Guides for Community Emergency Volunteers

The use of sandbags

and other ways to prepare property for flooding

The Guides for Community Emergency Volunteers series has been developed in collaboration with:

The series has been funded through grants from:

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Acknowledgements

This handbook is divided into two sections.

Section 1 of this handbook "The use of sandbags" consists almost entirely of text and graphics/ figures reproduced with kind permission from: "Sandbags and how to use them properly for flood protection", published by: Environment Agency, Rio House, Waterside Drive, Aztec West, Almondsbury, Bristol, BS32 4UD. Some headings and sub-headings have been changed from the original text for the purposes of this handbook.

Some content within Section 1 consists of original text written by the Cornwall Community Flood Forum and is referenced where appropriate.

Section 2 of this handbook "Preparing property for flooding" consists almost entirely of text reproduced with kind permission from the Environment Agency's website. Sections used include: "Prepare your property for flooding" and "Buy flood protection products".

Both sections include a short "Note of caution" regarding the pressure of floodwater against property which has been reproduced with kind permission from the National Flood Forum website.

The use of Sandbags

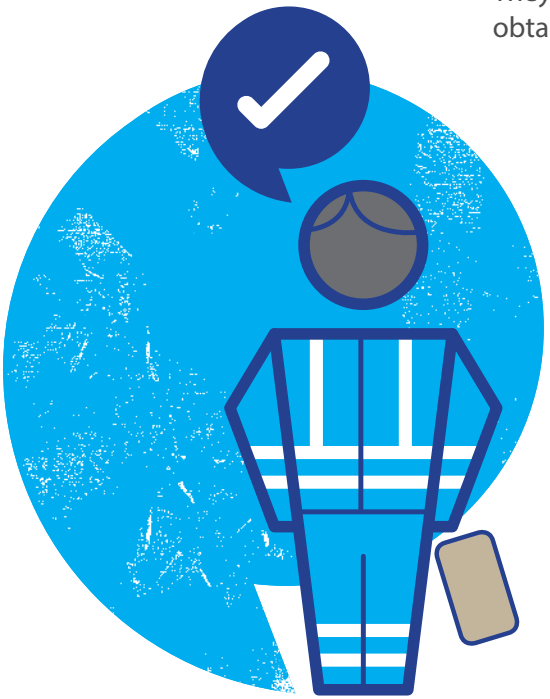
1.1 Introduction

Through your role as a community volunteer you may be called upon to assist with the filling, distribution and placement of sandbags. You may also be asked by property owners where they might be able to access information on steps they can take to reduce the impact of flooding.

1.2 What are the benefits of sandbags?

Traditionally, sandbags have been used to block doorways, drains and other openings into properties as well as to weigh-down manhole covers, garden furniture and to block sink, toilet and bath drains to prevent water backing up

- They can keep water out for short periods which can be improved by using them in conjunction with plastic sheeting
- They can filter out some muddy sediments found in flood waters
- They are cheap and easy to obtain



1.3 What are the disadvantages of sandbags?

Sandbags are relatively ineffective when compared to purpose-designed flood protection products.

Some of the pitfalls are:

- It takes two people to fill them (unless you have a sandbag filling machine)
- They take time to fill (approximately one hour to fill 12 sandbags)
- During an emergency sufficient quantities may be difficult to obtain
- They can be difficult to handle
- Laying them can be very time-consuming
- When they come into contact with floodwater they tend to retain contaminants such as sewage
- Sacking material is biodegradable and will perish if left in place for a long time
- It is difficult to place sandbags in water and particularly in running water
- Sandbags do seep water even when well-stacked and trodden into place.

As a result, the Environment Agency strongly encourages people to use purpose made flood protection products, such as flood boards, non-return valves for plumbing and air brick covers.

1.4 Who is responsible for protecting property?

Don't assume that the authorities will provide you with sandbags in a flood emergency!

It is the responsibility of property owners to take appropriate action to protect their property from flooding.

1.5 Obtaining sandbags

Your local council may have some sandbags ready to deploy at times of flooding, but their priority is to protect the public at large. You should check with your own local authority in advance to find out what their policy is and how you can get access to sandbags before flooding starts. There may be a charge for this service.

