SITE ASSESSMENT - Bittoms Car Park, The Bittoms

Address:	Bittoms Car Park, The Bittoms, Kingston upon Thames

Area:	0.34	**Ha**
Site Reference:	KNK17	

Current Use	Proposed Use
Multi-storey car park	Residential-led mixed-use development, including commercial, business and service uses

Current Vulnerability Classification	Proposed Vulnerability Classification
Less Vulnerable	More Vulnerable

Current Risk Summary					
Fluvial / Tidal			**Groundwater**		
FZ2	100	% of Site	<25	32.04	% of Site
FZ3a	95.35	% of Site	25-50	67.96	% of Site
FZ3b	0.00	% of Site	50-75	0	% of Site
Surface Water			>75	0	% of Site
1 in 30*	14.13	% of Site	**Artificial**		
1 in 100*	22.34	% of Site	Reservoir	YES	At risk?
1 in 1000*	46.67	% of Site			
Sewer Flooding					
No. Incidents within the predominant postcode					89

* return periods for potential flood events

Flood Defences
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, Hogsmill)				
Parameter	**FZ3b**	**FZ3a**	***FZ3a+CC**	**Units**
Time of Onset	N/A	9	8	Hrs
Min. Depth	N/A	0.02	0.05	m
Max. Depth	N/A	2.3	2.52	m
Max. Velocity	N/A	0.49	0.62	m/s
Max Flood Level	N/A	7.79	8.02	m AOD
Max Ground Level	N/A	8.38	8.38	m AOD
Min Ground Level	N/A	4.16	4.16	m AOD
Max Flood Hazard	N/A	2.17	2.37	N/A
Duration of Flood	N/A	>18	>19	Hrs

* The +35% Climate Change Allowance event is reviewed

Risk Assessment (Undefended, Hogsmill)			
Parameter	**FZ3a**	***FZ3a+CC**	**Units**
Time of Onset	N/D	N/D	Hrs
Min. Depth	N/D	N/D	m
Max. Depth	N/D	N/D	m
Max. Velocity	N/D	N/D	m/s
Max. Hazard	N/D	N/D	N/A
Duration of Flood	N/D	N/D	Hrs

Description of Flood Mechanism

- The highest fluvial risk at the site is from the River Hogsmill.
- The flood risk extent for the climate change scenario for the River Hogsmill and River Thames covers all of the site area.
- Climate change is predicted to increase the flood depth, hazard and flood levels in the defended scenario only.
- The site will be partially flooded from the onset and will remain flooded for in excess of 19 hours.

Note: Risk assessment defended data is for the worse case watercourse only, which is the River Hogsmill.

Figure 1 - Fluvial Flood Depth Map

Site Access / Egress

Site access and egress routes should be directed to the south east of the site towards Penrhyn Road where there is a lower risk of fluvial flooding.

Figure 2 - Fluvial Flood Hazard Map

Mitigation / FRA Requirements

- Self-contained basement dwellings and bedrooms are not permitted in FZ3a. See SFRA Level 2 Report mitigation requirement number 4.10 for additional basement stipulations.
- A FRA must be submitted as part of a planning application.
- Include appropriate flood resistance or resilience measures to address predicted flood depths.
- See SFRA Level 2 Report mitigation requirement numbers 4.2 and 4.3 for further development stipulations.
- Develop a Flood Emergency and Evacuation Plan for the site.
- Site users should be signed up to the EA's Flood Warning Service.

SURFACE WATER

Risk Assessment				
Parameter	**1 in 30**	**1 in 100**	**1 in 1000**	**Units**
Min. Depth	0.15 - 0.30	0.15 - 0.30	< 0.15	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

- The site is at high risk of surface water flooding, particularly along western side of the site.
- Climate change will increase the maximum velocity and maximum hazard of surface water flooding.

Site Access / Egress

Safe access and egress routes should be directed to the south of the site towards The Bittoms and Penrhyn Road where there is a lower risk of flooding.

Figure 3 - RoFSW Flood Depth Map

Mitigation - Flood Risk Requirements

Development should be directed away from the central and western areas of the site where there is higher risk of surface water flooding.

