



**Moorings are part of the everyday landscape in the Broads for residents, visitors and those who work on the river. As the interface between water and land, it is important that moorings are properly considered and well designed. The Broads Authority welcomes the right type of safe mooring design in the right place. This guide provides important information on how to achieve the same high standard that the Authority sets for its own work.**

**This guide focuses on mooring design and covers these topics:**

[Landscape and wildlife](#) • [Materials](#) • [Practical considerations](#) • [Types of mooring](#) • [Checklist](#)

*For information on riverbank stabilisation please see the relevant guide in this series.*

## **Landscape and wildlife**

**Design of moorings should be appropriate to the location and** reflect and complement the character of the area, whether it is rural, urban, near a heritage site or part of a conservation area. You can get free advice from the Broads Authority if you are unsure about how to achieve the right design for your location.

You also need to carefully consider the

effect of your mooring on wildlife and the environment. The impact of any work, both short and long term, must be minimal.

### **Length of mooring**

You might not need the whole frontage to be designed for moorings or part of it could be left natural with some other form of bank stabilisation. Natural frontage can save you money as well as benefiting the local landscape and

wildlife in your area. It would also enable other river users to appreciate the scenery of the Broads. Retaining the natural bank edge helps to protect local wildlife such as water voles, nesting birds and fish. Please contact us for free advice about whether natural frontage is appropriate as part of your mooring.

### **Piling**

Any length of piled mooring will need to be returned to the bank, meaning

the ends are directed in to the bank. Introducing hard piled bank edges could lead to the erosion of natural edges in some areas. Returning them to the bank stops water getting behind and causing pockets of erosion.

## Lighting, electricity and infrastructure

The impact of artificial light on local amenity and intrinsically dark landscapes and nature conservation should be minimised so please talk to planning officers about any fixed lighting or electric hook ups. You should also seek professional advice about any safety issues with electricity close to water.

Parking, lockers and other associated infrastructure should be sensitively located to take account of the local character of the site.

## Maintenance

Areas of old, rotten, abandoned moorings detract from the special qualities of the Broads. Anyone installing mooring must also ensure it's maintained during its life and replaced when necessary. This may mean cleaning, replacing timber work and also dredging to maintain adequate mooring depth.

## Wildlife and protected species

**The Broads is an internationally important wetland and home to more than a quarter of the UK's rarest species.**

**The Broads supports internationally important wildlife and habitats. Within the Broads are the Broads Special Area of Conservation (SAC), Broadland Special Protection Area (SPA) and Broads Ramsar site. These sites are underpinned at a national level by 28 Sites of Special Scientific Interest (SSSIs)**

**covering 24% of the executive area. You will need written consent from Natural England for any proposed works that may impact a protected site. In some cases an appropriate assessment may be required under the Habitat Regulations to demonstrate that there will be no adverse impacts on the integrity of the protected site.**

Protected species under the Wildlife and Countryside Act 1981 may occupy the proposed site. These include otter, water vole, breeding birds and reptiles. If you find a protected species, you must stop work immediately and contact Natural England.

Where bank protection options can enhance or create increased space for wildlife they should be explored. Provision of a bank edge with native wetland plant species is one of the best ways to encourage wildlife at the water's edge.

Any impacts to fish spawning areas will also need to be considered as part of the proposal.

You can contact the Broads Authority ecologist for advice.

## Heritage and Archaeology

Heritage is a finite resource so care should be taken throughout the design process to ensure that the physical and visual impact on built heritage and Archaeology is minimised.

The entire Broads is a site of exceptional waterlogged archaeology. This means there is potential for important discoveries during the course of carrying out work and you should be aware that archaeology may be uncovered. If planning permission is required it may be subject to an archaeological condition.

Early advice should be sought from the Authority. Consulting the relevant

Historic Environment record early in the process will indicate any known heritage assets and help assess the likelihood of potential archaeology.