Remember, during a flood crisis there may be limited stocks per person or supply routes may get blocked.

If your local authority doesn't supply sandbags, you can buy unfilled sandbags and a supply of sand from most DIY stores and builders merchants, but remember that if there is a flood expected in your area demand may exceed supply as people rush to buy them.

In an emergency you can use alternatives such as pillow cases or refuse sacks and fill them with garden soil.

1.6 Important health and safety considerations

Filling sandbags and building a wall is a physically demanding activity so it is important that all those involved are fit enough to carry out the work.

Remember that they can get heavy quickly, so do not overfill, or fill them too far away from where you want to position them.

A **tall** sandbag wall must be designed by engineers to withstand the water pressures, as failure or collapse of the structure could pose a danger to anyone nearby.

It is essential that everyone involved in building a sandbag wall is equipped with appropriate personal protective equipment, including gloves and steel toecap footwear. If the sand is dry, eye protection in the form of safety glasses is also required.

If emptied and dried the sacks can be filled again, otherwise they will rot after a period of time if damp. If sandbags are contaminated by flood water, advice should be sought from your local authority environmental health department regarding their safe disposal.

1.7 Using sandbags to protect your property

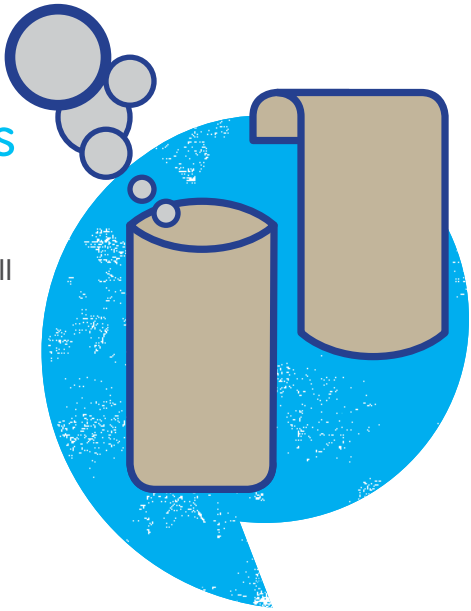
Sandbags are of no use if your property is already flooded – concentrate your efforts on protecting yourself, your belongings and moving precious items out of harm's way!

Consider all entry points that water could get through, not just doorways, such as – airbricks, utility service points, cable entry points. Use other solutions for entry points where sandbags won't work (such as silicone sealant).

You'll need at least 6 sandbags to keep out 20cm depth of water for a standard door opening. Each sandbag will need approximately 15kg of sand. You should use sharp, not soft, sand.

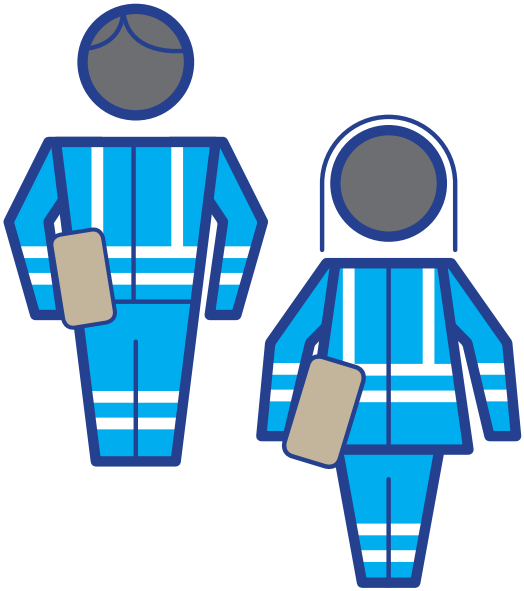
1.8 Filling sandbags

- This is a two-person job: one to hold the bag open and one to fill
- Do not fill bags more than half full
- You don't need to tie the end of the bag



1.9 Placing sandbags

- Clear any debris from the area where the bags are to be placed
- If you can, put a large sheet of heavy-duty plastic between the sandbags and the wall of your house
- Place the bags lengthways, tucking the open end under the filled half of the bag and position it pointing into the direction of water flow
- Place bags in layers. Like a brick wall, make sure that in the next layer each bag overlaps the one below by half
- Stamp bags firmly into place to eliminate gaps and create a tight seal
- To lay sandbags in a doorway (Figure 1), it may be necessary to empty some of the contents out or shape the sandbags to achieve a good fit without overlapping



The use of sandbags and other ways to prepare property for flooding

1.10 Building a more substantial sandbag wall

Building a sandbag wall up to 60cm high by 1 metre in length requires approximately 80 filled sandbags.

