

Appendix K – Flood risk / Drainage Strategy Review, Deadline 2

Drainage Strategy Review — Summary of Findings

A review of the submitted Drainage Strategy has identified a number of deficiencies across both the methodology and the level of information provided.

The rainfall analysis relies on outdated methodologies. The use of the Flood Studies Report (FSR) rainfall method is no longer considered appropriate; current guidance from both Norfolk County Council and Essex Design Guide requires the use of FEH 2022 data, and this should be updated accordingly.

Similarly, Suffolk Design Guidance requires the submission of BRE 365 infiltration testing data, a Phase 1 Contamination Assessment, and associated exploratory logs at pre-application stage — none of which have been provided.

The topographic analysis underpinning the drainage design is based on OS Terrain 5, a coarse dataset that is not suitable for outfall and channel assessment. Ground truthing and/or a topographic survey should be used to confirm outfall locations and drainage flow paths, particularly in low-lying areas where gravity-fed drainage viability has not been demonstrated. Outfall levels must be established at this stage rather than deferred.

The SuDS drainage hierarchy has not been adequately addressed. There is no evidence of feasibility assessment for rainwater harvesting or reuse, infiltration viability has not been confirmed through testing in accordance with BRE 365, and the assumption that 50% of surfaces are permeable is not justified given the reported poor infiltration. Until infiltration testing is completed, all surfaces should be treated as impermeable. Additionally, pond side slopes are proposed at 1:3, contrary to Suffolk Design Guidance which requires a maximum of 1:4.

Further outstanding information includes pre- and post-development catchment area calculations (absent from Appendix A), half drain time analysis for infiltration features, maintenance schedules that address infiltration-specific requirements, freeboard provisions for all pond and basin features, and details of any balancing basins required to manage diverted field drain flows.

In summary, the submitted strategy contains multiple areas where the design falls short of current guidance and where essential supporting information has not been provided.

The above points are matters which could be raised as grounds for objection and/or as conditions requiring resolution prior to any drainage approval being granted.

Page	Item	Supporting Note
9 (Section 2.3.5)	(FSR Rainfall) - Generally outdated now. Should use FEH22 as stated in the Norfolk County Council's Drainage Design Standards Page	https://www.norfolk.gov.uk/article/38639/Drainage-design-standards . This assessment should use up to date data i.e. FEH 2022 online rainfall / catchment characteristics.
9 (Section 2.3.6)	FEH rainfall was used; however, Suffolk Design Guidance states that BRE 365 data, groundwater data, and the Phase 1 Contaminated Land Assessment Report should be provided at the pre-application stage. This information is outstanding.	For pre-app requirements (in accordance with Suffolk Design Guidance (https://www.suffolk.gov.uk/asset-library/2023-sf3967-scc-suffolk-flood-risk-appendix-a2.pdf)) - Preliminary Site Investigation Report * Trial pits across the site to BRE365 with minimum infiltration rate of 10mm/hr if infiltration is to be the sole method of drainage. * Associated exploratory logs (including depth to peak seasonal groundwater). *Phase 1 Contamination Assessment Report.
9 (Section 2.3.7)	Essex (FSR) - Generally outdated now. Should use FEH22	https://www.essexdesignguide.co.uk/suds
15 (Section 3.1.2)	OS terrain 5 data used. Ground truthing should be considered	OS Terrain 5 is a coarse dataset and should not be relied upon for outfall/channel assessment.

37 (Section 5.3.4)	SuDS drainage hierarchy.	No investigation / feasibility study undertaken with regards to rain water re-use / harvesting
39 (Section 5.4).13)	No freeboard for shallower ponds	Freeboard should be included for all pond / basin features
44 (Section 5.4.54)	Assuming 50% of footprint is permeable	<p>Report indicates that infiltration is likely unviable. Finished platform levels mentioned to have "unbound free draining subbase and a minimum 75 mm top layer of stone chippings, allowing for storage of storm water during a storm event and drainage to existing ground."</p> <p>Surfaces should be 100% impermeable unless infiltration testing (in accordance with BRE 365) deems that infiltration is viable</p>
45 (Section 5.4.58)	Outfall locations based on OS terrain 5 lidar	OS Terrain 5 is a coarse dataset and should not be relied upon for outfall/channel assessment.
45 (Section 5.5.3)	The permeable platform construction shall naturally retain runoff, where runoffs will be lost to the soils or the atmosphere.	Infiltration testing must confirm this viability.
47 (Section 5.6.5)	"In low-lying areas where the elevation is flat and there is proximity to a watercourse, currently available topographic levels may not allow for gravity-fed drainage to the outfall location. In these cases, the pond depth has been limited to 0.5 m, which also reduces the risk of groundwater ingress from the likely high water	Outfall levels should be determined at this stage and if a gravity fed system is viable, using LiDAR and / or topographical survey data

	table. In the rest of the areas, a general pond depth of 1 m is proposed. More detailed, topographic data will be obtained from ground surveys at a later stage. "	
47 (Section 5.6.7)	"Attenuation ponds will be designed with a maximum gradient of 1:3"	Suffolk design guidance states that Sides slopes should not exceed 1 in 4 unless specific site/safety/maintenance arrangements allow for steeper slopes (C753 p.490 & 651)
50 (Section 5.7.11)	Diverted field drains should discharge to the closest watercourse or via balancing basins if required to mitigate flood risk at receiving watercourses. These balancing basins are not currently included in the drainage design and will need to be addressed at a future stage.	Further information is required regarding potential balancing basins. Retain natural flow pathways as much as possible.
63 (Table 9.1)	Maintenance Tables	Needs expanding. There is no mention of specific maintenance requirements for infiltration features, which is essential to prevent siltation and performance compromise.
Appendix A	No calculations / catchment areas provided. Must be included as part of final report	No pre and post development catchment areas or calculations have been provided.
Other	Norfolk specific data	Norfolk state the following should be submitted as a minimum to enable checks of the design: "Site investigation details including; topographic surveys, ground investigation surveys, infiltration testing, seasonally high groundwater levels, assessment of connection to

		<p>wider watercourse networks and any CCTV survey of existing drainage networks</p> <p>Drainage design details including; discharge location, catchment area of the drainage system (pre and post development), officers may request long sections and cross sections as necessary, hydraulic calculations and modelling results, flow paths/extent/depth of expected water above ground, pipe schedule, maintenance plan and inspection access proposals with appropriate easements showing distance from adjacent dwellings, structures, utilities and carriageway</p> <p>Evidence of any consents including permits from Environment Agency, IDB, LLFA or Anglian Water. Agreements from adjacent landowners may also be requested."</p>
Other	Half Drain Times	<p>Any infiltration feature must show that half drain time can be achieved within 24 hours. No information regarding this has been provided.</p>