[www.heritage.norfolk.gov.uk](http://www.heritage.norfolk.gov.uk)  
[www.heritage.suffolk.gov.uk](http://www.heritage.suffolk.gov.uk)

## Materials

Making the right materials choice can be essential in ensuring your work complements the local character as well as being important in terms of the quality and lifespan of your mooring.

### Timber

A typical materials choice is softwood timber as this is a natural and renewable product and is in keeping with the Broads. It should be pressure treated for use class 4 under British Standard BS8417 for suitable durability, especially if sawn softwood is used.

Alder for pole piling is available locally, and has a natural resilience to rot in a wet environment.

Timber should be from a sustainable source and should have Forestry Stewardship Council (FSC) certification.

### Plastic

Plastic products are often proposed as a substitute to timber. There are many different products on the market and their appearance varies widely so you will need to consider the visual impact. The use of plastic for mooring is a relatively new technology in the Broads, so you need to ensure that the material is durable for the life time of your project. There should be no ecological impacts like the plastic decaying and impacting wildlife and water quality.

Because this technology is advancing rapidly, we strongly recommend you contact us if you are considering it.



# Broads Authority mooring design guide



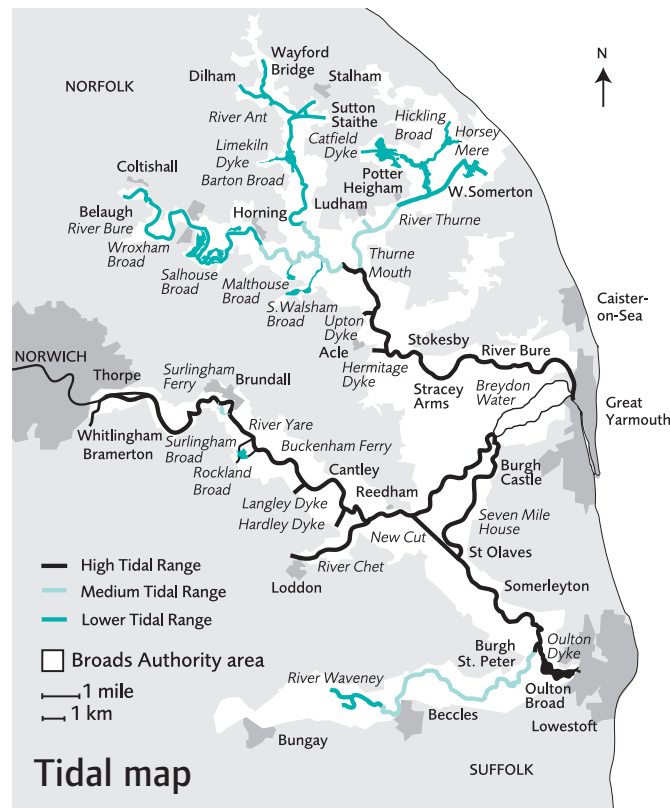
If materials other than timber are used for piling a double **waling** board could be put in. The additional horizontal timber will help disguise the less natural material.

## Surfacing

The type of surfacing behind moorings should reflect the environment where the moorings are located. For rural environments the use of grass or bark provides a more natural feature. Grass can be reinforced to provide a firmer surface to allow access by wheelchairs and pushchairs. In more urban environments or areas of high use alternative surfacing may be chosen. Please contact us for advice.

## Piling load

If piling is used it needs to meet the use of the mooring, whether that is public, private or commercial. For most piled moorings in the Broads light steel or timber is adequate but in some cases



the load on the piling may be significant due to vehicle access, tidal conditions or banked material. A piling contractor or engineer will be able to advise you.

## Practical considerations

Each site will have different considerations such as tidal range, water depth, channel width and proximity to flood defences which may influence choice of design, materials and layout. Sometimes solutions have to be tailored and you can get free advice from our planning officers on whether your proposed mooring is acceptable in principle. You may wish to seek professional advice to help you choose the appropriate design.

