Flood Risk Assessment

To accompany a planning application for an extension and outbuilding at

7 Derwent Avenue, Ickenham, Uxbridge, UB10 8HJ

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1 Executive Summary

A. The proposal is for a domestic extension and outbuilding not exceeding 250m^2, lies within an existing developed area and is minor development.

B. The site lies in part in Flood Zone 3, wholly in Flood Zone 2 at a High risk from surface water flooding and at a Low risk from ground water and reservoir flooding.

C. Flood resilience and resistive materials must be used and flood mitigation methods will be implemented on site, the extension and outbuilding do not impact on existing access and egress routes and the site will be signed up to flood warning schemes.

D. There is no documented evidence of flood risk from any other sources and the re-development does not impact on flood risk elsewhere.

E. Assuming the mitigation, warning and evacuation procedures can be maintained over the lifetime of the development, the proposed minor development to an existing building is considered acceptable.

2 Introduction

2.1 Site location

The project is at 7 Derwent Avenue, Ickenham, Uxbridge, UB10 8HJ (see Figure 1).

Figure 1: Site location plan, as indicated with North topmost. (source: EA flood mapping)

2.2 Development description

The proposal is for a domestic extension and outbuilding not exceeding 250m^2 in footprint. The site is an existing developed site and the proposed work is classed as minor development. The existing and proposed layouts and sections are to be submitted under separate cover.

2.3 Site geology

Geological mapping data from within the vicinity indicate Alluvium - Clay, Silt, Sand And Gravel however this would require confirmation on site. If available on site, the superficial deposits will offer only medium to poor permeability. Infiltration SuDS therefore may be viable (subject to site testing).

3 Policies

In preparation for this Flood Risk Assessment (FRA), National Planning Policy Framework[4] and British Standards on Assessing and Managing Flood Risk[2] were reviewed, and their related policies are, where applicable, referred to in this report.

The Environment Agency has 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 policies are summarised as below.

3.1 Standing Advice

Generally the following applies: Apart from habitable basements, domestic extensions within the curtilage of the dwelling (see GDPO definition of, minor development) and non-domestic extensions with a footprint of less than 250 m^2 will not require a detailed FRA. These applications should demonstrate that the risk of flooding from all sources has been assessed. The main sources of flooding are likely to be tidal, surface water and sewer flooding.

3.2 Environment Agency Guidance on 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 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. 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.

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

4 Flood risk analysis

4.1 Sources of potential flooding

Flood risk from various sources at the site is analysed in this section. It is concluded that the primary source of flood risk to the site is fluvial from the River Pinn.

4.1.1 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 a river channel due to high levels of rainfall in the catchment.

With reference to the Environment Agency Flood Map, Figure 2, the developed area of the site lies in Flood Zone 2. This means that the site has a Medium probability of fluvial flooding (between a 1 in 100yr and 1 in 1000yr annual probability of fluvial flooding).

Only a small area adjacent to the highway is shown to fall in Flood Zone 3.

Figure 2: Flood mapping from the EA online data. The site falls within Flood Zone 3

Historic flooding

The site is shown to lie in an area of historic flooding as indicated in Figure 3.

Figure 3: Historic flood mapping from the EA online data. The site falls within an area of historic flooding

4.1.2 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. The site's geology is classified as having low susceptibility to groundwater flooding (<25%).

Figure 4: Susceptibility to ground water flooding. The site falls within an area at low, <25% risk

Since the proposed development does not involve any basement elements, the impact of groundwater flooding on the proposed site will be minimal. Hence, the risk of groundwater flooding on the proposed site can be considered to be Low.

4.1.3 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.

Figure 5: Area flagged by Thames Water with instances of sewer flooding.

Although the site is in an area with records of sewer flooding, as shown in Figure 5 there are no indicators to Sewer flooding at the site itself.

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

4.1.4 Flooding risk from surface water

Flooding occurs when rainfall fall on a surface (on or off the site) which acts as run-off which has not infiltrated into the ground or entered into a drainage system.

With reference to the E.A online mapping, Figure 6, the footprint of the extension is at High risk from surface water flooding for the design period, 1 in 100yr event with flood depths to 300mm and the site of the outbuilding is at risk of flooding with flood depths to 600mm above relative ground levels.

