Sustainable Drainage Systems

Local Guidance

Date: 16/07/2015

Revision History

Revision Ref	Amendments	Issued to:
Version 1, 16/07/2015		Publication

Bolton Council Sustainable Drainage Systems Local Guidance

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1. Introduction

From 6th April 2015 local planning policies and decisions on planning applications relating to major development (developments of 10 dwellings or more; or equivalent non-residential or mixed development [as defined in Article 2(1) of the Town and Country Planning (Development Management Procedure) (England) Order 2010] will ensure that sustainable drainage systems for the management of run-off are put in place, unless demonstrated to be inappropriate.

Ministerial Statement

A Ministerial Statement directing Planning Authorities on Sustainable Drainage Systems (SuDS) was made on 18th December 2014. [1]

The statement is to be read in conjunction with the policies in the National Planning Policy Framework (NPPF), and a Planning Practice Guide [2] is available that supports the NPPF. Information on the importance of SuDS is available at:

http://planningguidance.planningportal.gov.uk/blog/guidance/flood-risk-and-coastal-change/reducing-the-causes-and-impacts-of-flooding/why-are-sustainable-drainage-systems-important/

This guidance note aims to provide direction to relevant design guidance for the successful implementation of SuDS and is the basis against which planning consultations from the Local Planning Authority (LPA) will be assessed.

2. Sustainable Drainage Systems

The LPA will determine the application in accordance with national and local policies whilst taking into account advice on technical matters from the Lead Local Flood Authority (LLFA).

The LPA will need to be satisfied that:

- any proposals meet national and local policies.
- any proposals clearly identify who will be responsible for maintaining the sustainable drainage systems; and there are clear arrangements in place for on-going maintenance over the lifetime of the development.
- any proposals set out a minimum standard to which the sustainable drainage systems must be maintained.

What is expected from the developer?

- Ensure that any submission has been designed in accordance with the national SuDS guidance [3] and our Local Flood Risk Management Strategy (LFRMS). [4]

- Use "*Planning for SuDS – making it happen*" CIRIA C687 to guide the planning of the site.

[1] http://www.parliament.uk/business/publications/written-questions-answers-statements/written-statement/Commons/2014-12-18/HCWS161/

[2] http://planningguidance.planningportal.gov.uk/blog/guidance/flood-risk-and-coastal-change/

[3] https://www.gov.uk/government/publications/sustainable-drainage-systems-non-statutory-technical-standards

[4] http://www.bolton.gov.uk/website/pages/Flooddefenceandwatercoursemanagement.aspx

- Consider how to manage the rate of surface water run-off so that it is similar to the conditions before the development. Also consider the effect this run-off will have on any receiving ground or watercourse.

- Use the "*Code of Practice for Surface Water Management for Development Sites*" BS8582:2013, in developing a drainage strategy for the site.

- Speak to the LLFA team about the surface water drainage proposals for the site. They can advise on what consents will be required, which types of SuDS are unsuitable and whether to take special precautions to prevent pollution or reduce infiltration.

- When carrying out the detailed SuDS design, use "*The SuDS Manual*" CIRIA C697 to inform the choice for the development of SuDS components, maintenance, etc.

- Demonstrate in the Flood Risk Assessment (FRA) that surface water will not cause flooding to property on-site or off-site as a result of the proposed development.

- Whilst constructing the site, protect adjoining areas from flooding.

- Consider the timetable for construction. Where permeable surfaces are installed, ensure they are not blocked with silt from site activities.

- With regard to planting within SuDS, careful and early consideration of design issues, and the provision of adequate landscape information is needed. In assessing the landscape implications of the application the site context, proposed layout, future uses and maintenance all need to be taken into account. Larger or more complex sites may require a greater involvement of landscape specialists.

- Ensure there is an adequate management and maintenance system in place to ensure operation of the drainage system.

- Sites where SuDS are deemed by the developer to be inappropriate will need to be supported by a detailed viability report including costings showing why SuDS is inappropriate for the site.

3. Design Principles

3.1 Key Principles

Four key principles to be followed are:

1. Ensure that people, property and critical infrastructure are protected from flooding.
2. Ensure that the development does not exacerbate flood risk off site.
3. Ensure runoff is stored and released slowly.
4. Ensure that resources are secured to maintain the SuD for the lifetime of the development.

3.2 The SuDS Management Train

A useful concept used in the development of sustainable drainage systems is the SuDS management train (sometimes referred to as the treatment train). As in a natural catchment, drainage techniques can be used in series to change the flow and quality characteristics of the runoff in stages.

