SITE ASSESSMENT - Burlington Retail Park (St. James)

Address: Burlington Road, New Malden, KT3 4PA

Area: 1.24 **Ha**

Site Reference: SA 089

Current Use	Proposed Use
Retail Park, Car Park	Mixed Use including Commercial, Residential (162 units if 100% residential)

Current Vulnerability Classification	Proposed Vulnerability Classification
Less Vulnerable	More Vulnerable

Current Risk Summary					
Fluvial / Tidal			**Groundwater**		
FZ2	25.87	% of Site	<25	2.65	% of Site
FZ3a	0.19	% of Site	25-50	39.6	% of Site
FZ3b	0.19	% of Site	50-75	57.75	% of Site
Surface Water			>75	0	% of Site
1 in 30	0.09	% of Site	**Artificial**		
1 in 100	2.13	% of Site	Reservoir	N	At risk?
1 in 1000	35.2	% of Site	Canal	N	At risk?
Sewer Flooding			**Town Centre**		
No. Incidents		105	Y/N	N	

Flood Defences

The site is not in an area benefitting from flood defences.

Flood Warning Area

The EA Flood Warning Service is available in the north-east corner and southern part of the site.

FLUVIAL / TIDAL

Risk Assessment (Defended)				
Parameter	**FZ3b**	**FZ3a**	***FZ3a+CC**	**Units**
Speed of inundation	N/A	N/A	N/A	Hrs
Min. Depth	N/A	N/A	N/A	m
Max. Depth	N/A	N/A	N/A	m
Max. Velocity	N/A	N/A	N/A	m/s
Max Flood Level	N/A	N/A	N/A	m AOD
Max Ground Level	N/A	N/A	N/A	m AOD
Min Ground Level	N/A	N/A	N/A	m AOD
Max Flood Hazard	N/A	N/A	N/A	N/A
Duration of Flood	N/A	N/A	N/A	Hrs

* The +20% Climate Change Allowance event is reviewed

Risk Assessment (Undefended)				
Parameter	**FZ3b**	**FZ3a**	***FZ3a+CC**	**Units**
Speed of inundation	N/A	N/A	N/A	Hrs
Min. Depth	N/A	N/A	N/A	m
Max. Depth	N/A	N/A	N/A	m
Max. Velocity	N/A	N/A	N/A	m/s
Max. Hazard	N/A	N/A	N/A	N/A
Duration of Flood	N/A	N/A	N/A	Hrs

Description of Flood Mechanism

- The Beverley Brook flows directly along the eastern border of the site. It is culverted along the south-east border.
- Although the eastern border of the site is at risk of flooding in the 1 in 100 year event, only a very small amount extends within the site boundary. This is the same for the climate change scenario. However, only the 1 in 100 + 20% scenario was available so is likely an underestimation of the fluvial flood risk to the site with climate change.
- The eastern border and the north east section of the site are located within Flood Zone 2.

Figure 1 - Fluvial Flood Depth Map

Site Access / Egress

Safe access / egress routes should be directed away from the eastern border to areas where there is no risk of flooding.

Figure 2 - Fluvial Flood Hazard Map

Mitigation / FRA Requirements

- Development should be directed away from the eastern border of the site.
- Self-contained residential basements and bedrooms at basement level will not permitted (SFRA Level 2 Report mitigation requirement numbers 4.10).
- See SFRA Level 2 Report mitigation requirement numbers 4.2, 4.4 and 4.5 for further development stipulations.
- Applicant must consult with the EA to confirm that the lifetime of the culvert surpasses the lifetime of the development.
- See Level 2 Report mitigation requirement number 4.8 for Main River stipulations.
- Develop a Flood Emergency and Evacuation Plan for the site.

SURFACE WATER

Risk Assessment				
Parameter	**1 in 30**	**1 in 100**	**1 in 1000***	**Units**
Min. Depth	N/A	0.00-0.15	0.00-0.15	m
Max. Depth	N/A	0.30-0.60	0.60-0.90	m
Max. Velocity	N/A	0.25-0.50	0.50-1.00	m/s
Max. Hazard	N/A	1.25-2.00	1.25-2.00	N/A

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

Description of Flood Mechanism

- A small extent of flooding is predicted along the southern section of Albert Road, which forms the western border of the site.
- Climate change is predicted to increase the extent of flooding within the site. Surface water is predicted to pool in the northern section of the site in the 1 in 1000 year flood event.
- Climate change is predicted to increase the max flood depth / hazard.

Site Access / Egress

Site access / egress routes should be directed toward the north-west corner of the site where there is a lower risk of flooding.