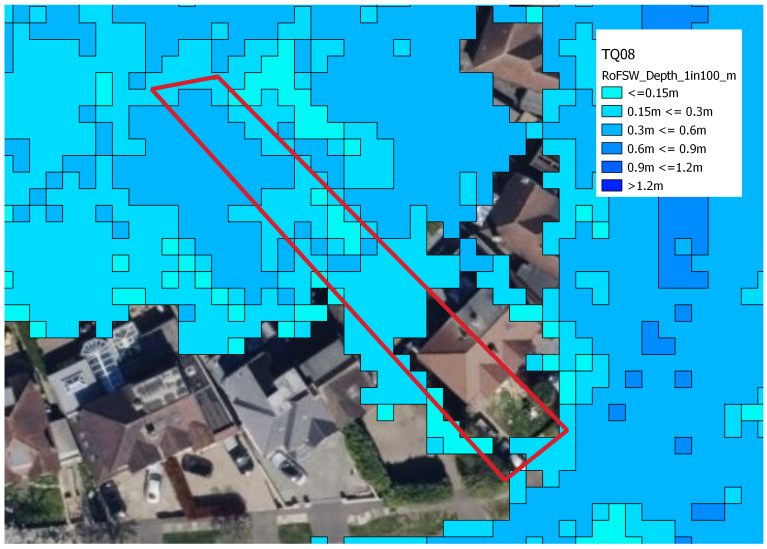

Figure 6: 1 in 100yr SW flood extent and depth mapping. The area on the site at the footprint of the extension is at risk from SW flooding to depths of 300mm above relative ground level, the area of the outbuilding to 600mm above relative ground levels

4.1.5 Flood risk from infrastructure failure

Flooding occurs because of canals, reservoirs, industrial processes, burst water mains or failed pumping stations.

The site is shown to be at flood risk due to reservoir failure, as indicated in Figure 7 with predicted flood depths to 2.0m.

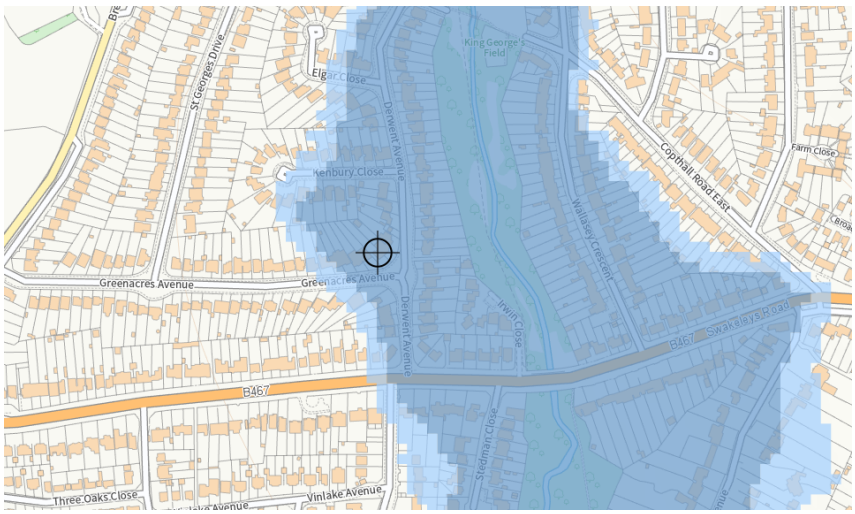

Figure 7: Flood risk from reservoir flooding relative to the site (Source: EA flood mapping)

However the EA have previously stated that:

> "Reservoir flooding is extremely unlikely to happen. There has been no loss of life in the UK from reservoir flooding since 1925. All large reservoirs

must be inspected and supervised by reservoir panel engineers. As the enforcement authority for the Reservoirs Act 1975 in England, we ensure that reservoirs are inspected regularly and essential safety work is carried out."

Hence the relative flood risk to the site from reservoir failure is considered to be Low.

4.2 On-site surface water analysis and management

4.2.1 Generation of Run-off

The post-development surface water run-off volume will increase when compared to the pre-development level because there is an overall reduction in permeable areas.

All surface water arising should be managed by use of SuDS so as to not increase flood risk elsewhere.

4.2.2 SuDS Statement:

Surface water 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.

