Level 2 Strategic Flood Risk Assessment – Site AS237

Final Report

April 2026

Prepared for:
Hinckley and Bosworth Borough Council

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Hinckley & Bosworth Borough Council

Contents

1 Background

This is a Level 2 Strategic Flood Risk Assessment (SFRA) site screening report for AS237. The content of this Level 2 SFRA site screening report assumes the reader has already consulted the Hinckley and Bosworth Level 1 SFRA and read the Hinckley and Bosworth Level 2 SFRA Main Report and is therefore familiar with the terminology used in this report.

1.1 Site details

- Location: Land to the west of Clickers Way (A47), Earl Shilton, located between Thurlaston Lane and Breach Lane.
- Site area: 74.1ha
- Existing site use: Predominantly greenfield with existing Sewage Treatment Works onsite
- Proposed site use: mixed-use (mainly residential)

1.2 Topography

Figure 1-1 shows the topography of the site represented by the Environment Agency (EA) 1m resolution LiDAR. The LiDAR shows that there is elevated terrain along the southern and northern ends of the site, with the western boundary of the site being an area of high elevation. Ground elevations slope downhill from west to east towards a depression in the centre of the site where the watercourse is situated, and there is a small area of lower elevation along the northern boundary of the site. The minimum elevation is 86.3mAOD near the eastern boundary, and the maximum elevation is 107.5mAOD near the southwestern boundary of the site.

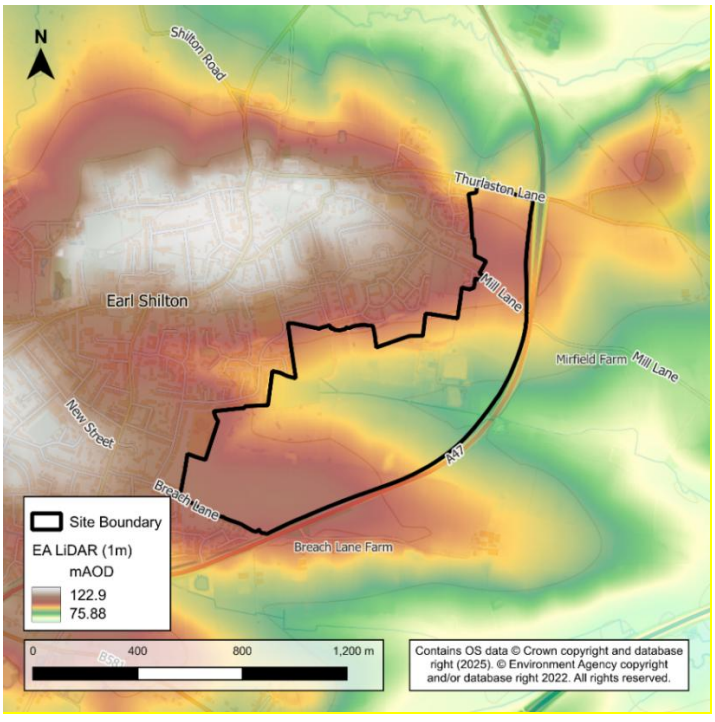


Figure 1-1: Topography of the site.

1.3 Geology and soils

Geology at the site consists of:

- Bedrock of the site is Edwalton Member comprised of mudstone.
- Superficial deposits:
  - Thrussington Till Member consisting of diamicton covers most of the site.
  - Alluvium consisting of clay, silt, sand, and gravel along the banks of the unnamed watercourse.
  - Wigston Sand and Gravel Member comprised of sand and gravel near the southern boundary of the site.

Soils at the site consist mainly of freely draining slightly acid loamy soils with the centre. Parts of the eastern boundary consisting of slightly acid loamy and clayey soils with impeded drainage, this follows the path of the unnamed watercourse.

2 Sources of flood risk

2.1 Location of site within the catchment

The site is within the downstream end of the Thurlaston Brook Catchment (a tributary of the River Soar), which drains an area of 65.4km^2. There is an unnamed watercourse which flows in an easterly direction from the centre of the site to where it exists the site through the eastern site boundary. The catchment upstream of the site is predominantly rural, with several small settlements including Thurlaston, Peckleton and Kirkby Mallory.

2.2 Existing drainage features

There is an unnamed watercourse located in the centre of the site flows in an easterly direction through the centre and eastern parts of the site, before leaving the site where it is culverted beneath Clickers Way (A47).

2.3 Fluvial

2.3.1 Available data

The EA's Flood Map for Planning (FMfP) has been used within this assessment to inform Flood Zones 2 and 3a.

