

Level 2 Strategic Flood Risk Assessment - Guidance Document

London Borough of Lewisham

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Quality information

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1 Introduction

1.1 Terms of Reference

AECOM has been commissioned by Lewisham Council to produce Level 2 Strategic Flood Risk Assessment (SFRA) site assessments to inform the development of their Local Plan. This document accompanies the site assessments and discusses how the Level 1¹ and Level 2 SFRA documents relate to one another, climate change allowances and the exception test. Finally, the report shows how the site assessments were produced and which parameters/assumptions were used.

1.2 Project Background

The National Planning Policy Framework² (NPPF) and associated Planning Practice Guidance for Flood Risk and Coastal Change (PPG)³ emphasise the active role Local Planning Authorities (LPAs) should take to ensure that flood risk is understood and managed effectively and sustainably throughout all stages of the planning process. The NPPF outlines that Local Plans should be supported by a Strategic Flood Risk Assessment (SFRA) and LPAs should use the findings to inform strategic land use planning. The overall approach of the NPPF to flood risk is broadly summarised Paragraph 163:

“When determining any planning applications, local planning authorities should ensure that flood risk is not increased elsewhere. Where appropriate, applications should be supported by a site-specific flood-risk assessment. Development should only be allowed in areas at risk of flooding where, in the light of this assessment (and the sequential and exception tests, as applicable) it can be demonstrated that:

- a) within the site, the most vulnerable development is located in areas of lowest flood risk, unless there are overriding reasons to prefer a different location;***
- b) the development is appropriately flood resistant and resilient;***
- c) it incorporates sustainable drainage systems, unless there is clear evidence that this would be inappropriate;***
- d) any residual risk can be safely managed; and***
- e) safe access and escape routes are included where appropriate, as part of an agreed emergency plan.”***

1.3 Level 1 SFRA Deliverables

The purpose of the Level 1 SFRA was to collate and analyse the most up to date readily available flood risk information for all sources of flooding and provide an overview of flood risk issues across the study area. The borough-wide mapping deliverables for the London Borough of Lewisham are presented in the **Level 1 SFRA Appendix A**.

The Level 1 SFRA provides guidance on:

- The application of the Sequential Test by Council when allocating future development sites to inform their Local Plan, as well as by developers promoting development on windfall sites.
- Managing and mitigating flood risk, the application of sustainable drainage systems (SuDS), and the preparation of site specific Flood Risk Assessments (FRAs).
- Potential flood risk management objectives and policy considerations which may be developed and adopted by the Council as formal policies within their developing Local Plan.

¹ AECOM, April 2019. *London Borough of Lewisham Strategic Flood Risk Assessment*.

² Ministry of Housing, Communities & Local Government. 2019. *National Planning Policy Framework*. Available at: <https://www.gov.uk/guidance/national-planning-policy-framework>

³ Department for Communities and Local Government. 2014. *Planning Practice Guidance: Flood Risk and Coastal Change*. Available at: <https://www.gov.uk/guidance/flood-risk-and-coastal-change>

2 Level 2 SFRA

Using the strategic flood risk information presented within the Level 1 SFRA, Lewisham Council undertook the Sequential Test to document the process whereby future development is steered towards areas of lowest flood risk. Where it was not possible to accommodate potential development sites outside those areas identified to be at risk of flooding, the Exception Test may be required, as set out in Table 2-1. This Level 2 SFRA Report provides information to support the application of the Exception Test for future development sites.

Table 2-1 Flood Risk Vulnerability and Flood Zone, ‘Compatibility’ (PPG, 2014)

Flood Risk Vulnerability Classification		Essential Infrastructure	Water Compatible	Highly Vulnerable	More Vulnerable	Less Vulnerable
Flood Zone	1	✓	✓	✓	✓	✓
	2	✓	✓	Exception Test Required	✓	✓
	3a	Exception Test Required	✓	✗	Exception Test Required	✓
	3b	Exception Test Required	✓	✗	✗	✗

✓ - Development is appropriate ✗ - Development should not be permitted

2.1 Exception Test

The purpose of the Exception Test is to ensure that where it may be necessary to locate development in areas at risk of flooding, new development is only permitted where the flood risk is clearly outweighed by other sustainability factors and where the development will be safe during its lifetime, considering climate change.