- Remove any debris from the area where the bags are to be placed and try to use firm and level ground if possible
  There are two ways of laying sandbags – Headers (Figure 2) and Stretchers (Figure 3). Headers should be used on first, third and fifth courses. Stretchers are used on second, fourth and sixth courses
- Lay sandbags with seams and bag mouths facing inwards, as this is where moisture enters the bags
- Shape the sandbags into rectangles before laying them
- Use half-filled sandbags to enable you to stagger joints
- Have the neck of the sandbags facing the same direction
- If the wall or dam is going to be in place over a long period of time PVC sheeting should be used to form a barrier on the wet side of the wall. Position the PVC sheet so that the leading edge falls approximately on the centre line of where you intend to build the wall with the spare sheet showing at the front side (water side) – see Figure 4
- If time and conditions permit, sandbags should be compacted after being laid, possibly using a vibrating plate
- When desired height of sandbag wall is reached, pull up the PVC sheet over the top of the wall and fix in place with a final course of sandbags

Figure 1: Sandbag wall across doorway (viewed from water side)

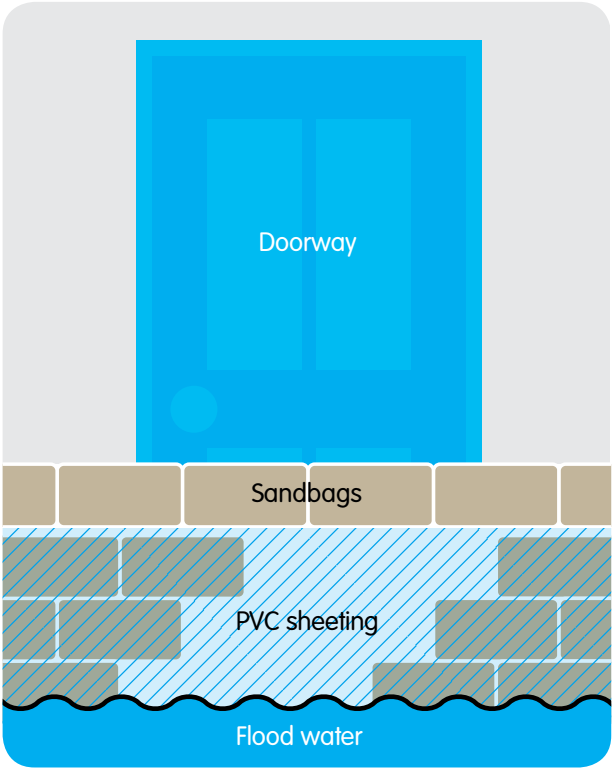


Figure 2: Header course (viewed from above)

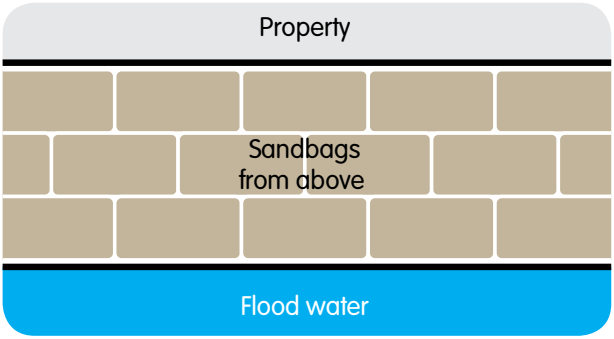


Figure 3: Stretcher course
(viewed from above)

