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Land South of Bosworth Academy, Desford

Bellway Homes Limited

Flood Risk Assessment

June 2026





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1 Introduction

Background

- 1.1 The purpose of this FRA is to assess the risk of flooding to the proposed development and where possible provide sufficient mitigation to demonstrate that the future users of the development would remain safe throughout its lifetime, that the development would not increase flood risk on site and elsewhere and, where practicable, that the development would reduce flood risk overall.

Site Proposals

- 1.2 This FRA has been produced to support the outline planning application for residential development, including provision of a primary healthcare facility and district centre [E Use Class]; sports facilities; public open space; access from Peckleton Lane and Leicester Lane with a connecting road; sustainable drainage; and associated infrastructure. All matters reserved except for access.
- 1.3 A copy of the proposed development drawings is included within **Appendix A**.

National & Local Planning Policy

- 1.4 The National Planning Policy Framework (NPPF)¹ sets out the Government's national policies on different aspects of land use planning in England in relation to flood risk. Planning Practice Guidance (PPG) is also available online².
- 1.5 The PPG sets out the vulnerability to flooding of different land uses. It encourages development to be located in areas of lower flood risk where possible and stresses the importance of preventing increases in flood risk off site to the wider catchment area.
- 1.6 The NPPF states that a site-specific Flood Risk Assessment will be required for proposals:
- a) that are greater than 1 hectare in area within Flood Zone 1
 - b) for all proposals for new development (including minor development and change of use) in Flood Zones 2 and 3
 - c) in an area within Flood Zone 1 which has critical drainage problems; and where proposed development or a change of use to a more vulnerable class may be subject to other sources of flooding
 - d) in an area within Flood Zone 1 identified in a Strategic Flood Risk Assessment as being at increased flood risk in the future
 - e) in an area in Flood Zone 1 that may be subject to other sources of flooding, where its development would introduce a more vulnerable use
- 1.7 This FRA aims to provide sufficient flood risk information to satisfy the requirements of the NPPF, PPG and regional/local government plans and policies.

¹ <https://www.gov.uk/government/publications/national-planning-policy-framework--2>

² <https://www.gov.uk/guidance/flood-risk-and-coastal-change>

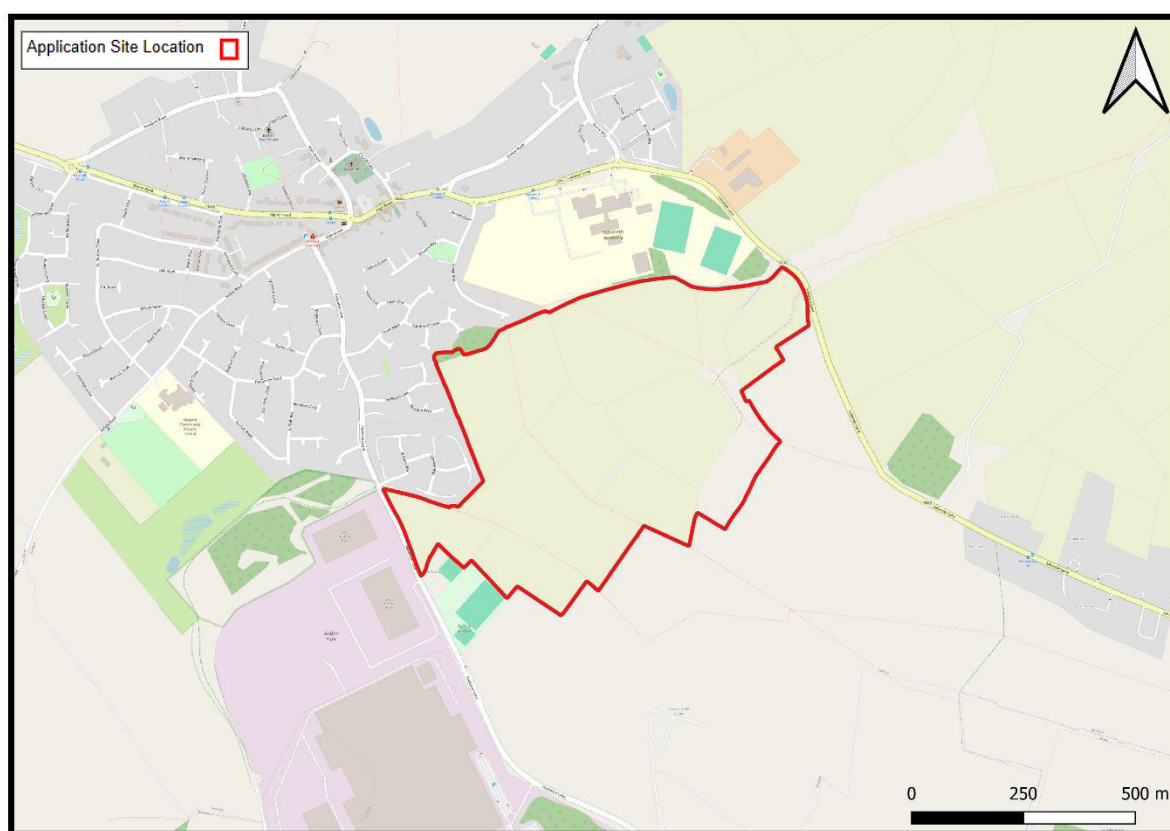


- 1.8 This assessment considers the risks of all types of flooding to the site including tidal, fluvial, surface water, groundwater, sewer and artificial sources and provides mitigation measures to ensure that the flood risk to the site is minimised and that flood risk off-site is not increased

2 Existing Site & Hydrology Characteristics

Site Location & Composition

- 2.1 The site is southeast of the village of Desford, situated west of Leicester. The approximate co-ordinates for the centre of the site are E: 448443; N: 302935, with the nearest postcode of LE9 9JL. The site location is approximately shown outlined in red in **Figure 2.1**.
- 2.2 The current site comprises of undeveloped greenfield land with no existing structures. The site is bound to the north by Bosworth Academy and residential dwellings, to the east by Leicester Lane (B582) and undeveloped land, to the south by further undeveloped land and to the west by residential dwellings, a recreational centre and Peckleton Lane (**Figure 2.1**).



(Source: OpenStreetMap/EA)

Figure 2.1 Site Location

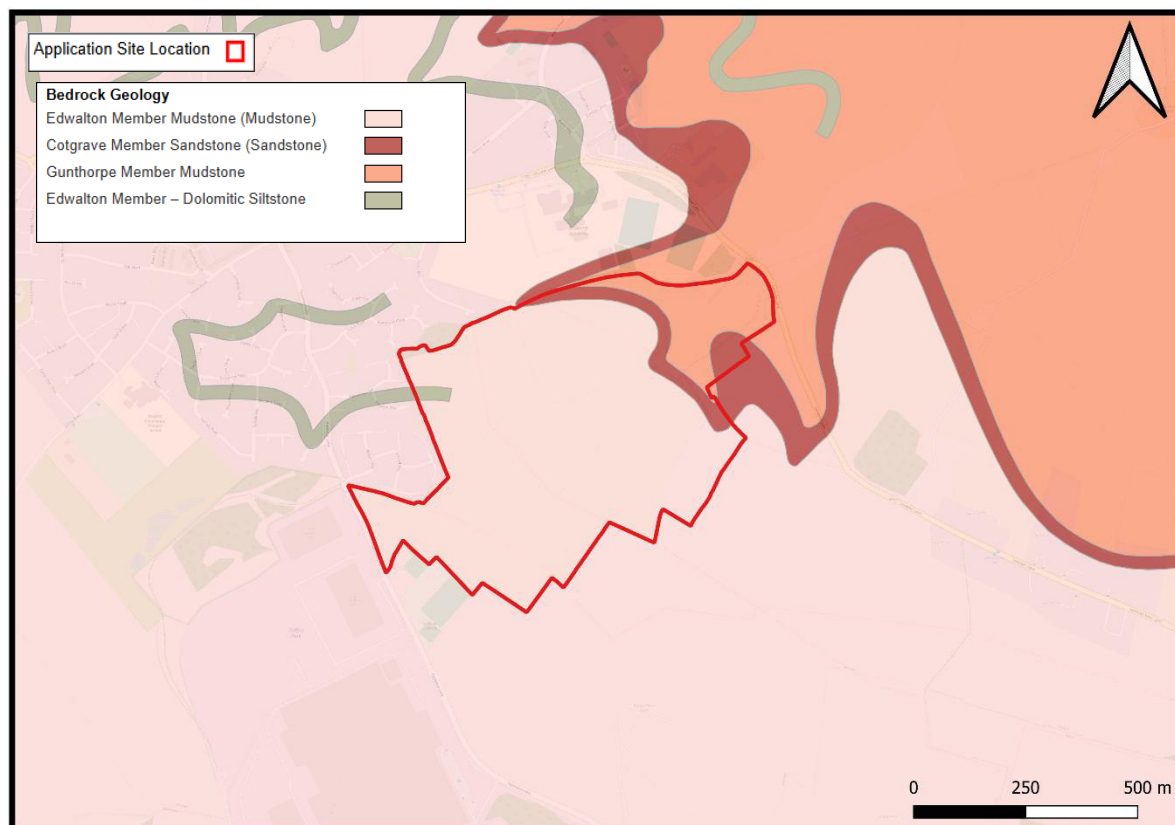
Topography

- 2.3 A detailed topographic survey was carried out during May 2025, a copy of which is included within **Appendix B**. Ground levels on the site fall in a northeasterly direction from 129.50 metres Above Ordnance Datum (mAOD) located at the southwestern boundary to 96.25 mAOD located in the northeastern corner of the site.
- 2.4 The topographic survey has identified several drainage ditches that flow through site and along the site boundaries. There is a ditch that runs from west to east through the centre of site parallel to the northern boundary along with an additional ditch along the northern boundary. There are also a series of ditches located across site associated with various

existing field boundaries. These ditches all converge in the northeastern site corner before continuing north towards the Rothley Brook.

Ground Conditions

- 2.5 Geological data held by the British Geological Survey (BGS)³ shows that the bedrock geology underlying the majority of the site is Edwalton Member - Mudstone. The northeast is shown to be underlain by both Cotgrave Sandstone Member – Sandstone and Gunthorpe Member - Mudstone. There is also a band of Edwalton Member – Dolomitic Siltstone that underlays a small area of the west of the site. This can be seen in **Figure 2.2**.

