	St Albans City and District Council Level 2 Strategic Flood Risk Assessment Detailed Site Summary Table
Site details	
Address	Car Park and Garage Block to rear of Telford Court Alma Road St Albans
Area	0.48ha
Current land use	Car park and garages - Brownfield
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 central St Albans, approximately 0.24 km south of St Albans City Station, which is on the Thameslink railway line. The site is surrounded by residential properties, including a large block of flats, and there is a place of worship on the site's northern boundary. The site is to the rear of properties along Oswald Road to the north, Ridgmont Road to the east, Grosvenor Road to the south, and Alma Road to the west. The site is within the River Ver catchment, which covers an area of 146.4 km², with the River Ver located approximately 0.4 km to the south of the site. It is situated in the lower catchment, in a heavily urbanized area. The River Ver is part of the Colne Management Catchment, which covers a much larger area of 1,040 km².
Topography	The Environment Agency 1m resolution LIDAR data across the site shows that the topography varies. The site is in a densely developed urban area, and the LIDAR data may not be fully representative of the actual site topography, which could impact some of the flood risk datasets used in the assessment. The LIDAR shows that the highest elevation within the site is located in the northeastern corner at 100.5mAOD. The elevation then decreases to the west along the northern border to 97.0mAOD. Where the site extends west to Alma Road, the elevation further decreases to 93.3mAOD. In the central area of the site, to the east of the apartment blocks, elevations range between 95.8mAOD and 97.4mAOD. In the southern area of the site, near the garages, the elevation varies from 98.0mAOD at the eastern boundary to 94.1mAOD between the two central garage blocks. The southern section of the site that extends out to Alma Road is on a gradient, decreasing from 94.4mAOD to 91.3mAOD.
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** – 4% Max depth – 0.30 – 0.60m Max velocity – 0.25 – 0.50m/s **0.1% AEP** – 5% Max depth – 0.90 to 1.20 Max velocity – 0.50 – 1.00m/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 water flooding within the site during the 3.3% AEP surface water event. During the 1% AEP event, there is an area of pooling between the two central garage blocks in the southern area of the site. The flood depths reach a maximum of between 0.30m and 0.60m. The flow velocity is predominantly <0.25m/s, with a small section on the northern edge reaching between 0.25m/s and 0.50m/s. The flood hazard is classified as 'Very low' to 'Danger for some'.

	During the 0.1% AEP event, the area of ponding between the two central garages in the southern area of the site has increased. The flood depths reach a maximum of 0.90 to 1.20m, with velocities mainly <0.25m/s, reaching a maximum of 0.50 to 1.00m/s on the northern edge of the ponding. The flood hazard is classified as 'Danger for most'. There is also a flow path in the northwestern area of the site that extends out to Alma Road. The flood depth is <0.15m, and the velocity is 0.50 to 1.00m/s. The flood hazard is classified as 'Very low'.
Reservoir	The Environment Agency's reservoir maps show the site is not at risk of flooding from any reservoir.
Groundwater	The JBA Groundwater mapping shows that the whole site has groundwater levels 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 21 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 City and 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 currently possible via several routes. There is vehicular access and egress route via Telford Close which is off Alma Road. An additional entrance is on Ridgmont Road, which is accessed via Grosvenor Road. There is also a pedestrian only access and egress route in the northwest of the site onto Alma Road. During the 3.3% AEP surface water event, there is only a small area of flooding at the southern end of Alma Road, just south of the junction where Telford Close joins. The flood depth ranges from less than 0.15m to 0.15m to 0.30m. The velocity is mainly less than 0.25m/s, with the northern end reaching between 0.25m/s to 0.50m/s. The flood hazard is mainly 'Very low' with a small area classified as 'Danger for some'. As a result, vehicular access and egress are possible. No other access and egress routes are affected by surface water flooding, so they provide safe access and egress.

