City and County of Swansea

Flood Risk Management Plan 2015

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1.0 Introduction

Following the extreme floods of 2007, the Pitt Review identified the need for better legislation for the effective management of flooding, particularly from surface water. Many of the recommendations from the Pitt Review have been implemented through the Flood and Water Management Act 2010, which places a greater responsibility on upper tier local authorities (county and unitary councils) for surface water management issues, under their new role as a Lead Local Flood Authorities.

Under The Flood Risk Regulations 2009 a responsibility was placed on City and County of Swansea to prepare a Flood Risk Management Plan.

The Flood Risk Management Plan gives an overview of the flood risk in City and County of Swansea and our high level objective for the 6 years which states that we will:

"Reduce Flood Risk in every area where significant flood risk has been identified"

Detailed objectives are also given within the Flood Risk Management Plan together with a series of measures, which will ensure flood risk in the City and County of Swansea area will be addressed and reduced during the 6-year period before the plan is reviewed.

Through the production of this plan and from the experience and knowledge of our engineering staff we have learned how to manage flood risk in an efficient and cost effective way. There are still many lessons to be learned and this first cycle of the Flood Risk Regulations will present many challenges in terms of providing solutions to reduce flood risk which will be acceptable within our communities and will also attract the appropriate funding from Welsh Government, Europe and other sources.

The Flood Risk Management Plan covers flooding from surface water, groundwater, ordinary watercourses and the interface with main river flooding. Flooding from main river and reservoirs is still the responsibility of Natural Resources Wales and their proposals are contained within the Western Wales River Basin Flood Management Plan

8 LLFAs in Wales are legally required to produce FRMPs but all 22 LLFAs in Wales have opted to produce a plan.

2.0 Purpose of Flood Risk Management Plans in managing flood risk

2.1 What is a Flood Risk Management Plan

Flooding remains a key threat to communities across Wales, and managing this risk through careful planning is important to minimise the risk to communities. Flood risk management planning allows risk management authorities (RMAs) to develop a better understanding of risk from all sources of flooding and agree priorities to manage that risk.

This Flood Risk Management Plan (FRMP) has been developed with this in mind and sets out how the City and County of Swansea will over the next 6 years manage flooding so that the communities most at risk and the environment benefit the most. In doing so, this FRMP takes forward the objectives and actions set out in our Flood Risk Management Strategy

This FRMP also aims to achieve some of the objectives set out in the Welsh Government's National Flood and Coastal Erosion Risk Management Strategy

(FCERM), which provides the national framework for flood and coastal erosion risk management in Wales through four overarching objectives

- **Reducing the consequences** for individuals, communities, businesses and the environment from flooding and coastal erosion.
- **Raising awareness of and engaging people in the response** to flood and coastal erosion risk.
- **Providing an effective and sustained response** to flood and coastal erosion events.
- **Prioritising investment** in the most at risk communities

2.2 What is included in this FRMP

The information included in the City and County of Swansea FRMP include the components set out in the EU Flood Directive (see appendix 1). Most of this information has been gathered and updated through this first cycle(2010-2016), and has been drawn from the findings of our PFRA and the measures we identified and set out in our Local Flood Risk Management Strategy (LFRMS)

This FRMP sets out appropriate objectives for the management of flood risk within the areas covered by the plan. The objectives focus on reducing the adverse consequences of flooding for human health, the environment, cultural heritage and economic activity.

To do so, this FRMP highlights the areas most at risk from surface water flooding and ordinary watercourses in the City and County of Swansea and draws the conclusions from these risks and sets out the measures we will take over the next 6 years to mitigate these risks and make our communities more resilient.

Due to the nature of flooding and current funding situation, we have also looked at measures to reduce the likelihood of flooding using non-structural measures and covering all aspects of flood risk management, including raising awareness of flooding and better understanding of local flooding issues. All the measures identified in this plan have been classed in 4 categories:

- Prevention
- Protection
- Preparedness
- Recovery and Review

2.3 Legislative Context

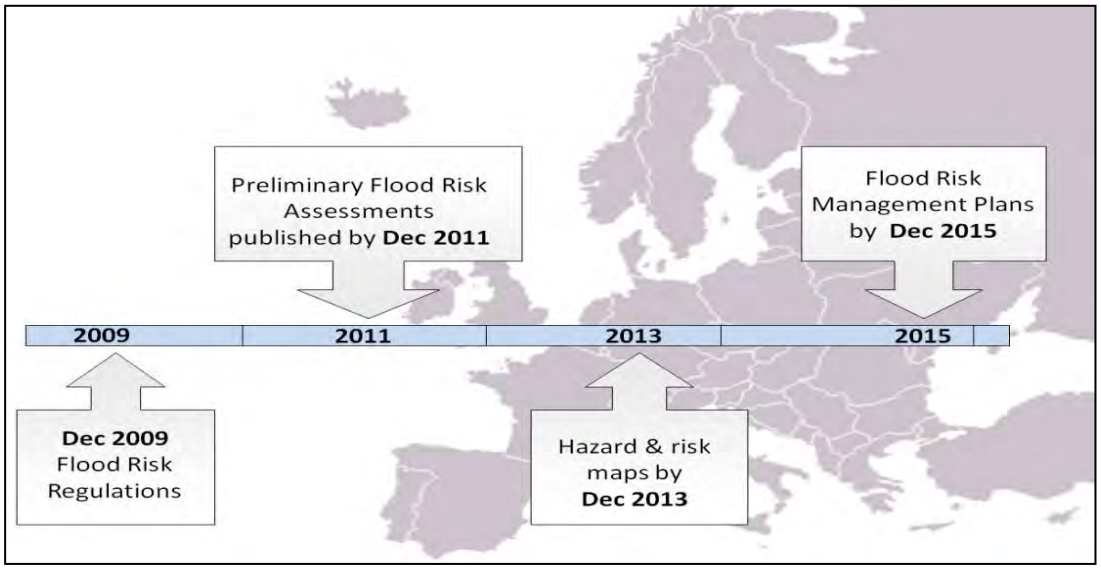
Under the Flood Risk Regulations 2009, Lead Local Flood Authorities (LLFAs) are responsible for producing Flood Risk Management Plans (FRMPs) for Indicative Flood Risk Areas that were identified in the Preliminary Flood Risk Assessments (PFRAs).

While Natural resources Wales (NRW) is responsible for producing FRMPs at a river basin district level for communities at risk of flooding from main rivers and the sea, LLFAs are only required to produce local FRMPs to manage flooding from surface water and ordinary watercourse.

The Regulations set out a six year cycle with timescales for reporting to the European Commission and the publication of 3 key outputs:
Preliminary Flood Risk Assessment identifying Flood Risk Areas (published in 2011).
Production of flood hazard and flood risk maps for Flood Risk Areas (published in 2013).
Preparation of a Flood Risk Management Plan for Flood Risk Areas.

We are currently in the first cycle of the Regulations and FRMPs represent the final output of this cycle and must be published by December 2015.

Figure 1: ***Flood Risk regulations (2009) Timescale***



Preliminary Flood Risk Assessment

The PFRA was a high level screening exercise that compiled information on significant local flood risk from past and future floods, based on readily available information. The scope of the PFRA was to consider flooding from surface runoff, ground water and ordinary watercourses, and any interaction

these sources have with main rivers with the aim of identifying flood risk areas as set out under the European Flood Directives (see section 3.3).

Production of flood hazard and flood risk maps for Flood Risk Areas

In 2013 the Environment Agency, working with Natural Resources Wales (NRW) and LLLFAs, produced the updated Flood Map for Surface Water. The updated map represents a significant improvement on the previous surface water flood maps (2008 and 2010), both in terms of method and representation of the risk of flooding. The updated Flood Map for Surface Water assesses flooding scenarios as a result of rainfall with the following chance of occurring in any given year:

- 1 in 30 (3%)
- 1 in 100 (1%)
- 1 in 1000 (0.1%)

The updated map also provides the following data for each flooding scenario:

- Extent
- Depth
- Velocity (including flow direction at maximum velocity)
- Hazard (as a function of depth and velocity)

It also includes information about the source of the data (i.e. whether it was from the nationally produced modelling or locally produced modelling) and the confidence in the data outputs.

Detailed maps for your area can be obtained using the following link: http://naturalresourceswales.gov.uk/alerts/whats-my-flood-risk/?lang=en#.U9DdgXlOU5h

Flood Risk Management Plans for Flood Risk Areas.

The City and County of Swansea are currently in the first cycle of the Regulations and FRMPs represent the final output of this cycle and must be published by December 2015.

Flood and Water Management Act

The Flood and Water Management Act was introduced in April 2010 in England and Wales. It was intended to implement Sir Michael Pitt's recommendations following the widespread flooding of 2007. The act was also intended to clarify roles are responsibilities between Risk Management Authorities (RMAs).
Under the Act, the Welsh Government was required to produce a National Strategy for Flood and Coastal Erosion Risk Management, and City and County of Swansea as Lead Local Flood Authority to produce a Local Flood Risk Management Strategy (LFRMS) which was completed in 2013.LFRMS were created to define who the Risk Management Authorities are, what their function is and what their responsibilities are. The LFRMS were developed to be consistent with the National Strategy for Flood and Coastal Erosion Management. Prior to publication the LFRMS underwent public scrutiny through a consultation period.

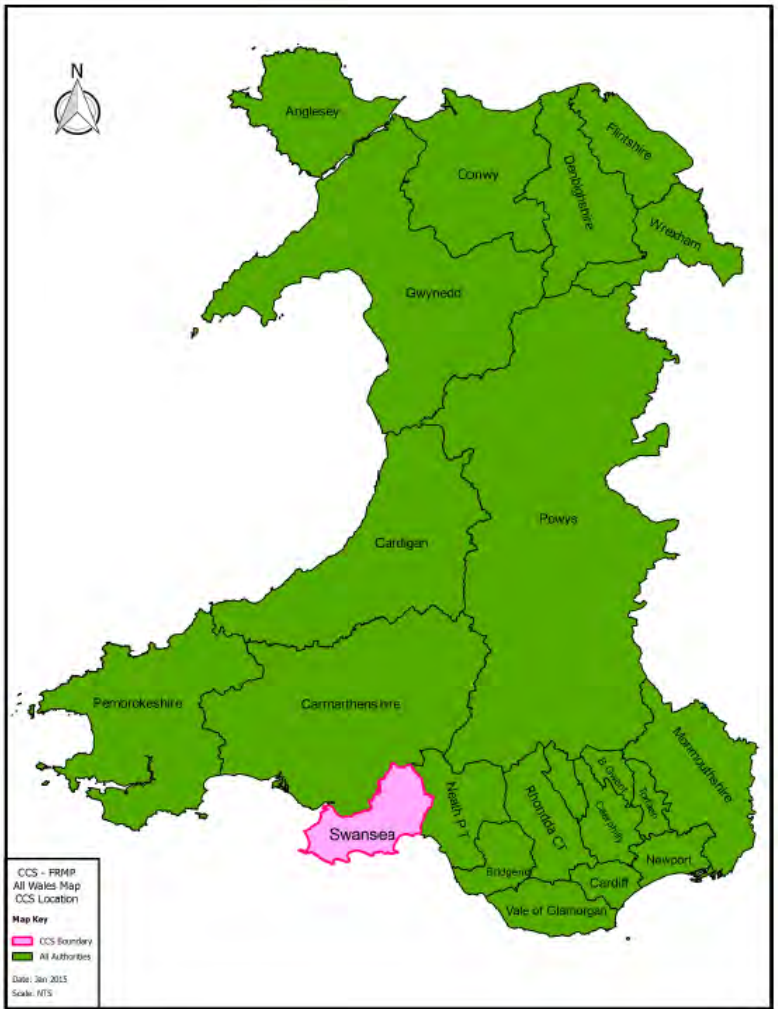
3.0 Study Area

3.1 Administrative Area

The study area is defined by the area administered by the City and County of Swansea. The Study area shown in **Figure 2** covers an area of approximately 378km 2. The south eastern extent of the council area is the most densely populated, consisting of the City of Swansea and its suburban areas. The Western extent is predominantly rural, consisting of the Gower Pensinular. The City and County of Swansea is a Unitary Authority situated within the valleys of South Wales. The census of 2011 shows the population of Swansea as 239,000 with number of residential properties as 101,702.

However it is the requirement of this FRMP to use the criteria as set out by the EA and National Resources Wales and so the FRMP has to take into account the property figures as set out in the National Receptor Database. Consequently, the NRD shows 109,432 properties in Swansea and using the multiplier of 2.35 persons/property gives an estimated population of 257,165

Figure 2: Location of CCS in Wales



River Catchments in City and County of Swansea

The City and County of Swansea is situated on the lower part of the Swansea Valley where the River Tawe meets the sea. The upper regions of the Swansea Valley is characterised by having steep sides which can generate flash floods in the River Tawe to cause the river to rise quickly during heavy rainfall.

On the Western edge of the administrative boundary the River Loughor also has steep catchments emanating from the Black Mountains which rapidly discharge surface water flows to the lower catchments situated on the Western edge of Swansea contributing to the flows and the general trend is for both rivers to rise quickly during storm events.

Where these two main rivers meet the sea at Swansea and Pontardulais respectively both rivers are affected by Tidal interactions. Although the Swansea Barrage on the River Tawe does influence tidal interaction and provides some protection.

NRW have a supervisory duty on these two rivers and also other designated main rivers situated in the City and County of Swansea. They are also responsible of supervisory duties for tidal flooding around the coastline of Swansea.

3.2 Flood risk in City and County of Swansea

The nature of flood risk within the City and County of Swansea is varied across the area. Much of the area is surrounded by Coastline and contained within the area there are networks of rivers the two largest being the River Tawe and Loughor, combined with number of towns and urbanised areas which means that there is a risk of flooding from a range of different sources.

Summary of types of flood risk present in City and County of Swansea
Local flood risk is defined within the Act as being a flood risk from:

- **Ordinary watercourses** – all watercourses that are not designated main river, and which are the responsibility of Local Authorities to regulate.
- **Surface runoff** - rainfall or other precipitation which is on the surface or ground and has not entered a watercourse drainage system or public sewer
- **Groundwater** - water that has percolated into the ground and may form underground ponds or streams, which may discharge above ground but lower down the catchment
- **The interface** between main rivers and surface water flows. More detail of the flood risk is given below.

Ordinary Watercourses
The most frequent form of flooding in ordinary watercourse arises from the blockage of grids at the entrance to the culverts. This usually occurs when intense rainfall causes leaf fall and other vegetation to enter the watercourse resulting in a ‘build up’ of debris at the front of the grids.

The City and County of Swansea have an operational procedure which is designed to minimise this risk by carrying out routine maintenance and pre-emptive cleaning prior to heavy rain when forecast. Measures will be introduced to replace substandard grids with grids designed to modern standards including additional upstream sacrificial grids. Flooding may also occur as a result of culvert failure due to the collapse of sidewalls, roofs or the scouring of culvert invert. This is particularly prevalent in older systems many of which have already exceeded their design life.

Flooding may also be caused by inadequate maintenance which is normally the responsibility of the riparian owners. Capacities of pipes are often significantly reduced by the 'build up' of silt and debris within the culverts. This type of flooding is difficult to manage proactively as it requires a significant level of resources to effectively inspect all culverts, therefore inspections is restricted to systems where there is evidence that the capacity has been adversely affected.

Although culvert capacity has not been found to be the most significant form of flooding within ordinary watercourses it has been considered as part of this FRMP. Should funding be available, surveys and calculations will be carried out to determine the maximum flow rates within significant culverts by consideration of intake conditions and hydraulic capacities.

Surface Water Flooding

Surface water flooding also known as pluvial flooding or flash flooding occurs when heavy rainfall intensities generates run –off which exceeds the capacity of local drainage networks and water flows across the ground to cause flooding of lower lying land. It can be exacerbated when the ground is saturated when run off from green and rural area is greatly increased.

Runoff will also be altered if an area is subject to a new development such as housing. Although the total runoff is likely to increase, controls will be imposed to restrict the maximum rate of runoff from these developments to a level no greater than green field runoff or existing discharge rates where appropriate.

Increases in run off can also be the result of change of land use or by tree felling. It can also be exacerbated by poor maintenance of ditches and watercourses by riparian landowners.

Groundwater Flooding

Groundwater flooding occurs when the level of groundwater increases sufficiently so it rises above the level of the ground and causes flooding. It is often dependant on the underlying geology of an area and occurs following heavy rainfall. Groundwater flooding within the majority of South Wales is typically a greater risk in areas with significant Coal Measures that were mined. However, the majority of the former coal mining areas within the City and County of Swansea are believed to be fully recovered and therefore do not present a significant risk flooding. Historically, there are no records of any groundwater flooding which can be considered to have significant consequences but there have been local problems due to ground water escaping through old mine entrances such as adits and mine shafts.

Highway Flooding

Flooding from highway drainage systems usually takes place as a result of short duration storms of very high intensity. Flooding often commences due to the inability of gullies to take the volume of water. This is usually as a result of gullies being blocked by debris washed off the roads filling the gullies. CCS mitigate the effects of gullies blocking by having an operational procedure that ensures that gullies are cleaned at least twice a year. They are also cleared when blockages are reported by members of the public.

Combined sewers
There are numerous combined sewers within the borough that take a combination of foul sewage and surface water flows. These are all in the ownership of Dŵr Cymru / Welsh Water. Flows in these pipes are usually controlled through the installation of Storm Water Overflows (CSOs), which causes excess surface water to be removed from the system and discharged into natural drainage channels.

This method of controlling flows can cause raw sewage to be discharged into the surface water drainage systems and main rivers during periods of heavy rainfall. This can have an adverse effect on the quality of the water. The consenting and monitoring of all CSOs is managed by NRW.

City and County of Swansea will work collaboratively with our risk partner NRW and Dŵr Cymru / Welsh Water to identify all CSOs and to establish their efficiency and the quality of the water being discharged.

Where necessary, City and County of Swansea will work Dŵr Cymru / Welsh Water to introduce measures which will reduce the quantity of surface water from entering the combined systems which will reduce flood risk and improve water quality in the water bodies in Swansea.