Flood Zone 3b has been defined using the EA's Rivers and Sea 3.3% AEP defended flood risk extent.

2.3.2 Description of risk to the site

The site is not shown to be at fluvial flood risk based on the EA's FMfP.

The unnamed watercourse flows through the centre of the site in an easterly is not represented within the EA's FMfP. The risk from this watercourse has been assessed using the EA's Risk of Flooding from Surface Water Map (see Section 2.4).

2.4 Surface water

2.4.1 Available data

The EA's Risk of Flooding from Surface Water (RoFSW) map has been used within this assessment.

2.4.2 Description of risk to the site

The RoFSW mapping indicates that surface water flooding extents are primarily aligned with existing watercourses and low-lying areas within the site.

In the 3.3% AEP event, there are small areas of ponding throughout the site mainly in the areas of low-lying topography of the site near the eastern border of the site, the course of the watercourse and at the eastern boundary near where the watercourse is culverted.

In the 1% AEP event, existing areas of surface water ponding increase in extent, new areas of surface water develop along the path of the watercourse and near the western boundary of the site.

In the 0.1%, a surface water flow path develops that transects through the western boundary of the site, through the centre of the site and exits through the eastern boundary where the watercourse is culverted. New areas of ponding and surface water flow paths develop in the centre of the site and in the northwestern corner of the site. The surface water ponding near the southern and eastern boundaries of the site increase in extent.

In the 0.1% AEP events, there are four areas of surface water flow paths near the western boundary of the site, which run parallel to each other. This is influenced by the LiDAR data of the hedges and boundaries on the site.

The maximum depths, velocities, and hazards (shown in Table 2-1) are associated with the lower topography along the path of the watercourse and where the water backs up onto the site upstream of the culvert under Clickers Way (A47) to the east of the site. However, depths also exceed 0.6m in the 0.1% AEP event, and exceed 0.3m in the 3.3% and 1% AEP events, in some of the additional areas of ponding on the site, with hazard classification up to 'Danger for Most'.

Table 2-1: Existing surface water flood risk based on the RoFSW map.

Event	3.3% AEP	1% AEP	0.1% AEP
Percentage of site at risk* (%)	<1	1.3	3.8
Maximum depth (m)	Exceeds 0.6m but does not exceed 0.9m	Exceeds 0.9m but does not exceed 1.2m	Exceeds 1.2m
Maximum velocity (m/s)	Exceeds 1.0m/s but does not exceed 2.0m/s	Exceeds 1.0m/s but does not exceed 2.0m/s	Exceeds 1.0m/s but does not exceed 2.0m/s
Maximum hazard classification	Danger for Most	Danger for Most	Danger for Most

** The percentage surface water extents quoted show the percentage of the site at surface water risk from that particular event, excluding the percentage of the site at flood risk at a higher risk zone (e.g. the 1% AEP does not include the 3.3% AEP percentage).*

2.5 Reservoir

The site is not shown to be at risk of reservoir flooding during the 'dry day' or 'wet day' scenario from the EA reservoir flood maps.

2.6 Groundwater

The JBA Groundwater Emergence Map shows that the majority of the site is shown to be at negligible risk of groundwater emergence due to the nature of the underlying geology.

In the southern boundary and southwest corner of the site, there are two areas where groundwater levels are between 0.5m and 5m below the ground surface, there is a risk of flooding to subsurface assets, but surface manifestation of groundwater is unlikely.

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.

2.7 Sewers

Severn Trent Water were consulted as part of the Regulation 18 process and each of the Strategic Housing and Employment Land Availability Assessment reports to provide comments on known issues of sewer flooding within or surrounding the site. There is model predicted flooding upstream of the site along the combined sewer. The site is predicted to have a potential high impact on the sewerage network, particularly due to the large size of the site. Therefore, early consultation with Severn Trent Water will be required to discuss the site drainage.

This assessment does not negate the requirement that drainage at the site should be in line with the drainage hierarchy (see Section 6.1).

2.8 Flood history

The EA's Historic Flood Map shows no records of flooding at the site.

Information provided by Leicestershire County Council shows no recorded flood incidents on the site but there is one recorded incident of internal property flooding during Storm Henk (January 2024) located approximately 140m west of the site along Equity Road. No details on the source of this flooding were noted.

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 Hinckley and Bosworth Level 2 SFRA report 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 egress must also address the potential increase in severity and frequency of flooding.

3.1 Fluvial

3.1.1 Available data

The EA's FMfP Flood Zones plus Climate Change layer has been used to indicate areas of the site likely to be at increased flood risk in future.

