



## Flood Evacuation Plan

### Thurrock Flexible Generation Plant

Application document number A8.5

APFP Regulations reference 5(2)(q)



**Document status**

Version	Purpose of document	Authored by	Reviewed by	Approved by	Review date
1	Site Construction and Operation	JM	JM	OH	January 2020
2	Site Construction and Operation	JM	TAD	-	-
3	Post-submission revisions	JM	TAD	-	November 2020

**Approval for issue**

OH 1 January 2020

© Copyright RPS Group Plc. All rights reserved.

The report has been prepared for the exclusive use of our client and unless otherwise agreed in writing by RPS Group Plc, any of its subsidiaries, or a related entity (collectively 'RPS'), no other party may use, make use of, or rely on the contents of this report. The report has been compiled using the resources agreed with the client and in accordance with the scope of work agreed with the client. No liability is accepted by RPS for any use of this report, other than the purpose for which it was prepared. The report does not account for any changes relating to the subject matter of the report, or any legislative or regulatory changes that have occurred since the report was produced and that may affect the report. RPS does not accept any responsibility or liability for loss whatsoever to any third party caused by, related to or arising out of any use or reliance on the report.

RPS accepts no responsibility for any documents or information supplied to RPS by others and no legal liability arising from the use by others of opinions or data contained in this report. It is expressly stated that no independent verification of any documents or information supplied by others has been made. RPS has used reasonable skill, care and diligence in compiling this report and no warranty is provided as to the report's accuracy. No part of this report may be copied or reproduced, by any means, without the prior written consent of RPS.

Prepared by:

**RPS**

Jonathan Morley  
Associate Director - Hydrology

Suite D10, Josephs Well, Hanover Walk  
Leeds, West Yorkshire LS3 1AB

T +44 1132 206 190  
E jonathan.morley@rpsgroup.com

Prepared for:

**Thurrock Power Ltd**

Andrew Troup  
Director

3<sup>rd</sup> Floor, 239 High Street Kensington  
London W8 6SA

## Contents

<b>1</b>	<b>INTRODUCTION, SCOPE AND OBJECTIVES</b>	<b>1</b>
1.1	Introduction	1
	Site Setting	1
1.2	Scope	3
1.3	Objectives	3
<b>2</b>	<b>FLOOD WARNINGS</b>	<b>4</b>
2.2	Responsibility	4
2.3	Flood Alert	4
2.4	Flood Warning	5
2.5	Severe Flood Warning	5
2.6	All Clear Status	6
<b>3</b>	<b>EVACUATION PLAN</b>	<b>7</b>
3.1	Details of the plan	7
3.2	Flood Risk to the Plant	7
3.3	Flood Evacuation Plan	7
	Flood Warnings	7
	Phase One: Monitor the Situation	7
	Phase Two: Evacuation	7
3.4	Safe Access	8
3.5	Rendezvous Point	9
3.6	Sandbagging	9
3.7	Dissemination of Flood Evacuation Plan	9
<b>4</b>	<b>ANNUAL REVIEW</b>	<b>10</b>
	Reading the plan and updating contacts list	10
	Contact the Environment Agency Floodline Service on 0345 988 1188	10
	Review and maintain a Flood Evacuation Kit	10

## Tables

Table 4.1:	Flood Evacuation Kit requirement	10
------------	----------------------------------	----

## Figures

Figure 1:	Site Location Map	1
Figure 2:	EA Flood Map for Planners (River and Seas)	3

## Appendices

Appendix A	Flood Evacuation Route
Appendix B	Environment Agency Sandbag Guidance



# 1 INTRODUCTION, SCOPE AND OBJECTIVES

## 1.1 Introduction

1.1.1 RPS Planning and Development (RPS) was commissioned by Thurrock Power Ltd to provide a Flood Evacuation Plan for the proposed Thurrock Flexible Generation Plant (proposed development) located on an irregular shaped parcel of land covering approximately 20 ha in Thurrock, Essex. The Plan outlines the management and evacuation procedures to be implemented during the construction and operational phases in the event of a flood.

