The Highland Council
Comhairle na Gàidhealtachd

Supplementary Guidance
Stiùireadh Leasachail

Flood Risk & Drainage Impact
Measadh Cunnart Tuile & Buaidh Drèanaidh

Supplementary Guidance
ADOPTED
January 2013

EXECUTIVE SUMMARY
GEÀRR-CHUNNTAS GNÌOMHACH

This document puts The Highland Council's (THC) general planning policy on flooding and development into detailed planning, construction and maintenance practice. It has been produced by THCs Flood Team in conjunction with other THC officials and in consultation with the Scottish Environment Protection Agency (SEPA). It aims to improve the design and implementation of developments and their related drainage arrangements. This technical guidance is aimed at the development industry but its themes will be of interest to the wider public. It has been in preparation for some time but has been augmented in response to recent flood events. It also explains the wider context to THCs flooding policy and the responsibilities of all parties with an interest, particularly; the development industry, landowners, Councils, Scottish Government, Scottish Water, SEPA and individual householders.

THC is committed to work with developers to ensure that appropriate development takes place in appropriate locations free from unacceptable flood risk and not liable to exacerbate flood risk elsewhere. Flooding and drainage are material planning considerations and this guidance document is aimed at helping THC achieve its long term flood management aspirations which include:

- Addressing flood risk issues as early as possible and prior to any development commencement
- Achieving good-quality and reliable flood risk assessment of proposed development sites
- Ensuring that robust drainage design criteria is applied which also addresses design exceedance measures
- Ensuring that Sustainable Drainage System (SuDS) schemes are designed and constructed to meet best practice and that long term maintenance is provided for by a responsible and competent body
- Provision of adequate access to bodies of water for maintenance and inspection purposes
- Reserving development-free riparian buffer zones to allow watercourses room to move naturally
- Exploring de-culverting opportunities where possible

- To reduce flood risk to existing development if possible, without increasing risk elsewhere
- Betterment of existing drainage maintenance regimes where possible and particularly where an existing drainage problem exists
- Working with the water environment and not against it

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CLÀR-INNSE

GLOSSARY

AEP	Annual Exceedance Probability. For example a flood with a 1% AEP has a statistical probability of being reached or exceeded in each year of 1%. This is often referred to as the "once in 100 year flood". It should be noted however, that the occurrence of a flood event does not change the statistical probability of another flood occurring.
CAR	Water Environment (Controlled Activities) Regulations 2011
CIRIA	Construction Industry Research and Information Association
FEH	The Flood Estimation Handbook is a Centre for Ecology and Hydrology publication, giving guidance on rainfall and river flood frequency estimation in the UK
SEPA	Scottish Environment Protection Agency
Sources of Flooding[1]	Fluvial – flooding originating from a watercourse either natural or culverted. Coastal – flooding originating from the sea (open coast or estuary) where water levels exceed the normal tidal range and flood onto the low-lying areas that define the coast line. Pluvial – urban or rural flooding which results from rainfall-generated overland flow before the runoff enters any watercourse, drainage system or sewer. Groundwater - flooding due to a significant rise in the water table, normally as a result of prolonged and heavy rainfall over a sustained period of time. Drainage - flooding as a result of surcharging of man-made drainage systems including combined sewers where the capacity of the system to discharge runoff has been exceeded. Infrastructure Failure – flooding due to failure of man made infrastructure including hydro-dams, water supply reservoirs, canals, flood defence structures, underground conduits, water treatment tanks etc.
SPP	Scottish Planning Policy
SuDS	Sustainable Drainage Systems
SW	Scottish Water
TECS	Technical, Environmental and Community Services
THC	The Highland Council

[1]Potential sources of flood risk as described in SEPA's 'Technical Flood Risk Guidance for Stakeholders' available for download from www.sepa.org.uk/flooding/flood_risk/planning__flooding.aspx

1 INTRODUCTION
RO-RÀDH

1.1
Within The Highland Council (THC) area there are a significant number of properties at risk of flooding from a variety of sources including watercourses, the sea, lochs, groundwater and surface water. Flooding is primarily a natural phenomenon which cannot be prevented entirely. If left un-managed however it can have a devastating effect on people, property, businesses and land.

1.2
The Flood Risk Management (Scotland) Act 2009 places a duty on responsible bodies such as Local Authorities to exercise their functions with a view to reducing overall flood risk.

1.3
THC therefore wants to ensure that the built environment works with the water environment and not against it by steering new development away from areas at unacceptable risk of flooding and by requiring developers to consider how their development is likely to impact on flood risk elsewhere.

1.4
THC recognises that managing flood risk and surface water is a material consideration for any development which should be assessed from the outset by a qualified, competent and experienced professional2. The location, layout and design of new developments are the most critical factors determining both the probability and impacts of flooding.

1.5
Detailed information on the concept of 'flood risk' i.e. the probability that a particular magnitude of flood will occur sometime in the future coupled with the impact that such a flood is likely to have is available from publications such as CIRIA C6243 and SEPA's Technical Flood Risk Guidance for Stakeholders4 document. These publications include information on the different types and mechanisms of flooding (such as fluvial, coastal, pluvial, groundwater etc).

[2]Appendix D provides contact details of professional institutions which may be able to recommend organisations who can provide specialist advice.
[3]http://www.ciria.org.uk/pdf/c624flyer.pdf
[4]http://www.sepa.org.uk/planning/flood_risk.aspx

2 PLANNING & REGULATORY FRAMEWORK
FRÈAM RIAGHLAIDH

2.1
Scottish Planning Policy (SPP)5 and the THCs planning policies aim to avoid and reduce flood risk in exercising planning functions.

2.2
SPP states that 'Planning authorities must take the probability of flooding from all sources – (coastal, fluvial (water course), pluvial (surface water), groundwater, sewers and blocked culverts) and the risks involved into account when preparing development plans and determining planning applications'

2.3
THCs general policy on Flood Risk requires avoidance of flood risk areas, specifies when a developer flood risk assessment will be required and promotes sustainable flood management measures. In addition, THCs policy on Surface Water Drainage requires all developments to adhere to accepted technical SuDS requirements. Full text below:

[5] Scottish Planning Policy Section 196

Policy 64 Flood Risk

Development *proposals* should avoid areas susceptible to flooding and promote sustainable flood management.

