



# Brookville, Littlewick Road

## Flood Risk Assessment

Job Number: 1049

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<b>Acronyms</b>	
<b>AOD</b>	Above Ordnance Datum
<b>CIRIA</b>	Construction Industry Research and Information Association
<b>EA</b>	Environment Agency
<b>FRA</b>	Flood Risk Assessment
<b>NPPF</b>	National Planning Policy Framework
<b>PPG</b>	Planning Practice Guidance
<b>SFRA</b>	Strategic Flood Risk Assessment

*Report by: Tom Quigg BSc MSc CEng MICE*

## Introduction

Flume Consultants have been appointed to undertake a Flood Risk Assessment for the proposed development at Brookville, Littlewick Road, GU21 4XR.

This FRA has been carried out in accordance with the National Planning Policy Framework (NPPF) and the Planning Practice Guidance 'Flood Risk and Coastal Change'. This FRA also incorporates advice and guidance from the Environment Agency (EA), the Strategic Flood Risk Assessment (SFRA) produced by Woking Borough Council and CIRIA documents.

The Environment Agency's (EA) indicative floodplain map shows that the site is located in Flood Zone 2. This assessment will therefore focus on the flood risk to the site from watercourses, and from all other sources.

## Site Description and Location

The existing detached house is a two-storey dwelling with an existing loft. Immediately to the side and rear of the property is a mix of hard and soft landscaping, with the main access door at the front of the building facing Littlewick Road. The building itself is approximately 300 metres west of the Parley Brook.

The site postcode is GU21 4XR and the OS grid reference is SU 97901 59567.

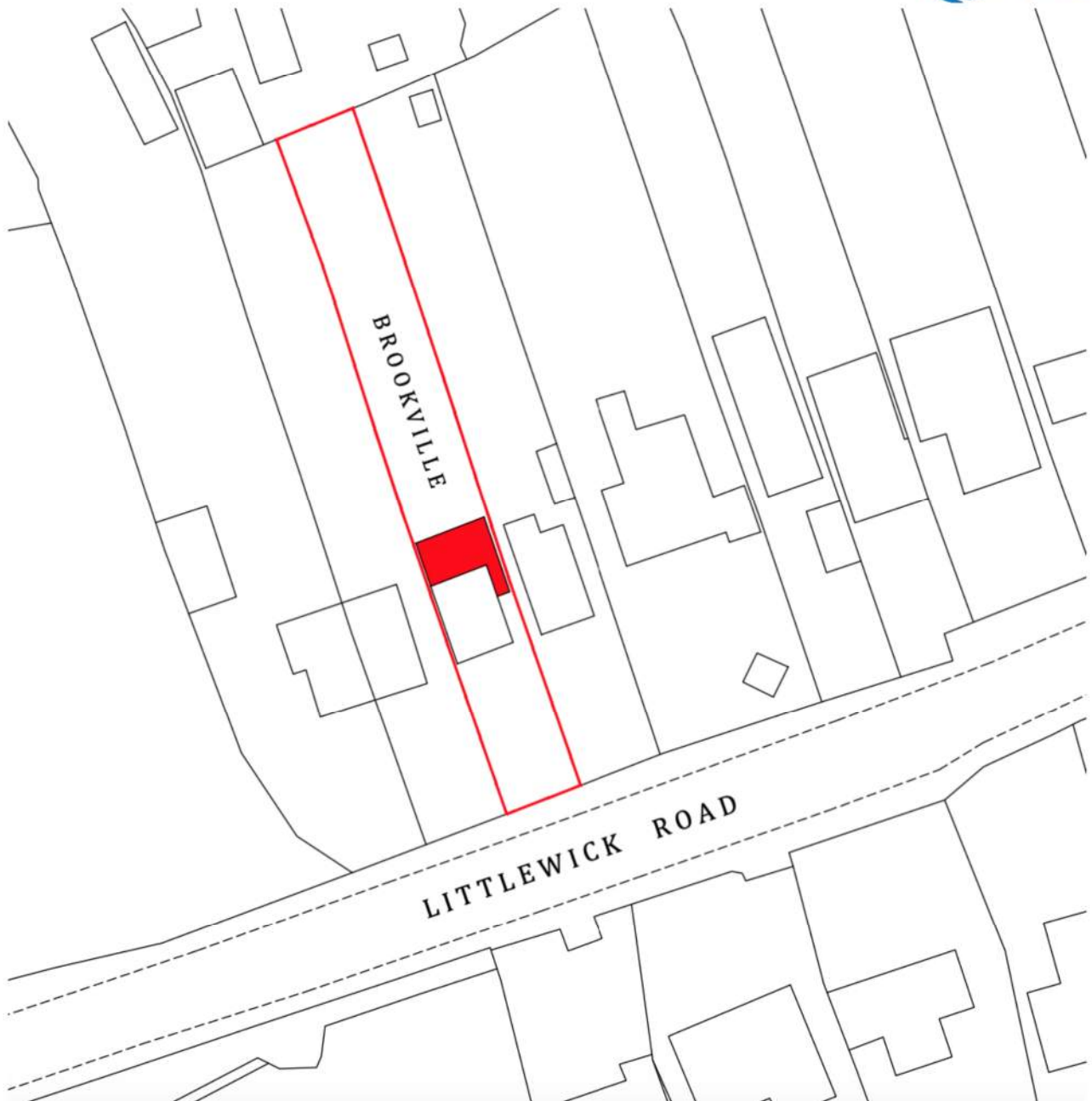


FIGURE 1. SITE LOCATION

## Development Proposal

The development proposals include a single-storey extension to the side and rear of the building, adding approximately 30m<sup>2</sup> of new internal floorspace.

