

SITE ASSESSMENT - Bittoms Car Park

Address: The Bittoms, Kingston, KT1 2BB	Area: 0.52 Ha
	Site Reference: SA 038

Current Use	Proposed Use
Multi-storey car park	Residential (80 units), Commercial

Current Vulnerability Classification	Proposed Vulnerability Classification
Less Vulnerable	More Vulnerable

Current Risk Summary					
Fluvial / Tidal			Groundwater		
FZ2	100	% of Site	<25	32	% of Site
FZ3a	95.35	% of Site	25-50	68	% of Site
FZ3b	0	% of Site	50-75	0	% of Site
Surface Water			>75	0	% of Site
1 in 30	14.1	% of Site	Artificial		
1 in 100	22.3	% of Site	Reservoir	Y	At risk?
1 in 1000	46.7	% of Site	Canal	N	At risk?
Sewer Flooding			Town Centre		
No. Incidents	84		Y/N		Y

Flood Defences
The site is not in an area benefitting from flood defences.
Flood Warning Area
The EA Flood Warning Service is available at this site.

FLUVIAL / TIDAL

Risk Assessment (Defended) - River Thames				
Parameter	FZ3b	FZ3a	*FZ3a+CC	Units
Speed of inundation	N/A	N/A	N/D	Hrs
Min. Depth	N/A	N/A	0.65	m
Max. Depth	N/A	N/A	2.76	m
Max. Velocity	N/A	N/A	0.14	m/s
Max Flood Level	N/A	N/A	9.65	m AOD
Max Ground Level	8.3	8.3	8.3	m AOD
Min Ground Level	4.25	4.25	4.25	m AOD
Max Flood Hazard	N/A	N/A	2.45	N/A
Duration of Flood	N/A	N/A	N/D	Hrs

* The +35% Climate Change Allowance event (upper end allowance extreme case) is reviewed

Risk Assessment (Defended) - Hogsmill River				
Parameter	FZ3b	FZ3a	*FZ3a+CC	Units
Speed of inundation	N/A	9:45	7:30	Hrs
Min. Depth	N/A	0.02	0.04	m
Max. Depth	N/A	2.3	2.52	m
Max. Velocity	N/A	0.49	0.62	m/s
Max. Hazard	N/A	2.17	2.37	N/A
Duration of Flood	N/A	>18	>20	Hrs

Description of Flood Mechanism
<ul style="list-style-type: none"> The site is at risk of flooding from the Hogsmill River and the River Thames. The Hogsmill River presents the highest risk to the site. It flows 80m from the western edge of the site. Flooding is predicted to inundate the site from the north-eastern corner of the site, covering most of the site. A small area in the southern section of the site is not predicted to be at risk of flooding in the 1 in 100 year flood event. The predicted flood risk extent for the climate change scenario is greater, covering 100% of the site. The maximum flood depth, velocity and hazard ratings are all predicted to increase in the climate change scenario. Figures 1 and 2 show the fluvial flood risk from the River Thames. <p>*Note: the EA are due to update River Thames model*</p>

[Figure 1 - Fluvial Flood Depth Map](#)

Site Access / Egress
<ul style="list-style-type: none"> Safe access / egress routes should be directed to the southern end of the site, towards, The Bittoms, where there is a lower risk of flooding. Safe refuge areas must be provided on site to account for the predicted impact of climate change on the site.

[Figure 2 - Fluvial Flood Hazard Map](#)

Mitigation / FRA Requirements
<ul style="list-style-type: none"> 'More Vulnerable' development should be directed to the south of the site where the flood risk is lower. Basement developments should be limited to 'Less Vulnerable' / water compatible uses in Flood Zone 3a. Self-contained basement dwellings and bedrooms are not permitted in Flood Zone 2 (the entire site). See SFRA Level 2 Report mitigation requirement number 4.10 for additional basement stipulations. See SFRA Level 2 Report mitigation requirement numbers 4.2, 4.3, 4.4, 4.5 and 4.6 for further development stipulations. Develop a Flood Emergency and Evacuation Plan for the site. Site users should be signed up to EA's Flood Warning Service.

SURFACE WATER

Risk Assessment				
Parameter	1 in 30	1 in 100	1 in 1000*	Units
Min. Depth	0	0	0	m
Max. Depth	0.90-1.20	>1.20	>1.20	m
Max. Velocity	0.50-1.00	1.00-2.00	>2.00	m/s
Max. Hazard	1.25-2.00	1.25-2.00	>2.00	N/A

*The 1 in 1000 annual probability extent represents the potential climate change adjusted impact of current risk

Description of Flood Mechanism
<ul style="list-style-type: none"> This site is at high risk of surface water flooding. Surface water is expected to pond in the centre of the site. Climate change is predicted to increase the flood extent, covering most of the ground surface within the site. The maximum flood depth and velocity also increases in the climate change scenario.

Site Access / Egress
Safe access / egress routes should be directed to the southern end of the site, towards, The Bittoms, where there is a lower risk of flooding.

[Figure 3 - RoFSW Flood Depth Map](#)

Mitigation - Flood Risk Requirements
<ul style="list-style-type: none"> Developments should be restricted to areas of lower flood risk and directed away from the centre of the site. See SFRA - Level 2 Report mitigation requirement numbers 4.2, 4.3, 4.5, 4.6 for further development stipulations.

