	St Albans City and District Council Level 2 Strategic Flood Risk Assessment Detailed Site Summary Table
Site details	
Site Code	**UC27**
Address	Berkeley House, Barnet Road. London Colney
Area	0.15ha
Current land use	Commercial
Proposed land use	Residential
Flood Risk Vulnerability	More Vulnerable
Sources of flood risk	
Location of the site within the catchment	The site is located in London Colney, a village to the south of St Albans. The village is located to the north of the M25 motorway close to junction 22. The site is situated in the southern area of the village. It is bordered to the north by Barnet Road, to the west by Willowside, and to the south and east by residential houses. The site is located approximately 0.12 km southeast of the River Colne. The river is within the Upper Colne and Ellen Brook catchment, which covers an area of 95.46 km². This catchment is a mixture of rural and urban areas, including Harpenden, western Hatfield, eastern St Albans, and London Colney. It forms part of the broader Colne Management Catchment, which spans 1,040 km².
Topography	Environment Agency 1m resolution LIDAR across the site shows that topography varies. The site is in a densely developed urban area and LiDAR data is unlikely to be representative of the actual site topography, this may have an impact on some of the flood risk datasets used in the assessment. The LIDAR shows that land is fairly level across the whole site in general between 67.6 to 67.6mAOD with a slight down slope at the southern end of the site to 66.3mAOD.
Existing drainage features	There are no existing drainage features within the site that are visible on topographic mapping or aerial imagery. The site is approximately 0.12km southeast of the River Colne. Additionally, the Sailsbury Hall Brook a small tributary of the River Colne is located 60.8m to the south of the site.
Fluvial	**The proportion of site at risk FMFP:** FZ3b – 0% FZ3a – 0% FZ2 – 20% FZ1 – 80%

	The Flood Zone values quoted show the percentage of the site at flood risk from that particular Flood Zone/event, including the percentage of the site at flood risk at a higher risk zone. This is because the values quoted are the area covered by each Flood Zone/extent within the site boundary. For example: Flood Zone 2 includes Flood Zone 3. Flood Zone 1 is the remaining area outside Flood Zone 2 (FZ2+ FZ1 = 100%). **Available data:** The Environment Agency's Flood Zone mapping has been used in this assessment, alongside the London Colney model (2018) 1D-2D hydraulic model as well as the Upper Colne (2010) model received for this Level 2 SFRA. **Flood characteristics:** The southwestern area of the site is within the Environment Agency's Flood Zone 2 (0.1%AEP event), which amounts to 20% of the site. However, this area is not shown to be within detailed London Colney (2018) 0.1% AEP model extent, so implies that the Flood Zone 2 was created from the older Upper Colne (2010) model. The Reduction in Risk of Flooding from Rivers and Sea due to Defences covers a small portion of the site located within the Environment Agency's Flood Zone 2. This means some of the site benefits from defences however the remaining area within Flood Zone 2 does not benefit.
Surface Water	**Proportion of site at risk (RoFSW):** **3.3% AEP** – 0% Max depth – N/A Max velocity – N/A **1% AEP** – 0% Max depth – N/A Max velocity – N/A **0.1% AEP** – 0% Max depth – N/A Max velocity – N/A **Available data:** The Environment Agency's Risk of Flooding from Surface Water (RoFSW) map has been used within this assessment. **Description of surface water flow paths:** There is no surface water flooding within the site for either the 3.3%, 1% or 0.1% AEP events. Therefore, the site is a negligible risk of surface water flooding.
Reservoir	1% of the site is at risk from reservoir flooding; the southwestern corner of the site is at risk Dry Day reservoir flooding from Bowmans Green Lake (aka Willows Lakes). The lake is managed by Bowmans Leisure Limited.

Groundwater	The JBA Groundwater mapping shows that the majority of the site (84%) is at low risk of groundwater flooding, as groundwater is between 0.5 to 5m below ground level. The remaining 16% is not at risk from groundwater flooding.
Sewers	The site is located within a postcode area with 23 historic incidences of sewer flooding, according to the Thames Water Hydraulic Sewer Flood Risk Register.
Flood history	The Environment Agency's historic flood map indicates that the site has experienced flooding in the past, with the southwestern section being covered by the historic flood extent. This flooding event occurred in September 1992.
Flood risk management infrastructure	
Defences	The Environment Agency AIMS dataset shows that the site is not protected by any formal flood defences. However, the site is partially in the Environment Agency's Reduction in Risk of Flooding from Rivers and Sea due to Defences, likely due to the Salisbury Brook culvert located upstream of the site.
Residual risk	The site is at residual risk from the London Colney overtopping the banks due to the blockage of the Telford Bridge. The residual risk to the site posed from a culvert blockage and potential overtopping must be considered in a site-specific Flood Risk Assessment.
Emergency planning	
Flood warning	The site is located within the Environment Agency Flood Warning Area: 062FWF28Lcolney – the River Colne at London Colney (The River Colne at London Colney including Colney Street and Broad Colney), and within the Environment Agency's Flood Alert Area: 062WAF28UpColne – Upper River Colne and Radlett Brook.
Access and egress	Access and egress to the site is currently by Willowside. Vehicular access to Willowside is via Barnet Road. There is currently pedestrian access to the front of the building on Barnet Road. During the 3.3% and 1% AEP fluvial events there is safe access and egress to the site. However, during the 1% AEP fluvial event there is flooding on Barnet Road to the west of the site in addition to flooding along the southern part of Willowside. The flood depth along Barnet Road reaches a maximum between 0.25m to 0.50m and along the southern area of Willowside between 0.50 to 0.75m. The flows are primarily <0.25m/s with a small area Barnet Road reaching a maximum of between 0.70 to 1.13m/s. The flood hazard is 'Very low' to 'Danger for some' along Barnet Road to the west of the entrance to Willowside. Therefore, vehicular access is still possible. The flood hazard associated with the flooding on Willowside is 'Very low' to 'Danger for most'. However, as the entrance to

