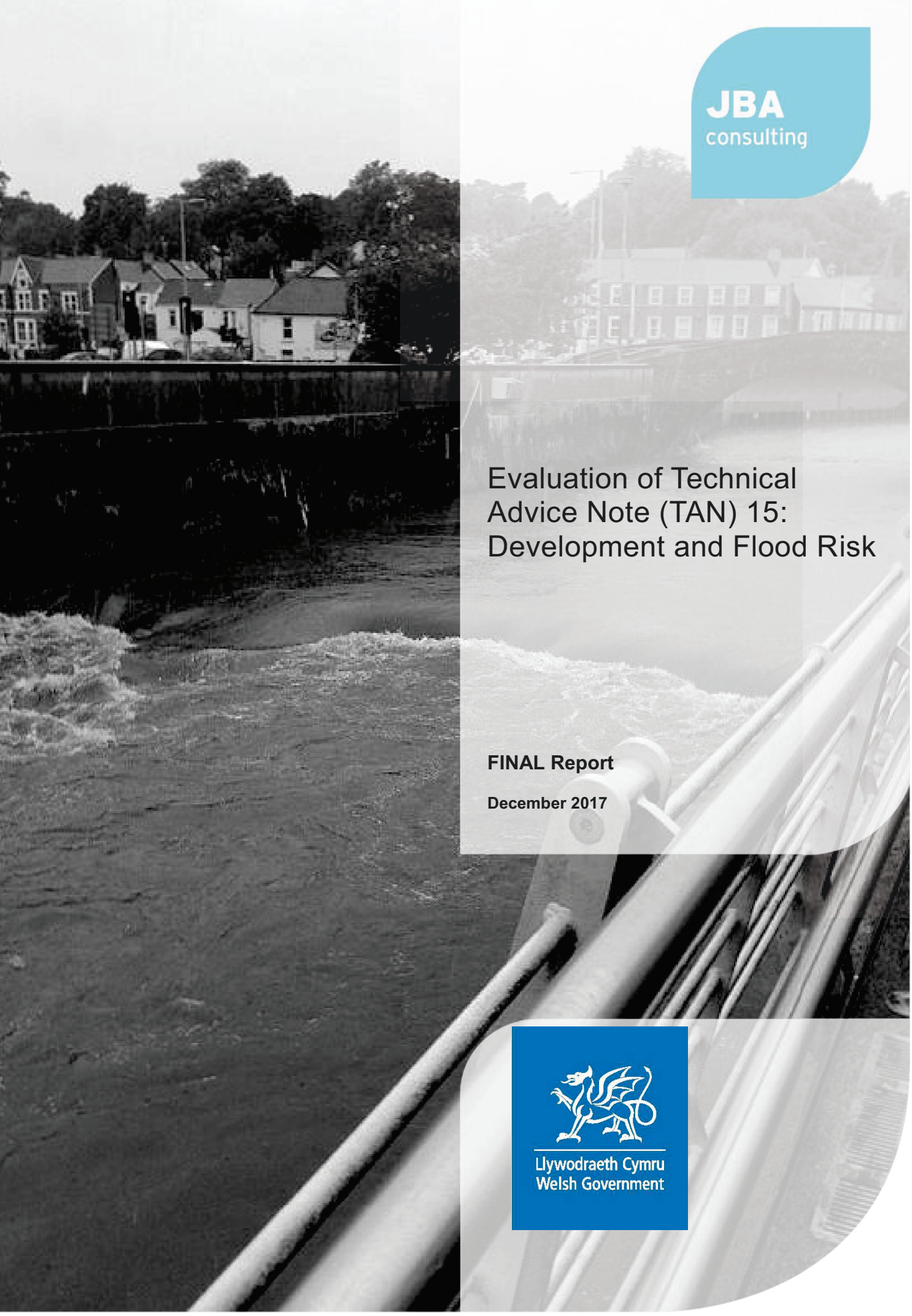

JBA consulting

Evaluation of Technical Advice Note (TAN) 15: Development and Flood Risk

FINAL Report

December 2017

Llywodraeth Cymru
Welsh Government

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This report describes work commissioned by the Planning Directorate of Welsh Government, by a letter dated 14th December 2016. Representatives for the contract were Jonni Tomos (Planning Policy) and James Morris (Flood Risk Management) at Welsh Government. The JBA Consulting project team included Jonathan Copper, Amy Evans, Charlotte Lloyd-Randall, Charlotte Beattie, George Baker, and Rachel Brisley with support from Peter Jones.

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Purpose

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Abbreviations

ABI	Association of British Insurers
AEP	Annual Exceedance Probability
APR	Annual Performance Report
AStGFW	Areas susceptible to groundwater flooding
BREEAM	British Research Establishment Environmental Assessment Method
CChMA	Coastal Change Management Areas
CPO	Chief Planning Officer
CSH	Code for Sustainable Homes
DAM	Development Advice Map
DCLG	Department for Communities and Local Government
Defra	Department for Environment, Food and Rural Affairs
DPA	Discretionary Planning Advice (NRW)
EA	Environment Agency
EA (Wales)	Environment (Wales) Act 2016
EAW	Environment Agency Wales (EAW)
EIA	Environmental Impact Assessment
FC	Flood Consequence Assessment
Flood Re	Flood Re-insurance
FRR	Flood Risk Regulations (2009)
FRM	Flood Risk Management
FWMA	Flood and Water Management Act (2010)
GIS	Geographical Information Systems
HBF	Home Builders Federation
HLT	High Level Target report
JHLAS	Joint Housing Land Availability Study
JBA	Jeremy Benn Associates (Consulting)
LDP	Local Development Plan
LPA	Local Planning Authority
LPAs	Local Planning Authorities
LLFA	Lead Local Flood Authority
LRF	Local Resilience Forum
LUC	Land Use Consultants
MCM	Multi-coloured Manual Handbook
NAP	New Approaches Programme
NPPF	National Planning Policy Framework
NPPF-PPGN	National Planning Policy Framework Planning Practice Guidance Note

NRW	Natural Resources Wales
NSFCERM	National Strategy for Flood and Coastal Erosion Risk Management in Wales
OPW	Office Public Works Ireland
PDL	Previously Developed Land
PINS	Planning Inspectorate
PPA	Positive Planning (Wales) Act 2015
PPG25:	Planning Policy Guidance 25: Planning and flood risk
PPW	Planning Policy Wales (Edition 9) 2016
RBMP	River Basin Management Plan
RMA	Risk Management Authorities
RoFSW	Risk of Surface Water Flooding
RoFRAS	Risk of Flooding from Rivers and the Sea
RTPI Cymru	Royal Town Planning Institute Cymru
SA	Sustainability Appraisal
SEA	Strategic Environmental Assessment
SFCA	Strategic Flood Consequence Assessment
SoP	Standard of Protection
SPR	Source Pathway Receptor
SMP2	Shoreline Management Plan (2nd Generation)
SuDs	Sustainable Drainage Systems
SWOT	Strengths, Weaknesses, Opportunities and Threats Analysis
TAN 1	Technical Advice Note 1: Joint Housing Land Availability Studies (2015)
TAN 12	Technical Advice Note 12: Design (2016)
TAN 14	Technical Advice Note 14: Coastal Planning (1998)
TAN 15	Technical Advice Note 15: Development and Flood Risk (2004)
UKCIP	United Kingdom Climate Impacts Programme
WAG	Welsh Assembly Government
WAO	Welsh Audit Office
WbFGA	Wellbeing of Future Generations Act (Wales) 2015
WG	Welsh Government
WLGA	Welsh Local Government Association

Executive Summary

The 'TAN 15 review' is intended to provide clear independent analysis of the evidence regarding the performance of TAN 15 and make recommendations for a future update to the guidance. This report sets out the evidence, analysis, and key findings of the review and identifies fourteen recommendations for Welsh Government.

The review has used a wide range of methods to gather and consider evidence, including analysis of existing documents, data and maps, face-to-face meetings, stakeholder workshops and survey, follow up interviews and the development of case studies. To aid in the consideration of the evidence, the report is broken down into the following key themes:

- Risk based approach
- Strengths and limitations
- Innovative and flood resilient design
- Roles and Responsibilities
- Vulnerability categories
- Development Advice Maps
- Local Development Plans
- Flood Consequence Assessments

The overarching recommendation of the review is that TAN 15 should move from a precautionary framework, to one that is risk based and identified a substantial body of evidence to substantiate this change. The shift from the precautionary approach reflects similar adjustments to planning policy in UK and Europe and capitalises on the advances in data, modelling and assessment that have been witnessed since 2004. It also recognises the need for TAN 15 to continue to incorporate guidance that takes full account of the material significance of the particular characteristics of flood risk in Wales and is based on the best available evidence.

The updated risk based framework should address all sources of flood risk and incorporate a source-pathway-receptor model. To assess the consequences of flood risk, it is reasonable to accept that not all flood risk can be removed and acknowledge flood risk is not static over time. Proposed development should be designed to take account of the actual and residual risks in Wales from rivers, the coast, surface water and from sewers. The adoption of this approach also potentially addresses issues linked to the implementation of sustainable drainage from schedule 3 of the Flood and Water Management Act 2010, innovative and flood resilient approaches to design and integrated catchment approaches to water sensitive design.

The review of the strengths, weaknesses, opportunities and threats of TAN 15 shows that the guidance is generally well respected and easy to use. However, it also identified a range of threats, weakness and limitations associated with TAN 15 and the Development Advice Maps (DAM). Furthermore, it identified how existing policy is restricting development in Zones C1 and C2 and how the definition of these zones is not always based on robust evidence. Issues were also found with the DAM in terms of conflicts and confusion with the NRW Flood Maps, the thresholds used to define the probability of flooding and the respective sources of flood risk within the DAM. The review identifies that any change to the DAM will require careful harmonisation with the criteria selected for the justification and acceptability tests.

In establishing a new risk based approach, the review recommends that TAN 15 should set out a strong presumption against highly vulnerable development in areas at 'greatest flood risk'. However, the review has not made recommendations for how these areas at 'greatest flood risk' should be defined.

There should be a clear policy requirement within TAN 15 for the development of a strategic local flood risk evidence base to inform the preparation of a Local Development Plan and strengthen the integrity and strategic role of the LDP in managing flood risk collaboratively to achieve long term benefit (where possible multiple benefits should be sought). This should be accompanied by the formulation of guidance that provides for improved clarity and consistency to support and enhance the decision-making role for the Local Planning Authority, and other key roles of Emergency Planning, Dwr Cymru, Lead Local Flood Authority, NRW and Welsh Government.

All fourteen recommendations from the TAN 15 review and their reasoned justification are provided below in Table 11-1, with cross references back to the relevant sections in the report. The report should be read as a whole and alongside the summaries of evidence within the appendices.

1 Introduction

1.1 Introduction

The objective of this evaluation project has been to provide an evidence based review of national planning policy on flood risk and development in Wales, as set out in TAN 15.

The 'TAN 15 review' is intended to provide clear independent analysis of the evidence regarding the performance of TAN 15. It covers key findings of the review and sets out a series of recommendations for Welsh Government.

The key findings have been provided to Welsh Government in the form of a presentation of key findings and this report.

1.2 TAN 15: Development and flood risk planning policy

Technical Advice Note (TAN) (2004)[1] 15 Development and flood risk was published thirteen years ago by the Welsh Assembly Government. The policy in the document supports Planning Policy Wales (2016)[2] Edition 9 and adopts a precautionary framework triggered by risk zones defined in Development Advice Maps (DAM's).

The precautionary framework of TAN 15 is used to direct development away from areas at risk of flooding, through the application of:

- policy triggers based on development types and development location within the DAM;
- satisfaction of the justification and acceptability tests; and
- specified planning actions related to flood zones to direct development away from locations of high flood risk, but including a presumption against highly vulnerable development in C2.

These requirements in terms of the DAM, tests and presumption against residential development in C2 are set out Table 2-1 below. This information is taken from Figure 1 in TAN 15, which provides a description of each of the DAM zones, the Zone C trigger for the justification and acceptability tests for all development in C1, and less vulnerable development in C2.

Table 1-1 Table of Development advice zones[3].

Description of Zone		Use within the Precautionary Framework
Considered to be at little or no risk of flooding of fluvial or tidal coastal flooding	A	Used to indicate that justification test is not applicable and no need to consider flood risk further.
Areas known to have flooded in the past evidenced by sedimentary deposits.	B	Used as part of the precautionary approach to indicate where site levels should be checked against the extreme (0.1%) flood level. If site levels are greater than the flood levels used to define adjacent extreme flood outline, there is no need to consider flood risk further.

[1] Welsh Assembly Government (2004) Technical Advice Note 15: Development and Flood Risk

[2] Welsh Government (2016) Planning Policy Wales Edition 9

[3] Ibid

Based on Environment Agency extreme flood outline, equal to or greater than 0.1% (river tidal or coastal)	C	Used to indicate that flooding issues should be considered as an integral part of decision making by application of the justification test including assessment of consequences.
Areas of the floodplain which are developed and served by significant infrastructure including flood defences.	C1	Used to indicate that development can take place subject to application of justification test, including acceptability of consequences.
Areas of the floodplain without significant flood defence infrastructure	C2	Used to indicate that only less vulnerable development should be considered subject to application of justification test, including acceptability of consequences. Emergency services and highly vulnerable development should not be considered.

The justification and acceptability policy tests[4] can be summarised as follows and require:

i. Its location in zone C is necessary to assist, or be part of, a local authority regeneration initiative or local authority strategy to sustain an existing settlement; **or**

ii. It's location in zone C is necessary to contribute to key employment objectives, supported by the local authority, and other key partners to sustain an existing settlement or region;

and

iii. It concurs with the aims of PPW and meets the definition of previously developed land; **and**

iv. The potential consequences of a flooding event for the particular type of development has been considered in terms of the criteria considered in sections 6 and 7 and appendix 1 found to be acceptable.

The first three tests form policy criteria and the last test requires the preparation of an appropriate Flood Consequence Assessment (FCA) to demonstrate the acceptability of the proposals.

1.3 Background to the TAN 15 Review

The TAN 15 review was commissioned by Welsh Government in January 2017 with a specific set of objectives and target completion date of end of May 2017. This built on the work completed by Natural Resources Wales and Welsh Government on a potential factual update to TAN 15 drafted in 2016, which identified a number of minor updates to reflect changes in guidance and organisations since 2004. Details of this never enacted update are included in Appendix E.

This review has been undertaken by a multidisciplinary project team in JBA Consulting, in consultation with Natural Resources Wales and Welsh Government.

The review was informed in part by two workshops on TAN 15. The workshops were supported by a number of key stakeholders in Wales including Local Planning Authorities, Emergency Planners, Resilience Forums, Lead Local Flood Authorities, Home Builders Federation, Developers and house builders and PINS Wales.

[4] Welsh Government (2014) Chief Planning Officer: Summary of TAN 15 requirements

The TAN 15 review has followed an iterative review process, based on evidence and key findings gathered in each key stage of the project.

1.4 Purpose of this Report

The purpose of this report is to set out and analysis the evidence, explore interlinkages and present recommendations for the future of TAN 15.

The report attempts to present the work of the review in a simple and succinct format, using non-technical language, minimising the use of acronyms.

The evidence and key findings of the TAN 15 review were prepared by addressing specific research themes and these have been used to provide the structure for reporting the outputs. Each of the themed sections in the report first present the evidence collected through the review, before following this with our analysis, conclusions and finally recommendations. Appendices A-I contain further information on the evidence and documents referred to in review.

1.5 Review: Scope and Objectives

The scope of the TAN 15 review was limited to **six main aims** set by Welsh Government. These were to:

- Maintain and strengthen the precautionary approach
- Adopt a risk based evidence analysis
- Consider whether greater emphasis should be placed on surface water flooding
- Consider what level of risk is acceptable, if any
- Review development types and vulnerability classifications
- Evidence the strengths and limitations of existing planning policy

These main aims are further defined by the twelve objectives outlined in Table 2-1.

1.6 Review: Limitations

During the time of the TAN 15 review there were timing and data limitations, which included:

- Welsh Government (March 2017) transferred the responsibility for the maintenance and update of the Development Advice Maps to NRW.
- Welsh Government (March 2017) public consultation on the implementation of sustainable drainage for all developments and National Development Framework in Wales.
- The piloting and updates of national flood risk assessment/data and maps in Wales (2009)[5] did not coincide with the timing of this review (January-May 2017).

This review has not undertaken a strategic environmental assessment (SEA) which may be required for the revised TAN 15 under the European Union Directive 2001/42/EC and the Environmental Assessment of Plans and Programmes (Wales) Regulations 2004.

[5] Environment Agency Wales (2009) Flooding in Wales: A national assessment of flood risk

1.7 Review: Further work

The TAN 15 review has identified key areas of further work for Welsh Government to consider;

- Disseminating the review findings with key stakeholders.
- Determining the criteria for areas at greatest risk.
- Identifying a set of key measures to help build capacity and skills in LPAs to improve understanding and decision making of development and flood risks and hazards.
- Identifying a set of measures from the revised TAN 15 to effectively monitor the implementation in the Planning Performance Framework.
- Identifying a small steering group to refine policy and guidance on strategic and flood consequence assessment.
- Scoping analysis of strategic environmental assessment regulations.

2 Methodology

2.1 Introduction

The TAN 15 review has used a range of methods, including analysis of existing reports and mapping outputs, face-to-face meetings, workshops and survey, follow up interviews and development of case studies. The overall methodology for the project was drawn up from Welsh Government's specification. Each of the methods (as detailed in Figure 2-1 and Table 2-1) formed a distinct stage in the project, and informed the scope of the subsequent stage and analysis.

Each method had a specific how, what, why and purpose linked back to the review aims and objectives. The choice of methods, in this review was influenced by the;

- Scope of the project and focus on quality and evidence;
- Timescales of the wider planning policy review programme of the National Development Framework and PPW;
- Budget and resources; and
- Availability of existing documents and mapping data.

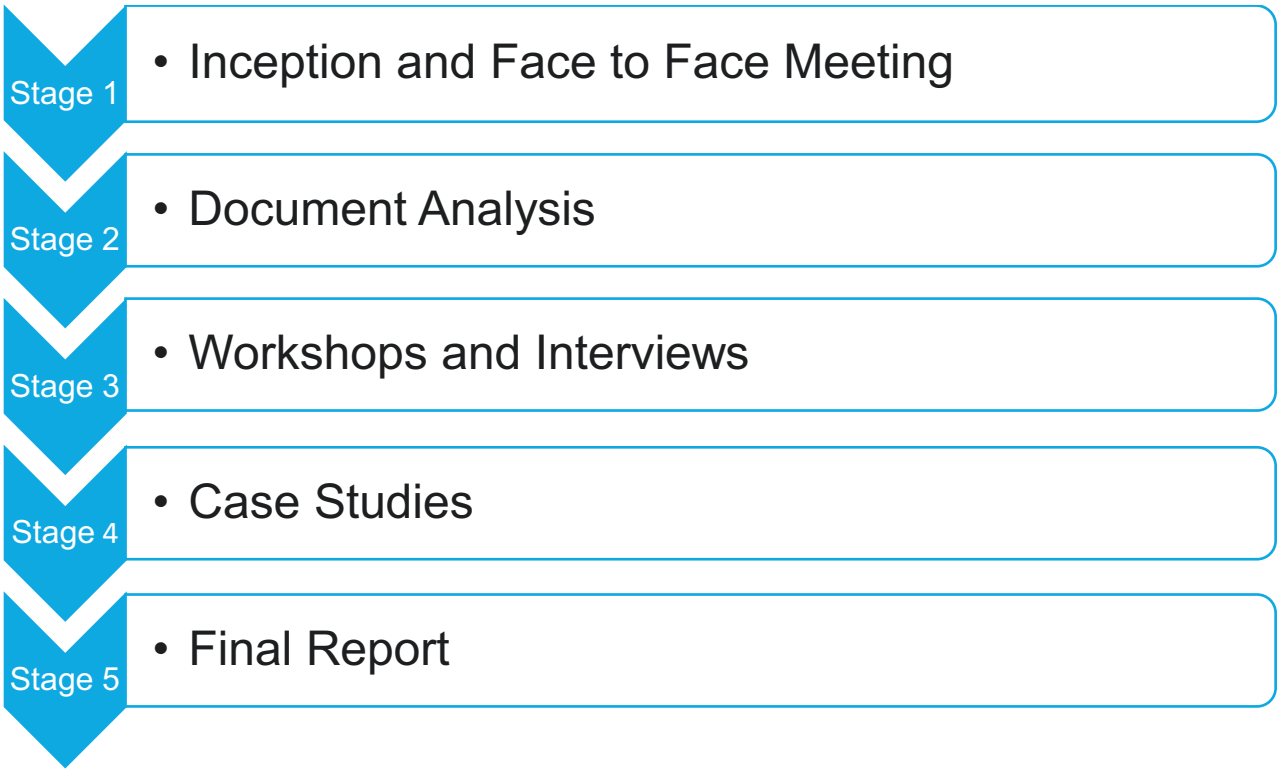


Figure 2-1 The five stages of the TAN 15 Review.

2.2 Stage 1: Face-to-Face meeting

The purpose of the face-to-face meeting was to agree the proposed methods and identify the principal issues or concerns in TAN 15, potential case studies/themes and potential data gaps. It was held at the beginning of February 2017 and involved key people from planning and flood risk management functions of JBA, Natural Resources Wales and Welsh Government. This meeting helped to identify available evidence and provide an indication of the structure of the analysis and plan to address the research objectives as set out in Table 2-1.

Table 2-1 TAN 15 Review objectives and methods.

TAN 15 Review Objectives	Stage 1	Stage 2	Stage 3	Stage 4
1. Assess the rigour of existing TAN 15 approach: Highly vulnerable development can only be acceptable on C1 defended land where the consequences of flooding can be reduced or does not endanger life. On defended land C2 policy is that highly vulnerable development should not be permitted?	x	x	x	x
2.Assess whether TAN 15 tests can be reasonably applied to residential development in C2 areas at risk areas between 1 in 100 and 1 in 1000 river and between 1 in 200 and 1 in 1000 coastal flood risk?	x	x	x	x
3.Assess the need for a more restrictive approach to development in areas of greatest risk (more than 1% fluvial or 0.5% coastal AEP/risk) or involving increases surface water flood risk?		x	x	
4.Identify examples where policy restricts development that could proceed with little or no risk?		x		x
5.Flood insurance standards of a 1 in 75 and 1 in 100 risk level thresholds. Should TAN 15 be more aligned with market forces. Compare national planning policy against standards used for the mortgage industry?		x	x	
6.Broader consideration of availability of land and sustainability locations impact by current TAN 15. Is it overly cautious and consider whether justification and acceptability tests provide a sustainable means of assessing proposals in areas at risk of flooding?	x	x	x	x
7.Develop a risk based analysis of planning policy to assess whether a greater focus should be placed on surface water flooding?		x	x	x
8.Evaluate what if any flood risk could be considered acceptable in terms of residential development and if allowances to develop defended areas of floodplain are appropriate?	x	x	x	x
9.Evaluate whether development types are accurately classed as highly vulnerable. Assess whether and different or additional development types need to be included?		x	x	x
10.Prepare evidence on strengths and weaknesses of existing planning policy and flood risk and development. Highlighting opportunities to update and improve the precautionary approach?	x	x	x	x
11. Evaluate how successful the current policy has been in directing development away from areas at risk of flooding?		x	x	x
12. Consider whether there is any role in planning policy for flood resistant building methods?		x	x	

2.3 Stage 2: Document Analysis

The document analysis informed the review of all research objectives (listed in Table 2-1) and involved a detailed strengths, weaknesses, opportunities and threats (SWOT) analysis and/or comparative analysis of the;

- High level target (HLT) reports, annual performance reports (APR) and Section 18 reports (NRW reports under the requirements of the Flood and Water Management Act FWMA 2010);
- Existing reports, DAM's and literature on flood risk and planning policy;
- New insurance (Flood Re) standards in the UK;
- Welsh Government policy clarifications and interim non-statutory standards on SuDs sustainable drainage,
- Case studies of LDPs and development management decisions by Local Planning Authorities identified by face-to-face meeting and workshops.
- NRW guidance on flood consequence assessments (FCAs).
- Approximately fifty appeals or called in decisions provided by Planning Inspectorate Wales (PINS), NRW and Home Builders Federation (HBF)
- Use Classes Order and multi-coloured manual descriptions for development categories in Wales against those currently used in England and Ireland.

2.4 Stage 3: Workshops and Follow up (Interviews)

The workshops and surveys were designed to focus on issues or concerns raised in the face-to-face meeting and address the research objectives of the TAN 15 review. The workshops also influenced the identification of suitable case studies.

It was recognised that the workshops needed to be efficient and focussed so as not to place additional resource pressure on those attending. To do this, two afternoon sessions with key stakeholders were arranged; one in Llandudno Junction and second in Cardiff by the invitation of Welsh Government.

Fifty-five (55) stakeholders attended in total, representing Local Planning Authorities (LPAs), NRW, Welsh Government, HBF, Emergency Planning, Lead Local Flood Authority (LLFA), PINS, Royal Town Planning Institute (RTPI) Cymru, Local Resilience Forum (LRF), Welsh Local Government Association (WLGA), planning consultancies and two, house building companies.

The workshops comprised facilitated sessions focussed on the initial SWOT analysis and emerging key themes for the review (flood consequence triggers, shoreline management or coastal change areas, roles and responsibilities, impacts of development on flood risk and offsite and urban development). Workshop discussions provided a good steer on the context of the key issues raised and details of a number of potential case studies. The general feedback from the breakout groups was very positive and the short surveys (five questions, included questions on strengths and weaknesses of TAN 15 surface water flooding and Development Advice Maps) were completed by 69% of attendees. Appendix C1.4 and F1.2 provides a summary of the survey feedback.

The workshops provided more case study information than expected, so whilst interviews had been planned with up to twenty stakeholders, it was agreed with Welsh Government to significantly narrow the list of potential interviewees, to avoid duplication of discussions.

2.5 Stage 4: Case Studies

The themes established for the ten case studies emerged from the face-to-face meetings and workshops, and the research objectives in Table 2-1. Some of the wider contextual issues identified during the review but not developed into case study themes, related to the flood reinsurance and the exclusion of post 2009 development; LPA's skills and capacity; the focus on NRW planning consultation responses; the language of risk, flood risk and probability; and policy versus guidance.

The TAN 15 review identified a total of forty-five (45) potential cases. This list of case studies (Appendix D1.1) was itself analysed in terms of available information, scope of the review and the need to avoid any case studies still going through the planning process.

The key areas of concern in TAN 15 were identified early in the project and refined through the evidence obtained from workshops and case studies, are as follows:

- Strengths and rigour of TAN 15 Policy framework and triggers.
- Role and links to shoreline management plans.
- Roles and responsibilities.
- Requirement for and scope of Flood Consequence Assessments.
- Innovative and flood resilient design.
- Urban development.
- Linkage to Local Development Plans.
- Impact of development on the flood risk to others.
- Surface water flooding and drainage.
- Vulnerability categories of development.
- Acceptability of residual risk and issues of uncertainty.

2.6 Stage 5: Final Report

The structure of this report is focussed around the key areas of concern as shown in Figure 2-2. The report sets out the evidence, the analysis and recommendations within each of the key areas. Identifying the key linkages between these areas and the implications for the TAN 15 review recommendations.

The TAN 15 review identifies 14 recommendations, all of which are based on the evidence gathered. The approach to the methodology for the review was comprehensive and integrated further evidence where required. The report has been prepared to reflect the requirements of Welsh Government and usability of a wider audience involved in the implementation of TAN 15.

Figure 2-2 Key areas of the TAN 15 review

3 Risk based approach

3.1 Introduction

One of the **six main aims** of the TAN 15 review related to the adoption of a risk based evidence analysis. This section sets out the context of a risk based approach and where appropriate draws on associated policy and practice in the UK and Europe since the adoption of TAN 15 in 2004. The content introduces the concept of a source-pathway-receptor model and the importance of considering flood risk from all sources.

This section and sections 4 and 8 describe the evidence supporting the development of a more risk based approach to flood risk planning policy. The intention is for the evidence, analysis, summary and recommendations describing the risk based approach in this chapter to provide the reader with links to other material in other sections that contain more detailed evidence and analysis.

3.2 Evidence

The evidence for this section draws on the document analysis, and further evidence from methods for each of key sources of flooding.

Document Analysis

It is evident from the Welsh Assembly Government (WAG) (2007) New Approaches Programme (NAP)[6], and Wales Audit Office (2009)[7] that a risk based approach could offer a more sustainable solution and help develop an effective integrated response.

A risk based approach underpinned the methodology of the Foresight Futures Flooding project (2002 and 2008)[8], Pitt Review (2008)[9] and Defra (2005)[10] Making Space for Water. It has driven a significant move towards a "more integrated management of tidal/fluvial intra urban systems", and more detailed assessment of sources, pathway, receptor likelihood, consequence and risk which considers all six key sources of flooding (excluding coastal erosion). The Source-Pathway-Receptor (SPR) approach and evidence regards to six different flooding sources is set out in Figure 3-2.

The national assessment of flood risk in Wales Environment Agency Wales (2011)[11] covers the most common sources of floods in Wales:

- River flooding;
- Coastal flooding;
- Surface Water flooding; and
- Sewer flooding.

The full SWOT analysis of TAN 15 prepared for the review is discussed in further detail in section 4 and included in full within Appendix B1.6. The evidence from the review in relation to all sources of flooding are considered separately as follows.

[6] Wales Audit Office (2009) Flood risk management in Wales
[7] Wales Audit Office (2009) Coastal Erosion and Tidal Flooding Risks in Wales
[8] Ibid
[9] Ibid
[10] Ibid
[11] Environment Agency Wales (2011) Flooding in Wales: A national assessment of flood risk

Fluvial (River flooding)

Fluvial or river flooding, describes inundation of floodplains from rivers and watercourses; inundation of areas outside the floodplain due to influence of bridges, embankments and other features that artificially raise water levels; overtopping or breaching of defences; blockages of culverts; blockages of flood channels/corridors. Fluvial flooding is associated with the exceedance of channel capacity during higher flows. The process of flooding from watercourses depends on a number of characteristics associated with the catchment including geographical location and variation in rainfall; steepness of the channel and surrounding floodplain; and infiltration and rate of runoff associated with urban and rural catchments.

NRW 'flooding from rivers and sea' dataset provides a hazard categorisation of flood risk (high, medium, low and very low. High representing a 1 in 30 AEP Annual Exceedance Probability (AEP) chance of flooding. Medium for locations with a risk of 1 in 100 and 1 in 30 AEP of flooding and low risk which has a risk of flooding between 1 in 1000 and 1 in 100 AEP of flooding. Very low flood risk is associated with areas with less than 1 in 1000 AEP chance of flooding.

NRW 'Flood Map' shows the fluvial risk of the 1 in 100 AEP (Flood Zone 3) and 1 in 1000 AEP (Flood Zone 2) chance events, assuming the absence of flood defences. This NRW 'Flood Map' zoning mirrors the approach adopted in England, as described in the NPPF (2012)[12] and accompanying Planning Practice Guidance (2014)[13].

Fluvial risk in the TAN 15 Development Advice Map is limited to the extreme 1 in 1000 AEP chance event, Zone C, which is based on NRW's Flood Zone 2. The DAM does not take account of the predicted effects of climate change. TAN 15 does specific in appendix A1.14 and A2 the need to assess the impacts of climate change.

Tidal

Tidal flood risk includes flooding from the sea, estuary; overtopping of defences; breaching of defences; other flows (e.g. fluvial and surface water) that could pond due to tide locking; wave action. Tidal flooding is caused by storm surge and/or extreme wave action in combination with high astronomical tides. Tidal flooding or flooding from the sea occurs when water levels or waves overtop the crest of coastal defences or when defences are breached or collapse.

The NRW 'Flood Map' shows the tidal risk of the 1 in 200 AEP (Flood Zone 3) and 1 in 1000 AEP (Flood Zone 2) chance events, assuming the absence of flood defences.

Tidal risk in the TAN 15 Development Advice Map is limited to the extreme 1 in 1000 AEP chance event, Zone C, which is based on NRW's Flood Zone 2 (again this mapping does not include for the effect of protection afforded by tidal defences). The DAM does not account of the predicted effects of climate change.

Within the flood consequence assessment guidance TAN 15 also applies acceptability thresholds based on the 1 in 200 AEP chance and 1 in 1000 AEP chance events, both including an allowance for climate change.

[12] DCLG (2012) National Planning Policy Framework
[13] DCLG (2014) National Planning Practice Guidance: Flood Risk and Coastal Change

According to the national assessment of flood risk in Wales Environment Agency Wales (2011) there are 220,000 properties in Wales at risk of flooding from rivers and the sea. Cardiff has the highest number of properties at risk from flooding from rivers and the sea, followed closely by Newport and Conwy and the majority of risk in these three locations is from the sea.

Surface Water Flooding

Surface water flooding includes the following two main flood mechanisms; intense run-off flowing across the surface of land and surcharging of piped drainage systems (public sewers, highway drains, etc.). Surface water flooding can occur anywhere where ground levels and terrain profiles tend to cause surface water to flow and accumulate. However, there are certain locations where the probability and consequence of these mechanisms are more prominent due the complex hydraulic interactions in the urban environment. Urban watercourse connectivity, sewer capacity and the location and condition of highway gullies all have a major role to play in surface water flood risk.

NRW latest dataset on surface water flooding is referred to as Risk of Flooding from Surface Water (RoFSW) and is available in surface water flood outlines, depths and velocities and hazards for the 1 in 30 AEP event (high risk), 1 in 100 AEP event (medium risk) and 1 in 1000 AEP event (low risk). This mapping is based on nationally consistent flood modelling.

The document SWOT analysis identified the absence of surface water flooding in the DAM as a weakness and an opportunity, because there is limited focus placed on surface water runoff and drainage. TAN 15 predates, the recommended non-statutory SuDs standards for Sustainable Drainage Systems (SuDs) published by Welsh Government in 2016 and Water Strategy for Wales (2015)[14] and the risk management approach adopted by Welsh Government in the last ten years.

The evidence from the workshops highlighted concerns with the clarity of roles and responsibilities on surface water flooding despite the publication CPO letter 2014[15]. The workshops identified these issues were partially related to the limited scope of NRW's consultations on flooding from rivers and sea mapping. This was identified as having potential implications for the LLFA to provide advice on surface water flood risks, flooding from ordinary watercourses and site drainage. This lack of clarity in TAN 15 on surface water flooding caused confusion as to whether consideration should be given to surface water flooding in a FCA and LDP.

90% of workshop survey respondents suggested a greater focus should be placed on surface water flooding, in terms of policy and in any revisions to the DAM. Furthermore, the workshop survey responses suggested potential revisions to the DAM should include flood risk from surface water flooding and links to implementation of SuDs, non-main rivers and local flood risk.

Groundwater

Groundwater flooding can occur from the water table rising after prolonged rainfall to emerge above the ground level remote from a watercourse. It is most likely to occur in low-lying areas underlain by permeable rock (aquifers) or from groundwater recovery after pumping for mining or industry has ceased. The occurrence of groundwater flooding is usually localised and unlike flooding from

[14] Welsh Government (2015) Water Strategy for Wales: Supporting the sustainable management of our natural resources
[15] Welsh Government (2014) Chief Planning Officer Letter Planning Policy on flood risk and insurance industry changes

rivers and the sea, does not generally pose a significant risk to life due to the slow rate at which the water level rises. However, it can be a protracted event and cause actual disruption over longer time periods.

Groundwater flooding can cause significant damage to property, especially in urban areas, and can pose further risks to the environment and ground stability. There are several mechanisms that increase the risk of groundwater flooding including prolonged rainfall, high in bank river levels, artificial structures and groundwater rebound. Properties with basements or cellars or that are located within areas susceptible to groundwater flooding are at greatest risk. Development within areas susceptible to groundwater flooding will generally not be suited to infiltration based SuDS.

NRW's national dataset, Areas Susceptible to Groundwater Flooding (AStGWF), provides information to assess groundwater flood risk. The maps are a low resolution and use four susceptibility categories to categorise groundwater flood risk on 1 km grid squares. These do not quantify the likelihood of groundwater flooding occurring and are not suitable for planning considerations at a site-specific level. They should only be used as a trigger for further investigation regarding the possibility of groundwater flooding. There are also commercially available groundwater maps[16] at the UK level that have been derived at much higher resolutions, although the levels of uncertainty generally remain high.

The national assessment of flood risk in Wales Environment Agency Wales (2011)[17] identifies groundwater flooding is not a significant source of flooding in Wales. The groundwater flooding AStGWF is not included in the DAM.

Infrastructure Failure

Infrastructure failure includes reservoirs; canals; industrial processes; burst water mains; blocked sewers or failed pumping stations. The risk of flooding associated with infrastructure failure is commonly regarded as a residual risk. Infrastructure failure is not included within the DAM.

The most significant of these risks, due to the potential catastrophic consequences, is reservoir flooding. A reservoir is usually an artificial lake where water is stored for use. Some reservoirs supply water for household and industrial use, others serve other purposes, for example, as fishing lakes or leisure facilities. This risk of failure is reduced through a strict statutory framework for reservoir safety. Reservoirs in the UK have an extremely good safety record with no incidents resulting in the loss of life since 1925. For these reasons, the likelihood of reservoir failure is extremely low, typically leading to a low assessment of risk.

NRW has prepared reservoir flood maps for all large reservoirs that they regulate under the Reservoirs Act 1975 (reservoirs that hold over 25,000 cubic metres of water). There have been recent amendments, following the Flood and Water Management Act (FMWA) 2010, to secondary legislation that has reduced the designation size of reservoirs to 10,000 cubic metres. The maps for reservoirs failure are available online and show the maximum extend, depth and velocity of flooding if a reservoir were to fail. More detailed information is security restricted and used to inform planning and preparedness duties of local authorities and LRFSs under the Civil Contingencies Act 2004.

[16] JBA Risk Groundwater Map at 50m and 5m resolutions http://www.jbarisk.com/jbas-new-national-groundwater-flood-map
[17] Ibid

Coastal Erosion

In the FWMA (2010) coastal erosion is defined as being "the erosion of the coast of any part of England and Wales." The national assessment of flood risk in Wales Environment Agency Wales (2011)[18] National Strategy for Coastal Erosion Risk Management in Wales (NSCERM) states that the rate of coastal erosion in Wales is generally quite low compared with parts of England. Despite this, the evidence emerging from post SMP2 projects suggests that in the next 100 years an increasing number of coastal communities in Wales are likely to be at risk from rising sea levels and eroding land. SMP2s suggest that some communities will become unsustainable in the longer term, forcing those who live there to move.

There are 415km of Welsh constructed sea defence structures that protect over £8 billion pounds' worth of assets from coastal erosion and tidal flooding, and erosion is occurring along 346km (23%) of the Welsh Coast[19]. It is important to recognise that whilst coastal erosion is a separate hazard to flooding, the two are closely linked. Coastal erosion can and will undermine coastal flood defences and features, and in this way, change the extent and level of coastal flood risk. Both coastal erosion and flood risk are also similarly impacted by the challenges of climate change.

National planning policy on coastal flooding and erosion is contained within PPW (2016)[20] and TAN 14[21]. There is evidently an "intertidal zone in which both marine and land use planning systems apply (perhaps within 10 nautical miles"[22]. The draft Welsh National Marine Plan (WNMP)[23] highlights the importance of coastal change and flooding and the significant impacts on natural resources that can arise. Policy SOC-10 refers to PPW (2016)[24] and TAN 15[25] preventing development in areas at high risk of flooding and suggests advice is sought from Welsh Government and NRW to identify the level of flood risk in coastal areas.

The National Trust (2015)[26] identifies the need for a consistent coastal vision, a greater level of detail in national planning policy on coastal change areas and making coastal change areas a requirement of Local Development Plans or "place plans".

Locations affected by coastal erosion and associated future changes in flood risk are not included in the current DAM.

Evidence from the workshops also highlighted the lack of linkages to coastal flooding and erosion from TAN 14 as a key weakness of TAN 15.

3.3 Analysis of evidence

The focus of the existing TAN 15 is firmly places on flooding from rivers and sea. There is a limited section on surface water run-off in which SuDs are promoted. The clarity of roles and responsibilities on surface water flooding was raised as an

[18] Ibid

[19] Marine Climate Change Impacts Partnership (2008) cit. Welsh Government (2011) National Strategy for Flood and Coastal Erosion Risk

[20] Ibid

[21] Ibid

[22] Welsh Government (2017) Natural Resource Management consultation

[23] Welsh Government (2015) Welsh National Marine Plan-Draft

[24] Ibid

[25] Ibid

[26] National Trust (2015) Shifting shores +10 on public policy and adaptive approaches to coastal change management: How are we doing

issue in the workshops and over 90% of survey respondents agreed that a greater focus should be placed on surface water flooding. The SWOT analysis of TAN 15 in section 4 and Appendix B1.6 identifies the absence of surface water flooding as both a weakness and opportunity.

The evidence of the different sources of flooding is useful to consider because of issues of significance in flood risk. Where different sources of flood risk are assessed against the likelihood and the consequences, are assessed in terms of the hazard, receptor and vulnerability.

Flood risk is a combination of the likelihood of flooding and the potential consequences arising and it is assessed using the SPR model (approach) as shown in Figure 3-2. This is a standard environmental risk model common to many hazards and is the logical starting point for flood consequence assessment.

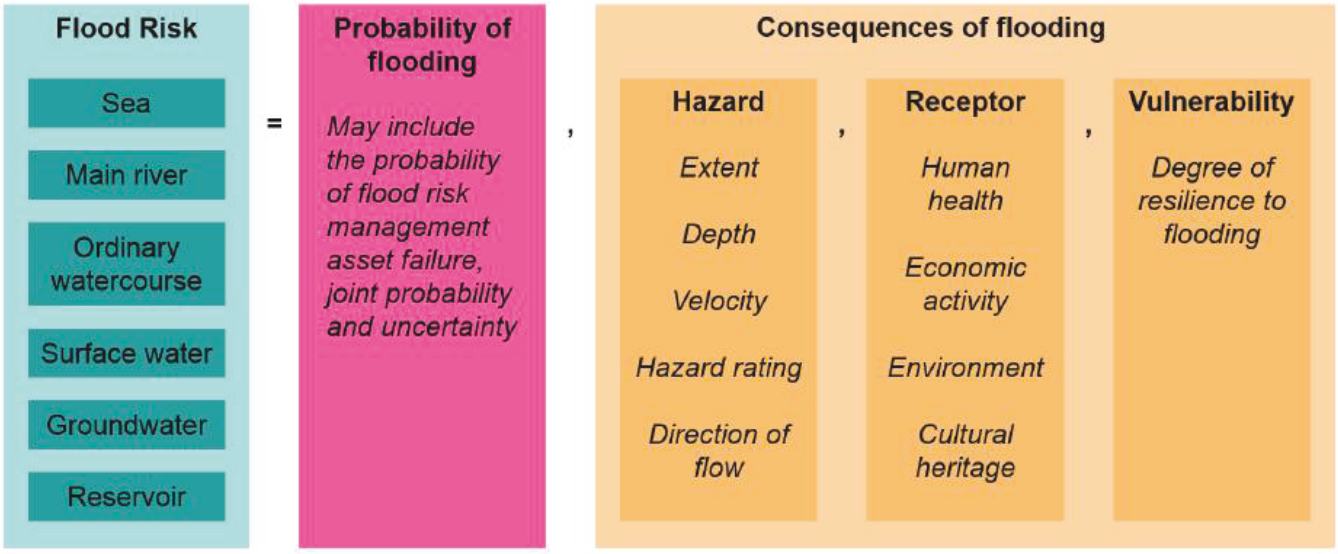


Figure 3-1 Source-Pathway-Receptor Model

Likelihood

The likelihood of flooding is expressed as the percentage probability based on the average frequency measured or extrapolated from records over a large number of years. A 1% probability indicates the flood level that is expected to be reached on average once in a hundred years, i.e. it has a 1% chance of occurring in any one year, not that it will occur at hundred year intervals.

When these probabilities are considered over the lifetime of development, such an apparently low frequency or rare flood has a significant probability of occurring. For example:

- A 1% flood has a 26% (1 in 4) chance of occurring at least once in a 30-year period - the period of a typical residential mortgage
- And a 49% (1 in 2) chance of occurring in a 70-year period - a typical human lifetime.

Consequences

The consequences of flooding can result in fatalities, damaging property, disrupting lives and businesses, with severe implications for people (e.g. financial loss, emotional distress, health problems). Consequences of flooding depend on the

hazards caused by flooding (depth of water, speed of flow, rate of onset, duration, wave-action effects, water quality) and the vulnerability and density of receptors (type of development, nature and number of receptors, e.g. age-structure, of the population, presence and reliability of mitigation measures, etc.). Flood risk is then expressed in terms of the of the source pathway receptor relationship in Figure 3-2.

Flood Risk

Flood risk is not static; it cannot be described simply as a fixed water level that will occur if a river overtops its banks or from a high spring tide that coincides with a storm surge. It is therefore important to consider the continuum of risk carefully. Risk varies depending on the severity of the event, the source of the water, the pathways of flooding (such as the condition of flood defences) and the vulnerability of receptors as mentioned above.

This is the risk 'as is' taking into account any flood defences that are in place for extreme flood events (typically these provide a minimum Standard of Protection (SoP)). Hence, if a settlement lies behind a fluvial flood defence that provides a 1 in 100-year SoP then the actual risk of flooding from the river in a 1 in 100-year event is generally low.

Actual and Residual Risk

Actual flood risk describes the primary consequences to receptors from a known and understood source managed to a known SoP or if no flood risk management measures are present the actual risk from the source. However, it is important to recognise that risk comes from many different sources and that the SoP provided will vary within a river catchment. Hence, the actual risk of flooding from the river may be low to a settlement behind defences but moderate from surface water, which may pond behind defences in low spots and is unable to discharge into the river during high water levels.