Figure 3 - RoFSW Flood Depth Map

Mitigation - Flood Risk Requirements

- Developments should be directed to areas of lower flood risk and directed away from the south-eastern corner 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

- 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 - Burlington Retail Park (St. James)

SEWER

Risk Assessment

• The majority of the site falls within a postcode area where there are 105 reported flood incidents from sewer flooding.
• A very small area in the south section of the site is within a postcode that has 65 sewer flood incident reports.
• The site is likely served by surface water sewers located along Albert Road and Burlington Road.

Figure 5 - Thames Water Sewer Flood Map

Mitigation Requirements

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

GROUNDWATER

Risk Assessment

• The eastern half of the site is classified as having 50-75% susceptibility to groundwater flooding, while the western half of the site is classified as having 25-50% susceptibility to groundwater flooding.
• The site is underlain by London Clay bedrock geology. The site is underlain by the Kempton Park Gravel member superficial deposits, except for the north-west corner of the site.

Figure 6 - Areas Susceptible to 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 not risk of flooding from reservoirs.

Figure 7 - Outline Reservoir Flood Map

Mitigation Requirements

• No mitigation required.

PLANNING CONSIDERATIONS

Safety of Development

A. Can the development be future proofed for climate change considerations?
• Yes. By directing development away from the eastern border and the north-east corner to areas of lower flood risk.
• See SFRA - Level 2 Report mitigation requirement numbers 4.3 and 4.4 for the required finished floor levels and 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 mitigation requirement number 4.5 for compensatory flood storage stipulations.
• By ensuring that the lifetime of the Beverley Brook culvert surpasses the lifetime of the development.

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'. Residential uses are being proposed.
• The site is currently a brownfield site with hardstanding areas and little green space. This offers an opportunity to improve flood attenuation through 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.

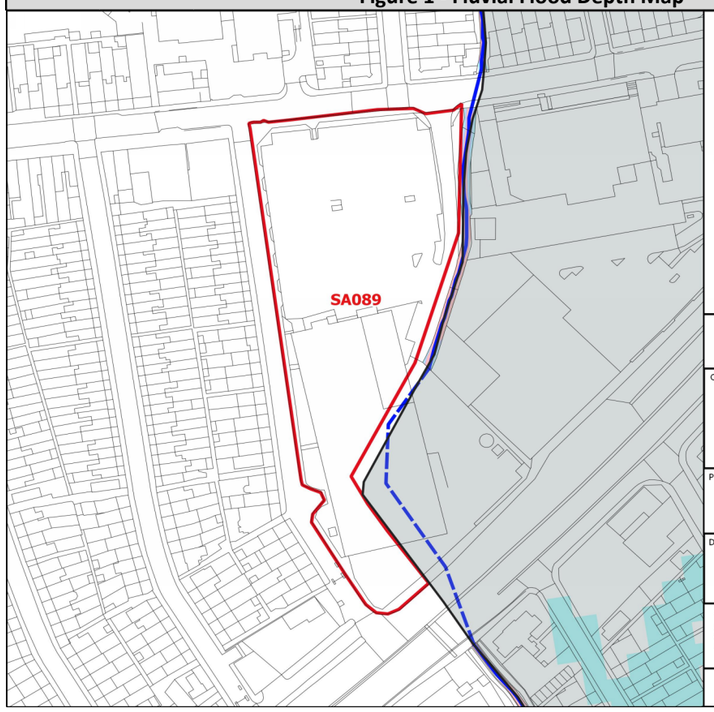
D. How can the development reduce risk overall?
• Directing development away from the south-eastern corner and centre of the site.
• Include SuDS to manage surface water runoff and reduce runoff rates to comply with Policy DM 4 in Kingston's Core Strategy.
• By complying with SFRA - Level 2 Report mitigation requirement numbers 4.3, 4.4 and 4.5.

E. Will development require a flood risk permit/watercourse consent?
• Yes. See Level 2 Report mitigation requirement number 4.8 for Main River stipulations.

F. Is the Exception Test required?
• The Exception Test may be required for 'More Vulnerable' development along the eastern border of the site (Flood Zone 3a).
• It can be passed if the development can be made safe throughout its lifetime across the site 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).

G. What are the delivery challenges in developing at this site in terms of passing the Exception Test?
• Any new development must be set back by 8m from the bank of the Beverley Brook (see mitigation requirement number 4.8)
• Additional flood modelling may be required to assess the flood depths in the 1 in 100 year + 35% climate change scenario.

