4. Flood risk to the development

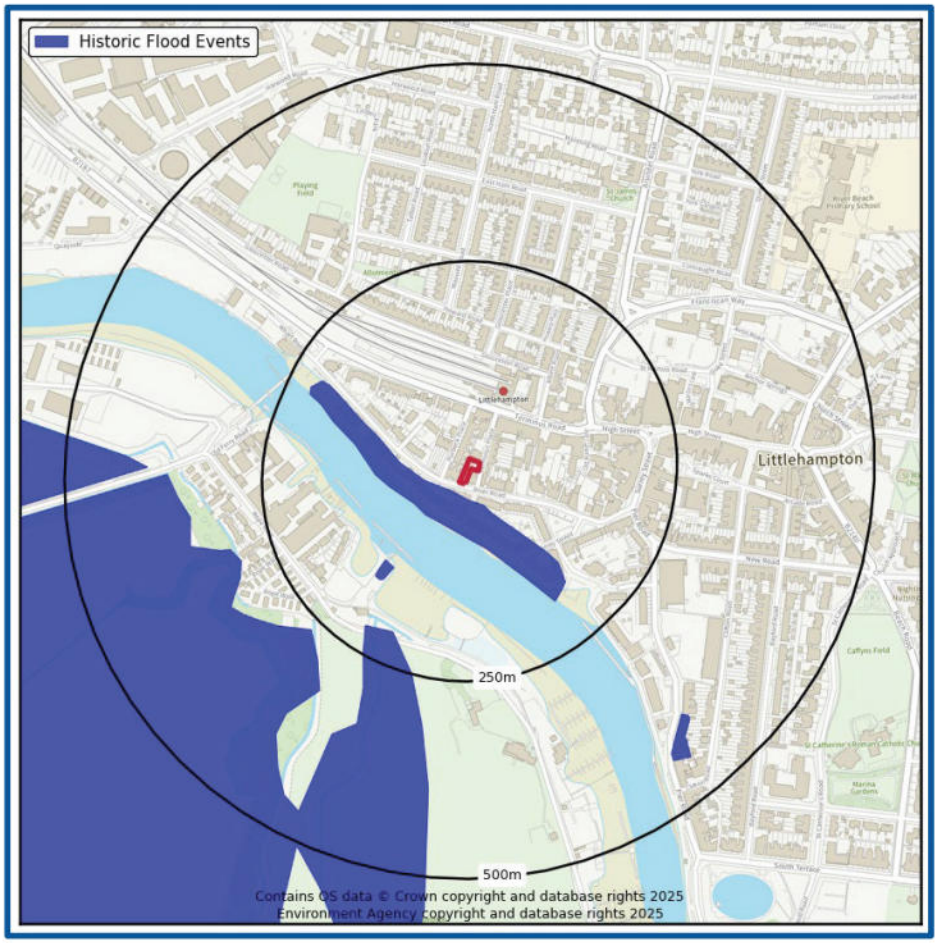
Historical flood events

According to the EA's Historical Flood Map (Figure 7) (EA, 2025) and the SFRA (JBA Consulting, 2016) no historical flood events have been recorded at the Site.

- It is noted that historical flooding has been recorded close to the southern Site boundary. According to the SFRA (JBA Consulting, 2016), 150 properties flooded in February 1983 in Littlehampton as a result of tidal surge, although the Site itself was not known to have been affected in this event.

The purpose of historical flood data is to provide information on where and why flooding may have occurred in the past. The absence of any recorded events does not mean flooding has never occurred on-Site or that flooding will never occur at the Site.

Figure 7. EA Historic Flood Map (EA, 2025)



Rivers (fluvial) / Sea (coastal/tidal) flooding

The Site is located in a coastal location (c. 900 m from the English Channel) and is located close to the River Arun, a tidally influenced watercourse. The predominant risk at the Site is from flooding from the sea, termed as coastal and/or tidal processes.

Coastal flooding is caused by extreme tidal conditions that occur because of three main mechanisms, either individually or in combination. These are:

- High tide levels – variations in tidal levels due to gravitational effects of the sun and moon can result in higher sea levels – there is an approximate twice daily variation between high and low tide, onto which is superimposed a spring-neap tide cycle when extra high and low tides occur.
- Surge – an increase in sea level above tidal level caused by low atmospheric pressure which may be exacerbated by the wind acting on the sea.
- Wave action – dependent on wind speed and direction, local topography and exposure.

According to the EA's Flood Map for Planning Purposes (Figure 8), the Site is located within fluvial and coastal Flood Zone 1, 2 and 3 and is therefore classified as having a Low to High probability of fluvial and tidal (coastal) flooding from the River Arun and the English Channel. The majority of the Site is located within Flood Zone 3 (c. 75% in the central and southern parts of the Site), with the north of the Site located within Flood Zone 2 (c. 25%), and a very minor area in the north west located within Flood Zone 1 (c. 0.1%).

Guidance

As defined in the NPPF (2024):

Ignoring the presence of any defences, land located in a Flood Zone 3 is considered to have High probability of flooding with a 1 in 100 year or greater annual probability of fluvial flooding or a 1 in 200 or greater annual probability of coastal flooding in any one year.

Development of "Water-Compatible" and "Less Vulnerable" land uses are suitable for this zone with "More Vulnerable" and "Essential Infrastructure" requiring an Exception test to be passed prior to development taking place. (see glossary for terminology).

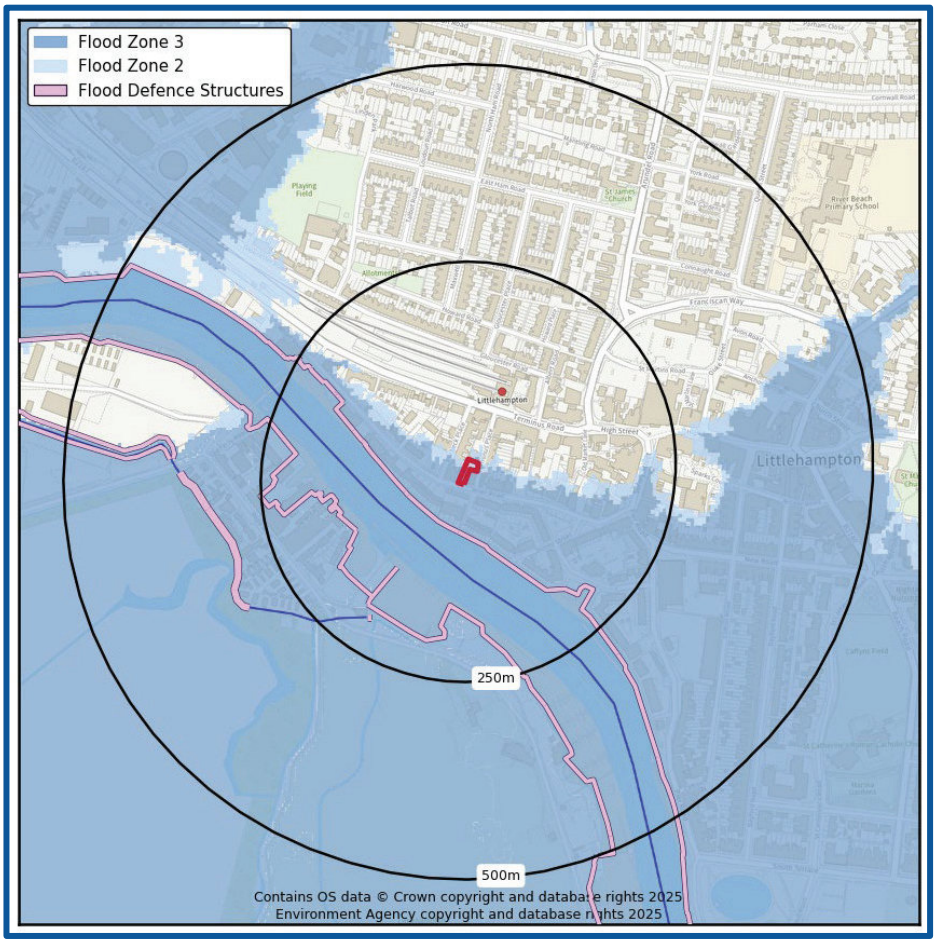
Ignoring the presence of any defences, land located in a Flood Zone 2 is considered to have a Medium probability of flooding, with between a 1 in 100 and 1 in 1000 annual probability of fluvial flooding or between a 1 in 200 and 1 in 1000 annual probability of coastal flooding in any one year.