Even when flood defences are in place, there is always a likelihood that these could be overtopped in an extreme event larger than considered for design or that they could fail or breach (i.e. Infrastructure failure). Where there is a consequence to that occurrence, this risk is known as residual risk. Defence failure can lead to rapid inundation of fast flowing and deep floodwaters, with significant consequences to people, property and the local environment behind the defence.

Whilst the actual risk of flooding to a settlement that lies behind a fluvial flood defence that provides a 1 in 100-year SoP may be low, there will always be a residual risk from flooding if these defences overtopped or failed that must be taken into account. Because of this, it is never appropriate to use the term "flood free".

3.4 Summary and Recommendations

The SPR approach highlights the advantages of assessing different sources and probabilities of flooding. It also draws attention to the importance of identifying the different variables associated with different flood risks, flood hazards of speed of inundation, depth and duration of flooding and consequences. It enables an approach which can take account of the range, frequency, pattern and severity of flooding, and how these are expected to change and become more damaging as a result of climate change.

A SPR approach also helps to identify potential issues of significance to consider at a national scale in terms of the different types of flood risk and development, including LDP's and strategic development proposals. Unlike when TAN-15 was last revised, there are now published datasets for different types of river and sea, surface water flooding, available to use within TAN 15 and any updated DAM. These make it possible to refine the DAM so that it can be used to define the respective risk categories and introduce policy that addresses more appropriately the respective risks.

The evidence from the national assessment of flood risk in Wales Environment Agency Wales (2011)[27] should help to determine the level of significance associated with different sources for the purposes of this report. Any updated national assessment completed by Natural Resources Wales will help to identify and understand the most up to date common forms of flooding in Wales includes river, coastal, surface water and sewer flooding, and allow consideration of how these sources of flood risk could potentially be incorporated into an updated DAM.

Groundwater flooding is a relatively low and localised flood risk. Therefore, the response to this risk needs to be proportional. The absence of groundwater flood risk considerations in TAN 15 could be resolved at a local scale by an evidence led approach and any consideration within strategic flood consequence assessment (SFCA).

Surface water flood risk is significant and a strategic issue for developments of national infrastructure, LDP's and large development proposals. The advent of extensive surface water risk mapping (unheard of when TAN 15 was conceived) presents significant opportunities to improve consideration of such risks during the planning process.

There are opportunities to make clear linkages to or incorporate the relevant details from Welsh Office (1998) TAN 14: Planning Guidance (Wales) Technical Advice Note (Wales) Coastal Planning[28].

The recommendations emerging from the evidence suggests the precautionary approach of TAN 15 needs to be updated or replaced by a more risk based approach to flood risk management and planning. No location should ever be considered entirely free of flood risk, and therefore an absolute intolerance to flood risk is impractical. However, given the social and economic consequences of flooding and aim for planning to deliver sustainable development, there should be a strong policy stance against development in areas defined as high or greatest risk. This should take full consideration of type and scale of risks from other sources of flood risk and a long-term view to development and flood risk.

Through the evidence gathering and analysis contained in this section of the review, four key recommendations have been developed. These relate to the need for a risk based approach that addresses flood risk from all sources, the formulation of policy guidance to introduce strategic testing of land use, appropriate linkages to TAN 14 and all factual updates required to TAN 15. As described the evidence and analysis in this section informs all subsequent sections of the report.

[27] Ibid

[28] Welsh office (1998) Planning Guidance (Wales) Technical Advice Note (Wales) 14 Coastal Planning

TAN 15 Review Recommendations:

1. Welsh Government should update and replace the precautionary approach of TAN 15 with a risk based approach. This approach should include a strong policy stance against development in areas at greatest flood risk and is reliant on updates to the Development Advice Maps.

2. The risk based approach in TAN 15 should include provisions to avoid highly vulnerable development in areas identified at greatest flood risk, which could include any one or combination of the following:

- **Flood Zone 3 (1% AEP fluvial; 0.5% Tidal);**
- **Flood Zone 3b / Functional flood plain (similar to those used England);**
- **Locally identified 'local flood risk areas' as set by the LPA;**
- **SMP2 Coastal Change areas.**

Further consideration should be given to the provisions for 'Water Compatible' and 'Essential Infrastructure' where such development must be located in areas at greatest flood risk subject to satisfying the justification and acceptability tests.

3. The revised TAN 15 should consider how to incorporate TAN 14: Coastal flooding in the risk based approach to all sources of flooding.

4. The revised TAN 15 should be updated to reflect all necessary updates in national planning policy and flood risk management since 2004, including:

- **PPW and National Development Framework (NDF);**
- **Key definitions of development (including lifetime of development) and flood risk;**
- **Key TAN's (i.e.12 and 14), legislation and evidence base;**
- **Use of consistent language on flood risk and probability to help improve understanding and skills;**
- **Link to published climate change guidance by Welsh Government.**
- **The criteria of call in procedures for Welsh Ministers for developments and flood risk;**
- **Reference to flood insurance or Flood Re standards.**

Links:

This risk based approach forms the context of the TAN 15 review and informs all sections in this report.

4 Strengths and Limitations of existing planning policy TAN 15

4.1 Introduction

Section 4 uses the context of the risk based approach recommended in section 3, to consider the evidence on the strengths and limitations of existing planning advice in TAN 15. This section sets out the evidence from the case studies, workshops and document analysis in relation to the TAN 15 planning policy framework and goes on to evaluate the performance in terms of the document and consider the implications of broader issues. The evaluation is described as follows:

- policy triggers to development types and location within the DAM;
- the justification and acceptability tests; and
- a presumption against highly vulnerable development in C2.
- The strengths and limitations of TAN 15
- Measuring the success of TAN 15
- Broader issues to be considered in update of TAN 15
- Analysis of evidence
- Summary and recommendations

4.2 Evidence on policy triggers and the justification and acceptability of proposals

The evidence in this section on planning policy draws on case studies, the workshop, the workshop survey and document analysis. The two relevant case studies exemplify the evidence in relation to the justification and acceptability tests and the acceptability of residential development (highly vulnerable development) in DAM C2. These case studies are used in the evaluation of the strengths and limitations of TAN 15 which are mirrored in subsequent sections headings (sections 5 to 10).

Policy Triggers

Currently all Flood Consequence Assessments (FCA) submitted for DAM Zone C1 highly vulnerable development and all other development in Zone C2 must address the justification tests and acceptability criteria through the preparation production of an appropriate a FCA. Influential policy characteristics are:

- The extent of Zone C is based on the extreme flood outline (0.1% probability event);
- C1 is floodplain which is developed and served by significant infrastructure including flood defences; and
- C2 is floodplain without significant flood defence infrastructure

From the appeal and call in decisions considered in the review (those since 2012 - see Appendix B1.7) it was found that the provision of an FCA was considered “material” to a proposal located in C2. The policy presumption in TAN 15 and the precautionary framework was afforded significant weight by the Planning Inspectorate to prevent highly vulnerable development in C2. Furthermore, the Inspectors consideration of the C1 trigger for justification and acceptability tests of

highly vulnerable development, was limited to river and sea sources of flooding as set out in TAN 15.

There were fifty appeal and call in decisions reviewed in the document analysis (Appendix B1.7). These cases involved both development proposals located in zones C1 and C2. Both the document analysis and survey responses raised queries with regards to the technical and policy criteria used to differentiate differentiation between C1 and C2, and it was suggested by workshop attendees these two zones could be merged, allowing the justification and acceptability tests to be applied across all of Zone C. The evidence from workshops, case studies and document analysis identified that it was not clear whether this policy trigger is appropriate or how well it is working.

From a brief analysis of available DAM data in Wales (April 2017), DAM Zone C1 equates to a significantly smaller area (18%) in Wales than C2. C1 forms 22,882 ha and C2 accounts for 126,717ha. A combined area of C1/C2 (Zone C) would allow for a significantly larger area of land in Wales to be considered for development prior to the application of justification tests, where development would need to be located on previously developed land (PDL).

Workshop discussions identified that LPAs wanted the discretion to require an FCA (policy trigger) based on their local evidence but found it was difficult to insist on their provision outside of DAM Zone C

Evidence from face-to-face meeting and workshops suggested the trigger for an FCA could relate to specific types of developments within NRW's Flood Map and the scope and level of detail in an FCA could be tailored to the type of development proposed. The FCA trigger would not apply to those areas identified at greatest risk where there is a presumption in policy against development; no FCA would make development acceptable. The workshops also identified close linkages between policy triggers and local validation requirements, which were being implemented differently by LPA's. These differences generally fell into three groups:

- LPAs who viewed FCAs as a local validation requirement;
- LPAs who relied on consultation responses from NRW before deciding if the application was valid; and
- LPAs who had a specific LDP policy on flood risk.

These linkages between policy triggers and validation requirements for an FCA by LPA's are further evidenced in section 6 on roles and responsibilities and case study 5. The issue of proportionality for FCAs formed a key discussion point in the workshops. Many attendees found TAN 15 to be ambiguous, unclear and in some cases disproportionate, by requiring application of the same tests and acceptability criteria and technical appendix requirements for all FCA's.

48% of responses to the workshop survey suggested changes to the DAM, although half of those respondents (42%) did not suggest specific improvements. 91% of survey respondents agreed that greater focus should be placed on surface water flooding and drainage in both policy and the DAM's. The survey responses suggested that changes to the DAM should include:

- Surface water flood risk (surface water flood maps), groundwater local sources of flooding and flooding from ordinary watercourses (non-main rivers);

- Site specific assessments or areas and NRW maps;
- Climate change outline trigger to require FCA and consult NRW; 1% plus climate change, or using a combination of Zone C1 and C2 with 1 in 1000 year plus climate change as a trigger for an FCA;
- Hazard maps (depth/velocity);
- FCA triggers, requirements and impacts of risk elsewhere;
- One map for Wales including climate change allowances;
- SuDS legislation and implementation should not be separate;
- Revision of Zone A and B (Zone A misleading and Zone B not used);
- Prescriptive tables on velocity and depths and FCA requirements;
- Zones of development categories; and
- Justification tests strengthened to prevent emergency services and highly vulnerable development in areas at high flood risk or hazard;

The NRW Flood Map (Flood Zone 2 and 3) has been published since 2015 and are already used in practice within SFCAs and FCAs in Wales. The review of TAN 15 could make use of revised FCA triggers linked to NRW Flood Map Flood Zone 2 and local flood risk or critical drainage areas as defined by LPAs or LLFAs. Consideration could also be given to a policy involving local refinement of zones based on higher resolution strategic assessment that captured the significance of influential local features and development.

NRWs Flood Map and the DAM do not currently include climate change mapping data and there are variations to climate change allowances across Wales. Climate change has particularly significant policy implications in coastal areas, where sea level rise will see large future changes in DAM Zone C. The SMP2s provide evidence of areas at future tidal flood risk that are currently situated outside of DAM Zone C and therefore not subject to the requirements of an FCA (even if the resulting FCA would not be favourable to development). If the DAM were updated to incorporate climate change predictions such contractionary situations could be avoided. The DAM and option to revise it are discussed in further detail in section 8 of this report.

The evidence suggests the desire for changes to the DAM identified by the survey respondents is closely related to key issues associated with other sources of flood risk and development vulnerability categories. As described in section 3, source and vulnerability are key components in assessing flood risk using a risk based approach. The prescriptiveness of DAM and vulnerability categories in the existing DAM was viewed in the workshops as a key weakness and opportunity for improvement. The issues relating to vulnerability categories and options for updating or replacing these, with evidence from elsewhere in the UK and Ireland are discussed within section 7 of this report.

Case Study 1: Justification and acceptability tests of residential development in DAM C2 at the Boathouse Yard, Anglesey

The appeal at the Boathouse Yard, Anglesey Appeal (APP/L6805/A/14/2215339)[29] was dismissed in 11.9.2014. The main issue on flood risk related to whether the

[29] PINS (2014) Town and Country Planning Act 1990 section 78 for demolition of existing boathouse and erection of new boathouse,

development could be regarded as less vulnerable and if not, whether the proposal satisfied the tests for highly vulnerable development in DAM Zone C2 as set out in TAN 15, and if there were other material considerations sufficient to outweigh any conflict with the TAN. The Inspector considered the dispute on whether the development could be regarded as less vulnerable development and found it constituted highly vulnerable development by virtue of its first-floor residential accommodation.

In terms of the justification tests, the Inspector found that whilst the proposed development may meet the third test relating to previously developed land, it had not addressed the first two tests and was therefore found to fail the tests in section 6 of TAN 15. The FCA, whilst a material consideration, was insufficient to outweigh the conflict with planning policies in TAN 15 relating to the prevention of highly vulnerable development in areas of the floodplain without significant flood defence infrastructure.

The case study raises the importance of the LPA's role in the evaluation the first two tests of the Justification Test, which are concerned with the requirement to justify the need for development within a flood zone. It is important the LPA have in place the necessary plans and policies to support such decision making. Furthermore, the case study sets an important precedent against using vertical segregation of development (first floor solutions) vulnerability to satisfy the requirements of TAN 15.

Case Study 2: Presumption against residential development in DAM C2 and former Auston Taylor site, Bethesda Gwynedd

The proposed demolition of an existing commercial property (Austin Taylor) and outline planning permission for the development of 37 residential dwellings in Bethesda (DAM Zone C2) was submitted as a planning application to Gwynedd Council in 2012 (LPA reference C13/0036/13/AM). The FCA for the proposed development suggested the tests set out in Sections 5 and 6 and Appendix 1 of TAN 15 could be satisfied and the risk to life and property could be properly managed. Hydraulic modelling was undertaken and this highlighted the site was located within the 0.1% AEP flood extent and could potentially flood with current conditions. The development included proposals to raise parts of the site to create a development plateau above the predicted flood outline, lowering other areas to provide compensatory storage and a new lower level access road which would act as an overflow. The application was refused by Planning Committee in April 2014 and subsequently put forward for approval in June 2014.

In July 2014, Welsh Ministers (APP/Q6810/V/14/2226486)[30] called in the application because it was considered to conflict with national planning policies and raised issues of more, than local importance. The proposal was dismissed in 2015 following a hearing, because it did not satisfy the tests for highly vulnerable development in Zone C set out in TAN 15 and it conflicted with PPW (2014)[31] and Policy B28 Gwynedd UDP (2009)[32] in relation to avoiding development in Zone C, for the following reasons:

leisure accommodation and associated development, Boathouse, adjacent to Pumping Station, Glyn Garth, Menai Bridge, Anglesey (APP/L6805/A/14/2215339).

[30] PINS (2015) Town and Country Planning Act 1990 section 77 report for proposed residential development High Street, Bethesda, Bangor Gwynedd APP/Q6810/V14/2226486)

[31] Welsh Government (2014) Planning Policy Wales (Edition 7)

[32] Gwynedd County Council (2009) Gwynedd Unitary Development Plan 2001-2016

- Paragraph 6.2 of TAN 15 makes it clear highly vulnerable development will not be permitted in Zone C2 and justification tests only apply to 'all other new development' and are therefore not relevant to highly vulnerable development in Zone C2. The proposal does not satisfy the tests for highly vulnerable development in Zone C, as set out in TAN 15.
- Whilst the FCA identifies mitigation in the form of raising site levels, this mitigation had not been put in place.
- The access road would remain at risk of flooding and the floodwater depth and velocity would exceed tolerable limits, and the proposed pedestrian escape method could be hazardous for those people with reduced mobility.

Case study 2 highlights the strength of TAN 15 policy against highly vulnerable development in Zone C2 and whether consideration can be given to the justification tests (including FCA) for this type of development and location. The Inspector's report refers to extent, depths and hazards of flood being intolerable; there is no indication of what off site impacts would occur with current and future flood risks.

4.3 Strengths and Limitations of TAN 15

The evidence on the strengths and limitations in TAN 15 is summarised below from the document analysis, workshop and workshop survey.

Document Analysis

The document SWOT analysis of TAN 15 identified several key strengths, limitations, threats and opportunities is provided in full within Appendix B1.6 and summarised below in Table 4-1:

Table 4-1 Summary of TAN 15 SWOT Analysis.

Key Strengths	
1.	The aim of TAN 15 is to direct new development away from those areas at flood risk is generally achieved for planning applications.
2.	There is a clear set of requirements for assessing FCAs.
3.	TAN 15 requires new development to not increase run-off and reduce where possible, to help manage and reduce flood risk.
4.	The emphasis is placed on fluvial and tidal flood risk.
Key Limitations	
1.	There is a lack of emphasis placed on flooding as a strategic issue and correspondingly guidance on how the approach in TAN 15 is used in the preparation of land allocations in LDP's that direct development away from areas at flood risk.
2.	The complementary nature of planning and environmental management is not emphasised.
3.	There is no clarity and focus in TAN 15 on roles and responsibilities.
4.	The requirements for all developments to consider surface water flood risk and drainage, irrespective of the DAM zoning is not sufficiently clear or precise.
Key Threats	
1.	The DAM data was only expected to be in place for three years before they were updated and so there is a 'shelf life' issue.

2.	TAN 15 aims to direct development towards Zone A. Zone A mapping does not necessarily identify significant tidal flood risks or coastal change areas identified in the Shoreline Management Plans 2 and does not identify surface water flood risk.
3.	The presumption against highly vulnerable development in C2 and limited details on defences and limited differentiation between C1 and C2 introduces uncertainties that reduce the confidence of LPA and developers in the application of TAN 15.
4	Lack of detail in relation to the significance and impacts of climate change and policy principles on how these should be addressed.
Key Opportunities	
1.	There are opportunities for action through the planning system to identify and drive in the commitments (strategic, funding, operational and tactical) required for adaptation to climate change for all sources of flood risk.
2.	Strengthen the strategic aim of the TAN 15 to direct new development away from those areas at greatest flood risk.
3.	Provide a clear and succinct set of requirements for assessing FCAs.
4.	Integrate the use of SuDs and design into developments to provide for effective management of surface water flood risk in the long term.

TAN 15 was first published in 1998 and updated in 2004. Since 2004 planning policy changes in Wales have included several iterations of PPW, two Policy Clarification letters and five Chief Planning Officer (CPO) letters published by Welsh Government. which are summarised in Appendix B1.2. Many of the policy features contained in TAN 15 were subsequently emulated by English, Irish and Scottish Governments.

More recently in the UK and Europe planning policy for flood risk has seen a paradigm shift, moving from an approach focussed on flood defence to living with flood risk, integrated flood risk management and a risk based approach to flood risk management. Adapting to climate change is now an important part of the UK and Dutch national plans, public safety and natural environment. In England planning policy has changed from Planning Policy Guidance Note 25: Planning and flood risk to National Planning Policy Framework (NPPF) (2012) and Planning Practice Guidance Note on climate change and flood risks in 2014. The Office of Public Works (OPW) in Ireland published planning policy guidelines for a risk based approach on flood risk management in 2009.

There have been some significant changes to flood risk management legislation with the enactment of the Flood and Water Management Act (2010) and Flood Risk Regulations (2009), and adoption of the national and local plans, strategies and maps, that have been set out in section 3 of this report. The principal driver for these responses was the significant flooding events experienced in 2007 across the UK, which were dominated by high intensity summer storms. These events highlighted the vulnerability of many communities to surface water flood risk, not previously identified. Over a relatively short time period there has been a significant government response to surface water flood risk including innovative approaches to integrated catchment management and water sensitive design. However, it should not be forgotten that the policy and institutional responses to such risk is relatively new, unlike the situation for river and sea flooding.

Terminology around flood risks is now better associated with adaptation to climate change and resilience and "living with flood risks" (Scott, 2013)[33]. Research evidence from the Netherlands Delta programme, the Elbe region, and Hamburg "flood resilient cities" (Restemeyer, 2011)[34] highlights the significant opportunities to strengthen the role of the planning system in helping to manage flood risk.

The evidence from the document analysis and case studies found there was an inadequacy of securing drainage design by condition. This was highlighted in an appeal decision (APP/A6835/A/16/3156854 (LPA 054770)[35] for residential development in Kinnerton Flintshire. This decision was allowed and permission granted subject to ten conditions including one on surface water drainage. This was one of many appeal decisions allowed or granted subject to conditions on drainage and surface water flood risk.

The appeal decision in Kinnerton is particularly relevant because of the limited analysis within the FCA to surface water and the material weight attached to the no objection consultation response from NRW. Case Study 5 highlights the important role of the LLFA in the planning process and further strengthens the planning policy role in design and flood resilience (set out in section 5) and decision-making role of the LPA (section 6).

It's not clear from review evidence if approaches to water sensitive design and integrated catchment management in Wales have become well established in planning practice.

Workshops and Survey

The workshop survey found conflicting evidence around the strengths and limitations of TAN 15. Whilst 75% of responses considered the TAN 15 policy was clear and well supported, 85% of responses also found areas of TAN 15 policy unclear or open to interpretation. It also found the inflexibility of TAN 15 was determined by its prescriptive framework and focus on river and sea sources of flooding. The workshop survey suggested the "presumption against highly vulnerable development in C2" in TAN 15 allowed interpretation because it uses "should" and not "will". Furthermore, it was identified that TAN 15 was not always being consistently applied, development does not always neatly fall within existing development categories and there had been issues with regards to the lack of and frequency of updates to the DAM in previous years.

The workshops, found the seven separate policy clarifications etc listed in Appendix B1.2 were viewed by stakeholders as both a strength and weakness of TAN 15.

There was widespread evidence from the face-to-face meeting, workshops and surveys to support TAN 15 guidance becoming a more living document rather than a fixed appendix, allowing national guidance to be brought together into a single source.

The workshop breakout groups on the SWOT analysis of TAN 15 (Appendix C1.2) identified an equal number and similar type of weaknesses (threats) and opportunities, plus several strengths. Overall and in summary of the evidence provided, the outputs from the workshop identified:

33 Scott (2013) Living with flood risk
34 Restemeyer et al., (2014). A strategy – based framework for assessing the flood resilience of cities – A Hamburg case study
35 PINS (2017) Town and Country Planning Act 1990 section 78 report for residential development, Land South of Kinnerton Lane, Higher Kinnerton, Flintshire CH4 9BG.

- Twenty-three (23) strengths related to TAN 15's principles and the weight afforded by Planning Inspectors, user-friendliness, readability and profile.
- Thirty-eight (38) weaknesses and thirty-seven (37) opportunities related to roles and responsibilities, DAM, viability issues, vulnerability categories, climate change allowances, C1 and C2 designations, other sources of flood risk including surface water and groundwater and the requirements for (SFCAs).

Face-to-face Meeting

The face-to-face meeting with Welsh Government and Natural Resources Wales identified eleven key areas for concern (as set out in Appendix A1.1) and these included:

- No increase in flood elsewhere.
- Policy triggers.
- Framework from mitigation to modelling.
- Residual risk.
- Roles and Responsibilities.
- Level of interpretation of policy triggers/justification and acceptability tests used for HVD in C2.
- Not currently a living document, CPO and CL too many and too easily out of date.
- Need to strengthen role of SFCA in LDP process.
- DAM doesn't include climate change or lifetime of development 1 in 100 or 1 in 75.
- Understanding of flood risk language and probability.
- No current relationship between DAM and SMP.

Evidence from the face-to-face meeting and workshops both identified a need to strengthen a presumption against development in areas at greatest risk, where an FCA would not be appropriate.

Case Study 3: Surface water flood risk in Flintshire and Wrexham County Councils

Flintshire and Wrexham (LLFA's)[36] have adopted two locally consistent planning guidance documents on the management of surface water generated from new development. These supplementary planning guidance documents are supported by Dwr Cymru Welsh Water and NRW.

The documents highlight TAN 15's reference to surface water as a material consideration and requirement for development not to create additional run-off and aim to reduce run-off where possible. They explain how it is essential to consider sustainable drainage early in the development process because of the implications for land purchase, drainage and layout. It strongly recommends consultation with the Flood and Water Management Team (LLFA) and provides a short list of information required for advice to be provided. It sets out who to consult, the expected surface water design criteria, run-off rates and storage of water on site. It also details, in two separate tables, the type and level of information that is

36 Flintshire County Council (2015) Management of surface water for new development guidance and pro forma and Wrexham County Borough Council (2015) Local planning guidance on management of surface water generated from new development

required for outline and detailed planning proposals and recommended reading and guidance.

Case study 3 highlights one of the key limitations of TAN 15 in terms giving appropriate weight to and capturing the role of the LLFA in promoting development and flood risk policy. The case study provides evidence of the advantages that can be gained by the introduction of strategic provisions to address surface water flooding and drainage. It also demonstrates one potential approach to addressing this shortcoming at the local level. There is an opportunity for TAN 15 to draw on linkages between good design and TAN 12[37] for development and flood risk. As well as the requirements set out under schedule 3 of the Flood and Water Management Act 2010 and the recommended non-statutory SuDs standards published by Welsh Government[38]

The pioneering approach taken to alleviating high volumes of surface water run-off in the existing town of Llanelli, South Wales is discussed further in section 5 innovative and flood resilient design and section 9 on LDP's.

Sustainable drainage as defined by Para 2 Schedule 3 of the Flood and Water Management Act is defines as a means of managing rainwater (including snow and other precipitation with the aim of:

- Reducing damage from flooding.
- Improving water quality
- Protecting and improving the environment.
- Protecting health and safety, and
- Ensuring the stability and durability of drainage systems.

4.4 Measuring the success of existing TAN 15 planning policy?

This section draws on the evidence from document analysis of the existing planning performance monitoring framework, section 18 reports, High-Level Target (HLT) Reports and the National Strategy on Flood and Coastal Erosion in Wales (NSFCERM) (2011)[39], and workshops.

Planning Performance Framework

The existing TAN 15 is monitored by the planning 'Performance Framework'[40] and sustainable development indicator SD4 "resilience to climate change-flood risk". This measures the number of residential or non-residential planning permissions granted and refused for development in C1 and C2 floodplain areas during the year, meeting or not meeting the tests of TAN 15 as provided by the LPA returns.

The returns from the LPAs on indicator SD4 in the last three years are summarised in Appendix B1.4. This shows the number of residential and non-residential units granted or refused permission in relation to meeting or not meeting all TAN 15 tests. Not all LPA's in Wales provided returns and the summary reports for each year identifies whether it's a full, partial or no response. This shows a significant increase for the number of residential units which meet TAN 15 tests and granted permission from 2013-2014 of 21 units to 724 units in 2013-2014. The number of units meeting TAN 15 tests and granted permission in 2014-2015 was 88 units. The number and

[37] Welsh Government (2016) Technical Advice Note: Design

[38] Welsh Government (2015) Recommended Non -Statutory SuDs standards

39 Welsh Government (2011) National Strategy for Flood and Coastal Erosion in Wales.

40 Welsh Government (2013) Performance Framework and Indicators

quality of LPA returns affects the accuracy of these indicator SD4 as a measure of resilience to climate change.

High Level Target Reports

The High-Level Target (HLT) reports once published by EAW and NRW provide information on the quantity of planning applications against the quantity of objections and consultations received on development planning proposals each year. These HLT reports, also provides indicators on the number and type of local development plan consultations completed. Table 4-2 below shows a significant difference between the total volume of applications and number of objections on flood risk grounds between 2005 and 2013. HLT reports were not published from 2014 onwards.

Table 4-2 Summary of planning application consultations by EAW on flood risk between 2005 and 2013.

Type/Date	2012/2013	2011/2012	2005/2006
Total number of planning applications received by LPAs	22,375	23,952	37,954
Total number of pre-applications received by EAW or NRW	620	633	458
Planning consultations on which EA Wales responded on all issues	2,724	3,128	12,703
Consultations which required detailed consideration on flood risk grounds	977	1,100	2,848
Total EA Wales objections made on flood risk grounds	236	301	1,115
Applications refused or approved with conditions in line with EA Wales Advice	80	55	250
Applications permitted contrary to EA Wales advice	15	71	133

Section 18 Reports

Two Section 18 reports published by EAW and NRW have been analysed for the study. In the Section 18 report for 2012-2013 EAW identified it was actively involved with LPAs preparing their LDPs. It also identified nine LDP's had been adopted and the lack of adopted LDPs remained a concern. It suggested flood risk is being considered in site allocations. The second Section 18 report (2014-2016) refers to "strategic planning" and how four LDP's were adopted which included policies specific to managing flood risk. It refers to how, most LPAs have undertaken a SFCA to assist and inform strategic site allocations for development and inform LDP policies regarding the alleviation of flood risk. This report acknowledges some SFCAs have been helpful in identifying opportunities to reduce levels of flooding, thereby helping to manage the overall consequences of flood risk. LPAs, which have not undertaken SFCAs, have scoped out sites as being unsuitable for development based on the DAM.

National Strategy for Flood and Coastal Erosion Risk Management in Wales

The NSFCERM (2011)[41] objective 3 "effective land use management and enhanced development control procedures" includes measures relating to the development of local plans which make adequate provision for flood risk and coastal erosion, compliance with PPW and TANs, provision of appropriate advice, appropriate undertaking of a SFCA, approval and adoption of SuDS and provision of advice and guidance on land use management. This objective provides a more appropriate range of measures and potential data than planning performance indicator SD4.

4.5 Broader issues to be considered in an update of TAN 15

TAN 15 reiterates the emphasis that PPW (2016)[42] placed on previously developed land in preference to greenfield sites. However, it does not specify or recognise that action is required throughout the planning process to deliver outcomes that move away from the implementation of flood defence and the mitigation of the consequences to a more positive avoidance of development in areas where the level of hazard is not acceptable and so be more in line with the sustainability objectives of Welsh Government as outlined by PPW (2016)[43].

The populations of Gwynedd, Wrexham, Ceredigion, Swansea, Bridgend, Cardiff Rhondda Cynon Taf and Newport are projected to increase between 2014 and 2039 Welsh Government (2017)[44].The Office for National Statistics (2011) [45] estimate from census data that between 2001 and 2011 the population of Wales increased by 153,000 (5%) to more than 3.06m, with a 12% increase reported in Cardiff. The mid-year estimates published by Welsh Government[46] (2016) estimated there now to be 3.1 million people living in Wales. It is reasonable to assume that there will be a corresponding demand for housing and employment land suggesting there will be significant pressures for new development in urban areas with significant existing flood risk.

Data on the scale of impact of TAN 15 on land and development is difficult to quantify because of the limited monitoring indicator SD4, the lack of comparative data sources, and because the UK national land use database is no longer used to record or classify land availability.

There is some evidence available from TAN 1 (2015)[47], Joint Housing Land Availability Studies (JHLAS), Local Development Plans and Welsh Governments summary of land housing supply. TAN 1 sets out the requirement for joint studies and the need to maintain a five-year housing land supply, and these are used as part of the evidence base to determine the housing requirements in LDPs.

The evidence from Swansea LDP (2013)[48] found that the requirement for new dwellings exceeds the brownfield land capacity. The Welsh Government (2015)[49] summary of housing land supply found 17 out of 25 LPAs had less than a five-year

[41] Ibid
[42] Ibid
[43] Ibid
[44] Welsh Government (2017) Population projections for Wales (2014-based) Principal projection
[45] Office of National Statistics: Population Census 2011
[46] Welsh Government (2017) Mid-year estimates of population
[47] Welsh Government (2015) Joint Housing Land Availability Studies (JHLAS)
[48] Swansea City Council (2013) Housing Land Availability
[49] Welsh Government (2015) Housing Land Availability in Wales: Summary 2015

supply of housing land. Twelve LPAs had less than five-years housing land availability for the last three consecutive years.

Low housing land supply and rising population are likely to place significant pressure to find land and development in flood risk areas.

4.6 Analysis of evidence

The workshops identified TAN 15 is considered to have a good level of support, good logic, high profile and awareness and is easy to use (Appendix C1.2). However, the absence of coverage of surface water flooding and Shoreline Management Plans, issues with the DAM and lack of up to date guidance in the appendix for FCA's form significant threats or weaknesses. The policy framework of TAN 15 needs to be strengthened by:

- Updates to the DAM that include a review of the zoning to allow the introduction of policy triggers that accommodate a risk based approach;
- The presumption against highly vulnerable development in areas at greatest risk of flooding (this is dependent on the zones being modified); and
- Updates to the justification and acceptability tests so that they can be applied to strategic allocation of land by LPAs.

The review found conflicting evidence between the strengths and limitations of TAN 15 and evidence which indicated the supplementary policy clarifications were viewed as both a strength and weakness.

The DAM policy trigger for an FCA is failing to recognise all aspects of flood risk and this is a significant issue for DAM Zone A where the future tidal flood risk, flooding from surface water or flooding from ordinary watercourses could occur.

The review has revealed a need to update the DAM. The opportunity should be taken to make best use of the latest flood risk datasets and climate change evidence available, so FCA's are triggered by a range of policy rules and validation requirements by LDPs and LPA's. Further evidence in terms of the DAM and FCA requirements are analysed in sections 8 and 10.

Consideration should be given to the need and desirability of LPAs to collect more detailed information to augment the data available in the DAM to provide strategic evidence in SFCAs to support land allocations. This could be most relevant in areas where the potential hazards are significant and there is a corresponding requirement for competent responses (measures) to address flood risks so development is safe.

Case study 2 highlights the existing TAN 15 policy presumption against highly vulnerable development in Zone C2 is considered in an appeal context and what weight this is afforded. The absence of a risk based approach in TAN 15, to all sources of flood risk may consequently be encouraging more development in Zone C1 with high residual risks, away from areas in Zone C2 that may be at considerably lower flood risk. The impacts are best illustrated thought consideration of two hypothetical residential scheme sites of similar, size and nature situated on previously developed land in different DAM C Zones:

- **Site A:** is situated DAM Zone C1 behind an existing flood defence wall. The flood defence has a 1 in 100 AEP standard of protection including an allowance for climate change. The proposal would trigger the need for an FCA. This FCA would need to consider the justification and acceptability tests in terms of the

potential overtopping and failure of the flood defence, in which the flooding would be severe and rapid. This level of significant risk to life would result in the need to further invest in the flood defences or to implement other expensive mitigation measures such as ground raising to keep within tolerable limits. Consequently, the development is expensive, out of character to surroundings/environment, and still has risk of flooding to depths up to 600mm in a 1 in 1000 AEP event.

- **Site B:** is situated some distance from the source of flooding. Although it is within the 1 in 1000 AEP flood extent (Zone C2) the site location is on the fringes of the floodplain and is only at risk from the most extreme flood events. Flood defences have never been constructed as the flood risk is too low to justify them. During a 1 in 1000 AEP event the flooding is shallow and of low hazard. Proposals are put forward that would safely remove the entire site from the 1 in 1000 AEP flood extent, leading to very low levels of residual flood risk without impact to others. The site's location in C2 conflicts with TAN 15 policy which has a strong presumption against highly vulnerable development in C2 and there is no policy trigger for an FCA or opportunity to justify the acceptability of development.

In these examples Site B would appear to be the more sustainable and lower flood risk option. The TAN 15 policy presumption is consequently directing development proposals to come forward in C1 in places of higher risk and contrary to a risk based approach.

Another consideration is the limited influence and value of Zone B, as this is a precautionary tool that is not compatible with a risk based approach (as Zone B cannot be assigned a particular probability of occurrence). The improved modelling techniques and data now available permit the introduction of a replacement zone based on a probability of occurrence.

The inclusion of NRW's Flood Map Flood Zone 2 and 3 within an updated DAM could help to avoid current duplication and confusion in the available flood maps. It would also facilitate a risk based approach.

Greater granularity in the likelihood of flooding would introduce an opportunity for TAN 15 to adopt a risk based approach that prevents unsuitable development in areas at greatest risk and strengthens the current presumption against such development.

When considering improvements to TAN 15, consideration should be given to the opportunity to introduced a new lower threshold for development in areas at risk of flooding from between 1 in 100-year (AEP) river or 1 in 200 year (AEP) tidal and 1 in 1000 year event (Flood Map Flood Zone 2). Flood Zone 2 development might include provision for design and mitigation informed by the requirements of the development vulnerability categories. An example of such a framework is outlined in Figure 4-1.

This lower policy trigger in TAN 15 policy could accord with analysis of flood insurance industry and flood risks to people methodology[50] HR Wallingford,

50 HR Wallingford, Middlesex University and Risk and Policy Analysts Ltd: Research and Development: Flood risks to people Phase 2 (FD2321/TR1 The Flood Risks to People Methodology

Middlesex University et al (2009) and is adapted from the OPW (2009)[51] Planning guidelines for flood risk management.

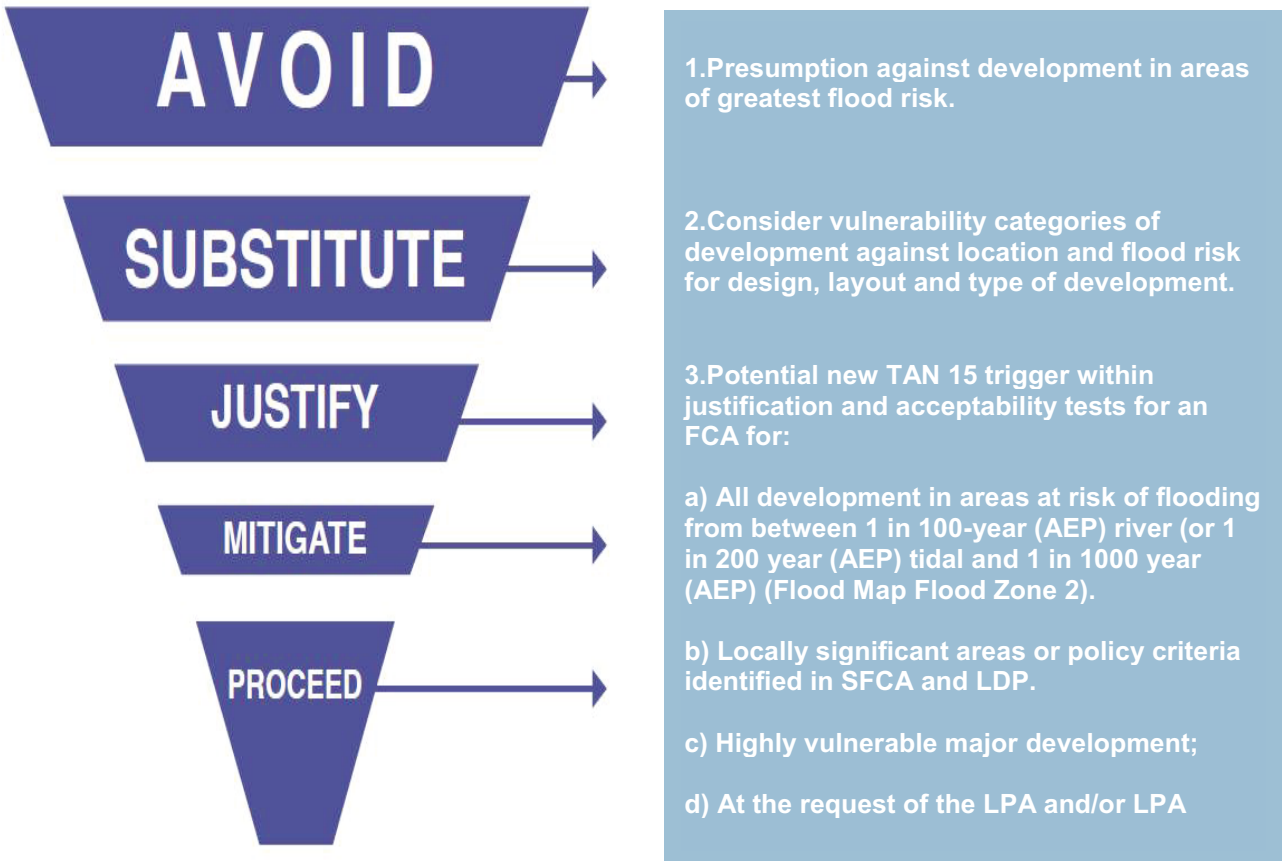


Figure 4-1 Potential policy framework for TAN 15.

Limited land availability and demand for housing supply are significant drivers for development proposals in areas at flood risk and could potentially account for the significant rise in the number of planning appeals and called in decisions in Wales since 2014.

TAN 15 should set out a clearer policy requirement for Strategic Flood Consequence Assessments (SFCA) within the development of LDP development briefs or strategic sites. It is a requirement which needs, to be explicit and clear, whilst drawing on the key strengths of PPW (2016)[52] in relation to the:

- Plan-led system in Wales;
- Strong links to Strategic Environmental Assessment (SEA) and Sustainability Appraisal (SA); and
- Alignment with sustainable development principles and wellbeing goals.

When considering the introduction of this enhanced emphasis, consideration should also be given to the potential requirement for the appropriate evidence prepared by LPA's to support land allocations. To satisfy these demands it is possible that LPAs will have to prepare more detailed analyses to augment the information that can be made available in the DAM. Thus, the particulars of a new process need careful review, examination and consultation prior to implementation so they can be reasonably accommodated.

[51] Ibid
52 Ibid

The risk of surface water flooding should be identified at the evidence gathering, sustainability appraisal and strategic site allocation stage of the Local Development Plan, and the appraisal of site development proposals with significant potential risk of surface water flooding.

A revised TAN 15 and LDP process should take into account broader considerations of sustainable development, regeneration, design, site context and meeting the objectives of the EU Floods Directive 2007/60/EC.

The success of TAN 15 policy is not easily measured from planning performance SD4 indicator because not all LPAs provided returns and consequently the overall figures are not nationally representative. There are opportunities whilst revising TAN 15 to update the monitoring measures and indicators. Potential revisions could be more closely aligned with the sustainable development principles and Wellbeing Goals; “A more Prosperous” or “A more Resilient Wales”. Measures or those measures set out in the NSFCERM.

Case study 5 and the document analysis of appeals and called in decisions and issues relating to roles and responsibilities in section 6 challenges the robustness of the presumption of residential development in C2 and suggests this should be updated to reflect the areas at greatest risk.

4.7 Summary and Recommendations

The current policy framework in TAN 15 is precautionary and does not provide a risk based framework to robustly assess river and tidal risks in combination with other sources of flood risk, probability, consequences, duration and hazard. Consequently, if a risk based approach is adopted changes will be required to the DAM, justification and acceptability tests, presumption against residential development in DAM Zone C2 and consideration given to the introduction of a strategic test to *‘Direct development away from those areas which are at a high risk of flooding*’.

The recommendation to update or replace the DAM with NRW Flood Zone maps is discussed in section 8. This has a wide range of potential implications for the justification and acceptability criteria. This recommendation alone will have implications for changes to the justification criteria in terms of the DAM, development vulnerability and ‘previously developed land’ and will need to be carefully considered.

The evidence identified in Section 4.2.4 on broader considerations and housing land availability helps us to gauge the potential shortage of housing land and implications of TAN 15 requirements for previously developed land. This suggests further evidence on the availability of previously developed land in Wales is required. It also, suggests that the introduction of a requirement for a robust SFCA within the evidence base of a LDP would provide strategic benefit and potentially provide for greater clarity on the evidence to be included in the LDP.

The revised TAN 15 policy triggers will need to reflect a risk based approach to key sources of flooding. It should also clearly set out the requirements for new development to adopt SuDS in line with the proposed implementation of schedule 3 of the FWMA (2010).

The TAN 15 review recommends an appropriate and proportional FCA should be required for all development if any of the criteria set out in Recommendation 9 are met.

The five recommendations on the policy framework, builds on the recommendations of the risk based approach. Setting the context and framework for the analysis of the following six sections of this report (sections 5-10).

TAN 15 Review Recommendations:

5. Welsh Government should develop an effective planning policy performance framework for TAN 15. This monitoring and implementation of TAN 15 will support the delivery of sustainable development and flood risk management.

6. TAN 15 policy should set out clear requirements for developments to adopt SuDS. This should align with the proposed implementation of Schedule 3 of the Flood and Water Management Act 2010.

7. The policy trigger for development to require an FCA should be updated to require a proportionate FCA, where any of the following criteria are met:

- **a) Development in Flood Zone 2 (and 3);**
- **b) Locally significant areas or policy criteria identified by the SFCA and LDP;**
- **c) Highly vulnerable major development; and**
- **d) At the request of the LPA and/or LLFA.**

Links:

The evidence and recommendations from section 3 and section 4, together set the context and framework for the analysis of further evidence and sections in this report.

5 Innovative and Flood Resilient Design

5.1 Introduction

Section 5 draws on the evidence describing the strengths, limitations and opportunities identified in the TAN 15 review and the broader sustainability considerations with respect to surface water drainage and linkages to Welsh Government (2016) TAN12 as discussed in section 4 (the preceding section of this report)4. The aim of Section 5 is to explore the evidence identified in the review against objective 12 (Table 2-1) and consider, whether there is any role in planning policy for flood resistant building methods.

This section sets out the evidence in the context of a risk based approach and considers updates to the policy framework to encourage innovative and flood resilient design. It draws on the linkages to further sections of the report on:

6. Roles and responsibilities;
7. Vulnerability categories of development;
8. Development Advice Maps;
9. Local development plans; and
10. Flood consequence assessments.

5.2 Evidence

The evidence in this section of the review is provided by document analysis and case studies. The following case study on innovative and flood resilient design guidance from Yorkshire Futures and the previous case study 3 on supplementary planning guidance on surface water drainage, also serve to illustrate the existing gaps in TAN 15 and potential opportunities.

Case Study 4: Innovative and flood resilient design in Yorkshire

The Yorkshire Futures (2010)[53] guidance on Flood Resilient Development assembles a portfolio of good practice and innovation for development in areas at high risk of flooding.