Interaction with Main Rivers and the Sea
The main areas where there is possibility of interaction with ordinary watercourses are mostly on the low lying areas of the study area around the Swansea Bay area on the Southern Boundary, and Crofty to Pontardulais on the Northern boundary.

3.3 Identification of areas at risk from surface water flooding

A need to identify areas at risk from surface water flooding was introduced in response to the Flood Risk Regulations (2009). The regulations set the publication of 3 key outputs

Preliminary Flood Risk Assessment
The Preliminary Flood Risk Assessment was the first stage of this process and was carried out in 2011 in order to establish the level of flood risk within each LLFA. The process looked specifically at flooding from surface water, ground water and ordinary watercourses and the interface with flooding from main river. Main river flooding, however, still remains the responsibility of NRW.

In order to have a consistency of approach DEFRA and WG identified a number of key risk indicators and their thresholds to establish significant risk and to determine the existence of indicative Flood Risk Areas.

The methodology was based on using the flood maps produced by the NRW to identify 1km squares where flood risk exceeds a defined threshold. These squares are known as areas above Flood Risk Threshold (Blue Squares).The key flood risk indicators and their thresholds for a 1km square were set as follows:-
A minimum of 200 people
A minimum of 20 businesses
2 or more critical service

NRW identified blue squares within City and County of Swansea.

A cluster of blue squares is an indication that an area of concentrated flood risk has been identified. Where there are four or more touching blue squares within a 3km x 3km square the whole 3km x 3km square was considered as an area which could form part of an indicative Flood Risk Area.

The key flood risk indicator for establishing an indicative Flood Risk Area was set as numbers of people at risk of being affected by flooding exceeding 5,000.On the basis of the 20 blue squares identified by NRW, and the methodology defined above, NRW identified an indicative Flood Risk Area within the City and County of 52 km2.

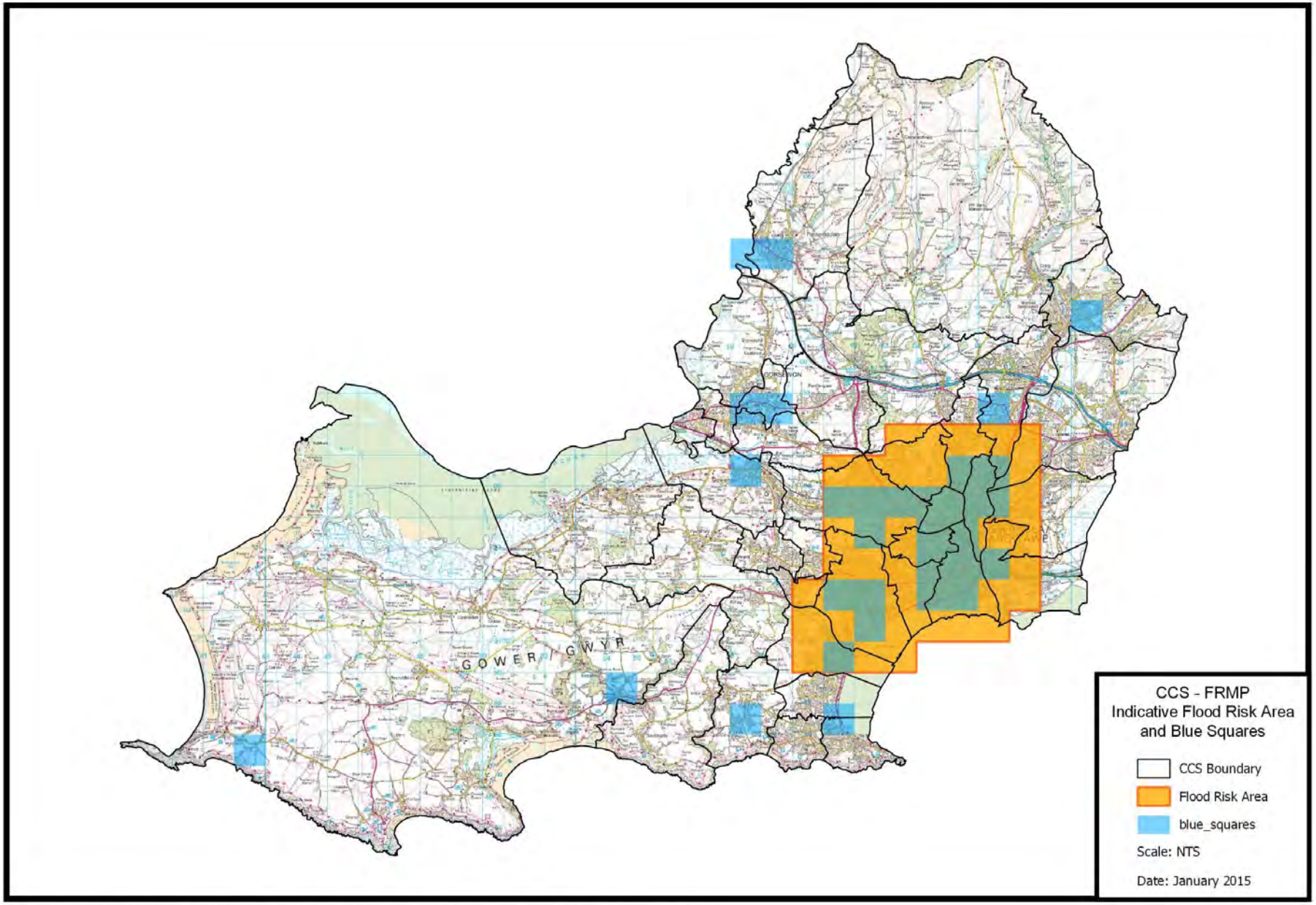
In order to review the indicative Flood Risk Area all 52 km squares within CCS were reviewed and CCS was satisfied that all the squares which were listed by NRW, as blue squares had been correctly identified.

The Key Flood Risk Indicators for CCS were calculated by the NRW as follows:

Table 1: Counts of Features in City and County of Swansea

Consequence	Number
Human health consequences	**6993** - Number of people (2.35 multiplier)
Other human health consequences	**5**-Number of critical services flooded
Economic consequences	**1036**- Number of non-residential properties flooded

FIGURE 3 : City and County of Swansea Flood Risk Area and Blue Squares



Production of the Flood Hazard and Flood Risk Maps for CCS Flood Risk Area

Under Part 3 of the Flood Risk Regulations 2009 (FRR 2009) Natural Resources Wales had the duty to prepare for each flood risk areas, flood hazard and flood risk maps related to the risk of flooding from the sea, main rivers and reservoirs while Lead Local Flood Authorities (LLFAs), have the duty to prepare flood hazard and flood risk maps related to surface water flooding for the flood risk areas identified in the PFRAs.

A service level agreement was signed between Welsh Government (WG), Natural Resources Wales (NRW) and the Environment Agency (EA) for the production of these maps and JBA Consultants were contracted to produce the maps on behalf of EA, NRW and LLFAs. The modelling used in producing the maps is considered to be more accurate than previous flood maps and these were completed and later published in December 2013.

The information in the maps

Data for each of the modelling probability of flooding – 1 in 30 (3.3%), 1 in 100 (1%) and 1 in 1000 (0.1%) – in any given year
Flood extent – the extent of the land that could be affected
Flood depth - the depth of flooding
Velocity – the velocity of flooding
Hazard – the flood hazard rating (defined as a function of the concurrent depth and velocity - see below)
Flow direction – the direction of flow, on a 2 metre grid
Flow direction – 25m – the direction of flow, displayed on a 25metre grid (to allow viewing a scale of 1:10,000

Viewing the maps
The Updated Flood Map for surface water (UFMfSW) can be viewed by the public on:
http://watermaps.environment-agency.gov.uk/wiyby/wiyby.aspx?topic=ufmfsw#x=357683&y=355134&scale=2
The (UFMfSW) can be viewed and downloaded by LLFAs only using the password provided by EA on:
http://www.geostore.com/environment-agency/

The risk maps have been generated from the updated Flood Map for Surface Water (uFMfSW) and the National Receptor Dataset (NRD). There are three types of map showing what is at risk of flooding:-

- Risk to People
- Risk to Economic Activity and
- Risk to Natural and Historic Environment

All three of these maps have been taken into account in the preparation of this FRMP.

Updated Flood Maps for Surface Water:

Data used

For the purpose of this Flood Risk Management Plan (FRMP), the Extents maps available from the Geostore website have been used. The extent map reflects the maximum flood extents, shown on the depth, velocity and hazard maps for each probability: 1 in 30, 1 in 100 and 1 in 1000 chance of flooding in any year.

This resulted in a 'flood extent' which was used as a boundary to trim the depth, velocity and hazard data so that the datasets cover the same area and we don't get depth without velocity, etc.
This process was repeated for the 1 in 30, 1 in 100 and 1 in 1000, and the three extents published together to show areas at high, medium and low risk of flooding.

Further info can be found on:
https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/2974 32/LIT_8988_0bf634.pdf

The maps may be viewed via the following link:
http://www.geostore.com/environment-agency/

Counts included in this FRMP

1. Risk to people and properties
- a Number of people in areas at risk of flooding - depth >0mm
- b Number of residential properties at risk of flooding – depth 200mm

2 Risk to economic activity
- a Non-residential properties in areas at risk of flooding – depth >0mm
- b Airports
- c Primary/Trunk Roads
- d Main Line Railways
- e Agricultural land – Grades 1, 2 and 3

3 Risk to Natural and Historic Environment
- a Bathing Waters
- b Environmental Permitting Regulations (EPR) Installations
- c Special Areas of Conservation (SAC)
- d Special Protection Areas (SPA)
- e Ramsar Sites
- f World Heritage Sites
- g Sites of Special Scientific Interest (SSSI)
- h Parks and Gardens
- i Scheduled Ancient Monuments
- j Listed Buildings
- k Licensed Abstractions (LA)
- l Sites of Interest for Nature Conservation (SINC)

With the exception of 1b above, namely:- Number of residential properties at risk of flooding – depth >200mm, all the counts have been identified by EA/NRW as the relevant counts to be used in this FRMP to consider the flood

risk from surface water. CCS has included this additional count as it seems to be the most appropriate measure of properties likely to be affected by internal flooding.

Analysing the data
Although the majority of the data has been provided by the EA, CCS has verified the accuracy of the information by carrying out our own counts for people, economic activity and Natural and Historic Environment. The counts were replicated to a very high degree of accuracy giving confidence in the data provided by EA and our own procedures.

Reference data
The CCS counts were carried out in accordance with the revised EA methodology and information provided in:

The updated Flood Map for Surface Water (uFMfSW) Property Points dataset.

The following dataset were used to generate the counts:

1 **National Receptors Database (NRD)** which contains data on listed buildings, scheduled ancient monuments, registered parks and gardens, environmental permitting sites, trunks/primary roads, railways, SSSI's.

2 **UMfSWF Property Point Dataset** containing residential and non-residential property point data within a defined LA's area. In addition to the standard OS address layer 2 property data, the dataset provides details of the percentage of a perimeter that is wetted in a P30, P100, and P1000 rainfall event at 6 different depths: 0mm, 150mm, 200mm, 300mm, 600mm and 900mm.

3 **Licensed Abstraction spreadsheet:** Spreadsheet containing details of all active water extraction licenses within each LLFA.

4 **Vector Map District** is an open data from OS containing simplified background mapping for reference purposes.

Figure 4- Map showing City and County of Swansea flood risk area and extents maps (based on new Flood Maps)

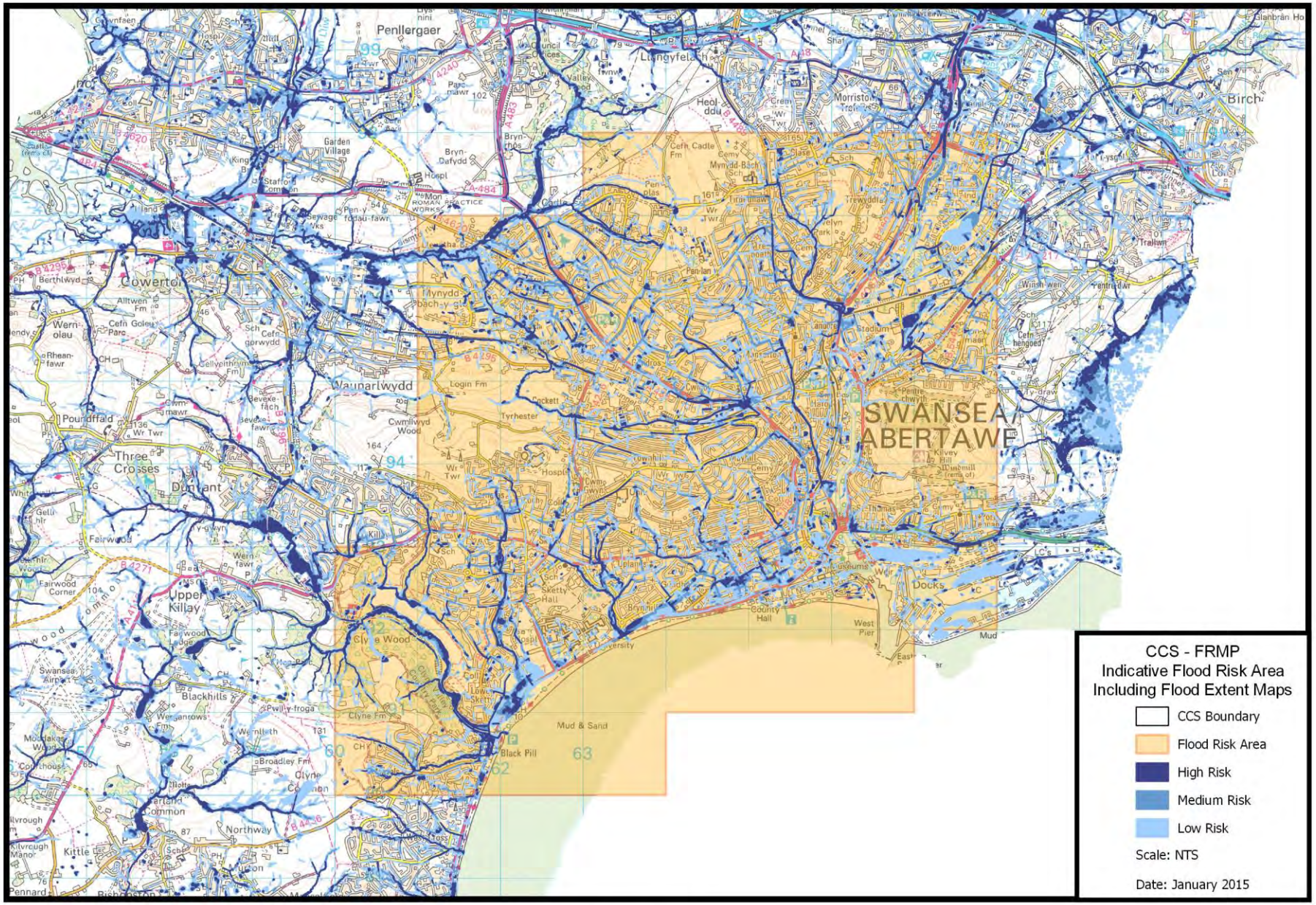


Table 2 : Risk Counts for Flood Risk Area City and County of Swansea (based on new Flood Maps)

COUNTS FOR FLOOD RISK AREA				
	Total in Defined Area	Risk Counts		
		LOW	MEDIUM	HIGH
		(low count - medium count)	(medium count - high count)	(high count)
Risk to people		**Residents in areas at Risk of Flooding**		
People (n) (multiplier 2.35)	127224	7165	1739	879
Residential Properties at Risk of Flooding				
Properties (n)	54138	1332	429	262
Services (n)	126	3	1	0
Risk to Economic Activity				
Non-Residential Properties (n)	8518	828	277	96
Airports (n)	0	0	0	0
Primary/Trunk Roads (km)	4	1	1	1
Main Line Railways (km)	11	1	0	1
Agricultural Land - Grades 1, 2 and 3 (ha)	684	23	8	8
Risk to Natural and Historic Environment				
Bathing Waters (n)	1	0	0	0
Environmental Permitting Regulations (EPR) Installations (n)	2	0	1	1
Special Areas of Conservation (SAC) (ha)	0	0	0	0
Ramsar Sites (ha)	0	0	0	0
Parks and Gardens (ha)	169	10	5	7
Sites of Scientific Interest (SSSI) (ha)	236	0	0	0
Schedule Ancient Monuments (ha)	16	0	0	0
Listed Buildings (n)	306	12	4	3
Licenced Abstractions (LA) (n)	3	0	0	1

Conclusions from Flood Map

The above table identifies the counts made for the City and County of Swansea Flood Risk Area for risk to people, economic activity and natural and historic environments. With the exception of the number of residential properties at risk of flooding and thus the number of people at risk of flooding all the counts identified by NRW are the relevant counts to be used in this FRMP. It is estimated that there are 879 people, 262 residential properties, 96 non-residential properties, 1km of Primary Trunk road, 1km of main railway line, 7ha of parks/gardens and 3 listed buildings at high risk of flooding for the Indicative Flood Risk Area.

3.4 Top communities at risk from surface water flooding

For the purpose of flood risk analysis, CCS has been divided into 36 Community Areas and have been based on wards. The use of wards provide a consistent approach with all Authorities in Wales and will be more relevant to council members and members of the public. Nineteen of the Community Areas are within the Flood Risk Area.(FRA) and details of the flood risk area given in Section 8 of this report. The remaining Community Areas situated outside of the Flood Risk Area are dealt with in Section 9.

