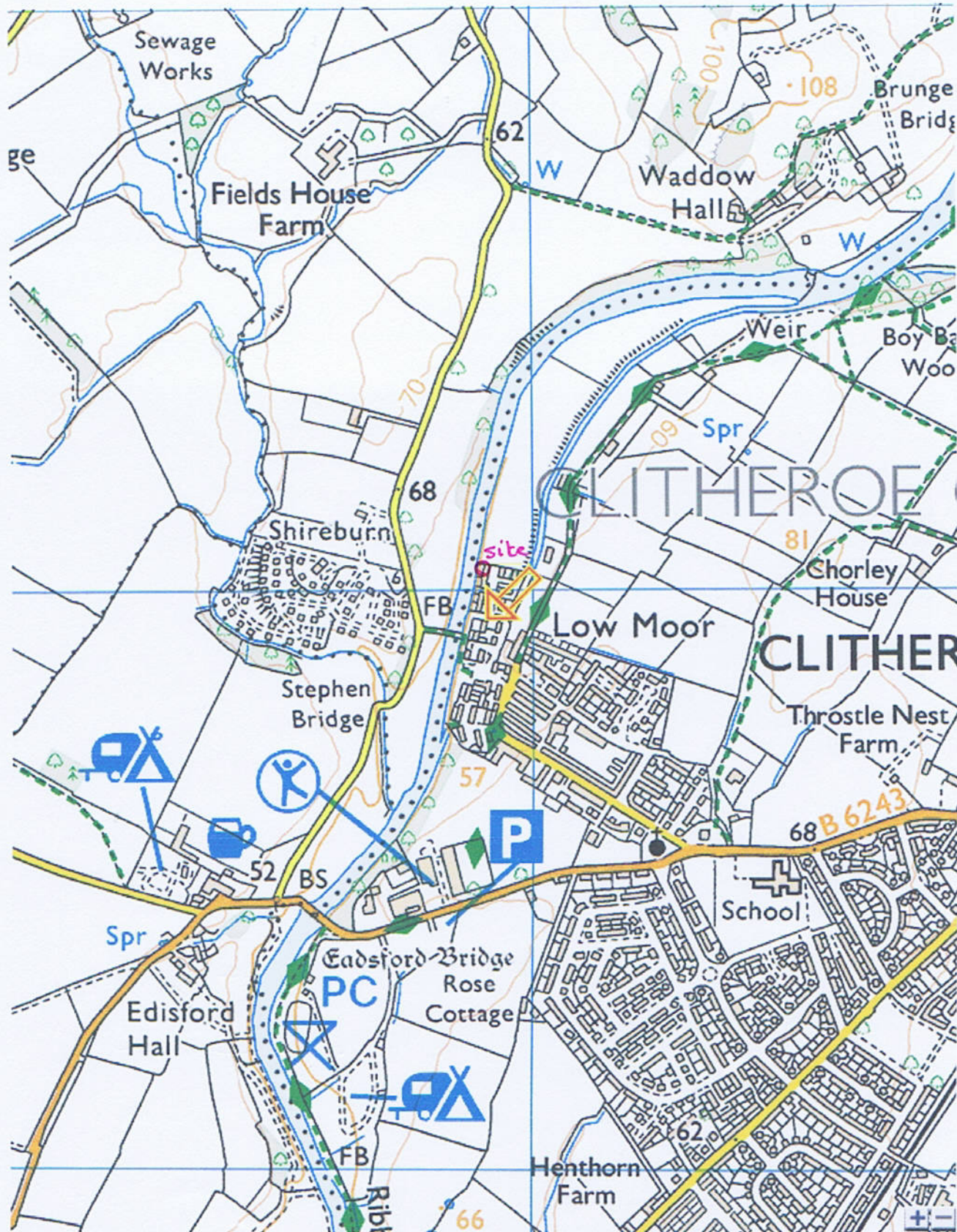




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Notes
 The drawings are to be used as a guide only. All construction shall be in accordance with the Building Regulations 2000. The drawings are to be used as a guide only. All construction shall be in accordance with the Building Regulations 2000. The drawings are to be used as a guide only. All construction shall be in accordance with the Building Regulations 2000.

Rev.	Date	Description

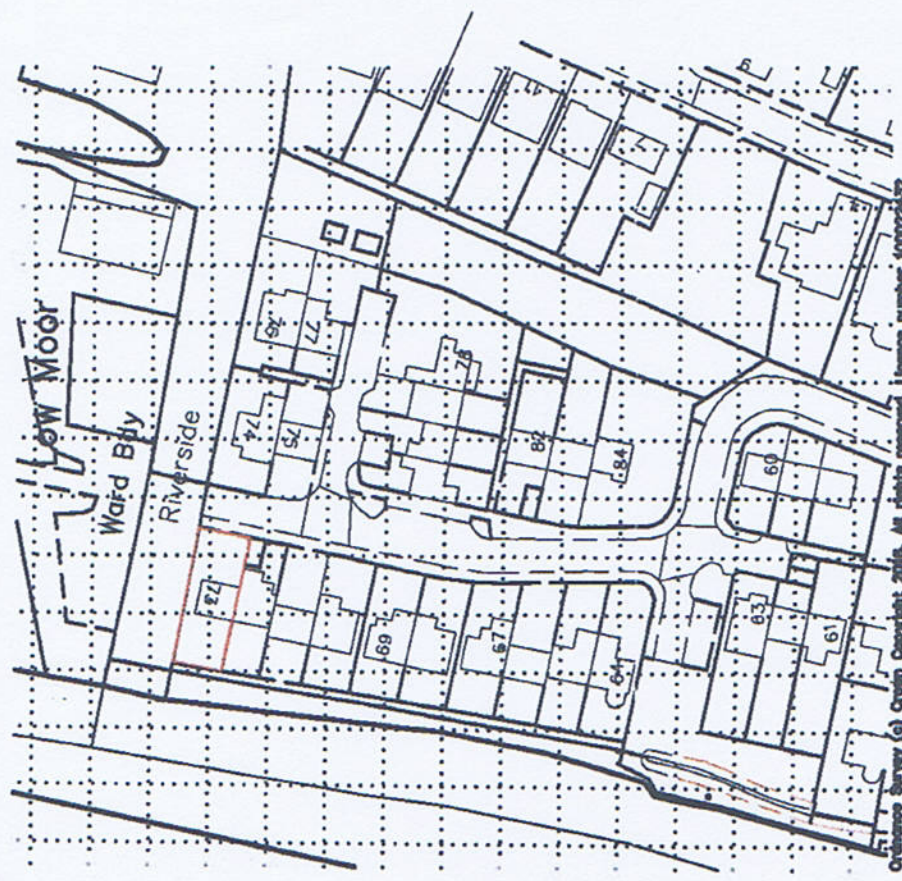
A.L.H. Design Services
 Barley Cottage, Brewery Street, Longridge, Lancs
 PR3 3NB, Tel & Fax : (01772) 785719

Client
 Mr M. Riches
 73 Riverside,
 Clitheroe,
 Nr Blackburn,
 Lancs, BB7 2NS

Job/Reference No.
**ERECTION OF TWO STOREY
 EXTENSION**

320160893P

Drawing Title
LOCATION PLAN



Ribble

Ward Bdy

Riverside

320160893P

67

69

73

Riverside

75

74

78

77

76

ERECTION OF TWO STOREY EXTENSION

Mr M. Riches
73 Riverside,
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A.L.R. Design Services
Bantry College, Banbury Street, Longridge, Lancs
PR8 3NB, Tel & Fax: (01772) 76719

EXISTING SITE PLAN

Author's Number	Drawing Number
0485193	Drawing No 05
1/250th Sept 16	a.t.h.

