



# Level 2 Strategic Flood Risk Assessment - Site HO/25/00021

Land east of Cedar Drive, Edenbridge

**FINAL**

Prepared for  
Sevenoaks District  
Council

Date  
July 2026

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# 1 Background

This is a Level 2 Strategic Flood Risk Assessment (SFRA) site screening report for site H/25/00021. The content of this Level 2 SFRA site screening report assumes the reader has already consulted the Sevenoaks Level 1 SFRA and read the Level 2 SFRA Main Report and is therefore familiar with the terminology used in this report.

## 1.1 Site details

- Location: Land east of Cedar Drive, Edenbridge, TN8 5JP
- Site area: 0.09 ha
- Existing site use: Brownfield
- Proposed site use: Residential
- Proposed use flood risk vulnerability classification: More Vulnerable

The site is currently a garage block and parking area which is located in the southern area of Edenbridge. The site is surrounded by residential areas along Park Avenue to the east, Cedar Drive to the south and Orchard Close to the east. A railway line runs parallel to the northern boundary of the site. A map showing the location of the site can be found below in Figure 1-1.



Figure 1-1: Location of site HO/25/00021

## 1.2 Topography

Figure 1-2 shows the topography of the site represented by the Environment Agency (EA) 1m resolution LiDAR. The railway line to the north is located on an embankment with a higher elevation than the site. The topography slopes down into the site through the northern boundary. There is also a slope down from west to east through the site which goes from 51.8mAOD down to 50.9mAOD. The centre of the site is also lower lying than land to the south, with elevations in the centre of around 51.1mAOD.

The site is situated within a developed urban area, and LIDAR data is unlikely to be representative of the actual site topography. As such, this may have an impact on some of the flood risk datasets used within this assessment.