The NPPF states that for the Exception Test to be passed:

- *Part a) - “the development would provide wider sustainability benefits to the community that outweigh the flood risk; and*
- *Part b) -the development will be safe for its lifetime taking account of the vulnerability of its users, without increasing flood risk elsewhere, and, where possible, will reduce flood risk overall.”*

Both elements of the test will have to be passed for development to be allocated or permitted.

In order to determine Part a) of the Exception Test, applicants should assess their scheme against the objectives set out in the LPA’s Sustainability Appraisal.

In order to demonstrate satisfaction of Part b) of the Exception Test, relevant measures, related to those presented within Sections 5.2-5.6 of the Level 1 SFRA, should be applied and demonstrated within a site-specific flood risk assessment (FRA), as detailed in Section 5.1 of the Level 1 SFRA.

2.2 Level 2 SFRA deliverables

The scope of the Level 2 SFRA is to consider the nature of the following flooding risks within the assessment sites:

- Fluvial Flood
- Breach Hazard
- Surface Water
- Ground Water
- Reservoir Flooding
- Sewer Flooding

As well as this, the SFRA will also consider:

- The SuDS suitability of the site.
- Historical fluvial or Pluvial

2.3 Level 2 SFRA sites for assessment

Table 2-2 provides a list of the sites assessed in this Level 2 SFRA:

Table 2-2 London Borough of Lewisham Level 2 SFRA sites for assessment

Page No.	Site Address	Page No.	Site Address	Page No.	Site Address	Page No.	Site Address	Page No.	Site Address
1	Former Sydenham Police Station	18	Homebase/Argos, Bromley Road	35	Willow Way Locally Significant Industrial Site (LSIS)	52	Land at Loampit Vale and Thurston Road (Carpet Right)	69	Sainsbury's Bell Green
2	Place/Ladywell (former Ladywell Leisure Centre)	19	Stanton Square Locally Significant Industrial Site	36	6 Mantle Road	53	Lower Creekside Locally Significant Industrial Site	70	Lewisham Shopping Centre
3	113-157 Sydenham Road	20	Land at Sydenham Road and Loxley Close	37	Laurence House and Civic Centre	54	New Cross Gate NDC Scheme, Besson Street	71	Bell Green Retail Park
4	Land at Forest Hill Station West (Devonshire and Dartmouth Roads)	21	Land at Engate Street	38	Land at Nightingale Grove and Maythorne Cottages	55	Former Deptford Green School (Upper Site)	72	Wickes and Halfords, Catford Road
5	Goodwood Road and New Cross Road	22	Featherstone Lodge, Eliot Bank	39	Lewis Grove	56	Worsley Bridge Road Locally Significant Industrial Site	73	New Bermondsey, Surrey Canal Triangle Mixed Use Employment Location
6	Land North of Reginald Road and South of Frankham Street (former Tidemill School)	23	Land at Rushey Green and Bradgate Road (Aldi)	40	100-114 Loampit Vale	57	Ladywell Play Tower	74	Timber Yard, Deptford Wharves, Oxestalls Road, Mixed Use Employment Location
7	154-160 Sydenham Road	24	Downham Co-op	41	Catford Police Station	58	Riverside Youth Club and 2000 Community Centre	75	Convoys Wharf Mixed Use Employment Location
8	Driving Test Centre, Nightingale Grove	25	Mayfields Hostel, Burnt Ash Hill	42	Conington Road	59	Sainsbury's Lee Green	76	Achilles Street
9	Silver Road and Axion House	26	Blackheath Hill Locally Significant Industrial Site	43	Clyde Vale Locally Significant Industrial Site	60	Evelyn Court at Surrey Canal Strategic Industrial Location	77	Apollo Business Centre
10	Church Grove Self-Build	27	McDonalds, Ashgrove Road	44	Land to the rear of Chiddington House	61	Land at Conington Road and Lewisham Road (Tesco)	78	House on the Hill at Slaitwhaite Road
11	Catford Shopping Centre and Milford Towers	28	Lidl, Southend Lane	45	Albany Theatre	62	SIL along Trundleys and Juno Road	79	Land at Lee Road and Lee High Road
12	Plassy Road Island	29	Travis Perkins and Citroen Garage	46	Former Bell Green Gas Holders	63	Neptune Works Mixed Use Employment Location	80	74 to 78 Sydenham Road
13	Bestway Cash and Carry	30	Southbrook Mews	47	Perry Vale Locally Significant Industrial Site	64	Sun-Wharf Mixed Use Employment Location	81	Pool Court
14	Jenner Health Centre	31	111-115 Endwell Road	48	Molesworth Street Car Park	65	Excalibur Estate, Baudwin Road	82	Land at Randlesdown and Bromley Road
15	Haverlock House	32	Beadles Garage	49	Creekside Village East, Thanet Wharf Mixed Use Employment Location	66	Lewisham Gateway		
16	Sydenham Green Group Practice	33	Land at Forest Hill Station East (Waldram Place and Perry Vale)	50	Leegate Shopping Centre	67	Former Hatcham Works, New Cross Road		
17	Ravensbourne Retail Park	34	Sainsbury Local and West of Grove Park Station	51	Lewisham Retail Park, Loampit Vale	68	Heathside & Lethbridge Estate (phase 5 and 6)		

