited above the centre arch. This is the last bridge (most western) to be fitted with the Special Signal Lights.

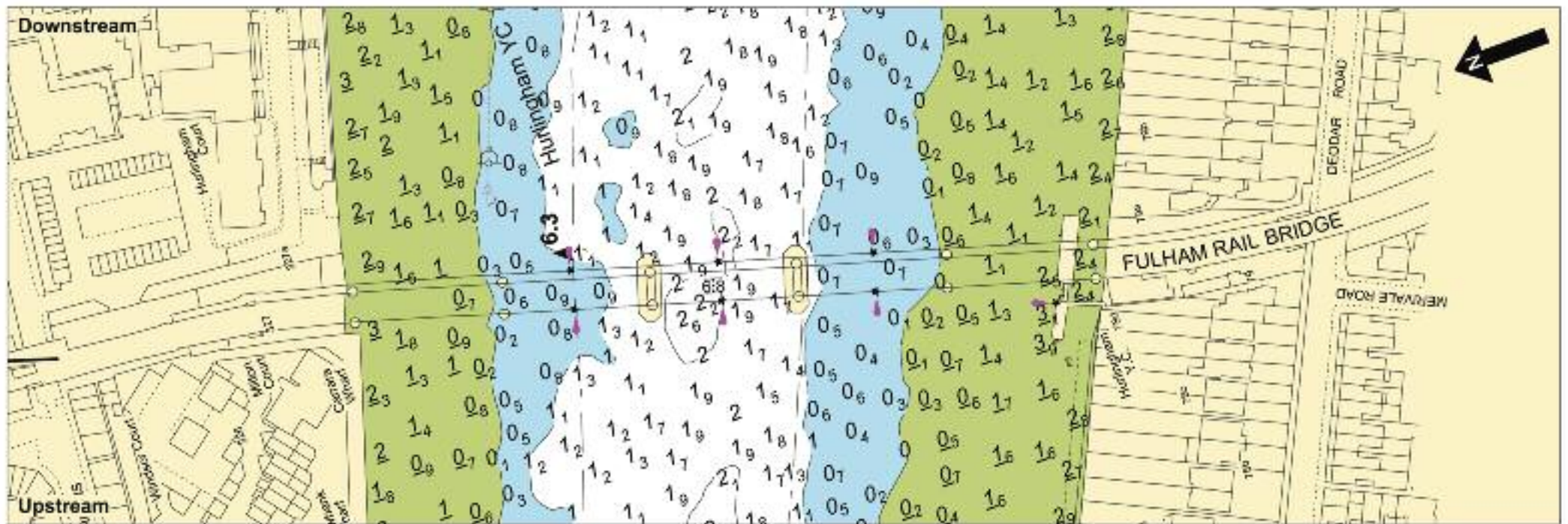
Navigating the Bridge

Wandsworth Bridge is situated on a bend in the river. The tide sets to the south on both flood and ebb tides. The bridge has three arches; Nos. 1 and 3 are not often used for navigation, and then only by small craft and rowers. At high water large vessels are often manoeuvring on and off Pier Wharf on the south side of the bridge, in the vicinity of No. 3 arch. Wandsworth Reach lies above the bridge, running on to Putney Bridge.

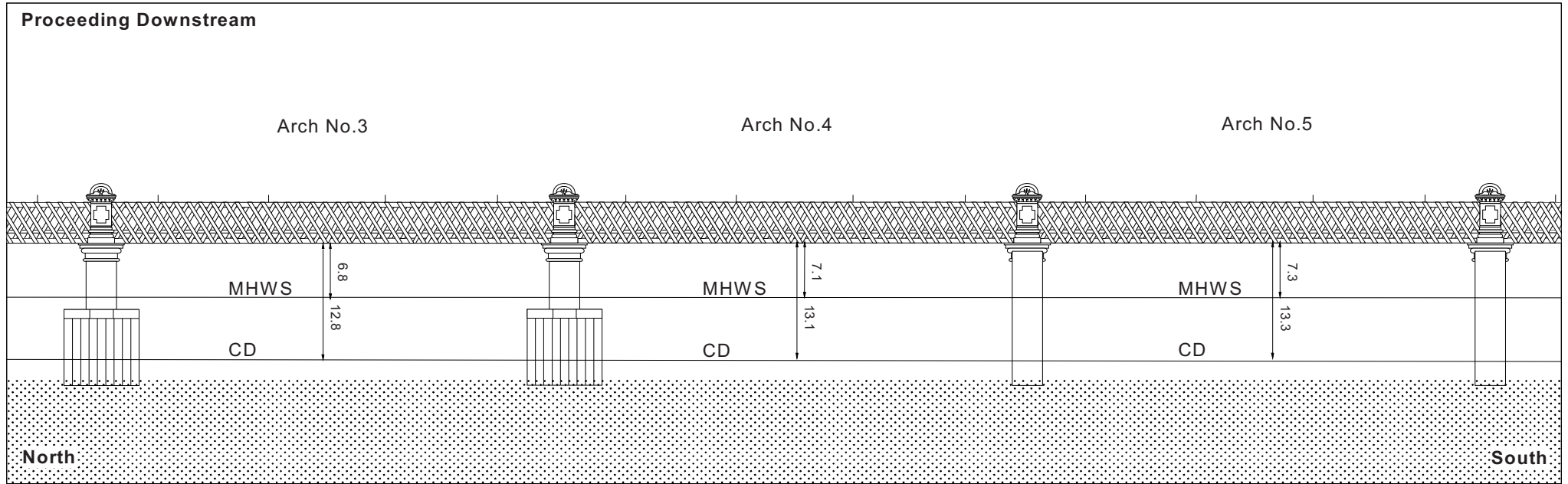
Once through the centre arch of the bridge at around 3 hours before high water one can expect to find tugs actively marshalling barges at the Western Riverside Waste Authority Transfer Station to deliver barges loaded with empty containers and collecting barges loaded with full containers to proceed downstream. From this point upstream there is reduced commercial freight carrying vessels and navigation is dominated by private motor cruisers and rowing and sailing craft with some commercial passenger vessels.

Wandsworth Bridge marks the start of the **8 knot speed limit**, which is enforced for the rest of the tidal river to Teddington. This bridge may also be regarded as the start of the part of the tideway used predominantly for recreational and competition rowing.

The next two bridges are located on a long bend in the river with the tide setting gradually towards the south side (surrey bank) on both the flood and ebb tides.



FULHAM RAIL BRIDGE



Working Arches	2, 3 & 4	Distance above London Bridge	6.31nm	Height in Main Navigable Arch	12.8m above CD	Distance above RTP Gravesend	29.46nm
					6.8m above MHWs	Special Signal Light	No

Brief Description

A rail bridge with five flat arches, three of which are lit for navigation. Also known as Putney Rail Bridge, the bridge also incorporates a foot bridge.

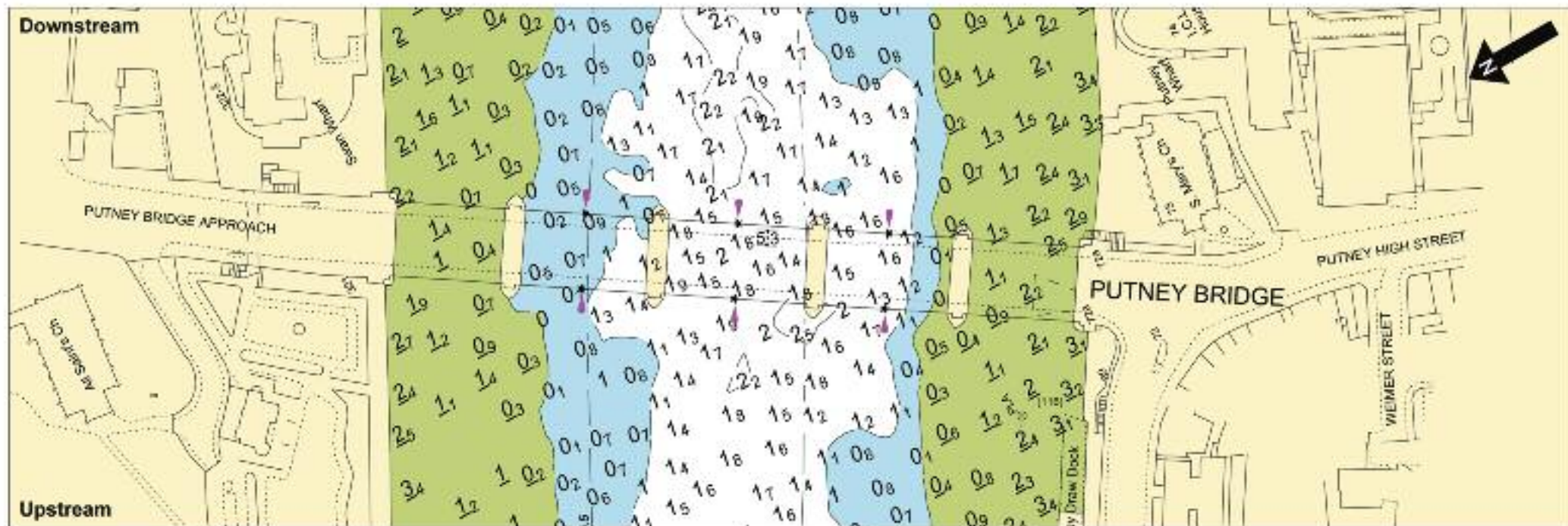
Opened in 1889, cast iron cylinders in pairs support the five river arches of the parallel sided iron trusses.

Navigating the Bridge

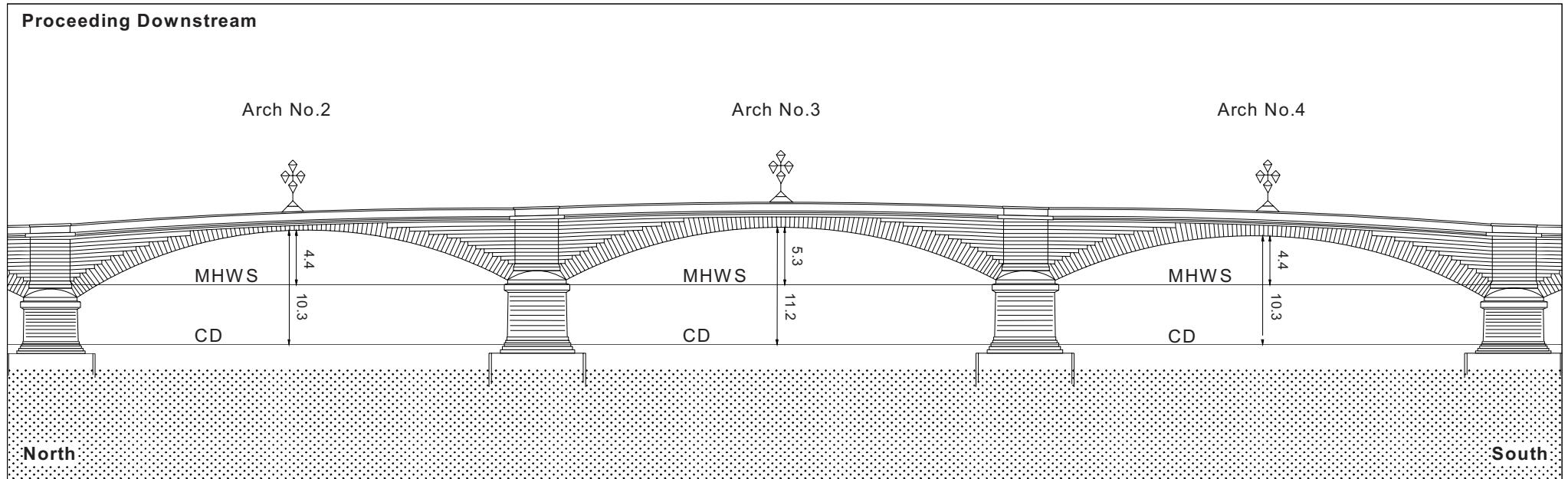
This bridge has five arches. Nos. 2, 3, and 4 are the working arches and are marked as such with horizontal amber lights above the arches.

The centre arch No. 3 is normally used by larger vessels, both inward and outward bound.

Subject to the height of the tide, No. 2 arch should normally be used by smaller vessels bound up stream and No. 4 arch by smaller vessels that are heading downstream.



PUTNEY BRIDGE



Working Arches	2, 3 & 4	Distance above London Bridge	6.45nm	Height in Main Navigable Arch	11.2m above CD	Distance above RTP Gravesend	29.60nm
					5.3m above MHWs	Special Signal Light	No

Brief Description

A road bridge with five curved arches, the centre three arches are lit for navigation.

In 1886 the existing wooden bridge was replaced with the current stone (granite) arched bridge designed by Sir Joseph Bazalgette.

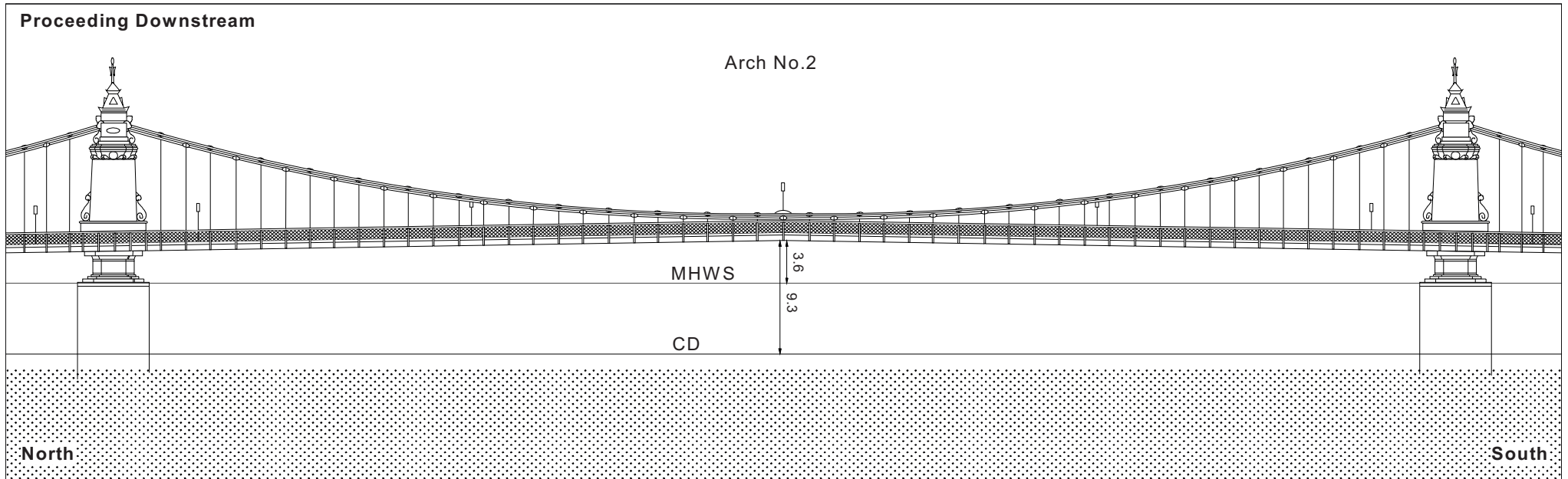
Navigating the Bridge

Subject to the height of the tide, No. 2 arch is normally used by vessels bound up stream and No. 4 arch by vessels that are heading downstream. No. 3 arch is for two way traffic when the tide will not allow Nos. 2 and 4 to be used.

Putney Pier is on the south shore and is in use by vessels at all states of the tide. The presence of rowing and sculling craft is very much in evidence in Barn Elms Reach and vessels should proceed with extreme caution.



HAMMERSMITH BRIDGE



Working Arches

2
Strong Set North Shore

Distance above London Bridge

7.97nm
Strong Set North Shore

Height in Main Navigable Arch

9.3m above CD
3.6m above MHWS

Distance above RTP Gravesend

31.12nm
No

Tidal Set Flood Tide

Tidal Set Ebb Tide

Special Signal Light

Brief Description

A road bridge with three arches, the centre arch is lit for navigation.

Hammersmith was the sight of the first suspension bridge over the Thames; but this current bridge replaced the original and was built in 1887, and strengthened in 1973. Twin stone decorative arched towers support the heavy suspension cables at each end of the main span. It lies between Barn Elms Reach and Chiswick Reach.