Development of "Water-Compatible", "Essential Infrastructure", "Less Vulnerable" and "More Vulnerable" land uses are suitable for this zone with "Highly Vulnerable" land uses requiring an Exception Test to be passed prior to development taking place.

Ignoring the presence of any defences, land located in a Flood Zone 1 is considered to have a Low probability of flooding, with less than a 1 in 1000 annual probability of fluvial or coastal flooding in any one year.

Development of all uses of land is appropriate in this zone (see glossary for terminology).

Figure 8. EA Flood Map for Planning Purposes (EA, 2025)



Flood defences

Guidance

Sites that are located close to flood defences are likely to be zones where rapid inundation will occur in the event of the flood defences being overtopped or breached. A Site located close to flood defences (within 250 m) may require a more detailed FRA subject to local topography.

Existing flood defences

The EA's Asset Information Management Systems (AIMS) dataset (2025) identifies the following assets within the vicinity of the Site:

- Flood wall defences (asset ID: 154862) are situated c. 50 m to the south, with an upstream crest level of 3.94 mAOD and a downstream crest level of 3.39 mAOD, designed to provide protection up to a 1 in 75 year event. The condition of these defences was not included within the dataset at the time of writing.

The Beachy Head to Selsey Bill Shoreline Management Plan (SMP2) (South Downs Coastal Group, 2006) designation for defence lines at Littlehampton (Unit 18) is to "Hold the Line" over the long term period to 2105 which means that the proposals will remain protected by flood defences currently and over the majority of the lifetime of the development[2]. It is assumed the defences will continue to be maintained thereafter until 2125, but freeboard will be provided to provide an allowance, should the defence policy change between 2105 and 2122.

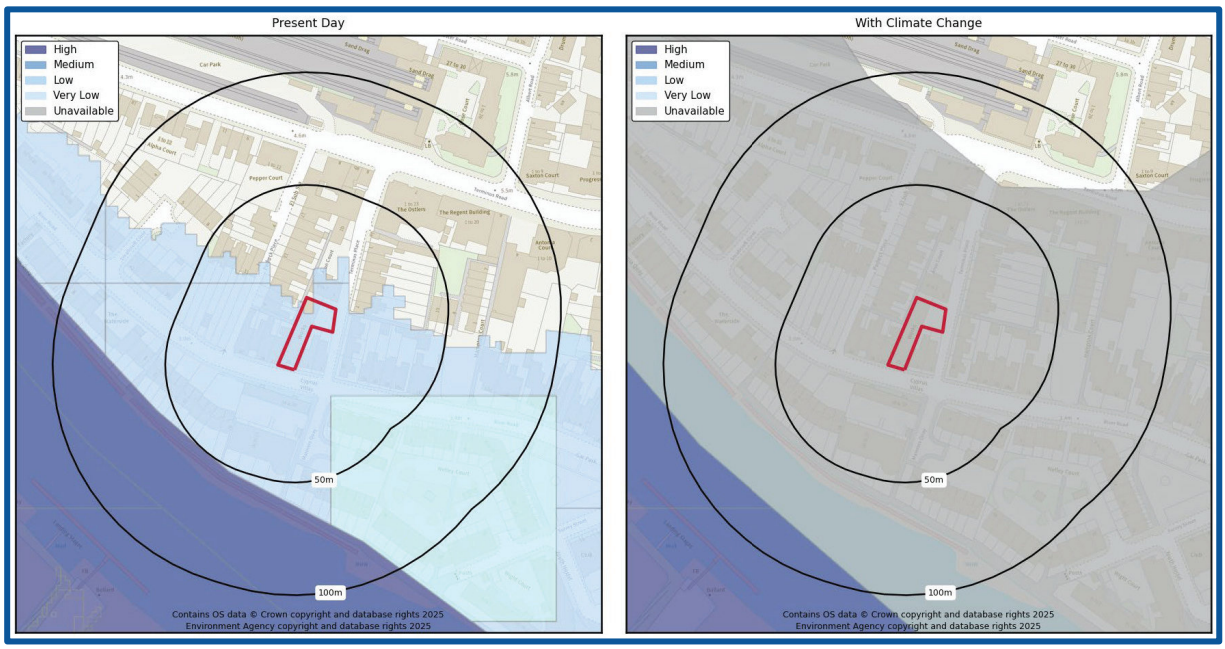
[2] A Shoreline Management Plan (SMP) is a large-scale report, assessing the risks associated with coastal processes. It aims to help reduce these risks to people, property and the historic and natural environment. The main objective of a SMP is to identify sustainable long-term management policies for the coast.

Flood risk including the benefit of defences

The type and condition of existing flood defences influence the 'actual' risk of fluvial flooding to the Site, albeit the long-term residual risk of flooding (ignoring the defences) should be considered when proposing new development.

According to the EA's Risk of Flooding from Rivers and Sea (RoFRS) map (Figure 9), which considers the type, condition and crest height of flood defences, the majority of the Site has a Low risk of flooding (with a minor area in the north at a Very Low risk) from the both the sea and the nearby watercourse, the River Arun. The RoFRS climate change (2036 to 2069) modelling is unavailable for this area.

Figure 9. Risk of Flooding from Rivers and Sea map present day and future (2036 to 2069) (EA, 2025)



Model data

As the Site is located within the EA's fluvial and coastal floodplain, modelled flood elevation data was obtained from the EA. This data is more up to date than that which is included in the Arun District Council SFRA (2016) and has been used to assess flood risk and to provide recommendations for mitigation for the proposed development.

Modelled defended flood data from the Arun to Adur Coastal Modelling Study (JBA Consulting, 2017) has been extracted from the two 2D node points located on-Site and have been used to assess flood risk[3]. The data is provided in the tables below and is included within Appendix B. Undefended data has also been provided by the EA.

Modelled flood outlines and data provided show the Site is affected during all modelled undefended events:

- 1 in 200 year (0.5% AEP) undefended 2012, 2070 and 2115 scenario; and
- the 1 in 1000 year (0.1 % AEP) 2012 undefended scenario events.

Modelled flood outlines and data provided show the Site is protected during some modelled defended events, but would be flooded in the following event:

- 1 in 200 year (0.5% AEP) defended 2115 scenario.

The EA have confirmed the climate change allowances provided are not up to date (i.e. only provide up to 2115), and therefore in order to assess the full 100 year lifespan of the proposed development up to 2125, the EA's guidance on climate change impacts has been used.

In order to assess the higher central allowance, a 13.1 mm allowance has been added for each year (10 years) and an 18.2 mm allowance has been added for each year for the upper end allowance.

The Beachy Head to Selsey Bill Shoreline Management Plan (SMP2) (South Downs Coastal Group, 2006) designation for defence lines at Littlehampton (Unit 18) is to "Hold the Line", therefore, a defended scenario has been considered for the Site.

[3] The accuracy of the modelled flood levels are not known. These are dependent on the accuracy of input datasets such as LiDAR data, used to model the impacts of flooding within the 2D domain. Confirmation of the accuracy of the modelled flood data can be obtained separately from the Environment Agency.

Table 2. EA modelled flood level data for the defended scenarios

Flood data	2012 1 in 1000 year	2115 1 in 200 year	2125 - 1 in 200 year	
			Higher central	Upper end
Flood level (mAOD)	N/A	4.55	4.68	4.73
Flood depths (m)*	No flooding anticipated	Up to 1.29	Up to 1.42	Up to 1.47

*Compared to ground levels at the Site of 3.26 to 4.31 mAOD.