The hierarchy of techniques to be used is:

1. Prevention - Prevention of runoff by good site design and reduction of impermeable areas.
2. Source Control - Dealing with water where and when it falls (e.g. infiltration techniques).
3. Site Control - Management of water in the local area (e.g. swales, detention basins).
4. Regional Control - Management of runoff from sites (e.g. balancing ponds, wetlands).

Developers should demonstrate how they have considered and used these techniques.

3.3 Runoff Destinations

Surface water runoff not collected for use must be discharged to one or more of the following in the order of priority shown:

1. into the ground (infiltration).
2. to a surface water body.
3. to a surface water sewer, highway drain or other drain.
4. to combined sewer.

3.4 Flood Risk within the Development

The drainage system must be designed so that, unless an area is designed to hold and/or convey water, flooding does not occur on any part of the site for a 1 in 30 year rainfall event.

The drainage system must be designed so that, unless an area is designed to hold and/or convey water, flooding does not occur during a 1 in 100 year rainfall event in any part of a building (including a basement) or in any utility plant susceptible to water (e.g. pumping station or electricity substation) within the development.

The design of the site must ensure that flows resulting from rainfall in excess of a 1 in 100 year rainfall event are managed in exceedance routes that avoid risk to people and property.

3.5 Peak Flow Control

For greenfield sites, the peak runoff rate from the developed site for the 1 in 1, 1 in 30 and 1 in 100 year rainfall events are to include an allowance for climate change and urban creep, and must not exceed the peak greenfield runoff rate from the site for the same event.

The catchment area considered shall be for the whole site and include any areas contributing run-off on to the site.

On brownfield sites where proposals are for 5 or more residential units, or 500m^2 or greater non-residential units; the rate of run-off should be 50% less than conditions before development. This is a requirement of our Core Strategy [5].

The greenfield run-off rate shall be calculated using the tool at: UK SuDS Tools Web site - HR Wallingford www.uksuds.com

3.6 Volume Control

Volume control shall comply with the requirements of S4, S5 and S6 of the National Non-statutory technical standards for sustainable drainage systems [6].

3.7 Pollution Control

SuDS design must ensure that the quality of any receiving water body is not adversely affected and is preferably enhanced. The current status of waterbodies and groundwater and the local objectives of the River Basin Management Plan will be considered when assessing applications.

Resources
CIRIA C697 The SuDS Manual [7] - Chapters 3 and 5
Ground Water Protection: Principles and Practice, (The Environment Agency), Nov 2012, updated Aug 2013 [8].

3.8 Designing for Exceedance

It must be demonstrated that the site design is such that when SuDS features fail or their design is exceeded, exceedance routes do not cause flooding of properties on or off site. This is achieved by designing suitable ground exceedance or flood pathways. Runoff must be completely contained within the drainage system (including areas designed to hold or convey water) for all events up to a 1 in 30 year event.

Resources
CIRIA C635 - Designing for Exceedance in Urban drainage - Good Practice [9]

[5] http://www.bolton.gov.uk/website/pages/Corestrategy.aspx

[6] https://www.gov.uk/government/publications/sustainable-drainage-systems-non-statutory-technical-standards

[7] http://www.ciria.org/Resources/Free_publications/the_suds_manual.aspx

[8] www.gov.uk/government/publications/groundwater-protection-principles-and-practice-gp3

[9] http://www.ciria.org/Resources/Free_publications/Designing_exceedance_drainage.aspx

3.9 Highway Drainage

SuDS features constructed specifically to drain highways can be adopted by Bolton Council as Highway Authority and maintained as part of the wider highways network subject to agreement of the Highway Authority. The incorporation of SuDS that involves highway drainage requires the developer either to enter into an agreement under Section 38 of the Highways Act, if involving new development, or an agreement under Section 278 of the Act, if existing highway arrangements are to be modified. A commuted sum may be payable.

Resources
Bolton Council Development Highway Design Guides[10] .
Design Manual for Roads and Bridges (DMRB)[11]

3.10 Climate Change

Due to changing climate, winters are likely to get wetter and we are likely to experience more extreme weather conditions such as intense rainfall events. To ensure that we take account of long-term sustainability issues, the effects of climate change is considered over the lifetime of the development, for residential development this is assumed to be a 100 year time horizon. An appropriate allowance for an increase in peak rainfall intensity shall be made in accordance with current national guidance.