Table 3- Community Areas in City and County of Swansea

Community	Area (ha)	Population (NRD)	In Flood Risk Area
Bishopston	627	3816	no
Bonymaen	777	7156	yes
Castle	411	20783	yes
Clydach	856	8103	no
Cockett	880	14906	yes
Cwmbwrla	148	8359	yes
Dunvant	242	4477	no
Fairwood	1366	2773	no
Gorseinon	190	4731	no
Gower	2473	3814	no
Gowerton	823	5241	no
Killay North	194	2627	yes
Killay South	129	2634	yes
Kingsbridge	476	4101	yes
Landore	224	7076	yes
Llangyfelach	1748	5161	yes
Llansamlet	1622	14403	yes
Lower Loughor	126	2437	no
Mawr	578	1842	no
Mayals	565	2980	yes
Morriston	701	17594	yes
Mynyddbach	356	9553	yes
Newton	262	4101	no
Oystermouth	297	5382	no
Penclawdd	2037	3838	no
Penderry	383	11846	yes
Penllergaer	614	2876	no
Pennard	1204	2902	no
Penyrheol	956	5617	no
Pontardulais	1561	6573	no
Sketty	821	17110	yes
St Thomas	726	8147	yes
Townhill	184	9539	yes
Uplands	285	14297	yes
Upper Loughor	165	2797	no
West Cross	390	7616	yes

The communities designated as at risk have been determined by a statistical analysis of the risk to people, economic activity and historic environments.See Table 4 and Table 5.

Table 4 Top communities at risk from Surface Water Flooding in FRA

	Bonymaen	Castle	Cockett	Cwmbwrla	Killay North	Killay South	Kingsbridge	Landore	Llangyfelach	Llansamlet	Mayals	Morriston	Mynyddbach	Pendery	Sketty	St Thomas	Townhill	Uplands	West Cross
Risk to people	**In Flood Risk Area**																		
Number of people	213	288	679	270	14	167	232	260	100	294	113	501	82	164	1050	242	28	947	279
Number of Services	4	4	0	1	0	0	1	0	0	0	0	3	0	1	0	0	0	0	0
Risk to economic activity																			
Number of non-residential properties	17	460	150	86	2	11	42	43	64	55	28	76	90	9	78	78	1	112	16
Airports (n)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Length of Primary/Trunk Roads (km)	0	0	0	0	0	0	0	0	0.8	1.7	0	3.41	0	0	0	3.3	0	0	0
Length of railway (km)	0.02	0.0	1.2	0.03	0	0	0	0.29	2.96	1.1	0	0.8	0.07	0	0	0.2	0.52	0	0
Agricultural Land – Grades 1,2 &3	0	0	6.7	0	4.57	28.36	0	0	55.3	126.6	23	22	1.3	7.18	52.2	0	0	0.38	11.6
Risk to Natural and Historic Environment																			
Bathing Waters (n)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Number of Environmental Permitting Regulations (EPR) Installations (n)	0	0	7	0	0	0	0	0	3	4	0	0	0	0	0	1	0	0	0
Special Areas of Conservation (SAC) (ha)	79.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14.9	0	0	0
Special Protection Areas (SPA) (ha)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
RAMSAR Sites (ha)	72.4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14.8	0	0	0
Sites of Special Scientific Interest (SSSI) (ha)	74	0	0	0	0	0	0	0	8.9	2.1	0.1	0	0	0	0	12	0	0.01	0.14
Parks and Gardens within area (ha):	0	0	0	0	0	0	0	0	9.2	0	5	0	0	0	14.5	0	0	11.5	0
Scheduled Ancient Monuments (ha)	0	0	0	0	0	0	0.32	0.04	0.01	0.07	0.22	0	0	0	0.23	2.46	0	0	0
Listed Buildings	1	0	0	1	0	0	1	4	0	3	4	0	0	0	2	0	0	4	0
Sites of Interest for Nature Conservation (SINC) (ha)	14.7	0.5	34.5	1.4	8.6	12.9	24.4	1.7	95.3	81.5	24.6	11.8	6.12	4.7	23.2	2.5	1.9	1.24	5.4

Table 5: To Communities at risk from Surface Water Flooding not in FRA

	Bishopston	Clydach	Dunvant	Fairwood	Gorseinon	Gower	Gowerton	Lower Loughor	Mawr	Newton	Oystermouth	Penclawdd	Penllergaer	Pennard	Penyrheol	Pontardulais	Upper Loughor
Risk to people	**Not in Flood Risk Area**																
Number of people	428	362	18	23	668	100	205	63	7	75	127	203	115	46	223	430	77
Number of Services	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Risk to economic activity																	
Number of non-residential properties (n)	8	90	6	6	79	66	32	6	25	9	44	52	55	0	58	65	2
Airports (n)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Length of Primary/Trunk Roads (km)	0	0	0	0	0	0	0	0	0	0	0	0	1.53	0	0.23	0	0
Length of railway (km)	0	0.02	0	0	0	0	0.61	0	0.17	0	0	0	0	0	0	0.85	0.03
Agricultural Land – Grades 1,2 &3	0	34.4	36.1	56.6	0.03	530.8	33.6	0	122.2	8	3.3	64.9	42.89	45.55	19.42	142.9	10.21
Risk to Natural and Historic Environment																	
Bathing Waters	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Number of Environmental Permitting Regulations (EPR) Installations (n)	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
Special Areas of Conservation (SAC) (ha)	7	0	0.04	9.54	0	112.3	14.8	0.83	0	0.02	0	43.8	0	13.7	25.7	0	4.3
Special Protection Areas (SPA) (ha)	0	0	0	0	0	36.24	31.4	0.83	0	0	0	13.6	0	0	0	0	0
RAMSAR Sites (ha)	0	0	0	0	0	36.24	14.9	0.83	0	0	0	34.7	0	0	0	0	0
Sites of Special Scientific Interest (SSSI) (ha)	11	0.02	0.28	9.66	0	201.4	14.7	0.83	9	0.57	0.3	8.2	0	16.2	25.6	6.5	4.3
Parks and Gardens (ha)	0	0	0	0	0	43.8	0	0	0	0	0	0	10.6	1.5	0	0	0
Scheduled Ancient Monuments (ha)	0	0.11	0	0	0.03	0.43	0	0	0.06	0	0	0.43	0	0	0	0	0
Listed Buildings	0	3	0	0	0	3	0	0	2	0	0	0	0	1	0	0	0
Sites of Interest for Nature Conservation (SINC) (ha)	16.6	22.8	11.4	49	3.37	158.7	27.19	0.9	195.3	1.8	0.3	33.9	22.5	17.9	7.6	45.3	1.5

4.0 How we currently manage flood risk in the City and County of Swansea

Procedures, measures and powers

Flood risk in CCS is managed through:-

- Operational procedures which have been developed over years through good custom and practice.
- Measures which were included in the Local Flood Risk Management Strategy.
- Powers given to all LLFAs through the Flood and Water Management Act 2010 and the Land Drainage Acts 1991
- As CCS is also the Highways Authority for the area Powers under the Highways Act 1980
- Emergency Planning through CCS/NPT joint resilience unit

Operational Procedures

The main operational procedures used to manage flood risk in CCS are listed below:-

- Routine inspection and cleansing of intake grids to culverts and critical which are situated on or protect publically owned land.
- Emergency inspection on critical grids prior to and during periods of heavy rainfall.
- Routine maintenance of gullies which serve public highway
- Emergency attendance to cleansing of gullies and grids which have been notified to CCS
- Installation of storm barriers in Swansea Bay following tidal warnings

Measures contained in LFRMS

Measures contained within the Local Flood Risk Management strategy which are currently being used by CCS to manage and reduce flood risk are listed below in accord to the high level theme they sit.

- **Development Planning and Adaption**
  Assessing and approving drainage strategies for new developments and promotion of SUDS
  Strategic Flood Risk Assessment undertaken to support the LDP
  Compliance to Planning Policy Wales and TAN 15
  To support preparation of the Water Cycle Strategy

- **Flood Forecasting, Warning and Response**
  Compliance to Civil Contingency Act 2004
  Flood warning and informing
  Emergency Planning and Multi-agency Response Plans
  Community Flood Plans

- **Land and Cultural Management**
  Good Land Management techniques to reduce run-off
  Environmental Enhancement and protection

- **Asset Data and Maintenance**

To keep an Asset register of structure which have a significant effect on flood risk
To maintain structures under public ownership
Consenting to works on ordinary watercourses
Enforcement to maintain flow in watercourses
Construction of flood defences

- **Studies assessment and plans**
  Flood investigations
  Resilience measures and increase in awareness

- **High Level Awareness and Engagement**
  Raising community awareness
  Collaborative working with other risk management Authorities

Additional powers given to CCS under the Flood and Water Management Act 2010

Under the Flood and Water Management Act 20010 LLFAs have been given additional duties which directly impact on flood risk management that include the following:-

1. A duty to investigate all flooding within its area, insofar as a LLFA consider it necessary or appropriate. (Section 19)
2. A duty to maintain a register of structures and features likely to affect flood risk. (Section 21)
3. A duty to contribute to sustainable development. SuDS. (Section 32 of Schedule 3)
4. Consenting on Ordinary Watercourses. (Section 29 of Schedule)

4.1 How we prioritise our work

The Welsh Government National Flood and Coastal Erosion Risk Management Strategy provides the framework for flood and coastal erosion risk management in Wales. This framework is centred around four key objectives and the measures to meet those objectives. In order to deliver the measures from the National FCERM Strategy, the City and County of Swansea will deliver in accordance to;-

- **Reducing the consequences** for individuals, communities, businesses and the environment from flooding and coastal erosion.
- **Raising awareness of and engaging people in the response** to flood and coastal erosion risk.
- **Providing an effective and sustained response** to flood and coastal erosion events.
- **Prioritising investment** in the most at risk communities

The City and County of Swansea take a risk based approach to prioritise where best to direct investment and the following issues will be taken into consideration in order to align with the National Objectives.

- Risk to life;
- Longer term sustainability of the community, the approach taken an

- the wider environment;
- Economic impacts, costs and benefits;
- Impacts of flooding on the operational capacity of critical infrastructure;
- Social impacts, costs and benefits;
- Frequency of flooding;
- Environmental costs and benefits derived from the work;
- Multiple benefits in relation to human health and wellbeing

When conducting a cost benefit analysis the risk to life is regarded as the most significant factor in determining priority of investment. This system has been set in place to ensure the sustainability of flood risk management throughout Wales.

Welsh Government as the primary funder of flood and coastal erosion risk management in Wales is currently consulting on Flood and Coast Investment Programme (WG December 2014) (FaCIP). The consultation is to consider the way that Welsh Government allocates funding to ensure it focuses on those places with greatest risk. Their objective is twofold:

To develop a methodology to prioritise areas at risk potentially forming a single source or Flood Risk Index;

Use the index as a starting point to guide a national funding programme that will direct funding to schemes in the highest risk areas.

This document is currently in draft form and may change and this could change the council's priority also, although it is understood that risk to life will still be the a key driver.

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4.2 Who we work with to manage flood risk in City and County of Swansea

The City and County of Swansea, as the Lead Local Flood Authority (LLFA), is responsible for leading the management of flood risk from local sources. In order to undertake this duty there are a number of key organisations which are classified as flood Risk Management Authorities and have an active role in collaboratively working with CCS. These are shown in Table 6 below.

Table 6 Risk Management Authorities in City and County of Swansea

Organisation Name	Primary Role
Welsh Government	Overall responsibility for all matters relating to flooding and coastal erosion in Wales
Natural Resources Wales	Welsh Government sponsored body that has operational responsibilities for flooding from main rivers, the sea and coastal erosion; and oversight responsibilities in relation to all flood and coastal erosion risk management in Wales. Also responsible for the administration of Internal Drainage Districts that fall within the RBD.
City and County of Swansea County Council	Responsible for the management of flood risk from local sources. Responsible for highway drainage.
Welsh Water / Dwr Cymru	Responsible for providing a high quality water supply to customers and to take away wastewater and return in to the environment safely.

Additional risk partners we work with in City and County of Swansea

Neighbouring Authorities

Neath Port Talbot
Carmarthenshire

Those authorities in the Southwest Wales Flood Risk Management Group.
City and County Swansea
Neath and Port Talbot Council
Bridgend Council
Carmarthenshire County council
Pembroke County Council
Ceridigion County Council

Internal Partners
Planning Department
Highways Department
Emergency Planning

Joint Resilience Unit (JRU)
The City and County of Swansea, in conjunction with Neath Port Talbot County Borough Council, has formed the Joint Resilience Unit (JRU) to help discharge its responsibilities in respect of emergency planning. This includes ensuring that there is adequate preparation for flooding emergencies

Other Key Partners
Emergency services
Fire Service
Police
Ambulance
Network Rail are riparian landowners of culverts crossing and serving the rail network and information relating to flood risk from these assets need to be

shared with the Lead Local Flood Authority
The Rivers and Canal Trust are now responsible for the canal network located in the Authority's area and for protecting its own structures, some of which are flood defences.
The South Wales Trunk Road Agent (SWTRA) is an Agency working on behalf of the Transport and Strategic Regeneration division of the Welsh Government (WAG). It is responsible for Managing, Maintaining and Improving the strategic road network in South Wales
Other Partners
National Flood Forum
Local Flood Groups
Community Councils
Housing Associations

4.3 How this FRMP has been co-ordinated

For this cycle The City and County of Swansea has produced a separate plan which covers flooding from local flood risk. Natural Resources Wales has produced their own Flood Risk Management Plan for the Western Wales River Basin District which will cover sources of flood risk from main river, reservoir and sea. Although, separate plans have been produced as the preferred option, the ultimate desire for the next cycle is for local Authorities in Wales to produce a consolidated plan which will cover all sources of flood risk.

However, it was critical that the City and County of Swansea together with other Lead Local Authorities worked closely with Natural Resources Wales, Welsh Local Government Association and Welsh Government in order to ensure that a consistent approach was applied to the production of the Flood Risk Management Plans across all Authorities in Wales. This was achieved through Regional Groups, meeting up on a quarterly basis. The City and County of Swansea played an active role in the Flood Risk Management Group working group and also chair the Southwest Wales Flood Risk Management Group which was formed to seek opportunities to join up on delivery and secure greater financial and environmental benefits with other risk management Authorities. In summary:-

Co-ordination and development of this FRMP has been achieved through regular meetings of the various groups as listed below:

1. Southwest Wales Flood Risk Management Group attended by LLFAs NRW, WLGA and DC/WW.

2. Flood Risk Management Plans Working Group attended by LLFAs with flood risk areas, WG, NRW and WGLA.

3. FRMP Task and Finish Group attended by CCS, NPTCBC, RCTCBC and MTCBC. Frequent meetings have taken place with WLGA

Regular Meetings have also taken place with Dwr Cymru / Welsh Water and NRW to share work programmes on a regular basis. Internal collaboration has also been achieved through quarterly meetings of the Flood Risk Management Group and a steering group specifically assigned to provide a consistent approach with the Flood Risk Management Plan.

4.4 Measures already underway in CCS to manage flood risk

Guidance provided by NRW stipulated that the there is a requirement that the measures and operational procedures already existing as stated under clause 4.1 above should address the four categories of Prevention, Protection, Preparedness and Recovery and Review. Details of the type of measures for each category are given in the table below.

Table 7 –Types of Measures

Measure Type	Measures
Prevention	Issue of Flood Consents to ensure works in ordinary watercourses do not increase flood risk Approving Flood Consequence Assessment and working closely with the Planning Department By avoiding construction of houses and industries in present and future flood-prone areas; By adapting existing receptors to the risk of flooding; and ensure that future developments take flood risk into account; Mapping and better understanding of Flood Risk Compliance with Reservoir Act 1975, to ensure reservoirs are regulated Work with other local Authorities, emergency services and other key partners and explore opportunities for joint outcomes
Protection	On-going maintenance programme for flood management of assets Capital expenditure on Drainage works Taking measures, both structural and non-structural, to reduce the likelihood of floods in a specific location. Undertake asset inspection
Preparedness	Informing the population about flood risk and what to do in the event of a flood, including emergency response; developing emergency response plans in the case of a flood. Provide a flood incident response service 24hours a day for highway flooding.
Recovery and Review	Returning to normal conditions as soon as possible and mitigating both the social and economic impacts on the affected population

For the purpose of reporting to the EU measures must be specifically categorised within each of these four categories as identified in the table below.

Table 8: Categorisation of Measures

Prevention
M21 Avoidance; Measure to prevent the location of new or additional receptors in flood prone areas, such as land use planning policies or regulation.
M22 Removal or relocation; Measure to remove receptors from flood prone areas, or to relocate receptors to areas of lower risk.
M23 Reduction; Measures to adapt receptors to reduce the adverse consequences in the event of a flood action on buildings, public networks, etc...
M24 Other prevention; Other measures to enhance flood risk prevention (may include, flood risk modelling and assessment, flood vulnerability assessment, maintenance programmes or policies etc...) Issue Ordinary Watercourse Consents, Comment on Flood Consequence Assessment, update and improve the accuracy of food risk mapping, understand local flood risk better.
Protection
M31 Natural flood management / runoff and catchment; Measures to reduce the flow into natural or artificial drainage systems, such as overland flow interceptors and or storage, enhancement of infiltration, etc and including in- channel, flood plain works and the reforestation of banks, that restore natural systems to help slow flow and store water.
M32 Water flow regulation; Measures involving physical intervention to regulate flows, such as construction modification or removal of water retaining structures (e.g. dams or other on-line storage areas or development of existing flow regulation rules and which have significant impact on the hydrological regime.
M33 Channel, Coastal and floodplain works; Measures involving physical interventions to freshwater channels, mountain streams estuaries coastal waters and flood prone areas of land, such as construction, modification or removal of structures or the alteration of channels, sediment dynamics management, dykes etc.
M34 Surface water management; Measures involving physical interventions to reduce surface water flooding, typically, but not exclusively, in an urban environment, such as enhancing artificial drainage capacity or through sustainable drainage systems (SuDS).
M35 Other protection; Other measures to enhance protection against flooding, which may include flood defences asset maintenance programmes or policies.
On-going maintenance programme
Preparedness
M41 Flood forecasting and warning; Measures to establish or enhance a flood forecasting or warning system
M42 Emergency Event; Measures to establish or enhance flood event institutional emergency response planning.
M43 Public awareness and preparedness; Measures to establish the public awareness or preparedness for flood events.
M44 Other preparedness; Other measures to establish or enhance preparedness for flood events to reduce adverse consequences. Flood awareness programme
Recovery and Review
M51 Individual and societal recovery; Clean up and restoration activities (buildings, infrastructure, etc) Health and mental health supporting actions, inc. managing stress disaster financial assistance (grants, tax) inc. disaster legal assistance, disaster unemployment assistance, temporary or permanent relocation, other
M52 Environmental recovery; Clean up and restoration activities (with several sub topics as mould protection, well-water safety and securing hazardous material containers)
M53 Other recovery and review; Other recovery and review, lessons learnt from flood events, insurance policies.