### Site Setting

1.1.2 The proposed development site is located at NGR 566285, 176730, and lies to the east of Tilbury town centre. The site sits within an area with mixed agricultural and industrial use, bound to the west and east by agricultural land, to the south by a National Grid substation with the River Thames and its associated mud and salt flats beyond, and to the north an embanked railway line with agricultural land beyond (Drawing 1).

1.1.3 Access to the site would be from Station Road to the east and the from A1089, via the 'Tilbury2' docks, to the west.



Figure 1: Site Location Map

- 1.1.4 The site is situated in Flood Zone 2 and Flood Zone 3 as can be seen from the Environment Agency (EA) map (figure 2) with flooding associated with the tidally dominant River Thames. However, the site is shown to benefit from flood defences. Records indicate that the standard of protection of the flood defences in close proximity to the site is 0.1% Annual Event Probability (AEP); designed to defend London up to a 1 in 1,000 year tidal flood event.
- 1.1.5 The current condition grade for defences in the area ranges from fair to very poor, with the potential for severe defects resulting in complete performance failure, although it is noted that the EA has a duty to maintain these defences.
- 1.1.6 In the event of a breach in defences in close proximity to the site the site has been assessed (Thurrock SFRA, 2018) to be at risk of flooding to 2.84 mAOD from a 1 in 1,000 year event plus climate change and an additional 0.39 m to account for the Upper End UKCP18 climate change predictions, as agreed with the EA. SFRA (2018) model outputs indicate that it would take between 1 to 8 hours for flood water to reach the site. Inundation mapping shows that the site is located on the furthest extent of the 1 to 4 hour inundation contour, therefore it can be reasonably assumed that site would have near 4 hours warning of an imminent flood event.
- 1.1.7 In the unlikely event of a failure in at the Tilbury flood barrier, c.3.5 km to the west of the site, the area would be at risk of flooding to 3.24 mAOD (including climate change from the upper end UKCP18 projections). Model outputs within the Thurrock SFRA (2018) indicates that it would take between 16 to 20 hours for flood water from a failure to reach the site.



**Figure 2: EA Flood Map for Planners (River and Seas)****1.2 Scope**

1.2.1 This Flood Evacuation Plan records the contingency measures that have been drawn up to provide maximum safety to the site workers during the constructional and operational phases of development in the event of a major flood. The plan has been disseminated to the emergency services to ensure responding agencies are aware of the pre-planned emergency measures.

**1.3 Objectives**

1.3.1 The objectives of the Flood Evacuation Plan are as follows:

- To outline a mechanism for the Plant to remain informed of potential flood risk via registration to the EA's flood warning system – Floodline;
- To enable a safe and well organised evacuation of site workers during a major flood event;
- To define the areas of responsibility for those participating in the plan;
- To establish procedures for implementing the plan;
- To establish a dry rendezvous point and route;
- To reduce the risk to life;
- To set security procedures during a flood event; and
- To reduce financial loss during a flood event.

## 2 FLOOD WARNINGS

- 2.1.1 The proposed development site has been assessed to be at risk from tidal flooding and is covered by the EA's online flood warning system (<https://flood-warning-information.service.gov.uk/warnings>).
- 2.1.2 A description of the three levels of flood warning issued by the EA is presented below.

### 2.2 Responsibility

- 2.2.1 The 'designated responsible person' is defined as:
- The Principal Contractor during the construction period and is responsible for dissemination, training and implementation of the Flood Evacuation Plan.
  - The site operator (as defined by the Environmental Permit) or person(s) assigned by the site operator during operation and is responsible for dissemination, training, implementation and annual review of the Flood Evacuation Plan.

### 2.3 Flood Alert



**Flood Alert:** Flooding is possible. Be prepared (Issued in 'waking hours')

**When it's used:** Two hours to two days in advance of flooding.

**What to do:**

- Be prepared to act on the Flood Plan.
- Prepare a flood kit of essential items.
- Monitor local water levels and the flood forecast on the EA's website.

- 2.3.1 The EA will issue a Flood Watch status when flooding is possible. This will be issued by the EA through their website and Flood Warning Direct based upon the weather, river and tidal conditions.
- 2.3.2 Flood Alert means – 'Flooding of low-lying land and roads is expected. Be aware, be prepared, watch out'.
- 2.3.3 When a flood watch warning is issued the designated responsible person should:
- Be aware of water levels and whether the level is rising or falling;
  - Reconsider travel plans;
  - Listen to and watch for weather and flood warnings on local radio and television stations;
  - Contact Floodline on 0345 988 1188; and
  - Check that a flood kit has been prepared.
- 2.3.4 At this stage the designated responsible person should ensure that on site staff are aware of the Flood Alert.



