Camden Planning Guidance

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Water and flooding

March 2019

Camden

CPG Water and flooding

1. Introduction

What is Camden Planning Guidance?

1.1 The Council has prepared this Camden Planning Guidance (CPG) on Water and flooding to support the policies in the Camden Local Plan 2017. This guidance is consistent with the Local Plan and forms a Supplementary Planning Document (SPD) which is an additional "material consideration" in planning decisions.

1.2 This document should be read in conjunction with and within the context of the relevant policies in Camden's Local Plan, other development / local plan documents and other Camden Planning Guidance documents.

1.3 Camden Planning Guidance (CPG) covers a range of topics (such as design, housing and sustainability) and all sections should be read in conjunction with, and within the context of, Camden's other documents.

What does this guidance cover?

1.4 This guidance provides information on the water environment in Camden, water efficiency and flooding, supporting Local Plan Policy CC3 Water and flooding.

1.5 Other relevant policies to water and flooding in the Local Plan include:

- C1 Health and wellbeing
- A2 Open space
- A3 Biodiversity
- CC1 Climate change mitigation
- CC2 Adapting to climate change

1.6 This document was adopted in March 2019 and replaces Chapters 7 - 'Water efficiency' and 11 - 'Flooding' in Camden Planning Guidance (CPG) 3 Sustainability, which was adopted September 2011 and updated March 2018.

2. Water efficiency

KEY MESSAGES

- All developments are to be water efficient.
- Residential developments are expected to meet the requirement of 110 litres per person per day (including 5 litres for external water use).
- Major developments and high or intense water use developments should include grey water recycling.
- Refurbishments and other non-domestic development will be expected to meet BREEAM water efficiency credits.

2.1 London has lower rainfall than the national average while having a very high population density. This combination of limited water resources and high demand has resulted in London being declared by the Environment Agency as an area of serious water stress and this trend is likely to be exacerbated by climate change. Development must therefore be designed to be water efficient.

2.2 Local Plan policy CC3 expects all developments to be designed to be water efficient and to minimise the need for further water infrastructure. The policy also protects the borough's existing water infrastructure to ensure we have an adequate water supply as well as adequate water storage and foul water capacity.

2.3 From the 1st April 2018 all off site water and wastewater network reinforcement works necessary as a result of new development will be delivered by the relevant statutory undertaker. Local reinforcement works will be funded by the Infrastructure Charge which is a fixed charge for water and wastewater for each new property connected. Thames Water encourages developers to use their free pre-planning service https://www.thameswater.co.uk/preplanning). This service can tell developers at an early stage if there is capacity in Thames Water water and/or wastewater networks to serve their development, or what they will need to do if there isn't capacity

2.4 This section outlines what measures the Council will expect to ensure developments reduce the consumption of water and reduce the amount of water that is disposed of.

WHAT DOES THE COUNCIL EXPECT?

The Council expects all developments, whether new or existing buildings, to be designed to be water efficient by minimising water use and maximising the re-use of water.

Normally, requirements for sustainable design and construction including water efficiency will be dealt with using conditions, but in some circumstances, a Section 106 agreement may be required to secure an environmental assessment or a sustainability plan.

Minimising water use

2.5 The simplest way of minimising water use is through installing efficient water fittings and plumbing, such as:

- low and dual flush toilets;
- low flow taps and shower heads;
- low water consuming washing machines and dishwashers;
- alternative water sources; and
- low water use landscaping and gardens.

2.6 In response to local context the Local Plan opted for a higher water efficiency standard. Residential developments are expected to meet the requirement of 110 litres per person per day (including 5 litres for external water use). Developments will need to make use of a range of these measures to reduce their water consumption. Specifications should be practical for the intended occupier to ensure that fittings are not simply replaced.

2.7 Development should include meters which are visible to occupants, as this has been shown to result in reductions in water use.

2.8 The Council will assess the performance of water minimisation measures used against the water category in BREEAM (where applicable) or the Water Efficiency Calculator for new dwellings as required for Building Regulations Part G (where applicable).

2.9 Details of the water used for irrigation should also be provided. Developers will be expected to re-use rainwater where possible and also consider planting drought resistant or low water consuming plants (dry gardens).

Maximising the re-use of water

2.10 At least 50% of water used in homes and workplaces does not need to be of drinkable quality. For example, rain water can be water used for flushing toilets, washing laundry and watering plants and gardens.

