UK Flood Risk
Flood Risk Consultants

Flood Risk Assessment

39 Frays Waye, Uxbridge UB8 2QU

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Executive Summary

The proposed development at 39 Frays Waye, Uxbridge involves the demolition of the existing rear extension and the construction of a part single, part double rear extension. In accordance with the NPPF, the development is classified as 'more vulnerable' and is considered appropriate within Flood Zone 2.

The site is located near the Fray's River and is identified as being at risk of fluvial flooding. However, no historical flooding incidents have been recorded at the site. Environment Agency mapping confirms the site lies within Flood Zone 2, indicating a medium probability of flooding (between a 1 in 100 and 1 in 1,000 annual probability), which remains unchanged under future climate change scenarios (2070-2125).

Surface water flood mapping indicates potential risk during 1 in 30, 1 in 100, and 1 in 1,000-year rainfall events, while flood risk from groundwater, sewers, and reservoirs is low.

Mitigation measures include setting finished floor levels no lower than existing levels and incorporating flood resistance and resilience measures. A site-specific Flood Evacuation Plan has been prepared, and occupants will be advised to register for the Environment Agency's Flood Warning Service. The first floor will provide a safe refuge if required.

Surface water runoff will be managed through SuDS, including rainwater harvesting, with maintenance responsibility assigned to the landowner. The development will not increase flood risk elsewhere or cause adverse impacts such as water displacement.

Overall, the proposed development is considered safe for its lifetime and compliant with flood risk policy requirements.

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Abbreviations

Abbreviation	Description
mAOD	Metres Above Ordnance Datum
EA	Environment Agency
FRA	Flood Risk Assessment
LLFA	Lead Local Flood Authority
NPPF	National Planning Policy Framework
SFRA	Strategic Flood Risk Assessment
PFRA	Preliminary Flood Risk Assessment
SuDS	Sustainable Drainage Systems

1.0 Background

UK Flood Risk has been commissioned to prepare this Flood Risk Assessment (FRA) in support of a planning proposal for the erection of part single part double rear extension, following the demolition of the existing rear extension at 39 Frays Waye, Uxbridge UB8 2QU.

This Flood Risk Assessment (FRA) has been prepared in accordance with the requirements of the National Planning Policy Framework (NPPF, February 2025), the Environment Agency's Flood Risk Assessment (FRA) Guidance Notes, and recognised best practices in flood risk management. The assessment also complies with the Defra's National Standards for Sustainable Drainage Systems (SuDS) (July 2025), ensuring that the proposed development incorporates appropriate surface water drainage measures and addresses all relevant flood risk considerations.

2.0 FRA Requirements and Objectives

The key objectives of this Site-Specific Flood Risk Assessment (FRA) are to:

- Identify all potential sources of flooding that may affect the development site, including fluvial (river), surface water, groundwater, sewer, and reservoir flooding.
- Assess the level of flood risk to the proposed development, both in the present day and accounting for the potential impacts of climate change.
- Evaluate the suitability of the proposed development type and its location in relation to the identified flood risk, in accordance with the National Planning Policy Framework (NPPF) and relevant local policy.
- Demonstrate that the development will be safe for its lifetime without increasing flood risk elsewhere, through appropriate mitigation and resilience measures.
- Support the application of the Sequential Test and, where required, the Exception Test, to justify the location of development within a flood risk area.
- Inform the design of site layout and drainage strategy, ensuring flood risk is managed effectively through sustainable drainage solutions (SuDS) and other appropriate infrastructure.
- Comply with the requirements of the Environment Agency, Lead Local Flood Authority (LLFA), and Local Planning Authority (LPA) for managing flood risk in the planning process.

3.0 General Description of the Site and the Proposals

3.1. Description of the site

The proposed development site is located at 39 Frays Waye, Uxbridge UB8 2QU, and is approximately centred on the Ordnance Survey Grid Reference TQ 05113 83602 (**Appendix A Figure 1**). The site lies within the administrative boundary of the London Borough of Hillingdon, which acts as the Lead Local Flood Authority (LLFA) for the area and is responsible for the management of flood risk from surface water, groundwater, and ordinary watercourses, in accordance with the Flood and Water Management Act 2010.