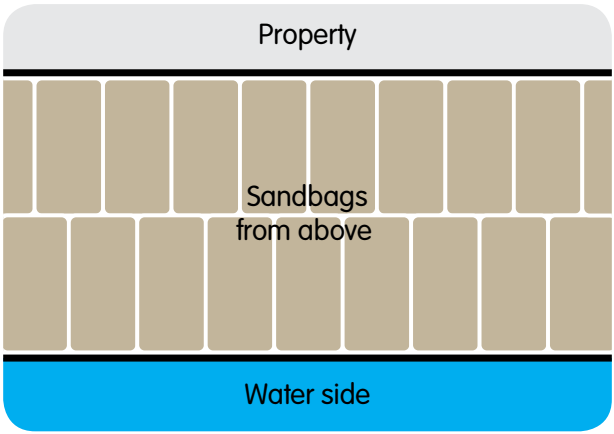
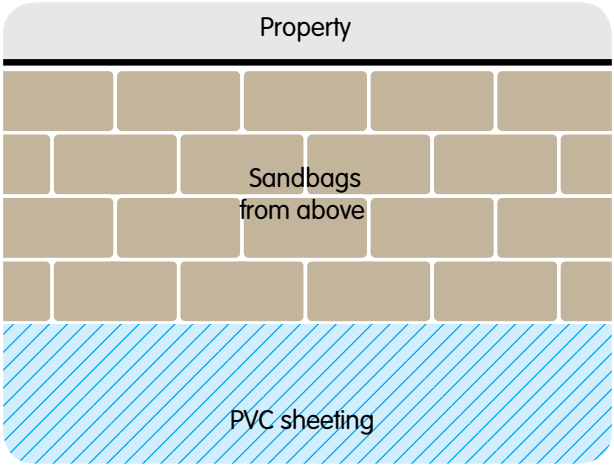


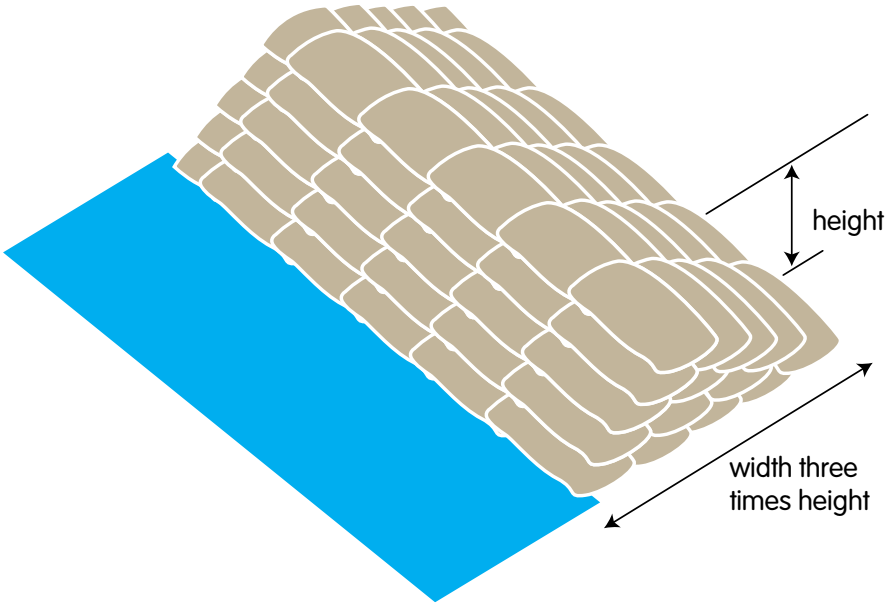
Figure 4: Polythene sheet in place
(viewed from above)



1.11 Pyramid placement method

If you need to create sandbag protection that is more than three layers high you will need to build in a pyramid style. For the structure to be stable, you should build the 'sandbag wall' three times as wide as you need it to be high. Again use the alternative Header and Stretcher method for alternative layers. Compact each bag into place and tuck the loose end firmly under the filled portion of the bag (Figure 5).