Navigating the Bridge

The bridge is built on a sharp bend in the river and has one working arch and navigation at all states of the tide is to the south side of the centreline. The tide sets strongly to the north shore (Middlesex) on both the flood and ebb tides. On the north shore are several rowing and dinghy sailing clubs that should be passed with caution. Hammersmith Pier has an assortment of residential and active craft moored on and around it. On the south shore opposite Hammersmith Pier is a busy rowing club used for teaching and training schools, so one can expect activity from rowers throughout the day as well as during the early evening. Scullers and rowers can be out in the hours of darkness and may be difficult to detect before a mariner knows they are close by.

Hammersmith Bridge is the lowest of the bridges spanning the tidal Thames. Suitable passage planning taking into account the vessels air draught, and available headroom should be completed before navigating this bridge to ensure safe passage.

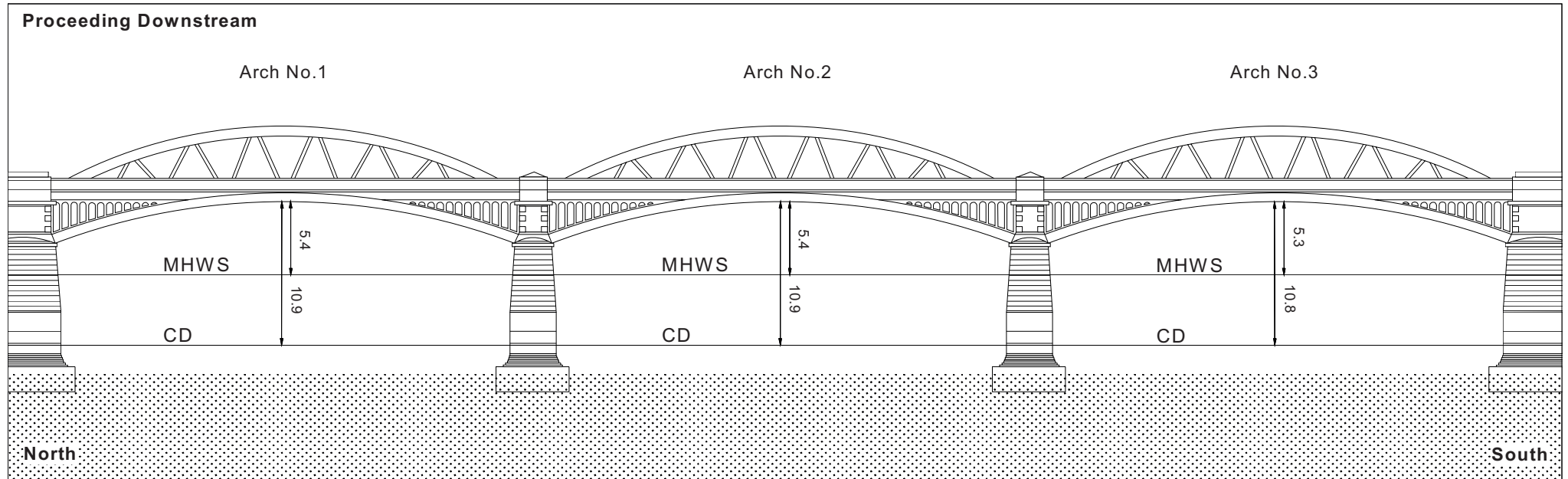
Air Draught boards are positioned immediately above and below the bridge to assist vessels in navigating the bridge safely.



Proceeding Downstream



BARNES RAIL BRIDGE



Working Arches	1, 2 & 3	Distance above London Bridge	9.55nm	Height in Main Navigable Arch	10.9m above CD	Distance above RTP Gravesend	32.70nm
Tidal Set Flood Tide	Moderate Set South Shore	Tidal Set Ebb Tide	Moderate Set South Shore		5.4m above MHS	Special Signal Light	No

Brief Description

A rail bridge with three curved arches, the centre arch (No.2) is lit for navigation.

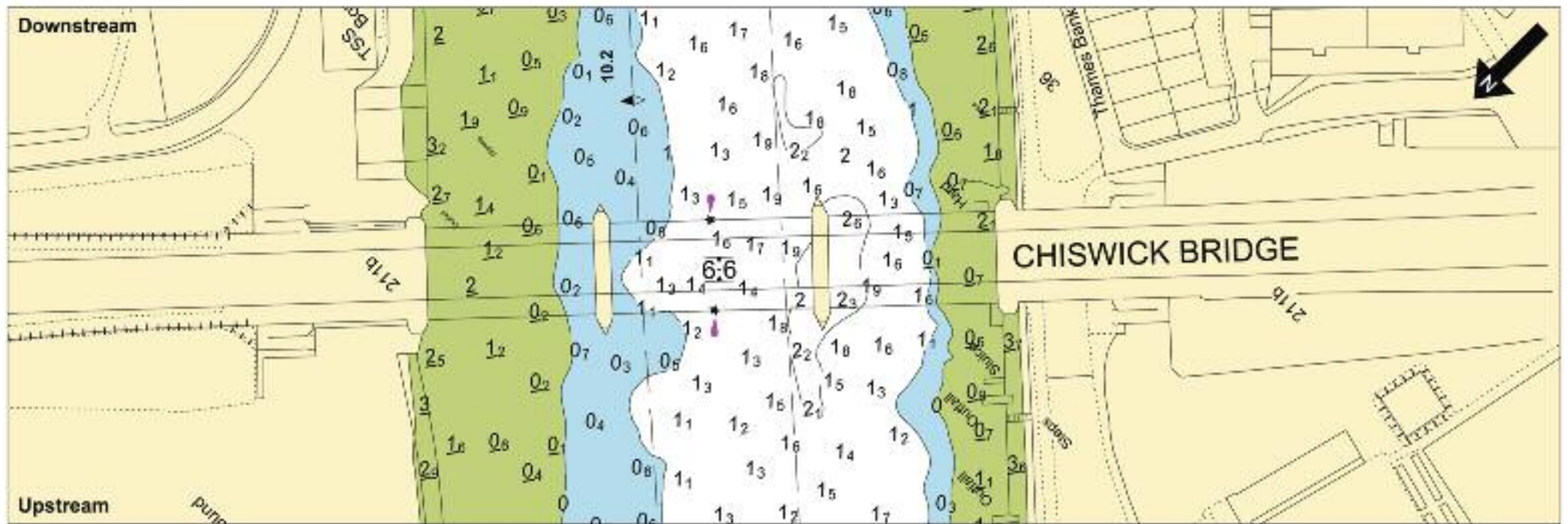
The bridge was built in 1849 and extended downstream in 1895 to carry two new decks with curved iron trusses. The original downstream arch was removed for the re-building, but the upstream arch still remains in place, though un-used. A pedestrian bridge is incorporated into the structure.

Navigating the Bridge

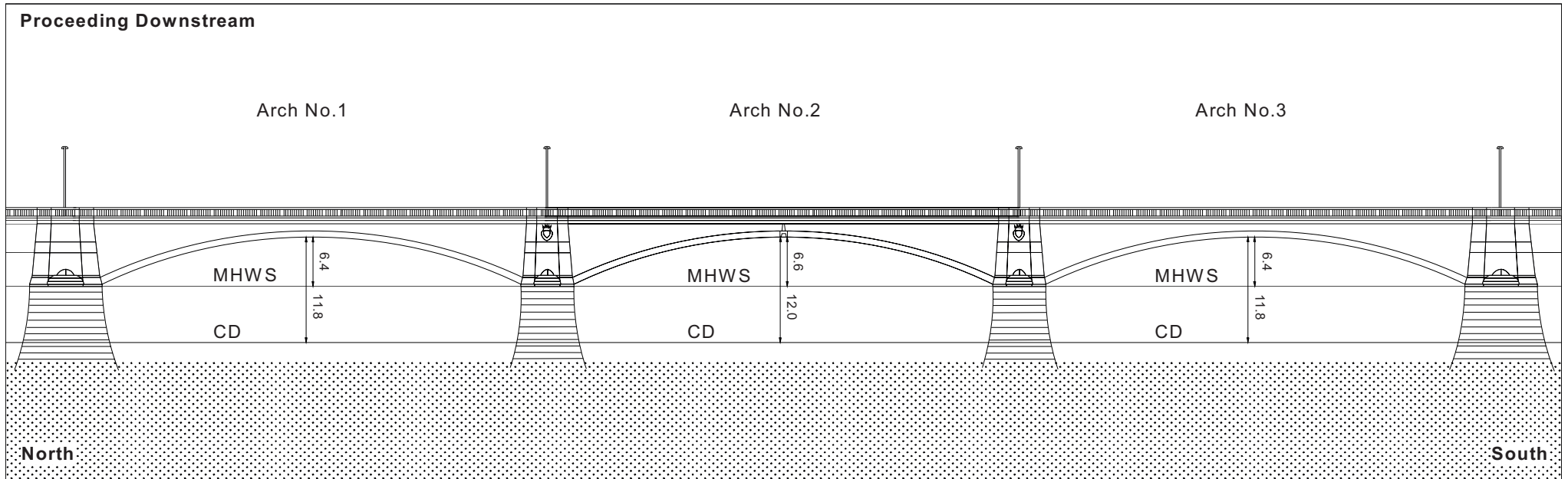
Approaching Barnes Bridge, another built on a bend in the river, on the early flood tide, keep to the centre for deep water to be correctly positioned once through the bridge. The tide sets moderately to the south (Surrey) shore on both the flood and ebb tides. Be aware of oncoming traffic, especially those on the ebb, appearing suddenly and also taking the centre arch.

Above Barnes Rail Bridge lies Mortlake Reach.

Immediately above and below Barnes Bridge on the north shore are two rowing clubs where boats may be launching and landing at all states of the tide.



CHISWICK BRIDGE



Working Arches	1, 2 & 3	Distance above London Bridge	10.22nm	Height in Main Navigable Arch	12.0m above CD	Distance above RTP Gravesend	33.37nm
					6.6m above MHWs	Special Signal Light	No

Brief Description

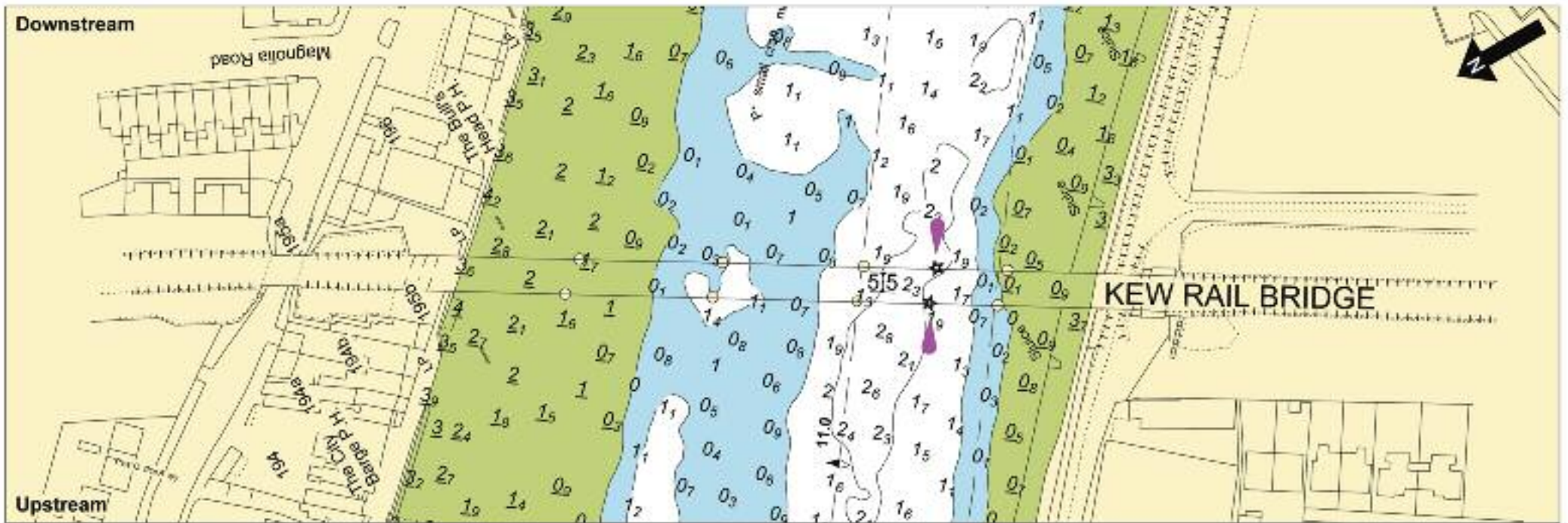
A road bridge with three curved arches, the centre arch is lit for navigation.

The bridge is of concrete construction with Portland stone facing and was opened in 1933 for the new trunk road.

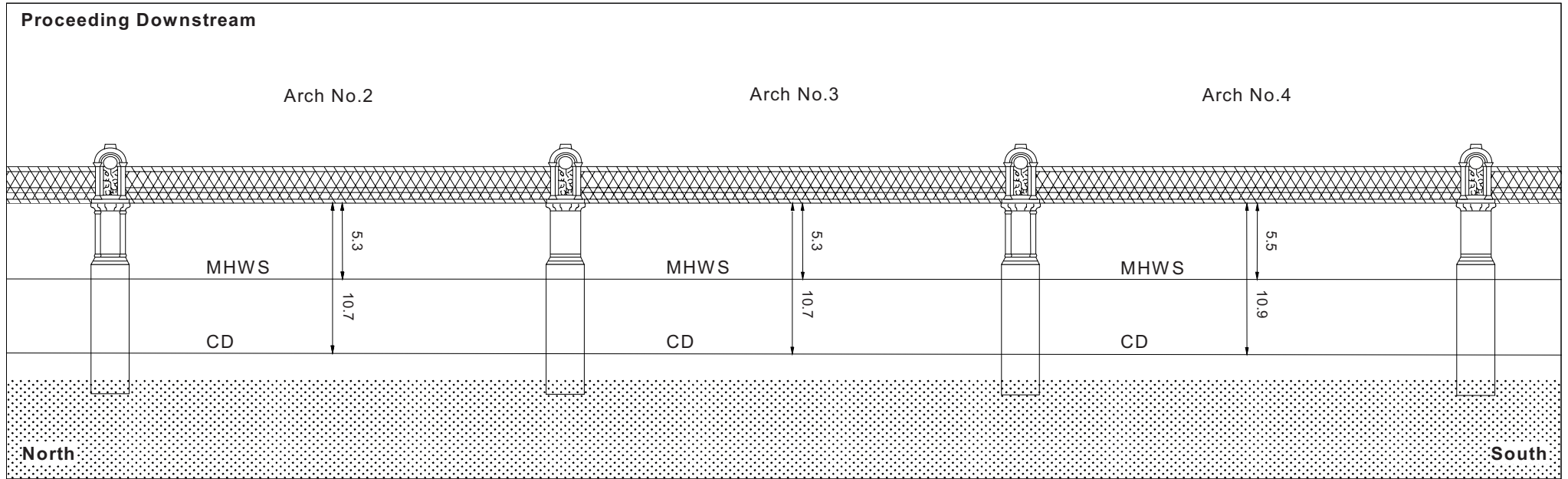
Navigating the Bridge

On both river banks immediately above Chiswick Bridge are rowing clubs with scullers landing and boating at all states of the tide.

Chiswick Dock and Marina, on the north shore is open two hours before high water and closes at the top of the tide. Private motor cruisers mainly use this facility.



KEW RAIL BRIDGE



Working Arches	4	Distance above London Bridge	10.98nm	Height in Main Navigable Arch	10.9m above CD	Distance above RTP Gravesend	34.13nm
					5.5m above MHWs	Special Signal Light	No

Brief Description

A rail bridge with five square arches, only the fourth of which is lit for navigation.