Collecting rain water

2.11 This involves collecting rainwater from a building's roof and/or surroundings, and storing it in a tank. Once filtered of leaves and larger objects, the water can be re-used for toilet flushing, laundry and watering plants. If used outside, the rain water harvesting system can take the form of a simple water butt. If used within the building it will need to be supplied through pipes and taps that are separate from the standard mains water supply.

2.12 Rainwater harvesting systems can be integrated with Sustainable Drainage Systems (SuDS), however an allowance has to be made in the storage capacity to cater for both general rainfall (minus what is used regularly), and the potential storm event that the system should cater for.

Green/brown roofs and collecting rain water

2.13 Green/brown roofs can be designed to include rain water collection. However, consideration needs to be given to the materials and pipe work that will go underneath the green/brown roof structure. Green/brown roofs with rainwater harvesting may also need to use extra filters to ensure the water can be re-used.

Re-using water

2.14 'Grey water' (water that has already been used in hand basins, baths and showers) can be stored, filtered and disinfected, and then reused, for toilet flushing, garden watering or laundry. It is also possible to recycle 'black water' (water used for toilet flushing and washing up) although this is more resource intensive. Both 'grey water' and 'black water' systems will require regular maintenance to ensure their ongoing quality and effectiveness. A separate standard mains supply will also always be needed to provide drinking water in addition to a re-used system.

Following Local Plan policy CC3, the Council will expect developments over 10 units or 1000sq m and/or intense water use developments, such as hotels, hostels, student housing etc. to include a grey water harvesting system, unless the applicant demonstrates to the Council's satisfaction that this is not feasible.

2.15 Applicants should submit a feasibility assessment for greywater harvesting which should consider the following:

- the cost of the system;
- cost savings for owner/occupier over a 10 year period;
- projected grey water generation;

- projected demand for use of grey water;
- water savings as a result of the grey water system; and
- payback for the system.

2.16 What is considered to be 'acceptable' payback will differ from scheme to scheme, however as a guide up to 20 years is considered to be reasonable. In some cases, the Council will expect developments to include greywater recycling even when payback is longer than this. Where greywater harvesting is not considered feasible, full justification must be given.

Abstraction

2.17 The Mayor's Sustainable Design and Construction SPG notes that the abstraction of groundwater in London is limited and of variable quality. Where it is available it can provide an alternative source to potable water (for industrial purposes or landscape watering) also the consistent temperature means that groundwater can be used for low energy cooling.

2.18 There are 'Groundwater Source Protection Zones' in Camden (see Local Plan map 6). These signal that there are likely to be particular risks posed to the quality or quantity of water obtained and should be taken into account when considering the environmental impact of development.

Existing buildings, retrofitting measures

2.19 Existing buildings can be retrofitted to include water efficiency and water saving measures such as:

- products that reduce the volume of cisterns;
- flow restrictions and aerators for taps;
- grey water systems; and
- water butts.

Waterwise in conjunction with other organisations – provide information on water efficiency for planners, developers and consumers including a calculation tool and case studies.
www.waterwise.org.uk

At Home with Water Energy Saving Trust – provides good evidence about energy and water in the home.
www.energysavingtrust.org.uk

3. Flooding

KEY MESSAGES

- All developments must not increase the risk of flooding.
- Developments are required to utilise Sustainable Drainage Systems (using the drainage hierarchy) to achieve greenfield run off rates, where feasible.

3.1 Camden has relatively few permeable surfaces and a very high population density. As a result it is deemed to have a high risk of surface water flooding, which is likely to be increased by further growth and intensification of the built environment as well as the increasing risk of heavy rainfall due to climate change. Surface water flooding is caused when the existing water infrastructure (drains and sewers) cannot cope with heavy rainfall.

3.2 Local Plan Policy CC2 notes that flooding and drought are key risks which require mitigation and adaptation measures in the borough. Changes to our climate can also threaten the quantity and quality of the borough's water supply. Such risks impact upon the health and wellbeing of Camden residents.

3.3 Map 6 in the Local Plan shows the parts of the borough that have experienced surface water flooding in the past and identifies the areas which are at risk of surface water flooding. Further information on these areas are set out in the Council's Surface Water Management Plan and Strategic Flood Risk Assessment (SFRA). Reference should also be made to Environment Agency surface water maps.

3.4 The location of development can impact the way that water flows around and underneath new and existing structures. Therefore development proposals need to consider the risk of flooding, especially where there are located within the identified areas, which must be designed to prevent causing additional pressure on adjoining sites and the sewer system.

