

# Flood Risk Assessment

For the proposed re-development at  
Waterperry Court, Middleton Road,  
Banbury, OX16 4QD

Prepared by

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Innervision Design Ltd

Updated October 2021



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# 1 Executive Summary

- A. The vulnerability classification of the building changes from “Less Vulnerable” to “More Vulnerable”.
- B. The site lies, in part, in defended Flood Zones 2 and 3.
- C. Safe access and egress routes are immediately available and the site will be signed up to flood warning schemes.
- D. The re-development does not impact on flood risk elsewhere.
- E. The re-development of the site to a hotel is considered acceptable as long as the mitigation, warning and evacuation procedures can be maintained over the lifetime of the development.

## 2 Introduction

### 2.1 Site location

The project is at Waterperry Court, Middleton Road, Banbury, OX16 4QD, see Figure 1.

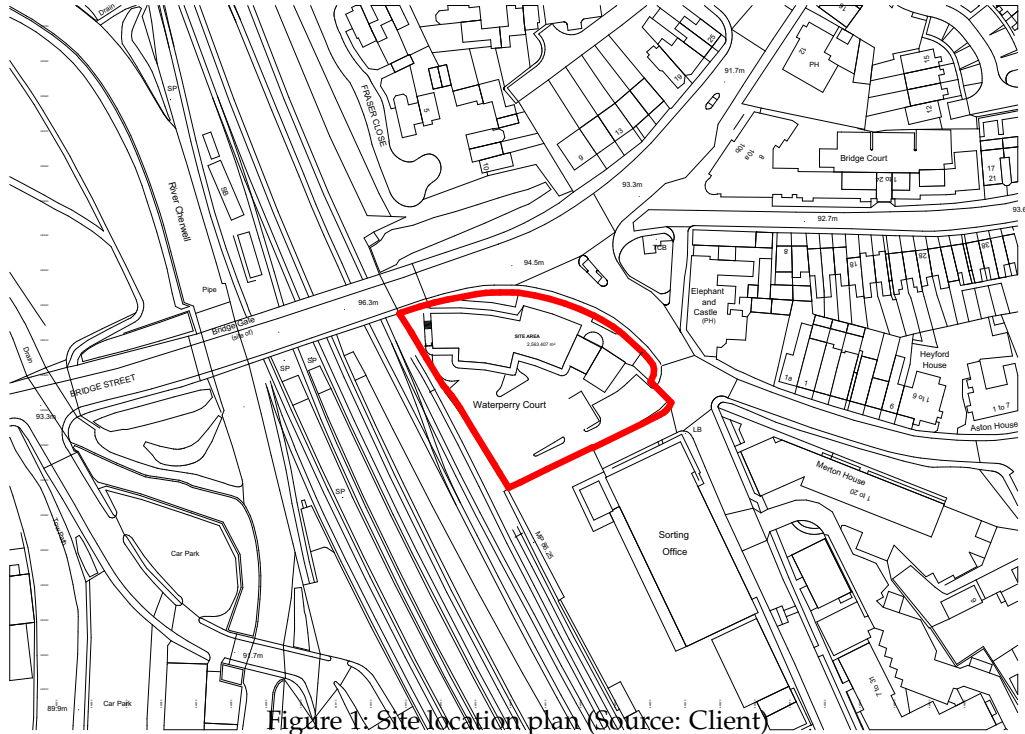
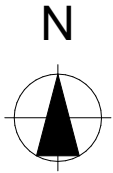


Figure 1: Site location plan (Source: Client)

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Site Area: 2,563.407 m<sup>2</sup> / 0.256 HA

### EXISTING LOCATION PLAN - SCALE 1:1250 @ A3

Rev	Date	Drawing Revision	By	Chk

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### 2.2 Proposed development description

All proposal plans and documents as submitted under separate cover.

### Preliminary Issue

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project: Waterperry Court, Banbury  
 drawing: Existing Location Plan  
 drawn by: MM checked:  
 scale: 1:1250 @ A3 date: 09.07.20

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## 3 Policies

In preparation for this Flood Risk Assessment (FRA), National Planning Policy Framework<sup>[3]</sup> and British Standards on Assessing and Managing Flood Risk<sup>[1]</sup> were reviewed, and their related policies were referred to in this report.

Furthermore, the Environment Agency have been consulted in order to establish the flood zone of the proposed site.

In addition, planning policies from the local authority were also reviewed including its Strategic Flood Risk Assessment.

Some of key planning policies and comments are summarised as below.

### **3.1 National Planning Policy Framework (NPPF)**

A site-specific flood risk assessment should be provided for all development in Flood Zones 2 and 3. In Flood Zone 1, an assessment should accompany all proposals involving: sites of 1 hectare or more; land which has been identified by the Environment Agency as having critical drainage problems; land identified in a strategic flood risk assessment as being at increased flood risk in future; or land that may be subject to other sources of flooding, where its development would introduce a more vulnerable use.

#### **3.1.1 Paragraph 162 - Sequential test**

The aim of the Sequential Test is to steer new development to areas with the lowest probability of flooding. Development should not be allocated or permitted if there are reasonably available sites appropriate for the proposed development in areas with a lower probability of flooding. The Strategic Flood Risk Assessment will provide the basis for applying this test. A sequential approach should be used in areas known to be at risk from any form of flooding.

#### **3.1.2 Paragraph 167**

When determining planning applications, local planning authorities should ensure flood risk is not increased elsewhere and only consider development appropriate in areas at risk of flooding where, informed by a site-specific flood risk assessment following the Sequential Test, and if required the Exception Test, it can be demonstrated that:

- within the site, the most vulnerable development is located in areas of lowest flood risk unless there are overriding reasons to prefer a different location;
- the development is appropriately flood resilient and resistant;
- it incorporates sustainable drainage systems, unless there is clear evidence that this would be inappropriate;
- any residual risk can be safely managed; and
- safe access and escape routes are included where appropriate, as part of an agreed emergency plan.



### 3.2 Environment Agency Guidance on More Vulnerable development up to 1ha in size in Flood Zone 3

Planning applications must be accompanied by a site-specific Flood Risk Assessment (FRA). The FRA should include information listed below:

- Flood level for the 1 in 100 annual probability river flood (1%); or 1 in 200 annual probability sea flood (0.5%) in any year (including an allowance for climate change) in relation to Ordnance Datum (Newlyn)
- Average ground level of the site in relation to Ordnance Datum (Newlyn)
- Finished floor level of lowest habitable room in relation to Ordnance Datum (Newlyn)
- 1 in 1000 annual probability (0.1%) in any year flood level including an allowance for climate change where this information is available.
- To indicate that surface water will be managed in accordance with the following standards:
  - Specific requirements for managing surface water set out in an adopted Strategic Flood Risk Assessment and/or Surface Water Management Plan produced by the Local Planning Authority.
  - Surface water run-off will be controlled to ensure no flooding of property and no increase in surface water run-off from the site to a watercourse or receiving water body compared to the existing pre-application run-off rate in a 1 in 100 year storm event (1% chance in any one year) plus an appropriate allowance for climate change.
  - Meets the requirements of Approved Document Part H of Building Regulations 2012.
- Flood resilience and resistance: to indicate that flood resilience/resistance and emergency escape measures/procedures have been incorporated where possible. This applies to any part of the building (e. g. basements), that are situated below the 1 in 100 annual probability river flood (1%); or 1 in 200 annual probability sea flood (0.5%) level in any year (including an allowance for climate change).
- Other sources of flooding (not rivers or the sea): to indicate that the SFRA has been referred to and that the recommendations regarding other sources of flooding have been incorporated into the application.

All flood management measures will need to be supported by plans and drawings that form part of the FRA.

### 3.3 Local Policy ESD 6

The Council will manage and reduce flood risk in the District through using a sequential approach to development; locating vulnerable developments in areas at lower risk of flooding. Development proposals will be assessed according to the sequential approach and where necessary the exceptions test as set out in the NPPF and NPPG. Development will only be permitted in areas of flood risk when there are no reasonably available sites in areas of lower flood risk and the benefits of the development outweigh the risks from flooding. In addition to safeguarding floodplains from development, opportunities will be sought to restore natural river flows and floodplains, increasing their amenity and biodiversity value. Building over or culverting of watercourses should be avoided and the removal of existing culverts will be encouraged. Existing flood defences will be protected from damaging development and where development is considered appropriate in areas protected by such defences it must allow for the maintenance and management of the defences and be designed to be resilient to flooding. Site specific flood risk assessments will be required to accompany development proposals in the following situations:

- All development proposals located in flood zones 2 or 3
- Development proposals of 1 hectare or more located in flood zone 1
- Development sites located in an area known to have experienced flooding problems
- Development sites located within 9m of any watercourses.

Flood risk assessments should assess all sources of flood risk and demonstrate that:

- There will be no increase in surface water discharge rates or volumes during storm events up to and including the 1 in 100 year storm event with an allowance for climate change (the design storm event)
- Developments will not flood from surface water up to and including the design storm event or any surface water flooding beyond the 1 in 30 year storm event, up to and including the design storm event will be safely contained on site.

Development should be safe and remain operational (where necessary) and proposals should demonstrate that surface water will be managed effectively on site and that the development will not increase flood risk elsewhere, including sewer flooding.

## **4 Flood risk analysis**

### **4.1 Sequential test**

This is an existing building hence the sequential test is deemed to have been passed.

### **4.2 Sources of potential flooding**

Flood risk from various sources at the site is analysed in this section. It is concluded that the primary flooding risk at the site is fluvial from a tributary of the River Cherwell.