This extension will be constructed largely over the existing hardstanding areas to the side and rear of the property. The ground floor extension will be finished throughout to the same floor level as the existing ground floor, in accordance with the EA and Planning Authority’s advice. Pedestrian and Vehicular access will remain unaffected.

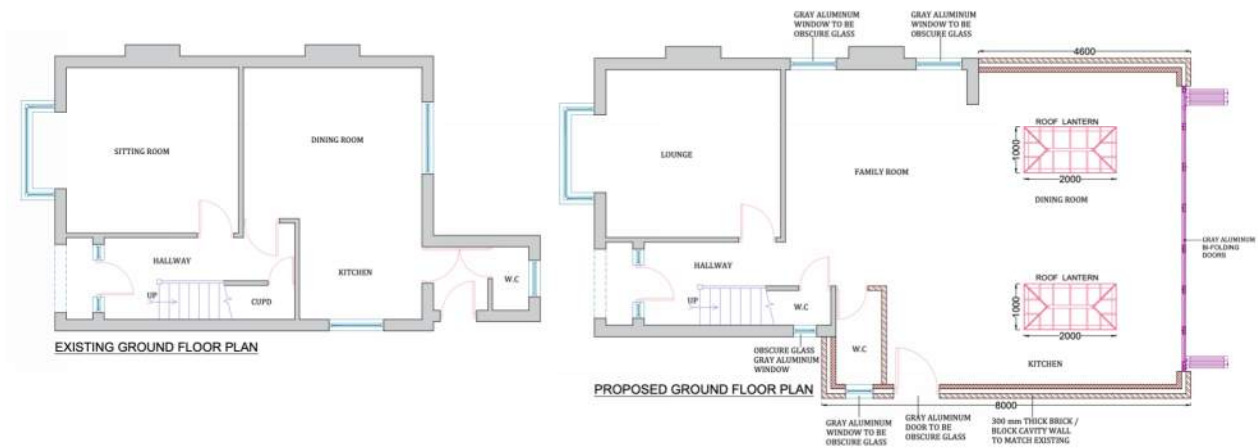


FIGURE 2. EXISTING BUILDING & PROPOSED EXTENSION

## Flood Risk Assessment

The National Planning Policy Framework states that minor developments such as residential extensions, are unlikely to raise significant flood risk issues. The NPPF refers applications to the Environment Agency's (EA) 'Standing Advice' for further guidance.

### Flood Risk from Watercourses

The EA's indicative floodplain map shows that the site is located in Flood Zone 2 and is at risk of flooding from the nearby ordinary watercourse, Parley Brook. Land in this flood zone is assessed as having between a 1 in 100 and 1 in 1,000 annual probability of river flooding (1% – 0.1%). The EA's indicative fluvial/tidal flood risk maps, Figure 3, suggest that the site is not located in an area which benefits from flood defences, however, the EA's website also states that not all defences are shown on the map.

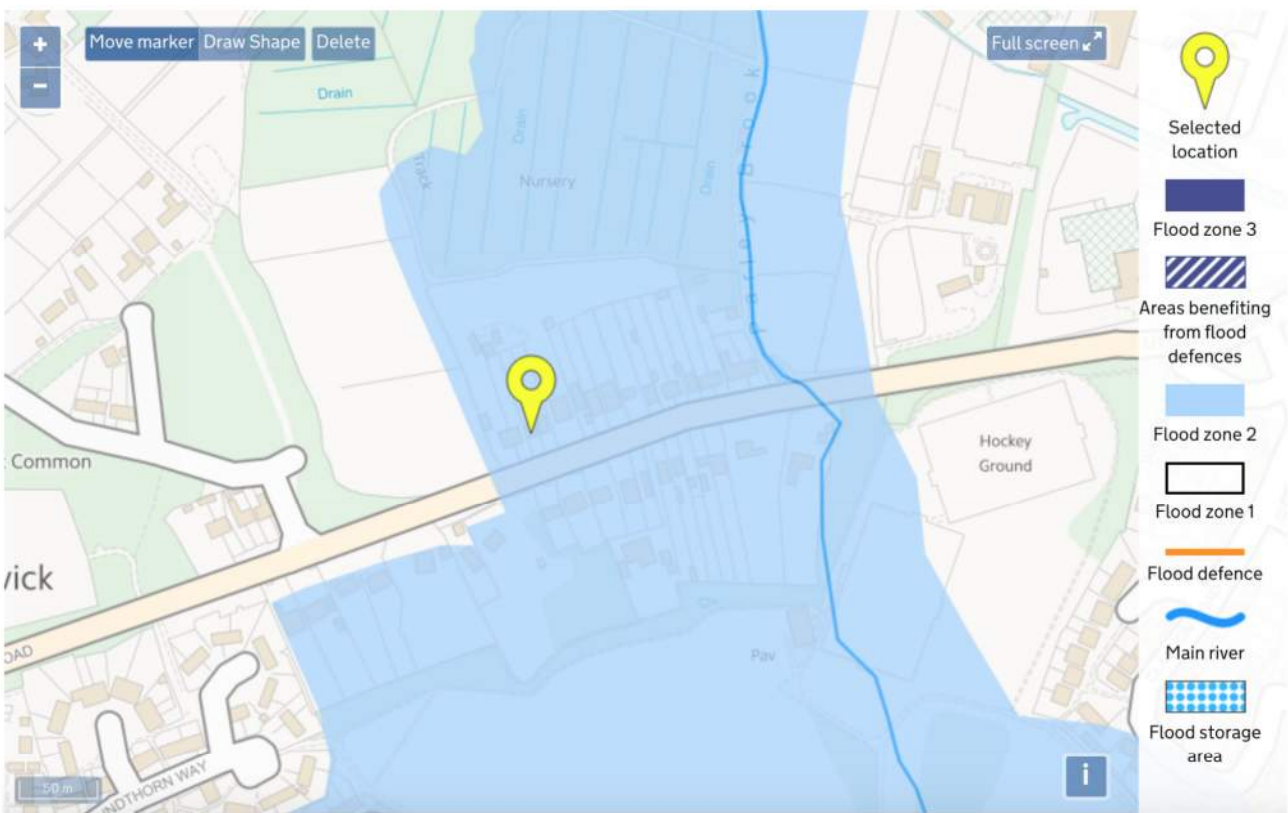


FIGURE 3. ENVIRONMENT AGENCY FLOOD RISK FROM RIVERS OR SEA MAP (GOV.UK, 2020)