Figure 1 - Fluvial Flood Depth Map



Legend

- Kingston borough boundary
- Site Allocations

Detailed River Network
- Main River
- Main River - Culverted
- Ordinary Watercourse
- Ordinary Watercourse - Culverted

Fluvial maximum flood depth (m) - 1 in 100 year + 20% event
- 0.00 - 0.15
- 0.15 - 0.30
- 0.30 - 0.60
- 0.60 - 0.90
- 0.90 - 1.20
- >1.20

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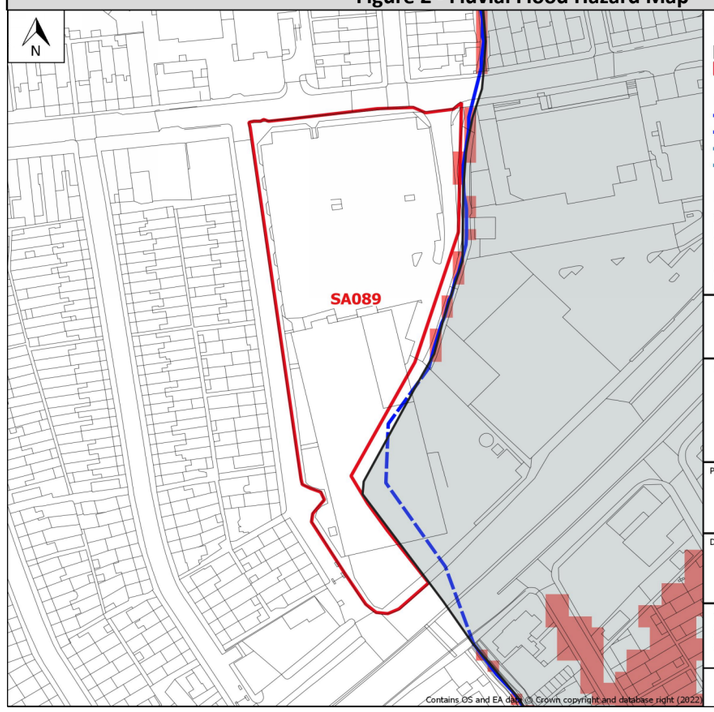
Client: The Royal Borough of Kingston upon Thames

Project Title: Level 2 Strategic Flood Risk Assessment

Drawing Title: Fluvial flood depth (1 in 100-year+20% Climate Change Allowance Event)

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

Figure 2 - Fluvial Flood Hazard Map



Legend

- Kingston borough boundary
- Site Allocations

Detailed River Network
- Main River
- Main River - Culverted
- Ordinary Watercourse
- Ordinary Watercourse - Culverted

Fluvial maximum flood hazard rating (1 in 100 year + 20% event)
- Low Hazard
- Danger for Some
- Danger for Most
- Danger for All

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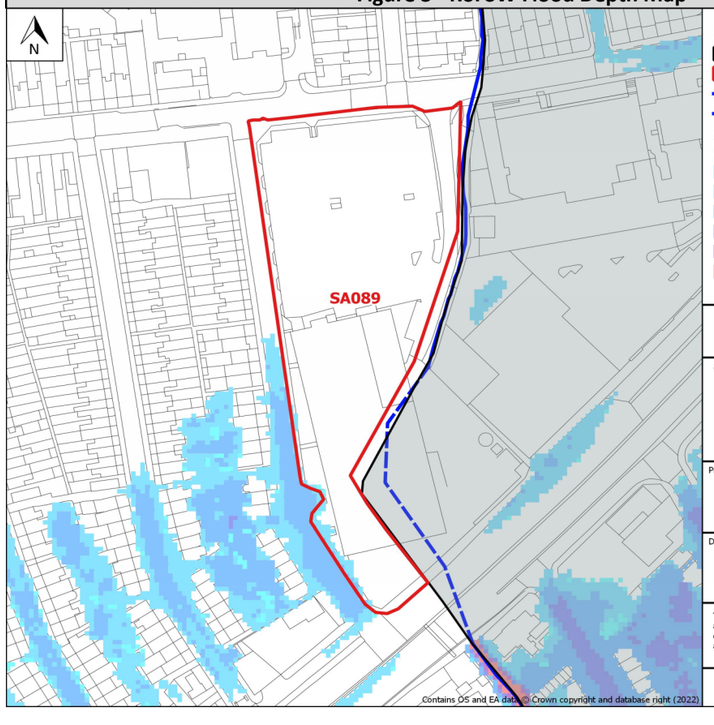
Project Title: Level 2 Strategic Flood Risk Assessment