Access to the site is via Frays Waye (**Appendix B**). The surrounding area is characterized by predominantly residential use (**Appendix A Figure 2)**.

The British Geological Survey's geological maps are provided in **Appendix C**. The geological maps show that the bedrock of the site comprises London Clay Formation-Clay, silt and sand. These sedimentary rocks are marine in origin. They are detrital and comprise coarse- to fine-grained slurries of debris from the continental shelf flowing into a deep-sea environment, forming distinctively graded beds. The superficial deposits consist of Alluvium-Clay, Silt, Sand and Gravel. These sedimentary deposits are fluvial in origin. They are detrital, ranging from coarse- to fine-grained and form beds and lenses of deposits reflecting the channels, floodplains and levees of a river or estuary (if in a coastal setting).

The site is located in close proximity to the Fray's River with the risk of fluvial flooding.

The site has a relatively flat topography, with the general elevations ranging from approximately 31.38mAOD to 31.69mAOD as shown in **Appendix D**. Further details regarding the existing site conditions are provided in **Appendix B**.

3.2. Proposed Development

The proposal is for the erection of part single part double rear extension, following the demolition of the existing rear extension. The footprint area of the proposed extension is approximately 33m^2. Further details about the proposals have been provided in **Appendix B**.

4.0 Development and Flood Risk Policy

4.1. National Planning Policy Framework (NPPF)

The National Planning Policy Framework (NPPF, February 2025) sets out the government's planning policies for England. The NPPF sets out planning and policies related to development planning and flood risk using a sequential characterisation of risk based on planning zones and the Environment Agency's Flood Maps. The aim of the flood risk assessment is to identify which Flood Zones the site is located in and vulnerability classification relevant to the proposed development, based on an assessment of current and future conditions.

4.2. Flood Zones

The Flood Zones refer to the probability of river and sea flooding which ignores the presence of defences. The national flood maps have been developed by the Environment Agency that shows the risk of tidal and/or fluvial flooding across England and Wales for different return period events. The Environment Agency's Flood Maps are the maps which have been developed using broad scale hydraulic modelling. It is therefore important to understand that the flood maps may not be very accurate at a site-specific level which may need further field observation and measurements. The Flood Zones do not take into account of the climate change impacts which must be considered in any flood risk assessment as required by the NPPF.

4.3. Sequential and Exception Tests

As set out in the NPPF, the overall aim of the Sequential Test should be to steer new development to Flood Zone 1 (Low Probability Flooding). Where there are no reasonably available sites in Flood Zone 1, the Local Authority should take into account the flood risk vulnerability of land uses and consider reasonably available sites in Flood Zone 2, applying the Exception Test if required. Where there are no reasonably available sites in Flood Zones 1 or 2, the suitability of sites in Flood Zone 3 should be considered, taking into account the flood risk vulnerability of land uses and applying the Exception Test if required.

As the proposal consists of extension to the existing building, the Sequential Test will not be required.

The Exception Test, as set out in the NPPF Framework, is a method to demonstrate and help ensure that flood risk to people and property will be managed satisfactorily, while allowing necessary development to go ahead in situations where suitable sites

at lower risk of flooding are not available. There are two requirements to meet for the Exception Tests. The proposed development will provide wider sustainability benefits to the community that outweigh flood risk, and that it will be safe for its lifetime, without increasing flood risk elsewhere and where possible reduce flood risk overall.

4.4. Vulnerability of Use and Flood Risk Assessment

The proposed development is categorised as 'more vulnerable' (**Table 2**). The site is located in Flood Zone 2 (i.e. medium probability flooding). The proposed development is therefore considered appropriate at this location (**Table 3**). As part of the flood risk assessment, all sources of flood risk must be considered. A site-specific Flood Risk Assessment must demonstrate that the development will be safe for its lifetime, taking into account the vulnerability of its users, without increasing flood risk elsewhere and, where possible, reducing flood risk overall.

This FRA aims to demonstrate that the proposal will remain safe for its lifetime and will not increase flood risk elsewhere.

4.5. NPPF Flood Zones

Table 1 below shows the NPPF Flood Zones and the requirements and policy aims in terms of undertaking site-specific flood risk assessment.