3.1.2 Description of risk to the site

The EA's FMfP Flood Zones plus Climate Change layer shows the site is unlikely to be at increased fluvial flood risk in future.

The unnamed watercourse within the site is not represented within the EA's FMfP within the site. The future risk from this watercourse has been assessed using the EA's Risk of Flooding from Surface Water Map (see Section 3.2).

3.2 Surface water

3.2.1 Available data

In the absence of suitable climate change data, the 0.1% AEP extent from the EA's RoFSW mapping has been used as a proxy to indicate areas likely to be at risk during the 1% AEP plus climate change event.

3.2.2 Description of risk to the site

The RoFSW mapping shows that the site is sensitive to climate change. The main difference between the 1% and 0.1% AEP events is that a surface water flow path develops and transects the entire cross-section of the site in the 0.1% event. New areas of surface water ponding develop between the 1% and 0.1% events, in the centre and near the northern and southern boundaries of the site.

Existing surface water ponding near the northern and southern boundaries only minorly increase in extent between the events.

Depth, velocity, and hazard along the main flow path through the centre of the site are shown to increase between the 1% AEP and 0.1% AEP events, indicating additional surface water hazard under future climate conditions.

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

The unnamed watercourse is culverted where it exits the site to the east beneath Clickers Way (A47). The RoFSW mapping shows water backing up on the site upstream of this culvert. There is a residual risk of a blockage resulting in increased risk within the site. The topography of the site means any water is likely to remain confined to the lower lying area surrounding the watercourse near the eastern boundary of the site.

5 Emergency planning

5.1 Flood warnings and alerts

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

5.2 Access and escape

Safe access and escape routes 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.

5.2.1 Potential access

The site can be accessed from the north via Thurlaston Lane and from the west from Clickers Way (A47), and from the south via Breach Lane. Mill Lane transects the northern end of the site, providing potential access to the centre of the site.

5.2.2 Fluvial

Access and escape are not shown to be impacted during any of the available fluvial flood events, including within the Flood Zones plus Climate Change dataset.

5.2.3 Surface water

During the 3.3% event, access and escape routes remain largely clear. There are instances of surface water ponding to the south along Clickers Way (A47), and where the unnamed watercourse is culverted. There are also minor instances of surface water ponding along to the west of Thurlaston Lane, and along Breach Lane. In the 3.3% event water depths on Breach Lane exceed 0.2m but do not exceed 0.3m, velocities exceed 0.25m/s but do not exceed 0.5m/s and have a ‘Danger for Some’ classification.

During the 1% AEP event, the existing surface water ponding on Clickers Way and Breach Lane increase in extent. There are new areas of surface water ponding along Breach Lane. In the 1% event water depths on Breach Lane exceed 0.2m but do not exceed 0.3m, velocities exceed 0.25m/s but do not exceed 0.5m/s and have a ‘Danger for Some’ classification.

During the 0.1% AEP event, the existing surface water ponding on Clickers Way, Thurlaston Lane, and Breach Lane increase in extent. New areas of surface water ponding develop on Mill Lane, Clickers Way and Breach Lane. Water depths on Clickers Way to the south of the site near the junction with Station Road exceed 0.6m but do not exceed 0.9m. In the 0.1% event water depths on Breach Lane exceed 0.3m but do not exceed 0.6m and water depths on Mill Lane exceed 0.2m but do not exceed 0.3m and have a ‘Danger for Some’ classification. On both roads, velocities exceed 0.25m/s but do not exceed 0.5m/s.

In both the 3.3% and 1% AEP events, due to the water depths being less than 0.3m access and escape is likely be possible to the southern parcel of the site via Breach Lane.

In all AEP events, access and escape to the site is not likely to be possible via Clickers Way from the south due to water depths on the road. However, access and escape along Clickers Way from the north is likely to be possible. Although the road is shown to be impeded where the unnamed watercourse is culverted to the east of the site, the topography data shows the road here is raised approximately 4m above the watercourse channel and therefore the surface water depths shown here are associated with the channel beneath the road. Therefore, access and escape along the whole eastern site boundary is likely to be possible via Clickers Way from the north.

In the 0.1% AEP event, a surface water flow path transects the site along the unnamed watercourse, running through the centre of the site. Due to this flow path, access to the north will need to be provided separate from that to the south.

5.3 Dry islands

The site not located on a dry island.

