

AMBIENTAL

ENVIRONMENTAL ASSESSMENT

Flood Risk Assessment 6221

Corewire Limited,
Station Road West,
Ash Vale,
Aldershot,
GU12 5LZ

Document Issue Record

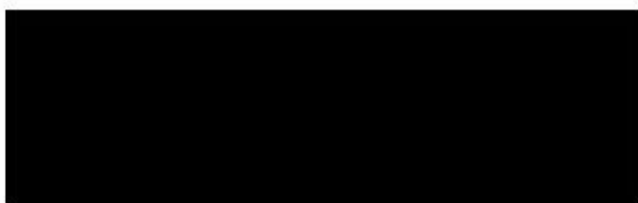
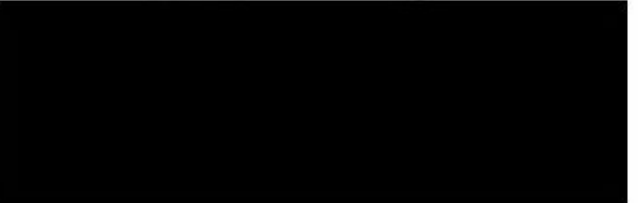

Project: Phase 1 Flood Risk Assessment

Prepared for: Corewire Limited

Reference: 6221

Site Location: Corewire Limited, Station Road West, Ash Vale, Aldershot, GU12 5LZ.

Proposed Development: Construction of two steel buildings to provide additional storage space to the existing site (industry).

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1. Summary

- 1.1 Ambiental Environmental Assessment has been appointed by Corewire Limited to undertake a National Planning Policy Framework (NPPF) compliant Flood Risk Assessment (FRA) for the proposed development at Corewire Limited, Station Road West, Ash Vale, Aldershot, GU12 5LZ.
- 1.2 The site is currently used by Corewire Limited (manufacturing company). The proposed development is for the construction of two steel buildings to provide additional storage space to the existing site. As such, it is considered an extension to the existing site use.
- 1.3 With reference to the Environment Agency (EA) Flood Map for Planning, the proposed development is located within Flood Zone 2.
- 1.4 The proposed development is for an extension of the existing site use and is considered “Less Vulnerable” under the Flood Risk and Coastal Change Planning Practice Guidance (PPG) and National Planning Policy Framework (NPPF).
- 1.5 The proposed development can be considered a ‘Minor Development’ under the Flood Risk and Coastal Change Planning Practice Guidance (PPG) and National Planning Policy Framework (NPPF), as it is for an industrial extension to the existing site, with a footprint less than 250m².
- 1.6 The Environment Agency have provided Ambiental with modelled flood information, using the Blackwater (Aldershot to Sandhurst and Bramshill to Swallowfield) 2007 model. The model was re-run in July 2017, to include the latest climate change allowances (February 2016).
- 1.7 Based on the modelled flood extents provided by the Environment Agency, the site is not shown to be affected in the present-day modelled events (20%, 5% or 1% AEPs); however, the site could be partially affected by the 1% plus climate change flood events. An analysis of in-channel flood levels of the River Blackwater in the climate change scenarios demonstrates the following:
 - In-channel water level at the nearest node to the site during the 1 in 100-year +25%CC flood event is 67.35mAOD. When compared with topographic levels, the new storage building could be affected by flood depths of up to 0.75m; whereas, the proposed storage shed will be on land topographically greater than this flood level, so should remain unaffected by flooding.
 - In the 1 in 100-year +35%CC flood event, the in-channel water level reached 67.43mAOD. Flood depths could reach up to 0.83m at the new storage building and 0.03m at the proposed storage shed.
 - It should be noted that there are natural embankments and a train track in between the River Blackwater and the proposed site, both having a maximum topographic level of approximately 67.50mAOD. This could act as a flood defence between the site and the River Blackwater and may mitigate the risk of flooding to the site given that the higher land between the site and the River Blackwater is above the flood levels in the 1 in 100-year +25%CC and 1 in 100-year +35%CC events.
- 1.8 Furthermore, the proposed extension should incorporate flood resilience measures in line with current best practice for construction within an area at risk of flooding in line with CLG 2007 'Improving the Flood Performance of New Buildings’.
- 1.9 In summary:

- The proposal could be considered a 'Minor Development' under the PPG and NPPF;
- The site is in Flood Zone 2;
- Finished Floor Levels of the proposed extension should be no lower than those of the existing building in line with the EA Standing Advice for Minor Developments;
- Flood resilience measures should be incorporated into the extension.

Following the guidelines contained within the NPPF, the proposed development is considered to be suitable assuming appropriate mitigation (including adequate warning procedures) can be maintained for the lifetime of the development.

Development Description	Existing	Proposed
Development Type:	Existing manufacturing company (Corewire Ltd)	Construction of 2no. steel buildings, to provide additional storage. This development is for an extension to the existing site use, so is considered a 'Minor Development' under the NPPF.
EA Vulnerability Classification:	Less vulnerable	Less vulnerable
Ground Floor Level:	Topographic levels at the site of the new storage building are between approximately 66.6mAOD and 66.8mAOD. At the site of the new storage shed, existing ground levels vary between approximately 67.4mAOD to 67.5mAOD (EA 2m DTM LiDAR dataset)	FFLs to be set no lower than existing FFLs in line with EA Standing Advice for Minor Developments
Impermeable Surface Area:	Existing site is wholly impermeable	As the site is wholly impermeable as existing, there will be no increase in impermeable surface areas as a result of this development.
Surface Water Drainage:	Site is positively drained	Discharge surface water runoff via existing drainage infrastructure on site.
Site Size:	Site area = 13,200m ²	No change in site size post-development.
Risk to Development	Summary	Comment
EA Flood Zone:	Flood Zone 2	
Flood Source:	Fluvial	River Blackwater
1:100 Year Flood Level	67.11mAOD	The Environment Agency have provided Ambiental with modelled flood information, using the Blackwater (Aldershot to Sandhurst and Bramshill to Swallowfield) 2007 model. The model was re-run in July 2017, to include the latest climate change allowances (February 2016). The nearest upstream node to the site is 06324_MN_BL1_Res4_29a.
1:100 Year Flood Level & Climate Change	+25%: 67.35mAOD +35%: 67.43mAOD	
1:1000 Year Flood Level	N/A ²	
Recorded Flood Events in Area:	Yes	Area west of site affected by flooding in 1968
Recorded Flood Events at Site:	No	EA historic flood records
SFRA Available:	Yes	Surrey Preliminary Flood Risk Assessment (2011)
Management Measures	Summary	Comment
Ground floor level above extreme flood levels:	No	FFLs to be set no lower than existing FFLs in line with EA Standing Advice for Minor Developments
Safe Access/Egress Route:	Yes	See Section 7
Flood Resilient Design:	Yes	See Section 7
Site Drainage Plan:	Site is positively drained	Discharge surface water runoff via existing drainage infrastructure on site.
Flood Warning & Evacuation Plan:	Yes	EA Flood Warning Service
Offsite Impacts	Summary	Comment
Displacement of floodwater:	No	Proposal is for minor extension and alterations to existing use, so should not displace flood waters.
Increase in surface run-off generation:	Negligible	Any additional surface water runoff to be managed on site.
Impact on hydraulic performance of channels:	None	Development will not impact any nearby watercourses.

Table 1 Summary of flood risks, impacts and proposed flood mitigation measures.

N/A¹ not required for this assessment; N/A² data not available.

2. Development Description and Site Area

Proposed Development and Location

- 2.1 The proposed development is located at Corewire Limited, Station Road West, Ash Vale, Aldershot, GU12 5LZ (Figures 1 and 2).
- 2.2 The site is currently used by Corewire Limited (manufacturing company). The proposed development is for the construction of two steel buildings to provide additional storage space to the existing site. The proposed storage building will be 10m x 9m (90m²) and the new storage shed will be 4.4m x 2.4m (10.56m²). This is based on plans provided by the client, which are included in Appendix 1.
- 2.3 Under the Flood Risk and Coastal Change Planning Practice Guidance (PPG), a 'Minor Development' is defined as a:
- 'minor non-residential extensions: industrial/commercial/leisure etc extensions with a footprint less than 250 square metres.'*
- 2.4 This development is for a commercial extension to the existing site, with a footprint less than 250m².
- 2.5 As such, this demonstrates that the proposed development at the existing manufacturing site can be considered a 'Minor Development' under the Flood Risk and Coastal Change Planning Practice Guidance (PPG) and National Planning Policy Framework (NPPF).
- 2.6 Using the EA's 2m DTM LiDAR dataset, topographic levels at the site of the new storage building are between approximately 66.6mAOD and 66.8mAOD. At the site of the new storage shed, existing ground levels vary between approximately 67.4mAOD to 67.5mAOD. This is demonstrated in Table 2 below, which shows contour lines at 0.1m intervals at the site of the proposed developments and the topographic levels at the site of each development.



Figure 1 Location Map, identifying the location of the proposed development (Source: Open Streetmap)



Figure 2: Aerial Imagery, showing location of site (Source: Google Maps)

	Proposed storage building (south-east of site)	Proposed storage shed (north-east of site)
Contour lines at 0.1m intervals, using EA's 2m DTM LiDAR dataset		
Topographic levels	66.6mAOD to 66.8mAOD	67.4mAOD to 67.5mAOD

Table 2: Topographic levels at site of proposed developments, using EA's 2m LiDAR DTM dataset (Source: EA; Open Street Map)

Vulnerability Classification

2.7 The EA Flood Map for Planning (Figure 3) demonstrates that the proposed development lies within Flood Zone 2 with a medium probability of between 1 in 100 and 1 in 1,000 (0.1% to 1%) of river flooding in any year.

2.8 Under Table 2 of the Flood Risk and Coastal Change Planning Practice Guidance and the principles of the National Planning Policy Framework (NPPF), the existing site could be considered as 'Less Vulnerable', due to its general industry usage. Given that the proposed development is for a minor extension and alterations to the existing site, the NPPF flood risk vulnerability of the site should not change post-development.

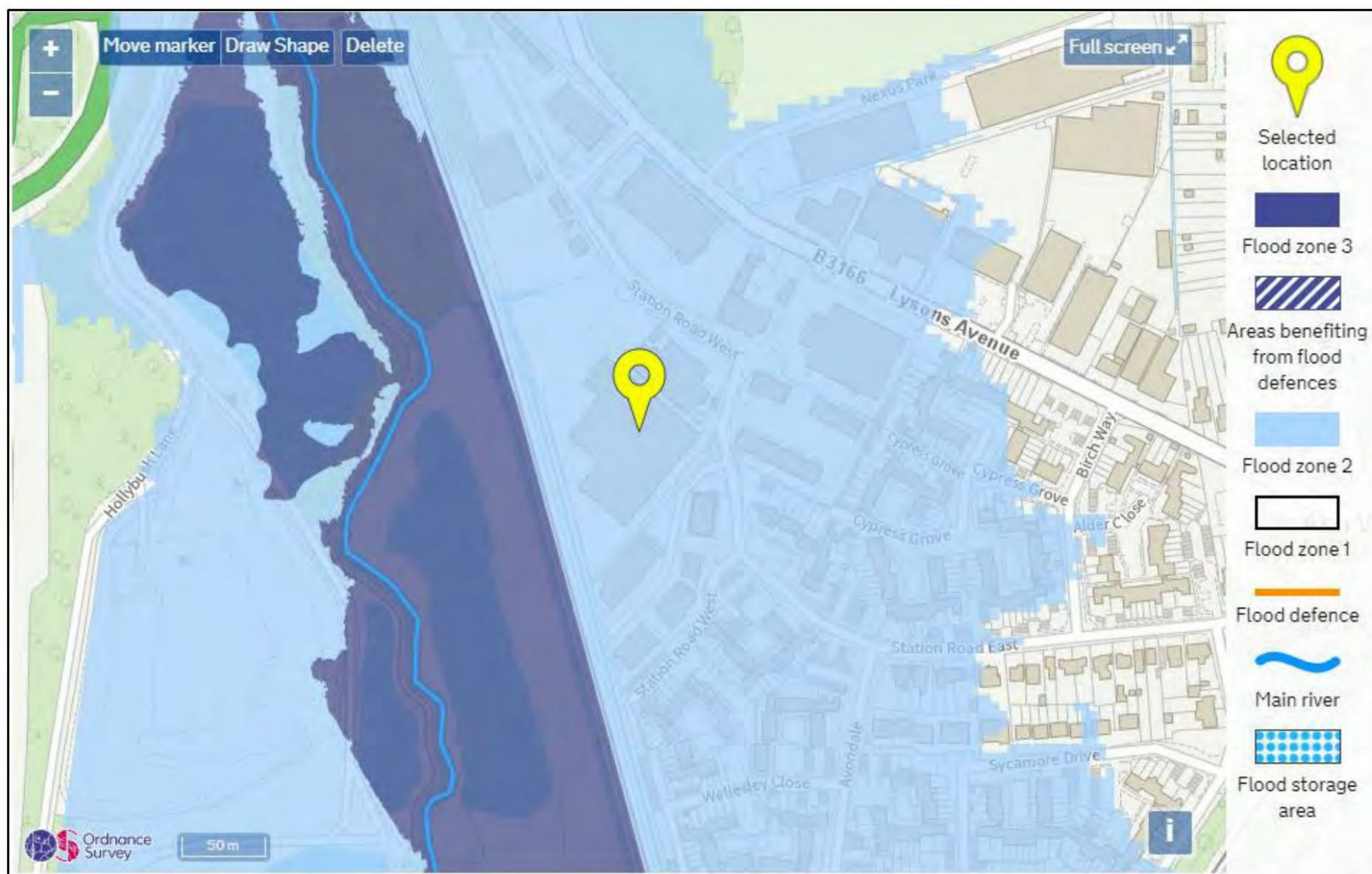


Figure 3: EA Flood Map for Planning, showing location of site (Source: EA)

Geology

- 2.9 The British Geological Survey (BGS) Geology of Britain Viewer indicates that the bedrock underlying the site is part of the Windlesham Formation, which comprises of sand, silt and clay (Source: BGS). The superficial deposits underlying the site are Alluvium, comprising of clay, silt, sand and gravel (Source: BGS).
- 2.10 Both formations are considered to be Secondary 'A' aquifers (Source: EA; Magic Map online resource. See Figure 4 and 5). A Secondary 'A' aquifer is permeable, supporting water supplies at a local scale and may contribute to base flow of rivers.
- 2.11 The site is not located within an Environment Agency Groundwater Source Protection Zone. This is based on mapping provided on DEFRA's Magic Map website and shown in Figure 6 below.