In accordance with local guidance for nearby developments, sleeping accommodation at the Site should be located above the 1 in 200 year plus climate change undefended event, therefore the undefended flood levels and depths at the Site are provided in Table 3.

Table 3. EA modelled flood level data for the undefended scenarios

Flood data	2012		2115	2125 - 1 in 200 year	
	1 in 200 year	1 in 1000 year	1 in 200 year	Higher central	Upper end
Flood level (mAOD)	3.77	4.03	4.88	5.01	5.06
Flood depths (m)*	Up to 0.51	Up to 0.77	Up to 1.62	Up to 1.75	Up to 1.80

*Compared to ground levels at the Site of 3.26 to 4.31 mAOD.

Surface water (pluvial) flooding

Surface water flooding occurs when intense rainfall exceeds the infiltration capacity of the ground and overwhelms the drainage systems. It can occur in most locations even at higher elevations and at significant distances from river and coastal floodplains.

According to the EA's Risk of Flooding from Surface Water (pluvial) flood mapping, the Site is at a variable risk of pluvial flooding ranging from Very Low to High, however, it should be noted that flooding is limited to the boundaries of the Site, with the majority of the Site at Very Low risk.

Figure 10 (overleaf) confirms the extent and depth of flooding in multiple modelled flood scenarios in the present day:

- During the High risk event (>3.3% AEP), flooding of less than 0.20 m is anticipated along the southern and western Site boundaries.
- During the Medium risk event (3.3 - 1% AEP), flooding of generally less than 0.20 m would impact the south-eastern, south-western and southern Site boundaries. A minor area of flooding is anticipated to encroach into the 0.20-0.29 m depth category on the eastern boundary during this event.
- During the Low risk event (1 - 0.1% AEP), flooding of typical depth 0.20-0.29 m would impact the southern boundary of the Site.

Guidance

According to EA's surface water flood risk map, areas of the Site are at:

- Very Low risk - chance of flooding of less than 1 in 1000 (0.1%).
- Low risk - chance of flooding of between 1 in 1000 & 1 in 100 (0.1% and 1%).
- Medium risk - chance of flooding of between 1 in 100 and 1 in 30 (1% and 3.3%).
- High risk - chance of flooding of greater than 1 in 30 (3.3%).

The SFRA does not indicate any reported incidents of historical surface water flooding within 100 m of the Site and confirms the Site is not located within a Critical Drainage Area (CDA) (JBA Consulting. 2016).

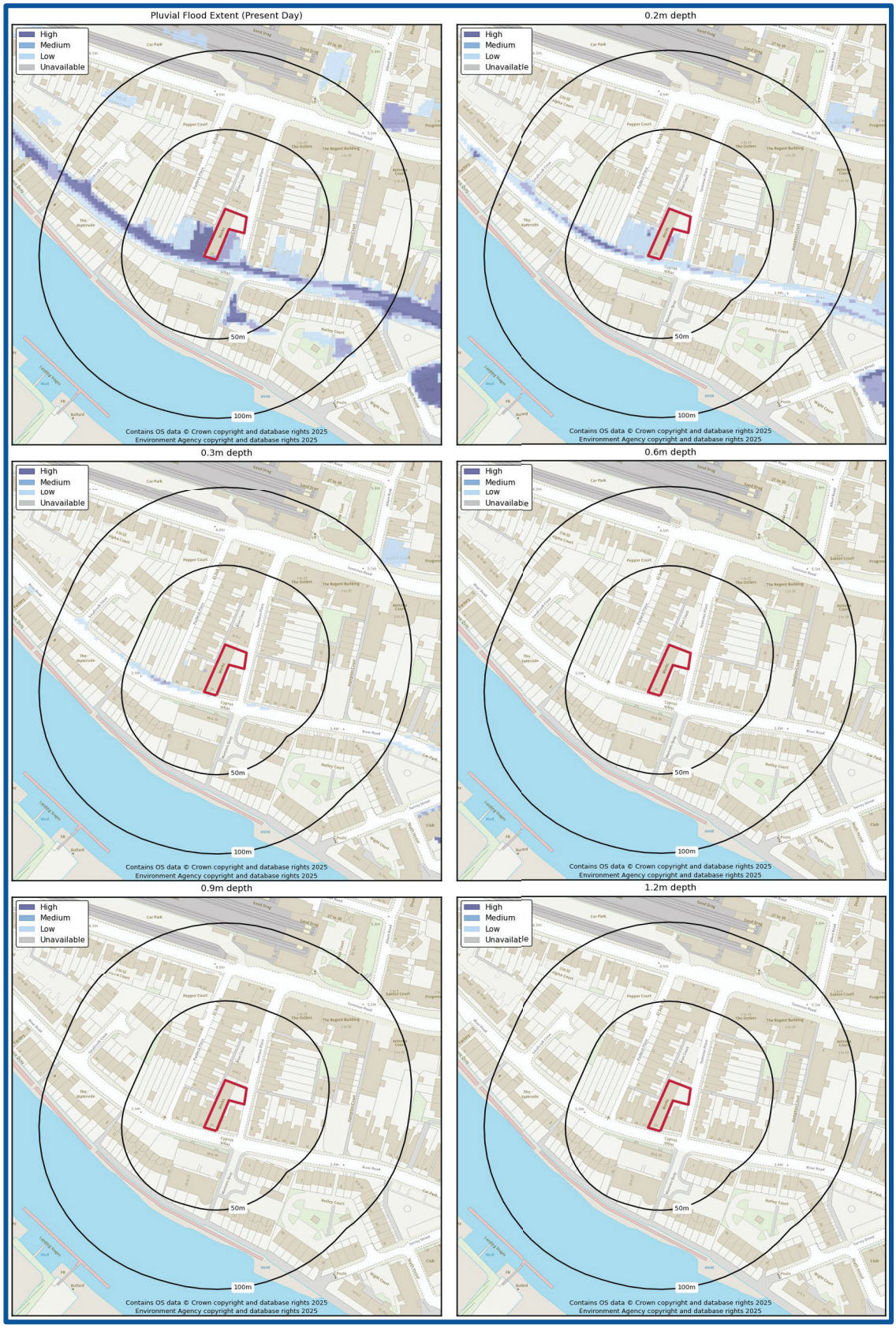
Guidance

According to EA's surface water flood risk map the following advisory guidance applies to the Site:

Flood Depths:

- 0.15 to 0.3 m - Flooding would: typically exceed kerb height, likely exceed the level of a damp-proof course, cause property flooding in some areas.

Figure 10. EA present day surface water flood extent and depth map (EA, 2025)



Surface water flooding flow routes

Analysis of OS mapping, ground elevation data and the EA's pluvial flow route mapping in the 1 in 1000 year (Low probability) event and Overland Flow Pathways mapping confirms the southern Site boundary is located on a potential overland flow route.

Based on the available data, it should be noted that the majority of the mapped pluvial flood risk during this event is considered representative of isolated ponding in topographic lows adjacent to the Site rather than significant overland flow.

During a 1 in 100 year event flows could potentially affect the buildings and/or access routes to the Site.

Climate change factors

Paragraph 002 of the National Planning Practice Guidance (2025) requires consideration of the 1% AP (1 in 100 year) event, including an appropriate allowance for climate change.

As the Site is located within the Arun and Western Streams Management Catchment and the proposed development is classed as More Vulnerable, where the proposed lifespan is approximately 100 years, the Upper End (45%) allowance is required to determine a suitable climate change factor to apply to rainfall data.