The guidance recognises the planning system's approach to managing development in areas of high flood risk was changing from a focus on a fixed standard of protection, at any cost to one of managing the likelihood and consequences of flooding. In essence, it describes a risk based approach integrating place making with managing flood risk and for example combining the use of drainage and green infrastructure to establish functional floodplains at the regional scale and attenuate the risk of surface water flooding at street scale using SuDs. The study uses a case by case analysis to generate discussion of capital versus long term costs the benefit of green space and waterside environments as detractors.

In urban locations throughout Yorkshire and Humber it identified that new development in areas of high flood risk is the only option. It found the unavailability of insurance in this context and the wariness of association with water are barriers to regeneration. It pointed to technologies such as floating concrete boxes making small scale development possible. It identified there was a lack of collected knowledge on how to roll out these designs or retrofitting them to commercial

[53] Yorkshire Futures, JBA Consulting, KCA and Loci, King Sturge and Randall Simmonds (2010) Flood Resilient Development: Principles, Feasibility and Potential in Yorkshire and Humber

premises. To role this out nationally It discusses how approaches to design of new buildings in flood risk areas have traditionally been precautionary and sometimes ignored the modification of the flood risks by defences, and provision of secondary defences or higher finished floor levels for habitable living space. It highlights how managing flood risks to new and existing development is a challenge that often leads to compromise between the quality of urban design and safety of people and property. It is a compromise which can often lead to additional construction and maintenance costs, poorer marketability and negative effects on community cohesion and behaviour.

It discusses the use and understanding of "resilience" and advocates the use of design and operational strategies to manage flood risk within the development. To make individuals more aware of the risks and how to manage them, bringing in the appropriate support from emergency planners, and providing a range of structural measures that allow the property to recover quickly back to its intended use following a flood event. The guidance suggests, developments should demonstrate:

- A clear understanding of the scale of the flood risks;
- The need to highlight and manage residual flood risks;
- How the precautionary approach should apply where significant risks remain;
- Integrated design;
- The importance of place;
- Spatial integrity; and
- Minimal impact on site viability.

Case study 4 highlights how planning policy and guidance can have an important role in contributing to the resilience of new development. Perhaps setting out the approach to design for developments and flood risk within an updated TAN 15 and PPW (2016). The practical introduction of such an approach would probably be heavily reliant on the weight that would need to be given at a strategic level to flood resilient proposals in addition to considering them with respect to development control. The scope of such strategic application could be combined with the introduction of the strategic level test to achieve the stated aim to '*Direct development away from those areas which are at a high risk of flooding*' as described in the previous section of this report.

Document Analysis

The document analysis identified that Building Regulations, Code for Sustainable Homes (CSH) and British Research Establishment on Environmental Assessment Methods (BREEAM) form separate industry standards or planning requirements.

Both PPW (2016)[54] and TAN 12[55] provide opportunities for TAN 15 to establish a greater integration and sustainability through design. This has the potential to address some of the limitations and weakness identified in section 4. There is a number of case studies which demonstrate how this could be achieved and the

54 Ibid

55 Welsh Government (2016) Technical Advice Note 12: Design

linkages required. Evidence from the Foresight Flooding Review (2004)[56], Foresight Flooding Review Update (2008)[57] and Pitt Review (2008)[58] identify a clear role for planning policy in flood risk management and it was this evidence directly led to the implementation of new flood risk legislation in the UK outlined in section 3.

PPW (2016)[59] highlights how planning for the consequences of climate change involves recognising the changes to our climate that are likely to occur over the next 30-40 years, planning for the impacts and identifying appropriate policies and measures to adapt to these impacts including consequential impacts of such measures.

There are established UK Industry approaches and guidance from CIRIA, Forest Research, Susdrain and the SuDs Wales groups in the UK on integrated catchment approaches to water sensitive design. To counteract the challenges presented to people and places by the impacts of climate change, increased population and increased flood risk cause by urban drainage issues. Water sensitive design is an approach to design that delivers greater harmony between water and the environment and communities. Achieved by integrating water cycle management in the built environment through planning and design.

The Forest Research (2015)[60] study on the Tawe catchment demonstrates the ecosystem services provided by urban trees in the Tawe catchment from carbon capture, rainwater interception and removal or air pollution to be valued at £1,720,000 per year.

5.3 Analysis of evidence

TAN 15 policy could do more to promote the role of design in managing flood risk and enhance community resilience, recognising the importance of place and linkages to TAN 12. This in turn would help address and integrate issues of amenity, viability, actual and residual flood risk (wide environmental and social benefits).

Case study 4 is informative because it discusses how a risk based approach can support improved flood resilience, acknowledging that resilience means different things to different people. The case study provided an example of a framework for increasing the flood resilience of new development, which could be used to inform the justification and acceptability tests of TAN 15 at strategic and development control stages.

This section highlights the role of planning in flood risk management, discussed in section 3. It also highlights the positive role that a LPA can take in making decisions that reflect their local needs.

5.4 Summary and Recommendations

There are significant opportunities from case studies in the UK and Europe to integrate design requirements of development and flood risk in TAN 15. Adopting the policy approach outlined in section 4 of avoid, substitution, justification and proceed (Figure 4-1) development should take account of land use zoning, layout

56 Foresight Project (2004) Foresight Future Flooding

57 Government Office for Science (2008) Update to Foresight Future Flooding

58 Cabinet Office (2008) Learning the Lessons from the 2007 floods.

59 Ibid

60 Forest Research (2015) Valuing ecosystem services provided by the urban trees of the Tawe catchment

and use of the site. This should demonstrate an integrated spatial design that maximises site viability through the LDP and development management process.

The recommendation from our review innovative and flood resilient design, is pragmatic and acknowledges that existing good practice/legislation already exists in Wales, UK and Europe.

TAN 15 Review Recommendation

8. TAN 15 should promote the role of design in managing flood risks and enhancing community flood resilience at strategic and development control stages. The importance of place should be recognised and linked to TAN 12: Design. Good design can help to address and integrate issues of amenity, viability, risk and residual risk.

6 Roles and Responsibilities

6.1 Introduction

The section on roles and responsibilities looks at one of the reoccurring themes of the review; identified throughout the research methods from face-to-face meeting, document analysis workshops and cases studies. However, the theme did not originate from a key TAN 15 review aim or objective. Our review of roles and responsibilities draws on evidence from the risk based approach and the analysis of strengths and limitations of existing TAN 15 policy.

6.2 Evidence

Evidence is drawn from a case study on proposed residential development in DAM C1, workshops and document analysis.

Case Study 5: Proposed residential development, Warren Drive, Prestatyn: Highlighting roles and responsibilities in decision making role of LPA's

Case study 5 involves an outline application for a 2.4ha residential development (all matters reserved) for land at Warren Drive, Prestatyn, refused and then allowed at appeal. (Appeal reference APP/R6830/A/16/3147438). The main issue on flood risk related to the TAN 15 justification and acceptability tests for highly vulnerable development in Zone C1 and policy RD1 of the Denbighshire LDP (2013)[61].

The Inspector considered that the proposals were "necessary" to help meet the requirements for new dwellings required within LDP and within growth towns such as Prestatyn. Furthermore, the site met the definition of previously developed land. Consequently, the Inspector concluded the first three justification tests were satisfied. The fourth and final justification test on the acceptability criteria, identified:

- There was conflicting evidence in terms of the consequences of flood risk. NRW had no objections and was satisfied the consequences of flooding could be acceptably managed provided mitigation of land raising levels on parts of the site to allow the finished floor levels of any new properties to be above anticipated flood levels. The Council, however suggested access and egress routes to and from the site would be inundated to depths that exceed the tolerances set out in table A1.15 of TAN 15.
- Flooding depths confirmed at inquiry by the appellant stated that access and egress routes would be flooded to with 640mm and velocity 0.46m/s. These thresholds form indicative guidance and would only be marginally exceeded.
- Time to inundation being four times longer than threshold requirements of TAN 15 table A1.15 was very significant and refers to the context of thresholds and tolerable conditions, the presence of flood warnings, plans and preparation. It suggests the LPA has not provided substantive evidence as to why this would not be the case or whether the capacity of emergency services would be exceeded as a result of the proposal.

Reference and weight was attached to NRW flood risk assessment guidance and the fact that the development would fall within hazard rating "danger to most", as described in 'flood risks to People'. However, given the significant lead times

[61] Denbighshire County Council (2013) Denbighshire Local Development Plan 2006-2021.

before the site would be affected, local residents would have more than reasonable opportunity to avoid dangers from flooding.

Case study 5 highlights the importance of the both the justification and acceptability tests for development in C1, the assessment of consequences and the decision-making role of the LPA.

Workshops

The document analysis identified weaknesses and opportunities in TAN 15, which require the clarification of roles and responsibilities in planning policy. It also considered the issues of skills and capacity of Risk Management Authorities (RMAs) identified by the NRW (2015)[62] Wales Coastal Flooding Review.

The lack of clarity and skills formed a key issue from the face to face meetings, workshops and case studies methods, related to the:

- Recognition of NRW's technical/advisory role, and over reliance on this role to the exclusion of review and consideration of evidence by LLFA officers;
- Potential impact on resources from changes to consultation criteria list (for all development in Zone C), or policy triggers;
- Lack of relevant expertise of planners and emergency planners; and
- Reliance on information submitted by applicants.

The evidence from the workshops identified different approaches taken by LPAs, where some LPAs had in-house validation requirements on submitted flood risk evidence, and others would await a consultation response from NRW before determining its validation, as set out in section 4.

The workshops identified an example of two local planning guidance documents on sustainable drainage produced by Flintshire and Wrexham LLFA (case study 3) that highlights the importance of pre-application consultation with the LLFA on local flood risks and surface water drainage during pre-application consultation.

Document Analysis

There are opportunities to recognise NRW's multifaceted role in development and flood risk policy and practice described in TAN 15. NRW deal with enquiries from many parties including the public, developers, local plans teams and Welsh Government. Recently, NRW has established a statutory pre-application advice service and a discretionary planning advice (DPA) service. NRW's 2017 guide[63] to pre-application advice sets out its services to provide a preliminary opinion, discretionary planning advice (DPA) and statutory advice (including substantive responses for major development).

The review noted the appeal decision at Warren Drive, Prestatyn in case study 3 potentially conflicts with an appeal decision in Mostyn Park, Prestatyn (Appeal Reference APP/A6835/A15/3133153)[64]. The Mostyn Park application for a proposed caravan (residential use) development in C1 Prestatyn was dismissed because of the additional burden on emergency services. The evidence from both appeal decisions suggests an updated version of TAN 15 should clarify roles and

62 Natural Resources Wales (2014) Wales Coastal Flooding Review: Delivery Plan Phase 2 Recommendations

63 Natural Resources Wales (2017) Guide to pre-application advice services

64 PINS (2016) Town and Country Planning Act 1990 section 78 appeal for use of land and siting of 1 ancillary static caravan as managers accommodation, St. Marys Caravan Camp, Mostyn Road, Gronant, Prestatyn

responsibilities, in terms of evidence and need to place a greater emphasis on the decision-making role of LPA's in considering the evidence and acceptability of flood risks in development proposals and plans.

Face-to-face meeting and Workshop

Roles and responsibilities was a key issue identified in the face-to-face meeting of the TAN 15 review and as such formed theme 3 in the breakout groups of the workshops (as summarized in Appendix C1.3). The workshops also identified issues relating to:

- The role of the LLFA as a statutory consultee;
- The weight attached to NRW consultation responses;
- Emergency planning role and remit and issues associated with access and egress;
- Lack of linkages with FWMA (2010);
- The decision-making role of the LPA: and
- Skills, competencies and resources.

6.3 Analysis of evidence

The case study Warren Drive, Prestatyn (case study 5) exemplifies the importance of evidence to support the application and scrutiny of the justification and acceptability tests and the decision-support role of the information in FCAs. It also identifies the importance of evidence in relation to the impact on flood receptors and the limited weight attached to separate NRW guidance on flood hazard ratings, time to inundation and hazards on access and egress.

The evidence highlights the importance of roles and responsibilities in the scrutiny of a FCA and need to strengthen the decision-making role of the Local Planning Authority in considering the flood risk evidence of a development proposal. The evidence suggests a need to facilitate a wider and more informed understanding of NRW's scope and role in development proposal consultations, and a greater understanding and capacity building of LPA's and LLFA's to make informed decisions.

The Inspectors' decision to allow the appeal in case study 5 specifically refers to the lack of substantive evidence from the LPA on the impacts of development, access and egress and impacts on emergency services. This potentially stems from guidance in TAN 15 which is not definitive (prescriptive) and thus allows for the introduction of other evidence which then places a greater burden on the LPA with respect to review and assessment. This contrasts with evidence within case study 1, Anglesey Boatyard, which raised key impacts on emergency services as a reason for refusal. This further highlights the need for clarity of roles and responsibilities, and the need to adopt a risk based approach of source-pathway-receptor and reliance on evidence that is based on improved science.

The key issues from workshops and case studies were the decision-making role of the LPA and differences in interpretation of TAN 15 and the importance of technical details within the FCA. Case study 5 and document analysis of appeals and called in decisions evidenced how not all residential development is acceptable with Zone C1.

6.4 Summary and Recommendations

TAN 15 needs to clarify the roles and responsibilities in relation to planning policy and flood risk. Specifically, the responsibility of LPA in decision-making and the statutory consultation role of the LLFA. This should be accompanied by introducing greater clarity on the risk based approach and the evidence and thresholds that should be used.

This clarification of roles should acknowledge and strengthen the technical leadership role of NRW. Additionally, recognition should be given to the fact that Welsh Government's role in the preparation of LDP is one of active stewardship of the system as a whole (PPW, 2016).

Section 6 on roles and responsibilities set out a recommendation aimed to clarify the roles and responsibilities.

TAN 15 Review Recommendations:

9.TAN 15 should clarify the roles and responsibilities in planning policy and flood risk. Specifically:

- **The responsibility of decision-making must clearly sit with the LPA alongside the statutory role of the LLFA.**
- **The technical leadership role of NRW should be recognised and strengthened.**
- **The "oversight" role and responsibilities of Welsh Government on planning policy and flood risk management.**
- **Emergency Planners, LRFs and Coastal Groups should work with LPAs to inform the development of LDP, SDP and SFCA. Specifically, these documents should contain local guidance on the acceptability of access and egress arrangements.**
- **The role of consultations and pre-application advice should be reiterated to best manage the complex nature of flood risk and development planning.**
- **This should be accompanied by modifications to the content and structure of the TAN to improve precision on the approach to risk assessment and the scientific basis for the acceptability thresholds that are used.**

The scope and purpose of development plans and management should be clearly defined.

Links:

Section 6 forms a key issue in the TAN 15 review and the evidence within this section links to all sections in this report.

7 Vulnerability Categories

7.1 Introduction

The focus of section 7 is drawn from one of the six main study aims, which is to review the development types and vulnerability classifications. The vulnerability categories of development form an integral part of the current "precautionary framework".

This section compares the vulnerability of development types in TAN 15 to those used for development planning in England and OPW. It also considers the potential use of the Use Classes Order as set out in the Town and Country Planning (Use Classes) Order 1987 and categorisation used in the multi coloured manual (MCM)[65].

7.2 Evidence

The evidence for the vulnerability categories of development is drawn from the document analysis, workshops and case studies.

Document Analysis

TAN 15 has three simple but prescriptive categories of development: Emergency Services, Highly Vulnerable and Low Vulnerability as set out in Table 7-1 below.

TAN 15 policy acknowledges there are uses that are exceptions to the general rule and fall outside of the three prescribed categories because they are required in fluvial, tidal or coastal locations by nature of their use. Specifically, this mentions boatyards, marinas, essential works at mooring basins and development associated with canals.

Table 7-1 Existing development categories in TAN 15

Development Category	Types
Emergency services	Hospitals, ambulance stations, fire stations, police stations, coastguard stations, command centres, emergency depots and buildings used to provide emergency shelter in time of flood
Highly vulnerable development	All residential premises (including hotels and caravan parks), public buildings (e.g. schools, libraries, leisure centres), especially vulnerable industrial development (e.g. power stations, chemical plants, incinerators), and waste disposal sites
Less vulnerable development	General industrial, employment, commercial and retail development, transport and utilities infrastructure, car parks, mineral extraction sites and associated processing facilities, excluding waste disposal sites

Sections A1.14 and A1.15 of TAN 15 set out key requirements of the acceptability criteria on the basis of 'type of development'. This uses five categories; residential, commercial & retail, industrial, emergency services and general infrastructure. This introduction of another scheme of development categorisation within TAN 15 was widely reported by stakeholders to be unhelpful.

[65] Environment Agency, Defra, Flood Hazard Research Centre and Middlesex University (2013) Multi-Coloured Manual

In England, the use of five categories is more complex and prescriptive than Wales. Ireland however uses a similar banding of three categories of highly vulnerable (including essential infrastructure), less vulnerable development and water compatible development. The categories of development used in England and Ireland are provided in Appendix B1.5.

The multi-coloured manual (MCM) is a reference document used to assess flood risks and its impacts, as well as the benefits of flood risk management measures. The MCM could provide an alternative approach to the categorisation of development.

The Use Classes Order forms a legislative requirement subject to different use types and conditions, and could be subject to change, with the current review of planning law in place.

The Use Classes Order and MCM categories both suffer from being quite technical classification tools, and may not be useable to all those involved in the planning system and may be subject to uncontrolled/unintended change.

Workshops

The workshops identified that the different use of and interpretation of the terms "development", "new development" and "permissible uses" were considered to be the result of information in TAN 15 being unclear and confusing.

Evidence from the workshops, face to face meeting and case studies identified an ambiguity is to whether TAN 15 should be applied to the built development or the whole development site (red line boundary).

Concerns were raised by Local Resilience Forum and Emergency Planners who were being asked to advise on access and egress issues in planning consultations. This links directly to roles and responsibilities discussed in section 6.

Case Study 6: Proposed floating hotel development, Milford Marina, and associated vulnerability of development, Milford Haven, Pembrokeshire

The development proposal for a set of floating hotel suites, Milford Marina, Milford Haven was granted subject to conditions in 2017 (LPA reference 16/0649/PA)[66]. The proposed development involved an access from a walkway attached to the harbour pontoon, and was located within a marina area characterised by mixed commercial and residential developments. The key issues identified in the planning officer's report include the:

- location of the development in C2;
- submitted FCA;
- previous approval for mixed-use development (LPA decision 14/0158/PA) 25th July 2014; and
- specific type of bespoke "hotel suite" development not falling within C2 presumption against accommodation.

The report notes the NRW consultation responded with no objection and a recommendation for a flood management plan to be submitted and approved by condition. The decision notice has four conditions, of which condition 3 requires the

[66] Pembrokeshire County Council (2017) Pembrokeshire County Council Delegated Decision Report Ref 16/0649/PA

details of a flood mitigation and management plan to be submitted and approved prior to commencement and implemented prior to occupation.

7.3 Analysis of evidence

The evidence from the workshops, survey and case studies suggests there are some development types which may fall under inappropriate categories within the existing system. This is further supported by the LPA decision in case study 6 Milford Marina for a small-scale hotel accommodation which was concluded not to fall within the existing categories in TAN 15. The details of the proposed development in case study 1, Boathouse Anglesey, shows that there is a need to clarify how vulnerability might be viewed to vary across a development site and vertically between floors.

The evidence in the workshops identified conflict between those supportive of greater flexibility and others who favoured more prescriptive policy requirements.

Currently the main function of development categories is to differentiate the planning requirements of Highly Vulnerable Development between DAM Zone C1 and C2. In practice, this is largely about the presumption against residential development in Zone C2. Within a risk based approach this narrow function of the development categories is a missed opportunity. Consequently, any changes to development categories need to be carefully considered alongside other potential change to TAN 15 and a move toward a more risk based approach.

Greater flexibility in TAN 15 could be achieved by the removal of a policy trigger on vulnerability types in the DAM. Providing that these vulnerability categories are inserted within the justification and acceptability tests and risk based approach

The evidence suggests, potential revisions to TAN 15 could include:

a) small changes to update existing categories/types, similar to those adopted in Ireland[67]; or

b) moderate changes to reflect five flood risk categories, similar to those adopted in England; or

c) significant changes involving the replacement of categories by the Multi-coloured Handbook Manual (MCM) coding or Town and Country Planning Use Classes Order (1987) as amended in (2002) and (2016).

The option of implementing small changes to the categories would group together emergency services, infrastructure, schools and residential development into one highly vulnerable category. Retail leisure and libraries would be included into a less vulnerable category, and a new water compatible development category introduced.

A potential option that incorporates small changes to the existing vulnerability categories of development are shown in Table 7-2.

[67] Ibid

Table 7-2 Potential vulnerability categories of development in TAN 15.

Vulnerability Category	Development Type
Highly Vulnerable Development	Emergency Services (Hospitals, ambulance, police and fire stations) Essential Infrastructure (as defined by NSFCERM 2011) **Residential (All types) and Schools**
Less Vulnerable Development	**Retail, leisure, libraries** Agriculture, waste treatment and local transport General Industrial Employment
Water Compatible Development	Flood control infrastructure Docks, marinas, Wharfs Amenity, open space Coastguards

The moderate changes required to adopted a similar to England appear to be more complex and unnecessary. Planning developments are likely to fall in more than one category and as case study 1, Boathouse Anglesey, demonstrated the highest vulnerability category within the development will form the basis of the acceptability assessment. This appeal case may have confused the interpretation of hazard issues between vulnerability and access and egress and should not set a precedent. The development of large sites can benefit positively from masterplanning of development types within zones.

The more categories the more complexity in vulnerability and vice versa. Careful consideration should also be given to the function of the development categories, and if further categories would result in meaningful changes for the justification and acceptability tests. A reason for potentially having more development categories is that it may then be possible to align with the 'type of development' categories used in A1.14 and A1.15.

The significant changes required by the MCM or Use Classes order would probably have limited benefits and could make planning policy unnecessarily complex. The limited benefits of the MCM coding would be related to the cost benefit analysis of flood management schemes. This more complex coding system would fall outside of the direct control of the TAN and would be less accessible to the wider audience involved in the planning system.

7.4 Summary and Recommendations

The current vulnerability categories of development have a specific role to inform the decision on the applicability of the justification test. The function here being, that the justification test should not be applied to highly vulnerable development in DAM Zone C2, where there is a presumption against highly vulnerable development.

LPA's should have an active role in determining the vulnerability categories of development coming forward in Local Development Plans and development proposals in consultation with NRW.

The potential changes to the DAM and vulnerability categories, can be finalised within the risk based policy approach/framework set out in section 4 and in changes to the acceptability criteria.

Case studies 1 Boathouse Anglesey, 2 Auston Taylor Bethesda, 5 Milford Marina and 6 Warren Drive Prestatyn demonstrate how important the vulnerability categories of development to the currently application of TAN 15. The recommendation on vulnerability categories suggests only small changes are required. However, this may be further dependent of the potential scope of changes to the DAM and justification and acceptability test. Any changes in vulnerability categories should not lose sight of their role in the TAN 15 framework.

TAN 15 Review Recommendation:

10. Development categories in TAN 15 have an important function in a risk based approach. The changes to development categories should include the grouping of residential development, essential infrastructure and schools into a highly vulnerable category, the reclassification of retail, leisure and libraries to a less vulnerable development category and establishment of a new category for water compatible development. These should act as an indicator to the potential vulnerability of development within the application of justification and acceptability tests. The review of the categories should be considered alongside the changes made through the introduction of a risk based approach.

TAN 15 should set out the role of LPAs in considering and determining vulnerability classifications in development proposals and LDP's.

8 Development Advice Maps

8.1 Introduction

This section on the Development Advice Map (DAM) builds on the strengths and limitations evidence outlined in section 4 and risk based approach of section 3. The assessment of the Development Advice Maps did not form a specific aim or objective of the TAN 15 review. However, the DAM forms an integral part of the policy framework and it has become a key theme of the TAN 15 review.

The DAM was identified as one of the key threats from the SWOT. Objectives 1-5 within Table 2-1 on the rigour of TAN 15, the application of justification and acceptability tests to C2 for highly vulnerable development, the assessment of a more restrictive policy in areas at greatest risk, and comparison of flood probabilities used by the flood or mortgage conveyance industry are all linked to the DAM.

This section sets out the evidence in relation to the DAM before analysing and summarising the review findings.

8.2 Evidence

The evidence is drawn from the document analysis, workshops, workshop survey and case studies.

Document Analysis

The role of the DAM is to direct development away from areas of flood risk and in this way, support the application of the justification and acceptability tests. The DAM is formed of three principal zones (Table 1-1); Zone A areas a little or no flood risk from tidal or fluvial sources; Zone B geological deposits suggesting a historical flood risk; and, Zone C areas of flood risk based on the 0.1 % AEP extreme flood extent.

Unlike the NRW Flood Map the DAM gives little regard to the probability or likelihood of flooding, utilising only the extreme flood extent. This contrasts to England where the planning system using three flood extents of varying probability (Zone 2, Zone 3a, Zone 3b).

The DAM Zone A defines areas at little or no flood risk from tidal or fluvial sources. Consequently, TAN 15 does not required development in Zone A to be supported by an FCA and developers need give flood risk little or no regard. However, Zone A does not consider residual flood risk such as asset failure, blockage or climate change.

Zone B refers to historical flood mapping and geological deposits. TAN 15 states that within Zone B “If site levels are greater than the flood levels used to define adjacent extreme flood outline there is no need to consider flood risk further.” Zone B essentially triggers the need to check that a site is not actually in Zone C from latest available flood mapping evidence. Provided, this ‘check’ is passed the requirements of Zone B are the same as Zone A. This requirement to check the predicted flood level against site levels, is largely a legacy from the flood modelling techniques available when TAN 15 was drafted in 2004. At this time flood modelling was almost exclusively based on 1 dimensional (1D) hydraulic modelling techniques which only calculated flood levels at discrete cross-sections along a watercourse. The results of 1D modelling then had to be processed and interpreted

to 'draw' flood outlines, which would often introduce errors/uncertainty. Also, to 'draw' outlines it is necessary have accurate data on the topography of the floodplain; something that was difficult before the advent of almost universal available high-resolution LiDAR data. The 'check' that Zone B therefore offered in 2004 was therefore a precautionary approach and a reasonable response to the uncertainty in flood modelling at the time.

DAM Zone C identifies areas of flood risk. It is based on NRW's Flood Map Zone 2 which describes the 0.1% AEP flood extent, ignoring the presence of defences. Although the extent of Zone C ignores the presence of defences it is subdivided into Zones C1 and C2 to distinguish those areas that are served by "significant defences" (Zone C1). There is no clear definition or guidance on what constitutes "significant defences" and this directly contrasts with NRW's Flood Map that defines Area Benefiting from Defences (ABD) in accordance with established operational instructions. TAN 15 does not set out any mechanism to challenge the DAM; either the extent of Zone C or classification of C1/C2.

The acceptability threshold set in TAN 15 A1.14 aligns with the probabilities found in Flood Map Zone 3 although direct reference to the Flood Map is not made. This may be because A1.14 is interested in the actual risk, whereas Zone 3 ignores the presence of flood defences. The thresholds in A1.14, that differ from the DAM, may cause confusion for some.

Different flood risk maps are used for different purposes and the volume and range of maps to provide flood risk information is considerably different now in 2017 to those available in 2004 when TAN 15 was updated. Thirteen years on (and ten years since the Pitt Review[68]) there have been significant advancements in mapping quality and outputs, which have led to further research, adopted flood risk management plans, local flood risk management strategies and a national assessment on flood risk (NaFRA)[69] in Wales.

Different maps are used for different sources of flood risk and to help assess significance and potential consequences of flooding to people or property using a range of probabilities. The document analysis has identified seventeen available mapping products on the geoportal Lle website[70] in Wales. Maps which include flooding from surface water, flood alert, warning or storage areas, spatial flood defences, historic flood outlines, NRW flood risk areas, shoreline management plans and costal erosion.

The NRW website on long term flood risk[71] hosts an interactive mapping tool which includes the DAM, and NRW's flood risk layers, and is available in a basic and more detailed form. These NRW layers are grouped into three categories; surface water, reservoir flood risk and rivers and sea. The basic view of Risk of Flooding from Rivers and the Sea (RoFRAS) shows the classification of risk to high, moderate, low and very low flood risk with regard to flood defences and the detailed view the NRW's Flood Map. The basic, detailed view and development advice map screen shots of the NRW flood map is shown in Figure 8-1, 8-2 and 8-3 below.

[68] Pitt Review (2008) The Pitt Review: Learning the lessons from the 2007 flood events

[69] Environment Agency Wales (2009) Flooding in Wales: A national assessment of flood risk

70 Natural Resources Wales and Welsh Government (2017) Lle geoportal website http://lle.gov.wales/Catalogue?lang=en&text=flooding

[71] Natural Resources Wales (2017) Flooding http://naturalresources.wales/flooding/

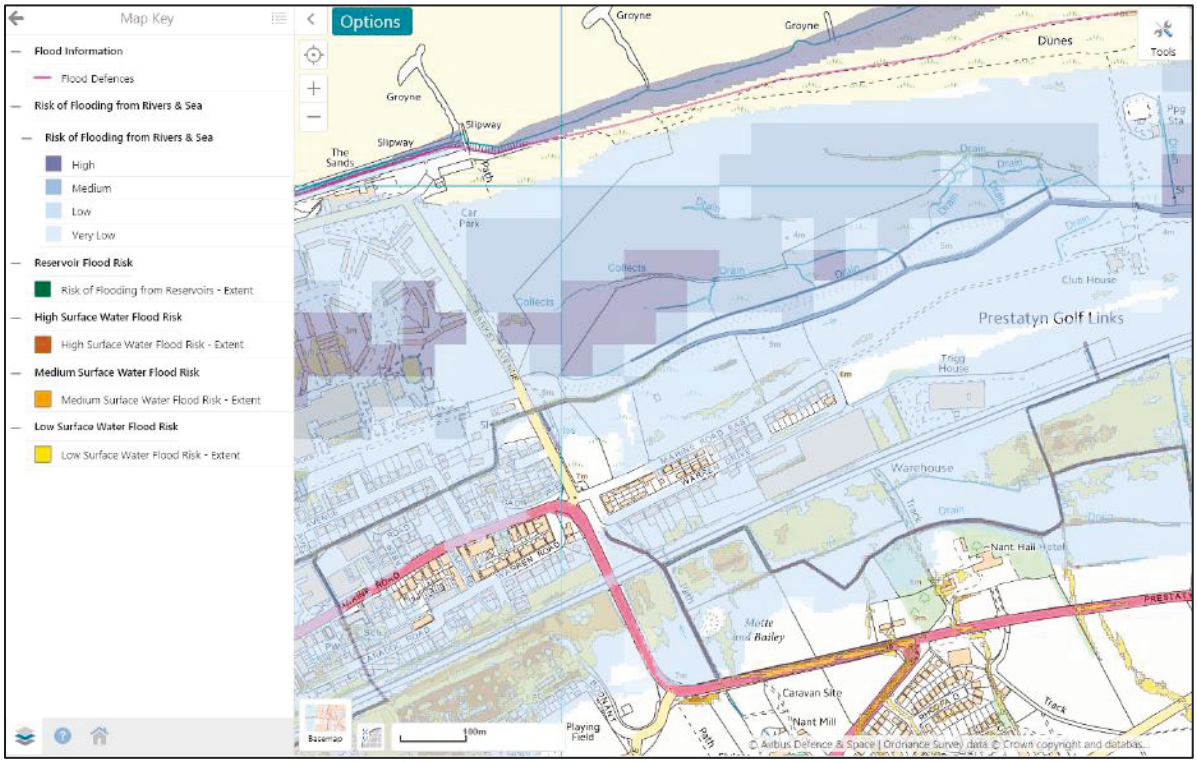


Figure 8-1 Basic view of Case Study 5: Warren Drive, Prestatyn[72]

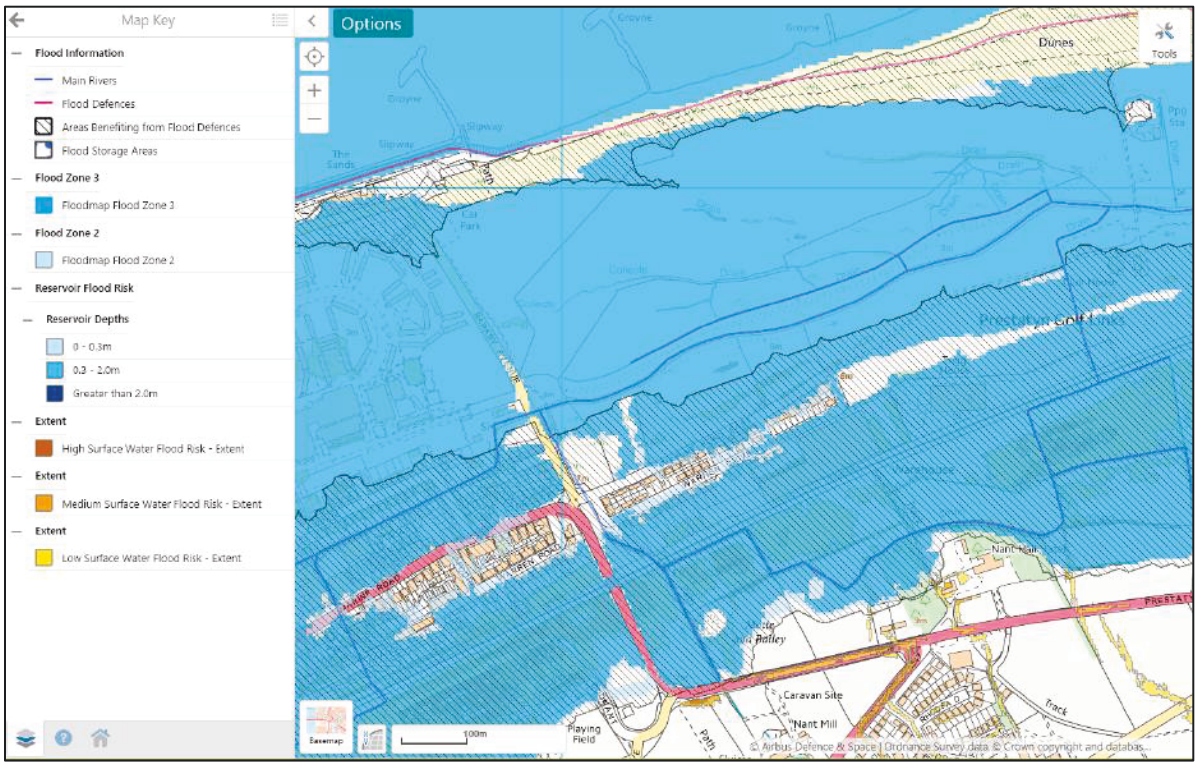


Figure 8-2 Detailed view of the Case Study 5: Warren Drive, Prestatyn[73]

[72] Natural Resources Wales (2017) Basic view of the long-term flood risk map
[73] Ibid

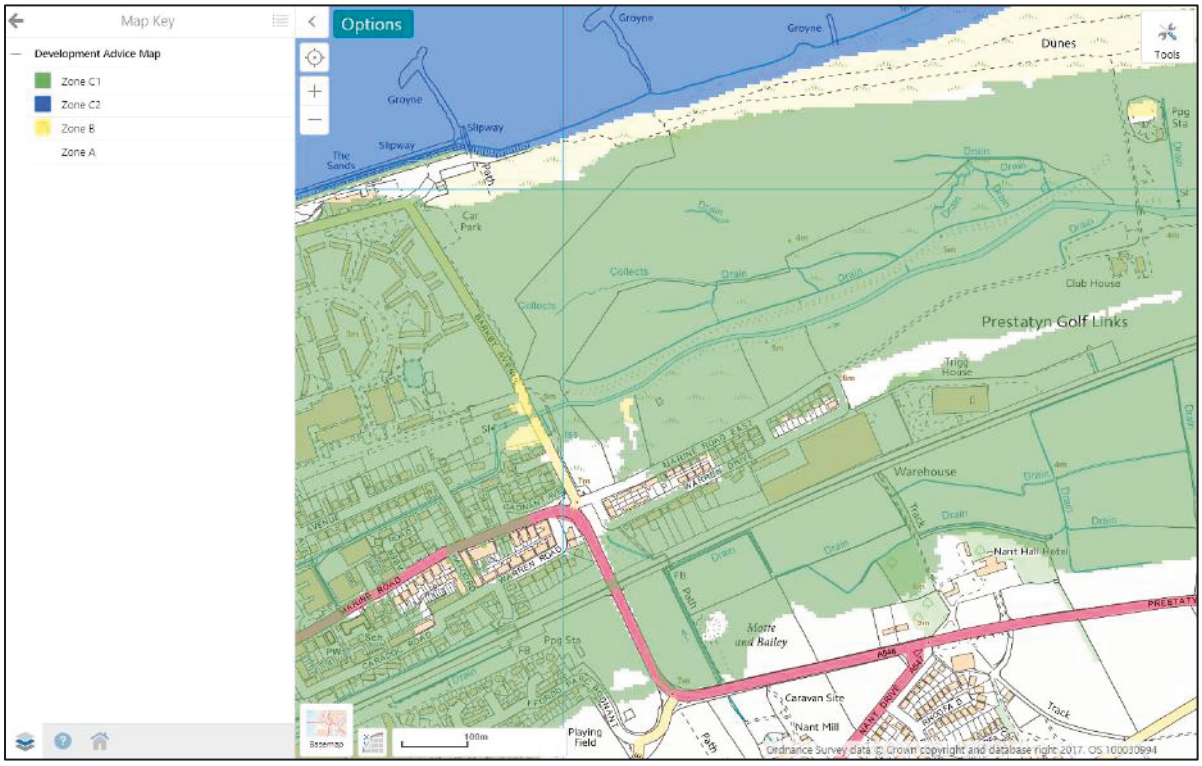


Figure 8-3 Development Advice Map of Case Study 5: Warren Drive, Prestatyn[74]

The EAW NaFRA (2009) report[75] establishes at a national scale, the spatial distribution and probability of flood risk across Wales from variety of different sources. This identifies Newport, Cardiff and Anglesey as having the highest percentages of land within the floodplain which could help to explain the significant pressures for new development in the floodplain in these places. It also identifies a number of existing properties at significant risk of flooding, the highest is for Gwynedd, then Newport, Denbighshire and Flintshire. The National Flood Risk Assessment (NaFRA) for Wales is due to be updated in 2018. It is understood that the update will be accompanied by significant updates in the associated flood mapping outputs, giving raise to new opportunities to revise the Flood Map and DAM.

Addressing risk formed one of the ten recommendations identified by the Town and Country Planning Association (TCPA) (2016)[76]. This report identified a need for proportionate and clearly defined rules of thumb in the planning and built environment. It also suggests these would be useful to ensure "a greater national determination on the probability of risk factors and support simple plan making methodology with nationally agreed approaches and locally agreed evidence or circumstances."

Workshops

The workshops identified differences in the requirements for FCA's. There were some stakeholders who supported a move towards FCA for all developments over a certain size, area or type (similar to England); other stakeholders were nervous about adding to the burden on applicants. However, there was broad support for FCAs to be proportional to the needs of development and for them not to become

[74] Ibid
[75] Ibid
[76] Ibid

overly onerous or require a disproportionate amount of evidence or technical modelling/assessments.

The workshop discussions did recognise the need for the planning system to remain separate to market forces to maintain the benefit of the wider public interest. Flooding is a significant material consideration and has potential impacts on viability, regeneration and growth aspirations in LDPs.

The issue of flood insurance raised differences of opinion in terms of planning considerations, despite the acknowledgement of the CPO letter in 2014 (as listed in Appendix B1.2) which refers to the "Flood Re" or flood re-insurance principles established by the Water Act 2014. The consideration of flood insurance is not within TAN 15, although there is guidance[77] published by Association of British Insurers (ABI) and the Flood Forum on flood insurance recommends that LPAs should:

- Establish a strong relationship with technical experts;
- Consider all sources of flooding taking account of climate change;
- Take potential impacts of drainage infrastructure seriously;
- Ensure all flood risk is mitigated to acceptable levels (less than a 1% probability of flooding for proposed development) and share information on this; and
- Make sure local plans take account of all relevant costs and are subject to regular review.

The insurance and conveyancing sector uses the Environment Agency and NRW maps NaFRA or RoFRAS data, as well as commercial flood mapping products that provide greater coverage, resolution, flexibility and consistency.

During the face-to-face meeting and workshops there was widespread recognition of issues surrounding the understanding of flood risks, roles and responsibilities and language associated with flood maps. Furthermore, the availability of a range of different flood maps evidently causes considerable confusion for many using the planning system.

8.3 Analysis of evidence, summary and recommendations

The evidence from the document analysis, workshops and surveys and case studies has identified gaps in TAN 15 DAM in relation to:

- the mapping of different flood risk probabilities;
- technological improvements in flood risk mapping since 2004;
- inclusion of different flood risk sources; and
- areas identified at greatest risk of flooding.

The importance of the DAM in triggering the requirement for an FCA has already been discussed in Section 4 and resulted in Recommendation 7 to expand the FCA trigger. However, once the DAM has informed the decision that a FCA is required, not required, or not appropriate, the DAM currently serves no function in the application of the justification and acceptability tests and the scope of an FCA.

[77] Association of British Insurers (2012) Flood Risk guidance will help local planning authorities make sustainable planning decisions

TAN 15 acknowledges that the development advice maps are based on the best available information. Although this was true at the time when the TAN was drafted, flood mapping tools and techniques have advanced considerably in the intervening time. Whereas a precautionary approach was really the only option in 2004 due to the limitation of flood mapping products, the tools, products and experience are now in place to support a more risk based approach as advocated in Section 3.

It would be appropriate to discontinue the precautionary Zone B classification, as its inclusion is not compatible with a risk based approach and in practice it is no longer used.

Recommendations 1 (adopt a flood risk approach) and 2 (avoidance of highly vulnerable development in areas of greatest flood risk) both support the need to update DAM. To support these recommendations an updated DAM will need to provide information on the probability of the flood risk, acknowledging the role of flood defences and future impacts of climate change. Such information is currently available in NRW's Flood Map and/or RoFRAS.

Recommendation 2 introduces the opportunity to consider a range of options that include a new presumption against highly vulnerable development in areas of greatest flood risk. Some of these options could use existing mapping products, whilst others may need new mapping products to be developed. Imminent update to the National Flood Risk Assessment (NaFRA) for Wales may provide a timely opportunity to develop appropriate products.

The survey respondents, document analysis and case studies, acknowledge the current limitations of the DAM to consider other sources of flood risk. The option to include surface water mapping could be difficult to achieve given the uncertainties associated with surface water flood risk mapping, the complex nature of the mapping and lesser dangers of surface water flooding compared to fluvial and tidal risks. It is perhaps more appropriate to consider surface water risk at a catchment or strategic scale as part of a SFCA/LDP.

The opportunities for revision of TAN 15 policy with a clear and simple language on flood risk should contribute towards an improved understanding of flood risk management as a whole. In this regard flood maps have an important role in supporting public and professional understanding of flood risk. Consequently, opportunities to better align the various flood map products should explored and defined.

There is currently a lack of clarity in TAN 15 in the definition and consideration of flood defences. The use of defended and undefended scenarios should form an integral part of a FCA through the requirements to consider actual and residual risk (As set out in section 3). Improved guidance and transparency around what is and is not considered to be a flood defence is required.

No nationally consistent flood map can achieve the detail and accuracy of a site-specific assessment, be without uncertainty, or keep pace with new methods, improved data or guidance. For this reason, there should be clear processes for updating and/or challenging the DAM.

This review has identified a range of existing NRW flood mapping products that could be used in TAN 15 and an updated DAM, which include:

- Risk of flooding from rivers and sea (RoFRAS);
- Flood Map: Zones 2 and 3;

- Flood Map: Areas Benefiting from Flood Defences
- Flood Map: Spatial flood defences with standardised attributes;
- Historic Flood Outlines;
- Flood alert areas; and
- Surface water flood map(s).

It is not possible for this review to evaluate all the possible options for updating or replacing the DAM, and the many permutations of how a reviewed DAM may interact with all other aspects of TAN 15. However, the review has closely examined the strengths, weakness and opportunities of the DAM. Through this work a wide range of aspects have been explored and suggestions made for the way forward. Consequently, our recommendation for the DAM is not prescriptive and it will be necessary for Welsh Government to consult closely with stakeholders to agree the future of the DAM and coordinate the new mapping with the associated requirements of a risk based approach.

TAN 15 Review Recommendation:

11. To support a more risk based approach the DAM should be updated to recognise the varying risks of flooding. If practical the DAM and Flood Map should be more closely aligned.

9 Local Development Plans

9.1 Introduction

This section on Local Development Plans was not a key aim or objective of the TAN 15 review, but was identified as a key theme during the evidence gathering stages.

The section sets out the evidence, analysis, summary and recommendations in relation to Local Development Plans. It draws on earlier sections on the risk based approach (section 3), planning policy framework (section 4) and roles and responsibilities (Section 6).

9.2 Evidence

The evidence drawn from document analysis, workshops, workshop survey and case studies, is subdivided into two main sections:

- Strategic Flood Consequence Assessments;
- Shoreline Management Plans; and
- Integrated Catchment management and water sensitive design.

Evidence in relation to Flood Consequence Assessments (FCA's) is set out in section 10.

Strategic Flood Consequence Assessments

The number of adopted LDP's forms a regular feature of Cynllunio the Journal of the RTPI and Welsh Government website. The Autumn edition of Cynllunio (2017)[78]identifies eighteen adopted LDP's and four in preparation. The four in preparation includes Flintshire, Powys, Swansea and Wrexham. There are approximately seven Councils with adopted LDP's which are currently undertaking a review or completing first stages of consultation in the review.