WHAT DOES THE COUNCIL EXPECT?

Developments must not increase the risk of flooding, and are required to put in place mitigation measures where there is known to be a risk of flooding (Local Plan policies CC2 and CC3).

Major developments will be required to constrain runoff volumes for a 1 in 100 year, 6 hour rainfall event, where feasible.

All sites in Camden of one hectare or more require a Flood Risk Assessment in line with the National Planning Policy Framework.

Assessing flood risk

3.5 In accordance with the Local Plan an assessment of flood risk is required for:

- all sites of 1 hectare or over;
- all major applications in areas of high risk to flooding; and
- all basement development on streets identified as being at flood risk, or in an area where historic watercourses are known to have been present, or where there is an elevated risk of groundwater flooding. (See Map 6 in the Camden Local Plan and Camden's Strategic Flood Risk Assessment).

3.6 Where it is necessary to undertake a Flood Risk Assessment (FRA) this should be site specific and concentrate on the management of surface water run-off, and/or ground water where applicable, and should address the amount of impermeable surfaces resulting from the development and the potential for increased flood risk both on site and elsewhere within the relevant catchment area. These must be prepared by a suitably qualified professional and should be submitted with a planning application.

3.7 The Council expects the FRA to assess what would happen in the event of a 40% uplift in peak rainfall intensity on the drainage network. This is to understand what implications there may be for future site occupants, taking into account predicted future increase in rainfall as a result of climate change. It is crucial to ensure that the design of any flood mitigation or Sustainable Drainage System (SuDS) do not cause an increased risk as a result of changes in run-off routes and changes in levels of water.

Reducing the risk of flooding

Surface water

3.8 Every urban surface should be considered as a collector of rainfall, allowing water to pass through to a drainage layer below or flow to a soakage area so that water volumes do not build up to create problems downstream. Therefore, the design of drainage is very important. Poorly designed and maintained drainage can lead to surface water flooding when there is by heavy rainfall. The mitigations need to be able to cope with the heaviest of rainfall expected over the buildings lifetime (this is around 60 years for commercial development and 100 years for residential development) and also help reduce and slow the amount of run-off leaving a site.

3.9 The best way to deal with heavy rainfall and a traditional pipe drainage system is to introduce new areas for water to soak into the ground. Sustainable Drainage Systems (SuDS) provide a way to manage surface water in a way which mimics the natural environment. SuDS help reduce the amount of surface water leaving a site and can slow down the rate water flows. It can also help improve water quality by filtering out contaminants. SuDS can provide broader benefits, including the capture and re-use of water by linking into a rainwater or grey water harvesting system. They can also provide green, landscaped areas offering recreation and habitat for wildlife.

WHAT DOES THE COUNCIL EXPECT?

A drainage report is required for all major applications, basement development, and vulnerable development in areas identified as at risk of flooding (details of what this should include can be found in paragraph 8.67 of the Local Plan). The Council will expect plans and application documents to describe how water will be managed within the development, including an explanation of the proposed SuDS, the reasons why certain SuDS have been ruled out and detailed information on materials and landscaping

The Council will expect developments to achieve a greenfield surface water run-off rate where feasible once SuDS have been installed.

3.10 Greenfield run-off rates are defined as the run off rates from a site in its natural state prior to any development. Developers will be expected to show to the Council's satisfaction how all opportunities to reduce site run-off have been included. SuDS details need to be provided at the full planning stage to clearly demonstrate that any proposed SuDS can be accommodated within the development.

The drainage hierarchy

3.11 Surface water should be managed as close to its source as possible. The following drainage hierarchy should be followed when considering which SuDS techniques to use.

Storing water for later use: i.e. rainwater harvesting and rainwater

butts. It is also possible to combine rainwater harvesting systems with attenuation tanks. This will enable the run-off reductions to be included within the scheme drainage modelling. (General good practice requires rainwater harvesting tank volume to be excluded from run-off modelling as the tank should be assumed to be full at the point of storm.) Water can also be collected in blue roofs (that is, roof with temporary rooftop water storage).

Infiltrate: Infiltration through porous and permeable surfaces which allow water to soak (infiltrate) directly into the subsoil, rather than flowing over the top. Infiltration SuDS can include borehole soakaways, infiltration basins, trenches (linear soakaways) and permeable pavements. Where the underlying soil is not permeable a layer of material needs to be laid between the clay and the uppermost surface to act as a storage/drainage channel. Green roofs and landscaping (including swales, trees, planters, and raingardens) can also provide some level of infiltration and attenuation. Infiltration SuDS are described in further detail below, paragraphs 3.15 – 3.25.