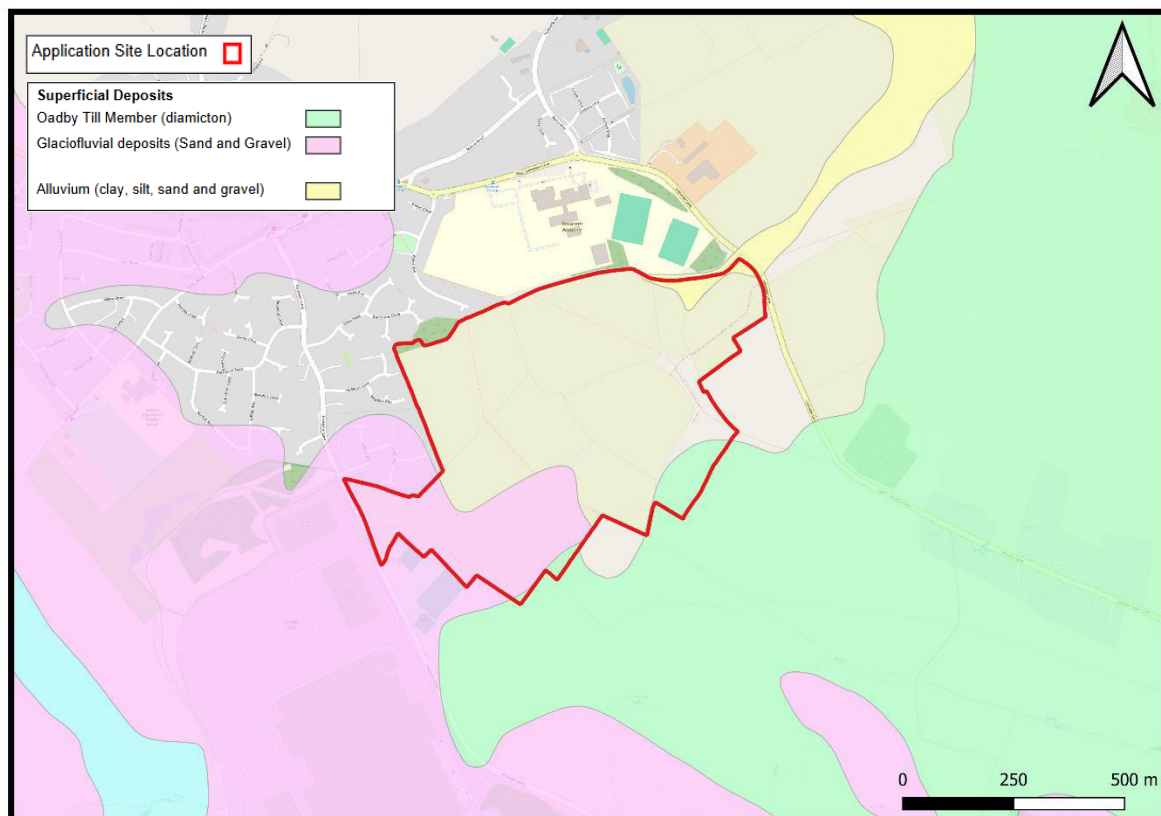


(Source: OpenStreetMaps/BGS)

Figure 2.2 Bedrock Geology

- 2.6 Geological data held by BGS also shows that superficial deposits of Glaciofluvial deposits, Mid-Pleistocene – Sand and Gravel as well as Oadby, Till Member (Trias-Rich) – Diamicton underlay the south of the site. Superficial deposits of Alluvium – Clay, silt, sand and gravel are shown to underlay the northeastern corner of the site. This can be seen in **Figure 2.3**.

³ <https://geologyviewer.bgs.ac.uk/>



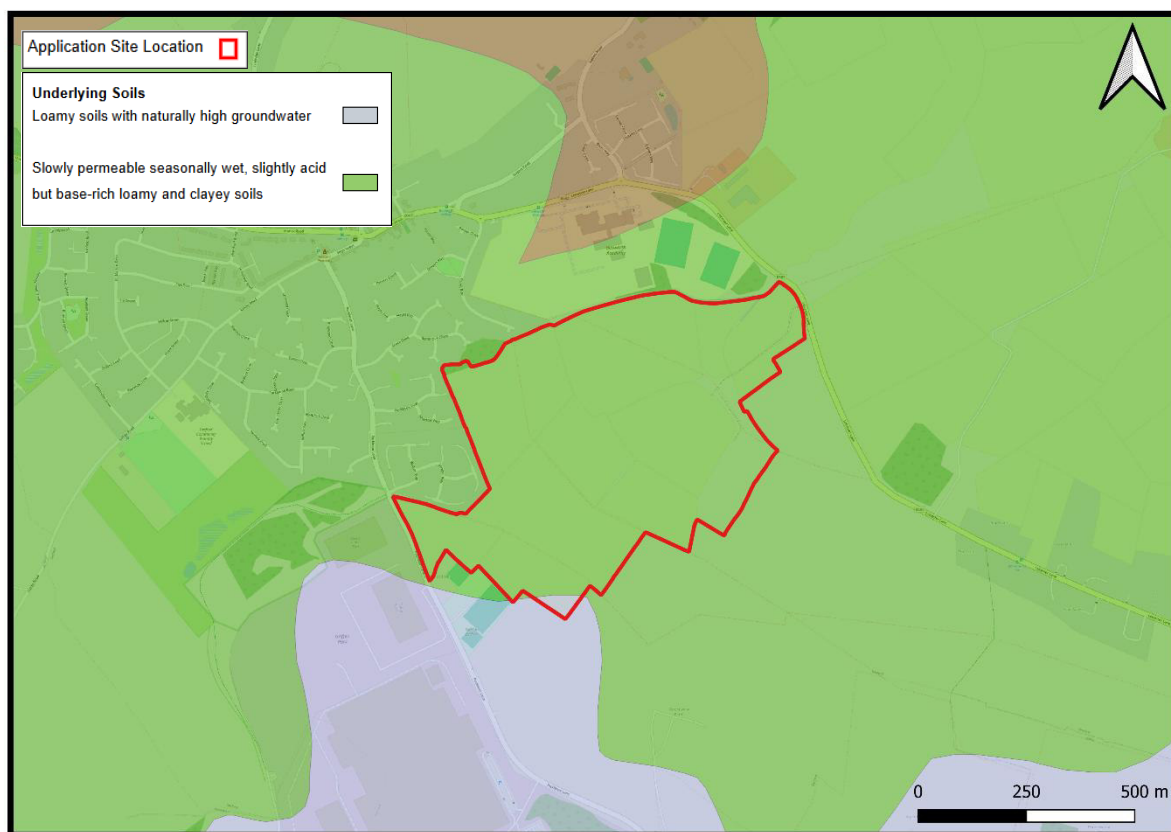
(Source: OpenStreetMap/BGS)

Figure 2.3 Superficial Deposits

- 2.7 The nearest borehole log with freely available information is located approximately 385m north of the site and was recorded to a depth of 15.84m, obtained via online BGS maps⁴. The borehole log reference number is SK40SE21. The log identifies presence of red clay and wet and hard skerry with signs of groundwater ingress.
- 2.8 Soilsapes mapping⁵ indicates the underlying soil of the majority of the site as slowly permeable seasonally wet, slightly acid but base-rich loamy and clayey soils. There is a small area in the south of the site which has loamy soils with naturally high groundwater. This can be seen in **Figure 2.4**.

⁴ https://mapapps2.bgs.ac.uk/geoindex/home.html?layer=BGSBoreholes&_ga

⁵ <http://www.landis.org.uk/soilsapes/>



(Source: OpenStreetMap//LandIS)

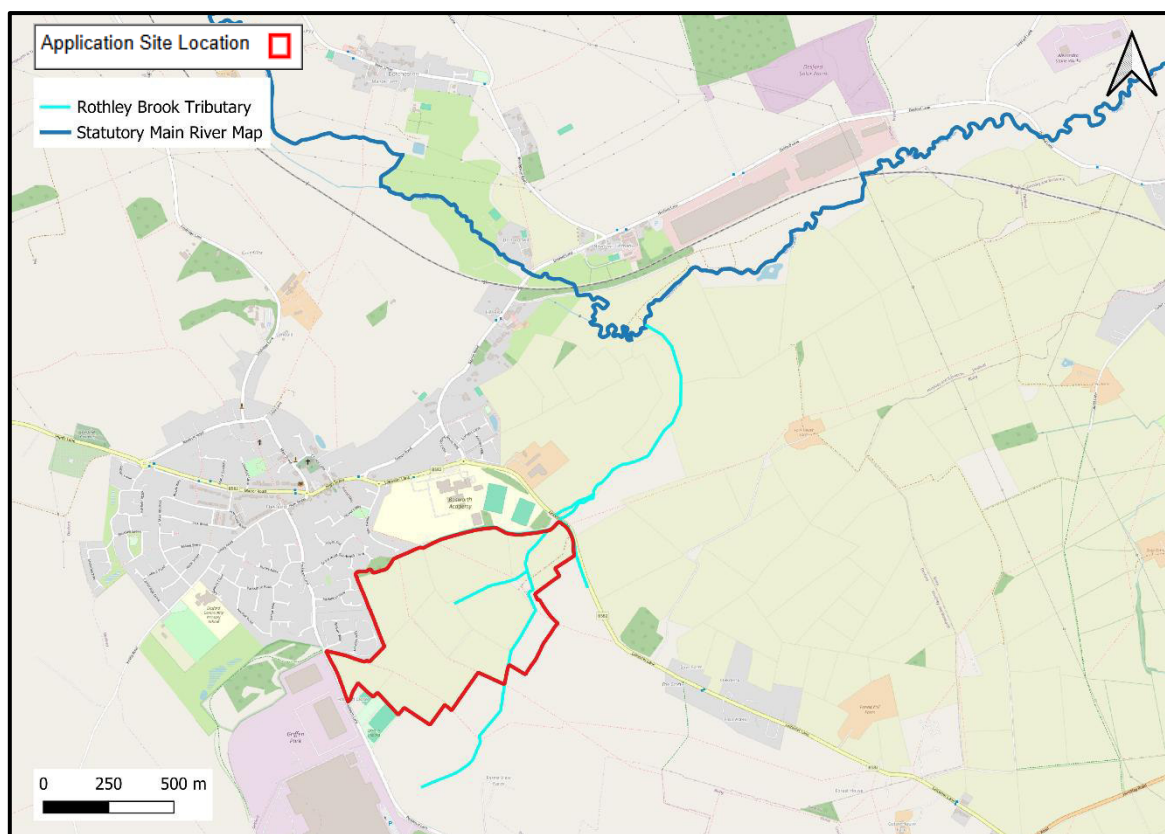
Figure 2.3 Underlying Soils

- 2.9 Due to the noted poorly infiltrating underlying geology identified through desk study, soakaway testing to BRE 365 has not been undertaken at this stage.
- 2.10 Department for Environment, Food & Rural Affairs (DEFRA) Magic Service Mapping⁶ shows the site is not located in a groundwater Source Protection Zone (SPZ).