	the site is currently north of this area of flooding access and egress to the site is possible via Willowside. There is safe access and egress to the site during the 3.3% AEP and 1% surface water events, as there is no surface water present on the access route to the site. During the 0.1% AEP surface water event there is flooding along Barnet Road. The flood depths are predicted to be <0.15m with velocities up to 0.25 to 0.50m/s. The flood hazard is classified as 'Very low'. Therefore, pedestrian and vehicular access and egress to the site is possible.
Dry Islands	The site is not located on a dry island.
Climate change	
Implications for the site	**Management Catchment: Colne Management Catchment** Increased storm intensities due to climate change may increase the extent, depth, velocity, hazard, and frequency of both fluvial and surface water flooding **Fluvial:** The latest climate change allowances have also been applied to the London Colney (2018) model to indicate the impact on fluvial risk. The 1% AEP plus 35% climate allowance which represents the higher allowance for peak river flow for the 2080s epoch shows that Barnet Road to the west of the site is affected by fluvial flooding, with flood depths between 0.01-0.1m. During the 1% AEP plus 72% climate change allowance which represents the upper end flood depths range from 0.01 to 0.31m. So safe access and egress to the site via Barnet Road to the west may be affected. **Surface Water:** The latest climate change allowances have also been applied to the Risk of Flooding from Surface Water map to indicate the impact on pluvial flood risk. The 1% AEP plus 40% climate change corresponds to the 1% AEP upper end allowance for peak rainfall intensity for the 2070s epoch and is therefore the 'design event' scenario. In the 1% AEP plus 40% climate change event the flood extent is similar to that in the 0.1% AEP event. Therefore, the site remains unaffected by surface water flooding. The surface water flow path on Barnet Road reaches a maximum depth, velocity, and hazard of 0.14m, 1.33m/s and 'Very Low', therefore safe access and egress by vehicle is possible. 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.
Requirements for surface water drainage and integrated flood risk management	

Broad-scale assessment of potential SuDS	**Geology & Soils**
	• Geology at the site consists of:
	  ○ Bedrock - Bedrock geology of the site is Lewes Nodular Chalk Formation and Seaford Chalk Formation – chalk.
	  ○ Superficial – The superficial geology of the site is Kesgrave Catchment Subgroup – Sands and gravels. A type of sedimentary superficial deposit.
	• Soils at the site consist of:
	  ○ Freely draining slightly acid loamy soils.
	Sustainable Drainage Systems (SuDS)
	• Groundwater levels are indicated to be between 0.5 and 5m below ground level and there is a risk of flooding to subsurface assets and below ground development such as basements. Groundwater monitoring is recommended to determine the seasonal variability of groundwater levels, as this may affect the design of the surface water drainage system.
	• BGS data indicates that the underlying geology is chalk which is likely to be free draining. This should be confirmed through infiltration testing, with the use of infiltration maximised as much as possible in accordance with the SuDS hierarchy.
	• The whole site is located within Groundwater Source Protection Zones 2 and 3. Proposed SuDS should be discussed with relevant stakeholders (St Albans City and District Council, Hertfordshire County Council, and the Environment Agency) at an early stage to understand possible opportunities and constraints. The Groundwater Source Protection Zone guidence is currently undergoing a review, therefore developers should ensure they are using the latest guidance available.
	• The site is not located within a historic landfill site.
	• Where possible, proposed attenuation features such as basins, ponds and tanks should be located outside of Flood Zone 2 to avoid the potential risks to the hydraulic capacity or structural integrity of these features.
	• Surface water discharge rates should not exceed pre-development discharge rates for the site and should be designed to be as close to greenfield runoff rates as reasonably practical in consultation 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.
	• 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.

Opportunities for wider sustainability benefits and integrated flood	• 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 (St

risk management	Albans City and District Council, Hertfordshire County Council, and the Environment Agency) 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. Consideration should be made to the existing condition of receiving waterbodies and their Water Framework Directive objectives for water quality. The use of multistage SuDS treatment will clean and improve water quality of surface water runoff discharged from the site and reduce the impact on receiving water bodies. • 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.
NPPF and planning implications	
Exception Test requirements	The site is within Flood Zone 2 and at low risk from groundwater flooding. The Sequential Test must be passed, the criteria for which is highlighted within the Level 1 Assessment. The site is classified in the NPPF as 'More Vulnerable' and is partially within Flood Zone 2 therefore the Exception Test should be applied to this site.