The SFCA's prepared to support these LDP's range in focus, size and complexity and have been completed by Councils and consultancies. The Newport LDP is supported by a 3 stage SFCA, whereas Gwynedd and Anglesey Joint LDP (case study 8) SFCA formed a background topic paper. Detailed SFCA's have been completed by Cardiff, Ceredigion, Rhonda Cynon Taf, and Denbighshire.

It is noticeable that the completion date for SFCA's is on average three years prior to the date of LDP adoption. This results in cases of significant changes in flood risk understanding in period between preparation and adoption, and changes should be monitored through the LDP and SA process. The review has not involved a detailed analysis of all SFRA's completed in Wales for adopted plans.

There was some discussion within the workshops around a FCA trigger based on developments over a certain size, area or type as included in practice in England. On this point there was no consensus, and opposing views were held by attendees. There was however support for a FCA to be proportional to the needs of development proposals and for them not to become overly onerous or require a disproportionate amount of evidence or modelling.

78 RTPI Cymru (2017) Cynllunio: The Journal of the RTPI Cymru

Workshop discussions identified evidence from a recent UK study completed by Town and Country Planning Association (2016)[79] and requested evidence from Local Development Plans be considered within the TAN 15 review.

Case Study 7: Strategic flood consequence assessments and Newport Local Development Plan

The Inspectors report (PINS, 2014)[80] on the Newport LDP identified 13 key changes to the plan relating to the removal of housing sites because of flood risk and other delivery constraints. This report highlights how managing flood is a material consideration: in the regeneration of many sites; improving the city centre; providing affordable housing; and protecting the area's heritage. A strategic understanding of the risk is essential to provide evidence to demonstrate that the vision of the LDP can be realised.

The allocation of housing sites within DAM Zone C1 was not considered to be unsurprising given Newport's tidal riverside location and significant availability of brownfield land within the built-up area. The report identifies the focus of Newport's regeneration and emphasis on the re-use of sustainably located brownfield sites, constituted a clear justification, subject to satisfactory FCA's and existing planning permissions.

The significance of flood risk in the Newport City Council, 2013[81] LDP Background Paper on development and flood risk is clear. It recognises climate change as a key consideration and sets out the risk and justification requirements for sites. It draws on the number of studies undertaken and the new developments that resulted in flood mitigation measures. The Background Paper explains how planning policy regularly addresses flood risk issues and how a joined-up approach between the LPA and NRW can lead to improved local consideration of flood risks. It also discusses how flood risk from a range of sources needs an assessment against TAN 15 requirements (justification and acceptability tests).

The SFCA within the Background Paper suggests TAN 15 has no direct requirements or advice on the content and preparation of SFCA's, and refers to the overall aim of the TAN to locate development to the lowest flood risk areas. It suggests there are existing and potential sites located within high risk areas such as Zone C and therefore, some flexibility is necessary to enable the ongoing social and economic growth within Newport, whilst ensuring the consequences of flooding are appropriately assessed and mitigated.

This case study does not demonstrate an exemplar SFCA or approach to the LDP. However, it serves to illustrate the current weakness of TAN 15 in relation to SFCA and opportunities for LDP to develop a strategic and long-term plan for local flood risk management and development. It highlights the opportunities for catchment approach to flood risk management and local FCA's requirements as policy in LDP's.

Shoreline Management Plans

Shoreline Management Plans (SMPs) are developed by Coastal Groups with members mainly from local councils and Natural Resources Wales. They identify the most sustainable approach to managing the flood and coastal erosion risks to

[79] Town and Country Planning Association (2106) planning for climate change: understanding the performance of English local plans

80 Planning Inspectorate (2014) Report on Newport Local Development Plan 2011-2026

81 Newport City Council (2013) Background paper: Development and flood risk

the coastline in the short-term (0 to 20 years), medium term (20 to 50 years) and long term (50 to 100 years).

TAN 15 does not relate to shoreline management plans/policy or coastal change management areas (CChMA). Although, Welsh Government (2015)[82] CPO letter refers to impacts of climate change and SMP2 policy (as listed in Appendix B1.2).

TAN 15 does not relate to TAN 14 (1998) Coastal Flooding. Such absence in linkage between the TAN's suggests a weakness in reflecting a risk based approach to all sources of flooding.

The workshops, identified that Gwynedd, Anglesey and Carmarthenshire LPAs had identified coastal change management areas and drafted policies to help them form local plan policies which would direct development away from vulnerable coastal locations and promote the need for replacement properties and housing delivery.

Case study 8 highlights the opportunity for TAN 15 to better inform the preparation of LDP's. Case study 8 on Gwynedd and Anglesey joint LDP, also demonstrates how a strategic and collaborative approach to planning across LPA's administrative boundaries can support a local policy presumption against development in areas at greatest risk, based on locally available evidence.

The workshops and workshop survey identified support for the incorporation of SMP2 policy units and triggers within the DAM. However, this may be difficult because SMPs are non-statutory and subject to review through lower tier plans and projects. However, there are opportunities to link the DAM, NRW and SMP2 datasets now that all three are hosted together on NRW interactive mapping website.

As previously identified in Recommendation 2, SMP2 Coastal Change areas might form part of the proposed definition of areas at greatest risk.

Case Study 8: Shoreline management plans, Gwynedd and Anglesey Joint Local Development Plan

The joint Gwynedd and Anglesey draft LDP (2016) has a Coastal Change Management Policy ARNA1 which refers to Coastal Change Management Area (CChMA). This identifies areas related to the West of Wales SMP2 policy boundaries and preferred policies up to 2025 and 2055 given risks of flooding and coastal erosion.

The policy ARNA1 refers to new development, relocation of existing dwellings in the countryside, new and existing non-residential dwellings/community facilities or infrastructure, new or replacement coastal defence schemes and managing development. It also refers to evidence from SMP2 and the potential impact on a small number of residential properties. The plan is supported by a Level 1 SFCA that refers to flooding as a strategic issue and requiring collaboration with adjoining local authorities. This SFCA refers to the requirements of Catchment Flood Management Plan (CFMP) and SMP2 and the use of the DAM to inform the identification of issues and site allocations. It also refers to the presumption against highly vulnerable development in C2 and highlights the need to consider Zone B in more detail in consultation with NRW.

The sustainability appraisal includes a specific objective (SA11) on safeguarding water quality, managing water resource sustainability and minimising flood risk

82 Welsh Government (2015) Chief Planning Officer Letter on TAN 15 and impacts of climate change and SMP2 policy

(SEA topic water, biodiversity) by aiming to minimise the risk of all types of flooding (tidal, fluvial, surface water and sewerage) to people and property throughout appropriate planning and sustainable design. It also promotes water efficiency and SuDs to facilitate development away from land that is at risk from flooding.

This case study highlights the importance of an explicit presumption against development in areas of greatest risk. It highlights the important role of the LDP and linkages between SFCAs and sustainability appraisals undertaken by the LPA.

Integrated Catchment Management and Water Sensitive Design

There has been evidence emerging from Susdrain, SuDs Wales group, CIRIA and UK in last three to four years on the benefits of integrated catchment approaches to sustainable drainage and water sensitive design and natural flood management.

The pioneering approach of Arup, Morgan Sindall and Welsh Water (2017)[83] in Llanelli, South Wales demonstrates an innovative community focused strategy to retrofitting sustainable drainage systems. This aimed to tackle combined sewer overflows, issues caused by increasing population, climate change, increased frequency and intensity of rainfall, urban creep and infiltration. This strategy analysed the benefits of traditional approaches to capital improvements and found they would have significant costs and be incompatible with the operation of the Llanelli waste treatment works. On this evidence, it adopted a collaborative multi criteria analysis approach with partners and key stakeholders, to identify a range of schemes, which would retain the levels of service within highway drainage, attenuate to a 1 in 5 year event, prevent property flooding and manage exceedance events greater than 1 in 30.

The ten schemes implemented between 2010-2015 has resulted in a reduction in annual combined sewer flows and discharge frequencies of 39%. One of the ten implemented schemes in Gelvering Street involved the retrofitting of green infrastructure into several urbanized streets. This adopted the design principles of managing the conveyance of surface water, using overland flow routes, kerb drainage, planted tree cells, roadside planters, and basins. This resulted in 642m^2 surface water attenuation, addition of 2,689m^2 of green space, 32 new trees, 15.2ha impermeable area, property protection to 7 properties and reduction in 600m3 of urban flooding. Some of the key challenges for the strategy related to:

- Type of alterations or modifications to highway assets and agreed short-term maintenance and adoption period;
- Site specific maintenance schedules;
- Lack of potential infiltration options because of underlying ground conditions;
- Utility plans details within complex urban setting;
- Extent of community engagement and management of political stakeholders;
- Iterative use of lessons learned and managing public expectation;
- Quality and design of planting; and

83 Ellis, Cripps, Russ and Broom (2017) Transforming water management in Llanelli, UK

- Weekly monitoring and benefits of the scheme within the catchment and hydraulic performance.

The strategy demonstrates that for retrofitting of sustainable drainage systems in the form of green infrastructure can achieve considerable flow reductions has surpassed expectations. The complex task of engaging with the community and developing schemes has helped to regenerate historically deprived areas. The implementation has freed up capacity within the sewer network and provided a platform for new housing and business development. The presence of green infrastructure has improved the quality and appeal of the town and acted as a catalyst to engagement and education opportunities.

9.3 Analysis of evidence

Case study 7, Newport LDP, highlights how modifying the requirement for strategic assessment in TAN 15 could significantly improve the evidence and evaluation used to inform allocations in the LDP, directly supporting LPAs in achieving sustainable strategic growth and regeneration in urban centres. Strategic assessments of flood consequences should inform LDP spatial strategy and policies. Case study 7 sets out a potential approach to establishing clear principles for decision making in the formulation of a spatial strategy and utilising land in the most sustainable locations. Case study 7 may not be an exemplar case study in all respects, however it helps to highlight the potential challenges and opportunities for SFCA's and LDP's.

The LDP could utilise the evidence in SFCA to help demonstrate consideration of article 4 tests of the WFD 2000/60/EC in relation to location, accounting for all practicable mitigation, comparing issues of overriding public interest or benefits and assessing reasons for modifications/alterations.

The evidence from Llanelli demonstrates the wider benefits of a strategy based approach to alleviating high flows of surface water flows, managing exceedance and improving resilience, which is relevant because "flooding issues are not isolated to Llanelli; it is predicted that 3.2 million people in the U.K will be at risk of flooding from similar urban drainage issues by 2050 (Houston et al, cit. Ellis, Cripps, Russ and Broom 2017)[84].

9.4 Summary and Recommendations

As discussed in section 4, a risk based approach involves considering risk at different spatial scales, from site specific FCA to Strategic-FRA and National-FRA. The evidence from conflicting appeal decisions suggests there is a need for TAN 15 to clarify roles and responsibilities as set out in section 6, specifically with respect to the consideration of flood risk in the preparation of LDP's by LPA's. This should link with legislative requirements including, Strategic Environmental Assessment (SEA) and Sustainability Appraisal (SA) and EU Floods Directive 2007/42/EC, Flood Risk Regulations (2009) and FWMA (2010).

There are opportunities for TAN 15 to reflect on the planning policy shifts elsewhere in the UK and Europe to pool the benefits of changes in environmental and flood risk legislation. Careful consideration should be given to the input and outputs associated with more prescribed SFCA requirements and a balance is also

[84] Ibid

required with respect of the appropriate evidence to support a risk based approach and the associated resource and commitments demanded of LPAs.

It is recognised that whilst case studies 7 and 8 are not perhaps exemplar SFCA's, this is perhaps unsurprising given the absence of guidance or clear definition in TAN 15.

TAN 15 Review Recommendations:

12. TAN 15 should strengthen the integrity of LDPs using SFCA's to provide appropriate local evidence and encourage collaborative working across administrative boundaries and catchments to manage flood risks effectively, now and for the long term. This includes clearly setting out:

- **The role of SFCAs in assessing flood risk at a strategic scale and setting locally appropriate policies;**
- **Integrating catchment approaches to managing and reducing surface water flooding and combined sewer inflows and water sensitive urban design; and**
- **The scope of the LPA to develop evidence and policies for flood risk and development that work alongside TAN 15.**

13. LPAs should consider within their SFCAs the appropriateness of setting additional circumstances when an FCA is mandatory. This may take the form of development in Coastal Change or Critical Drainage Areas, or development of a certain kind/size (and form a local validation requirement).

10 Flood Consequence Assessments

10.1 Introduction

This section of the review looks specifically at Flood Consequences Assessments (FCA). For many planning and flood risk practitioners an FCA represents the application of TAN 15 in practice. Section 10 of the review, builds on the context of a risk based approach and strengths and limitations identified in sections 3 and 4. It also has strong linkages to design integration recommendations in section 5, the key decision-making role of the LPA in section 6 and use of vulnerability categories in FCA's in section 7.

10.2 Evidence

This evidence draws on face-to-face meeting, case studies, document analysis and workshops.

Document Analysis

In section 7.3 of TAN 15 the acceptability criteria forms' the fourth and final justification test in TAN 15. This sets, out that an FCA should be used to establish whether suitable mitigation measures can be incorporated so development is as safe as possible and must therefore demonstrate there is:

- minimal risk to life;
- minimal disruption to people living and working in the area;
- minimal potential damage to property;
- minimal impact of the proposed development on flood risk generally; and,
- minimal disruption to natural heritage.

The NRW (2015) Good Practice Guide (GPG101)[85] provides guidance on the production of flood risk models and flood consequence assessments for development planning purposes. This guidance sets out a brief guide to the scope, regulatory information, the interaction with NRW and flood data and technical advice, mitigation evidence and increased flood risk and its measurable limits. It refers to the requirements of A1.12 of TAN 15 and need for developments to demonstrate no flooding elsewhere and how national policy requires consideration of climate change.

The Welsh Government (2016)[86] policy clarification CL-03-16 accompanies technical guidance on climate change allowances for planning purposes in relation to TAN 15. It reiterates the TAN 15 requirements for development to consider the impacts of climate change may have in areas at risk of flooding over the lifetime of development. Together with guidance on how projected increases to peak river flows and sea levels because of climate change and how this should be incorporated into flood consequences assessments for individual planning applications and development planning in areas where there is a risk of flooding.

The case studies reviewed all involve FCA's and all provide useful evidence. Two case studies (case study 9 and 10) illustrate some of the current weaknesses in

[85] Natural Resources Wales (2015). Good Practice Guide (GPG) 101 Producing flood risk hydraulic models and flood consequences assessments for development planning purposes

[86] Welsh Government (2016) CL-03-16 Climate Change Allowances for Planning and Guidance for Flood Consequence Assessments- Climate Change Allowances

the current thresholds approach as currently set out in TAN 15 Appendix 1. The review of case studies and appeal decisions suggests a degree of confusion and/or lack of knowledge and understanding in the production of satisfactory FCAs, because of the surprising fact that they were brought forward to appeal at all.

During the time of the review, Defra Welsh Government, NRW and Environment Agency (2017)[87] published a new guide for flood risk managers to identify and manage the uncertainty in their flood risk assessments and flood defence designs. This new guide replaces the Environment Agency Fluvial Freeboard Guidance Note (report W187) published in 2000 and is available for developers, engineering consultants who work on their behalf. The guide sets out five principles for managing residual uncertainties and residual uncertainty allowance in terms of:

- Challenging your understanding of the system.
- Considering the reality of present day.
- Exploring a range of measures.
- Ensuring a proportionate response.
- It's a continuous process.

This provides a structured method for identifying uncertainties across the flooding system. Ensuring that any factors of safety used in the design process are not duplicated and should help users to consider all appropriate actions for managing uncertainty across the source-pathway-receptor. The guidance aims to ensure uncertainties are identified, managed and tracked as the project moves from appraisal, to design and delivery and provides a hierarchy of methods to ensure the management of uncertainty is proportional to the decision.

Research by Defra (2006)[88] defined methods to consider flood hazard, principally based on the velocity and depth of flood water. The hazard rating table shown in Table 10.2 is now widely accepted as the most appropriate means of considering flood hazard and risk to people.

Table 10-1 Hazard rating table to people

Depth x(v+0.5)	Degree of Flood Hazard	Description
Less than 0.75m	Low	Caution "Flood Zone with shallow flowing water or deep standing water"
0.75-1.25	Moderate	Dangerous for some (i.e children) "Danger flood zone with deep or fast flowing water"
1.25-2.5	Significant	Dangerous for most people "Danger: flood zone with deep fast flowing water"
More than 2.5m	Extreme	Dangerous for all "Extreme danger: flood zone with deep fast flowing water.

[87] Defra, Welsh Government, NRW and EA (2017) Accounting for Residual Uncertainty-an update to the fluvial freeboard guide

[88] Defra (2006) Flood Risks to People Phase 2 Guidance Document

Face-to-face meeting and workshops

The evidence from the face-to-face meeting and workshops identified a wide range of issues, recommendations and areas for consideration. These included:

- Clarification required around the minimal risk acceptability criteria and context specific thresholds with A1.14 and A1.15.
- FCA processes need to be more flexible and proportionate to the size of the development.
- LPA/SFCA could provide guidance on local acceptability criteria.
- Quantification of flood damages could improve decision making but would still be subjective (would also place a burden on the evidence required).
- Benefits of national guidance and LPA need to be considered when deciding what 'impact' is acceptable.
- Consideration should be given to adopting the 'flood risk to people' flood hazard approach, rather than the 'not prescriptive' flood depth and properties advice.
- Onset of flooding was recognised as important, but difficult to define/use technically within wider range of events.
- Existing ground levels detail and proposed development level details.
- The potential need for cumulative impacts to be assessed to inform LPA decision making.
- Excessive technical burden of undertaking and reviewing FCAs.
- Technical requirements to consider residual flood risks of breach and blockage and climate change.
- Consistency in the language of flood risk in TAN 15 and FCA's.
- Need for a robust FCA which recognises the level of uncertainty and quality of information used within the assessment and implications for the design process.
- Aligning FCA guidance and acceptability criteria with current flood modelling practice.

Case Study 9: Acceptability, residual risk and issues of uncertainty

The proposed redevelopment of a builder's yard to form 8 no residential dwellings at Builders Yard, Maude Street, Connah's Quay Flintshire (Appeal reference APP/A6835/A/12/2169673)[89] was dismissed in 2012. The main issue on flood risks, related to whether the risks and consequences of flooding on the site could be acceptably managed over the lifetime of the development.

Located in DAM Zone C1, the FCA suggested that with 50-year event climate change the development would be flood free. But during this event the flood modelling showed that Maude Street (the site access) would be flooded to a depth of 0.16m, and the velocity of the water would be 0.31m/s. Consequently, at this point in time the depth of water on the site access would be within the acceptable limits set out in TAN A1.15, but the flood velocity would slightly exceed the

89 PINS (2012) Town and Country Planning Act Section 78 for the redevelopment of 8 residential dwellings, Builders Yard, Maude Street, Connah's Quay Flintshire APP/A6835/A/12/2169673

guidance. In the 75-year event climate change scenario, the ground floor of the dwellings would be flooded to a depth within the acceptable limits of A1.15, but not of A1.14. However, flood depths and velocities across the development site and Maude Street would be well above the tolerable conditions identified in TAN A1.15. Tolerable levels would be significantly exceeded in the 100-year climate change scenario.

The inspector acknowledged the previous appeal decision on this site (APP/A6835/10/2139520) and suggested whilst it was inconceivable that defences will not be maintained in the future, there was no guarantee the standard of protection would be at least equivalent to the 0.5% probability frequency threshold.

The possible depth and velocity of flooding at the site would pose an unacceptable risk to occupiers and rescuers. Whilst it is noted that an alternative escape route was available across a railway line, the Inspector was not convinced that this would provide a satisfactory means of escape since it would require the crossing of a flooded ditch and the railway, and people would still need rescuing from the land beyond the railway.

Case study 9; Maude Street Connah's Quay demonstrates not all development within C1 is acceptable and the presence of defences should not be relied on to enable all development. It also highlights how development needs to demonstrate the acceptable level of flood risks for the lifetime of the development.

Case Study 10: Snowdon Street, Gwynedd: Flood consequence assessment and impact of development on others

The development proposal involved an outline planning application for the demolition of existing garages and erection of new garages with a three-bedroom flat (Land near 26 Snowdon Street, Y Felinheli, Gwynedd; Appeal Reference APP/Q6810/A/15/ 3035795)[90]. The main issue related to the acceptability of the proposed development and the key points of the Inspector's decision for dismissing the appeal related to:

- It's location on the foreshore of the Menai Strait abutting a sea wall, and DAM Zone C1 which is contrary to Gwynedd UDP policy (2009)[91]. Policy B29 'Development at risk of flooding' of the UDP makes it clear that new development proposals in C1 will be refused unless they are necessary to assist in a regeneration initiative or strategy to contribute to key employment. Consequently, the proposals did not meet the first part of the justification test to justify the development in line with local authority strategy.
- Extreme tidal flooding was predicted to surround the property within the lifetime of the development and there would not be a safe access to, or egress from the building. Circumstances, which would potentially create an additional burden on emergency services at a time when they would be at full stretch.
- The Inspector does not draw reference to all three of the consultation responses from NRW and the focus on the vulnerable form of residential development and limitations of this response in terms of access and egress.

Case study 10: Snowdon Street, highlights the importance of:

[90] PINS (2015) Town and Country Planning Act 1990 section 78 for demolition of garage and erection of new garages and flat on land near 26 Snowdon Street, Y Felinheli, Gwynedd (APP/Q6810/A/15/3035795)

[91] Ibid

- tolerable allowances assessment for the whole site;
- the lifetime of development;
- the important role of the LPA and local plans in deciding the justification test;
- how flood consequences are considered in terms of increased risk to emergency services; and
- the need for TAN 15 to be supported by clear policy guidance.

10.3 Analysis of evidence

The evidence shows that although there is little wrong with the general approach to FCA's, there are many opportunities to refine the requirements and guidance around the FCA. Key areas for improvement include the acceptability criteria, proportionality and SFCA requirements for LDP's.

The existing FCA requirements set out in section 7.3 of TAN 15 are open to interpretation and are supplemented by other sections and appendix in TAN 15 and separate NRW (2015)[92] guidance on hydraulic modelling and FCA's. FCA requirements have also been redefined by chief planning officer letter and clarification letters (Appendix B1.2). These additional guidance documents, separate to the core TAN 15 document, increase the complexity of producing robust FCAs. In the workshops, these separate and additional guidance documents were viewed as a source of confusion and concern. It is inevitable that technical guidance around TAN 15 will need to change with time. Consequently, there is a good case for designing a revised TAN to link more clearly to a single repository of external guidance that is more easily and frequently updated. An example of a similar arrangement is National Planning Policy Framework (NPPF) and NPPF Planning Practice Guidance in England.

One area of specific confusion raised in the workshop discussions was the need to demonstrate "**minimal** impact of the proposed development on flood risk generally" established in Section 7.3 of TAN 15. This requirement appears to conflict with Appendix 1, A1.12 which requires the development to result in "**no flooding elsewhere**".

Appendix A1.14 of TAN 15 introduces a critical threshold for flood frequency. This specifies that development should be designed to be flood free during the 1% fluvial flood (i.e. that fluvial flood with a 100 to 1 chance of occurring in any year) and the 0.5% tidal/coastal flood (i.e. 200 to 1 chance in any year event). Given the significance of this threshold it is surprising to find it solely within an appendix of the TAN. Some practitioners also noted that the source of the "Environment Agency advice" given as the basis of the thresholds is unspecified. Although the threshold is described as 'indicative', there is little or no evidence that variations from the recommended thresholds have been accepted.

The flood frequency threshold, "no flooding elsewhere", and the acceptability threshold of A1.15 are all good illustrations of the strength and weaknesses associated with setting prescriptive threshold (even if presented as 'indicative'). At the workshop, there were strong advocates for both rigidly prescriptive and flexible approaches. Some suggested a prescriptive approach made the preparation and evaluation of FCA simpler. Others argued that a prescriptive approach precluded

[92] Natural Resources Wales (2015) Good Practice Guide (GPG) 101 (2015): Producing flood risk hydraulic models and flood consequence assessments for development planning purposes

consideration of local circumstances and a level of pragmatism and scope for innovation. Clearly, there are varying degrees to how prescriptive or flexible the guidance on the updated TAN 15 can be and it is not possible for this review to establish the ideal balancing point.

The issues outlined in the workshops and case studies, combined with recommendations of section 3 and 4 for TAN 15 to adopt a risk based framework, show the need for the acceptability criteria to be updated. Such an update will need to more clearly establish the distinction between policy and guidance (as set out in section 6 roles and responsibilities and section 9 Local Development Plans).

In light of the evidence acquired and reviewed, it is suggested that revised acceptability criteria should focus on the 12 areas set out in Table 10-2. This is provided in order to facilitate further discussion and not as specific recommendations, as there are too many potential linkages between the acceptability criteria and the other potential changes to TAN 15 and we would anticipate a requirement for consultation on the criteria.

Table 10-2 Summary of potential acceptability criteria for revised TAN 15.

Revised TAN 15 acceptability criteria	
1.	Flood defences should be structurally sound with adequate plans/funding for their future maintenance and operation, and thus demonstrating no impact on viability.
2.	Appropriate measures are proposed by the developer so future occupiers are aware of source and scale of flood consequences and risks with the provision of effective flood warnings.
3.	Flood emergency plans and procedures produced by the developer and development design allow the occupier to rapidly move people and property away from floodwaters. Escape and evacuation routes should remain safe and operational under all conditions. Appropriate measures are incorporated to maintain access and egress at all times.
4.	Development proposals should reflect the uncertainty in predicting flood risk and include suitable allowances and measures for uncertainty and residual risks. In this respect, the focus should be on risk to life and flood resilience.
5.	Developments should assess the scale of impacts and consequences on and off site to natural heritage, water quality, other properties and infrastructure. It should. not increase the flood risk to others, be able to manage residual risk and improve flood management.
6.	All likely mechanisms and sources of flood risk should be considered, including breach, blockage and asset failure. In terms of residual and actual flood risks.
7.	An FCA should evaluate the range of depths, velocity and hazard across a development and surrounding area against recommended tolerable thresholds or guidance with full regard to impacts of climate change over the lifetime of the development. .
8.	Consideration should be given to the rate of rise to predicted floodwaters and overland flow routes, to ensure the safety of development.
9	Developments should recognise the importance of place, safeguarding areas for flood storage, and demonstrating an integrated design approach to flood risk and surface water drainage requirements for SuDS.
10	All forms of developments (including retrofitting schemes) should assess the potential contributions or costs associated with the adoption and maintenance of Sustainable Drainage System, flood resilience or defence measures by section 106 or Community Infrastructure Levy.

10.4 Summary and Recommendations

Any proposed development or development plan in areas at risk of flooding now and the future should be assessed in planning policy TAN 15 through the preparation of an appropriate FCA/SFCA. This should be based on the requirements of the justification and acceptability tests. The only exception to this rule, would be in areas at greatest risk where there should be a strong presumption against development and it would be inappropriate to prepare an FCA.

It is therefore essential that the FCA trigger is robust and reflective of a wide range of potential development and flood risk considerations. The policy triggers for an FCA in TAN 15 need to align with the previous recommendations to updates to the DAM.

Adopting the recommended move to a more risk based approach will provide new opportunities for revising both the justification and acceptability tests. It may also make it easier to define the level of detail required in FCA dependent on the level of flood risk and development vulnerability; addressing concerns on scope and proportionality.

The revised TAN 15 should strengthen the use of SFCA to inform and manage flood risks at a strategic scale, identify areas at greatest risk, draft local policy validation requirements and inform site specific FCA requirements or allocations. This will require the establishment of new guidance for SFCA, an area currently missing from TAN 15. The acceptability criteria need to be clarified and updated within TAN 15. This should be supported by new technical guidance. The review recommends that such 'guidance' is best brought together in the form of a single 'living' document', perhaps led by NRW working with a small steering group of LPAs and Welsh Government.

TAN 15 Review Recommendations:

14. TAN 15 acceptability criteria should be clarified and updated. The updates should be supported by new guidance which should replace Appendix A1 and the web of other guidance documents.

This guidance should exist in a form that can easily and regularly be updated. NRW should take leadership responsibility for the development of the new guidance, consulting with WG, LPA, LLFA, and LRF as appropriate.

The key areas to address in the updated guidance include:

- **a) Assessment of all sources of flood risk including groundwater, reservoir, coastal erosion;**
- **b) Proportionality in the preparation of FCAs;**
- **c) Assess presence of defences, asset condition and maintenance in terms of actual and residual risks, breach and blockage analysis;**
- **d) An assessment of climate change risks and impacts;**
- **e) Assessment and acceptability of onsite and offsite flood risk mechanisms, flow routes and impacts (taking a risk based approach and source pathway model);**
- **f) Acknowledgement of the limitations in the assessment and provision of a summary of the level of uncertainty and quality of information;**

g) **Recognition of the importance of place and integrating design approach to flood risk management and drainage design for the lifetime of the development;**

h) **Identification of tolerable risks and hazards to people and property;**

i) **Identification of measures to raise awareness of the source and scale of flood risks for future occupiers, and operational mechanisms for adoption and monitoring of flood plans and flood warning systems;**

j) **Potential contributions or costs for the adoption and maintenance of Sustainable Drainage Systems (SuDs), flood resilience or defence measures by section 106 or Community Infrastructure Levy are evidenced.**

11 Conclusions and Recommendations

11.1 Conclusions

The TAN 15 review has undertaken an independent, evidence based approach to the evaluation of Welsh Government TAN 15 (2004)[93]. The use of different analytical methods, has been challenging to the development of a clear set of recommendations for Welsh Government. The TAN 15 review has unsurprisingly produced conflicts in evidence and conflicting views on the same evidence and between methods.

The factual update drafted in 2016 by NRW and Welsh Government has helpfully identified the updates required for TAN 15 in terms of the terminology, flood risks, hazards and legislation.

The TAN 15 review explores the evidence of innovative and flood resilient design, roles and responsibilities, vulnerability categories, Development Advice Maps (DAM), Local Development Plans (LDP's) and Flood Consequence Assessments. From this we have identified a set of fourteen recommendations, which align with the aims and objectives of the project set out in section 1.

The TAN 15 review has found a clear and significant body of evidence to substantiate the need to update and replace the precautionary framework. Consequently, the review has advised that the precautionary framework should be replaced with a risk based approach.

An updated risk based framework should address all sources of flood risk and incorporate a source-pathway-receptor model. To assess the consequences of flood risk, it is reasonable to accept that not all flood risk can be removed and acknowledge flood risk is not static over time. Proposed development should be designed to take account of the actual and residual risks in Wales from rivers, the coast, surface water and from sewers.

The adoption of a risk based approach will allow the analysis of likelihood and probability of flood risks and recognition of surface water flooding and coastal change areas. This will potentially address issues linked to the implementation of sustainable drainage from schedule 3 of the Flood and Water Management Act 2010, innovative and flood resilient approaches to design, and integrated catchment approaches to water sensitive design.

The shift from the precautionary approach reflects similar adjustments to planning policy in UK and Europe and capitalises on the advances in data, modelling and assessment that have been witnessed since 2004. It also recognises the need for TAN 15 to continue to incorporate guidance that takes full account of the material significance of the particular characteristics of flood risk in Wales and is based on the best available evidence.

The review of the strengths, weaknesses, opportunities and threats of TAN 15 shows that the guidance is generally well respected and easy to use. However, it also identified a range of threats, weakness and limitations associated with TAN 15 and the Development Advice Maps (DAM). Furthermore, it identified how existing policy is restricting development in Zones C1 and C2 and how the definition of these zones is not always based on robust evidence. Issues were also found with the DAM in terms of conflicts and confusion with the NRW Flood Maps, the thresholds used to define the probability of flooding and the respective sources of flood risk within the DAM. The

[93] Ibid

review identifies that any change to the DAM will require careful harmonisation with the criteria selected for the justification and acceptability tests.

In establishing a new risk based approach, the review recommends that TAN 15 should set out a strong presumption against highly vulnerable development in areas at 'greatest flood risk'. However, the review has not made recommendations for how these areas at 'greatest flood risk' should be defined.

There should be a clear policy requirement within TAN 15 for the development of a strategic local flood risk evidence base to inform the preparation of a Local Development Plan and strengthen the integrity and strategic role of the LDP in managing flood risk collaboratively to achieve long term benefit (where possible multiple benefits should be sought). This should be accompanied by the formulation of guidance that provides for improved clarity and consistency to support and enhance the decision-making role for the Local Planning Authority, and other key roles of Emergency Planning, Dwr Cymru, Lead Local Flood Authority, NRW and Welsh Government.

Issues of low housing supply and limited land availability in Wales in context of flood risk and the need to adapt to climate change present a significant challenge. However, broader considerations on sustainable development and long-term development needs provide the goals required to balance decisions. The current planning performance indicator SD4 falls short of the need to monitor the planning system contribution to flood risk management and revised metrics should be developed.

TAN 15 should integrate the importance of place (case study 4 Yorkshire Futures) and design, scale and resilience linkages of TAN 12 (2016)[94] Design.

Ten case studies highlight the key themes within the review and link back to a larger evidence base of four or five additional case studies per theme.

The TAN 15 review has not been simple or straight forward and it is difficult not to overstate the importance and complexity of flood risk and development planning policy, and the many competing agenda's and technical viewpoints. Consequently, the review has sought to balance a large volume of document analysis with stakeholder engagement and the seeking of other sources of evidence where gaps have been identified. The development of key themes has helped in maintaining the focus and scope of the review, and reconcile some of the conflicts between the evidence. Nevertheless, extensive consultation and further work will be required to establish the future form of TAN 15.

11.2 TAN 15 Review Recommendations

The TAN 15 review has identified 14 recommendations in total, with key recommendations emerging from the risk based approach and policy framework. Each of the sections in the report provides details of the evidence, analysis a summary and recommendations in relation to a specific theme, issue or gap. All fourteen recommendations from the TAN 15 review and their reasoned justification are summarised below in Table 11-1, with cross references back to the relevant sections in the report.

[94] Ibid

Table 11-1 TAN 15 Review Recommendations

ID	Recommendation	Reasoned Justification	Report section
1.	Welsh Government should update and replace the precautionary approach of TAN 15 with a risk based approach. This approach should include a strong policy stance against development in areas at greatest flood risk and is reliant on updates to the Development Advice Maps.	The analysis of flood risk from all sources using the source-pathway-receptor model is critically important. The current TAN 15 precautionary approach is directing development away from flood risk is not reflective of a risk based approach. The most significant forms of flooding in Wales relate to rivers, coastal, surface and sewer flooding. The current TAN 15 has significant gaps in relation to surface water flooding and coastal change areas. There are some general updates in terms of language and probability which have already been identified by the draft factual update to TAN 15. TAN 15 has not got a strong presumption against development in areas at greatest risk of flooding.	Section 3-4.
2	The risk based approach in TAN 15 should include provisions to avoid highly vulnerable development in areas identified at greatest flood risk, which could include any one or combination of the following: ▪ Flood Zone 3 (1% AEP fluvial; 0.5% Tidal); ▪ Flood Zone 3b / Functional flood plain (similar to those used England); ▪ Locally identified areas as set by the LPA; ▪ SMP2 Coastal Change areas. Further consideration should be given to the provisions for 'Water Compatible' and 'Essential Infrastructure' where development could be allowed in areas at greatest flood risk subject to meeting the justification and acceptability tests.	The presumption against development in areas of greatest risk should be included with a revised policy framework.	Section 3,4, 8 and 9.

ID	Recommendation	Reasoned Justification	Report section
3	The revised TAN 15 should consider how to incorporate TAN 14: Coastal flooding in the risk based approach to all sources of flooding.	The absence of coastal change areas within the TAN 15 policy framework/DAM forms a significant gap.	Section 3, 8 and 9.
4	The revised TAN 15 should be updated to reflect all necessary updates in national planning policy and flood risk management since 2004, including: ▪ PPW and National Development Framework (NDF); ▪ Key definitions of development (including lifetime of development) and flood risk; ▪ Key TAN's (i.e.12 and 14), legislation and evidence base; ▪ Use of consistent language on flood risk and probability to help improve understanding and skills; ▪ Link to published climate change guidance by Welsh Government. ▪ The criteria of call in procedures for Welsh Ministers for developments and flood risk; ▪ Reference to flood insurance or Flood Re standards.	There are a number of immediate updates which could be included within a revised TAN 15 which have been identified. These principally relate to issues around updated legislation, language of flood risk and probability.	Section 3-4
5	Welsh Government should develop an effective planning policy performance framework for TAN 15. This monitoring and implementation of TAN 15 will support the delivery of sustainable development and flood risk management.	The current monitoring indicator SD4 is not representative of planning and flood risk measures. An updated set of indicators could be developed, using the objectives from the National Strategy for Flood and Coastal Erosion Management in Wales and/or the Wellbeing and Future Generation indicators.	Section 4.
6	TAN 15 policy should set out clear requirements for developments to adopt SuDS. This should align with the proposed implementation of Schedule 3 of the Flood and Water Management Act 2010.	TAN 15 should promote the integrated use of design and resilience measures. Integrating the linkages with TAN 12 (2016) Design and Schedule 3 of the Flood and Water Management Act 2010	Section 3.
7	The policy trigger for development to require an FCA should be updated to require a proportional FCA, where any of the following criteria are met:	The policy trigger for an FCA should be updated within a revised TAN 15 policy framework.	Section 4 and 10.

ID	Recommendation	Reasoned Justification	Report section
	▪ Development in Flood Zone 2 (and 3); ▪ Locally significant areas or policy criteria identified by the SFCA and LDP; ▪ Highly vulnerable major development; and ▪ At the request of the LPA and/or LLFA.	This is dependent on changes to an updated DAM, the vulnerability categories of development and justification and acceptability tests.	
8	TAN 15 should promote the role of design in managing flood risks and enhancing community flood resilience at strategic and development control stages. The importance of place should be recognised and linked to TAN 12: Design. Good design can help to address and integrate issues of amenity, viability, risk and residual risk.	TAN 15 should promote the use of design to manage long term flood risk and set out necessary requirements within the TAN 15 policy framework.	Section 5.
9	TAN 15 should clarify the roles and responsibilities in planning policy and flood risk. Specifically: ▪ The responsibility of decision-making must clearly sit with the LPA alongside the statutory role of the LLFA. ▪ The technical leadership role of NRW should be recognised and strengthened. ▪ The "oversight" role and responsibilities of Welsh Government on planning policy and flood risk management. ▪ Emergency Planners, LRFs and Coastal Groups should work with LPAs to inform the development of LDP, SDP and SFCA. Specifically, these documents should contain local guidance on the acceptability of access and egress arrangements. ▪ The role of consultations and pre-application advice should be reiterated to best manage the complex nature of flood risk and development planning. ▪ This should be accompanied by modifications to the content and structure of the TAN to improve precision on the approach to risk	TAN 15 should clarify roles and responsibilities in planning policy on development and flood risk. Highlighting the importance of the LPA decision-making role and the LDP. TAN 15 should strengthen the role of the LDP to strategically manage flood risk in long term and enable development in sustainable locations. Identify areas at greatest risk, set local policy and FCA requirements and incorporate the evidence from resilience and emergency planning on flood warning, access, egress actions being undertaken with preparedness and plans.	Section 6.

ID	Recommendation	Reasoned Justification	Report section
	assessment and the scientific basis for the acceptability thresholds that are used. The scope and purpose of development plans and management should be clearly defined.		
10	Development categories in TAN 15 have an important function in a risk based approach. The changes to development categories should include the grouping of residential development, essential infrastructure and schools into a highly vulnerable category, the reclassification of retail, leisure and libraries to a less vulnerable development category and establishment of a new category for water compatible development. These should act as an indicator to the potential vulnerability of development within the application of justification and acceptability tests. The review of the categories should be considered alongside the changes made through the introduction of a risk based approach. TAN 15 should set out the role of LPAs in considering and determining vulnerability classifications in development proposals and LDP's.	TAN 15 should integrate the vulnerability categories of development within a revised policy framework. Utilising small changes and updates to the justification and acceptability tests.	Section 7.
11	To support a more risk based approach the DAM should be updated to recognise the varying risks of flooding. If practical the DAM and Flood Map should be more closely aligned.	TAN 15 should be updated to reflect a risk based approach to flood risk, and evidence available.	Section 3, 4 and 8.
12	TAN 15 should strengthen the role of LDPs and SFCA's to use local evidence and encourage collaborative working across administrative boundaries and catchments to manage flood risks effectively, now and for the long term. This includes clearly setting out: ▪ The role of SFCAs in assessing flood risk at a strategic scale and setting locally appropriate policies. ▪ Integrating catchment approaches to managing and reducing surface water flooding and combined sewer inflows and water sensitive urban design; ▪ The scope of the LPA to develop evidence and policies for flood risk and development that work alongside TAN 15.	Existing TAN 15 has no clear role for LDP and SFCA, despite LDP and SA forming a statutory requirement. The LDP provides a key opportunity to identify evidence and areas at significant flood risk. Identify local validation requirements for FCA and policy. Working collaboratively with other LPA's where required to establish a catchment based approach.	Section 9.

ID	Recommendation	Reasoned Justification	Report section
13	LPAs should consider within their SFCAs the appropriateness of setting additional circumstances when an FCA is mandatory. This may take the form of development in Coastal change or Critical Drainage Areas, or development of a certain kind/size (and form a local validation requirement).	Existing TAN 15 requirements for an FCA are limited to DAM C1 and less vulnerable development C2. Evidence shows this need to be updated to reflect risk based approach to different sources of flooding and probabilities and more closely aligned with NRW map, or local evidence identified by LPA'S	Section 9 and 10.
14	TAN 15 acceptability criteria should be clarified and updated. The updates should be supported by new guidance which should replace Appendix A1 and the web of other guidance documents. This guidance should exist in a form that can easily and regularly be updated. NRW should take leadership responsibility for the development of the new guidance, consulting with WG, LPA, LLFA, and LRF as appropriate. The key areas to address in the updated guidance include: a) Assessment of all sources of flood risk including groundwater, reservoir, coastal erosion; b) Proportionally in the preparation of FCAs; c) Assess presence of defences, asset condition and maintenance in terms of actual and residual risks, breach and blockage analysis; d) An assessment of climate change risks and impacts; e) Assessment and acceptability of onsite and offsite flood risk mechanisms, flow routes and impacts (taking a risk based approach and source pathway model); f) Acknowledgment of the limitations in the assessment and provision of a summary of the level of uncertainty and quality of information; g) Recognition of the importance of place and integrating design approach to flood risk management and drainage design for the lifetime of the development; h) Identification of tolerable risks and hazards to people and property;	Existing TAN 15 Appendix A1 should be updated to reflect revised TAN 15 and take the form of living guidance to avoid the need for continual updates or policy clarifications as separate notes/Chief Planning Officer letters.	Section 10.

ID	Recommendation	Reasoned Justification	Report section
	i) Identification of measures to raise awareness of the source and scale of flood risks for future occupiers, and operational mechanisms for adoption and monitoring of flood plans and flood warning systems; j) Potential contributions or costs for the adoption and maintenance of Sustainable Drainage Systems (SuDs), flood resilience or defence measures by section 106 or Community Infrastructure Levy are evidenced.		

References

ABI (2012). Guidance on Insurance and Planning in Flood Risk Areas for Local Planning Authorities in England

ABI (2016). Guide to resistant and resilient repair after a flood

Australian institute for disaster resilience (2013). Managing the floodplain: a guide to best practice in flood risk management in Australia

Arcadis & Welsh Government (2012). Flood Risk Management, Economics and Decision Making Support.

Arup & Fortismere (2013). RTPI Cymru, study into the operation of planning committees in wales.

BIS (2015). Flood Risk communications dialogue.

Cave et al., (2016). Comparison of the planning systems in the four UK countries. Commons library briefing paper.

Cabinet Office (2004) Civil Contingencies Act 2004: a short guide (revised)

Ch2m (2015). Shifting shores +10. Public policy and adaptive approaches to coastal change management: how are we doing?

Christie et al., (2002). Living Spaces, A vision for the future of planning.

Construction Industry Research and Information Association (2004) Development and flood risk – guidance for the construction industry. Report CP/102. London.

CIRIA (2005) standards for the repair of buildings following flooding

Departments of Communities and Local Government (2012) National Planning Policy Framework

Departments of Communities and Local Government (2014) Planning Practice Guidance Note on Climate Change and Flood Risks

Department of Communities, Local Government Building Regulations, Defra & environment Agency (2007). Improving the flood Performance of New Buildings flood resilient construction.

Defra (2002). Directing the flow priorities for future Wales Policy

Defra (2004) Making Space for Water: Developing a new Government Strategy for Flood & Coastal Erosion Risk Management in England – Consultation, London: Defra

Defra (2005) Making Space for Water: Developing a new Government Strategy for Flood & Coastal Erosion Risk Management in England – Consultation, First Government response to the autumn 2004 Making space for water consultation exercise, London: Defra

Departments of Local Communities Government (DCLG)

Ellis, Cripps, Russ and Broom (2017) Transforming water management in Llanelli, UK, ICE Publishing

Environment Agency (1998) Environment Agency response to the independent report on the Easter 1998 floods: Action plan. Bristol, Environment Agency

Environment Agency (2000). Flood Estimation Handbook Guidelines

Environment Agency (2003) Strategy for Flood Risk Management. Bristol: Environment Agency

Environment Agency (2003). UK Climate Impact Programme 2000, Climate Change Scenarios: Implementation for Flood and Coastal Defence: Guidance for Users, R&D Technical Report W5B-029/TR

Environment Agency (2009). Flooding in Wales: A national assessment of flood risk

Environmental Agency (2015). Delivering benefits through evidence. Public dialogues on flood risk communication, Literature Review.

Environmental Agency (2015). Delivering benefits through evidence. Public dialogues on flood risk communication, Evaluation report.

Environmental Agency (2015). Delivering benefits through evidence. Public dialogues on flood risk communication, Final report.