It is unlikely that soakaways will be viable given the expected ground conditions associated with the local geology hence the recommendation of this report would be to adopt the use of soakaways and water butts as a viable and proportionate SuDS solution on site.

4.2.3 Impact on flood risk elsewhere

SW arising: Since the proposal is intending to manage any additional surface water at source the impact on flood risk elsewhere is Low.

5 Levels

5.1 Flood level data

Predicted surface water flood depths are:

- to 300mm above ground level at the extension
- to 600mm above ground level at the outbuilding

5.2 Floor level data

The proposed floor level of the extension is to be no lower that any existing ground floor levels.

The proposed floor level of the non-habitable outbuilding is to be set as high as reasonably practicable.

5.2.1 Assumption regarding relative levels

Without evidence to offer flood levels and relative floor levels, for the purpose of this risk assessment, it is assumed that the existing ground floor and hence proposed floor levels are at or below predicted undefended flood levels (rationale: there is no evidence to suggest they are at a higher level than flood levels for undefended Flood Zones 2 & 3 or above predicted surface water flood depths).

6 Management of flood risk

6.1 Flood risk resilience measures

Because the site is located in close proximity to Flood Zone 3 and at High risk from surface water flooding and floor levels are not higher than 300mm above assumed flood levels, it is a strong recommendation[1] of this report that flood risk resilience measures should be incorporated into the development's construction, specifically at ground floor and all construction below such that "the development is appropriately flood

[1]While the actual choice of resilience measures is not a Statute requirement under the T&CP Act 1990, the designer should follow best practice guidance to meet NPPF:167(b) and any local related Planning Policy. Hence the designer is advised to consider in full such recommendations within this report so that NPPF:167(b) and any Local Policy are met and in doing so compliance with Part C of the Building Regulations 2010 can later be demonstrated to the B.C.B.

resistant and resilient such that, in the event of a flood, it could be quickly brought back into use without significant refurbishment"[4].

In accordance with the document "Improving the Flood Performance of New Buildings - Flood Resilient Construction"[3] a series of design approaches should be planned to mitigate the flood risk.

For flood depths to 600mm the design measures should be based on a "water exclusion" strategy, and a "water entry" strategy for all higher flood depths.

Table 1 provides guidance on which materials are most suitable, suitable and unsuitable, when considering construction work involved in this project. This report recommends the use of materials from the "most suitable" column were this is at all possible on site, however they are not mandatory requirements.

Component	Most suitable	Suitable	Unsuitable
Flooring	Concrete, pre-cast or in situ	Timber floor, fully sealed, use of marine plywood.	Untreated timber, Chipboard
Floor Covering	Clay tiles, Rubber sheet floors, Vinyl sheet floors	Vinyl tiles, Ceramic tiles	
External Walls - to max flood level	Engineering brick, Reinforced concrete	Low water absorption brick	Large window openings
Doors	Solid panels with waterproof adhesives, Aluminium, plastic or steel	Epoxy sealed doors	Hollow core plywood doors
Internal Partitions	Brick with waterproof mortar, Lime based plasters	Common bricks	Chipboard, Fibreboard panels, Plasterboard, Gypsum plaster
Insulation	Foam or closed cell types	Reflective insulation	Open cell fibres
Windows	Plastic, metal	Epoxy sealed timber with waterproof glues and steel or brass fittings.	Timber with PVA glues and mild steel fittings

Table 1: Summary of Material Suitability for Building Components[1]

6.2 Flood mitigation measures

The designer is also recommended to consider the provision of a combination of the following flood mitigation measures, to be installed if at all practicable, for use within and around the extension and outbuilding for use in any flooding event:

- Flood resilient doors: Specifically designed to prevent ingress of flood water - passive system.
- Door defence: Bespoke barriers fitted externally across doors and low windows and/or the provision of filled sandbags.
- Anti flood air bricks: Where these are unavoidable, these offer replacements for standard air bricks these prevent water entering the sub floor void - passive system i.e. fully automatic.
- Air brick and flue covers.
- No service penetrations or other openings (cat flaps and letter boxes included) below 1m above FFL.

7 Management of residual risk

Any residual risk can be safely managed by not impairing access and evacuation routes, signing residents up to flood warning schemes and preparation of domestic flood plans.

7.1 Safe access and egress routes

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 buildings in design flood conditions. The extension does not impact on existing access and egress routes. It is noted that the existing routes are within the flood risk zone (ref Figure 8).