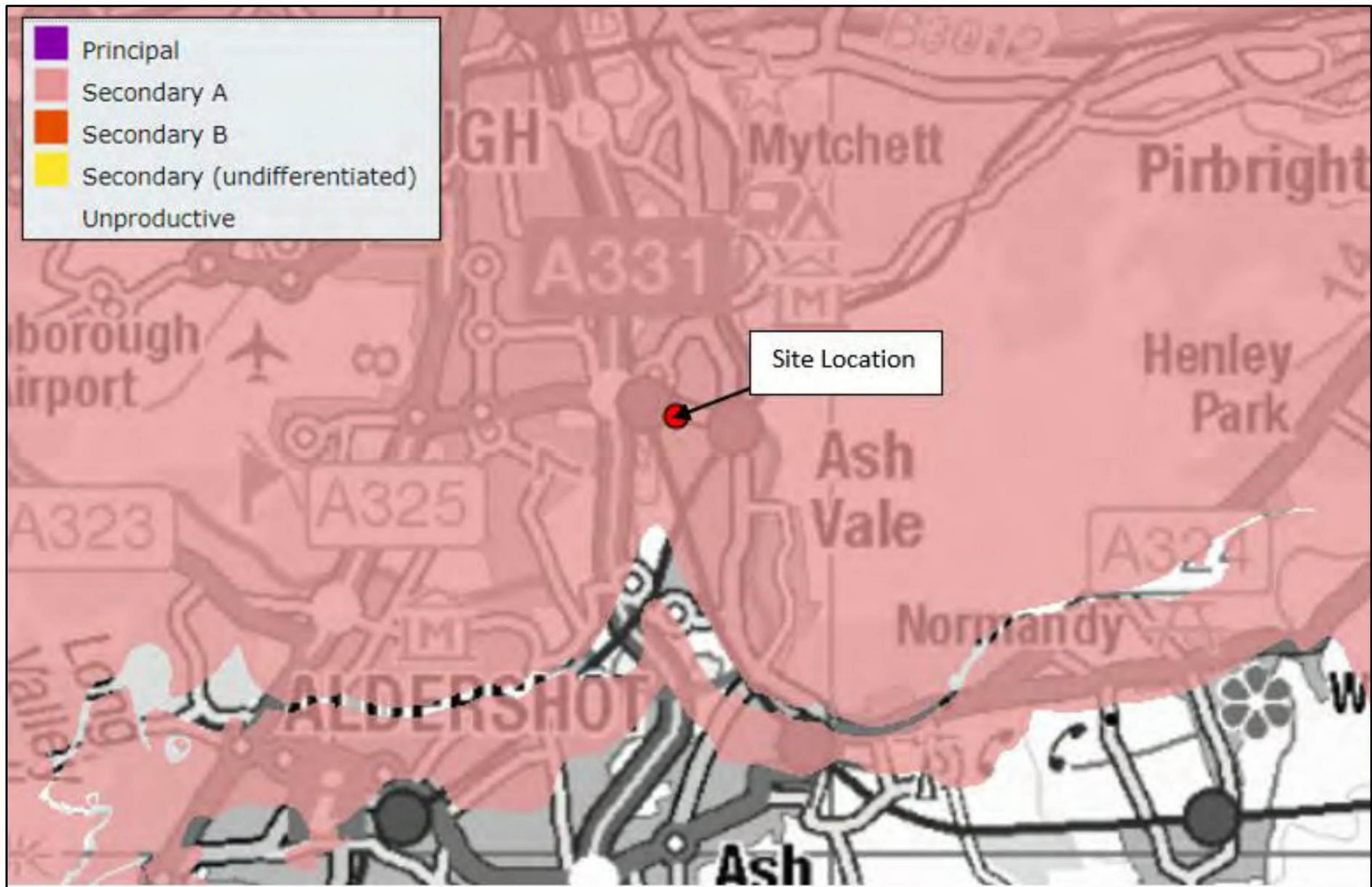


Figure 4: Aquifer Designation Map for Bedrock Geology, indicating the site location (Source: MagicMap)

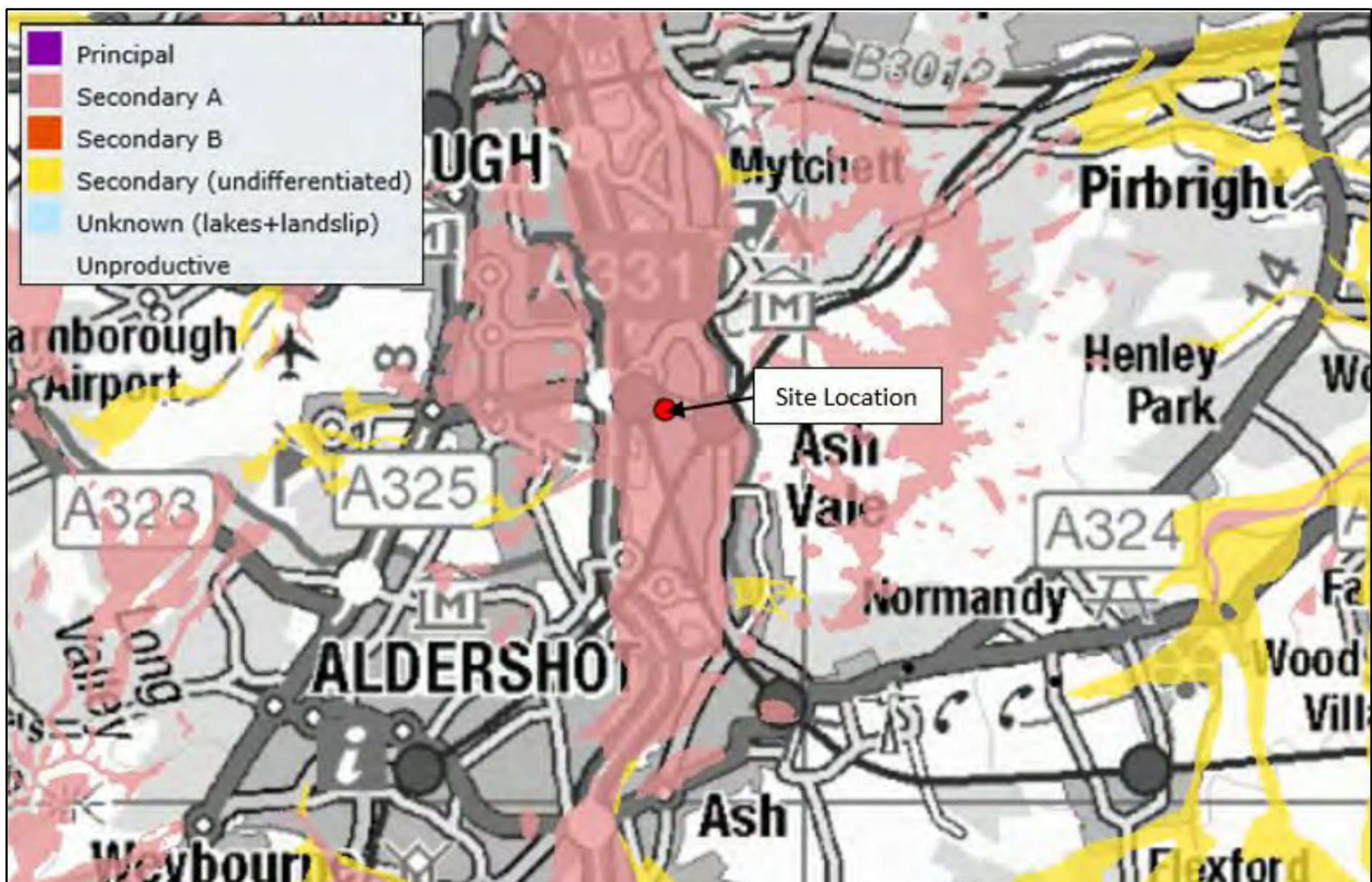


Figure 5: Aquifer Designation Map for Superficial Geology, indicating the site location (Source: MagicMap)

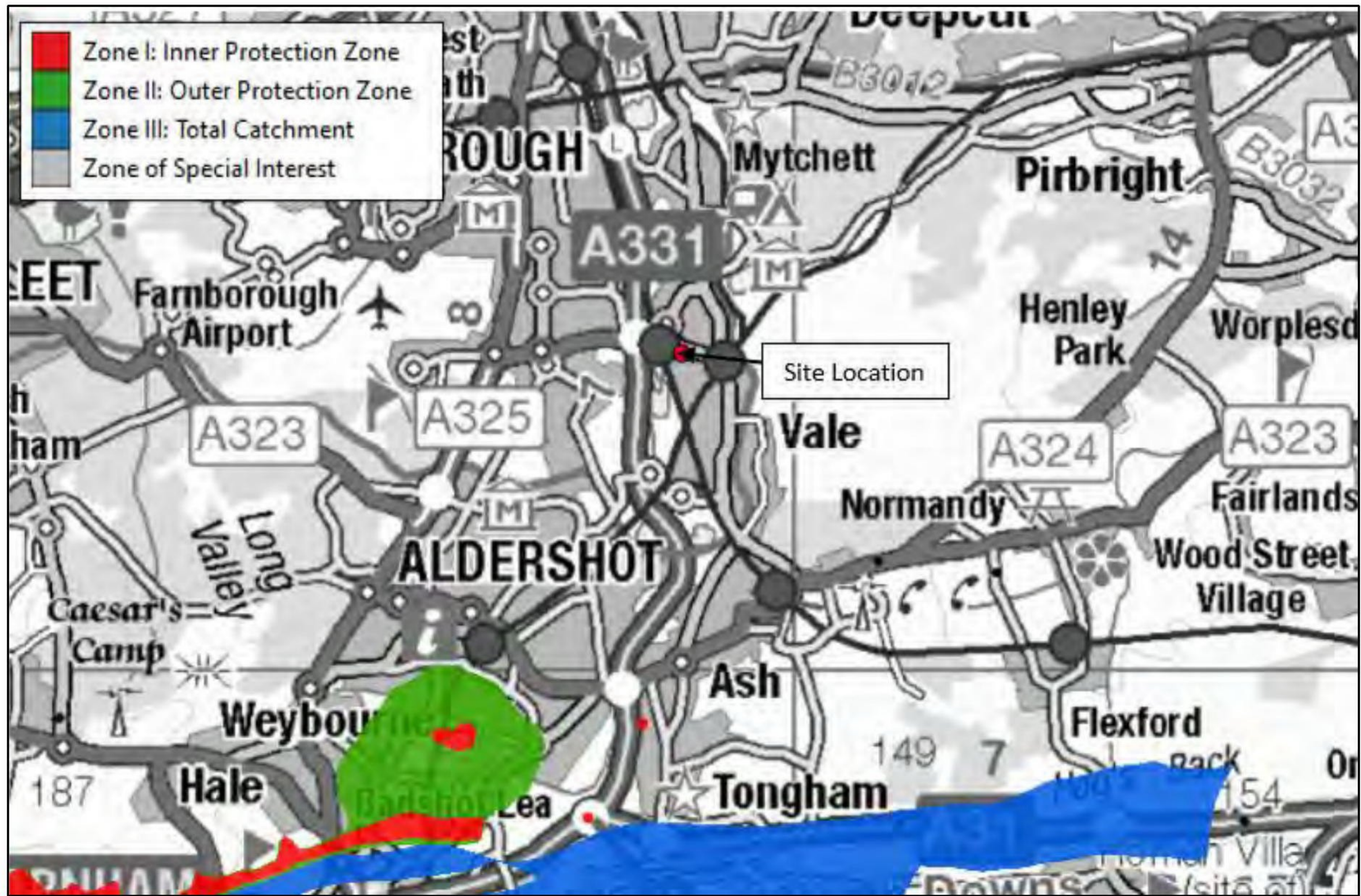


Figure 6: EA Groundwater Source Protection Zones, indicating location of site (Source: MagicMap online)

3. Sequential Test/Exception Test

- 3.1 Under the Flood Risk and Coastal Change Planning Practice Guidance, all new planning applications should undergo a *Sequential Test*. This test should be implemented by local planning authorities with a view to locating particularly vulnerable new developments (e.g. residential, hospitals, mobile homes etc.) outside of the floodplain.
- 3.2 The Flood Risk and Coastal Change Planning Practice Guidance *Sequential Test: Flood Risk Vulnerability and Flood Zone 'Compatibility' Table* is reproduced below;

Flood Risk Vulnerability Classification		Essential Infrastructure	Water Compatible	Highly Vulnerable	More Vulnerable	Less Vulnerable
Flood Zone	Zone 1	✓	✓	✓	✓	✓
	Zone 2	✓	✓	Exception Test Required	✓	✓
	Zone 3a	Exception Test Required	✓	✗	Exception Test Required	✓
	Zone 3b <i>Functional Floodplain</i>	Exception Test Required	✓	✗	✗	✗

Table 3 Flood Risk Vulnerability and Flood Zone 'Compatibility' Table as specified by NPPF.
 Please note: ✓ means development is appropriate; ✗ means the development should not be permitted.

- 3.3 The proposed development is for an extension to the existing site use, which is considered as 'Less Vulnerable' under Table 3 of the Flood Risk and Coastal Change Planning Practice Guidance (PPG) and the National Planning Policy Framework (NPPF). The site is within Flood Zone 2 (as defined by the EA).
- 3.4 With reference to Table 3 above, 'Less Vulnerable' developments in Flood Zone 2 are considered to be appropriate and do not require an Exception Test or Sequential Test.
- 3.5 The proposed development could be considered as a 'Minor Development' under the National Planning Policy Framework (NPPF).
- 3.6 The revised NPPF states that:
- "Applications for some **minor developments** and changes of use **should not be subject to the sequential or exception tests** but should still meet the requirements for the site-specific flood risk assessments."*
- (Source: NPPF)*
- 3.7 Therefore, the proposed development should not be subject to the Sequential Test or the Exception Test.
- 3.8 Under guidance provided in the Flood Risk and Coastal Change Planning Practice Guidance (PPG) and the National Planning Policy Framework (NPPF), all developments in Flood Zone 2 and 3 are required to be submitted with a site-specific Flood Risk Assessment. To support in meeting this requirement, Ambiental have conducted a Flood Risk Assessment for the proposed development.

4. Site Flood Hazards

Sources of Flooding

4.1 The proposed development is located within Flood Zone 2 (medium risk of flooding) and is considered to be 'Less Vulnerable' according to NPPF guidelines. Table 4 summarises the potential sources of flooding to the site:

Source	Description
Fluvial	Flood Zone 2 – River Blackwater (EA Main River)
Surface	Low risk
Groundwater	<i>'Potential for groundwater flooding to occur at the surface'</i>
Sewer	Local area has been affected by sewer flooding in the past

Table 4 Summary of flood sources.

Fluvial

- 4.2 With reference to the EA Flood Map for Planning shown in Figure 3, the proposed development is in Flood Zone 2 (medium risk of flooding). The main source of flood risk is fluvial and from the River Blackwater (EA Main River).
- 4.3 The River Blackwater is approximately 70m west of the site boundary.
- 4.4 Using the EA's 2m DTM LiDAR dataset, topographic levels at the site of the new storage building are between approximately 66.6mAOD and 66.8mAOD. At the site of the new storage shed, existing ground levels vary between approximately 67.4mAOD to 67.5mAOD.
- 4.5 The Environment Agency have provided Ambiental with modelled flood information, using the Blackwater (Aldershot to Sandhurst and Bramshill to Swallowfield) 2007 model. The model was re-run in July 2017, to include the latest climate change allowances (February 2016). The EA data is included in Appendix 2.
- 4.6 The EA have provided a map which shows the proposed site boundary and modelled flood extents for the 20% AEP, 5% AEP and 1% AEP present-day events and the 1% plus climate change flood events, for several scenarios (see Figure 7). The site is not shown to be affected in the present-day modelled events (20%, 5% or 1% AEPs); however, the site could be partially affected by the 1% plus climate change flood events. The climate change scenarios have been assessed further in Section 5 of this report.
- 4.7 The River Blackwater flows from south to north past the site. The EA provided modelled water levels for in-channel nodes on the River Blackwater. From reviewing the map of node locations in relation to the site (see Figure 7), it is considered that the nearest upstream node to the site is 06324_MN_BL1_Res4_29a. The flood levels extracted from this node are shown in Table 5 below.

Node	1% (1:100) (mAOD)	0.1% (1:1,000) (mAOD)	Topographic levels at new storage building (mAOD)	Topographic levels at new storage shed (mAOD)
Res4_29a	67.11	No data	66.6 – 66.8	67.4 - 67.5

Table 5: Modelled flood levels at two upstream nodes (Source: EA)

- 4.8 Based on the EA's LiDAR, the proposed storage shed will be located on land between 67.4mAOD and 67.5mAOD. This land is topographically higher than the 1 in 100-year flood level (67.11mAOD), so the proposed shed should remain unaffected by flooding in this event.
- 4.9 The proposed storage building will be located on land with topographic levels between 66.6mAOD and 66.8mAOD. As such, during the 1 in 100-year flood event, the proposed building could be between 0.31m to 0.51m below the flood level of 67.11mAOD.
- 4.10 However, it should be noted that there are natural embankments and a train track in between the River Blackwater and the proposed site, both having a maximum topographic level of approximately 67.50mAOD. This could act as a flood defence between the site and the River Blackwater. Hence, the EA modelled flood extents provided indicate that the proposed development site could remain unaffected in the 1 in 100 year event despite being on land below the flood level in places.
- 4.11 No data was provided for the modelled 1 in 1,000-year fluvial flood event.
- 4.12 The impact of climate change on potential flood risk to the site is discussed in Section 5 of the report.
- 4.13 Therefore, following a review of the EA's data, the risk of flooding from fluvial sources could be considered relatively low at the proposed storage shed, but medium at the new storage building.
- 4.14 However, it is important to note that the proposal could be considered a Minor Development under the NPPF and can adhere to the EA Standing Advice for such (FFLs no lower than existing). Furthermore, the proposed buildings are to be considered Less Vulnerable storage buildings and thus raising the FFLs could be considered onerous. Flood resilience measures are discussed in Section 7 of this report.