Requirements and guidance for site-specific Flood Risk Assessment	**Flood Risk Assessment:**
	• At the planning application stage, a site-specific FRA will be required as the site is:
	  ○ Within fluvial flood zone 2
	  ○ At risk of groundwater and reservoir flooding.
	  ○ All sources of flooding should be considered as part of a site-specific FRA. Ground investigations are likely to be necessary to confirm the risk form groundwater flooding to the site.
	• Consultation with St Albans City and District Council, Hertfordshire County Council, Thames Water, and the Environment Agency should be undertaken at an early stage.
	• Any FRA should be carried out in line with the National Planning Policy Framework (NPPF); Flood Risk and Coastal Change Planning Practice Guidance (PPG); St Albans City and District Council's Local Plan Policies and Hertfordshire County Council's Guidance for Developers.

	• The development should be designed with mitigation measures in place where required.
	
	Guidance for site design and making development safe:
	
	• The developer will need to show, through an FRA, that future users of the development will not be placed in danger from flood hazards throughout its lifetime. It is for the applicant to show that the development meets the objectives of the NPPF's policy on flood risk. For example, how the operation of any mitigation measures can be safeguarded and maintained effectively through the lifetime of the development. (Para 048 Flood Risk and Coastal Change PPG).
	• Planning permission is required to surface more than 5 square metres of unpaved ground using a material that cannot absorb water.
	• Flood resilience and resistance measures should be implemented where appropriate during the construction phase, e.g. raising of floor levels. These measures should be assessed to make sure that flooding is not increased elsewhere.
	  ○ raise them as much as possible
	  ○ 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.

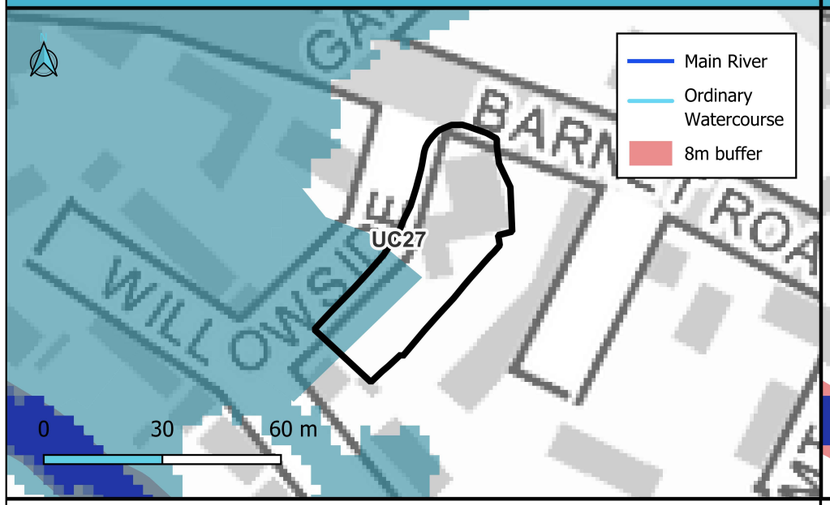
Key messages	
The Exception Test will be required for this site, and St Albans Council will need to carefully consider the benefits of developing the site against the fluvial risks. Development may be possible provided the flood risk part of the Exception Test can be satisfied as below: • A site-specific FRA demonstrates 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 on the site and to neighbouring areas. • Development is steered away from the area of fluvial flood risk in the southwestern side of the site. • If flood mitigation measures are implemented then they are tested to check that they will not displace water elsewhere (for example, if land is raised to permit development on one area, compensatory flood storage will be required in another).	
Mapping Information	
Flood Zones	Flood Zones 2 and 3a have been taken from the Environment Agency's Flood Map for Planning mapping. Flood Zone 3b has been created from the London Colney (2018) hydraulic model.

Climate change	The most recent uplifts have been applied to the London Colney (2018) hydraulic model to indicate the impacts on fluvial flood risk. The latest climate change allowances have been applied to the RoFSW map to indicate the impact on pluvial flood risk.
Fluvial depth, velocity and hazard mapping	Depth, velocity, and hazard data was derived from the London Colney (2018) hydraulic model.
Surface Water	The Environment Agency's Risk of Flooding from Surface Water dataset has been used for this assessment.
Surface water depth, velocity and hazard mapping	The surface water depth, velocity, and hazard mapping for the 3.3%, 1% and 0.1% AEP events (considered to be high, medium, and low risk) have been taken from Environment Agency's RoFSW.

Site Reference	UC27
Site Name	Berkeley House, Barnet Road, London Colney

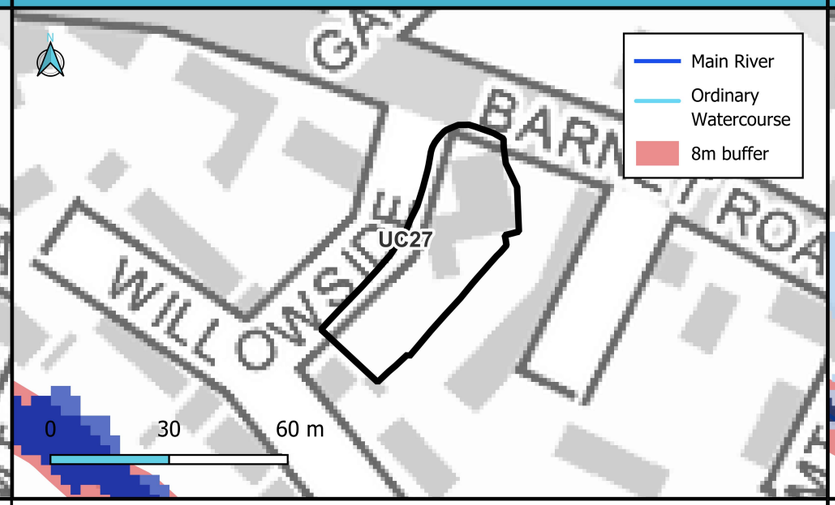
St Albans District Council
Strategic Flood Risk Assessment
Level 2 Detailed Site Summary