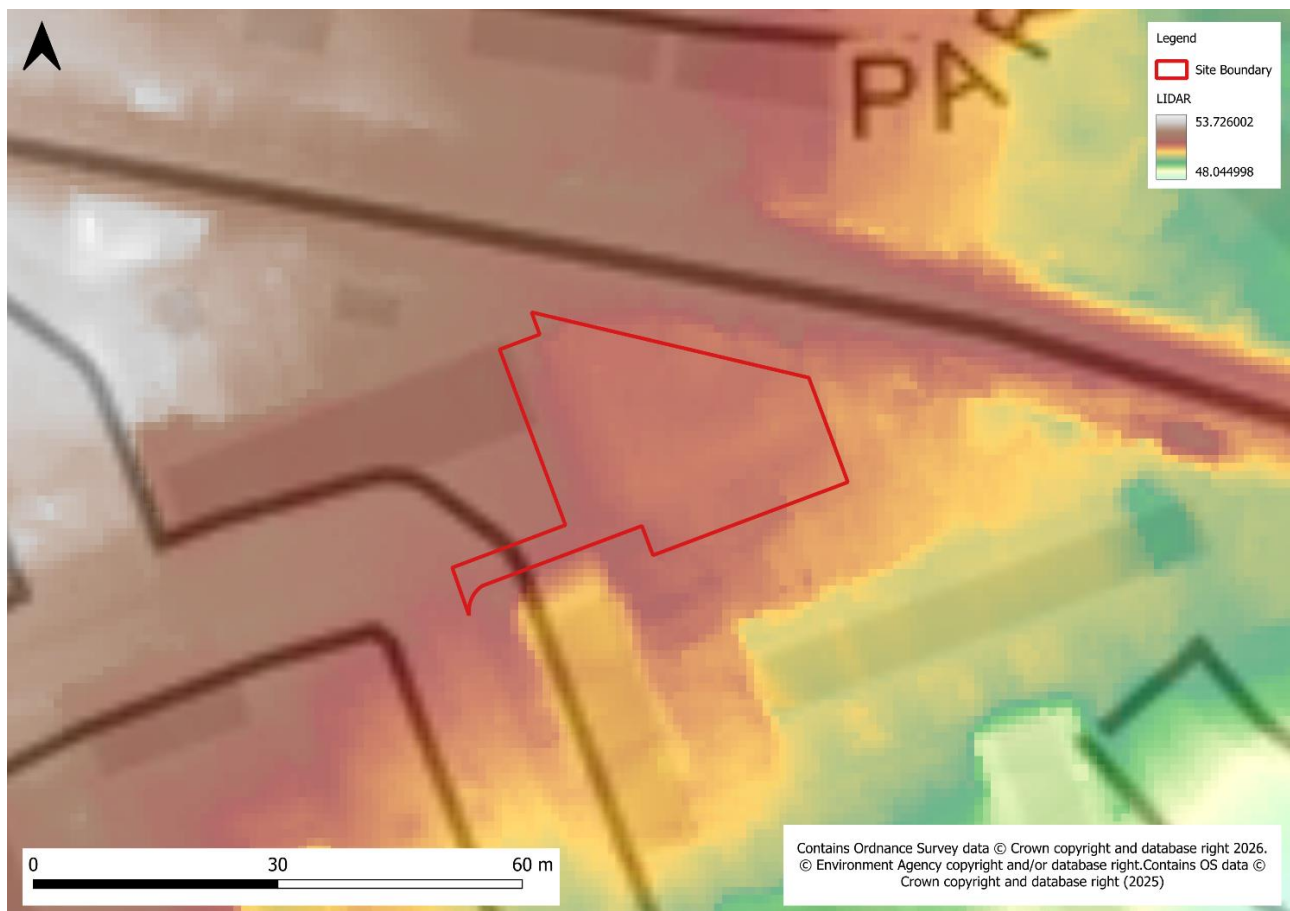


Figure 1-2: Topography of HO/25/00021

## 1.3 Geology and soils

Geology at the site consists of:

- Bedrock - Weald Clay Formation consisting of mudstone.
- There is no superficial deposits data available for the site

Soils at the site consist of:

- Slowly permeable seasonally wet slightly acid but base-rich loamy and clayey soils.

## 2 Sources of flood risk

### 2.1 Location of site within the catchment

The site is located within the catchment for the Lower Eden Water Body which is part of the Eden Operational Catchment. The Lower Eden Water Body has a catchment area of 79.81km<sup>2</sup> and is described as heavily modified. The River Eden is located approximately 1.1km southeast of the site.

### 2.2 Existing drainage features

There are no identifiable drainage features at the site. However, as there is an existing development on the site, it is expected that the development is served by a surface water drainage system, which discharges into the local sewer system.

The River Eden flows through Edenbridge 260m north of the site.

### 2.3 Fluvial

#### 2.3.1 Available data

The EA's Flood Map for Planning (FMfP) has been used within this assessment to determine Flood Zones 3a and 2. The 3.3% AEP defended extent from the EA's Risk of Flooding from Rivers and Sea (RoFRS) mapping has been used to determine Flood Zone 3b.

#### 2.3.2 Description of risk to the site

As shown in Table 2-1, the site is located within Flood Zone 1 and is therefore predicted to be at a very low risk of fluvial flooding.

Table 2-1: Existing fluvial flood risk based on EA FMfP

| Flood Zone 1 (%) | Flood Zone 2 (%) | Flood Zone 3a (%) | Flood Zone 3b (%) |
|------------------|------------------|-------------------|-------------------|
| 100              | 0                | 0                 | 0                 |

### 2.4 Surface water

#### 2.4.1 Available data

The EA's FMfP Surface Water Spatial Planning mapping has been used to assess the extent and depth of surface water flooding. The EA's Risk of Flooding from Surface Water (RoFSW) mapping has been used to assess the velocity and hazard of surface water flooding.

### 2.4.2 Description of risk to the site

As shown in Table 2-2 and Figure 2-1, the site is not at risk of flooding during the 3.3% (high risk) or 1% (medium risk) AEP events. However, approximately 40% of the site is at risk during the 0.1% (low risk) AEP event. This comes from an offsite flow path which originates along the side of the railway line embankment to the northwest,, and enters the site along the northern boundary. The flooding is predicted to follow the topography into the centre of the site and out of the eastern boundary. The maximum depth is 0.30m observed in small patches within the centre and north of the site. The maximum hazard classification is Low (caution).