Table 1 - NPPF Flood Zones and Requirements (NPPF Technical Guidance)

Zone 1: Low Probability Flood Zone	**This is defined as the land assessed as having a less than 1 in 1000 annual probability of river or sea flooding in any year (<0.1%).**
Appropriate uses	All uses of land are appropriate in this zone.
FRA requirements	For development proposals on sites comprising 1 ha or above the vulnerability to flooding from other sources as well as from river and sea flooding, and the potential to increase flood risk elsewhere through the addition of hard surfaces and the effect of the new development on surface water run-off, should be incorporated in a FRA.
Policy aims	Developers and local authorities should seek opportunities to reduce the overall level of flood risk through the layout and form of the development, and

	the appropriate application of sustainable drainage techniques.
Zone 2: Medium Probability Flood Zone	**This is defined as the land assessed as having between a 1 in 100 and 1 in 1000 annual probability of river flooding (1% - 0.1%) or between a 1 in 200 and 1 in 1000 annual probability of sea flooding (0.5% - 0.1%) in any year.**
Appropriate uses **FRA requirements** **Policy aims**	The water-compatible, less vulnerable and more vulnerable uses of land and essential infrastructure in Table 2 are appropriate in this zone. Highly vulnerable uses in Table 2 are only appropriate in this zone if the Exception Test is passed. All proposals in this zone should be accompanied by a FRA. Developers and local authorities should seek opportunities to reduce the overall level of flood risk through the layout and form of the development, and the appropriate application of sustainable drainage techniques.
Zone 3a: High Probability Flood Zone	**This is defined as the land assessed as having a 1 in 100 or greater annual probability of river flooding (<1%) or a 1 in 200 or greater annual probability of flooding from the sea (>0.5%) in any year.**
Appropriate uses **FRA requirements** **Policy aims**	The water-compatible and less vulnerable uses of land in Table 2 are appropriate in this zone. The highly vulnerable uses (Table 2) should not be permitted in this zone. The more vulnerable and essential infrastructure uses in Table 2 should only be permitted in this zone if the Exception Test is passed. All proposals in this zone should be accompanied by a FRA. Developers and local authorities should seek opportunities to:

	❖ reduce the overall level of flood risk through the layout and form of the development and the appropriate application of sustainable drainage techniques; ❖ relocate existing development to land with a lower probability of flooding; ❖ create space for flooding to occur by allocating and safeguarding open space for flood storage.
Zone 3b: Functional Floodplain	**This is the land where water has to flow or be stored in times of flood. This zone is generally defined as the land which would flood with an annual probability of 1 in 20 (5%AEP) or greater in any year. The Local Council may define the Functional Floodplain area with a different annual probability of event.**
Appropriate uses	Only the water-compatible uses and the essential infrastructure listed in Table 2 that has to be there should be permitted. It should be designed and constructed to: ❖ remain operational and safe for users in times of flood; ❖ result in no net loss of floodplain storage; ❖ not impede water flows; ❖ not increase flood risk elsewhere.
FRA requirements	All proposals in this zone should be accompanied by a FRA.
Policy aims	In this zone, developers and local authorities should seek opportunities to: ❖ reduce the overall level of flood risk through the layout and form of the development and the appropriate application of sustainable drainage techniques; ❖ relocate existing development to land with a lower probability of flooding.

Table 2 - Flood Risk Vulnerability Classification (NPPF Technical Guidance)

Essential Infrastructure	Essential transport infrastructure and strategic utility infrastructure, including electricity generating power stations and grid and primary substations.
Highly Vulnerable	❖ Police stations, Ambulance stations and Fire stations and Command Centres and telecommunications installations and emergency dispersal points. ❖ Basement dwellings, caravans, mobile homes and park homes intended for permanent residential use. ❖ Installations requiring hazardous substances consent.
More Vulnerable	❖ Hospitals, residential institutions such as residential care homes, children's homes, ❖ Social services homes, prisons and hostels. ❖ Buildings used for: dwelling houses, student halls of residence, drinking establishments, nightclubs, hotels and sites used for holiday or short-let caravans and camping. ❖ Non–residential uses for health services, nurseries and education. ❖ Landfill and waste management facilities for hazardous waste.
Less Vulnerable	❖ Buildings used for shops, financial, professional and other services, restaurants and cafes, offices, industry, storage and distribution, and assembly and leisure. ❖ Land and buildings used for agriculture and forestry. ❖ Waste treatment (except landfill and hazardous waste facilities), minerals working and processing (except for sand and gravel). ❖ Water treatment plants and sewage treatment plants (if adequate pollution control measures are in place).