Development *proposals* within or bordering medium to high *flood risk areas*, will need to demonstrate compliance with *Scottish Planning Policy* through the submission of suitable information which may take the form of a *Flood Risk Assessment*.

Development *proposals* outwith indicative medium to high *flood risk areas* may be acceptable. However, where:

- better local flood risk information is available and suggests a higher risk;
- a sensitive land use (as specified in the risk framework of *Scottish Planning Policy*) is proposed, and/or;
- the development borders the coast and therefore may be at risk from climate change;

A *Flood Risk Assessment* or other suitable information which demonstrates compliance with SPP will be required.

Developments may also be possible where they are in accord with the flood prevention or management measures as specified within a local (development) plan allocation or a *development brief*. Any developments, particularly those on the flood plain, should not compromise the objectives of the EU Water Framework Directive.

Where flood management measures are required, natural methods such as restoration of floodplains, wetlands and water bodies should be incorporated, or adequate justification should be provided as to why they are impracticable.

Policy 66 Surface Water Drainage

All proposed development must be drained by *Sustainable Drainage Systems* (SuDS) designed in accordance with The SuDS Manual (CIRIA C697)and, where appropriate, the Sewers for Scotland Manual 2nd Edition. Planning applications should be submitted with information in accordance with *Planning Advice Note* 69: Planning and Building Standards Advice on Flooding paragraphs 23 and 24. Each drainage scheme design must be accompanied by particulars of proposals for ensuring long-term maintenance of the scheme.

2.4

THC are in the process of developing Local Flood Risk Management Plans which will determine a catchment-based approach to reducing overall flood risk. Opportunities to return bodies of water to their natural drainage capability will be explored e.g. de-culverting watercourses where possible through the planning process, provided flood risk is not increase elsewhere as a result. It should also be noted that THC supports SEPA's presumption against culverting for land gain (please refer to SEPA's Position Statement on Culverting of Watercourses6).

2.5

The Building (Scotland) Regulations 2004, as amended states under mandatory standards 3.3 Flooding and Groundwater: - Every building must be designed and constructed in such a way that there will not be a threat to the building or the health of the occupants as a result of flooding and the accumulation of groundwater.

[6]http://www.sepa.org.uk/planning/engineering-water_environments.aspx

3 ROLES AND RESPONSIBILITIES
DREUCHDAN AGUS DLEASTANASAN

3.1

Many organisations, with different roles and responsibilities, work together to manage flood risk in the Highlands. Many public organisations are placed under a duty to work together to reduce overall flood risk by the Flood Risk Management (Scotland) Act 2009 and there are specific requirements on each which are summarised below. Developers, landowners and householders also have responsibilities.

3.2
Developers

- Provide sufficient information to the relevant authorities to demonstrate that their proposals will not increase flood risk and where there are already flooding issues within a catchment, demonstrate net betterment
- Provide sufficient information to the relevant authorities to demonstrate that their proposals will not be subject to an unacceptable risk of flooding as per SPP
- Provide sufficient information to the relevant authorities to demonstrate that their proposals will safeguard water quality and have adequate and effective maintenance arrangements for all SuDS devices, other water bodies and associated set-back areas

3.3
Scottish Government

- Setting National Policy on Flood Risk Management and Flood Warning
- Setting Scottish Planning Policy
- Provision of resources to enable authorities to address flood risk

3.4
SEPA

- Provide a flood warning service for Scotland and operate Floodline[7]
- Provide advice to Local Authorities on flood risk and planning
- SEPA also have an important new role in the coordination of flood risk management policy and activities across Scotland which includes the:
    - Development and publication of the National Flood Risk Assessment
    - Development of Flood Risk Management Strategies
    - Assessment of flood risk across Scotland including publication of flood risk and hazard maps

[7]http://www.floodlinescotland.org.uk/

- Establishment of national and local Flood Risk Advisory Groups
- Preparation of maps of artificial structures and natural features
- Publishing of national Flood Risk Management Plans

3.5 The Highland Council

- Preparation of maps of water bodies and SuDS
- Assessing water bodies for conditions likely to pose a flood risk
- Undertake maintenance works in water bodies including the clearance of watercourses where the works will significantly reduce flood risk
- Maintenance of existing flood alleviation schemes
- Maintain road gullies – these are as not designed to cope with extreme weather events but it is still important that they operate efficiently to avoid localised flooding.
- Planning policy and development management (with flood risk advice from SEPA in the first instance and TEC Services)
- Working with the emergency services in response to severe flooding
- Coordinating reception centres for people evacuated from their homes and arrange temporary accommodation if appropriate
- Coordinating the aftermath of a flood
- Dealing with road closures (except on trunk roads)
- Preparation of local Flood Risk Management Plans (from 2012)
- Local Authorities also have powers to promote new flood alleviation schemes where these can be justified and funding is available. There is no statutory duty for a Local Authority to prevent property from flooding nor is there a duty to provide sandbags in the event that there is deemed to be a risk of flooding
- THCs TEC Services will endeavour to make filled sandbags available for collection from suitable locations to those vulnerable to flooding during a flood event. TECS staff will be deployed with sandbags to areas of high priority including those where there are elderly or infirm residents
- Property owners are strongly advised to make prior preparations for protecting their own property as flood incidents can occur with little warning and can be widespread

3.6 Scottish Water

- Maintaining water supply and drainage infrastructure
- Managing the discharge of surface water that enters the public drainage system
- Working in partnership with the local authority and emergency services

- Dealing with flood damaged mains and any flooding caused by bursts and chokes
- Liaising with SEPA, local authorities and the emergency services during a flood event to alleviate any flooding from public sewers
- Scottish Water will be responsible for assessing the risk of flooding from surface water and combined (surface and foul) sewers that results from higher than usual rainfall events. Once risks are identified, Scottish Water, working with local authorities and SEPA, will look for opportunities to reduce those risks through its capital investment programme. This will be co-ordinated with other work to address surface water flooding."

