	St Albans City and District Council Level 2 Strategic Flood Risk Assessment Detailed Site Summary Table
Site details	
Address	Car Park to the rear of Portman House, Therfield Road St Albans
Area	0.14ha
Current land use	Brownfield - Garages and car park
Proposed land use	Residential
Flood Risk Vulnerability	More Vulnerable
Sources of flood risk	
Location of the site within the catchment	The site is located within the residential area of New Greens in northern St Albans, Hertfordshire. The site is situated off Therfield Road via a singletrack road, to the north of Portman House. The site is surrounded by residential housing as it is situated to the rear of properties along Francis Avenue and Batchwood Drive. The site is within the River Ver catchment, which covers an area of 146.4 km², with the River Ver located approximately 1.6 km to the west of the site. The site sits in the lower catchment, within the large urban area of St Albans. The River Ver is part of the Colne Management Catchment, which covers a much larger area of 1,040 km².
Topography	Environment Agency 1m resolution LIDAR across the site shows that topography is fairly flat. 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 the site elevations range from 102.8 to 103.7mAOD, with the southern area slightly lower than the northern.
Existing drainage features	There are no existing drainage features within the site that are visible on topographic mapping or aerial imagery. Given that the site is within the main St Albans urban area, it is likely to be drained by the surface water drainage network.
Fluvial	**The proportion of site at risk FMFP:** FZ3b – 0% FZ3a – 0% FZ2 – 0% FZ1 – 100%

	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. No detailed hydraulic modelling was available for this site. **Flood characteristics:** The site is located within Flood Zone 1 and is at negligible risk of fluvial flooding.
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** – 37% Max depth – 0.30 – 0.60m Max velocity – 1.00 – 2.00m/s **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 flooding within the site during the 3.3% and 1% AEP events. During the 0.1% AEP event, a surface water flow path enters the site from the north, flowing around the garages. Part of the flow moves east between the garage blocks, while the other part flows southwest around the southern garage blocks. Flood depths are primarily between 0.15 to 0.30m, with an area along the northern face of the southern block of garages reaching between 0.30 to 0.60m. The flow velocities vary across the site, the area of pooling between the garages has velocities <0.25m/s, whereas the maximum velocity reaches between 1.00 to 2.00m/s to the west of the garages, where the flow route enters the site from the north. The flood hazard is mainly 'Very low' and 'Danger for some', but there is a small area in the east of the site in front of the southern garage block classified as 'Danger for most'.
Reservoir	The Environment Agency's reservoir maps show the site is not at risk of flooding from any reservoir.

Groundwater	The JBA Groundwater mappings shows that groundwater levels for the whole site are likely to be at least 5m below ground level. As a result, groundwater flood risk is not likely.
Sewers	The site is located within a postcode area with 4 historic incidences of sewer flooding, according to the Thames Water Hydraulic Sewer Flood Risk Register.
Flood history	There are no reported flood incidents reported by the Environment Agency, St Albans District Council or Hertfordshire County Council within the site.
Flood risk management infrastructure	
Defences	The Environment Agency AIMS dataset shows that the site is not protected by any formal flood defences.
Residual risk	The site is not at residual risk of flooding.
Emergency planning	
Flood warning	The site is not located within any Environment Agency Flood Warning or Alert Areas.
Access and egress	Access and egress to the site is by a single-track road that runs along the northern boundary of Portman house, from Therfield Road. Vehicular access and egress to Therfield Road is via Francis Avenue. In the 3.3% AEP surface water event, there is a small surface water flow route along Francis Avenue; however, it will not impede access. In the 1% AEP surface water event, there are several surface water flow routes, including along Therfield Road and the eastern half of Francis Avenue. However, these will not impede access. During the 0.1% AEP surface water event, there is larger flow path along Therfield Road, extending south to Batchwood Drive via a pedestrian alley. Additionally, there is a flow route along the eastern half of Francis Avenue. Along Therfield Road, flood depths are <0.15m, with velocities ranging between 1.00 to 2.00m/s and >2.00m/s in some areas. The flood hazard is classified as 'Very low' to 'Danger for some', as a result access and egress by a vehicle is possible, but pedestrian access may be limited in the higher hazard areas. The flow route along the eastern part of Francis Avenue reaches flood depths of between 0.15 to 0.30m. Flow velocities are mainly between 1.00 to 2.00m/s reaching a maximum >2.00m/s where Nicholas Close joins Francis Avenue. The flood hazard is 'Very low' to 'Danger for most', with the higher hazard zones located by the Nicholas Close junction and where Francis Avenue joins Harpenden Road (A1081). Vehicular access and egress maybe limited in the areas classified as 'Danger for most'. Developers will need to demonstrate that safe access and egress in the 0.1% AEP event, including allowance for climate change.

