

West Thames – Surface Water Flood Risk Assessment (FRA) Guidance note and pro-forma for Major development parcel drainage

PURPOSE OF THIS DOCUMENT

This document is a modified version to the West Thames – Surface Water Flood Risk Assessment (FRA) Guidance note and pro-forma that we supply to local authorities for use with developments over 1 Ha in size.

This version is intended for use on major developments where reserved matters or discharge of condition applications will come forward in phases or for individual parcels. The attached pro forma should be submitted along with a detailed drainage plan, and supporting calculations to demonstrate that the parcel/phase drainage is consistent with the overall drainage strategy and NPPF. This give developers, local authorities and the Environment Agency a standard template in which to submit and review information, speeding up the approval process.

INTRODUCTION

To be acceptable as a FRA the applicant should confirm as a minimum:

1. That it will be feasible to balance surface water run-off to the Greenfield run-off rate for all events up to the 1 in 100 year storm (including additional climate change allowance*). The FRA should set out how this will be achieved, or if the development is Brownfield, achieve betterment in the surface water runoff regime. It must be demonstrated that surface water runoff will not increase flood risk to the development or third parties.

* *Climate Change* - An allowance for climate change needs to be incorporated, which means adding an extra amount to peak rainfall (20% for commercial development, 30% for residential).

2. How sustainable drainage system techniques (SuDS) will be used with any obstacles to their use clearly justified.
3. That the residual risk of flooding has been addressed should any drainage features fail or if they are subjected to an extreme flood event. Overland flow routes or above ground storage of water should not put people and property at unacceptable risk. This could include measures to manage residual risk such as raising ground or floor levels where appropriate.

The applicant should confirm these above points to you by using the pro-forma which is contained below. This should be completed by the developer and returned to you. The top part of the pro-forma includes a section where the developer can clearly state what the difference in rates and volumes as a result of the development will be. The lower sections are provided to show that the

developer can explain how drainage rates and volumes are being dealt with on the site in order to not increase rates and volumes. The pro-forma includes a column where the developer should identify where the information is demonstrated. If the pro-forma is completed and signed by the developer, this can serve as a summary of the surface water strategy on the site and will allow them to demonstrate that they have complied with the Technical Guidance to the National Planning Policy Framework (NPPF).

INFORMATION

Climate Change

The NPPF provides advice on the impact of climate change. Table 5 of the Technical Guidance indicates that surface water FRAs should allow for an increase of 30% in peak rainfall intensity for developments still in existence by 2085 (20% for developments with a life expectancy which ends prior to 2085).

Sustainable Drainage Systems (SuDS)

Surface water run-off should be controlled as near to its source as possible through a sustainable drainage approach to surface water management. SuDS seek to mimic natural drainage systems and retain water on or near to the site, when rain falls, in contrast to traditional drainage approaches, which tend to pipe water off site as quickly as possible. SuDS therefore offer significant advantages over conventional piped drainage systems and will be applicable to most sites.

Government policy set out in paragraph 103 of the NPPF expects Local Planning Authorities (LPAs) to give priority to the use of SuDS in determining planning applications. Further support for SuDS is set out in chapter 5 of the Planning Policy Statement 25 (PPS25) Practice Guide.

Approved Document Part H of the Building Regulations 2010 also establishes a hierarchy for surface water disposal, which encourages a SuDS approach beginning with infiltration where possible e.g. soakaways or infiltration trenches. Where SuDS are used, it must be established that these options are feasible, can be adopted and properly maintained and would not lead to any other environmental problems.

Where the intention is to dispose to soakaway, these should be shown to work through an appropriate assessment carried out under Building Research Establishment (BRE) Digest 365.

Further information and references on SuDS can be found in chapter 5 of the PPS25 Practice Guide. The Interim Code of Practice for Sustainable Drainage Systems provides advice on design, adoption and maintenance issues and a full overview of other technical guidance on SuDS. The Interim Code of Practice is available electronically on CIRIA's web site at:

http://www.ciria.com/suds/interim_code.htm.

Disposal of surface water to public sewer

Before disposal of surface water to the public sewer is considered all other options set out in Approved Document Part H of the Building Regulations 2010 should be exhausted. When no other practicable alternative exists to dispose of surface water other than the public sewer, the Water Company or its agents should confirm that there is adequate spare capacity in the existing system taking future development requirements into account.