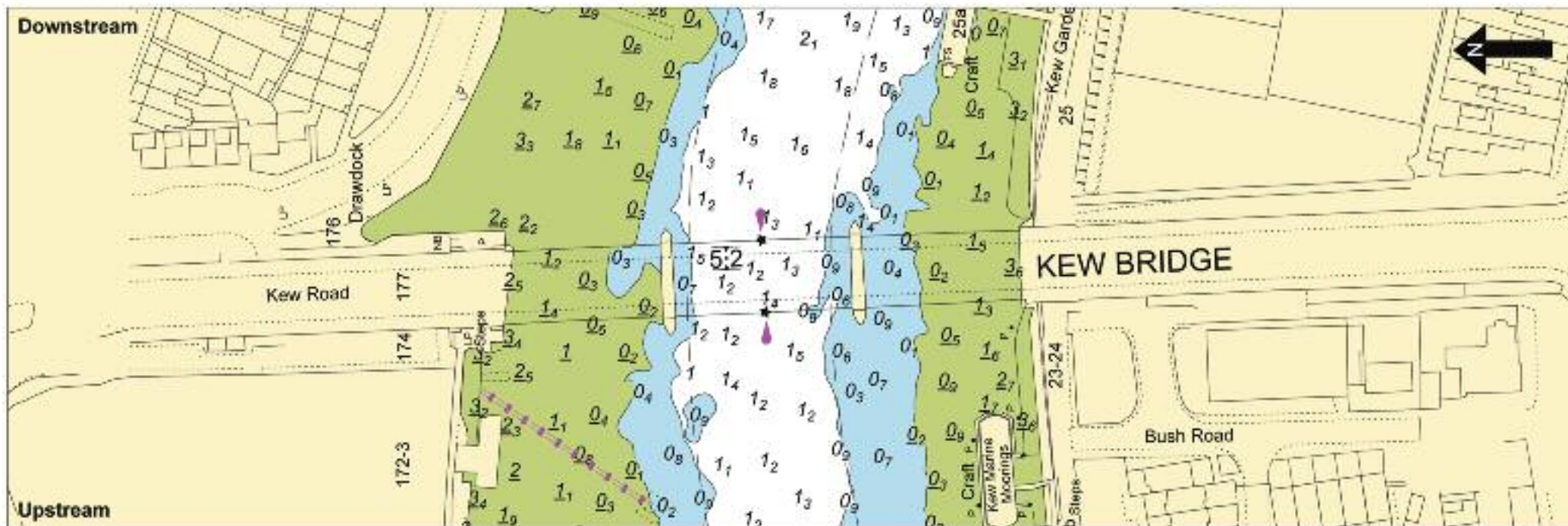
Sometimes known as Strand-on-the-Green Bridge, the bridge was opened in 1869. The four pairs of cast iron cylinders in the river support a lattice girder deck.

Navigating the Bridge

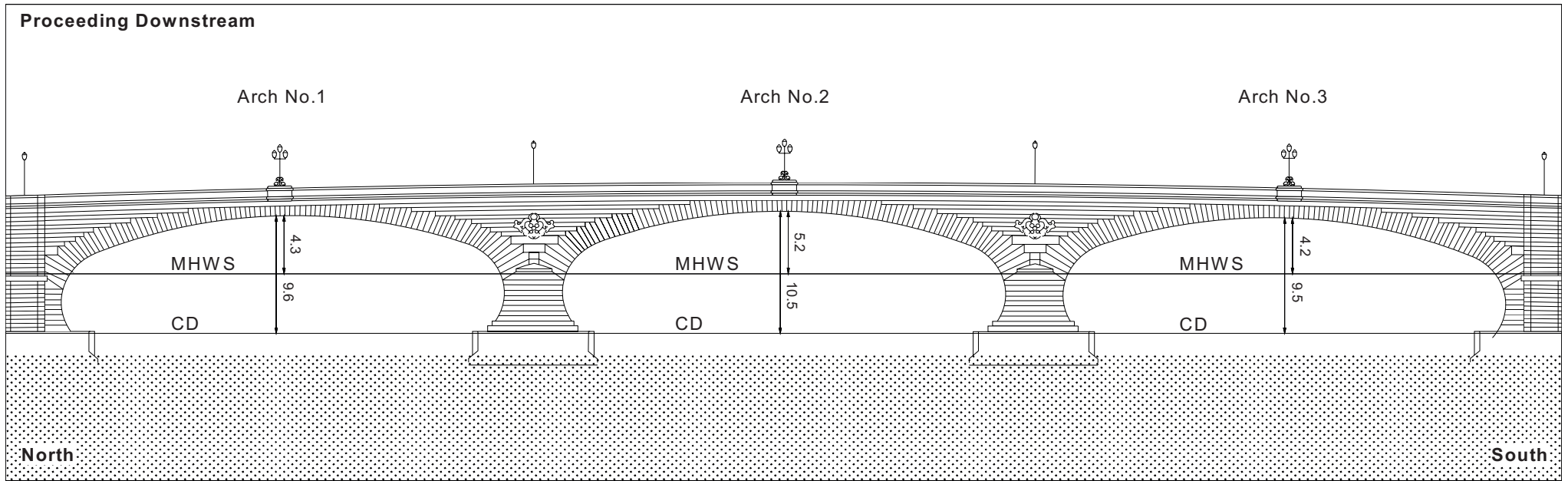
Navigation is through No. 4 Arch keeping Oliver's Ait on the north side. Close to Kew Road Bridge on the south shore is Kew Pier where large passenger vessels are regularly landing and boarding. These vessels quite often at certain states of the tide will make their approach to the pier stern upon tide.

Other vessels in the area should keep clear and give them extra room to manoeuvre. Mariners are reminded that the only reliable and unambiguous method of making their intentions clear is by use of the appropriate sound signals used in accordance with the Collision Regulations as amended by PLA Byelaws and Permanent Notice to Mariners.

Craft activity may also come from the barge grid on the north bank at Strand on the Green and from craft using Kew Draw Dock immediately downstream of Kew Bridge on the north side.



KEW BRIDGE



Working Arches	2	Distance above London Bridge	11.33nm	Height in Main Navigable Arch	10.5m above CD	Distance above RTP Gravesend	34.48nm
Tidal Set Flood Tide	Strong Set North Shore	Tidal Set Ebb Tide	Strong Set North Shore		5.2m above MHWs	Special Signal Light	No

Brief Description

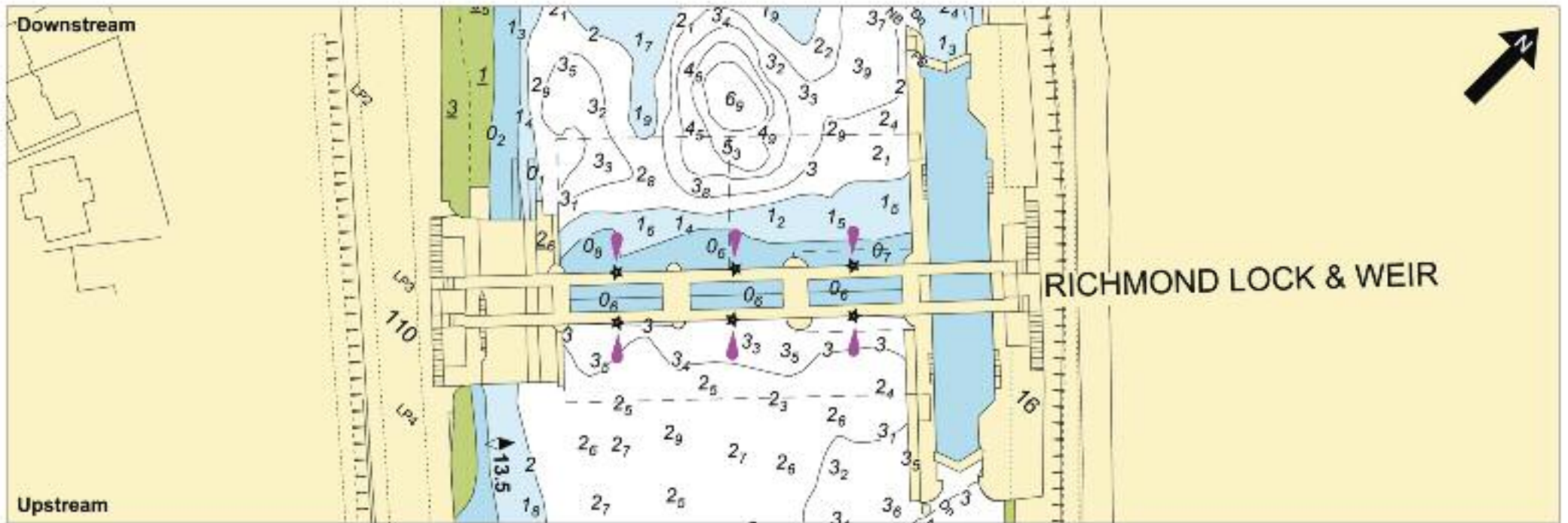
A road bridge with three curved arches, the centre arch being lit for navigation.

The bridge was rebuilt in 1903 as a three span stone faced arched bridge. Also known as King Edward VII bridge, who opened the bridge himself.

Navigating the Bridge

Visibility on the bend in the vicinity of Kew Bridge is particularly restricted and passenger boats regularly manoeuvre on and off Kew Pier. All craft are to navigate with extreme caution in the area. The tide sets strongly to the north (Middlesex) shore on both the flood and ebb tides.

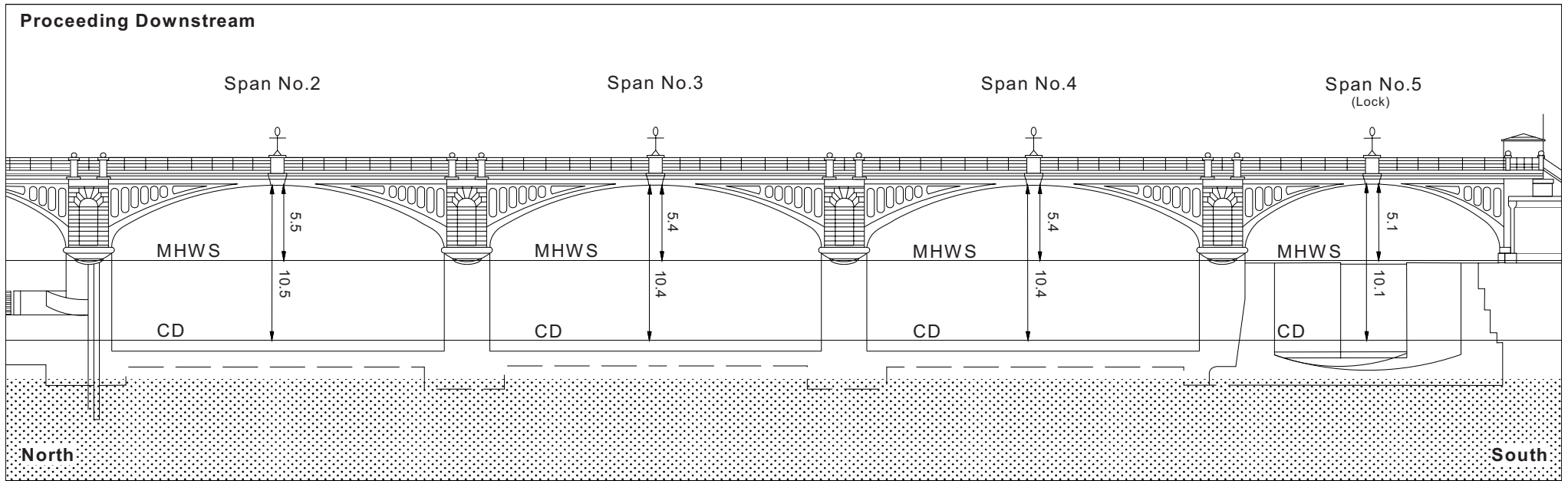
Navigation is through the centre arch (No.2) and mariners should always be prepared to meet oncoming traffic on what is again something of a blind bend. Mariners are reminded that the only reliable and unambiguous method of making their intentions clear is by use of the appropriate sound signals used in accordance with the Collision Regulations as amended by PLA Byelaws and Permanent Notice to Mariners.



Proceeding Upstream



RICHMOND FOOTBRIDGE, LOCK & WEIR



Working Arches	2, 3 & 4	Distance above London Bridge	13.49nm	Height in Main Navigable Arch	10.4m above CD	Distance above RTP Gravesend	36.64nm
					5.4m above MHWS	Special Signal Light	No

Brief Description

The Footbridge forms part of Richmond Lock and Weir.

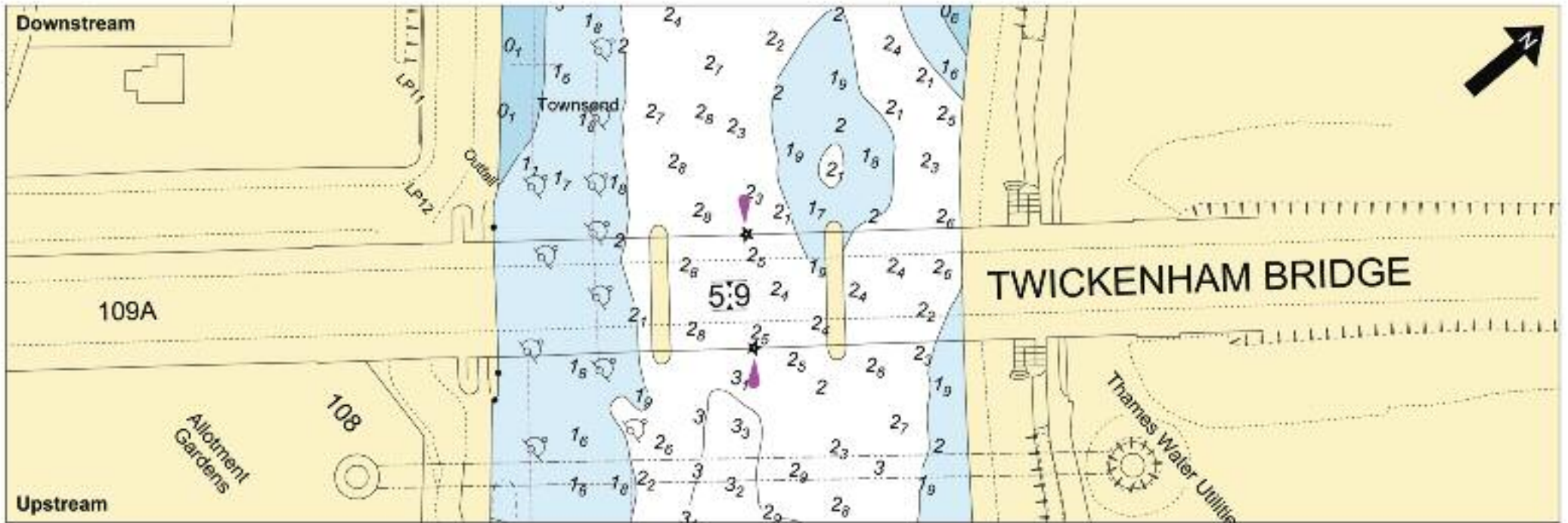
Designed by Stoney and incorporating three weirs, a lock and boat slide, the footbridge was opened in 1894. Twin arched wrought iron footbridges between stone intermediate piers cross the river in five spans. Renovation works were carried out between 1990 and 1994.

After the Thames Barrier this is the first point for the control of water levels (by raising and lowering the gates at the weir) between the tidal Thames and its source at Lechlade. However that control is lifted from 2 hours before to 2 hours after high water. The water level upstream of the lock is controlled by 3 steel curtain gates that are raised to allow vessels to pass under and lowered to the river bed to prevent water running out at a predetermined level.

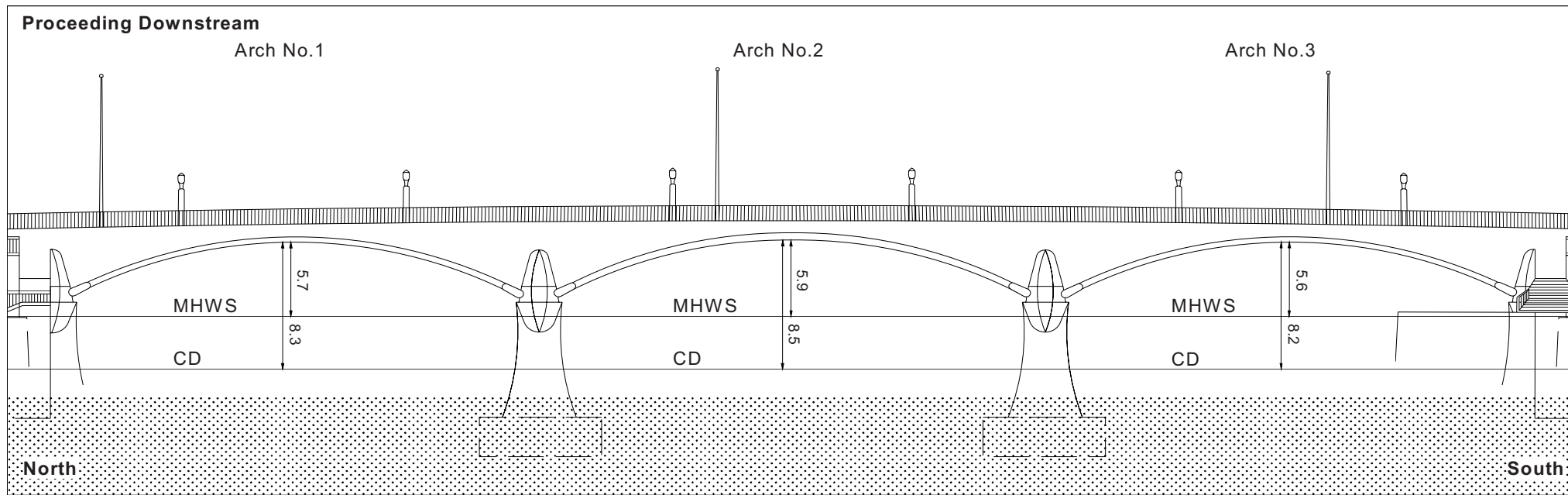
Navigating the Lock and Weir

When the gates are up, the river is fully navigable and mariners should normally use the Middlesex or north arch inward bound and the centre arch when proceeding outward bound. When the weir gates are down in position, vessels transit the site through the lock.