Each City and County of Swansea proposed measure has been placed into one of these categories. The CCS measures are set out in section 7 of this document.

5.0 Co-ordination with the Western Wales River Basin Management Plan

5.1 General

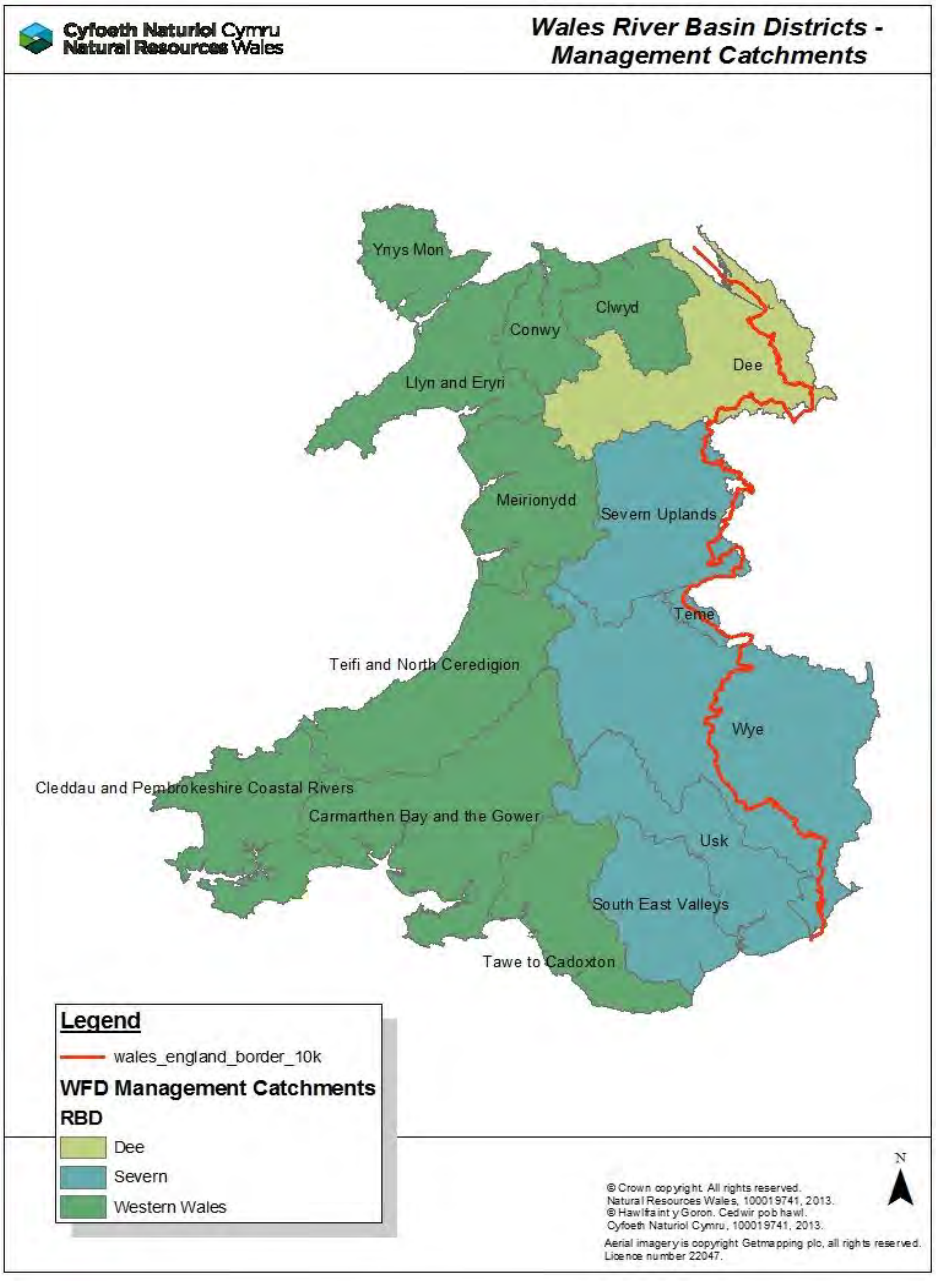
In preparing the Flood Risk Management Plan that we take into account the Water Framework Directive which seeks to protect water quality or improve it where it does not currently meet “good status".

Under the WFD, EA and NRW have a duty to prepare River Basin Management Plans for each River Basin District. Wales is divided into three River Basin Districts as noted below.

- Western Wales covering the whole of the western sector of Wales from Anglesey to the south coast.
- Dee situated in the north east of Wales which extends over the border into England
- Severn covering the central east and south east of Wales which also extend over the border into England

City and County of Swansea is located within the **Western Wales River Basin District** as shown in Figure 5 below.

Figure 5: WFD Management Catchments for Wales



5.2 Western Wales River Basin District Overview

The Western Wales River Basin District covers an area of 16,653 square kilometres. It extends across the entire western half of Wales, from the Vale of Glamorgan in the South to Denbighshire in the north.

The main centres of population are restricted to the coastal strip and the westernmost part of the South Wales valleys. The main urban centres are Swansea, Bridgend and Neath in the south, Aberystwyth in the centre on the coast and Bangor in the north.

The river basin district is primarily rural, with land mainly used for agriculture and forestry. Swansea Bay and Milford Haven are centres of heavy industry with the Port Talbot steelworks and oil refineries and gas terminals that provide fuel for the nation

Figure 6: Western Wales River Basin District

5.3 Summary of Co-ordination with the Western Wales River Basin Management Plan

The draft Western Wales, prepared jointly by Natural Resources Wales as a requirement of the Water Framework Directive, was published on the NRW website on10 October 2014.

As part of the development on the RBMP a consultation process has commenced with NRW including the provision of a questionnaire. The consultation process commenced on 10th October 2014 and it was run until 10th April 2015. CCS to responded to this questionnaire within this time scale.

In addition CCS has examined the objectives and measures proposed within the RMBP and has indicated within section 7. of this report, details of the measures within the CCS FRMP which link with the measures proposed within the RBMP.

It is anticipated as consultation continues additional measures and links will be identified by CCS to strengthen the links with the RBMP.

Link to River Basin Management Plan

https://consult.environmentagency.gov.uk/portal/ho/wfd/draft_plans/consult?pointId=s1405417965041#section-s1405417965041

6.0 City and County of Swansea Flood Risk Management Objectives

6.1 Summary of Welsh Government National Flood and Coastal Erosion Risk Management Strategy

At the request of Welsh Government CCS has developed a Local Strategy for the Management of Flood Risk in the Borough. This document, which was prepared during 2012, was approved by WG and published in June 2013.

It was important that the objectives accord with the Welsh Government National Strategy for Flood and Coastal Erosion Risk Management in Wales. As part of this process a list of objectives were agreed and the relevant section of the Strategy is given below.

In November 2011 the Welsh Government published "The National Strategy for Flood and Erosion Risk Management in Wales". This document identifies four Overarching Objectives that must be addressed within Local Strategies.

The four overarching objectives are:

1 Reducing the consequences for individuals, communities, businesses and the environment from flooding and coastal erosion.

2 Raising awareness of and engaging people in the response to flood and coastal erosion risk.

3 Providing an effective and sustained response to flood and coastal erosion events.

4 Prioritising investment in the most at risk communities.

In their guidance document–"Local Flood Risk Management Strategies" Local Strategy–November 2011 the Welsh Government listed objectives in relation to social, economic and environmental risk. These objectives have been used by CCS as a foundation for the establishment of detailed objectives which will ensure the delivery of the Strategy.

Flood Risk Management Objectives

1 **Social:**

Reduce distress (No. of people exposed to flooding).
Reduce community disruption
Reduce risk to life
Reduce disruption to critical infrastructure

2 **Economic:**

Reduce economic damage).
Reduce cost of management (note: a risk management outcome for use in appraisal).

3 **Environmental:**

Reduce damages to Natura 2000 / SSSIs / BAP sites (or improve sites).
Improve naturalness (reduce modification of channels / waterbodies).
WFD objectives: improve water quality / ecological status (or not deteriorate)

6.2 City and County of Swansea objectives from Local Strategy

The City and County of Swansea Local Flood Risk Management Strategy presents eight detailed objectives which outline how the Authority intends to manage flood risk within this LFRMS cycle. These objectives adhere to the high level objectives set out in the Welsh Government's National Strategy for Flood and Coastal Erosion Risk Management and have been adopted by the Authority to show the ambitions of City and County of Swansea Strategy. The following table show the eight overarching objectives with actions to deliver these objectives stipulated in our Strategy.

Table 9 City and County Swansea Local Flood Risk Management Objectives

No	Objective	Social	Economic	Environment
1	To commit to the understanding of Flood and Coastal risks and to ensure that all stakeholders understand their roles and responsibilities in relation to Flood and Coastal risk management	✓	✓	
2	To work together with other flood risk management Authorities to reduce flood risk, using all available resources and funds in an integrated way and in so doing derive overall benefit.	✓	✓	✓
3	Develop policies for effective land use and management and enhance development control procedures. Avoidance of development in flood risk areas. To prevent an increase in flood risk as a result of development by preventing additional flow entering existing drainage systems and watercourses whenever possible		✓	✓
4	Established regular maintenance schedules for flood and coastal erosion risk management assets	✓	✓	✓
5	Raising awareness of and engaging people in response to flood and coastal erosion risk	✓	✓	
6	Enhance property and community level of resilience	✓	✓	
7	Take a sustainable and holistic approach to flood and coastal management, seeking to deliver wider environmental and social benefits.	✓	✓	✓
8	Prioritising investment in the most at risk communities	✓	✓	

The Welsh Government Guidance further stated that when developing Local Strategies, LLFAs may wish to consider both high level strategic objectives and more detailed objectives. Any measures that City and County of Swansea undertakes as part of this Local Flood Risk Management Plan will be for the purpose of meeting these objectives and thus the Welsh Government National Flood Coastal Erosion Risk Management objectives

7.0 Measures to manage Flood Risk

The following measures have been taken from the City and County Local Flood Risk Strategy (2013) and are to be used for this Flood Risk Management Plan.

The following table identifies all on-going measures from the Flood Risk Management Strategy.These have then been split into borough wide measures which have been adopted by the Authority to be used across the Borough, and new local measures which are used in specific locations identified from the assessment of the flood maps.

7.1 Borough Wide Measures –Linked to LFRMS

Measure Code	Specific Measure	Measure Type	Link to FRMP Objective	Link to RBMP & Western Wales FRMP	Time Scale	Progress
CCS 01	Adopt the Local Development Plan with a Strategic Flood Consequences Assessment as part of evidence base which directs new development away from high flood risk areas	Prevention M21	1,3,7	Improve understanding of flood risk to inform decision making processes	2016-2021	On-going
CCS 02	Assessing and approving drainage design for all construction work which has drainage implications	Other Prevention M24	1,3	Improve understanding of flood risk to inform decision making processes	2016-2021	On-going
CCS 03	Compliance to the requirements of Planning Policy Wales and relevant Technical Advice Notes to ensure that all new development is given further consideration and assessment to flood risk constraints	Other Prevention M24	1,3	Improve understanding of flood risk to inform decision making processes	2016-2021	On-going
CCS 04	To support the preparation of the water cycle strategy which will form part of the evidence base for the LDP	Other Prevention M24	1,2,3	Improve understanding of flood risk to inform decision making processes	2016-2021	On-going
CCS 05	To inform communities with best practice measures to improve their awareness of good property resilience techniques.	Preparedness M43	1,5,6	Improve community awareness and resilience to flooding	2016-2021	On-going
CCS 06	To inform communities to access to flood warning systems	Preparedness M43	2,5,6	Improve community awareness and resilience to flooding	2016-2021	Not yet started

Measure Code	Specific Measure	Measure Type	Link to FRMP Objective	Link to RBMP & Western Wales FRMP	Time Scale	Progress
CCS 07	Preparation of flood evacuation procedures, community and emergency response plans	Other Preparedness M44	2,5,6	Improve community awareness and resilience to flooding	2016-2021	Not yet started
CCS 09	Protection to environment and seek enhancement whenever possible, Protection to SACs, SPAs, Ramsar Sites and SSSIs	Protection M31	1,3,7	Incorporate the ecosystem approach into delivery of FRM	2016-2021	On-going
CCS 10	Develop and maintain a register of flood assets.	Other Prevention M24	1,2,8	Improve understanding of flood risk to inform decision making processes	2016-2021	On-going
CCS 11	Develop a maintenance recording system and ensure these are informed by the register of flooding incidents.	Other Prevention M24	1,2,8	Improve understanding of flood risk to inform decision making processes.	2016-2021	On-going
CCS 12	The Authority will investigate and record significant flooding incidents	Other Prevention M24	1,2	Improve understanding of flood risk to inform decision making processes	2016-2021	On-going
CCS 13	To maintain asset register for assets prone to flooding in order to inform future improvement works	Other Prevention M24	1,2,8	Improve understanding of flood risk to inform decision making processes	2016-2021	On-going

Measure Code	Specific Measure	Measure Type	Link to FRMP Objective	Link to RBMP & Western Wales FRMP	Time Scale	Progress
CCS 14	To ensure adequate maintenance regimes for assets significant to flooding	Protection M35	1,2,8	Reduce the risk of harm to life from flooding to people and communities	2016-2021	On-going
CCS 15	In certain circumstances CCS will request information from other risk management Authorities.	Other Prevention M24	1,2	Improve understanding of flood risk to inform decision making	2016-2021	On-going
CCS 16	Designation of Structures -To ensure that structures and features significant to flood risk are maintained by the Authority	Other Prevention M24	1,5	Improve understanding of flood risk to inform decision making	2016-2021	Not yet started
CCS 17	Creation of Suds approving Body	Protection M34	7	Reduce the risk of harm to life from flooding to people and communities	2016-2021	Not yet started
CCS 18	Consenting to works on ordinary watercourses	Other Prevention M24	3,7	Reduce the risk of harm to life from flooding to people and communities	2016-2021	On-going
CCS 19	Acting as land drainage body CCS has permissive powers to serve notice on riparian landowners	Other Prevention M24	7	Reduce the risk of harm to life from flooding to people and communities	2016-2021	On-going

CCS 20	Construction of Flood defences- subject to available funding and priorities	Other Protection M35	1,2,8	Reduce the risk of harm to life from flooding to people and communities	2016-2021	On-going
CCS 21	Cause incidental flooding for the purposes of flood risk management whilst seeking wider environmental benefits	Protection M31	3,7	Incorporate the ecosystem approach into delivery of FRM	2016-2021	Not yet started

7.2 New local Measures

Measure Code	Specific Measure	Measure Type	Link to FRMP Objective	Link to RBMP & Western Wales FRMP	Time Scale	Progress
CCS 100	**Improve Flood Warning service** *Investigate how a flood warning service can be developed , employed , implemented. A feasibility study to establish whether the service can be linked into social media and if it is viable for flood risk warnings, severe warning etc.* *Location: Any area within CCS where there is significant flood risk and people would benefit from having more information and weather warnings etc* *Costs: Cost of CCS staff time to carry out a feasibility study to establish where the service is required and how it can be implemented.* *Effect on Flood risk: Residents will be informed prior to a flood event that there is potential for flooding of their properties and to allow individuals and communities to be more aware and prepared.*	Preparedness M41 Flood forecasting and warning M41	1,2,5,6	Flood Forecasting warning & incident management	2016-2021	Not started proposed
CCS 200	**Further Survey Work** *Locate, record and map the Authority's drainage infrastructure. Identify how it combines with Dwr Cymru Welsh water systems and riparian systems. Record physical details and condition of each component. Continuously update and maintain the Authority Asset records database.* *Location: Borough Wide Measure* *Costs: Cost of CCS Staff time to carry to carry out these investigations and use of specialist surveying sub contractors* *Effects on Flood Risk: The gathering of information will not only reduce flood risk but will enable measures to be designed and delivered.*	Other Prevention M24	1,2,7,8	Improve understanding of flood risk to inform decision making	2016-2021	On-going

CCS 300	**Derive Hydrology for Catchment** *Carry out inspection and survey of the catchment, watercourse, culverts and surface water drainage networks. Build hydraulic model from the information gathered through investigation and survey.* *Location: Areas susceptible to high flood risk* *Cost: Cost of CCS staff time to carry out these investigations and use of sub-contractor to undertake modelling and capacity checks* *Effects on Flood Risk: The study itself will not reduce flood risk but will indicate if the risk has been over stated. Further measures may be identified as a result of the investigation, which could reduce flood risk in the area.*	Other Prevention M24	1,2,7,8	Improve understanding of flood risk to inform decision making	2016-2021	On-going
CCS 400	**Carry out Further Investigation of accumulations of Surface water** *Investigating areas identified by flood risk maps as being at a high level of flood risk. Understanding further sources of flood risk within these areas and identifying measures to mitigate flood risk if it is validated by the investigation. The work may include topographical surveys to confirm drainage paths and improved localised catchment modelling.* *Location: At locations throughout the borough where the updated maps for surface water identify areas affected by accumulations of flood water* *Costs: Cost of CCS staff time to carry out these investigations and for the use of specialist sub-contractors .* *Effects on flood risk:Whilst this measure will not directly reduce flood risk, it will help to validate the accuracy of the flood maps and highlight any measures to reduce the flood risk moving forward.*	Other Prevention M24	1,2,7	Improve understanding of flood risk to inform decision making	2016-2021	Not started proposed
CCS 500	**Flood Asset Inspection** *Developing a inspection programme to be carried out by officers separate to regular maintenance regimes. Detailed inspections to be undertaken which will involve identifying the general condition of the flood structure/feature and making recommendations based on the outcomes.* *Location: Borough wide measure to assets having a significant impact on flood risk e.g. High priority culvert grids* *Costs: Cost of CCS staff time to carry out these investigations and for the use of specialist sub-contractors* *Effects on flood risk: To gather critical information by assessment on structures/features will enable a the Authority to build up a database of the condition of assets which will inform future work programmes.*	Other Prevention M24	1,2,7,8	Improve understanding of flood risk to inform decision making	2016-2021	On-going

CCS 600	**Flood Asset Maintenance** *Scheduling and undertaking the maintenance of CCS's flood defence assets. This will involve activities such as grid cleansing, desilting and channel clearance to allow for the drainage systems to work at maximum capacity. Scheduling the maintenance regime will ensure those areas at risk are prioritised to minimize flood risk.* . *Location: Assets which are located throughout the boroughs that are classified as having an impact on flood risk and prioritized accordingly* *Costs: Cost of CCS staff time to carry out investigation and continuous monitoring of maintenance programmes whilst having due regard to the significant impacts of the consequences of flooding..* *Effects on flood risk: To provide an holistic approach to flood risk management by using the new flood maps to inform future maintenance regimes of flood defence assets in Swansea. Scheduling and continuous monitoring of the maintenance programme is essential to ensuring the success of this measure*	Protection M35	1,4,7	Reduce the risk of harm to life from flooding to people and communities	2016-2021	On-going
CCS 700	**Liaison with owners of Significant flood Assets** *Establish contact with landowners where flood defence assets are situated including. But not limited to, riparian owners, DCWW, Network Rail, SWTRA and various other bodies. To collate information on condition and maintenance activities.* *Location: Where assets are deemed to be in private ownership and having significant impact on flood risk* *Costs: Cost of CCS staff time to carry out investigation and engagement with private owners* *Effect on Flood Risk: Establishing the owners of significant flood assets and ensuring the maintenance of those assets are known .* .	Other Prevention M24	1,2,5,7	Improve understanding of flood risk to inform decision making	2016-2021	Not started proposed

7.3 Joint Schemes

There are no joint schemes currently underway or planned with other Risk Management Authorities or stakeholders

Local Measures to mitigate flood risk

The maps provided by NRW identify the areas at risk of flooding. From our experience the most likely source of surface water flooding is from blocked grids at intakes to culverts and therefore this is also considered in our local analysis.