	During the 1% AEP surface water event, there is a large flow path along Alma Road from the junction with Oswald Road. Flood depths at the northern end of this flow route are <0.15m and reach 0.15 to 0.30m at the southern end. The flow velocity ranges from <0.25m/s with a maximum between 1.00 to 2.00m/s. The flood hazard is 'Very low' to 'Danger for some'. Therefore, vehicular access and egress is possible. There are two small areas of pooling at both entrances of Grosvenor Road: where it joins Alma Road and where it joins London Road. Both areas have flood depths of >0.15m and velocities reaching a maximum of 1.00 to 2.00m/s. The flood hazard for both areas is 'Very low', therefore vehicular access and egress is possible. During the 0.1% AEP surface water event, there is a large surface water flow path extending along the entire length of Alma Road. There are additional flow routes along Ridgmont Road and Grosvenor Road. The flood depths along Alma Road are mainly <0.15m with an area at the southern end reaching between 0.30 to 0.60m. The flow route velocities are primarily 1.00 to 2.00m/s. The flood hazard is classified as mainly 'Very low' but reaches 'Danger for some' at the southern end of Alma Road. Therefore, vehicular access and egress via Telford Close and Alma Road is possible. The flow route along Ridgmont Road and then the western part of Grosvenor Road reaches flood depths of up to 0.15 to 0.30m but is primarily <0.15m. The flow route has a maximum velocity of 1.00 to 2.00m/s. The flood hazard is 'Very low'; as a result, vehicular and pedestrian access is possible. 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 pooling between the two central garages in the southern area and a small flow route in the northwestern corner of the site. Within the site the maximum flood depth, velocity and hazard is 0.95m, 0.63m/s and 'Danger for most'. 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 Formation – Chalk. A type of sedimentary bedrock.
	  ○ Superficial – The Superficial deposit of the site is Kesgrave Catchment Subgroup – sand and gravel. A sedimentary superficial deposit.
	• Soils at the site consist of:
	  ○ Slightly acid loamy and clayey soils with impeded drainage
	
	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 a Groundwater Source Protection Zone. Proposed SuDS should be discussed with relevant stakeholders (St Albans City and District Council, Hertfordshire County Council (LLFA) 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 1%

	and 0.1% AEP events. 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 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 and generally at low risk from surface water flooding.
Development is likely to be able to proceed if:

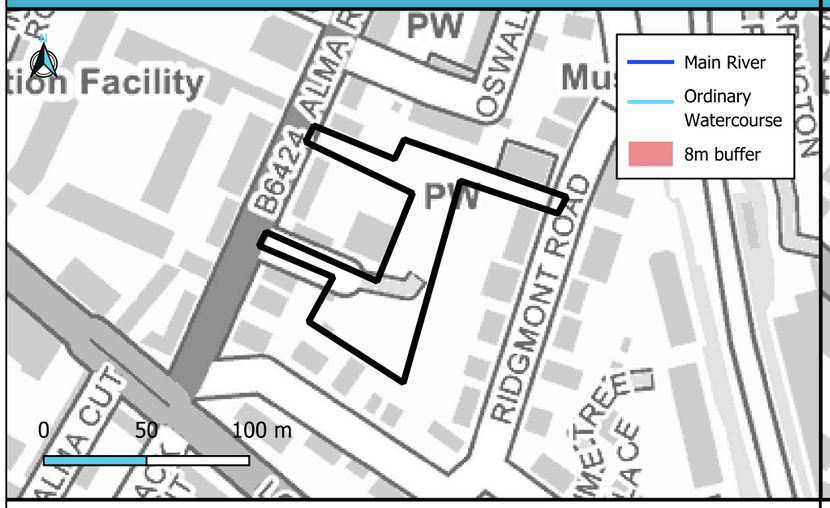
- A carefully considered and integrated flood resilient and sustainable drainage design is put forward, with development steered away from the areas identified to be at risk of surface water flooding across the site.
- A site-specific FRA demonstrates that the site is not at an increased risk of flooding 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 and Garage Block to rear of Telford Court Alma Road St Albans

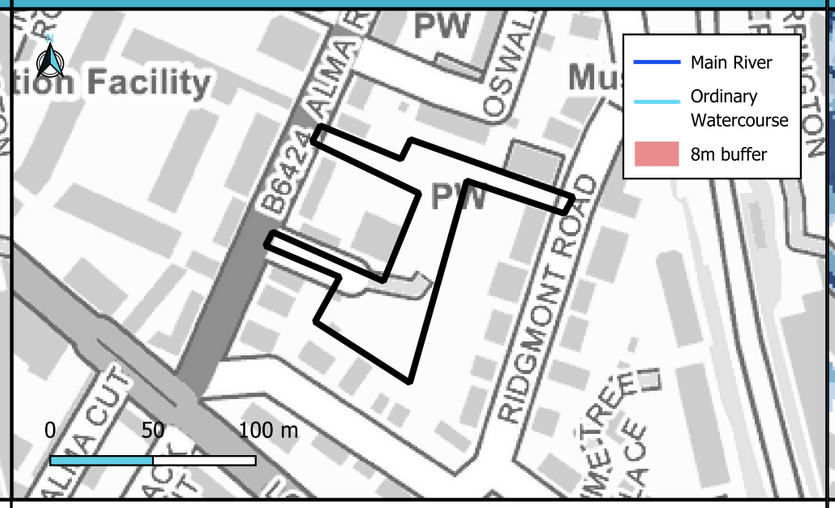
St Albans District Council
Strategic Flood Risk Assessment
Level 2 Detailed Site Summary