On the Middlesex side of the weir are the boat rollers that may be used for rowing boats that can be dragged out of the water and pushed upstream or downstream over the rollers.



TWICKENHAM BRIDGE



Working Arches	2	Distance above London Bridge	13.64nm	Height in Main Navigable Arch	8.5m above CD 5.9m above MHWs	Distance above RTP Gravesend	36.79nm
					Special Signal Light		No

Brief Description

A road bridge with five gently curved arches, only three of which are in the river and used for navigation at appropriate states of the tide.

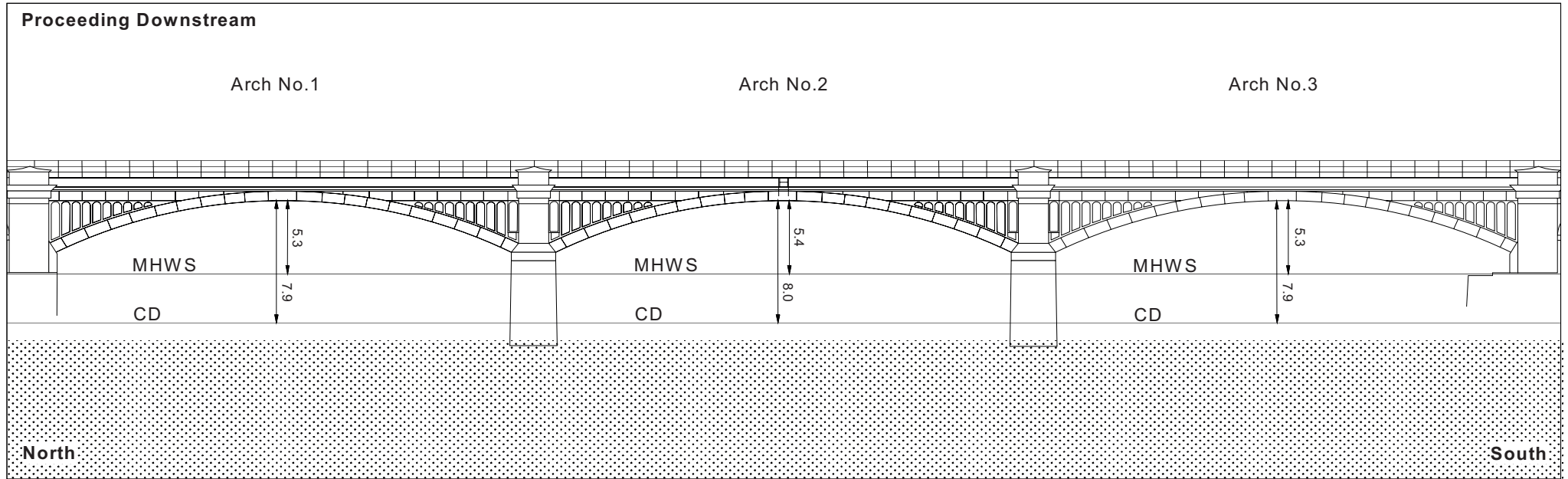
The bridge was opened in 1933. The three span arched bridge is of a reinforced concrete construction.

Navigating the Bridge

The centre or No. 2 arch is normally used for navigation.

The river narrows substantially from here westwards, with riverside towpaths and private gardens much in evidence. Private boat moorings line the Middlesex side with navigation keeping to midstream and passing vessels head-on port-side to port-side.

RICHMOND RAIL BRIDGE



Working Arches	2	Distance above London Bridge	13.67nm	Height in Main Navigable Arch	8.0m above CD 5.4m above MHSW	Distance above RTP Gravesend	36.82nm
					Special Signal Light		No

Brief Description

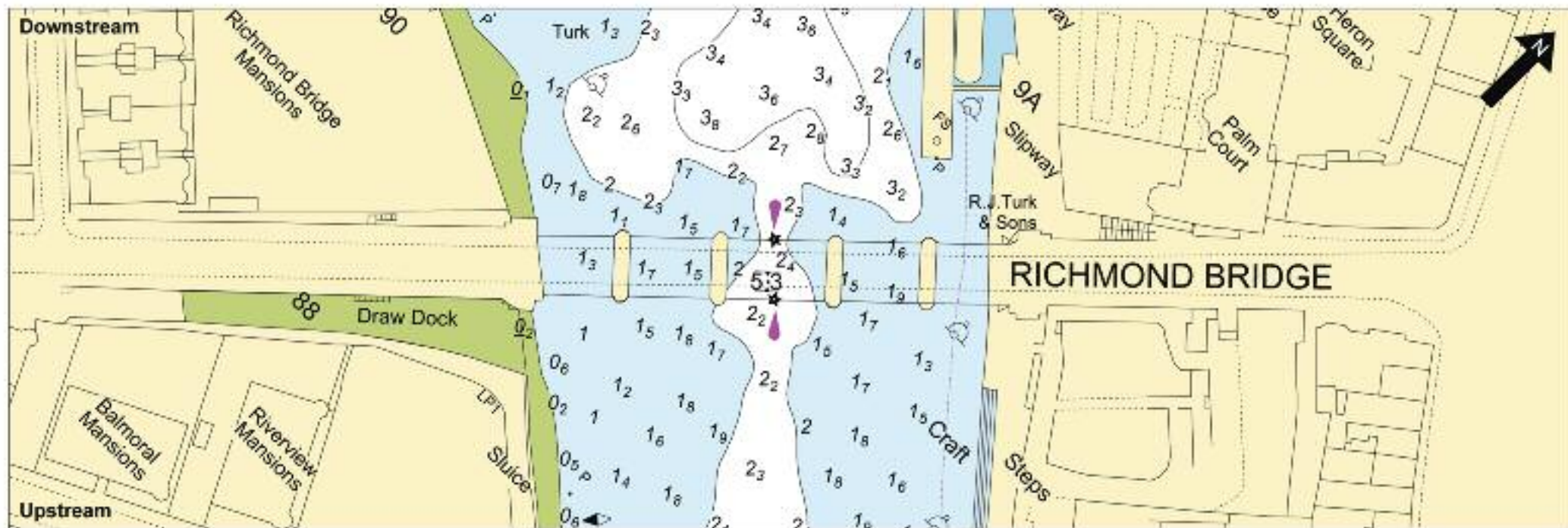
A rail bridge, with the centre arch (No.2) being lit for navigation.

This three-span wrought iron arched bridge is supported on brick faced abutments and intermediate supports.

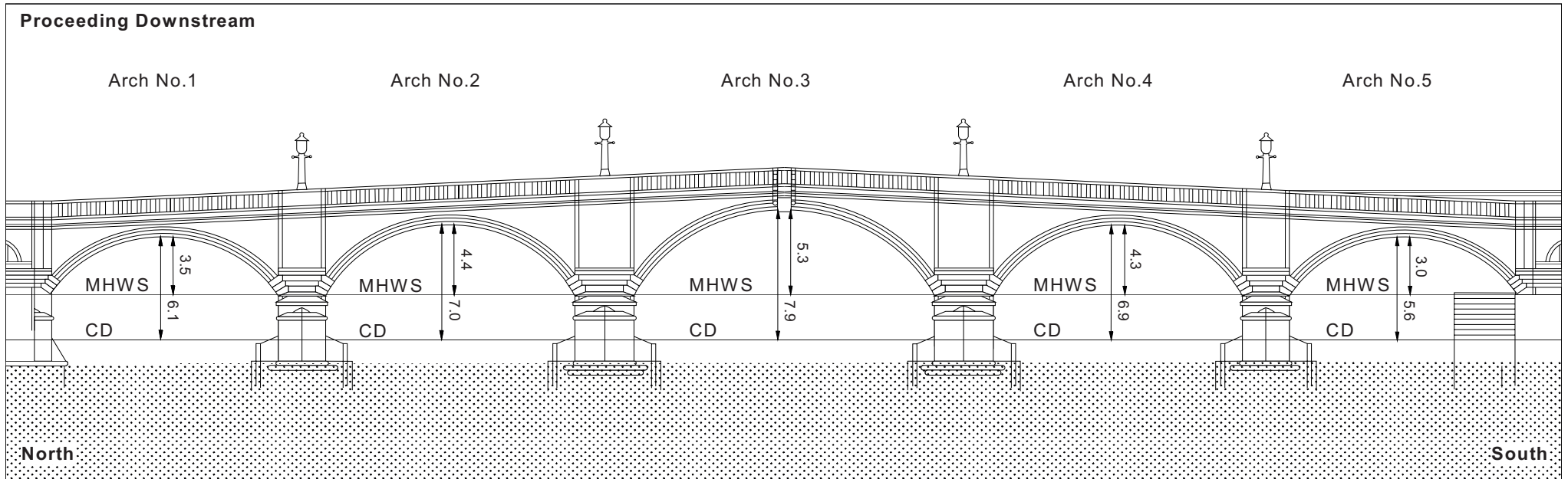
Navigating the Bridge

Approaching inward bound with Corporation Island (Richmond Ait) on the north side and St Helena Pier on the Surrey side, craft should proceed with caution on the approach to Richmond Bridge. At spring tides, with the curtain gates at Richmond Lock and Weir raised, there is a strong inward current that will sweep any unsuspecting mariner onto Richmond Bridge very quickly. Be aware of other vessels working in the area particularly large passenger boats in the summer-time outward bound from Hampton Court and Richmond Pier.

This is also an area for private hire boats available from Richmond Bridge. Small fixed seat rowing boats and small four seat motor boats are very active from Richmond to Eel Pie Island.



RICHMOND BRIDGE



Working Arches	3	Distance above London Bridge	13.97nm	Height in Main Navigable Arch	7.9m above CD 5.3m above MHWS	Distance above RTP Gravesend	37.12nm
						Special Signal Light	No

Brief Description

One of the oldest bridges below Teddington, Richmond Bridge is a road bridge with the centre arch marked for navigation.

Originally opened in 1777 it was widened in 1939. The arched stone bridge has five curved spans.

Navigating the Bridge

Most powered craft are restricted to navigating through the centre arch. Immediately upstream of the bridge on the Surrey bank is Richmond Landing Stage used by large passenger vessels at all states of the tide. This area can be very congested with small craft, particularly in the summer months when skiffs are hired out to the public. Great care should be exercised when navigating this area, being especially aware of potentially many inexperienced river users.

APPENDICES

APPENDIX A

THAMES BRIDGE CLEARANCES

BRIDGE	Individual Arch Clearance Heights above MHWS							Main Navigational Arch Clearance Heights above				
	1	2	3	4	5	6	7	CHART** DATUM	MHWN**	MLWN**	MLWS**	HAT** (prov)
Snapper (Eel Pie Island)	27*							5.3	3.9	5.3	5.3	2.2
Richmond	3.5*	4.4*	5.3*	4.3*	3.0*			7.9	6.5	7.9	7.9	4.8
Richmond Rail	5.3*	5.4*	5.3*					8.0	6.6	8.0	8.0	4.9
Twickenham	5.7*	5.9*	5.6*					8.5	7.1	8.5	8.5	5.4
Richmond Footbridge, Lock & Weir		5.5	5.4	5.4	5.1			10.4	6.7	10.4	10.4	5.0
Lot's Ait	3.8							9.1	5.0	9.0	9.1	3.3
Kew	4.3	5.2	4.2					10.5	6.4	10.4	10.5	4.7
Kew Rail	5.3	5.3	5.3	5.5	5.5			10.7	6.5	10.6	10.7	4.8
Chiswick	6.4	6.6	6.4					12.0	7.8	11.9	12.0	6.1
Barnes Rail	5.4	5.4	5.3					10.9	6.6	10.7	10.9	4.9
Hammersmith (South)	2.4	3.6	2.5					9.3	4.7	9.0	9.3	3.1
Putney	3.4	4.4	5.3	4.4	3.5			11.2	6.4	10.8	11.1	4.8
Fulham Railway	6.3	6.5	6.8	7.1	7.3			12.8	8.0	12.3	12.7	6.3
Wandsworth	3.1	5.8	3.1					11.9	7.0	11.4	11.8	5.3
Battersea Rail	6.0	6.0	6.0	6.0	6.0			12.1	7.1	11.5	11.9	5.5
Battersea	2.5	4.0	5.6	3.9	2.5			11.8	6.7	11.2	11.7	5.0
Albert	4.3	5.4	5.3	4.2				11.6	6.5	11.0	11.5	4.5
Chelsea	6.3	6.6	6.3					13.0	7.8	12.3	12.8	6.1
Victoria Rail	6.0	6.1	6.0	6.0				12.4	7.2	11.7	12.2	5.5
Vauxhall	3.9	5.1	5.7	5.1	3.9			12.2	6.9	11.4	12.0	5.2
Lambeth	3.2	5.2	6.4	5.2	3.4			13.1	7.6	12.2	12.8	5.9
Westminster	4.2	4.8	5.2	5.4	5.2	4.8	4.2	12.2	6.5	11.1	11.8	4.8
Charing Cross Rail	6.9	7.0	7.0	6.9	6.9			13.6	8.0	12.6	13.2	6.4
Waterloo	6.2	8.5	8.6	8.6	6.1			15.4	9.8	14.3	15.0	8.1
Blackfriars		6.1	7.0	5.9	4.5			13.9	8.1	12.7	13.5	6.5
Blackfriars Rail		7.1	7.1	7.2	7.1			14.0	8.3	12.8	13.6	6.6
Millennium Foot	8.6	8.9	6.4					15.8	10.1	14.7	15.5	8.4
Southwark	5.6	6.5	7.2	6.6	5.6			14.1	8.3	12.9	13.7	6.7
Cannon Street Rail	6.8	7.0	7.2	7.0	6.8			14.2	8.4	13.0	13.8	6.7
London Bridge	6.6	8.7	6.7					15.8	9.9	14.5	15.4	8.2
Tower	6.8	8.5	6.8					15.6	9.7	14.3	15.2	8.0
QE2		54.1						60.7	55.2	59.3	60.2	53.4

Clearance Heights identified in **BOLD** refer to the main navigational arch

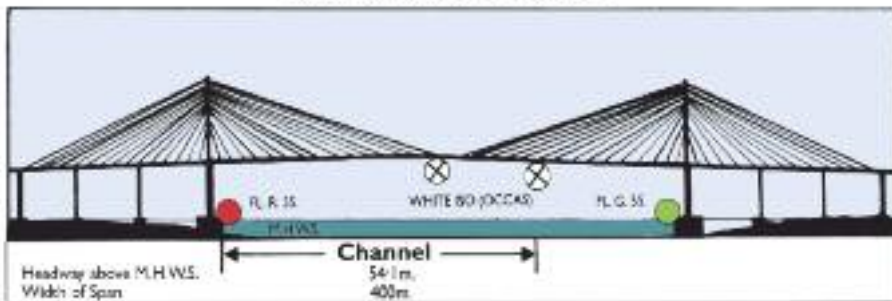
* Refers to headway above maintained water level.