For each community area the following analysis has been undertaken:

Overview

- A description of the location within the Borough
- Size of the area
- Brief outline of the geography and types of development
- A description of the water catchment area
- A table of significant intakes in the area

Map of Flood Risk

- A map identifying the NRW flood extent areas for low (1 in 1000), medium (1 in 100) and high (1 in 30) risk

Conclusions

- An overall conclusion drawn from our analysis of the maps
- A table of the risks to people and property, economic activity and natural and historic environment

Measures to mitigate flood risk

Through analysing the maps and data provided by NRW specific locations are identified where measures are proposed. The measures involve investigating the source of the problem and identifying solutions; and in some instances, where there is knowledge of past flooding, an awareness measure is also put in place.

Chapter 8 identifies the local measures for communities within the Flood Risk Area whilst chapter 9 identifies the local measures for communities outside the Flood Risk Area.

Links to documents referred to in this FRMP

Links to Emergency Planning (plans)

http://www.jointresilience.co.uk/Default.aspx?page=7943

Link to the Local Development Plan

http://www.swansea.gov.uk/ldp

Link to the Preliminary Flood Risk Assessment

Add link

Link to the Local Flood Risk Management Strategy

http://www.swansea.gov.uk/article/8031/Flooding-advice

http://www.swansea.gov.uk/floodstrategy

8.0 How we will manage flood risk in our Flood Risk Area

8.1 Bonymaen Community Area

Overview

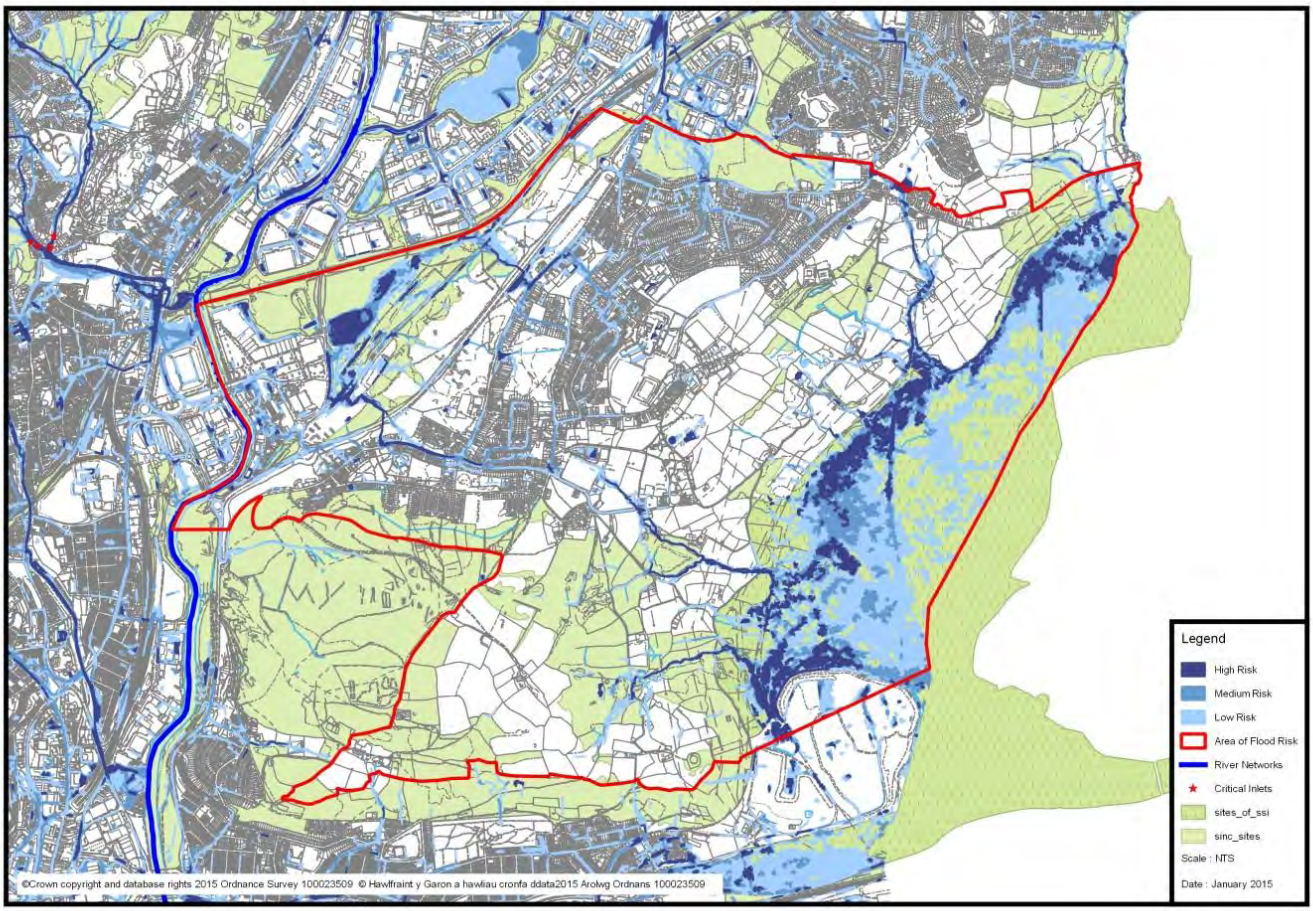
Bonymaen Ward is situated 4km north East of Swansea City Centre, consisting of the Bonymaen, Pentrechwyth and Enterprise Park localities. The area is 647 hectares in size and has a population of 6845.The topography steeply slopes from east to west with the drainage of the catchment comprising of small streams and watercourses which discharge to the River Tawe on the Western edge and Crymlyn Bog towards the east. The catchment includes the Swansea Enterprise Zone which includes a high number of businesses and commercial properties and the Morfa Retail Park. Crymlyn Bog a nature reserve designated as a site of Special Scientific Interest of international significance.

There are 3 intakes to culverts which are maintained by the Authority, and the likelihood of further culverts which have yet to be found which cross the Swansea Enterprise Zone before discharging into the river Tawe.

Table 10: Bonymaen – Significant Intakes

Grid Ref	Address
E266946, N195270	Upper Bank, Pentrechwyth (North)
E266961, N195225	Upper Bank, Pentrechwyth (South)
E266879, N195462	Nantong Way, Morfa

Figure 7 Bonymaen – Flood Risk Map



Conclusions from the Flood risk Maps

The Flood risk map for Bonymaen area of flood risk indicates that the main cause of flooding for the area relates to the ordinary watercourses and intakes to existing surface water systems and culverts. However, it is to be noted that the maps may be overstating the extent of flooding as the full capacity of any existing culverts was not included in the modelling process when the maps were prepared.

Significant flooding is also apparent in the Crymlyn Bog area which enhances the natural environment in the wetlands at this locality.

Table 11 Bonymaen – Counts for flood risk

COUNTS FOR CCS, BONYMAEN WARD				
Risk to People	**TOTAL**	**LOW**	**MED**	**HIGH**
Residential Properties in areas at risk of flooding Properties at Risk (n) People at Risk (n) (multiplier 2.35)	7156	117	87	9
Residential Properties at risk of flooding Properties at Risk (n) People at Risk (n) (multiplier 2.35)	3045	50	37	4
Services (n)	8	3	1	0
Risk to Economic Activity				
Non-Residential Properties (n)	406	11	4	2
Airports (n)	0	0	0	0
Primary / Trunk Roads (km)	0	0	0	0
Main Railway Lines (km)	0.56	0.02	0	0
Agricultural Land – Grades 1, 2 and 3 (ha)	0	0	0	0
Risk to Natural Environment and Historic Environment				
Bathing Waters (n)	0	0	0	0
Environmental Permitting Regulations (EPR) Installations (n)	0	0	0	0
Special Areas of Conservation (SAC) (ha)	150.33	50.21	14	15
Special Protection Areas (SPA) (ha)	0	0	0	0
Ramsar Sites (ha)	139.57	45.58	13.11	13.71
World Heritage Sites (ha)	0	0	0	0
Sites of Special Scientific Interest (SSSI) (ha)	150.59	47.23	13.81	14.55
Parks and Gardens (ha)	0	0	0	0
Scheduled Ancient Monuments (ha)	0.26	0	0	0
Listed Buildings (n)	6	0	1	0
Licensed Abstractions (LA) (n)				
Sites of Interest for Nature Conversation (SINC) (ha)	175.80	8.7	2.28	3.70

In addition to the existing borough wide measures to mitigate flood risk as stipulated in section 7.The following measures will be applied to the main sources of flood risk within the Bonymaen community area.

Table 12 Bonymaen - Measures to mitigate flood risk

Location	Risk Level	Risk to:	Measure	Measure Type	Link to FRMP Objective	Timing	Measure Status
Upper bank North	high	Residential properties Highways	CCS 500: Flood Asset Inspection	Other prevention M24	1,2,7,8	2016-2021	Not started proposed
Upper bank South	low to medium	Risk to Highway	CCS 400 further investigation of accumulations of surface water	Other prevention M24	1,2,7	2016-2021	Not started proposed
Nantong Way	high	Highway	CCS 400 further investigation of accumulations of surface water	Other prevention M24	1,2,7	2016-2021	Not started proposed

In order for this Flood Risk Management Plan to be successful it is essential that significant additional funding be made available to City and County of Swansea on top of the normal funding arrangements from Welsh Government. Failure to receive this additional funding could result in measures identified in this report not being implemented either in part or in full.

Number of Measures in each category

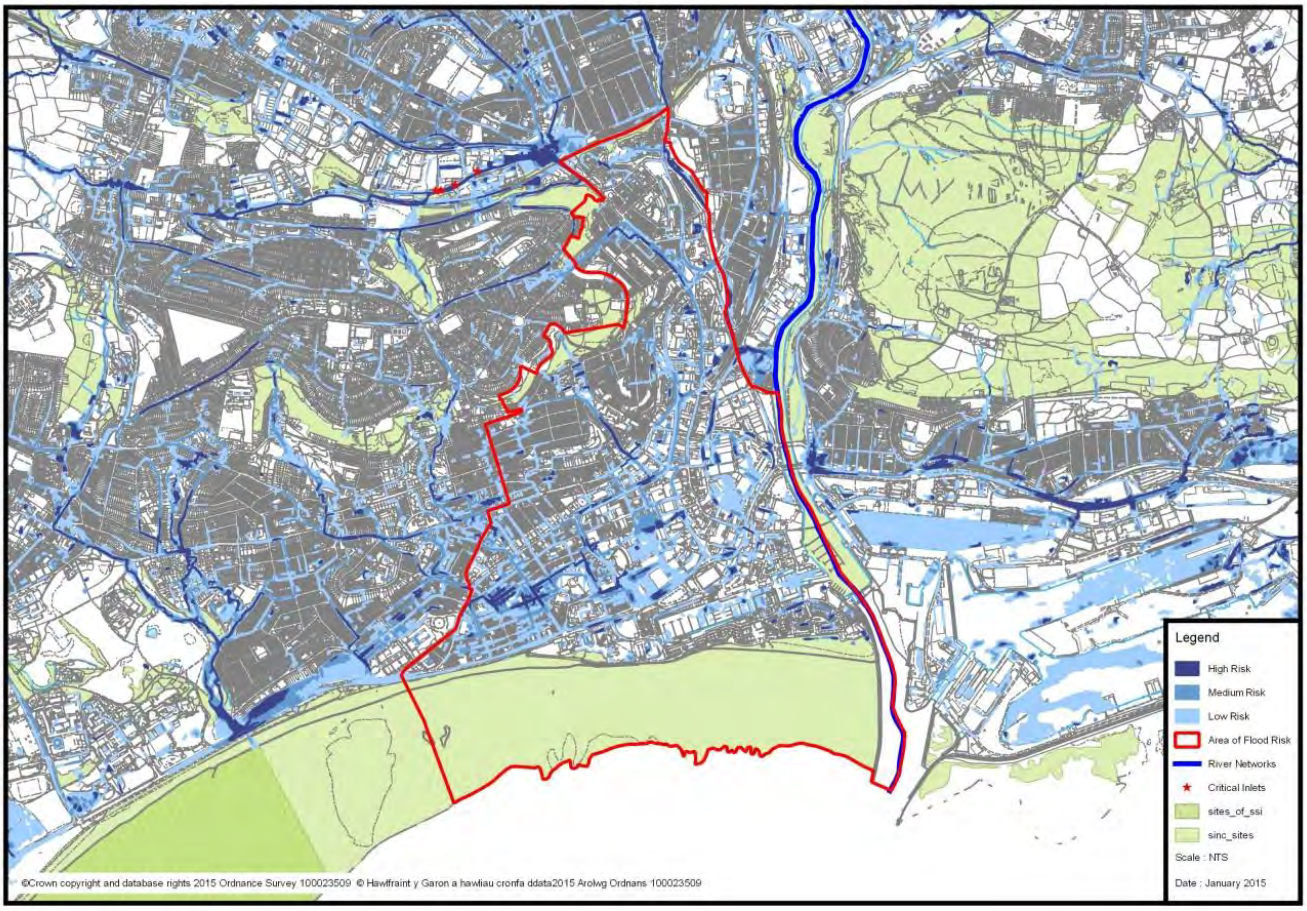
8.2 Castle Community Area

Overview

The castle is a ward which comprises Swansea City centre and areas to its west and North. The ward is bounded to the East by the River Tawe and to the South by Swansea Bay. Predominantly the catchment is densely urbanised with the city centre shopping centre and surrounding residential areas of Sandfields and Townhill being the largest sub-urban areas. Maritime Quarter, City centre shopping centre, Civic Centre, and Parc Tawe retail park. Other key features include Swansea Train station, Swansea Prison, National Waterfront and Swansea museums, Leisure centre, Metropolitan University and emergency service stations.
The urbanised areas are drained by combined sewers and separate surface water drainage systems which accept the surface water run-off from these areas. Welsh Water has a storm water pumping station which caters for flood flows in the sewerage systems and more information is required in order to understand the function of this asset.

There are no significant intakes in the Castle catchment.

Figure 8 Castle –Flood Risk Map



Conclusions from the Flood risk Maps

The Flood risk map for Castle area of flood risk indicates that large areas are susceptible to surface water flooding and fall into the low risk category. This is primarily because of the high impermeable nature of the Castle Ward location within the City and also it is situated on low lying land which accepts run-off from other higher neighbouring urbanised catchments. However, it is to be noted that the maps may be overstating the extent of flooding as the full capacity of any existing culverts and urban drainage systems was not included in the modelling process when the maps were prepared.

Table 13 Castle – Counts for flood risk

COUNTS FOR CCS, CASTLE WARD				
Risk to People	**TOTAL**	**LOW**	**MED**	**HIGH**
Residential Properties in areas at risk of flooding Properties at Risk (n) People at Risk (n) (multiplier 2.35)	20783	1901	719	261
Residential Properties at risk of flooding Properties at Risk (n) People at Risk (n) (multiplier 2.35)	8844	809	306	111
Services (n)	17	3	1	0
Risk to Economic Activity				
Non-Residential Properties (n)	2138	306	136	18
Airports (n)	0	0	0	0
Primary / Trunk Roads (km)	0	0	0	0
Main Railway Lines (km)	0.69	0.01	0.01	0.01
Agricultural Land – Grades 1, 2 and 3 (ha)	0	0	0	0
Risk to Natural Environment and Historic Environment				
Bathing Waters (n)	1	0	0	0
Environmental Permitting Regulations (EPR) Installations (n)	2	0	0	0
Special Areas of Conservation (SAC) (ha)	0	0	0	0
Special Protection Areas (SPA) (ha)	0	0	0	0
Ramsar Sites (ha)	0	0	0	0
World Heritage Sites (ha)	0	0	0	0
Sites of Special Scientific Interest (SSSI) (ha)	0	0	0	0
Parks and Gardens (ha)	0	0	0	0
Scheduled Ancient Monuments (ha)	0.28	0	0	0
Listed Buildings (n)	125	2	0	0
Licensed Abstractions (LA) (n)				
Sites of Interest for Nature Conversation (SINC) (ha)	127.49	0.28	0.11	0.06

In addition to the existing borough wide measures to mitigate flood risk as stipulated in section 7.The following measures will be applied to the main sources of flood risk within the Castle community area.