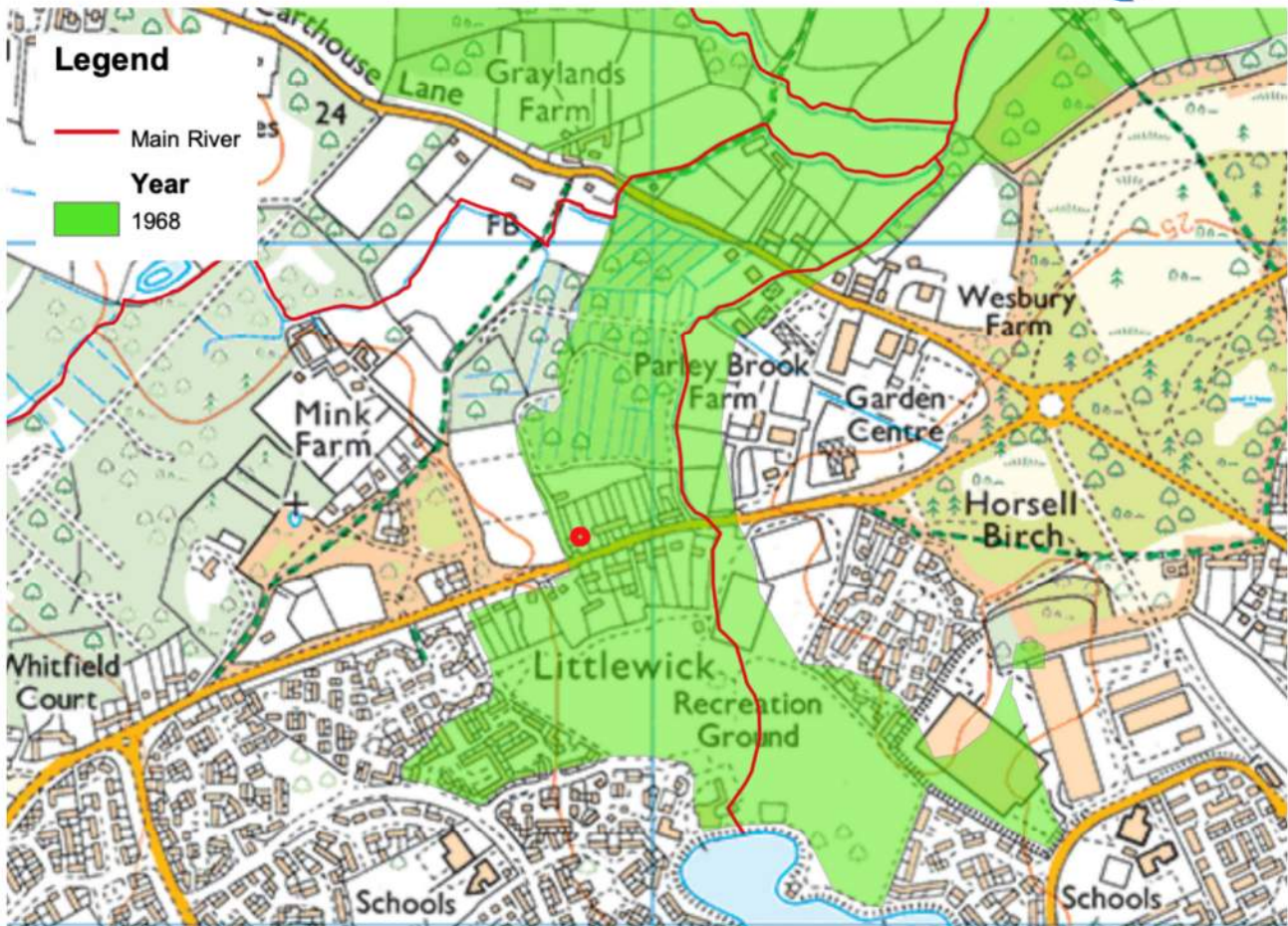


FIGURE 4. EA'S RECORDED FLOOD OUTLINE MAP (EA, 2020)

Furthermore, the EA's *Recorded Flood Outline* maps indicated in Figure 4, shows the site has not flooded since 1968. Small ordinary watercourses are often not modelled by the EA, therefore, the national generalised flood maps as shown in Figure 3, are often drawn up based on historic flood extents. This appears to be the case for the proposed development - the nearest modelled watercourse is the Addlestone Bourne, nearly 1km north of the site and according to the EA the development does not flood (Appendix A).

### Flood Risk from Groundwater

Flooding from groundwater typically occurs following prolonged periods of wet weather within low laying areas underlain by permeable aquifers. When aquifers are fully saturated, flooding at surface level can occur from the sub-surface strata.

The susceptibility or vulnerability of the particular area, is highlighted on the groundwater vulnerability map (Figure 5), which indicates a *medium-high* risk of groundwater flooding in the area.