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Fluvial Defences

Asset Ref.	National Grid Reference	Asset Type	Protection Type	Location	Maintained By	Design Standard (Return Period)	Overall Condition Grade (Excellent 1-5 Very Poor)	Effective Crest Level (m)		E.C.I. Data Quality (Reliable 1-4 Unreliable)	Length (m)	Height (m)
								UCL (mAOD)	DCL (mAOD)			
01210RIBB0601R27	SD 73476 42547	High Ground	Fluvial	Sherburn Wood	Unknown	70	3	N/A	N/A	N/A	833	-
01210RIBB0601L32	SD 73349 42504	High Ground	Fluvial	Start of Wall downstream of Weir to End of Properties	Unknown	10	3	N/A	N/A	N/A	717.9	-
01210RIBB0601R26 <i>opposite bank</i>	SD 72895 42120	High Ground	Fluvial	Sherburn Wood to Footbridge at Low Moor	Unknown	70	3	N/A	N/A	N/A	198	-
01210RIBB0601L31	SD 72992 42081	Embankment	Fluvial	Low Moor Farm	Unknown	50	3	52.29	52.51	2	89.9	-
01210RIBB0601L30	SD 72907 42058	Wall	Fluvial	End of Properties to Start of Wall	Unknown	50	3	52.49	52.42	1	98.4	-
01210RIBB0601L29	SD 72895 41965	Embankment	Fluvial	Start of Wall to Start of Embankment	Unknown	50	2	52.42	52.30	2	85.9	-
01210RIBB0601R25 <i>opposite bank</i>	SD 72855 41927	High Ground	Fluvial	Footbridge at Low Moor to Edisford Bridge	Unknown	70	3	N/A	N/A	N/A	558.2	-
01210RIBB0601L28	SD 72871 41888	High Ground	Fluvial	Start of Embankment to Start of Properties	Unknown	70	3	N/A	N/A	N/A	127.8	-
01210RIBB0601L27 <i>opp. bank</i>	SD 72846 41763	High Ground	Fluvial	Start of Properties to Edisford Bridge	Unknown	70	3	N/A	N/A	N/A	399.8	-

Site Location

River Ribble, Clitheroe

CL27239

Fluvial Structures

Asset Ref.	National Grid Reference	Asset Type	Protection Type	Location	Maintained By	Design Standard (Return Period)	Overall Condition Grade (Excellent 1-5 Very Poor)	Length (m)	Height (m)
01210RIBB0601129001	SD 72891 41965	Outfall	Fluvial	Low Moor	Private	-	2	-	-



Improving the flood performance of new buildings

Flood resilient construction



May 2007
Consortium managed by CIRIA
Department for Communities and Local Government: London

Improving the Flood Performance of New Buildings

Flood Resilient Construction



6 Guidance on flood resilient design and construction

6.1 General principles

Management of flood risk can be achieved during the planning and outline design stages for any new development as discussed in Chapters 3 (Planning Policy and Building Standards) and Chapter 4 (Design Strategies). This chapter is concerned with measures aimed at achieving flood resilience that can be applied at the building design level. This chapter provides technical guidance on building materials and forms of construction (and to a lesser extent, on fittings) that are appropriate for improving the flood resilience of buildings. It is the result of a synthesis of information from a number of different sources: published literature, review of existing practice, experiential information, and laboratory testing. Some recommendations in this Guidance naturally differ from current standards, such as those contained in the NHBC, in order to address the severity of exposure to flood water which hitherto has not been considered.

Any resilience measures should be designed so that the building can be occupied safely over its proposed lifetime taking climate change into account.

It is generally accepted that total prevention of water ingress or 'dry proofing' to a building is very difficult to achieve. The strategies that are recommended to minimise flood impact to buildings and their occupants are described in Figures 4.2 to 4.4 of Chapter 4. In terms of achieving resilience, there are two main strategies, whose applicability is dependent on the water depth the property is subjected to (see Chapter 4).

- **Water exclusion strategy** – where emphasis is placed on *minimising* water entry whilst maintaining structural integrity, and on using materials and construction techniques to facilitate drying and cleaning. This strategy is favoured when low flood water depths are involved (not more than 0.3m). According to the definitions adopted in this Guidance, this strategy can be considered as a resistance measure but it is part of the aim to achieve overall building resilience
- **Water entry strategy** – where emphasis is placed on allowing water into the building, facilitating draining and consequent drying. Standard masonry buildings are at significant risk of structural damage if there is a water level difference between outside and inside of about 0.6m or more. This strategy is therefore favoured when high flood water depths are involved (greater than 0.6m).

Other important factors that should be considered for resilient design and construction, but not addressed in this guidance, are:

- cost
- durability

- ease and practicability of construction
- environmental, social and aesthetic acceptability.

Guidance is provided in the following sections:

Section 6.2 – building materials

Section 6.3 – foundations

Section 6.4 – floors

Section 6.5 – walls

Section 6.6 – doors and windows

Section 6.7 – fittings

Section 6.8 – services.

In each section dealing with construction elements (e.g. materials, foundations, floors, and walls) there is a brief discussion of the design issues, followed by general advice on resilience. Some illustrative sketches are also included which provide information on general arrangements but do not cover construction details.

6.2 Building materials

The recommendations given in this section on building materials are based primarily, but not exclusively, on recent laboratory investigations (permeability and drying tests on 13 typical building materials subjected to 1m head of flood water). An illustrative example of testing is given in Figure 6.1.

Figure 6.1 Pressed facing bricks being tested



6.5.2 Water entry strategy

This strategy is applicable to design flood depths above 0.6m, or above 0.3m if the structural assessment of the design shows that the integrity of the building would be compromised by a “water exclusion strategy”.

General advice for resilient design

Ensure high quality workmanship at all stages of construction.

Masonry walls:

Use good quality facing bricks for the external face of cavity walls.

Do not use soft bricks, such as hand made clay bricks, which can easily crumble when subjected to water.

Concrete blocks dry more quickly than Aircrete blocks. However, Aircrete blocks allow less leakage. Therefore, design of blockwork walls needs to take into account these two opposite types of behaviour and consider whether drying or resistance to water is most relevant in each situation. For a “water entry strategy” which is aimed at allowing water passage through the property, concrete blocks are recommended.

Clear cavity walls, i.e. with no insulation, have better resilience characteristics than filled or part filled cavity walls as they dry more quickly.

Framed walls: Avoid timber framed walls containing construction materials that have poor performance in floods, namely oriented strand board and mineral fibre insulation. Timber framed walls are generally not recommended, unless a sacrificial approach is adopted whereby some materials will be stripped to allow drying.

Steel framed walls may offer a suitable alternative option but specialist advice needs to be sought on how to incorporate resilient materials/construction methods in the design. The possible use of bituminous paint on steel plates may be a means of preventing corrosion.