Water-compatible Development	❖ Flood control infrastructure, water transmission infrastructure and pumping stations. ❖ Sewage transmission infrastructure and pumping stations. ❖ Sand and gravel workings. ❖ Docks, marinas and wharves, navigation facilities. ❖ MOD defence installations. ❖ Ship building, repairing and dismantling, dockside fish processing and refrigeration and compatible activities requiring a waterside location ❖ Water-based recreation (excluding sleeping accommodation). ❖ Lifeguard and coastguard stations. ❖ Amenity open space, nature conservation and biodiversity, outdoor sports and recreation. ❖ Essential sleeping or residential accommodation for staff required by uses in this category, subject to a warning and evacuation plan.

Table 3 - Flood Risk Vulnerability and Flood Zone 'compatibility'

Vulnerability Classification (Refer Table 2)		Essential Infrastructure	Water Compatible	Highly Vulnerable	More Vulnerable	Less Vulnerable
Flood Zones	Flood Zone 1	✓	✓	✓	✓	✓
	Flood Zone 2	✓	✓	Exception Test	✓	✓
	Flood Zone 3a	Exception Test	✓	×	Exception Test	✓
	Flood Zone 3b	Exception Test	✓	×	×	×

✓ Development is appropriate

× Development should not be permitted

4.6. Strategic Flood Risk Assessment (SFRA)

The West London Strategic Flood Risk Assessment (West London SFRA) undertaken jointly by the boroughs of Barnet, Brent, Ealing, Harrow, Hillingdon and Hounslow, is a comprehensive study that assesses the potential risks and impacts of flooding in the area. The SFRA provides important information to support land use planning, development control, emergency planning, and community resilience.

The SFRA considers a range of potential flood risks, including those from rivers, surface water, and groundwater sources. The study includes detailed flood risk maps that identify areas at risk of flooding and the potential consequences of flooding, such as property damage, business disruption, and loss of life.

The SFRA also provides guidance on flood risk management strategies and measures that can be implemented to mitigate the potential impacts of flooding. This includes measures such as flood defences, land use planning controls, emergency response planning, and public awareness and education campaigns.

The SFRA provides a strategic overview of all forms of flood risk throughout the area, now and in the future. This document, and the associated web-based mapping delivered as part of the SFRA, is designed to help address local requirements, manage development requirements, and manage the risk of flooding posed to both residents and buildings.

The Local Authority's SFRA is an important tool for ensuring that flood risk is considered in land use planning and development decisions. It supports the Local Authority's efforts to manage flood risk and build resilience in the face of potential flooding events.

5.0 Assessment of Flood Risk

5.1. History of Flooding

The West London Strategic Flood Risk Assessment (West London SFRA) provides brief information on past flooding events in the area. The SFRA reported some historical flooding incidents in the wider area, however, there were no recorded flooding events at the site.

In addition, information on historic flooding was obtained from the Environment Agency's online records of historic flood events in the area (**Appendix E Figure 1)** Historic flood maps indicate flooding incidents occurred in areas surrounding the site; however, the site itself lies outside the recorded historic flood extents.

5.2. Risk of Fluvial Flooding

The site is located in close proximity to the Fray's River with the risk of fluvial flooding. The Environment Agency's Flood Map around the site is shown in **Appendix E Figure 2** which shows that the site lies within the Flood Zone 2 (i.e. medium probability flooding). Flood Zone 2 fluvial outline shows a land having between a 1 in 100 and 1 in 1,000 annual probability of river flooding.

Appendix E Figure 3 shows that the site will remain within the Flood Zone 2 (i.e. medium probability flooding) when climate change is considered for the future 2070-2125 time frame.

