



# **Assessment of Surface Water Flooding Local Development Plan, Adoption - 2021**

**Pembrokeshire County Council  
December 2010**

## List of Abbreviations

ASTSWF	Areas Susceptible to Surface Water Flooding
EA	Environment Agency
FCA	Flood Consequence Assessments
GIS	Geographical Information System
JUDP	Joint Unitary Development Plan for Pembrokeshire
LA	Local Authority
LDP	Local Development Plan
LRF	Local Resilience Forum
PCC	Pembrokeshire County Council
WAG	Welsh Assembly Government

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## Introduction

1. The Planning and Compulsory Purchase Act 2004 (the Act) requires each Local Planning Authority in Wales to prepare a Local Development Plan (LDP). The LDP being prepared for Pembrokeshire (excluding the National Park) proposes allocations for the future development of land from the adoption of the plan until 2021.
2. This document is one of a number of background documents providing evidence to support the LDP. It examines the susceptibility to surface water flooding of proposed development site allocations made by the Council's LDP.
3. In accordance with TAN 15: Development and Flood Risk (2004) susceptibility to fluvial / tidal / coastal flooding has been factored in to plan preparation at an early stage, based on the Welsh Assembly Government's Development Advice Maps. The PCC Site Assessment Report 2010 identifies sites at risk of flooding based on information from these maps. This report supplements that information.
4. This background paper is also a response to a recommendation of the Pitt Review<sup>1</sup> into the summer 2007 floods, which suggested that the Environment Agency (EAW) and Local Authorities should identify areas at risk from surface water flooding. It has been undertaken at a late stage in preparation of the Deposit LDP, in response to newly published guidance and maps showing Areas Susceptible to Surface Water Flooding (ASTSWF) together with the associated guidance notes produced by the Environment Agency Wales<sup>2</sup> (October 2009) and supplements earlier work.

## ASTSWF Maps

5. The maps show three bands of surface water flooding from 'less' to 'intermediate' to 'more' susceptible. These terms are based in the guidance notes produced by the EAW in October 2009. The 'more' susceptible areas have '*a natural vulnerability to flood first, flood deepest and/or flood for relatively frequent, less extreme events (when compared to the other bands)*' (Environment Agency, 2009).
6. The maps have been developed at a national level to provide information to the Welsh Assembly Government (WAG) and Local Resilience Forum (LRF) partners. This national scale means the maps should be used with caution at a local level and should not be relied upon as the sole evidence for LDP allocations analysis or for planning applications.

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<sup>1</sup> Pitt Review, "Learning Lessons From the 2007 Floods", 2008

<sup>2</sup> <http://www.environment-agency.gov.uk/research/planning/33698.aspx>

## Aim

7. The aim of this study is to establish the risks posed to allocated sites within the LDP from surface water flooding, to assist the County Council in its decisions on site allocations for the Plan and to identify those site allocations where there will be a requirement for additional information on surface water flooding to accompany planning applications for individual sites and where additional requirements for site layout and design may be required.
8. As noted by the Environment Agency's guidance, the maps will help to '*prioritise areas requiring more detailed analysis of surface water flooding*' and to establish which sites may require Flood Consequence Assessments (FCAs) to be carried out by developers. Whilst we would look at SuDS on all sites, this report identifies those sites particularly likely to be at risk of surface water flooding and where this would need to be considered at early design stage.

## Methodology

9. The assessment is for all sites proposed for allocation by the deposit LDP, including those for housing, mixed use, employment, retail, community facilities and gypsy and traveller accommodation. It was required to:
  - i. identify all proposed allocations having any susceptibility to surface water flooding (Stage 1);
  - ii. distinguish between those proposed allocations considered to be of a lower risk, capable of being dealt with entirely through layouts which avoid built development within the 'at risk' area(s) and those areas requiring more detailed analysis of surface water flooding at an application stage (Stage 2); and
  - iii. cross check the assessment results with local knowledge, provided by relevant in house and external stakeholders (Stage 3).