3.7
Northern Constabulary

- Co-ordinate the actions of all agencies involved during the course of a major flood incident
- Will control the scene at its outer limits by setting up cordon points and setting up a traffic management system in conjunction with the Local Authority
- Responsible for saving lives, co-ordinating evacuation and public information

3.8
Highlands & Islands Fire and Rescue Service

- The Scottish Fire & Rescue services have a duty to save lives in the event of serious flooding. This means rescuing people trapped, or likely to become trapped, by water; and protecting them from serious harm
- "Serious flooding" in this context means flooding that causes or is likely to cause one or more individuals to die, be seriously injured or become seriously ill and which results from natural causes; or an escape of water

3.9
Met Office

- Produces weather forecasts which help the UK public make informed decisions about day-today activities
- Warns people of extreme weather to mitigate its impacts
- Provides dedicated forecasting services to SEPA's flood warning team

3.10
Transport Scotland

- Gully (gutter and drain covers) maintenance for trunk roads
- Trunk road closures

3.11
Scottish Flood Forum

- Scottish Government supported organisation offering support and advice on flood protection, insurance, recovery, advice on establishing community flood groups and business continuity planning
- Represents the interests of people affected by, or at risk of, flooding

3.12
Landowners

- Under law are primarily responsible for the maintenance of watercourses and other water bodies including repairs and clearing
- Responsible for private flood defences on their land and maintenance of private drainage systems

3.13
Householders

- Principle responsible for protecting their property from flooding
- Responsible for acquiring home contents and buildings insurance
- Responsible for taking action to prepare for flooding
- Responsible for maintaining private drainage, including gullies and drains on shared private access roads / courtyards etc

4 MATTERS TO CONSIDER
GNOTHAICHEAN AIR AM BEACHDAICHEAR

4.1

Before a planning application is lodged the following flood risk and drainage matters should be considered first:

- is the development site at risk of flooding from any source (see Glossary)?
- would development of the site lead to increased flood risk elsewhere?
- would safe access and egress to and from the development be possible during flood events?
- is the development likely to prevent safe access to and maintenance of bodies of water and/or flood defence measures?
- is the development design employing SuDS?
- how is natural water emanating from the site being dealt with and managed, surface or ground water that will not be part of the storm water treatment?
- how is extraneous water being dealt with, uphill surface or ground water?
- what is to be done during construction phases to control water contamination and limit flow rates?
- will future users of the development be faced with difficulty obtaining insurance or mortgage finance?

5 FLOOD RISK ASSESSMENT (FRA)
MEASADH CUNNART TUILE (FRA)

5.1
Where the Planning Authority, in consultation with TEC Services and SEPA considers that there might be a risk of flooding to a proposed development or as a result of the development (as defined in its general policy or in accordance with Regulation 248 (as and when amended) of the Town and Country Planning (Development Management Procedure) (Scotland) Regulations 2008)) it will request that a Flood Risk Assessment is submitted in support of any planning application.

5.2
THC may seek developer contributions towards the betterment of watercourses in the area of their development which have been identified by the Flood Team. Where the improvement has connectivity to a Natura site it must be established that the improvement will have no adverse effect on the integrity of the connected Natura site.

5.3
Consultation with SEPA, THCs TEC Services, Scottish Water and relevant local councillors (both THC and Community Council) is considered critical to establish the flood history of the site. The location, nature and size of development coupled with the perceived flood source, probability and history will guide the complexity and technical requirements of a FRA.

5.4
A key requirement for a FRA is that it must consider all sources of flooding (with the specific exclusion of internal sewer flooding as defined in The Act) and demonstrate how flood mitigation methods will be managed. The FRA will be required to certify that any flood risk associated with the development can be managed now and for the lifetime of the development, taking into account the potential effects of climate change. It should also demonstrate that the development will not increase the risk of flooding elsewhere.

5.5
It is important to note that adoption of flood mitigation measures would only be suitable in some circumstances (such as Brownfield sites, clarified in SPP) and that THC will insist on the avoidance of flood risk as the first principle.

5.6
In line with SPP all new development need to be free from unacceptable flood risk for all flood events up to the 1 in 200 year return period (including an allowance for

[8]http://www.legislation.gov.uk/ssi/2008/432/regulation/24/made

climate change). THC may insist on a higher level of protection however, typically the 1 in 1000 year return pediod for potentially vulnerable developments such as care homes, schools, critical infrastructure etc.

Proportionality of FRA (refer to Appendix D for summary)

5.7
The detail and technical complexity of a FRA will reflect the scale and potential significance of the proposed development.

5.8
In line with C6249 (section 5.3) an 'appropriate level of FRA' should be carried out as soon as a site is considered for development. C624 states that 'an initial FRA can be extremely useful in identifying the viability of a potential development site and guiding development proposals at an early stage, and it is strongly recommended that this is undertaken before purchasing any site. As development proposals progress, additional FRAs can be undertaken to inform the master planning and outline design process. These will be at increasing levels of detail, as appropriate'.

5.9
THC agree that requirements for flood risk assessment should be proportionate to the development proposal and as such could request any of the following three levels of FRA (as extracted from C624):

Table 5.2 *Levels of flood risk assessment*

FRA Level	Description
1	**Screening study** to identify whether there are any flooding issues related to a development site which may warrant further consideration.
2	**Scoping study** to be undertaken if the Level 1 study indicates that the site may lie within an area which is at risk of flooding or that the site may increase flood risk due to increased runoff, to confirm the possible sources of flooding which may affect the site. The study should include the following objectives: ● assessment of the availability and adequacy of existing information ● qualitative assessment of the flood risk to the site, and the impact of the site on flood risk elsewhere ● assessment of the possible scope for appropriate development design and to scope additional work required.
3	**Detailed study** to be undertaken if the Level 2 study concludes that quantitative analysis is required to assess flood risk issues related to the development site. The study should include: ● quantitative assessment of the potential flood risk to the development ● quantitative assessment of the potential impact of development site on flood risk elsewhere ● quantitative demonstration of the effectiveness of any proposed mitigation measures.