Flood Zone Map (present day)



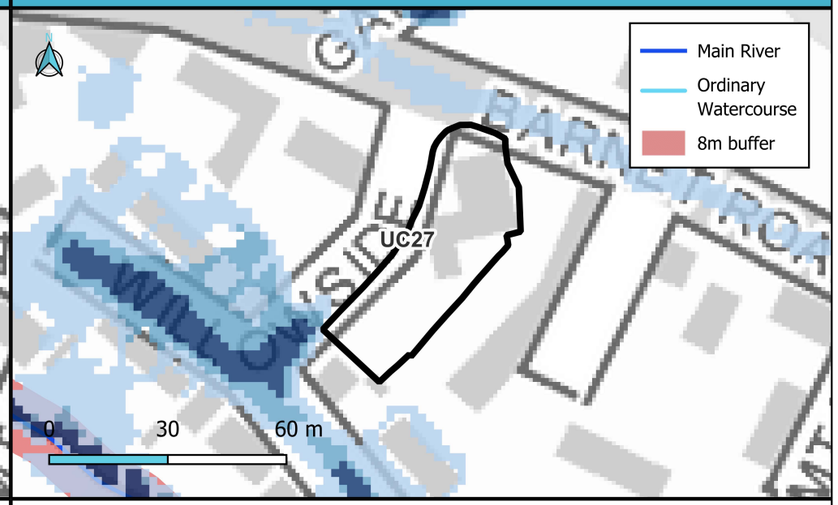
Flood Zone 2 (Between 1% and 0.1% AEP)
Flood Zone 3a (Between 3.33% and 1% AEP)
Flood Zone 3b (Less than 3.33% AEP)
Site boundary
Other site

Flood Zone 3b + Climate Change



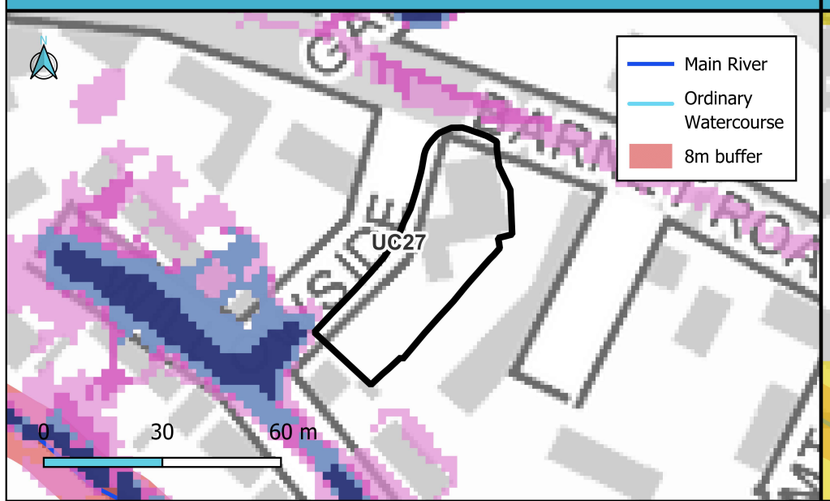
Flood Zone 3b + 21% (Central allowance)
Flood Zone 3b + 35% (Higher allowance)
Flood Zone 3b
Site boundary
Other site

Surface Water Map (RoFSW)



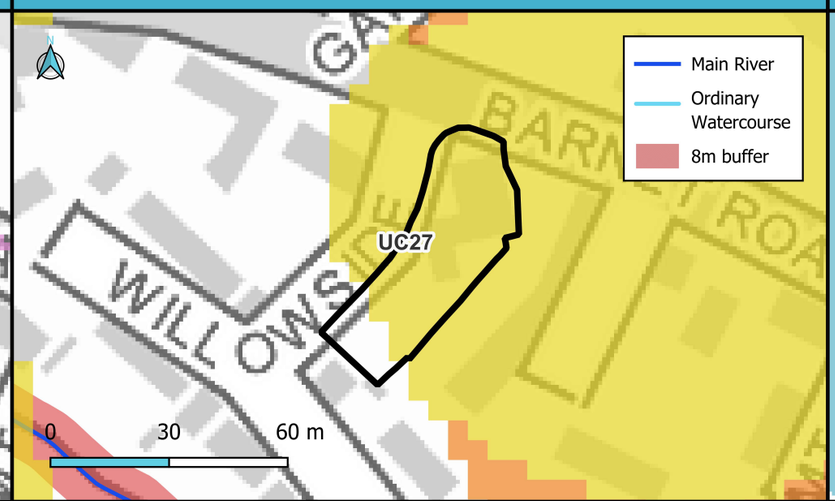
RoFSW 1 in 30-year (3.33% AEP)
RoFSW 1 in 100-year (1% AEP)
RoFSW 1 in 1000-year (0.1% AEP)
Site boundary
Other site