Existing Drainage & Hydrology

- 2.11 The nearest EA designated river is the Rothley Brook which is located circa 750m to the northeast. A tributary to this brook flows in a northerly direction from within site to a confluence 830m north of site. The ditches that flow through site, as aforementioned converge in the northeast forming a tributary of the Rothley Brook. These watercourses are shown in **Figure 2.4**.
- 2.12 There is also a pond located immediately east of the eastern boundary.

⁶ <https://magic.defra.gov.uk/MagicMap.aspx>



(Source: OpenStreetMap)

Figure 2.4 Existing Watercourses

- 2.13 Severn Trent asset plans show that there are a number of foul and surface water public sewers located around the site. The residential area to the north west of site is served by a number of surface water and foul sewers including a 300mm diameter public surface water sewer that runs south from Forest Rise and outfalls into the existing ditch located on the northern site boundary. There are also public foul sewers located within Bambrook Close that discharge to a pump station where flows are then directed east. These sewers flow north away from site. Further sewers are located to the north in Barns Way where surface water sewers flow south discharging into the watercourse network and foul sewers flow north away from site. Severn Trent sewer records are contained in **Appendix C**.
- 2.14 The DEFRA Magic Map (England and Wales) shows there are no designated sites (SSSIs) in or close to the site including downstream (from a flood risk and drainage perspective).

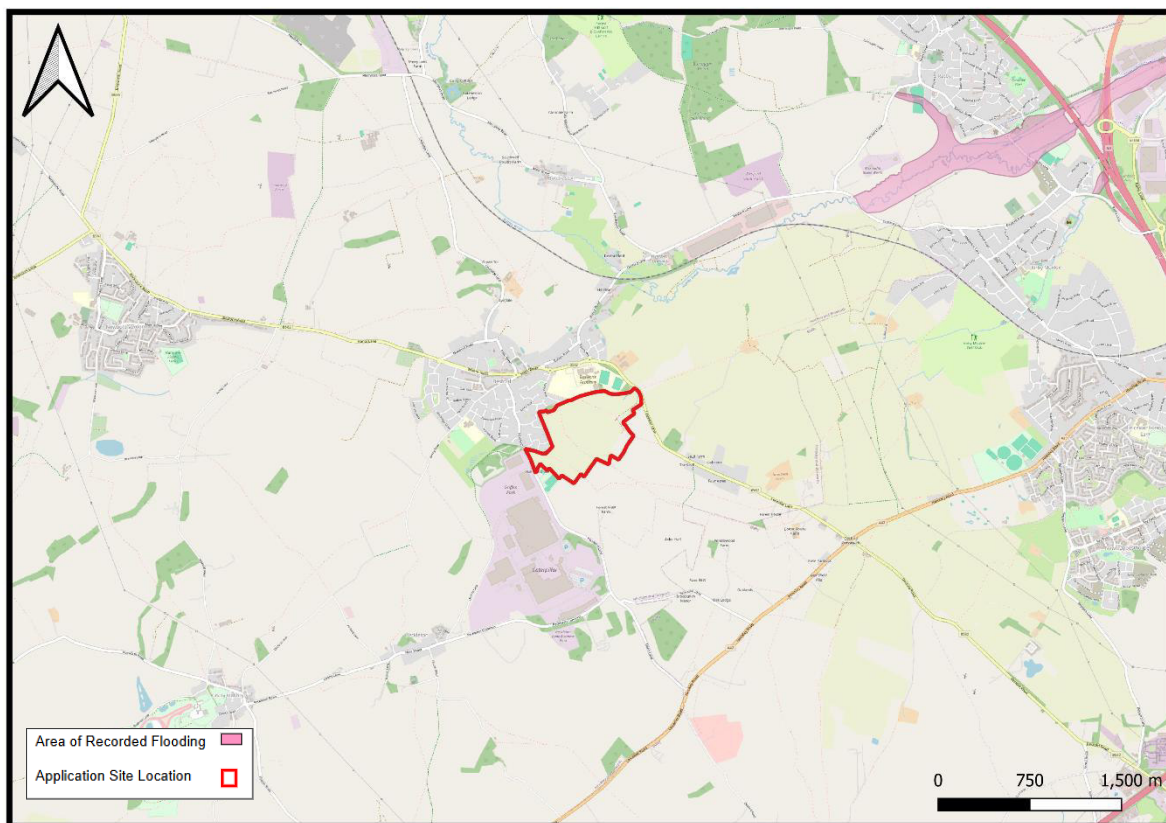
3 Site Specific Flooding

National Planning Policy Framework (NPPF)

- 3.1 Local Planning Authorities, (LPA) have a statutory obligation to consult the EA on all applications in flood risk zones. The EA will consider the effects of flood risk in accordance with the NPPF.
- 3.2 In accordance with paragraph 181 of the NPPF, as part of the planning process, it requires:
- a) A 'site specific' Flood Risk Assessment will be undertaken for any site that has a flood risk potential.
 - b) Flood risk potential is minimised by applying a 'sequential approach' to locating 'vulnerable' land uses
 - c) Sustainable drainage systems are used for surface water disposal where practical
 - d) Flood risk is managed through the use of flood resilient and resistant techniques.
 - e) Residual risk is identified and safely managed
- 3.3 Table 1 of NPPF, categorises flood zones into:
- a) Zone 1- Low risk, less than 0.1% Annual Event Probability (AEP) (< 1 in 1000 years)
 - b) Zone 2- Medium risk, 0.1% AEP (1 in 1000 - 1 in 100 years)
 - c) Zone 3a- High risk, 1% AEP (> 1 in 100 years)
 - d) Zone 3b- High risk - Functional Floodplain, 3.33% AEP (>1 in 30 years)
- 3.4 In accordance with the NPPF, this FRA considers all sources of flooding including:
- a) Tidal flooding – from sea;
 - b) Fluvial flooding – from rivers and streams;
 - c) Pluvial flooding – overland surface water flow and exceedance;
 - d) Groundwater flooding – from elevated groundwater levels or springs;
 - e) Flooding from sewers – exceedance flows from existing sewer systems; and
 - f) Artificial sources – reservoirs, canals etc.
- 3.5 The latest National Planning Policy Guidance for Flood Risk defines a “design flood” as a flood event of a given annual flood probability, which is generally taken as:
- a) river flooding likely to occur with a 1% annual probability (a 1 in 100 chance each year); or
 - b) tidal flooding with a 0.5% annual probability (1 in 200 chance each year); or
 - c) surface water flooding likely to occur with a 1% annual probability (a 1 in 100 chance each year),
- plus, an appropriate allowance for climate change.

Historic Flooding

- 3.6 EA mapping shows there to be no historic flooding on or in the vicinity of the site. The nearest recorded incidents of historic flooding are approximately 2.4km to the northeast, associated with the channel capacity of the Rothley Brook being exceeded. This can be seen in **Figure 3.1**.

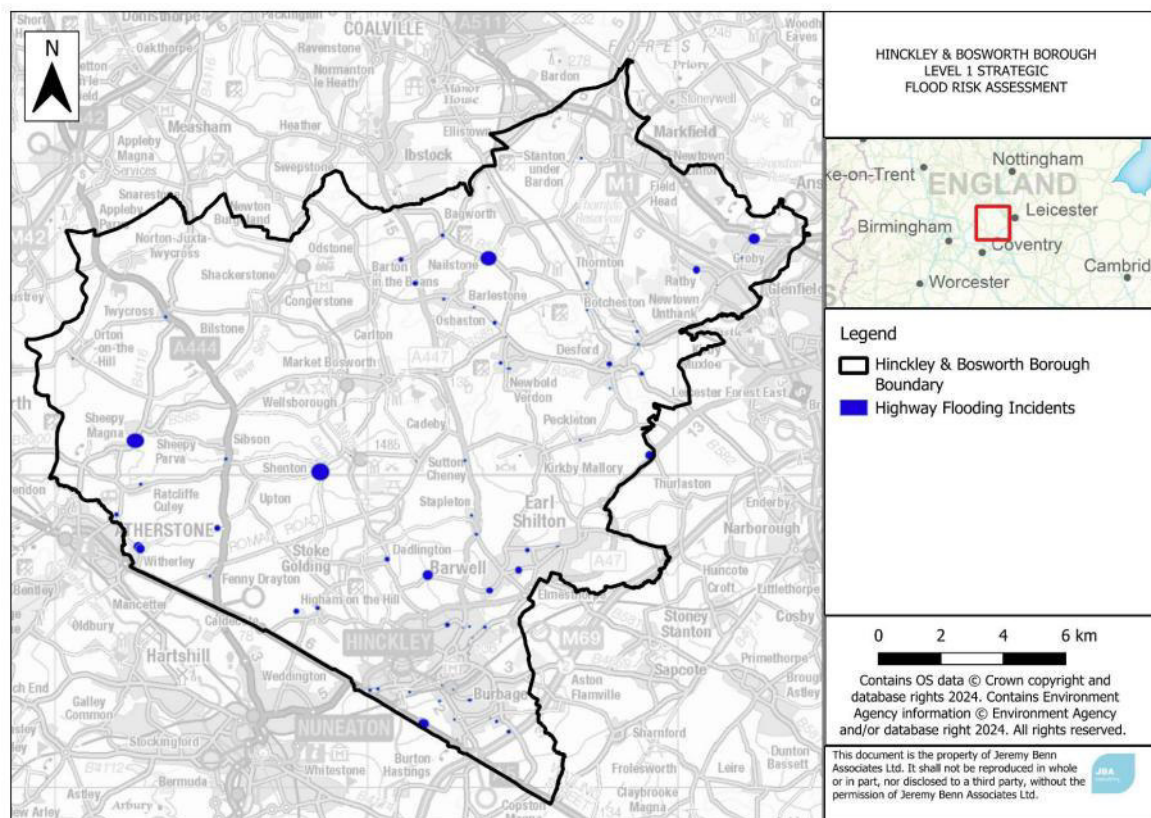


(Source: OpenStreetMap/EA)

Figure 3.1 Historic Flooding

- 3.7 The Hinckley and Bosworth Level 1 Strategic Flood Risk Assessment (SFRA) (2025)⁷ mentions no incidents of historic flooding on or in the vicinity of the site. The locations of highway flooding are mapped and included in the SFRA (**Figure 3.2**) highlighting 1 incident of highway flooding on Leicester Lane located to the east of the site and a second incident occurring in the centre of Desford. No further detail about these incidents is provided.