** Definitions are provided in Appendix C.

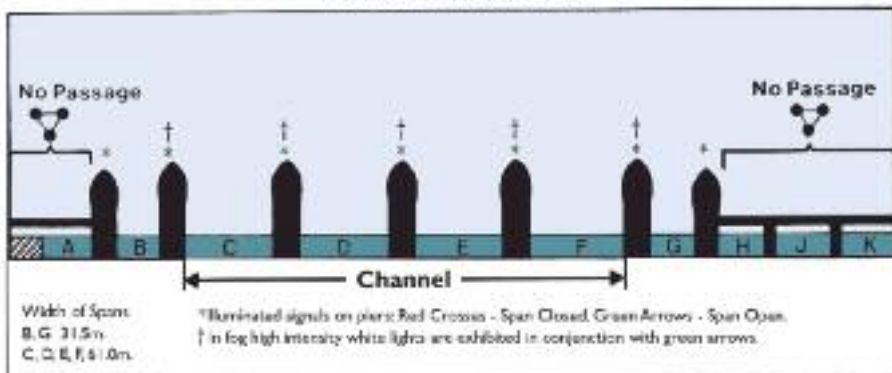
APPENDIX B BRIDGE SILHOUETTES

UPSTREAM

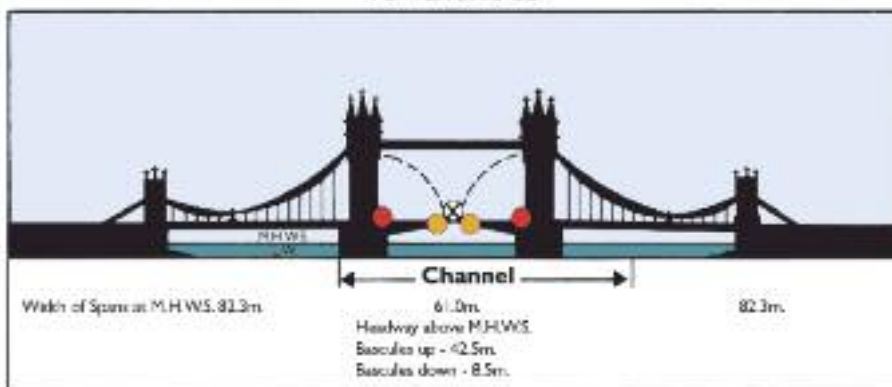
QUEEN ELIZABETH II BRIDGE



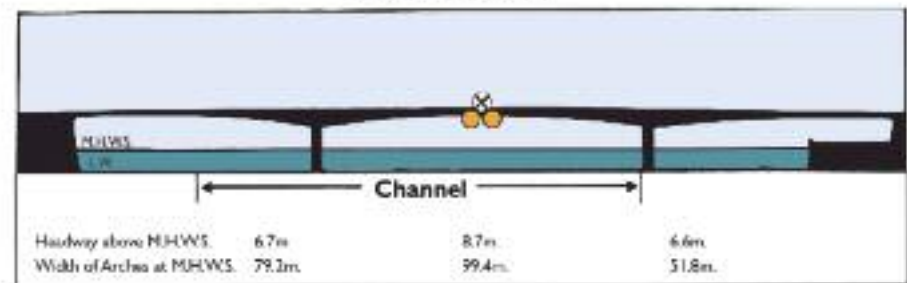
THAMES FLOOD BARRIER



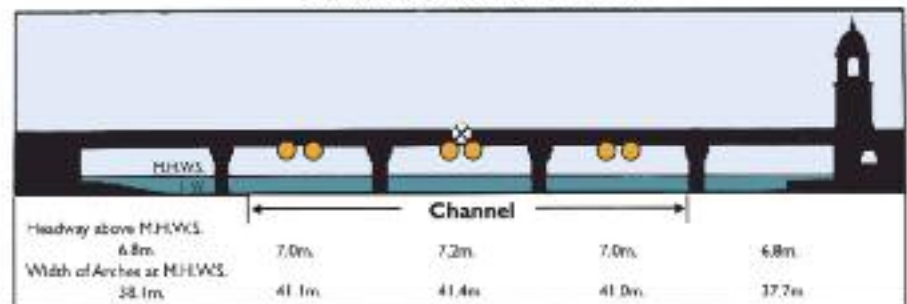
TOWER BRIDGE



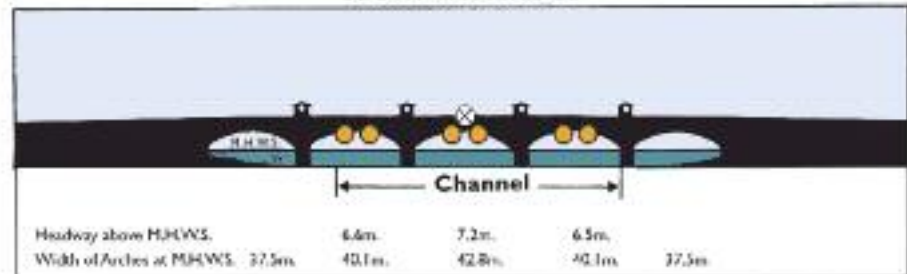
LONDON BRIDGE



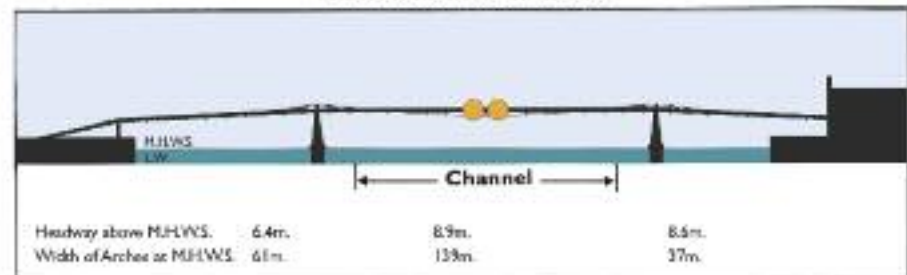
CANNON STREET RAIL BRIDGE



SOUTHWARK BRIDGE

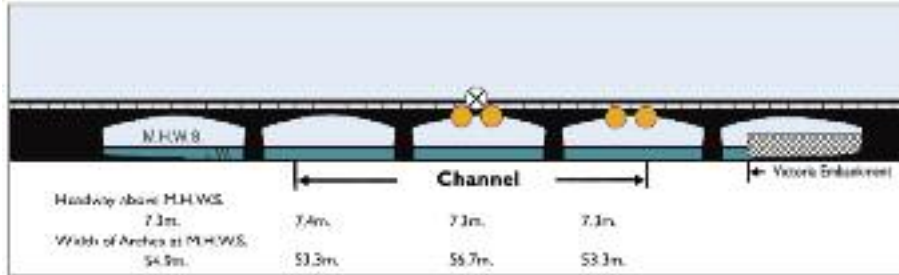


MILLENNIUM FOOTBRIDGE

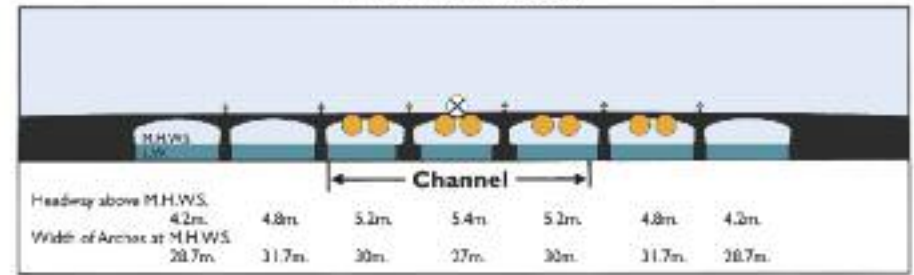


PROCEEDING UPSTREAM

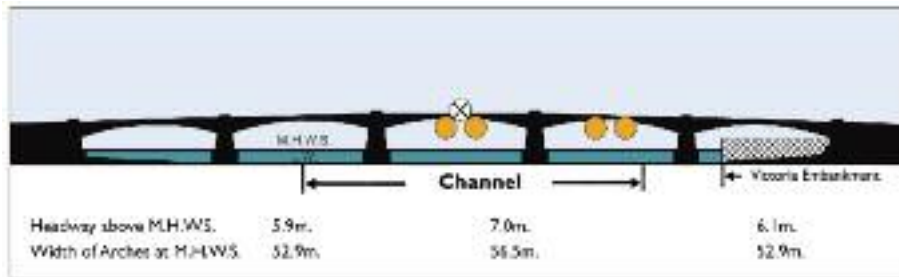
BLACKFRIARS RAIL BRIDGE



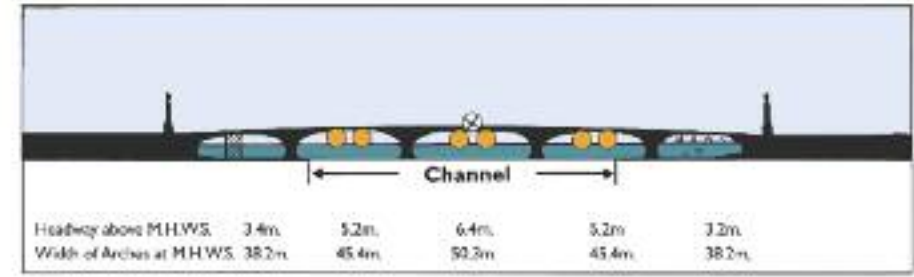
WESTMINSTER BRIDGE



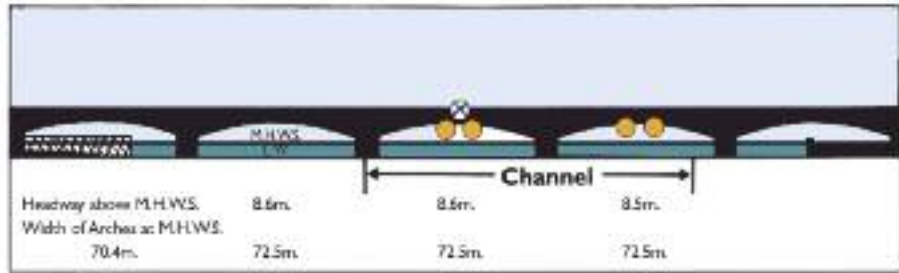
BLACKFRIARS BRIDGE



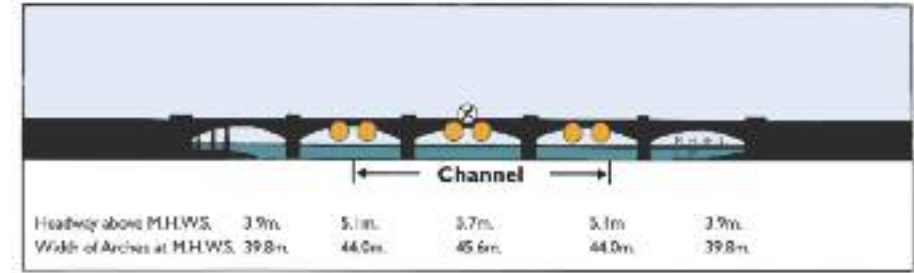
LAMBETH BRIDGE



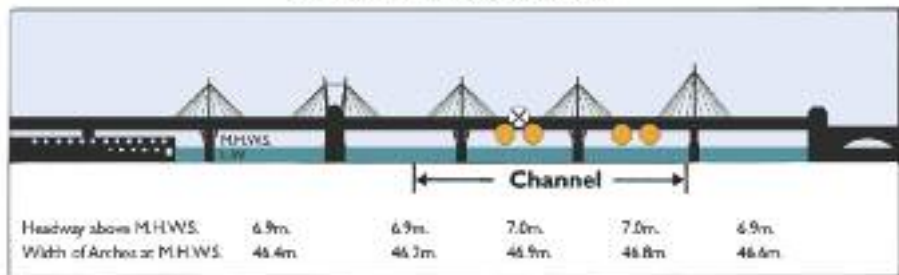
WATERLOO BRIDGE



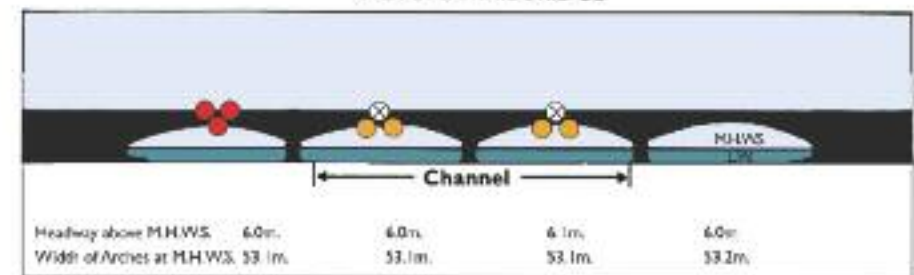
VAUXHALL BRIDGE



CHARING CROSS RAIL BRIDGE

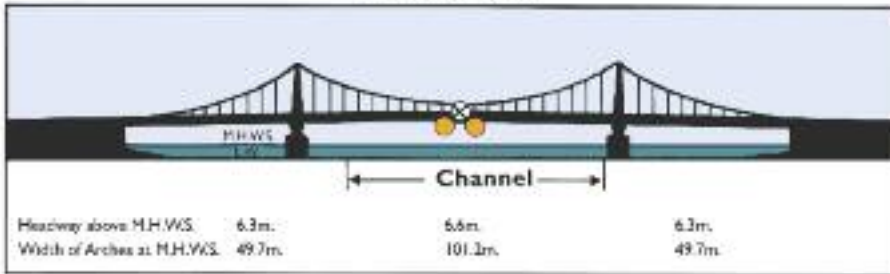


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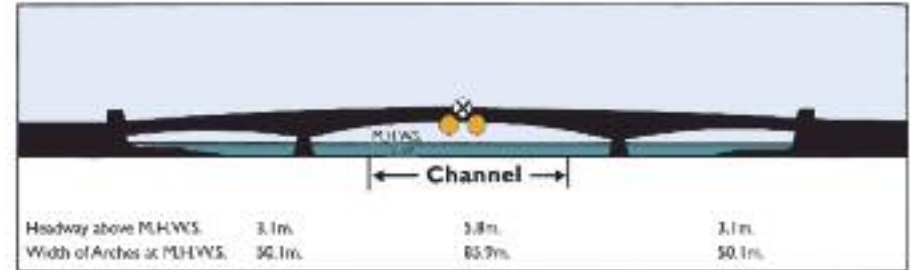


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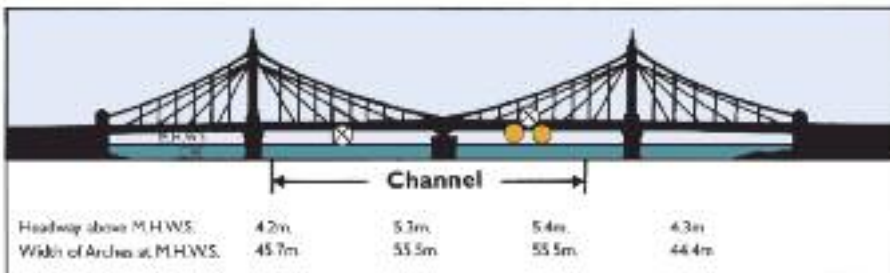
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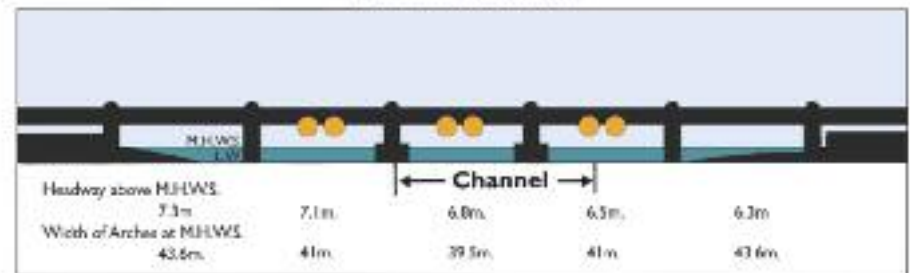
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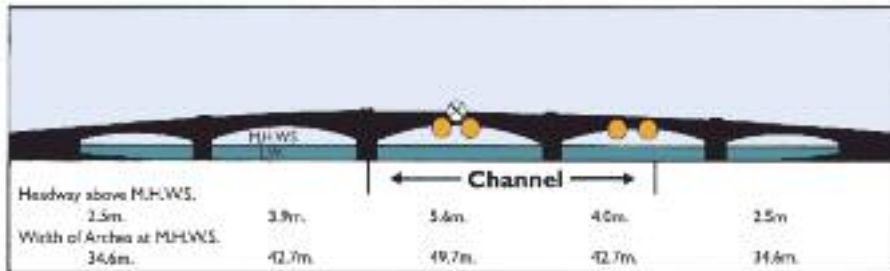
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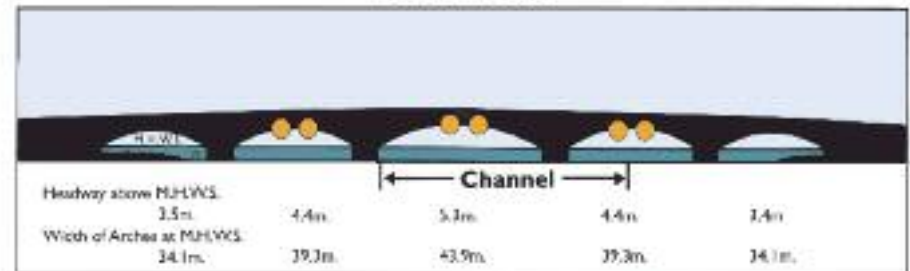
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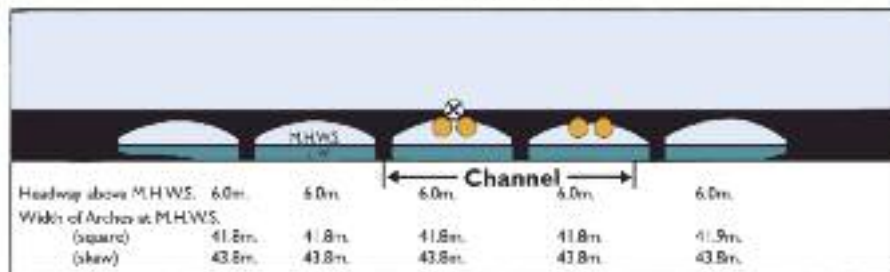
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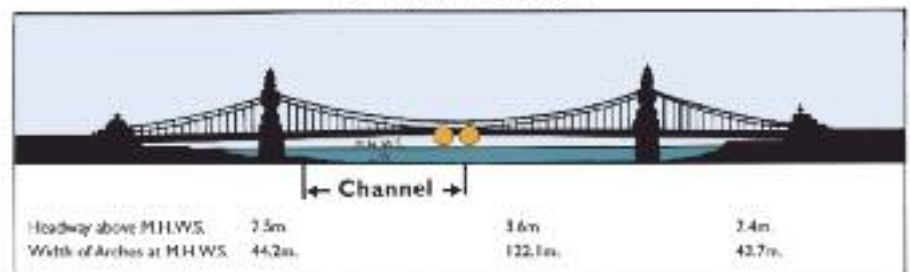
PUTNEY BRIDGE