It is therefore important that the occupiers gain early warning of likely flood events.

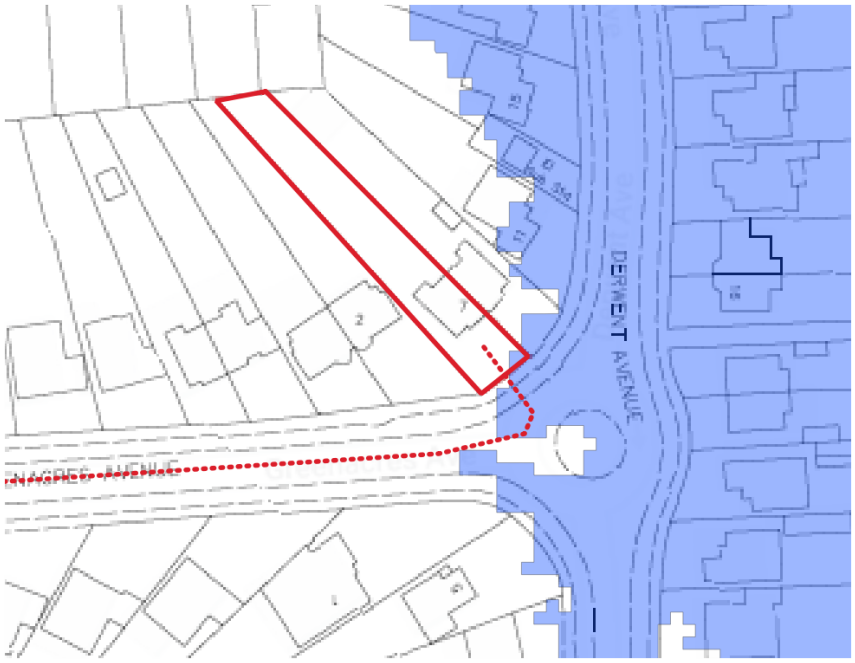

Figure 8: Access and Egress routes for the 1 in 100yr design period event are existing and not impacted by the extension or outbuilding.

7.2 Flood warning schemes

Since it has been established that the site is sited in an area with a possibility of flooding the owners of the dwelling should (if they have not done so already) sign up to the E.A. "Flood Warnings Direct" which 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.

7.2.1 Flood Plan

The project team will also provide the owners of the dwelling with a proforma Flood Plan (See Appendix A 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

- Provide a check list of essential items.

8 Conclusions

Given that:

- The extension lies within an existing developed site and this is minor development;
- The site lies in part in Flood Zone 3, wholly in Flood Zone 2 at a High risk from surface water flooding and at a Low risk from ground water and reservoir flooding;
- Flood resilience and mitigation methods must be implemented on site;
- Safe access/egress routes are not affected and the site will be signed up to flood warning schemes;
- There is no documented evidence of flood risk from any other sources;
- The development does not impact on flood risk elsewhere;

and assuming the resilience measures, mitigation, warning and evacuation procedures can be maintained over the lifetime of the development, the proposed minor development to an existing dwelling is considered acceptable.

Signed: 

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Date: 22nd October, 2021

References

[1] J Wingfield; M Bell; P Bowker. Improving the flood resilience of buildings through improved material, methods and details. Technical Report WP2c, CIRA, 2005.

[2] BSI. BS 8533:2011. Technical report, 2011.

[3] CIRIA, CLG, EA and DEFRA. Improving the flood performance of new buildings. Flood resilient construction, 2007.

[4] Ministry of Housing, Communities and Local Government. National planning policy framework. 2021.

A Emergency flood plan (example)

Personal flood plan

Name

Environment Agency

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?

Environment Agency

- Put important documents out of flood risk and protect in polythene ☐
- Check your insurance covers you for flooding ☐
- Look at the best way of stopping floodwater entering your property ☐
- Make a flood plan and prepare a flood kit ☐
- Find out where you can get sandbags ☐
- Identify who can help you/ who you can help ☐
- Identify what you would need to take with you if you had to leave your home ☐
- Understand the flood warning codes ☐

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

Actions	Location
Home	
• 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	
• Move your car out of the flood risk area	
• Move any large or loose items or weigh them down	
Business	
• 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	
• 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

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