#### **4.2.1 Flood risk from sea and rivers**

Flooding can occur from the sea due to a particularly high tide or surge, or combination of both.

The site is not at risk from tidal flooding.

Flooding can also take place from flows that are not contained within the channel due to high levels of rainfall in the catchment.

With reference to the Environment Agency Flood Mapping data, Figures 2 and 3, parts of the proposed site to the rear lay in areas classed as Flood Zones 2 and 3. This means that the part of the proposed site has high probability from river flooding (greater than a 1 in 100 annual probability of river flooding in any year). While it noted that the remainder of the site is outside of the defined flood zones the worst case flood Zone applies to the site as a whole and in this instance that is Flood Zone 3.

Site levels are then used against predicted design period, 1 in 100yr +CC, flood levels to determine the risks and residual risks to the building as a whole.

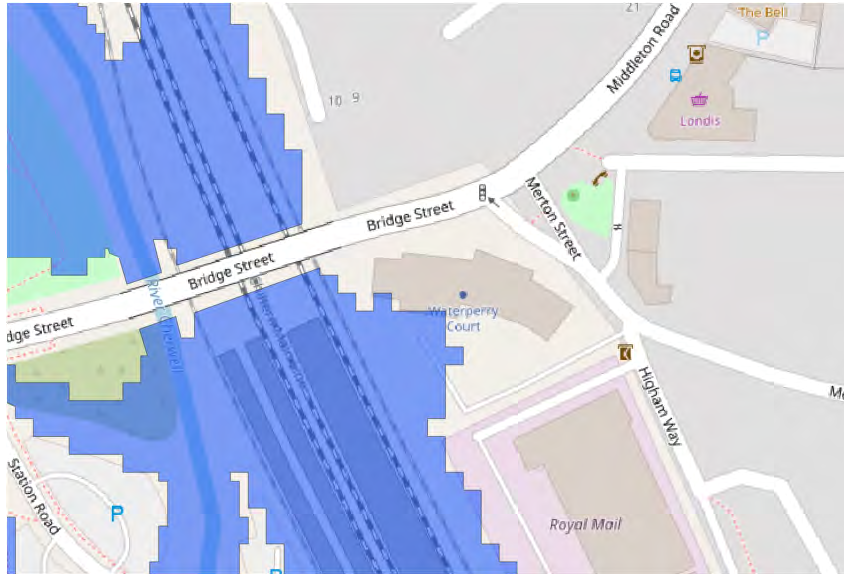


Figure 2: Site location relative to flood zone 3, an area with greater than a 1 in 100 annual probability of flooding in any one year (Source: EA online flood data).



Figure 3: Site location relative to flood zone 2, an area with a 1 in 100yr to 1 in 1000yr annual probability of flooding in any one year (Source: EA online flood data).

#### 4.2.2 Defences

With reference to the EA provided data, as at Appendix A, the site is noted to be protected to the 1 in 200yr standard by the Banbury Flood Alleviation Scheme.

### **4.2.3 Flood risk from sewer and highway drains**

Flooding occurs when combined, foul or surface water sewers and highway drains are temporarily over-loaded due to excessive rainfall or due to blockage.

There is no documented evidence of flood risk from highway drainage or sewage networks at the proposed site.

Hence, the risk of sewer and highway flooding to the site can be considered to be Low.

### **4.2.4 Flood risk from groundwater**

Groundwater flooding occurs when water levels in the ground rise above surface levels. It is most common in low-lying areas underlain by permeable rock (aquifers), usually due to extended periods of wet weather.

With reference to SFRA from the Council, the flood risk from ground water in the area is low. The site has no documented evidence of flood risk from ground water however this may manifest as surface water flooding.

### **4.2.5 Flooding risk from surface water**

Flooding occurs when combined, foul or surface water drains are temporarily over-loaded due to excessive rainfall or due to blockage.

Part of the site is in an area at a High risk from surface water flooding, Figure 4 with flood depths to 900mm for the 1 in 100yr event.

This corresponds to an area shown on the site level survey to be circa 1m lower than the central area of the car park as extract at Figure 5.

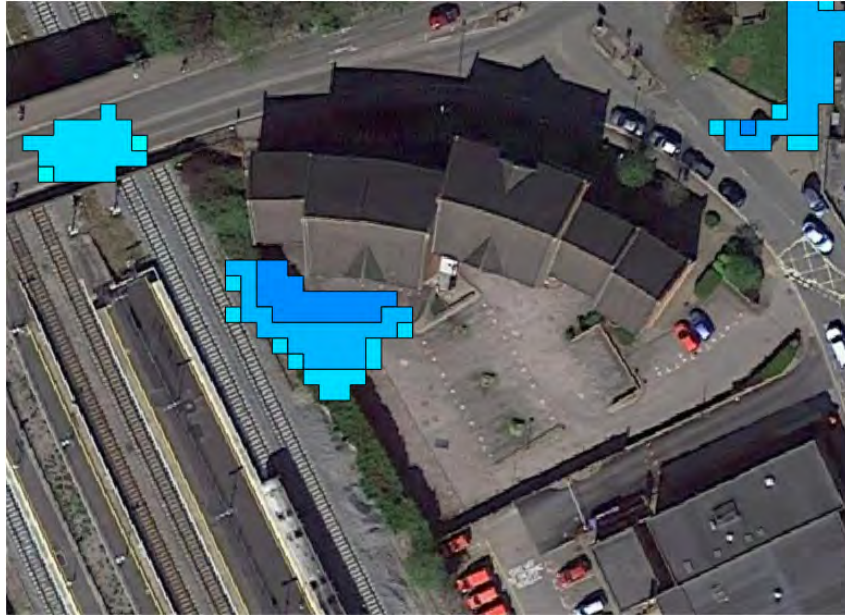


Figure 4: Site location relative to 1 in 100yr surface water flood risk area (Sources: EA RoSWF data overlain on Google mapping)

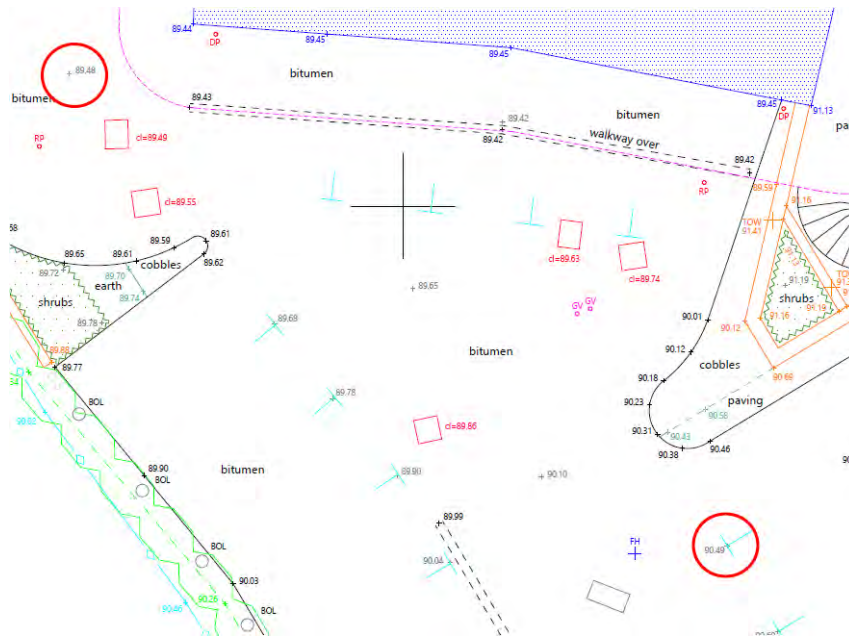


Figure 5: Spot levels from site, as highlighted, showing a circa 1m reduced ground level in the area shown to be at risk from surface water flooding





#### 4.2.9 SuDS Statement

Surface water for the development will be managed in full alignment with the SuDS hierarchy as required under provisions made under the Town and Country Planning Act 1990.

While not required for Planning permission consent it can be confirmed that all SW on site will be also be designed, installed and tested in full accordance with Part H of the Building Regulations 2010 (as amended 2013), Requirement H3, as made under the Building Act 1984.

A drainage strategy will be submitted under separate cover.

#### 4.2.10 Impact on flood risk elsewhere

Since the proposal is intending to manage any additional surface water at source and the run-off is not increased the impact on flood risk elsewhere is Low.

### 4.3 Flood risk vulnerability and flood zone “compatibility”

Flood risk vulnerability classification (see table 2)		Essential infrastructure	Water compatible	Highly vulnerable	More vulnerable	Less vulnerable
Flood zone (see table 1)	Zone 1	✓	✓	✓	✓	✓
	Zone 2	✓	✓	Exception Test required	✓	✓
	Zone 3a	Exception Test required	✓	✗	Exception Test required	✓
	Zone 3b functional floodplain	Exception Test required	✓	✗	✗	✗

**Key:** ✓ Development is appropriate.  
✗ Development should not be permitted.

Figure 7: Flood risk vulnerability and flood zone compatibility<sup>[2]</sup>

With reference to Figure 7, the proposed re-development of the site changes the vulnerability classification of the building from “Less Vulnerable” to “More Vulnerable”. This is still considered to be appropriate development subject to a site specific FRA.

## **5 Levels**

### **5.1 Floor level data**

Refer to site level survey at Appendix B. Levels are found to be:

External ground levels down to 89.42m AOD to the rear and as high as 95.5m AOD to the front.