## Safety

For any commercial or public mooring you should provide a way of getting out of the water and we also recommend that private moorings abide by these standards.

**Safety ladders should be spaced at no more than 50m apart along the length of the mooring. There should also be**

a chain, rail or similar structure that someone in the water can grab onto in any tidal conditions. You should also complete a risk assessment to determine where public rescue equipment such as lifebuoys or unlocked throw lines should be located.

If access from the water to the bank is not required, or only provided at specific points, the mooring will need to be designed to discourage people from jumping onto the bank from their vessel as this can cause injury.

There is a free Health and Safety Executive code of practice [www.hse.gov.uk/pubns/books/l148.htm](http://www.hse.gov.uk/pubns/books/l148.htm) relating to docks and moorings. There is also a British Marine Federation Yacht Harbour Association guide [www.tyha.co.uk/codepractice.asp](http://www.tyha.co.uk/codepractice.asp) which you can buy that sets out best practice guidance for marinas and yacht harbours. While this is not specifically for private moorings and

the guidance is costly, it may be relevant.

## Channel width

Any refurbishment must maintain the existing piling line. Any new or improved mooring that goes beyond this is unlikely to be acceptable as it will narrow the width of the channel. Any new mooring will need to ensure there is no adverse impact on channel width as this could affect navigation and reduce channel capacity which could increase flood risk elsewhere. This may mean removing the current piling rather than re-piling in front as such 'piling creep' can narrow the channel. It is also not necessarily about the mooring itself, but the impact on channel width by the vessel that is to be moored.

## Existing uses

You need to consider at an early stage how the location is already used and make any allowances so that existing use can be continued.

If the site is used for angling you should take that into account in your project design, for example by providing a specific location for anglers.

You also need to know about rights of access, such as public rights of way and public staithe rights, and ensure these can continue.

You need to check permissions, easements and other issues relating to drainage pipes and water outfalls.

If the site is intended for the launching of canoes and row boats consider low freeboard pontoons. Launching platforms that may submerge should be adequately signed or marked to avoid boat collisions.

If the mooring is near livestock, you may need fencing to stop animals accessing or damaging the moorings and equipment.

Protected species such as water vole and nesting birds should be considered, as should fish spawning areas (see page 3).

Tie rods are often used to secure the piled frontage. These can impact the root system of trees on the site and lead to trees dying. You should contact us for advice if you are planning a mooring near to trees.

## Access

Some mooring types may require a dinghy to access land. Others, such as staging, enable people to get onto land directly from the vessel. Others may need a ramp with bank work to provide a secure point on a plinth or piling.

If the mooring is intended for commercial or public use consideration should be

given to access by disabled people or wheelchair users in line with the Equalities Act 2010.

## Signage

You may wish to put up signage to deter others using your mooring. This should always be in keeping with location and local character and you should seek advice from the Broads Authority. If you need signage lettering should be 50mm in height and text should be white on a black background.

## Byelaws

There are some byelaws in the Broads which relate to the location and use of moorings. Go to page 26 of the Navigation Byelaws 1995 for full details of these. [www.broads-authority.gov.uk/\\_\\_data/assets/pdf\\_file/0008/399230/Navigation\\_Byelaws\\_1995-1.pdf](http://www.broads-authority.gov.uk/__data/assets/pdf_file/0008/399230/Navigation_Byelaws_1995-1.pdf)

## Climate Change

The easterly, low-lying and coastal nature of the Broads makes it vulnerable to the effects of climate change and sea level rise. The Broads Authority has produced a Climate Change Adaptation Plan which may be of relevance when considering your scheme.

## Ways of mooring

In some locations double mooring or mooring stern on are more efficient ways of using space as long as there is adequate channel width. However adequate mooring posts or cleats should be installed regardless of how vessels will be moored.

## Permissions and notices

It is your responsibility to ensure you have the right permissions and consents before beginning work to make changes to or install a mooring but advice on

what you require is easily available. Some typical consents required are listed below, but this list is not exhaustive.