Attenuate: ponds or open water features for gradual release. These are generally suitable for larger sites and those upstream of areas at risk of flooding. Ponds and reed beds can have significant wildlife value. Ponds can be constructed using concrete, butyl liners or puddled clay. It is better that they are designed to be topped up with rainwater rather than mains water, as topping up with mains water adds nutrients to the pond and can lead to algal blooms, as well as being an inefficient use of mains water supply.

Attenuate: in tanks or sealed water features for gradual release into the ground or existing sewer. Water can also be collected in blue roofs (blue roof loading tends to be equivalent to snow loading and are no more expensive than underground attenuation tanks). Filter drains can also provide some level of attenuation and run-off reduction as well as water treatment. Rills or runnels are small, open-surface water channels within paved construction. They collect water directly from hard surfaces and convey water, at a reduced flow rate, to, from or between other SuDS components.

Discharge rainwater direct to a watercourse: is preferred over discharge into a sewer/drain (provided permission is obtained by the owner/manager) as this reduces the need to provide a drainage network, allows recharge to rivers and groundwater, and reduces sewer flooding. Discharge should ideally be at greenfield rates and ideally without increasing the volume of run-off. Potential contamination (e.g. from roads and car parks) must be considered.

Discharge rainwater to a surface water sewer/drain: British Standards require that storm water must be connected to storm water sewer whenever such sewer is present.

Discharge rainwater to the combined sewer

3.12 Major developments (including refurbishments) should submit a drainage report and meet London Plan run-off reduction targets. Surface water run-off modelling calculations must be submitted alongside the drainage report. Because the drainage system needs to be able to cope with the heaviest of rainfall expected over the building's lifetime, water infrastructure should be designed to cope with all storms up to and including the 1 in 100 year 6 hour storm. Microdrainage (or other suitable software or method) should be used to model all rainfall events, and demonstrate that the proposed SuDS system should not cause flooding in any of these rainfall events. The whole site should be included in run-off calculations and the calculations must demonstrate that the site will reduce surface water run-off in line with the targets above. The modelling should include the whole network / system to demonstrate that the network / system will be able to cope with all storm events.

3.13 The Council also expects the drainage system to be designed to accommodate a 20% climate change allowance on top of the 1 in 100 year storms. Applicants should apply a sensitivity test against the 40% climate change allowance to ensure that the additional runoff is wholly contained within the site and that there is no increase in the rate of runoff discharged from the site. This is to understand any implications to people from increased flood hazard (e.g. due to depths or velocities of surface water runoff) and to ensure that under the 40% climate change uplift scenario the development is safe. The additional runoff volume between the 20% and 40% allowances may exceed the storage capacity of attenuation basins and spill into different areas of the site temporarily, but the crucial thing is to ensure that the additional runoff is contained within the site safely and does not contribute to an increased flood risk to third parties elsewhere.

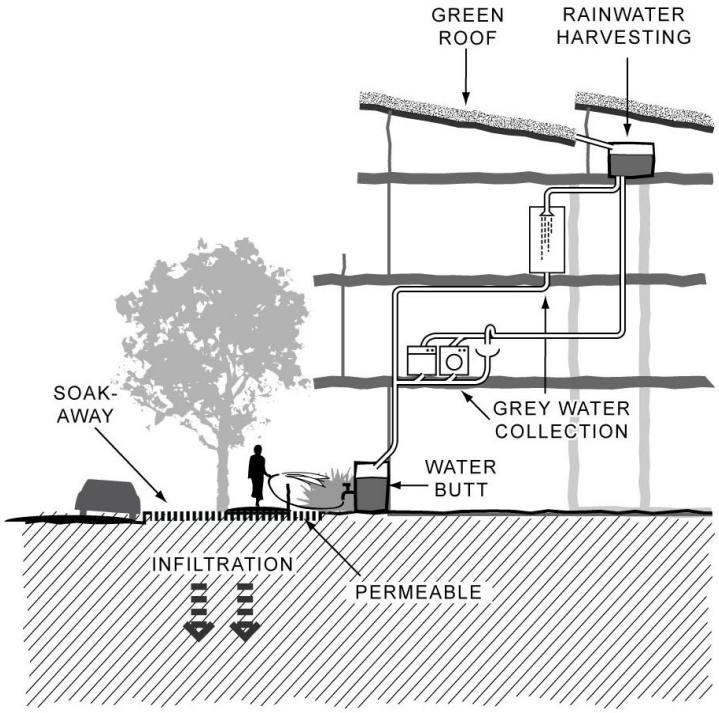
3.14 Rainwater harvesting tanks and green roofs are preferred over other SuDS lower down in the drainage hierarchy, such as attenuation tanks, they cannot always be included in run-off reduction calculations. Green roofs, when properly designed attenuate storm water for gradual release, allow for evaporation of the first 5mm of rainfall, provide water treatment and improve biodiversity and community benefits. However, green roofs cannot be considered a permeable soil and should be assumed to be saturated at the point of intense storms (i.e. storms that are more