Table 2-2: Existing surface water flood risk based on the RoFSW map

| Event                          | 3.3% AEP (high risk) | 1% AEP (medium risk) | 0.1% AEP (low risk)                                                                 |
|--------------------------------|----------------------|----------------------|-------------------------------------------------------------------------------------|
| Percentage of site at risk (%) | 0                    | 0                    | 39.98                                                                               |
| Maximum depth (m)              | N/A                  | N/A                  | 0.30                                                                                |
| Maximum velocity (m/s)         | N/A                  | N/A                  | 1.00                                                                                |
| Maximum hazard classification  | N/A                  | N/A                  | 0.25 - Low - Caution: Flood zone with shallow flowing water or deep standing water. |

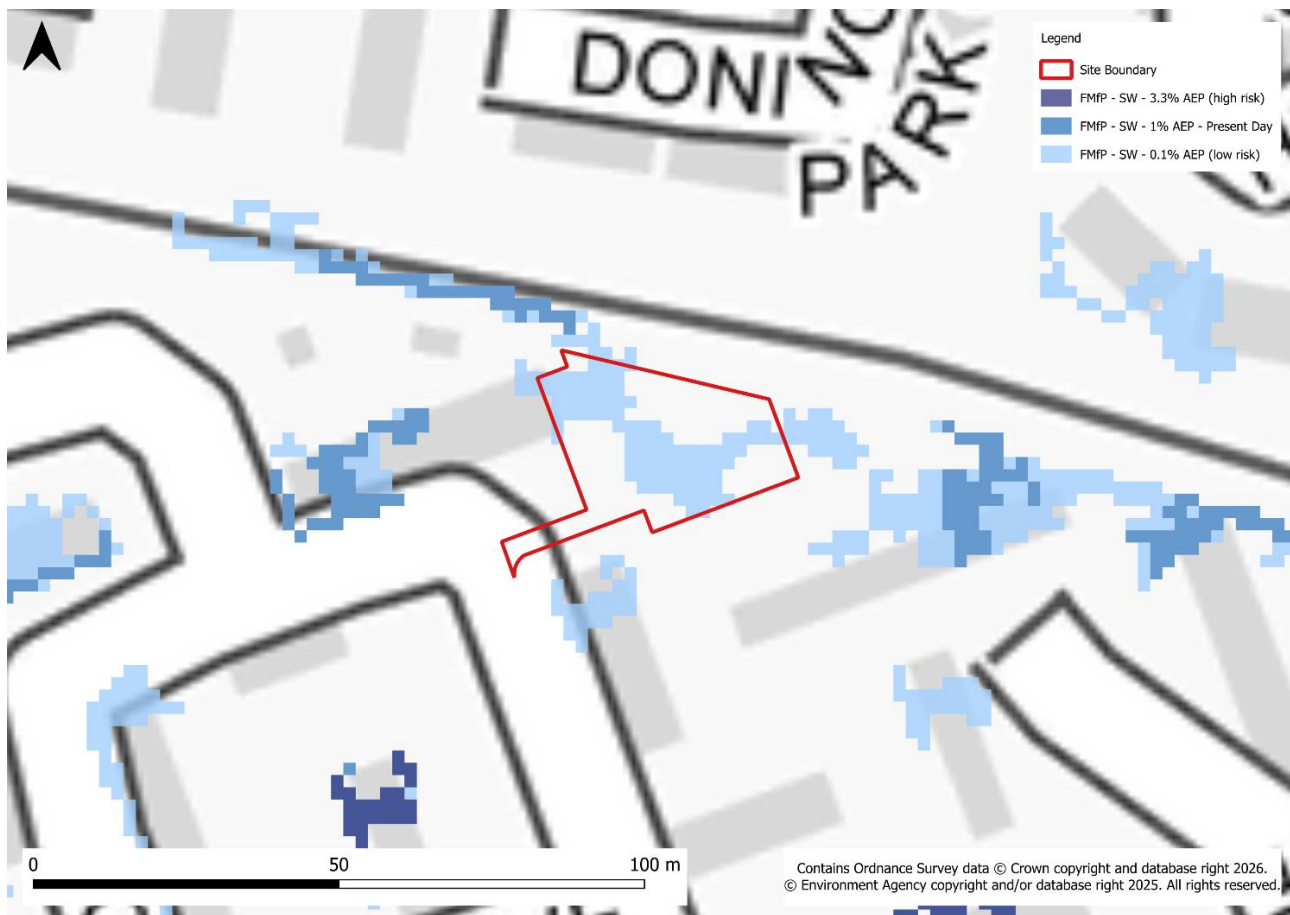


Figure 2-1: Flood Map for Planning - Surface Water Spatial Planning extents

## 2.5 Reservoir

The site is not shown to be at risk of reservoir flooding during the Dry Day or Wet Day scenarios in the EA Reservoir Flood Maps.