## Planning

Waterside development, including new and replacement works, usually requires planning permission. The Broads Authority is the local planning authority for the Broads. We have policies specifically relating to moorings which can be found on the Broads Authority's website or you can contact us for free advice.

## Works Licence

A licence will be necessary for the design and timing of installation of work which affects a publicly navigable stretch of river. The Broads Authority is responsible for issuing the Works Licence. Full details can be found on the Authority's website [www.broads-authority.gov.uk/planning/](http://www.broads-authority.gov.uk/planning/)

## Planning-permission/works-licences

### Environment Agency

Prior written consent of the Environment Agency is required for any proposed works or structures in, under, over or within nine metres of a main river or a flood/sea defence. Depending on the length and type of works proposed a water framework directive assessment may be needed. Full details and how to contact the agency can be found on the relevant section of the Government website. [www.gov.uk/government/organisations/environment-agency](http://www.gov.uk/government/organisations/environment-agency)

### Landowner

You will need permission from the landowner of the riverbed over which your proposed mooring will be installed. You can find this information from the Land Registry.

## Marine Management Organisation

You may need a marine licence from the Marine Management Organisation for carrying out any works related to your mooring, including dredging or depositing. There are certain exempted activities and more information on this and how to apply for a licence can be found on the relevant section of the Government website [www.gov.uk/do-i-need-a-marine-licence](http://www.gov.uk/do-i-need-a-marine-licence).

## Notice to Mariners

If any machinery work or the scheme itself significantly affects navigation, the Broads Authority may need to let boat users know. This involves a public notice placed in a local newspaper at least 35 days in advance of work. This will be at your cost but is administered by us. You can find full details on our website. [www.broads-authority.gov.uk/boating/navigating-the-broads/notices-to-mariners](http://www.broads-authority.gov.uk/boating/navigating-the-broads/notices-to-mariners)



## Insurance

You may need insurance for your mooring. Your insurance provider may also have some requirements relating to the mooring design. Please contact your provider to find out more.

## Mooring design

We have outlined the different design methods used. Precise specifications will depend on site conditions and the agreement of the Broads Authority and other consenting bodies.

Tie rods can impact the root system of trees and lead to trees dying. You should contact us for advice if you are planning a mooring near to trees.

The cost (low, medium or high) of the designs of the various types of mooring methods will depend on the size and quantity of moorings. Additionally maintenance requirements and costs

will be affected by the quality of the initial work.

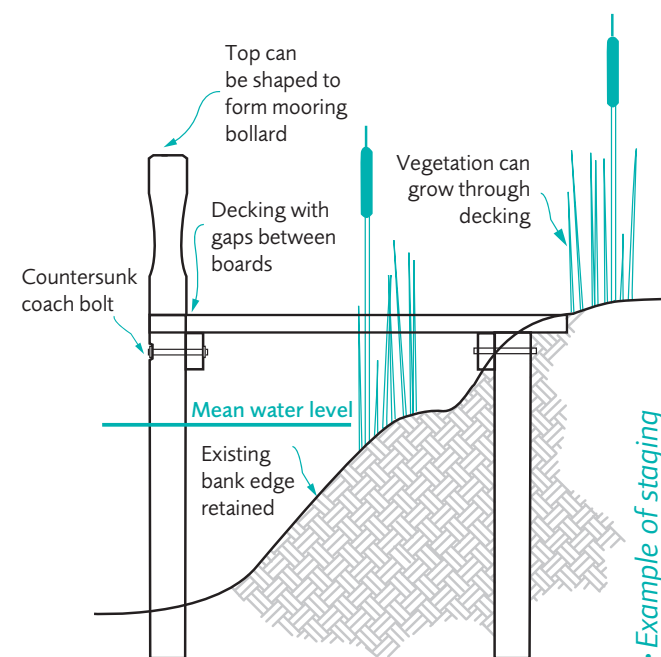
Drawings in this guide are for illustrative purposes only.