## 2.4 Flood Warning



**Flood Warning:** Flooding is expected. Immediate action required.

**When it's used:** Half an hour to one day in advance of flooding.

**What to do:**

- Check on site equipment and deploy individual asset protection measures, where appropriate.
- Monitor local water levels and the flood forecast on the EA's website.
- Move to a safe place.
- Be prepared to evacuate.

2.4.1 The flood warning alert will be issued when water levels are rising and further rain is expected – it is advised to safeguard the Plant and/or critical assets and prepare to evacuate.

2.4.2 At this stage designated responsible person should:

- Contact the local emergency authorities to find out whether evacuation is considered necessary;
- Check that all site workers and adjacent site operators, where appropriate, are aware of the situation;
- Secure unoccupied properties during evacuation; and
- Deploy flood protection measures, as necessary - this may include closing flood doors, flood gates, removing mobile equipment to a flood safe location.

2.4.3 The designated responsible person should contact the EA Floodline on 0345 988 1188 periodically and listen to and watch for weather and flood warnings on local radio and television stations. If water levels begin to fall without reaching the site, the designated responsible person should continue to monitor the situation. Site workers should stay alert and be ready to evacuate until the EA issues the “All Clear” status.

## 2.5 Severe Flood Warning



**Severe Flood Warning:** Severe flooding. Danger to life.

**When it's used:** When flooding poses a significant threat to life.

**What to do:**

- Be ready should you need to evacuate.
- Co-operate with the emergency services.
- Call **999** if you are in immediate danger.

2.5.1 Severe flood warning means that severe flooding is expected. There is extreme danger to life and property and people are advised to act immediately i.e. evacuate.



- 2.5.2 The EA aim to provide at least 2 hours warning between the Flood Warning alert being issued and the commencement of flooding. The EA recommend that site workers should evacuate when a Flood Warning or Severe Flood Warning status is issued.
- 2.5.3 If flood levels continue to rise, site workers are advised to evacuate before safe access is lost.
- 2.5.4 At this level driving through flood water may become hazardous.
- 2.5.5 The designated responsible person and site workers should monitor the flood progression and evacuate, on foot as soon as possible.
- 2.5.6 The safe access route in times of flood will be clearly marked and signposted and site workers should use this route for means of evacuation rather than attempting an alternative route. Site workers should be aware that parts of the evacuation route may be up to 300mm depth of flooding.
- 2.5.7 Before evacuating, the designated responsible person must ensure that the site is secure; this will provide protection against thefts. On leaving site workers must ensure that doors, including internal doors, are securely locked and closed.
- 2.5.8 At this stage the local authority, the emergency services and the EA should be managing the situation, with widespread flooding potentially over a large area, and will endeavour to provide advice on an evacuation route, shelter and assistance to evacuees.

## 2.6 All Clear Status

- 2.6.1 All Clear means that flood watches or warnings are no longer in force in this area. At this stage the designated responsible person and site workers should:
- Keep listening to weather reports;
  - Only return to site if informed it is safe to do so; and
  - Beware sharp objects and pollution in flood water.
- 2.6.2 The designated responsible person should contact the local authority to check that it is safe to return to the site.
- 2.6.3 Site workers should be aware that if floodwaters have entered the facility and plant, it will need to be cleaned, disinfected, repaired, fully dried and checked by a suitably qualified professional prior to use. The designated responsible person and site workers must check that buildings are safe before entering, and if there are any doubts professional opinion should be sought.
- 2.6.4 If there is any doubt that equipment may be water damaged, it must be checked before switching on.

## 3 EVACUATION PLAN

### 3.1 Details of the plan

3.1.1 This section details the key facts of the Thurrock Flexible Generation Plant Flood Evacuation Plan.

### 3.2 Flood Risk to the Plant

3.2.1 The main flood risk to the Plant is from the tidal dominant River Thames and a breach/failure and/or overtopping of flood defences to the south of the site.