Lowest internal habitable ground floor level, as designed: 91.16m AOD

### **5.2 Flood level data**

Flood level data as provided by the EA for the nearest node (1.016), see Appendix A and for nodes on the site itself, flood point 2. These data do not include revised climate change allowances.

For this site, being in the Thames River basin district, the Higher Central Allowance is considered appropriate to guide development and the Upper End allowance for sensitivity testing.

Climate change allowances of +35% & + 70% (Higher Central and Upper End to 2115) are now to be applied to the data.

#### **5.2.1 Establishing a stage to discharge relationship from EA data**

Using the data as provided by the EA a stage discharge relationship was generated, Figure 8. From this it is possible to add revised climate change allowances following the “intermediate” approach. These can then be adjusted relative to the provided site nodal data, at EA Flood Point 2, to arrive at revised flood levels relative to the site.

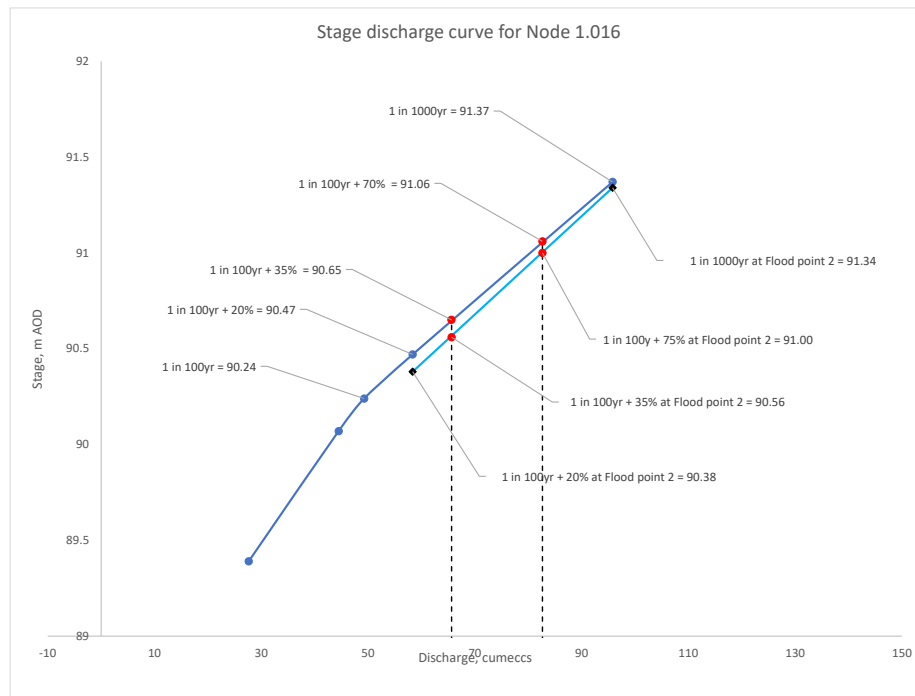


Figure 8: Stage-Discharge relation ship using EA data. Points are also plotted for the given flood point 2 nodes from which relative flood levels are established at the site.

## 5.2.2 Applying revised climate change figures

It is now possible to fit revised climate change allowances:

The 100yr Higher Central allowance is + 35% and the Upper End is 70%

The 1 in 100yr + 35% flow is found to be 65.6 cumecs giving an “in channel” flood level of 90.65m AOD.

The provided nodal data at “flood point 2” for the 1in 100yr + 20% and the 1 in 1000yr are used to establish the relationship between “in channel” flood levels and the relative flood levels at the site.

The 1 in 100yr + 35% CC allowance flood level at the site is found to be **90.56m AOD**

For sensitivity the 1 in 100 + 70% = 82.7m<sup>3</sup>s<sup>-1</sup> giving an “in channel” flood level of 91.06m AOD, see Figure 8, and site flood levels of **91.0m AOD**.

These flood levels take no account for the 1 in 200yr defences in place in line with EA requirements for assessment of flood risk.

The flood levels have previously been accepted for this site and hence, while climate change allowances have since been revised downwards<sup>1</sup> (as of July 2021) for the purpose of design those provided here remain valid.

### **5.3 Free board**

Given this site's floor levels are defined by Flood Zone 3 and the proposal is for single storey accommodation, the minimum freeboard of 600mm is appropriate.

Hence minimum FFL should be no lower than  $90.56 + 0.6 = 91.16\text{m AOD}$

The lowest habitable floor level proposed is 92.6m AOD hence OK.

For sensitivity testing, this lowest floor level provides a 1.6m freeboard over the 1 in 100yr +70% flood event.

The floor levels also provide 1.26m freeboard over the modelled 1 in 1000yr event.

### **5.4 Basement floor usage**

The use of the basement for non-habitable use is considered to be acceptable.

### **5.5 Residual Risks**

#### **5.5.1 Flood warning scheme**

Since it has been established that the site is sited in an area at flood risk the management team for the building are advised to sign up to the E.A. "Flood Warnings Direct". This is a free service providing flood warnings by phone, text or email. See <https://www.fws.environment-agency.gov.uk/app/olr/register>, or call the E.A. on 0345 988 1188 for full information.

#### **5.5.2 Safe access and egress**

The NPPF stipulates that, where required, safe access and escape routes should be available to/from new developments in flood risk areas. Access routes should be such that occupants can safely access and exit the building in design flood conditions.

The lowest level for a front main entrance/exit door is 93.7m AOD which is 2.7m above design 1 in 100yr +35% flood levels.

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<sup>1</sup>to +25% and +49% respectively

The safest exit route from the site is West along Merton Street and then West along The Causeway as Figure 9.

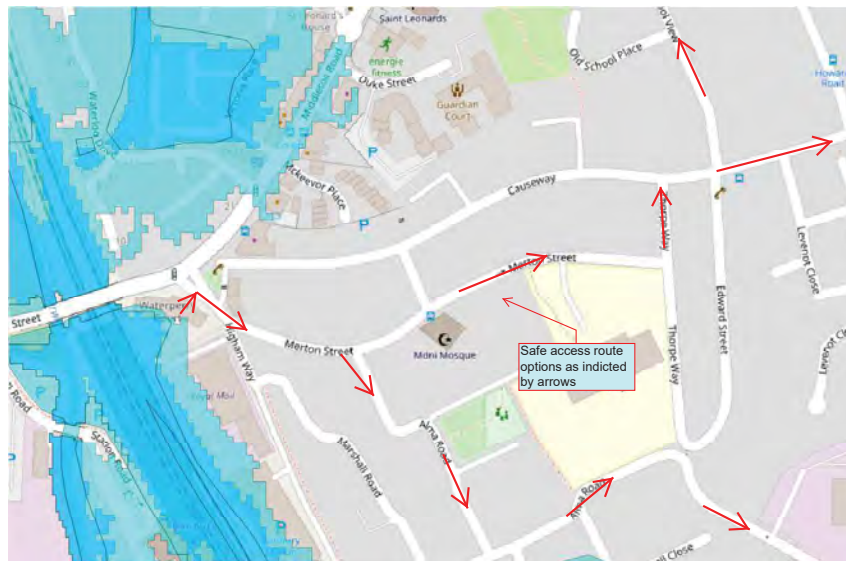


Figure 9: Safe access routes

The business flood plan will provide details of these exit routes from the local area.

### 5.5.3 Flood Plans

It is widely recommended that owners/managers of buildings are “reasonably prepared” to deal with a flooding incident. Hence the developer will provide a Flood Plan (in line with the EA guidance) for this development (See Appendix C for an example). The plan will provide guidance on emergency response procedures in the event of flooding to the site. This will:

- Provide details of who to contact and how;
- Provide details of how to turn off gas, electricity and water mains supplies;
- Provide details of designated safe egress routes out of the building and out of the local area at risk;
- Provide details of E.A. Flood warning codes;
- Provide details of local radio stations;

It is also suggested that such a plan could be saved securely on smartphones, webmail or in the cloud so that the management team can access it anywhere they can use their phone or a computer.

## 6 Conclusions

- Flood risk from all sources has been assessed.
- The site lies, in part, in Flood Zones 2 and 3.
- The site, in part, is at risk from surface water flooding.
- The building benefits from defences sufficient to defend against the 1 in 200yr flood event.
- Safe and dry access and egress is immediately available.
- The management team will be signed up to the E.A. “Flood Warnings Direct”.
- The development will be safe and can remain operational under flood conditions. A surface water strategy<sup>2</sup> will demonstrate that surface water will be managed effectively on site and that the development will not increase flood risk elsewhere, including sewer flooding. The proposal is therefore found to be compliant with Local Policy ESD6.

It is therefore considered that the proposed redevelopment is acceptable in respect to flood risk.

Signed:



Dr. R. D. Saunders CEng, C. Build E, MCABE, BEng(Hons), PhD

Date: 11<sup>th</sup> November, 2021

## References

- [1] BSI. BS 8533:2011. Technical report, 2011.
- [2] Department for Communities and Local Government. Technical guidance to the national planning policy framework. 2018.
- [3] Ministry of Housing, Communities and Local Government. National planning policy framework. 2021.

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<sup>2</sup>to be submitted under separate cover

# A EA data provided for the site



## Product 4 (Detailed Flood Risk) for Middleton Road, Banbury, OX16 4QD Our Ref: THM189269

Product 4 is designed for developers where Flood Risk Standing Advice FRA (Flood Risk Assessment) Guidance Note 3 Applies. This is:  
i) "all applications in Flood Zone 3, other than non-domestic extensions less than 250 sq metres; and all domestic extensions", and  
ii) "all applications with a site area greater than 1 ha" in Flood Zone 2.