External renders should not be used as they provide a barrier to water penetration and may induce excessive differences in depth between outside and inside of the property resulting in possible structural problems.

Insulation:

External insulation is better than cavity insulation because it is easily replaced if necessary; however it is generally protected by rigid lining which may create a barrier to water.

Cavity insulation should incorporate rigid closed cell materials as these retain integrity and have low moisture take-up. Other common types, such as mineral fibre batts, are not generally recommended as they can remain wet several months after exposure to flood water which slows down the wall drying process. Blown-in insulation can slump due to excessive moisture uptake, and some types can retain high levels of moisture for long periods of time (under natural drying conditions).

Internal linings:

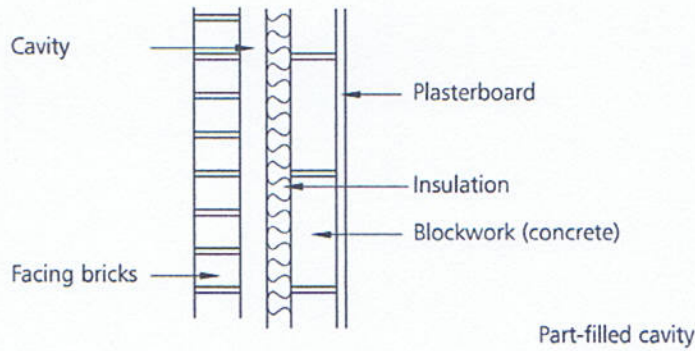
Avoid internal cement renders as these can prevent effective drying.

Use standard gypsum plasterboard up to the predicted flood level (plus freeboard of 50mm) as a sacrificial material. For this purpose, the use of a dado rail to separate the above and below flooded area may be useful. Splash proof boards do not necessarily offer better protection against flood waters, which may remain for some time and exert pressure on the board.

Above predicted flood level (plus freeboard) the use of plasterboard or internal cement renders is appropriate.

Anecdotal evidence suggests that internal lime plaster/render can be a good solution. Lime plaster depends on contact with the air to set and harden. Because of this, full strength lime plaster, which typically requires over 6 months, was not possible to test. Consequently, no assurance can be given for its performance. Tests performed when young showed that it crumbles very easily under high water pressure.

Figure 6.10 Cavity External Walls – Part-filled cavity with sacrificial plasterboard



Part-filled cavity

- External face consisting of engineering bricks up to required level for flood protection (up to d.p.c.). Other external facing materials can be used above this level, but ensure transition is watertight.
- Rigid insulation
- Internal cement based render, preferably with lime content. Composition depends on masonry; the following mix is effective:
 - 1 cement : 6 sand: 1 lime on concrete blocks.
- Stainless steel wall ties should be used to minimise corrosion and consequent staining.
- Sacrificial plasterboard can be used, but it needs to be removed between ground floor to flood level. The board should be laid horizontally to make removal easier.

6.6 Doors and windows

Doors, windows and air vents are potential flow paths into properties.

General advice for resilient/resistant design

Doors: Raising the threshold as high as possible, while complying with level access requirements, should be considered as the primary measure. In addition, sealed PVC external framed doors should be used and, where the use of wooden doors is a preferred option, all effort should be made to ensure a good fit and seal to their frames.

Hollow core timber internal doors should not be used where the predicted frequency of flooding is high. Where sufficient flood warning is given, butt hinges, that allow internal doors to be easily removed and stored in dry areas prior to a flood, should be used. Where the frequency of predicted flooding is low or where there is no warning (e.g. overland or sewer flooding) it may be necessary to replace the doors after the flood.

Windows/patio doors: Windows and patio doors are vulnerable to flood water and similar measures to those used for doors should be taken. Special care should be taken to ensure adequate sealing of any PVC window/door sills to the fabric of the house. Of particular concern would be excessive water pressure on the glazing of patio doors. Double glazing conforming to the relevant standards would in principle adequately resist the pressures generated by flood waters; debris carrying flows may cause damage.

Air vents: special designs of air vent are available in the market to prevent water ingress in circumstances where the predicted flood depth is low (i.e. < 0.3m); e.g. periscopic air vent, see Figure 6.11. Careful consideration should be given to effectively sealing any associated joints.

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Product model FACC001

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- Quick and simple to install for emergency response
- Can be fitted using a small air pump
- Made of chemical resistant rubber and plastic to withstand sewage

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The **Toilet /WC Pan Seal** is an essential anti-flooding device for preventing sewage flowing backwards through toilet and sanitation systems in the event of severe flooding. Ideal for downstairs toilets.

- Creates a secure seal around the toilet pan rim
- Can be fitted in seconds and requires just a few squeezes from a small air pump to secure the water tight seal
- The panseal is manufactured from chemical resistant rubber and plastic for a durable and effective seal

Benefits of a Toilet / WC Pan Seal

- Rapid, easy fitting for fast emergency response
- Prevents sewage from entering homes and offices
- Creates a water tight seal

How to use a toilet / WC pan seal

- Place the Toilet / WC Pan Seal directly below the toilet pan rim
- Using a conventional bicycle pump, pump in air to expand and create a seal
- To deflate after use, press in the pin in the centre of the valve
- After use, always clean the product carefully with a disinfectant
- Dry well and store in a cool dry place that is easily accessible for future floods
- Store away from sharp objects

You are advised to practise installing the panseal to ensure you are familiar with its use, so that you can respond quickly when flooding hits.

How the toilet / WC pan seal works?

The toilet / WC pan seal works by creating a secure seal around the toilet pan rim preventing the back-flow of flood and foul waste water.

The inner part or 'main body' of the panseal is manufactured by injection moulding, a thermoplastic polymer and ABS, a chemical resistant plastic. The outer section is formed in a semi-circle shape to accommodate the seal expansion.

Round rubber tubing forms the outer part of the 'PanSeal' which is bonded to the main body. Chemical resistant rubber is used (Buytl) allowing the tubing to expand, creating a double seal.

A watertight seal is achieved between tubing and the inner wall of the pan and a secondary seal is formed underneath the rim.

Please Note: Toilet /WC Panseals are not suitable for square or luxury style toilets. Don't forget to fit non-return valves to all drains and water inlet pipes! Keep a small bicycle pump nearby so that it can be quickly accessed.

Product Model : FACC001

Range : Home Flood Protection

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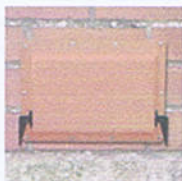
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Flood plan gets green light

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6 Jan 1998



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WORK looks set to start next month on a £54,000 flood defence scheme, aimed at keeping the River Ribble at bay in Clitheroe.

Residents of Riverside in Low Moor gave their backing to the scheme when it was unveiled last year.

Several houses suffered damage costing thousands of pounds when the Ribble burst its banks following torrential rain three years ago.

The scheme, which will include a five-foot high embankment and automatic flood warning system, was designed by the Ribble Valley Council's chief engineer, Graham Jagger, is due for completion in March.

The Ribble Valley Council planning committee is tonight expected to approve a £45,000 contribution toward the scheme.

The rest will be split between the Environment Agency and other organisations.

Residents were repeatedly told by the council and the Environment Agency that no cash was available for flood defence in Clitheroe.