Designing for exceedence

For on/near site flooding, the PPS25 Practice Guide at paragraph 5.51 states that:

“For events with a return-period in excess of 30 years, surface flooding of open spaces such as landscaped areas or car parks is acceptable for short periods, but the layout and landscaping of the site should aim to route water away from any vulnerable property, and avoid creating hazards to access and egress routes (further guidance in CIRIA publication C635 Designing for exceedence in urban drainage - good practice). No flooding of property should occur as a result of a 1 in 100 year storm event (including an appropriate allowance for climate change). In principle, a well-designed surface water drainage system should ensure that there is little or no residual risk of property flooding occurring during events well in excess of the return-period for which the sewer system itself is designed. This is called designing for event exceedence.”

The CIRIA publication 'Designing for exceedence in urban drainage-good practice' can be accessed via the following link:

http://www.ciria.com/suds/ciria_publications.htm

For off-site flooding, the PPS25 Practice Guide states at paragraph 5.54:

“For the range of annual flow rate probabilities up to and including the one per cent annual exceedence probability (1 in 100 years) event, including an appropriate allowance for climate change, the developed rate of run-off into a watercourse, or other receiving water body, should be no greater than the existing rate of run-off for the same event. Run-off from previously-developed sites should be compared with existing rates, not greenfield rates for the site before it was developed. Developers are, however, strongly encouraged to reduce runoff rates from previously-developed sites as much as is reasonably practicable. Volumes of run-off should also be reduced wherever possible using infiltration and attenuation techniques. Interim guidance on calculation of site run-off rates can be found on the CIRIA website: <http://www.ciria.org>

Note:

Development which involves a culvert or an obstruction to flow on an Ordinary Watercourse will require consent under the Land Drainage Act 1991 and the Floods and Water Management Act 2010. In the case of an Ordinary Watercourse the responsibility for Consenting lies with the Lead Local Flood Authority (LLFA). An Ordinary Watercourse is defined as any watercourse not identified as a Main River on maps held by the Environment Agency (www.environment-agency.gov.uk) and DEFRA. For further information on Ordinary Watercourses contact the LLFA.

Environment Agency, West Thames, SE Region Surface Water Pro-forma

This pro-form accompanies our surface water guidance note on sites between 1-5 hectares. Developers should complete this form and return to the Local Authority and indicate where the evidence is provided within their submission document for the answers given.

1. Site Details

Site and Parcel number	
Address & post code	
Outline application number	
Reserved matters application number	
Discharge of condition application number	
Grid reference	
Is the existing site developed or Greenfield?	
Total Parcel Area (Ha)	
Over arching drainage strategy document reference	

2. Impermeable Area

	Existing	Proposed	Difference (proposed-existing)	Notes for developers & Local Authorities
Impermeable area (ha)				If proposed > existing then runoff volumes will be increasing. Section 6 must be filled in. If proposed ≤ existing, then section 6 can be skipped & section 7 filled in.
Drainage Method (infiltration/sewer/watercourse)				If different from the existing, please fill in section 3. If existing infiltrated & proposed does not, discharge volumes may increase. Fill in section 6.

3. Proposing to discharge surface water via

	Y	N	Evidence that this is possible	Notes for developers & Local Authorities
Infiltration				e.g. soakage tests. Section 6 (infiltration) must be filled in if infiltration is proposed.
To watercourse				e.g. Is there a watercourse near by?
To surface water sewer				Confirmation from sewer provider that sufficient capacity exists for this connection.
Combination of above				e.g. part infiltration part discharge to sewer. Provide evidence above.

4. Peak Discharge Rates (The maximum flow rate at which surface water leaves the site during a particular storm event)

	Existing Rates (l/s)	Agreed rates for this parcel/phase from overall strategy (l/s)	Proposed Rates (l/s)	Difference (l/s) (proposed-existing)	Notes for developers & Local Authorities
Greenfield QBAR					QBAR is approx. 1 in 2 storm event. Provide this if Section 6 (QBAR) is proposed.
1 in 1					Proposed discharge rates (with mitigation) should be no greater than existing rates for all corresponding storm events. e.g. discharging all flow from site at the existing 1 in 100 event increases flood risk during smaller events.
1 in 30					
1 in 100					
1 in 100 plus climate change					To mitigate for climate change the proposed 1 in 100 +CC must be no greater than the existing 1 in 100 runoff rate. If not, flood risk increases under climate change. Use 30% for climate change where life time of the development is 100 yrs (e.g. residential) and 20% when the life span is 60 yrs (e.g. commercial). See NPPF table 5

5. Discharge Volumes (The total volume of surface water leaving the site during a particular storm event)

	Existing Volume (m ³)	Proposed Volume (m ³)	Difference (m ³) (proposed-existing)	Notes for developers & Local Authorities
1 in 1				Proposed discharge volumes (without mitigation) should be no greater than existing volumes for all corresponding storm events. Any increase in volume increases flood risk elsewhere. Where volumes are increased section 6 must be filled in.
1 in 30				
1 in 100				
1 in 100 plus climate change				To mitigate for climate change the volume discharge from site must be no greater than the existing 1 in 100 storm event. If not, flood risk increases under climate change.