5.10
The individual requirements for the three levels of FRA are discussed in detail in Sections 5.3.3 to 5.3.5 of C624.

[9]http://www.ciria.org.uk/pdf/c624flyer.pdf

FRA Content

5.11

It is essential that a FRA is completed to a highly proficient standard, contain only relevant information and cover all site specific issues. As outlined in 5.6 to 5.9 the detail and technical complexity of a FRA will be determined by the level of assessment required but, in all cases, whenever a FRA is undertaken for any location, the resulting report should ideally conform to the following structure:

FRA LEVEL				
1	**2**	**3**		**A. Background Information**
X	X	X	A1	Study area description.
X	X	X	A2	Outline of development proposal.
X	X	X	A3	Geo-referenced location and site plans showing all bodies of water or sources of flood risk which may have an influence on the site.
	X	X	A4	Plan of site illustrating pre and post development ordnance datum levels to a recognised scale.
	X	X	A5	A plan and description of any structures that may influence local hydraulics. This will include bridges and pipes/ducts crossing the watercourses together with culverts, screens, embankments or walls, overgrown or collapsing channels and their likelihood of choking with debris.
X	X	X	A6	Good use of photographs illustrating important features such as culverts etc.
X	X	X	A7	Catchment description.
	X	X	A8	If appropriate, information on current flood alleviation measures including the level of protection and condition.
	x	x	A9	Identification on the ownership of any water related structures and assessment of their condition.

	X	X	A10	Information of historic flood events, photographs, levels, trends in the vicinity of the development[10].
	X	X	A11	Clear drawings, plans and maps to a recognised scale relevant to the site.
	X	X	A12	Information on consultations undertaken with others.

FRA LEVEL				
1	**2**	**3**		
X	X	X	B1	Description of the type or source of any present flooding risk.
		X	B2	In the event that hydrological and/or hydraulic modelling is required it is important to ensure that the appropriate method has been chosen and explained in the FRA, justifying how the chosen model will accurately reflect the complexity of the hydrological processes.
		X	B3	Appropriate model calibration and verification should be carried out where possible. Un-calibrated models should be accompanied by appropriate sensitivity analysis.
		X	B4	For fluvial assessments all technical records and data sets derived from the Flood Estimation Handbook (FEH) or other (if appropriate).
		X	B5	For coastal assessments all technical records and data sets derived by following the industry accepted methodology[12].

B. Methodologies[11]

[10]Where developments are located in areas known to suffer from existing or historic flood problems higher standards may be required by THC and contributions from the developer towards ongoing flood alleviation schemes or other appropriate flood management measures may be required.
[11]When completing a FRA the methodology followed should be in line with industry standards and best practice
[12]Coastal flood boundary conditions for UK mainland and islands- Project: SC060064/TR4: 'Practical guidance design sea levels'

		X	B6	All modelling should be completed using recognised industry software to determine design water levels and a sensitivity analysis undertaken to determine the sensitivity of design water levels with regards to the key model parameters (e.g. design flow, boundary conditions and roughness)[13].
		X	B7	It is considered best practise to include an additional allowance for climate change, preferably utilising latest estimates from UKCIP. In general a 20% increase in peak flows should be adopted to assess the potential long term impacts of climate change on future flood risk[14].

[13]Further information on hydrological and hydraulic modelling is available in SEPA's 'Technical Flood Risk Guidance for Stakeholders' available for download from www.sepa.org.uk/flooding/flood_risk/planning__flooding.aspx

[14]An higher percentage increase in peak flows could be required for developments with a longer design life

FRA LEVEL		
1	**2**	**3**
X	X	X
		X
		X
		X
		X
		X
		X
		X

C. Results

C1	Comment and recommendations on application of appropriate design to suit flood risk.
C2	To ensure a complete FRA, the reporting of any modelling study is compulsory and should address important issues to an appropriate level of detail.
C3	If the FRA is underpinned by hydraulic modelling the results should be summarised in a tabular format, including results for appropriate sensitivity analysis.
C4	If applicable pre- and post development flood levels should be compared for a range of return periods up to 1 in 200 years.
C5	If the proposal is likely to result in a loss of flood plain storage then a quantitative assessment should be made of the anticipated loss on a level-for-level and volume-for-volume basis. Proposals to compensate for such loss should also be included.
C6	Should site flood levels be influenced by downstream hydraulic features such as culverts, an assessment should me made of the potential impact various blockage scenarios may have on expected flood levels.
C7	An appropriate freeboard, to mitigate uncertainty in relation to flood estimation, climate change and exacerbating factors such as wave action, should be suggested in line with industry standard principles and available guidance[15].
C8	An assessment of the impact of the design flood on access to and egress from the development will be required.

[15]According to PAN 69 calculating an allowance for freeboard is a specialist task which is best undertaken as part of a developer's flood risk assessment. The appropriate level of freeboard will take account of the flow and turbulence of the flood water, the speed, direction and duration of the wind, plus the extent of the water over which the wind blows. It is therefore not possible to give a universal figure for freeboard, but it should be determined through a consistent approach such as that adopted by the Environment Agency in their 'Fluvial Freeboard Guidance Note' 1999.

FRA LEVEL		
1	**2**	**3**
X	X	X
X	X	X
X	X	X
	x	X

D. Conclusions

D1	The conclusions should include a summary of the findings detailing any recommendations that have been made.
D2	The report should also indicate how all flood risks have been identified and appropriately mitigated or managed. The plans of the development should clearly take cognisance of these conclusions.
D3	A statement outlining how, in the author(s) opinion, the development proposal complies with current flood legislation and policy should be provided.
D4	A summary of residual risk after any proposed flood mitigation measures have been suggested and recommendations for further study/risk reduction.

5.7

There are a number of professional guidelines produced by recognised bodies which are designed as a reference for the implementation of good practice in the assessment of flood risk. See Appendix A for details.

6 DRAINAGE IMPACT ASSESSMENTS (DIA) MEASADH BUAIDH DRÈANAIDH

6.1
Drainage is a material consideration at the planning stage of a development and due consideration must be given to the impact of the proposed development elsewhere. This includes an assessment of potential from both a water quantity (i.e. flood risk) and water quality (i.e. pollution) perspective.

6.2
A DIA is a report, prepared by or on behalf of the developer, demonstrating the drainage issues relevant to a proposal and the suitable means of providing drainage.

6.3
A DIA is site specific and should deal with foul and surface water drainage. The scope of the DIA will depend on the type and scale of the development and the sensitivity of the area. Early discussions with THC are encouraged and with SEPA for those applications of a significant scale.

6.4
Surface water should be drained according to the principles of SuDS. The Water Environment (Controlled Activities) (Scotland) Regulations 2011 make SuDS a requirement for nearly all new development within Scotland.

6.5
SuDS have the benefit of taking account of water quantity, water quality and environmental and amenity issues and mimic natural systems by providing storage, flow attenuation and biological treatment. They can be integrated into the environment as visually attractive features, which can also provide wildlife habitats that would otherwise be scarce in the built environment.