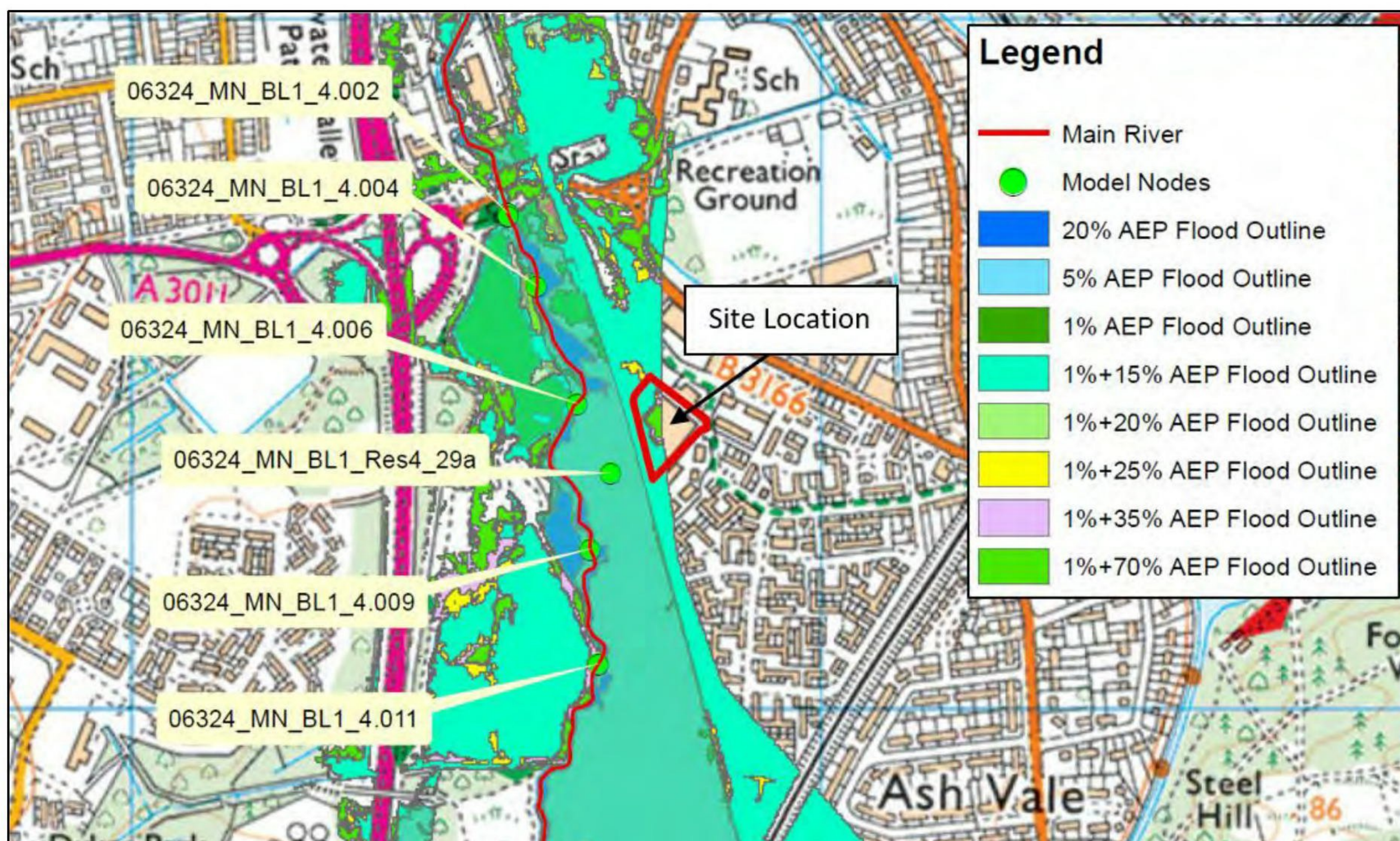


Figure 7: Location of model nodes in relation to site (Source:EA)

Surface Water (Pluvial)

4.15 The online Environment Agency Flood Risk from Surface Water map shown in Figure 8 shows the proposed development to be within an area of 'Very Low' risk of flooding from surface water.

4.16 The following definitions of the annual surface water flood risk classifications are given by the EA:

- 'High Risk'; >3.3% AEP (more often than 1 in 30);
- 'Medium Risk'; 3.3% to 1.1% AEP (between 1 in 30 and 1 in 100);
- 'Low Risk'; 1% to 0.1% AEP (between 1 in 100 and 1 in 1000);
- 'Very Low Risk'; <0.1% AEP (less often than 1 in 1000);

4.17 Ambiental have assessed the Environment Agency's Risk of Flooding from Surface Water (RoFSW) dataset on our internal GIS software. The 1 in 30-year, 1 in 100-year and 1 in 1,000-year flood extents and depths have been reviewed, which are indicative of the 'High', 'Medium' and 'Low' risk extents on the Environment Agency Flood Risk from Surface Water map.

4.18 As shown in Figure 9, the proposed development site is wholly unaffected by flooding in the EA modelled 1 in 30-year surface water flood event.

4.19 During the EA modelled 1 in 100-year surface water flood event (Figure 10), the footprint of the proposed development is shown to be unaffected by flooding. Most of the site boundary is unaffected by flooding in this event.

4.20 In the EA modelled 1 in 1,000-year event, the footprint of the proposed development is demonstrated to be partially affected by flooding, as shown in Figure 11. These potential flood depths are very low (up to 150mm) and most of the site of the proposed development is unaffected.

4.21 As such, the risk of pluvial flooding to the proposed extension could be considered to be very low, as it remains unaffected by the 1:100-year event.

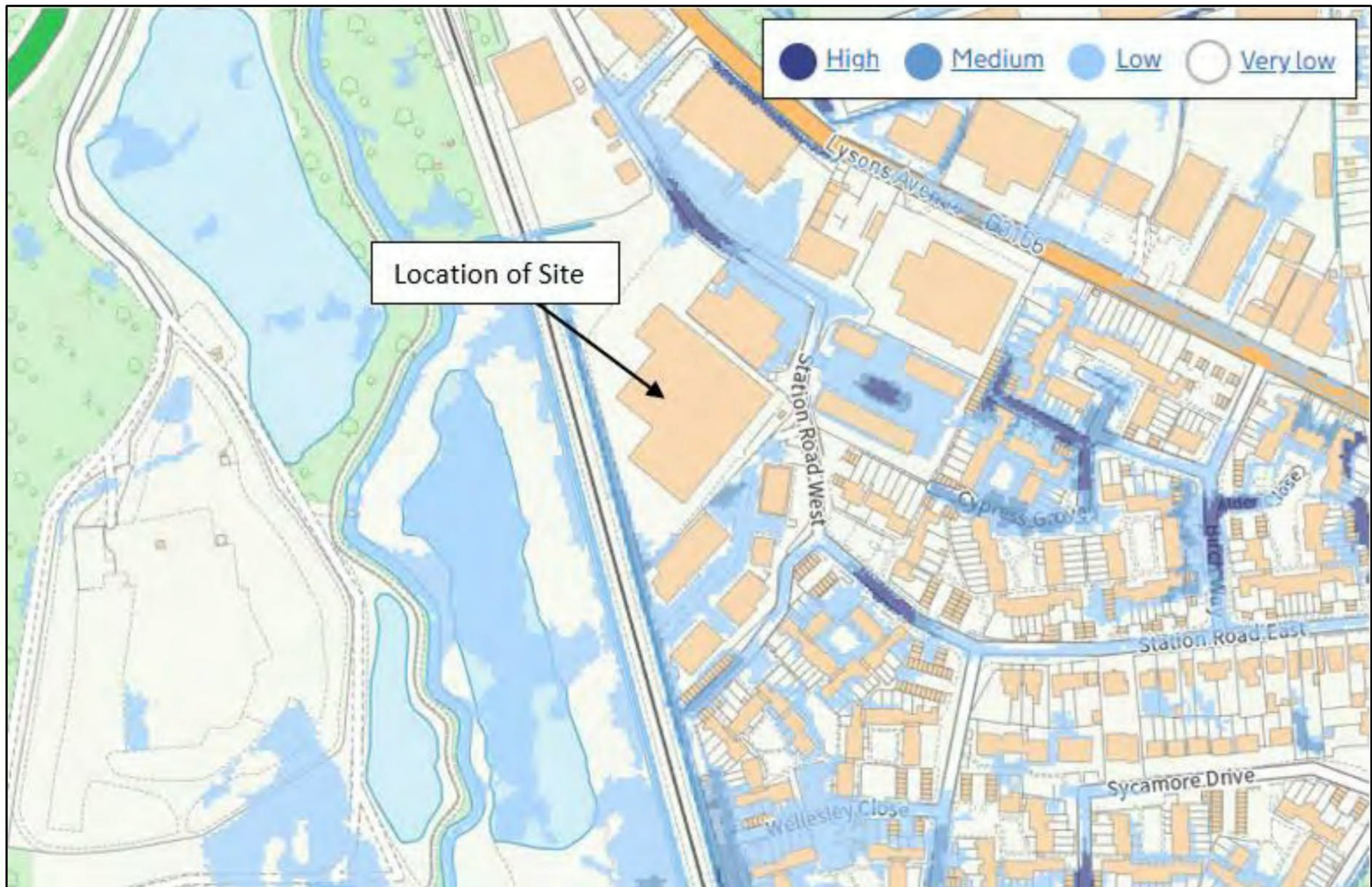


Figure 8: EA Surface Water Flood Risk Map, showing approximate location of site (Source: EA)



Figure 9: EA modelled 1:30-year surface water event, showing location of site (Source: EA)



Figure 10: EA modelled 1:100-year surface water event, showing location of site (Source: EA)

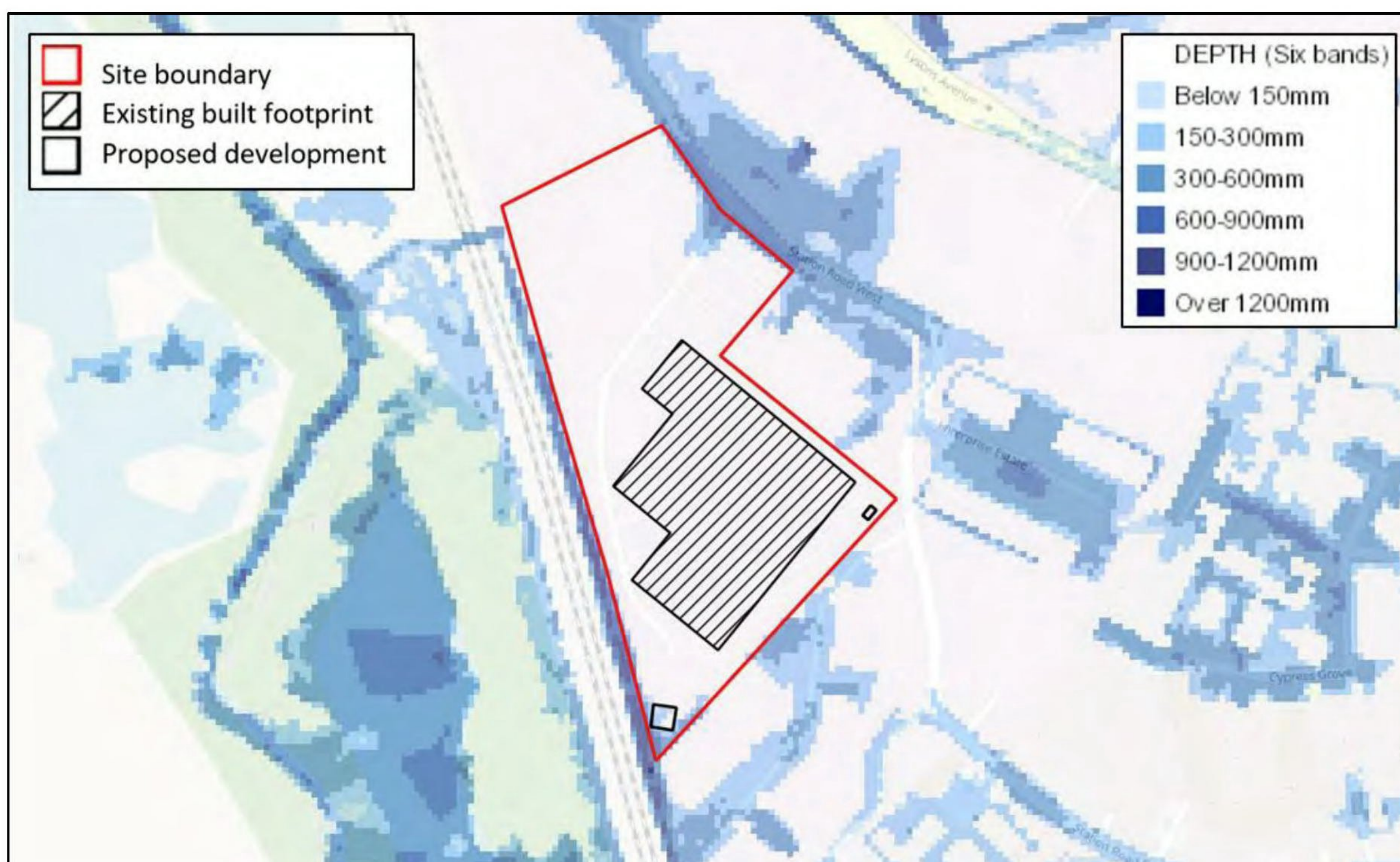


Figure 11: EA modelled 1:1,000-year surface water event, showing location of site (Source: EA)

Groundwater

4.22 The BGS Susceptibility to Groundwater Emergence mapping shown in Figure 12 demonstrates that the proposed development site is wholly located within an area with ‘Potential for groundwater flooding to occur at the surface’.

4.23 The site is not located within an Environment Agency Groundwater Source Protection Zone.

- 4.24 If groundwater is encountered during any excavation works for the proposed development, works will need to stop until further notice and appropriate action taken by the contractors.

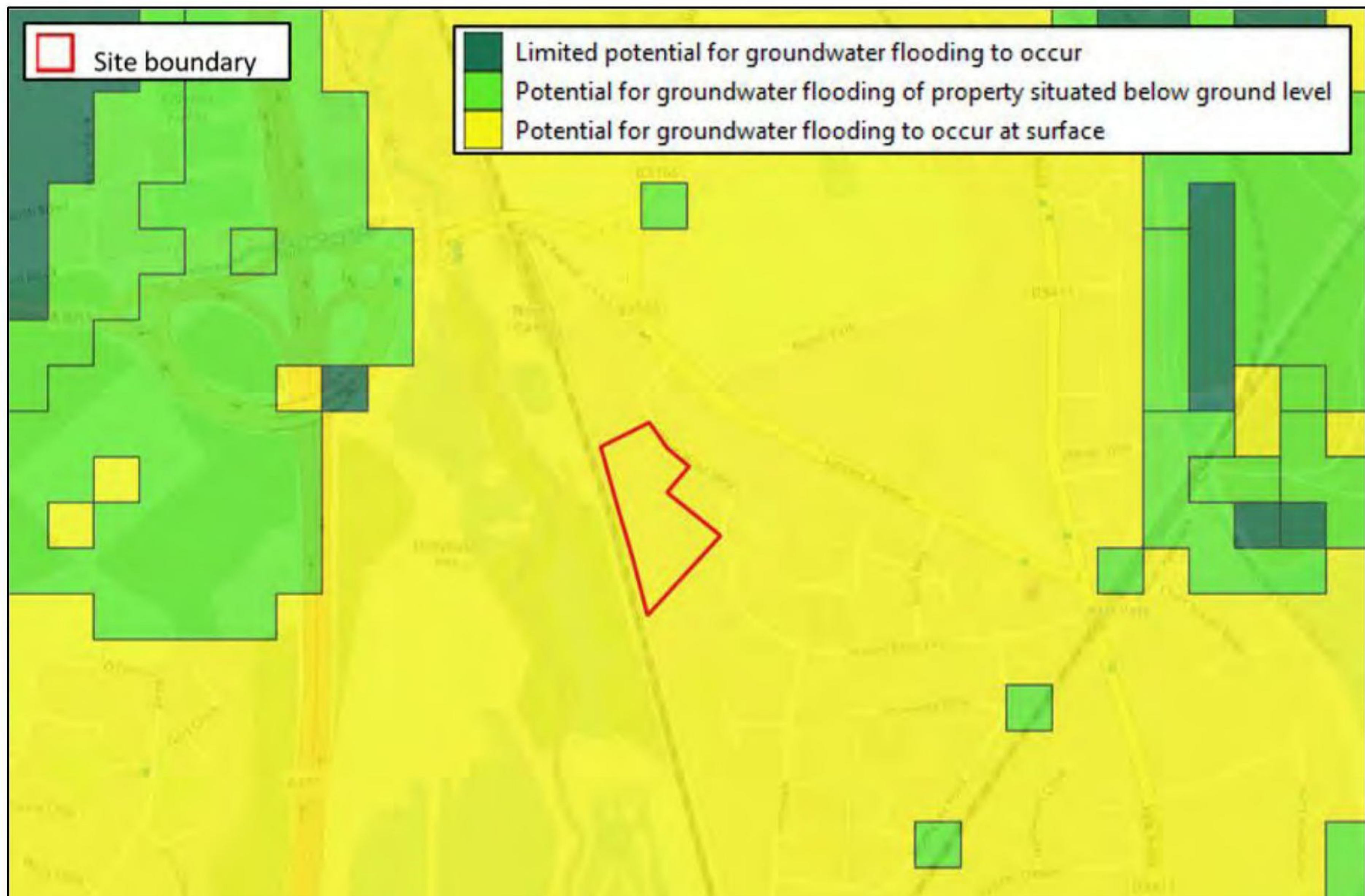


Figure 12: BGS Susceptibility to Groundwater Emergence, indicating site boundary (Source: BGS)

Sewer

- 4.25 The Guildford Borough Council Level 1 Strategic Flood Risk Assessment was completed by Capita in 2016. The SFRA maps demonstrate in Figure 13 that there have been 23 recorded incidences of sewer flooding in GU1, which is the postcode area where the site is located. Due to the nature of the sewer flooding records, there is no indication about whether the site has been affected by flooding in the past.