Flood Zone Map (present day)



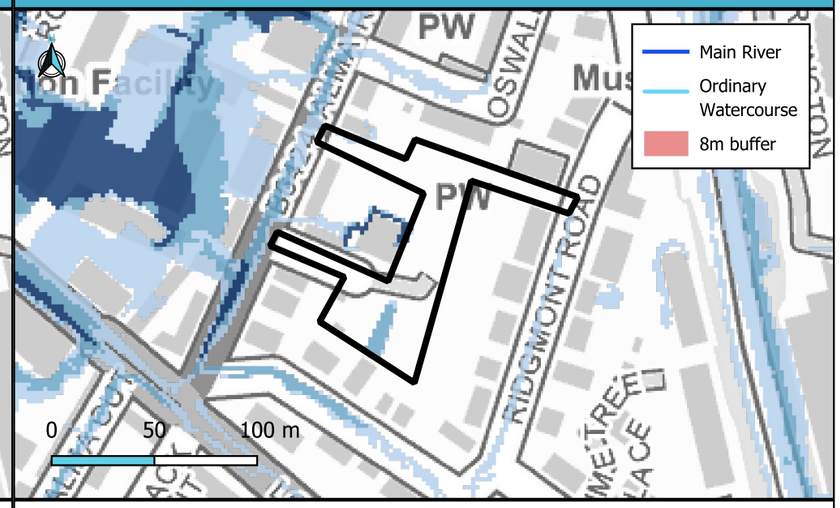
- Flood Zone 2 (Between 1% and 0.1% AEP)
- Flood Zone 3a (Between 3.33% and 1% AEP)
- Flood Zone 3b (Less than 3.33% AEP)
- Site boundary
- Other site

Flood Zone 3b + Climate Change



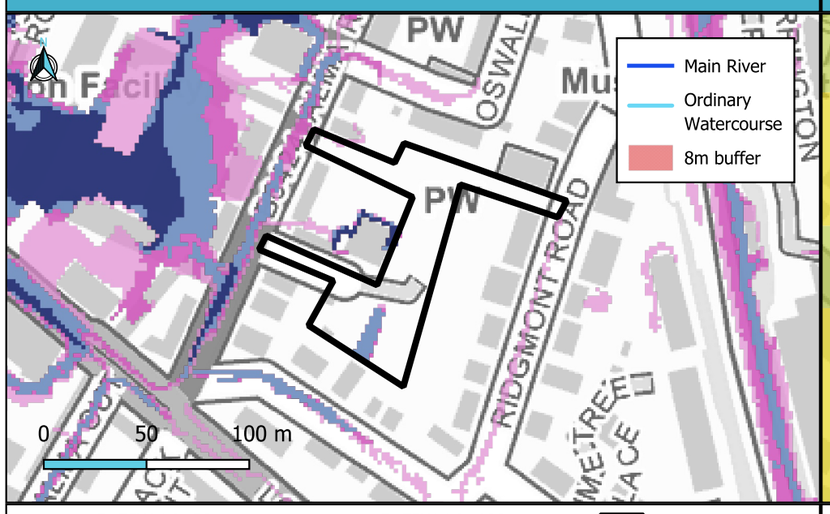
- Flood Zone 3b + 21% (Central allowance)
- Flood Zone 3b + 35% (Higher allowance)
- Flood Zone 3b
- Site boundary
- Other site

Surface Water Map (RoFSW)