## Timber staging

This type of mooring consists of piling and decking. Piling would need to be undertaken by a contractor.

- It still allows wildlife such as water voles to access the bank and, provided there are spaces left in the decking for light to penetrate, bankside vegetation will continue to grow.
- It is suitable for a river or broad where there is not a large tidal range.
- Staging should be kept as narrow as possible and preferably use timber. Consider that timber can become slippery when wet.

- The decking will need regular cleaning and it is likely that the piling will need to be replaced every 10 years, so maintenance is high.



- The impact on landscape character does depend on how the staging is integrated and depends on the size and its context.

- Compared to other mooring designs in this guide, the cost is medium.

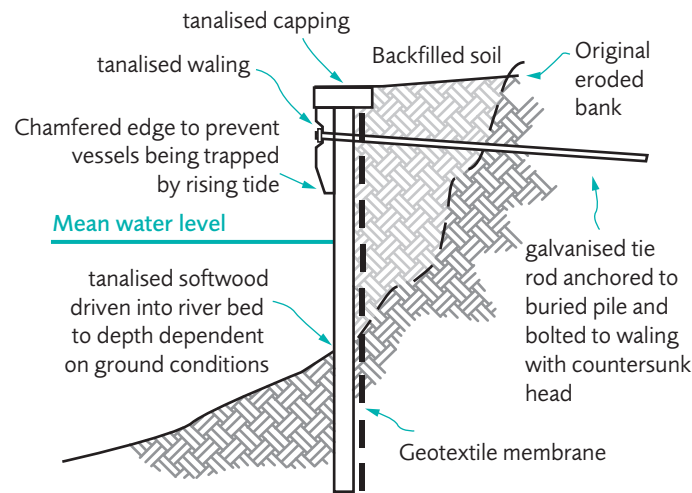
## Quay heading and piling

This would result in a continuous line of piles. As this is a more complicated mooring structure, there is a need for a more robust anchoring system of the piles.

**This design is suitable for most tidal ranges but consider the use of vertical fenders/rubbing strips in areas of high tidal range.**

- Steel is the most expensive material, followed by plastic then timber.
- Timber has a typical life of up to 10 years. Plastic and steel have a typical lifetime of around 40 years or more.
- The design is suitable for most tidal ranges.
- It creates a less natural modified vertical

edge to the river bank.



### • Example of piling

- Timber piling has a high impact at low tide. Capping and **waling** of steel or plastic piles can help the mooring to be more in keeping with the Broads.
- Surfacing and capping must be topped up and level.
- **Consider appropriate drainage behind**

**piling to stop puddles.**

- Cost of installation is high as contractors will be on site for longer.

## Pontoons

Relatively quick to install. Will need secure anchorage or piling. You will need to consider access to the bank.

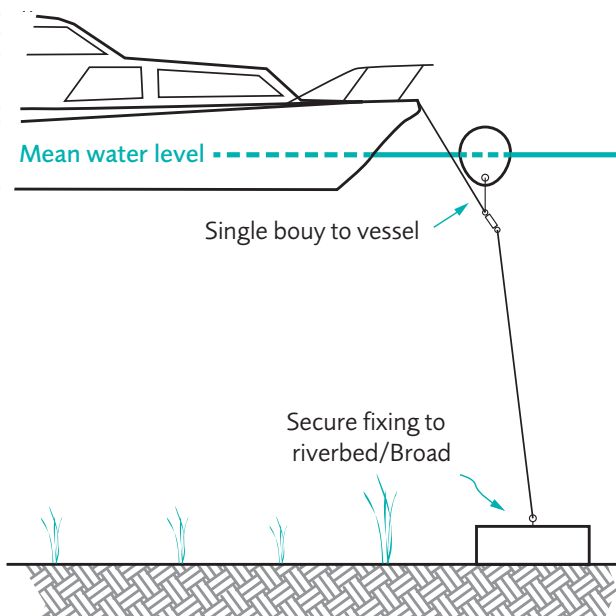
- Not a solution for narrow channels as can impede navigation
- Will require regular deck cleaning. Could have a life time of up to 30 years.
- Suitable for wider navigations or broads and areas of mid to high tidal range.
- Provides protection to the natural bank behind
- Pontoons can provide a safe refuge for fish
- Likely to have a high landscape impact due to the bulk of the structure.