Resources

Guidance: Climate Change Allowances for Planners[12]
BS8582:2013 Code of Practice for Surface Water Management for Development Sites - Section 5.

3.11 Urban Creep

Urban Creep describes future urban expansion within a development and activities such as building extensions and paving gardens. These activities increase the impermeable area of a site and often sit outside of the development control process. As such proposed developments must have an allowance for this increase in impermeable area of 10%.

Resources

BS8582:2013 Code of Practice for Surface Water Management for Development Sites - Section 8.

[10] http://www.bolton.gov.uk/website/pages/Roadsandpavements.aspx

[11] http://www.standardsforhighways.co.uk/dmrb/vol4/section2.htm

[12] https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/296964/LIT_8496_5306da.pdf

4. SuDS Component Design

4.1 SuDS Components

The *SuDS Manual* (CIRIA publication C697) can guide the design process and includes calculations to ensure that sustainable drainage principles have been applied.

Resources
Susdrain.org.uk website [13]
CIRIA C697 The SuDS Manual Chapter 6. [14]

4.2 Water Butts and Rainwater Harvesting Systems

Any attenuation provided by water butts or rainwater harvesting systems shall not to be taken into account when calculating site runoff rates or flood storage volumes.

4.3 Infiltration

If infiltration is proposed as a means of disposal of surface water it must be demonstrated prior to approval that the soil on the development site is suitable for this purpose by undertaking an infiltration test in accordance with BRE Digest 365 Soakaway Design.

Resources
BRE Digest 365 Soakaway Design. [15]

4.4 Geocellular/Modular Systems

Geocellular or modular attenuation systems are not to be constructed under adoptable carriageways or footways.

4.5 Conventional Drainage Pipes, Subsurface Drainage and Storage

To be constructed in accordance with the latest version of *Sewers for Adoption* produced by WRc plc.

4.6 Silt Removal Devices

Silt removal devices shall be constructed so they are easily accessible by maintenance vehicles.

4.7 Separators/Interceptors

Separators and interceptors are to be used on the sites set out in section 1b of *Pollution Prevention Guidelines PPG3* to prevent hazardous chemical and petroleum products entering

[13] http://www.susdrain.org/delivering-suds/using-suds/suds-components/suds-components.html

[14] http://www.ciria.org/Resources/Free_publications/the_suds_manual.aspx

[15] http://www.brebookshop.com/index.jsp

water bodies or drainage systems. In some instances you may not require an oil separator if there is a sufficient SuDS treatment train in place (see section 3.2 above).

Resources

Pollution Prevention Guidelines : Use and Design of Oil Separators in Surface Water drainage Systems: PPG3. [16]
BS EN 858: Separator systems for light liquids (e.g. oil and petrol).

4.8 Pumping Stations

Pumping Stations are not considered to be an appropriate or sustainable means of surface water disposal.

5. Construction

Damage caused during the construction phase has the potential to prevent SuDS functioning as required, for example, by contamination with sediments generated during construction. As such appropriate planning must take place during the construction phase.

Resources

BS8582:2013 Code of Practice for Surface Water Management for Development Sites - Section 10.
C698 Site handbook for the construction of SUDS [17]

6. Maintenance

We will need to be satisfied that the minimum standards of operation are appropriate, that SuDs are completed to standard and that there are clear arrangements in place for ongoing maintenance over the lifetime of the development.

If the developer intends to maintain the SuDS at a major development we will require a Section 106 agreement that includes drainage maintenance clauses securing continued maintenance of the system.

Maintenance requirements for proposed SuDS are to be agreed with the Local Planning Authority.

If the developer intends to maintain the SuDS, the following is required:

a) If constructed, a copy of a maintenance and operation manual for single property SuDS must be supplied to the relevant residents.

b) A whole life cycle plan for the SuDS (i.e. the surface water management for the whole site) to include when elements will require major maintenance or replacement.

[16] https://www.gov.uk/government/publications/choosing-and-using-oil-separators-ppg3-prevent-pollution

[17] www.susdrain.org/resources/ciria-guidance.html

c) Details of the organisation responsible for the ongoing maintenance of the SuDS for the lifetime of the development.

d) Details of the funding arrangements for SuDS maintenance. It must be demonstrated how the ongoing maintenance of the SuDS for the lifetime of the development will be funded.

To ensure performance of the system remains as per the agreed design and to ensure the performance of the system is not impacted by future alterations, some features such as flow controls may be designated by the LLFA as flood risk assets under the Flood and Water Management Act 2010.