## Stage 1

10. The stage 1 assessment is intended to identify all proposed site allocations where all or part of the site is located within an area of susceptibility for surface water flooding. Appendix 1 lists each of the proposed allocations that are affected.

## Stage 2

11. Some of the proposed allocations identified as being at some risk of surface water flooding in the stage 1 assessment will be capable of delivery without substantial mitigation measures, even though they are located in a 'less' or 'intermediate' banding as interpreted using EAW guidance, provided that the site layout places new buildings away from the areas most susceptible to surface water flooding.
12. Drawing on EA guidance, the Council has defined two categories of risk:
  - i. Sites where susceptibility to surface water flooding is considered more likely which requires design consideration of risk mitigation measures, including layout and SuDS and assessment of whether an FCA is required:
    - All or any part of any site located within a 'more'<sup>3</sup> susceptible banding; and
    - Any site with 10% or more of its area within a 'less' or 'intermediate' susceptibility banding.
  - ii. Lower risk sites requiring consideration of susceptibility in site layouts:
    - Any site with less than 10% of its area within a 'less' or 'intermediate' susceptibility banding

The Deposit LDP allocations where susceptibility to surface water flooding is more likely to occur are listed at appendix 2.

## Stage 3 (stakeholder input)

13. The Environment Agency recommends that the Authority uses '*local knowledge from .... planning and engineering teams ... to assess the suitability of the map as an indicator for surface water flooding*'.
14. In line with this guidance, site assessment information is complemented by local information sought from relevant County Council officers and the Environment Agency's stakeholder commentary is recorded in appendices 1 and 2.

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<sup>3</sup> As listed in paragraph 5 of this report

## Existing Data

15. The assessments have been undertaken using preliminary ASTSWF maps (GIS layers) produced by the Environment Agency in 2010.
16. The Environment Agency's guidance states that *'The Welsh Assembly Government (WAG) have produced maps of known locations of historic surface water flooding, mostly from Local Authority and Water Company records. This data is being shared with Local Resilience Fora partners, including LAs and is expected to be available during the Autumn of 2009'*.
17. These maps were not available at the time of the analysis (August 2010), but once published, should they indicate increased risk for any allocated sites, such information could be fed into later stages of plan preparation (for example into 'focussed changes' at submission of the plan for Examination) and could also be used to inform developers of information requirements for planning applications.

## Conclusions

18. Forty seven proposed allocations, covering 280.21 hectares, are identified as being at some risk of surface water flooding (stage 1 assessment).
19. Where a site's susceptibility to flooding is limited<sup>4</sup> it is considered deliverable without substantial mitigation measures, provided that the site layout favours built development away from areas of surface water flooding susceptibility. Thirty of the proposed allocations fall into this category, covering 96.6 hectares of housing land, 28.58 hectares of employment land, 10.04 hectares of strategic employment land, 1.03 hectares of retail land, 10.1 hectares of community facilities land and 0.78ha of gypsy travellers' accommodation land.
20. Seventeen of the proposed allocations are identified as being more likely to be susceptible to surface water flooding<sup>5</sup>. This comprises 12.32 hectares of housing land, 60.91 hectares of employment land, 54.06 hectares of strategic employment land, 5.47 hectares of mixed use land and 0.31 hectares of retail land.
21. There is limited local information on historic flooding of the proposed allocations. Local information, on future risk, including some from