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 been applied to the River Ver (2019) model to indicate the impact of fluvial flood risk. Mapping shows that the site is within Flood Zone 1 and with the latest climate change allowances applied fluvial flood risk to the site remains negligible. **Surface Water:** The latest climate change allowances have 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, with surface water flowing around the garage blocks entering the site from the north and causing ponding between the two blocks of garages. Within the site the maximum flood depth, velocity and hazard is 0.35m, 1.37m/s and 'Danger for some'. 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 consist of:
	  ○ Bedrock – Bedrock geology of the site is Lewes Nodular Chalk Formation and Seaford Chalk Formation. This is a sedimentary bedrock.
	• Soils at the site consist of:
	  ○ Freely draining slightly acid but base-rich soils
	
	Sustainable Drainage Systems (SuDS)
	• Groundwater levels are indicated to be at least 5m below ground level and groundwater flooding is not likely, however below ground development such as basements may still be susceptible to groundwater flooding.
	• 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 (with 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 guidance is currently undergoing a review. Therefore, developers should ensure they are using the latest guidance. • The site is not located within a historic landfill site. • 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. • The Risk of Flooding from Surface Water (RoFSW) mapping indicates the presence of surface water flow paths during the 0.1% AEP event. Existing flow paths should be retained and integrated with blue-green infrastructure and public open space. • If it is proposed to discharge runoff to a 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 risk management	• Implementation of SuDS at the site could provide opportunities to deliver multiple benefits including volume control, water quality, amenity and biodiversity. Proposals to use SuDS techniques should be discussed with relevant stakeholders (with St Albans City and District Council, Hertfordshire County Council (LLFA) 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 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.
NPPF and planning implications	

Exception Test requirements	The site is within Flood Zone 1 but at risk from surface water flooding. The Sequential Test must be passed, the criteria for which is highlighted within the Level 1 Assessment. The Exception Test is not required under the NPPF. However, it must be shown that the development will be safe for its lifetime and the risk can be managed through a sequential approach to design.
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 at significant risk of flooding from surface water • All sources of flooding should be considered as part of a site-specific FRA. • 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). • 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 greenfield rates. • Planning permission is required to surface more than 5 square metres of unpaved ground using a material that cannot absorb water. • Should built development be proposed within the 1% AEP surface water flood extent, careful consideration will need to be given to flood resistance and resilience measures. • Arrangements for safe access and egress will need to be demonstrated for all the surface water events with an appropriate allowance for climate change, using the depth, velocity, and hazard outputs.

	• 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 site is in Flood Zone 1; however, it has a notable risk of surface water flooding. Development is likely to be able to proceed if:

- A carefully considered and integrated flood resilient and sustainable drainage design is put forward, with development steered away from the areas identified to be at risk of surface water flooding across the site.
- Safe access and egress can be demonstrated in the surface water plus climate change events. This includes measures to reduce flood risk along these routes such as raising access, but not displacing floodwater elsewhere.
- 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.
- 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. There is no detailed hydraulic modelling available at this location.
Climate change	In the absence of detailed hydraulic modelling, Flood Zone 2 has been used as an indicative assessment of future fluvial risk at 1% AEP. The latest climate change allowances have been applied to the Environment Agency's RoFSW map to indicate the impact on surface water flood risk.
Fluvial depth, velocity and hazard mapping	There is no detailed hydraulic modelling available at this location.

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.