Table 14 Castle - Measures to mitigate flood risk

Location	Risk Level	Risk to:	Measure	Measure Type	Link to FRMP Objective	Timing	Measure Status
Sandfields and City Centre	low to medium	Residential, retail and commercial properties Highways	CCS 400 Carry out further investigation of accumulations of surface water CCS 700 Establish contact with DCWW	Other Prevention M24	1,2,5,7	2016-2021	Not started proposed

In order for this Flood Risk Management Plan to be successful it is essential that significant additional funding be made available to City and County of Swansea on top of the normal funding arrangements from Welsh Government. Failure to receive this additional funding could result in measures identified in this report not being implemented either in part or in full.

Number of Measures in each category

8.3 Cockett Community Area

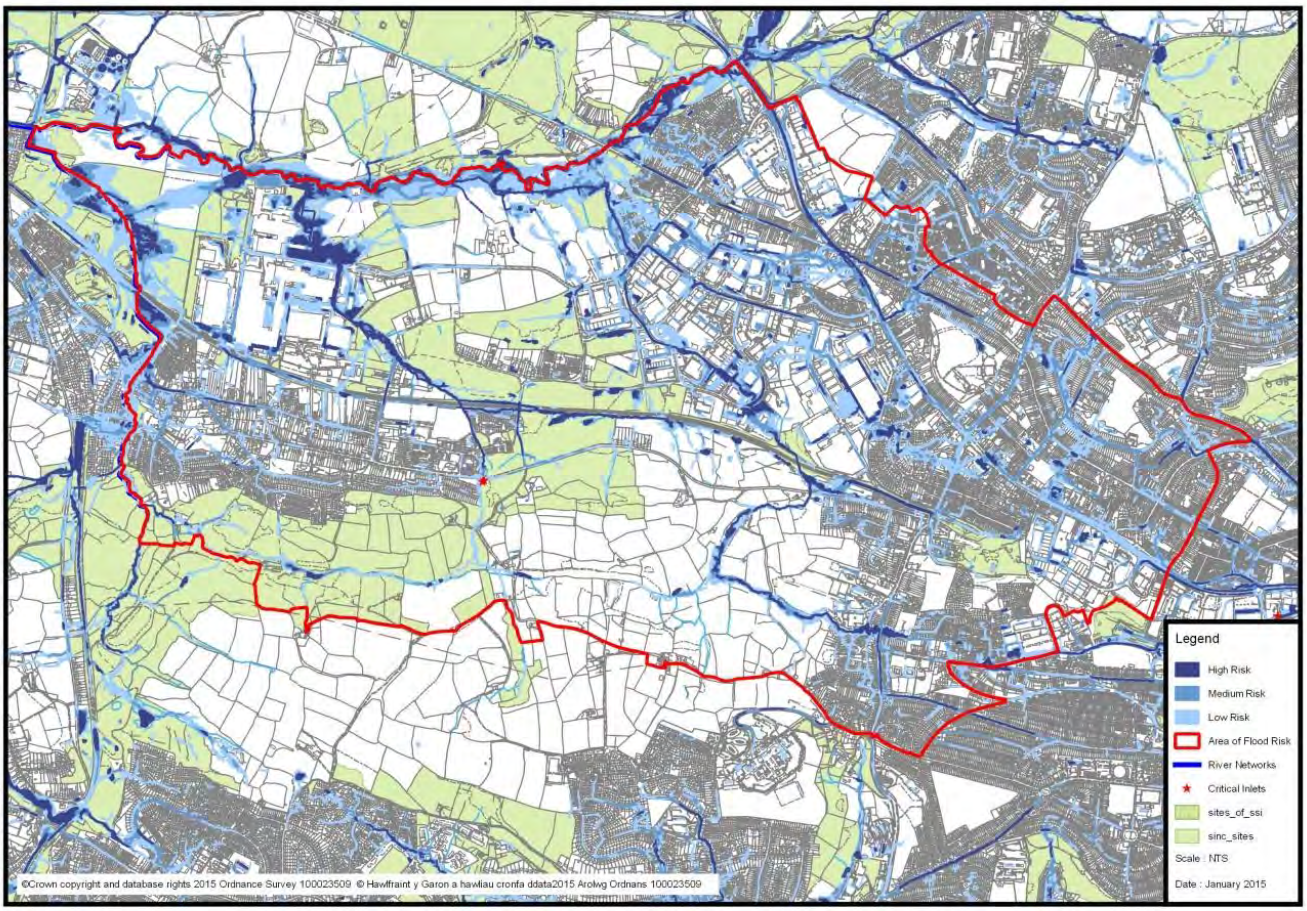
Overview

The community of Cockett is situated 3km north west of Swansea Centre, consisting of the Waunarlwydd, Fforestfach , Gendros, Fforesthall, Ravenhill and Cockett Localities. It covers an area of 860ha consisting mainly of housing industrial and commercial development. Of notable significance is the Fforestfach Retail Park and Swansea West Business Park. Also, situated within the community area is key infrastructure such as the Western Wales main rail network and Carmarthen Road Dual carriageway which is used as the main gateway to access the City Centre from the west.
The catchment drains into two ordinary watercourses. The larger of the two runs through Swansea West Business Park and the smaller watercourse through Pontardulais Road Retail Park. Both watercourses drain to the Afon Llan. There are smaller streams and watercourses in the area but these are considered to be of lesser significance.
There is one significant intake which is currently maintained by the Authority and also other known culverts which have been caused surface water flooding in the past. These features have been record on the Authority's GIS system.

Table 15: Cockett – Significant Intakes

Grid Ref	Address
E261208, N195225	Cwmbach Road, Waunarlwydd (opp. 12 Clas-y-Deri)

Figure 9 Cockett –Flood Risk Map



Conclusions from the Flood Risk Maps

The Flood Risk Map for Cockett community area indicates that the main cause of flood risk for the area relates to ordinary watercourses and the intakes to existing surface water culverts. Typically the flood map has indicated large amount of surface water accumulations as the result of surface water flooding where local drainage systems may have restricted capacity. These areas have been identified in Table 17 with appropriate measures recommended to further investigate the accuracy of the flooding modelling as shown on the flood extents map. The map indicates some potentially large areas of high risk surface water flooding on Carmarthen /Pontardulais Road and flooding from the watercourse which transverses through the Fforestfach Industrial Estate. Generally this correlates with local knowledge although it is believed that the flood risk is overstated as the full capacity of the existing culverts was not included in the modelling process when the maps were prepared.

Table 16 Cockett – Counts for flood risk

COUNTS FOR CCS, COCKETT WARD				
Risk to People	**TOTAL**	**LOW**	**MED**	**HIGH**
Residential Properties in areas at risk of flooding Properties at Risk (n) People at Risk (n) (multiplier 2.35)	14906	599	68	12
Residential Properties at risk of flooding Properties at Risk (n) People at Risk (n) (multiplier 2.35)	6343	255	29	5
Services (n)	11	0	0	0
Risk to Economic Activity				
Non-Residential Properties (n)	1206	115	27	8
Airports (n)	0	0	0	0
Primary / Trunk Roads (km)	0	0	0	0
Main Railway Lines (km)	4.42	0.3	0.55	0.34
Agricultural Land – Grades 1, 2 and 3 (ha)	101.76	1.84	4.87	0
Risk to Natural Environment and Historic Environment				
Bathing Waters (n)	0	0	0	0
Environmental Permitting Regulations (EPR) Installations (n)	5	3	3	1
Special Areas of Conservation (SAC) (ha)	0	0	0	0
Special Protection Areas (SPA) (ha)	0	0	0	0
Ramsar Sites (ha)	0	0	0	0
World Heritage Sites (ha)	0	0	0	0
Sites of Special Scientific Interest (SSSI) (ha)	0	0	0	0
Parks and Gardens (ha)	0	0	0	0
Scheduled Ancient Monuments (ha)	0.01	0	0	0
Listed Buildings (n)	3	0	0	0
Licensed Abstractions (LA) (n)				
Sites of Interest for Nature Conversation (SINC) (ha)	187.83	17.16	7.48	9.85

In addition to the existing borough wide measures to mitigate flood risk as stipulated in section 7.The following measures will be applied to the main sources of flood risk within the Cockett community area.

Table 17 Measures to mitigate flood risk

Location	Risk Level	Risk to:	Measure	Measure Type	Link to FRMP Objective	Timing	Measure Status
Cockett Allotments	high	Residential properties Highways	CCS 500 Flood Asset Inspection	Other Prevention M24	1,2,7,8	2016-2021	Not started proposed
			CCS 600 Flood Asset maintenance	Protection M35	1,4,7	2016-2021	Not started proposed
Fforestfach Industrial Estate	low to medium	Residential Commercial and industrial properties	CCS 400 Carry out further investigation of accumulations of surface water	Other Prevention M24	1,2,7	2016-2021	Not started proposed
Weig Fach	low to medium	Residential properties	CCS 400 Carry out further investigation of accumulations of surface water	Other Prevention M24	1,2,7	2016-2021	Not started proposed
Carmarthen Road Fforestfach	low to high	Residential Property and Highway	CCS 400 Carry out further investigation of accumulations of surface water	Other Prevention M24	1,2,7	2016-2021	Not started proposed
Pontardulais Road	low to high	Commercial, retail residential property	CCS 400 Carry out further investigation of accumulations of surface water	Other Prevention M24	1,2,7	2016-2021	Not started proposed
Cwmbach Road	low	Residential Properties and Highway	CCS 400 Carry out further investigation of accumulations of surface water	Other Prevention M24	1,2,7	2016-2021	Not started proposed

In order for this Flood Risk Management Plan to be successful it is essential that significant additional funding be made available to City and County of Swansea on top of the normal funding arrangements from Welsh Government. Failure to receive this additional funding could result in measures identified in this report not being implemented either in part or in full.

Number of Measures in each category

8.4 Cwmbwrla Community Area

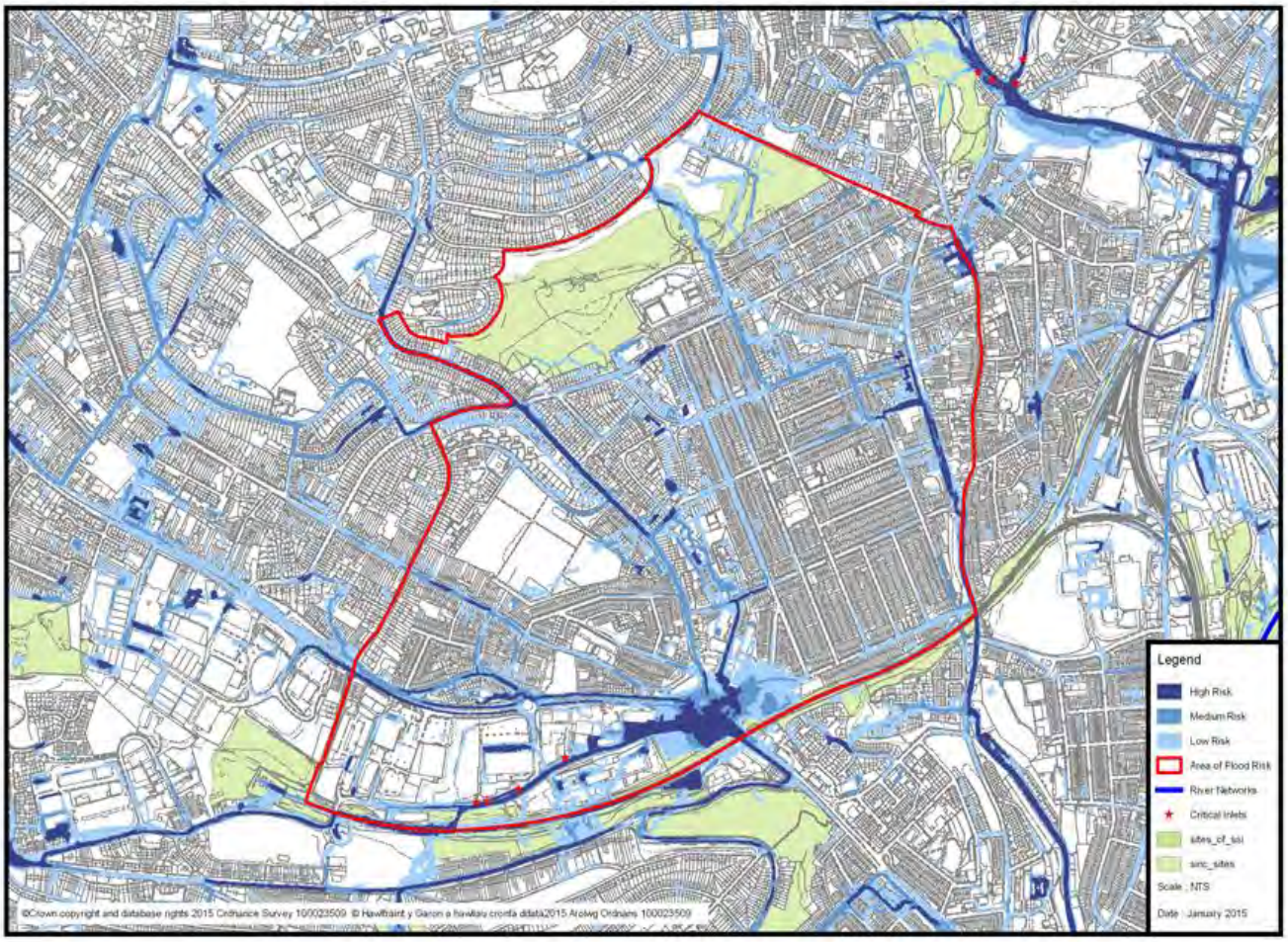
Overview

Cwmbwrla Community area is situated 2km north East of Swansea City Centre, consisting of the Brynhyfrd, Manselton and Cwmbwrla localities. It covers an area of 150Ha, consisting mainly of housing and a small element industrial and retail units situated adjacent to Carmarthen Road
The Western Wales rail network passes through this community.
The catchment is drained by a number of small culverts which drain the top of the catchment commonly known as the Penlan slopes and serves the urban surface water drainage of the Manselton locality. The Burlais Brook emanates on the Western fringe of the community, and has a number of significant grids and intakes along Gors Road which the Authority maintain. From the Cwmbwrla roundabout the watercourse becomes piped and drains into the lower community of Castle before it eventually discharges to the River Tawe.

Table 18: Cwmbwrla– Significant Intakes

Grid Ref	Address
E264427, N194546	Heol y Gors, Cwmbwrla Location 1 (+ Location 2- d/s security grille)
E264552, N194574	Heol y Gors, Cwmbwrla Location 3
E264626, N194641	Heol y Gors, Cwmbwrla Location 4
E264561, N194561	Heol y Gors, Cwmbwrla – Side of Council Depot

Figure 10 Cwmbwrla Flood Risk Map



Conclusions from the Flood Risk Maps

The Flood Risk Map for Cwmbwrla indicates that the main cause of flood risk for the area relates to ordinary watercourses and the intakes to existing surface water culverts. The worst affected area is typified by large amounts of surface water run-off generated from higher impermeable areas, and also, overspilling from the watercourse situated on Heol y Gors which affects Carmarthen Road/Cwmbwrla roundabout . Carmarthen Road is regarded as a main gateway into the City Centre and further investigation is recommended for this location together with other areas as shown in Table 20 below. Generally this correlates with local knowledge although it is believed that the flood risk is overstated as the full capacity of the existing culverts and highway drainage systems was not included in the modelling process when the maps were prepared.

Table 19 Cwmbwrla Counts of Flood Risk

COUNTS FOR CCS, CWMBWRLA WARD				
	TOTAL	**LOW**	**MED**	**HIGH**
Residential Properties in areas at risk of flooding Properties at Risk (n) People at Risk (n) (multiplier 2.35)	8359	183	68	19
Residential Properties at risk of flooding Properties at Risk (n) People at Risk (n) (multiplier 2.35)	3557	78	29	8
Services (n)	8	1	0	0
Risk to Economic Activity				
Non-Residential Properties (n)	355	58	19	9
Airports (n)	0	0	0	0
Primary / Trunk Roads (km)	0	0	0	0
Main Railway Lines (km)	0.43	0.01	0.02	0
Agricultural Land – Grades 1, 2 and 3 (ha)	0	0	0	0
Risk to Natural Environment and Historic Environment				
Bathing Waters (n)	0	0	0	0
Environmental Permitting Regulations (EPR) Installations (n)	1	0	0	0
Special Areas of Conservation (SAC) (ha)	0	0	0	0
Special Protection Areas (SPA) (ha)	0	0	0	0
Ramsar Sites (ha)	0	0	0	0
World Heritage Sites (ha)	0	0	0	0
Sites of Special Scientific Interest (SSSI) (ha)	0	0	0	0
Parks and Gardens (ha)	0	0	0	0
Scheduled Ancient Monuments (ha)	0	0	0	0
Listed Buildings (n)	7	0	1	0
Licensed Abstractions (LA) (n)				
Sites of Interest for Nature Conversation (SINC) (ha)	15.57	1.00	0.24	0.13

In addition to the existing county wide measures to mitigate flood risk as stipulated in section 7.The following measures will be applied to the main sources of flood risk within the Cwmbwrla community area.

Table 20 Cwmbwrla - Measures to mitigate flood risk

Location	Risk Level	Risk to:	Measure	Measure Type	Link to FRMP Objective	Timing	Measure Status
Watercourse at Heol y gors	low to high	Commercial properties Highway	CCS 500 Flood Asset Inspection	Prevention M24	1,2,7,8	2016-2021	Not started proposed
			CCS 600 Asset Maintenance	Protection M35	1,4,7	2016-2021	Not started proposed
Cwmbwrla Roundabout	low to high	Residential, non-residential and commercial properties, Highway	CCS 400 Carry out further investigation of accumulations of surface water	Other Prevention M24	1,2,7	2016-2021	Not started proposed
Clare Street	low to high	Residential properties Highway	CCS 400 Carry out further investigation of accumulations of surface water	Other Prevention M24	1,2,7	2016-2021	Not started proposed
St John Road	low	Residential properties	CCS 500 Flood Asset Inspection	Prevention M24	1,2,7,8	2016-2021	Not started proposed
Manor Road Penfilia Road	low to medium	Residential properties	CCS 400 Carry out further investigation of accumulation of surface water	Other Prevention M24	1,2,7	2016-2021	Not started proposed

In order for this Flood Risk Management Plan to be successful it is essential that significant additional funding be made available to City and County of Swansea on top of the normal funding arrangements from Welsh Government. Failure to receive this additional funding could result in measures identified in this report not being implemented either in part or in full.