2.4 Climate Change Allowances

2.4.1 Fluvial flood risk allowance

Table 2-3 shows peak river flow allowances for the Thames river basin district. The Environment Agency Flood Zone and NPPF flood risk vulnerability classification of the development should be used to determine which Allowance Category is most appropriate to be applied to the assessment (as shown in Table 2-4).

The lifetime of the development should be considered when determining which future climate change allowance time period should be used. The lifetime of a proposed development should be judged based on the characteristics of the development. In the case of residential developments, a minimum lifetime of 100 years should be taken when selecting climate change allowance percentages. For other types of development, the applicant should assess how long they anticipate the development to be in place for and justify the lifetime of the development. Otherwise, a 75 year lifetime should be used. Therefore, in most cases, it is suggested that applicants use the '2070 to 2115' allowances in Table 2-3.

All site-specific FRAs should demonstrate that finished floor levels are at a minimum of 300mm above the 1% AEP (1 in 100 year) flood event plus an appropriate allowance for climate change. Table 2-4 identifies that for More Vulnerable developments in Flood Zone 2, the 'Higher Central' (35%) climate change allowance is the Environment Agency's minimum benchmark for flood risk mitigation, and in Flood Zone 3a the minimum benchmark for flood risk mitigation is the 'Higher Central' (35%) climate change allowance. In addition to this, a sensitivity test should also be undertaken using the higher central (35%) in Flood Zone 2 and the Upper End allowance (70%) in Flood Zone 3a, to ensure that the finished floor levels are a minimum of 50mm above this flood water level.

Table 2-3 Peak river flow allowances for the Thames river basin district (based on a 1961 to 1990 baseline) ⁴

Allowance Category	2015 to 2039	2040 to 2069	2070 to 2115
Upper end	25%	35%	70%
Higher central	15%	25%	35%
Central	10%	15%	25%

Table 2-4 Flood Zone and development vulnerability classification used to identify peak river flow allowance category⁴

	Flood Zone 2	Flood Zone 3a	Flood Zone 3b
Essential Infrastructure	Upper End allowance	Upper End allowance	Upper End allowance
Highly Vulnerable	Higher Central and Upper End allowances	Development should not be permitted	Development should not be permitted
More Vulnerable	Higher Central and Upper End allowances	Higher Central and Upper End allowances	Development should not be permitted
Less Vulnerable	Central and Higher Central allowances	Central and Higher Central allowances	Development should not be permitted
Water Compatible	Central allowance	Central allowance	Central allowance

Table 2-4 reflects the current EA advice issued in July 2020. This supersedes Table 3-4 in the Level 1 report. Developers should check current EA advice when preparing a site-specific FRA.

The Environment Agency requires evidence that an FRA has considered if it is appropriate to apply the high ++ allowances for the site. The high++ allowances apply to developments that are very sensitive to flood risk and with lifetimes beyond a century. The high++ allowances for river flow in the Thames river basin district are provided in Table 2-5⁵.