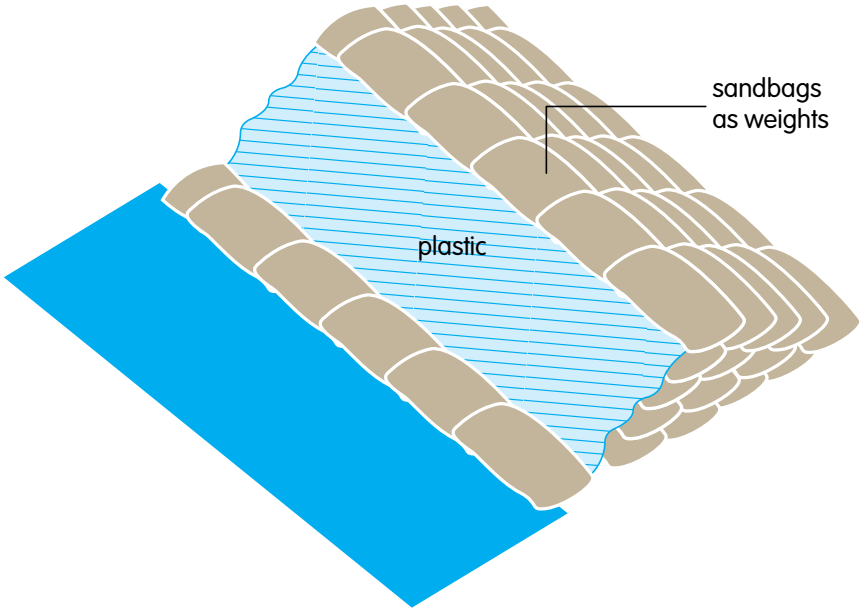
Figure 5: Pyramid placement



1.12 Additional waterproofing

Lay plastic sheeting across the side of the sandbag wall on the water side. Weigh down with additional sandbags (Figure 6).

Figure 6: Additional waterproofing



1.13 Used sandbags[1]

Removal after use

Sacking material is biodegradable and will perish if left in place for a long time. Remove sandbags after use.

Ensure sand does not wash into drains and gullies as it may cause blockages and possibly flooding!

Disposal of contaminated sandbags

When sandbags come into contact with floodwater they tend to retain contaminants such as sewage.

If sandbags are contaminated by flood water, advice should be sought from your local authority environmental health department regarding their safe disposal.

Always ensure suitable personal protective equipment (PPE) is worn when handling contaminated sandbags.

1.14 An alternative: Non-sand bags[1]

As an alternative to traditional sandbags, manufacturers have developed modern versions which do not use sand. Some products require hydrating prior to use in a flood situation making them lighter and easier to handle and store.

You can find suppliers of modern non-sand bags on the National Flood Forum Blue Pages Directory.

If you use these products, remember to follow the instructions provided by the manufacturer as they may have to be used differently to guidance provided above for traditional sandbags.

A note of caution![2]

Where there is a risk of flooding to a depth of more than 0.9m, keeping water out can sometimes do more harm than good. The pressure of water against your property may cause structural damage to the building itself.

Summary

Before

- Don't assume the authorities will provide sandbags in a flood emergency!
- During an emergency sufficient quantities of sandbags may be difficult to obtain. Plan ahead and source materials in advance of flooding
- You'll need at least 6 sandbags to keep out 20cm depth of water for a standard door opening

During

- Use appropriate personal protective equipment, including gloves and steel toecap footwear when filling and handling sandbags
- Do not fill bags more than half full
- Use plastic sheeting to improve the effectiveness of sandbags in keeping water out

After

- If sandbags are contaminated by flood water, advice should be sought from your local authority environmental health department regarding their safe disposal.
- Sacking material is biodegradable and will perish if left in place for a long time. Remove sandbags after use.

  Ensure sand does not wash into drains and gullies as it may cause blockages and possibly flooding!
- Sandbags are relatively ineffective when compared to purpose-designed flood protection products such as flood boards, non-return valves for plumbing and air brick covers

Preparing property for flooding

2.1 Introduction

While it's impossible to completely flood-proof a property, there are lots of things you can do to reduce the damage flooding can cause.

The key is to act now so you're prepared if there's a flood in your area.