Number of Measures in each category

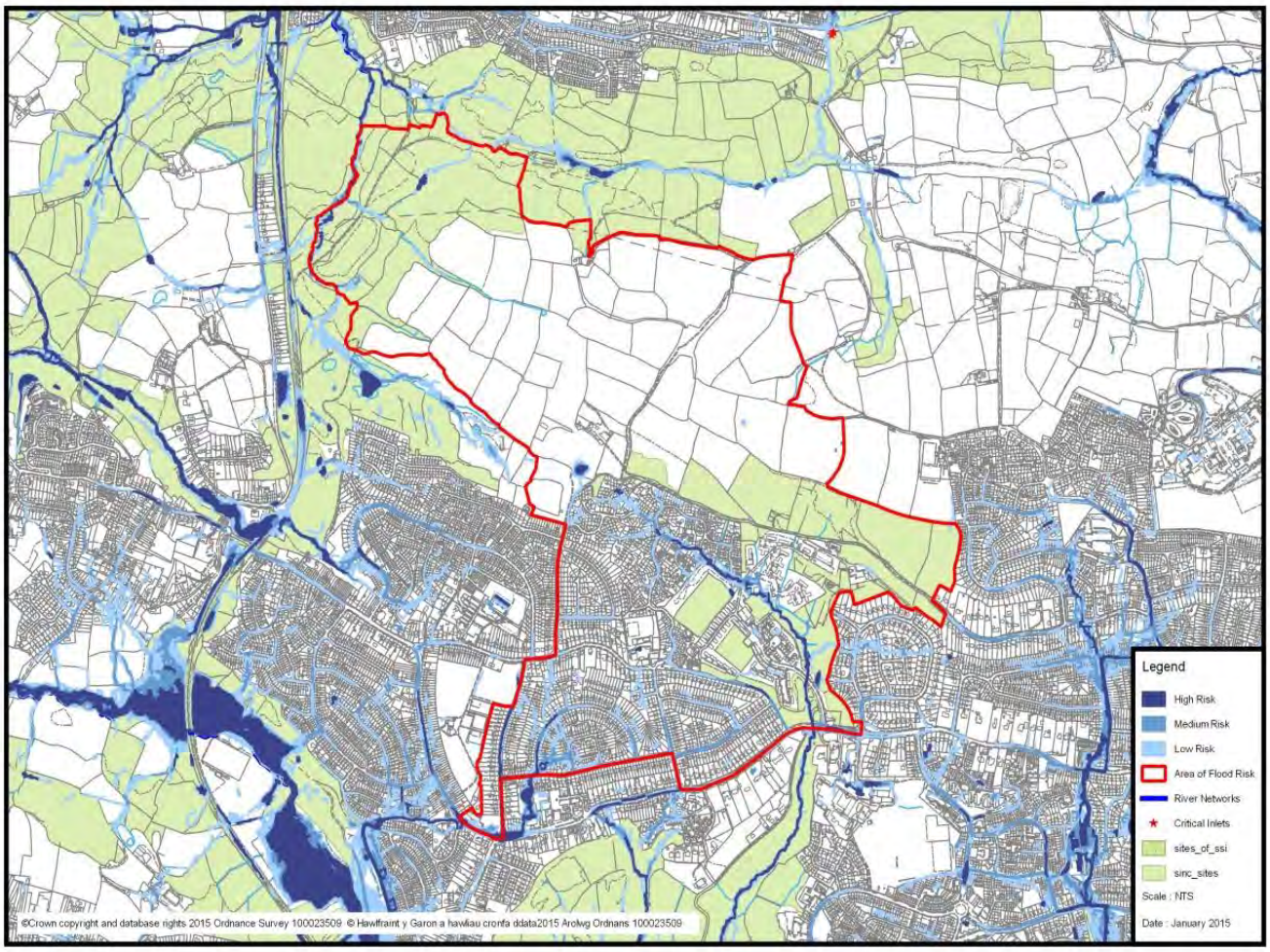
8.5 Killay North Community Area

Overview

The community of Killay North is situated 6.4km northwest of the City centre. The size of the catchment is 194 hectares with the majority of its urban population situated in the south part of the community. The topography is steep in parts and drains to the watercourse situated on the eastern edge of the ward. There is one intake which is not deemed as critically high but is on the Authority's list for maintenance.

There are no significant intakes in the Killay North catchment.

Figure 11 Killay North –Flood Risk Map



Conclusions from the Flood Risk Maps

The Flood Risk Map for Killay North indicates that there is no high flood risk in this area. The area is susceptible to medium to low risk in the urbanised areas but with a lack of historical evidence it is believed that the flood risk is overstated as the full capacity of the existing culverts and urban drainage systems was not included in the modelling process when the maps were prepared. The map shows that the community is not exposed to a great deal of flood risk. Most of the flooding is low risk and is shown to be contained with highway networks which serve the ward.

Table 21 Killay North – Counts for flood risk

COUNTS FOR KILLAY NORTH WARD				
Risk to People	**TOTAL**	**LOW**	**MED**	**HIGH**
Residential Properties in areas at risk of flooding Properties at Risk (n) People at Risk (n) (multiplier 2.35)	2627	14	0	0
Residential Properties at risk of flooding Properties at Risk (n) People at Risk (n) (multiplier 2.35)	1118	6	0	0
Services (n)	2	0	0	0
Risk to Economic Activity				
Non-Residential Properties (n)	109	2	0	0
Airports (n)	0	0	0	0
Primary / Trunk Roads (km)	0	0	0	0
Main Railway Lines (km)	0	0	0	0
Agricultural Land – Grades 1, 2 and 3 (ha)	118.14	1.22	3.35	0
Risk to Natural Environment and Historic Environment				
Bathing Waters (n)	0	0	0	0
Environmental Permitting Regulations (EPR) Installations (n)	0	0	0	0
Special Areas of Conservation (SAC) (ha)	0	0	0	0
Special Protection Areas (SPA) (ha)	0	0	0	0
Ramsar Sites (ha)	0	0	0	0
World Heritage Sites (ha)	0	0	0	0
Sites of Special Scientific Interest (SSSI) (ha)	0	0	0	0
Parks and Gardens (ha)	0	0	0	0
Scheduled Ancient Monuments (ha)	0	0	0	0
Listed Buildings (n)	3	0	0	0
Licensed Abstractions (LA) (n)				
Sites of Interest for Nature Conversation (SINC) (ha)	51.10	1.03	0.25	7.31

Measures detailed in section 7 will be applied in Killay North Community Area

In order for this Flood Risk Management Plan to be successful it is essential that significant additional funding be made available to City and County of Swansea on top of the normal funding arrangements from Welsh Government. Failure to receive this additional funding could result in measures identified in this report not being implemented either in part or in full.

Number of Measures in each category

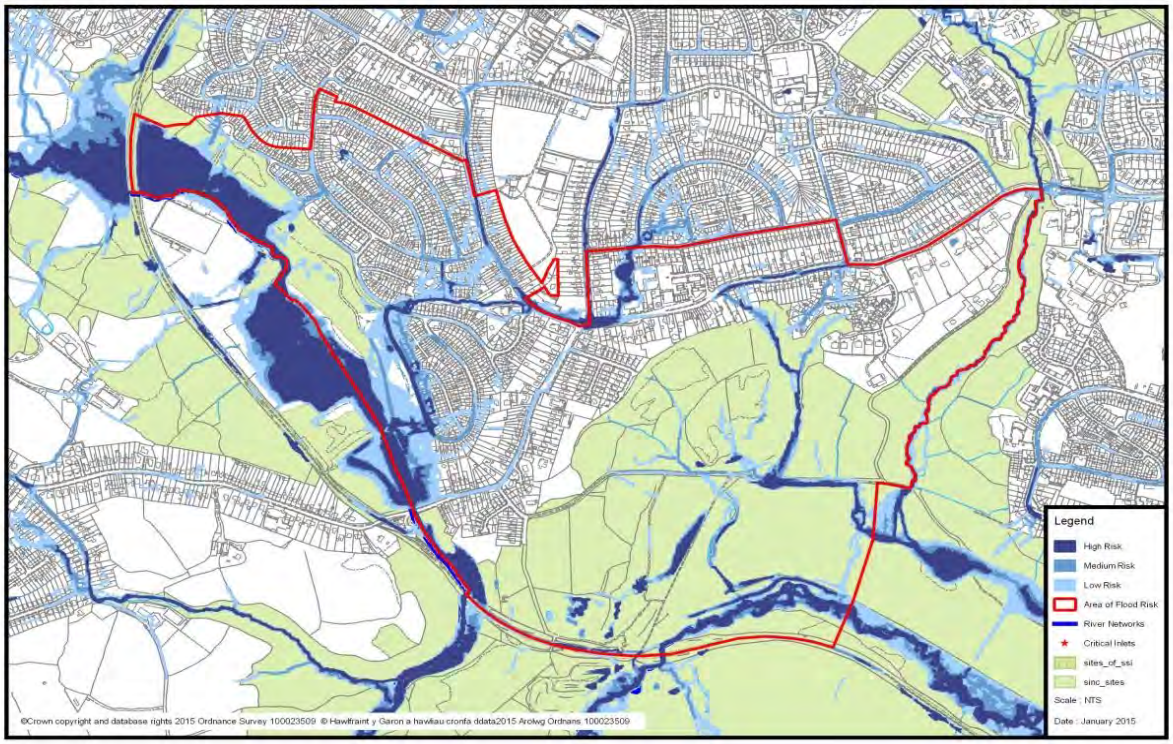
8.6 Killay South Community Area

Overview

The community of Killay South is situated 5km west of the city centre. The community has a small shopping precinct on the Northern edge which is encompassed among the main urbanised area. The area being on a lower elevation to the adjoining area of Killay North accepts surface flows and eventually discharges to the River Clyne which is situated on the most southerly edge of the community in Clyne Valley country park.

There are no significant intakes in the Killay South catchment.

Figure 12 Killay South –Flood Risk Map



Conclusions from the Flood risk Maps

The Flood risk map for Killay South area of flood risk indicates that the main cause of flooding relates to the surface water accumulations in Killay square and on the highway situated below the surgery. The flood risk is classified as medium to low risk. This is supported by historical evidence where steep catchment flows have caused localised flooding on the highway. There have also been recorded incidents of flooding below the surgery.

However, it is to be noted that the maps may be overstating the extent of flooding as the full capacity of any existing culverts or highway drainage systems was not included in the modelling process when the maps were prepared.

Table 22 Killay South– Counts for flood risk

COUNTS FOR CCS, KILLAY SOUTH WARD				
Risk to People	**TOTAL**	**LOW**	**MED**	**HIGH**
Residential Properties in areas at risk of flooding Properties at Risk (n) People at Risk (n) (multiplier 2.35)	2634	125	42	0
Residential Properties at risk of flooding Properties at Risk (n) People at Risk (n) (multiplier 2.35)	1121	53	18	0
Services (n)	0	0	0	0
Risk to Economic Activity				
Non-Residential Properties (n)	165	11	0	0
Airports (n)	0	0	0	0
Primary / Trunk Roads (km)	0	0	0	0
Main Railway Lines (km)	0	0	0	0
Agricultural Land – Grades 1, 2 and 3 (ha)	82.62	5.79	22.57	0
Risk to Natural Environment and Historic Environment				
Bathing Waters (n)	0	0	0	0
Environmental Permitting Regulations (EPR) Installations (n)	0	0	0	0
Special Areas of Conservation (SAC) (ha)	0	0	0	0
Special Protection Areas (SPA) (ha)	0	0	0	0
Ramsar Sites (ha)	0	0	0	0
World Heritage Sites (ha)	0	0	0	0
Sites of Special Scientific Interest (SSSI) (ha)	0	0	0	0
Parks and Gardens (ha)	0	0	0	0
Scheduled Ancient Monuments (ha)	0	0	0	0
Listed Buildings (n)	2	0	0	0
Licensed Abstractions (LA) (n)				
Sites of Interest for Nature Conversation (SINC) (ha)	65.52	4.48	1.82	6.55

In addition to the existing borough wide measures to mitigate flood risk as stipulated in section 7.The following measures will be applied to the main sources of flood risk within the Killay South community area.

Table 23 -: Killay South - Measures to mitigate flood risk

Location	Risk Level	Risk to:	Measure	Measure Type	Link to FRMP Objective	Timing	Measure Status
Killay Square	low to high	Highway	CCS 400 Carry out further investigation of accumulations of surface water	Other Prevention M24	1,2,7	2016-2021	Not started proposed

In order for this Flood Risk Management Plan to be successful it is essential that significant additional funding be made available to City and County of Swansea on top of the normal funding arrangements from Welsh Government. Failure to receive this additional funding could result in measures identified in this report not being implemented either in part or in full.

Number of Measures in each category.

8.7 Kingsbridge Community Area.

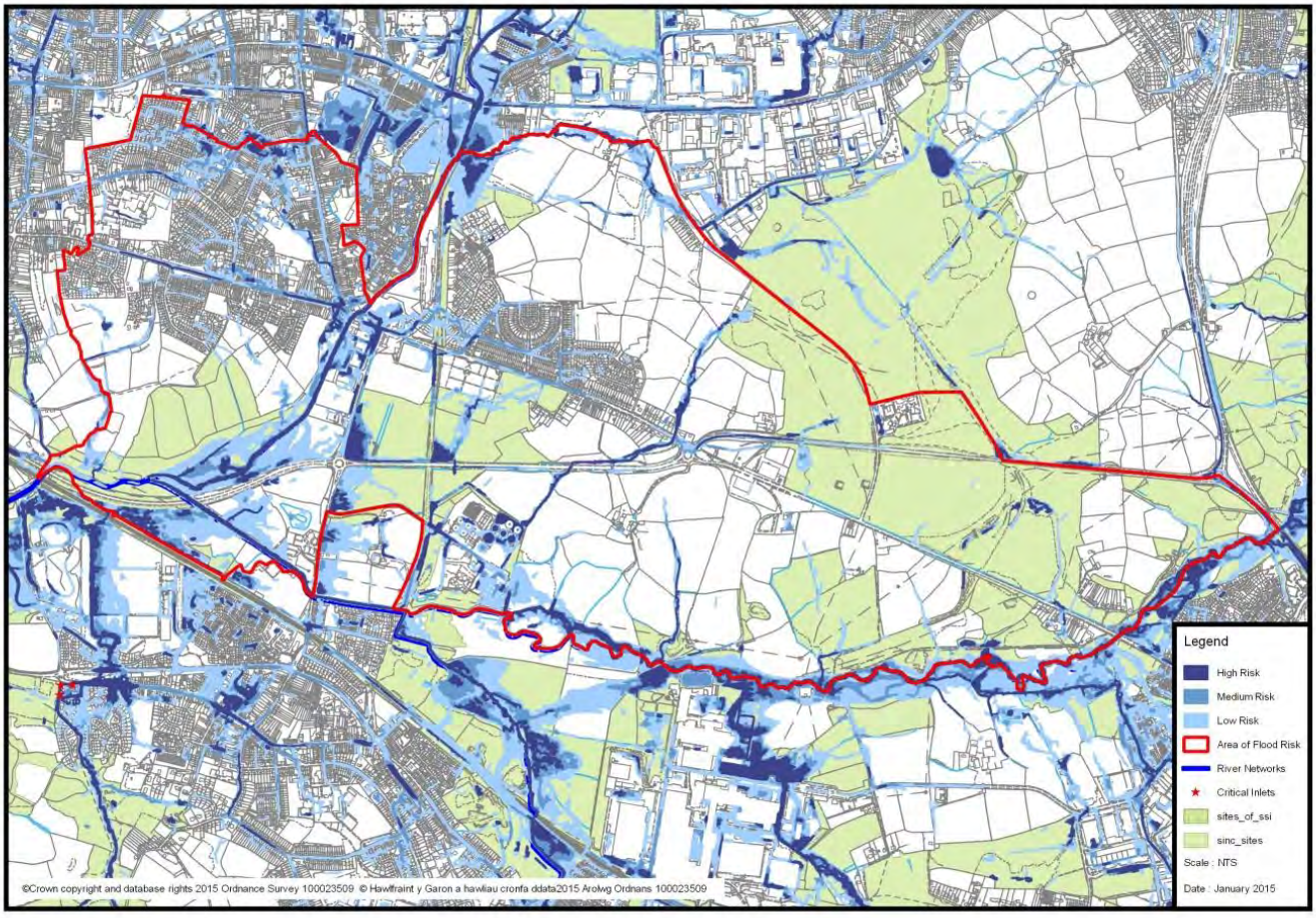
Overview

Approximately 7km northwest of the city centre, consisting largely of the Kingsbridge and Garden Village localities. It covers an area of 482hectares. The remainder of the catchment is generally low lying grasslands. Key infrastructure which is located in this community include Garngoch Hospital, Local Radio station and DCWW waste treatment works. Gower College is also situated on the western edge of the community.
The two urban areas of Kingsbridge and Garden Village is separated by the river Llan. This is classed as a designated river and flows generated from the catchment discharge to this river

Table 24: Kingsbridge – Significant Intakes

Grid Ref	Address
E259057, N198258	Libanus Road, Gorseinon (between No. 17 &19)

Figure 13 Kingsbridge – Flood Risk Map



Conclusions from the Flood Risk Maps

The Flood Risk Map for Kingsbridge indicates that the main cause of flood risk for the area relates to ordinary watercourses and the intakes to existing surface water culverts. The majority of this ward is low lying resulting in accumulation of surface water generally ponding in the many green areas adjacent to main highway networks. However, it is evident that the Kingsbridge roundabout is affected from high risk of flooding which needs to be further investigated. There is one significant intake on a watercourse at Libanus Road which shows high risk of flooding and an appropriate measure has been recommended for this location. Generally this correlates with local knowledge although it is believed that the flood risk is overstated as the full capacity of the existing culverts was not included in the modelling process when the maps were prepared.