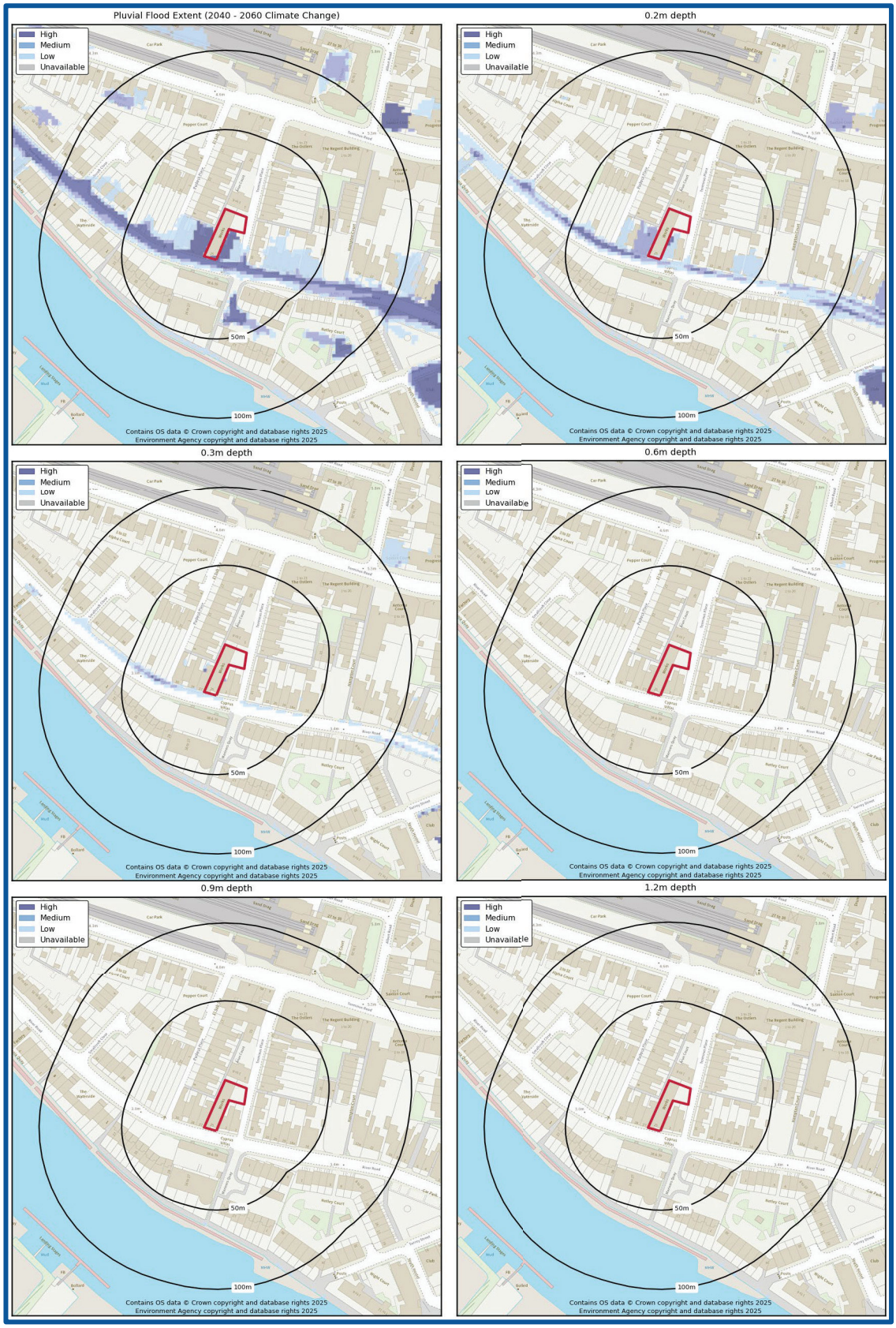
As part of RoFSW mapping, climate change modelling has been applied exclusively for the central allowance up to the 2050s epoch. Whilst it should be noted that the risk of pluvial flooding is likely to be greater than this dataset indicates for the lifetime of the development, in the absence of more extensive modelling scenarios this data is considered the best resource at the time of writing.

According to the RoFSW climate change modelling, the Site remains at Very Low to High risk, with the majority of the area unaffected during all three modelled events (Figure 11, overleaf):

- During the High risk event (>3.3% AEP), flooding of less than 0.20 m is anticipated along the south-eastern, south-western and southern Site boundaries, with a minor area on the eastern boundary susceptible to flooding of up to 0.20-0.29 m.
- During the Medium risk event (3.3 - 1% AEP), flooding of up to 0.20-0.29 m is anticipated along the south-western and southern Site boundaries.
- During the Low risk event (1 - 0.1% AEP), flooding of up to 0.59 m is anticipated along the southern boundary.

To take into account the full lifetime of the development, the 1 in 1000 year present day extent has also been considered as a proxy for the 1 in 100 year plus climate change (2070s) pluvial event. This indicates that flooding remains limited to the boundaries in the south of the Site during this event.

Figure 11. EA future (2040 to 2060) surface water flood extent and depth map (EA, 2025)

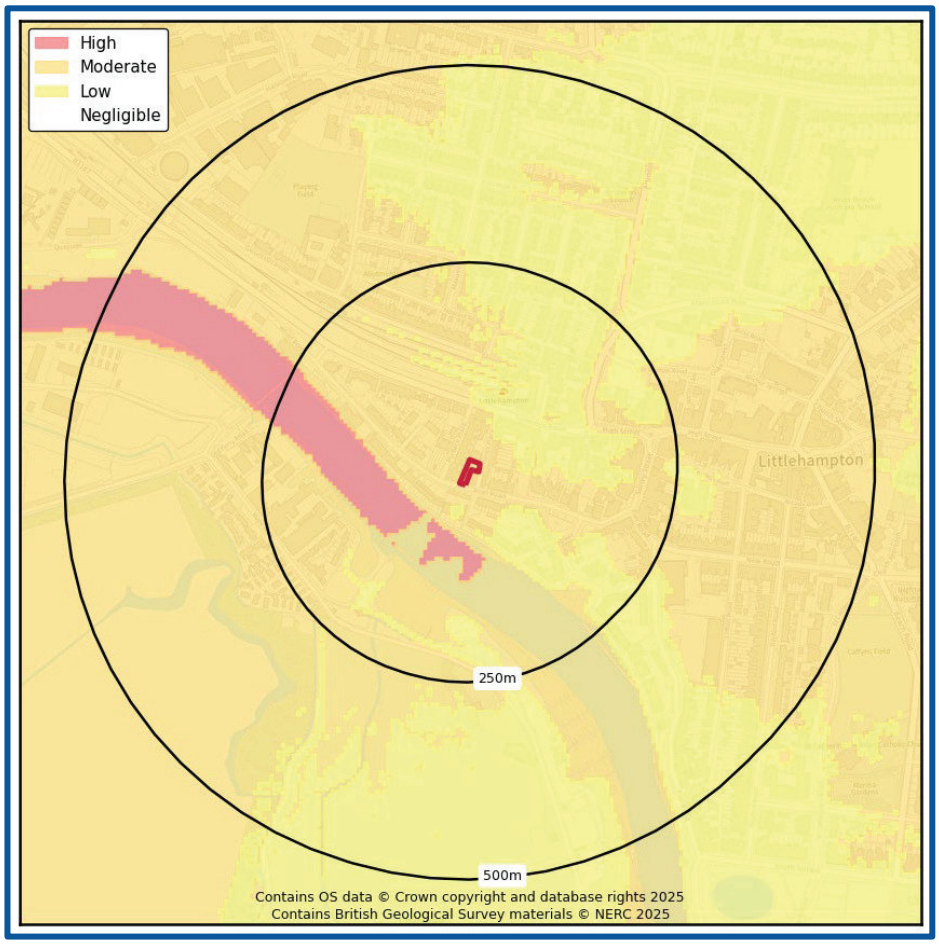


Groundwater flooding

Groundwater flooding occurs when sub-surface water emerges from the ground at the surface or into Made Ground and structures. This may be as a result of persistent rainfall that recharges aquifers until they are full; or may be as a result of high river levels, or tides, driving water through near-surface deposits. Flooding may last a long time compared to surface water flooding, from weeks to months. Hence the amount of damage that is caused to property may be substantially higher.