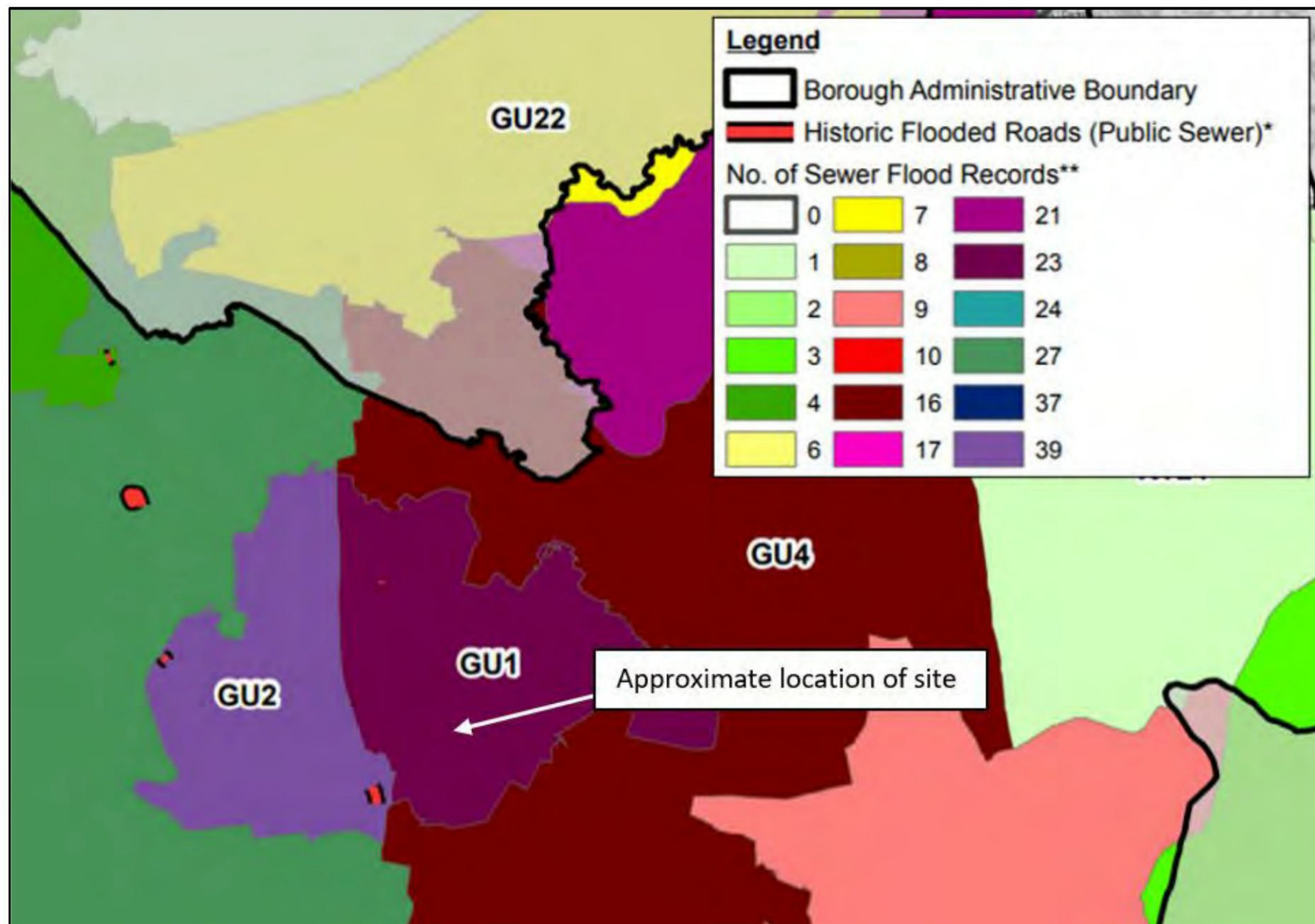


Figure 13: Sewer flood records near site, from Guildford Borough Council SFRA (2016)

Surface Water Drainage Strategy

- 4.26 In order to mitigate flood risk posed by the proposed development, adequate control measures are required to be considered. This will ensure that surface water runoff is dealt with at source and the flood risk on/off site is not increased over the lifetime of the development.
- 4.27 The runoff generated will need to be managed in accordance the National Planning Policy Framework (NPPF 2019) policy, which requires the use of Sustainable Drainage Systems (SuDS).
- 4.28 The site is currently used by Corewire Limited (manufacturing company) and considered wholly impermeable.
- 4.29 The proposed development is for the construction of two steel buildings to provide additional storage space to the existing site. The proposed storage building will be 10m x 9m (90m²) and the new storage shed will be 4.4m x 2.4m (10.56m²). This development is considered as an extension of the existing site use and a 'Minor Development' under the Flood Risk and Coastal Change Planning Practice Guidance (PPG) and National Planning Policy Framework (NPPF).
- 4.30 Given that the existing site is wholly impermeable, it is considered that the increase in surface water runoff as a result of this development will be negligible. It is recommended that the surface water runoff created as a result of the proposed extension should be discharged via the existing drainage infrastructure currently used for the existing hardstanding areas on site.

Records of Historical Flooding

4.31 According to the EA's historic flood records, the site is not located within an historic flood extent; however, as shown in Figure 14, the area to the east of the existing site has been affected by flooding in the past, notably during 1968.

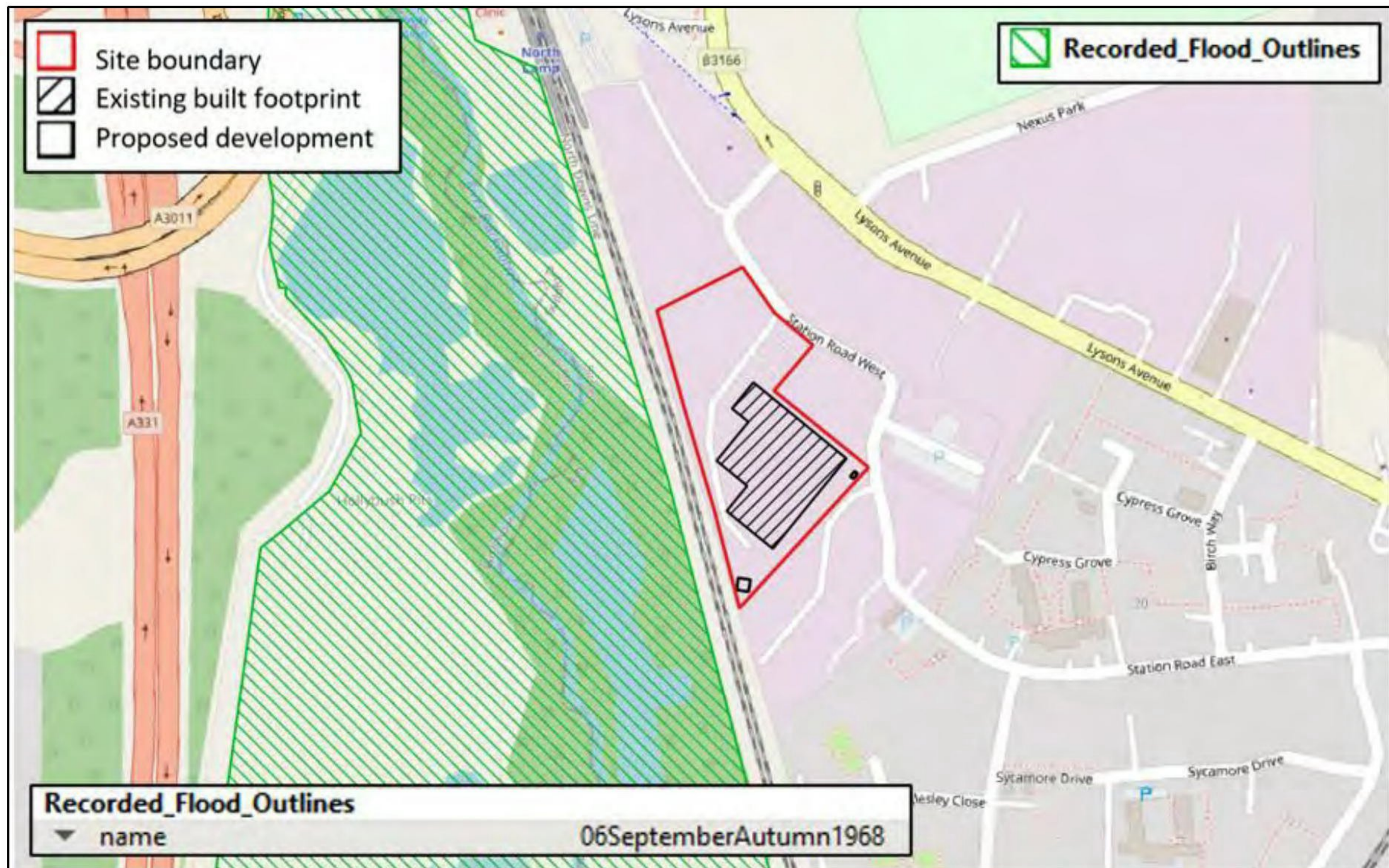


Figure 14: EA Recorded Flood Outlines, showing location of site (Source: EA)

5. Probability of Flooding

Flood Zones

- 5.1 According to the EA Flood Map for Planning, the site is located within Flood Zone 2 (medium risk of flooding).
- 5.2 The EA Flood Map for Planning has been produced in part using a relatively coarse, national scale flood modelling strategy, and in part by detailed modelling. It is important to note that only the potential floodplain is modelled; **the mitigating effects of any flood defences currently in place are not considered.** For reference, the definition of the NPPF flood risk zones is included below.

Zone	Description
1	Low Probability. This zone comprises land assessed as having a less than 1 in 1000 annual probability of river or sea flooding in any year (<0.1%).
2	Medium Probability. This zone comprises 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.
3a	High Probability. This zone comprises 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.
3b	The Functional Floodplain. This zone comprises land where water has to flow or be stored in times of flood. SFRA's should identify this Flood Zone (land which would flood with an annual probability of 1 in 20 (5%) or greater in any year or is designed to flood in an extreme (0.1%) flood, or at another probability to be agreed between the LPA and the EA, including water conveyance routes).

Table 6: Definition of the NPPF Flood Zones. (Source: EA)

Climate Change on Site

- 5.3 Climate change is likely to increase the flow in rivers, raise sea levels and increase storm intensity. The range of allowances in *Table 7* 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.
- 5.4 The:
- central allowance is based on the 50th percentile
 - higher central is based on the 70th percentile
 - upper end is based on the 90th percentile
- 5.5 So, if the central allowance is 30%, scientific evidence suggests that it is just as likely that the increase in peak river flow will be more than 30% as less than 30%.
- 5.6 At the higher central allowance, 70% of the possible scenarios fall below this value. So, if the higher allowance is 40%, then current scientific evidence suggests that there is a 70% chance that peak flows will increase by less than this value, but there remains a 30% chance that peak flows will increase by more (Source: EA).

5.7 The risk of flooding to the site would, therefore, be expected to increase following the effects of climate change. The likely increases in peak rainfall intensity would also lead to an increased risk of surface water flooding. The increase in river flows for the Thames river basin has been provided below in *Table 8*.

Flood Zone	Essential Infrastructure	Highly Vulnerable	More Vulnerable	Less Vulnerable	Water Compatible
1	Central	Central	Central	Central	None
2	Upper End	Higher Central and Upper End	Higher Central and Upper End	Central and Higher Central	Central
3a	Upper End	Development should not be permitted	Higher Central and Upper End	Central and Higher Central	Central
3b	Upper End	Development should not be permitted	Development should not be permitted	Development should not be permitted	Central

Table 7: Allowance and Flood Zone Table (Source EA)

Allowance category	Total potential change anticipated for the 2020's (2015 to 2039)	Total potential change anticipated for the 2050's (2040 to 2069)	Total potential change anticipated for the 2080's (2070 to 2115)
H++	25%	40%	80%
Upper end	25%	35%	70%
Higher central	15%	25%	35%
Central	10%	15%	25%

Table 8: Peak river flow allowances for the Thames River Basin district (Source EA)

5.8 The proposed development is 'Less Vulnerable' under the Flood Risk and Coastal Change Planning Policy Guidance. The site is in Flood Zone 2. The main source of flood risk is fluvial.

5.9 With reference to Table 5, 'Less Vulnerable' developments in Flood Zones 2 and 3a should consider the 'Central' and 'Higher Central' allowances. For the Thames basin, this equates to an increase in peak flows of +25% (Central) and +35% (Higher Central) respectively.

5.10 The Environment Agency have provided Ambiental with modelled flood information, using the Blackwater (Aldershot to Sandhurst and Bramshill to Swallowfield) 2007 model. The model was re-run in July 2017, to include the latest climate change allowances (February 2016).

5.11 The EA have provided a map which shows the proposed site boundary and modelled flood extents for the 20% AEP, 5% AEP and 1% AEP present-day events and the 1% plus climate change flood events, for several scenarios (see Figure 7). The site is not shown to be affected in the present-day modelled events (20%, 5% or 1% AEPs); however, the site could be partially affected by the 1% plus climate change flood events.

- 5.12 Site-specific flood levels have not been provided by the Environment Agency; only in-channel water levels of the River Blackwater. The EA's LiDAR data demonstrates that land between the existing site and the watercourse varies and is sometimes higher than the site, in places. The higher land reaches 67.5mAOD in places.
- 5.13 Using the EA's 2m DTM LiDAR dataset, topographic levels at the site of the new storage building are between approximately 66.6mAOD and 66.8mAOD. At the site of the new storage shed, existing ground levels vary between approximately 67.4mAOD to 67.5mAOD.
- 5.14 The nearest upstream node to the site is 06324_MN_BL1_Res4_29a. During the 1 in 100-year +25%CC flood event, the water level reached 67.35mAOD. At the new storage building, this could result in flood depths of up to 0.75m; whereas, the proposed storage shed will be on land topographically greater than this flood level, so should remain unaffected by flooding.
- 5.15 In the 1 in 100-year +35%CC flood event, the water level reached 67.43mAOD. Flood depths could reach up to 0.83m at the new storage building and 0.03m at the proposed storage shed.
- 5.16 It should be noted that there are natural embankments and a train track in between the River Blackwater and the proposed site, both having a maximum topographic level of approximately 67.50mAOD. This could act as a flood defence between the site and the River Blackwater and may mitigate the risk of flooding to the site, given that the higher land between the site and the River Blackwater is above the flood levels in the 1 in 100-year +25%CC and 1 in 100-year +35%CC events.
- 5.17 The existing site is developed and wholly impermeable. The proposal is for a minor extension to the existing site use, so it could be considered that the risk of fluvial flooding in the climate change scenarios may not increase as a result of this development.