- Medium cost.

## Swing or trot

This is a buoy which is permanently fixed to the bed to provide stationary mooring. One buoy is called a swing mooring and the vessel will move with the wind or current.

A row of linked buoys is a trot mooring and enables vessels to be secured so



they do not drift with the wind or current.

- Requires a means to get ashore, such as a dinghy.
- Maintenance is generally low, but regular inspections of the chain and replacements will be required.
- Swing would not be suitable for rivers but ideal for broads in areas where there are not strong currents.
- Trot could be suitable for rivers, if buoys are securely positioned.
- At the time of writing, trot moorings are a new concept to the Broads, so please contact us for advice on 01603 610734.
- Low impact on wildlife and minimal landscape character impact.
- Relatively easy to install and low cost.

· *Example of swing mooring*

## Dolphin

A number of vertical piles driven into the river/broad bed connected with horizontal beams to which a vessel can moor.

- Will require piling which would need to be undertaken by a contractor.
- As the timber piling is likely to be bulky, the lifetime will be around 20 years.
- Suitable for rivers and broads in most tidal ranges.
- Low wildlife and landscape character impact.
- Medium cost.

## King post

Either a single piled post or two posts allowing fore and aft mooring.

- If there is one post, the boat will move with the wind or current.
- Will require piling which would need to be undertaken by a contractor.
- As the timber piling is likely to be bulky, the lifetime will be around 20 years.
- Suitable for rivers if the vessel will be moored fore and aft using two posts
- A single post is not suitable for rivers but ideal for broads in areas where there are not strong currents.
- Low wildlife and landscape character impact.
- Medium cost.



## Checklist for moorings.

Please complete this checklist and submit with your planning application.

- ☐ Have you checked with the Broads Authority if moorings are acceptable in principle in the proposed location?
- ☐ Do you need moorings for an entire length, or can you have a smaller area of mooring?
- ☐ In your design, have you returned the mooring to the bank so that the ends are slanted inwards to address erosion further along?
- ☐ Have you considered and addressed other users and uses in the area in your design? e.g. anglers, water pipes, existing rights of way and canoes or row boats.
- ☐ What effect will your proposal have on the width of the publicly navigable channel?
- ☐ Do you need to have access to the river bank? If so, how?
- ☐ Have you organised the necessary permissions such as Notice to Mariners? [www.broads-authority.gov.uk/boating/navigating-the-broads/notices-to-mariners](http://www.broads-authority.gov.uk/boating/navigating-the-broads/notices-to-mariners)
- ☐ Have you considered affordability and costs of maintenance? e.g. cleaning, insurance and dredging.
- ☐ Does your proposal reflect the local character?
- ☐ Does the design take into account the local tide, water depth and channel width?
- ☐ Have you considered the type of vessel to be moored? Are the design details such as fixings, appropriate to the weight of the vessel?
- ☐ Is there likely to be an impact on protected species or fish spawning areas as part of the proposed works?
- ☐ What safety features have you included and why?
- ☐ Have you considered different types of mooring configurations? Why is the chosen format most appropriate?
- ☐ Are you aware of the byelaws in the area?
- ☐ Have you investigated and do you have the required consents **and licences**?
- ☐ Have you met the policy requirements in your proposal?
- ☐ **How does your proposal reflect the local character and consider impact on heritage assets including archaeology?**

### Contact us:

For more information and advice please contact the Broads Authority on 01603 610734 or visit our website [www.broads-authority.gov.uk/contact-us](http://www.broads-authority.gov.uk/contact-us)