⁷https://www.hinckley-bosworth.gov.uk/downloads/file/8507/strategic_flood_assessment_sfra_2025_level_1_main_report



(Source: Hinkley & Bosworth SFRA)

Figure 3.2 Locations of Highway Flood Records Held by LCC

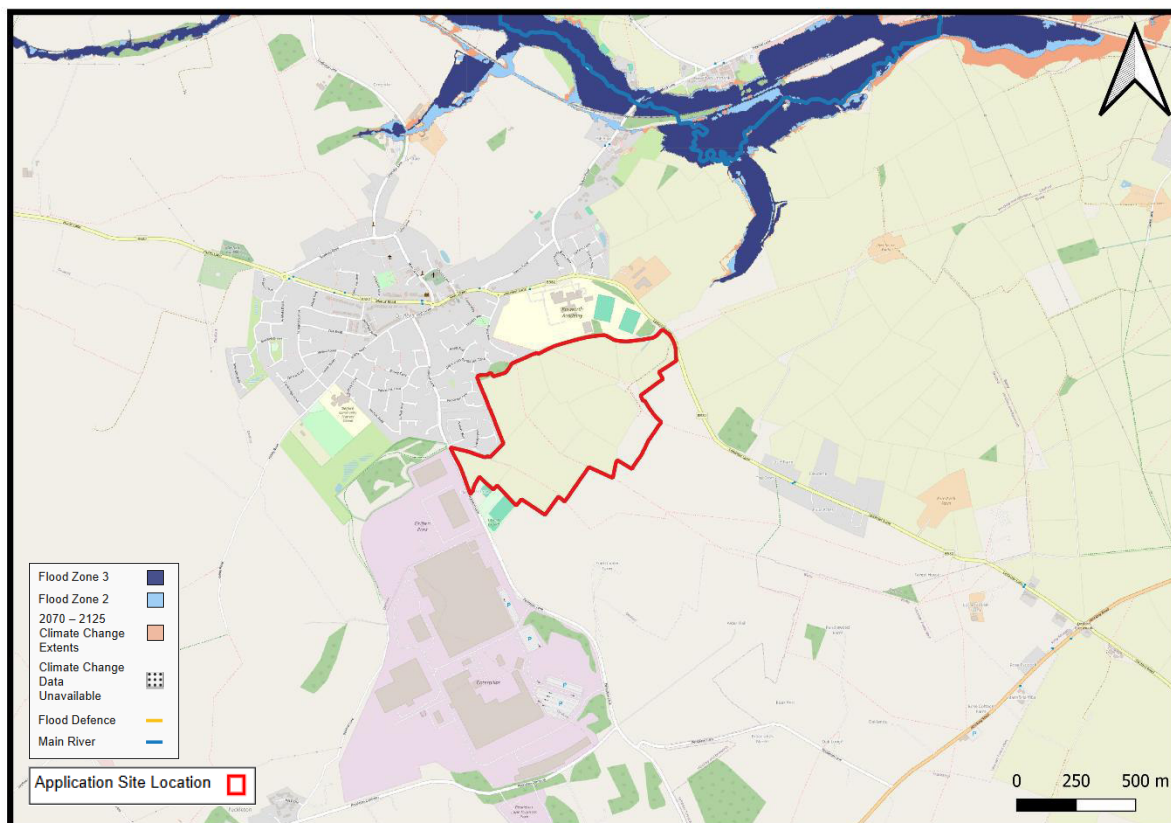
Tidal Flooding

- 3.8 Inundation of low-lying coastal areas by the sea may be caused by seasonal high tides, storm surges and storm driven wave action. Tidal flooding is most commonly a result of a combination of two or more of these mechanisms, which can result in the overtopping or breaching of sea defences. River systems may also be subject to tidal influences.
- 3.9 There are no watercourses/waterbodies in the vicinity of the site that pose a tidal risk to the site. The risk of tidal flooding is therefore negligible.

Fluvial Flooding

- 3.10 Flooding from watercourses occurs when flows exceed the capacity of the channel, or where a restrictive structure is encountered, which leads to water overtopping the banks into the floodplain.

- 3.11 The site is located within Flood Zone 1 as shown on **Figure 3.3**. This is the area shown to be at low risk of river flooding with a less than 0.1% AEP of flooding occurring. The nearest areas affected by Flood Zones 2 and 3 are found approximately 265m to the northeast and are associated with the Rothley Brook (**Figure 3.3**).



(Source: OpenStreetMap/EA)

Figure 3.3 Environment Agency Flood Map for Planning

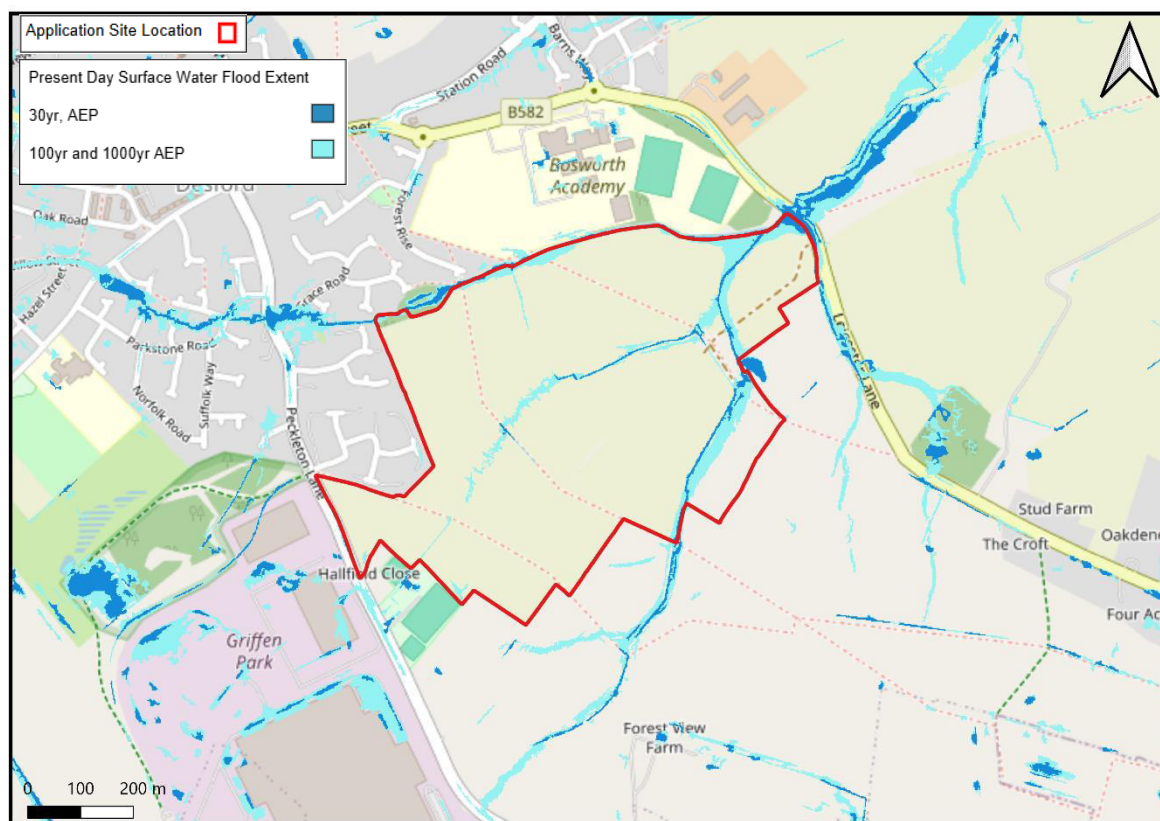
- 3.12 Fluvial flood risk for the proposed development is considered to be low.

Pluvial Flooding

- 3.13 Pluvial flooding can occur during prolonged or intense storm events when the infiltration potential of soils, or the capacity of drainage infrastructure is overwhelmed leading to the accumulation of surface water and the generation of overland flow routes.
- 3.14 Risk of flooding from surface water mapping has been prepared⁸, this shows the potential flooding which could occur when rainwater does not drain away through the normal drainage systems or soak into the ground but lies on or flows over the ground instead.

⁸ <https://flood-warning-information.service.gov.uk/long-term-flood-risk/map>

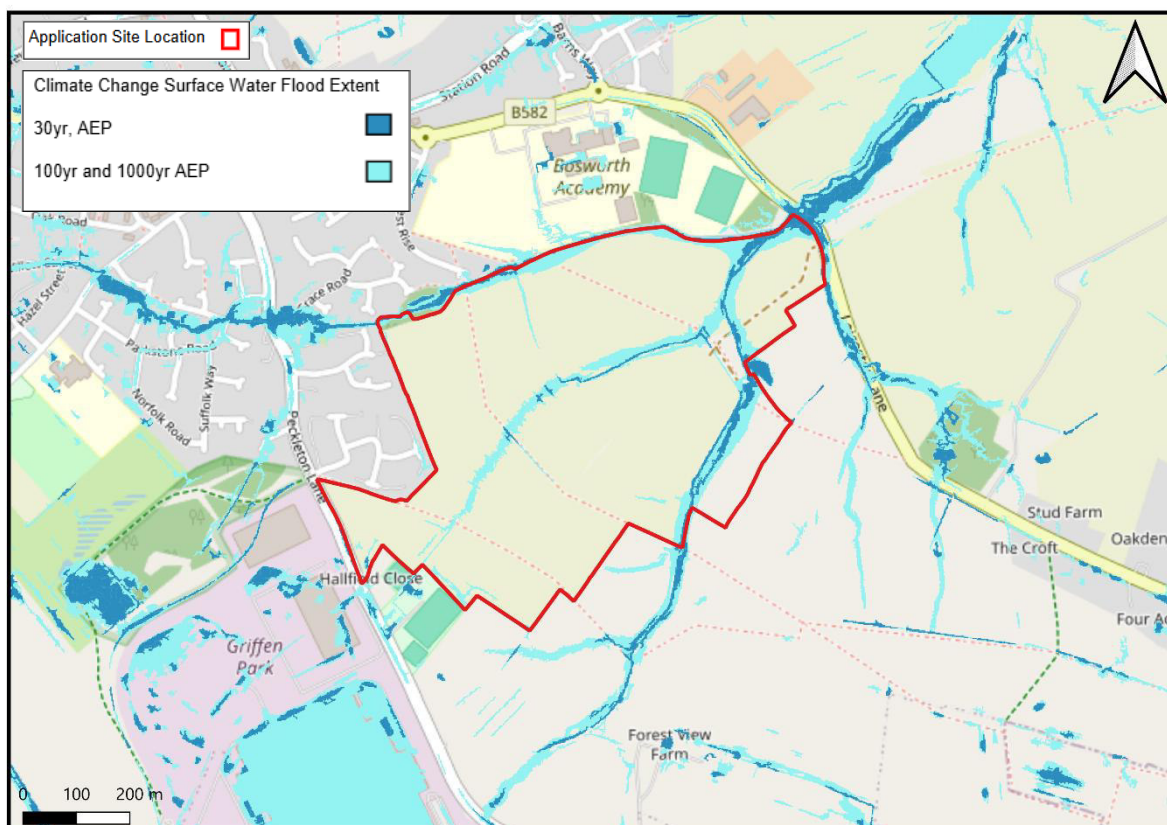
- 3.15 The Present Day Surface Water (Pluvial) Flood map provided by the Environment Agency (**Figure 3.4**) indicates that the majority of site is at low risk of pluvial flooding. However, mapping identifies four medium-high risk surface water flow routes that flow either through site or along site boundaries to the northeast where they converge to form a larger flow route before flowing towards the Rothley Brook. The flow routes are largely associated with existing ditches and topographical depressions that run through the site and along the boundaries. All flow paths that cross site are deemed to be generated by the wider catchment to the south and west.