Figure 4 - RoFSW Flood Hazard Map

Mitigation - Surface Water Drainage

- A site-specific FRA is required for new proposals in Flood Zone 2 or 3, including minor development and change of use.
- All planning applications need a flood risk assessment and/or drainage strategy with a completed SuDS/Drainage proforma.
- Developments should apply the Sustainable Drainage Hierarchy set out in Policy SI 13 of the London Plan.
- Ground investigations are required to confirm whether infiltration SuDS are suitable.

SITE ASSESSMENT - Bittoms Car Park, The Bittoms

SEWER

Risk Assessment

• The site falls within a postcode area where there are 89 reported flood incident from sewer flooding.
• The site is assumed to be served by separate surface water and foul sewer networks, given their proximity to the site.

Figure 5 - Thames Water Sewer Flood Map

Mitigation Requirements

• Applicant must consult with TWUL to confirm if the development site has historically flooded. TWUL must agree to any proposed sewer connections.
• Where historic flooding has occurred, the applicant must show how this risk will be managed for the lifetime of the development.

GROUNDWATER

Risk Assessment

• The susceptibility to groundwater flooding of 25-50% covers 67.96% of the site and <25% covers 32.04% of the site.
• The site is mostly underlain by London Clay Formation bedrock geology and Langley Silt Member superficial deposits.

Figure 6 - Groundwater flooding map

Mitigation Requirements

• 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.

ARTIFICIAL

Risk Assessment

• This site is at risk of flooding from reservoirs based on the EA reservoir Wet Day Extent.

Figure 7 - Outline Reservoir Flood Map

Mitigation Requirements

• 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.

PLANNING CONSIDERATIONS

Safety of Development

A. Can the development be future proofed for climate change considerations?
• Yes. See SFRA - Level 2 Report Section 4 mitigation requirement number 4.2 for the required flood resistant / resilient building stipulations.

B. Can the development be designed safe throughout its lifetime without increasing flood risk elsewhere?
• 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 Section 4 mitigation requirement number 4.5 for compensatory flood storage stipulations.

C. What is the cumulative impact of the development land use change and will flood risk increase?
• The development land use is changing from 'less vulnerable' to 'more vulnerable'.
• The site is covered by impermeable areas. This offers an opportunity to improve flood attenuation through the new development.
• 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.

D. How can the development reduce risk overall?
• Direct development away from central and eastern areas of the site.
• Safe access and egress routes should be directed to the south of the site towards The Bittoms and Penrhyn Road where there is a lower risk of flooding.
• By complying with Policy DM4 of the Kingston Core Strategy (2012) through including SuDS to ensure that the development is not vulnerable to surface water, sewer and groundwater flooding and to reduce the overall level of flood risk in the borough and beyond.
• By complying with SFRA - Level 2 Report Section 4 mitigation requirement numbers 4.2, 4.3 and 4.5.

E. Will development require a flood risk permit/watercourse consent?
• No. The site is not located within 8m of a Main River or 5m of an Ordinary Watercourse.

F. Can the site pass the Exception Test?
• Yes. The Exception Test is required for this site as 95.35% of the site area in Flood Zone 3a (fluvial) and 22.34% of the site in Flood Zone 3a (surface water) and the proposed vulnerability classification is 'More Vulnerable'.
• 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 - Flood Risk Requirements' and 'Mitigation - Surface Water Drainage' boxes).