Proportionality of DIA

6.6
THC recognises that requirements for drainage impact assessment should be proportionate to the development proposal and as such will request a Drainage Statement for small developments and a full DIA for larger developments.

6.7
Drainage design is a complex process so it is important that all drainage matters are considered at an early stage in the design process. As a result a DIA (statement or full

depending on the scale and nature of the proposal) is required to be submitted with the first planning application, whether outline or full, for any development which requires foul or surface water to be drained.

6.8

It is also recommended that a pre-application meeting takes place for larger schemes and, when located in sensitive areas, a discussion regarding plans for the site and any potential drainage issues with THC Planning & Development, THCs TEC Services, SEPA and Scottish Water.

6.9

The following categories of development will require a Drainage Statement only to demonstrate the best available options for foul and surface water drainage:

- householder applications;
- developments of four or less new dwellings unless the development may affect a sensitive area (refer to Full DIA)
- non-householder extensions under 100 square metres;
- changes of use not involving new buildings or additional hardstanding;
- where the submission forms part of a larger development for which a full DIA has already been accepted.

Drainage Statement

DIA LEVEL		
1	**2**	**3**
x		
x		

A Drainage Statement should typically include the following:

1 A description of the existing drainage characteristics of the site including general/ surrounding topography, the existence of any public sewers in the area.

2 A concept drawing of the proposed development including proposed/ anticipated drainage arrangements; identification of likely permeable and impermeable (hardstanding) areas (including a summary of area sizes)

6.10

Further guidance on drainage and flood risk for small developments is available in THCs Supplementary Planning Guidance: 'Access to Single Houses and Small Housing Developments'16.

[16]http://www.highland.gov.uk/NR/rdonlyres/042D2DA8-24CA-45F2-B5CF-B720F51C00BB/0/AccesstoSingleHousesMay2011.pdf

Full DIA

DIA Level				
1	**2**	**3**		A DIA is required to meet the following basic requirements and any additional site specific requirements specified by THC. Requirements may include:
x	x	x	1	A description of the existing drainage characteristics of the site including general/ surrounding topography, the existence of any public sewers in the area.
x	x	x	2	A concept drawing of the proposed development including proposed/ anticipated drainage arrangements; identification of likely permeable and impermeable (hardstanding) areas (including a summary of area sizes)
	x	X	3	An examination of the current and historical drainage rights
	x	X	4	An outline drawing of how the drainage design provides SuDS techniques in accordance with recognised design manuals
	x	X	5	Waste water drainage proposals
	x	X	6	If connection to a public sewer is proposed then agreement letter from Scottish Water should be provided
	x	X	7	If no public sewer is available in the settlement then evidence of compliance with SEPA's Policy and Supporting Guidance on the Provision of Waste Water Drainage in Settlements (available from www.sepa.org.uk/planning.aspx)
	x	X	8	Subsoil porosity tests at the location of any intended infiltration device and the proximity of the seasonally highest water table
	x	X	9	The soil classification of the site
	x	X	10	If any discharge is to be made to a body of water then the intended rate of discharge, the point of discharge and the outfall structure proposals should be provided
	x	X	11	Calculations comparing pre- and post development runoff rates for a range of storm events (e.g. 1:2, 1:30, 1:100 and 1:200 return periods) if applicable. An additional allowance for the potential impacts of climate change

	x	X	12	Demonstration that post development peak run-off volumes do not exceed that for pre-development for the range of return periods i.e. that the pre-development drainage situation is improved or at least mimicked[17]
	x	X	13	Demonstration that the drainage solution selected will ensure that properties on and off the proposed site are not at risk of flooding from the appropriate rainfall return period
	x	X	14	Details of the accountable body responsible for vesting and maintenance for individual aspects of the drainage proposals and confirmation in writing that these bodies will vest/adopt the system
	x	x	15	Waste water drainage proposals and confirmation in writing that they will vest in Scottish Water (if applicable)
	x	x	16	Confirmation of measures to be employed to manage surface water runoff during the construction phase
		X	17	Topographical survey of the site and adjoining land if available

There are a number of professional guidelines produced by recognised bodies which are designed as a reference for the implementation of good practice when completing a Drainage Impact Assessment. See Appendix B for details

Surface Water

6.11

The DIA should demonstrate that the surface water drainage system takes account of SuDS principles and specifications in accordance with current legislation and guidelines such as the CIRIA Publication C697 - The SuDS Manual.

6.12

The SuDS principles must also conform, as a minimum to General Binding Rules 10, 11 and 21 of the Water Environment (Controlled Activities) (Scotland) Regulations 2011 (CAR). Note that surface water discharges from > 1000 residential houses or car park

[17]In areas of existing flood risk THC may seek a significant reduction in post development runoff

spaces, all industrial estates and drainage from major roads/motorways will require CAR licence. Consultation with SEPA is advisable in these cases.

6.13

The DIA should demonstrate, using up to date techniques, that the post-development runoff rate and volume do not exceed the pre-development runoff rate and volume for Brownfield sites, or the Greenfield runoff rate for previously undeveloped sites. More importantly, the proposed method used for drainage should ensure that there is no increase to the probability of flooding within the receiving watercourse and local area, upstream or downstream from the site.

6.14

Evidence and details of any flow limiting device(s) should be presented at the outline planning stage. If any discharge is to be made to a body of water then the intended rate of discharge, the point of discharge and the outfall structure proposals should be provided

6.15

The IOH124 method is the preferred approach for calculating Greenfield run-off from development sites[18]. This should however be compared to the ADAS method on steep sites.

6.16

Surface water runoff should also be managed to minimise pollutants reaching the receiving watercourses and should be provided with the appropriate levels of SuDS treatments to achieve this. Further guidance is available from SEPA's website at www.sepa.org.uk/planning.

6.17

The requirements for drainage should be taken into account when determining the overall layout of the development. For large developments where there is an intention to separate the development in to zones, which are to be constructed at different stages, or by different developers, it is a requirement that a drainage master plan covering the whole area of the development is submitted.

6.18

Formal on-site storage should be provided up to the 1 in 30 year return period event and attenuation measures should be designed such that SuDS features will not surcharge during a 30-year return period rainfall event.