6. Mitigation for increased discharge volumes

		Notes for developers & Local Authorities
Infiltration	<p>State the Site's Geology</p> <p>State Infiltration rate (m/s)</p> <p>State the distance between the infiltration device base and the ground water (GW) level</p> <p>Were infiltration rates obtained by desk study or infiltration test?</p> <p>Is the site contaminated?</p>	<p>Avoid infiltrating in made ground. Infiltration rates are highly variable</p> <p>Infiltration rates should be no lower than 1×10^{-6} m/s.</p> <p>Need 1m (min) between the base of the infiltration device & the water table to protect GW quality & ensure GW doesn't enter infiltration devices. Avoid infiltration where this isn't possible.</p> <p>Infiltration rates can be estimated from desk studies at most stages of the planning system if a back up attenuation scheme is provided. Fill in section 6 QBAR or Trickle rate as well if infiltration rates were estimated. Infiltration test results in accordance to BRE 365 must be submitted at discharge of condition stage.</p> <p>Water should not be infiltrated through contaminated land.</p>

OR QBAR	Will runoff from the 1 in 100 plus climate change event be discharged at Greenfield QBAR?		Discharging the entire site's runoff during the 1 in 100 plus CC storm at the QBAR rate means that the runoff is released so slowly that the extra runoff volume has a negligible impact downstream.
	Storage (m ³) required to discharge at QBAR		Volume of water to attenuate on site if discharging at QBAR. Not to be confused with discharge volumes.
	Where is this storage located?		
OR Trickle rate	Will existing volumes be discharged at existing rates?		Releasing the extra volume at 2l/s will have a negligible impact on the receiving watercourse downstream. Storage for the existing volumes must be kept separate from storage for the extra volume otherwise instead of discharging the extra volume at 2l/s/ha, the extra volume will be released at a rate that equal the existing rate + 2l/s/ha. This increases flood risk. See Preliminary Rainfall Runoff Management for developments Rev E for further details.
	Will the <u>extra volume</u> be discharged at 2l/s/ha?		
	Storage (m ³) needed for the existing runoff		
	Storage (m ³) need for the <u>extra</u> runoff		
	Where are these storage areas located?		

7. Change in rates only Fill in if either discharge volume will not be increased or only the increased in runoff volumes are being infiltrated

		Notes for developers & Local Authorities
Storage volume required to retain rates as existing (m ³)		Volume of water to attenuate on site if discharging at existing rates.
Where is storage to be accommodated on site		Can't be used where discharge volumes are increasing

8. Please confirm

		Notes for developers & Local Authorities
Which Sustainable Drainage Systems (SUDS) measures have been used		SUDS can be adapted for most situations even where infiltration isn't feasible e.g. impermeable liners beneath some SUDS devices allows treatment but not infiltration. See CIRIA SUDS Manual C697.
Drainage system can contain in the 1 in 30 storm event without flooding		This a requirement for sewers for adoption & is good practice even where drainage system is not adopted.
Any flooding between the 1 in 30 & 1 in 100 plus climate change storm events will be safely contained on site.		Safely: not causing property flooding or posing a hazard to site users i.e. no deeper than 300mm on roads/footpaths. Flood waters must drain away at section 6 rates. Existing rates can be used where runoff volumes are not increased.
How are rates being restricted (vortex flow control etc)		Vortex flow control or similar to be used where rates are between 2l/s to 5l/s. Orifices not be used below 5l/s as the pipes may block. Pipes with flows < 2l/s are prone to blockage.

9. Evidence Please identify where the details quoted in the sections above were taken from. i.e. Plans, reports etc

Pro-forma Section	Document reference where details quoted above are taken from	Page Number
Section 2		
Section 3		
Section 4		
Section 5		
Section 6		
Section 7		
Section 8		
Please include full references for the relevant drainage plans and calculations that support this pro forma (if not listed in Section 2-8 of this box.) These should be appended to this pro forma.		

The above form should be completed using evidence from the Flood Risk Assessment and site plans. It should serve as a summary sheet of the drainage proposals and should clearly show that the proposed rate and volume as a result of development will not be increasing. If there is an increase in rate or volume, the rate or volume section should be completed to set out how the additional rate/volume is being dealt with.

This form is completed using factual information from the Flood Risk Assessment and Site Plans and can be used as a summary of the surface water drainage strategy on this site.

Form Completed By.....

Qualification of person responsible for signing off this pro-forma

Company.....

On behalf of (Client's details)

Date:.....