### 3.3 Flood Evacuation Plan

#### Flood Warnings

3.3.1 The EA operates a flood forecasting and warning service in areas at risk of flooding from rivers or the sea, which relies on direct measurements of rainfall, river levels, tide levels, in-house predictive models, rainfall radar data and information from the Met Office. This service operates 24 hours a day, 365 days a year.

3.3.2 If flooding is forecast, warnings are issued using a set of easily recognisable codes. A description of the codes and actions to be taken are described in section 2 of this report.

3.3.3 To ensure that the plant remains informed of flooding within the area it will be registered to the EA's Floodline Warnings Direct Service. Registering will be the responsibility of the Principal Contractor during the construction period and the site operator (as defined by the Environmental Permit) during operation.

#### Phase One: Monitor the Situation

3.3.4 Upon receipt of a flood alert the designated responsible person will monitor the EA's flood warning system, contacting Floodline every hour for general update of the situation.

- The Floodline number is 0345 988 1188.

3.3.5 Should the EA escalate the warning from a Flood Alert to a Flood Warning, the designated responsible person will warn site workers of the threat of flooding and Phase two of the plan (Evacuation) will be actioned, outlined below.

#### Phase Two: Evacuation

3.3.6 If the flood defences in close proximity to site are overtopping and/or breached, or if the EA issue a Flood Warning, the designated responsible person will implement a Plant evacuation.

1. The designated responsible person must inform site workers of the activation of the Flood Evacuation Plan.
2. The designated responsible person will explain to site workers that they must vacate the Plant.

3. Trained staff will deploy demountable flood barriers and/or sandbags around the perimeter of the Plant and critical assets, as required.
4. If flood waters have entered a building, local circuits will be isolated to minimise risk of fire or electrocution.
5. The designated responsible person announces the site/plant closure. This is followed by the sounding of the fire alarm.
6. The designated responsible person will reassure site workers that they are not in immediate danger and that the evacuation is a precaution.
7. Whilst providing reassurance the designated responsible person will direct site workers from the site to the identified Rendezvous Point. The specific route through the site is to be fully considered at detailed design stage.
8. Priority will be given to disabled site workers.
9. Site workers to be directed east along the access road to Station Road and Low Street Lane from where access north away from the event would be available. (See Flood Evacuation Route, Figure 1 Appendix A.)  
 Site workers not to be directed south or west along the access road via Tilbury2 to the A1089 as this route lies closer to the river, tidal defence wall and likely origin of flooding.
10. The designated responsible person will then check that the site/Plant is clear.
11. Site/Plant to be securely locked.
12. The designated responsible person secures the site, then congregates with site workers at the Rendezvous Point at which point a rollcall of site workers is undertaken to ensure all are accounted for.
13. If any site worker(s) does not check in or recorded absent, a designated responsible person must be sent immediately to check on them.
14. The designated responsible person must then inform the Site Operator of the activation of the Flood Evacuation Plan.
15. All site workers to be sent home. Site workers advised to call the designated responsible person for further information on site/Plant reopening.

### 3.4 Safe Access

- 3.4.1 A specific evacuation route through the site is to be fully considered at detailed design stage when the site layout has been finalised. This flood evacuation plan must be updated accordingly, to specify the route, prior to operation of the flexible generation plant.
- 3.4.2 A safe access route has been provided off the site to be used during a flood event, illustrated in Appendix A. The proposed emergency access is via Station Road
- 3.4.3 The route will be clearly marked, and the designated responsible person will ensure there are no trip hazards near to or on the safe access route.

### **3.5 Rendezvous Point**

3.5.1 The Rendezvous Point for site workers following an evacuation is Low Street, Tilbury.

- Flood Evacuation route Figure 1 Appendix A

### **3.6 Sandbagging**

3.6.1 Guidance for laying sandbags can be found in Appendix B. This may be required if the designated responsible person feels it is necessary to sandbag the plant, critical assets or car park area.

### **3.7 Dissemination of Flood Evacuation Plan**

3.7.1 The Plan is to be disseminated to the following agencies to ensure they are aware of the planned procedures:

- Thurrock Borough Council;
- Essex County Council;
- Environment Agency (Thames Region);
- Local Police Force;
- Fire and Rescue Service; and
- Local Ambulance Service.