Environmental Agency (2015). Delivering benefits through evidence. Public dialogues on flood risk communication, Project Summary report.

Environmental Agency (2016). Flood Risk Management: considering the use of floodplain compensatory storage.

Environment Agency and Sciencewise (2016) Food and Coastal Erosion Risk Management Research and Development: Communicating risk: for understanding, belief ownership and action

Environment Agency (2017). Delivering benefits through evidence, accounting for residual uncertainty: updating the freeboard guide

Environment Agency, (2017). Accounting for Residual Uncertainty – an update to the fluvial free board guide.

Environmental Policy Consulting Ltd (2017). Sustainable Drainage Systems on new developments, analysis of evidence including costs and benefits of SuDS construction and adoption.

European Union (2000) Water Framework Directive, Brussels: European Union (2000/60/EC)

European Commission (2014). Links between the floods Directive and water framework directive.

EU ourcoast (2017). Flood Risk Management in Ireland

Evans, E., Ashley, R., Hall, J., Penning-Rowsell, E., Sayers, P., Thorne, C. and Watkinson, A.

EXCIMAP (2007). Handbook on good practices for flood mapping in Europe.

FCERM (2017) Updating the fluvial freeboard guidance note (W187)

FLOODsite (2008). Integrated flood Risk Analysis and Management Methodologies. Pilot Study 'Elbe River Basin'

Forest Research (2015) Valuing ecosystem services provided by the urban trees of the Tawe catchment

Grabs, W (2015). Benchmarking flood risk reduction in the Elbe River.

Hall et al., (2004). Integrate Flood Risk Management in England and Wales.

Henderson, E (2016). The planning series: 02- Local Planning Policy.

HM Treasury (2003) THE GREEN BOOK – Appraisal and Evaluation in Central Government, London: TSO

HM government (2013). The National Adaption Programme making the country resilient to a changing climate.

HM Government (2017), UK climate change Risk Assessment 2017.

JBA Risk Groundwater Map at 50m and 5m resolutions http://www.jbarisk.com/jbas-new-national-groundwater-flood-map

KPMG, (2015). Building the homes, we need, A programme for the 2015 government.

LiCCo Living with a changing coastline (2015). Engaging communities in planning for coastal change.

Macdonald et al., (2012). Progress in Physical Geography.

Marine Climate Change Impacts Partnership (2008) cit. Welsh Government (2011) National Strategy for Flood and Coastal Erosion Risk Management Strategy summary

Middlesex University Flood Hazard Research Centre (1990) FLAIR (Flood Loss

National SuDS Working Group (2004). Interim Code of Practice for Sustainable Urban Drainage Systems. Available for download from www.ciria.org/suds/icop.htm (July 2004)

National Assembly for Wales (2003). Water Resources, England and Wales. The Water Environment (Water Framework Directive) (England and Wales) Regulations 2003.

National Trust (2015). Mapping our shores. 50 years of land use change at the coast.

National Trust (2015). Shifting Shores. Playing our part at the coast.

National Trust (2015). Shifting Shores – the next ten years.

Natural Resources Wales (2012). High Level target 13 (HLT13), Development and Flood Risk in Wales

Natural Resources (2013). High Level Target 13 (HLT13), Development and flood risk in Wales.

Natural Resources Wales (2014) Wales Coastal Flooding Review: Delivery Plan Phase 2 Recommendations.

Natural Resources Wales (2015). Flood and Coastal Erosion Risk management in Wales, 2011-2014. First Report to the Minister under section 18 of the flood and water management Act 2010.

Natural Resources Wales (2015). Good Practice Guide (GPG) 101 Producing flood risk hydraulic models and flood consequences assessments for development planning purposes.

Natural Resources Wales (2016) Checklist: full Flood Consequence Assessment (FCA)

Natural Resources (2016). Natural Resources Wales' Development Planning Advice Service – Customer Survey 2016.

Natural Resources Wales (2016). Technical guidance: Flood Estimation.

Natural Resources Wales (2017). Flood and Coastal Erosion Risk Management in Wales, 2014-2016. Report to the cabinet secretary for Environment and rural Affairs under section 18 of the Flood and water management Act 2010.

Office of Public Works (OPW) (2003). Report of the Flood Policy Review Group

Office of Public Works (OPW) (2009). The Planning system and flood risk management guidelines for planning authorities. Technical Appendices

Office of Public Works (OPW) (2009). The Planning system and flood risk management guidelines for planning authorities.

Penguin (2000) The new English dictionary.

Planning Inspectorate (2014) Report on the Examination into the Newport Local Development Plan 2011-2026

Planning Policy Wales (2004). Technical Advice Note, 15: Development and flood Risk.

Restemeyer et al., (2014). A strategy – based framework for assessing the flood resilience of cities – A Hamburg case study

Scott (2013 Living with Flood Risk

Shaw, E.M. (1994) Hydrology in Practice. 3rd edition. Chapman & Hall

SMARTeST (2013). Six Steps to property level flood resilience: guidance for property owners.

Smith, L & Priestley, S, (2016). Planning and Flood Risk

SUPPLEMENTARY NOTE ON FLOOD HAZARD RATINGS AND THRESHOLDS FOR DEVELOPMENT PLANNING AND CONTROL PURPOSE – Clarification of the Table 13.1 of FD2320/TR2 and Figure 3.2 of FD2321/TR1. (http://randd.defra.gov.uk/Document.aspx?Document=FD2321_7400_PR.pdf)

Surendran et al., (2008). Supplementary note on flood hazard ratings and thresholds for development planning and control purpose.

The Environment, Food and Rural Affair Committee (2016). Future Flood Prevention.

The Environment, food and Rural Affairs Committee (2017). Post-legislative scrutiny: Flood and Water Management Act 2010. Sixth Report.

The Flood Risk Regulations (2009). Environmental Protection. Second Report 2016-2017

The Stationery Office Limited (2010). Flood and Water Management Act 2010. Chapter 29.

Thomson Reuters Limited (1995). Town and country Planning, England and Wales. The Town and Country Planning (General Development Procedure)

TPCA (2016). Planning for the climate change? Understanding the performance of English local plans

Tarrant et al., (2017). Residential uncertainty allowance.

The Guardian (2016). Floating homes: a solution to flooding, crowded cities and unaffordable housing.

UKCIP (2002) Climate Change Scenarios for the United Kingdom

Uittenbroek et al (2013) Mainstreaming climate adaptation into urban planning: overcoming barriers, seizing opportunities and evaluating the results in two Dutch case studies. Journal of Regional Environmental Change (13) 399-411. DOI 10.1007/S10113-012-0348-8.

Wales Audit Office (2009) Flood risk management in Wales

Wales Audit Office (2009) Coastal Erosion and Tidal Flooding Risks in Wales

Welsh Assembly Government (2004) Technical Advice Note 15 Development and Flood Risk

Welsh Assembly Government (2004) (Update 2008) People Places Futures: The Wales Spatial Plan.

Welsh Assembly Government (2010). Consultation Document. Flood and Coastal Erosion Risk Management Development of a National Strategy for Wales.

Welsh Government (2004). The National flood and Coastal Erosion Risk Management Strategy: Wales. Post Adoption Statement.

Welsh Government (2006). Planning (Wales) Bill.

Welsh Government (2011). Strategic Environmental Assessment, Environmental Report. Flood and Coastal Erosion Risk Management: Development of a National strategy for Wales.

Welsh Government (2011). National Strategy for Flood and Coastal Erosion Risk Management in Wales.

Welsh Government (2011). Strategic Environmental Assessment.

Welsh Government (2011). Habitat Regulations Assessment. Flood and Coastal Erosion Risk Management: Development for a National Strategy for Wales

Welsh Government (2012). Town and country Planning (development management procedure) (Wales)

Welsh Government (2012). A New Approach to Managing Development in Wales.

Welsh Government (2012). Public Attitudes the planning systems in Wales.

Welsh Government (2012). National Strategy for flood and coastal Erosion Risk Management in Wales: summary.

Welsh Government (2012). Environment and Sustainable Development.

Welsh government (2012). Guidance, The town and country Planning (notification) (wales) Direction.

Welsh Government (2013). Update of Tan 215 Development Advice Maps.

Welsh Government (2014). Department for Housing and Regeneration.

Welsh Government (2014). Consultation Document, flood and Coast Investment Programme (FaCIP).

Welsh Government (2014) Chief Planning Officer: Summary of TAN 15 requirements

Welsh Government (2015). Consultation Document. Flood and Costal Investment Programme (FaCIP).

Welsh Government (2015). Update of TAN 15 Development Advice Maps and Approval of Shoreline Management Plans.

Welsh Government (2015). Planning Performance Framework Indicators and Targets in Detail.

Welsh Government (2015). Local Development Plan Manual. Edition 2.

Welsh Government (2015). How to measure a nations progress? National indicators for wales.

Welsh Government (2015). How to measure a nations progress? National indicators for wales: Technical note

Welsh Government (2015) Welsh National Marine Plan-Draft

Welsh Government (2015) Housing Land Availability in Wales: Summary 2015

Welsh Government (2016). Call for Evidence and Projects National Development Framework

Welsh Government (2016). Planning Policy Wales Edition 9.

Welsh Government (2016). Guidance on Climate Change Allowance for Planning Purposes.

Welsh Government (2016). Flood Consequence Assessment: climate Change allowances.

Welsh Government (2016). National Development Framework, Statement of public participation.

Welsh Government (2016). All Planning Annual Performance Report 2014/15.

Welsh Government (2016). Recommended non-statutory standards for suitable drainage (SuDS) in Wales -designing, constructing, operating and maintaining surface water drainage systems.

Welsh Government (2017). National Development Framework, Engagement Plan.

Welsh Government (2017). National Development Framework for Wales.

Welsh Government (2017). All Planning Annual Performance Report 2015/16.

Welsh Government (2017). Transfer of the Development Advice Map.

Welsh Government (2017) Population projections for Wales (2014-based) Principal projection

Welsh Government (2017) Natural Resource Management consultation

Welsh Office (1998). Planning guidance (Wales). Technical Advice Note (wales) 14: Coastal Planning.

Welsh Statutory instruments (2011). The flood and Coastal Erosion Risk Management Information Appeal (Wales) Regulations 2011.

Welsh Statutory Instruments (2011). The flood risk (Amendment) (Wales) Regulations 2011.

Van Alphen, J (2014). The Delta Programme and update flood risk management policies in the Netherlands

Yorkshire Futures, (2010). Flood Resilient Development, principles, feasibility and potential in Yorkshire and Humber.

Appendix A

A1.1 Evidence identified in the face-to-face meeting

The face-to-face meeting for the TAN 15 review was held in Newport and involved representatives from JBA project team, Welsh Government and Natural Resources Wales. Natural Resources Wales had been provided with a copy of the proposed methodology for the review and the focus for the meeting was to discuss the key methods proposed and identified key areas of concern. The key areas of concern identified in this meeting were identified as:

- K1. No increase in flood elsewhere.
- K2. Policy triggers.
- K3. Framework from mitigation to modelling
- K4. Residual risk.
- K5. Roles and Responsibilities.
- K6. Level of interpretation of policy triggers/justification and acceptability tests used for HVD in C2.
- K7. Not currently a living document, CPO and CL too many and too easily out of date.
- K8. Need to strengthen role of SFCA in LDP process.
- K9. DAM doesn't include climate change or lifetime of development 1 in 100 or 1 in 75.
- K10. Understanding of flood risk language and probability.
- K11. No current relationship between DAM and SMP.

From the discussions on key evidence and key concerns, the following set of seventeen potential recommendations was identified:

- R1. Incorporate climate change allowances into DAM.
- R2. Amend triggers to reflect changes to DAM and new categories of development.
- R3. Compile separate (S) FCA checklist for Local Planning Authority validation processes with up to date criteria of A1.17 and NRW guidance.
- R4. Strengthen the role of SFCA in preparation of Local Development Plans to produce local lists, thresholds, flood storage areas, historic flood map and Flood Re (post) 2009 development and reflect local catchment characteristics.
- R4. Revise DAM maps to Intolerable, high, medium and low risk categories using a traffic light system.
- R5. Merge C1 and C2 zones in DAM.
- R6. Add the three SMP policies as a new DAM layer.
- R7. Remove the justification test for intolerable or high-risk areas.
- R8. Inclusion of a 1 in 200 1 in 100 and 1 in 75 flood risk maps in DAM, with and without climate change to reflect lifetime of development requirements.
- R9. Clarify roles and responsibilities of NRW and LLFA on flood risk and development within planning system.

- R10. Improve understanding of flood risks, using consistent probability language, definitions of flood risk and precautionary principles.
- R11. Define the parameters of no increase in flood risk elsewhere.
- R12. Categorise the vulnerability types to reflect who and what is at risk.
- R13. Introduce an approach or flood plan framework to mitigation then modelling in flood consequence assessments.
- R14. Maintain TAN 15 as “Living Document” separating out FCA checklists.
- R15. TAN 15 policy to include (prescriptive/flexible site by site) guidance on residual risk and thresholds.
- R16. Review gaps in breach and blockage analysis guidance.
- R17. Establish a new risk based criteria approach to consultations for NRW and LLFA.

Appendix B:

B1.1 Evidence from document analysis

Appendix B sets out the key pieces of evidence identified in the document analysis method of the TAN 15 review and includes:

- Summary table of the supplementary guidance published for TAN 15 in terms of Chief Planning Officer Letters, Ministerial notifications and policy clarifications.
- Summary extract of what TAN 15 requires for the justification and acceptability tests form Chief Planning Officer letter 2014.
- An extract of the monitoring figures provided by LPA's for TAN 15 for the last three years for planning performance indicator SD4.
- Comparison tables of the vulnerability categories in TAN 15 in Wales to those used in England and Ireland.
- A simple SWOT analysis of TAN 15 and PPW.
- A short summary of the appeals and called in decisions analysis.

This evidence is drawn from:

High level target (HLT) reports and annual performance reports (APR) and section 18 reports (NRW report under the requirements of the Flood and Water Management Act FWMA 2010);

- Existing reports and policy literature to complete a strengths, weaknesses, opportunities and threats (SWOT) of TAN 15;
- Approximately fifty appeals or called in decisions provided by Planning Inspectorate Wales (PINS), NRW and Home Builders Federation (HBF);
- Use classes order and multi, coloured manual ranking for development categories in Wales against those currently used in England and Ireland.

This appendix doesn't include:

- New insurance (Flood Re) standards in the UK, Welsh Government position and interim non-statutory standards on SuDs sustainable drainage.
- Case studies of LDPs and development management decisions by Local Planning Authorities identified by face-to-face meeting and workshops.
- NRW guidance on flood consequence assessments (FCAs) and modelling breach and blockage assessment guidance.

The full set of references used in the review are included in section 8 references of the report.

B1.2 Summary of TAN 15 supplementary policy clarifications and guidance

Publication Date	Summary of Chief Planning Officer or Policy Clarification Letter or Ministerial Direction Details
2010 Chief Planning Officer letter (CPO):	This outlines the implications of the Flood and Water Management Act (FWMA) in England and Wales, sustainable drainage and potential training requirements.
2012 T&CP(Wales) Direction Order 7/12:	This direction order relates to development in flood risk areas and the requirement for highly vulnerable development or emergency service proposals which are wholly located within C2 and above the ten units or more threshold to be referred to Welsh Ministers for a decision.
2013 Chief Planning Officer letter (CPO):	This outlines the DAM updates and likely changes to C2 since 2009.
2014 Chief Planning Officer letter (CPO):	This letter highlights the importance of planning policy on flood risk and insurance industry standard changes, flood insurance and flood risks as a material consideration, future monitoring in the High-Level Target (HLT) reports, climate change and lifetime of development and a separate one page summary on the requirements of TAN 15 justification and acceptability tests
2014 Policy Clarification CL-02-2014:	This draws attention to the NRW report on recent winter flooding and importance of climate change, lifetime of development and precautionary principle
2015 Chief Planning Officer (CPO):	This relates to the DAM and Shoreline Management Plan in relation to Appendix 5 of TAN 15.
2016 Chief Planning Officer letter (CPO) CL-03-16):	This reinforces climate change allowances for planning in relation to TAN 15, and provides guidance on peak river flows and sea levels resulting from climate change and requirements of flood consequence assessments and advice required from NRW.
2017 Chief Planning Officer letter (CPO):	This letter refers to TAN 15 as being a long-established policy to actively direct inappropriate development away from areas at risk of flooding, and refers to the supplementary DAM as being integral to effective implementation of policy and available on WG website since 2009. It advises that the DAM will be managed and maintained and published by NRW. It refers to benefits of all maps showing flood hazard and information in one location and removal of confusion between out of step flood map and DAM. Together with advice for map challenges to be directed to NRW

B1.3 TAN 15 justification and acceptability tests[95]

Summary of what TAN15 requires for highly vulnerable development (houses) to be considered acceptable.

Justification Criteria:

1) Should be located only in an area of flood risk which is developed and served by significant infrastructure, including flood defences (Zone C1 of the DAM) **AND**
2) Its location is necessary to assist a local authority regeneration initiative or strategy[1], or contribute to key employment objectives, necessary to sustain an existing settlement or region **AND**
3) The site meets the definition of previously developed land (i.e. it is not a Greenfield site) and concurs with the aims of Planning Policy Wales (i.e. the presumption in favour of sustainable development). **AND**
4) A Flood Consequence Assessment has been produced to demonstrate that the potential consequences of a flood event up to the extreme flood event (1 in 1000 chance of occurring in any year) have been considered and meet the criteria below in order to be considered acceptable.

Acceptability Criteria (has to meet all):

- Flood defences must be shown by the developer to be structurally adequate particularly under extreme overtopping conditions (i.e. that flood with a 1 in 1000 chance of occurring in any year).
- The cost of future maintenance for all new/approved flood mitigation measures, including defences must be accepted by the developer and agreed with the Environment Agency (now Natural Resources Wales).
- The developer must ensure that future occupiers of the development are aware of the flooding risks and consequences.
- Effective flood warnings are provided at the site
- Escape/evacuation routes are shown by the developer to be operational under all conditions
- Flood emergency plans and procedures produced by the developer must be in place
- The development is designed by the developer to allow the occupier the facility for rapid movement of goods/possessions to areas away from floodwaters.
- Development is designed to minimise structural damage during a flooding event and is flood proofed to enable it to be returned to its prime use quickly in the aftermath of the flood.
- No flooding elsewhere.
- Developer is required to demonstrate that the site is designed to be flood free for the lifetime (A1.5) of development for either a 1 in 100 chance (fluvial) flood event, or a 1 in 200 chance (tidal) flood event including an allowance for climate change (depending on the type of flood risk present) in accordance with table A1.14.
- In respect of the residual risk to the development it should be designed so that over its lifetime (A1.5) in an extreme (1 in 1000 chance) event there would be less than 600mm of water on access roads and within properties, the velocity of any water flowing across the development would be less than 0.3 m/second on access roads and 0.15m/second in properties, and the maximum rate of rise of floodwater would not exceed 0.1m/hour. (see table A1.15).

[1] Regeneration Initiatives will be comprehensive, multi-approach and form part of a suite of initiatives which have been subject to public consultation. Local Authority strategy will be the development plan for the area (deposit version as minimum).

[95] Welsh Government (2014) Chief Planning Officer Letter

B1.4 Planning performance indicator SD4

This table below summarises the LPA returns for planning performance indicator SD4 for three years.

Summary of LPA returns on Planning Performance Indicator SD4 since 2013

2013-14

4. Planning permission granted and refused for development in C1 and C2 floodplain areas during the year:		**Residential** Number of units		**Non-Residential** Area of land (ha)	
		C1	C2	C1	C2
Not meeting all TAN 15 tests:	(i) Granted planning permission	1	28	0	13.7
	(ii) Refused planning permission (on flood risk grounds)	2	15	0	1
Meeting all TAN 15 tests:	(i) Granted planning permission	103	21	32.65	23.92

2014-15

4. Planning permission granted and refused for development in C1 and C2 floodplain areas during the year:		**Residential** Number of units		**Non-Residential** Area of land (ha)	
		C1	C2	C1	C2
Not meeting all TAN 15 tests:	(i) Granted planning permission	6	10	6.1606	7.6064
	(ii) Refused planning permission (on flood risk grounds)	10	17	0.677	0.07
Meeting all TAN 15 tests:	(i) Granted planning permission	672	724	78.14145	111.8324

2015-2016

4. Planning permission granted and refused for development in C1 and C2 floodplain areas during Q1-Q3:		**Residential** Number of units		**Non-Residential** Area of land (ha)	
		C1	C2	C1	C2
Not meeting all TAN 15 tests:	(i) Granted planning permission	9	9	7.66	3.86
	(ii) Refused planning permission (on flood risk grounds)	5	23	13.35	15.58
Meeting all TAN 15 tests:	(i) Granted planning permission	69	88	1766.74	26.26

B1.5 Vulnerability categories of development

This appendix summarises the different categories of vulnerability used for development planning purposes in Wales, Ireland and England.

B1.5.1 Welsh Government (2004) TAN 15 vulnerability categories

In Wales, there are three categories within a table and policy text which refers to other types of water compatible development as shown below:

Development Category	Types
Emergency services	Hospitals, ambulance stations, fire stations, police stations, coastguard stations, command centres, emergency depots and buildings used to provide emergency shelter in time of flood
Highly vulnerable development	All residential premises (including hotels and caravan parks), public buildings (e.g. schools, libraries, leisure centres), especially vulnerable industrial development (e.g. power stations, chemical plants, incinerators), and waste disposal sites
Less vulnerable development	General industrial, employment, commercial and retail development, transport and utilities infrastructure, car parks, mineral extraction sites and associated processing facilities, excluding waste disposal sites

B1.5.2 OPW (2009) Planning system guidelines and flood risk management in Ireland

In Ireland, there are three categories but they are different to Wales. The highly vulnerable category includes residential development, schools and essential infrastructure.

Vulnerability Class	Land uses and types if development which include
Highly vulnerable development (including essential infrastructure)	• Garda, ambulance and fire stations and command centres required to be operational during times of flooding; • Hospitals; • Emergency access and egress routes; • Schools; • Dwelling houses, student halls of residence and hostels; • Residential institutions such as residential care homes, children's homes and social services homes; • Caravans and mobile home parks; • Dwelling houses designed and constructed or adapted for the elderly or other people with impaired mobility; and • Essential infrastructure, such as primary transport and utilities distribution including electricity generating power stations and sub stations, water and sewage treatment and potential significant sources of pollution (SEVESO) sites, IPPC sites etc) in the event of flooding.
Less vulnerable development	• Buildings used for: retail, leisure, warehousing, commercial, industrial and non-residential institutions;

Vulnerability Class	Land uses and types if development which include
	• Land and buildings use for holiday or short-let caravans and camping subject to specific warning and evacuation plans; • Land and buildings used for agriculture and forestry; • Waste treatment (except landfill and hazardous waste); • Mineral working and processing; and • Local Transport infrastructure.
Water-compatible development	• Flood control infrastructure; • Docks, marinas and wharves; • Navigation facilities; • Ship building, repairing and dismantling, dockside fish processing and refrigeration and compatible activities requiring a waterside location; • Water-based recreation and tourism (excluding sleeping accommodation; • Lifeguard and coastguard stations; • Amenity open space, outdoor sports and recreation and essential facilities such as changing rooms; and • Essential ancillary sleeping or residential accommodation for staff required by uses in this category (subject to specific warning and evacuation plan).
*Uses not listed here should be	

B1.5.3 DCLG (2017) NPPF guidance on flood risk and climate change

In England, there are five categories of development as shown below:

Essential infrastructure

- Essential transport infrastructure (including mass evacuation routes) which has to cross the area at risk.
- Essential utility infrastructure which has to be located in a flood risk area for operational reasons, including electricity generating power stations and grid and primary substations. and water treatment works that need to remain operational in times of flood.
- Wind turbines.

Highly vulnerable

- Police and ambulance stations; fire stations and command centres; telecommunications.
- Installations required to be operational during flooding.
- Emergency dispersal points.
- Basement dwellings.
- Caravans, mobile homes and park homes intended for permanent residential use.
- Installations requiring hazardous substances consent. (Where there is a demonstrable need to locate such installations for bulk storage of materials with port or other similar facilities, or such installations with energy infrastructure or carbon capture and storage installations, that require coastal or water-side locations, or need to be located in other high flood risk areas, in these instances the facilities should be classified as 'Essential Infrastructure').

More vulnerable

- Hospitals.
- Residential institutions such as residential care homes, children's homes, social services homes, prisons and hostels.
- Buildings used for dwelling houses, student halls of residence, drinking establishments, nightclubs and hotels.
- Non–residential uses for health services, nurseries and educational establishments.
- Landfill* and sites used for waste management facilities for hazardous waste.
- Sites used for holiday or short-let caravans and camping, subject to a specific warning and evacuation plan.

Less vulnerable

- Police, ambulance and fire stations which are not required to be operational during flooding.
- Buildings used for shops; financial, professional and other services; restaurants, cafes and hot food takeaways; offices; general industry, storage and distribution; non-residential institutions not included in the 'more vulnerable' class; and assembly and leisure.
- Land and buildings used for agriculture and forestry.
- Waste treatment (except landfill* and hazardous waste facilities).
- Minerals working and processing (except for sand and gravel working).
- Water treatment works which do not need to remain operational during times of flood.
- Sewage treatment works, if adequate measures to control pollution and manage sewage during flooding events are in place.

Water-compatible development

- Flood control infrastructure.
- Water transmission infrastructure and pumping stations.

- Sewage transmission infrastructure and pumping stations.
- Sand and gravel working.
- Docks, marinas and wharves.
- Navigation facilities.
- Ministry of Defence, and Defence installations.
- Ship building, repairing and dismantling, dockside fish processing and refrigeration and compatible activities requiring a waterside location.
- Water-based recreation (excluding sleeping accommodation).
- Lifeguard and coastguard stations.
- Amenity open space, nature conservation and biodiversity, outdoor sports and recreation and essential facilities such as changing rooms.

Essential ancillary sleeping or residential accommodation for staff required by uses in this category, subject to a specific warning and evacuation plan.

B1.6 SWOT analysis of PPW and TAN 15

This SWOT analysis of TAN 15 and PPW (2016) Edition 6 is shown below

Document	Strengths	Weaknesses	Opportunities	Threats
Planning Policy Wales (Edition 9) 2016	Plan led system Strongly linked to Strategic Environmental Assessment (SEA) and Sustainability Appraisal legislation Aligned with 7 Wellbeing goals of Wellbeing of Future Generations Act 2015 and contribution to sustainable development by • tackling climate change • preference for re-use of land • promoting sustainability through good design Objectives of WG are to maximise environmental protection for people. Natural and cultural resources, property and infrastructure and prevent or manage pollution and promote good environmental practice Flood risk whether inland or from the sea is a material consideration in land use planning. Adopt a precautionary approach when formulating development plan policies on development and flood risk, and when considering planning applications. In areas of floodplain currently unobstructed, where water flows in times of flood, built development should be wholly exceptional and limited to essential transport and utilities infrastructure. Designed and constructed to remain operational even at times of flood, and resulting in no net loss of floodplain storage, not impede water flows and no net increase of flood risk elsewhere. Determinations for development proposals in areas being defined as being of high flood hazard should only be considered where • new development can be justified in that location, even though it is likely to be at risk of flooding; • the development proposal would not result in the intensification of existing development which may itself be at risk; and • new development would not increase the potential adverse impacts of a flood event.	All development on land within floodplain of a watercourse, or drained via a culvert or low-lying land adjacent to tidal water is at some risk of flooding and whilst flood risk can be reduced or mitigated it can never be eliminated. Rapid flows due to failure of defences pose a greater risk to life and land protected by tidal defences in extremely vulnerable in event of a breach, speed and depth of flooding. LPA recognise, it will be inappropriate to locate certain types of development such as schools, hospitals, residential development and emergency services within some areas being defined as being of high flood hazard. LPAs should ensure appropriate allocations in development plans.	Planning and environmental management are separate but complementary. Action through the planning system to move away from flood defence and the mitigation of consequences of new development in areas of flood hazard towards a more positive avoidance of development in areas being defined as flood hazard, or areas of managed retreat. Taking a strategic approach to flood risk and considering the catchment and assessing cumulative impacts, and working across administrative boundaries. Determination of planning applications offer opportunity for LPA, NRW, drainage bodies, sewerage undertakers, prospective developers, and other relevant authorities to work closely together. Where detailed information in respect of flood risk is not available, LPA should require developers to carry detailed technical investigations to evaluate extent the risk.	Attention required to minimise and manage risks associated with climate change by Natural Resources Wales, and others and building industry to plan and act now. Need to consider how a changing climate is expected to influence environmental risks over the lifetime of new development, given current uncertainty. It's important that places and development proposals are adaptable. LPA should be aware NRW will not automatically provide or extend a flood warning service. Increasing numbers of new properties in areas at risk from flooding will place increasing pressure on the emergency services and therefore consideration should be given to refusing development.

TAN 15 (2004) Development and flood risk	It provides a framework within which risks arising from both river and coastal flooding and from additional run-off from development in any location can be assessed. The precautionary framework outlined in the TAN allows flooding issues to be accorded appropriate consideration whilst recognising that development will continue to be necessary in these areas. It refers to flood events of 2000 and impacts on 1,900 properties and experience of recent years which suggests incidence of problems due to flooding may be increasing in frequency and scale. It clearly refers to Government and Wales Act to promote sustainable development and important role of managing flooding. Aim of the TAN and general approach of PPW in respect of new development in areas at high risk of flooding by setting out a precautionary framework in order of preference • Direct new development away from those areas which are at risk of flooding; • Where development has to be considered in high risk areas (Zone C) only those developments which can be justified on basis of tests outlined (section 6 and 7) are located within such areas. The operation of the precautionary framework for forward planning and development control is governed by • a Development Advice Map (DAM) containing three zones (A, B, C with subdivision of C1 and C2) which should be used to trigger the appropriate planning tests in relation to sections 6 and 7 and appendix 1. • Definitions of vulnerable development and advice of permissible uses in relation to location of development and consequences of flooding. Roles and responsibilities • LPA satisfied that the proposal is justified and consequences of flooding are acceptable. Where risks and consequences cannot be managed to an acceptable level then development should be avoided irrespective of the justification. Developers need to provide information to demonstrate that their proposal satisfies tests in the TAN.	TAN 15 relates to PPW 2002. Chief Planning Officer letters and Direction Circular exist as separate documents. It estimates some 140,000 properties in Wales (12% of the total housing stock are thought to be at risk from flooding or the sea). Refers to catastrophic effect on public health and environment from flooding to sewerage infrastructure, but focuses on access and egress, not water quality or location. Refers briefly to issues of contaminated land and assessment requirements. Refers to “surface water runoff from new development” relevant to all types of development and all zones, and list of authorities which should be considered or consulted on case by case basis (Highway Authorities, Land Drainage Authorities and Sewerage Authorities). It suggests planning authorities “may” consider imposing a condition requiring developers to examine the SuDS option. Where necessary, conditions attached to permissions and /or agreements can be used to secure these objectives. Where flooding is a strategic issue that significantly constrains development options, local authorities should use the precautionary framework as part of considering sustainability options and, where necessary, set out the positive steps which have been taken to promote development in zones A and B.	It refers to climate change evidence and climate change scenarios from 2002. Nature of development/land use is split between three categories (Figure 2) • Emergency Services and hospitals • Highly vulnerable development-all residential and libraries • Less vulnerable development- general industrial Looks at types and development and vulnerability impacts. It refers to exceptions to rule and none classification of boatyards, marinas and essential works, canals which are not subject to justification part, but will be subject to acceptability of consequences part. It acknowledges historical context of development but overall aim to avoid flood risk areas. It advises some flexibility is necessary to enable risk of flooding to be addressed and economic/social impacts of precluding investment and benefits of using previously developed land. Further development in such areas whilst benefiting from some protection will not be free from risk and could exacerbate consequences-requires balanced judgement. Planning and building standards have complimentary role in flood management, use of flood damage resistant and mitigation measures, raising of flood levels, access and sockets-references DTLT Preparing for floods and from publications of Association of British Insurers	Development Advice Maps Best available information Sufficient to determine when flood risk issues Three development advice zones on maps which are attributed to different planning actions Based on EA extreme outlines (Zone C) and British Geological Survey (BGS) drift data (Zone B). Composition and use of zones to control and manage development in Figure 1. Zone A- (Little/or no risk fluvial or tidal/coastal) used to indicate justification test is not applicable no need to consider flood risk further. Zone B-(Areas known to have flooded in past)-Used as part of precautionary approach and levels checked against extreme levels)0.1%. If site levels greater no need to consider flood risk further. Zone C (EA extreme flood outline equal or greater than 0.1% river, tidal and coastal) Used to indicate that flooding issues should be considered as integral part of decision making by application of justification test and assessment of consequences. Zone C1 (Areas of developed floodplain served by significant flood defence infrastructure) Used to indicate that development can take place subject to justification, acceptability and consequences Zone C2 (Areas of flood plain-no infrastructure) Used to indicate only less vulnerable development should be considered subject to justification, acceptability and consequences. Emergency services and highly vulnerable development should not be considered. Robust for triggering application of tests, accepts new data will become available and only expected they will be in place for 3 years. Further edition maps will need to be numbered and dated. New development should be directed away from Zone C towards suitable land in Zone A, otherwise Zone B. Highly vulnerable and Emergency services in Zone C2 should not be permitted. All other development C1 and C2 should be determined by LPA to be justified in that location if its Necessary to assist or be part of local authority regeneration initiative or required to sustain an existing settlement; or region;

	Environment Agency (EA) should assist the planning authority in coming to their decision by providing expert advice on the flooding consequences assessment and the acceptability of flooding consequences to people and property. EA should make available data and expertise to assist developers in undertaking FCA and where appropriate on any necessary mitigation measures. Assessing flood consequences If low vulnerable development proposed C1 or C2 and meets tests outlined in section 6-justification, this section sets out material planning requirements in respects of flooding. Whether the development should proceed will depend on consequences of flooding of that development, and if it is acceptable It states that it is not sensible for people to live in two storey buildings in areas subject to flooding where timely flood warnings and safe access and egress cannot be achieved. Where justified an assessment of flooding should demonstrate Minimal risk to life Minima; disruption to people living and working in the areas Minimal potential damage to property Minimal impact pf the proposed development on flood risk generally; and Minimal disruption to natural heritage Assessment examines mechanisms which cause flooding and consequences. Protection measures does not remove vulnerability. Where mitigation measures are proposed developers must implement these at appropriate stage of development and where necessary long-term maintenance must be provided. Surface water runoff-it refers to need for new development not to create additional run-off when compared to an undeveloped situation/and redevelopment to reduce runoff where possible, but that there may be practicalities to achieving this aim. It promotes use of SuDs, hard and soft to manage run-off, and combination of techniques and interim code of practice for Sustainable Drainage Systems (2004). It suggests planning authorities “may” consider imposing a condition requiring developers to examine the SuDS option.	In this sense, flood risk will be a material factor in the formulation of specific policies and allocation of sites. Allocations should only be made in zone C if it can be justified that a development/use must be located there in accordance with section 6 and if the consequences of locating development are acceptable, in accordance with section 7 and appendix 1. The local planning authority wishes to allocate a site, and can justify such an allocation, the local planning authority will need to undertake a broad level assessment of the consequences of flooding occurring on that site, in consultation with the Environment Agency. Sites in zone C2 should not be allocated for highly vulnerable development in accordance with the advice set out in paragraph 6.2. Allocations for other built development should be justifiable under sections 6 and 7 and appendix 1. When considering allocations in zone B, local planning authorities should consult the Environment Agency to ascertain whether flooding raises a significant constraint in terms of land use.		Necessary to contribute to key employment objectives supported by local authority and other key partners to sustain an existing settlement of region.; and Concurs with aims of PPW and meets definition of previously developed land; Potential consequences of a flooding vets for the development have been considered against criteria in sections 5 and 7 and appendix 1 and found to be acceptable;

	It refers to need for consideration must be given to maintaining the effectiveness of any drainage system and the ability for them to cope with severe rainfall/snowmelt events, with provision for long term maintenance and renewal. Section 9 gives a summary of policy requirements in terms of different zones, development types, planning requirements, acceptability criteria and development advice. Actions through development plans Development Plans provide the strategic locational guidance for development, and the detailed site specific policies and identification of proposals for development. extent of both river and coastal flooding in Wales is such that flooding is often of sub-regional significance, particularly since what happens in one part of a river catchment will often have effects on other parts some distance away. Local planning authorities, in preparing their Development Plans, should consult with neighbouring authorities on issue of flooding. The Assembly Government is committed to looking for a way forward in terms of assisting with strategic assessments and attributing priority through the production of Catchment Flood Defence Management Plans. The option of managed coastal alignment and floodplain restoration may be considered as a means of reducing future flood risk and protecting and enhancing natural heritage. This will apply particularly in areas within zone C where existing development cannot be sustained in the face of increasing flood risk, or in sparsely developed areas where this offers a more cost effective and sustainable solution than building new defences. Planning authorities will need to consider the specific objectives and requirements of Catchment Flood Management Plans and Shoreline Management Plans for their area. Planning authorities should use the development advice maps to identify whether flooding is a strategic issue and hence likely to influence the overall strategy of the development plan. The key characteristics of the plan, in social, economic and environmental terms should be identified as part of sustainability appraisal.			

	Recognising that flood risk should be an integral part of all land use decisions, plans must include policies which promote the use in appropriate locations of sustainable drainage systems to control surface water as near to its source as possible, in accordance with paragraphs 8.1 – 8.6. For development control, it advises on pre-application role, consultation, developer contributions and EIA. Individual householders Changes of use Public open space, recreation and agriculture Caravan and camping sites Canals and other artificial water bodies Appendix 1 -Assessing flood consequences Appendix 2 Flooding and climate change Appendix 3- Environment Agency Appendix 4 Sustainable Drainage Systems Appendix 5- Relevant statutory and non-statutory plans Appendix 6 Warning notices/signs at caravan sites and other developments at risk of flooding			

B1.7 Summary of appeals and called in decisions analysis

There were 50 appeals or called in decisions identified since 2012 for analysis in the TAN 15 review. These were not part of the original methodology but because of the limited data on effectiveness, these were sourced as an alternative evidence base to review implementation These decisions were sourced from the (47) Planning Inspectorate Wales via Welsh Government, (1) Natural Resources Wales, (2) Home Builders Federation and directly from the Welsh Government website.

The appeal and called in decisions were analysed in terms of

- Main issues and other material considerations;
- Types of appeals/Called in decisions;
- Date and decision;
- C1 and C2 DAM zone; and
- Evidence of FCA and other.

Main Issues and material considerations

The analysis of appeals and called in decisions, where flood risk was the main issue found the other material planning considerations related to:

- Highway and pedestrian safety;
- Residents living conditions and amenity;
- Harm or inappropriate development in green belt;
- Housing or land availability;
- Regeneration* (Workshops);
- Viability;
- Surface water drainage;
- Biodiversity;
- Character and appearance of landscape/built environment;

Types of appeals

In terms of the type of appeals/called in decisions:

- Largest proportion related to s78 appeals.
- Other appeals included s174, s77(s77 &s78) and (s78 &s79).

Date and decision

The review only included appeals and called in decisions since 2012 (or last five years). From the appeal and called in decisions it was found;

- Two decisions were issued in 2012 and both were dismissed.
- In 2013 there were nine decisions an increase of 450% from the previous year.
- In 2014 90% appeals/called issued were dismissed (one from eleven allowed).
- In 2016 there were 16 appeals/called in decisions was issued.

- There has been a significant increase in the number of appeal decisions/called in decisions since 2012.
- There are eight times as many appeal or called in decisions in 2016 than 2012, an increase of 800%.
- The proportion of allowed decisions (from total number of decisions each year) rose from 10% in 2014 to 57% in 2015.

C1 and C2 Zones

The appeal and called in decisions reviewed relat7ed to proposals located in DAM C1 and C2 Zone and increasing number of those were proposed in C2.

Evidence of FCA and Other Evidence

Most of appeal decisions considered the evidence presented in an FCA despite being in C2. There were several appeal decisions and case studies which highlighted the principles of TAN 15 presumption against highly vulnerable development in C2. The decisions referred to an FCA being material to the decision. Other evidence considered included Local Development Plan policies and housing land supply and modelling reports. There were a few appeal decisions which referred to the role of the LPA and LLFA and evidence required and potential impacts on access and egress and emergency services. Two or three case studies have been identified in this review to exemplify the consideration given to these impacts.

Appendix C

C1.1 Evidence from workshops and survey

Two workshops were held for the TAN 15 review., one in North Wales and one South Wales. Both these workshops were held as a half-day session. The focus of the workshops was placed on introducing the TAN 15 review, the review findings to date, and two break out groups. The layout of the room was organised to allow mixed groups from different organisations with 5-6 participants to each table and a facilitator. A copy of the presentation for the workshops is provided in Appendix F1.1. The first break out group was focussed on a SWOT analysis of TAN 15 and the second break out group focussed on one or two key themes that has been identified in the face-to-face meeting. Each of the key themes was presented as a potential case study. The agenda for each workshop included:

Agenda: TAN 15 Review

North Wales Workshops

Conwy Business Centre, Llandudno Junction 14th March 2017
Clayton Hotel, Cardiff 22nd March

13:00-13:10 **Welcome**

13:10- 13:20 **Workshop objectives and agenda**

13:20 –13:40 **Introduction to TAN 15**

13:40- 14:00 **Review scope, findings and emerging themes**

14:05-15:00 **Break out Group – SWOT session** on strengths and weaknesses of existing planning policy on flood risk and development.

15:00-15:15 **Tea Break**

15:15-16:20 **Break out Group -Themes identifying session** on different area/problem/concern to help draw out consider evidence and identify if consensus/opposing views

16:20-16:30 **Next steps**

16:30 **Close**

C1.2 Breakout out session 1: SWOT analysis of TAN 15

For break out session one each table was introduced to the emerging SWOT analysis of TAN 15 and asked to discuss in groups and add to a flipchart, strengths, weaknesses, opportunities and threats using evidence from experience or potential case studies. The summary of SWOT from both workshops is summarised briefly in the table below:

Strengths

1. Precautionary principles-directing development to low risk.
2. Vulnerability types and impacts.
3. Focussed on justification, acceptability and consequences.
4. Good level of support for precautionary principles from group.

5. Inspectors decisions clear and Planning Policy Wales held in strong regard.
6. Two authorities (Gwynedd and Denbighshire) referred to national policy TAN 15 and one authority (Conwy) had three local policies on local flood risk and drainage.
7. It has a high profile, which promotes its overall message to developers.
8. It is working and is one of the more successful TANs because it is simplistic.
9. Its works well, easy to read, high profile and awareness.
10. Precautionary principles- Needs to be clarifies according, to development.
11. Justification, acceptability and consequences -needs updating, somewhat unrealistic,
12. Needs to be more focused on hazard risk.
13. Good notice, Newport risk incremental development, adaptive, add in defences when needed -make planning.
14. DAMs to NRW – but if align TAN 15 with risk management mapping NRW why have DAMs.
15. Wider awareness of flood risk
16. Approachable and clear.
17. Certainty in use/decision making.
18. It's a start.
19. Readable/ understandable easily applied for most cases.
20. DAMs to NRW – more responsive and up to date.
21. Good logic & fundamental principles.
22. Direct development to low Flood risk areas.
23. Climate change reconstruction.

Weaknesses

1. Development Advice Maps (river and sea flooding) only expected to be in place 3 years.
2. Multiple advice-TAN 15, Chief Planning Officer letters, and Ministerial Circulars.
3. Strategic/Local/Catchment requirements are not clearly defined.
4. Consideration of whole site/access and egress.
5. Weakness and opportunities associated with surface water mapping basis of 3km2.
6. Developers still progress applications in Zone C.
7. Access and Egress issues not been addressed. Links to emergency Service need to be established with Local Resilience Forum. NRW consultations are currently directing LPA to them for advice. Raises the question on whether the scope of NRW consultations should involve (NRW) LRF colleagues to provide a substantive approach as these colleagues. Evacuation/emergency planning access egress – are people being informed EPO. No consultation with emergency services/Emergency Planner or Resilience Forum.
8. Different approaches to validation between Local Planning Authorities on FCA from A1.15 in TAN 15. For one authority (Gwynedd Council), it only becomes a validation requirement if NRW identify and once identified the clock stops until this is received. Conwy CBC accept application proposals where FCA required, but one may not be requested if it's clear that proposal may be refused anyway.
9. DAM zone B not always useful and DAM maps don't always capture surface water flood risk and don't include climate change allowances.
10. Role of SFCA and links to LDP not clear.
11. Breach blockage analysis should this be tested against A1.14 as not clear in current TAN 15.
12. Issues with raising of land development, map challenge then development.

13. No template of what goes into FCA and no policy background for requesting FCA in DAM area.
14. Multiple advice docs -opens contradiction and maybe not sufficiently long-term.
15. Strategic/locally/catchment not clearly defined Problems of Wales/England border.
16. Reliance on emergency plans defences – cannot always give a warning.
17. Focus on new not existing development e.g. groundwater.
18. SFCAs don't consider ground water or surface water.
19. Private businesses not vulnerable e.g. childcare.
20. Are the vulnerability categories, right?
21. Inconsistencies - ≤10 units in highly vulnerable, no notification. >10 notification, but are all LDAs doing this for 710? No mention of groundwater vulnerability -BGS & local authority -Valleys FWMA responsibility.
22. FCA -effective flood warning system.
23. Viability of sites LDP.
24. Change in flexibility.
25. Lack of clarity of roles and responsibility, no link to building control roles/processes and no definition of roles - Access/ egress no form of consultation body.
26. Interpretation of technical criteria.
27. Flexibility in vulnerability classification.
28. Policy summary not quite accurate.
29. Key policy messages not headlines/flagged up.
30. Call-in criteria 'entirely in C2' not helpful/ too rigid.
31. Accumulative effort.
32. Only guidance – how enforceable over written e.g. Newport school.
33. Zoning names A-D, Zone B and Clarification of zones c1 & 2
34. Terminology RP and Interpretative.
35. Coverage of coast -map to distinguish fluvial/tidal.
36. Tables are not prescriptive with poor description.
37. Prescriptiveness of tables and DAM's.