## 2.6 Groundwater

The JBA Groundwater Emergence Map (Figure 2-2) shows that there is negligible risk to groundwater flooding during a 1% AEP groundwater event.

This assessment does not negate the requirement that an appropriate assessment of the groundwater regime should be carried out at the site-specific Flood Risk Assessment (FRA) stage.

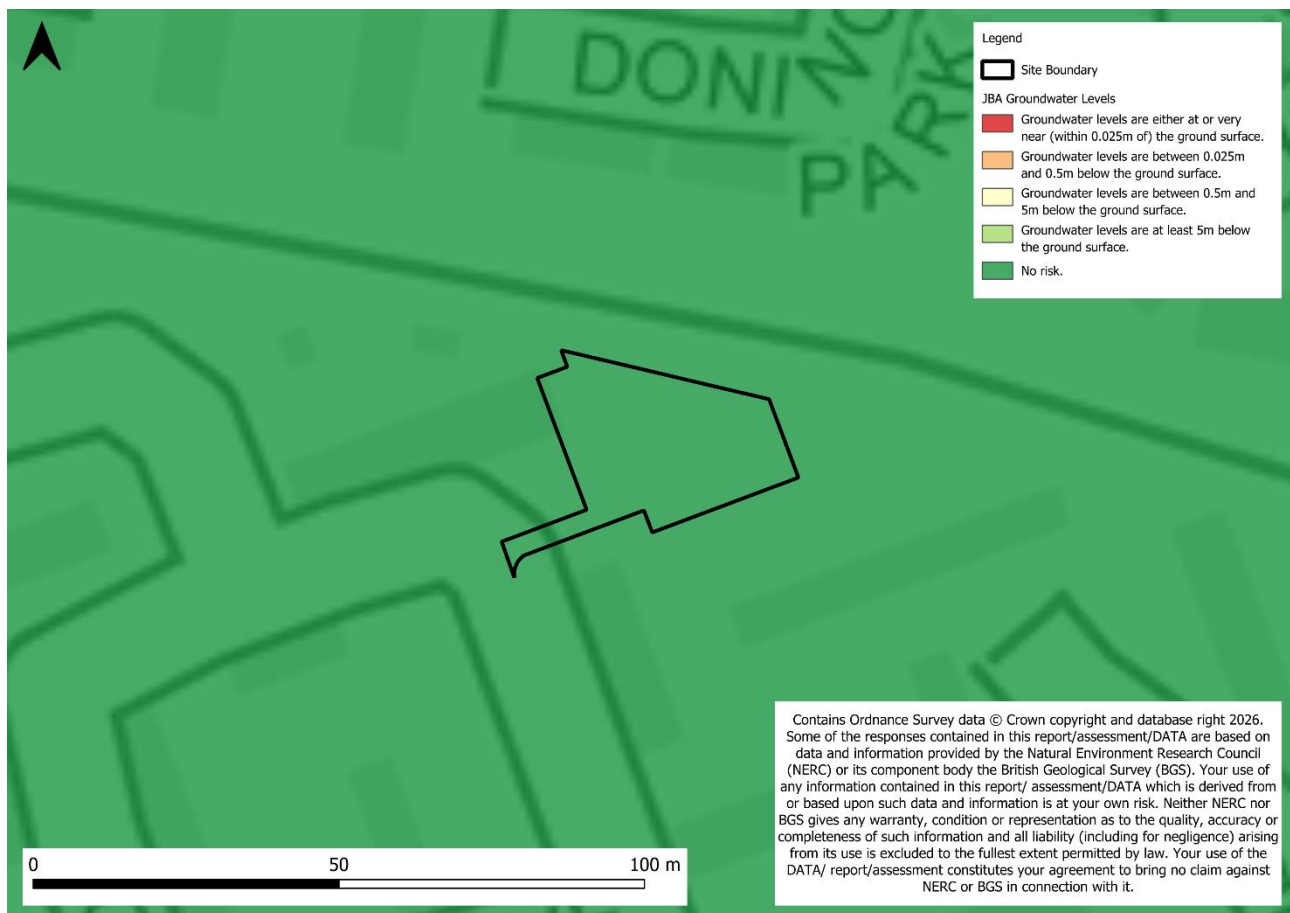


Figure 2-2: JBA Groundwater Emergence Mapping

## 2.7 Sewers

The site is located within postcode area TN8 5, where Thames Water sewer flooding incident data indicates that there have been no incidents of foul sewer flooding recorded in the last 20 years.

## 2.8 Flood history

There are no recorded flood incidents within the site boundary, however, Kent County Council LLFA flood incidents records include 3 incidents within 50m of the site boundary, all of which were reported to be due to blocked drains.

### 3 Climate change

Increased storm intensities due to climate change may increase the extent, depth, velocity, hazard, and frequency of both fluvial and surface water flooding. Please see Section 4.6 of the Sevenoaks District Level 2 SFRA for information on climate change allowances.

Development proposals at the site must address the potential changes associated with climate change and be designed to be safe for the intended lifetime. The provisions for safe access and escape must also address the potential increase in severity and frequency of flooding.

#### 3.1 Fluvial

##### 3.1.1 Available data

The EA RoFRS maps have been used to assess the impact of climate change on flood risk to the site. The 1% AEP plus 35% ('2080s' epoch Central allowance) climate change extents are currently available, and are based on national modelling. These are shown in shown in Table 3-1. No local detailed flood modelling is available.

##### 3.1.2 Description of risk to the site

As shown below in Table 3-1, the site is not predicted to be impacted by fluvial flooding during the 1% AEP or 1% AEP plus 35% climate change event.

Table 3-1: Comparison of fluvial flood risk to the site between the 1% AEP and 1% AEP plus 35% climate change extents.

| Event                          | 1% AEP | 1% AEP plus 35% CC |
|--------------------------------|--------|--------------------|