intense than a 1 in 10 year storm). Due to the sporadic nature of water consumption, rainwater harvesting tanks should also be assumed to be full at the point of a storm event. Both of these systems are generally not intended to control peak run-off rate during critical events, and are mainly useful during medium and small events to capture run-off and thus reduce the volume of water entering the drainage system during these smaller events.

3.15 Some rainwater harvesting tanks can incorporate an attenuation chamber/ overflow with controlled release, and green roofs can incorporate an attenuation layer ("blue roof") or be designed to be substantially thick, allowing the associated attenuation volume to be included within the modelling. The Council will consider inclusion of these SuDS in developments favourably due to their additional environmental benefits. Where these types of SuDS cannot be included within surface water run-off modelling and it impacts the ability of the development to meet higher London Plan run-off reduction targets, the Council may consider a reduced target. This will be assessed on a case-by-case basis.

3.16 Figure 1 below shows all the different elements of a Sustainable Urban Drainage System, from rain water harvesting, green roofs, porous surfaces, vegetation to ponds, reed beds and rivers.

Figure 1: Sustainable Drainage System



Information for infiltration SuDS

3.17 Proposals for infiltration SuDS will need to take location (ground quality) and design constraints into consideration in order to protect groundwater quality and ensure that infiltration can work. Please refer to Chapter 7 of the Council's Strategic Flood Risk Assessment.

3.18 There are many different types of drainage components that can be used to facilitate infiltration. These include soakaways, infiltration trenches, filter strips (with infiltration), infiltration blankets and infiltration basins. Bio-retention and permeable paving systems can also be designed to infiltrate into the ground. The four key criteria has to be satisfied before infiltration can be considered:

- the ground must be suitable for infiltration;
- groundwater must be a minimum 1m below surface for permeable pavements, swales, ponds etc., or at least 1m below invert level of any soakaways;
- ground must not be contaminated or it must be proved that infiltration will not activate pollution in the soil; and
- soakaways cannot be placed closer than 5m to a building (this is governed by the Building Regulations Part H).

3.19 Subsurface conditions should be assessed by a geotechnical expert to ensure that the operation of the soakaway will not saturate the foundations of any structure. Geotechnical reports and soakaway tests should be provided if soakaways are proposed, identifying the proximity to any subterranean development. Where a soakaway is proposed applicants must demonstrate that the BRE Soakaway Design Digest 365 has been followed. The soakaway must be able to discharge 50% of the run-off generated during a 1 in 10 year storm event within 24 hours in readiness for subsequent storm flow.

3.20 Developers should submit evidence of infiltration test results and details of any soil improvements required to aid drainage. If it is not feasible to access the site to carry out soakage tests before planning approval is granted, a desktop study should be undertaken looking at the underlying geology of the area and assuming a worst-case infiltration rate for that site. If infiltration SuDS are proposed within 5m of buildings (including buildings located outside of the site boundary) they should be designed to avoid harm to the buildings in accordance with the Building Regulations.

3.21 Details of the presence of groundwater and its location in relation to any proposed infiltration SuDS should also be provided. If the groundwater table is higher than the bottom of the soakaway then infiltration may not be suitable. Ideally, groundwater levels should be at least a meter below the soakaway. Developers should undertake monitoring at different times of the year to understand the location and movement of groundwater and how it may affect infiltration. To mitigate against the potential presence of groundwater, shallower and wider soakaways may be proposed instead.

3.22 Developers should build in contingency when designing soakaways: where soakaways are located in more urban areas, a higher safety coefficient (i.e. 10) should be selected when modelling infiltration rates.