Surface Water Map + Climate Change



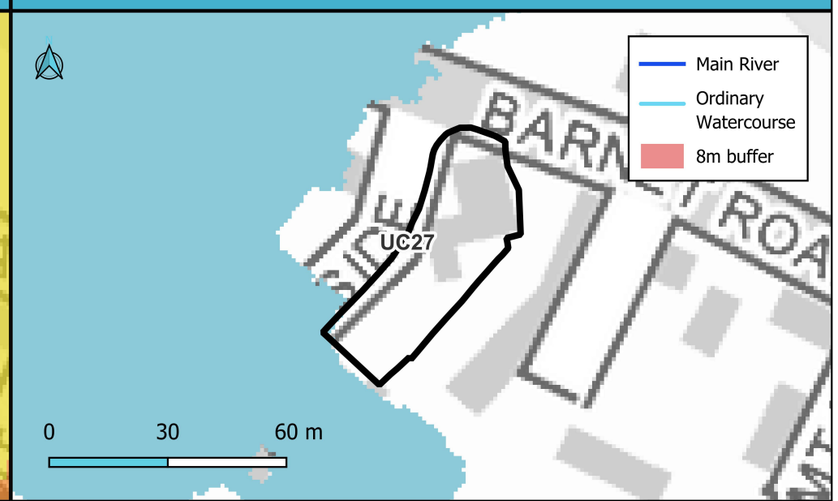
RoFSW 1 in 30-year (3.33% AEP)
RoFSW 1 in 30-year (3.33% AEP) plus 40%
RoFSW 1 in 100-year (1% AEP)
RoFSW 1 in 100-year 1% AEP plus 40%
Site boundary
Other site

Groundwater (Gw) Flood Risk 1% AEP



GW levels <0.025m below ground
GW levels 0.025m to 0.5m below ground
GW levels 0.5 to 5m below ground
GW levels atleast 5m below ground
Site boundary
Other site

Reservoir Flood Risk



Reservoir 'Dry Day' flood extent
Reservoir 'Wet Day' flood extent
Reservoir - Fluvial contribution to flood extent
Site boundary
Other site

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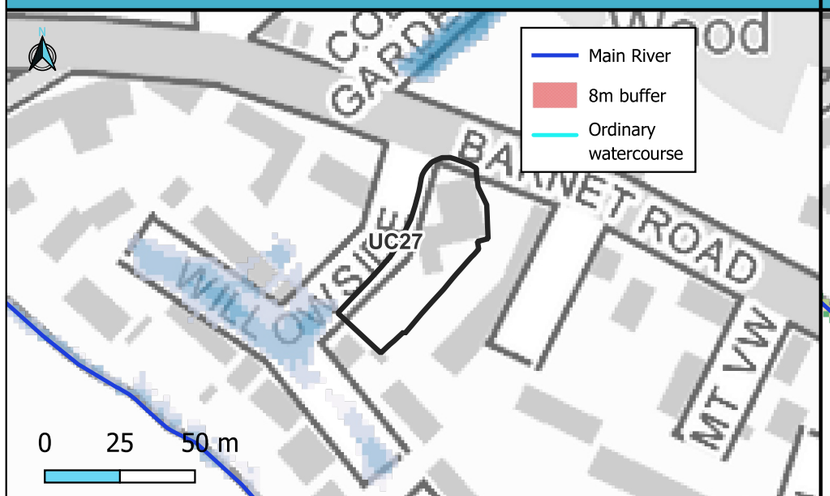
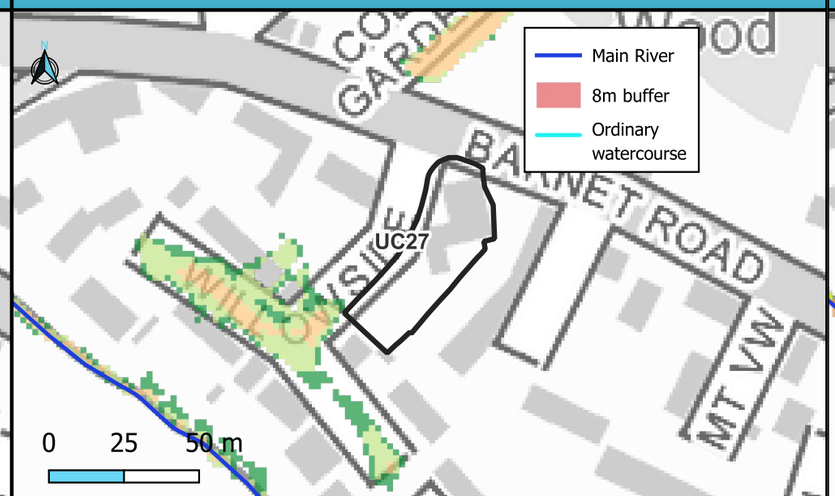
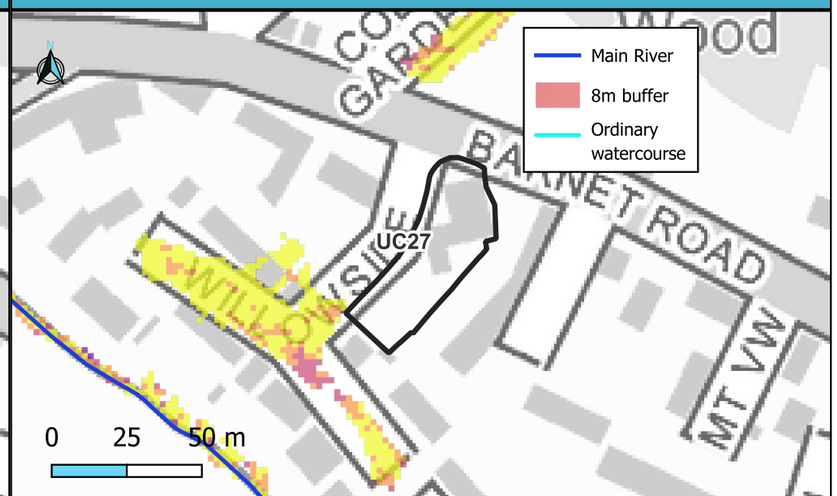
RoFSW Max Depth - 1% AEP