[18]For catchments less than 50ha calculations should be undertaken for a catchment area of 50ha and pro-rata'ed to that of the development catchment area.

Design Exceedance

6.19
In the event of a design exceedance, the DIA requires to include an assessment and consideration of the flood flow route for the appropriate return period flood event. The design is required to demonstrate that there will be no detriment to land or property elsewhere as a result of overland flow caused by the development.

6.20
A sensitivity test to ensure that there is no flooding to property or critical roads during a 1 in 200 year return period rainfall event is also required. The 1 in 200 year event should be contained on-site (unless it can be demonstrated that the 1 in 200 year event could be managed appropriately without causing a flood risk elsewhere) and information requires to be provided demonstrating how this will be achieved. A flood routing exercise needs to be undertaken clearly illustrating where flood water generated by such extreme events will be routed to on-site.

6.21
Any flows that are to be discharged to a watercourse must have the appropriate permission from THC and from SEPA in terms of compliance with the relevant CAR General Binding Rule.

6.22
With regards to ponds and detention basins the DIA should demonstrate a safe mechanism for overtopping within these features should the design capacity be exceeded during extreme rainfall events. Overtopping of these features must not lead to flooding of property or critical infrastructure and preferential flood flow paths should be identified in the event of overtopping.

6.23
Information should be provided on the anticipated drain down time for any attenuation facilities. The SuDS Manual (p.3-8) notes that storage should drain down from full to empty within 24 to 48 hours. If the drain down time is more than 24 hours, then long duration events should be assessed to ensure that the storage is not overwhelmed by long periods of rainfall or consecutive high intensity storm events.

6.24
Long sections through the proposed surface water system should be provided showing the proposed 'first-flood' manhole locations and likely overland flow routes for return periods greater than the 1 in 30 year event (and up to the 1 in 200 year event).

Drainage of the Road

6.25
Roads are drained either by off-the-edge diffuse drainage to grass filter strips and swales or stone filled filter trenches, or by point collection in gullies and other off-lets for discharge to sewers, trenches, swales, etc.

6.26
Gullies are commonly used in the urban situation, and these need to be spaced out to adequately collect water without allowing substantial quantities to remain on the road surfaces. Tables and graphs are available in industry accepted drainage design publications to ensure appropriate gully spacings for various road widths and gradients. However, Scottish Water advise that whilst gullies have been utilised commonly in the past that in future they should only be used as a last resort.

6.27
Things to watch out for in gully positioning include making sure that they are located at the uphill toe of ramps and other vertical deflections of the road surface, that they conflict as little as possible with vehicle accesses to properties, and that there is some provision for overflow from the road surface at low areas (especially at road ends), when gully blockage or inability to cope with a greater-than-design storm may cause ponds to form to the detriment of nearby properties.

6.28
Road drainage is designed for the annual or 1 in 2 year return period storm, but systems should be able to handle up to a 1 in 30 year storm without overflow because of storage in gullies, manholes, etc. Greater storms will cause water to flow/pond on the road surface. Such water may emanate from properties fronting the road as well as the road surface, but the flows and ponding can often be acceptable in managing the greater events without detriment to downhill properties or downstream watercourses and structures.

6.29
Further guidance on roadside drainage is available in Section 4.7 of THCs Supplementary Planning Guidance: 'Access to Single Houses and Small Housing Developments'19 and SuDS for Roads.

[19]http://www.highland.gov.uk/NR/rdonlyres/042D2DA8-24CA-45F2-B5CF-B720F51C00BB/0/AccesstoSingleHousesMay2011.pdf

Foul Water

6.30
Where the development will lead to the production of waste water, a DIA must include a section on foul water drainage. The preferred option for dealing with foul drainage is for it to connect to the public foul drainage system and the assessment will examine the availability of public sewers to carry waste water from the development and should include copies of all correspondence with Scottish Water including their approval in principle to connect to the local network.

6.31
Any discharge to existing networks should not increase the occurrence of flooding or surcharging to the existing sewer network. Consideration should also be given for the potential for effluent to discharge during severe storm events in to adjacent watercourses via combined sewer overflows and the impact this may have on the receiving watercourse.

6.32
The DIA should also address what measures are in place to ensure that during construction there will be no cross connections leading to contamination of surface water sewers.

6.33
When a public sewer is currently not available in the vicinity of the development the developer should first discuss with Scottish Water the possibility of extending the public sewer to carry foul water to an existing public wastewater treatment plant. If such provision is clearly demonstrated as not being a viable option and the development is of significant scale to warrant it, the developer will need to consider providing a new foul sewerage system to adoptable standard and consult with Scottish Water on the acceptability of the system. It is SEPA's stated preference that the drainage system and treatment plant are publicly maintained.

6.34
If the development is small scale or remote from an existing public sewage system, then a private discharge of sewage effluent to land or controlled waters (including rivers, lochs, groundwater and coastal water) will be required. In this situation SEPA prefers discharge to land via a properly designed soakaway system and such a discharge will require authorisation under CAR.

6.35
If a proposed development is reliant on private foul water provisions then the long term maintenance requirements and ownership of the proposed foul water system should be addressed in the DIA. For multiple-house developments the long term

sustainability and in particular the liability of shared systems should be considered as part of the DIA process.

Approvals

6.36

Throughout the planning process the DIA will form the basis of statutory consultation with the appropriate bodies:

- Scottish Water (drainage connection consent)
- THC (planning permission and adoption of road drainage)
- SEPA (CAR authorisation).

Final Drainage Design

6.37

A final drainage design should be submitted and approved by the Planning Authority (in consultation with SEPA for larger scale developments) before the commencement of any development. This will usually be made a condition of full planning approval.

7 CERTIFICATION & CHECKLISTS
TEISTEANACHADH AGUS LIOSTAICHEAN-SGRÙDAIDH

7.1
Level 1 Flood Risk Statements and Drainage Statements may be completed and submitted by the applicant, architect or agent acting for the client. Level 2 and 3 Flood Risk and Drainage Impact Assessments should be undertaken by a competent professional. It is recommended that assessments should be carried out under the direction of a chartered member of a relevant professional institution, with experience of flood risk/drainage assessment and management.