## 4 ANNUAL REVIEW

4.1.1 New members of staff/site workers must review the Flood Evacuation Plan during the normal induction process and a review must be carried out annually by all site workers and the following carried out by the designated responsible person.

### Reading the plan and updating contacts list

4.1.2 So that site workers are familiar with the required actions and contact numbers are up to date.

### Contact the Environment Agency Floodline Service on 0345 988 1188

4.1.3 Undertake an annual check that the flood risk to the plant has not changed.

### Review and maintain a Flood Evacuation Kit

4.1.4 Flood Evacuation Kits will be made available during construction an operation.

4.1.5 During the constructional phase of works a number of kits will be strategically placed throughout the constructional area, especially in locations with a high density of site workers.

4.1.6 During operation kits will be located where readily accessible to operational and maintenance staff, for example at the control room or staff welfare facilities.

4.1.7 Each kit will contain items which are essential for evacuation and must be stored where it is easily accessible by all site workers and members of staff. The kit will contain the following items:

**Table 4.1: Flood Evacuation Kit requirement**

Item	Reason
Torch	In case of loss of electrical power.
Rechargeable radio	To listen to radio announcements in case of loss of electrical power.
High Visibility Clothing	To ensure visibility during periods of low light.
Waterproofs for all staff members	To be worn during flooding/during poor weather conditions.
First Aid Kit	To be used in case of emergency by a relevantly trained person.
Flood Evacuation Route Plan	To ensure that the correct route is taken
List of important numbers	Environment Agency Floodline..... 0345 988 1188 Police.....999 or 101 Fire and Rescue.....999 or 01376 576840 Essex Council Emergency Management..... 0345 743 0430 Gas supplier and meter.....Northern Gas Networks Electricity supplier and meter number.....UK Power Networks Water supplier and meter number..... Essex & Suffolk Water Doctor's Surgery..... East Tilbury Surgery, 2 Bata Ave, East Tilbury, Tilbury RM18 8YS or Darent Valley Hospital Darent Wood Rd, Dartford DA2 8DA. Local radio station: (BBC Essex) frequency for news alerts and updates.....95.3 FM, 103.5 FM and 1530 AM.