But the new scheme will see the construction of a flood defence barrier and an alarm at the Environment Agency being triggered when the Ribble rises above a certain height in Low Moor.

ADVERTISING

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Agency staff will then contact the residents and place them on flood alert.

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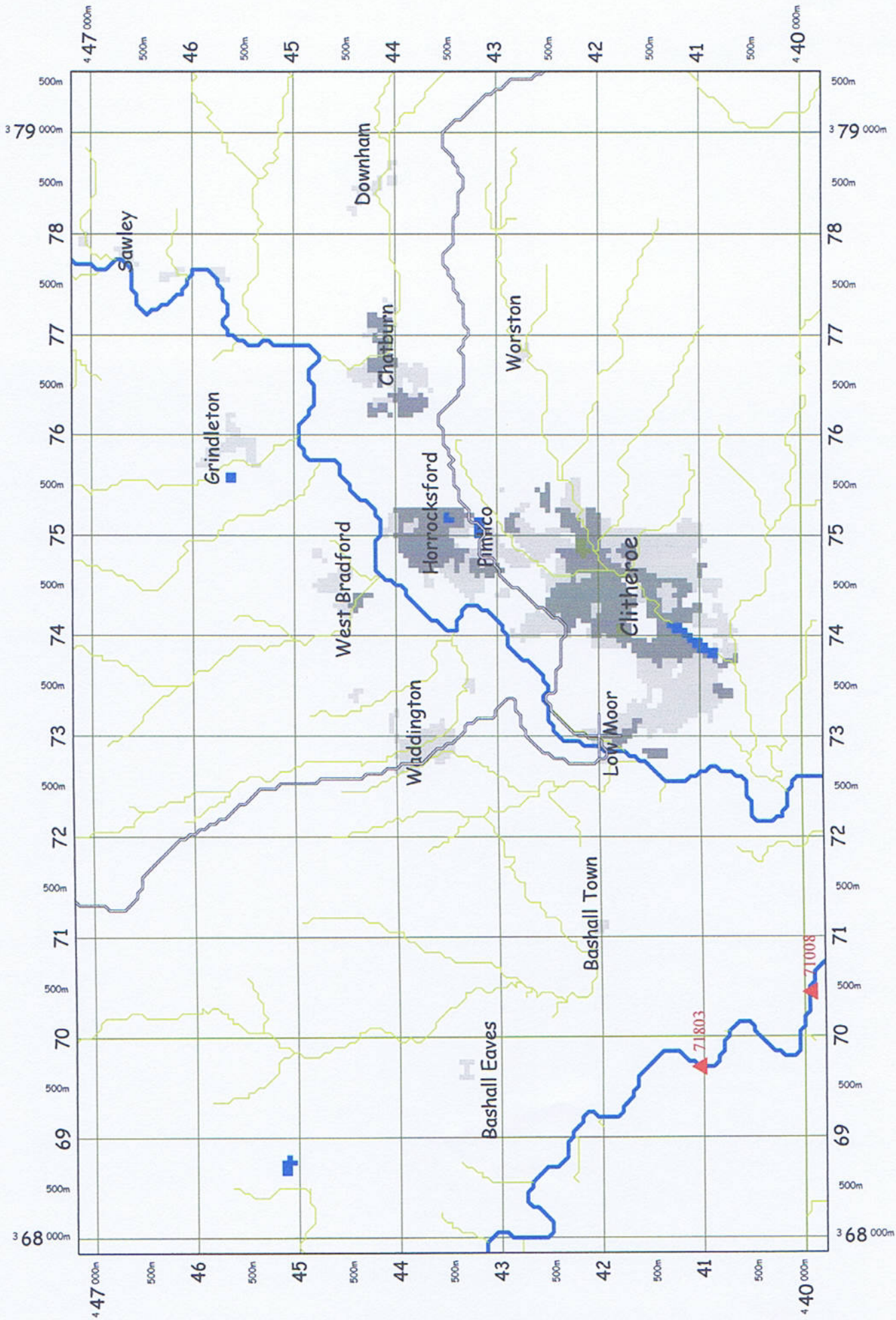
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Revitalised FSR/FEH rainfall runoff method

Spreadsheet application report

User name	mikel	Catchment name		Date/time modelled	22-Nov-2016 15:25
Company name	mla	Catchment easting	372850	Version	1.4
Project name	ribble-low moor	Catchment northing	441950		
		Catchment area	400.12		

Summary of model setup

Design rainfall parameters		Loss model parameters		Routing model parameters		Baseflow model parameters	
Return period (yr)	100	C_{max} (mm)	263	T_p (hr)	6.26	BL (hr)	43
Duration (hr)	15	C_{ini} (mm)	140	U_p	0.65	BR	1.08
Timestep (hr)	1	α factor	0.83	U_k	0.8	BF₀ (m³/s)	34.9
Season	Winter						

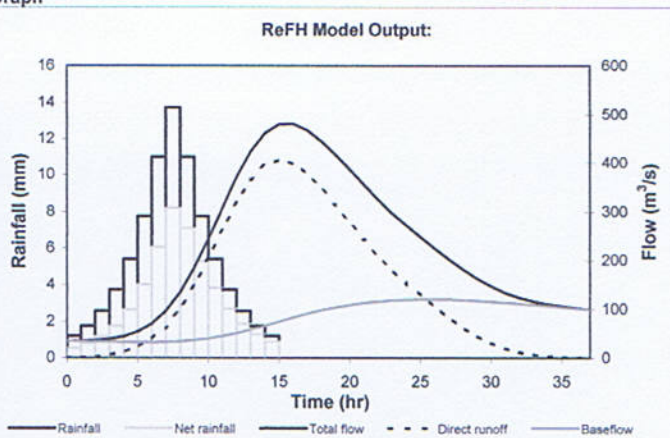
Summary of results

FEH DDF rainfall (mm)	103.8	Peak rainfall (mm)	13.7
Design rainfall (mm)	80.5	Peak flow (m³/s)	480.7

Results

Series	Design Rainfall	Net rainfall	Direct runoff	Baseflow	Total flow
Unit	mm	mm	m ³ /s	m ³ /s	m ³ /s
0	1.2	0.5	0.0	34.9	34.9
1	1.8	0.8	0.5	34.1	34.6
2	2.6	1.2	2.2	33.4	35.6
3	3.7	1.8	5.8	32.7	38.4
4	5.4	2.6	12.0	32.2	44.2
5	7.8	4.0	22.3	31.8	54.1
6	11.0	6.0	38.7	31.9	70.6
7	13.7	8.2	63.9	32.4	96.3
8	11.0	7.1	100.5	33.7	134.2
9	7.8	5.3	148.6	36.0	184.7
10	5.4	3.8	204.2	39.6	243.8
11	3.7	2.7	262.4	44.4	306.9
12	2.6	1.9	317.9	50.6	368.5
13	1.8	1.3	364.5	57.9	422.4
14	1.2	0.9	395.2	66.0	461.2
15	0.0	0.0	405.5	74.4	479.9
16	0.0	0.0	398.1	82.7	480.7
17	0.0	0.0	377.3	90.4	467.6
18	0.0	0.0	347.7	97.3	444.9
19	0.0	0.0	313.2	103.2	416.4
20	0.0	0.0	277.2	108.2	385.3
21	0.0	0.0	242.2	112.1	354.4
22	0.0	0.0	209.6	115.1	324.7
23	0.0	0.0	180.1	117.3	297.4
24	0.0	0.0	153.1	118.8	271.9
25	0.0	0.0	128.2	119.5	247.7
26	0.0	0.0	105.0	119.7	224.7
27	0.0	0.0	83.5	119.2	202.7
28	0.0	0.0	63.8	118.3	182.1
29	0.0	0.0	46.0	117.0	163.0
30	0.0	0.0	31.2	115.2	146.4
31	0.0	0.0	20.0	113.2	133.2
32	0.0	0.0	12.2	111.0	123.3
33	0.0	0.0	7.0	108.7	115.7
34	0.0	0.0	3.7	106.3	110.0
35	0.0	0.0	1.6	104.0	105.6
36	0.0	0.0	0.5	101.6	102.1
37	0.0	0.0	0.1	99.3	99.3
Total (mm)	80.5	48.1	48.1	27.6	75.7