(Source: OpenStreetMap/EA)

Figure 3.4 Environment Agency Present Day Surface Water Flood Risk Extent

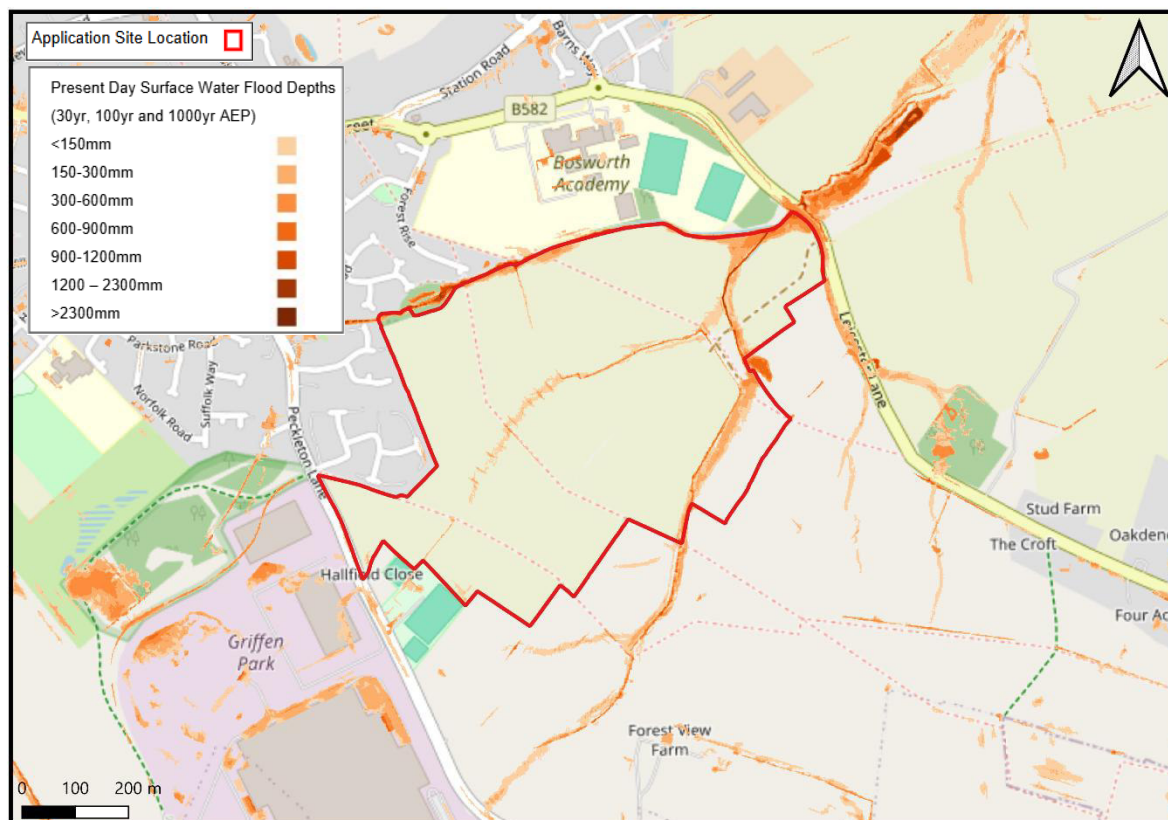
- 3.16 The EA Surface Water Flood mapping was updated in June 2026 to account for the impacts of climate change on surface water flood risk. On review of this updated mapping (**Figure 3.5**), there is an overall increase in the mapped extents of flood risk across site however, the overall site remains at low risk from surface water flooding. Following the impact of climate change, the four key flow routes are maintained however, they now extend further into site forming wider flow paths with some areas at an elevated risk from the present day mapping. The flow path that moves along the eastern boundary and converges at the northern site corner has migrated from what was largely a low – medium risk flow route to a predominantly high risk path.



(Source: OpenStreetMap/EA)

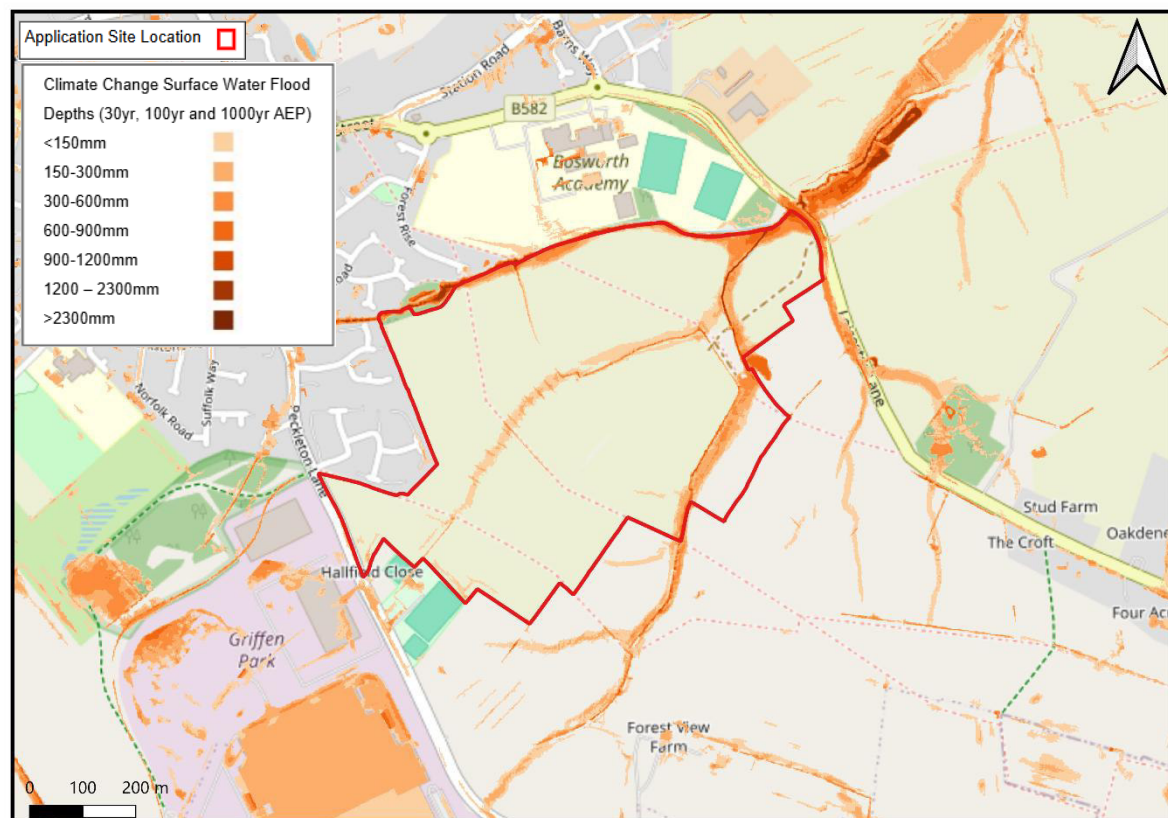
Figure 3.5 Environment Agency Climate Change Surface Water Flood Risk Extent

- 3.17 As discussed the flow routes are largely associated with existing ditches that run through the site and along the boundaries. On review of the present day depth mapping seen in **Figure 3.6** the majority of surface water flooding is noted to be confined within the banks of the ditch network with some localised areas where flooding is found outside of the ditch extents and these are shown to predominantly be a maximum of 0.3m deep. These depths are deemed shallow and not a risk as such.
- 3.18 Maximum depths of flooding seen in the ditch that flows through the centre of the site are noted to be 0.6m. The central ditch associated with this flow path is circa 0.8m deep and thus it can be concluded that flows of this depth stay contained within the ditch banks. The four flow paths discussed, converge in the northern corner of site and in this location depths of up to 0.6m can be seen outside of bank along the northern boundary before breaching onto Leicester Lane.
- 3.19 The pond located to the east of site, along with the ditch that flows through the southeastern portion of site are also noted to have maximum depths of 0.6m. The ditch associated with this flow route is identified on the topographical survey to be circa 0.9 m deep and therefore it can be concluded surface water flows will be contained within the ditch banks.
- 3.20 The ditch along the northern boundary line and the ditch running through the northeast of the site both have maximum flood depths of 1.2m. The topographic survey indicates that these ditches range between 1.25m and 1.4m deep and thus surface water flows are again contained within the banks.



(Source: OpenStreetMap/EA)

Figure 3.6 Environment Agency Present Day Surface Water Flood Risk Extents



(Source: OpenStreetMap/EA)

Figure 3.7 Environment Agency Present Day Surface Water Flood Risk Depths

- 3.21 The depth mapping for the climate change scenarios can be seen in **Figure 3.7**. This mapping shows an increase in flood extents of depths up to 0.3m through the centre of site and greater extents reaching depths between 0.6-0.9m associated with the flow paths located on the northern and eastern boundary. The overall surface water flood risk however, is largely aligned with the present day risk.
- 3.22 The pluvial maps do not fully represent any underground drainage systems and therefore any flooding entering the site from existing roads is likely to be intercepted by road gullies and discharged into the local drainage network.
- 3.23 Pluvial flood risk for the majority of the proposed development is low with several medium-high risk surface water flow routes flowing through site. These flow routes have been assessed in more detail through detailed hydraulic modelling, the details of which can be found within the Hydraulic Modelling Report.