6. Residual Risks

Identification of Residual Risks

6.1 Residual risks are those remaining after applying the sequential approach to the location of development and taking mitigating actions. Examples of residual flood risk include:

- the failure of flood management infrastructure such as a breach of a raised flood defence, blockage of a surface water conveyance system, overtopping of an upstream storage area, or failure of a pumped drainage system;
- failure of a reservoir, or;
- a severe flood event that exceeds a flood management design standard, such as a flood that overtops a raised flood defence, or an intense rainfall event which the drainage system cannot cope with.

Defence Breach

6.2 The site is not in an area which benefits from flood defences according to the EA Flood Map for Planning. Thus, there should be no residual risk of flooding to the site and proposed development in the event of a breach or failure in flood defences.

Reservoir Failure

6.3 The online EA Risk from Reservoir Flooding Map (Figure 15) demonstrates that the site is outside flood extents in the event of reservoir flooding.



Figure 15: EA Reservoir Flooding map, showing approximate location of site (Source: EA)

Drainage Exceedance

- 6.4 In the event of drainage failure/exceedance, overland flows would be dictated by external topography. Given that the existing site is developed and wholly impermeable, it is considered that the proposed minor extension to the existing site will not significantly alter the drainage of the site, as per the existing situation.

7. Flood Risk Management Measures

Flood Risks

- 7.1 The site is currently used by Corewire Limited (manufacturing company). The proposed development is for the construction of two steel buildings to provide additional storage space to the existing site. The proposed storage building will be 10m x 9m (90m²) and the new storage shed will be 4.4m x 2.4m (10.56m²). This is based on plans provided by the client, which are included in Appendix 1.
- 7.2 Under the Flood Risk and Coastal Change Planning Practice Guidance (PPG), a 'Minor Development' is defined as a:
- 'minor non-residential extensions: industrial/commercial/leisure etc extensions with a footprint less than 250 square metres.'*
- 7.3 This development is for a commercial extension to the existing site, with a footprint less than 250m².
- 7.4 As such, this demonstrates that the proposed development at the existing manufacturing site can be considered a 'Minor Development' under the Flood Risk and Coastal Change Planning Practice Guidance (PPG) and National Planning Policy Framework (NPPF). The proposed development can therefore adhere to the EA Standing Advice for Minor Developments.
- 7.5 Furthermore, the proposed extension should incorporate flood resilience measures in line with current best practice for construction within an area at risk of flooding in line with CLG 2007 'Improving the Flood Performance of New Buildings. These measures are detailed below:
- Construction:
 - Ground floor to be of solid construction, with waterproof membrane (where possible).
 - All floors to be finished with waterproof screed (where possible).
 - Ground floor internal render to be waterproof.
 - Utilise waterproof seals on the doors/windows of the buildings, to minimise flood water ingress during a flood event.
 - External walls to be resistant to flooding.
 - Exterior ventilation outlets, utility points and air bricks to be fitted with removable waterproof covers.
 - Electrical connection:
 - Any electrical sockets should be installed 300mm above the ground floor level, to minimise damage to electrical services in a flood event.
 - Drainage:
 - Non-return valves to be fitted to all drain and sewer outlets.
 - Interior fittings:
 - Use of MDF carpentry (i.e. skirting, architrave, built-in storage) to be avoided at ground floor level.

- Site owners/ staff/ management will be required to sign up to the EA Flood Warning Service, if they have not done so already.

Flood Warning Service

- 7.6 The EA operates a 24-hour telephone service on 0345 988 1188 that provides frequently updated flood warnings and associated floodplain information. Further information can be found on www.environment-agency.gov.uk/floodline. Floodline Warnings Direct is a free service operated by the EA that provides flood warnings direct to occupants by telephone, mobile phone, fax or pager.
- 7.7 The proposed development site is located within an EA Flood Warning Service Area, as indicated in Figure 16. As such, it is recommended that site users sign up to this service, if they have not done so already.
- 7.8 Upon receipt of a Flood Warning, site users are advised to evacuate the site to a designated place of safe refuge within Flood Zone 1.
- 7.9 If flood waters along the proposed evacuation route have exceeded 25cm, site users are advised, if possible, to seek refuge at the upper floors on site.

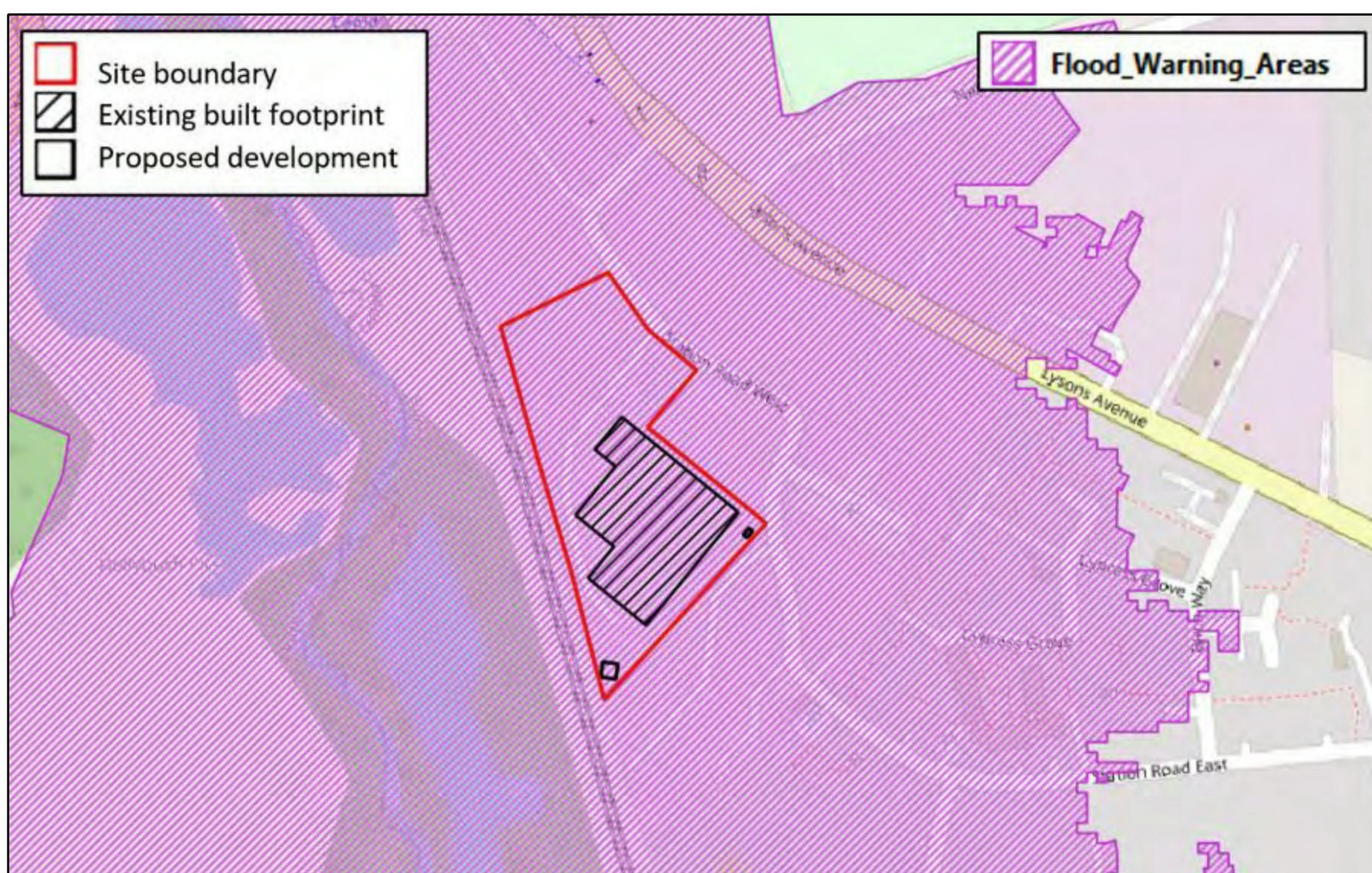


Figure 16: EA Flood Warning Areas and location of site (Source: EA)

Flood Evacuation Plan

- 7.10 The site is in Flood Zone 2 and the main source of potential flood risk to the site is fluvial.
- 7.11 Given that the proposal is for a minor extension to the existing manufacturing site, it is recommended that site users and staff use the same evacuation route that is already in place for the site, if required. Furthermore, in the event of flooding at the site, the site would likely need to be temporarily closed, until it is safe to re-open again.

8. Off Site Impacts

Impact to Flood Risk Elsewhere

8.1 The proposal is for a minor extension to the existing site (commercial), with a footprint of less than 250m². Thus, the proposed development is considered a 'Minor Development' under the Flood Risk and Coastal Change Planning Practice Guidance (PPG).

8.2 The Flood Risk and Coastal Change Planning Practice Guidance (PPG) states the following with regards to flood risk issues raised by minor developments:

Minor developments are unlikely to raise significant flood risk issues unless:

- *they would have an adverse effect on a watercourse, floodplain or its flood defences;*
- *they would impede access to flood defence and management facilities, or;*
- *where the cumulative impact of such developments would have a significant effect on local flood storage capacity or flood flows.*

8.3 The proposed development will not affect the nearby watercourse, floodplain or the existing defences; it will not prevent access to the flood defences and management facilities; and it should not affect flood storage capacity or flood flows.

8.4 Thus, this demonstrates that the proposed development should not increase the risk of flooding elsewhere.

Generation of Runoff

8.5 In order to mitigate flood risk posed by the proposed development, adequate control measures are required to be considered. This will ensure that surface water runoff is dealt with at source and the flood risk on/off site is not increased over the lifetime of the development.

8.6 The runoff generated will need to be managed in accordance the National Planning Policy Framework (NPPF 2019) policy, which requires the use of Sustainable Drainage Systems (SuDS).

8.7 The site is currently used for Corewire Limited (manufacturing company) and considered wholly impermeable.

8.8 The proposed development is for the construction of two steel buildings to provide additional storage space to the existing site. The proposed storage building will be 10m x 9m (90m²) and the new storage shed will be 4.4m x 2.4m (10.56m²). This development is considered as an extension of the existing site use and a 'Minor Development' under the Flood Risk and Coastal Change Planning Practice Guidance (PPG) and National Planning Policy Framework (NPPF).

8.9 Given that the existing site is wholly impermeable, it is considered that the increase in surface water runoff as a result of this development will be negligible. It is recommended that the additional surface water runoff created as a result of the proposed extension should be discharged via the existing drainage infrastructure currently used for the existing hardstanding areas on site.

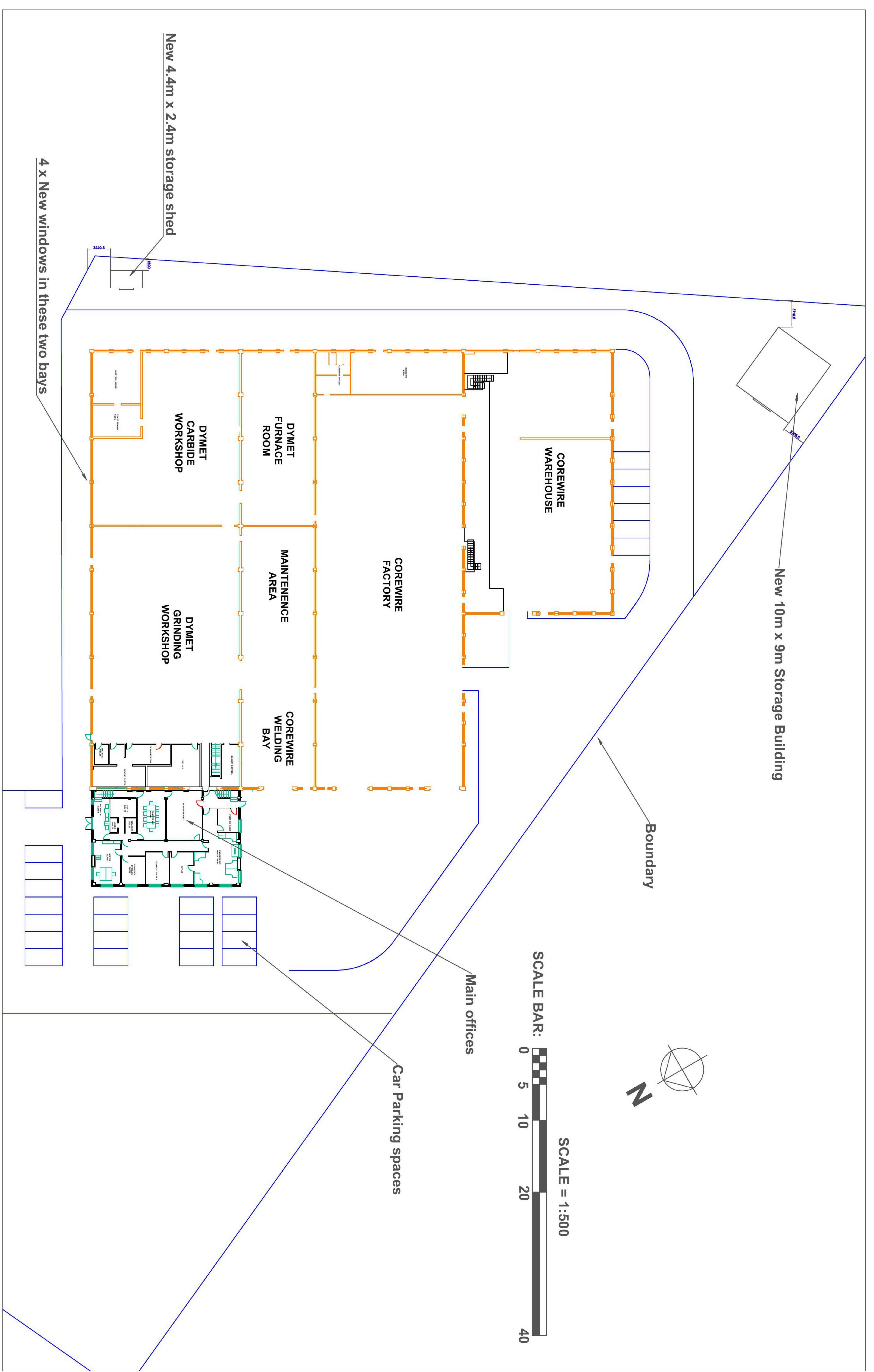
9. Conclusion

- 9.1 Ambiental Environmental Assessment has been appointed by Corewire Limited to undertake a National Planning Policy Framework (NPPF) compliant Flood Risk Assessment (FRA) for the proposed development at Corewire Limited, Station Road West, Ash Vale, Aldershot, GU12 5LZ.
- 9.2 The site is currently used by Corewire Limited (manufacturing company). The proposed development is for the construction of two steel buildings to provide additional storage space to the existing site. As such, it is considered an extension to the existing site use.
- 9.3 With reference to the Environment Agency (EA) Flood Map for Planning, the proposed development is located within Flood Zone 2.
- 9.4 The proposed development is for an extension of the existing site use and is considered “Less Vulnerable” under the Flood Risk and Coastal Change Planning Practice Guidance (PPG) and National Planning Policy Framework (NPPF).
- 9.5 The proposed development can be considered a ‘Minor Development’ under the Flood Risk and Coastal Change Planning Practice Guidance (PPG) and National Planning Policy Framework (NPPF), as it is for an industrial extension to the existing site, with a footprint less than 250m².
- 9.6 The Environment Agency have provided Ambiental with modelled flood information, using the Blackwater (Aldershot to Sandhurst and Bramshill to Swallowfield) 2007 model. The model was re-run in July 2017, to include the latest climate change allowances (February 2016).
- 9.7 Based on the modelled flood extents provided by the Environment Agency, the site is not shown to be affected in the present-day modelled events (20%, 5% or 1% AEPs); however, the site could be partially affected by the 1% plus climate change flood events. An analysis of in-channel flood levels of the River Blackwater in the climate change scenarios demonstrates the following:
- In-channel water level at the nearest node to the site during the 1 in 100-year +25%CC flood event is 67.35mAOD. When compared with topographic levels, the new storage building could be affected by flood depths of up to 0.75m; whereas, the proposed storage shed will be on land topographically greater than this flood level, so should remain unaffected by flooding.
 - In the 1 in 100-year +35%CC flood event, the in-channel water level reached 67.43mAOD. Flood depths could reach up to 0.83m at the new storage building and 0.03m at the proposed storage shed.
 - It should be noted that there are natural embankments and a train track in between the River Blackwater and the proposed site, both having a maximum topographic level of approximately 67.50mAOD. This could act as a flood defence between the site and the River Blackwater and may mitigate the risk of flooding to the site given that the higher land between the site and the River Blackwater is above the flood levels in the 1 in 100-year +25%CC and 1 in 100-year +35%CC events.
- 9.8 Furthermore, the proposed extension should incorporate flood resilience measures in line with current best practice for construction within an area at risk of flooding in line with CLG 2007 'Improving the Flood Performance of New Buildings'.
- 9.9 In summary:

- The proposal could be considered a 'Minor Development' under the PPG and NPPF;
- The site is in Flood Zone 2;
- Finished Floor Levels of the proposed extension should be no lower than those of the existing building in line with the EA Standing Advice for Minor Developments;
- Flood resilience measures should be incorporated into the extension.