7.2
THC support SEPA's flood risk assessment checklist procedure which involves the requirement to complete and attach a checklist to the front cover of a FRA to provide a summary of key information in relation to the FRA.20

7.3
In addition THC requires Level 2&3 FRAs and Level 2&3 DIAs to be accompanied by a signed-off Compliance Certificate to certify that the assessment(s) has been carried out in accordance with this guidance, relevant documents and legislation.21 An individual Compliance Certificate must be submitted for each assessment.

7.4
THC also requires that the signatory holds Professional Indemnity Insurance which is maintained at the minimum level of one million pounds (£1,000,000) in line with Annex 1 of THC Contract Standing Orders V1.1 September 2011. Evidence will take the form of a copy of the insurance policy, certificate of insurance and evidence that all premiums are paid and up to date for a minimum of ten years.

7.5
It is the responsibility of the author(s) to ensure that all detailed calculations and computations are technically accurate. THC is reliant on the accuracy, completeness and timeliness of information submitted.

[20]A copy of the checklist can be found and downloaded from SEPA's website http://www.sepa.org.uk/flooding/flood_risk/planning__flooding.aspx
[21]See Appendix C using the Assessment Compliance Certificate.

8 BUILDING STANDARDS
INBHEAN TOGAIL

8.1
THC, as Building Standards authority, must be satisfied that suitable provision has been made for drainage and prevention of flood risk. Any proposed scheme should be designed and constructed to meet the Technical Standards for compliance with the Building (Scotland) Regulations 2004, as amended.

8.2
THC should be given the opportunity to inspect drainage features during and after construction. As-built drawings of drainage features shall be submitted to the Flood Team (FRM@highland.gov.uk) upon completion.

9 ADOPTION OF SuDS
GABHAIL RI SuDS

9.1
As an addendum to SuDS for Roads, Scottish Water is negotiating agreements with all 32 Scottish Local Authorities (as Roads Authorities under the Roads (Scotland) Act 1984} to manage stormwater using shared facilities including both sewer pipes and SuDS measures. These agreements are being made pursuant to Section 7 of the Sewerage (Scotland) Act 1968.

9.2
THC still has some way to go to reach agreement, but the principles of it are supported. Local Authorities have worked with Scottish Water to develop a generic agreement for individual Councils to consider, and these parties have also produced supporting documents that clarify the proposals.

9.3
Until such time a formal agreement is reached developers shall provide details regarding the long term maintenance requirements and responsibilities of any SuDS features within their development at detailed planning stage.

10 RIPARIAN BUFFER STRIPS (DEVELOPMENT SET-BACK FROM WATERCOURSES) STIALLAN DÌONA TAOBH AIBHNE

10.1
THC will seek a minimum buffer strip of 6 metres between the top of the bank of any body of water within an application site and any proposed new development. This strip should be kept free from any development, whether proposed as part of the application or in the future, in order to allow access to the watercourse for the purposes of watercourse assessment and maintenance, to aid water and ecological quality and to ensure bank stability. Riparian buffer strips may be secured by a planning condition.

10.2
An additional set-back (typically 3 metres) could be requested by the Planning Authority in consultation with TECS/The Flood Team to allow natural watercourse migration, to reduce the impact of any overtopping, to mitigate for erodible soils or steeply sloped riverside land. The additional setback distance should be proportionate to the nature of that section of the watercourse and the risk it poses. For example, steeper sections and/or those in the lower part of a catchment tend to be more at risk of migration, erosion, and overtopping than those flatter sections in the upper part of a catchment. Where development is proposed around Natura watercourses, a wider riparian buffer strip may be required to ensure no adverse impact on the integrity of the Natura site. The size of this buffer will be assessed on a case by case basis.

10.3
There should be no encroachment on this strip during any stage of the development e.g. no materials are to be stored within this strip that could reduce the storage capacity of the flood plain, no structures such as decking or bridges should be erected without prior consent from THC and ground levels should be maintained at pre-development levels.

10.4
For the avoidance of doubt a buffer strip is required on both banks of a watercourse and will not form part of garden ground i.e. boundary fences/walls should be erected outwith these riparian buffer strips. Suitable land-use should be designated for these areas in consultation with THCs Planning & Development Services and TEC Services.

10.5
Future maintenance of these strips should be undertaken and/or funded by the developer, most sensibly as part of the public open space maintenance contract for

the development. Title to these areas should not be sold to individual householders. Ownership and the maintenance responsibility should stay with the developer or its factor.

The need for a development set-back from watercourses:



APPENDIX A: FRA REFERENCE DOCUMENTS

Scottish Planning Policy, Scottish Government, Feb 2010

Planning Advice Note 51: Planning, Environmental Protection and Regulation;

Planning Advice Note 69: Planning and Building Standards Advice on Flooding;

Planning Advice Note 79: Water and Drainage;

Scottish Environment Protection Agency – Technical Flood Risk Guidance for Stakeholders;

Scottish Environment Protection Agency – Flood Risk Assessment checklist;

Scottish Environment Protection Agency Policy No 22: Flood Risk Assessment Strategy;

Scottish Environment Protection Agency Position Statement on Culverting of Watercourses.;

Scottish Environment Protection Agency Policy No 41: Development at Risk of Flooding: Advice and Consultation;

Water Environment (Controlled Activities)(Scotland) Regulations 2010 ("the Controlled Activities Regulations, or CAR");

CIRIA C697: The SuDS Manual;

CIRIA C698: Site Handbook for the Construction of SuDS;

CIRIA C624: Development and Flood Risk Guidance for the Construction Industry;

CIRIA R168: Culvert Design Manual;

Flood Estimation Handbook, Centre for Ecology and Hydrology, Wallingford

Flood Studies Report, NERC, London

THC Roads and Transport Guidelines for New Development 2012: Flooding Section

APPENDIX B: DIA REFERENCE DOCUMENTS

The SuDS Manual (C697), CIRIA Publication, Feb 2007

Scottish Planning Policy, The Scottish Government, Feb 2010

Planning and Sustainable Urban Drainage Systems Planning Advice Note PAN61, The Scottish Executive, 2001

Ponds, Pools and Lochans, SEPA, June 2000

Watercourses in the Community, SEPA, June 2000

Disposal of Sewage Where No Mains Drainage is Available: PPG4, SEPA

Safety at Inland Water Sites RoSPA, Birmingham

Control of Water Pollution From Construction Sites –Guidance For Constructors And Contractors CIRIA Report 532, London