Groundwater Flooding

- 3.24 Groundwater flooding occurs when the water table rises above ground elevations. It is most likely to happen in low lying areas underlain by permeable geology. This may be regional scale chalk or sandstone aquifers, or localised deposits of sands and gravels underlain by less permeable strata such as that in a river valley.
- 3.25 As aforementioned, geological data held by the BGS shows that shows that the bedrock geology underlying the majority of the site is Edwalton Member - Mudstone. The northeast is shown to be underlain by both Cotgrave Sandstone Member – Sandstone and Gunthorpe Member - Mudstone. There is also a band of Edwalton Member – Dolomitic Siltstone that underlays a small area of the west of the site. Superficial deposits of Glaciofluvial deposits, Mid-Pleistocene – Sand and Gravel as well as Oadby, Till Member (Trias-Rich) – Diamicton underlay the south of the site. Superficial deposits of Alluvium – Clay, silt, sand and gravel are shown to underlay the northeastern corner of the site.
- 3.26 The majority of these rock types have low levels of permeability and porosity and the SFRA does not include the site nor Desford to be an area susceptible to groundwater flooding.
- 3.27 Therefore, the risk of flooding from groundwater at this stage is considered to be low.

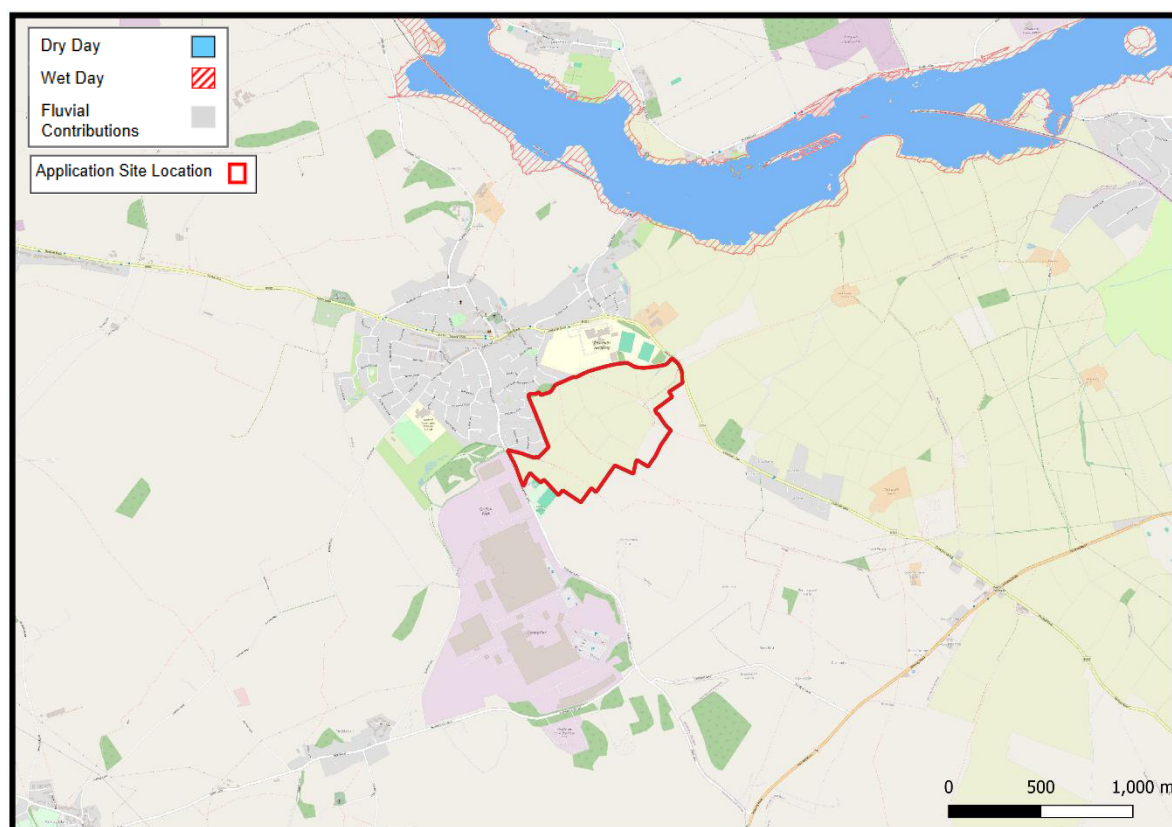
Sewer Flooding

- 3.28 Sewer flooding can occur when the capacity of the infrastructure is exceeded by excessive flows, or as a result of a reduction in capacity due to collapse or blockage, or if the downstream system becomes surcharged. This can lead to the sewers flooding onto the surrounding ground via manholes and gullies, which can generate overland flows.
- 3.29 Severn Trent Water asset plans show that there are a number of both foul and surface water sewers surrounding the site however, owing to their location any exceedance would be contained within the existing highway or ditch network and conveyed away from site.
- 3.30 The SFRA lists 12 counts of sewer flooding within the Postcode of LE9 9, however notes no incidents of sewer flooding on or in the vicinity of the site.
- 3.31 The risk of sewer flooding to the site is therefore considered to be low.

Flooding from Artificial Sources

Reservoirs

- 3.32 Flooding can occur from large waterbodies or reservoirs if they are impounded above the surrounding ground levels or are used to retain water in times of flood. Although unlikely, reservoirs and large waterbodies could overtop or breach leading to rapid inundation of the downstream floodplain.
- 3.33 To help identify this risk, reservoir failure flood risk mapping has been prepared⁹, this shows the largest area that might be flooded if a reservoir were to fail and release the water it holds. The map displays a worst-case scenario and is only intended as a guide. **Figure 3.8** displays the reservoir flood risk to the site. This identifies the site isn't at risk from this source, with the closest area affected by reservoir flooding being approximately 600m to the northeast of the site.



(Source: OpenStreetMap/EA)

Figure 3.8 Reservoir Flooding

- 3.34 The development is considered to be at low risk of flooding from reservoirs.

Canals

- 3.35 The development is considered to be at negligible risk of flooding from canals.

⁹ <https://flood-warning-information.service.gov.uk/long-term-flood-risk/map>

4 NPPF Requirements

Sequential Test

- 4.1 The Sequential Test is a simple decision-making tool designed to ensure that areas at little or no risk of flooding are developed in preference to areas at higher risk. Local Planning Authorities (LPAs) should make the most appropriate use of land to minimise flood risk, substituting land uses so that the most vulnerable development is in the lowest risk areas.
- 4.2 Details on requirements for the application of a Sequential Test are included as part of the Planning Practice Guidance (PPG) that supports the NPPF.
- 4.3 A Sequential Test is required for the development proposal if both of the following apply:
 - a) The development is in Flood Zone 2 or 3
 - b) A Sequential Test hasn't already been carried out for a development of the type proposed
- 4.4 The Sequential Test also requires demonstration of the 'reasonable availability' of sites and those sites in areas with a lower probability of flooding 'would be appropriate to the type of development or land use proposed', which would clearly include the suitability of land with a lower flood risk in terms of planning balance as well as availability.
- 4.5 A Sequential Test is not required if one has already been undertaken for a development of the type proposed including for sites allocated for development in the LPAs Local Plan.
- 4.6 A Sequential Test is also not required if either of the following apply:
 - a) The proposal is a minor development
 - b) The development includes a change of use unless the development is a caravan, camping chalet, mobile home or park home site
 - c) The development site is in Flood Zone 1, unless there are flooding issues in the area of the proposal as identified within the relevant LPAs SFRA
- 4.7 Following the update to the PPG (17/09/25), a Sequential Test is also not required "where a site-specific flood risk assessment demonstrates clearly that the proposed layout, design and mitigation measures would ensure occupiers and users remain safe from current and future surface water flood risk for the lifetime of the development, without increasing the risk elsewhere."
- 4.8 Based on the EA Flood Map for Planning, the entirety of the site is located in Flood Zone 1, and, with the exception of surface water flooding, the assessment of flood risk identifies the site to be at low risk from all sources of flooding.
- 4.9 It should also be noted that, where possible, a sequential approach to the proposed development has been taken, as per paragraph 175 of the NPPF and all existing ditches / surface water conveyance features have been safeguarded and retained through the development of the masterplan. Furthermore, as per guidance within the PPG, mitigation measures (set out below and within the Hydraulic Modelling Report) have been proposed where required, to ensure all proposed development is free from surface water risk whilst simultaneously ensuring there are no off-site increases in risk (i.e., a policy compliant scheme). The appended Hydraulic Modelling Report confirms that all surface water flood

risk identified within this assessment can be mitigated and therefore, meeting the requirements of the Sequential Test.

Exception Test

- 4.10 The proposed development is considered to be 'More Vulnerable' in terms of its land use type flood risk vulnerability as shown in Annex 3 of the PPG¹⁰.
- 4.11 **Table 4.1** shows the matrix indicating the flood risk vulnerability types of development that are acceptable in different flood zones based upon the Flood Map for Planning and where an Exception Test is not required as shown in Table 2 of the PPG¹¹. The tick marks in the table show where the principle of a development proposal is acceptable. The cross marks indicate where development would not be permitted.

Flood Zones/ Vulnerability	Essential Infrastructure	Highly Vulnerable	More Vulnerable	Less Vulnerable	Water Compatible
Flood Zone 1	✓	✓	✓	✓	✓
Flood Zone 2	✓	Exception Test Required	✓	✓	✓
Flood Zone 3a~	Exception Test Required~	✗	Exception Test required	✓	✓
Flood Zone 3b*	Exception Test Required*	✗	✗	✗	✓*

(Flood Risk Table 2)

Table 4.1 Flood Risk Vulnerability and Flood Zone Compatibility

“~” In Flood Zone 3a essential infrastructure should be designed and constructed to remain operational and safe in times of flood.