| Percentage of site at risk (%) | 0      | 0                  |

#### 3.2 Surface water

##### 3.2.1 Available data

The EA's FMfP Surface Water Spatial Planning mapping has been used to assess the extent and depth of surface water flooding impact of climate change on flood risk to the site in the 1% AEP plus 40% event. The impact of climate change on surface water flood risk should be assessed as part of a site-specific Flood Risk Assessment, in line with the latest available climate change allowances and guidance. The data is shown in Table 3-2 and Figure 3-1.

### 3.2.2 Description of risk to the site

The site is not impacted by the 1% AEP event. However, in the 1% AEP plus 40% climate change event, similarly to the 0.1% AEP event, there is an offsite flow path which enters through the north, flows into the centre and out of the eastern boundary. Maximum flood depths are also at 0.30m.

Table 3-2: Comparison of surface water flood risk to the site between the 1% AEP and 1% AEP plus 40% climate change extents.

| Event                          | 1% AEP | 1% AEP plus 40% CC |
|--------------------------------|--------|--------------------|
| Percentage of site at risk (%) | 0      | 38.57              |
| Maximum depth (m)              | N/A    | 0.30               |



Figure 3-1: Comparison of surface water flood risk to the site between the 1% AEP and 1% AEP plus 40% climate change extents.

## 4 Flood risk management infrastructure

### 4.1 Defences

The EA AIMS dataset shows that the site is not protected by any formal flood defences.

### 4.2 Residual risk

There is no residual risk to the site from flood risk management structures.

## 5 Emergency planning

### 5.1 Flood warnings and alerts

The site is not located in an EA Flood Warning or Flood Alert Area.

### 5.2 Existing emergency plans and procedures

Kent County Council's Kent Resilience Forum (KRF) is one of a number of Local Resilience Forums (LRFs) that have been set up across England. The overall aim of an LRF is to ensure that the various agencies and organisations plan and subsequently work together so that responses to emergencies are coordinated appropriately. The KRF is made up of a number of different agencies and organisations that work together across a range of areas including planning for emergencies.