Opportunities

1. Types of development are limited to three categories-potential for more categories or more flexibility?
2. Stronger integration of surface water flooding.
3. Align DAM with hazard matrix.
4. Vulnerability categories including scale of developments should be considered.
5. Change of use guidance/minor development.
6. Climate Change needs to be incorporated into the update and tidal flood zones
7. Local/Urban Regeneration A1.14 and allowances for exceptions i.e. Caernarfon
8. Surface Water Mapping should include management, roles and responsibilities of surface water flooding.
9. Need to better define responsibilities, and clearly set roles & responsibilities – NRW role/ planning responses.
10. Update C1 and C2 more regularly but C1 and C2 designations unnecessary.
11. Need to implement schedule 3 of FWMA 2010.
12. Need more focus on working with water, not against it, very blunt instrument.
13. Types of development are limited to 3 categories -needs reasoning & rationale.

14. Stronger integration of surface water flooding -different to fluvial flooding shouldn't be tied in.
15. Align DAM with hazard matrix -job of the FCA.
16. Causes approved p1 inspection much more needed to policy than LDA especially HV in C2
17. Greater precaution where higher risk.
18. No reference to ground water flooding.
19. Reference to exceedance flows from drainage systems above Q30.
20. WBGF Act.
21. Developer contributions -Newport regen/LDP / CIL Regulations.
22. Porthcawl LDP – Vale of Glamorgan exception.
23. PPW TAN 15 infrastructure & innovation housing resilient approaches.
24. Surface water -strengthen types of development.
25. Clarification expertise and expand knowledge -take pressure off NRW.
26. Improved presentation and consistent and summary /easy to read version Include CC as appendix for update.
27. WG call-in process.
28. Adapt people v hazard methodology.
29. Mitigate first model second increase consultee process.
30. Insurance clarifications control & resilience policy/ high way.
31. Strategic approach to all development risk.
32. Context for SDPs/ WDF FCA.
33. Hazard -changing approach to A1.15 (or better in PWW).
34. Address SW in holistic approach.
35. Address Flood risk off site – flood protection policy – continual small development.
36. National guidance.
37. Robust reason to request FCA in Dam- mapped areas with evidence.

Threats

1. Potential for accepting residential development in Zone C.
2. Is the absence of SMP policy areas in DAM's a threat?
3. Appendix guidance on FCA is not a living document.
4. Some issues/threats were identified from early implementation of TAN 15 and extant planning permissions issues/potential issues for frequency of updates.
5. Local urban regeneration project in St Helens Street Caernarfon has involved a standoff between stakeholders and undeveloped since 2006 was having an impact on vitality of town.
6. Potential to put communities at greater risk/issues of blight.
7. Over-reliance on NRW and scope of NRW advice.
8. FCA's could become more challenging and flood risk work more technical.
9. One off flash flooding issues.
10. DAM needs minimum of 5 years and include climate change.
11. Potential for accepting residential development in zone C.
12. Is absence of SMP policy areas in DAMs a threat.
13. Ground water, surface water, ordinary water course risk.
14. Paragraph 6.1 ….and Paragraph 6.2 'should not' not 'can't'.
15. Planning officer access to assessments of evacuation plans -advice LRF

16. C" classification is too absolute.
17. Politics involved in decision making.
18. Uncertainty.
19. Balanced approach to keep Wales open.
20. Expertise within public sector.
21. How to link to wide range of legislative changes lots of new regulations.
22. TAN 15 does not cover duration of flood event.
23. Integration/ duplication with schedule 3.

C1.3 Break out session 2: key themes analysis of TAN 15

The themes breakout session stimulated the most discussions. Each table was provided with print outs of one or two themes which included a case study. The material for these themes is provided in the copy of the presentation (separately in Appendix F1.1). The table below highlights some of the key points identified by the facilitators for each of the key themes.

Theme 1 Flood Consequence Assessment (FCA) Trigger

- NRW's flood map should be updated when the new flood map comes out.
- At present it is clear, but are they correct? Are they too constrained at present and need to be based on evidence.
- LPA's should be able to insist on FCS if yes/appropriate/corroborated evidence supports
- FCA required: presumption yes but scale and scope needs to be more flexible and pragmatic based on nature of development and hazard.
- DAM replaced by NRW flood map-yes but need to agree policy trigger of 1% instead of C2.
- FCA for all large developments is too simplistic.
- NRW should also consult with LAs about their flood risk, because LA's know more about flooding 'hotspots', especially in relation to surface water flooding.
- NRW need to keep up to date with C1 and C2 flood zones. NRW want to keep/ get rid of these categories as multiple maps/some confusion.
- NRW maps do not identify defended and undefended.
- Is allowing development in defended areas setting out it's safe to build behind defences.
- There is a lack of clarity about what C2 means.
- There should maybe a requirement that all large developments over a certain size (i.e. 10 houses or more) should have an FCA in all zones.
- There should be better guidance in the updated TAN 15 on what LA's are supposed to do as a requirement i.e. Is it the LA's job to ask the developer how water will be treated on site?
- Appendix 1 should have figures and CC.
- Unclear level of FCA required for e.g. change of use.
- All LPA's can insist on FCA, some don't, even if on zone A if greenfield potential and flood risk evident.
- Potential case study examples: Snowdonia updating local plan and need site allocations to build in FCA's to build in climate change allowances.

Theme 2 Shoreline Management Plan or Coastal Change Areas

- SMPs are not much of an issue as they are not statutory. It was agreed that it is hard to accommodate for SMPs.
- Some FCA assume defences in place-so SMP policies are considered.
- There is opportunity for developer contributions to upgrade coastal defences.

- It would help if TAN 15 and others identified SMP policies to identify developer contributions?
- Some LDP identify CCA's. some identify specific areas e.g. Conwy-Kinmel Bay, some require development in line with SMP.
- Ceredigion want to incorporate some aspects into their LDP, however this has been difficult. Snowdonia acknowledge the existence of the SMP in their LDP, however they have had issues with coastal squeeze and Fairbourne, including polices and impacts on habitats.
- Fairbourne is currently being used as a benchmark, for all other LAs. Fairbourne has shown the implications of the SMPs. SMP2 has more weight than SMP1, however it didn't consider any compensation to residents.
- Most attendees had never used TAN14.
- All the relevant sections of TAN14 should be absorbed into the updated TAN 15 document.
- Need to bring TAN 14 into TAN 15 discussed, and need to incorporate Wellbeing Act but where does Coastal Erosion fit and how is this addressed. Amenity and Coastal FRM benefits need to be recognised. But what value does TAN 14 have given that's its very different. Should coastal erosion be brought into TAN 15?
- Potential case studies-Pier Pavilion Llandudno.

Theme 3 Roles and Responsibilities

- LLFA not viewed as a statutory consultee role and LLFA funding question raised.
- One local authority described local mapping triggers (Wrexham CBC) and staged approach to site allocations in LDP against surface water drainage requirements SPG (Wrexham CBC).
- Flintshire and Wrexham Councils has supplementary planning guidance on local surface water drainage requirements and Conwy (1st January 2017) have a local validation requirement for major applications.
- LPA considered more/strong emphasis placed on NRW consultations and there were areas of overlap so LLFA expectation not to double count. Need for LPA to have a good understanding was important given balance required, and explanation required to members on flood risk issues.
- The LPA raised the issue that there is no formal validation requirement from 1APP.
- Question raised by Emergency Planning role on consultations on flood evacuation plans as part of an FCA and whether that was appropriate to consult and scope of responses required and whether this should be directed by wider emergency plans.
- Emergency planning were not consulted on original TAN 15 and issues still not resolved. There were arguments for and against technical guidance requirements, need proportionality and cost for small development sites and wider strategic studies as part of an LDP process and whether this was sufficiently clear in section 10 of TAN 15.
- The requirements for flow charts and linked roles and responsibilities was discussed
- In terms of drainage requirements, there is no clear specification from outset, despite potential implementation of Flood and Water Management Act 2010 schedule 3. Local solutions have involved preparation of SPG. But revisions in TAN 15 will need to take account of these changes.
- Expertise but lack of resources and question of capacity and core work versus advisory.
- Resistance to making decisions clear response.
- Response often disproportionate.
- Communication planners needs more steer.
- Pre-application process – does this work to make planning more efficient?
- NRW only comment on main rivers & sea – who scrutinises everything else?

- Tell developers to get external advice on access & egress.
- Regionalise some functions to achieve critical number of competency & expertise -links to SuDS body.
- Examples of English LPA's raising council tax to pay for flood defences & monitoring e.g. Somerset & Gloucestershire.
- Will city regions have focus on managing flood risk?
- LLFA involvement – provide review, request for information but can't undertake drainage assessment – need to work better together, policy expertise need to improve to support DC.
- Reliance on what developer says – applies to a lot of issues.
- Lack of enforcement & monitoring – will impact on issues like SuDS.
- Adoption issues: SuDS: crucial role in Sabs not happening: schedule not yet issued by WG although consultation imminent – no body to monitor & review.
- Down to LPA to check every planning application -but this won't happen because of resources/knowledge?
- Potential case studies: FCA criteria Wrexham CBC or Flintshire and Wrexham SPG on drainage requirements and Prestatyn appeal decision, Denbighshire CC, Somerset and Gloucestershire.

Theme 4 FCA and Strategic FCA Technical Guidance

- Many issues around roles and responsibilities related to FCA, issues of quality over quantity, case by case requirements, modelling studies and level of certainty/uncertainty behind the threshold requirements in Appendix 1.
- The question about whether FCA requirements were clear was discussed, and some differences of opinion on levels between LLFA and LPA identified. There was an LLFA considered the requirements too prescriptive.
- Differences of opinion were evidences in group on whether technical guidance should form part of main document and be owned by Welsh Government or whether it should signpost to industry standard guidance such as CIRIA or BS.
- SFCA not expertise/not sued.
- Shelf life unstable.
- FCA-Table structure more useful and if clearer this may help communication issue
- Checklist -who are they useful to?
- There is a consolidation of documents required.
- There is a need to review A1.7
- Language is open to interpretation i.e. thresholds.
- How to improve on clarity and updating re NRW role only rivers and coastal flooding
- Include an appendix that can be updated along with other changing elements such as climate change.
- Responsibility with Welsh Government.

Theme 5 Urban Development

- Group felt that the presumption against all HVD in C2 was too restrictive and not always the right thing.
- Group liked the idea of 'functional floodplain'.
- Discussion over the justification for development where there would be no 'net increase in vulnerability'.

- Lots of discussion about LPA's making informed decisions that reflect the local needs for development.
- Awareness of wider sustainability context needs to be looked at
- Flexibility need centres of towns/cities to develop.
- Phrases urban development is too broad.
- NRW need to look at risk/consequence before development.
- Residual risk of outcomes and risk needs to be considered.
- Only 1 of many planning considerations.
- Therefore, is flexibility as TAN 15 is not prescription.
- Use of hazard values for failures in defencing – helps as a decision-making tool.
- Weight attributed is specific.
- Pragmatism is needed case by case.

Theme 6 Impact of development on flood risk to others

- Many felt that TAN 15 should consider the change in risk to people, rather than just flood depth.
- Onset of flooding discussed. Recognised as important, but difficult technically to define/use. Certainly, there are cases where a wider range of events should be considered.
- Ground discussed both pros and cons of having absolute thresholds. No consensus reached.
- Potential for cumulative impacts discussed. No consensus reached. Generally, felt it was LPA responsibility to consider cumulative impacts.
- Technical burden of undertaking and reviewing FCA's discussed.
- Minimal risk needs clarification and context specific thresholds.
- Process needs more flexibility needs to be proportionate, to size pf the development
- LA should decide on acceptability should 'criteria change'
- Start quantifying hazard/ LLOL/ damages would improve decision making but would still be subjective.
- Currently not descriptive so completely flexible but is subjective – residential differences
- National guidance should add the LPA in what 'impact' is acceptable.

C1.4 Workshop survey

The survey was provided at the beginning of the workshop and participants were asked to complete it during or after the session. It contained five simple questions and asked for contact details. The questions in the survey included:

1. Are the precautionary principles of TAN 15 clear and well supported and could you provide examples?
2. Are there areas of existing policy which are unclear or open to interpretation? For example, is it clear that highly vulnerable development in Development Advice Map (DAM) Zone C2 is not acceptable?
3. Should greater focus be placed on surface water flooding and drainage (both policy document and DAM maps)?
4. Would you like to see changes to Development Advice Map triggers, and what improvements would you like to see?
5. Would you be willing to participate in a follow up interview?

The full responses and info graphs for the workshop survey are provided in separate Appendix F1.2.

C1.4 Workshop summary

A total number of fifty-five participants attended the two workshops. From those, thirty-four completed the survey. Sixty percent advised they would be willing to participate in a follow up interview (approx. 24 people) in total. There was interest from those who were unable to attend the workshops to participate also including BIBA, Atkins and South Wales Police. The purpose of the interviews was specifically to follow up from workshop discussions, clarify and source additional information for case studies.

C1.5 Workshop flipcharts

Appendix F1.3 includes scanned copies of the flipcharts from the South Wales workshop. This are useful to illustrate the responses from the stakeholders on the SWOT analysis and the key themes.

Appendix D

D1.1 Evidence from case study analysis

A list of key case studies was drawn up from the information obtained in the face-to-face meeting, workshop, workshop surveys and follow up. This identified four or six potential case studies for each of the key themes and total of 51 case studies in total. A guide was drawn up for the project team to methodically obtain and review the information for each of the case studies. This guide provided a steer from the scope of the review, key themes and key questions in the workshop survey, availability of information and any potential conflict of interests or pending decision. Each case study was required to have the following key information;

- Location including site address and postcode (or NGR) and map to scale;
- Local Planning Authority Name;
- Short summary of key issues in planning report;
- Proposed development- plan or photo;
- Decision or appeal references and dates;
- Copies of appeal decision (if relevant) and Local Planning Authority decision notice.

There are six review objectives which relate to the development of the case studies (objectives 2a, 2b, 2c 2e, and 4b set out in Table 2-1). The questions used to inform the drafting of the case studies included:

1. What's the rigour behind application of justification and acceptability tests in C1 and not C2 for highly vulnerable development? Explain answer.
2. What do you understand as sustainable locations, and how does this differ to justification test of previously developed land?
3. What criteria is required to test sustainability of proposals in flood risk areas?
4. What are key strengths and limitations of existing planning policy on flood risk and development?
5. What opportunities are there to update and improve existing precautionary approach?
6. How possible is it to determine success of existing policy at directing development away from areas at most risk of flooding?

This table below summarises the key themes against the identified case studies, whether or not the case studies should be illustrative and tasks taken to complete and potential interviewees identified. This list of potential interviewees was shortened and number of case studies eliminated (subject to current appeals or called in decisions) following discussions with Welsh Government in April 2017.

No.	Theme	Potential Case Studies	Illustrative only?	Interviewees/Case Study Tasks
1	Flood consequence triggers from DAM maps	1. Swansea Library 2. Milford Marina, Pembrokeshire 3. Bangor gypsy site (LPA reference C14/1111/25/LL) 4. Large site Swansea affected by viability- (LPA reference 15/1295/13) 5. Rhonda Cynon Taf 6. Monmouth appeal decision(s) at public inquiry (3164287)	No	1. No- Email -done 2. No- Website/Reports identified/done 3. No-Email-done 4. No- Email HBF/Dan-done 5. Yes-two contacts -done 6. Yes-two contacts-done
2	Consideration of shoreline management plans and coastal change areas (TAN 14)	1.Fairbourne 2. Gwynedd and Anglesey Joint Local Development Plan (LDP) 3. Snowdonia LDP 4. Aberystwyth	Yes	1. No 2. No-Email contact-done 3. No-Email contact -done 4. Yes-contact-done but unavailable for interview 1st and 2nd
3	Roles and responsibilities	1. Somerset and Gloucestershire Council 2. Two appeals in Prestatyn (Breach analysis/tolerable conditions and consultations and types of development) (3147438 (LPA reference 43/2014/1166/PO Warren Drive and 3133153 Mostyn Road Gropnant (LPA reference 52381) 3, Population growth by Local Authorities in Wales and risk of flooding by rivers and sea.	No	1. Yes-contact TACP Climate Change -done document/report published October 2016, no response to interview request. 2. No-Email two contacts-done 3. Document analysis of maps, statistics and /LDP-done
4	Flood consequence assessments	1. Queen Street, Queensferry, Flintshire Appeal decision 3136858(053080) (LPA reference 43/2014/1166/PO)	No	1. No-Email contact, check Council website with LPA reference from appeals spreadsheet-email done 2. No-Internal but current project so potential conflict.

		2.Denbighshire Strategic Flood Consequence Assessment-JBA? 3. Bont Farm, 4. Llanwrst 5. AustinTaylor, Bethesda, Gwynedd C13/0036/13/AM 6. CIRIA or BS standards? 7. Access and Egress Gwynedd appeal decision (3035795) (LPA reference C14/1202/20/AM) 8. Sources of flood risk appeal decision (3132838) Newport (LPA reference 15/0478) 9. NRW flood consequence and breach and blockage analysis		3. No-NRW email contact 4. Yes-contact Conwy CBC-email done but not available 5. Yes/No links from NRW survey response-check file. Done and google search found LPA file. 6. No- Document analysis of website and Flintshire Wrexham SPG request by email 7. No, Council website and Email-done 8. No appeal Decision-Council website 9. Yes/No and document analysis of guidance provided by NRW. Survey response very detailed.
5	Innovative and flood resilient design	1. Lower Broughton, Salford 2.Humber Resilience Project 3. Pier Pavilion, Llandudno 4. Milford Marina, Pembrokeshire 5. The Guardian, Floating Homes	Yes/No	1. No-internal/document analysis 2. No-internal/document analysis 3. No, Email two contacts Conwy CBC-done email Conwy LLFA, done, Additional info on email. Unavailable. 4. No, see above.
6	Urban Development	1. Newport Local Development Plan (LDP) 2. Swansea 3. Port Talbot 4. River Thames 5. Caernarfon 6. Rhyl and Towyn 7. Vale of Glamorgan	No	1. Yes, contact Council website-done email, limited/no availability 2. No Email and Council website 3. No-check internally 4. No, check internally 5. No, contact NRW or Gwynedd Council contact done email

		8. Porthcawl 9. Bridgend Largely search led “flood risk, urban development SFCA		6. Yes, contact done, Council website-done email, no availability 7. No check internally/Council website 8. No-Check internally/Council website 9. No-check internally/Council website
7	Impact of development and flood risk on others and off site	1. Appeal decision, Kinnerton Lane, Flintshire (3156854) (LPA reference 05470) 2.Appeal decision, Former Clayton Works, Pontraddulas (3132964) (LPA reference 2013/1254), Swansea 3. Wave action in tidal locations in Sun Centre Rhyl and Warwick Chemicals Mostyn	Yes	1. No-Council website with LPA reference 2. No -Council website with LPA reference 3. No/Yes, Council website NRW) see detailed survey response/further face-to-face? 4. No/Yes Council website NRW). See detailed survey response/further face-to-face.
8	Surface water drainage	1. Flintshire and Wrexham Supplementary Planning Guidance (SPG); 2.Bridgend appeal decision on surface water drainage (3121472) (LPA reference P/15/164/FUL) Bridgend	No	1. No, Council website/contacts -checked-phone and email 2. No Council website/Email -done email
9	Vulnerability categories and issues of “development” proposals/site	1. Swansea Library 2. Caernarfon heliport C13/0796/1766 3. Appeal decision Former wool depot (2217565) LPA reference 01/2012/1607/PO 4. Issue of site boundary appeal decision 3138074 (LPA reference 2014/1906) Swansea 5.Highly vulnerable development/FCA Carmarthenshire appeal decision (3023037) (LPA reference Ref E/31599) 6. Anglesey Boathouse refusal-NRW	No	1. No, Council website-done email 2. No, (NRW) Council website-done email 3. No, Council website 4. No, Council website 5. No, Email/Council website 6. No, Council website 7. No/Yes Council website 8. Yes (NRW) Document analysis. See detailed survey response.

		7. Change of use planning application from tile shop to children's nursery St. Asaph 8. Use classes order comparison		
10	Acceptability of residual risk and issues of uncertainty	1.Maude Street, Connah's Quay appeal decision (3132838) (LPA reference 15/0478) 2.Camerthenshire, tolerable conditions called in decision (2215871) (LPA reference W/2864, Cardiff (2205453) No LPA reference. 3.LDP allocation/principle of development appeal decision (2215132) (LPA reference 12/0637/13 Aberdare 4. Justification and acceptability tests or appeal decisions in Abergele (3140639) (LPA reference 0/41842and Llanymynech (3141917) (LPA reference P/2015/0852) 5.Floodplain compensation guidance by Environment Agency 6. Freeboard guidance -Environment Agency/NRW/WG and DCLG	Yes/No	1. No, Council website 2. No Council website 3. No Council website 4. No Council website/Email 5. No, Document analysis/Email/discussions with NRW See detailed survey response. 6. No Document analysis/Email/Discussions with NRW See detailed survey response

Appendix E

E1.1 TAN 15 factual update

A factual to TAN 15 was drafted early 2016 by Welsh Government (WG) and reviewed with key staff from Natural Resources Wales (NRW). This note summarises the main queries raised in the draft factual update and the background to the review of Technical Advice (TAN) 15: Development and Flood Risk and Planning Policy Wales (PPW).

	Query	Reference to factual update document	Notes or Action for review
1	Policy Clarification note (CPO)		
2	DAM vs NRW flood map decision for Wales	Para 1.3 Section 4.2 Section 10.4	Background information on DAM map project sought from NRW Need to incorporate 1000yr +cc publication Incorporate cc in maps Zone A-what about localised flood risk sites for major development sites/which could cause/exacerbate flood risk elsewhere? Move to NRW Flood Map for Wales? Is Zone B to be removed or is it being renamed as lower risk of flooding area? Localised flooding problems could be missed if limited to zone maps? Reference to NRW Flood Map
3	s18 and s19 data request	Section 2.3	S18 information requested. S19 information required?
4	Significance of climate change challenge	Section 2.4 Section A1.4	Impact of climate change/significance of challenge to be considered. Reference to level of uncertainty in climate change projections/estimating extreme flood events but the evidence of recent large-scale events.
5	Update to reference of Flood Re	Section 2.7	Noted.
6	Role of insurance companies and developers at pre-application stage	Section 2.9 Section 7.6 -references	Workshop Perhaps clarification required for the flood map process challenge. References downloaded. ABI guide to resistant and resilient repair after a flood. C293 Standards for the repair of buildings following flooding. DCLG Improving the Flood Performance of New Buildings. Six steps to flood resilience BRE and Flood Forum blue pages
7	Figures and maps -Lle or NRW or WG		

	Query	Reference to factual update document	Notes or Action for review
8	Wellbeing and Future Generations (Wales) Act 2015 and Planning Act (Wales) 2015 and the Environment Act (Wales) 2015	Section 2.10 Section 11.16	References to new statutory duty on sustainable development from legislation which replaces section 2.10 of the Government of Wales Act. Not Integrated Coastal Zone Management-Sustainable Management of Natural Resources.
9	Timescales Planning Policy Wales, Developments of National Significance (DNS) and Flood Risk Management Plans (FRMPs).	Section 2.11	Context of other plans strategies is important
10	High risk/multiple scenarios-C2	Section 3.1	The note from NRW suggests a deletion of “high” risk of flooding
11	Roles and responsibilities: Note to WG to include LLFA’s Emergency Planning, Emergency Services and Local Resilience Forum and clarify requirements for justification	Section 3.4	Whole of the site within red line or proposed development -influence of this on consultations. Issue of substantive response Advice of IDD or just riparian owners?
12	Highly Vulnerable Development/vulnerability classification and low vulnerability/lifetime of development	Section 3.4 Section 5 and Figure 2 A1.5	Does reference to HVD in C2 need to be clarified or reinforced. Is amending the categories of vulnerable development an option? Clarification of table against vulnerability and lifetime of development against classification for mixed use type of development proposals Influence of type and uncertainty on consultation responses by NRW. Marine type developments against appendix 1 requirements. Reference to Life time of Development and mixed-use proposals in A1.5
13	Justification zones, removal of lower risk, difference between C1 and C2, challenges and loop holes, decisions, and presumption against HVD in C2	Section 7.3 Section 11.1	Development “over lifetime of development” Does it confuse requirements of section 6.7and appendix 1 (A1.14 and A1.12). Does it create loopholes and challenges and used to justify inappropriate development minimal risk to life. Need to remove minimal reference. Need to demonstrate compliance against section 7.5 prior to determination? Does the justification requirement fall to LPA or developer? FCA should demonstrate likely cause of flood risk/ not NRW

	Query	Reference to factual update document	Notes or Action for review
14	Effect of flooding on water and sewerage infrastructure	Section 7.7 and Section 7.8	Does this fall between water quality and FRM? Example of STW wanting to upgrade assets in floodplain-potential example/case study. Is there a requirement for the LPA to carry out sequential test/or should this be considered at local development plan stage.
15	Pre-application consultation	Section 11.4 A1.9	Reference to LLFA on pre-application discussions is required. NRW have dual responsibilities on flood risk and flood defence. Does the reference to consequences being "acceptably managed" need to be deleted? NRW scope of advice Does emphasis of A1.9 need to be placed on developer not NRW on provision of emergency plans/activities.
16	Community Infrastructure Levy (CIL)	Section 11.1	Wider benefits and use of conditions and contributions needs to be considered.
17	Licensing NRW/EA and EIA requirements	Section 11.14	Relationship of EIA, Appropriate Assessment and marine licence legislation and consents, role, advice and process being promoted at earliest stage as possible.
18	Referencing to interim standards for sustainable drainage systems	Section 8.5	Suggest referencing to CIRIA and WG non-interim standards

	Query	Reference to factual update document	Notes or Action for review
19	Changes of use, development management regulations and flood consequence assessment requirements/caravans	Section 11.20 Section 11.22 A1.16 A1.17	Re-write? Do the justification tests apply? What are issues in relation to access and egress? Is an FCA required? Does this link to vulnerability classifications? Clarification on intensity/intensive use of the site? Is this limited to new caravan sites or does it need to consider all applications for extensions or redevelopments, seasonal or fixed structures? Limits to planning remits and controls required. References to planning enforcement needs to be deleted. References to WG caravan sites LRF procedures/flood warning procedures Imposition of conditions involving the incorporation of physical flood defence features-can this be enforced? Detail of an FCA (see detailed comments) sustainability, probability, climate change, hazard (depth, velocity, precautionary measure) Compensation requirements like for like? Simple tabular summary required. Measures not conditions required.
20	Blockage and breach analysis A1.14	A1.5 A1.6 A1.7	Add bullet on the impacts of structure failure, blockage of bridges and culverts or breach of raised flood defences for 0.1% assessment. Clarify that it's not above the requirements of A1.14 BUT within them and TAN 15. Consideration of flood defences/extreme events. LDP or LPA requirements.

	Query	Reference to factual update document	Notes or Action for review
21	Acceptability-Hazard matrix instead of thresholds and minimum requirements site by site basis	A1.10 A1.11 A1.12, A1.13 and A1.14 A1.15	Reference to scope of FCA being done by applicants using local knowledge. Should hazard matrix be included? See detailed comments on list of A1.12 and A1.13 and A1.14 NRW recommends removal of thresholds table in A1.14 and replaced with hazard matrix. Need for assessment of extreme tidal not fluvial? Acceptability of access and egress requirements from CPO Jan 14. Replace table in A1.15 with hazard matrix Example: NRW assessed Cardiff and Rhondda modelling exercise demonstrated that its highly unlikely that this criterion could be met in the majority of cases,
22	Summary of policy requirements-table	Section 9	Does remain unchanged
23	Action through development plans	Section 10.2 Section 10.6	Need to refer to LLFA for local flood risk information. Support recommended the use of FRMPs and SMP's to underpin strategic assessments as part of LDP's, and references to new legislation. Is further clarity required on what is needed prior to allocation of a site in zone C. NRW examples of only broad level assessments being completed, and stance that FCA will be completed at detailed planning application stage. But given that its allocated affords it more weight and therefore justification. Does this need to make reference against the presumption of HVD/ES in C2 and that any proposals to allocate HVD/ES in areas of flood risk must be subject to more detailed assessments. Is a separate appendix on minimum content of SFCA required?

Appendix F

F1.1 Workshop presentation

F1.2 Workshop survey results

F1.3 Workshop flipcharts

TAN 15 Review

Workshop 1

Welcome

Welsh Government

Llywodraeth Cymru
Welsh Government

www.gov.wales

Nodyn Cyngor Technegol 15:
Datblygu a Pherygl o Lifogydd
Technical Advice Note 15:
Development and Flood Risk

Gwerthusiad polisi a chyngor
An evaluation of policy and guidance

Jonni Tomos
Uwch-Reolwr Cynllunio / Senior Planning Manager
Y Gyfarwyddiaeth Gynllunio / Planning Directorate

Wedi gweld dyddiau gwell..?

An out-of-date TAN…?

Yn 2004…

- Enillodd Federer yn Awstralia
- Agorwyd Canolfan y Mileniwm
- Lansiwyd TAN 15 gan y Gweinidog Amgylchedd a Materion Gwledig

In 2004…

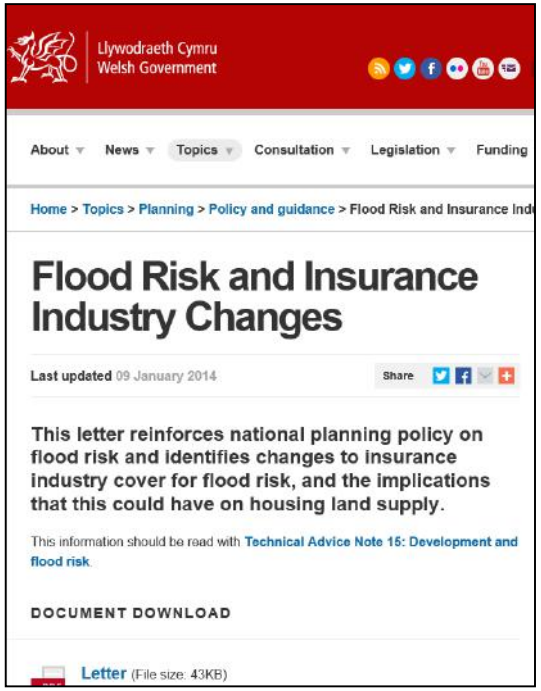
- Federer won Australian Open
- Millennium Centre opened
- TAN 15 issued by Minister for Environment and Rural Affairs

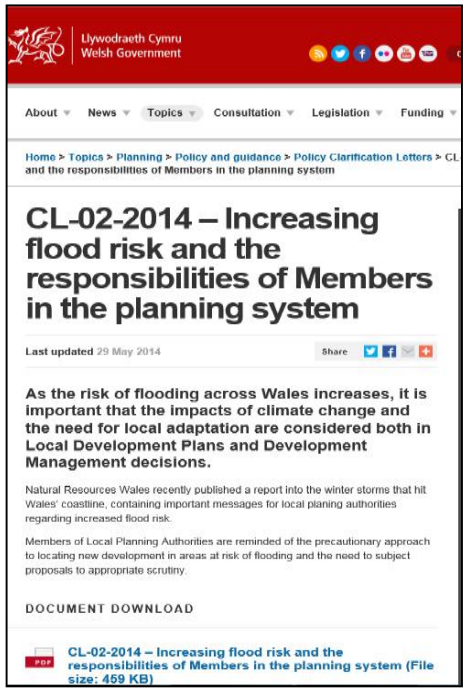
Wedi gweld dyddiau gwell..?
An out-of-date TAN…?

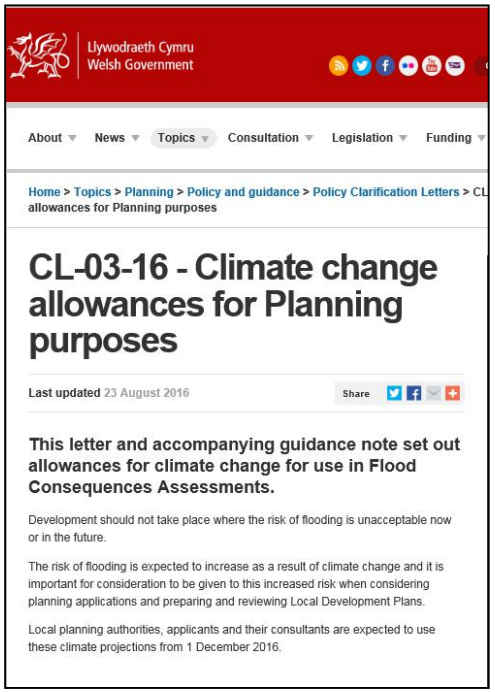
• Deddf Cynllunio 2004 yn rhoi sylfaen i fynd o CDU i CDLl	2004 Planning Act requires LDPs to replace UDPs
• Lansio Cynllun Gofodol Cymru	Wales Spatial Plan launched
• Pwyllgor Cynaliadwyedd CCC– Ymchwiliad i lifogydd 2010	NAfW Sustainability Committee - Inquiry into Flooding, 2010
• Adolygiad Pitt	Pitt Review
• Cynlluniau Rheoli Traethlin – ddwywaith	Shoreline Management Plans – twice
• Mapio dŵr wyneb	Surface water mapping

Mwy na TAN 15
Not just TAN 15

2014 **2014** **2016**







Pam gwerthuso TAN 15?
Why evaluate TAN 15?

• Ymrwymiad i'r fframwaith o ragofalon yn parhau	Commitment to precautionary framework remains
• Defnydd anghyson	Inconsistent application
• Mathau newydd o ddatblygiad	New types of development
• 20,000 o dai fforddiadwy erbyn 2021	20,000 affordable homes by 2021
• Egwyddor datblygu cynaliadwy	Sustainable development principle
• Adolygu Polisi Cynllunio Cymru	Planning Policy Wales review

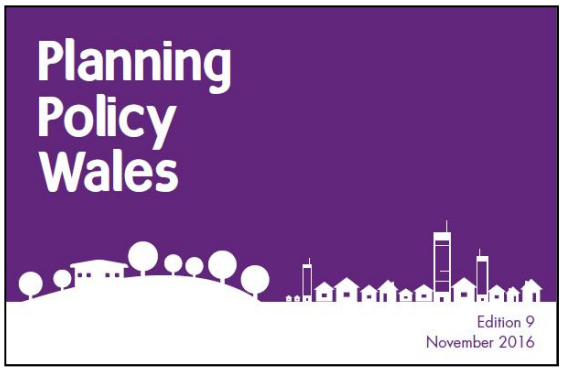
Gofynion y prosiect
Project requirements

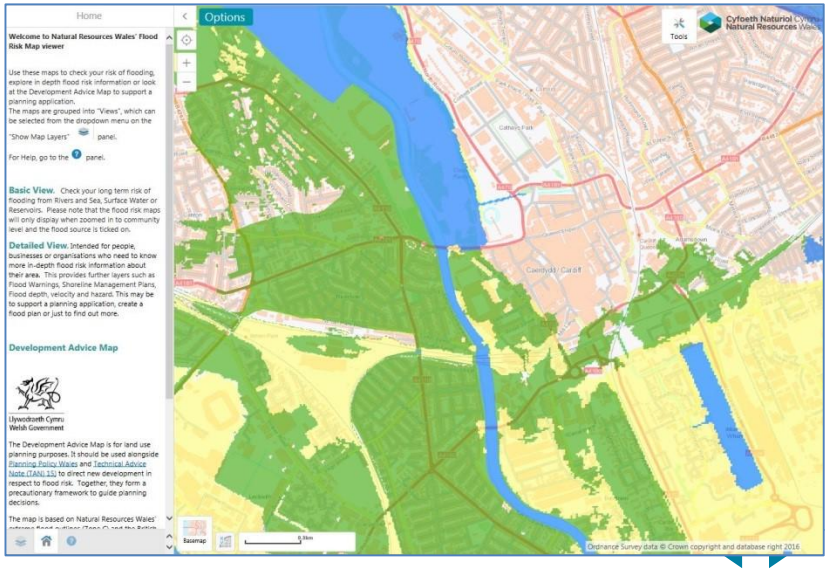
• Adroddiad ymchwil gyda argymhellion	Research report with recommendations
• Tystiolaeth o gryfderau a gwendidau polisi cynllunio	Evidence of strengths and limitations of planning policy
• Ydy'r profion cyfiawnhad a chanlyniadau yn asesiad teg?	Do justification and consequences tests provide a fair assessment?
• Asesu fyddai ymagwedd fwy cyfyngol yn y lleoedd gyda'r perygl mwyaf yn addas	Assess benefits of a more restrictive approach in areas of greatest hazard
• Ail-asesu pa ddatblygiadau sy'n fwy a llai agored i niwed	Re-evaluate which developments are highly vulnerable and less vulnerable
• Enghreifftiau lle mae polisi yn atal datblygu risg isel	Examples where policy restricts low risk development

Newidiadau posib
Potential changes

• Eglurdeb ar gyfrifoldebau	Clarity on responsibilities
• Newid yr hinsawdd – dangos ar fap?	Climate change – show on a map?
• Mwy o bwyslais ar ddŵr wyneb	Greater emphasis on addressing surface water
• Perthnasedd Cynlluniau Rheoli Traethlin	Relevance of Shoreline Management Plans
• Mynediad a dianc – y gofynion	Access and Egress – the requirements
• Terminoleg ac enwau cyfoes	Current terminology and names

Beth arall sy'n digwydd
What else is happening





Agenda and Objectives

JBA Consulting

Workshop Agenda

- Welcome
- Workshop agenda and objectives
- Introduce context of TAN 15 review
- Review scope, findings to date and emerging themes
- Break out group 1: SWOT analysis (45-55 mins)
- Tea Break (15 mins)
- Break out group 2: Themes (45-55 mins)
- Next Steps

Workshop Objectives

- Provide brief context of TAN 15 review
- Enable discussions on strengths and weaknesses of policy
- Focus on key review themes and potential case studies

TAN 15 Review: Context

Welsh Government

Review scope findings and emerging themes

JBA Consulting

Challenge of Flood Risk

Natural Resources Wales s18 report (2014-2016) estimates current flood risk

- 208,500 properties are at risk from flooding (rivers and sea flooding);
- 11,100 of 148,150 residential properties are at high risk;
- 163,000 total properties at risk of surface water flooding;
- 2,126 properties at coastal erosion risk with no active intervention (reducing to 145 properties with full implementation of SMP policies);

Future flood risks

Planning Policy Wales and TAN 15

Key Legislation

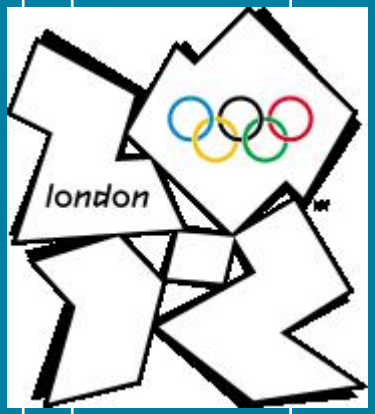
- Environment Act (Wales) 2016
- Positive Planning (Wales) Act (2015)
- Wellbeing of Future Generations (Wales) Act (2015)
- Flood and Water Management Act (2010);
- Flood Risk Regulations (2009)

Development and Flood Risk Policy

- Planning Policy Wales (Edition 9) 2016;
- Technical Advice Note: Development and Flood Risk (2004);
- Chief Planning Officer Letters;
- Policy Clarifications
- Updated DAM maps ;

Events since 2004

2004	2006	2009	2012	2014	2017
George Bush re-elected Strictly Come Dancing	Twitter launched	Barak Obama 44th President USA Water discovered on the moon	London Olympics	Winter Flooding Events 2014 England and Wales	Year of Legends

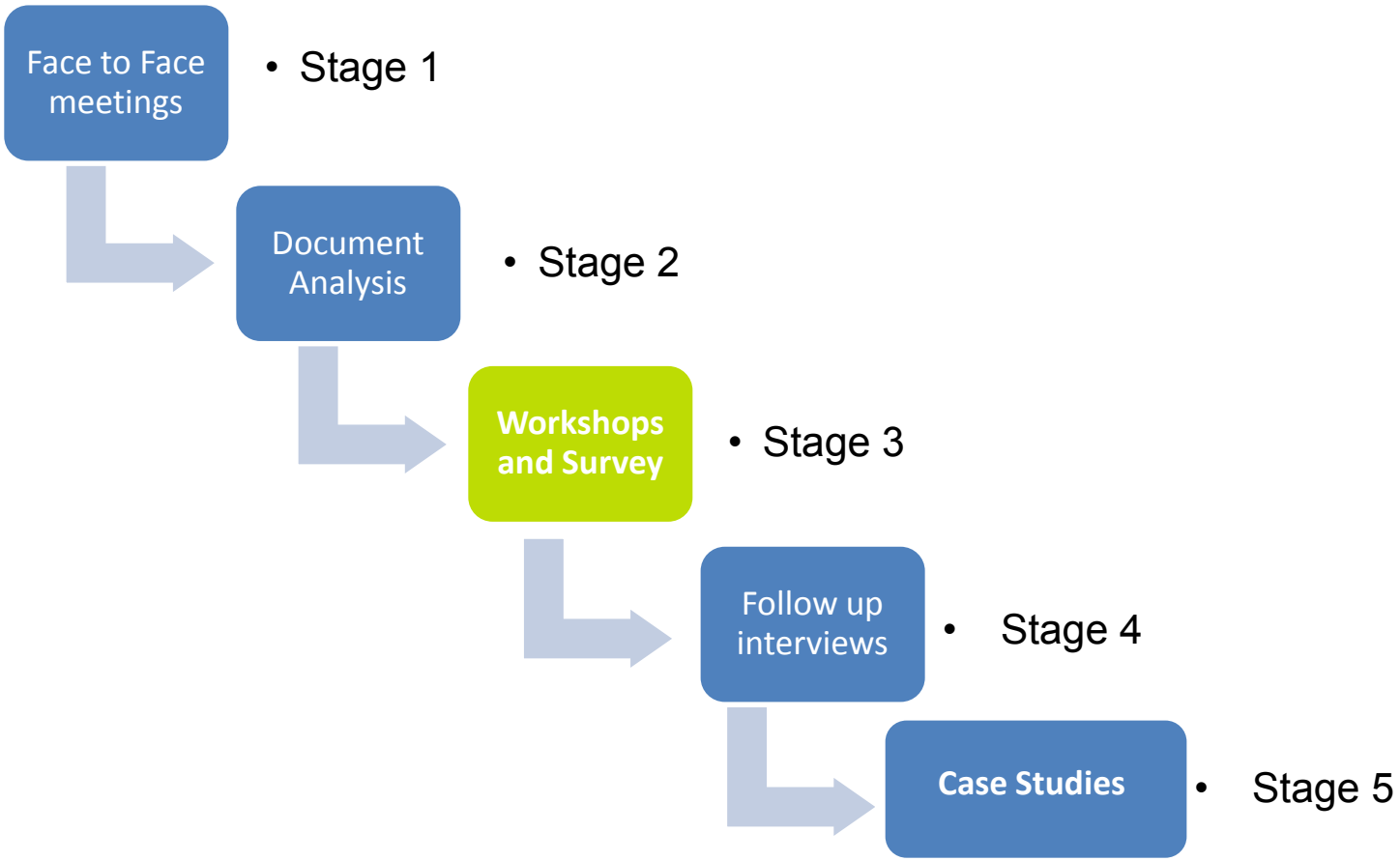


TAN 15 Review: Scope

The TAN 15 review has **six** aims

1. Maintain and strengthen precautionary approach
2. Risk based evidence analysis
3. Greater emphasis of surface water flooding;
4. Consider what level of flood risk is acceptable; if any;
5. Review development types/ vulnerability classifications;
6. Evidence the strengths and limitations of existing planning policy.