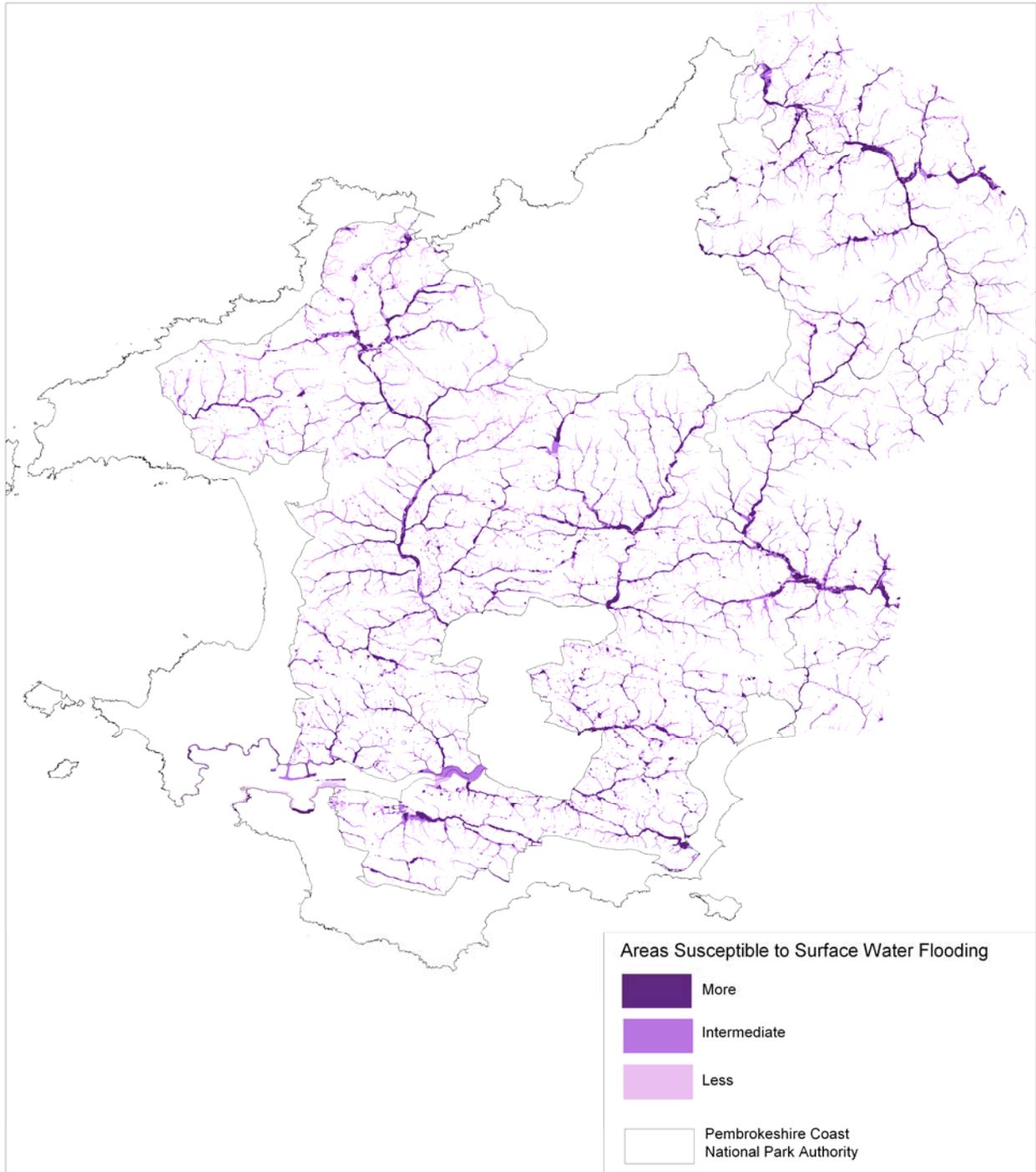
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<sup>4</sup> where less than 10% of the site is identified as being of 'less' or 'intermediate' susceptibility to surface water flooding

<sup>5</sup> Where any part of the site is designated as at 'more' susceptibility or with 10% or more of the site area designated as at either 'less' or 'intermediate' susceptibility to surface water flooding

strategic flood consequences assessments, is provided on five of the proposed allocations.