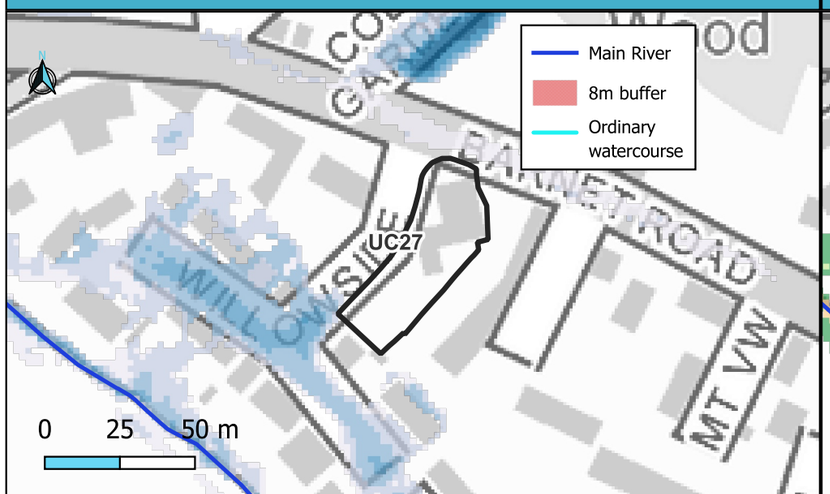
RoFSW Max Hazard - 1% AEP



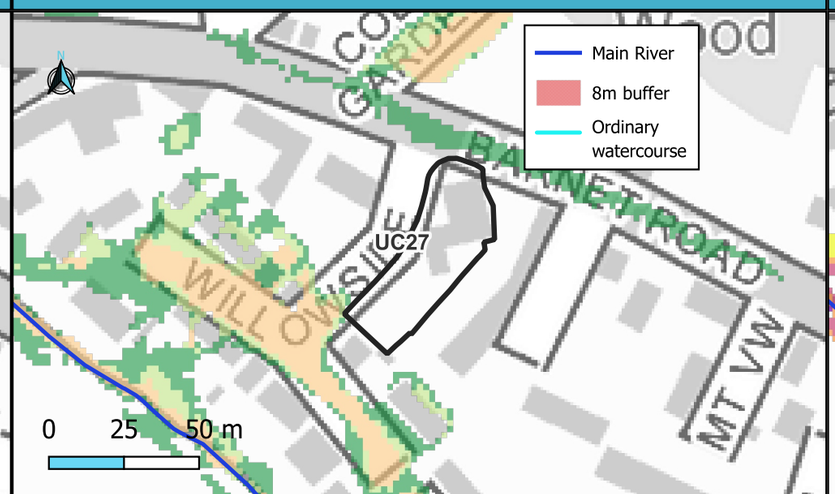
RoFSW Max Velocity - 1% AEP



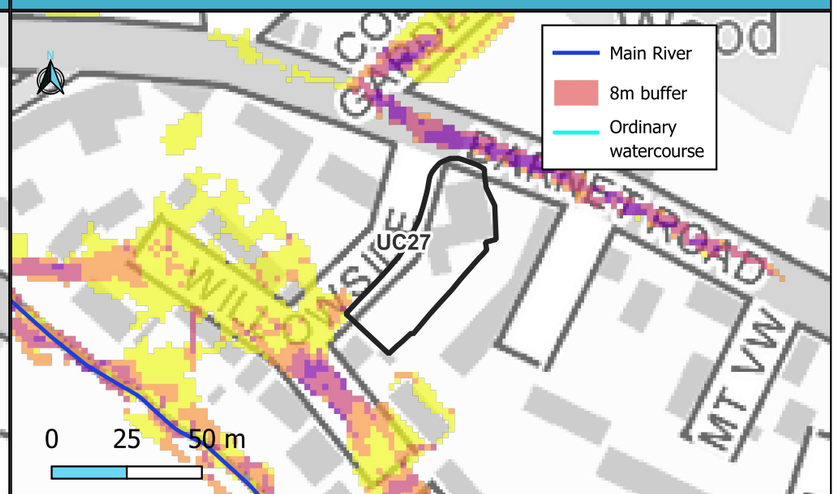
RoFSW Max Depth - 1% AEP + 40% CC



RoFSW Max Hazard - 1% AEP + 40% CC



RoFSW Max Velocity - 1% AEP + 40% CC



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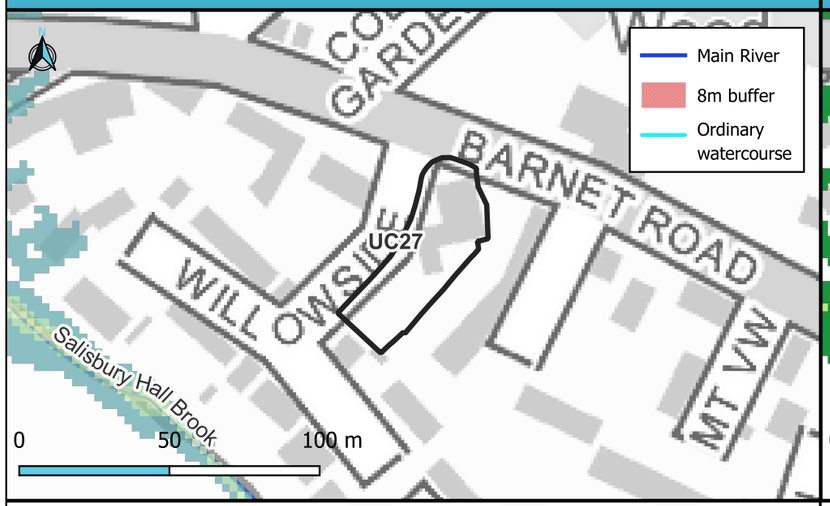
Strategic Flood Risk Assessment
Level 2 Detailed Site Summary