# Appendix A

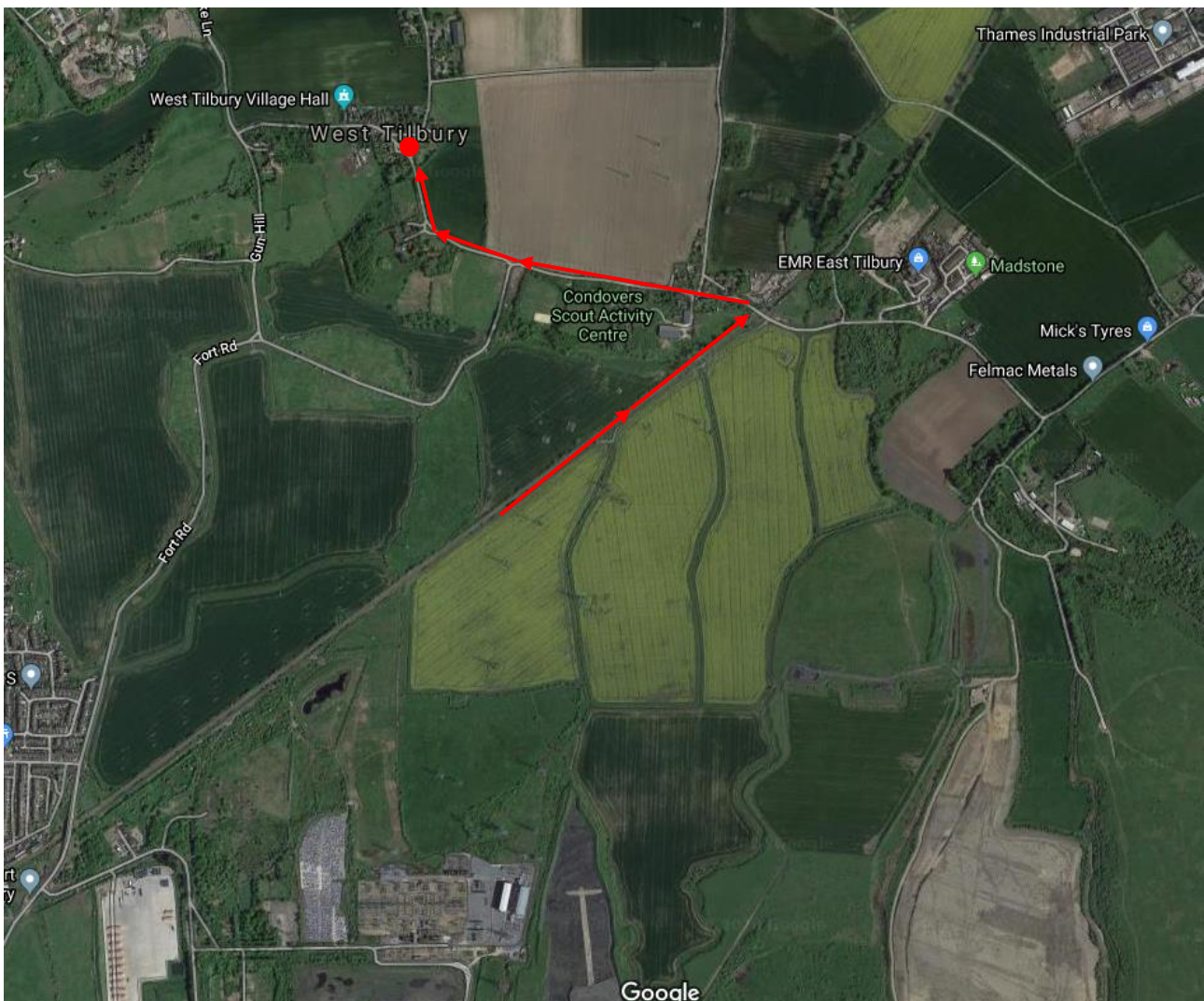
## Flood Evacuation Route

## FLOOD EVACUATION ROUTE

Based on inundation mapping is likely to be several hours of warning before floodwater impact upon the site.

As flood water propagates across the floodplain towards the site from either the south or west it is proposed that site workers are be directed east away from flood water along the access road to Station Road and Low Street (illustrated in Figure A-1) located within an area designated as Flood Zone 1. From this point site workers would be directed north away from the flood incident.

The incorporation of flood resistance and resilience measures at the site, together with the implementation of a flood evacuation plan, would reduce the risk of damage and ensure the safety of site workers occupants.