Figure 1 - Fluvial Flood Depth Map

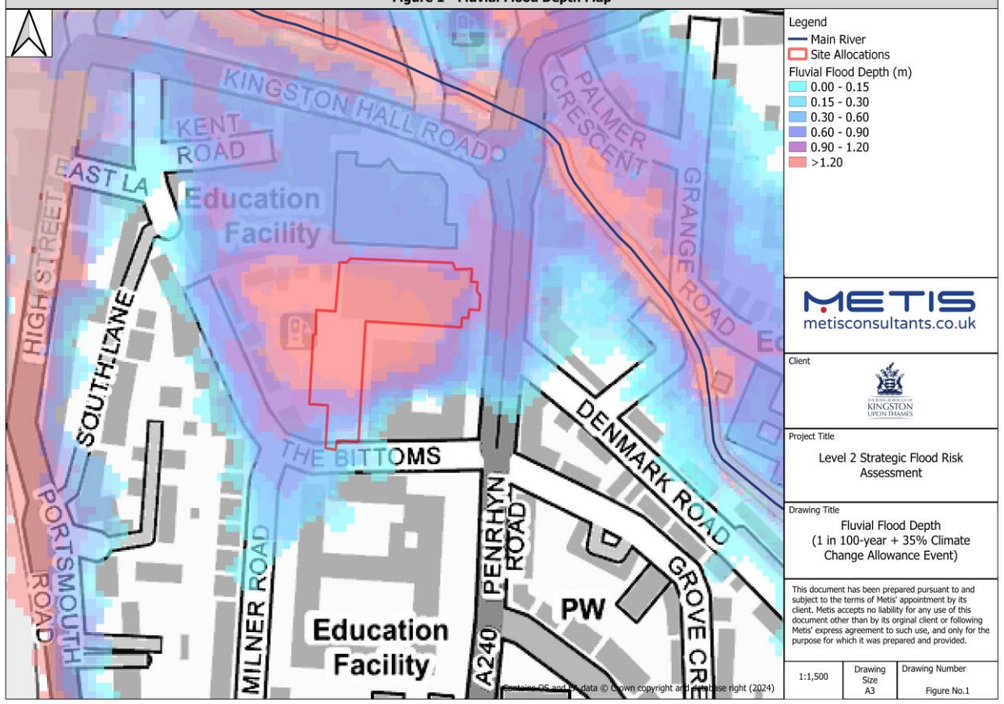


Figure 2 - Fluvial Flood Hazard Map

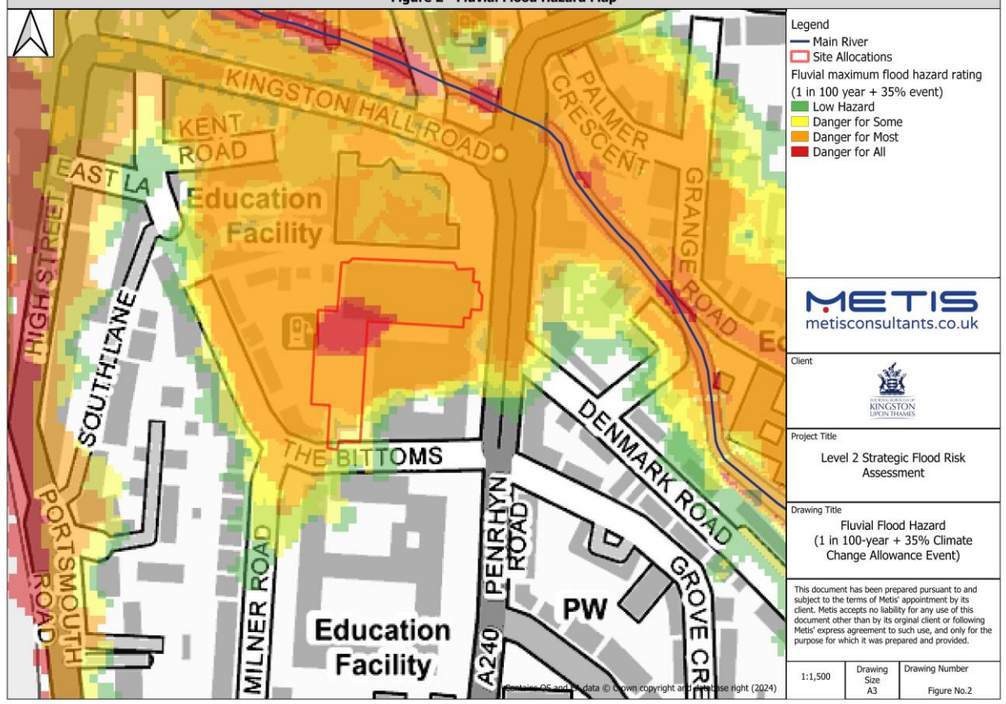


Figure 3 - RoFSW Flood Depth Map