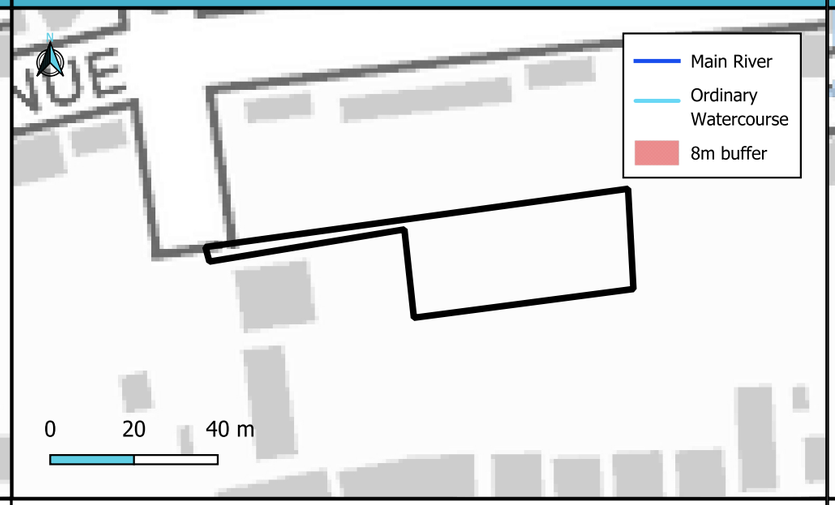
Site Reference	
Site Name	Car Park to the rear of Portman House, Therfield Road St Albans

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

Flood Zone Map (present day)

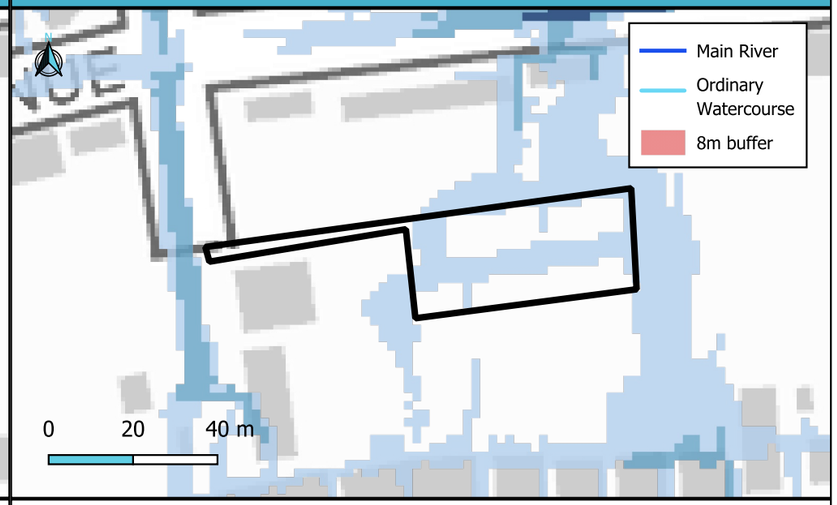
Flood Zone 2 (Between 1% and 0.1% AEP)
Flood Zone 3a (Between 3.33% and 1% AEP)
Flood Zone 3b (Less than 3.33% AEP)
Site boundary
Other site

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)

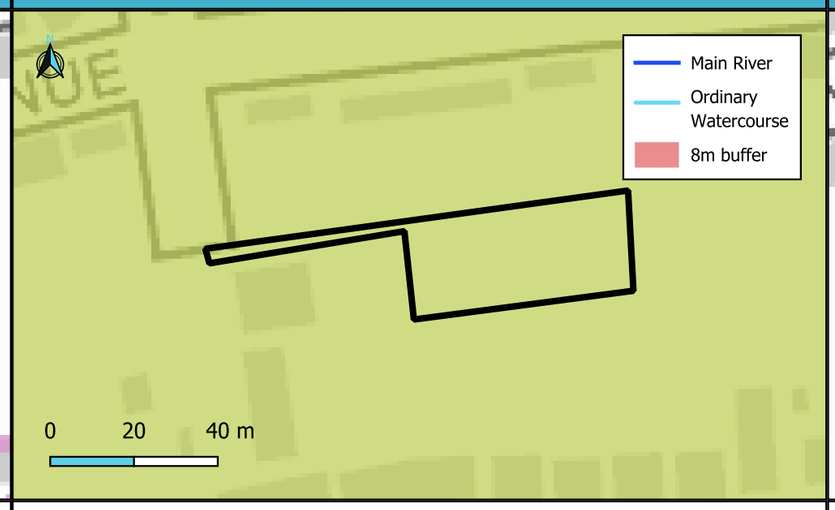


RoFSW 1 in 30-year (3.33% AEP)
RoFSW 1 in 100-year (1% AEP)
RoFSW 1 in 1000-year (0.1% AEP)
Site boundary
Other site

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

Site Reference	
Site Name	Car Park to the rear of Portman House, Therfield Road St Albans