22. For proposed allocations with any susceptibility to surface water flooding, additional information will be required and developers should demonstrate that their site layouts and designs have taken into account the possibility of surface water flooding.
23. For proposed allocations where there is limited susceptibility (see footnote 3), developers must demonstrate that their site layouts favour locations for built development away from areas of surface water flooding susceptibility.
24. Proposed allocations with significant susceptibility to surface water flooding (see footnote 4) are identified in the Council's Development Sites Supplementary Planning Guidance as sites where SuDS (Sustainable Drainage Systems) will be a requirement.
25. No additional requirements for FCAs are identified as a direct result of this study, although it is noted that in some instances the need for an FCA has been identified in relation to tidal / fluvial flood risk.
26. Where mitigation of surface water flood risk is proposed for new development implications for nearby land will need to be taken into consideration.



**Surface Water Flooding**  
**Pembrokeshire County Council**

**Pembrokeshire County Council**  
**Cyngor Sir Penfro**



Scale 1:321289

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Compiled by on 4 August 2010

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**APPENDIX 1 – All proposed site allocations with part or all of the site designated as susceptible to surface water flooding.**

HOUSING							
Site Ref	Site Name	Area (ha)	Number of Units	EAW ASTSWF Less	EAW ASTSWF Inter	EAW ASTSWF More	PCC Officer Comments
HSG/095/00147	Pembroke - adjacent Long Mains & Monkton Priory	7.57	115		✓	✓	No information on historic flooding
HSG/040/00275	Haverfordwest - Shoals Hook Lane & Bypass	9.23	277	✓	✓		No information on historic flooding
HSG/040/00274	Haverfordwest - Slade Lane South	17.05	512	✓	✓		No information on historic flooding
HSG/086/00226	Milford Haven - Steynton Myrtle Hill	3.4	102	✓	✓		No information on historic flooding
HSG/029/00017	Crundale - Land at Cardigan Slade	2.22	55		✓		No information on historic flooding
HSG/088/00078	Narberth - west of Bloomfield Gardens	3.58	89		✓		No information on historic flooding
HSG/034/00215	Fishguard - Maesgwynne Farm	13.31	399		✓		No information on historic flooding
HSG/052/00011	Lamphey - South of Cleggars Park	2.42	55		✓		No information on historic flooding
HSG/020/00062	Cilgerran - adjacent to Holly Lodge	1.1	24		✓		No information on historic flooding
HSG/041/LDP/01	Hayscastle Cross - land opposite Barrowgate	0.43	6		✓		No information on historic flooding
HSG/040/00273	Haverfordwest - Slade Lane North	15.31	459	✓			No information on historic flooding
HSG/086/00222	Milford Haven - South West of The Meads	3.09	93	✓			No information on historic flooding

HSG/093/00066	Neyland - East of Poppy Drive	3.37	161	✓			No information on historic flooding
HSG/048/00038	Johnston - adjacent to Milford Road	4.77	119	✓			No information on historic flooding
HSG/044/00050	Hook, Rear of Pill Road	0.59	15	✓			No information on historic flooding
HSG/086/00318	Milford Haven - Castle Pill - 96/0491/PA	2.9	72	✓			No information on historic flooding
HSG/095/00153	Pembroke - adjacent to Monkton Swifts	3.7	118	✓			No information on historic flooding
HSG/095/00144	Pembroke - south of Gibbas Way	2.33	58	✓			No information on historic flooding
HSG/053/00009	Letterston - Court Meadow	2.28	91	✓			No information on historic flooding
HSG/030/LDP/01	Crymych - east of Waunaeron	1.24	35	✓			No information on historic flooding
HSG/046/00015	Hundleton - east of Bentlass Road	1.26	40	✓			No information on historic flooding
HSG/108/LDP/02	Puncheston - west of Awelfa	0.44	12	✓			No information on historic flooding
HSG/028/00013	Croesgoch - East of the Forge	0.73	22	✓			No information on historic flooding
HSG/086/00117 HSG/086/002	Milford Haven - Hubberston Adjacent to Kings Function Centre, Dale Road	5.16	50	✓			No information on historic flooding
HSG/087/LDP/01	Milton - West of Milton Meadows	0.75	15	✓			No information on historic flooding
HSG/034/LDP/01	Fishguard - Old Infants School	0.7	21	✓			No information on historic flooding