2.2 Am I at risk of flooding?

You need to find out. It could save you money, help you protect yourself and your property – maybe even save your life. Even if your home or business is not directly at risk of flooding from rivers or the sea, you could still be affected by surface or groundwater flooding. Visit www.gov.uk and search for 'prepare for a flood' or call Floodline to see if your property or business is at risk and for other useful flood information.

Visit **www.gov.uk** and search for **'prepare for a flood'** or call Floodline to see if your property or business is at risk and for other useful flood information.

2.3 Protect your property and possessions

Whether you rent or own your home or business premises, there are many things you can do to help yourself. Some are simple and temporary while others involve permanent structural work.

You can also make improvements so that even if flood water enters your property it causes less damage, so drying-out and cleaning up is faster and easier. This means you could move back home or open for business far more quickly.

2.4 Prepare your property for flooding

It's impossible to completely flood-proof a property but there are lots of things you can do to reduce flood damage.

Keep flood water out

If you know your property is in an area that could flood, buy protection equipment and prepare your property well in advance to reduce the risk of flood water getting inside. Remove flood protection equipment once the water has gone to help dry out your property

- Sandbags: contact local builders' merchants for stocks of bags and sand. Alternatively, you can find suppliers of modern non-sand bags designed for flooding on the National Flood Forum Blue Pages Directory. Note that sandbags are ineffective for groundwater flooding. Please refer to the 'keep groundwater out' section for advice on this
- Doors and windows: buy automatic flood-proof doors and windows, or purpose-built flood boards that can be fitted when flooding is expected. Raise door thresholds to help keep shallow water out.
- Exterior walls: check the pointing, and apply water-proofing sealant to exterior walls

- Floors: raise damp-proof brick courses. Seal floors or replace wooden floodboards with concrete with a damp-proof membrane. Be aware that water can enter where the floor and walls join
- Air bricks: buy automatic flood-proof air bricks or specially designed covers that are easy to fit over air bricks when flooding is expected
- Drains and pipes: fit non-return valves to drains and water inlet and outlet pipes. This will prevent wastewater from flowing back into the property through sewerage pipes for ground floor toilets and sinks
- Barriers: you could arrange free-standing temporary flood barriers, but remember that water could still get in through the drainage system. Talk to your neighbours about building a single barrier around several houses to help spread the cost and the benefits. You may need Environment Agency permission to install a barrier
- Landscaping: landscape garden areas and driveways to help divert water away from your property

You should accept that flood water might get in. In the case of bigger floods this actually needs to happen otherwise the weight of the water outside might cause the building to collapse.

A note of caution!

Where there is a risk of flooding to a depth of more than 0.9m, keeping water out can sometimes do more harm than good. The pressure of water against your property may cause structural damage to the building itself.

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Reduce flood water damage

Prepare your property in advance to reduce the damage floodwater might cause inside, making drying out and cleaning up quicker and easier.

- Shelving: keep irreplaceable or valuable items on high mounted shelves
- Home entertainment: fix your audio-visual equipment such as your TV and hi-fi to the wall, about 1.5 metres above floor level
- Skirting: fit water-resistant skirting boards or varnish wooden ones
- Walls: use horizontal plasterboard or lime-based plaster to dry-line, instead of gypsum. Get a special draining system for cavity walls
- Floors: lay tiles with rugs rather than fitted carpets
- Internal doors: fit synthetic or waxed doors, or make sure wooden doors are easy to remove before a flood
- External doors and windows: install synthetic or waxed windows and doors, or varnish wooden ones
- Kitchen and bathroom: use water-resistant materials such as stainless steel, plastic or solid wood rather than chipboard. Where possible raise fridges and other appliances on plinths
- Electricals: raise electrical sockets, fuse boxes, controls and wiring to at least 1.5 metres above floor level. If re-wiring, bring cables down the wall to the raised sockets so cabling isn't affected by flood water
- Large items: buy extra large, sealable bags that you can use to protect items that are difficult to move such as electrical goods and sofas

Keep groundwater out

If your property could flood through the ground, a pump will be the best way to keep water out. Other methods such as sandbags will be ineffective because water comes up through the ground. You are likely to have to pump water for days, weeks or months. Pumps work best when the inlet is installed in a low point where water can drain (a sump).