6 Requirements for drainage control and impact mitigation

6.1 Broadscale assessment of possible SuDS

Surface water at the site should be discharged in accordance with the drainage hierarchy as set out in the National standards for SuDS (gov.uk). SuDS that provide opportunities to deliver multiple benefits including volume control, water quality, amenity and biodiversity, should be prioritised. SuDS proposals should be discussed with relevant stakeholders (Local Planning Authority, Lead Local Flood Authority, and the EA) at an early stage to understand possible constraints.

Opportunities to incorporate source control techniques such as green roofs, permeable surfaces and rainwater harvesting must be considered in the design of the site.

The potential to utilise conveyance features such as swales to intercept and convey surface water runoff should be considered. Conveyance features should be located on common land or public open space to facilitate ease of access. Where slopes are >5%, features should follow contours or utilise check dams to slow flows.

The following factors should be considered when assessing whether infiltration is suitable at the site:

- The site is not considered to be susceptible to groundwater flooding, due to the nature of the local geological conditions. This should be confirmed through additional site investigation work.
- BGS data indicates that the underlying geology is Mudstone and is likely to be poorly draining. Any proposed use of infiltration should be supported by infiltration testing. Off-site discharge in accordance with the SuDS hierarchy is required to discharge surface water runoff.
- The site is not located within a Groundwater Source Protection Zone and there are no restrictions over the use of infiltration techniques with regard to groundwater quality.
- The site is not located within a historic landfill site.

If it is proposed to discharge runoff to a watercourse or sewer system, the condition and capacity of the receiving watercourse or asset should be confirmed through surveys and the discharge rate agreed with the asset owner (see Section 2.7).

The Risk of Flooding from Surface Water (RoFSW) mapping indicates the presence of surface water flow paths during the 3.3%, 1%, 0.1% AEP events. The unnamed watercourse on the site should be integrated into the site drainage strategy as a blue-green corridor or public open space.

6.2 Opportunities for wider sustainability benefits and integrated flood risk management

The following are opportunities for wider sustainability benefits and integrated flood risk management at 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.
- Opportunities to incorporate filtration techniques such as filter strips, filter drains and bioretention areas must be considered.
- Consideration should be made to the existing condition of Thurlaston Brook and their Water Framework Directive objectives for water quality. The use of multistage SuDS treatment will improve water quality of surface water runoff discharged from the site and reduce the impact on receiving water bodies. Thurlaston Brook is considered to be of poor ecological status.

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 it is not shown to be at fluvial flood risk within the EA Flood Map for Planning.

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:

- greater than 1 hectare
- at risk of flooding from ordinary watercourse and surface water
- will be at increased risk of flooding during its lifetime

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

Consultation with the Local Authority, Lead Local Flood Authority, Water Company, 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 Hinckley and Bosworth 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 must adopt a sequential approach by steering more vulnerable aspects of the development away from the areas of highest risk in the eastern and central areas of the site.

A detailed hydraulic model of unnamed watercourse may be required at FRA stage to accurately represent the risk from this watercourse and to inform site design and mitigations. Detailed survey of the culvert under Clickers Way (A47) should be included in modelling to ensure this is properly represented within the modelling as the available flood risk mapping shows this is likely to significantly impact the flood extents within the east of 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 to both the northern and southern sections of the site will need to be provided for the 1% AEP surface 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 and may need to consider multiple access routes.

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.

If proposed works affect an ordinary watercourse, Leicestershire County Council as the Lead Local Flood Authority should be contacted respectively to obtain prior written consent. Any watercourses should be accommodated within the site layout and should not be culverted except for where access is required. The site layout should allow for access to any watercourse for maintenance and they should generally be located within publicly accessible areas. A buffer of at least 8 metres should be maintained between the watercourses and any built development.