Following the guidelines contained within the NPPF, the proposed development is considered to be suitable assuming appropriate mitigation (including adequate warning procedures) can be maintained for the lifetime of the development.

Appendix I - Site Plans



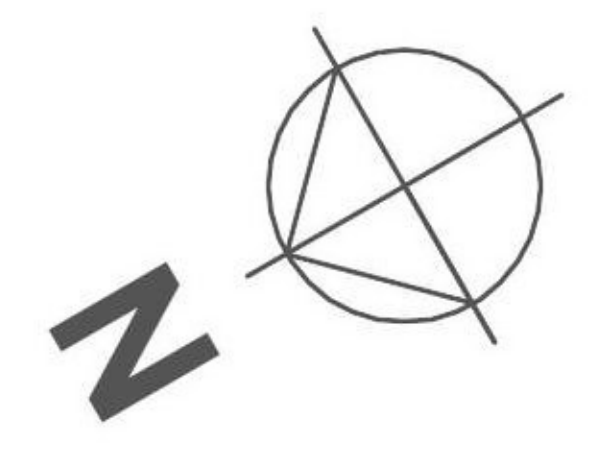
New 10m x 9m Storage Building

Boundary

Main offices

Car Parking spaces

SCALE BAR: 0 5 10 20 40
SCALE = 1:500



4 x New windows in these two bays

New 4.4m x 2.4m storage shed

DYMET CARBIDE WORKSHOP

DYMET FURNACE ROOM

MAINTENANCE AREA

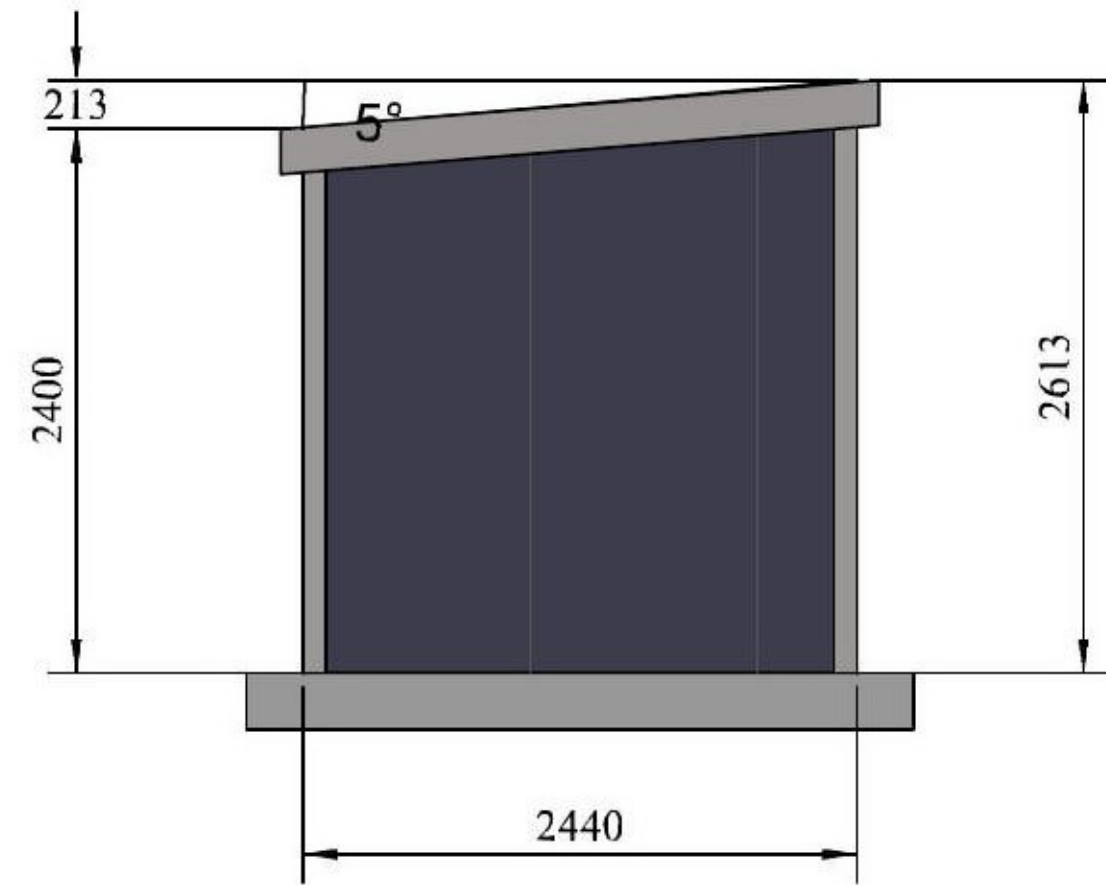
DYMET GRINDING WORKSHOP

COREWIRE FACTORY

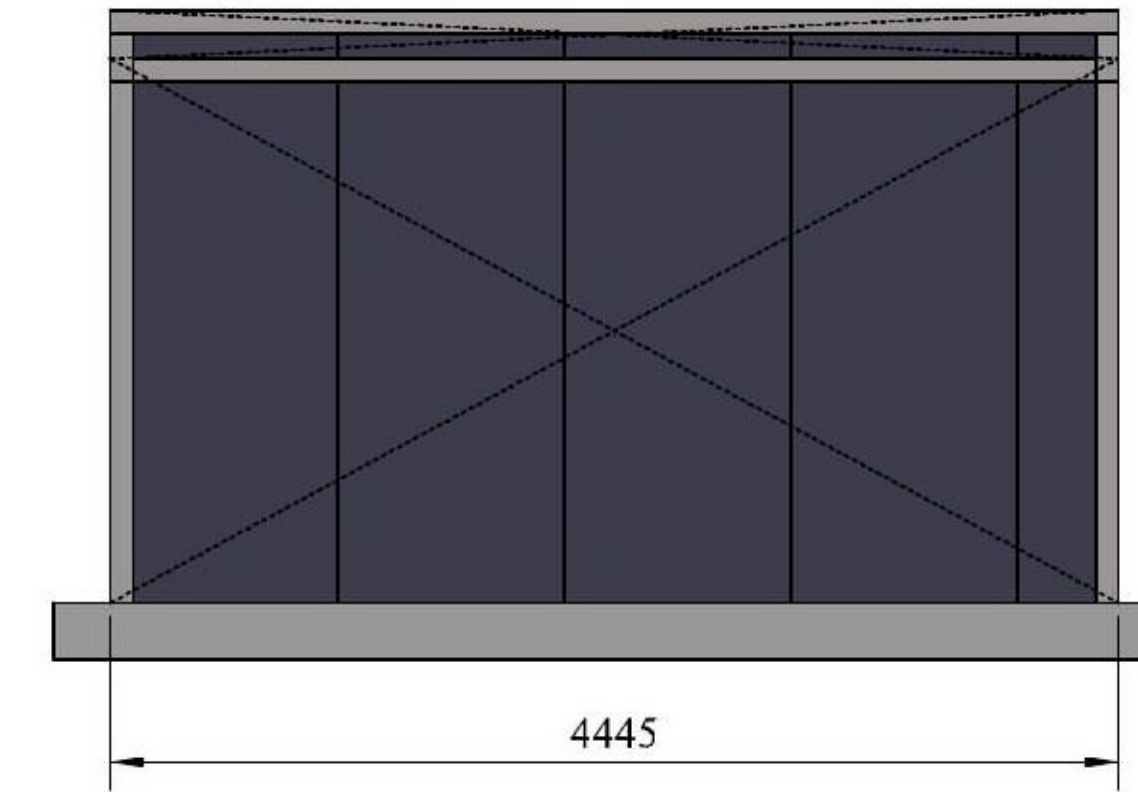
COREWIRE WELDING BAY

COREWIRE WAREHOUSE

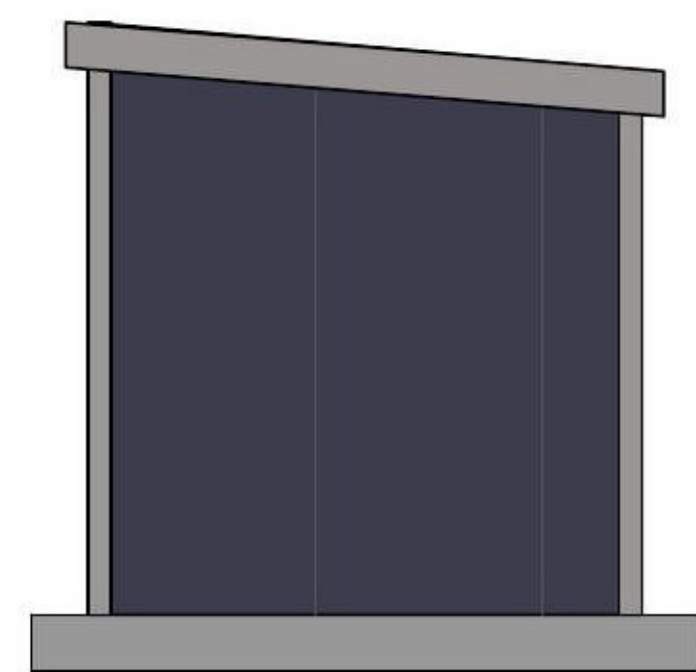
Diagonal lines indicate Strap bracing



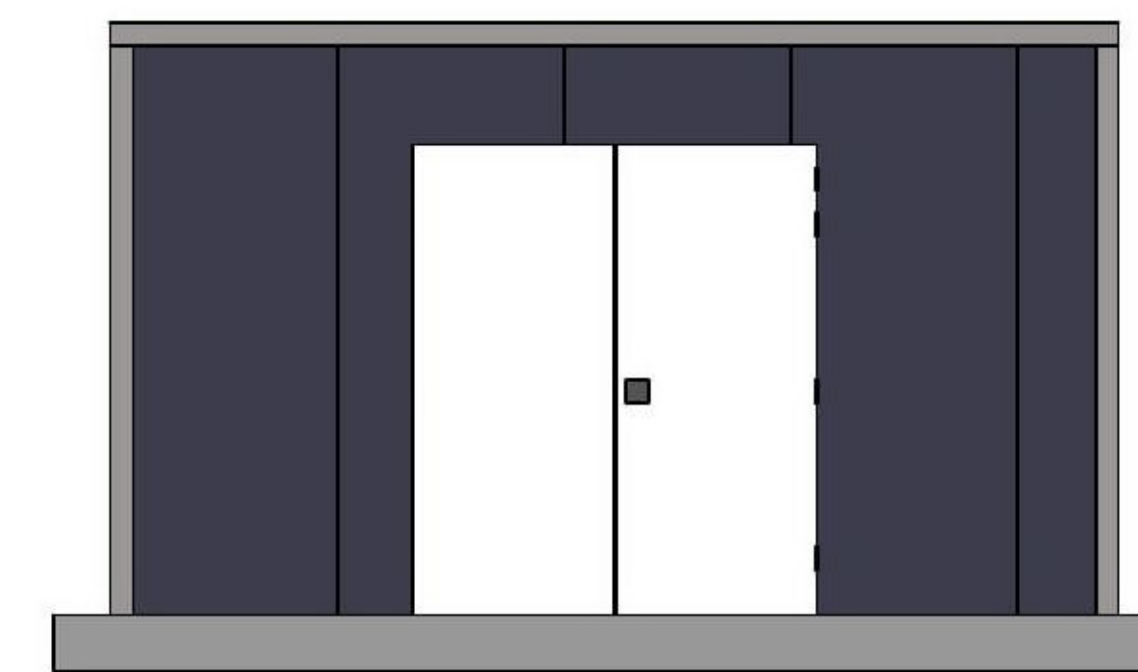
Front Elevation (External)



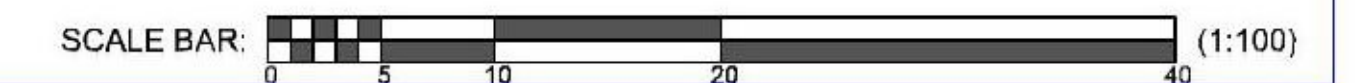
Left Elevation Internal (Scale = 1:100)



Back Elevation (Scale = 1:100)



Right Elevation (Scale = 1:100)