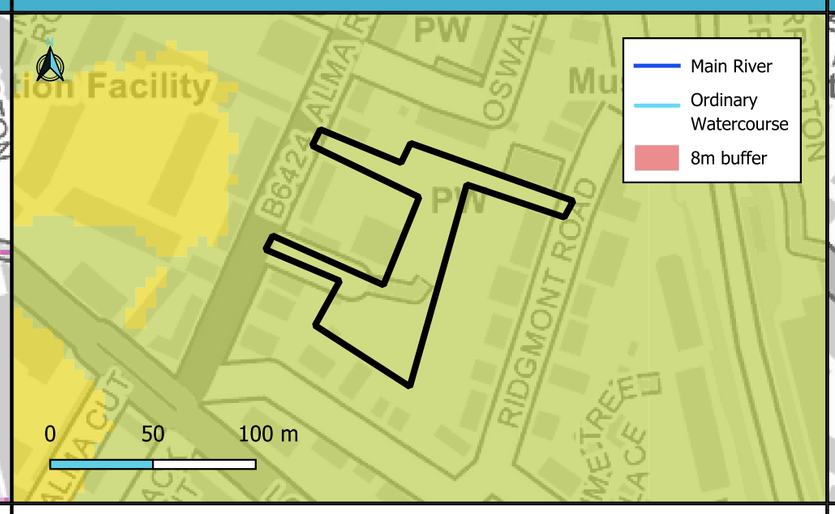
- RoFSW 1 in 30-year (3.33% AEP)
- RoFSW 1 in 100-year (1% AEP)
- RoFSW 1 in 1000-year (0.1% AEP)
- Site boundary
- Other site

Surface Water Map + Climate Change



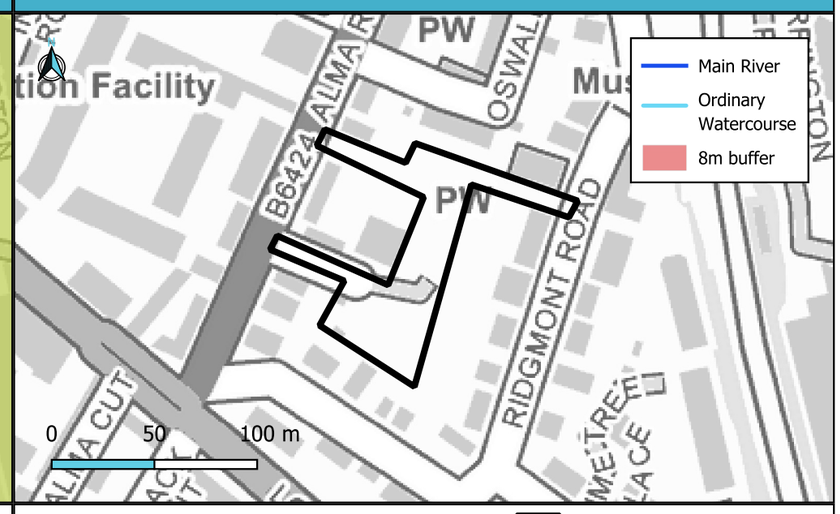
- RoFSW 1 in 30-year (3.33% AEP)
- RoFSW 1 in 30-year (3.33% AEP) plus 40%
- RoFSW 1 in 100-year (1% AEP)
- RoFSW 1 in 100-year 1% AEP plus 40%
- Site boundary
- Other site

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

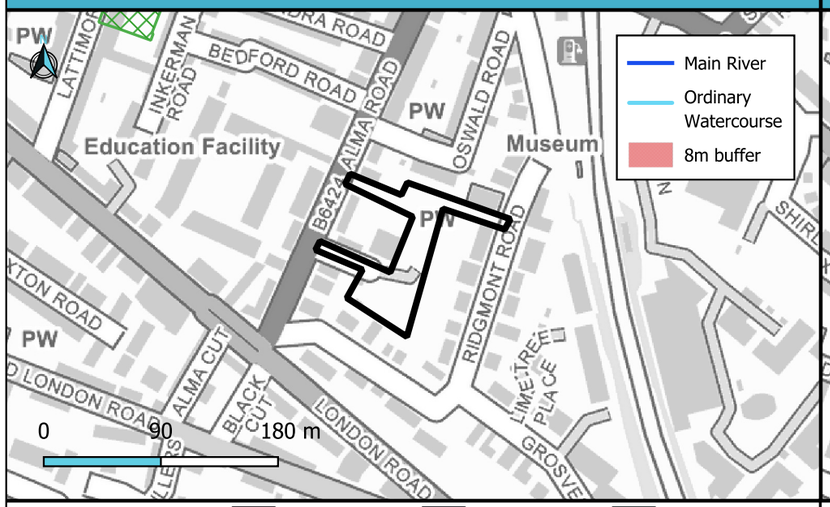


- Reservoir 'Dry Day' flood extent
- Reservoir 'Wet Day' flood extent
- Reservoir - Fluvial contribution to flood extent
- Site boundary
- Other site

