Essex County Council

SuDS Water quantity and Quality – LLFA Technical Assessment Proforma

Introduction

This proforma identifies the information required by Essex LLFA to enable technical assessment the Designers approach to water quantity and water quality as part of SuDS design approach in compliance with Essex SuDS Design Guide.

Completion of the proforma will also allow for technical assessment against Non-statutory technical standards (NSTS) for Sustainable Drainage. The proforma will accompany the site specific Flood Risk Assessment and Drainage Strategy submitted as part of the planning application.

Please complete this form in full for full applications and the coloured sections for outline appllications. This will help us identify what information has been included and will assist with a smoother and quicker application.

Instructions for use

Use the units defined for input of figures

Numbers in brackets refer to accompanying notes.

Where ……m^3 .....m^3/m^2 *are noted – both values should be filled in.*

Site details

1.1	Planning application reference (if known)	-		
1.2	Site name	Hartford End, Felsted		
1.3	Total application site area (1)	2.41	ha	
1.4	Predevelopment use (4)	Greenfield		
1.5	Post development use	Residential		
	If other, please sepcify	-		
1.6	Urban creep applicable	Yes	if yes, factor applied:	10%
1.7	Proposed design life / planning application life	100		
1.8	Method(s) of discharge: (5)			

☐ *Reuse* ☐ *Infiltration* ☐ *Hybrid* ☑ *Waterbody* ☐ *Storm sewer* ☐ *Combined sewer*

1.9	Is discharge direct to estuary / sea	No
1.10	Have agreements in principle (where applicable) for discharge been provided	No

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Calculation inputs

2.1	Area within site which is drained by SuDS (2)	9754	m^2
2.2	Impermeable area drained pre development (3)	0	m^2
2.3	Impermeable area drained post development (3)	9754	m^2
2.4	Additional impermeable area (2.3 minus 2.2)	342	m^2
2.5	Method for assessing greenfield runoff rate	IH124	
2.6	Method for assessing brownfield runoff rate	-	
2.7	Coefficient of runoff (Cv) (6)	.75	
2.8	Source of rainfall data (FEH Preferred)	FSR	
2.9	Climate change factor applied 45	%	

Attenuation (positive outlet)

2.10 Drainage outlet at risk of drowning (tidal locking, elevated water levels in watercourse/sewer)
Note: Vortex controls require conditions of free discharge to operate as per manufacturers specification.

2.11 Invert level at final outlet TBC mAOD

2.12 Design level used for surcharge water level at point of discharge (16) 43.27 mAOD

Infiltration (Discharge to Ground)

2.13 Have infiltration tests been undertaken No

2.14 If yes, which method has been used -

2.15 Infiltration rate (where applicable) - m/s

2.16 Depth to highest known ground water table - mAOD

2.17 If there are multiple infiltration features please specify where they can be found in the FRA -

2.18 Depth of infiltration feature - mAOD

2.19 Factor of safety used for sizing infiltration storage -

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Calculation outputs

Sections 3 and 4 refer to site where storage is provided by full attenuation or partial infiltration. Where all flows are infiltrated to ground go straight to Section 6.

3.0	**Greenfield runoff rates** (incl. Urban Creep)			
3.1	1 in 1 year rainfall	l/s/ha, 4.7	l/s for the site	
3.2	1 in 30 year rainfall	l/s/ha, 10.8	l/s for the site	
3.3	1 in 100 year rainfall + CCA	l/s/ha, 13.8	l/s for the site	
4.0	**Brownfield runoff rates** (incl. Urban Creep)			
4.1	1 in 1 year rainfall	l/s/ha, -	l/s for the site	
4.2	1 in 30 year rainfall	l/s/ha, -	l/s for the site	
4.3	1 in 100 year rainfall + CCA	l/s/ha, -	l/s for the site	
5.0	Proposed maximum rate of runoff from site (incl. Urban Creep) (7)			
5.1	1 in 1 year rainfall	~~4.7~~ l/s/ha, 4.7	l/s for the site	
5.2	1 in 30 year rainfall	~~4.7~~ l/s/ha, 4.7	l/s for the site	
5.3	1 in 100 year rainfall + CCA	~~4.7~~ l/s/ha, 4.7	l/s for the site	
6.0	Attenuation storage to manage flow rates from site (incl. **Climate Change Allowance** (CCA) and Urban Creep)			
6.1	Storage - 1 in 100 year + CCA (9)	401	m^3	m^3/m^2
6.2	50% storage drain down time 1 in 30 years	10	hours	
7.0	Controlling volume of runoff from the site(10)			
7.1	Pre development runoff volume(12) (development area)	-	m^3 for the site	
7.2	Post development runoff volume (unmitigated) (12)	401	m^3 for the site	
7.3	Volume to be controlled (5.2 - 5.1)	401	m^3 for the site	