Pumps can be electric or petrol/diesel. Electric pumps may be the most convenient, but you will need to take care using an electric pump near floodwater. You may need a back-up generator in case of power cuts during a flood. Contact a qualified electrician for further advice. Petrol or diesel pumps can be noisier and will require re-fuelling. Position the generator outside as generators produce carbon monoxide fumes which can kill.

Only pump out water when flood levels outside your property are lower than inside to reduce the risk of structural damage. Contact a structural engineer before pumping very deep water from basements.

A good quality pump should last around 10 years. However, this depends on how often it is used and the acidity and dirtiness of the water. Regularly check and test your pump. Remove and thoroughly clean the pump at least once a year. Disconnect the pump from the power source before you handle or clean it.

Pumping from one place to another may cause flooding elsewhere. You must not pump water into the public foul sewer. When deciding where to pump water, you should contact:

- your local Environment Agency office if you are thinking about pumping water into main rivers or boreholes
- your local authority if you are thinking about pumping water into ditches, watercourses or piped watercourses

- the water company if you are thinking about pumping water into public surface water sewers or foul sewers
- the Highways Authority if you are thinking about pumping water into a highway drain

Visit www.gov.uk and search for 'flooding from groundwater' for further information on actions you can carry out to reduce groundwater damage.

2.5 Where to buy flood protection products

The **National Flood Forum** has an independent directory of flood protection products and service providers known as the **Blue Pages Directory**.

The **Flood Protection Association** is the industry association for flood protection suppliers and service providers.

Before buying a flood product check it has been tested to industry standards and it is up to the job. It should display the **Kitemark symbol** or equivalent accreditation if it has been tested properly.

The **National Flood Forum** has an independent directory of flood protection products and service providers known as the **Blue Pages Directory**.

2.6 Get professional advice on flood protection products

Seek professional advice from a building surveyor, architect or other independent professional if you are considering flood protection solutions for your property.

There is no formal assurance scheme for flood surveyors, but the **Royal Institution of Chartered Surveyors** and the **Royal Institute of British Architects** hold lists of members who have undergone internal vetting and adhere to a common code of conduct.

There is no guarantee that any flood protection system will work and neither the Environment Agency nor the developers of this handbook endorse a particular product or supplier. If you buy a flood protection product, you are responsible for ensuring it is appropriate for your property, fit for purpose and correctly fitted.

Flood products may make flood water outside the protected area more dangerous by making it flow faster. If flood water overwhelms a barrier, it may have a more catastrophic effect than if the area had flooded gradually. Check with your local **Environment Agency** office if you plan to take measures which could affect the flow of a river or divert flood water to other properties.

If you live in a historic building read the advice from **English Heritage**.

If you are at high risk of flooding, you can get information on any funding available for property level flood protection schemes from the Environment Agency.

Ask your **mortgage company** whether your mortgage can be extended to cover the cost of making your property more flood proof.

2.7 Insure property at risk of flooding

- Contact the **National Flood Forum** (NFF), an independent organisation offering advice and guidance on how to get insurance for properties at risk of flood and reduce your premium or excess
- Talk to an **insurance broker** specialising in properties that are difficult to insure. You should be able to find these brokers in the Yellow Pages, on the British Insurance Brokers' Association website or by calling the broker helpline
- Contact the **Association of British Insurers** via **www.abi.org.uk** who may be able to offer you advice
- Read **Defra's** guide to insurance for owners of property in high flood risk areas on **www.defra.gov.uk**

References

1 This section has been written by the Cornwall Community Flood Forum.

2 This note of caution has been reproduced with kind permission from the National Flood Forum website.

This handbook provides an introduction to the use of sandbags so you can use them most effectively and responsibly and an introduction to some of the factors to consider when attempting to prepare property for flooding and the steps that might be taken.

This information pack is intended as a guide only. Whilst the information it contains is believed to be correct, Cornwall Community Flood Forum can take no responsibility for actions taken based on the information contained in this pack.

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All information correct at the time of going to print.

Jn 37209 October 14