The Kent County Council Flood Response Plan (October 2023) sets out the principles that govern the Kent County Council's response to a significant flooding event within their local authority administrative area. The Plan is built upon the existence and maintenance by Category 1 and 2 Responders of their own plans for response to flooding. The response plan provides information on Kent County Council's actions, roles, and responsibility in response to a flood emergency in their administrative area.

### 5.3 Access and escape

Safe access and escape will need to be demonstrated in the 1% AEP plus climate change surface water events. Site drainage proposals should address the requirements for access routes, avoid impeding surface water flows and preserve the storage of surface water to avoid exacerbation of flood risk elsewhere on the site and in the wider catchment.

#### 5.3.1 Potential access

The site is currently accessed via Cedar Drive in the southwest of the site; it is anticipated that this will remain the access and escape route.

#### 5.3.2 Fluvial

Safe access and escape from the site can be achieved via Cedar Drive during fluvial flood events.

#### 5.3.3 Surface water

During the 1% AEP plus climate change event, surface water flooding is predicted along Cedar Drive. However, the depth remains less than 0.30m, which is considered suitable for vehicular travel therefore, access and escape is therefore achievable.

A site-specific Flood Risk Assessment (FRA) must show that the development can be designed to be safe and that there is adequate emergency planning provision.

#### **5.4 Dry islands**

The site is not located on a dry island.

## 6 Requirements for drainage control and impact mitigation

### 6.1 Broadscale assessment of possible SuDS

- The site is not considered to be susceptible to groundwater flooding due to the nature of the local geological conditions, however BGS data indicates that the underlying geology is mudstone and is likely to be poorly draining. The viability of managing surface water runoff via infiltration should be confirmed through site investigations and infiltration testing, in line with Kent County Council LLFA guidance. Off-site discharge in accordance with the SuDS hierarchy is likely to be required to discharge surface water runoff from the site.
  - If infiltration is viable, infiltration features will only be permitted 30m away from the railway line, as per National Rail requirements.
- The site is not located within a historic landfill site.

### 6.2 Opportunities for wider sustainability benefits and integrated flood risk management

- Implementation of SuDS at the site could provide opportunities to deliver multiple benefits including volume control, water quality, amenity and biodiversity. This could provide wider sustainability benefits to the site and surrounding area. Proposals to use SuDS techniques should be discussed with relevant stakeholders (Local Planning Authority, Lead Local Flood Authority, and the EA) at an early stage to understand possible constraints.
- Development at this site should not increase flood risk either on or off site. The design of the surface water management proposals should take into account the impacts of future climate change over the projected lifetime of the development.
- Opportunities to incorporate filtration techniques such as filter strips, filter drains and bioretention areas must be considered.
- Opportunities to incorporate source control techniques such as green roofs, permeable surfaces and rainwater harvesting must be considered in the design of the site.
- Surface water discharge rates should not exceed the existing greenfield runoff rates for the site. Opportunities to further reduce discharge rates should be considered and agreed with the LLFA. It may be possible to reduce site runoff by maximising the permeable surfaces on site using a combination of permeable surfacing and soft landscaping techniques.
- The Risk of Flooding from Surface Water (RoFSW) mapping indicates the presence of surface water flow paths during the 0.1% AEP event. Existing flow paths should be retained and integrated with blue-green infrastructure and public open space.

- If it is proposed to discharge runoff to a sewer system, the condition and capacity of the receiving asset should be confirmed through surveys and the discharge rate agreed with the asset owner.

## 7 NPPF and planning implications

### 7.1 Exception Test requirements

The Local Planning Authority will need to confirm that the Sequential Test has been carried out in line with national guidelines. The Sequential Test will need to be passed before the Exception Test is applied.

The NPPF classifies residential development as More Vulnerable.

The Exception Test is not required for this site because more vulnerable development is compatible with Flood Zone 1.

While the Exception Test is not explicitly required for sites at risk from other sources of flooding, the LPA should follow a similar principle, as the proposed site is at risk from surface water flooding. This includes ensuring that site users can be kept safe through the lifetime of the development and ensuring that residual risk can be safely managed.

A site-specific Flood Risk Assessment will still be required to support a planning application.