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7.4	Volume control provided by:				
	- Interception losses[13]	-	m^3		
	- Rain harvesting [14]	-	m^3		
	- Infiltration	-	m^3		
	- Attenuation	401	m^3		
	- Separate volume designated as long term storage[15]			-	m^3
7.5	Total volume control (sum of inputs for 5.4)			401	m^3 [17]

8.0 Site storage volumes (full infiltration only)

8.1	Storage - 1in 30 year + CCA [8]	-	m^3	-	m^3/m^2 (of developed impermeable area)
8.2	Storage - 1 in 100 year + CCA [11]	-	m^3	-	m^3/m^2

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Design Inputs

Proposed site use: Residential

Pollution hazard category (see C753 Table 26.2): Low

High risk area defined as area storing fuels chemicals, refuelling area, washdown area, loading bay.

Design Outputs

List order of SuDS techniques proposed for treatment: Permeable paving, detention basin 1, detention basin 2

Note that gully pots, pipes and tanks are not accepted by Essex LLFA as a form of treatment (for justification see C753 Section 4.1, Table 26.15 and Box B.2)

Are very high pollution risk areas drained separate from SuDS to foul system: No

Other

Please include any other information that is relevant to your application

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Notes

1. All area with the proposed application site boundary to be included.
2. The site area which is positively drained includes all green areas which drain to the SuDS system and area of surface SuDS features. It excludes large open green spaces which do not drain to the SuDS system.
3. Impermeable area should be measured pre and post development. Impermeable surfaces include, roofs, pavements, driveways and paths where runoff is conveyed to the drainage system.
4. Predevelopment use may impact on the allowable discharge rate. The LLFA will seek for reduction in flow rates to GF (Essex SuDS Design Guide).
5. Runoff may be discharge via one or more methods.
6. Sewers for Adoption 6th Edition recommends a Cv of 100% when designing drainage for impermeable area (assumes no loss of runoff from impermeable surfaces) and 0% for permeable areas. Where lower Cv's are used the applicant should justify the selection of Cv.
7. It is Essex County Council's preference that discharge rates for all events up to the 1 in 100 year event plus climate change are limited to the 1 in 1 greenfield rate. This is also considered to mitigate the increased runoff volumes that occur with the introduction of impermeable surfaces. If discharge rates are limited to a range of matched greenfield flows then it is necessary to provide additional mitigation of increased runoff volumes by the provision of Long-term Storage.
8. Storage for the 1 in 30 year must be fully contained within the SuDS components. Note that standing water within SuDS components such as ponds, basins and swales is not classified as flooding. Storage should be calculated for the critical duration rainfall event.
9. Runoff generated from rainfall events up to the 1 in 100 year will not be allowed to leave the site in an uncontrolled way. Temporary flooding of designated areas to shallow depths and velocities may be acceptable.
10. The following information should only be provided if increased runoff volumes are not mitigated by limiting all discharge rates back to the greenfield 1 in 1 year rate.
11. Climate change is specified as 40% increase to rainfall intensity, unless otherwise agreed with the LLFA / EA.
12. To be determined using the 100 year return period 6 hour duration winter rainfall event.
13. Where Source Control is provided Interception losses will occur. An allowance of 5mm rainfall depth can be subtracted from the net inflow to the storage calculation where interception losses are demonstrated. The Applicant should demonstrate use of subcatchments and source control techniques. Further information is available in the SuDS Design Guide.
14. Please refer to Rain harvesting BS for guidance on available storage.
15. Flows within long term storage areas should be infiltrated to the ground or discharged at low flow rate of maximum 2 l/s/ha.
16. Careful consideration should be used for calculations where flow control / storage is likely to be influenced by surcharged sewer or peak levels within a watercourse. Outlets can be tidally locked where discharge is direct to estuary or sea. Calculations should demonstrate that risk of downed outlet has been taken into consideration. Vortex controls require conditions of free discharge to operate as per specification.
17. In controlling the volume of runoff the total volume from mitigation measures should be greater than or equal to the additional volume generated.