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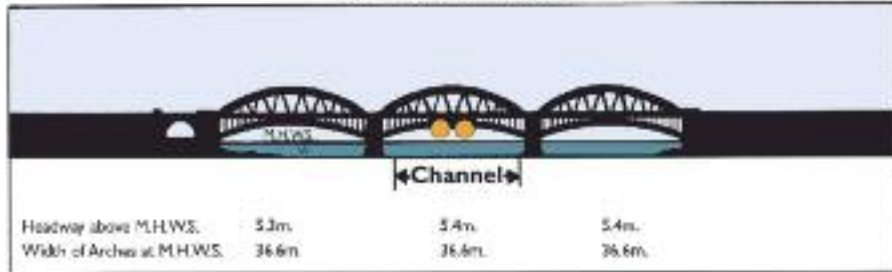


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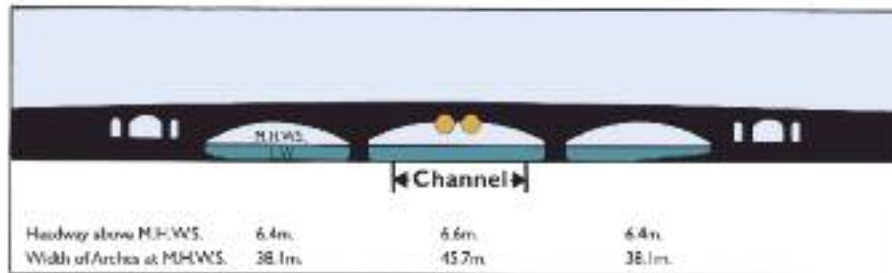


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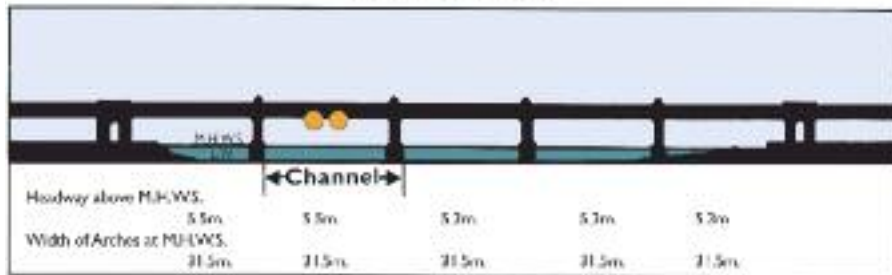
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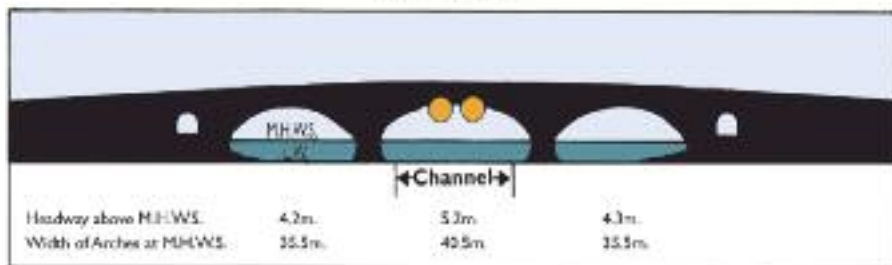
CHISWICK BRIDGE



KEW RAIL BRIDGE



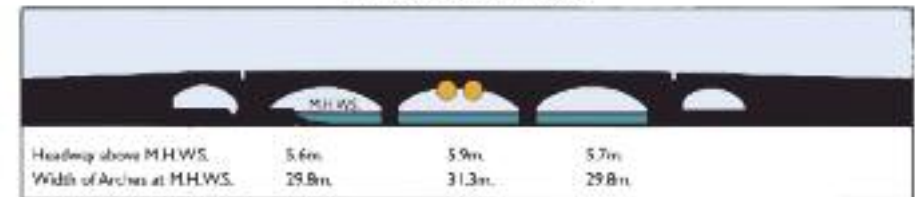
KEW BRIDGE



RICHMOND FOOTBRIDGE, LOCK & WEIR



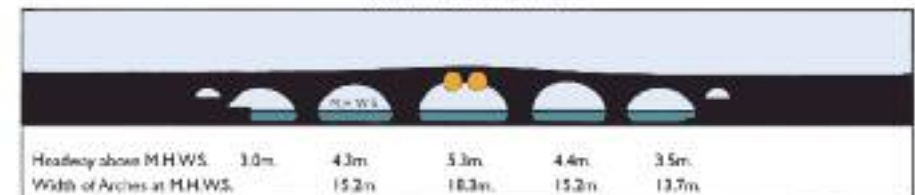
TWICKENHAM BRIDGE



RICHMOND RAIL BRIDGE

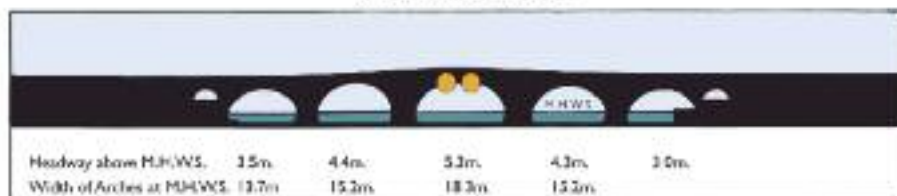


RICHMOND BRIDGE

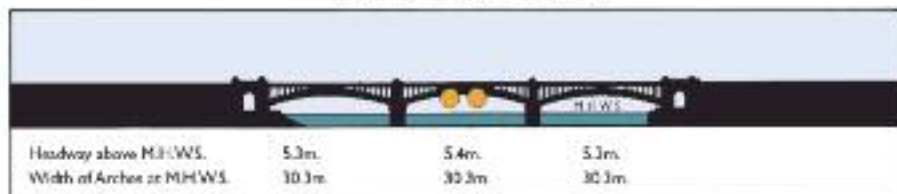


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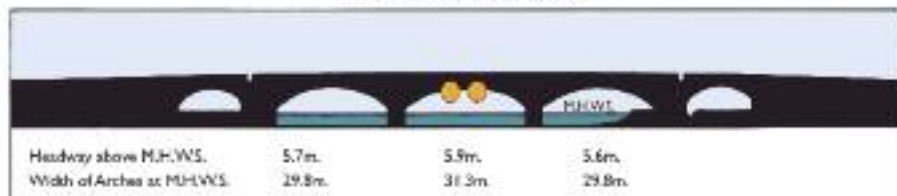
RICHMOND BRIDGE



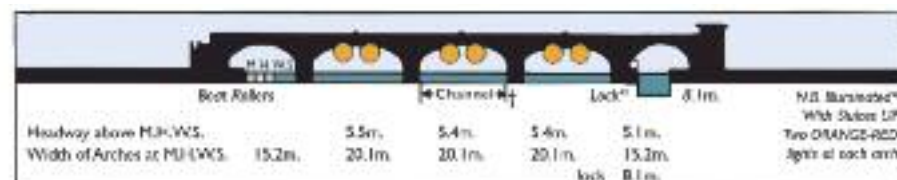
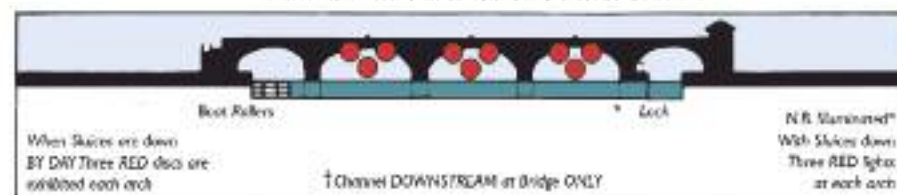
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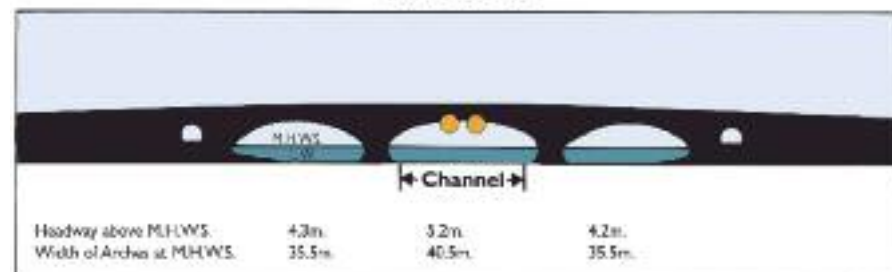
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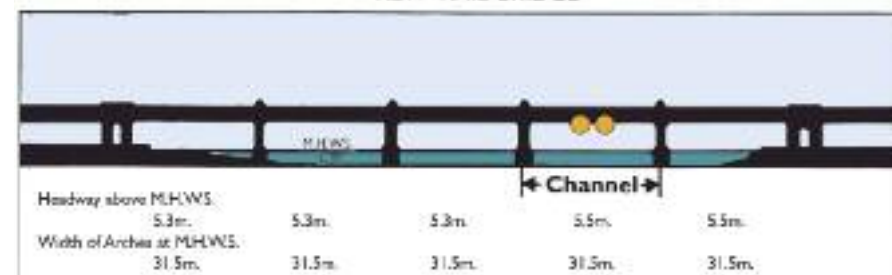
RICHMOND FOOTBRIDGE, LOCK & WEIR



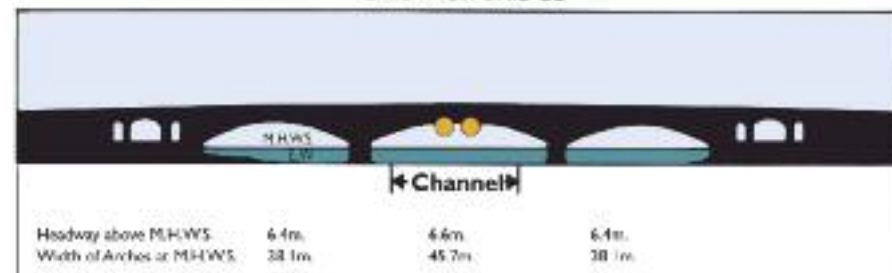
KEW BRIDGE



KEW RAIL BRIDGE



CHISWICK BRIDGE

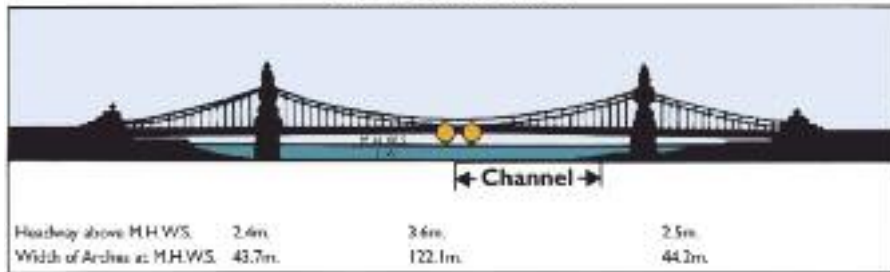


BARNES RAIL BRIDGE

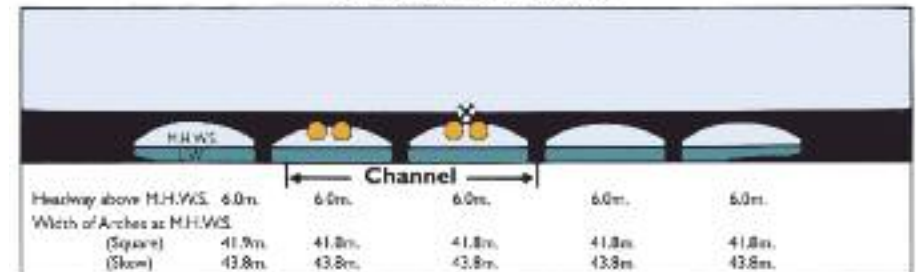


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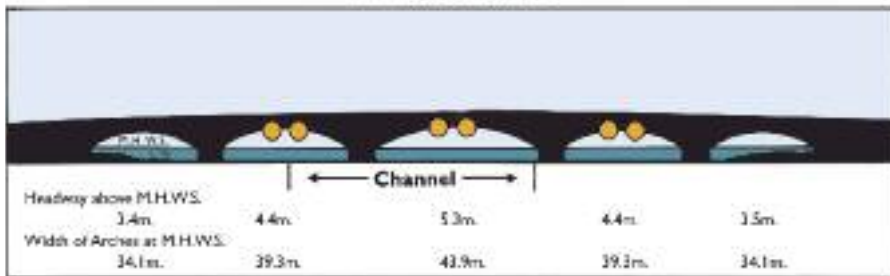
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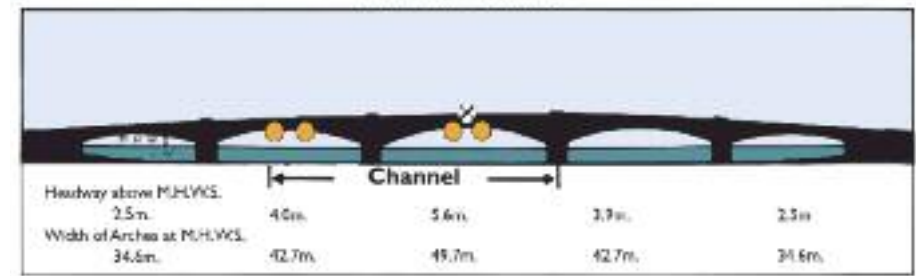
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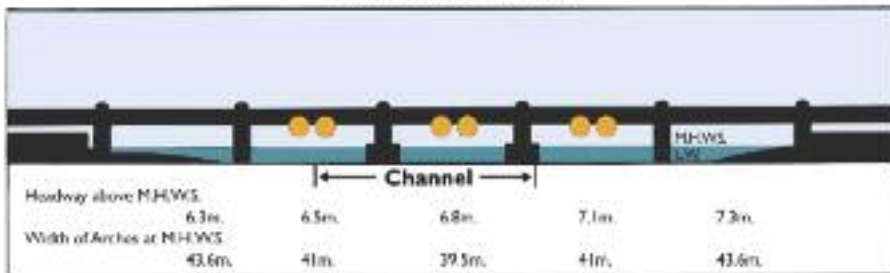
PUTNEY BRIDGE