5.3. Risk of Tidal Flooding

The watercourses are not influenced by tidal waves at this location. The risk of tidal flooding is therefore low.

5.4. Risk of Flooding From Artificial Water Bodies

There were no known flood risks from any artificial water bodies near the site.

5.5. Risk of Groundwater Flooding

In recent years, groundwater has been increasingly recognised as a significant source of flooding in the UK. According to the British Geological Survey (BGS), groundwater flooding occurs when the water table in permeable rocks rises high enough to enter basements or cellars, or even emerge above the ground surface. Unlike other types

of flooding, groundwater flooding is not always directly linked to specific rainfall events and is typically of longer duration, potentially lasting for weeks or even months.

Within the Strategic Flood Risk Assessment (SFRA), evidence of historical groundwater flooding is very limited. However, it is important to note that the risk of groundwater flooding is highly variable and largely dependent on local geological and hydrological conditions at any given time.

Based on information provided by the landowner, there are no known records of groundwater flooding incidents at or near the site. Taking into account both the available evidence and local knowledge, it is reasonable to conclude that the risk of groundwater flooding to the site is low.

5.6. Risk of Surface Water Flooding

Surface water flooding occurs when the infiltration capacity of the land or the drainage capacity of the local sewer network is exceeded, causing excess rainwater to flow overland. The severity of surface water flooding is influenced by several factors, including the degree of soil saturation prior to the rainfall event, soil and geological permeability, topography (e.g. slope steepness), and the intensity of land use.

The Environment Agency maintains mapping data on the risk of surface water flooding. Relevant maps are included in **Appendix E Figures 4, 5, and 6**. According to these maps, part of the site lies within the predicted flood extents for surface water flooding during the 1 in 30-year, 1 in 100-year, and 1 in 1,000-year rainfall events.

5.7. Risk of flooding from Reservoirs

The Environment Agency's reservoir flood map in **Appendix E Figure 7** indicated that the proposal site is located within the maximum extent of flooding from reservoir. However, according to the Environment Agency, the reservoir flooding is extremely unlikely to happen and reservoirs in the UK have an extremely good safety record; indeed, there has been no loss of life in the UK from reservoir flooding since 1925. The Environment Agency is the enforcement authority for the Reservoirs Act 1975 in England and Wales. All large reservoirs must be inspected and supervised by reservoir panel engineers on a regular basis. It is therefore assumed that these reservoirs are regularly inspected, and essential safety work is carried out. These reservoirs therefore present a managed residual risk.

5.8. Flood Risk from Sewers

Sewer flooding is commonly caused by excess surface water entering the drainage network, which can lead to the surcharging of sewers. The Strategic Flood Risk Assessment (SFRA) provides limited information regarding sewer flooding in the area. However, no records of sewer flooding incidents have been identified at the site.

It is important to recognise that the absence or presence of historic sewer flooding does not necessarily reflect the current or future risk to a site. Infrastructure upgrades may have been implemented to address previous issues, or conversely, deterioration of local drainage systems in areas with no past incidents could increase the future risk.

According to information provided by the landowner, there is no known history of sewer flooding at the site. Based on this evidence and local knowledge, it is reasonable to conclude that the risk of sewer flooding to the site is low.

5.9. Impact of Climate Change

In July 2021 the 'Flood Risk Assessments: Climate Change Allowances' were updated from the originally published Climate Change allowances on GOV.UK. The guidelines outline the peak river flow climate change allowances by management catchment. The range of Climate Change allowances is based on percentiles. A percentile is a measure used in statistics to describe the proportion of possible scenarios that fall below an allowance level. The 50th percentile is the point at which half of the possible scenarios for peak flows fall below it and half fall above it. The central allowance is based on the 50th percentile, higher central is based on the 70th percentile and the upper end is based on the 90th percentile.

The proposal site is located within the London Management Catchment and within the Thames River Basin District. The relevant climate change allowances are summarised in **Table 4**.

Using peak river flow allowances for flood risk assessments

The guideline suggests to consider the flood zone and the appropriate flood risk vulnerability classification to decide which allowances applies to the development or plan.