### 7.2 Requirements and guidance for site-specific Flood Risk Assessment

At the planning application stage, a site-specific FRA will be required as the proposed development site:

- within Flood Zone 1 and the [flood map for planning](#) shows it is at risk of flooding from surface water, now or in future
- that increases the [vulnerability classification](#) and may be subject to sources of flooding other than rivers or sea

All sources of flooding should be considered as part of a site-specific FRA.

Consultation with the Local Authority, Lead Local Flood Authority, Thames Water, and the EA should be undertaken at an early stage.

Any FRA should be carried out in line with latest guidance including the National Planning Policy Framework (NPPF), Flood Risk and Coastal Change Planning Practice Guidance (PPG), and Sevenoaks District Council Local Plan Policies.

The development should be designed with mitigation measures in place where required.

### 7.3 Guidance for site design and making development safe

- The site layout should adopt a sequential approach by steering the most vulnerable aspects of the development outside of areas at risk of surface water flooding.
- Where this is not possible, flood resilience and resistance measures should be implemented, where appropriate e.g. raising of floor levels, including property flood resistance and resilience measures. These measures should be assessed to make sure that flooding is not increased either on or off the site.

- The risk from surface water flow routes should be quantified as part of a site-specific FRA, including a drainage strategy, so runoff magnitudes from the development are not increased by development across any ephemeral surface water flow routes. A drainage strategy should help inform site layout and design to ensure runoff rates are as close as possible to pre-development greenfield rates, with areas of surface water ponding used as open space and SuDS or water compatible/essential infrastructure uses only.
- Arrangements for safe access and escape will need to be provided for the 1% AEP fluvial and surface water events with an appropriate allowance for climate change, considering depth, velocity, and hazard. Design and access arrangements will need to incorporate measures, so development and occupants are safe.
- Provisions for safe access and escape should not impact on surface water flow routes or contribute to loss of floodplain storage. Consideration should be given to the siting of access points with respect to areas of surface water flood risk.
- The site is located within a catchment identified as highly sensitive to the cumulative impacts of development on flood risk. The site-specific FRA and surface water drainage strategy should consider the recommendations outlined for catchments of high sensitivity in the Sevenoaks District Level 1 SFRA Cumulative Impacts Assessment.
- Finished Floor Levels should be raised above the expected height of flooding in line with the EA's guidance and any raising of ground levels should ensure that flood risk is not increased elsewhere.
- Flood resilience and resistance measures should be implemented where appropriate, e.g. raising of floor levels. These measures should be assessed to make sure that flooding is not increased elsewhere. If the floor levels cannot be raised to meet the minimum requirements, developers will need to:
  - raise them as much as possible.
  - consider moving vulnerable uses to upper floors.
  - include extra flood resistance and resilience measures.
- Other examples of flood resistance and resilience measures include:
  - using flood resistant materials that have low permeability to at least 600mm above the estimated flood level.
  - making sure any doors, windows or other openings are flood resistant to at least 600mm above the estimated flood level.
  - by raising all sensitive electrical equipment, wiring and sockets to at least 600mm above the estimated flood level.

## 8 Conclusions

The Exception Test is not required for this site because more vulnerable development is compatible with Flood Zone 1.

The site is located within Flood Zone 1, however risk from surface water flooding is predicted in the 1% AEP plus climate change and 0.1% AEP events as an offsite flow path flows from the northern boundary, through the centre of the site and out of the eastern boundary.

The site is at negligible risk from groundwater flooding and reservoir flooding.

There have been 3 historical flood incidents within 50m of the site boundary, as recorded by Kent County Council Flood records. No flood incidents have been recorded on the site.