### Product 4 includes the following information:

- Ordnance Survey 1:25k colour raster base mapping: Flood Zone 2 and Flood Zone 3;
- Relevant model node locations and unique identifiers (for cross referencing to the water levels, depths and flows table);
- Model extents showing *defended* scenarios;
- FRA site boundary (where a suitable GIS layer is supplied);
- Flood defence locations (where available/relevant) and unique identifiers; (supplied separately)
- Flood Map areas benefiting from defences (where available/relevant);
- Flood Map flood storage areas (where available/relevant);
- Historic flood events outlines (where available/relevant, not the Historic Flood Map) and unique identifiers;
- Statutory (Sealed) Main River (where available within map extents);

### A table showing:

- i) Model node XY coordinate locations, unique identifiers, and levels and flows for *defended* scenarios;
- ii) Flood defence locations unique identifiers and attributes; (supplied separately)
- iii) Historic flood events outlines unique identifiers and attributes; and
- iv) Local flood history data (where available/relevant).

### Please note:

If you will be carrying out computer modelling as part of your Flood Risk Assessment, please request our guidance which sets out the requirements and best practice for computer river modelling.

This information is based on that currently available as of the date of this letter. You may feel it is appropriate to contact our office at regular intervals, to check whether any amendments/ improvements have been made. Should you re-contact us after a period of time, please quote the above reference in order to help us deal with your query.

This information is provided subject to the enclosed notice which you should read.

This letter is not a Flood Risk Assessment. The information supplied can be used to form part of your Flood Risk Assessment. Further advice and guidance regarding Flood Risk Assessments can be found on our website at:

<https://www.gov.uk/guidance/flood-risk-assessment-local-planning-authorities>

If you would like advice from us regarding your development proposals you can complete our pre application enquiry form which can be found at:

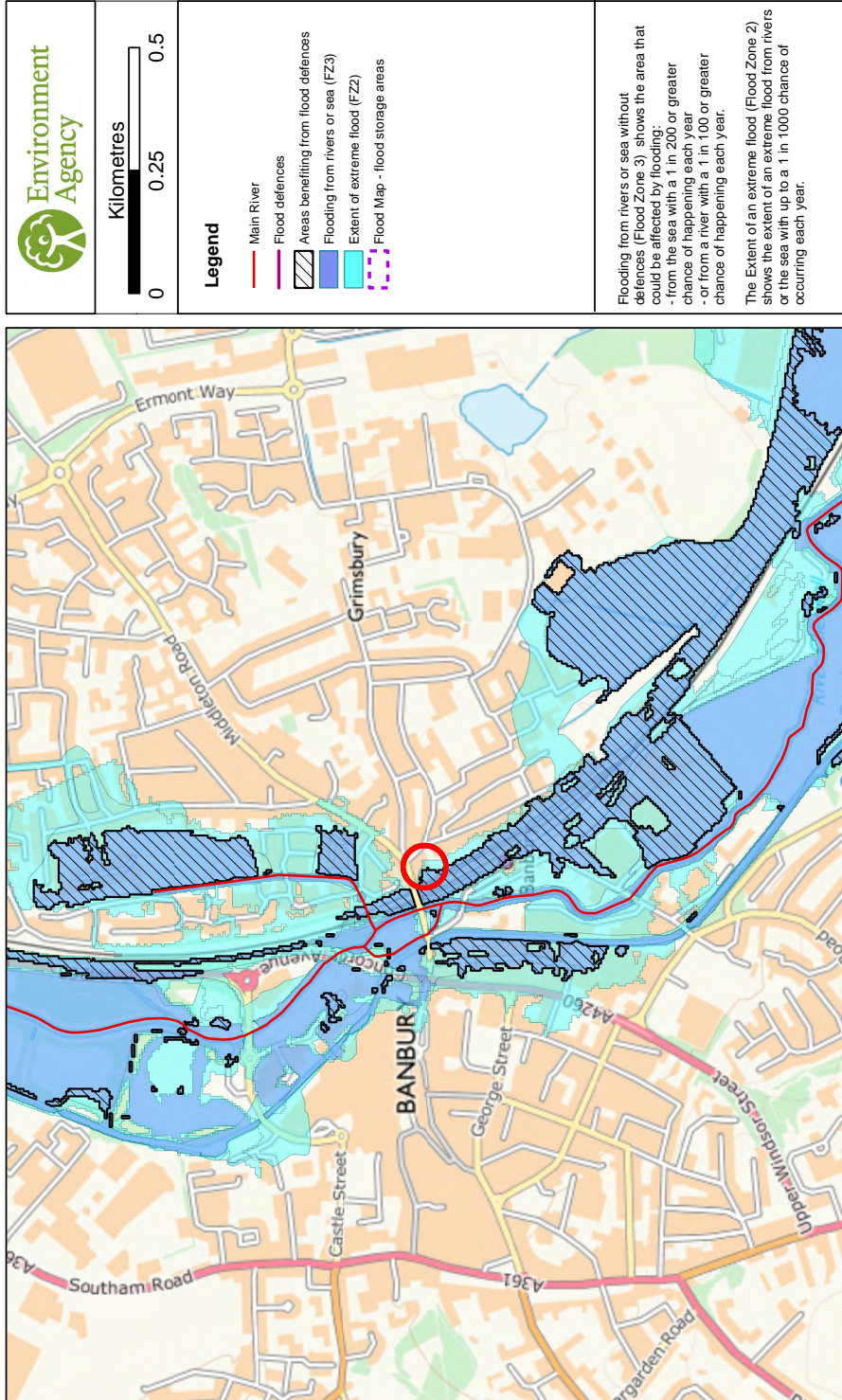
<https://www.gov.uk/government/publications/pre-planning-application-enquiry-form-preliminary-opinion>

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**Flood Map for Planning centred on Middleton Road, Banbury, OX16 4QD  
Created on 16/10/2020 REF: THM189269**



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**THM189269**

## Defence information

Defence Location: **Banbury FAS**

Description: This location is offered protection from the Banbury Flood Alleviation Scheme. This consists of a large flood storage area to the north west of the town, as well as various bunds and walls throughout the town. These are maintained by the Environment Agency and some private owners. The site will be offered up to 1 in 200 year protection (0.5% chance of occurring annually). There are no other planned defences in this area.

**Model information**

Model: **Cherwell (Banbury) 2015**

Description: The information provided is taken from the River Cherwell modelling study completed in September 2015 for the Banbury Flood Alleviation Scheme As-Constructed investigations. The study was carried out using SIS-TUFLOW software. The model covers the River Cherwell from Cropredy to Kings Sutton and the lower section of the Hanwell Brook in Banbury.

Model design runs:

Undersized: 1 in 5 / 20% Annual Exceedance Probability (AEP), 1 in 20 / 5% AEP; 1 in 100 / 1% AEP; 1 in 100+20% / 1% AEP plus 20% increase in flows, 1 in 200 / 0.5% AEP and 1 in 1000 / 0.1% AEP

Defended: 1 in 5 / 20% AEP, 1 in 20 / 5% AEP; 1 in 100 / 1% AEP; 1 in 100+20% / 1% AEP plus 20% increase in flows, 1 in 200 / 0.5% AEP and 1 in 1000 / 0.1% AEP

Mapped Outputs:

1 in 5 / 20% AEP, 1 in 20 / 5% AEP; 1 in 100 / 1% AEP, 1 in 200 / 0.5% AEP and 1 in 1000 / 0.1% AEP

Model accuracy:

Levels  $\pm$  250mm

THM189269

**Modelled in-channel flood flows and levels**

The modelled flood levels and flows for the closest most appropriate model node points for your site that are within the river channel are provided below.

Node label	Model	Flood Levels (mAOD)						
		Easting	Northing	20% AEP	5% AEP	1% AEP	1% AEP (+20% increase in flows)	0.1% AEP
061_14_2015_001MD_3_0082	Cherwell (Barbury) 2015	446143	240777	89.33	89.34	89.34	89.34	90.18
061_14_2015_001MD_3_003	Cherwell (Barbury) 2015	446099	240723	89.30	89.30	89.30	89.30	90.18
061_14_2015_001RC_1_016d	Cherwell (Barbury) 2015	446074	240623	89.39	90.08	90.26	90.50	91.44
061_14_2015_001RC_1_016	Cherwell (Barbury) 2015	446084	240595	89.39	90.07	90.47	90.71	91.37
061_14_2015_001RC_1_015	Cherwell (Barbury) 2015	446089	240528	89.28	89.94	90.12	90.34	91.29