In flood zones 2 or 3a for:

- Essential infrastructure – use the higher central allowance,
- Highly vulnerable – use central allowance (development should not be permitted in flood zone 3a),

- More vulnerable – use the central allowance,
- Less vulnerable – use the central allowance,
- Water compatible – use the central allowance.

In flood zone 3b for:

- Essential infrastructure – use the higher central allowance,
- Highly vulnerable – development should not be permitted,
- More vulnerable – development should not be permitted,
- Less vulnerable – development should not be permitted,
- Water compatible – use the central allowance.

Table 4 - Peak river flow allowances by Management Catchment and River Basin District

Management Catchment Name / River Basin District	Climate Change allowance	Total potential change anticipated for the '2020s' (2015 to 2039)	Total potential change anticipated for the '2050s' (2040 to 2069)	Total potential change anticipated for the '2080s' (2070 to 2115)
London / Thames	Upper end	26%	30%	54%
	Higher central	14%	14%	27%
	Central	10%	7%	17%

Assessment of Climate Change Impact for the Site

The proposal site is located within the London Management Catchment and Thames River Basin District. As the proposed development is categorised as 'more vulnerable' and the site is located within a flood zone, the guideline recommends to use the Central allowance for assessing the impact of climate change. The Central allowance for the London/Thames River Basin District is 17% for the period between 2070 and 2115 (**Table 4**). This allowance should be used for assessing the impact of climate change to the flood risk to the site.

6.0 Mitigation Measures

6.1. Recommended Finished Floor Level

The Environment Agency has issued a Standing Advice on preparing a Flood Risk Assessment which includes the advice on setting the finished floor level for the householder extension located within a flood zone. This applies to domestic extensions and non-domestic extensions where the additional footprint created by the development does not exceed 250m^2. The additional footprint created by the development is approximately 33m^2. As such, there are two options available for flood mitigation from which the applicant needs to choose one option as shown in **Table 5** below.

Table 5 – Flood Mitigation Measures for Minor Extensions in Flood Zone 2 and 3

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]	

For the proposed development, the first option has been chosen for flood mitigation. According to this option, the floor level of the proposed extension will be set no lower than the existing level of the property, and flood proofing of the proposed development will be incorporated where appropriate.

It is recommended that flood resilient measures are used in the development as far as practicable to manage the residual risk, reduce the damage and clean up time following a flood. The flood proofing and resilient measures have been briefly discussed below.

6.2. Flood Proofing and Resilient Measures (Up to 600mm from Ground Levels)

The following flood proofing and resilient measures will be adopted, where practicable, to minimise the damage and to enable quick recovery and clean up after the flooding event:

- Automatic or manual covers will be used for air bricks to prevent water from entering through ventilation hole.
- Non-return valves will be fitted in the drainage system to prevent back-flow of diluted sewage in situations where there is an identified risk of the foul sewer surcharging.
- All service entries will be sealed (e.g. with expanding foam or similar closed cell material).
- Closed cell insulation will be used for pipes which are below the predicted flood levels.
- Wiring for telephone, TV, Internet and other services will be protected by suitable insulation to minimise damage.
- Important documents, electronics and valuable belongings will be stored in waterproof containers to avoid water damage.
- Waterproof coatings and sealants will be applied to walls and foundations.
- Cracks and gaps in walls, floors, and around pipes will be sealed.
- Building materials that are effective for a 'water exclusion strategy' will be used which include: engineering bricks, cement-based materials including water retaining concrete and dense stone.

6.3. Flood Warning and Evacuation

As the site lies within a designated flood zone, it is essential that occupants are made fully aware of the flood risk and the procedures for flood warning and evacuation in the event of an extreme flood. If required during a flood event, the first floor will serve as a safe refuge for occupants until it is safe to evacuate.

A site-specific Flood Evacuation Plan has been developed for the site to ensure the safety and well-being of the occupants by providing a clear, structured, and efficient

response to flooding events, which is provided in **Appendix F**. The Flood Evacuation Plan ensures that occupants are evacuated promptly and safely before the floodwaters pose a significant threat to life.