TAN 15 Review : Methods and Timeline



December 2016

May 2017

Stage 1 and 2

Stage 1: Face to Face Meeting

- Finalise methods
- Identify any data limitations
- Identify key areas of concern and key themes

Stage 2: Document Analysis

- Vulnerability categories
- Development Advice Maps (DAM's)
- Planning Policy Wales and TAN 15
- High Level Target Reports, s18 reports
- Planning Policy Performance Reports
- Planning Appeals

Stage 1 Face to Face meeting key themes

Stage 2 Vulnerability Categories

Wales (2004) TAN 15

Emergency Services	Hospitals, fire and ambulance stations, command centres,
Highly Vulnerable Development	Residential Leisure centres Schools, Caravan Parks, Libraries Vulnerable industrial development
Less Vulnerable Development	General industrial, retail or commercial

England (2014) Practice Guidance

Essential Infrastructure	Essential transport, utility and wind turbines
Highly Vulnerable	Police and ambulance stations Emergency dispersal points, Basement dwellings Caravans and mobile homes,
More Vulnerable	Hospitals, Residential institutions, student halls
Less Vulnerable	Police, fire and ambulance stations not required to be operational during flood
Water Compatible Development	Flood control infrastructure Water/transmission pumping Ship building/navigation

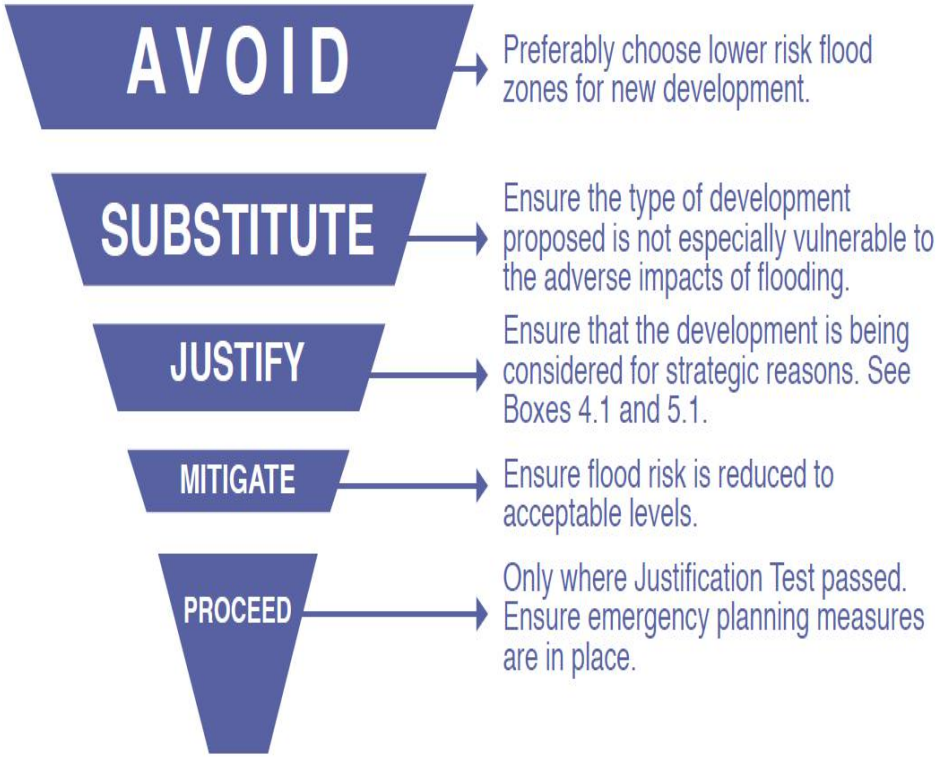
Stage 2 Development Types

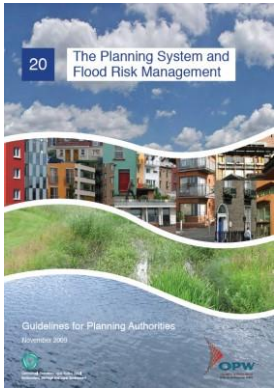
Table 5.2 Indicative floor sizes for NRPs

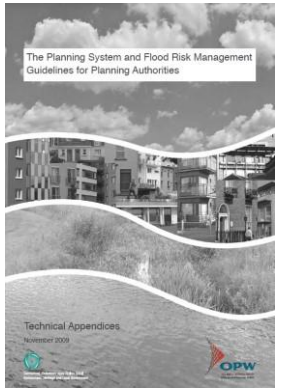
New MCM Code	Property Type	Floor Area (m²)
2	Retail	340
3	Offices	360
4	Warehouses	3,270
5	Leisure and sports	NA
51	Leisure	1,020
52	Sports	NA
521	Playing Field	21,850
523	Sports Centre	5,400
526	Marina	1,860
525	Sports Stadium	25,600
6	Public Buildings	1,300
8	Industry	2,480
9	Miscellaneous	NA
910	Car park	3,500
910	MS Car park	2,700
960	Sub Station	48

Multi Coloured Handbook (2016)

Stage 2 Development Approach in Ireland



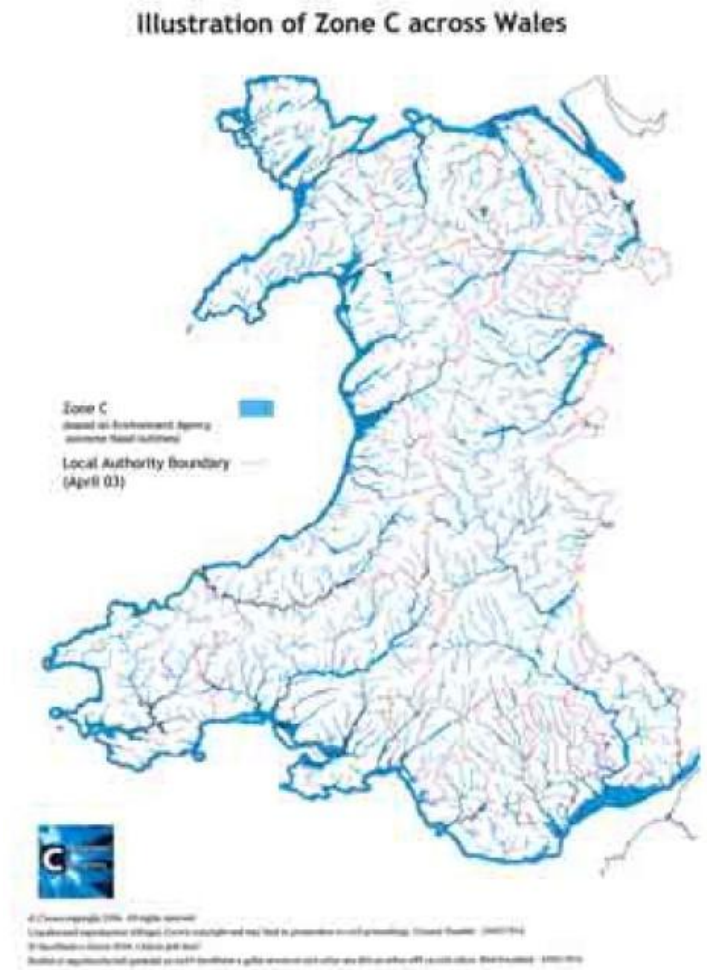




The Planning System and Flood Risk Management Guidelines, which JBA Consulting co-authored

Stage 2 Development Advice Maps (DAM's)

- Do not include
  - climate change allowances
  - surface water flooding triggers
  - Shoreline Management Plan policies
- Used as a trigger for vulnerability categories
- Limited to three zones (A, B and C (C1 and C2)
  - Zone A no or little risk
  - Zone B historical flood risk
  - Zone C) is extreme flood event 0.1%



Stage 2 Development Advice Maps (DAM's)

- New NRW flood risk maps

Stage 2 Existing Reports/Evidence

Natural Resources Wales (NRW) S18 report 2014-16

- Strategic Planning had Development Planning Advice/Development Management

Annual Performance Reports

- SD4 Resilience to climate change and flood risk indicator
- National Indicator 31 percentage of dwellings free from hazards and;
- National Indicator 32: number of properties (homes and businesses at medium or high risk of flooding from rivers and sea

High Level Target Report 2012-2013

- High Level Target reports estimated 22,378 applications received by LPA's
- EAW responded to 2,724 consultations on all issues of which 977 were on flood risk grounds.

Stage 2: Planning Appeals/Called in Decisions

- Total number (48) of planning appeals/Called in Decisions relating to development and flood risk since 2012.
- Significant increase since 2014
- 11 of the 48 decisions did not consider flood risk the main issue
- Only one appeal of 10 allowed 2016*
- All appeals dismissed in 2014*
- 35 of the 37 cited development within zone C1 and C2 and considered justification and acceptability tests

Stage 1 and 2: Initial SWOT Analysis

Strengths

1. Precautionary principles- directing development to low risk
2. Vulnerability types and impacts
3. Focussed on justification, acceptability and consequences

Weaknesses

1. Development Advice Maps (river and sea flooding) only expected to be in place 3 years.
2. Multiple advice-TAN 15 and Chief Planning Officer letters, Ministerial Circulars.
3. Strategic/Local/Catchment requirements are not clearly defined.

Opportunities

1. Types of development are limited to three categories- potential for more categories or flexibility?
2. Stronger integration of surface water flooding triggers into policy/maps.
3. Align DAM with hazard matrix.

Threats

1. Potentially accepting residential development in high risk areas
2. The absence of SMP policy areas in DAM's- a threat?
3. Appendix guidance on FCA is not a living document.

Stage 1 and 2: Emerging Themes

- Incorporate climate change allowances into Development Advice Maps
- Align DAM to hazard matrix
- Include surface water flooding policy/mapping triggers
- Lifetime of development
- Amend/Update vulnerability categories
- Role of Local Development Plans
- Interpretation of planning policy
- Flood Consequence Assessment (FCA) Trigger
- Shoreline Management Plan or Coastal Change
- Roles and Responsibilities
- FCA and Strategic FCA Technical Guidance
- Urban Development
- Impact of development on flood risk to others
- Surface Water Drainage

Stage 3 Workshop Focus Themes

1. Flood Consequence Assessment (FCA) Trigger
2. Shoreline Management Plan or Coastal Change
3. Roles and Responsibilities
4. FCA and Strategic FCA Technical Guidance
5. Urban Development
6. Impact of development on flood risk to others

SESSION 1

SWOT Analysis

Stage 1 and 2: Initial SWOT Analysis

Strengths

1. Precautionary principles- directing development to low risk
2. Vulnerability types and impacts
3. Focussed on justification, acceptability and consequences

Weaknesses

1. Development Advice Maps (river and sea flooding) only expected to be in place 3 years.
2. Multiple advice-TAN 15 and Chief Planning Officer letters, Ministerial Circulars.
3. Strategic/Local/Catchment requirements are not clearly defined.

Opportunities

1. Types of development are limited to three categories- potential for more categories or flexibility?
2. Stronger integration of surface water flooding.
3. Align DAM with hazard matrix.

Threats

1. Potentially accepting residential development in high risk areas
2. The absence of SMP policy areas in DAM's- a threat?
3. Appendix guidance on FCA is not a living document.


Tea?

SESSION 2

Key Themes

Theme 1: FCA trigger

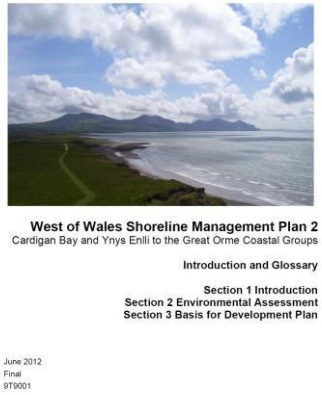
TAN 15 does not require an FCA for sites located in DAM Zone A. However, in some cases there may be flood risks that would otherwise be regarded as unacceptable by TAN 15 despite the site being located in DAM Zone A. This is most clearly evident with surface water flood risk and where future sea level rise will exceed existing Flood Zones.

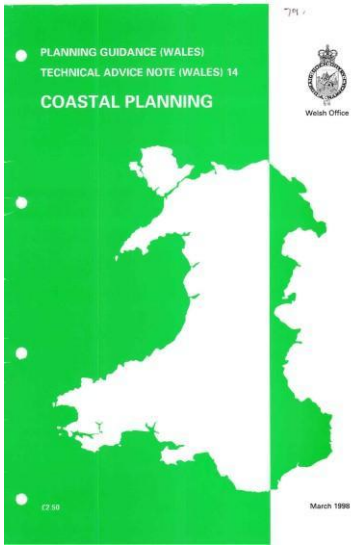
- Are the triggers for requiring an FCA clear?
- Should LPA's be able to insist on an FCA?
- Presumption towards requiring an FCA?
- Could the DAM be replaced with NRW's Flood Map?
- Should all large developments require an FCA as in England?

Theme 2: SMP or Coastal Change areas

TAN 15 makes no reference to the policies of the Shoreline Management Plans (SMP's) or Coastal Change areas. Does this area of TAN 15 need improving and how?

- Do the policies and risk mapping contained with the SMP's need to be given greater consideration within FCA's and SFCA's?
- Do LDPs identify the SMP policy areas and coastal change areas?
- Should TAN 14 be incorporated into TAN 15?





Theme 3: Roles and responsibilities

Are the roles and responsibilities of key stakeholders, LPAs and LLFAs in planning in flood risk management, made sufficiently clear TAN 15? And do these organisations have the resources and expertise to fulfil their duties?

- Is the scope of NRW consultations and their role well understood?
- Are Lead Local Flood Authorities sufficiently involved in planning consultations?
- Do all planners have sufficient understanding to review sometimes complex drainage and flooding issues?
- What level of drainage design is required?

Theme 4: FCA & SFCA Technical Guidance

TAN 15 Appendix A contains guidance on the technical requirements for the production of acceptable Flood Consequence Assessments (FCA). As part of the TAN this guidance has not been updated since 2004 and is supplemented by a number of documents from WG and NRW.

- Are the requirements of a FCA & SFCA sufficiently clear?
- What could be done to improve FCA & SFCA technical guidance?
- Are checklists helpful?
- Should technical guidance exist outside of TAN 15, and if so who should be responsible for this?

Theme 5: Urban development

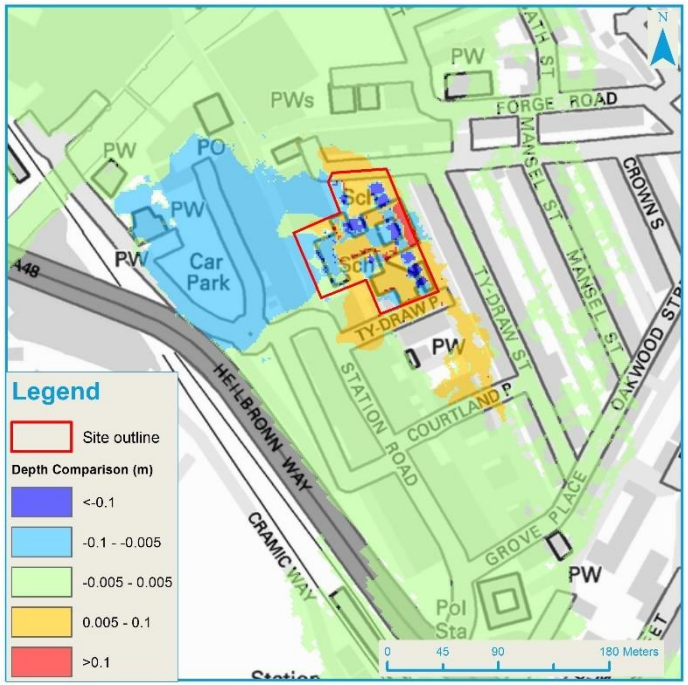
There are specific challenges associated with development within existing settlements which are themselves at flood risk. Whilst TAN 15 gives some recognition to these challenges (e.g. justification test and Zone C1) in some cases existing settlement have been blighted by flood risk.

- Does TAN 15 give sufficient flexibility to LPA to regenerate areas at flood risk?
- Should ‘urban development’ be recognised differently in TAN 15?
- What consideration is appropriate to residual risk (i.e. flood defence failure)?
- In an urban environment, is a more pragmatic approach required to third party changes in flood risk?

Theme 6: Impact of development on flood risk to others

Section 7.3 of TAN 15 states that an FCA should demonstrate the 'minimal impact of the proposed development on flood risk generally'. Section A1.12 states that development must not cause 'No flooding elsewhere'. There often difficulty in assessing and satisfying these requirements, particularly in urban environments, or in delivering flood defences. NRW have chosen to apply a policy position that there much be no increase in flood level greater than 5mm, and a detailed 1D-2D flood model is almost always required to demonstrate this.

- What is a 'minimal impact'?
- Is the current system about right, or too inflexible/strict?
- Who should decide on the acceptability of the 'impact'?
- Can positive impacts outweigh negative impacts?



Workshop 1: Summary

- Brief context of TAN 15 review
- Enable discussions on strengths and weaknesses of current policy
- Focus of review themes and potential case studies

TAN 15 Review Next Steps

- Prepare a short workshop summary
- Complete follow up interviews
- Develop ten illustrative case studies
- Submit draft report of review recommendations


Thank You

Evaluation of TAN 15: Workshop survey and feedback results

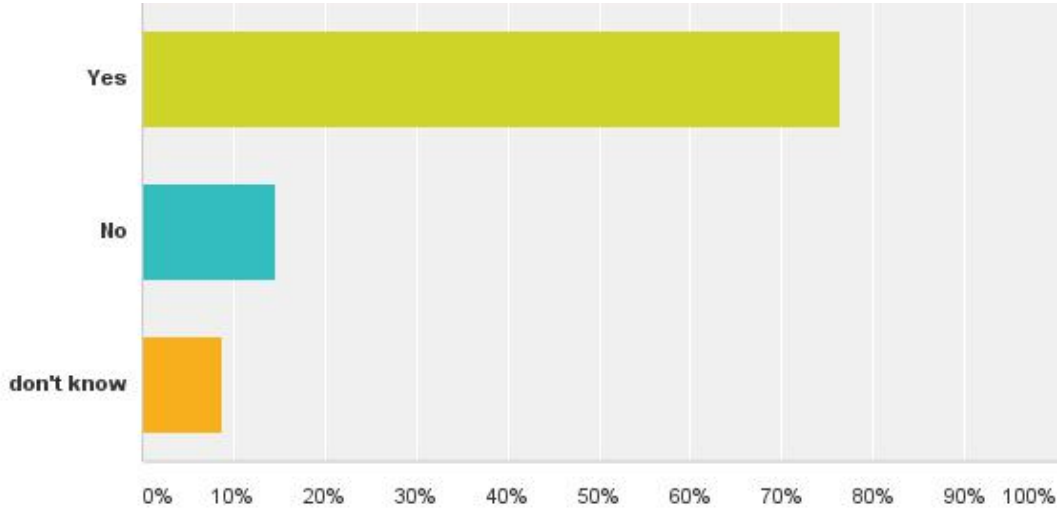
Thursday, April 06, 2017

Final Results: 34 Responses

This supersedes workshop survey summary dated 29th March 2017

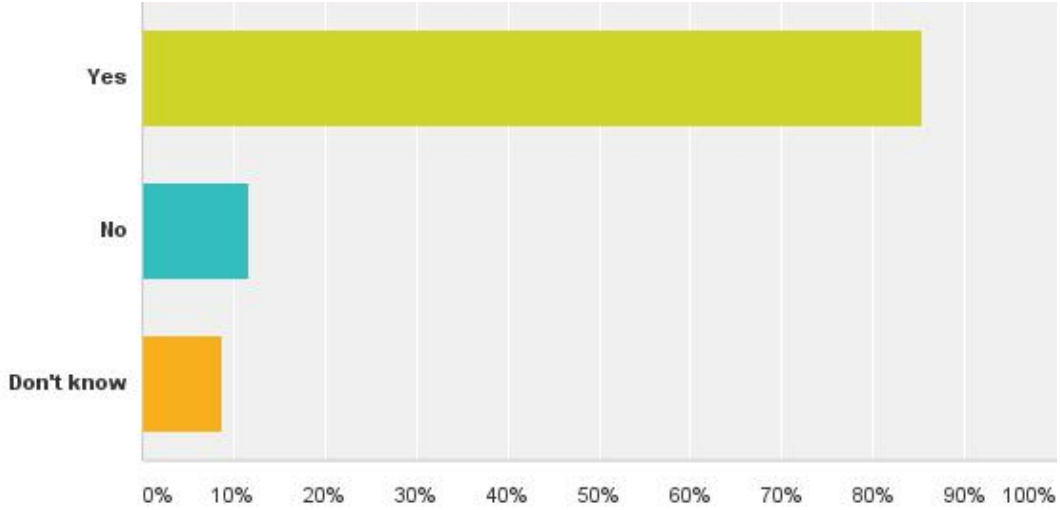
Q1: Are the precautionary principles of TAN 15 clear and well supported and can you provide examples?

Answered: 34 Skipped: 0



Answer Choices	Responses	
Yes	**76.47%**	26
No	**14.71%**	5
don't know	**8.82%**	3
Total		**34**

Q2: Are there areas of existing policy which are unclear or open to interpretation? for example, is it clear that highly vulnerable Development Advice Maps (DAM) Zone C2 is not acceptable?

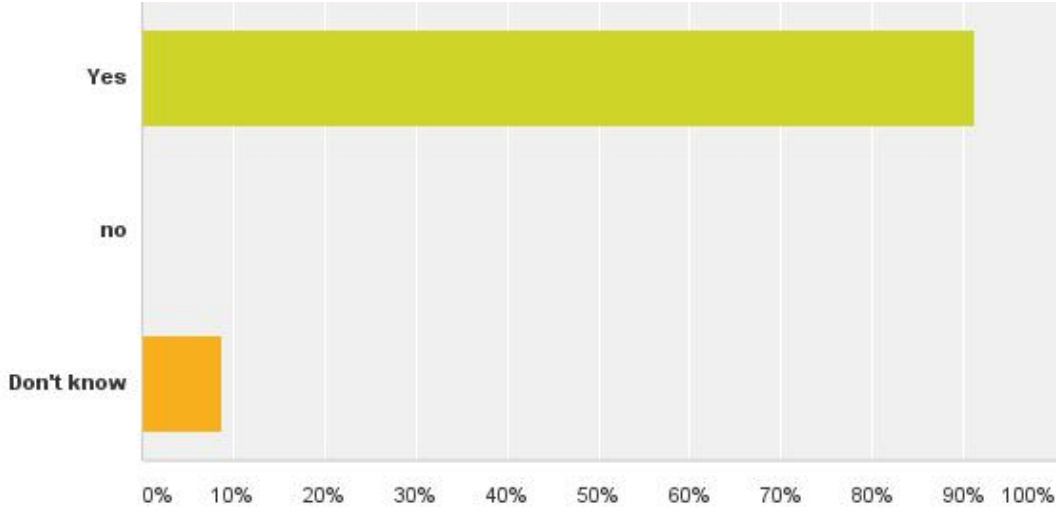


Answer Choices	Responses	
Yes	**85.29%**	29
No	**11.76%**	4
Don't know	**8.82%**	3
Total Respondents: 34		

Answered: 34 Skipped: 0

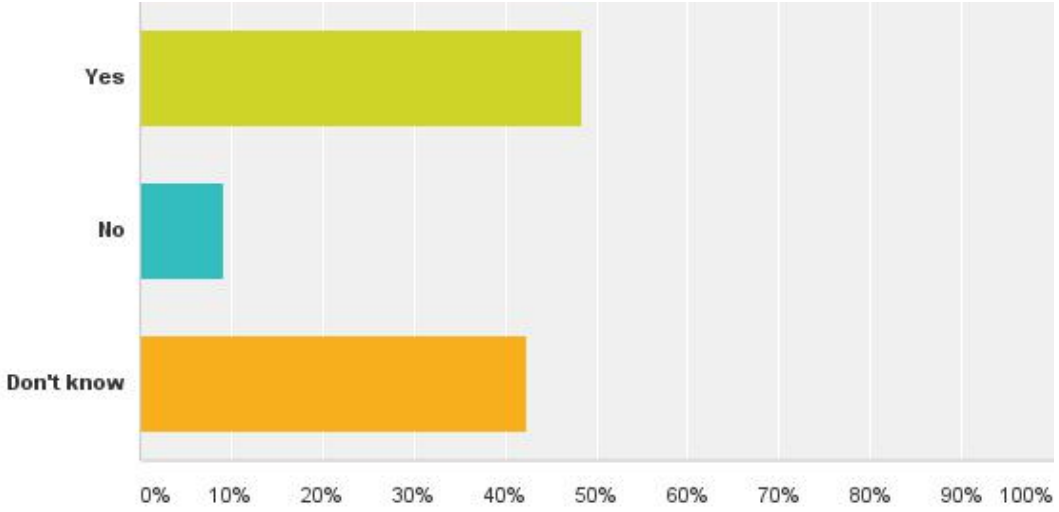
Q3: Should greater focus be placed on surface water flooding and drainage (both policy document and DAMs map)?

Answered: 34 Skipped: 0



Answer Choices	Responses	
Yes	**91.18%**	31
no	**0.00%**	0
Don't know	**8.82%**	3
Total		**34**

Q4: Would you like to see changes to Development Advice Maps triggers, and what improvements would you like to see?

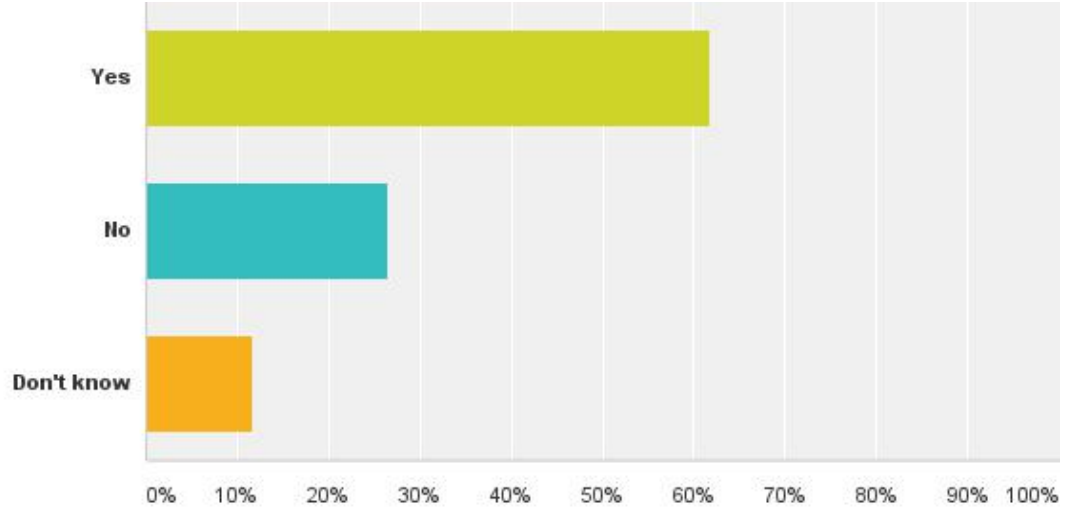


Answer Choices	Responses	
Yes	**48.48%**	16
No	**9.09%**	3
Don't know	**42.42%**	14
Total		**33**

Answered: 33 Skipped: 1

Q5: Would you like to participate in a short follow up interview to the workshop?

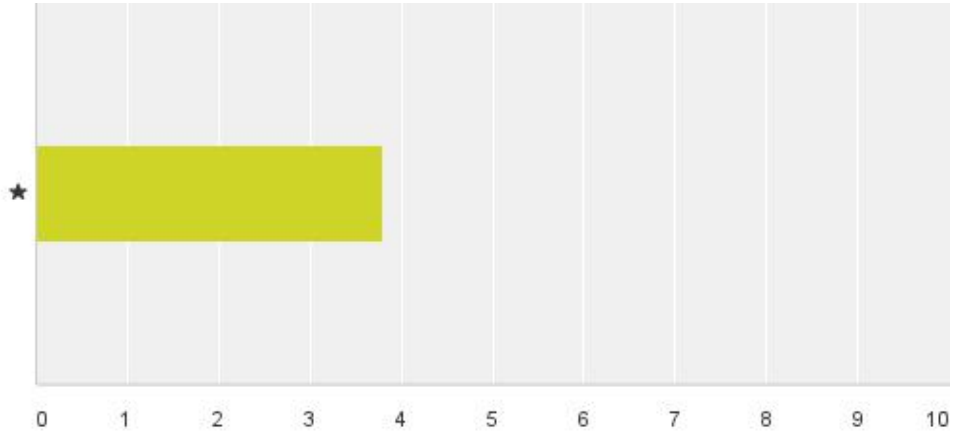
Answered: 34 Skipped: 0



Answer Choices	Responses	
Yes	61.76%	21
No	26.47%	9
Don't know	11.76%	4
Total		34

Q7: How would you rate the event over all?

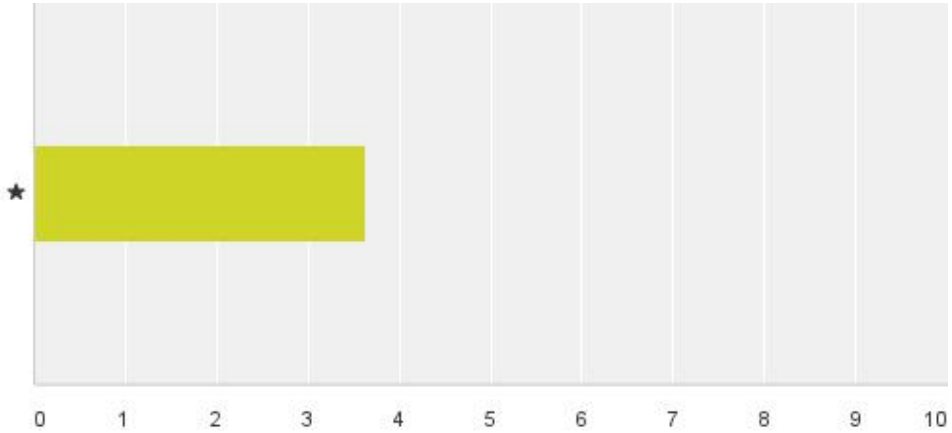
Answered: 27 Skipped: 7



	unsatisfied	satisfied	good	very good	excellent	Total	Weighted Average
★	**0.00%** 0	**0.00%** 0	**33.33%** 9	**51.85%** 14	**14.81%** 4	27	3.81

Q8: How would you rate the presentation material?

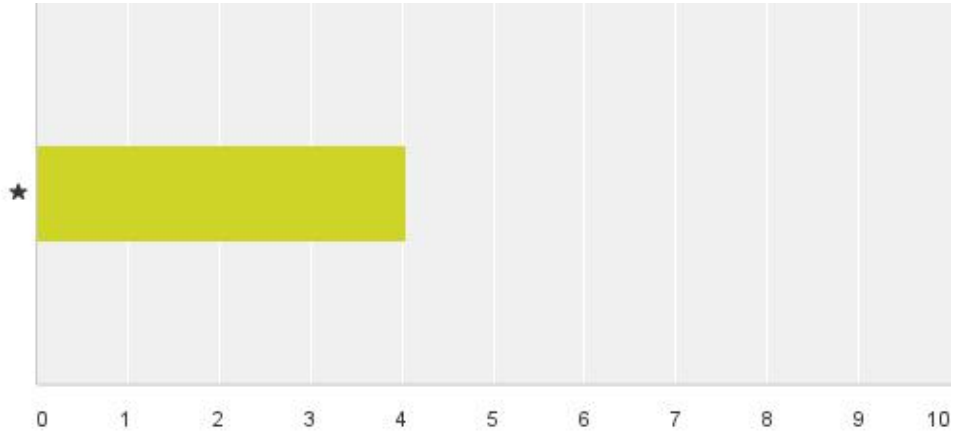
Answered: 27 Skipped: 7



	unsatisfactory	satisfactory	good	very good	excellent	Total	Weighted Average
★	0.00% 0	11.11% 3	29.63% 8	44.44% 12	14.81% 4	27	3.63

Q9: How would you rate the break out groups?

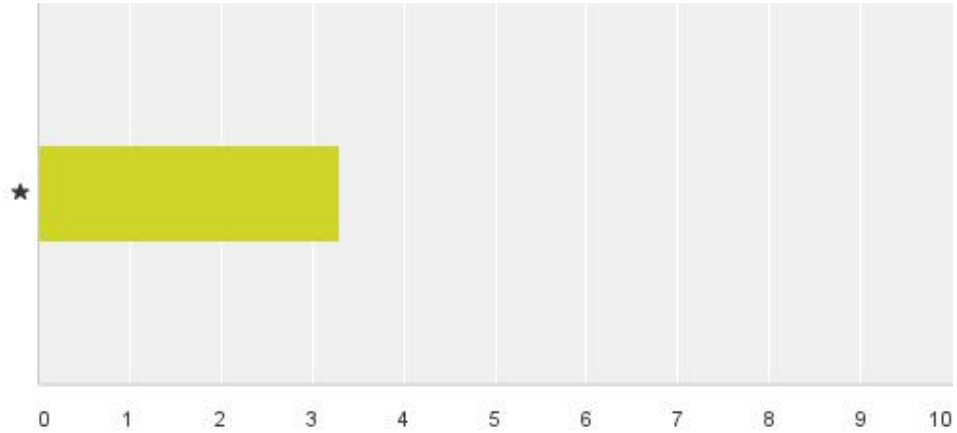
Answered: 27 Skipped: 7



	unsatisfactory	satisfactory	good	very good	excellent	Total	Weighted Average
★	0.00% 0	0.00% 0	22.22% 6	51.85% 14	25.93% 7	27	4.04

Q10: How would you rate the location and venue?

Answered: 27 Skipped: 7



	unsatisfactory	satisfactory	good	very good	excellent	Total	Weighted Average
★	7.41% 2	14.81% 4	29.63% 8	37.04% 10	11.11% 3	27	3.30

Group

1

STRENGTHS

1. Precautionary principles
2. Vuln. types & impacts
3. Justification, acceptibility & consequences

WEAKNESSES

1. DAMS - 3 Years
2. Multiple advise docs
3. Strategic/local catchment regts not clearly defined

Inconsistencies ≤10 units in highly vul, no notification. >10 notification. But are all LPAs doing this for 7/10?

No mention of groundwater vulnerability

OPPORTUNITIES

1. Types of development (to 3.
2. Stronger integration of surface water flooding
3. Align DAM with hazard matrix

Greater precaution where higher

THREATS

1. Potential for accepting residential development in zone C.
2. Is absence of SMP policy areas in DAMs a threat.
3. Appendix guidance on FCA is not a living doc.

Groundwater, surface water, ordinary water course risk

Para 6.1 b/c outweighed principles & 6.2 'should not' not 'can't'

1) TRIGGERS:
AT PRESENT IT IS CLEAR BUT QUESTION IS ARE THEY CORRECT?
TOO CONSTRAINED AT PRESENT AND SHOULD BE BASED ON EVIDENCE

2) LPA's: SHOULD BE ABLE TO INSIST ON FCA?
YES IF EVIDENCE SUPPORTS
↑ APPROPRIATE/CORROBORATED

3) FCA REQUIRED: PRESUMPTION YES BUT SCALE/SCOPE NEEDS TO BE MORE FLEXIBLE AND PRAGMATIC BASED ON NATURE OF DEVELOPMENT & HAZARD

4) DAM REPLACED BY NRW FLOOD MAP?
-YES BUT NEED TO AGREE POLICY TRIGGERS e.g. 1% INSTEAD OF C2?

5) FCA FOR ALL LARGE DEVTS? - NO AS TOO SIMPLISTIC

Group 6

Strengths

- Precautionary Principle
- Vulnerability types + impacts
- Focus on justification, acceptability + consequences
- Wider awareness of flood risk

Weaknesses

- DAM only expected to last 3yrs.
- multiple advice: TAN15, CPO letters ministerial circulars
- confusion on strategic/local/catchment requirments
- FCA - effective flood warning system?

→ Viability of sites LDP.

Opportunities

- Types of development could be expanded.
- Integration of surface water flood risk.
- Align DAM with hazard matrix.
- WBFG Act - Env Act SMNR LLFA
- Developer contributions?
  Newport - regen LDR
  Porthcawl
  CIL Regs.
  CDP Vale of Glamorgan Exception
- PPW O TAN15 - Infrastructure & types of development
- Innovative housing → resilient approaches.
- Surface Water - strengthen.

Threats

- allowing inapropriate development.
- lack of SMP integration
- FCA guidance - Appendix A - keeping current.

Planning officers access to assesments of evacuation plans. → Advice? LRF.

Scope of NRW Advice?

Theme 5

- Awareness of wider sustainability context
  - needs to be looked at
- Flexibility - need centres of towns/cities to develop.
- In context of flooding consequences
- Phrase 'urban development' is too broad.
- NRW - Need to look at risk/consequence before development.
- Residual risk of outcomes and risk need consideration.

Theme 6

- 'Minimal risk' - needs clarification and context
  - " specific thresholds.
- Process - needs more flexibility
  - Needs to be proportionate to size of the development.
- LA should decide on acceptability
  - Should the " criteria change?

Group 4

Strengths

1. Precautionary principles → Needs to be clarified according to development
   - General / Prescriptive
2. Vulnerability types and impacts – Context could be changed
3. Justification, acceptability ✓ and consequences
   - needs updating
   - Somewhat unrealistic (tests)
4. Approachable + Clear ✓

Weaknesses

1. DAM's – 3 years ✓
   - more often updates
2. Multiple advice – TAN 15, Chief Planning Officer letters, and Ministerial Circulars. (opens up contradiction)
   - should be incorporated
3. Strategic / Local / Catchment requirements ✓
4. Access & Egress
5. Lack of Clarity + roles?
   - Emergency planner – Emergency services.
   - Flood Resilience Forums
6. Interpretation of technical criteria
7. Change in Flexibility

Opportunities

1. Types of development are limited to 3 categories – + potential for more categories or more flexibility? (2 strengths) → Needs reasoning + rationale
2. Stronger integration of SW flooding – ~~needs~~ different to Fluvial flooding ✓
   - Parameters
   - shouldn't be tied in
3. Allign DAM with hazard matrix? – Job of the FCA ✗
4. Clarification – Expertise
5. Expand on knowledge expertise – take pressure off NRW.

Threats

1. Potential for accepting residential development in Zone C. ✓ → needs to be less ~~rest~~
   - regeneration.
2. Is the absence of SMP policy areas in DAM's a threat? ✓
3. Appendix guidance on FCA is not a living document. ✓
   - ~~Some~~ Tests.
4. Development tech.

GROUP

5

STRENGTHS

1. Precautionary principles
2. Vulnerability types and impact
3. Justification, acceptability & consequences
4. Certainty in use / decision making

WEAKNESSES

1. DAMS - 3 Years
2. Multi-advice docs.
3. Strategic / Local / catchment reqmts not clear enough
4. flexibility in vulnerability classification (take a/c of likely danger to occupants)
5. policy summary not quite accurate.
6. key policy messages not headlined / flagged up.
7. call-in criteria "entirely in C2" not helpful / too rigid

OPPORTUNITIES

1. Types of development Ltd to 3.
2. Stronger integration of surface water flooding.
3. Align DAM with hazard matrix
4. improved presentation
5. WG call-in process
6. Clearly set roles + responsibilities ⇒ NRW Role / Planning Responses.

THREATS

1. Potential for accepting residential devel. in C.
2. Absence of SMP policy area in DAMs a threat.
3. Appendix guidance on FCA is not a living document
4. CZ classification is too absolute

Themes

3) Roles & responsibilities

- expertise but lack of resources/ capacity Core work Vs advisory.
- resistance to making a decision/ clear response
- Response often disproportionate.

- communication
  - → planners need more steer
  - → Pre-app process → does this work to make planning more efficient?

4) FCA & SFCA Tech guidance

- SFCA
  - No expertise / not used
  - shelflife
  - unusable

FCA
- Table / dummy structure more useful - if clear may help communication issue
- checklists - who are they useful to?
- consolidation of docs needed

GROUP 7

STRENGTHS

1) Precautionary principles
2) Vuln types & impacts
3) Justification, acceptability & consequences
4) It's a start
5) Readable / understandable
easily applied for most cases
- public

WEAKNESSES

- cumulative effect
- definition
- No link to building control
1) DAMs - 3 years
- No review cycle in place
2) Multiple advice docs
- only guidance - how enforceable
- overwriting eg. Newport school
3) Strategic, local, catchment
reqts not clear
- zoning names A-D?
- resilience zone B?
- Terminology R.P
- Problems at Wales / England border
- Clarification of zones eg C1 & 2

OPPORTUNITIES

- adopt people v. hazard methodology
- emergency services access/egress clarification
- mitigate first model second
- increase consultee process
1) Types of devlpt ltd to 3 categs - more flex?
- All docs. need to stay consistent
2) Stronger integ of SW flooding
- needs expanding in guidance
- Trigger needs detailed modelled combined
3) Align DAM with hazard matrix
- problem with land
4) Insurance clarifications
5) building control & resilience
policy (highways)
Strategic approach to development risk

THREATS

- evacuation / emergency planning access/egress
- Are remote people being considered in EPO
- Responsibility
- Temporary
1) Residential devlpt in Zone C
- Politics.
2) Absence of SMP/CFMP policy areas in DAMs
- not statutory, not refreshing
3) FCA Appendix guidance - not a living doc
4) uncertainty
5) balanced approach to keep Wales open
6) expertise within public sector

Table 1

STRENGTHS

1) Precautionary Principles
2) Vuln types & impacts
3) Justification, acceptability & consequences

- DAMs to NRW – more responsive & up-to-date
- Good logic + fundamental principles.

WEAKNESSES

1) DAMS – 3 years
2) Multiple advice docs
3) Strategic/local/catchment reqts not clearly defined

- Clarity around responsibilities (sp.?)
- Interpretative
- Maybe not sufficiently long-term
- coverage of coast → map to distinguish fluvial/tidal.

Opportunities

1) Types of devlpt ltd to 3 categories – flex for more?
2) Stronger integ? of SW
3) Align DAM with hazard matrix

- clarify what is a proportionate Using charts/diagrams etc
- Context for SDB/WDF/FCA.
- Hazard → changing approach to A1.15 (or better in PPW?)
- Summary/Easy-read versions

Threats

Sterilizing areas

1) Accepting residential devlpt in Zone C
2) Absence of SMP policy areas in DAMs
3) FCA App Guidance not a living doc

- How to link to wide range of legislative changes... lots of new reqs.

TAN 15 doesn't cover duration of flood event

③ Roles & responsibilities ?

Table 1

Need more clarity on roles upfront ⇒ who does what?

① NRW only comment on main rivers & sea – who scrutinises everything else?

↳ insufficient resources in LLFA to address

Regionalise some functions to achieve critical mass of competency & expertise

↳ links to SuDS body

② Emergency planning – not expertise or resources

↳ tell developers to get external advice on access & egress

Will City Regions have powers on managing flood risk?

Examples of English LAs raising council tax to pay for flood defences & monitoring e.g. Somerset & Glouc

LLFA involvement → provide review, request for info but can't undertake drainage assessment

Need to work better together → Policy expertise need to improve to support LDC

Reliance on developer says → applies to a lot of issues

Planners don't need expertise in drainage → need to be able to understand & weigh up risks provided.

Lack of enforcement & monitoring → will impact on issues like SuDS

Adoption issues re: SUDS: crucial role of SABs
↳ not happening: schedule not yet issued by WG although consultation imminent
↳ no body to monitor & renew
↳ down to LPA to check every pl app
↳ won't happen

↳ tie this in with renew of TAN 15

Table 1

④ FCA & SFCA Guidance

Need to ~~be~~ review A.1.17

Language open to interpretation e.g.
thresholds

How to improve?

Use/when of checklists
Y/N → risk of missing something

More clarity & updating re: NRW role
& only r&c flooding

Include as appendix that can be updated along with other frequently changing elements e.g. CC

Liaise with Welsh Govt

② SMPs

TAN 14 & 15 v different

↳ value?

↳ bring erosion into TAN 15?

Table

5) NATIONAL GUIDEL...

STRENGTHS

1) Precautionary principles
2) Vuln types & impacts
3) Justification, acceptability & consequences
4) DIRECTS DEVELOPMENT TO LOW FR AREAS
5) CLIMATE CHANGE RECOGNITION

WEAKNESSES

1) DAMS - 3 years
2) Multiple advice docs
3) Strategic, local, catchment requirements not clear
4) TABLES ARE NOT PRESCRIPTIVE WITH POOR DESCRIPTION
5) NO DEFINITION OF ROLES
   - ACCESS / EGRESS NO FORMAL CONSULTATION BODY.
6) NO CONSULTATION WITH EMERGENCY SERVICES
7) NO TEMPLATE OF WHAT GOES INTO FCA.
8) POOR SW CONSIDERATION
9) ~~NO POLICY GUIDANCE FOR~~ REQUESTING FCA IN NON RSM AREA.

OPPORTUNITIES

1) Types of devlpt ltd to 3 categories — flex for more?
2) Stronger integration of SW flooding
3) Align DAM with hazard matrix
4) CONTINUAL DAM UPDATE
5) INCLUDE CC AS APPENDIX for UPDATE
6) ADDRESS SW IN HOLISTIC APPROACH
7) ADDRESS FR DFF SITE.
   - FLOOD PLAIN PROTECTION POLICY
   - CONTINUAL SMAK DEVELOPMENT.
8) NATIONAL GUIDANCE.

THREATS

1) Residential devlpt in Zone C
2) Absence of SMP policy areas in DAMs
3) FCA Appendix not a living document
4) UPDATE OF CC INTO DAM
5) INTERACTION / DUPLICATION WITH SCHEDULE 3.

Table 3

a) ROBUST REASON TO REQUEST FCA IN NON-MAPPED AREA WITH EVIDENCE

5 URBAN DEVELOPMENT.

- ONLY 1 OF MANY PLANNING CONSIDERATIONS
- THERE IS FLEXIBILITY AS TAN IT IS NOT PRESCRIPTIVE
- USE OF HAZARD VALUES FOR FAILURES IN DEFENCES
  - HELPS AS A DECISION MAKING TOOL.
- WEIGHT ATTRIBUTED TO IS SITE SPECIFIC.
- PRAGMATISM IS NEEDED CASE BY CASE.