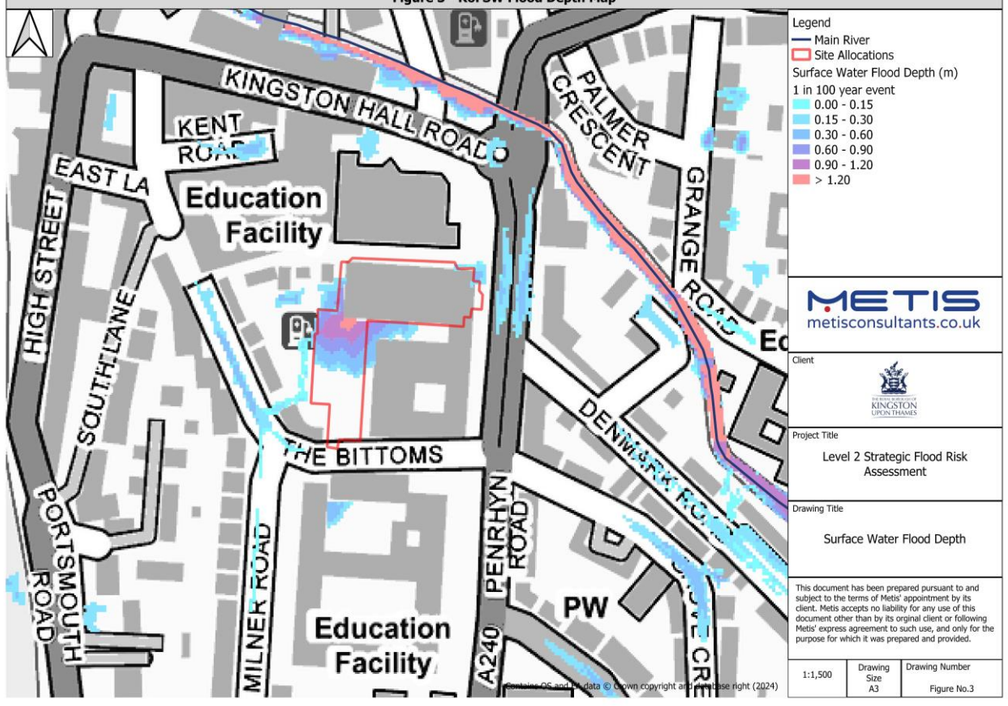


Figure 4 - RoFSW Flood Hazard Map

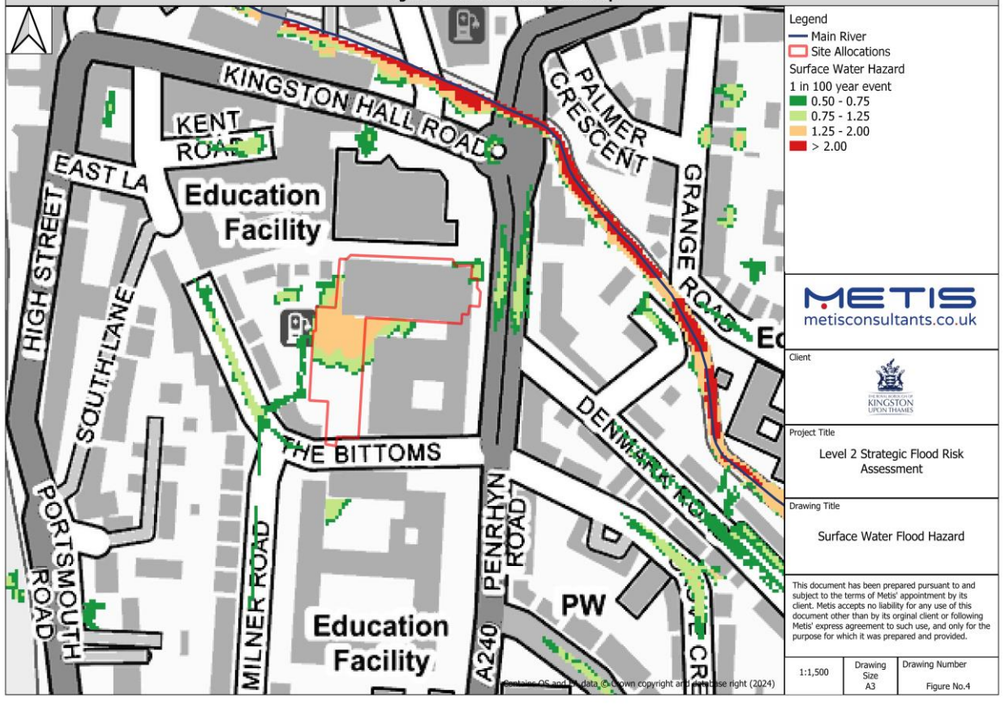
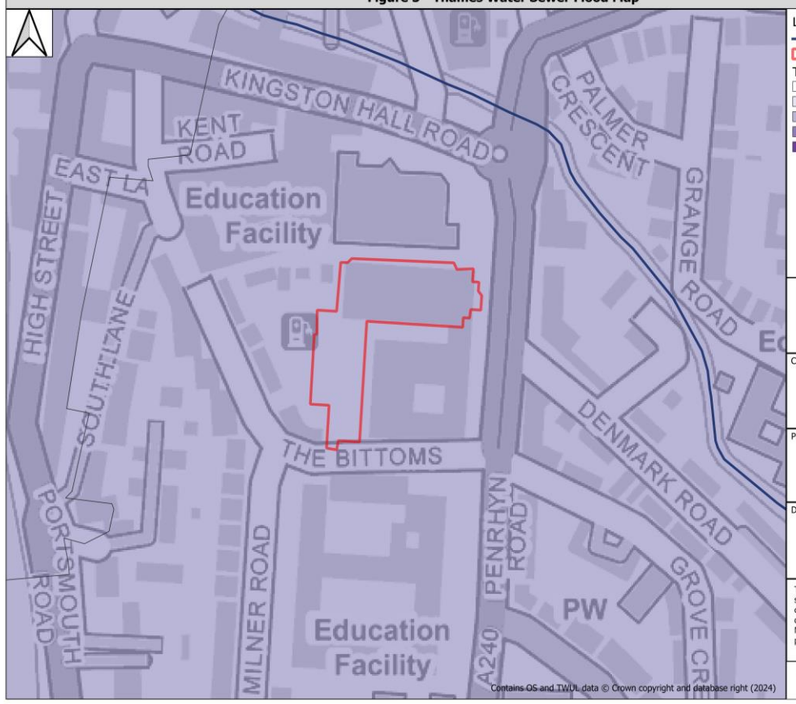


Figure 5 - Thames Water Sewer Flood Map



Legend
- Main River
- Site Allocations

Thames Water Sewer Flood Records
- 0 to 20 incidents reports
- 20 to 50 incidents reported
- 50 to 100 incidents reports
- 100 to 200 incidents reported
- More than 200 incidents reported