Groundwater Flood Risk screening data (Figure 12) indicates there is a Moderate risk of groundwater flooding at surface in the vicinity from permeable bedrock and superficial aquifers during a 1 in 100 year event.

Figure 12. GeoSmart GW5 Groundwater Flood Risk Map (GeoSmart, 2025)



Mapped classes combine likelihood, possible severity and the uncertainty associated with predicting the subsurface system. The map is a national scale screening tool to prompt site-specific assessment where the impact of groundwater flooding would have significant adverse consequences. Mapping limitations and a number of local factors may reduce groundwater flood risk to land and property even where it lies within mapped groundwater flood risk zones, which do not mean that groundwater floods will occur across the whole of the risk area.

A site-specific assessment has been undertaken to refine the groundwater risk screening information on the basis of site-specific datasets (see Section 3) including BGS borehole data, and the EA's fluvial and coastal floodplain data (where available) to develop a conceptual groundwater model. The risk rating is refined further using the vulnerability of receptors including occupants and the existing and proposed Site layout, including the presence of basements and buried infrastructure. The presence of any nearby or on-Site surface water features such as drainage ditches, which could intercept groundwater have also been considered.

- It is understood there are no existing basements and a basement is not proposed as part of the development. *Note: the risks are higher for basements, buried infrastructure and soakaway systems which may be affected by high groundwater levels.*
- According to a review of the hydrogeology (Section 3), the Site is underlain by permeable superficial deposits above permeable bedrock. Groundwater levels may rise in the bedrock and superficial aquifers in a seasonal response to prolonged rainfall recharge which may cause an unusually high peak in groundwater levels during some years.
- Groundwater levels may rise in the bedrock and superficial aquifer in response to high river and coastal events due to the potential hydraulic continuity with the tidal River Arun.
    - It is noted that groundwater flooding may also occur in response to prolonged high river levels even if overtopping of flood defences does not occur.
    - The water level during the 1 in 200 year defended 2125 event along the River Arun was estimated at 4.73 mAOD on Site, compared to a minimum Site level of 3.26 mAOD; this indicates that a raised groundwater response could occur at the Site, which could potentially impact the development.
- The design of the properties should consider the groundwater pathway through permeable formations.
- However, despite the presence of underlying aquifers, the Site would only be at risk of groundwater flooding if the water table reaches the base of the Site development or the ground surface, when groundwater seepage could lead to overland flow and ponding. The surrounding topography suggests that groundwater seepage is more likely to occur downgradient of the Site adjacent to the southern boundary.
- A shallow water table has been identified potentially within 5 m of the ground surface (BGS borehole (ref: TQ00SW270 encountered groundwater at 4.50 m bgl and rose to 4.25 m bgl after 20 minutes).
- Figure ADC_01 of Appendix F of the SFRA does not indicate any reported incidents of historical groundwater flooding within 20 m of the Site but confirms the Site is in an area with a susceptibility to groundwater greater or equal to 75 % (JBA Consulting, 2016).
- The Site and surrounding areas are relatively urbanised and predominantly impermeable, which may limit the lateral migration of groundwater through the surface in those areas. Although buried drainage features and areas of green space

in rear gardens and cracks within the surface hard-standings may provide routes for emergence.

The baseline groundwater flood risk rating is Moderate. However, on the basis of site-specific assessment, as the impermeable coverage at the Site and surrounding area will limit the emergence potential at the Site and along evacuation routes, the groundwater risk to future occupants is therefore reduced to Low.

Guidance
Low Risk - There will be a remote possibility that incidence of groundwater flooding could lead to damage to property or harm to other sensitive receptors at, or near, this location.

Climate change predictions suggest an increase in the frequency and intensity of extremes in groundwater levels.

- Rainfall recharge patterns will vary regionally resulting in changes to average groundwater levels.
- A rise in peak river levels will lead to a response of increased groundwater levels in adjacent aquifers subject to the predicted climate change increases in peak river level for the local catchment.
- Sea level rises of between 0.4 m and 1 m are predicted by 2100, leading to a rise in average groundwater levels in the adjacent coastal aquifer systems, and potential increases in water levels in the associated drainage systems. The 'backing up' of groundwater levels from both coast and tidal estuary locations may extend a significant distance inland and affect infrastructure previously constructed above average groundwater levels.

The impact of climate change on groundwater levels beneath the Site is linked to the predicted rise in both peak river levels and sea levels, as well as the variation in rainfall recharge, which is uncertain.

Flooding from artificial sources

Artificial sources of flood risk include waterbodies or watercourses that have been amended by means of human intervention rather than natural processes. Examples include reservoirs (and associated water supply infrastructure), docks, sewers and canals. The flooding mechanism associated with flood risk from artificial sources is primarily related to breach or failure of structures (reservoir, lake, sewer, canal, flood storage areas, etc.).

Sewer flooding

Table 5-2 of the SFRA has identified 22 incidences or modelled incidences of flooding as a result of surcharging sewers within the BN17 5 postcode. However, it is recognised that this five digit postcode covers a large area and instances of flooding are not specific to the Site (JBA Consulting, 2016).

Guidance

Properties classified as "at risk" are those that have suffered, or are likely to suffer, internal flooding from public foul, combined or surface water sewers due to overloading of the sewerage system either once or twice in the ten year reference period. Records held by the sewage utility company provide information relating to reported incidents, the absence of any records does not mean that the Site is not at risk of flooding.

Canal failure

According to Ordnance Survey (OS) mapping, there are no canals within 500 m of the Site.

Water supply infrastructure

Water supply infrastructure is comprised of a piped network to distribute water to private houses or industrial, commercial or institution establishments and other usage points. In urban areas, this represents a particular risk of flooding due to the large amount of water supply infrastructure, its condition and the density of buildings. The risks of flooding to properties from burst water mains cannot be readily assessed.

If more information regarding the condition and history of the water supply infrastructure within the vicinity of the Site is required, then it is advisable to contact the local water supplier (Southern Water).

Culverts and bridges

The blockage of watercourses or structures by debris (that is, any material moved by a flowing stream including vegetation, sediment and man-made materials or refuse) reduces flow capacity and raises water levels, potentially increasing the risk of flooding. High water levels can cause saturation, seepage and percolation leading to failure of earth embankments or other structures. Debris accumulations can change flow patterns, leading to scour, sedimentation or structural failure.

Culverts and bridges have been identified within 500 m of the Site; a tributary of the River Arun is culverted 345 m to the south west and 230 m, 250 m to the south.