- Key - ● Assembly point in Flood Zone 1  
➔ Primary evacuation route

**Figure A.1: Flood Evacuation Route**

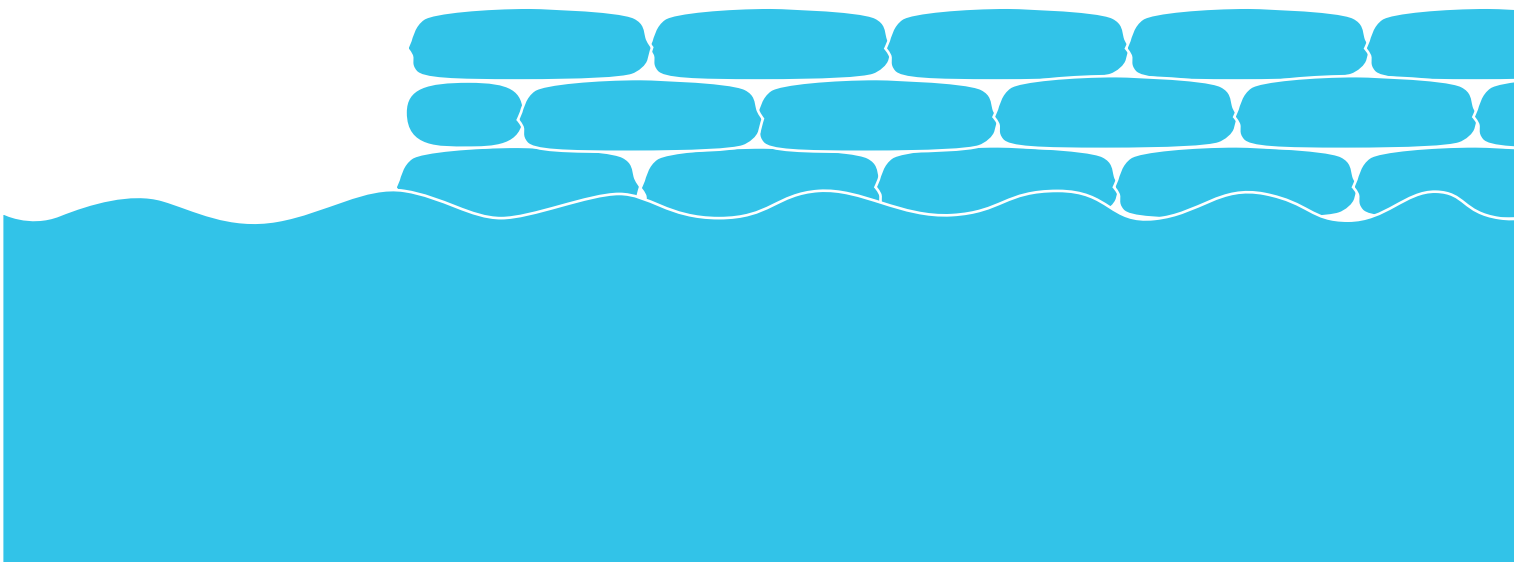
## **Appendix B**

# **Environment Agency Sandbag Guidance**



# Sandbags

and how to use them  
properly for flood protection



We are the Environment Agency. It's our job to look after your environment and make it a **better place** – for you, and for future generations.

Your environment is the air you breathe, the water you drink and the ground you walk on. Working with business, Government and society as a whole, we are making your environment cleaner and healthier.

The Environment Agency. Out there, making your environment a better place.

Published by:  
Environment Agency  
Rio House  
Waterside Drive, Aztec West  
Almondsbury, Bristol BS32 4UD  
Tel: 08708 506 506  
Email: [enquiries@environment-agency.gov.uk](mailto:enquiries@environment-agency.gov.uk)  
[www.environment-agency.gov.uk](http://www.environment-agency.gov.uk)

© Environment Agency

All rights reserved. This document may be reproduced with prior permission of the Environment Agency.  
March 2009

## Do sandbags work?

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.

However, 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).
- They can be difficult to handle.
- Laying them can be very time-consuming.
- 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, we strongly encourage people to use purpose made flood protection products, such as flood boards, non-return valves for plumbing and air brick covers.**

## How to obtain sandbags

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.

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.

## 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 the 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.

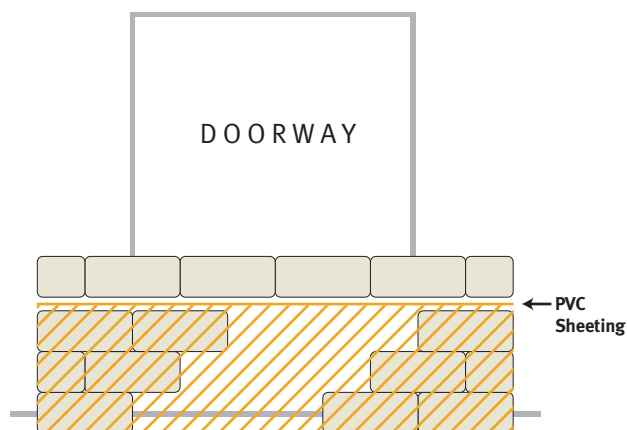
## Protecting your property

**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 harms way!**

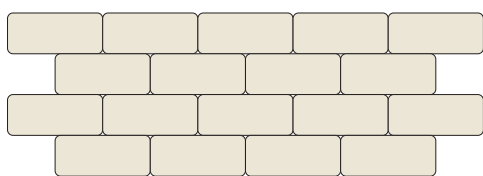
Consider all entry points that water could get through, not just doorways, such as – airbricks, utility service points, cable entry points. Use other solutions for entry points where sandbags won't work (such as silicone sealant).

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.