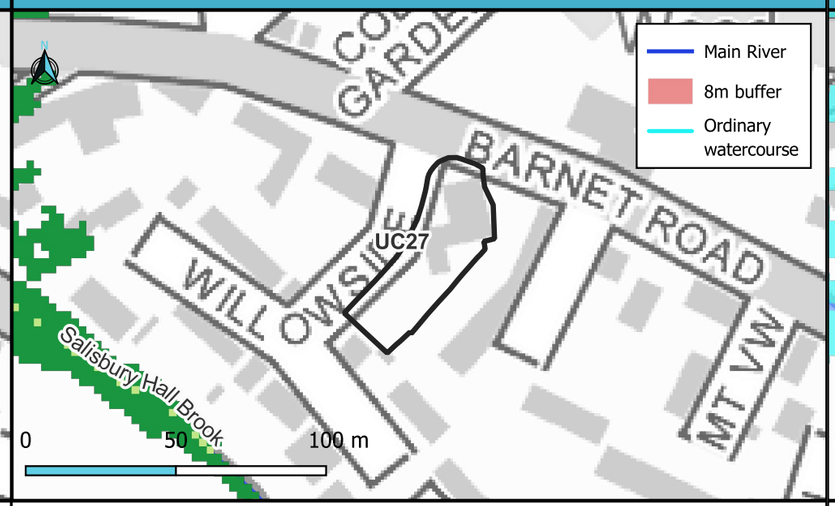
Max Fluvial Flood Depth (m) - 1% AEP



Site boundary
Site boundary
Other sites

Depth (m)
<= 0.25
0.25 - 0.50
0.50 - 0.75
0.75 - 1.00
1.00 - 1.25
1.25 - 1.50
1.50 - 1.75
1.75 - 2.00
> 2.00

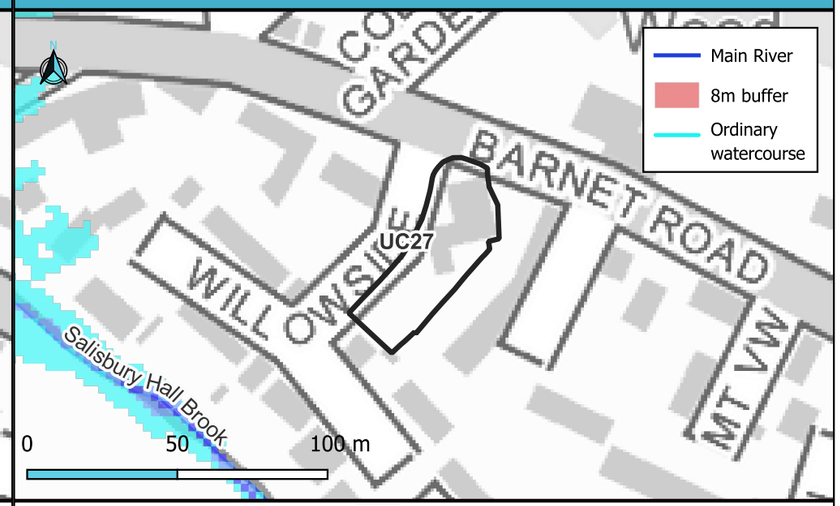
Max Fluvial Flood Hazard - 1% AEP



Site boundary
Site boundary
Other sites

Hazard
<= 0.75: Low
0.75 - 1.25: Moderate
1.25 - 2.00: Significant
> 2.00: Extreme