Drawing Title: Fluvial flood hazard (1 in 100-year+20% Climate Change Allowance Event)

1:1,500 | Drawing Size A4 | Drawing Number Figure No.2

Figure 3 - RoFSW Flood Depth Map



Legend

- Kingston borough boundary
- Site Allocations
- Main River
- Main River - Culverted

Surface Water flood depth (m) 1 in 100-year flood
- 0.00 - 0.15
- 0.15 - 0.30
- 0.30 - 0.60
- 0.60 - 0.90
- 0.90 - 1.20
- > 1.20

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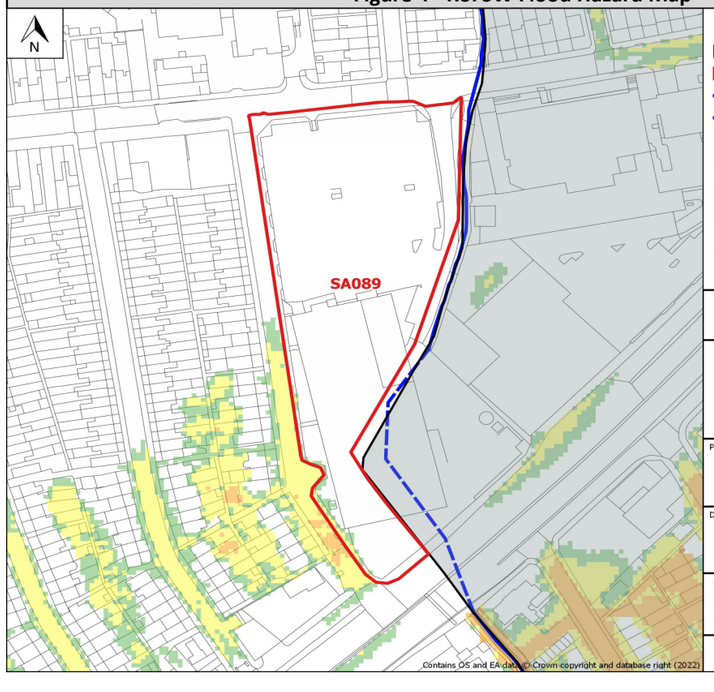
Project Title: Level 2 Strategic Flood Risk Assessment

Drawing Title: Surface Water flood depth

1:1,500 | Drawing Size A3 | Drawing Number Figure No.3

Figure 4 - RoFSW Flood Hazard Map



Legend

- Kingston borough boundary
- Site Allocations
- Main River
- Main River - Culverted

Surface Water Hazard 1 in 100-year flood
- Low Hazard
- Danger for Some
- Danger for Most
- Danger for All

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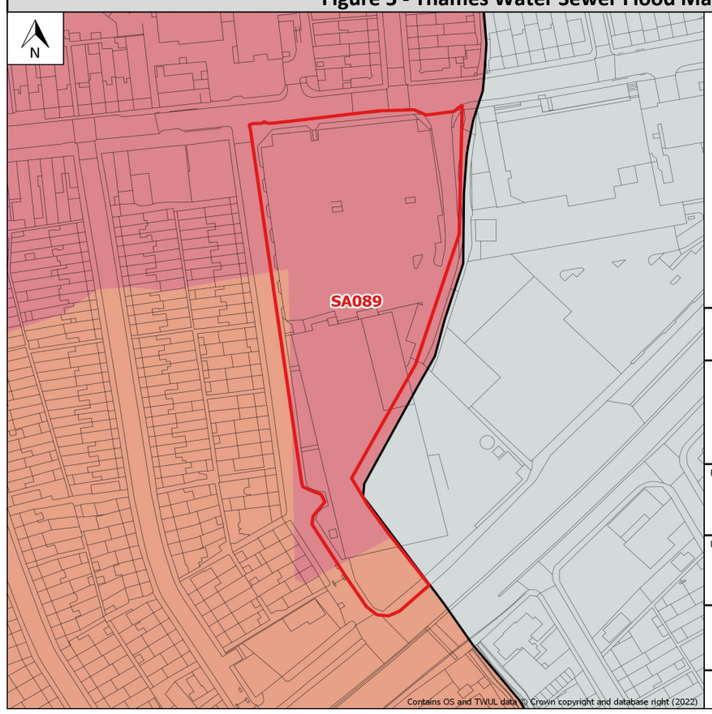
Project Title: Level 2 Strategic Flood Risk Assessment