[Figure 4 - RoFSW Flood Hazard Map](#)

Mitigation - Surface Water Drainage
<ul style="list-style-type: none"> A Kingston SuDS Proforma must be submitted with the planning application. Developments should apply the Sustainable Drainage Hierarchy set out in Policy SI13 of the London Plan. Ground investigations are required to confirm whether infiltration based SuDS are suitable.



SITE ASSESSMENT - Bittoms Car Park

SEWER	GROUNDWATER	ARTIFICIAL
Risk Assessment	Risk Assessment	Risk Assessment
<ul style="list-style-type: none"> The site is served by separate surface water and foul sewer networks. The site falls within a postcode area where there are 84 reported flood incidents from sewer flooding. 	<ul style="list-style-type: none"> The western half of the site is classified as having 25-50% susceptibility to groundwater flooding, while the eastern half of the site is classified as having <25% susceptibility to groundwater flooding. The site is underlain by Langley Silt Member superficial deposits and London Clay bedrock geology. 	<ul style="list-style-type: none"> The site is at risk from a number of reservoirs including the Hampton (Grand Junction, Stain Hill, Sunnyside), Island Barn, Queen Elizabeth II, Queen Mother, Staines (North & South), Walton (Bessborough & Knight), and Wraysbury reservoirs. If any of these reservoirs breach on a wet day i.e. when the local rivers are at capacity, the site will be at high risk of flooding.
Mitigation Requirements	Mitigation Requirements	Mitigation Requirements
<ul style="list-style-type: none"> Applicant must consult with TWUL to confirm if the development site has historically flooded. TWUL must agree to any proposed sewer connection. If historic flooding has occurred, the applicant must show how this risk will be managed for the lifetime of the development. 	<ul style="list-style-type: none"> Applicant should carry out a screening study (as a minimum) to establish if there are any subterranean flood risk issues that may require further investigation. If there is a potential level of impact, mitigation actions must be proposed. Must be prepared by a chartered professional or specialist. 	<ul style="list-style-type: none"> Propose appropriate and proportionate risk management measures. A suitable emergency response plan should be put in place, including an emergency warning system in the event of a reservoir flooding incident. Local Authority Emergency Planning Officers must be consulted to create a reservoir failure emergency and evacuation plan.

Figure 5 - Thames Water Sewer Flood Map

Figure 6 - Areas Susceptible to Groundwater Flooding Map

Figure 7 - Outline Reservoir Flood Map

PLANNING CONSIDERATIONS

Safety of Development

<p>A. Can the development be future proofed for climate change considerations?</p> <ul style="list-style-type: none"> Yes. By restricting more vulnerable development to the southern section of the site where there is lower flood risk. See SFRA - Level 2 Report mitigation requirement numbers 4.2 and 4.4 for the required finished floor levels and flood resistant / resilient building stipulations. <p>B. Can the development be designed safe throughout its lifetime without increasing flood risk elsewhere?</p> <ul style="list-style-type: none"> Yes. The development must use surface water drainage techniques to manage surface water runoff onsite through above ground SuDS and / or below ground attenuation. Green drainage infrastructure should be prioritised to provide wider ecological / biodiversity benefits as per London Plan Policy SI 13. See SFRA - Level 2 Report mitigation requirement numbers 4.5 and 4.6 for compensatory flood storage and void stipulations. <p>C. What is the cumulative impact of the development land use change and will flood risk increase?</p> <ul style="list-style-type: none"> The development land use is changing from the 'Less Vulnerable' to 'More Vulnerable' classification. The site is proposed to be used for residential purposes. The site is currently a brownfield site with hardstanding areas. However, there are areas of green space on the site. Development must mitigate any increase in impermeable area to the site with flood plain compensation and runoff storage to prevent any increase in flood risk. An increase in impermeable area coverage on site will increase surface water runoff and flood risk if not managed properly. <p>D. How can the development reduce risk overall?</p> <ul style="list-style-type: none"> By directing development towards the southern edge of the site. Include SuDS to manage surface water runoff and reduce runoff rates to comply with Policy DM 4 in Kingston's Core Strategy. By complying with SFRA - Level 2 Report mitigation requirement numbers 4.2, 4.4 and 4.5. <p>E. Will development require a flood risk permit / watercourse consent?</p> <ul style="list-style-type: none"> No. The site is not located within 8m of a Main River or 5m of an Ordinary Watercourse. <p>F. Is the Exception Test required?</p> <ul style="list-style-type: none"> The Exception Test is required for 'More Vulnerable' development in Flood Zone 3a (the majority of the site). This can be passed by making the site safe throughout its lifetime without increasing flood risk elsewhere (see questions A, B, and C). The site could also reduce flood risk overall with appropriate SuDS and flood storage compensation measures implemented (see Mitigation - Surface Water Drainage and Mitigation - Flood Risk Requirements boxes). <p>G. What are the delivery challenges in developing at this site in terms of passing the Exception Test?</p> <ul style="list-style-type: none"> Given the high flood level expected on the site, significant floodplain compensation and voids will be required. Due to the high flood levels predicted for the 1 in 100 year + CC event, achieving the required finished floor levels may not be feasible (see SFRA requirement 4.3).