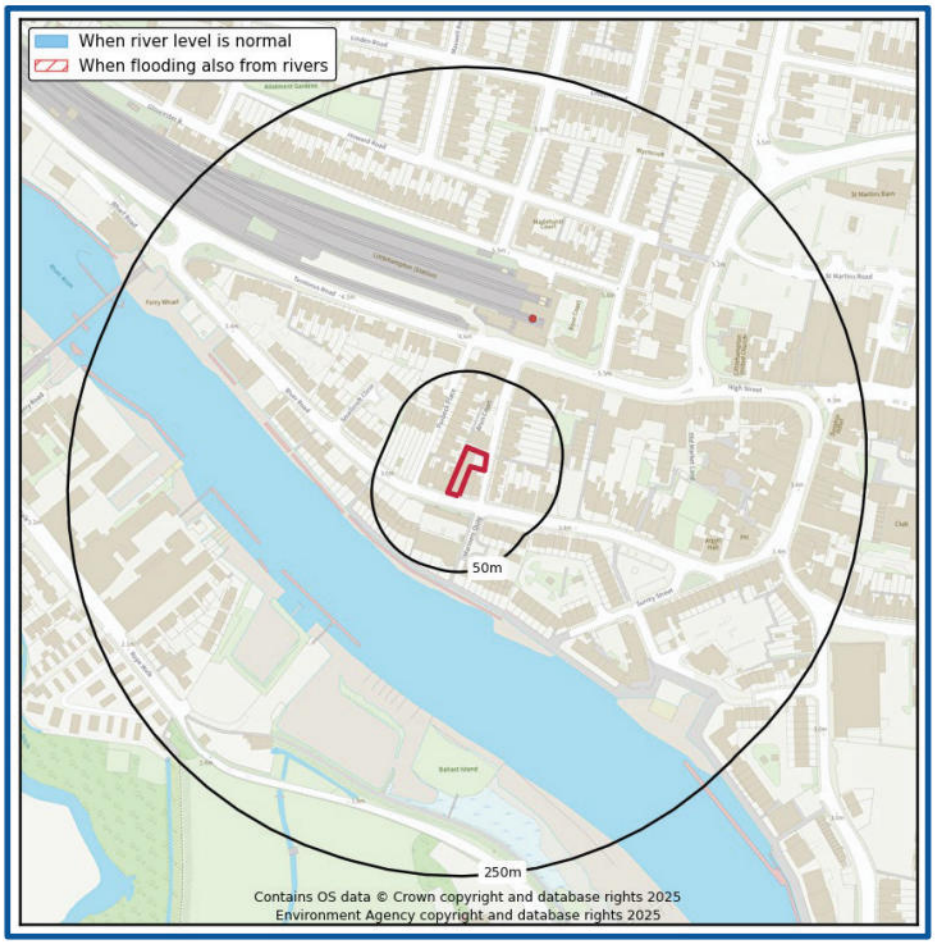
However, these structures are a significant distance from the Site on the southern bank of the River Arun and are unlikely to represent a flood risk to the Site in the event of a blockage.

The SFRA has not identified any historical drainage issues within the Site area (JBA Consulting. 2016).

Reservoir flooding

According to the EA's Risk of Flooding from Reservoir mapping the Site is not at risk of flooding from reservoirs (Figure 13) (EA, 2025).

Figure 13. EA Risk of Reservoir Flooding (EA, 2025)



Guidance

The risk of reservoir flooding is related to the failure of a large reservoir (holding over 25,000 m^3 of water) and is based on the worst-case scenario. Reservoir flooding is extremely unlikely to occur (EA, 2025).

5. Flood risk from the development

It is considered best practice to provide an overall improvement in flood risk, so improving flood storage and providing Sustainable Drainage (SuDS) features should be considered wherever possible.

Floodplain storage

The development is located within a fluvial and tidal Flood Zone 1, 2 and 3 but does not involve an increase in building footprint. Therefore, there would be no displacement of flood water and compensatory flood storage is not required.

Drainage and run-off

Based on the topography and surface water flood risk in the vicinity, interference or interaction with overland flow paths and inflows from off-Site is considered possible. It is recommended that steps are taken to manage these potential inflows within the Site drainage system.

The proposed development involves the demolition of on-Site structures and the erection of two, two storey buildings. An estimation of run-off may therefore be required to permit effective Site water management and prevent any increase in flood risk to off-Site receptors from the Site. It is noted that the proposed development will increase the area of permeable surfacing so should modestly reduce the rates of surface water run off.

The potential surface water run-off generated from the Site during a 1 in 100 year return period should be calculated, using FEH 2013 rainfall data from the online Flood Estimation Handbook (FEH), developed by NERC (2009) and CEH (2016).

The NPPF (2024) recommends the effects of climate change are incorporated into FRA's. As per the most recent update to the NPPG (2025) the applicable climate change factor for the 1 in 30 (≥ 3.3% AEP) and 1 in 100 (< 3.3 to 1% AEP) year event to apply to surface water flooding is dependent upon the management catchment.

As the Site is located within the Arun and Western Streams Management Catchment the following peak rainfall allowances are to be applied.

Table 4. Climate change rainfall allowances

Arun and Western Streams Management Catchment	3.3% Annual exceedance rainfall event		1% Annual exceedance rainfall event	
	2050s	2070s	2050s	2070s
Upper end	35%	40%	45%	45%
Central	20%	25%	20%	25%

Sustainable Drainage System (SuDS)

It is recommended that attenuation of run-off is undertaken on-Site to compensate for proposed increases in runoff over the lifespan of the development. Attenuation may comprise the provision of storage within a Sustainable Drainage System (SuDS). SuDS can deliver benefits from improving the management of water quantity, water quality, biodiversity and amenity. Potential SuDS options are presented in the table below, subject to further investigation:

Table 5. SuDS features which may be feasible for the Site

Option	Description
Rainwater harvesting	Rainwater harvesting can collect run-off from the roofs for use in non-potable situations, using water butts for example.
Green roof	Having part/all of the roof as a green roof covered in vegetation can intercept and store a proportion of the rainfall to result in an overall reduction in the amount of surface water run-off generated from a building structure. They comprise a substrate (growth medium) layer which can be seeded with specially selected plants suitable for the local climatic conditions. Beneath the growth medium is a geotextile filter layer which filters out the substrate from entering the aggregate/geo-composite drainage layer below. At the very bottom of the green roofing, a waterproof membrane protects the roof structure below.
Lined permeable paving	Permeable pavements can be used for driveways, footpaths and parking areas to increase the amount of permeable land cover. Suitable aggregate materials (angular gravels with suitable grading as per CIRIA, 2007) will improve water quality due to their filtration capacity. Plastic geocellular systems beneath these surfaces can increase the void space and therefore storage but do not allow filtration unless they are combined with aggregate material and/or permeable geotextiles.

Due to the screening data indicating a Moderate groundwater flood risk on-Site, combined with likely spatial constraints, attenuation SuDS are recommended in preference to infiltration SuDS, this is reflected in the potential options suggested above.

It is assumed that any changes to the existing drainage system will be undertaken in accordance with best practice and that care will be taken to ensure the new development does not overload/block any existing drainage or flow pathways to/from the Site.

6. Suitability of the proposed development

The information below outlines the suitability of proposed development in relation to national and local planning policy.

National policy and guidance

The aims of the national planning policies are achieved through application of the Sequential Test and in some cases the Exception Test.

Guidance

Sequential test: The aim of this test is to steer new development towards areas with the lowest risk of flooding (NPPF, 2024). Reasonably available sites located in Flood Zone 1 should be considered before those in Flood Zone 2 and only when there are no reasonably available sites in Flood Zones 1 and 2 should development in Flood Zone 3 be considered.

Exception test: In some cases, this may need to be applied once the Sequential Test has been considered. For the exception test to be passed it must be demonstrated that the development would provide wider sustainability benefits to the community that outweigh flood risk and a site-specific FRA must demonstrate that the development will be safe for its lifetime taking account of the vulnerability of its users, without increasing flood risk elsewhere, and, where possible, will reduce flood risk overall.

Suitability of the proposed development, and whether the Sequential and Exception Tests are required, is based on the Flood Zone the Site is located within and the flood risk vulnerability classification of the existing and proposed development. Some developments may contain different elements of vulnerability and the highest vulnerability category should be used, unless the development is considered in its component parts.

This report has been produced to assess all development types, prior to any development. The vulnerability classification and Flood Zones are compared within Table 6 overleaf (Table 3 of the NPPG (2025)).

As the Site is located within Flood Zone 3a and the proposed development is defined as More Vulnerable; the proposals would be acceptable subject to the Sequential and Exception Tests; but this should be confirmed with the Local Planning Authority (LPA).

Where the Sequential Test is required, it must be demonstrated that there are no alternative reasonably available Sites at lower risk of flooding within an area agreed with Arun District Council. In order for a site to be considered to be reasonably available it must be 'deliverable' and 'developable' as defined by the NPPF (2024).