Site Reference	
Site Name	Car Park and Garage Block to rear of Telford Court Alma Road St Albans

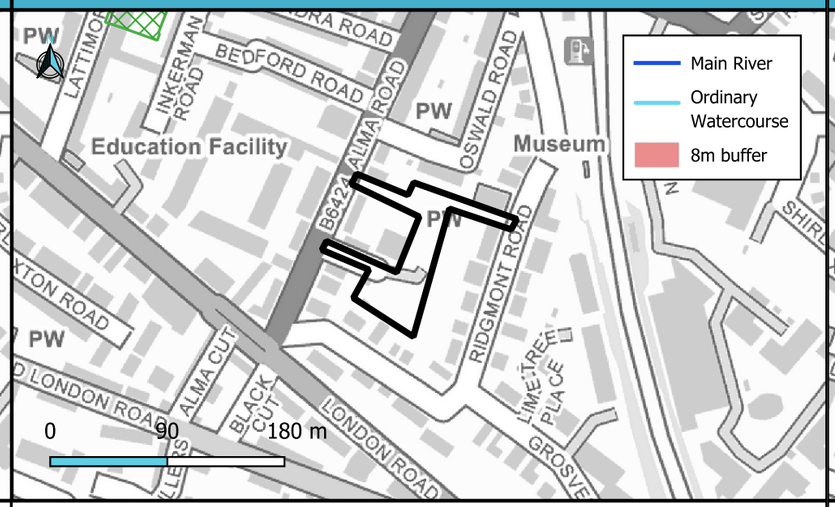
St Albans District Council
Strategic Flood Risk Assessment
Level 2 Detailed Site Summary

Max Fluvial Flood Depth (m) - 1% AEP



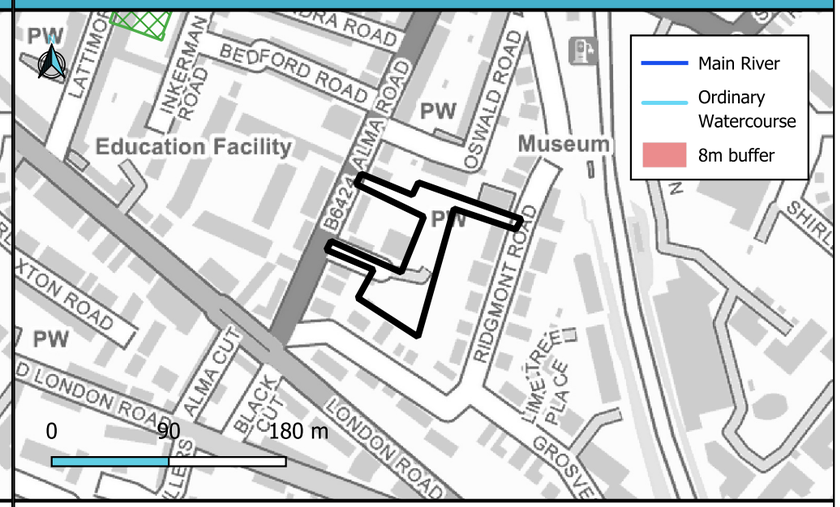
Depth (m)
- <= 0.25
- 0.25 - 0.50
- 0.50 - 0.75
- 0.75 - 1.00
- 1.00 - 1.25
- 1.25 - 1.50
- 1.50 - 1.75
- 1.75 - 2.00
- > 2.00
- Site boundary
- Other site

Max Fluvial Flood Level (mAOD) - 1% AEP



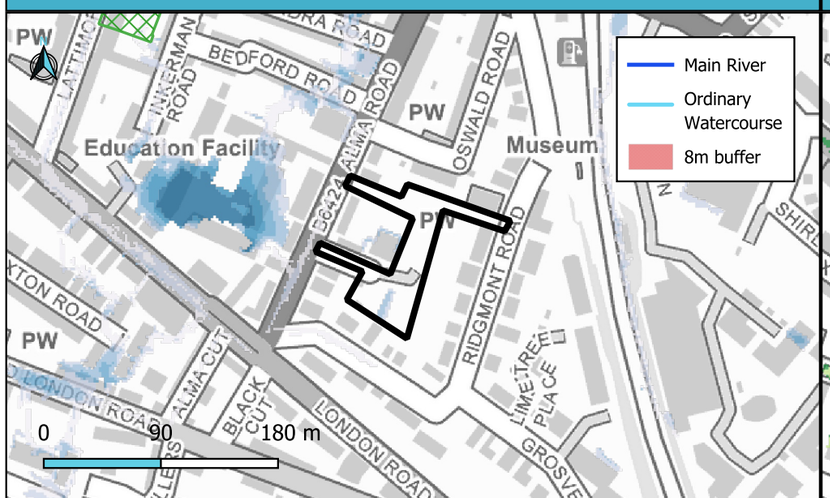
Flood Level (mOD)
- <= 65.0
- 65.0 - 72.0
- 72.0 - 80.0
- 80.0 - 85.0
- 85.0 - 93.0
- > 93.0
- Site boundary
- Other site