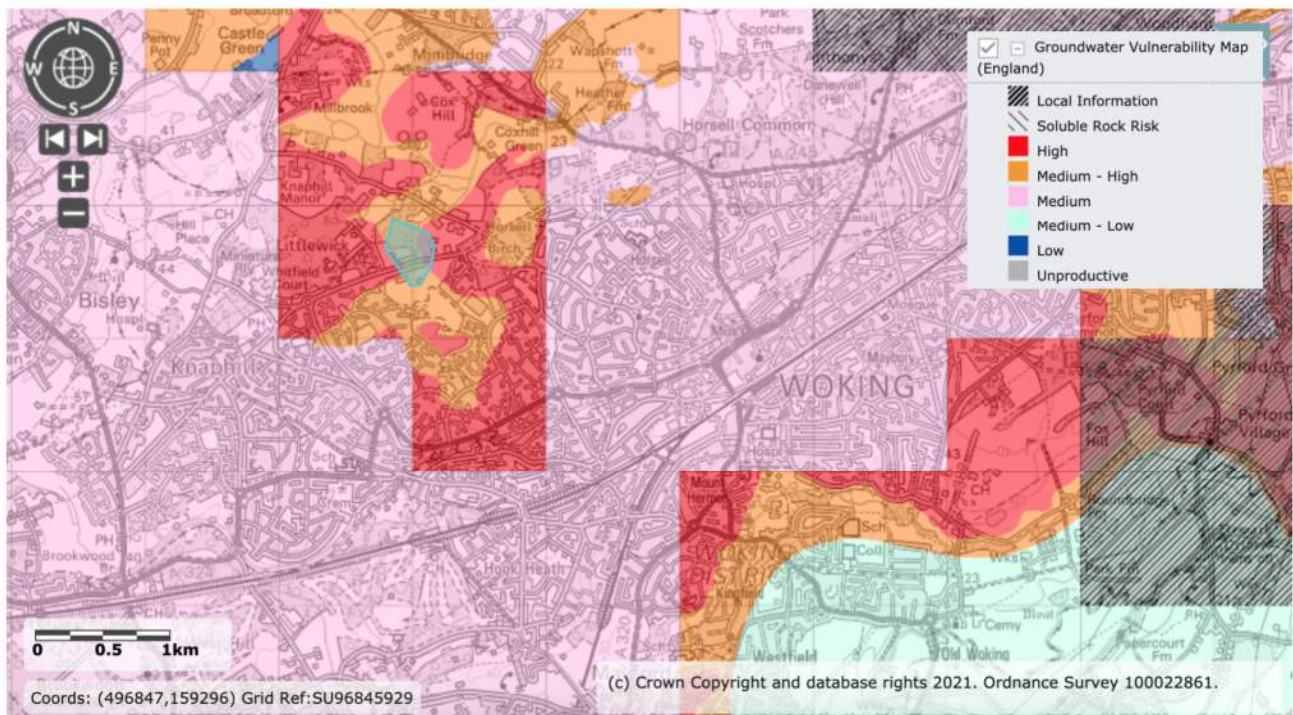


FIGURE 5. DEFRA'S GROUNDWATER VULNERABILITY MAP (DEFRA.GOV.UK, 2020)

These maps consider very large areas of the underlying geology, and ignore subtle shifts in local geology and ground levels. Furthermore, groundwater flooding is an important consideration for subterranean basements. However, this is a small extension and no basements are proposed in this instance. Therefore the likelihood of groundwater flooding tends to be low risk.

Finally, engineering techniques will also be incorporated into the design to further mitigate any flood risk from groundwater.



### Flood Risk from Surface Water and Overland Flows

Surface water flooding occurs when intense rainfall is unable to infiltrate into the ground or overwhelms the drainage system. This surface water runs across the surface of the ground causing flooding. The Environment Agency’s Surface Water Flood Risk Map can also reflect surface water flooding along the line of small ordinary watercourses. Overland flows can also be generated by burst water mains, failed dams and any failure in a system storing or transferring water.

The EA’s indicative Surface Water Flooding Map, Figure 6, shows that the site is at *very low* risk of surface water flooding.