Table 6. Flood risk vulnerability and flood zone 'compatibility (taken from NPPG, 2025)

Flood risk vulnerability classification		Essential infrastructure	Water compatible	Highly vulnerable	More vulnerable	Less vulnerable
Flood Zone	Zone 1 – low probability	✓	✓	✓	✓	✓
	Zone 2 – medium probability	✓	✓	Exception test required	✓	✓
	Zone 3a - high probability	Exception test required	✓	X	Exception test required	✓
	Zone 3b – functional flood plain	Exception test required	✓	X	X	X

EA Flood Risk Standing Advice for vulnerable developments located in Flood Zones 2 or 3

For all relevant vulnerable developments (i.e. more vulnerable, less vulnerable and water compatible), advice on the points should be followed:

- Surface water management;
- Access and evacuation; and,
- Floor levels.

Surface water management

Plans for the management of surface water need to meet the requirements set out in either the local authority's:

- Surface water management plan where available; OR,
- Strategic flood risk assessment.

They also need to meet the requirements of the approved building regulations Part H: drainage and water disposal. Read section H3 rainwater drainage.

Planning permission is required to use a material that can't absorb water (e.g. impermeable concrete) in a front garden larger than 5m^2.

Access and evacuation

Details of emergency escape plans should be provided for any parts of a building that are below the estimated flood level.

Plans should show:

- Single storey buildings or ground floors that don't have access to higher floors can access a space above the estimated flood level, e.g. higher ground nearby;
- Basement rooms have clear internal access to an upper level, e.g. a staircase;
- Occupants can leave the building if there's a flood and there's enough time for them to leave after flood warnings.

Floor levels

The following should be provided:

- Average ground level of your site;
- Ground level of the access road(s) next to your building; and,
- Finished floor level of the lowest room in your building.

Finished floor levels should be a minimum of whichever is higher of 300 mm above the:

- Average ground level of the site;
- Adjacent road level to the building; OR
- Estimated river or sea flood level.

You should also use construction materials that have low permeability up to at least the same height as finished floor levels.

If you cannot raise floor levels to meet the minimum requirement, you will need to:

- Raise them as much as possible;
- Consider moving vulnerable uses to upper floors; and,
- Include extra flood resistance and resilience measures.

When considering the height of floor levels, you should also consider any additional requirements set out in the SFRA. Flood water can put pressure on buildings causing structural issues. If your design aims to keep out a depth of more than 600 mm of water, you should get advice from a structural engineer. They will need to check the design is safe.

Extra flood resistance and resilience measures

Follow the guidance in this section for developments in flood risk areas where you cannot raise the finished floor levels to the required height. You should design buildings to exclude flood water where possible and to speed recovery in case water gets in.

Make sure your flood resilience plans for the development follow the guidance in the CIRIA Property Flood Resilience Code of Practice. Please note that the code of practice uses the term 'recovery measures'. In this guide we use 'resilience measures'.

Flooding can affect the structural stability of buildings. If your building design would exclude more than 600 mm of flood water, you should get advice from a structural engineer. They will need to check the design is safe. Only use resistance measures that will not cause structural stability issues during flooding. If it is not possible to safely exclude the estimated flood level, exclude it to the structural limit then allow additional water to flow through the property.

The design should be appropriately flood resistant and resilient by:

- Using flood resistant materials that have low permeability to at least 600 mm above the estimated flood level;
- Making sure any doors, windows or other openings are flood resistant to at least 600 mm above the estimated flood level;
- Using flood resilient materials (for example lime plaster) to at least 600 mm above the estimated flood level;
- By raising all sensitive electrical equipment, wiring and sockets to at least 600 mm above the estimated flood level;
- Making it easy for water to drain away after flooding such as installing a sump and a pump;
- Making sure there is access to all spaces to enable drying and cleaning; and,
- Ensuring that soil pipes are protected from back-flow such as by using non-return valves.

Temporary or demountable flood barriers are not appropriate for new buildings. Only consider them for existing buildings when:

- There is clear evidence that it would be inappropriate to raise floor levels and include passive resistance measures; and,
- An appropriate flood warning or other appropriate trigger is available.

If proposals involve the development of buildings constructed before 1919, refer to Flooding and Historic Buildings guidance produced by Historic England.

7. Resilience and mitigation

Based on the flood risk identified at the Site, the national and local policies and guidance and proposed development, the mitigation measures outlined within this section of the report are likely to help protect the development from flooding.

Rivers (fluvial) & Sea (coastal/tidal) flood mitigation measures

The Site is located within an area which is affected by flooding from the sea, the following table confirms the flood depths associated with the area proposed for development.

Table 7. Flood levels compared to ground levels in the area proposed for development during the 2125 1 in 200 year events

Flood data	Defended scenario		Undefended Scenario	
	Higher central	Upper end	Higher central	Upper end
Flood level (mAOD)	4.68	4.73	5.01	5.06
Flood depths (m)*	Up to 1.42	Up to 1.47	Up to 1.75	Up to 1.80

Raising minimum floor levels

The vulnerability classification of the Site and the Flood Zone means proposals for the Site fall under the EA's Flood Risk Standing Advice (FRSA) for More Vulnerable developments. In this instance, in line with the EA's FRSA the recommended minimum Finished Floor Level (FFL) of the ground floor should be set at least 0.6 m above the 1 in 200 year (higher central) 2125 scenario flood level of 4.68 mAOD.

Table 8. Recommended Minimum Finished Floor Level Required

Ground Level (mAOD)	Flood Level (mAOD)	Freeboard above Flood Level (m)	Recommended FFL (mAOD)
3.26 and 4.31	4.68	0.6 m	5.28

Given the significant flood depths anticipated at the Site, it is unlikely to be feasible to raise FFLs to the recommended elevation. Where this cannot be achieved, as a minimum, sleeping accommodation proposed on the first floor of the development, should be set above the

worst case scenario flood level of 5.06 mAOD (1 in 200 year undefended Upper End 2125 scenario).

If feasible , the raising of finished floor levels would reduce the flood risk to the development from Medium to Low.

Additional Mitigation

As the defence policy to hold the line runs to 2105, it is recommended that the following flood resilience measures are also considered, as well as providing additional mitigation for the 1000 year event.

- Flood resilient materials and designs:
    - Use of low permeability building materials up to 0.3 m such as engineering bricks (Classes A and B) or facing bricks;
    - Hard flooring and flood resilient metal staircases;
    - The use of internal lime plaster/render or where plasterboards are used these should be fitted horizontally instead of vertically and/or using moisture resistant plasterboard at lower levels;
    - Water, electricity and gas meters and electrical sockets should be located above the predicted flood level;
    - Communications wiring: wiring for telephone, TV, Internet and other services should be protected by suitable insulation in the distribution ducts to prevent damage.

As flood depths are expected to exceed 0.6 m on Site, a water entry strategy should be adopted for the ground floor to preserve building integrity and to promote flood resilience rather than resistance (which is more difficult to achieve for significant flood depths). A structural engineer should be consulted to confirm this would be a suitable strategy for the proposed development, to ensure flood flows would not impact the structural integrity of the building. Potential strategies include:

- Lower ground floor designed to permit water passage at high flood depths;
- Hard flooring and flood resilient metal staircases;
- Heating systems, electrical sockets and utility meters should be raised above the predicted flood level where possible; and
- Sump and pump.

Where mitigation measures are implemented this would reduce the flood risk to the development from Medium to Low over the lifetime of the development.

Surface water (pluvial) flood mitigation measures

The mitigation measures detailed above for river and sea flood risk are likely to be suitable for the relatively shallow flood depths which could be experienced in a 1 in 30 year pluvial flood event.

In addition, the regular maintenance of any drains and culverts surrounding/on the Site should be undertaken to reduce the flood risk.

A Sustainable Drainage Strategy (SuDS) should be developed for the Site, for effective management of surface water runoff over the lifetime of the proposed development.

If these mitigation measures are implemented this would reduce the flood risk to the development from Very Low - High to Very Low - Low.

Groundwater flood mitigation measures

It is likely the flood mitigation measures recommended for fluvial and coastal flood risk will be sufficient to reduce the groundwater flood risk at the development. However specific groundwater measures that may also be considered for the Low risk identified include:

- Waterproofing of the lower ground floor;
- Interceptor drains;
- Automatic sump and pump to extract flood water; and
- Non-return flap valves on the proposed foul and surface water sewer lines.