Graph



Audit comments

Model run with ReFH dll version 1.4.0005

Catchment

Catchment descriptors imported from file
 Catchment descriptor file = 'ribblecatch.csv'
 Catchment descriptor file exported from CD ROM version 3
 Catchment descriptor file exported on 22-Nov-2016 15:22
 BFIHOST value of 0.372 used
 PROPWET value of 0.61 used
 SAAR value of 1350 used
 DPLBAR value of 34.39 used
 DPSBAR value of 88.6 used
 URBEXT value of 0.0053 used
 C value of -0.02321 used
 D1 value of 0.41047 used
 D2 value of 0.37457 used
 D3 value of 0.41122 used
 E value of 0.29405 used
 F value of 2.47572 used

Rainfall

Recommended season is Winter, as URBEXT < 0.125
 ReFH design standard Seasonal Correction Factor of 0.86 applied
 ReFH design standard Areal Reduction Factor of 0.90 applied

Loss Model

C_{max} derived from catchment descriptors
 ReFH design standard C_{ini} used
 ReFH design standard α factor used

Routing Model

T_p derived from catchment descriptors



- [Home \(https://www.gov.uk/\)](https://www.gov.uk/)

Guidance

Flood risk assessment: standing advice

From: Environment Agency (<https://www.gov.uk/government/organisations/environment-agency>) and Department for Environment, Food & Rural Affairs (<https://www.gov.uk/government/organisations/department-for-environment-food-rural-affairs>)

First published: 1 April 2012

Applies to: England

Find out if you need to follow standing advice when completing a flood risk assessment and what to do if so.

Contents

- [Research your development site](#)
- [What to include in your assessment](#)
- [Minor extensions standing advice](#)
- [Vulnerable developments standing advice](#)
- [Submit your flood risk assessment](#)
- [Contact the Environment Agency](#)

You need to follow the Environment Agency's standing advice if you're carrying out a flood risk assessment for a development classed as:

- a minor extension (household extensions or non-domestic extensions less than 250 square metres) in flood zone 2 or 3 (<http://planningguidance.planningportal.gov.uk/blog/guidance/flood-risk-and-coastal-change/flood-zone-and-flood-risk-tables/table-1-flood-zones/>)
- 'more vulnerable' (<http://planningguidance.planningportal.gov.uk/blog/guidance/flood-risk-and-coastal-change/flood-zone-and-flood-risk-tables/table-2-flood-risk-vulnerability-classification/>) in flood zone 2 (except for landfill or waste facility sites, caravan or camping sites)
- 'less vulnerable' (<http://planningguidance.planningportal.gov.uk/blog/guidance/flood-risk-and-coastal-change/flood-zone-and-flood-risk-tables/table-2-flood-risk-vulnerability-classification/>) in flood zone 2 (except for agriculture and forestry, waste treatment, and water and sewage treatment)
- 'water compatible' (<http://planningguidance.planningportal.gov.uk/blog/guidance/flood-risk-and-coastal-change/flood-zone-and-flood-risk-tables/table-2-flood-risk-vulnerability-classification/>) in flood zone 2

This includes developments involving a change of use (<http://www.planningportal.gov.uk/permission/commonprojects/changeofuse/>) into one of these vulnerable categories or into the water compatible category.

Find out what flood zone your development is in (<http://maps.environment-agency.gov.uk/wiyby/wiybyController?>

[x=357683.0&y=355134.0&scale=1&layerGroups=default&ep=map&textonly=off&lang=_e&topic=floodmap](http://maps.environment-agency.gov.uk/wiyby/wiybyController?x=357683.0&y=355134.0&scale=1&layerGroups=default&ep=map&textonly=off&lang=_e&topic=floodmap)).

Read the guide on flood risk assessment for planning applications

(<https://www.gov.uk/guidance/flood-risk-assessment-for-planning-applications>) if this doesn't apply to your development.

Contact the Environment Agency for advice if your development is:

- classed as 'more vulnerable' (<http://planningguidance.planningportal.gov.uk/blog/guidance/flood-risk-and-coastal-change/flood-zone-and-flood-risk-tables/table-2-flood-risk-vulnerability-classification/>) and is a landfill or waste facility site, or a caravan or camping site
- classed as 'less vulnerable' (<http://planningguidance.planningportal.gov.uk/blog/guidance/flood-risk-and-coastal-change/flood-zone-and-flood-risk-tables/table-2-flood-risk-vulnerability-classification/>) and is for agriculture and forestry, waste treatment, mineral processing, or water and sewage treatment

Research your development site

For all developments covered by standing advice, you should do the following research before starting your flood risk assessment.

Contact the Environment Agency for information about flood risk in your area.

Contact your local planning authority

(http://www.planningportal.gov.uk/wps/portal/genpub_LocalInformation) or check the planning section of their website for their strategic flood risk assessment (<https://www.gov.uk/guidance/local-planning-authorities-strategic-flood-risk-assessment>) if one has been adopted as part of the local plan (<http://planningguidance.planningportal.gov.uk/blog/guidance/local-plans/local-plans-key-issues/>). Refer to the strategic flood risk assessment in your flood risk assessment.

Check if your development is within 20 metres (m) of a main river (<http://maps.environment-agency.gov.uk/wiyby/wiybyController?>

[x=357683.0&y=355134.0&scale=1&layerGroups=default&ep=map&textonly=off&lang=_e&topic=floodmap](http://maps.environment-agency.gov.uk/wiyby/wiybyController?x=357683.0&y=355134.0&scale=1&layerGroups=default&ep=map&textonly=off&lang=_e&topic=floodmap)).

Ask the Environment Agency for advice if it is.

Check if you need to do a sequential test

Before you start a flood risk assessment, check if you need to carry out a sequential test (<https://www.gov.uk/guidance/flood-risk-assessment-the-sequential-test-for-applicants>). A sequential test compares your proposed site with other available sites to show which one has the lowest flood risk.

You need to carry out a sequential test if one hasn't already been done for the type of development you plan for your proposed site - check with your local planning authority

(http://www.planningportal.gov.uk/wps/portal/genpub_LocalInformation).