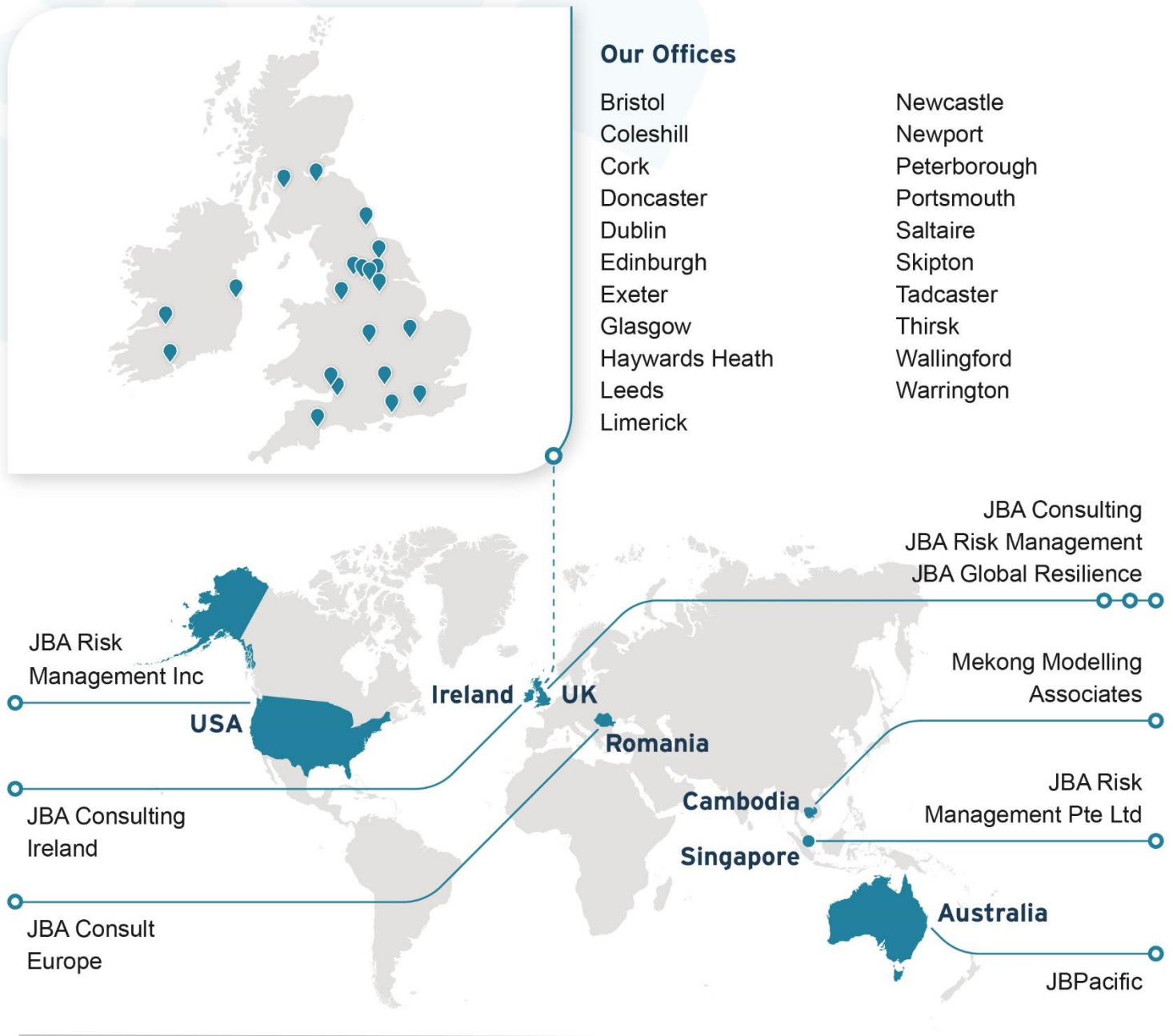
The following points should be considered in development of this site:

- A site-specific Flood Risk Assessment is required which demonstrates that site users will be safe during events up to and including the 0.1% and 1% AEP rainfall event, with an appropriate allowance for climate change. This will need to show that the site is not at an increased risk of flooding in the future and that development of the site does not increase the risk of surface water flooding either on or off the site.
- Development should be steered outside of surface water flood risk where possible. Where this is not possible, flood resilience and resistance measures should be implemented, where appropriate e.g. raising of floor levels, including property flood resistance and resilience measures. Within areas at risk of surface water flooding, habitable living spaces should not be located on the ground floor. These measures should be assessed to make sure that flooding is not increased either on or off the site.
- Developers should utilise SuDS with multiple benefits throughout the site, particularly in areas of predicted surface water ponding.
- Arrangements for safe access and escape will need to be provided for the 1% AEP fluvial and surface water events with an appropriate allowance for climate change, considering depth, velocity, and hazard. Design and access arrangements will need to incorporate measures, so development and occupants are safe.

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