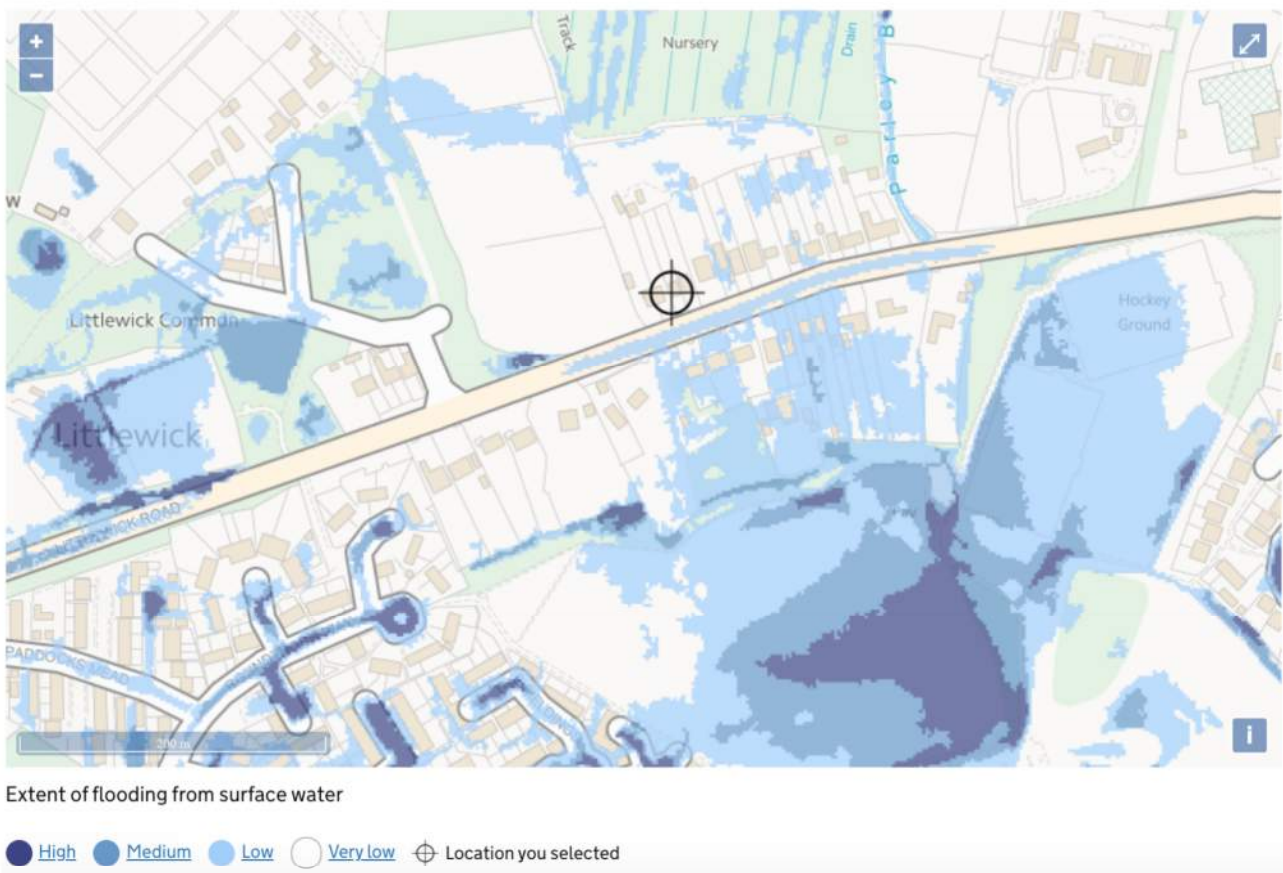
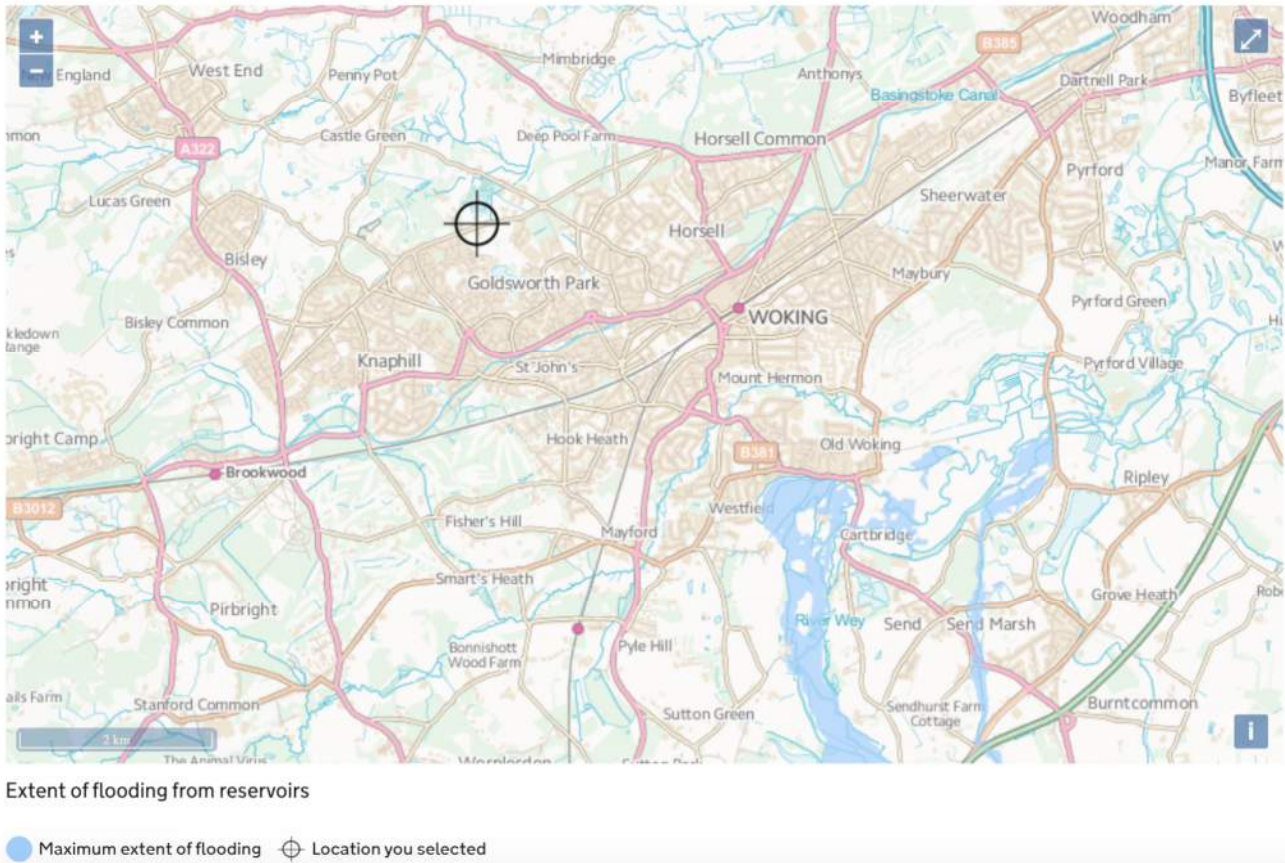


FIGURE 6. ENVIRONMENT AGENCY FLOOD RISK FROM SURFACE WATER MAP (GOV.UK, 2020)

### Flood Risk from Reservoir and Infrastructure Failure

The EA's information states that reservoir flooding is extremely unlikely to happen and there has been no loss of life in the UK from reservoir flooding since 1925. The Reservoir Act of 1975 ensures that reservoirs are inspected regularly and essential safety work is carried out.