What to include in your assessment

For all developments covered by standing advice, you must put together a flood risk assessment which includes:

- your site address
- a description of your development
- an assessment of the flood risk for your development (consider all sources of flooding not just rivers and the sea and include an allowance for climate change (<https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances>))
- the estimated flood level for your development, ie the 1 in 100 year river flood level or the 1 in 200 year tidal flood level
- details of your flood resilience and resistance plans
- any supporting plans and drawings
- any information the relevant standing advice tells you to include

You may be able to get the estimated flood level from the Environment Agency or your local planning authority. If not, you'll need a flood risk specialist to calculate this for you.

Your written flood risk assessment can be in any format, but must include the relevant plans, surveys and assessments. Check with your local planning authority if they have any specific software requirements, eg for producing detailed hydraulic models.

Minor extensions standing advice

You need to provide a plan showing the finished floor levels and the estimated flood levels.

Make sure that floor levels are either no lower than existing floor levels or 300 millimetres (mm) above the estimated flood level. If your floor levels aren't going to be 300mm above existing flood levels, you need to check with your local planning authority if you also need to take flood resistance and resilience (<https://www.gov.uk/flood-risk-assessment-in-flood-zones-2-and-3#extra-flood-resistance-and-resilience-measures>) measures.

State in your assessment all levels in relation to Ordnance Datum (the height above average sea level). You may be able to get this information from the Ordnance Survey (<http://www.ordnancesurvey.co.uk/>). If not, you'll need to get a land survey carried out by a qualified surveyor.

Your plans need to show how you've made efforts to ensure the development won't be flooded by surface water runoff, eg. by diverting surface water away from the property or by using flood gates.

If your minor extension is in an area with increased flood risk as a result of multiple minor extensions in the area, you need to include an assessment of the off-site flood risk. Check with your local planning authority if this applies to your development.

Make sure your flood resistance and resilience plans are in line with the guidance on improving the flood performance of new buildings (<https://www.gov.uk/government/publications/flood-resilient-construction-of-new-buildings>).

Vulnerable developments standing advice

For all relevant vulnerable developments (ie more vulnerable, less vulnerable and water compatible), you must follow the advice for:

- surface water management
- access and evacuation
- floor levels

Surface water management

Your plans for the management of surface water need to meet the requirements set out in either your local authority's:

- surface water management plan where available
- strategic flood risk assessment (<https://www.gov.uk/guidance/local-planning-authorities-strategic-flood-risk-assessment>)

They also need to meet the requirements of the approved building regulations Part H: drainage and water disposal (<https://www.gov.uk/government/policies/providing-effective-building-regulations-so-that-new-and-altered-buildings-are-safe-accessible-and-efficient/supporting-pages/approved-documents>). Read section H3 rainwater drainage.

You need to get planning permission (<https://www.gov.uk/planning-permission-england-wales/when-you-need-it>) to use a material that can't absorb water (eg impermeable concrete) in a front garden larger than 5 square metres.

Access and evacuation

You need to provide details of your emergency escape plans for any parts of a building that are below the estimated flood level.

Make sure that your plans show:

- single storey buildings or ground floors that don't have access to higher floors can access a space above the estimated flood level, eg higher ground nearby
- basement rooms have clear internal access to an upper level, eg a staircase
- occupants can leave the building if there's a flood and there's enough time for them to leave after flood warnings (<https://www.gov.uk/check-if-youre-at-risk-of-flooding>)

Floor levels

You need to provide both the:

- average ground level of your building
- finished floor level of the lowest habitable room in your building

Ground floor levels should be a minimum of whichever is higher of:

- 300millimetres (mm) above the general ground level of the site
- 600mm above the estimated river or sea flood level

State in your assessment all levels in relation to Ordnance Datum (also known as height above average sea level). You may be able to get this information from the Ordnance Survey (<http://www.ordnancesurvey.co.uk/>). If not, you'll need to get a land survey carried out by a qualified surveyor.

If you can't raise floor levels above the estimated flood level, you need to consider extra flood resistance and resilience (<https://www.gov.uk/flood-risk-assessment-in-flood-zones-2-and-3#extra-flood-resistance-and-resilience-measures>).

Submit your flood risk assessment

Submit your completed flood risk assessment with your planning application (<http://www.planningportal.gov.uk/planning/applications>) to your local planning authority (http://www.planningportal.gov.uk/wps/portal/genpub_LocalInformation).

They'll review your flood risk assessment and tell you if it's satisfactory. Planning applications that don't have a satisfactory flood risk assessment may be refused.

Contact the Environment Agency

Environment Agency

PO Box 544

Rotherham
Yorkshire
S60 1BY

Emailenquiries@environment-agency.gov.uk

Monday to Friday, 8am to 6pm 0370 8506 506

From outside the UK +44 1709 389 201

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From: Environment Agency (<https://www.gov.uk/government/organisations/environment-agency>)
Department for Environment, Food & Rural Affairs
(<https://www.gov.uk/government/organisations/department-for-environment-food-rural-affairs>)



- [Home \(https://www.gov.uk/\)](https://www.gov.uk/)

Guidance

Flood risk assessment in flood zones 2 and 3

From: Environment Agency (<https://www.gov.uk/government/organisations/environment-agency>) and Department for Environment, Food & Rural Affairs (<https://www.gov.uk/government/organisations/department-for-environment-food-rural-affairs>)

First published: 1 April 2012

Applies to: England

How to carry out a flood risk assessment so that you can complete your planning application.

Contents

- Research your development site
- Plans
- Surveys
- Assessments
- Extra flood resistance and resilience measures
- Submit your flood risk assessment
- Contact the Environment Agency

You need to complete a flood risk assessment as part of your planning application if your development is in flood zone 2 or 3 (<http://planningguidance.planningportal.gov.uk/blog/guidance/flood-risk-and-coastal-change/flood-zone-and-flood-risk-tables/table-1-flood-zones/>).

Find out what flood zone you're in (http://maps.environment-agency.gov.uk/wiyby/wiybyController?x=357683.0&y=355134.0&scale=1&layerGroups=default&ep=map&textonly=off&lang=_e&topic=floodmap).

If your development is in flood zone 2 or 3 and is either a minor extension or is classed as vulnerable, you may need to read the standing advice (<https://www.gov.uk/guidance/flood-risk-assessment-standing-advice>) instead.

Read flood risk assessment for planning applications (<https://www.gov.uk/guidance/flood-risk-assessment-for-planning-applications>) if you're not sure if this guidance applies to you.

Your written flood risk assessment can be in any format but must include the relevant plans, surveys and assessments. Check with your local planning authority if they have any specific software requirements, eg for producing detailed hydraulic models.

Research your development site

Contact the following organisations for information about flood risk in your area:

- Environment Agency
- Internal Drainage Board (http://www.ada.org.uk/idb_members_map.html)
- your lead local flood authority - contact your local council (<https://www.gov.uk/find-your-local-council>) to find out who this is

Contact your local planning authority

(http://www.planningportal.gov.uk/wps/portal/genpub_LocalInformation) or check the planning section of their website for their strategic flood risk assessment (<https://www.gov.uk/guidance/local-planning-authorities-strategic-flood-risk-assessment>) if one has been adopted as part of the local plan (<http://planningguidance.planningportal.gov.uk/blog/guidance/local-plans/local-plans-key-issues/>). Refer to the strategic flood risk assessment in your own flood risk assessment.