7. Pre-Application Discussion and Information Requirements

7.1 Pre-application Discussion

The LLFA will either engage in direct pre-application discussion with developers, or as part of a multi-disciplinary team during LPA discussions. The importance of early discussions cannot be over-emphasized. **There is no charge or fee levied for pre-application discussions regarding SuDS.**

7.2 Outline Planning Application

The following information should be presented in the form of a drainage strategy to enable determination of the application:

a) the technical design criteria used for the development site(s) based upon the national SuDS guidance.

b) any constraints which affect the proposed development, for example, physical restrictions, land contamination, statutory undertakers plant, habitat and species etc.

c) details of any existing land drainage, private drainage and public sewers.

d) topographical survey of the site, including levels and sections of any adjacent watercourses for an appropriate distance upstream and downstream of discharge point.

e) how the indicative drainage design meets the FRA requirements (if an FRA is required)

f) proposed approach in the drainage design to deal with flood risk, water quality, conveyance, storage, exceedance routes and multi-functional use of drainage ‘space’ to meet community and environmental requirements.

g) details of any off-site works required.

h) details of any consents required.

i) identification of discharge points or receptors i.e. to ground, watercourse or sewer.

j) identification of sensitive receptors, including groundwater protection zones, habitat designations or archaeological features.

k) an assessment of the need and opportunity for rainwater harvesting and use.

l) evidence of infiltration capacity at the site and suitability of infiltration drainage.

m) proposed design calculations for peak flow, volume control and greenfield runoff, and/or brownfield runoff where appropriate. Based upon the national SuDS guidance showing pre-development (greenfield or brownfield as relevant) and post-development runoff rates, critical storm duration and associated storage estimates with indicative impermeable areas.

n) inclusion of climate change, future development allowances and quantification of any surface water flows on-site from off-site locations.

o) temporary drainage during construction.

p) proposed split of the surface water management systems between private (i.e. within curtilage) and public (i.e. in public open space and/or highway).

q) the relationship with and links to the LFRMS, Water Framework Directive, Planning, Sustainability and Environmental Policies (National, Regional and Local).

r) the clear arrangements to be put in place for on-going maintenance over the lifetime of the development.

The minimum data requirements for a submission is summarised in Appendix A.

For larger sites with a Masterplan (in addition to the drainage strategy information) additional information should include:

a) details of phasing;
b) individual plot discharge and storage constraints;
c) who would be responsible for construction, maintenance and adoption of the regional and/ or linking components of the drainage system;
d) who would be responsible for controlling the overall surface water management of the site;

Due to the nature of outline planning applications and whether or not certain aspects of the proposed development are reserved, the amount of information which would be contained within the drainage strategy (set out above) should be considered to be a minimum.

If the drainage of the site is not reserved (and the layout and landscape design are also not reserved) then the drainage strategy should be more detailed as set out below. It is likely that an outline planning permission will have a condition(s) attached requiring the submission of more detailed drainage information which must be approved before the development can commence.

7.3 Full Planning Application, (or reserved matters application if applicable) Discharge of Conditions

Detailed design

If a reserved matters application is being made, the submission on the detailed design and layout of the sustainable drainage system should update and enhance the drainage strategy, taking into account the advice from the LLFA team and stakeholder inputs, and be submitted as a detailed

drainage strategy.

If a full planning application is being made then the submission should be a combination of the information required for an outline application drainage strategy and the following information, to produce a detailed drainage strategy:

a) Final design calculations to demonstrate conformity with the design criteria for the site for peak flow, volume control and greenfield runoff, and/or brownfield runoff where appropriate. Based upon the national SuDS guidance showing pre-development (greenfield or brownfield as relevant) and post-development runoff rates, critical storm duration and associated storage estimates to determine the scale (and associated land take) of conveyance and storage structures.

b) The design shall consider the whole of the site including how run-off from permeable areas is managed and controlled.

c) Supply the hydraulic design software model for verification purposes.

d) Plans of the existing and proposed site including existing and proposed sections and spot heights.

e) Long sections and cross sections for the proposed drainage system.

f) Plan of proposed SuDS with sub-catchment areas including impermeable areas and phasing.

g) Location details of connections to watercourses and sewers.

h) Location, type and design details of flow controls.

i) Details of SuDs source control features or proprietary products that have been incorporated to improve water quality.

j) Operational characteristics of any mechanical features including maintenance and energy requirements.

k) Plan demonstrating flooded areas for the 1 in 100 year storm when system is at capacity and demonstrating flow paths for design exceedance, the plan shall include proposed spot heights at a suitable interval for the whole site.

l) Access arrangements for all proposed SuDS.

m) Management plan for all drainage, including the locations of features requiring inspection and recommended inspection frequencies.

n) Landscape planting scheme - if proposing vegetated SuDS.

o) Plan for management of construction impacts including any diversions, erosion control, phasing and maintenance period.

p) the clear arrangements to be put in place for on-going maintenance over the lifetime of the development.