“*” In Flood Zone 3b (functional floodplain) essential infrastructure that has passed the Exception Test, and water-compatible uses, should be designed and constructed to:

- remain operational and safe for users in times of flood;
- result in no net loss of floodplain storage;
- not impede water flows and not increase flood risk elsewhere

- 4.12 The Exception Test is a method to demonstrate and help ensure that flood risk to people and property will be managed satisfactorily, while allowing necessary development to go ahead in the situations where suitable sites at lower risk of flooding are not available.
- 4.13 The Exception Test requires two additional elements to be satisfied (as set out in paragraph 178 of the National Planning Policy Framework) before allowing development to be allocated or permitted in situations where suitable sites at lower risk of flooding are not available following application of the Sequential Test.
- 4.14 There are two parts to the Exception Test. It should be demonstrated that:

¹⁰ <https://www.gov.uk/guidance/national-planning-policy-framework/annex-3-flood-risk-vulnerability-classification>

¹¹ <https://www.gov.uk/guidance/flood-risk-and-coastal-change#para77>

- a) development that has to be in a flood risk area will provide wider sustainability benefits to the community that outweigh flood risk; and
 - b) 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.
- 4.15 The development proposals are classed as 'More Vulnerable' within Flood Zone 1 and therefore an exception test is not required.
- 4.16 All proposed residential dwellings are to be located within the Flood Zone 1 areas of the site. This is the area in which all forms of development are considered acceptable. The Drainage Strategy details included in Section 5 will detail how development drainage will be managed to ensure flood risk is not increased elsewhere.
- 4.17 It is recommended that Finished Floor Levels (FFLs) are set at minimum 300mm above the finished external ground level to provide a design for exceedance approach and ensure appropriate mitigation measures are taken in the area of development.

Access & Egress

- 4.18 The proposed development has two points of access, 1 from Leicester Lane to the east and 1 from Peckleton Lane to the west. In a surface water flood event, safe and dry pedestrian access/egress to the site is available west on Peckleton Lane, which is located in Flood Zone 1 and identified to be at low risk of surface water flooding. From Peckleton Lane site uses can move north or south from site.

Flood Mitigation Measures

- 4.19 A number of mitigation measures have been proposed on site in order to mitigate existing flood risk on site in order to reduce the risk posed to the proposed development site. The proposed mitigation measures include a series of ditches and culverted sections to ensure flow routes can be diverted away from the proposed developable area to ensure these areas are free from surface water risk whilst ensuring there is no increase in flood risk off site.
- 4.20 The modelling, when mitigation measures are included, has illustrated that the scheme will ensure the development can come forward safely with all development located outside of the area of pluvial flood risk whilst simultaneously ensuring there are no off-site increases in pluvial flood risk. Refer to Rappor's Hydraulic Modelling Report which is included in **Appendix D**.
- 4.21 In addition to the modelled mitigation measures, it is recommended that Finished Floor Levels are set to 300 mm above the Post Development design event flood levels (**Figure 4.1**) or to 150 mm above finished ground levels, whichever is higher to adopt a design for exceedance approach.

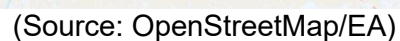


Figure 4.4 Post-Development Design Event – Max Flood Levels (mAOD)

5 Proposed Drainage Strategy

Introduction

- 5.1 Consideration of flood issues is not confined to the floodplain. This is recognised in the NPPF and associated guidance. The alteration of natural surface water flow patterns through developments can lead to problems elsewhere in a catchment, particularly flooding downstream; and replacing permeable vegetated areas with low permeability roofs, roads and other paved areas will increase the speed, volume and peak flow of surface water runoff.
- 5.2 A surface water management strategy for the development is proposed to manage and reduce the flood risk posed by surface water runoff from the site. The surface water drainage arrangements for any development site should be such that the volume and peak flow rates of surface water leaving a developed site are no greater than the rates prior to the proposed development unless specific off-site arrangements are made and result in the same net effect.
- 5.3 An assessment of the surface water runoff rates was undertaken to determine the surface water options and attenuation requirements for the site and is discussed below.

Existing Drainage

- 5.4 The current Site is identified to be largely greenfield and is considered to runoff at the existing uncontrolled greenfield runoff rates overland to the existing ditch network and watercourse.
- 5.5 The existing greenfield runoff rates have been calculated using MicroDrainage and the Flood Estimation Handbook (FEH) method. The resulting calculations are included within **Appendix E**. The runoff rates were calculated as following in Table 5.1:

Return Period (Yrs)	Runoff Rate (l/s/ha)
QMED	6.2 l/s/ha
QBAR	6.9 l/s/ha

Table 5.1 Greenfield Runoff Rate

Surface Water Management

- 5.6 Sustainable drainage system measures (SuDS) should be used to control the surface water runoff from the proposed development site, thereby managing the flood risk to the Site and surrounding areas from surface water runoff. These measures will also improve the quality of water discharged from the Site.



- 5.7 Based on the latest National Standards for SuDS guidance¹², the SuDS hierarchy demands that surface water run off should be disposed of as high up the following list as practically possible:
- a) Collected for non-potable use
 - b) Into the ground (infiltration) and re-use, or then;
 - c) To a surface water body, or then;
 - d) To a surface water sewer, highway drain or another drainage system, or then;
 - e) To a combined sewer.

Water Reuse

- 5.8 The proposed development provides an opportunity to reuse surface water throughout the provision of rainwater harvesting products.
- 5.9 Rainwater butts should be provided at suitable locations where feasible, to reduce the volume of water entering the underground drainage system and the demand on the water supply network.
- 5.10 Harvested rainwater may be used for garden watering and other applications where a pressurise hose connection is not required. Stored rainwater also provides a source of clean water when hosepipe bans are in effect.

Infiltration Testing

- 5.11 Based on the geology shown to be underlying the site in the BGS online mapping, it is expected that infiltration would not provide viable means of surface water discharge.
- 5.12 As such, the surface water drainage strategy has been designed to account for a 'worst-case' scenario of infiltration not being deemed suitable.
- 5.13 Infiltration testing will be carried out in accordance with BRE 365 at the detailed design stage to inform the final drainage design in accordance with the SuDS hierarchy.
- 5.14 In the event infiltration was found feasible at the design stage, it should be noted that attenuation requirements would reduce from the current design and therefore the design proposed within this report and thus the outline masterplan is conservative.

Proposed Drainage

- 5.15 The developable area associated with the proposed development is approximately 17.86ha, which equates to an estimated impermeable area of 11.62ha and this is based on 55% of the developable area becoming impermeable and an additional 10% Urban Creep allowance. This would increase the amount of runoff generated and could increase flood risk elsewhere unless managed to LLFA drainage requirements.
- 5.16 The proposed drainage strategy consists of seven catchments and eleven attenuation basins located across site focused along the northern and southern boundaries and the

¹²<https://www.gov.uk/government/publications/national-standards-for-sustainable-drainage-systems/national-standards-for-sustainable-drainage-systems-suds>

central site corridor. The concentration of attenuation features along the northern boundary forms a blue-green corridor.

- 5.17 The proposed discharge rates from each parcel will be restricted to the equivalent QBAR greenfield runoff rate of 6.9 l/s/ha based on the associated developable area. Therefore, for the entire developable area of 17.86ha, the combined discharge rate proposed across the site is 123 l/s.
- 5.18 The proposed attenuation basins have been designed to accommodate up to and including a 1 in 100 year event plus 40% climate change allowance, which will reduce risk of flooding downstream. All proposed basins on site will be designed to consider a 300mm freeboard and 3m maintenance and access easement.
- 5.19 Details of the proposed catchments, runoff rates and associated storage requirements can be found in **Table 5.2**.

Catchment	Developable Area (ha)	Impermeable Area (ha)	Runoff Rate (l/s)	Storage Required (m ³)	Storage Provided (m ³)
SW	3.6	2.34	24.9	1,781	1,840
NW	2.97	1.93	20.5	1,482	1,598
C	1.7	1.1	11.6	848	867
SE	2.36	1.54	16.2	1,176	1,179
CE	2.46	1.6	16.9	1,219	1,868
NE	2.53	1.65	17.5	1,254	1,866
N	2.24	1.46	15.4	1,117	1,346
Total	17.86	11.62	123	8,877	10,564

Table 5.2 Catchment Attenuation

- 5.20 Additional SuDS on site such as permeable paving, swales, bioretention areas can be utilised on site and act as source control features providing at source water quality treatment as well as additional biodiversity and amenity benefits. The presence of multiple SuDS across the site will promote a SuDS management train and blue/green corridor.
- 5.21 In order to ensure amenity value is offered through the implementation of SuDS features, the attenuation basins have been designed to a range of depths, side slopes and shapes to encourage integration into the public open space.
- 5.22 To demonstrate the necessary storage volumes can be accommodated on the site an illustrative drainage layout has been prepared and has been included within **Appendix F**. Supporting drainage calculations are included in **Appendix E**.
- 5.23 The proposed drainage strategy is purely indicative at this stage as aligned with the requirements of an outline planning application. The final layout and design of the surface water drainage network including detailed sewer runs, refined surface water storage

volumes/areas and source control SuDS locations will be determined at the detailed design stage.

Exceedance Events

- 5.24 The attenuation basins will be designed with a capacity up to a 1 in 100-year (plus 40% climate change) event, with a +300mm freeboard allowance, based on the restricted discharge rate. This provides a betterment (reduction) in runoff when compared to existing undeveloped conditions, where runoff is uncontrolled across all return periods.
- 5.25 A storm event in excess of this design standard would be extreme and would cause the attenuation basins to overtop (with no sudden deluge) and would then shed overland following the topography of the site, as per existing conditions.
- 5.26 Finished floor levels of buildings will be set above external levels, which will mitigate the residual risk of overtopping.

Water Quality

- 5.27 The SuDS Manual (CIRIA C753) states that the design of surface water drainage should consider minimising contaminants in surface water runoff discharged from the site. The level of treatment required depends on the proposed land use, according to the pollution hazard indices. For this site contaminant risks come from the residential roofing and parking.
- 5.28 To ensure that adequate treatment is provided the SuDS mitigation indices for the development must be equal to, or exceed, the pollution hazard indices. Surface water runoff from residential roofs is considered to present a **very low** hazard to water quality, whilst general residential low traffic roads presents a **low** hazard.
- 5.29 To ensure a suitable mitigation index is achieved the affected stormwater system has been assessed. **Table 5.3** indicates satisfactory water quality is achieved as all runoff will pass through an attenuation basin.
- 5.30 It is also recommended, as good practice, that gullies and chambers have suitable silt traps/catchpits to reduce sediments entering the system.