Check if your development is within 20 metres (m) of a main river ([http://maps.environment-agency.gov.uk/wiyby/wiybyController?](http://maps.environment-agency.gov.uk/wiyby/wiybyController?x=357683.0&y=355134.0&scale=1&layerGroups=default&ep=map&textonly=off&lang=_e&topic=floodmap)

[x=357683.0&y=355134.0&scale=1&layerGroups=default&ep=map&textonly=off&lang=_e&topic=floodmap](http://maps.environment-agency.gov.uk/wiyby/wiybyController?x=357683.0&y=355134.0&scale=1&layerGroups=default&ep=map&textonly=off&lang=_e&topic=floodmap)).

Ask the Environment Agency for advice if it is.

Check if you need to do a sequential test

Before you start a flood risk assessment, check if you need to carry out a sequential test (<https://www.gov.uk/guidance/flood-risk-assessment-the-sequential-test-for-applicants>). A sequential test compares your proposed site with other available sites to show which one has the lowest flood risk.

You need to carry out a sequential test if one hasn't already been done for the type of development you plan for your proposed site - check with your local planning authority

(http://www.planningportal.gov.uk/wps/portal/genpub_LocalInformation).

If the sequential test shows there aren't suitable alternative sites, you may need to carry out an exception test. The exception test (<https://www.gov.uk/flood-risk-assessment-the-sequential-test-for-applicants#exception-test>) shows how you'll manage flood risk on and off the site.

You'll need to carry out an exception test if your development is:

- highly vulnerable and in flood zone 2
- essential infrastructure in flood zone 3a or 3b
- more vulnerable in flood zone 3a

Plans

You need to provide a location plan showing:

- street names
- any rivers, streams, ponds, wetlands or other bodies of water
- other geographical features, eg railway lines or local landmarks such as schools or churches

You can buy a location plan from the Ordnance Survey (<http://www.ordnancesurvey.co.uk/>).

You also need to provide a site plan showing:

- the existing site
- your development proposal
- any structures that could affect water flow, eg bridges, embankments

Surveys

You need to provide surveys showing

- the existing site levels and the levels of your proposed development
- a cross-section of the site showing finished floor or road levels and any other levels that inform the flood risk, eg existing raised banks and flood defence walls

You may also need to show your site in relation to its surroundings - contact your local planning authority to check if you need to do this.

Site levels need to be stated in relation to the Ordnance Datum (the height above average sea level). You may be able to find Ordnance Datum information from the Ordnance Survey (<http://www.ordnancesurvey.co.uk/>). If not, you'll need to get a land survey carried out by a qualified surveyor.

Assessments

You should consider the following aspects of flood risk in your assessment.

Assess flood risk

Assess what the risk would be to your development if there was a flood. Consider flooding from other sources (eg surface water drains, a canal) as well as from rivers and the sea and include an allowance for climate change (<https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances>).

State in your assessment the estimated level for your site, ie the 1 in 100 year river flood level or the 1 in 200 year tidal flood level.

You may be able to get this from the Environment Agency or your local planning authority. If not, you'll need a flood risk specialist to calculate this for you.

You need to include an estimate of the:

- duration of a flood
- rate of surface water runoff
- order in which areas of the site would be flooded
- consequences for people living on or using the site

You should also provide details of past floods where this information is available. Contact:

- Environment Agency
- Internal Drainage Board (http://www.ada.org.uk/idb_members_map.html)
- your lead local flood authority - contact your local council (<https://www.gov.uk/find-your-local-council>) to find out who this is
- your local planning authority (http://www.planningportal.gov.uk/wps/portal/genpub_LocallInformation)

Assess surface water runoff

You need to assess surface water runoff from the site and provide:

- an estimate of how much surface water runoff (excess water that flows over surfaces) your development will generate - both the volume and the rate of the runoff
- details of the existing methods for managing surface water runoff, eg drainage to a sewer
- your plans for managing surface water and for making sure there's no increase in the level of surface water runoff

Surface water runoff describes flooding from sewers, drains, groundwater, and runoff from land, small water courses and ditches that occurs as a result of heavy rainfall.

Make sure your plans for managing surface water are in line with:

- guidance on managing surface water runoff in your local planning authority's strategic flood risk assessment (<https://www.gov.uk/guidance/local-planning-authorities-strategic-flood-risk-assessment>)
- guidance from your lead local flood authority
- sustainable drainage principles (<http://www.susdrain.org/delivering-suds/using-suds/suds-principles/suds-principals.html>)

Managing the flood risk

You need to state in your assessment:

- details of existing flood resistance and resilience measures on your site - ask the Environment Agency or your lead local flood authority about these
- the capacity of drains or sewers (existing and proposed) on your site - ask your local water company about this

State how your proposed design will reduce flood risk. Include details of how people will leave buildings during a flood and an explanation of how:

- raised flood embankments or changes to ground levels could affect water flow
- your development could affect rivers and their floodplain or coastal areas

Also explain what the residual risks will be to your site after any necessary flood defences have been built and how you plan to manage these risks.

Check if you need to carry out extra flood resistance and resilience measures to reduce flood risk and state this in your assessment if so.

Developments on or near main rivers

State in your assessment if you need Environment Agency flood defence consent (<https://www.gov.uk/government/publications/flood-defence-consent-england-and-wales>) and if you've applied for it if so.

Sites within the functional flood plain

If your site falls within the functional flood plain (land where water has to flow or be stored in times of flood), you need to state this.

Only water compatible (<http://planningguidance.planningportal.gov.uk/blog/guidance/flood-risk-and-coastal-change/flood-zone-and-flood-risk-tables/table-2-flood-risk-vulnerability-classification/>) developments or essential infrastructure (<http://planningguidance.planningportal.gov.uk/blog/guidance/flood-risk-and-coastal-change/flood-zone-and-flood-risk-tables/table-2-flood-risk-vulnerability-classification/>) developments that have met the requirements of the exception test (<http://planningguidance.planningportal.gov.uk/blog/guidance/flood-risk-and-coastal-change/flood-zone-and-flood-risk-tables/table-3-flood-risk-vulnerability-and-flood-zone-compatibility/>) are allowed in the functional floodplain.

Show that any water compatible or essential infrastructure developments have been designed to:

- stay safe and operational during a flood
- avoid blocking water flows or increasing flood risk elsewhere
- avoid loss of floodplain storage (ie loss of land where flood waters used to collect)

Extra flood resistance and resilience measures

Areas at little or no risk of flooding from any source should always be developed in preference to areas at higher risk. You must make every effort to locate your development in an area that has little or no risk of flooding.

When developments can't be located in a lower flood risk area, you need to consider flood resistance and resilience measures if you can't raise your development's ground floor levels above the estimated flood level for the site.

Which flood resistance and resilience measures you need to take depends on the estimated depth in metres (m) that flood water will reach in your building.

State that you have met the necessary requirements in your flood risk assessment.

Water depth up to 0.3m

Design your building or development to keep water out as much as possible. Do this by using materials that have low permeability (ie materials that water can't pass through such as impermeable concrete).