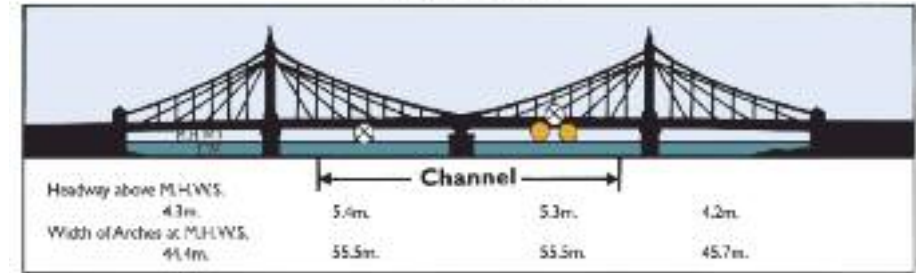
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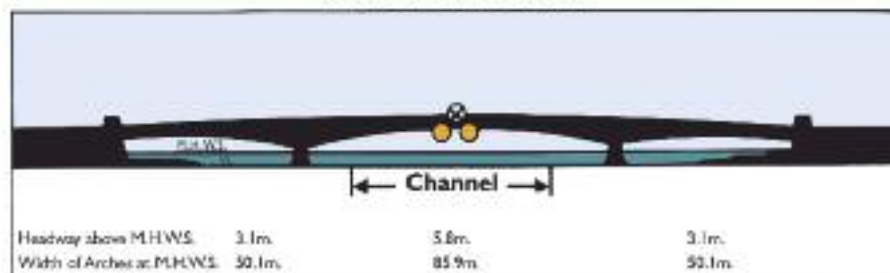
FULHAM RAIL BRIDGE



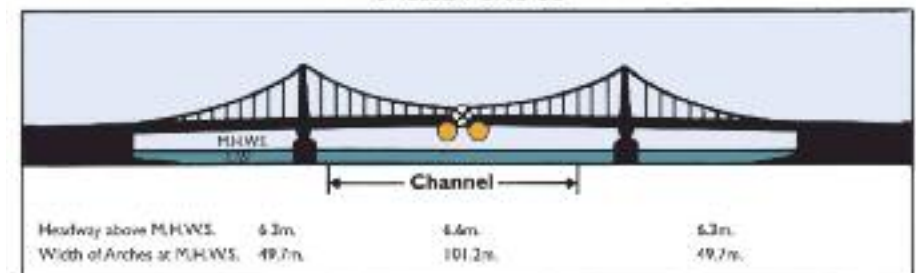
ALBERT BRIDGE



WANDSWORTH BRIDGE

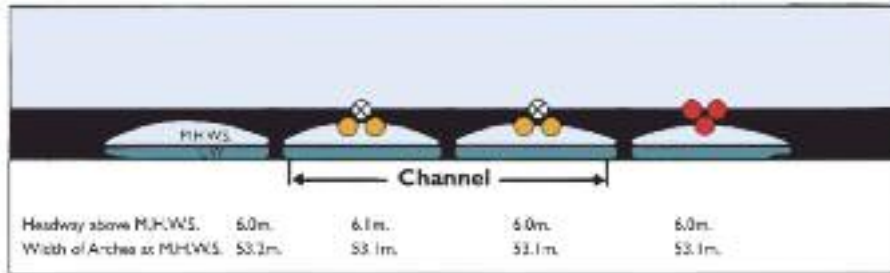


CHELSEA BRIDGE

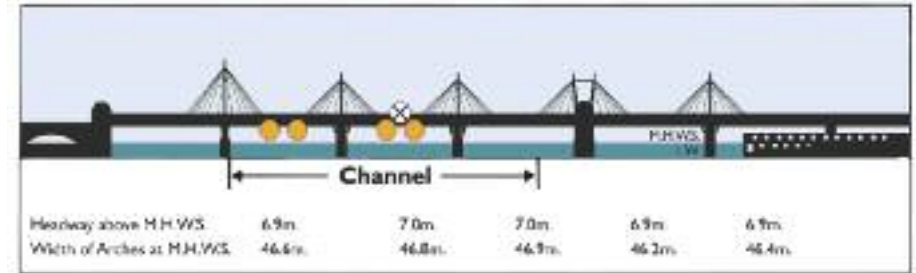


PROCEEDING DOWNSTREAM

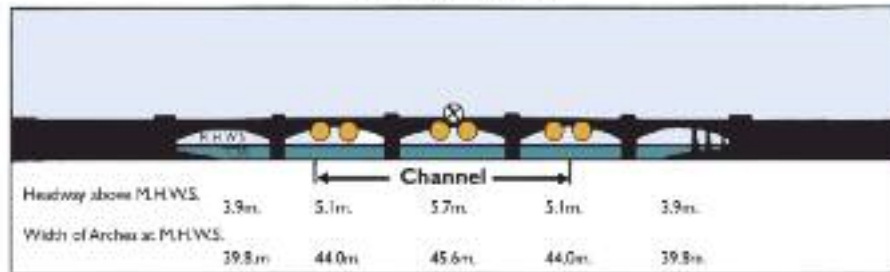
VICTORIA RAIL BRIDGE



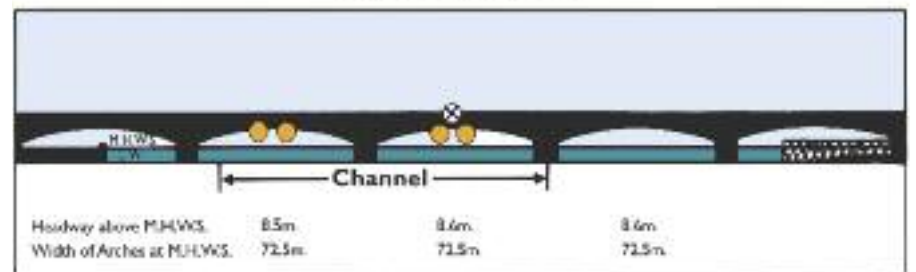
CHARING CROSS RAIL BRIDGE



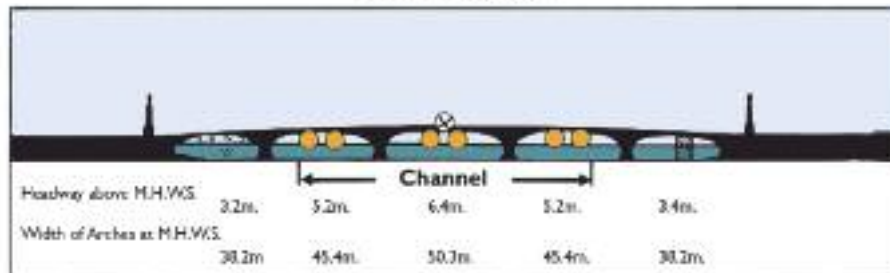
VAUXHALL BRIDGE



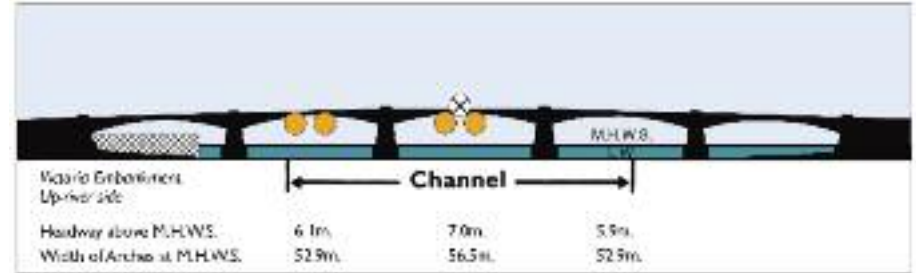
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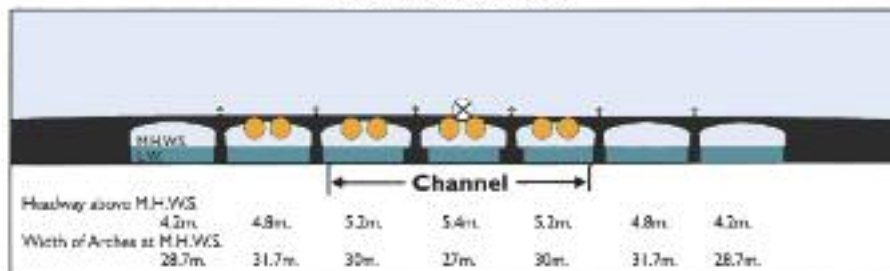
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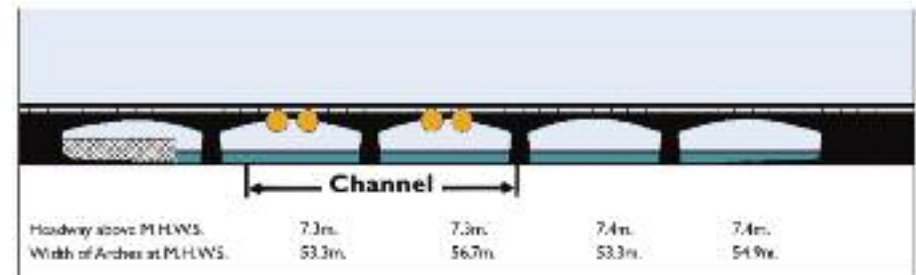
BLACKFRIARS BRIDGE



WESTMINSTER BRIDGE

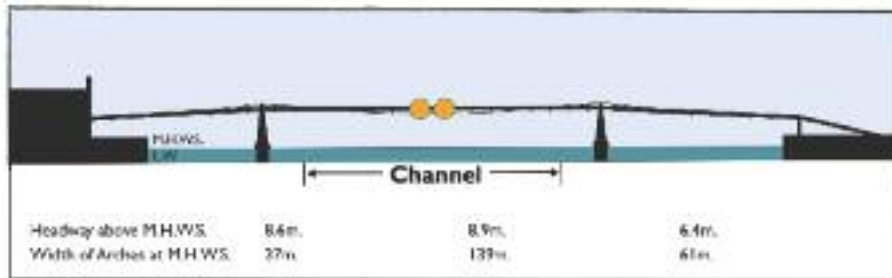


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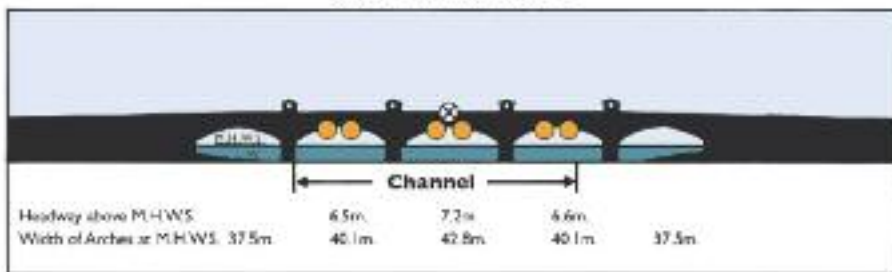


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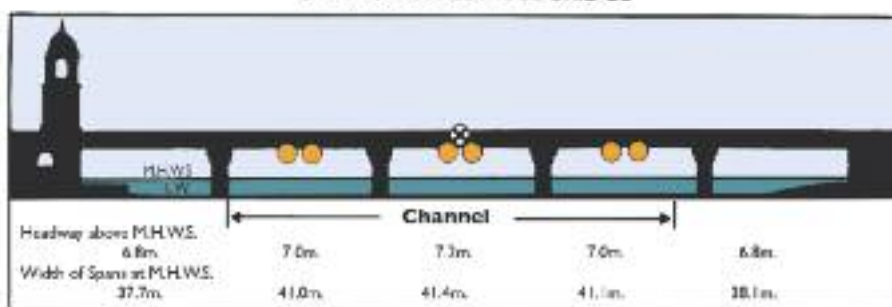
MILLENNIUM FOOTBRIDGE



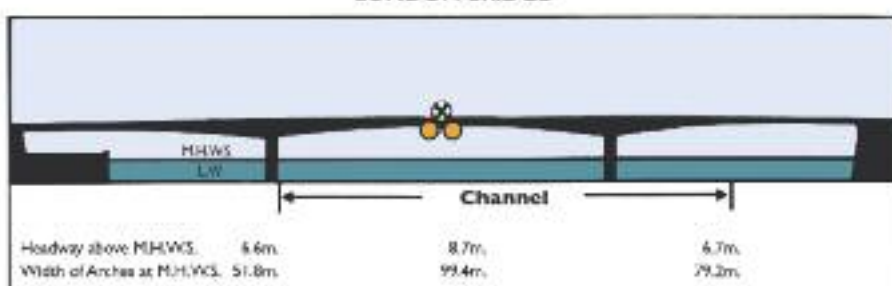
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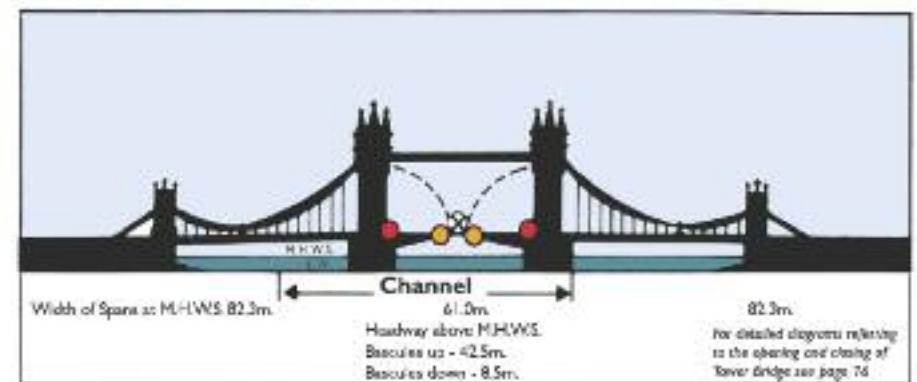
CANNON STREET RAIL BRIDGE



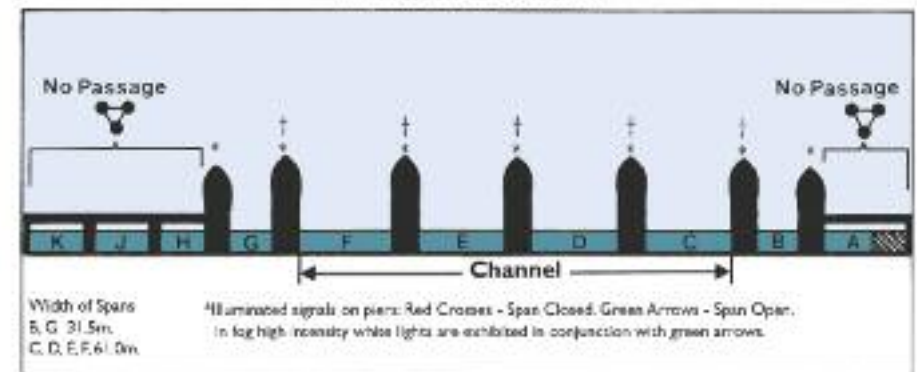
LONDON BRIDGE



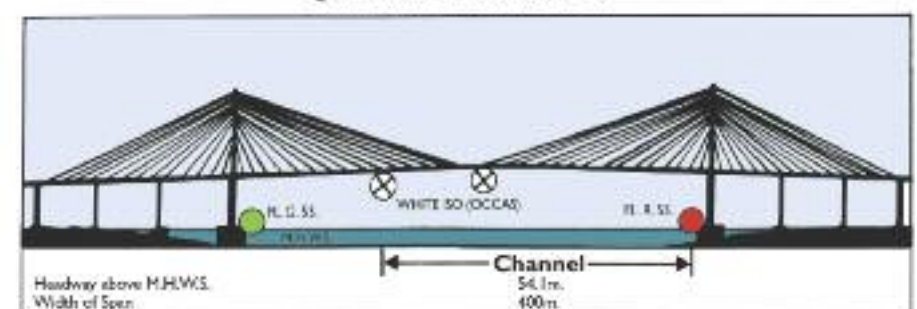
TOWER BRIDGE



THAMES FLOOD BARRIER



QUEEN ELIZABETH II BRIDGE



APPENDIX C

CHART DATUMS & STANDARD LEVELS IN THE PORT OF LONDON

- Chart Datum** is set to approximately the level of Lowest Astronomical Tide (L.A.T.)
- Low Water Levels** in the upper reaches of the tidal Thames are greatly affected by the land water flow at Teddington Weir. **They frequently fall below chart datum** when this flow is significantly reduced, typically during the summer months.
- Maintained level** and chart datum above Richmond half tide weir are both 1.72 metres above Ordnance Datum (Newlyn).
- Trinity High Water (T.H.W.)** is deemed by the Port of London Act 1968, to be a level having a value of 11.4 feet (i.e. **3.475 metres**) above Ordnance Datum (Newlyn).
- Highest Astronomical Tide (HAT)** is the highest tidal level which can be predicted to occur under average meteorological conditions and under any combination of astronomical conditions.