		Pollution Hazard Level	Total suspended solids	Metals	Hydro-carbons
Land Use	Individual property driveways, residential car parks, low traffic roads	Low	0.5	0.4	0.4
Total			0.5	0.4	0.4
SuDS Component	Attenuation Basin		0.5	0.5	0.6
Total			0.5	0.5	0.6
Total SuDS Mitigation Indices ≥ Pollution Hazard Indices			Yes	Yes	Yes

(As per C753 The SuDS Manual)

Table 5.3 Water Quality Indices

Maintenance Regime

- 5.31 Maintenance of SuDS features are essential to ensure that the surface water drainage system operates effectively and that flooding of the site and surrounding areas is prevented.
- 5.32 The responsibility of maintaining the private surface water and foul water drainage components would lie with the landowner of the site, who may delegate responsibility to an appointed external private management company.
- 5.33 A full maintenance regime should be carried out to ensure that the drainage system remains operational over its lifetime. **Table 5.4** summarises an initial maintenance plan for the drainage components proposed within the development. The SuDS Manual (CIRIA C753) and manufacturer's guidelines should be referred to for further maintenance information.

Drainage Component	Required Action	Typical Frequency
Pipework, manholes, flow control chambers, catch pits and silt traps	Stabilise adjacent areas	As required
	Remove weeds	As required
	Clear any poor performing structures.	As required
	Inspect all structures for poor operation	Three monthly, 48 hours after large storms in first six months
	Monitor inspection chambers. Inspect silt accumulation rates and determine silt clearance frequencies	Annually
Attenuation Basin	Remove litter and debris	Monthly
	Cut grass – for spillways and access routes	Half yearly (spring – before nesting season, and autumn)
	Manage other vegetation and remove nuisance plants	Monthly (at start, then as required)
	Inspect inlets, outlets and overflows for blockages and clear is required	Monthly
	Inspect banksides, structures, pipework etc for evidence of physical damage	Monthly
	Inspect inlets and facility surface for silt accumulation. Establish appropriate silt removal frequencies	Monthly (for the first year), then annually or as required
	Check penstocks and other mechanical devices	Annually
	Tidy all dead growth before start of growing season	Annually
	Remove sediment from inlets, outlet and forebay	Annually (or as required)
	Manage wetland plants in outlet pool – where provided	Annually (as set out in Chapter 23 if Ciria SuDS Guidance)
	Reseed areas of poor vegetation growth	As required
	Prune and trim and trees and remove cuttings	Every 2 years, or as required

(As per C753 The SuDS Manual)

Table 5.4 Initial Operation and Maintenance Plan



Foul Water Management

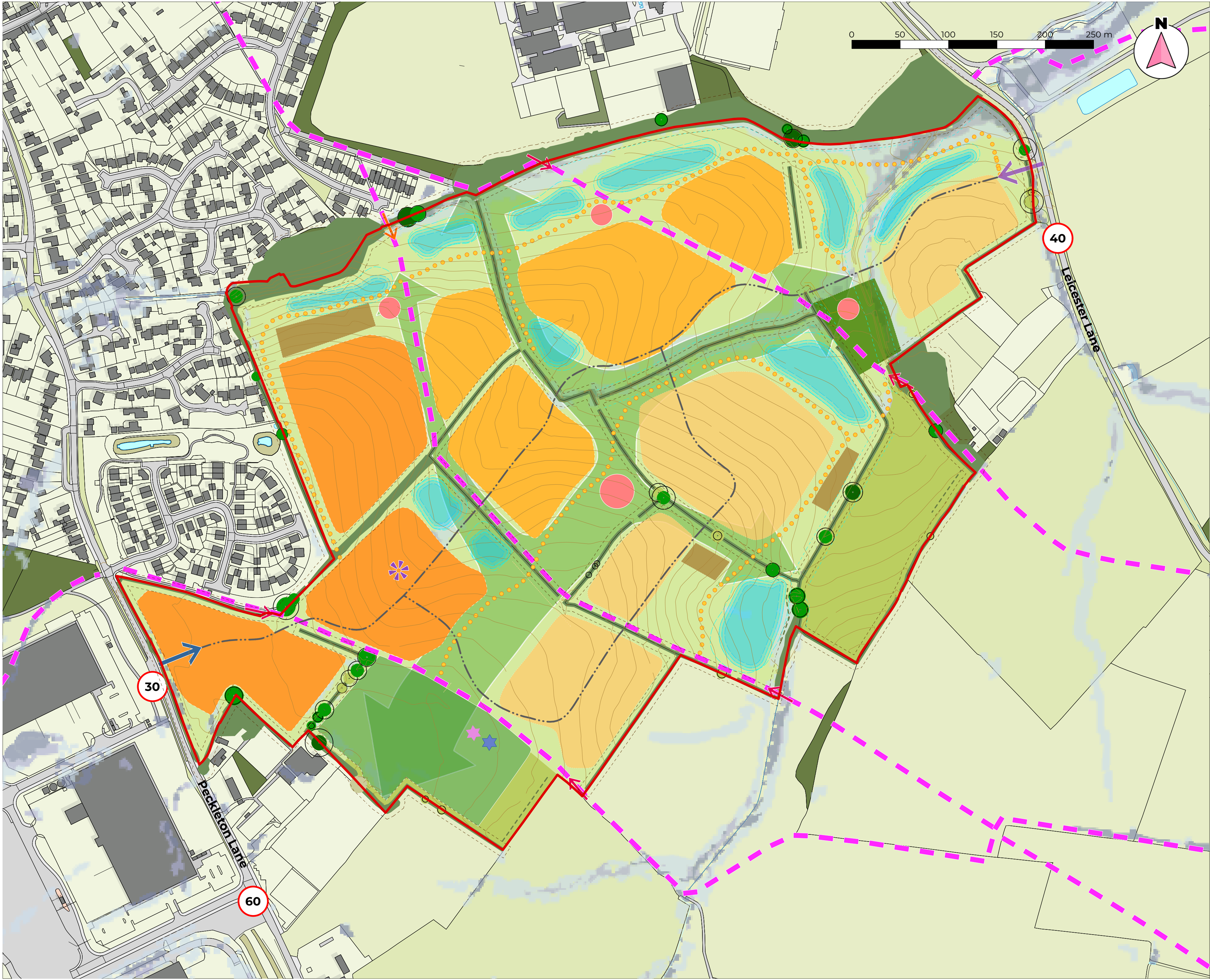
- 5.34 Foul water from the proposed development shall be collected through a traditional gravity drainage system and directed to a Type 3 Pumping Station where flows will then be pumped west towards the Severn Trent Water (STW) foul network.

6 Summary and Conclusions

- 6.1 This assessment has considered the risk of all types of flooding to the site including tidal, fluvial, surface, groundwater, sewer and artificial sources and provides mitigation measures to ensure the flood risk to the site is minimised and that flood risk off-site is not increased.
- 6.2 The site is located within Flood Zone 1 as shown on the Environment Agency Flood Map for Planning and is at very low risk of sewer and artificial flooding sources, and at low risk of tidal, fluvial and groundwater flooding, however, is at increased risk of surface water flooding.
- 6.3 The mitigation measures stated above will ensure the development is safe (effectively managing on site pluvial risk) whilst also simultaneously ensuring there is no off-site increase in pluvial risk as a result of the proposed development (i.e., a policy compliant scheme). Therefore, as per the update to the PPG, a Sequential Test is not deemed to be necessary (to be confirmed by the planning consultant).
- 6.4 Given the Flood Zone 1 location, the Exception Test also does not need to be applied.
- 6.5 Surface water runoff from the proposed development is to be discharged to the existing watercourse at equivalent QBAR greenfield runoff rates. Attenuation is to be provided within attenuation basins which have been sized to accommodate the 100-year plus 40% climate change event. The proposed attenuation basins will provide sufficient water quality treatment prior to flows entering the existing ditch network.
- 6.6 Safe pedestrian access/egress to the site is available west on the Peckleton Lane, which is located in Flood Zone 1 and identified to be at low risk of surface water flooding.
- 6.7 In compliance with the requirements of the National Planning Policy Framework, and subject to the mitigation measures proposed, the development will not cause or be subject to significant flood risk issues.



Appendix A – Proposed Development Drawings



Do not scale from this drawing.
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PRE-APPLICATION

- Site boundary (49.197ha)
- - - Public Rights of Way (PROW)
- Existing pedestrian access
- Proposed vehicular access point (including pedestrian and cycle access)
- Proposed vehicular access point
- Proposed improvements to existing
- - - Proposed link road through development
- Surface water (High-Low risk)
- Indicative areas for attenuation
- - - Indicative Skylark mitigation
- - - 5m offset from existing hedgerow
- Indicative location for Play
- Recreational routes
- Lower landscape sensitivity area (5.3ha @ 40dph = 212 dwellings)
- Medium landscape sensitivity area (5.47ha @ 35dph = 191 dwellings)
- Higher landscape sensitivity area (5.67ha @ 30dph = 170 dwellings)
- Area identified for sport pitches (2ha)
- ★ Indicative location for Skate Park
- ★ Indicative location for changing facilities and parking
- ✱ Local centre inc. potential community uses (e.g. Potential GP)
- Green corridors
- Natural and semi natural green space (2.88 ha)
- Amenity green spaces
- Indicative location for parks and gardens (0.51ha)
- Tree survey:
 - Category A canopy (&RPA)
 - Category B canopy (&RPA)
 - Category C canopy (&RPA)
 - Category U canopy (&RPA)

Rev.	Date	Description
Land south-east of DESFORD		
Illustrative Framework Plan		
Job ref: 785	Drawing number: SK02	Revision:
Scale: 1:2500 @ A2		Date: June 2026

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Appendix B – Topographical Survey



Appendix C – Sewer Records



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- | | | |
|--|---------------------|---------------------------------------|
| Public Four Gravity/Lateral Drain | Highway Drain | Manhole Foil |
| Public Combined Gravity/Lateral Drain | Overflow Pipe | Manhole Surface |
| Public Surface Water Gravity/Lateral Drain | Disposal Pipe | Abandoned Pipe |
| Pressure Foil | Covert Water Course | Chamber |
| Pressure Combined | Pumping Station | Section 151 sewers are shown in green |
| Pressure Surface Water | Filling | Private sewers are shown in magenta |

infadmin@rapport.co.uk

Desford South





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Date: 18/03/26

Scale: 1:1250

Map Centre: 448577,303368

Data updated: 14/02/26

Our Ref: 2063068 - 1

Wastewater Plan A2
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Public Foul Gravity/Lateral Drain		Highway Drain		Manhole Foul	
Public Combined Gravity/Lateral Drain		Overflow Pipe		Manhole Surface	
Public Surface Water Gravity/Lateral Drain		Disposal Pipe		Abandoned Pipe	
Pressure Foul		Culverted Water Course		Chamber	
Pressure Combined		Pumping Station		Section 104 sewers are shown in green	
Pressure Surface Water		Fitting		Private sewers are shown in magenta	

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