**FIGURE 7. ENVIRONMENT AGENCY FLOOD RISK FROM RESERVOIRS MAP (GOV.UK, 2020)**

Figure 7 shows the site is not at risk of Reservoir Failure.

## Flood Mitigation Measures

The proposed extension will not increase the flood risk to the building users, as it will not change the use of the development or introduce more people into a flood risk area. The ground floor extension will also be used for living space only, and will not be used for sleeping accommodation. Therefore, the development should be acceptable without introducing any mitigation measures. However, to further reinforce the flood resilience of the building to account for any residual flood risk, any construction works at ground level should include an appropriate damp proof membrane, and incorporate other available flood resilient materials where possible. Furthermore, all drainage systems should be routinely maintained to reduce the risk of blockage and surface water flood risk.

The extension is approximately 30m<sup>2</sup> in size. It is proposed that the Finished Floor Level (FFL) of the extension remains the same as the existing ground floor FFLs. These proposals are in accordance with the EA's Standing Advice<sup>1</sup>, which states that floor levels within the proposed development should be set no lower than existing levels, and flood proofing should be incorporated in order to protect the extension from flooding.

It is proposed flood resilient<sup>2</sup> materials will be used for flooring and on the walls up to minimise the potential for damage, in the unlikely event of flood water inundating the development. Finally, unrestricted access to the first floor will be available at all times.

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<sup>1</sup> <https://www.gov.uk/guidance/flood-risk-assessment-standing-advice>

<sup>2</sup> [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/7730/flood\\_performance.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/7730/flood_performance.pdf)



## Conclusions

The National Planning Policy Framework (NPPF) states that minor developments such as residential extensions, are unlikely to raise significant flood risk issues. The FRA has further demonstrated the proposed development has an acceptable flood risk within the terms and requirements of NPPF and accompanying technical guidance.



**Appendix A - Environment Agency Flood Information**

## Product 4 (Detailed Flood Risk) for GU21 4XR

### Our Ref: THM170227

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:

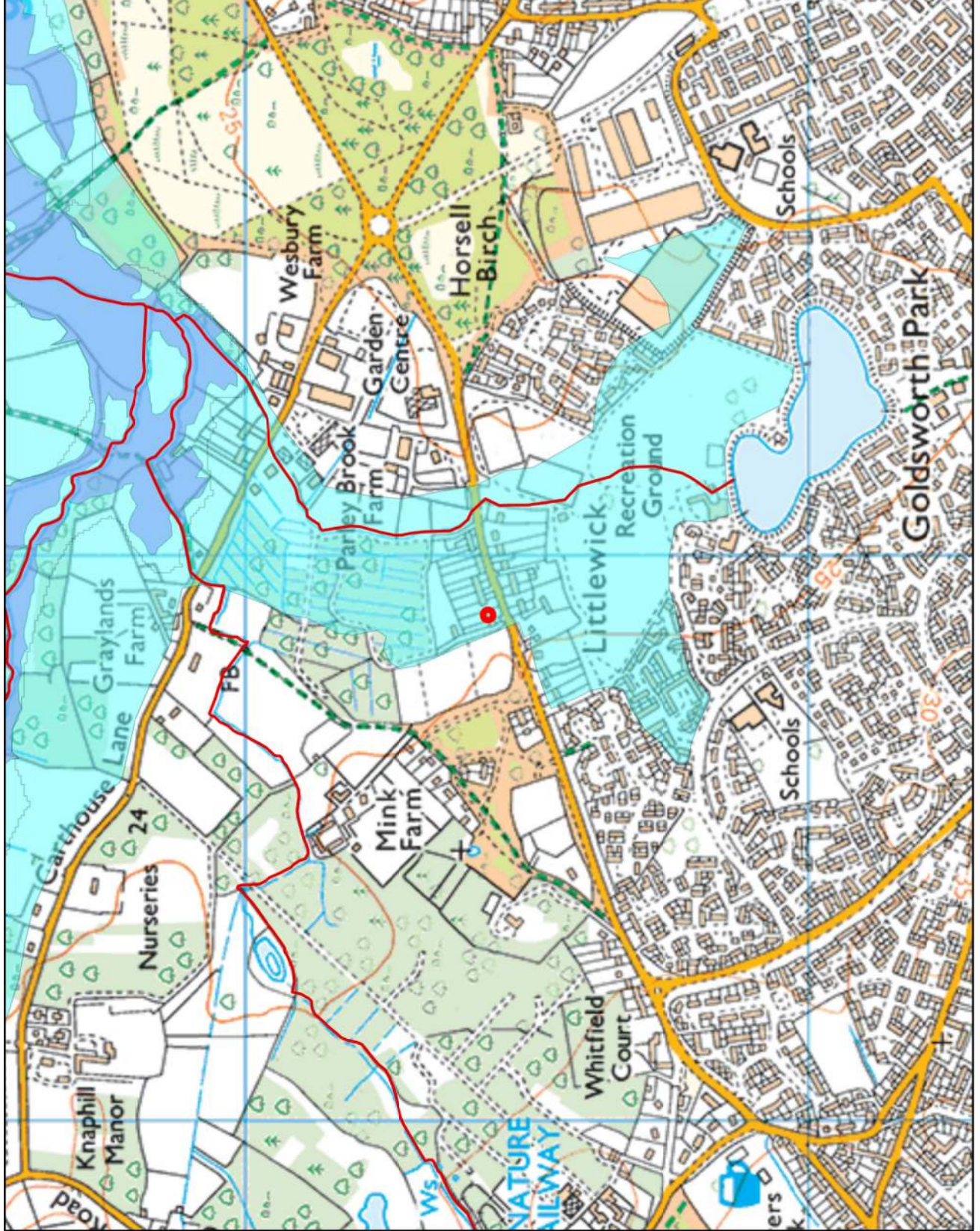
<https://www.gov.uk/guidance/flood-risk-assessment-local-planning-authorities>