6.3.1. Flood Warnings Direct

The occupants are advised to utilise the Environment Agency's Flood Warnings Direct which is a free flood warning service called Floodline Warnings Direct (FWD). This service generally gives an advance notice of when flooding is likely to happen and time to prepare for a flood event. Property owners on the proposed development site will be able to sign up to FWD online using the following contact details (**Table 6**):

Table 6- Contacts for flood warning services

Methods	Remarks
Online	https://fwd.environment-agency.gov.uk/app/olr/register
Telephone	0345 988 1188

6.3.2. Flood Warning Service

The Flood Warning Service is provided by the Environment Agency across England and Wales in areas at risk of flooding from rivers or the sea. This is provided using up to date rainfall, river level and sea condition monitoring 24 hours a day to forecast the possibility of flooding. If flooding is forecast, the Environment Agency will issue warnings using a set of three different warning types **(Table 7).** Many areas of England are covered by the full four stages of the Environment Agency's Flood Warning Service. The site is located in an area covered by the Flood Alert Services **(Appendix E Figure 8).**

The Environment Agency's Flood Warning target lead time; the time between a flood warning being issued and the onset of flooding is approximately two hours. Providing the Environment Agency can meet their target Flood Warning lead time, the occupants of the proposed development will have two hours to ensure that property is relocated to minimise risk and evacuation to safe locations can be carried out.

Table 7 - Environment Agency's Flood Warning Codes

Flood Warning Code	Meaning	Actions to be taken
	Flooding is possible. Be prepared.	• Be prepared to act on your flood plan. • Prepare a flood kit of essential items. • Monitor local water levels and the flood forecast on EA website.
	Flooding is expected. Immediate action required.	• Move family, pets 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 flooding. Danger to life.	• Stay in a safe place with a means of escape. • Be ready should you need to evacuate from your home. • Co-operate with the emergency services. • Call 999 if you are in immediate danger.
Warnings no longer in force	No further flooding is currently expected in your area.	• Be careful. Flood water may still be around for several days. • If you've been flooded, ring your insurance company as soon as possible.

6.4. Surface Water Management

6.4.1. Hierarchy of SuDS Measures

The surface runoff from the site will be improved by implementing appropriate SuDS. The requirements for SuDS will ensure that any redevelopment or new development does not negatively contribute to the surface water flood risk of other properties and instead provides a positive benefit to the level of risk in the area. It will also ensure that appropriate measures are taken to increase the flood resilience of new properties and developments in surface water flood risk areas, such as those identified as being locally important flood risk areas.

The SuDS hierarchy and management train has been discussed in the SuDS Manual (C753) which aims to mimic the natural catchment processes as closely as possible. The general hierarchy of the SuDS measures is provided in **Table 8**.

Table 8 General Hierarchy of SuDS Measures

Measures	Definition/Description
Prevention	The use of good site design and housekeeping measures to prevent runoff and pollution (e.g. rainwater harvesting/reuse).
Source control	Control of runoff at or very near its source (e.g. soakaways, porous and pervious surfaces, green roofs).
Site control	Management of water in a local area on site (e.g. routing water to large soakaways, infiltration or detention basins)
Regional control	Management of runoff from a site or several sites (e.g. balancing ponds, wetlands).

Table 9 presents the feasibility assessment of the SuDS measures for the site.

Table 9 General Assessment of SuDS measures for the site

SuDS Measures	Issues/Description	Feasibility for the site
Prevention Good site design and housekeeping/rainwater harvesting/infiltration devices/education.	Surface runoff can be improved by implementing rainwater harvesting using water butt.	Yes. There is a potential for a rainwater harvesting (water butt) to storage the runoff from roof and utilise the water for gardening, cleaning etc.

Source Control Porous and pervious materials/soakaways/green roof/infiltration trenches/disconnect downpipes to drain to lawns or infiltrate to soakaway.	Presence of clay and fine soil means the infiltration measures may not be appropriate.	No. The underlying soil is composed of clay and fine silt with very low permeability. Therefore, the potential of a soakaway is low.
Site and Regional Control Infiltration/detention basins/ balancing ponds/ wetlands/underground storage/swales/retention ponds.	Balancing pond/storage will not be feasible due to limited space available.	No. The potential for balancing pond/storage is low as there is very limited space available for any storage.