Retail						
Site Ref	Site Name	Area (ha)	EAW ASTSWF Less	EAW ASTSWF Inter	EAW ASTSWF More	PCC Officer Comments
RT/034/01	The Primary School Site, Fishguard	1.34		✓		No information on historic flooding

Mixed Use						
Site Ref	Site Name	Area (ha)	EAW ASTSWF Less	EAW ASTSWF Inter	EAW ASTSWF More	PCC Officer Comments
MXU/048/01	Arnolds Yard	5.47	✓	✓	✓	No information on historic flooding. However, flooding has occurred on the trunk road in the vicinity of Victoria Gardens (opposite), but it is not known whether the flooding was caused by lack of hydraulic capacity in the watercourse/culvert or whether it was caused by blockages of trash screens/gullies.

Employment						
Site Ref	Site Name	Area (ha)	EAW ASTSWF Less	EAW ASTSWF Inter	EAW ASTSWF More	PCC Officer Comments
EMP/093/00001	North of Honeyborough Industrial Estate	8.55	✓	✓	✓	No information on historic flooding
EMP/086/00002	Dale Road, Hubberston	4.63	✓	✓	✓	No information on historic flooding
EMP/034/00006	Celtic Link Business Park, near Scleddau	13.47	✓	✓	✓	No information on historic flooding
EMP/040/00004	Withybush East of Business Park	16.45		✓		No information on historic flooding
EMP/040/00005	Withybush North of Business Park	6.09		✓		No information on historic flooding
EMP/034/LDP/01	Goodwick-Former Dewhirst Factory	1.4	✓	✓		No information on historic flooding
EMP/040/00003	Merlins Bridge Creamery Extension	5.13	✓			No information on historic flooding
EMP/136/00001	Former RNAD Site, Trecwn	21.11	✓		✓	No information on historic flooding
EMP/030/00001	Crymych - adj' to Riverlea / opp' Llygad-yr-Haul	5.2	✓			No information on historic flooding
EMP/086/LDP/01	Adjacent to Marble Hall Road, Milford Haven	6.86	✓			No information on historic flooding
EMP/034/LDP/02	Goodwick- Parrog	0.6			✓	No information on historic flooding, but may be at risk of flooding in the future due to sea level rise/climate change

Strategic Employment						
Site Ref	Site Name	Area (ha)	EAW ASTSWF Less	EAW ASTSWF Inter	EAW ASTSWF More	PCC Officer Comments
S/EMP/136/0001	Former RNAD Site, Trecwn	21.11	✓	✓	✓	No information on historic flooding
S/EMP/040/00001	Withybush Business Park	20.61	✓	✓	✓	No information on historic flooding
S/EMP/096/00001	Pembrokeshire Science and Technology Park	22.38	✓	✓		No information on historic flooding

Community Facilities						
Site Ref	Site Name	Area (ha)	EAW ASTSWF Less	EAW ASTSWF Inter	EAW ASTSWF More	PCC Officer Comments
CF/040/02	Withybush Hospital Extension	2.57		✓		No information on historic flooding
CF/040/01	Slade Lane School Site	5.83	✓			No information on historic flooding
CF/096/01	Pennar CP School	1.4	✓			No information on historic flooding
CF/052/01	Lamphey School	0.3	✓			No information on historic flooding

Gypsy Traveller Extension Sites						
Site Ref	Site Name	Area (ha)	EAW ASTSWF Less	EAW ASTSWF Inter	EAW ASTSWF More	PCC Officer Comments
GT/050/001	Kingsmoor Extension Site	0.78	✓			No information on historic flooding, but considered to be at risk of flooding in the future.