If these mitigation measures are implemented, this could reduce the flood risk to the development from Low down to Negligible.

Reservoir flood mitigation measures

The Site is not a risk of flooding from reservoirs; therefore, mitigation measures are not required.

Other flood risk mitigation measures

A risk has been identified from sewers, although the level of risk could not be determined.

Residual flood risk mitigation measures

The risk to the Site has been assessed from all sources of flooding and appropriate mitigation and management measures proposed to keep the users of the development safe over its lifetime. There is however a residual risk of flooding associated with the potential for failure of mitigation measures if regular maintenance and upkeep isn't undertaken. If mitigation measures are not implemented or maintained, the risk to the development will remain as the baseline risk.

Further flood mitigation information

More information on flood resistance, resilience and water entry can be found here: http://www.planningportal.gov.uk/uploads/br/flood_performance.pdf

www.knowyourfloodrisk.co.uk

Emergency evacuation - safe access / egress and safe refuge

Emergency evacuation to land outside of the floodplain should be provided if feasible. Where this is not possible, 'More Vulnerable' developments and, where possible, development in general should have internal stair access to an area of safe refuge within the building to a level higher than the maximum likely water level. An area of safe refuge should be sufficient in size for all potential users and be reasonably accessible to the emergency services.

Emergency evacuation from the development and the Site should only be undertaken in strict accordance with any evacuation plans produced for the Site, with an understanding of the flood risks at the Site including available mitigation, the vulnerability of occupants and preferred evacuation routes.

Flood warnings

The EA operates a flood warning service in all areas at risk of flooding; this is available on their website: https://www.gov.uk/check-flood-risk. The Site is located within an EA Flood Alerts/Warning coverage area so is able to receive alerts and warnings (Figure 14). All warnings are also available through the EA's 24 hour Floodline Service 0345 988 1188.

- Flood Alert: 065WAC406; Quick Dial code: 216032
- Flood Warning: 065FWC2602; Quick Dial code: 316035

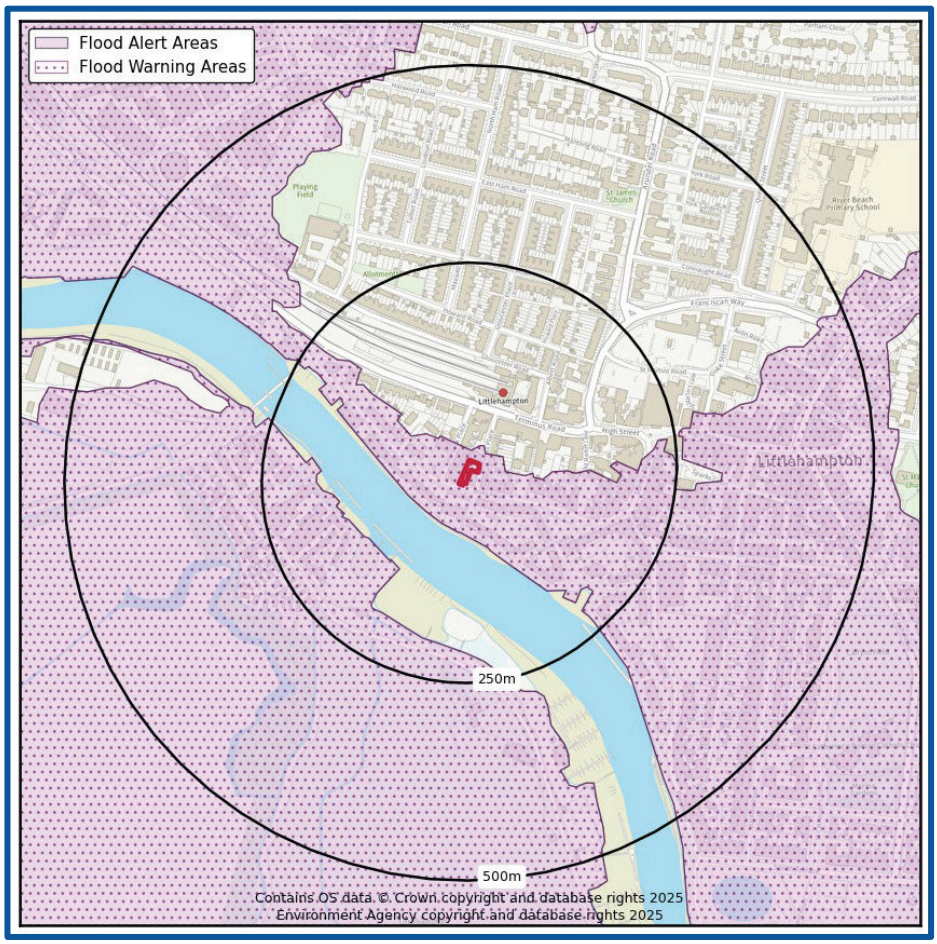
The EA aims to issue Flood Warnings 2 hours in advance of a flood event. Flood Warnings can provide adequate time to enable protection of property and evacuation from a Site, reducing risk to life and property.

Emergency evacuation

Where possible, a safe access and egress route with a 'very low' hazard rating from areas within the floodplain to an area wholly outside the 1 in 100 year flood event including an allowance for climate change should be demonstrated.

Based on the EA's Flood Zone Map the closest dry evacuation area within Flood Zone 1 is adjacent to the north along Terminus Road. It is advised that evacuation from the premises would be the preferred option in a flood event if safe to do so. It is recommended that residents prepare to evacuate as soon as an EA Flood Warning is issued in order to completely avoid flood waters.

Figure 14. EA Flood Warning Coverage for the local area (EA, 2025)



On-Site refuge (Invacuation)

Evacuation should be the primary action in preference, however safe refuge (Invacuation) could be sought at first floor level in a worst-case scenario as the residential areas of the development are situated on the ground and first floor.

Other relevant information

A Flood Warning and Evacuation Plan (FWEP) is recommended, and occupants should be signed up to receive EAs Flood Alerts and Warnings.

Registration to the Environment Agency's flood warning scheme can be done by following this link: https://www.gov.uk/sign-up-for-flood-warnings.

It is recommended that main communication lines required for contacting the emergency services, electricity sockets/meters, water supply and first aid stations and supplies are not compromised by flood waters. Where possible these should all be raised above the extreme flood level.

8. Conclusions and recommendations

Table 9. Risk ratings following implementation and subsequent maintenance of mitigation measures

Source of Flood Risk	Baseline	After Analysis	After Mitigation
Sea (coastal/tidal) and River (fluvial) flooding	Very Low to Low	Medium	Low
Surface water (pluvial) flooding	Very Low to High		Very Low to Low
Groundwater flooding	Moderate	Low	Negligible
Other flood risk factors present	Yes (sewers)		Yes
Is any other further work recommended?	Yes		No

1 BASELINE risks assigned for the whole Site, using national risk maps, including the benefit of EA flood defences and the impacts of climate change.

2 AFTER ANALYSIS modification of risk assessment based on detailed site specific analysis including some or all of the following: flood model data, high resolution mapping, building location, access routes, topographic and CCTV surveys.

3 AFTER MITIGATION risks include risks to proposed development / asset and occupants if mitigation measures recommended in this report are implemented, including the impacts of climate change.

*N/A indicates where mitigation is not required.

The table below provides a summary of where the responses to key questions are discussed in this report. Providing the recommended mitigation measures are put in place it is likely that flood risk to this Site will be reduced to an acceptable level.

Table 10. Summary of responses to key questions in the report

Key sources of flood risks identified	Rivers & sea, pluvial, groundwater (see Section 4).
Are standard mitigation measures likely to provide protection from flooding to/from the Site?	Yes (see Section 7).
Is any further work recommended?	Yes (see executive summary and Section 7).