⁴ Environment Agency (July 2020), Flood risk assessments: climate change allowances. Available at: <https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances>

⁵ Environment Agency (April 2016), Adapting to Climate Change: Advice for Flood and Coastal Erosion Risk Management Authorities. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/571572/LIT_5707.pdf

Table 2-5 H++ allowances for peak river flow

River Basin District	Total potential change anticipated for 2020s	Total potential change anticipated for the 2050s	Total potential change anticipated for the 2080s
Thames	25%	40%	80%

The 70% climate allowances for the River Ravensbourne model were not available at the time of writing. Where this climate allowance is required to be considered as part of a site-specific FRA, the developer should contact the Environment Agency for further information. This is explained further in section 3.5.9 and Appendix D of the Level 1 SFRA.

In September 2016, the Environment Agency produced area specific guidance on how to apply the updated climate change allowances in flood risk assessments. The Kent and South London area guidance⁶ provides an indication of the appropriate level of technical assessment of climate change impacts on fluvial flooding for new developments depending on their scale and location. This should be used as a guide only and the agreed approach should be based on expert local knowledge of flood risk conditions, local sensitivities and other influences. Therefore, **it is recommended that developers contact the Environment Agency at the pre-planning application stage to confirm the assessment approach, on a case by case basis.**

The guidance defines three possible approaches to account for flood risk impacts due to climate change in new development proposals:

- Basic: Developer can add an allowance to the 'design flood' (i.e. 1% annual probability) peak levels to account for potential climate change impacts.
- Intermediate: Developer can use existing modelled flood and flow data to construct a stage-discharge rating curve, which can be used to interpolate a flood level based on the required peak flow allowance to apply to the 'design flood' flow.
- Detailed: Perform detailed hydraulic modelling, through either re-running Environment Agency hydraulic models (if available) or construction of a new model by the developer.

Table 2-6 identifies how these approaches should be applied to different development types within each flood zone.

Table 2-6 Indicative guide to fluvial climate change assessment approach

Vulnerability Classification	Flood Zone	Development Type		
		Minor	Small-major	Larger Major
Essential Infrastructure	Zone 2	Detailed		
	Zone 3a	Detailed		
	Zone 3b	Detailed		
Highly Vulnerable	Zone 2	Intermediate/Basic	Intermediate/Basic	Detailed
	Zone 3a	Not appropriate development		
	Zone 3b	Not appropriate development		
More Vulnerable	Zone 2	Basic	Basic	Intermediate/Basic
	Zone 3a	Basic	Detailed	Detailed
	Zone 3b	Not appropriate development		
Less Vulnerable	Zone 2	Basic	Basic	Intermediate/Basic
	Zone 3a	Basic	Basic	Detailed
	Zone 3b	Not appropriate development		
Water Compatible	Zone 2	None		
	Zone 3a	Intermediate/Basic		
	Zone 3b	Detailed		

⁶ Environment Agency (Sept 2016), Kent and South London Area – Flood Risk Assessments: Climate change allowances.

Notes:

- *Minor: 1-9 dwellings/ less than 0.5 ha | Office / light industrial under 1ha | General industrial under 1 ha | Retail under 1 ha | Gypsy/traveller site between 0 and 9 pitches*
- *Small-Major: 10 to 30 dwellings | Office / light industrial 1ha to 5ha | General industrial 1ha to 5ha | Retail over 1ha to 5ha | Gypsy/traveller site over 10 to 30 pitches*
- *Large-Major: 30+ dwellings | Office / light industrial 5ha+ | General industrial 5ha+ | Retail 5ha+ | Gypsy/traveller site over 30+ pitches | any other development that creates a non-residential building or development over 1000 m².*

Developers should check with the Environment Agency for the latest guidance on climate change allowances.

2.4.2 Pluvial flood risk allowance

Table 2-7 shows anticipated changes in extreme peak rainfall intensity in small and urban catchments. The anticipated increase in rainfall intensity may cause greater volumes and rates of rainfall to enter the sewer network during storm events.