Working at Construction and Demolition Sites: PPG6, SEPA

Sewers for Scotland – 2 Edition WRc ,Nov2007

The Wallingford Procedure UK Edition, Wallingford;

The Wallingford Procedure Europe Edition, Wallingford

Infiltration Drainage Manual of Good Practice CIRIA Report 156 ,London

BREDigest365, Building Research Establishment

Scope For Control of Urban Runoff CIRIA Report 123, London

Manual of River Restoration Techniques River Restoration Centre

Culverting, an agenda for action SEPA

SuDS for Roads and Scottish Environment Protection Agency - Policy and Supporting Guidance on Provision of Waste Water Drainage in Settlements (WAT-PS-06-08)

Returning Watercourses to the community ICE

THC Roads and Transport Guidelines for New Development 2012: Flooding Section

APPENDIX C: SELF CERTIFICATION (overleaf)

The Highland Council Comhairle na Gàidhealtachd	FRA and DIA Guidance Assessment Compliance Certificate

I certify that all reasonable skill, care and attention to be expected of a qualified and experienced professional in this field have been exercised in carrying out the attached Assessment. I also confirm that I maintain the required Professional Indemnity Insurance*. The report has been prepared in support of the below named development in accordance with the reporting requirements issued by The Highland Council.

Please select Assessment type:

Flood Risk Assessment ☐ Drainage Impact Assessment ☐

Additional Information

Assessment Ref No: Assessment Revision:

Assessment Date: Planning Application No:

Name of Development:

Address of Development:

Name of Developer:

Name and Address of Organisation preparing this Assessment:

Name of Approver: Date:

Signed:

Position Held:

Qualification of person responsible for signing off this Assessment**

* Please attach appropriate evidence of Professional Indemnity Insurance

** A chartered member of a relevant professional institution

APPENDIX D: SUMMARY OF FRA/DIA APPLICATION

Level of Assessment	Completed by:	Applicable to:	Requirements (refer to main text for full requirements):
Level 1 Flood Risk Statement	Architect/ Applicant/ Agent	Requested at the discretion of Planning Authority/ where developer seeks to assure planning Authority of no risk. Small scale developments where FR not expected/ known	Brief statement/ screening General description of the development, its size, location and surrounding topography. FR from all sources considered/ commented on (based on authors' knowledge/ observations/ experience). Consultation with THC Flood Team for historic flooding incidences and comment Reference to SEPA flood maps where applicable.
Level 2 Flood Risk Assessment	Civil Engineer/ Hydrologist or equivalent member of professional institution e.g. ICE, CIWEM, ISTRUCTE	Whenever FR is known (e.g. within SEPA 200yr flood extents). Larger scale developments > 5 no. properties (offsite risk of flooding may increase)	General FRA requirements as Level 1 but providing a full report including drawings/ calcs/ figures FR from all sources qualified in detail. Desk study approach

			Consultation with THC Flood Team for historic flooding incidences/ guidance Consultation with SEPA & Scottish Water Recommendations on appropriate development design/ possible mitigation Assessment as to whether further modelling is required to fully assess impact of flooding
Level 3 Flood Risk Assessment	Civil Engineer/ Hydrologist or equivalent member of professional institution e.g. ICE, CIWEM, ISTRUCTE	Whenever FR is known (e.g. within SEPA 200yr flood extents).. Larger scale developments > 5 no. properties (offsite risk of flooding may increase)	As Level 2 but with flood risk on and off site quantified by hydraulic/ hydrological model results. Detailed development drawings/ elevations to be provided. Detailed proposals of mitigation methods. Detailed proposals of flood resilient materials Topographic site survey to be provided and used to assess flood routing/ depths Calculations provided for provision of compensatory storage.
Exemptions: A FRA is not required for extensions to single dwellings; garages/ conservatories, above ground structures or Permitted Dev.			

Level of Assessment	Completed by:	Applicable to:	Requirements (refer to main text for full requirements):
Level 1 Drainage Statement	Architect/ Applicant/ Agent	1-5 (incl.) property developments Extensions (between 25-100m^2 Change of use (not involving substantial new hardstanding/ buildings) Where submission forms part of larger dev. where full DIA is provided.	Brief statement. General description of the development, its size, location and surrounding topography and land uses. Description of existing drainage arrangements on site and any sewers A concept drawing of the development and proposed/ likely means of providing foul and surface water drainage
Level 2 Drainage Impact Assessment	Civil Engineer or equivalent member of professional institution e.g. ICE, CIWEM, ISTRUCTE	Any development not covered above. Larger scale developments > 5 no. properties (offsite risk of flooding may increase)	Report including drawings/ calcs/ figures. Description of existing drainage rights/ arrangements on site Assessment of pre/ post run off rates, changes in impermeable areas Evidence of proposed runoff rates and storage volumes for a variety of return periods Outline Drainage Design showing use/ application of SUDS supported by calculations/ model results

			Wastewater drainage proposals including a letter of agreement from Scottish Water to accept foul flows (if applicable) Reporting of onsite subsoil porosity tests (where suitable) Proposals relating to discharge rate control methods, receiving water bodies, structures etc
Level 3 Drainage Impact Assessment	Civil Engineer or equivalent member of professional institution e.g. ICE, CIWEM, ISTRUCTE	Where pluvial flood risk is known/ off site flooding impermeable areas a risk. Larger scale developments > 5 no. properties (offsite risk of flooding may increase)	As Level 2 but also including detailed Topographic Site Survey
Exemptions: A FRA is not required for extensions to single dwellings; garages/ conservatories, above ground structures or Permitted Dev.			

Getting Involved

If you would like more information or to get involved in the production of future plans please contact us in one of the following ways:

Telephone

(01463) 702259

Post

Director of Planning and Development, The Highland Council, Glenurquhart Road, Inverness IV3 5NX

Email

devplans@highland.gov.uk

Fax

(01463) 702298

For the most up to date news on the work of the Development Plans Team (and more) please follow our twitter account, 'Like' our Facebook page and check out our blog:

Twitter

www.twitter.com/highlanddevplan

Facebook

www.facebook.com/highlandLDPs

Blog

hwldp.blogspot.co.uk

Feedback

If you have any experience of Development Planning that you would like to comment on please complete a customer satisfaction survey:
http://www.surveymonkey.com/s/X89YVTY