Tidal Station	Level of Chart Datum below Ordnance Datum (Newlyn) m	Standard levels above local C.D.			
		Mean Low Water Springs	Mean Low Water Neaps	Mean High Water Neaps	Mean High Water Springs
Walton	2.16	0.5	1.2	3.5	4.2
Margate	2.50	0.5	1.3	4.0	4.7
Shivering Sand	-	0.5	1.3	4.4	5.2
Southend	2.90	0.5	1.4	4.8	5.8
Canvey	2.97	0.6	1.4	5.0	6.1
Coryton	3.05	0.6	1.4	5.1	6.1
Tilbury	3.12	0.5	1.4	5.4	6.4
Greenhithe	3.20	0.5	1.4	5.5	6.6
Dagenham	3.28	0.5	1.4	5.7	6.8
North Woolwich	3.35	0.5	1.5	5.9	7.0
Tower	3.20	0.4	1.3	5.9	7.1
Blackfriars	3.05	0.4	1.2	5.8	6.9
Westminster	2.90	0.4	1.1	5.6	6.8
Vauxhall	2.59	0.2	0.8	5.3	6.4
Victoria Rail	2.44	0.2	0.7	5.2	6.4
Albert Bridge	2.29	0.1	0.6	5.1	6.2
Wandsworth	2.13	0.1	0.5	4.9	6.1
Putney	1.98	0.1	0.5	4.8	6.0
Hammersmith	1.68	0.0	0.3	4.6	5.7
Barnes	1.37	0.0	0.2	4.3	5.5
Chiswick	1.22	0.0	0.1	4.2	5.4
Kew	1.07	0.0	0.1	4.1	5.3
Brentford	0.91	0.0	0.0	4.0	5.2
Richmond	0.61	-	-	3.7	4.9
Twickenham	Note 3	-	-	1.5	2.7

APPENDIX D

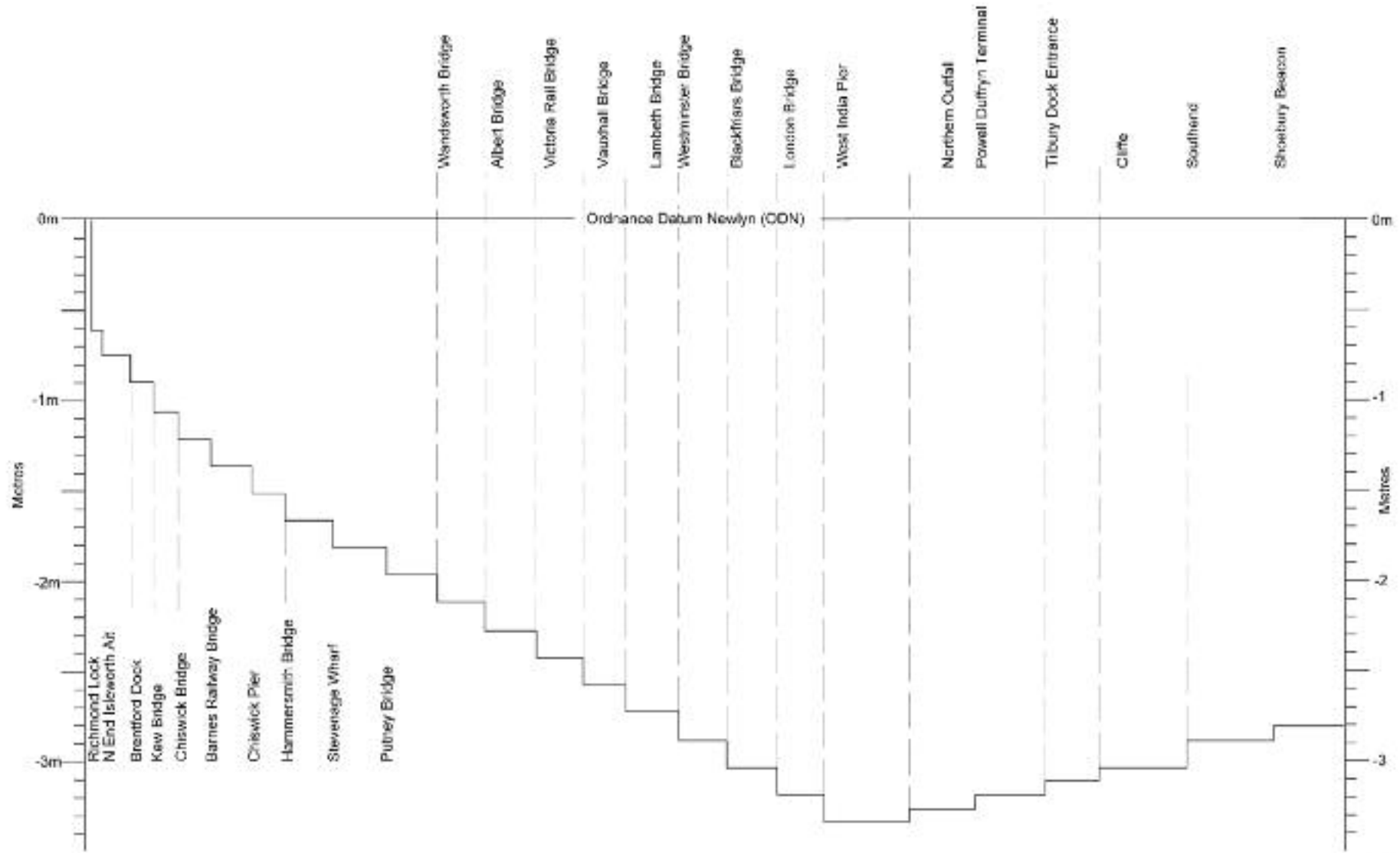
CHART DATUMS & STANDARD LEVELS IN THE PORT OF LONDON

- Chart Datum** is set to approximately the level of Lowest Astronomical Tide (L.A.T.)
- MHWS** is the average height of the high waters of Spring Tides above the Chart Datum.
- MLWS** is the average height of all low waters of Spring Tides above the Chart Datum.
- MHWN** is the average height of the high waters of Neap Tides above the Chart Datum.
- MLWN** is the average height of the low waters of Neap Tides above the Chart Datum
- Low Water Levels** in the upper reaches of the tidal Thames are greatly affected by the land water flow at Teddington Weir. **They frequently fall below chart datum** when this flow is significantly reduced, typically during the summer months.
- Maintained level** and chart datum above Richmond half tide weir are both 1.72 metres above Ordnance Datum (Newlyn).
- Trinity High Water (T.H.W.)** is deemed by the Port of London Act 1968, to be a level having a value of 11.4 feet (i.e. **3.475 metres**) above Ordnance Datum (Newlyn).
- Highest Astronomical Tide (HAT)** is the highest tidal level which can be predicted to occur under average meteorological conditions and under any combination of astronomical conditions.

Tidal Station	Level of Chart Datum below Ordnance Datum (Newlyn) m	Standard levels above local C.D.			
		Mean Low Water springs	Mean Low Water Neaps	Mean High Water Neaps	Mean High Water Springs
Walton	2.16	0.5	1.2	3.5	4.2
Margate	2.50	0.5	1.3	4.0	4.7
Shivering Sand	-	0.5	1.3	4.4	5.2
Southend	2.90	0.5	1.4	4.8	5.8
Canvey	2.97	0.6	1.4	5.0	6.1
Coryton	3.05	0.6	1.4	5.1	6.1
Tilbury	3.12	0.5	1.4	5.4	6.4
Greenhithe	3.20	0.5	1.4	5.5	6.6
Dagenham	3.28	0.5	1.4	5.7	6.8
North Woolwich	3.35	0.5	1.5	5.9	7.0
Tower	3.20	0.4	1.3	5.9	7.1
Blackfriars	3.05	0.4	1.2	5.8	6.9
Westminster	2.90	0.4	1.1	5.6	6.8
Vauxhall	2.59	0.2	0.8	5.3	6.4
Victoria Rail	2.44	0.2	0.7	5.2	6.4
Albert Bridge	2.29	0.1	0.6	5.1	6.2
Wandsworth	2.13	0.1	0.5	4.9	6.1
Putney	1.98	0.1	0.5	4.8	6.0
Hammersmith	1.68	0.0	0.3	4.6	5.7
Barnes	1.37	0.0	0.2	4.3	5.5
Chiswick	1.22	0.0	0.1	4.2	5.4
Kew	1.07	0.0	0.1	4.1	5.3
Brentford	0.91	0.0	0.0	4.0	5.2
Richmond	0.61	-	-	3.7	4.9
Twickenham	Note 3	-	-	1.5	2.7

Diagram showing Chart Datums in the River Thames

(Between Richmond Lock and Teddington Lock, the maintained level is 1.72m above ODN)



APPENDIX E

TABLE OF DISTANCES WITHIN THE PORT OF LONDON

BRIDGE	TEDDINGTON	RICHMOND LOCK & WEIR	BRENTFORD LOCK	LONDON BRIDGE	THAMES BARRIER WOOLWICH	ROYAL TERRACE PIER GRAVESEND	SR1
Teddington Lock	0.00	2.59	4.20	16.08	23.60	39.23	62.14
Richmond Bridge	2.11	0.48	2.09	13.97	21.49	37.12	57.59
Richmond Rail Bridge	2.41	0.18	1.79	13.67	21.19	36.82	57.29
Twickenham Bridge	2.44	0.15	1.76	13.64	21.16	36.79	57.26
Richmond Lock & Footbridge	2.59	0.00	1.61	13.49	21.01	36.64	57.11
Kew Bridge	4.75	2.16	0.55	11.33	18.85	34.48	54.95
Kew Rail Bridge	5.10	2.51	0.90	10.98	18.50	34.13	54.60
Chiswick Bridge	5.86	3.27	1.66	10.22	17.74	33.37	53.84
Barnes Rail Bridge	6.53	3.94	2.33	9.55	17.07	32.70	53.17
Hammersmith Bridge	8.11	5.52	3.91	7.97	15.49	31.12	51.59
Putney Bridge	9.63	7.04	5.43	6.45	13.97	29.60	50.07
Fulham Rail Bridge	9.77	7.18	5.57	6.31	13.83	29.46	49.93
Wandsworth Bridge	10.62	7.75	6.14	5.74	13.26	28.89	49.36
Battersea Rail Bridge	11.25	8.66	7.05	4.83	12.35	27.98	48.45
Battersea Road Bridge	11.81	9.22	7.61	4.27	11.79	27.42	47.89
Albert Bridge	12.04	9.45	7.84	4.04	11.56	27.19	47.66
Chelsea Bridge	12.68	10.09	8.48	3.40	10.92	26.55	47.02
Victoria Rail Bridge	12.77	10.18	8.57	3.31	10.83	26.46	46.93
Vauxhall Bridge	13.62	11.03	9.42	2.46	9.98	25.61	46.08
Lambeth Bridge	14.06	11.47	9.86	2.02	9.54	25.17	45.64
Westminster Bridge	14.44	11.85	10.24	1.64	9.16	24.79	45.26
Charing Cross Bridge	14.72	12.17	10.56	1.32	8.84	24.47	44.94
Waterloo Bridge	14.96	12.37	10.76	1.12	8.64	24.27	44.74
Blackfriars Road Bridge	15.45	12.86	11.25	0.63	8.15	23.78	44.25
Blackfriars Rail Bridge	Not published					23.75	
Millennium Footbridge	15.67	13.08	11.47	0.41	7.93	23.56	44.03
Southwark Bridge	15.84	13.25	11.64	0.24	7.76	23.39	43.86
Cannon Street Rail Bridge	15.92	13.33	11.72	0.16	7.68	23.31	43.78
London Bridge	16.08	13.49	11.88	0.00	7.52	23.15	43.62
Tower Bridge	16.56	13.97	12.36	0.48	7.04	22.67	43.14
Queen Elizabeth II Bridge	33.72	31.17	29.56	17.68	10.16	5.47	25.94

DIFFERENCES ON NORTH WOOLWICH

	For H.W.			For L.W		
		h	m		h	m
Greenwich Pier and Buoys	add	0	13	add	0	21
India & Millwall Dock Entrance	add	0	10	add	0	19
Royal Victoria Dock, Western Entrance	add	0	7	add	0	14

DIFFERENCES ON TILBURY

	For H.W.			For L.W		
		h	m		h	m
Ford's (Dagenham)	add	0	23	add	0	33
Purfleet	add	0	12	add	0	17
London International Cruise Terminal	sub	0	4	sub	0	4
Diver Shoal	sub	0	7	sub	0	7

APPENDIX F

TABLE OF AVERAGE TIME DIFFERENCES

The times of high and low water at the following places on the River Thames may be found **approximately** by applying the differences shown to the times of high and low water given in the Tide Tables.

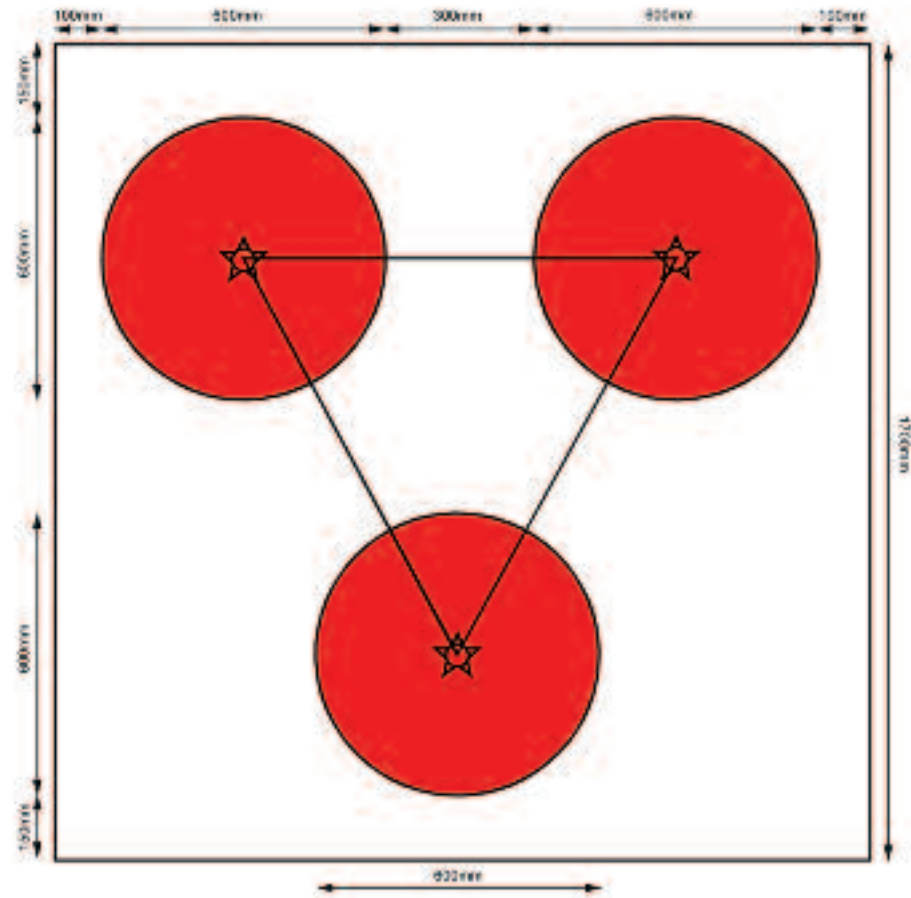
DIFFERENCES ON LONDON BRIDGE

	For H.W.			For L.W		
		h	m		h	m
Teddington Lock	add	1	01	add	-	-
*Richmond Lock	add	1	01	add	2	50
Kew Bridge	add	0	52	add	2	46
Barnes Rail Bridge	add	0	44	add	2	19
Hammersmith Bridge	add	0	38	add	1	58
Putney Bridge	add	0	31	add	1	38
Battersea Bridge	add	0	21	add	1	10
Greenland Dock Entrance	sub	0	9	sub	0	14

*The sluice-gates at Richmond Weir are raised at approximately 2 hours before and lowered again at approximately 2 hours after high water at Richmond Lock during which period passage through the navigation spans of Richmond Footbridge is available. At other times Richmond Lock may be used: length 76.2m width 8.1m.

APPENDIX G

TEMPORARY ARCH CLOSURE SIGN



★ Red Light