Drawing Title: Surface Water flood hazard

1:1,500 | Drawing Size A3 | Drawing Number Figure No.4

Figure 5 - Thames Water Sewer Flood Map



Legend
- Kingston borough boundary
- Site Allocations

Sewer flooding
- 0 - 50
- 50 - 100
- 100 - 150
- 150 - 200
- > 200

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THE ROYAL BOROUGH OF KINGSTON UPON THAMES

Project Title

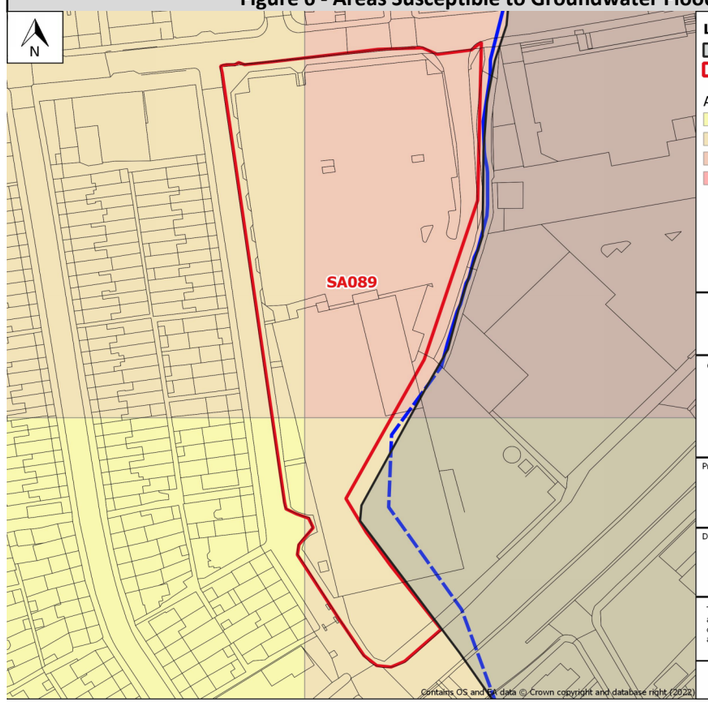
Level 2 Strategic Flood Risk Assessment

Drawing Title

Thames Water 2022 Sewer Flooding Records

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

Figure 6 - Areas Susceptible to Groundwater Flooding Map



Legend
- Kingston borough boundary
- Site Allocations

Areas Susceptible to Groundwater Flooding
- < 25%
- >= 25% <50%
- >= 50% <75%
- >= 75%

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THE ROYAL BOROUGH OF KINGSTON UPON THAMES

Project Title

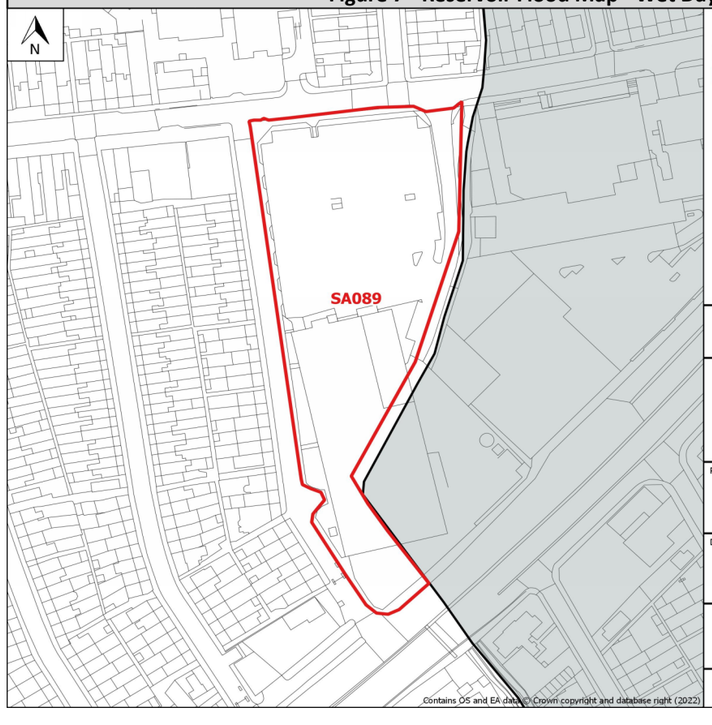
Level 2 Strategic Flood Risk Assessment

Drawing Title

Areas Susceptible to Groundwater Flooding

1:1,500	Drawing Size A4	Drawing Number Figure No.6

Figure 7 - Reservoir Flood Map - Wet Day



Legend
- Kingston borough boundary
- Site Allocations
- Reservoir Flood Extents (Wet Day)

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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