Capital Steel Limited

Web: www.capitalsteelbuildings.co.uk
Email: info@capitalsteelbuildings.co.uk

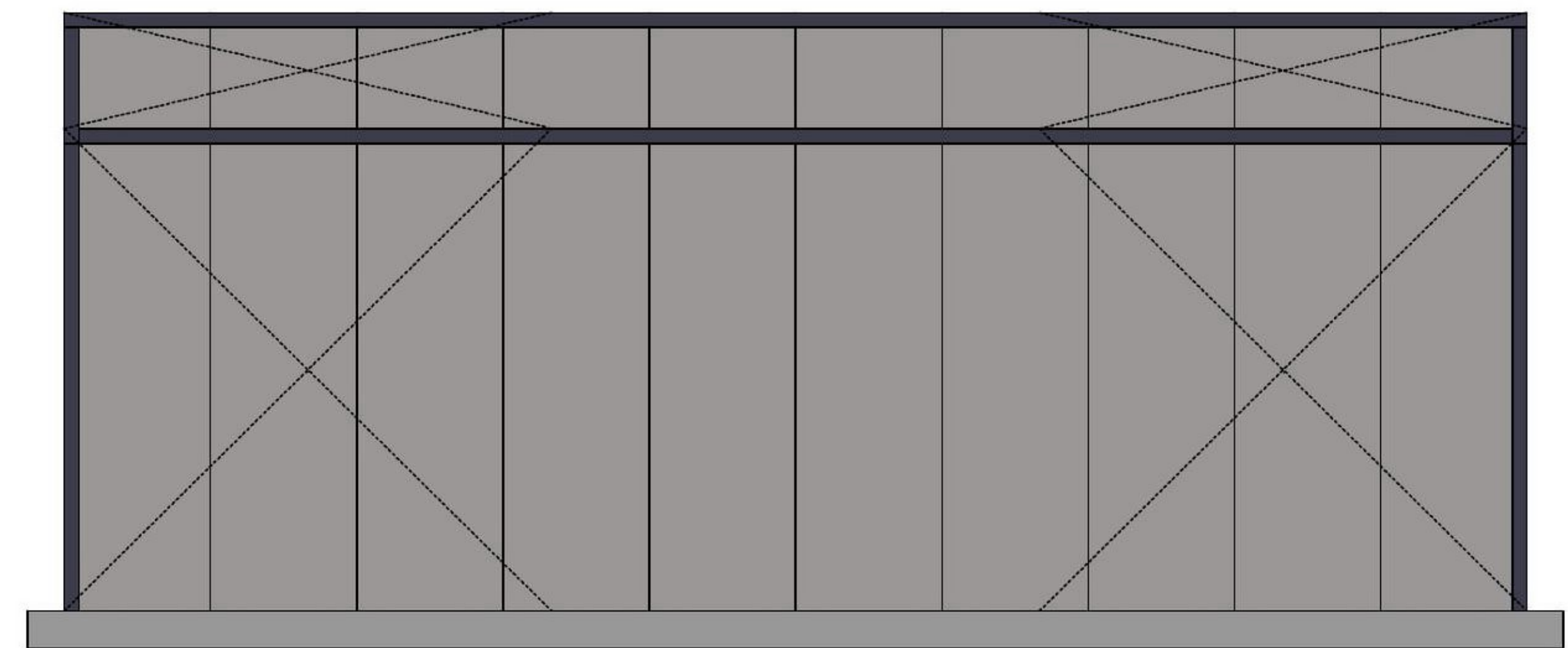
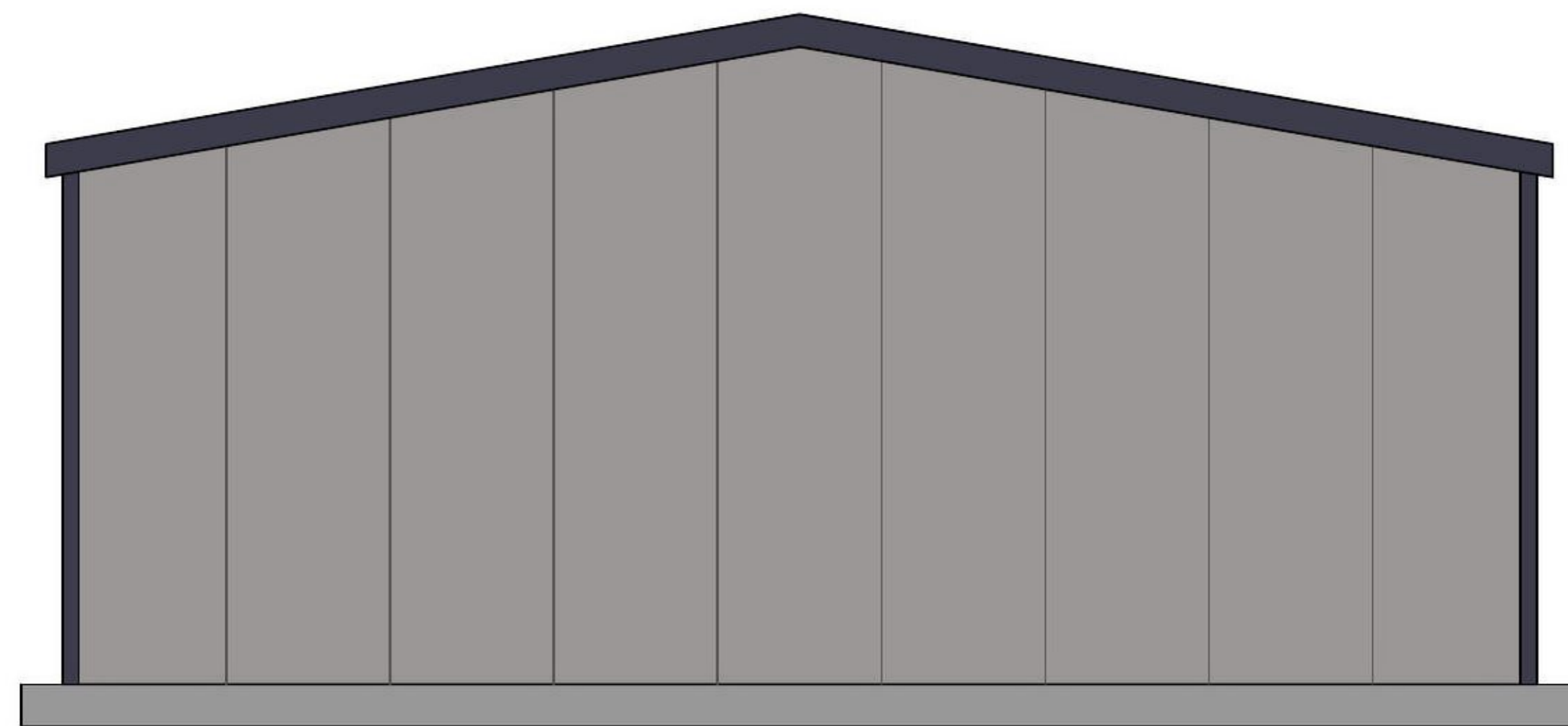
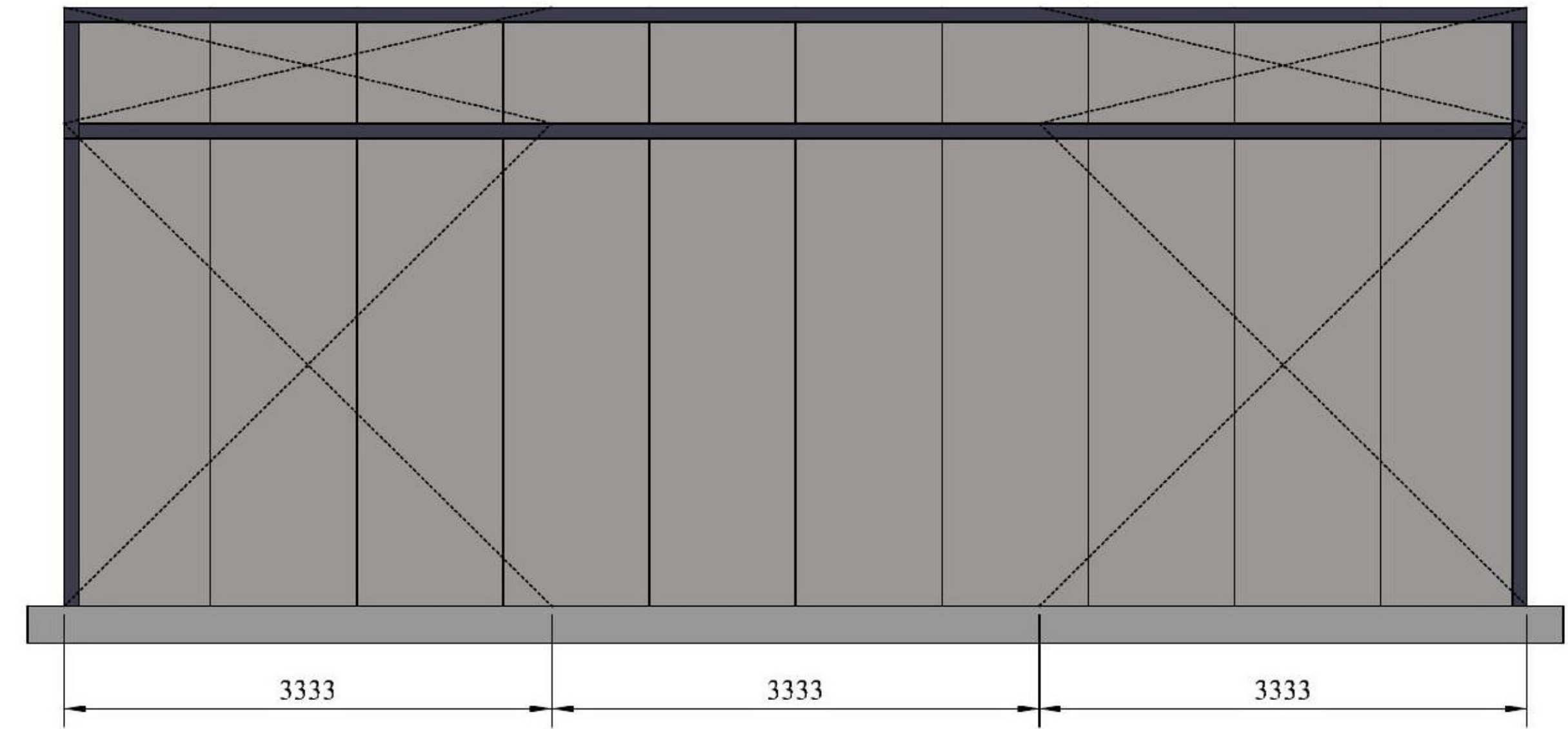
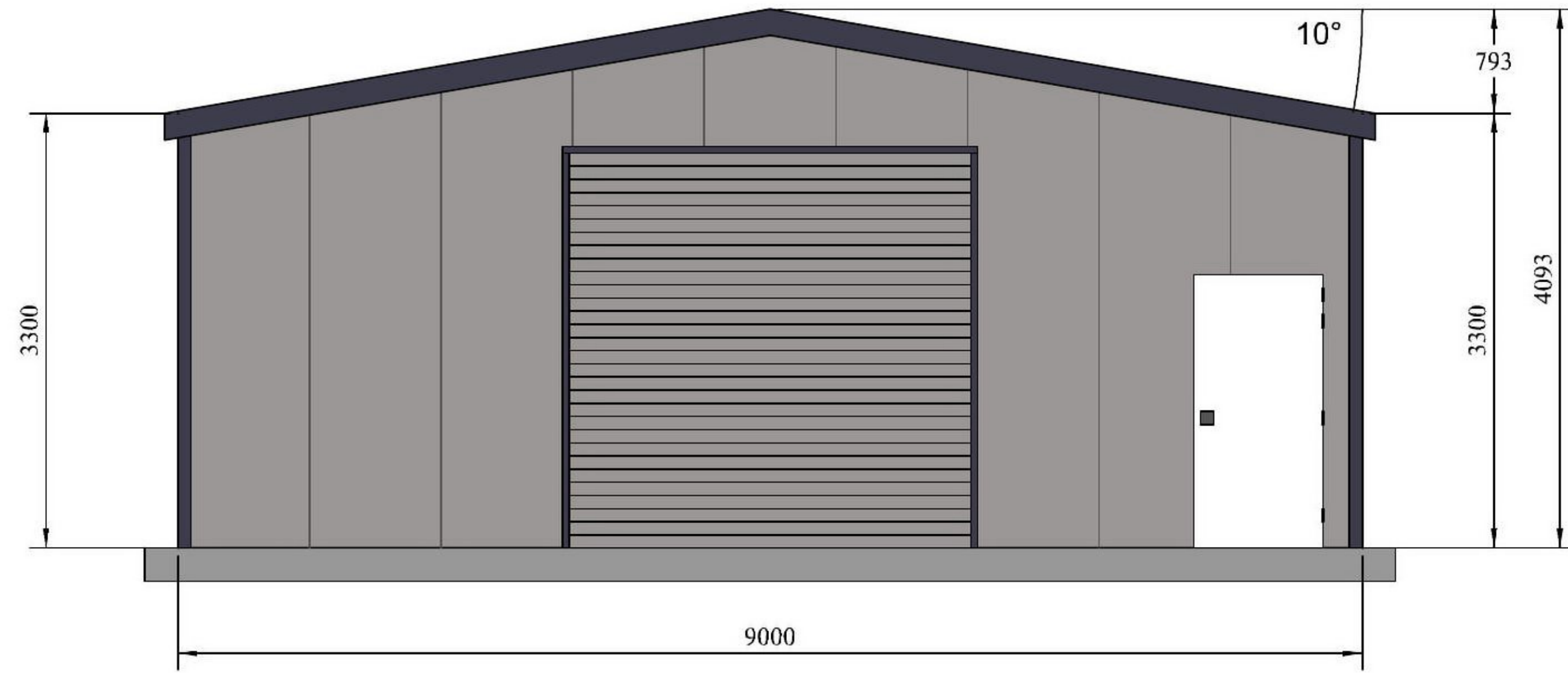
Supplied By: Murray Steel Buildings

Phone 01383 668820
Email peter@murraysteelbuildings.com

Customer: Mark Buxton

Core Wire, Station Road West, Ash Vale, ALDERSHOT
, GU12 5LZ

Diagonal lines indicate Strap bracing



SCALE BAR: 0 5 10 20 40 (1:100)



Capital Steel Limited

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Phone 01383 668820
Email peter@murraysteelbuildings.com

Customer: Mark Buxton

Core Wire, Station Road West, Ash Vale, ALDERSHOT,
GU12 5LZ

Appendix II - EA Data

Product 4 (Detailed Flood Risk) for Site on Station Road West, Ash Vale, Aldershot, GU12 5LZ Our Ref: THM215983

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 X/Y 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:

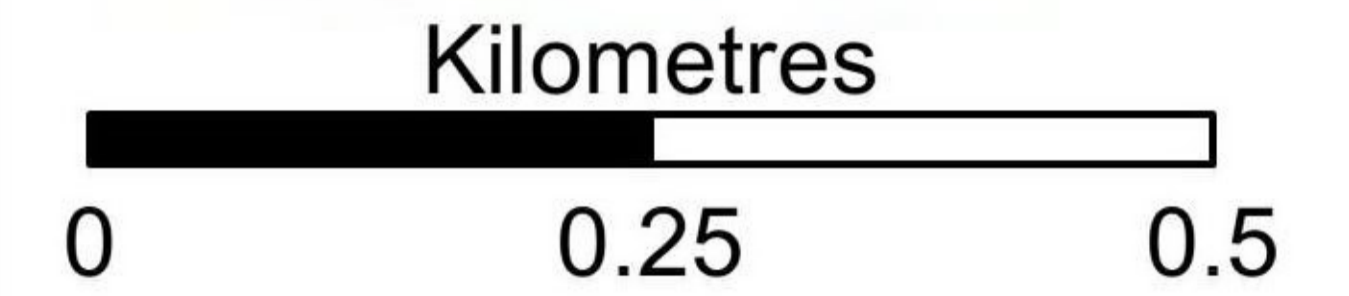
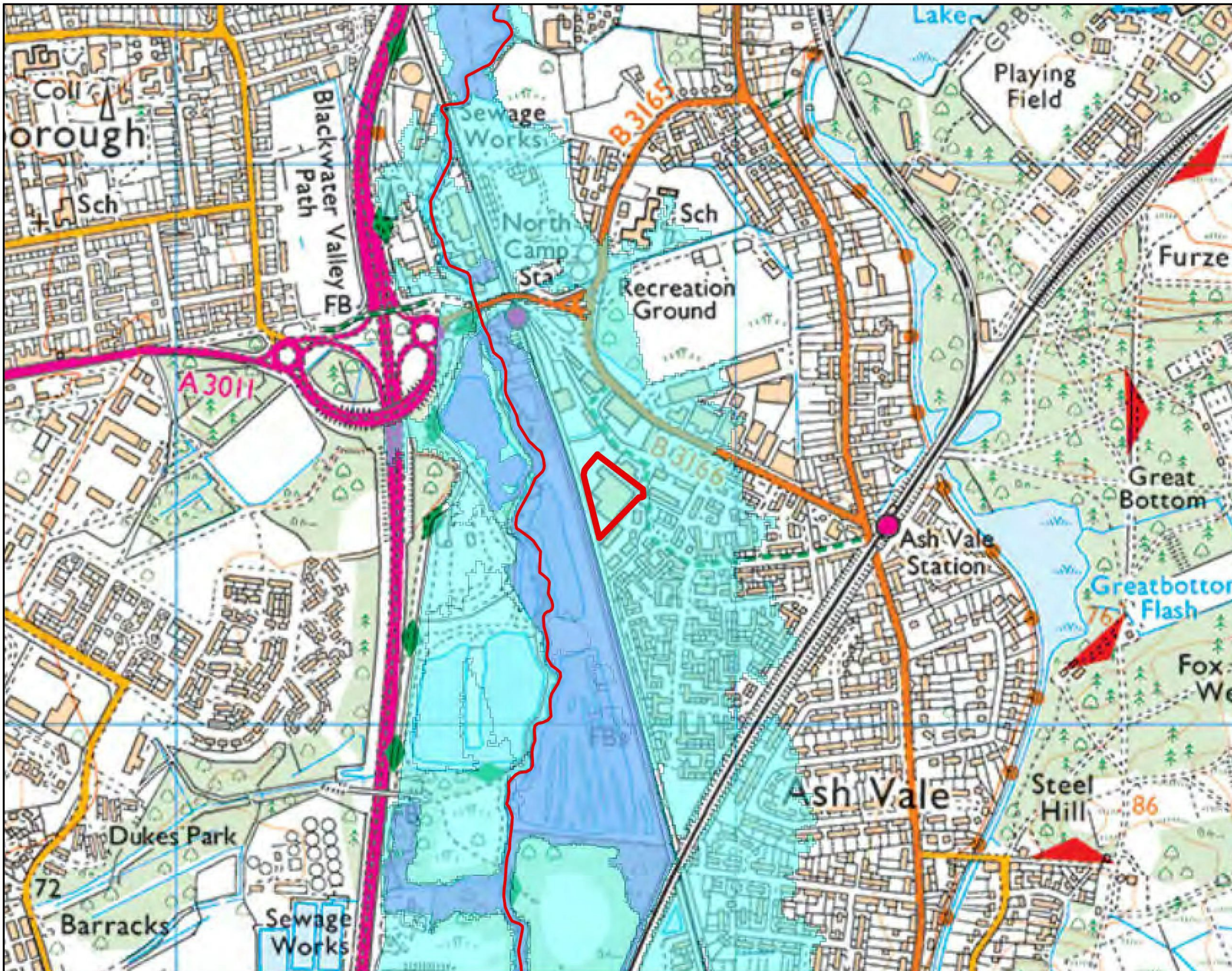
<https://www.gov.uk/guidance/flood-risk-assessment-local-planning-authorities>

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 GU12 5LZ

Created on 10.05.21 REF: THM215983



Legend

- Main River
- 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

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

Model: Blackwater (Aldershot to Sandhurst and Bramshill to Swallowfield) 2007

Description: The data provided is taken from the River Blackwater 1D Detailed Flood Risk Mapping Study which was completed in September 2007. The model includes Blackwater, Marrow Brook, Pystock Stream and Vigo Stream. Model re-run to include new climate change allowances in July 2017.