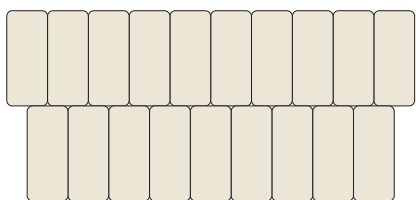
**Figure 1: Sandbag wall across doorway  
(viewed from water side)**



**Figure 2: Header course (viewed from above)**



**Figure 3: Stretcher course (viewed from above)**



## Filling the bags

- 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.

## Placing the bags

- 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.

## 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.

### 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).

### Additional waterproofing

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

### Remember!

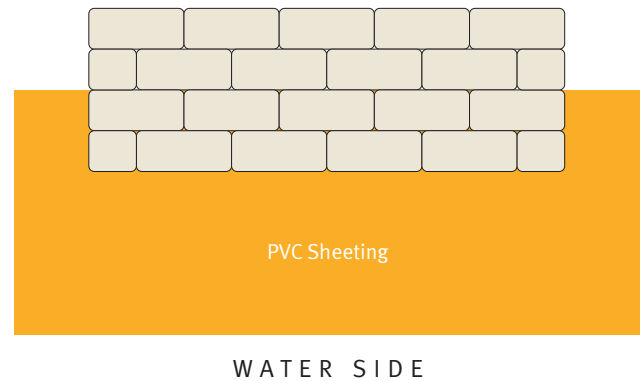
**Sandbags are popular but they have disadvantages:**

- **During an emergency sufficient quantities may be difficult to obtain.**
- **They are time-consuming and require two people to fill.**
- **They can be difficult to handle, particularly for the elderly or infirm.**
- **When they come into contact with floodwater they tend to retain contaminants such as sewage.**
- **Sacking material is biodegradable, and will disintegrate if left in place for long periods of time.**

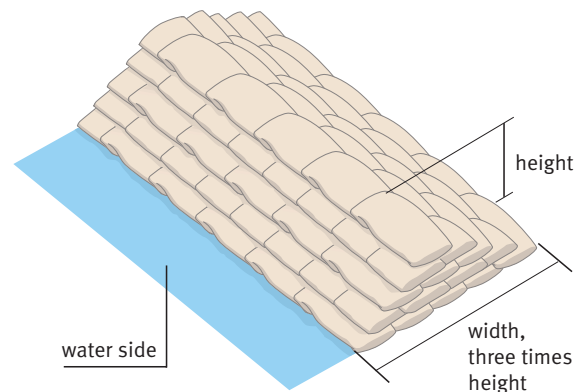
More information on protecting yourself from flooding can be found on the Environment Agency website: [www.environment-agency.gov.uk](http://www.environment-agency.gov.uk)

In certain circumstances, local authority grants may also be made available to cover some of the costs of providing resistance and resilience products for individual private dwellings. Contact your local authority to find out whether you may be eligible.

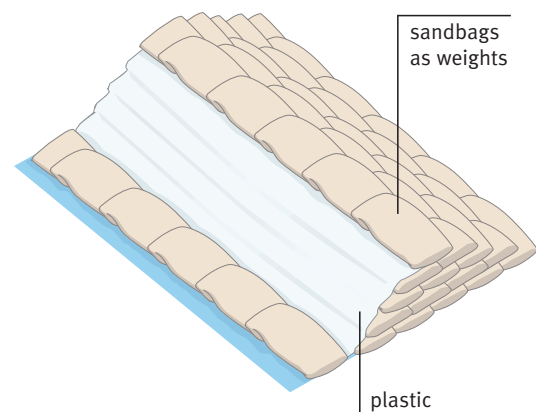
**Figure 4: Polythene sheet in place (viewed from above)**



**Figure 5: Pyramid placement**



**Figure 6: Additional waterproofing**



**Would you like to find out more about us,  
or about your environment?**

**Then call us on  
08708 506 506 (Mon–Fri 8–6)**

**email  
enquiries@environment-agency.gov.uk**

**or visit our website  
www.environment-agency.gov.uk**

**incident hotline 0800 80 70 60 (24hrs)  
floodline 0845 988 1188**



**Environment first:** Viewing this on-screen? Please consider the environment and only print if absolutely necessary. If you're reading a paper copy, please don't forget to reuse and recycle.