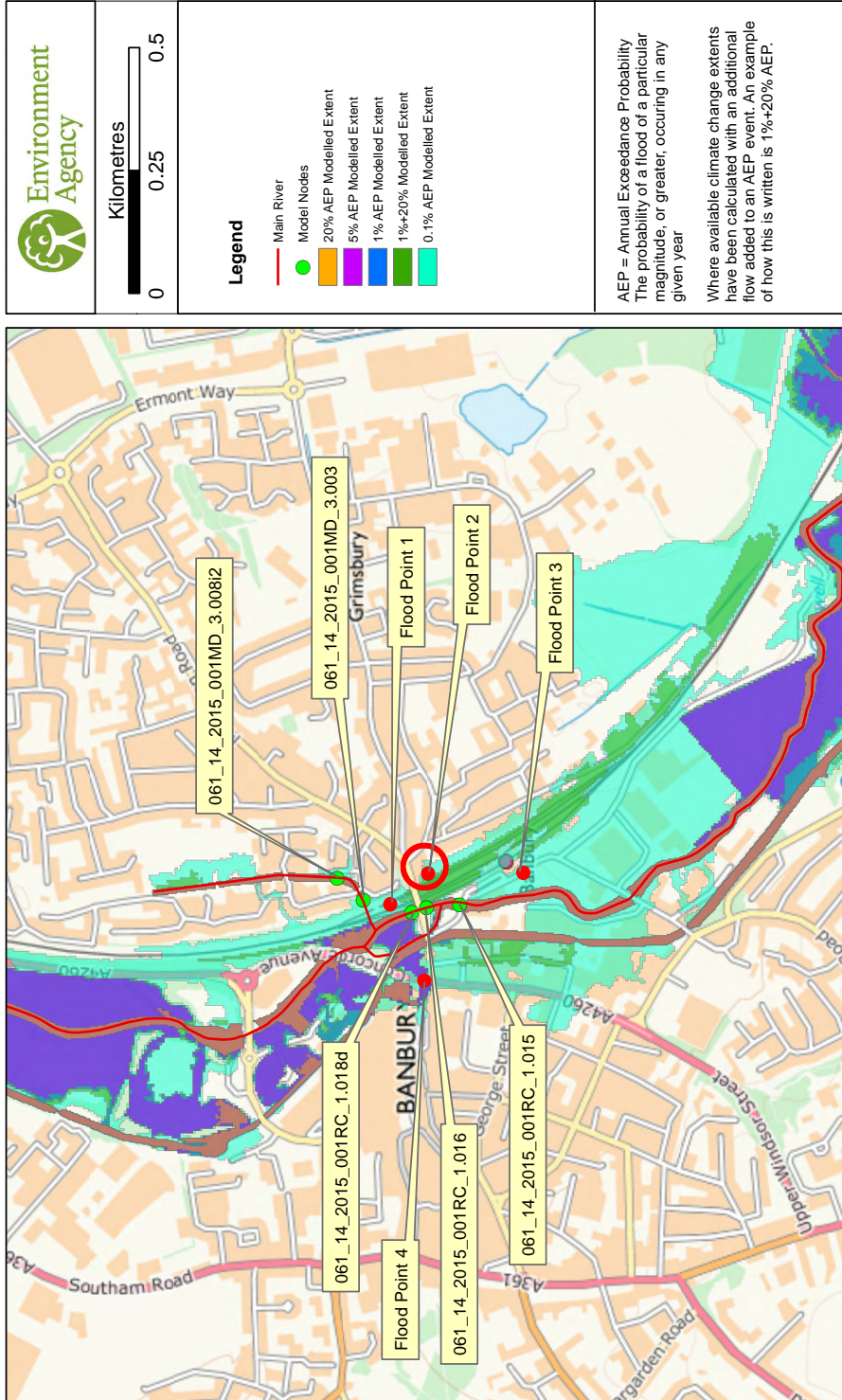
Node label	Model	Flood Flows (m³/s)						
		Easting	Northing	20% AEP	5% AEP	1% AEP	1% AEP (+20% increase in flows)	0.1% AEP
061_14_2015_001MD_3_0082	Cherwell (Barbury) 2015	446143	240777	1.40	1.42	1.58	1.69	1.74
061_14_2015_001MD_3_003	Cherwell (Barbury) 2015	446099	240723	1.64	1.59	1.56	1.62	1.58
061_14_2015_001RC_1_016d	Cherwell (Barbury) 2015	446074	240623	27.63	44.48	49.26	58.35	66.80
061_14_2015_001RC_1_016	Cherwell (Barbury) 2015	446084	240595	27.63	44.48	49.26	58.35	66.80
061_14_2015_001RC_1_015	Cherwell (Barbury) 2015	446089	240528	26.38	46.22	51.06	60.55	62.81

Note:

Due to changes in guidance on the allowances for climate change, the 20% increase in river flows should no longer be used for development design purposes. The data included in this Product can be used for interpolation of levels as part of an intermediate level assessment.

For further advice on the new allowances please visit <https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances>.

**Detailed FRA Map centred on Middleton Road, Banbury, OX16 4QD  
Created on 16/10/2020 REF: THM189269**



### Modelled floodplain flood levels

The modelled flood levels for the closest most appropriate model grid cells for your site are provided below:

2D grid cell reference	Model	Easting	Nothing	flood levels (mAOD)				
				20% AEP	5% AEP	1% AEP	1% AEP (+20% increase in flows)	0.1% AEP
Flood Point 1	Cherwell (Banbury) 2015	446,090	Nothing	No data	No data	No data	No data	91.4358
Flood Point 2	Cherwell (Banbury) 2015	446,149	240,58	No data	No data	No data	90.38	91.3424
Flood Point 3	Cherwell (Banbury) 2015	446,155	240,396	No data	No data	No data	No data	90.9045
Flood Point 4	Cherwell (Banbury) 2015	445,931	240,600	No data	90.93	90.93	90.93	91.4181

This flood model has represented the floodplain as a grid. The flood water levels have been calculated for each grid cell.

Note:

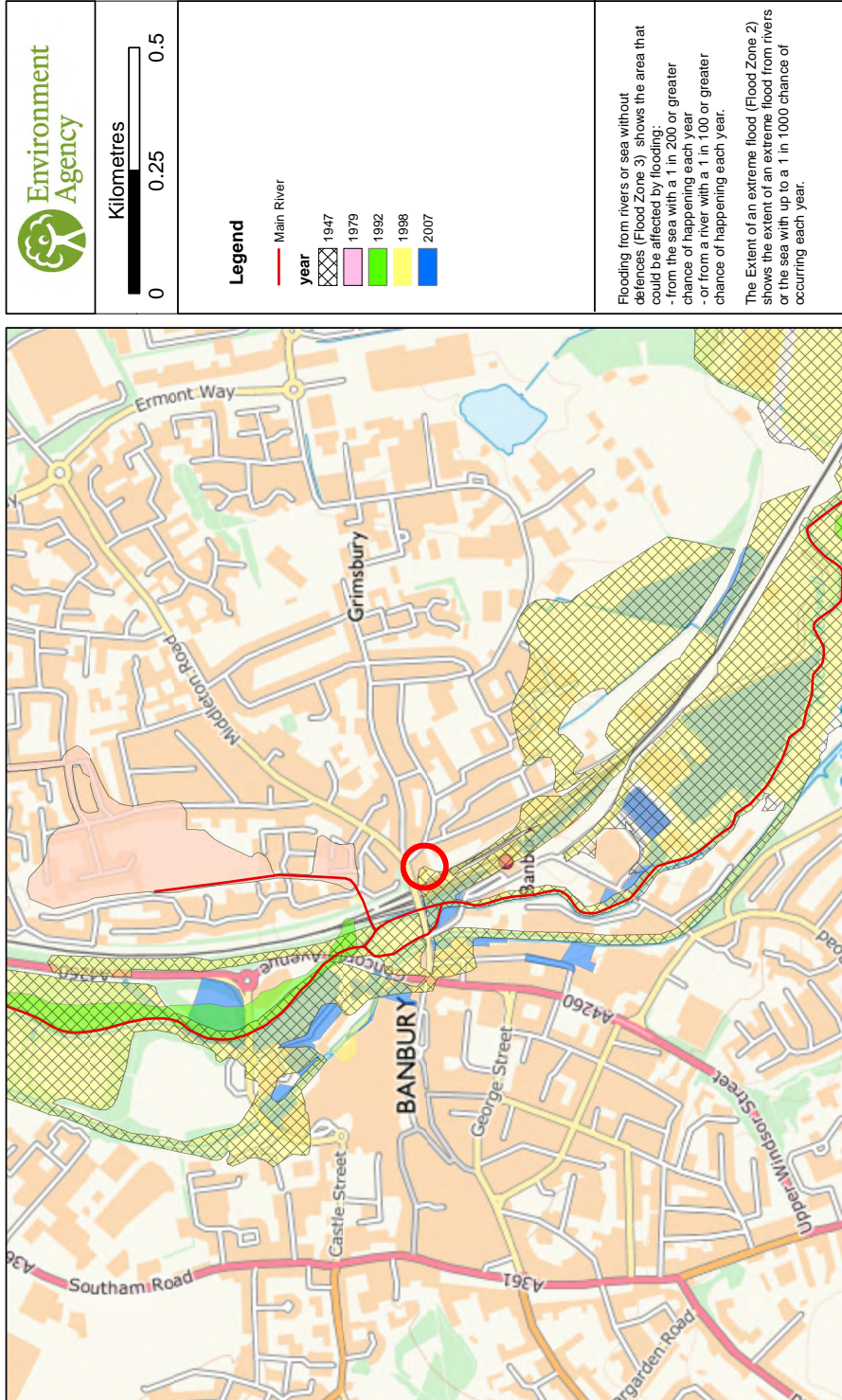
Due to changes in guidance on the allowances for climate change, the 20% increase in river flows should no longer to be used for development design purposes. The data included in this Product can be used for interpolation of levels as part of an intermediate level assessment.