3.23 The presence of any contamination in run-off could result in the pollution of a groundwater source or resource. Therefore soakaways are not acceptable in areas containing contaminated soils or contaminated groundwater.

Maintenance of SuDS

3.24 Like all drainage systems, SuDS components need to be inspected and maintained to ensure efficient operation and prevent failures. Mechanisms for ensuring the long-term maintenance of SuDS needs to be considered at an early stage, i.e. pre-application. The adopter of the drainage system will need to ensure they have the right to access and maintain the adopted asset. Developers should follow best practice from the SuDS Manual (CIRIA C697, 2007). Susdrain have also published a number of useful documents and fact sheets which cover maintenance and adoption options.

3.25 The arrangements for the future maintenance of the system should be considered during the early stages of SuDS design as this will influence the design of the system. Full details should be provided to the Council. Developers will need to consider the following:

- siting and selection of the SuDS component,
- function(s) and benefiting parties of SuDS component,
- complexity of the SuDS component,
- defined minimum standards of operation and maintenance,
- competence and longevity of prospective responsible party,
- land ownership and access, and
- interaction with other assets.

SuDS and the Flood Asset Register

3.26 Under the Flood and Water Management Act 2010, the Council (as the appointed Lead Local Flood Authority) is required to maintain a register of structures or features that would cause an increased flood risk if absent, modified or not appropriately maintained. This includes SuDS, particularly in large developments, or SuDS in developments located within a Local Flood Risk Zone. The Council will inform developers if this affects their development and will notify the developer that details of the SuDS, including the person/s responsible for maintaining the SuDS will be added to the asset register. The owner of the SuDS should provide details of the condition of the SuDS when requested. A copy of the Flood Asset Register can be requested from the Council.

Groundwater

3.27 The geology in the northern parts of the borough consists of gravel and silt on top of a layer of clay. Water can travel through the gravel and silt, but the rate of infiltration slows when it reaches the clay layer. This results in an area where ground water is likely to collect. This geology has resulted in the formation of springs, wells and the chain of ponds on Hampstead Heath. The flow of water through the ground is important in order to maintain the local wells and ponds. It is essential that development, especially subterranean development, does not stop or significantly alter the direction of this underground flow of water.

3.28 Ground water must be considered when development involves below ground excavation and construction. New underground structures can alter the flow of groundwater as it needs to change its course to flow around the new structure. This can cause water to collect or pool upstream which may result in flooding of nearby areas or buildings.

3.29 More information on geology and hydrology in the borough can be found in the Camden Hydrological and Geological Study 2010. Please also see further guidance on basement development in the Council's CPG on Basements.

Flood proofing

3.30 Developments in areas of flood risk should be designed so that they can cope with flooding. This can be done by carefully considering design and layout, for example by locating vulnerable uses in lower risk parts of the development, by ensuring buildings do not block key flood routes, and by raising floor levels.

3.31 Flood proofing measures can also be designed into developments to reduce flood damage. The Environment Agency has advice on

how to plan to reduce flood damage and reduce the amount of flood water that enters a building.

Basements

3.32 The Council will require all applications for basement and underground developments to be accompanied by an assessment of the scheme's impact on drainage, flooding, groundwater conditions and structural stability, as appropriate. Please refer to CPG on Basements for all basement related proposals.

3.33 The Council will also require a site-specific flood risk assessment with applications for basements on streets identified as being 'at risk' from surface water flooding, unless it can be demonstrated that the scale of the scheme is such that there is no, or minimal, impact on drainage conditions.

3.34 The Council will not allow habitable rooms and other sensitive uses for self contained basement flats and other underground structures in areas at risk of flooding.

Further information

Environment Agency	Provides a range of guidance on SUDS, including planning advice www.environment-agency.gov.uk Guidance on how to reduce flood damage www.environment-agency.gov.uk/homeandleisure/floods/105963.aspx
CIRIA	Provide a range of advice and publications on SUDS, including the SUDS Manual, Sustainable Drainage Systems – design manual for England and Wales and Sustainable Water Management in Schools www.ciria.org.uk/suds
London Wildlife Trust	Spring, H. (2014). Living with rainwater; A guide to working with nature to make your neighbourhood more flood proof www.wildlondon.org.uk
Living roofs	Provide information on the role of green roofs in SUDS www.livingroofs.org
LB Camden Strategic Flood Risk Assessment	Carried out to inform the preparation of Camden's Local Plan. The SFRA presents the most up to date flood risk information in the borough. www.camden.gov.uk