Environment Agency guidance⁷ requires all site-specific FRAs and Drainage Strategies to assess both the Upper end and Central allowances to understand the range of impact, and ensure that there is no increase in the rate of runoff from the site for the upper end allowance. The lifetime of the development should be considered when determining which future climate change allowance time period should be used.

Table 2-7 Peak rainfall intensity allowance in small and urban catchments (use 1961 to 1990 baseline)⁴

Allowance Category	2015 to 2039	2040 to 2069	2070 to 2115
Upper end	10%	20%	40%
Central	5%	10%	20%

⁷ Environment Agency (July 2020), Flood risk assessments: climate change allowances. Available at: <https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances>

3 Site Assessment Approach

3.1 Site Assessment Proforma Format

GIS data has been used to create the outputs for the site assessments. Table 3-1 shows the data and method used to generate the assessments. and has been described in the Level 1 SFRA in Table D2.

Table 3-1 Datasets described in the Level 1 SFRA used to assess each section in the Level 2 SFRA site assessments

Section	Dataset	Parameters/Assumptions
Flood Risk Vulnerability	Lewisham Council Site Allocations Flood Risk Vulnerability Classification	
Flood Zone Classification	Flood Map for Planning (Rivers and Sea) Flood Zones 2 and 3 Ravensbourne Catchment Model (Flood Zone 3b data) Areas Benefitting from Flood Defences	Most serious flood zone that the site covers >5% of site. Where <90% of the site was identified within any one flood zone, the text output also includes the other flood zones the site is found.
Flood Zone Compatibility	Flood Zones and Development Compatibility	
Proximity to Main River	Detailed River Network	
Breach Hazard Category	Thames Tidal Upriver Inundation 2017 Model	Most serious breach hazard category that covers >5% of site.
Surface Water Flood Risk	Risk of Flooding from Surface Water Local Critical Drainage Areas	Highest risk found on site. Where “High Risk” areas were found to be a result of localised low points which did not pose a significant risk to the site, Column 3 is used to identify the likely flooding mechanism and suggest the mitigation which will be required. Sites that were found to have a High or Medium Risk in Column 2 but are unlikely to pose a significant risk to the development of the site are highlighted. For sites where surface water flooding is predicted to flow into the site from elsewhere additional mitigation measures are suggested. Where the site lies within more than one CDA, it is identified as the CDA where the majority of site is found.
SuDS Suitability	Infiltration SuDS Summary Map	Highest percent of the site within each SuDS suitability category.

Ground Water Flood Risk	Susceptibility to Groundwater Flooding	Highest risk found on site.
Reservoir Flood Risk	Area Deemed at of Risk of Flooding from Reservoirs	
Sewer Flooding Incidents	DG5 Register of sewer flooding incidents, by post code area	Where the site was situated in multiple postcode regions, the postcode which had the highest number of sewer flooding incidents was used, provided >5% of the site was found to be in this region.
Historical Fluvial or Pluvial Flooding	Recorded Flood Outlines	Flooding incident has been recorded within 250m of the site boundary. Where an incident is identified on the site assessment the developer should contact Council for more information.

3.2 Impact of additional development on flood risk

Within the London Borough of Lewisham, the sites found in Table 3-2 are located partially within Flood Zone 3. Without any flood mitigation measures applied to their design, such as compensation storage, these developments could increase the fluvial flood risk in other areas due to the removal of floodplain.

Table 3-2 Sites located partially within Flood Zone 3

Page	Site Name
9	Silver Road and Axion House
10	Church Grove Self-Build
48	Molesworth Street Car Park
50	Leegate Shopping Centre
51	Lewisham Retail Park, Loampit
52	Land at Loampit Vale and Thurston Road (Carpet Right)
57	Ladywell Play Tower
59	Sainsbury's Lee Green
66	Lewisham Gateway
70	Lewisham Shopping Centre
72	Wickes and Halfords, Catford Road
79	Land at Lee Road and Lee High Road
81	Pool Court
82	Land at Randlesdown and Bromley Road

There are 49 potential development sites identified as being within a Critical Drainage Area. Without surface water attenuation and SuDS incorporated into the design, these development sites could increase surface water flooding in other areas within their drainage catchment through changes in surface water flow routing and runoff rates. Therefore, mitigation measures and SuDS are required for all planning applications.