For further advice on the new allowances please visit

<https://www.gov.uk/guidance/food-risk-assessments-climate-change-allowances>



**Historic Flood Map centred on Middleton Road, Banbury, OX16 4QD  
Created on 16/10/2020 REF: THM189269**



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**Contact Us:** National Customer Contact Centre, PO Box 544, Rotherham, S60 1BY. Tel: 03708 506 506 (Mon-Fri 8-6). Email: enquiries@environment-agency.gov.uk

**THM189269**

**Historic flood data**

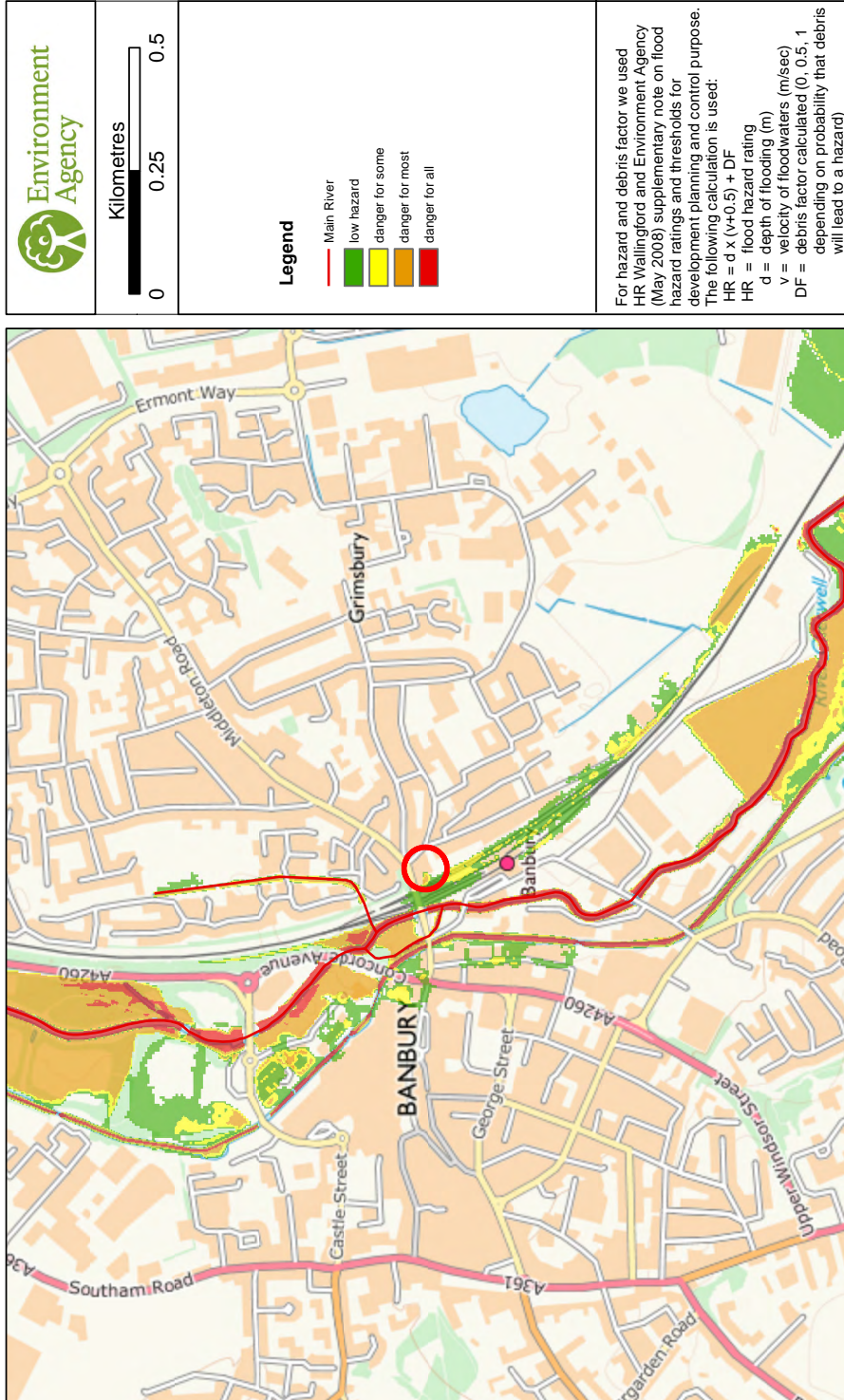
Our records show that the area of your site has been affected by flooding. Information on the floods that have affected your site is provided in the table below:

Flood Event Code	Flood Event Name	Start Date	End Date	Source of Flooding	Cause of Flooding
EA0619470300444	06MarchSpring1947	01/01/1947	12/12/1947	main river	channel capacity exceeded (no raised defences)
EA0619790200111	06FebruaryWinter1979	01/01/1979	12/12/1979	main river	channel capacity exceeded (no raised defences)
EA06198209000281	06SeptemberAutumn1982	01/01/1992	12/12/1992	main river	channel capacity exceeded (no raised defences)
EA0619980400097	06AprilEaster1998	01/04/1998	30/04/1998	main river	channel capacity exceeded (no raised defences)
ea061142605	Banbury CP - Fluvial Water	19/07/2007	29/07/2007	main river	channel capacity exceeded (no raised defences)

Please note the Environment Agency maps flooding to land not individual properties. Floodplain extents are an indication of the geographical extent of a historic flood. They do not provide information regarding levels of individual properties, nor do they imply that a property has flooded internally.

Start and End Dates shown above may represent a wider range where the exact dates are not available.

**Hazard Map centred on Middleton Road, Banbury, OX16 4QD  
Created on 16/10/2020 REF: THM189269**



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## Hazard Mapping (for the 1%+20% climate change scenario)

### Hazard Mapping methodology:

To calculate flood hazard with the debris factor we have used the supplementary note to Flood Risk to People Methodology (see below).

The following calculation is used:

$$HR = d \times (v+0.5) + DF$$

Where HR = flood hazard rating

d = depth of flooding (m)

v = velocity of floodwaters (m/sec)

DF = debris factor calculated (0, 0.5, 1 depending on probability that debris will lead to a hazard)

The resultant hazard rating is then classified according to:

Flood Hazard	Colour	Hazard to People Classification
Less than 0.75	Green	Very low hazard - Caution
0.75 to 1.25	Yellow	Danger for some - includes children, the elderly and the infirm
1.25 to 2.0	Orange	Danger for most - includes the general public
More than 2.0	Red	Danger for all - includes the emergency services

REF: HR Wallingford and Environment Agency (May 2008) Supplementary note of flood hazard ratings and thresholds for development planning and control purpose – Clarification of the Table 113.1 of FD2320/TR2 and Figure 3.2 of FD2321/TR1

Red Kite House, Howbery Park, Wallingford, Oxon OX10 8BD  
Customer services line: 08708 506 506  
Email: [WTenquiries@environment-agency.gov.uk](mailto:WTenquiries@environment-agency.gov.uk)

[www.environment-agency.gov.uk](http://www.environment-agency.gov.uk)

# B Site levels

## B.1 Level survey



## B.2 Sectional level data



PROPOSED NORTH ELEVATION - SCALE 1:100 @ A1

**SAFETY, HEALTH AND  
ENVIRONMENTAL HAZARD  
INFORMATION BOX**



THE HAZARD INFORMATION BOX IS A REQUIREMENT OF THE HSE. THE BOX IS TO BE USED TO PROVIDE INFORMATION ON THE HAZARD OF THE WORK AND TO PROVIDE INFORMATION ON THE HAZARD OF THE WORK AND TO PROVIDE INFORMATION ON THE HAZARD OF THE WORK.

**NOTES**

1. This drawing is for information only. It is not to be used for construction purposes. It is not to be used for construction purposes. It is not to be used for construction purposes.

**ADDITIONAL INFORMATION**

1. This drawing is for information only. It is not to be used for construction purposes. It is not to be used for construction purposes. It is not to be used for construction purposes.

**PLANNING ISSUE**

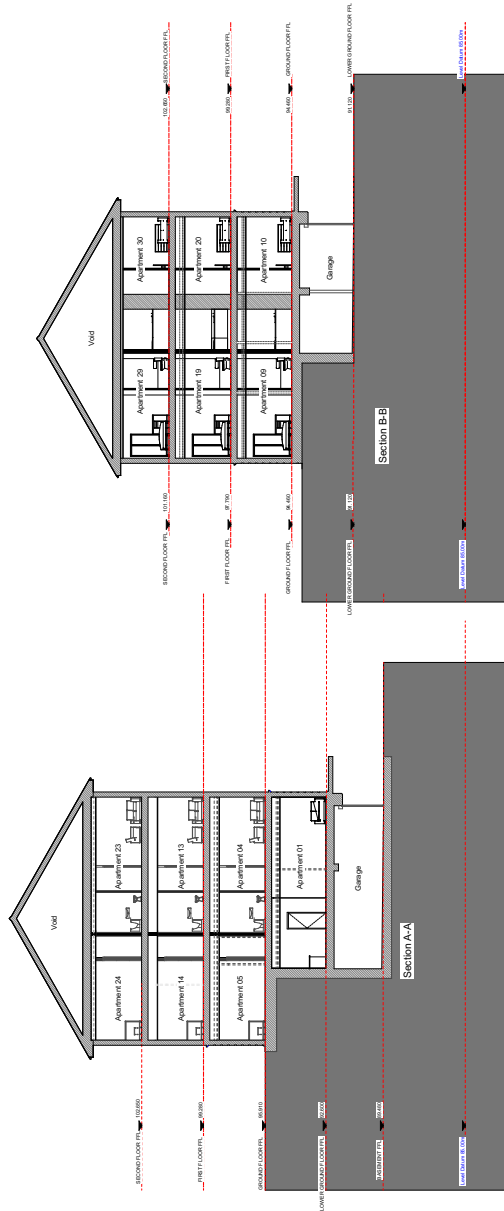
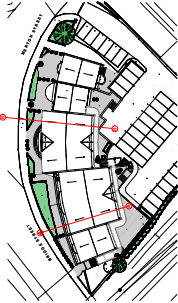
**MAS**  
 MASSACHUSETTS PLANNING BOARD  
 100 STATE STREET, SUITE 1000  
 BOSTON, MA 02109  
 TEL: 617-725-2000  
 FAX: 617-725-2001  
 WWW.MAS.PLANINGBOARD.STATE.MA.US