The minimum data requirements for a submission is summarised in Appendix A.

The local planning authority will determine the application in accordance with national and local policies whilst taking into account advice on technical matters from the LLFA.

Due to the nature of full or reserved matters planning applications certain aspects of the proposed development may not be fully developed at the time of submission. The amount of information which would be contained within the detailed drainage strategy (set out above) should be considered to be a minimum.

If the applicant has not fully detailed the drainage design, it is likely that the planning permission will have a condition(s) attached requiring the submission of more detailed drainage information which must be approved before the development can commence.

The LLFA cannot approve the drainage strategy post commencement.

In order to discharge conditions, the planning conditions may include the requirement to submit a Verification Report detailing the as built drainage system, its compliance and any departure from the agreed design, as built drawings, materials test results, the results of performance testing and a photographic record of its construction. The validation report should be prepared by a suitably qualified and competent person. The individual or company should have suitable professional indemnity insurance and will normally be independent of the developer / contractor / subcontractor to ensure there is no conflict of interest.

8. On-Line Resources

PPS25 Development and Flood Risk Practice Guide: (*withdrawn 7th March 2015*)
https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/7772/pps25guideupdate.pdf

Flood Risk and Coastal Change Guidance
http://planningguidance.planningportal.gov.uk/blog/guidance/flood-risk-and-coastal-change/

Susdrain the community for sustainable drainage www.susdrain.org

DEFRA Non-Statutory Technical Standards for Sustainable Drainage Systems
https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/415773/sustainable-drainage-technical-standards.pdf

UK SuDS Tools Web site - HR Wallingford www.uksuds.com

CIRIA Guidance
http://www.susdrain.org/resources/ciria-guidance.html

CIRIA C697 The SuDS Manual:
http://www.ciria.org/Resources/Free_publications/the_suds_manual.aspx

9. Model Planning Conditions

Drainage

No development shall commence until details of a scheme for the disposal of foul and surface water has been submitted to and agreed in writing by the local planning authority. The scheme shall be implemented in accordance with the approved details prior to the [x] use of the development and retained in perpetuity.

Drainage (sustainable drainage systems)

Sustainable Drainage *(where an appropriate sustainable drainage scheme has been previously submitted and it is accompanied by an agreed implementation, management and maintenance plan)*

No building shall be occupied until [a / the] sustainable drainage system for the site has been completed in accordance with the [approved details / details first submitted to and agreed in writing by the local planning authority]. The sustainable drainage system shall be managed and maintained thereafter in accordance with the agreed management and maintenance plan.

Sustainable Drainage *(where a sustainable drainage scheme is required but nothing suitable has been proposed)*

No building shall be occupied until surface water drainage works have been implemented in accordance with details that have been submitted to and approved in writing by the local planning authority. Before these details are submitted, an assessment shall be carried out of the site potential for disposing of surface water by means of a sustainable drainage system, and the results of the assessment provided to the local planning authority. Where a sustainable drainage scheme is to be provided, the submitted details shall:

i) provide information about the design storm period and intensity, the method employed to delay and control the surface water discharged from the site and the measures taken to prevent pollution of the receiving groundwater and/or surface waters;

ii) include a period for its implementation; and

iii) provide a management and maintenance plan of the development which shall include the arrangements for adoption by any public authority or statutory undertaker and any other arrangements to secure the operation of the scheme throughout its lifetime.

Sustainable Drainage *(where an appropriate sustainable drainage scheme has been submitted with the application and it is accompanied by an agreed implementation, management and maintenance plan)*

No building shall be occupied until the sustainable drainage scheme for the site has been completed in accordance with the submitted details. The sustainable drainage scheme shall be managed and maintained thereafter in accordance with the agreed management and maintenance plan.

Sustainable Drainage *(where an appropriate sustainable drainage scheme has been submitted with the application but without details of implementation, management and maintenance)*

No development shall take place until details of the implementation, maintenance and management of the sustainable drainage scheme have been submitted to and approved in writing by the local planning authority. The scheme shall be implemented and thereafter managed and maintained in accordance with the approved details.