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



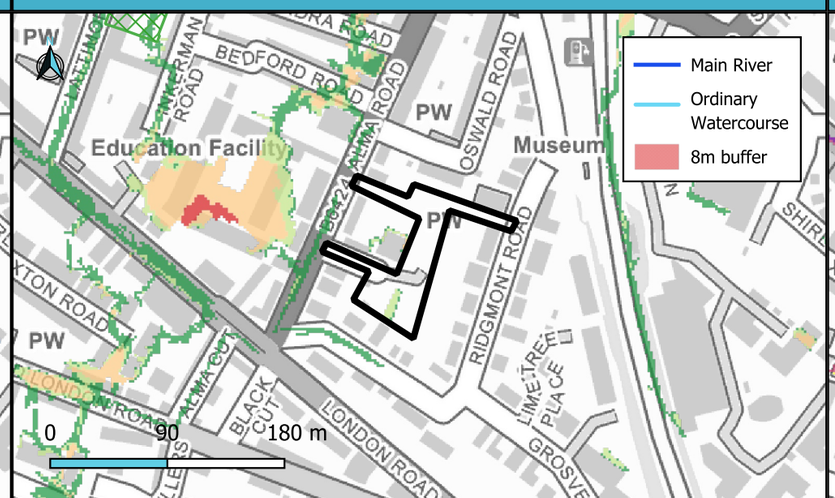
Velocity (m/s)
- <= 0.25
- 0.25 - 0.50
- 0.50 - 1.00
- 1.00 - 2.00
- > 2.00
- Site boundary
- Other site

RoFSW Max Depth - 1% AEP



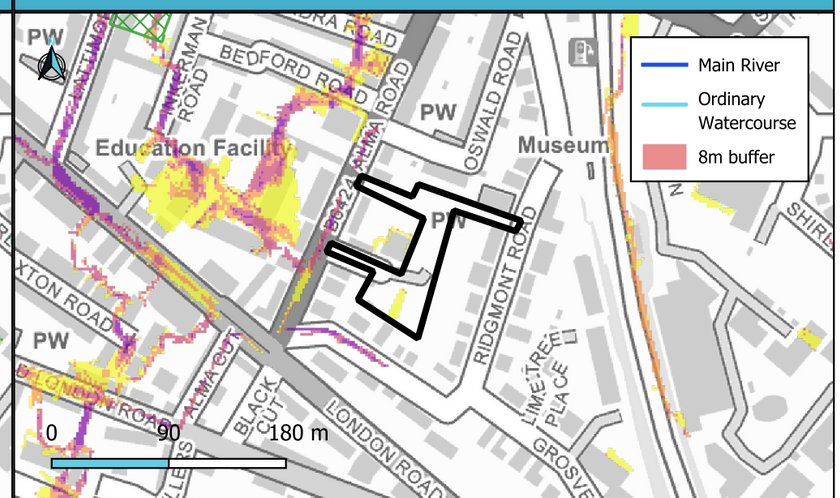
Depth (m)
- 0.00 - 0.15
- 0.15 - 0.30
- 0.30 - 0.60
- 0.60 - 0.90
- 0.90 - 1.20
- > 1.20
- Site boundary
- Other site

RoFSW Max Hazard - 1% AEP



Hazard
- < 0.75: Low
- 0.75 - 1.25: Moderate
- 1.25 - 2.00: Significant
- > 2.00: Extreme
- Site boundary
- Other site

RoFSW Max Velocity - 1% AEP



Velocity (m/s)
- 0.00 - 0.25
- 0.25 - 0.50
- 0.50 - 1.00
- 1.00 - 2.00
- > 2.00
- Site boundary
- Other site