Based on the general assessment of the potential SuDS measures above, it is proposed that a rainwater harvesting (water butt) will be implemented to improve the surface runoff from the site. The general layout of the proposed rainwater harvesting is shown in **Appendix G**. The location of the water butt can be changed in order to suit the location condition.

Rainwater harvesting is the process of collecting and storing rainwater that falls on rooftops or other areas for later use. Rainwater harvesting is a simple and effective way to conserve water, save money, and reduce the impact on the environment. Rainwater is generally clean and free of pollutants, which can make it a safer and more environmentally friendly option for various uses. Harvesting rainwater can help save money on water bills by using the stored water for non-potable uses, such as watering plants or washing cars.

The landowners will be fully responsible for the repair and management of the implemented SuDS throughout the lifetime of the proposed development.

7.0 Assessment of Impact on flow of floodwater

The proposed development is for the erection of part single part double rear extension, following the demolition of the existing rear extension. In order to ensure that the proposed development will not increase flood risk elsewhere the mitigations will ensure that all flood water, surface water and rainwater is processed on-site and not redirected elsewhere through the use of appropriate SuDS measures as outlined above. The development will not give rise to backwater effects or divert water towards other properties.

8.0 Conclusion

The proposed development is for the erection of part single part double rear extension, following the demolition of the existing rear extension at 39 Frays Waye, Uxbridge UB8 2QU.

In accordance with the NPPF Guidelines, the proposed development use is categorised as 'more vulnerable'. As the site is located in Flood Zone 2, the proposed development is appropriate at this location.

The site is located in close proximity to the Fray's River with the risk of fluvial flooding.

According to the information available from the Local Authority's SFRA and the Environment Agency, there were no records of flooding at the site.

The Environment Agency's Flood Maps show that the site lies within the Flood Zone 2 (i.e. medium probability flooding). Flood Zone 2 fluvial outline shows a land having between a 1 in 100 and 1 in 1,000 annual probability of river flooding.

The Environment Agency's flood risk map also indicates that the site will remain within the Flood Zone 2 (i.e. medium probability flooding), when climate change is considered for the future 2070-2125-time frame.

According to the Environment Agency's surface water flood maps, the site lies within the predicted flood extents for surface water flooding during the 1 in 30-year, 1 in 100-year, and 1 in 1,000-year rainfall events.

The flood risk from other sources including underground water, sewer and reservoir is low.

In line with the Environment Agency's Standing Advice on Preparing a Flood Risk Assessment, in order to provide a level of protection against flooding the floor level of the proposed extension will be set no lower than the existing level of the property, and flood proofing of the proposed development will be incorporated where appropriate.

A range of flood proofing and resilient measures will be implemented to minimise potential damage and facilitate a quicker recovery and clean-up following a flooding event.

As the site lies within a flood risk area, it is essential to ensure that all occupants are fully aware of the potential flood risk, flood warnings, and the evacuation procedures to be followed during an extreme event. If necessary, the first floor of the property will serve as a safe refuge for occupants until floodwaters recede or assistance arrives.

A site-specific Flood Evacuation Plan has been prepared for the property to ensure the safety and well-being of occupants by outlining a clear, structured, and effective response during flood events. The plan aims to facilitate the safe and timely evacuation of occupants before floodwaters pose a significant risk to life.

Occupants are advised to register for and make use of the Environment Agency's Flood Warning Service available in the area.

The surface runoff will be improved by implementing appropriate SuDS measures. A rainwater harvesting (water butt) will be implemented to improve the surface runoff. The landowners will be fully responsible for the repair and management of the implemented SuDS throughout the lifetime of the proposed development.

The development will not give rise to backwater effects or divert water towards other properties.

This report demonstrates that the proposal will be safe, in terms of flood risk, for its design life and will not increase the flood risk elsewhere.

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Appendix A Site Location Maps

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Appendix B Existing Site and Proposed Plans

Appendix C Geological Map

Appendix D Topographic Map

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Appendix E Environment Agency's Flood Maps

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Appendix F Flood Evacuation Plan

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Appendix G Proposed Sustainable Drainage Systems (SuDS)