## APPENDIX 2 – Proposed allocations with significant susceptibility to surface water flooding

### 2a - Proposed site allocations located in areas of ‘more’ susceptibility to surface water flooding.

HOUSING					
Site Ref	Site Name	Area (ha)	Number of Units	EAW ASTSWF More	PCC Officer Comments
HSG/095/00147	Pembroke - adjacent Long Mains & Monkton Priory	7.57	115	✓	No information on historic flooding

Employment					
Site Ref	Site Name	Area (ha)	EAW ASTSWF More	PCC Officer Comments	
EMP/093/00001	North of Honeyborough Industrial Estate	8.55	✓	No information on historic flooding	
EMP/086/00002	Dale Road, Hubberston	4.63	✓	No information on historic flooding	
EMP/136/00001	Former RNAD Site, Trecwn	21.11	✓	No information on historic flooding	
EMP/034/00006	Celtic Link Business Park, near Scleddau	13.47	✓	No information on historic flooding	
EMP/034/LDP/02	Goodwick- Parrog	0.6	✓	No information on historic flooding, but may be at risk of flooding in the future due to sea level rise/climate change	

Strategic Employment				
Site Ref	Site Name	Area (ha)	EAW ASTSWF More	PCC Officer Comments
S/EMP/040/00001	Withybush Business Park	20.61	✓	No information on historic flooding
S/EMP/136/00001	Blackbridge	33.45	✓	No information on historic flooding

Mixed Use						
Site Ref	Site Name	Area (ha)	EAW ASTSWF Less	EAW ASTSWF Inter	EAW ASTSWF More	PCC Officer Comments
MXU/048/01	Arnolds Yard	5.47	✓	✓	✓	No information on historic flooding. However, flooding has occurred on the trunk road in the vicinity of Victoria Gardens (opposite), but it is not known whether the flooding was caused by lack of hydraulic capacity in the watercourse/culvert or whether it was caused by blockages of trash screens/gullies.

**APPENDIX 2a - Proposed site allocations with 10% or more of the site area designated as at either 'less' or 'intermediate' susceptibility to surface water flooding.**

Employment					
Site Ref	Site Name	Area (ha)		EAW ASTSWF Inter	PCC Officer Comments
EMP/034/LDP/02	Goodwick- Parrog	0.6		✓	No information on historic flooding, but may be at risk of flooding in the future due to sea level rise/climate change
EMP/040/00005	Withybush North of Business Park	6.09		✓	No information on historic flooding
EMP/053/00001	Old Station Yard, Letterston	1.23		✓	No information on historic flooding
EMP/086/00002	Dale Road, Hubberston	4.63		✓	No information on historic flooding
HOUSING					
Site Ref	Site Name	Area (ha)	Number of Units	EAW ASTSWF Inter	PCC Officer Comments
HSG/052/00011	Lamphey - South of Cleggars Park	2.42	55	✓	No information on historic flooding
HSG/095/00144	Pembroke - south of Gibbas Way	2.33	58	✓	No information on historic flooding

Mixed Use						
Site Ref	Site Name	Area (ha)	EAW ASTSWF Less	EAW ASTSWF Inter	EAW ASTSWF More	PCC Officer Comments
MXU/048/01	Arnolds Yard	5.47	✓	✓	✓	No information on historic flooding. However, flooding has occurred on the trunk road in the vicinity of Victoria Gardens (opposite), but it is not known whether the flooding was caused by lack of hydraulic capacity in the watercourse/culvert or whether it was caused by blockages of trash screens/gullies.

Retail						
Site Ref	Site Name	Area (ha)	EAW ASTSWF Less	EAW ASTSWF Inter	EAW ASTSWF More	PCC Officer Comments
RT/040/01	Fred Rees Site	0.31		✓		This site is at risk of flooding from the Western Cleddau as shown by a Strategic Flood Consequence Assessment that has

						been carried out for Haverfordwest Town Centre. Following on from that assessment, a Flood Alleviation Option Appraisal Study has been undertaken. This study showed that this site is within the TAN 15 indicative acceptability criteria for commercial development subject to ground and structural investigation of the integrity of the existing river flood defence wall
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