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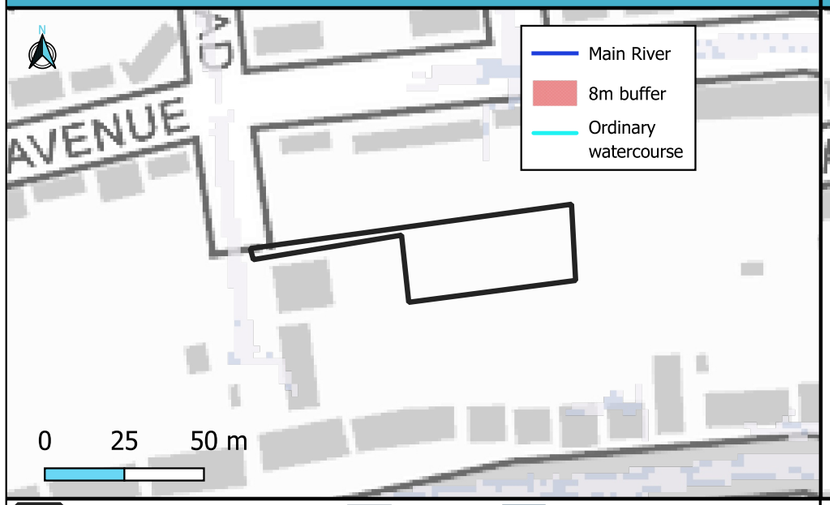
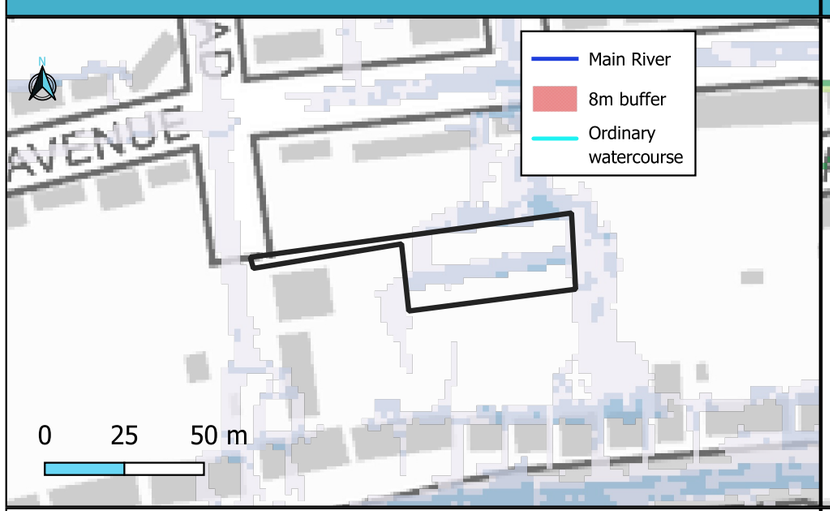
RoFSW Max Depth - 1% AEP



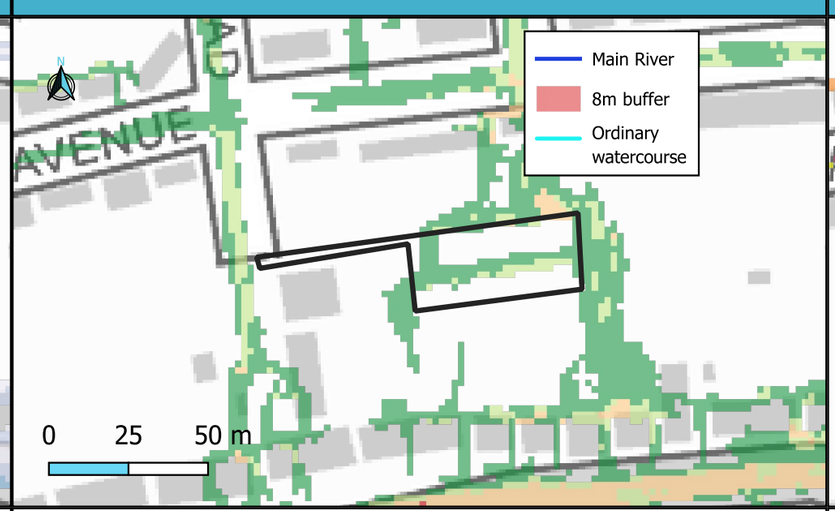
RoFSW Max Hazard - 1% AEP

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