Those details shall include:

i) a timetable for its implementation, and

ii) a management and maintenance plan for the lifetime of the development which shall include the arrangements for adoption by any public body or statutory undertaker, or any other arrangements to secure the operation of the sustainable drainage system throughout its lifetime.

Appendix A.

Design Criteria and Minimum Data Submission Requirements

The purpose of this document is to assist developers to comply with the Council's requirements in relation to flood risk assessment for new developments on green and brown field sites.

The tables below outline the minimum information required together with the preferred format.

Notes for Guidance

Hydraulic modelling global variables, simulation criteria & Outputs

1. For Bolton, typical global variables are:

    - M5_60 = 19.0mm
    - Ratio r = 0.3
    - Cv (Summer) = 0.75
    - Cv (Winter) = 0.84

2. The following return period storms should be analysed with the durations listed.

    - Return period (1 in x): 1, 2, 30, & 100 (both summer and winter storms)
    - Storm durations (mins): 15, 30, 60, 120, 180, 360, 1440, 2160, 2880, 4320, 5760, 7200, 8640 & 10080.

    The appropriate allowance for climate change should be included in the above return periods.

3. The following outputs / reports are required:

    - Network Details
    - Hydraulic section Table
    - Manhole schedule
    - Outfall Details
    - Simulation Details
    - Online / Offline controls
    - Summary of results – Critical by all Return Periods, ranked by Maximum Level.

Data to be submitted regarding the Existing Site

For Brownfield Sites

Requirement	Format	Comments
State the existing impermeable area of the site (ha).	To be shown on a plan of the existing site.	
State the peak discharge rates for return periods up to 1 in 100 years.	Summary output from hydraulic modelling package.	

For Greenfield Sites

Requirement	Format	Comments
A summary of green field run-off rates for return periods up to 1 in 100 years.	PDF of calculation sheet or a table of results including a description of how the values were calculated.	For sites <1Ha a max discharge rate of 5l/s can be used for all storms up to 1 in 100 years + CC.
Calculation of Qbar.	Summary output from hydraulic modelling package (or MDX file) or a description of how the value was calculated.	
Compliance with Building Regulations H3.	Demonstrate that an infiltration check has been carried out.	Preference given to soakaways etc.

Data to be Submitted on the Proposed Development

For Green and Brownfield Sites

Requirement	Format	Comments
Schematic layout plan with all pipes, manholes and ancillary features clearly numbered or referenced to the hydraulic model. Pipe diameters and levels should be included.	AutoCad 2007 (or earlier) PDF	
The total permeable & impermeable area of the whole development (Ha)	To be shown on schematic layout.	
If Micro Drainage has been used, a copy of the simulation file.	Micro Drainage MDX file	
If an alternative hydraulic modelling package has been used, a summary sheet of the global variables used.	PDF	
Evidence a 5mm rainfall depth can be retained on site if infiltration is to be used.	Summary output from hydraulic modelling package.	
Evidence that the developed run off rate will not exceed green field rates for storm events up to 1 in 100 years.	Summary output from hydraulic modelling package.	
Evidence that the difference between the volume of run-off during a 1 in 100 year, 6 hour event before and after development can be retained in site.	Summary output from hydraulic modelling package.	**(The following for Greenfield sites only)** If it cannot, can the discharge rate from the new development be limited to a) 2l/s/Ha or b) Qbar for 1:30 and 1:100 year storms?

Requirement	Format	Comments
Evidence the proposed drainage design will not result in surcharging for 1 in 1 year return period storms.	Summary output from hydraulic modelling package.	
Evidence the proposed drainage design will not result in site flooding for 1 in 30 year return period storms.	Summary output from hydraulic modelling package	
Evidence that no property will suffer flooding for 1 in 100 year return period storms.	Summary output from hydraulic modelling package.	
Evidence that up to 1 in 100 year exceedance flows can be stored within the boundary of the site.	Summary output from hydraulic modelling package and relevant drawing(s).	
The total volume of attenuation that will be provided both above ground and below ground and the location of both within the site. For above ground storage, provide details of finished ground & floor levels and demonstrate flood pathways to storage areas.	Summary output from hydraulic modelling package and relevant drawing(s).	
An indication of the likely path for flood flows within and from the site during storm events in excess of 1 in 100 years.	Summary output from hydraulic modelling package and relevant drawing(s).	