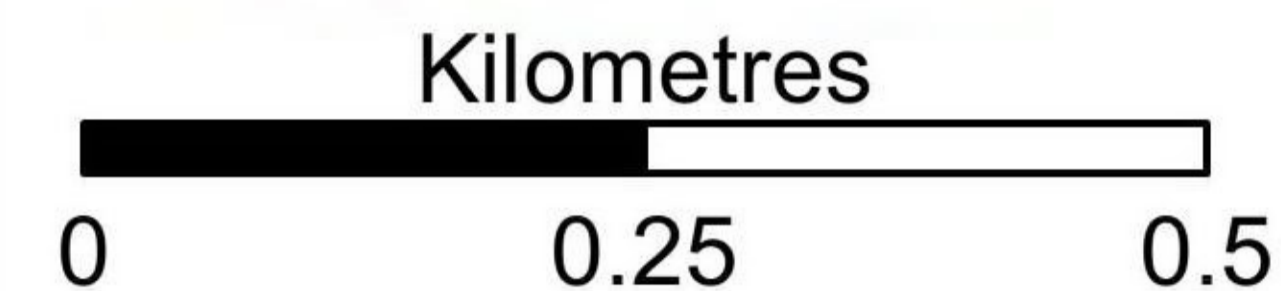
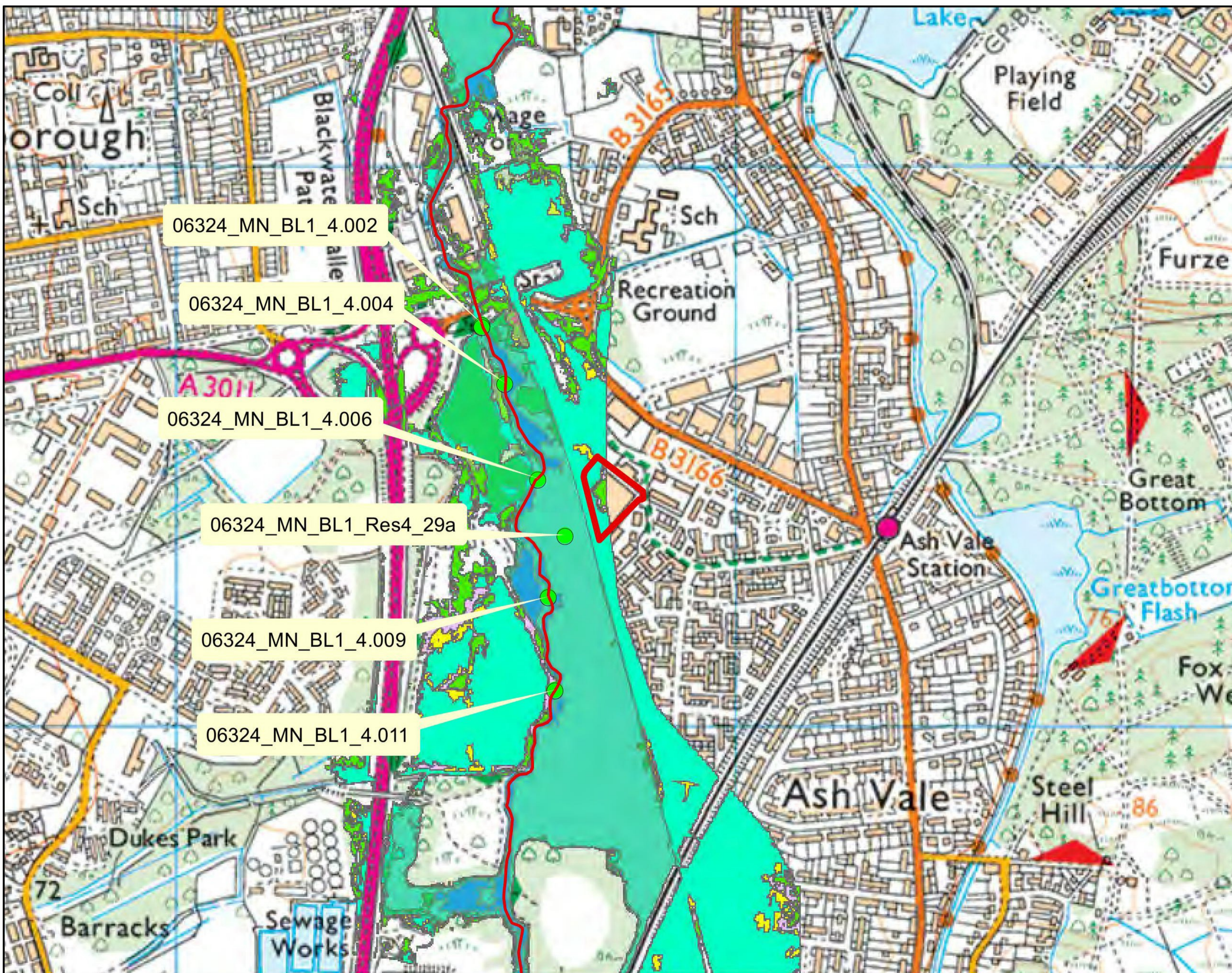
Model design runs and Mapped Outputs:

- 1 in 5 / 20% AEP
- 1 in 20 / 5% AEP
- 1 in 50 / 2% AEP
- 1 in 100 / 1% AEP
- 1 in 100+15% / 1% AEP with 15% AEP climate change allowance
- 1 in 100+25% / 1% AEP with 20% AEP climate change allowance
- 1 in 100+35% / 1% AEP with 25% AEP climate change allowance
- 1 in 100+35% / 1% AEP with 35% AEP climate change allowance
- 1 in 100+70% / 1% AEP with 70% AEP climate change allowance
- 1 in 1000 / 0.1% AEP

Model accuracy:
Levels \pm 300mm

Detailed FRA Map centred on GU12 5LZ

Created on 10.05.21 REF: THM215983



Legend

- Main River
- Model Nodes
- 20% AEP Flood Outline
- 5% AEP Flood Outline
- 1% AEP Flood Outline
- 1%+15% AEP Flood Outline
- 1%+20% AEP Flood Outline
- 1%+25% AEP Flood Outline
- 1%+35% AEP Flood Outline
- 1%+70% AEP Flood Outline

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.

Modelled in-channel flood flows and levels

THM215983

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	Easting	Northing	Flood Levels (mAOD)							
				20% AEP	5% AEP	1% AEP	1% AEP (+20% increase in flows)	1% AEP (+25% increase in flows)	1% AEP (+35% increase in flows)	1% AEP (+70% increase in flows)	0.1% AEP
06324_MN_BL1_4.011	Blackwater (Aldershot to Sandhurst and Bramshill to Swallowfield) 2007	488677	153062	66.82	67.25	67.41	67.54	67.65	67.69	67.94	0.00
06324_MN_BL1_4.009	Blackwater (Aldershot to Sandhurst and Bramshill to Swallowfield) 2007	488665	153229	66.75	67.15	67.30	67.42	67.53	67.58	67.84	0.00
06324_MN_BL1_Res4_29a	Blackwater (Aldershot to Sandhurst and Bramshill to Swallowfield) 2007	488695	153339	66.04	66.94	67.11	67.22	67.35	67.43	67.71	0.00
06324_MN_BL1_4.006	Blackwater (Aldershot to Sandhurst and Bramshill to Swallowfield) 2007	488646	153440	66.61	67.00	67.16	67.27	67.39	67.46	67.73	0.00
06324_MN_BL1_4.004	Blackwater (Aldershot to Sandhurst and Bramshill to Swallowfield) 2007	488587	153611	66.52	66.92	67.10	67.21	67.34	67.42	67.70	0.00
06324_MN_BL1_4.002	Blackwater (Aldershot to Sandhurst and Bramshill to Swallowfield) 2007	488546	153716	66.47	66.87	67.05	67.17	67.29	67.37	67.65	0.00

Node label	Model	Easting	Northing	Flood Flows (m3/s)							
				20% AEP	5% AEP	1% AEP	1% AEP (+20% increase in flows)	1% AEP (+25% increase in flows)	1% AEP (+35% increase in flows)	1% AEP (+70% increase in flows)	0.1% AEP
06324_MN_BL1_4.011	Blackwater (Aldershot to Sandhurst and Bramshill to Swallowfield) 2007	488677	153062	3.35	5.83	6.93	7.32	7.36	7.49	7.85	0.00
06324_MN_BL1_4.009	Blackwater (Aldershot to Sandhurst and Bramshill to Swallowfield) 2007	488665	153229	3.34	5.62	6.47	7.71	7.91	8.38	10.81	0.00
06324_MN_BL1_Res4_29a	Blackwater (Aldershot to Sandhurst and Bramshill to Swallowfield) 2007	488695	153339	0.00	0.00	0.00	0.00	0.00	0.00	0.29	0.00
06324_MN_BL1_4.006	Blackwater (Aldershot to Sandhurst and Bramshill to Swallowfield) 2007	488646	153440	3.90	6.80	7.95	8.86	9.23	9.82	11.36	0.00
06324_MN_BL1_4.004	Blackwater (Aldershot to Sandhurst and Bramshill to Swallowfield) 2007	488587	153611	3.93	6.29	7.44	8.24	8.57	9.23	12.30	0.00
06324_MN_BL1_4.002	Blackwater (Aldershot to Sandhurst and Bramshill to Swallowfield) 2007	488546	153716	3.93	6.29	7.43	8.23	8.56	9.21	12.29	0.00

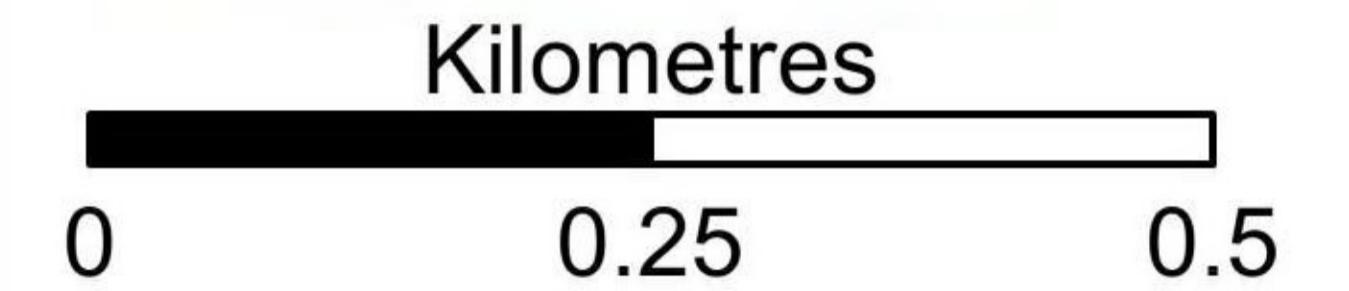
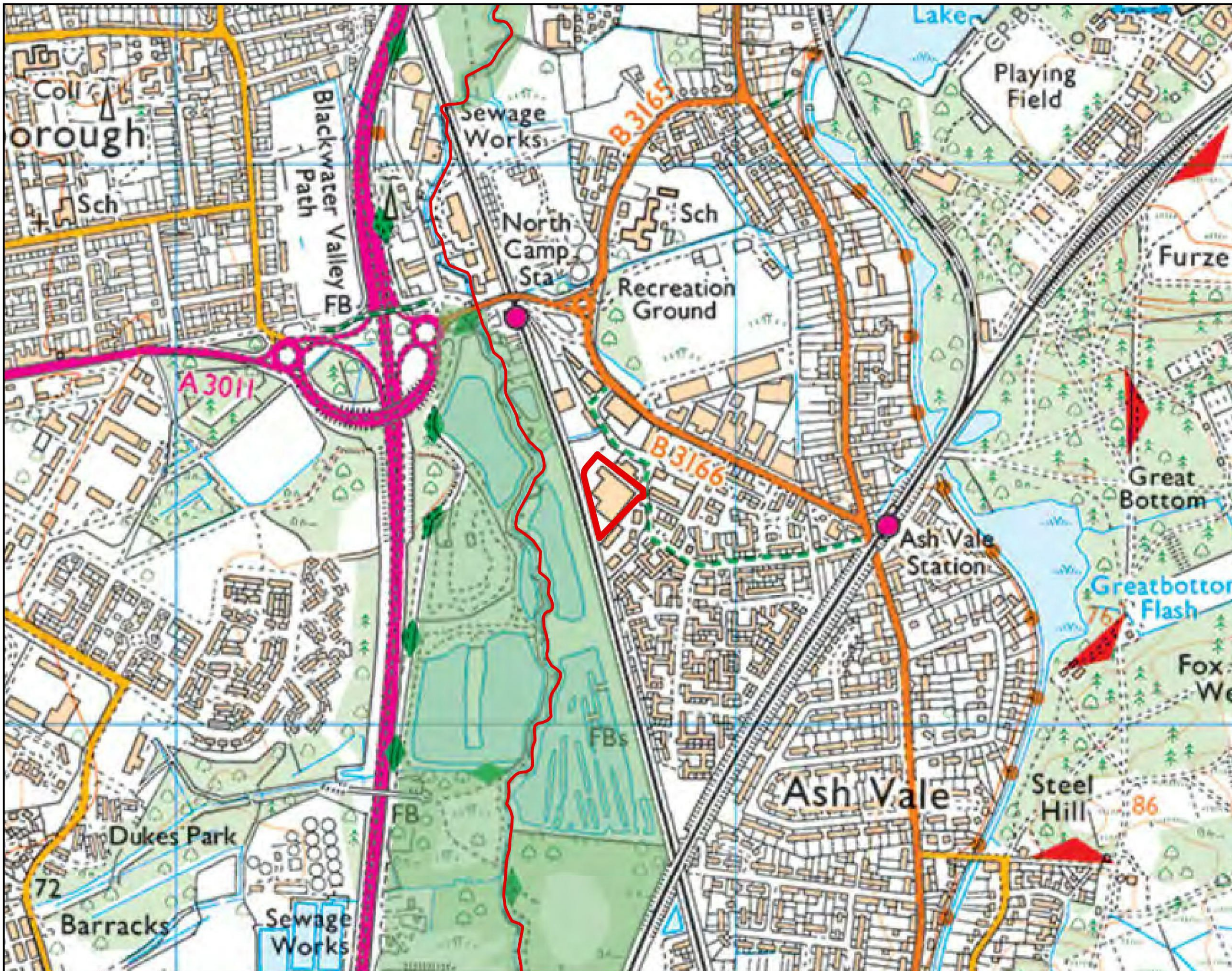
Note:

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/flood-risk-assessments-climate-change-allowances>

Historic Flood Map centred on GU12 5LZ

Created on 10.05.21 REF: THM215983



Legend

- Main River
- 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.

Historic flood data

THM215983

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
No record of historic flooding affecting site at this location					

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.