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>



**Flood Map for Planning centred on HU21 4XR  
Created on 11/5/2020 REF: THM170227**



Kilometres



**Legend**

- Main River
- Flood defences
- Areas benefiting from flood defences
- Flooding from rivers or sea (FZ3)
- Extent of extreme flood (FZ2)
- - - Flood Map - flood storage areas

Flooding from rivers or sea without defences (Flood Zone 3) shows the area that could be affected by flooding:  
 - from the sea with a 1 in 200 or greater chance of happening each year  
 - or from a river with a 1 in 100 or greater chance of happening each year.

The Extent of an extreme flood (Flood Zone 2) shows the extent of an extreme flood from rivers or the sea with up to a 1 in 1000 chance of occurring each year.



## Defence information

**THM170227**

Defence Location:

No defences on Main River

Description:

This location is not currently protected by any formal defences and we do not currently have any flood alleviation works planned for the area. However we continue to maintain certain watercourses and the schedule of these can be found on our internet pages.



## Model information

**THM170227**

Model: **Addlestone Bourne 2007**

Description: The information provided is taken from the Addlestone/Hale Bourne Detailed Flood Risk Mapping Study completed in July 2007. The Addlestone/Hale Bourne catchments were modelled using ISIS 1D.

Accuracy of the final model in the Lightwater area (at node points L1.007 – L1.011) is less, due to simplification of the model in this area, but the topography at this location means that this increase (or decrease) in level will not significantly affect the flood extent.

Woburn Park Stream: There are larger inaccuracies in Woburn Park Stream, downstream of the Addlestone Gauging Station. The modelled Chertsey Bourne 100-year flood levels at this location are higher than those achieved in this study, as a precaution, the levels for this reach should be taken from the Chertsey model.

Model design runs:

1 in 5 / 20% Annual Exceedance Probability (AEP); 1 in 20 / 5% AEP; 1 in 50 / 2% AEP; 1 in 100 / 1% AEP; and 1 in 100+20% / 1% AEP plus 20% increase in flows

Mapped outputs:

1 in 5 / 20% AEP; 1 in 20 / 5% AEP; 1 in 100 / 1% AEP

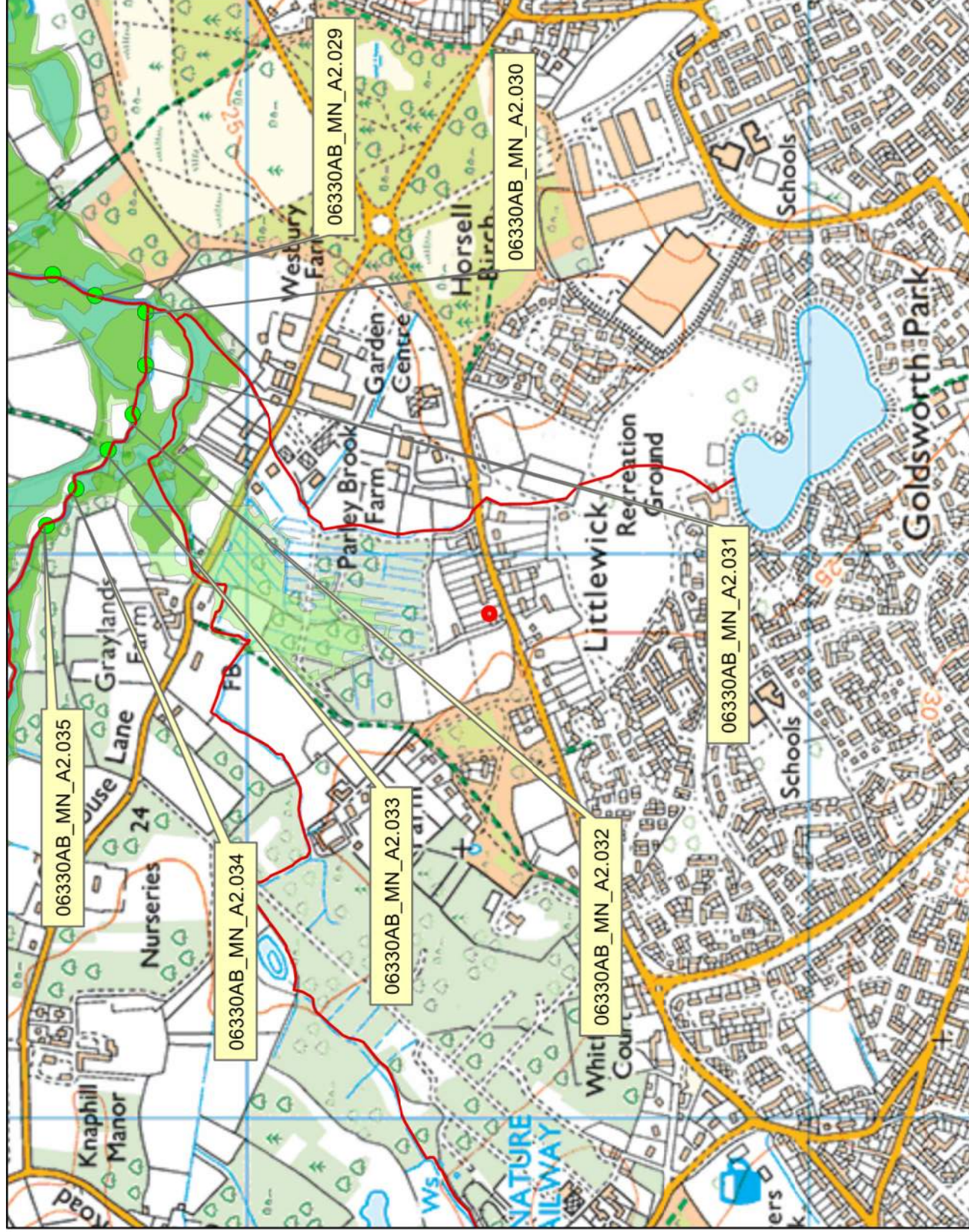
Model accuracy:

Levels ± 250mm (generally)

Levels ± 500mm (Lightwater area only see above)



**Detailed FRA Map centred on HU21 4XR  
Created on 11/5/2020 REF: THM170227**



**Legend**

- Main River
- Model Nodes
- 20% AEP flood extent
- 5% AEP flood extent
- 1% AEP flood extent
- 1%+20% AEP flood extent

**AEP = Annual Exceedance Probability**  
The probability of a flood of a particular magnitude, or greater, occurring in any given year

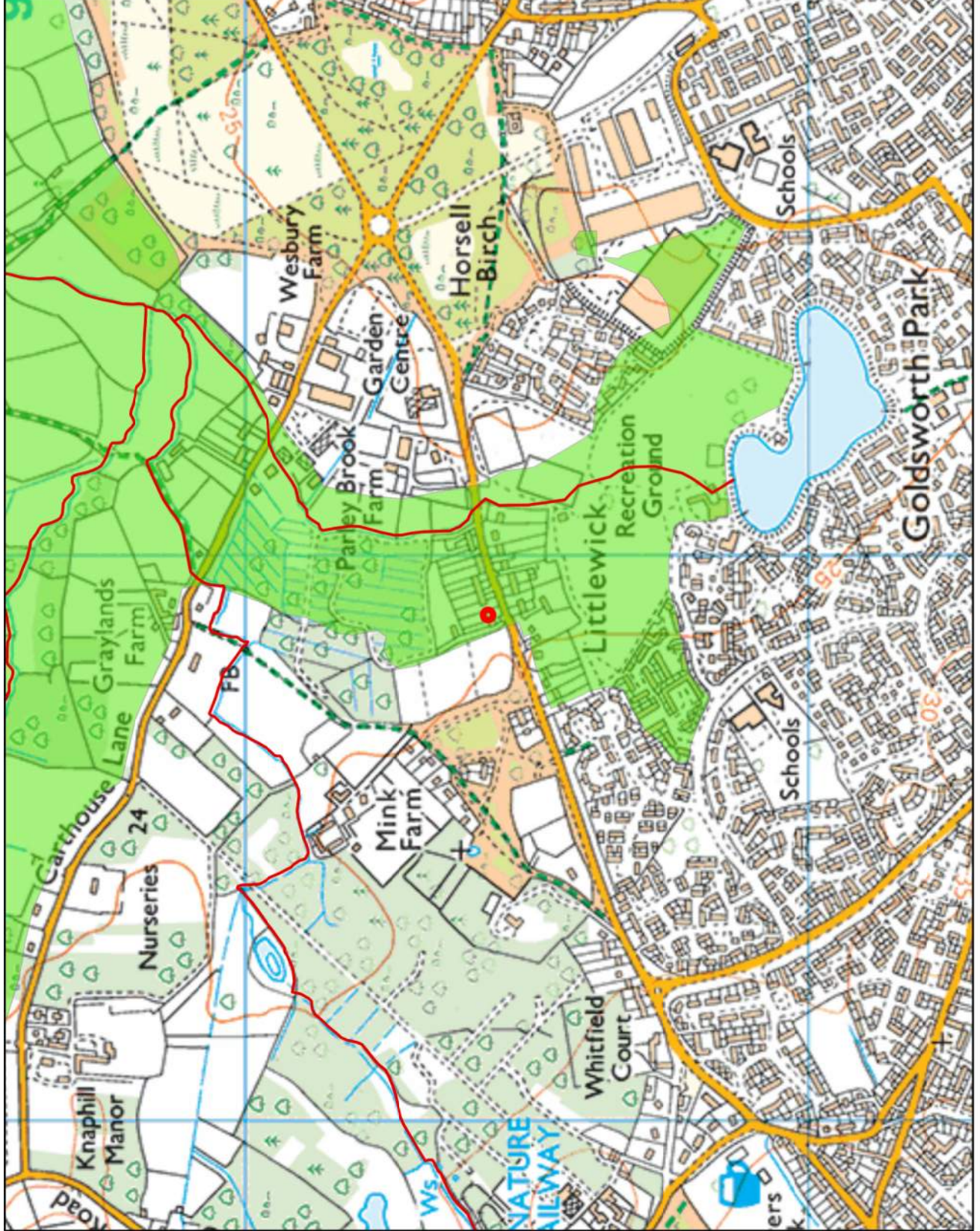
Where available climate change extents have been calculated with an additional flow added to an AEP event. An example of how this is written is 1%+20% AEP.







**Historic Flood Map centred on HU21 4XR  
Created on 11/5/2020 REF: THM170227**



**Legend**

- Main River
- Year 1968

Flooding from rivers or sea without defences (Flood Zone 3) shows the area that could be affected by flooding:  
 - from the sea with a 1 in 200 or greater chance of happening each year  
 - or from a river with a 1 in 100 or greater chance of happening each year.

The Extent of an extreme flood (Flood Zone 2) shows the extent of an extreme flood from rivers or the sea with up to a 1 in 1000 chance of occurring each year.