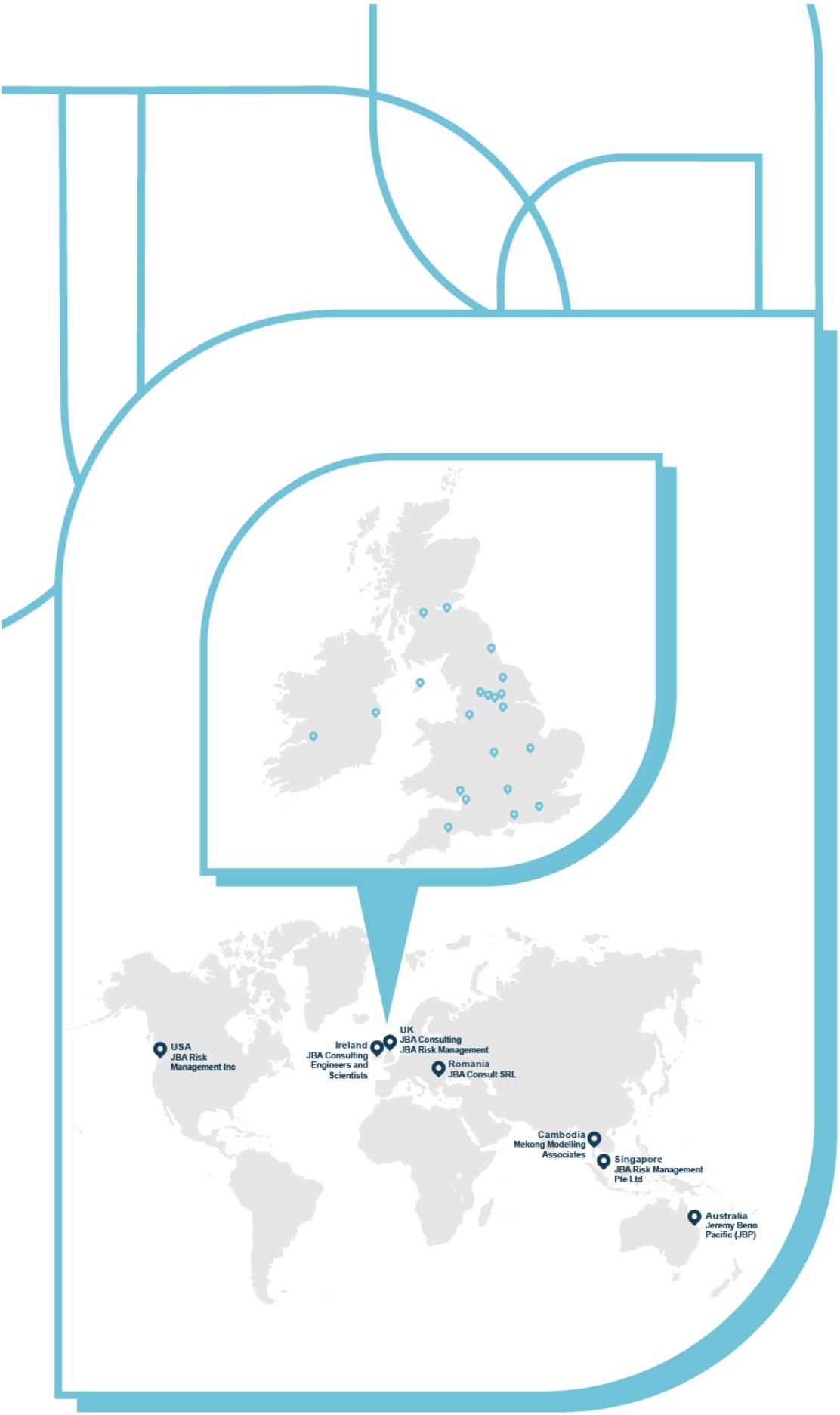
8 Conclusions

The site is affected by surface water flooding, but the majority of the site is not shown to be at flood risk. There is a significant surface water flow path associated with an unnamed watercourse that bisects the centre of the site and flows easterly before exiting through the eastern boundary. There are also areas of surface water ponding mainly in the centre of the site, and smaller areas of ponding in the northern and southern ends of the site. There are culverts downstream of the site which present a residual flood risk.

The Exception Test is not required, because the site is not shown to be at fluvial flood risk within the EA Flood Map for Planning. However, a site-specific FRA will be required, because the proposed development site is greater than one hectare, subject to ordinary watercourse and surface water flooding, and will be at increased risk of flooding during its lifetime.

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

- A buffer of at least 8 metres should be maintained between the watercourses and any built development.
- The site layout must adopt a sequential approach by steering more vulnerable aspects of the development away from the areas of highest risk in the centre and eastern side of the site, informed by the topography. Developers should consider utilising this area as a green corridor.
- A detailed hydraulic model of the unnamed watercourse that bisects the centre of the site may be required at FRA stage to accurately represent the risk from these watercourses. Detailed survey of the culvert under Clickers Way (A47) should be included in modelling to ensure this is properly represented within the modelling as the available flood risk mapping shows this is likely to significantly impact the flood extents within the east of the site.
- Safe access and escape routes should be demonstrated for both the northern and southern parts of the site in the 1% AEP plus climate change surface water events which may result in more than one access route.
- A carefully considered and integrated flood resilient and sustainable drainage design should be put forward, including a site-specific Surface Water Drainage Strategy, and SuDS maintenance and management plan and supported by detailed modelling with development to be steered away from the areas identified to be at highest risk of surface water flooding within the site.



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