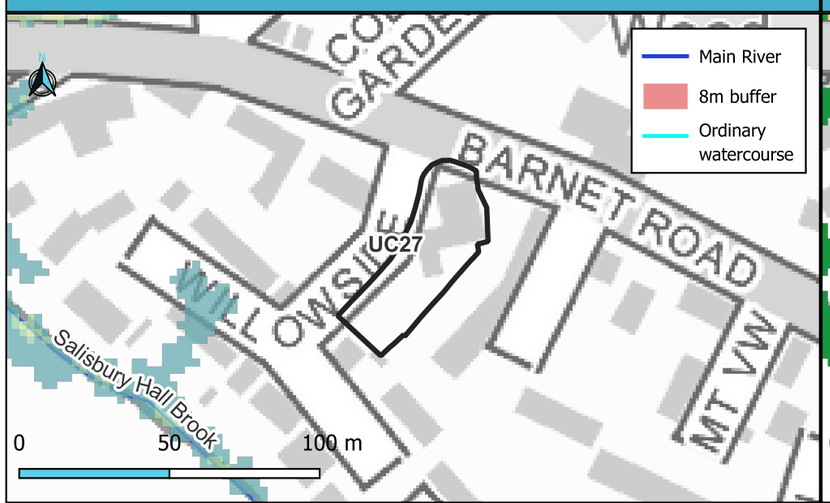
Max Fluvial Flood Velocity (m/s) - 1% AEP



Site boundary
Site boundary
Other sites

Velocity (m/s)
<= 0.25
0.25 - 0.50
0.50 - 1.00
1.00 - 2.00
> 2.00

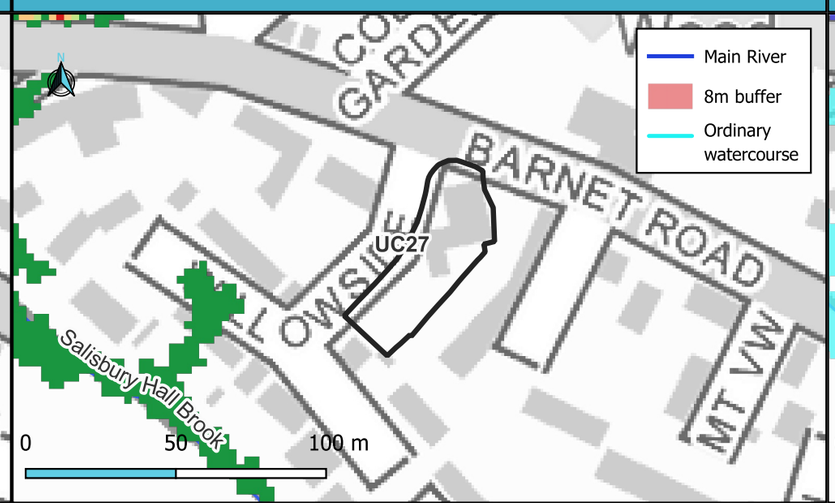
Max Fluvial Flood Depth - 1% AEP +35% CC



Site boundary
Site boundary
Other sites

Depth (m)
<= 0.25
0.25 - 0.50
0.50 - 0.75
0.75 - 1.00
1.00 - 1.25
1.25 - 1.50
1.50 - 1.75
1.75 - 2.00
> 2.00

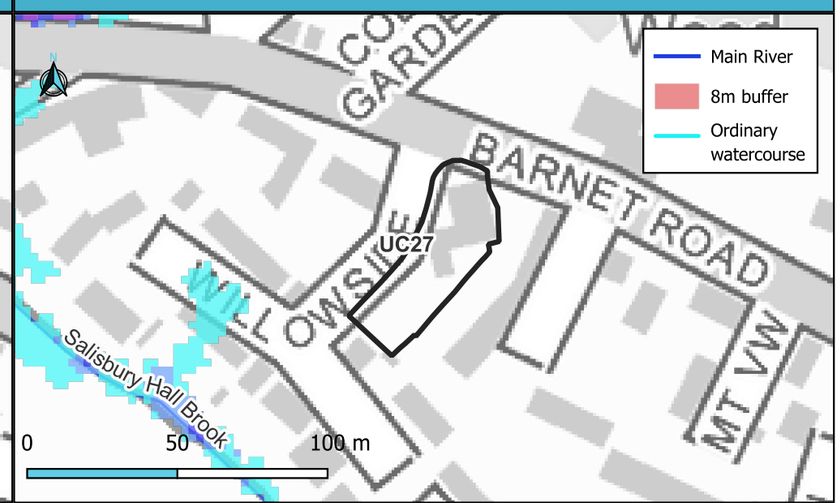
Max Fluvial Flood Hazard - 1% AEP +35% CC



Site boundary
Site boundary
Other sites

Depth (m)
<= 0.75: Low
0.75 - 1.25: Moderate
1.25 - 2.00: Significant
> 2.00: Extreme

Max Fluvial Flood Velocity - 1% AEP +35% CC



Site boundary
Site boundary
Other sites

Velocity (m/s)
<= 0.25
0.25 - 0.50
0.50 - 1.00
1.00 - 2.00
> 2.00