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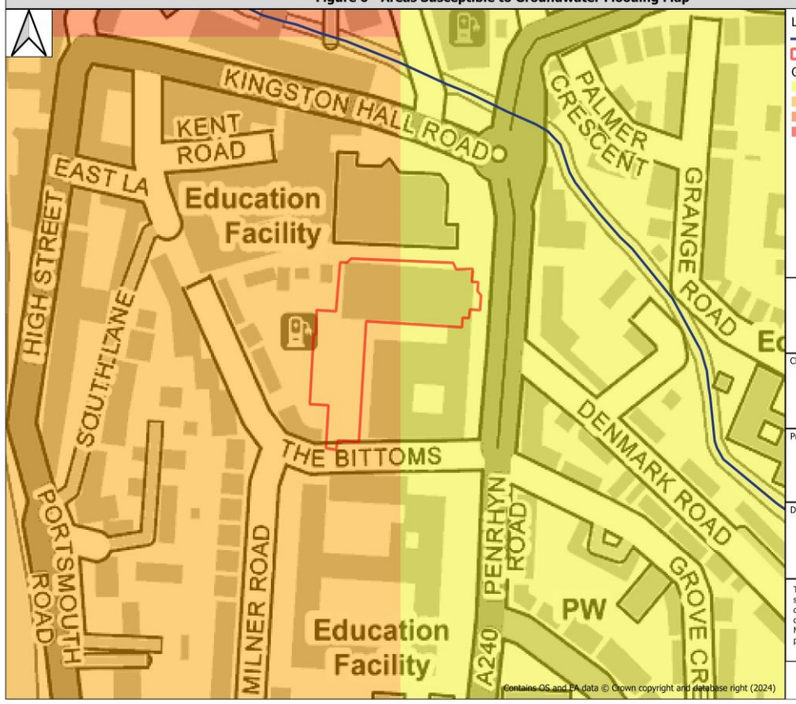
Client: The Royal Borough of Kingston upon Thames

Project Title: Level 2 Strategic Flood Risk Assessment

Drawing Title: Thames Water Sewer Flooding Records

1:1,500	Drawing Size A3	Drawing Number Figure No.5

Figure 6 - Areas Susceptible to Groundwater Flooding Map



Legend
- Main River
- Site Allocations

Groundwater Flood Risk
- < 25%
- >= 25% <50%
- >= 50% <75%
- >= 75%

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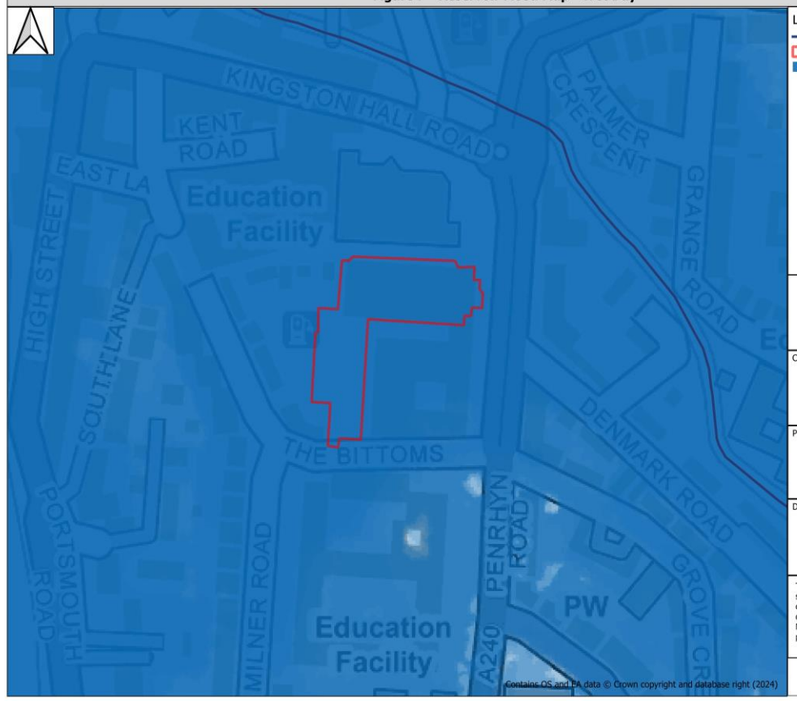
Project Title: Level 2 Strategic Flood Risk Assessment

Drawing Title: Areas Susceptible to Groundwater Flooding

1:1,500	Drawing Size A3	Drawing Number Figure No.6

Figure 7 - Reservoir Flood Map - Wet Day



Legend
- Main River
- Site Allocations
- Reservoir Flood Extents (Wet Day)

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Client: The Royal Borough of Kingston upon Thames

Project Title: Level 2 Strategic Flood Risk Assessment

Drawing Title: Reservoir Flood Extents (Wet Day)

1:1,500	Drawing Size A3	Drawing Number Figure No.7