Water depth from 0.3m to 0.6m

Design your building or development to keep water out (unless there are structural concerns) by:

- using materials with low permeability to at least 0.3m
- using flood resilient materials (eg lime plaster) and design (raised electrical sockets)
- making sure there's access to all spaces to enable drying and cleaning

Water depth above 0.6m

Design your building or development to allow water to pass through the property to avoid structural damage by:

- using materials with low permeability to at least 0.3m
- making it easy for water to drain away after flooding
- making sure there's access to all spaces to enable drying and cleaning

Submit your flood risk assessment

Submit your completed flood risk assessment with your planning application (<http://www.planningportal.gov.uk/planning/applications/>) to your local planning authority (http://www.planningportal.gov.uk/wps/portal/genpub_LocallInformation).

They'll review your flood risk assessment and tell you if it's satisfactory.

Planning applications that don't have a satisfactory flood risk assessment may be refused.

Contact the Environment Agency

Environment Agency

PO Box 544

Rotherham
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S60 1BY

Emailenquiries@environment-agency.gov.uk

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From outside the UK +44 1709 389 201

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(<https://www.gov.uk/government/organisations/department-for-environment-food-rural-affairs>)

Route to this page -->Step by Step-->non-res < 250m2-->No culvert/20m-->Flood Zone 2

Restart

Print Form

Householder and other minor extensions in Flood Zones 2 and 3

This guidance is for domestic extensions and non-domestic extensions where the additional footprint created by the development does not exceed 250 sq. metres. It should NOT be applied if an additional dwelling is being created, e.g. a self contained annex. In this instance consult the Environment Agency.

We recommend that:

Planning Authorities:

- 1) Refer the applicant to the standing advice pages on the Environment Agency website or provide them with a copy of this page for them to include as part of the planning application submission.
- 2) Check the planning application to ensure that one or other of the mitigation measures from the table below has been incorporated.

Applicants:

Complete the table below and include it with the planning application submission. The table, together with the supporting evidence, will form the Flood Risk Assessment (FRA) and will act as an assurance to the Local Planning Authority (LPA) that flood risk issues have been adequately addressed.

Applicant to choose one or other of the flood mitigation measures below	Applicant to provide the LPA with the supporting information detailed below as part of their FRA	Applicant to indicate their choice in the box below. Enter 'yes' or 'no'
Either ; Floor levels within the proposed development will be set no lower than existing levels AND, flood proofing of the proposed development has been incorporated where appropriate.	Details of any flood proofing / resilience and resistance techniques, to be included in accordance with 'Improving the flood performance of new buildings' CLG (2007)	YES
Or; Floor levels within the extension will be set 300mm above the known or modelled 1 in 100 annual probability river flood (1%) or 1 in 200 annual probability sea flood (0.5%) in any year. This flood level is the extent of the Flood Zones	This must be demonstrated by a plan that shows finished floor levels relative to the known or modelled flood level. All levels should be stated in relation to Ordnance Datum ¹	

Subterranean/basement extensions

Due to the risk of rapid inundation by floodwater basements should be avoided in areas at risk of flooding. The LPA may hold additional guidance for basement extensions.

Self-contained basement dwellings are 'highly vulnerable' development and should not be permitted in Flood Zone 3. We are opposed to these developments.

Continued...

¹ Ordnance Datum or the abbreviation 'OD' is the mean level of the sea at Newlyn in Cornwall from which heights above sea level are taken. The contour lines on Ordnance Survey maps measure heights above OD for example, though these are not accurate enough for a flood risk assessment..

Cumulative impact of minor extensions and the removal of Permitted Development rights.

There is potential for cumulative impact of minor extensions to have a significant effect on flood risk. Where local knowledge (Strategic Flood Risk Assessment held by the LPA/information provided by the parish council) suggests this is the case the guidance contained in FRA guidance note 2 should be applied. FRA guidance note 2 can also be applied where permitted development rights have been removed for flood risk reasons. The Environment Agency does not usually comment on minor development in this category.

Permeable paving and changes to permitted development rights for householders

On the 1st October 2008 the General Permitted Development Order (GPDO) in England was amended by the Government (Statutory Instrument 2008 No. 2362).

One of the changes introduced by the GPDO amendment is the removal of permitted development rights for householders wishing to install hard surfacing in front gardens which exceeds 5sq. metres (i.e. 1m x 5 m) without making provision to ensure permeability. This means that use of traditional materials, such as impermeable concrete, where there is no facility in place to ensure permeability, requires an application for planning permission.

In order to help and advise householders of the options for achieving permeability and meeting the condition for permitted development status the Department for Communities and Local Government (CLG) has produced guidance on permeable paving which can be found on the following link <http://www.communities.gov.uk/publications/planningandbuilding/pavingfrontgardens>

The Environment Agency supports the GDPO amendment as it is in line with the recommendations of the Pitt Report regarding the need to better tackle the impact of surface water flooding. However, Local Planning Authorities should determine these applications in accordance with the CLG guidance **without** consulting the Environment Agency.

End of comment

Personal flood plan

Name



Are you signed up to receive flood warnings?
If not call Floodline on 0345 988 1188 to see if your area receives free flood warnings.

Let us know when you've completed your flood plan by calling Floodline on **0345 988 1188**. This will help us learn more about how people are preparing for flooding.

General contact list	Company name	Contact name	Telephone
Floodline	Environment Agency		0345 988 1188
Electricity provider			
Gas provider			
Water company			
Telephone provider			
Insurance company and policy number			
Local council			
Local radio station			
Travel/weather info			

Key locations

Service cut-off	Description of location
Electricity	
Gas	
Water	

Who can help/who can you help?

Relationship	Name	Contact details	How can they/you help?
Relative			
Friend or neighbour			

Be prepared for flooding. Act now

Personal flood plan

What can I do NOW?



<input type="checkbox"/>	Put important documents out of flood risk and protect in polythene	<input type="checkbox"/>	Look at the best way of stopping floodwater entering your property	<input type="checkbox"/>	Identify what you would need to take with you if you had to leave your home
<input type="checkbox"/>	Check your insurance covers you for flooding	<input type="checkbox"/>	Make a flood plan and prepare a flood kit	<input type="checkbox"/>	Understand the flood warning codes

What can you do if a flood is expected in your area?

Actions	Location
Home	
<ul style="list-style-type: none"> ● Move furniture and electrical items to safety ● Put flood boards, polythene and sandbags in place ● Make a list now of what you can move away from the risk ● Turn off electricity, water and gas supplies ● Roll up carpets and rugs ● Unless you have time to remove them hang curtains over rods ● Move sentimental items to safety ● Put important documents in polythene bags and move to safety 	
Garden and outside	
<ul style="list-style-type: none"> ● Move your car out of the flood risk area ● Move any large or loose items or weigh them down 	
Business	
<ul style="list-style-type: none"> ● Move important documents, computers and stock ● Alert staff and request their help ● Farmers move animals and livestock to safety 	
Evacuation - Prepare a flood kit in advance	
<ul style="list-style-type: none"> ● Inform your family or friends that you may need to leave your home ● Get your flood kit together and include a torch, warm and waterproof clothing, water, food, medication, toys for children and pets, rubber gloves and wellingtons 	

There are a range of flood protection products on the market to help you protect your property from flood damage. A directory of these is available from the **National Flood Forum** at www.bluepages.org.uk

Be prepared for flooding. Act now