6. IMPACT OF DEVELOPMENT ON FLOOD RISK TO OTHERS.

- START QUANTIFYING HAZARD / LLOL / DAMAGES WOULD IMPROVE DECISION MAKING BUT WOULD STILL BE SUBJECTIVE.
- CURRENTLY NOT PRESCRIPTIVE SO COMPLETELY FLEXIBLE BUT IS SUBJECTIVE - REGIONAL DIFFERENCES
- NATIONAL GUIDENCE SHOULD AID THE LPA IN WHAT 'IMPACT' IS ACCEPTABLE.
- YES - THE GREATER GOOD

Table 3

Appendix G

G1.1 Presentation of key findings

TAN 15 Review

Key Findings

Methods

Objective	Theme	Document Analysis	Maps	Workshops and Survey	Follow up	Case Studies
1. Assess the rigour of existing TAN 15 approach:		x	x	x	x	x
2. Assess application of TAN 15 tests against C2		x	x	x	x	x
3. Assess the need for a more restrictive approach to development in areas of greatest risk (more than 1% fluvial or 0.5% coastal AEP/risk)?		x	x	x		x
4. Identify areas where planning policy restricts development?		x	x	x		x
5. Flood Insurance standards comparison to TAN 15?		x	x	x		x
6. Broader consideration of availability of land and sustainability principles		x				x
7. Risk based approach of approach to surface water flooding?		x	x	x		x
8. Evaluate what if any flood risk could be considered acceptable and if allowances to develop defended areas of floodplain are appropriate?		x	x	x		x
9. Evaluate different development types classification, types itself?		x		x		x
10. Strengths and limitations of existing planning policy?		x		x	x	x
11. How successful has current policy been?		x	x	x		x
12. Consider role of planning policy and flood resilient building methods?		x		x		x

Structure of Final Report

1. Introduction
2. Aims and Objectives
3. Review Methods
4. **Precautionary planning policy**
5. **Risk Based Approach**
6. **Flood Consequence Assessment**
7. Summary

Precautionary planning policy

Precautionary planning policy

- Planning policy to manage flood risks
  - Planning Policy Framework;
  - Changes in policy since 2004;
  - Definition of flood risk;
- Precautionary planning and Sustainable development
- Strengths and limitations of TAN 15 of current policy, economic and social context;
  - Updating
  - Shifts in policy
  - Success of existing policy
  - Flood risk management understanding
  - Importance of a long term approach
  - Interpretation of planning policy and decision making
  - Definition of development
- Roles and responsibilities
- Summary and Recommendations

Planning Policy Framework Wales

- PPW Edition 9 (2016) and TAN 15;
  - CPO January 2015.
  - Climate Change Guidance CL-03-16.
  - CPO January 2014.
  - CPO 2010 Flood and Water Management Act 2010.
  - TCP Notification order 2012.
- Precautionary Principle
  - Development Advice Maps
  - Vulnerability triggers
- Changes in policy direction since 2004
  - Positive Planning Act Wales 2015
  - Future wellbeing and Generations Act 2015
- Definition of flood risk
  - Probability and Consequence

Broader/Material considerations

Material considerations in appeal decisions;

- Highway and pedestrian safety;
- Residents living conditions and amenity;
- Harm or inappropriate development in green belt;
- Housing or land availability;
- Regeneration* (Workshops);
- Viability;
- Surface water drainage;
- Biodiversity;
- Character and appearance of landscape/built environment;

NRW survey response

- Sustainability/good design/climate responsive;
- Resource efficient, and re-use of previously developed land;
- More Prosperous Wales goal;

Broader Sustainable Development and Wellbeing Goals

- A more resilient Wales
- A more prosperous Wales

Strengths and limitations

TAN 15 (2004): Development and Flood Risk

Strength
- Precautionary framework outlined in the TAN allows flooding issues to be accorded appropriate consideration whilst recognising that development will continue to be necessary in these areas;

Weakness
- Links to legislation, PPW and out of date

Opportunity
- Emphasis on balanced judgement and flexibility

Threat
- DAM only expected to be in place for three years and CPO and other guidance sits separately to TAN

PPW Edition 9 (2016):
- refers plan led system, and importance of SEA and SA , objectives of sustainable development and precautionary approach to flood risk and planning and;
- refers to areas of “high flood hazard”

Opportunities/Updates

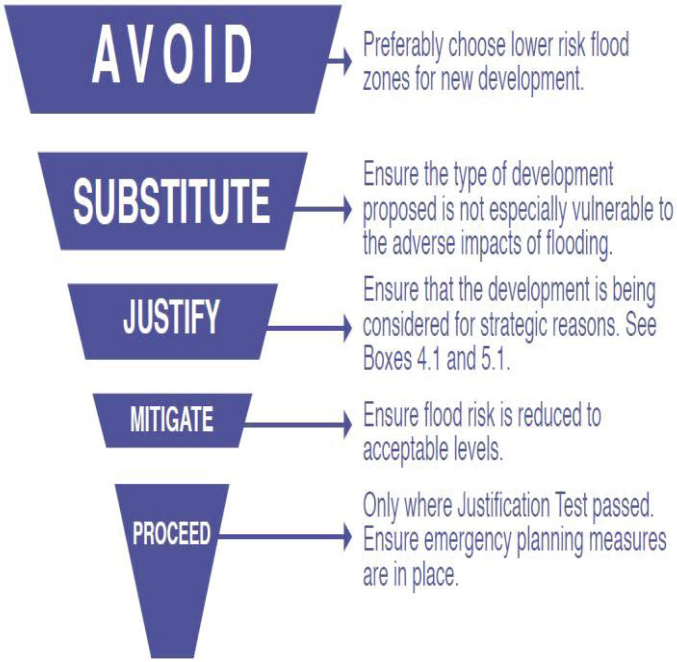
- Incorporation of climate change allowances into DAM.
- Potential local and/or urban regeneration exceptions policy.
- Potential alignment of DAM with hazard matrix.
- Strengthen role of LDP in policy.
- Mitigation then modelling-adaptive framework set out in policy
- Greater precaution/prevention of development in high risk or significant risk areas explicit within policy.
- Updating and providing links with Wellbeing and Future Generations goal of “A more Resilient Wales in policy
- Update or amend policy monitoring indicators.

Shifts in Policy

Paradigm shifts in flood risk management policy

- Netherlands Delta Programme
- Elbe region-Benchmarking flood risk reduction and Pilot study
- Hamburg flood resilient cities

Highlight opportunities to strengthen the role of planning to risk and strengthen plan led system



OPW

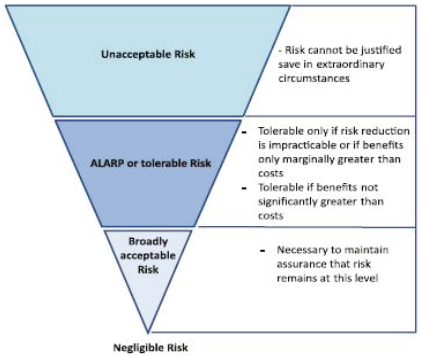


Figure 5 Concept of risk acceptance (Abhas *et al.*, 2012), adapted from: FLOOD site 'Language of Risk').

Grabs (2016) Benchmarking flood risk reduction in Elbe region

How Successful has current policy?

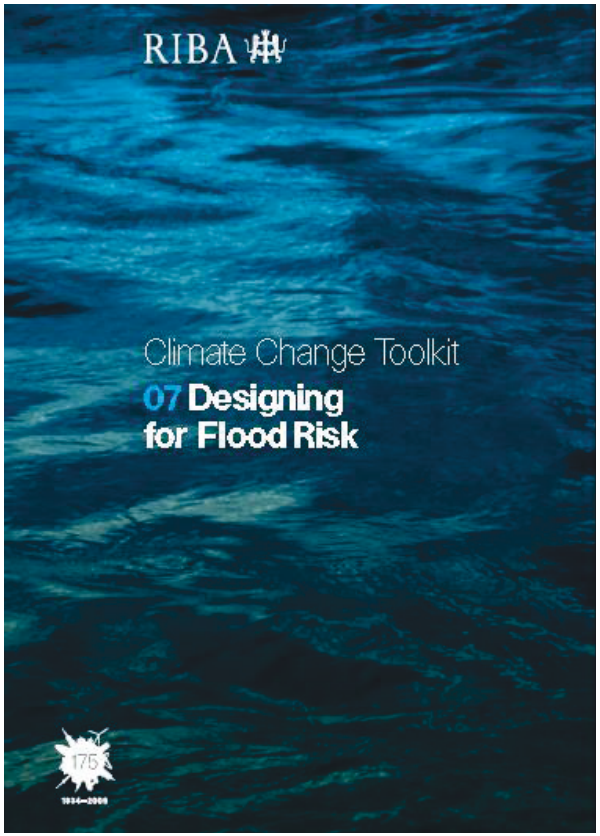
- Limited evidence on success or effectiveness
- 76% survey responses suggest policy is clear and well supported.
- Success criterion of policy:
  - APR (SD4) Indicator on C1 and C2 units meeting/not meeting tests;
  - HLT number of NRW/EAW consultations or objections;
  - S18 reports;
  - SFCA included in LDP evidence base;
  - Number of units built post 2009 on flood plains;
  - Not feasible to compare NaFRA and ONS datasets;
- Different context of flood risk and planning in 2017 to 2004.
- Sustainable Development/Wellbeing goals in place.
- No links to Floods or WFD directive but does refer wider objectives.
- Workshops identified significant opportunities to strengthen existing policy.
- Key issues of policy were well understood and discussed amongst workshop participants.

Flood risk understanding, language and use of probability

- Improving flood risk understanding is key (NFCERMS);
- Probability used as a communication tool on flood risks, and has changed;
- Potential miss-understanding of risk levels;
- Tools, modelling and mapping led;
- Benefits of zoning or hazard mapping approach within policy;

Role of planning policy in flood resilient methods to enable development?

The Guardian (2016)



RIBA (2010)

Interpretation, Definitions and Roles

- Interpretation of planning policy;
  - Clear policy approach and triggers;
- Definition of development;
  - All types of “development as defined in legislation including change of use
  - Whole site;
- Clearly defined roles and responsibilities ;
  - Role of Planning
  - Role of FRM authorities
  - Role of NRW

Planning Policy and Precautionary Principles Summary

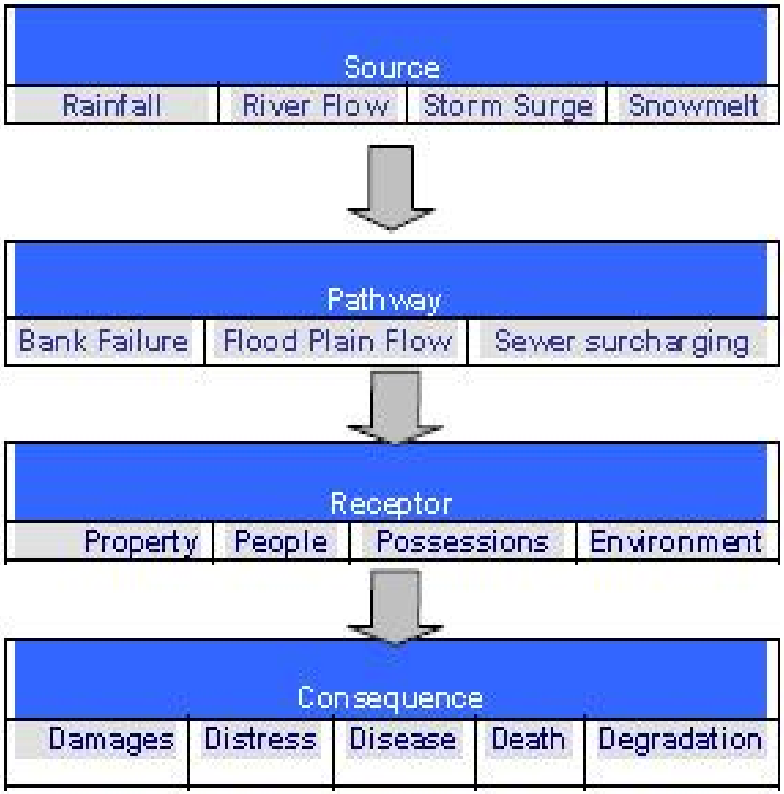
- Significant opportunities to strengthen existing precautionary approach.
- DAM could easily be adapted or replaced.
- Role of LDP and strategic approach to flood risk could be significantly strengthened.
- Improved focus on risk based approach to sources and consequences would help to inform and deliver more resilient development.
- Role of policy in resilience and design and links to TAN 12.
- Current indicators/measures could be improved to reflect role of planning and flooding.
- Limited use of probability or technical language in policy will be important to wider range of users/decision makers.

Risk Based Approach

Risk Based Approach

- Introduction
- Explanation of risk based approach
- Role of Development Advice Maps
  - Assess application of TAN 15 tests against C2
  - Highlight differentiation between C1/C2
  - Fluvial and tidal zones
- Development types and vulnerability
- Different development type classifications and types
- Flood Consequence (SPRC) model
- Other sources of flood risk
    - Surface water flood risk
    - Groundwater
    - Reservoir or other?
- Evaluation of current risk based approach
- Areas at greatest risk
- Combination of risks
- Assess need for more restrictive policy to development at areas of greatest risk
- Identify areas where policy restricts development
- Flood Insurance standards

Risk Based Approach



Adapted Example Foresight, 2002

PPW Edition 9 (Welsh Government)

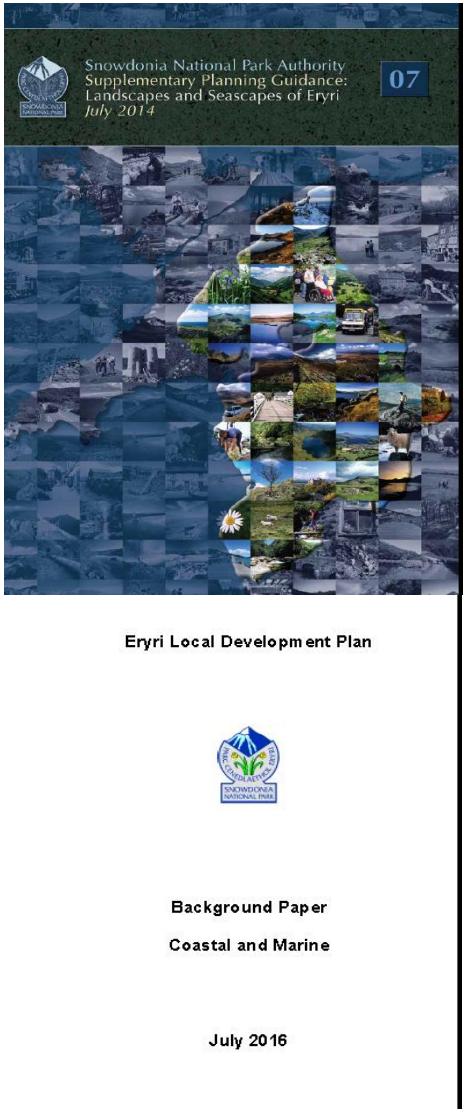
- Separate but complimentary system to environmental management;
- Material planning consideration
- Climate change is expected to influence environmental risks over lifetime of development;
- Action through the planning system to move away from flood defence and mitigation;
- Precautionary principal linked to development plan, increased climate risks, sea level rise and more intense rainfall, surface water and drainage infrastructure
- Avoidance of development in flood hazard areas

Assess the Rigour of Existing TAN 15 approach

- 90% of survey responses at workshops identified that there were areas of policy which were unclear and open to interpretation.
- 75% survey responses found TAN 15 was clear and well supported.
- Definition of “rigour” relates to harshness and inflexibility.
- Rigour of TAN 15 governed by the “Precautionary approach” and use of DAM and development types/vulnerability.
- Presumption against HVD in C2.
- Focussed on fluvial and tidal sources of flood risk and extreme flood events.

Assess the Rigour of Existing TAN 15 approach

- TAN 15 and DAM does not relate to SMP policy areas or Coastal flooding TAN 14 (1998)
- National Strategy for Wales "holistic approach" to all sources of flood risk including coastal erosion
- Policy needs to help deliver a more resilient Wales by directing development away from high risk locations identified in SMP2
- Opportunity to strengthen role of new LDP's and evidence, Gwynedd and Anglesey, Carmarthenshire and Snowdonia National Park.



Source: Snowdonia National Park Authority Website

Assess the Rigour of Existing TAN 15 approach

- Presumption against highly vulnerable development (residential and emergency services) in C2;
- Fifty appeal/Call in decisions since 2012.
- Significant increase in number of challenges .
- Differences between C1 and C2 considered arbitrary and unnecessary by workshop participants.
- Acknowledged whilst DAM doesn't include climate change allowances it is based on extreme events.

(Gwynedd Council, 2014)

Assess TAN 15 tests application to HVD in C2

- Acceptability criteria (section 7 and appendix 1 TAN 15 tests) following application of justification tests.
- The justification and acceptability tests apply (section 6 and 7).
- 50:50 split between survey responses on changes to DAM triggers and 90% supported greater focus of surface water flooding in policy and DAM's.
- Use of different maps for Flood Consequence Assessments.
- C1 and C2 have same probability so would a shift to defended and undefended scenario's within FCA required instead for appropriate types of development and location. Definition of highly vulnerable development/acceptability criteria needs to be changed first as interlinked.
- Areas of high risk/hazard as defined by 1 in 75 return period should be intolerable to development.
- Development definition (minor and change of use) and whole site.
- Justification should be applied also to surface water flood zones- City of London example?

Areas of greatest risk and little or no risk

- Areas of greatest risk defined as significant or high hazard or coastal change areas could easily identified by existing NAFRA data or NRW maps;
- Zone B, Zone A (Zone 1) if it existed do not restrict development and type of development restricted in Zone C1/C2.
- Areas at little risk could relate to urban areas where no updates to DAM maps or model outlines have taken place.
- Little difference between C1 and C2 map outlines so presumption against (without application of tests)is too harsh?
- Urban town centre case studies: Bridgend, Swansea or Newport.

Development types

- Current policy categories are limited to three types plus other, and are simple/prescriptive.
- Different categorisation between England and Ireland. Residential and hospitals are “more vulnerable” in England but Ireland has residential and hospitals as “highly vulnerable”
- NRW survey response suggests:
  - Critical and utilities infrastructure/water compatible development;
  - Add doctors surgery/day centre and nursery “highly vulnerable”; and
  - Consideration of new legislation required/Use Classes order is required;

- Use classes order subject to conditions/legislation changes but easily categorised (Highly =C and D, Moderate =B, Low=A and Sui generis or other case by case.
- Grouping of MCM codes is possible and could align with zoning/design completed in assessments or project appraisals.
- Would a category of developments of national significance be required or would these fall under infrastructure/utilities?

Surface water flooding

- Interim SuDs standards in Wales are not mandatory or statutory.
- SuDs standards well established (Industry guidance and BS standards).
- Flood and Water Management Act 2010 Schedule 3 in Wales not enacted yet.
- Drainage and Design to development are key to long term sustainability and flood risk management.
- UK Parliament (April 2017) highlights need for strengthened policy on SuDs.
- Strong linkages between flood risk and water quality objectives and benefits within legislation but not policy.
- Policy should reflect mandatory requirements for WFD assessments development management and consents.
- Existing policy wording suggests planning authorities “may” consider imposing a condition requiring developers to examine the SuDs option.

Surface water flooding

- Policy focus and operation of TAN 15 is placed on fluvial and tidal risks.
- Flood risk is combination of probability and consequence.
- Vulnerability focus could be strengthened.
- Hazard analysis not included in TAN 15 but referred to PPW Edition 9 (2016).
- Hazard maps show areas of potential flood according to three probabilities (low, medium and high).
- Greater emphasis on surface water flooding risks required.
- Greater need to accord with FACIP approach to flood investment programme or community risk register.
- Risk based approach/analysis to surface water flooding could be significantly strengthened.

Other Sources

- Groundwater
  - Mapping not available publicly
  - Broad scale maps intended for limited purposes
  - More appropriate for FCA than policy trigger
- Reservoir
  - Mapping are publicly available
  - Detailed and protected maps
  - More appropriate as FCA than policy trigger
- Local flood risk (Non-main river)
  - Quality and consistency of data
  - S19 reports –can they be used to update zone B
- Coastal Erosion? (or does this need separate attention)

Flood Insurance Standards

- Flood Re (Water Act 2014) relates to properties built before 2009 (and excludes small to medium SME's).
- ABI/Flood Forum key recommendations to Local Planning Authorities;
  - Strong relationship with technical experts
  - Consider all sources of flooding taking account of climate change
  - Take potential impacts of drainage infrastructure seriously.
  - Ensure all flood risk is mitigated to acceptable levels (less than a 1% probability of flooding for proposed development and share information on this;
  - Make sure local plans take account of all relevant costs/regular review.
- Different maps for different purposes Flood Industry uses different maps/probability periods from EA and NRW not DAM's
- Some workshop(s) participants who didn't consider flood insurance was a material planning consideration:
- Planning system has to remain separate and for wider public interest.
- PPW Edition 9 refers to flood risk and hazard but TAN 15 only refers to DAM's
- Mapping availability/latest data. DAM only available online 2008 or 2011 onwards via webpage and dataset limited to LPA's

Risk Based Approach Summary: DAM

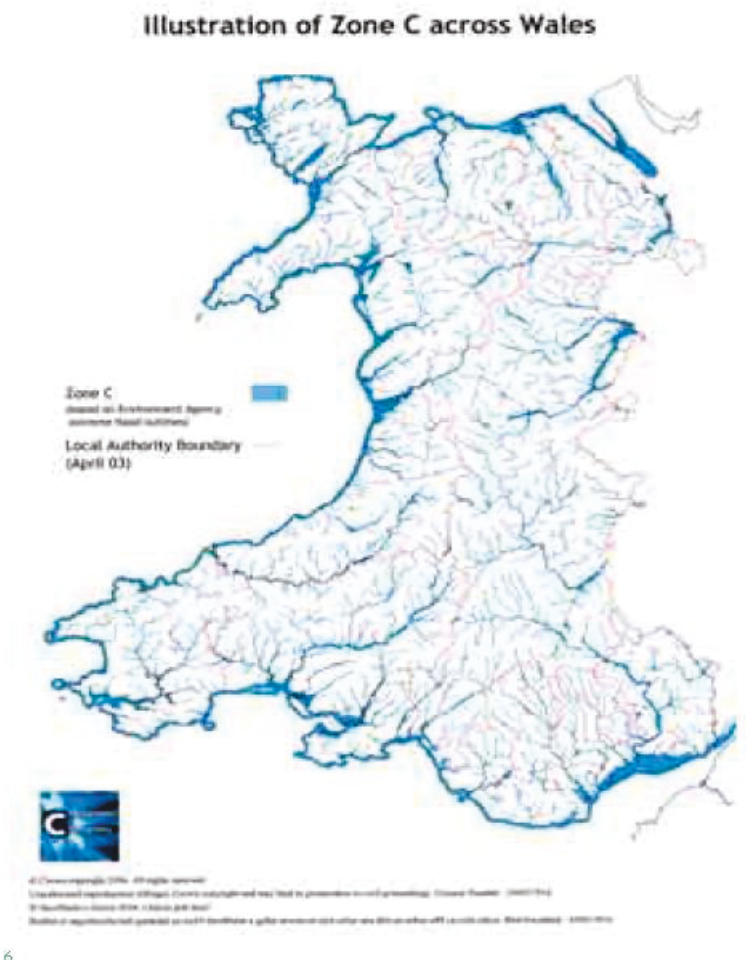
Risk based approach and role of development advice maps could be strengthened in policy by adding;

- climate change allowances to DAM.
- surface water flooding triggers to DAM.
- historical local flooding incidents to Zone B
- shoreline management plan policies to DAM.
- Merging C1/C2 zone.
- Identifying and preventing SMP coastal change areas.

Additional changes could include the provision of a 1 in 100 to 1 in 1000 zone as equivalent to zone 3.

Alternative options to replacing DAM maps

- NRW flood risk maps 2 and 3 zones
- NaFRA flood hazard zones



Risk Based Approach Summary

- Risk based approach in policy could be easily strengthened.
- Differentiation of C1 and C2 no longer valid and barrier to development and regeneration.
- Analysis of all sources of flood risk key to approach (SPR) as identified in Foresight (2002) and Pitt Review (2008) and New Approaches (2008).
- Role of evidence base for LDP and SMP needs to be clearly strengthened.
- Presumption against all development in areas of intolerable or significant risk such as SMP coastal change areas.
- Broader sustainability considerations could help influence and shape a redefined set of tests and acceptability criteria. Greater weight and emphasis on surface water flooding is required.
- Surface water flood risks in the UK are significant.
- Role of drainage and design to development is key.
- Policy linkages between flood risk and water quality could be strengthened.
- Other sources of flood risk and data analysis should feed into risk based approach to development and flood risk policy.

Flood Consequence Assessment

Flood Consequence Assessment

- Triggers for an FCA
  - DAM's
  - Development Types
  - Purpose
  - Issues of proportionality
  - Role of LDP
- Justification and acceptability tests
  - Scale and Proportionality
  - Technical requirements and assessments
  - Guidance
- Acceptability
  - What risk if any is acceptable
  - Consequences and impacts
  - Tolerable allowances
- Role of planning in flood resilient methods
  - Innovation as exception or rule
  - Role detailed drainage and design
  - Design and Resilience

Triggers for an FCA

These triggers will fundamentally be dependant on changes to;

- DAM's
- Development Types

But updated policy will also need to consider opportunities to strengthen policy and address

- Issues of proportionality or scale
- Role of the LDP
- FCA or breach or blockage analysis guidance from NRW is which is not available publicly.
- Inclusion of climate change allowances.

Justification and Acceptability

- Highlights importance of roles and responsibilities in evaluating the justification and acceptability tests.
- Roles and responsibilities have changed.
- Expectations of NRW and resources/understanding of LPA are important.
- Changes in policy could have implications on roles and responsibilities.
- PPW Edition 9 (2016) states development of floodplain wholly exceptionally to certain types of infrastructure and critical development.
- Building on defended floodplains is not be sustainable in long term.
- Highlights importance of pre-application and validation requirements in development management and scope of evidence required at different stages of LDP preparation.
- Tidal Breach locations, such as Rhyl Sun Centre
- Warwick Chemicals, Mostyn Lifetime of Development 25 years, and use of conditions.

Acceptability

- Understanding of flood risk and probability and acceptability identified as key issues in face to face meeting.
- New guidance from Environment Agency (2017) Residual uncertainty highlights issues with technical language by end users.
- Significant shifts in policy identified by flood risk research of UK and Europe.
- Life time of development is not explicit in policy but CPO letters and changes to insurance industry standards would expect to be 100 years or 75 years, and could be strengthened in policy given sustainable development principles.
- Highlights roles and responsibilities and scope of NRW advice.
- Presence of NRW guidance for FCA and Breach and Blockage Analysis.

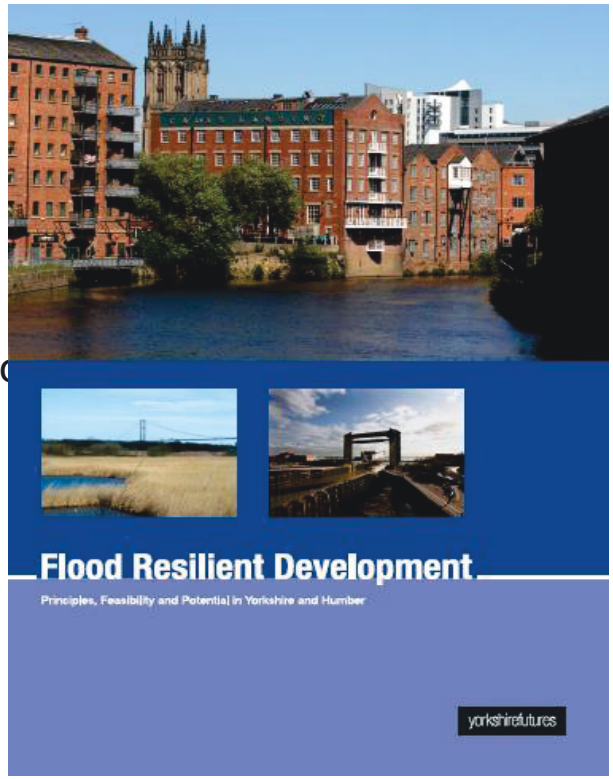
Role of planning policy in flood resilient methods

Resilient Methods are strongly linked to planning policy

- Urban/rural, regional or local
- Exception or rule
- Flood resilience or adaptation
- Vulnerability and Consequence
- Resilience mapping and spatial mapping of residual
- Iterative process of place making and partnership wo
- Residual/acceptable risk levels
- Role of planning obligations
- Value of good and integrated design
- Funding, viability and regeneration
- Risk Based approach
- Overcoming barriers and challenges

Number of pilot studies and toolkits

- City of London Plan
- Lower Broughton Masterplan-RiBA Toolkit, Countryside Properties, Salford Council and Environment Agency
- Arup Cities Hazard and Adaptation Toolkit



Yorkshire Futures, (2010, 2014)

FCA Summary

- Acceptability of flood risk consequences relate to type of development, vulnerability and probability of risks.
- Understanding of issues of uncertainty and modelling and mapping assumptions could be clarified and simplified.
- Proportionality of FCA assessment is required.
- Different options of development categories available.
- Defended and undefended scenarios required or worst case scenario.
- Roles and responsibilities need to be clearly defined.
- Scope and role of NRW consultations clarified.
- Presumption against development proposals (and assessments) in high risk areas.

Overall Summary in Brief

- Precautionary approach to DAM and vulnerability categories will dictate **“decision tree”** of review option recommendations.
- Significant number of opportunities to strengthen policy have been identified.
- Tan 15 policy should place greater emphasis on surface water flooding.
- Areas at high risk or hazard are identifiable from NRW or NAFRA existing maps.
- Presumption against “development” in high risk areas would strengthen planning policy contribution to sustainable development.
- Updates to the justification and acceptability tests needs careful consideration, including no increase to flood risk or elsewhere.
- Changes to classification or categories could be easily achieved providing they are appropriate to vulnerability and kept simple and clear.
- Case studies will be used throughout report to highlight strengths, limitations and opportunities.

Appendix H

H1.1 Natural Resources Wales guidance GPG101

Cyfoeth Naturiol Cymru
Natural Resources Wales

Good Practice Guide

Producing flood risk hydraulic models and flood consequence assessments for development planning purposes

Date Published: September 2015

GPG 101

Document Owner: Steve Cook

Version History:

Document Version	Date Published	Summary of Changes
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5. Increased Flood Risk and its Measurable Limit....6

1. Scope

The Welsh Government seeks to ensure new development is sustainable in the long term and does not create a legacy of problems for future generations. Its national planning policy aims to direct new development away from areas of flood risk and ensure any flood risk and associated impacts both on and off-site can be appropriately managed. The preparation of a Flood Consequences Assessment (FCA) is key in identifying the flood risk to and from a development. It can also be used to demonstrate what mitigation measures will be required to reduce the risks and impacts to ensure the development itself is as safe as possible and that there is minimal impact on flood risk generally.

This guidance has been developed by Natural Resources Wales (NRW) to provide good practice advice for developers and their consultants who are preparing flood risk documentation to support development planning proposals associated with flood risk.

It should be noted that this document is a living draft and will be updated as a result of any future changes or amendments made to the Welsh Governments flood risk, or development planning legislation and data.

2. Regulatory Information

Most development proposals require planning permission from the Local Planning Authority (LPA). In gaining that permission, any development shown to be at risk of flooding will need to comply with the Welsh Government's Planning Policy Wales and Technical Advice Note 15 (TAN15)[1]. In some circumstances, a formal Flood Defence Consent is also required, either from NRW for locations at risk of flooding from main rivers or the sea, or from a Local Authority for ordinary watercourses such as streams.

Information on whether a location is at river or coastal flood risk can be found by referring to the Welsh Government's development advice map[2]. Further detail on all sources of flood risk can be found on NRW's own flood maps[3].

[1]http://gov.wales/topics/planning/policy/tans/tan15/?lang=en
[2] http://data.wales.gov.uk/apps/floodmapping/
[3] https://naturalresources.wales/our-evidence-and-reports/maps/flood-risk-map/?lang=en

A key requirement of TAN15 is that a Flood Consequence Assessment (FCA) must be produced for any development at risk of river or coastal flooding. The results of the FCA should be used to inform the final design of a development and to demonstrate that all risks have been identified and appropriately mitigated for. This is vital to ensure that the development will be safe for people to live in or use for all of its proposed lifetime.

NRW is a statutory consultee in the Town & Country Planning process. Our role regarding flood risk is to provide technical advice to LPAs on the acceptability of flood risk assessment and the measures proposed to manage that risk to people and property from any new development proposal.

NRW assess FCAs and any other supporting flood risk documentation that accompany planning application consultations to identify whether the applicant has met the requirements of Planning Policy Wales and TAN15. Within our advice to the LPA, we provide comment regarding the acceptability of flooding consequences and the technical soundness of an FCA. It is important to note however that there are matters related to flood risk that we are unable to give advice on, such as emergency plans, procedures and measures to address structural damage that may result from flooding. For such matters, advice should be sought other professional advisors.

Although TAN15 primarily refers to built development such as housing, industrial or commercial premises, the principles of assessing flood consequences relate to any development at risk of flooding that requires planning permission and/or land drainage consent and the production of a FCA.

Ideally, the FCA/assessment of flood risk will be a standalone document and should be considered as early as possible in the development feasibility stage. To comply with the requirements of TAN15, the FCA/ appraisal must include:

- an assessment of the consequences of flooding to the development.
- consideration of an appropriate allowance for climate change in line with current government guidance at the time of application. Current national planning policy requires climate change to be considered on all fluvial flows up to and including the 1% (1 in 100) annual probablilty of occurence and on all coastal flood levels up to and including the 0.1% (1 in 1000) annual probability of occurence.
- an assessment of the flood consequences of the development to third parties for an appropriate range of fluvial flows and coastal flood levels (including climate change) up to and including the 0.1% annual probability of occurrence (1 in 1000 in any given year).

If a development covers an area of combined fluvial (river) and coastal flood risk then agreement with NRW's Operational Flood Risk Analysis team must be made about the combinations of joint probability to be assessed. Please note, where a development is located in an area at risk from any other source of flooding (incl. surface water [4]/ groundwater), the FCA should include an assessment of this risk. Information pertaining to surface water or groundwater flooding will be assessed by the Local Authority in their role

[4] http://naturalresources.wales/flooding/managing-flood-risk/whats-my-flood-risk/?lang=en

as Lead Local Flood Authority (LLFA), as per the Floods and Water Management Act 2010.

Section A1.12 of TAN15 states that any new development must show 'no flooding elsewhere'. Current national policy suggests this should include a flood event with a 0.1% (1 in 1000) annual probability of occurrence (including climate change for coastal flood levels).

TAN15 also advises that a FCA can be used to establish whether appropriate mitigation measures can be incorporated within the design of a development to ensure that it minimises risk to life, damage to property and disruption to people living and working on the site or elsewhere in the floodplain. NRW will review the FCA and hydraulic modelling and advise the LPA on the submissions technical competence and the merits of the proposed mitigation. Our assessment of the FCA will have two key aims:

- to identify whether the flood risks to both to the development itself and elsewhere have been fully identified and quantified.
- to advise the LPA on whether every reasonable mitigation measure has been included in the final proposed design to ensure the development is as safe as possible and that the consequences of flooding meets the requirements of current planning policy.

NRW advice on flood risk matters is intended to assist the LPA in making a fully informed decision based on the merits of a proposed development.

3. Interaction with NRW for Flood Data and Technical Advice

The first point of contact for provision of NRW hydraulic model data is via the organisation's 'Access to Information' team who can be can be contacted via email at: datadistribution@cyfoethnaturiolcymru.gov.uk . They will liaise with the Operational Flood Risk Analysis teams, who are the custodians of the organisation's hydraulic models.

If a NRW hydraulic model already exists in the area of interest, we can provide the starting model (under licence if required) and provide advice on the scope of any work that may be required to achieve the objectives of the hydraulic modelling work. Please note that provision of this information may incur a cost.

If a hydraulic model does not exist at the area of interest, our Operational Flood Risk Analysis teams can assist with defining the scope of the hydrological and hydraulic model required.

Pre application discussions with the relevant Flood Risk Analysis team is strongly recommended as they can provide local knowledge, data and advice on the suitability of a hydraulic model's fitness for purpose.

A hydraulic model may also be used to provide design water levels. Site specific hydraulic model accuracy and safety margins (freeboard) should also be discussed and agreed with the relevant Flood Risk Analysis team.

If a development project has a long duration or a flood event occurs, it may be necessary to review the hydrology, hydraulic model calibration and blockage scenarios being considered in light of new data becoming available.

NRW will also specify final data deliverables that are required if changes to the Flood Map are to be requested as part of the development proposal.

Please note that NRW will not accept a hydraulic model for review and consideration to be included within our library of hydraulic models, or as part of a FCA, unless it is accompanied by a hydraulic modelling technical/user report, log, record and results files.

4. Mitigation Evidence

It is usually necessary to undertake mitigation work to address any increased flood risk elsewhere. The following evidence is required as part of the FCA/development appraisal to ensure a full assessment of the risks and impacts to third parties of any development, and to pass the acceptability criteria in line with the requirements of current planning policy.

- An appropriate baseline hydraulic model must be constructed to represent current conditions and include the latest hydraulic modelling software (if a hydraulic model is used), topography and flood flow estimates available at the time of the planning application.
- A proposed hydraulic model must be developed where the proposed permanent and temporary works have been integrated with the baseline hydraulic model.
- Both the baseline and proposed hydraulic models must produce, where possible for the model software and hydrological input, outputs that clearly calculate the flood risk in terms of depth, velocity, rate of rise, speed of inundation and extent for the appropriate range of flood flows chosen.
- A comparison of Baseline and Proposal results.
- An appropriate range of flood flows “up to and including” the maximum event should be considered, particularly around the threshold of flooding, if considered to be critical to the results.
- An appropriate allowance for climate change must be considered in line with current government guidance at the time of application.

5. Increased Flood Risk and its Measurable Limit

Calculations will be carried out to the appropriate numerical precision; however, for the purposes of determining any flooding impact, depth and level results will be produced in metres to two decimal places due to model resolution. For example; a baseline water level would be calculated to 100.000m Above Ordnance Datum (AOD), the proposed change in water level would be calculated as 100.004m AOD and therefore reported as 100.00mAOD. That is, no reported change.

Conversely in the same example, should the calculated proposed water level be 100.005mAOD, then this would be reported as a change in water level with a proposed water level of 100.01mAOD. This is a positive change in water level from the baseline.

Velocity, rate of rise of flood water and hazard values must also be measured in metres to one decimal place.

To demonstrate that a proposed development has not increased flood risk elsewhere the FCA and hydraulic modelling must show:

- No increased depth, velocity, rate of rise or extent for flood water outside the river channel, or agreed flood storage area.
- No change to the onset of flooding.
- No impact to infrastructure within or connected hydraulically to the river channel.

Where parts 1, 2 and 3 cannot be fully met, all appropriate evidence must be provided within the FCA to enable NRW to advise the LPA on the merits and acceptability of the development proposal in comparison to any demonstrated increased flood risk elsewhere. The FCA must therefore clearly identify the residual increase in flood risk elsewhere and provide comprehensive detail on depth, velocity, rate of rise, speed of inundation and /or extent and the number and type of property and/or infrastructure affected.

NRW technical advice to the LPA will be based on the evidence presented in the FCA.

Appendix I

I1.1 HM Registry flood risk indicator

I1.2 HM Registry example of a flood Risk Indicator

HM Land Registry

Flood Risk Indicator

Show all answers | Hide all answers

- What is a Flood Risk Indicator?

The Flood Risk Indicator is a textual result indicating flood risk to registered land.

The Flood Risk Indicator combines Environment Agency and Natural Resources Wales flood data with HM Land Registry property data to provide customers with a high level indication of whether a piece of land is at risk of flooding.

The result is provided on a title-by-title basis for registered properties within England and Wales.

It is available via HM Land Registry's Find a property Service, providing customers with an instant online indicator of flood risk for the land they are interested in.

Please see: Flood Risk Indicator example

- Why is a Flood Risk Indicator useful to me?

The Flood Risk Indicator result is designed to increase awareness of the likelihood of flooding for any registered piece of land in England and Wales to encourage people living and working in areas prone to flooding to find out more and take appropriate action.

The Flood Risk Indicator can also be used by those people who wish to apply for planning permission to see whether the site they plan to develop is in a flood risk area. It will appeal to those involved in buying and selling houses, property owners and developers.

For further information see Environment Agency and Natural Resources Wales

- How is a Flood Risk Indicator result produced?

Flood Risk Indicator combines HM Land Registry address data with Environment Agency and Natural Resources Wales flood data to identify flood risk for a registered piece of land within England and Wales.

The flood information from the Environment Agency combines detailed local data from modelling and mapping studies with information from a national model of England and Wales.

For rivers, detailed survey data information about the topography or ground surface is combined with information on flows.

For coastal areas, Environment Agency and Natural Resources Wales takes detailed survey data and combines it with analysed sea level and wave data. This allows it to work out the water level at the coast and how the water could flood inland.

Where detailed mapping is unavailable, the Environment Agency have supplemented its data with national generalised modelling, which gives a consistent picture of flood risk for all rivers with a catchment size greater than 3 km² and the sea.

- What information does a Flood Risk Indicator result contain?

Flood Risk Indicator is a textual result indicating whether the registered land you are interested in is:

- wholly outside of a floodplain and therefore also indicates how close the land is to the nearest floodplain
- wholly within a floodplain and therefore also indicates the likelihood of that land being affected by flooding
- affected by a floodplain and therefore also indicates the likelihood of flooding for the part of the land affected by the floodplain (unfortunately we are unable to indicate which specific part of land is affected)

- What's included in the Environment Agency assessment of flood risk and what isn't?

The NaFRA includes flooding from all rivers with a catchment size greater than 3 km², and all flooding from the sea (both along the open coast and tidal estuaries). Smaller rivers are included in the assessment where they fall within the area that could be affected by an extreme flood (0.1% chance in any year). It does not include other forms of flooding such as from highway drains, sewers, overland flow or rising groundwater.

The assessment takes into account the type, location and condition of flood defences.

For further information see Environment Agency and Natural Resources Wales

- Why doesn't the Environment Agency flood data include other forms of flooding in their data, as well as flooding from rivers and the sea?

The Environment Agency's National Flood Risk Assessment is of the risk of flooding from rivers and the sea. It is published online as the Risk of Flooding from Rivers and Sea map. The Environment Agency also publishes maps of flooding from other sources, namely Risk of Flooding from Surface Water and Risk of Flooding from Reservoirs

For further information see Environment Agency and Natural Resources Wales

Next »

Specimen Flood Risk Indicator

This is an example of a Flood Risk Indicator of the title number set out below. This example is created purely for illustrative purposes only. For detailed information on each of the points below, please refer to the Flood Risk Indicator help pages.

Land Registry

in association with the

Environment Agency

Cyfoeth Naturiol Cymru
Natural Resources Wales

The Flood Risk Indicator is a textual result that will identify one of 3 scenarios for land registered under a title

1) The whole of the land under a registered title number falls within a river or sea floodplain.
2) The land under a registered title number is affected by a river or sea floodplain.
3) The whole of the land under a registered title falls outside of a river or sea floodplain.

You will also receive an indication of the likelihood of flooding where it is possible to do so.

Flood Risk Indicator

The title number is Land Registry's unique reference number for this registered land.

Title number and property description

CS72510
23 Cottage Lane, Kerwick, PL14 3JP.

When the property falls outside of a floodplain the result will indicate the proximity to the nearest floodplain for that land expressed in metres

Flood risk

The land registered under the above title number falls within a river or sea floodplain.

When the land falls within a flood plain or partially within a floodplain the result will also show the likelihood of flooding for that land.

The land is in an area that has a low chance of flooding from rivers or the sea which means that it is unlikely to flood except in extreme conditions. The chance of flooding each year is less than 1 percent (1 in 100), but greater than or equal to 0.1 percent (1 in 1000). This takes into account the effect of any flood defences that may be in this area.

This uses information on the predicted likelihood of flooding from rivers or the sea for defined areas.

This result was produced on 15 December 2014 based on Environment Agency and Natural Resources Wales flood risk data that was current as of 1 December 2014 and Land Registry data that was current as of 15 December 2014. The Flood Risk Indicator is based on the most up to date Environment Agency and Natural Resources Wales flood data available at the date and time of your search

Disclaimer

The information contained in this document is for general information purposes only. The flood risk information is provided by the Environment Agency and Natural Resources Wales. You should note that:-

The Flood Risk Indicator shows only the predicted likelihood of flooding of areas of land from rivers or the sea and it is not detailed enough to describe the likelihood of flooding for individual properties.

Individual properties may not always face the same chance of flooding as the areas that surround them because, for example the property may be higher than the surrounding land. There may also be particular occasions when flooding occurs and the observed pattern of flooding does not in reality match the predicted patterns shown on the Environment Agency and Natural Resources Wales flood data.

Because the flood data from the Environment Agency and Natural Resources Wales is created as a result of a modelling process, it may by its nature not be as accurate as might be desired.

If you believe that a particular property does not face the chance of flooding shown on the Environment Agency and Natural Resources Wales flood data, or if you have information that you believe may not have been taken into account, then you should contact your local Environment Agency or Natural Resources Wales office or see the Environment Agency or Natural Resources Wales website for more information on flood data.

We will endeavour to keep the information up to date and correct but make no representations or warranties of any kind, express or implied, about the completeness, accuracy, reliability, suitability or availability with respect to the flood data. Any reliance you place on such information is therefore strictly at your own risk.

See https://www.gov.uk/browse/environment-countryside/flooding-extreme-weather
and http://naturalresourceswales.gov.uk/flooding-and-water

Specimen VAT Receipt

This is an example of a VAT receipt for the Floor Risk Indicator result. It will be automatically included in each result. This example is created purely for illustrative purposes only. For further information please refer to the Flood Risk Indicator Help pages.

Land Registry

VAT receipt
Date
04 August 2009

Items
Flood risk indicator for CS72510

WorldPay transaction ID: 5322757

Net value	£0.00
VAT @ 0%	£0.00
Total including VAT	£0.00

Land Registry
Trafalgar House
1 Bedford Park
Croydon
CR0 2AQ

VAT registration number: GB 8888 181 53

Offices at
Coleshill
Doncaster
Dublin
Edinburgh
Exeter
Glasgow
Haywards Heath
Isle of Man
Limerick
Newcastle upon Tyne
Newport
Peterborough
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