PROPOSED SOUTH ELEVATION - SCALE 1:100 @ A1

<p><b>SAFETY, HEALTH AND ACCIDENT INFORMATION BOX</b></p> <p><b>!</b></p> <p>THE DRAWING IS SUBJECT TO THE DESIGN AND CONSTRUCTION ACT 2014. THE CLIENT IS ADVISED THAT THE DRAWING IS FOR INFORMATION ONLY AND IS NOT TO BE USED FOR CONSTRUCTION PURPOSES. THE CLIENT IS ADVISED THAT THE DRAWING IS FOR INFORMATION ONLY AND IS NOT TO BE USED FOR CONSTRUCTION PURPOSES.</p>	<p><b>NOTES:</b></p> <p>Construction is per the design package.</p> <p>The drawing is for information only and is not to be used for construction purposes.</p> <p>The drawing is for information only and is not to be used for construction purposes.</p>	<p><b>ADDITIONAL:</b></p> <p>On the date of this drawing, the design is subject to the design package.</p> <p>The drawing is for information only and is not to be used for construction purposes.</p> <p>The drawing is for information only and is not to be used for construction purposes.</p>	<p><b>Plan No:</b> 2021/001</p> <p><b>Scale:</b> 1:100</p> <p><b>Date:</b> 2021/001</p>	<p><b>Client:</b> [Name]</p> <p><b>Project:</b> [Name]</p> <p><b>Address:</b> [Address]</p>	<p><b>Drawn By:</b> [Name]</p> <p><b>Checked By:</b> [Name]</p> <p><b>Date:</b> [Date]</p>	<p><b>Project No:</b> 201465</p> <p><b>Scale:</b> 1:100 @ A1</p> <p><b>Date:</b> 2021/001</p>
<p><b>PLANNING ISSUE</b></p> <p><b>MAS</b></p> <p>Application for planning permission for the proposed development.</p> <p>The drawing is for information only and is not to be used for construction purposes.</p> <p>The drawing is for information only and is not to be used for construction purposes.</p>						





**PROPOSED SECTIONS A-A & B-B - SCALE 1:100 @ A1**

**SAFETY, HEALTH AND INFORMATION BOX**

- indicates Existing Structure
- indicates new internal partitions

THIS DRAWING IS TO BE USED IN CONJUNCTION WITH THE DRAWINGS IN ACCORDANCE WITH THE NORMS AND REGULATIONS OF THE INSTITUTO TECNOLÓGICO DE CATALUÑA (ITC) AND THE REGULATIONS OF THE INSTITUTO TECNOLÓGICO DE CATALUÑA (ITC) AND THE REGULATIONS OF THE INSTITUTO TECNOLÓGICO DE CATALUÑA (ITC).

**NOTES:**  
 Consultar la normativa de aplicación.  
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Project Name	Proposed Sections A-A & B-B
Client	XXXXXXXXXX
Architect	XXXXXXXXXX
Date	XXXXXXXXXX

**PLANNING ISSUE**

**MAS**  
 Muestra de Arquitectura Sostenible  
 Proyecto de Arquitectura Sostenible  
 XXXXX, XXXXX  
 XXXXX, XXXXX

## C Emergency flood plan (proforma)



would your  
business stay  
afloat?

A guide to preparing your  
business for flooding



Flooding is the most common and widespread natural disaster in the UK. Since 1998 there has been at least one serious flood every year. Businesses like yours are more likely to be flooded than destroyed by fire. As our climate changes we can expect to see more extreme weather – and more floods.

We aim to reduce the likelihood of flooding by managing land, rivers, coastal systems and flood defences. While we do everything we can to reduce the chance of flooding, it is a natural process and can never be completely eliminated.

By taking action to prepare in advance for flooding, most businesses can save between 20 and 90 per cent on the cost of lost stock and movable equipment, as well as some of the trouble and stress that goes with such an event.

This is a simple guide to some of the easy actions that you can take to make sure that your business is as well prepared as possible.

It tells you about how to find out if your business is at risk, our flood warning service and what our flood warning codes mean. It also has a simple template to use to design a flood plan for your company.

For more information about flooding, visit our website at [www.gov.uk/flood](http://www.gov.uk/flood) or call Floodline on **0345 988 1188**.

Make sure that your business is prepared for flooding.



# How do I find out if my business is at risk from flooding?

There are two quick and easy ways for you to find out if you're at risk.

call us on  
**0345 988 1188**

Our Floodline service is open 24 hours, calls are charged at local rate. By taking your postcode, our operators will check and see if your business is in a flood risk area.

Look at our website  
[www.gov.uk/flood](http://www.gov.uk/flood)

You need to be aware of flooding and keep an eye on the water levels and weather situation at all times. You can do this by checking the flood forecasts and the river and sea levels on our website.

Our online flood map uses the latest technology and data gathered over many years to give the most accurate view of flooding in your area.

By entering your postcode you can find out if your business is at risk. Areas at risk from flooding are shown in dark blue and areas at risk from extreme flooding in light blue.

Environment Agency A guide to preparing your business for flooding 2

# My business is at risk from flooding. What should I do now?

Start preparing now. If the weather conditions are right, flooding can happen at any time.

Remember, floods can happen at any time and any day – make sure you provide a number that can be contacted at all times – even out of working hours.

## Sign up for flood warnings.

The first thing you should do is find out if you can receive flood warnings. In areas of high flood risk, we offer a service called Floodline Warnings Direct. This is a free, 24 hour service that sends automated flood warnings by telephone, SMS text, email, fax or pager.

To find out if you can receive this service, call Floodline on 0345 988 1188.

If your business isn't in an area covered by our warnings you can still check the latest flood warnings in force on our website.

When the situation is serious, flood warnings will also be broadcast on local television and radio news.

Environment Agency A guide to preparing your business for flooding 3

# What practical steps can I take to protect my business?

Now that you've checked your risk and found out about flood warnings, it's time to start thinking about preparing a flood plan specifically for your business.

Taking simple steps can go a long way to protecting your business from flooding. Preparing a flood plan could:

- Significantly reduce financial losses, damage to property and business interruption;
- Help compliance with regulatory requirements (for example, Occupier's Liability Act 1984);
- Reduce exposure to civil or criminal liability;
- Enhance your company's image and credibility with employees, customers, suppliers and the community;
- Help fulfil your moral responsibility to protect employees, the community and the environment;
- Help you to obtain insurance cover.

# What is a flood plan?

Just as many businesses have health and safety policies and contingency plans for an emergency, they should also have flood plans.

A flood plan is a written document that outlines how your business will respond to a flood.

This might include a list of steps you will take in case of a flood and the order you will take them in. It could also include the purchase of flood products and insurance.

A written plan can make information **easy** to access during a flood, **easy** to communicate to staff, and **easy** to remember.

**Small** businesses should make sure there is a plan of action in case of flooding. As the business owner, this may be your responsibility.

If your business is **medium sized**, flood preparation might be the responsibility of a team of people from different areas of the business.

If your business decides to have a flood planning team, this could be led by the business owner or Managing Director.

The leader of the flood planning team will need to let staff know about the plan once it is finished.

All members of the team should also keep a copy of important flood contacts at home for easy access.

Key areas to consider in your flood plan are:

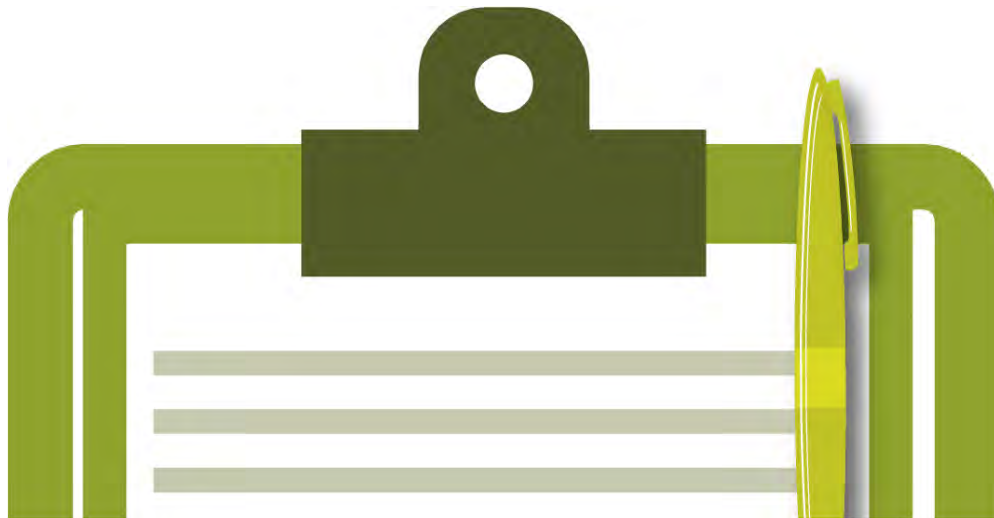
- human resources;
- maintenance/facilities;
- finance and purchasing.

Once you have completed your plan don't forget about it. Look at it regularly and make sure it is up to date and in the event of a flood **use it**.



Environment Agency A guide to preparing your business for flooding 6

# business flood plan



A written flood plan is recommended for businesses.

It should include:

- A list of important contacts, including Floodline, building services, suppliers and evacuation contacts for staff;
- A description or map showing locations of key property, protective materials and service shut-off points;
- Basic strategies for protecting property, preventing business disruption and assisting recovery;
- Checklists of procedures that can be quickly accessed by staff during a flood.

If a flood is imminent, your main priority is to make sure that your staff are safe. However there may be other actions that you can take to prepare your building and it's contents to minimise damage and post-flood repair and restoration costs.

Environment Agency [A guide to preparing your business for flooding](#) 7

**Business flood plan**

Flood plan for \_\_\_\_\_ dated \_\_\_\_\_  
Registered address \_\_\_\_\_  
Postcode \_\_\_\_\_

**Staff contact list**

Name	Address	Telephone/mobile	Emergency contact	Emergency telephone and address

**Note staff who may require assistance in the event of a flood.**

Name	Office location

**Key locations**

Service cut-off	Description of location
Electricity	
Gas	
Water	

**Answer the following if applicable**

	Description of location	How to protect from a flood (for example, move, cover, tie down)
First Aid Kit		
Oil based products (gasoline, oil, cooking oil etc.)		
Chemicals (including cleaning products)		



**Protective actions**

Identify stock, equipment and possessions that may need special protective measures, and describe the actions you will take to prevent damage in the event of a flood. We have suggested items and ways to protect them, but make sure you follow through on your plans.

**think about:**

- Computers;
- Tables / heavy furniture;
- Vehicles;
- Paper files;
- Electrical items;
- Chairs / stools;
- Databases;
- Soft furnishings;
- Computer files;
- Staff files.

**ways to protect items**

- Make a copy of important documentation and store in safe location;
- Raise items above ground level;
- Buy flood protection products;
- Buy new flood-resistant items;
- Move items to a safer location if possible – to an upper level of the building or off site.

Valuable item	Protective action	New location (if applicable)	Done
			<input type="checkbox"/>
			<input type="checkbox"/>
			<input type="checkbox"/>
			<input type="checkbox"/>
			<input type="checkbox"/>
			<input type="checkbox"/>
			<input type="checkbox"/>
			<input type="checkbox"/>
			<input type="checkbox"/>

**Suggested basic building materials to help protect your property**

If materials are not needed, leave the relevant section blank

Materials	Used for	Items to protect / where to use	Storage location	Done
Sand and sand bags (unfilled), shovel	Creating flood barriers (used with plastic sheeting)			<input type="checkbox"/>
Tools – hammer, nails, saw	Boarding up doors, windows and openings, creating shelves			<input type="checkbox"/>
Wood – plywood, blocks of wood	Boarding up doors, windows and openings, creating shelves			<input type="checkbox"/>
Sturdy plastic sheeting	Sandbag barriers, pulling up around furniture and appliances			<input type="checkbox"/>
Strong plastic bags	Putting around legs of tables and chairs			<input type="checkbox"/>
Pallets	Raising stored stock above flood level			<input type="checkbox"/>
Emergency power generator	Maintaining function of air conditioning units (can help dry out a building), running fridges and freezers, medical equipment if appropriate			<input type="checkbox"/>



# discussion guide

This discussion guide sums up the key areas of flood planning. Some of this information can be found in this pack to help get you started.



## Research

- Look at your existing business policies, and think about whether they are appropriate in the event of a flood.

## Staff

- Make a list of **employees' contact details in the event of an evacuation**. This might include mobile telephone numbers, or numbers for their home or the home of a friend or relative;
- Think about staff who **may need special assistance** in the event of a flood (for example, elderly, deaf, blind etc.)

## Security procedures

- **Locking windows, doors and setting the alarm**. You might need more than one person to help do this;
- Insurance policies – **Are you insured for flood damage**, business interruption and lost revenue?
- Employee manuals – You might **add flood safety to staff information packs**, or adapt job descriptions to include flood warden duties;
- Hazardous materials plan – You must ensure that **chemicals, oils and other substances in your possession are kept safe** and do not contaminate flood water;
- Health and safety assessment – Plan to **check the functioning of flood products and flood warning systems regularly**, just as you do for fire safety equipment.

Environment Agency [A guide to preparing your business for flooding](#) 13

**Check codes and regulations that might apply to your business in the event of a flood. The following could provide guidance on the right actions to take:**

- Occupational health and safety regulations;
- Environmental regulations.



**Important contacts**

Make a list of important telephone numbers, including contacts for gas, electricity, water and telephone providers.

**Key locations**

- **Know the location** of cut-off points for gas, electricity and water. Ideally, these should be marked on a map that is stored with your flood plan;
- Know the location of chemicals, oils or other materials that could be dangerous or contaminate flood water. These should be stored safe from floods and other damage.

**Protective actions**

- Note key stock, equipment and possessions that may need special protection from flood water;
- Consider things you may need during or after a flood (for example, sandbags, plastic sheeting, loudspeaker);
- See if it's **possible to move key operations**, such as shipping or customer services, to another building.

**Suppliers and external links**

- Identify products and services you won't need in the event of a flood, or which suppliers may not be able to provide. **Make back-up plans** or arrangements for short-notice cancellation of deliveries;
- Consider contracting in advance with companies whose help you may need after a flood.

# business checklist

## Are you prepared for flooding?

If you answer no to any of the questions overleaf, there may be more you can do to protect your business.

The individual sections will give you valuable information on effective actions you can take to prepare for a flood.



Environment Agency A guide to preparing your business for flooding 15

If you can answer yes, please , otherwise leave blank for no.

### Know if you're at risk

- Do you know if you're at risk of flooding?
- Are flood warnings available in your area?
- Do you know how you can receive flood warnings?

### Preparing a flood plan

- Do you know how your business will respond to a flood?
- Do you have a list of useful numbers including Floodline, local authority and insurance company?
- Do you know how to shut off your gas/electric/water supplies?
- Are your stock, fittings and valuable equipment stored above flood level?
- Have you developed flood contingency plans with suppliers and/or clients?
- Can you call someone to help you in the event of a flood?

### Staff training and evacuation

- Are you aware of correct flood safety procedures for you and your staff?
- Have you trained your staff on flood safety procedures?
- Can your staff work quickly and efficiently to protect your business in the event of a flood?

### Protecting your property

- Have you installed flood protection products?
- Do you have a stockpile of useful materials including plywood, plastic sheeting, sandbags (unfilled), sand, nails, hammer, shovel, blocks of wood and a saw?
- Have you installed non return valves in your toilets and drains?
- Do you and your staff have high ground where you can park your cars?
- Are your electrical sockets above flood level?
- Do you have computer equipment in the basement?

### Flood insurance

- Do you have sufficient insurance cover in the event of a flood situation?
- Do you know what information your insurer will require to support a claim?

### Evacuation

- Do you have an easy way to let your staff know about an evacuation?
- Do you know which roads will stay open in your area during a flood?
- Have you identified where staff can shelter in the event of a flood?
- Could you control staff panic during a flood?

Environment Agency A guide to preparing your business for flooding 16

# understand your flood warning codes

Our warning service has three types of warnings - Flood Alert, Flood Warning and Severe Flood Warning - that will help you prepare for flooding and take necessary actions.

---

## ONLINE FLOOD RISK FORECAST

### What it means

Be aware.  
Keep an eye on the weather situation.

### When it's used

Forecasts of flooding on the Environment Agency website are updated at least once a day.

---

### What to do

- Check weather conditions.
- Check for updated flood forecasts on our website.



## FLOOD ALERT

### What it means

Flooding is possible.  
Be prepared.

### When it's used

Two hours to two days in advance of flooding.

---

### What to do

- Be prepared to act on your flood plan.
  - Prepare a flood kit of essential items.
  - Monitor local water levels and the flood forecast on our website.
-





## FLOOD WARNING

### What it means

Flooding is expected.  
Immediate action required.

### When it's used

Half an hour to one day  
in advance of flooding.

---

### What to do

- Move staff, stock and valuables to a safe place.
  - Turn off gas, electricity and water supplies if safe to do so.
  - Put flood protection equipment in place.
- 



## SEVERE FLOOD WARNING

### What it means

Severe flooding.  
Danger to life.

### When it's used

When flooding poses a  
significant risk to life.

---

### What to do

- Stay in a safe place with means of escape.
  - Be ready should you need to evacuate.
  - Co-operate with the emergency services.
  - Call 999 if you are in immediate danger.
- 

## WARNING NO LONGER IN FORCE

### What it means

No further flooding is  
currently expected in  
you area.

### When it's used

When river or sea  
conditions begin to  
return to normal.

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### What to do

- Be careful. Flood water may still be around for several days.
  - If you've been flooded, ring your insurance company as soon as possible.
-

# useful contacts

Fill in the contact details you may need if your business floods.  
Keep it in a safe place, where you can hold of it quickly.

	Company name	Telephone number/s
Environment Agency Floodline		0345 988 1188
Electricity supplier and meter number		
Gas supplier and meter number		
Water supplier and meter number		
Telephone provider		
Local authority emergency services		
Insurance company 24-hour number and policy number		
Insurance agent		
Local radio station for news alerts and weather updates		
<b>Companies that may be able to help you after a flood</b>		
Electrician		
Plumber		
Builder		
Equipment repair/suppliers		
Security services		
Water pumping services		
Emergency power suppliers		

**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.gov.uk/environment-agency**

**incident hotline 0800 80 70 60 (24hrs)  
floodline 0345 988 1188 (24hrs)**

**\* Weekday Daytime calls cost 8p plus up to 6p/min from BT Weekend Unlimited. Mobile and other providers' charges may vary.**



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