Table 25 Kingsbridge– Counts for flood risk

COUNTS FOR CCS, KINGSBRIDGE WARD				
Risk to People	**TOTAL**	**LOW**	**MED**	**HIGH**
Residential Properties in areas at risk of flooding Properties at Risk (n) People at Risk (n) (multiplier 2.35)	4101	167	56	9
Residential Properties at risk of flooding Properties at Risk (n) People at Risk (n) (multiplier 2.35)	1745	71	24	4
Services (n)	3	1	0	0
Risk to Economic Activity				
Non-Residential Properties (n)	393	28	10	4
Airports (n)	0	0	0	0
Primary / Trunk Roads (km)	0	0	0	0
Main Railway Lines (km)	0.01	0	0	0
Agricultural Land – Grades 1, 2 and 3 (ha)	0	0	0	0
Risk to Natural Environment and Historic Environment				
Bathing Waters (n)	0	0	0	0
Environmental Permitting Regulations (EPR) Installations (n)	1	0	0	0
Special Areas of Conservation (SAC) (ha)	0	0	0	0
Special Protection Areas (SPA) (ha)	0	0	0	0
Ramsar Sites (ha)	0	0	0	0
World Heritage Sites (ha)	0	0	0	0
Sites of Special Scientific Interest (SSSI) (ha)	0	0	0	0
Parks and Gardens (ha)	0	0	0	0
Scheduled Ancient Monuments (ha)	1.92	0.11	0.10	0.11
Listed Buildings (n)	1	1	0	0
Licensed Abstractions (LA) (n)				
Sites of Interest for Nature Conversation (SINC) (ha)	153.61	12.93	3.74	7.74

In addition to the existing borough wide measures to mitigate flood risk as stipulated in section 7.The following measures will be applied to the main sources of flood risk within the Kingsbridge community area.

Table 26 -: Kingsbridge - Measures to mitigate flood risk

Location	Risk Level	Risk to:	Measure	Measure Type	Link to FRMP Objective	Timing	Measure Status
Libanus Road	low to high	Residential properties Highway	CCS 500 Flood Asset Inspection	Other Prevention M24	1,2,7,8	2016-2021	Not started proposed
Kingsbridge roundabout	low to high	Residential and non-residential properties and Highway	CCS 400 Carry out further investigation of accumulations of surface water	Other Prevention M24	1,2,7,8	2016-2021	Not started proposed

In order for this Flood Risk Management Plan to be successful it is essential that significant additional funding be made available to City and County of Swansea on top of the normal funding arrangements from Welsh Government. Failure to receive this additional funding could result in measures identified in this report not being implemented either in part or in full.

Number of Measures in each category

8.8 Landore Community Area

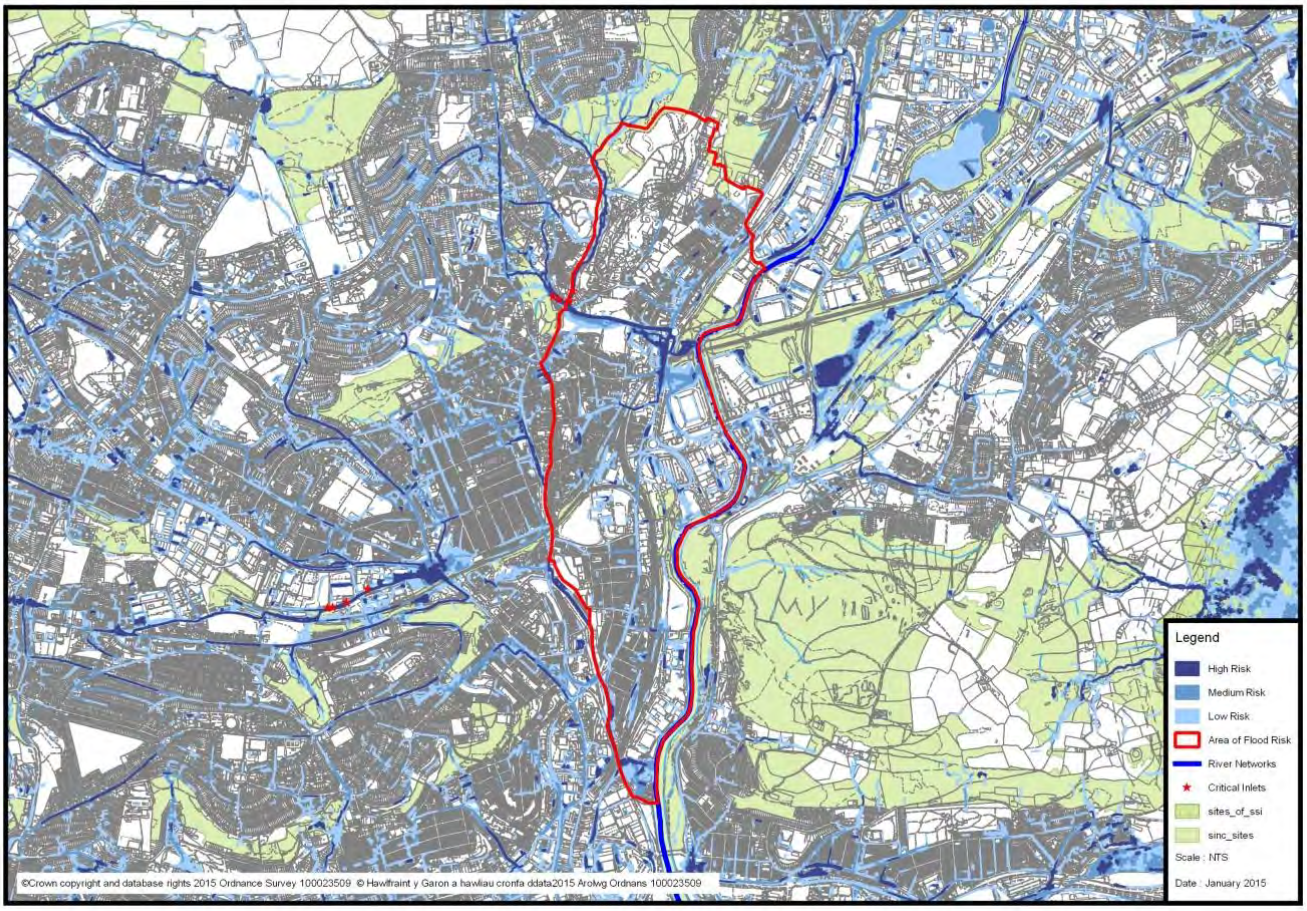
Overview

Approximately 2.4km north of the city centre, Landore community runs predominantly alongside the main River Tawe with the catchment typically accepting flows form higher elevation of the surrounding community areas of Bonymaen, Mynyddbach in particular to convey flows to the river Tawe via a number of critical culverts and open watercourses.
The area is 230hectares in size and typically is a mix a of residential terrace housing and small industrial estates/units contained within the catchment. A key feature included in the catchment is the Liberty Stadium. National rail network runs centrally across the area.
Historical flood events have been experience on the A4067 Dual carriage which has emanated from the watercourse situated above Cwm level park (Quarry Road).

Table 27: Landore – Significant Intakes

Grid Ref	Address
E265636, N196080	Cwm Level Road – Heol Nant Gelli, Treboeth

Figure 14 Landore –Flood Risk Map



Conclusions from the Flood Risk Maps

The Flood Risk Map for Landore indicates that the main cause of flood risk for the area relates to ordinary watercourses and the intakes to existing surface water culverts. The worst flooding in this ward is caused by the watercourse situated Cwm Level Road, historically this has been problem for the City and County of Swansea and this is supported by the information contained within the flood map. However, it is believed that the flood risk is overstated as the full capacity of the existing culverts was not included in the modelling process when the maps were prepared but there have been instances where floodwater has accumulated on the A4067 Landore roundabout. .

Table 28 Landore– Counts for flood risk

COUNTS FOR CCS, LANDORE WARD				
Risk to People	**TOTAL**	**LOW**	**MED**	**HIGH**
Residential Properties in areas at risk of flooding Properties at Risk (n) People at Risk (n) (multiplier 2.35)	7076	176	61	23
Residential Properties at risk of flooding Properties at Risk (n) People at Risk (n) (multiplier 2.35)	3011	75	26	10
Services (n)	8	0	0	0
Risk to Economic Activity				
Non-Residential Properties (n)	520	27	13	3
Airports (n)	0	0	0	0
Primary / Trunk Roads (km)	0	0	0	0
Main Railway Lines (km)	3.59	0.05	0.20	0.04
Agricultural Land – Grades 1, 2 and 3 (ha)	0	0	0	0
Risk to Natural Environment and Historic Environment				
Bathing Waters (n)	0	0	0	0
Environmental Permitting Regulations (EPR) Installations (n)	2	0	0	0
Special Areas of Conservation (SAC) (ha)	0	0	0	0
Special Protection Areas (SPA) (ha)	0	0	0	0
Ramsar Sites (ha)	0	0	0	0
World Heritage Sites (ha)	0	0	0	0
Sites of Special Scientific Interest (SSSI) (ha)	0	0	0	0
Parks and Gardens (ha)	0	0	0	0
Scheduled Ancient Monuments (ha)	0.29	0.01	0.02	0.01
Listed Buildings (n)	25	2	1	1
Licensed Abstractions (LA) (n)				
Sites of Interest for Nature Conversation (SINC) (ha)	24.40	0.89	0.32	0.47

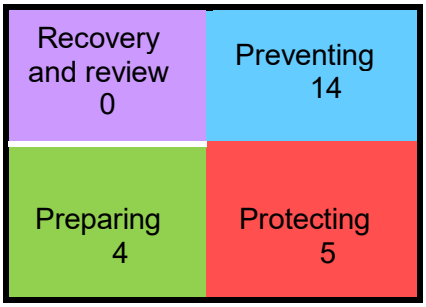
In addition to the existing county wide measures to mitigate flood risk as stipulated in section 7.The following measures will be applied to the main sources of flood risk within the Landore community area.

Table 29 -: Landore - Measures to mitigate flood risk

Location	Risk Level	Risk to:	Measure	Measure Type	Link to FRMP Objective	Timing	Measure Status
Cwm Level	low to high	Residential properties Highway	CCS 500 Flood Asset Inspection	Other Prevention M24	1,2,7,8	2016-2021	Ongoing
			CCS 100 Improve Flood warning service	Preparedness M43	1,2,5,6	2016-2021	Not started proposed
Ffordd Cwmtawe	low to medium	Highway	CCS 400 Carry out further investigation of accumulations of surface water	Other Prevention M24	1,2,7,	2016-2021	Not started proposed

In order for this Flood Risk Management Plan to be successful it is essential that significant additional funding be made available to City and County of Swansea on top of the normal funding arrangements from Welsh Government. Failure to receive this additional funding could result in measures identified in this report not being implemented either in part or in full.

Number of Measures in each category



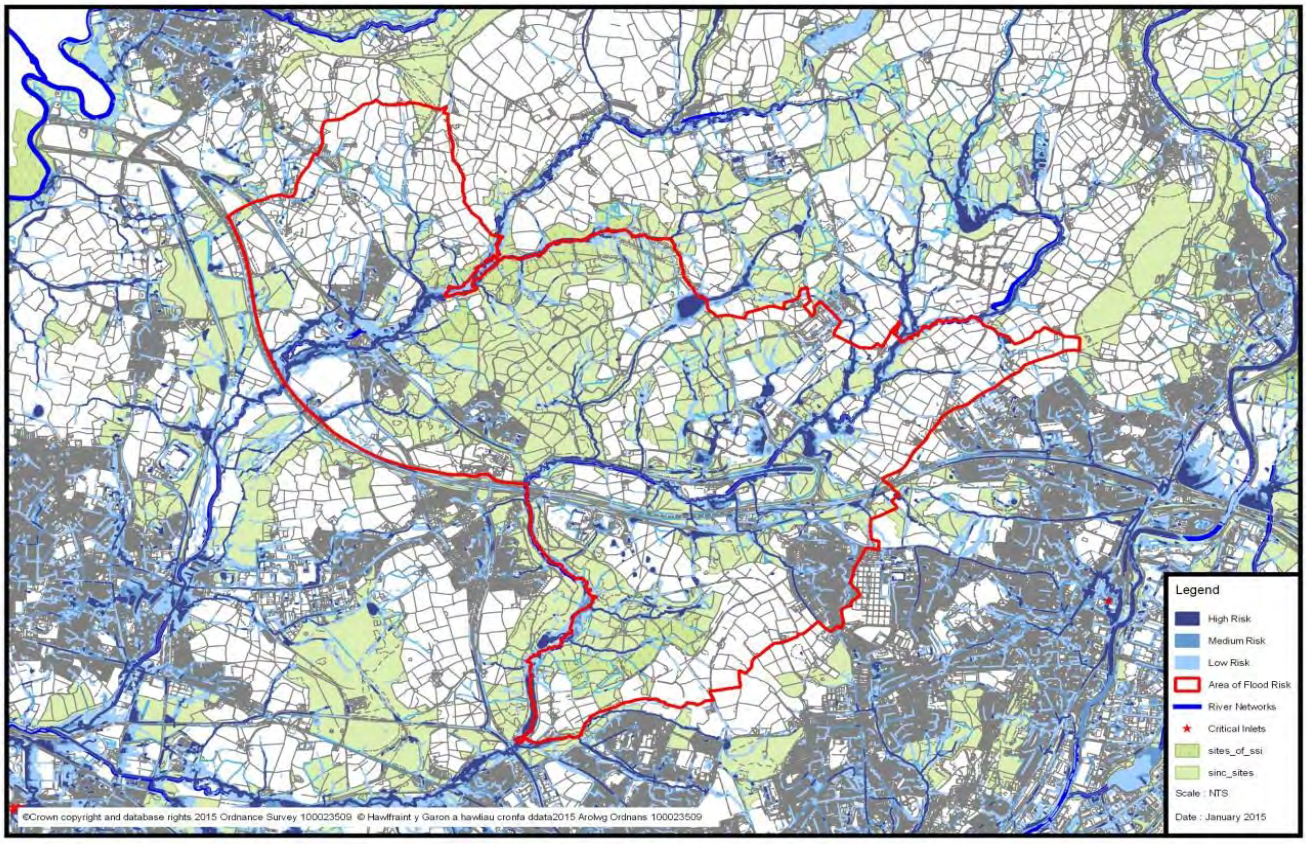
8.9 Llangyfelach Community area

Overview

The community area of Llangyfelach is situated 9km northwest of the city centre and consists of a number of small communities of Pontlliw, Llangyfelach, Rhydypandy and Tircoed. It covers an area of 1711 hectares with vast amounts of land use being rural. Centrally running through the community is the M4 motorway.
Due to its size, the catchment has large network of natural streams and watercourses which accepts flows from the higher and adjoining elevated community of Mawr and convey these flows to the main rivers namely the River Cadle and Lliw.

There are no significant intakes in the Llangyfelach catchment.

Figure 15 Llangyfelach –Flood Risk Map



Conclusions from the Flood Risk Maps

The Flood Risk Map for Llangyfelach indicates that the main cause of flood risk for the area relates to ordinary watercourses and the intakes to existing surface water culverts. Generally this correlates with local knowledge although it is believed that the flood risk is overstated as the full capacity of the existing culverts was not included in the modelling process when the maps were prepared.

Table 30 Llangyfelach– Counts for flood risk

COUNTS FOR CCS, LLANGYFELACH WARD				
Risk to People	**TOTAL**	**LOW**	**MED**	**HIGH**
Residential Properties in areas at risk of flooding Properties at Risk (n) People at Risk (n) (multiplier 2.35)	5161	70	16	14
Residential Properties at risk of flooding Properties at Risk (n) People at Risk (n) (multiplier 2.35)	2196	30	7	6
Services (n)	3	0	0	0
Risk to Economic Activity				
Non-Residential Properties (n)	586	46	13	5
Airports (n)	0	0	0	0
Primary / Trunk Roads (km)	8.32	0.54	0.1	0.16
Main Railway Lines (km)	6.44	0.55	1.22	1.19
Agricultural Land – Grades 1, 2 and 3 (ha)	555.38	11.05	44.27	0
Risk to Natural Environment and Historic Environment				
Bathing Waters (n)	0	0	0	0
Environmental Permitting Regulations (EPR) Installations (n)	4	0	2	1
Special Areas of Conservation (SAC) (ha)	0	0	0	0
Special Protection Areas (SPA) (ha)	0	0	0	0
Ramsar Sites (ha)	0	0	0	0
World Heritage Sites (ha)	0	0	0	0
Sites of Special Scientific Interest (SSSI) (ha)	77.60	4.89	1.54	2.43
Parks and Gardens (ha)	32.08	4.75	1.68	2.76
Scheduled Ancient Monuments (ha)	0.48	0.01	0	0
Listed Buildings (n)	11	0	0	0
Licensed Abstractions (LA) (n)				
Sites of Interest for Nature Conversation (SINC) (ha)	702.79	50.37	15.56	29.39

In addition to the existing borough wide measures to mitigate flood risk as stipulated in section 7.The following measures will be applied to the main sources of flood risk within the Llangyfelach community area.

Table 31 -: Llangyfelach - Measures to mitigate flood risk

Location	Risk Level	Risk to:	Measure	Measure Type	Link to FRMP Objective	Timing	Measure Status
A48 Pontlliw	low to high	Residential properties Highway	CCS 400 Carry out further investigation of accumulations of surface water	Other Prevention M24	1,2,7,	2016-2021	Not started proposed

In order for this Flood Risk Management Plan to be successful it is essential that significant additional funding be made available to City and County of Swansea on top of the normal funding arrangements from Welsh Government. Failure to receive this additional funding could result in measures identified in this report not being implemented either in part or in full.

Number of Measures in each category

8.10 Llansamlet Community Area

Overview

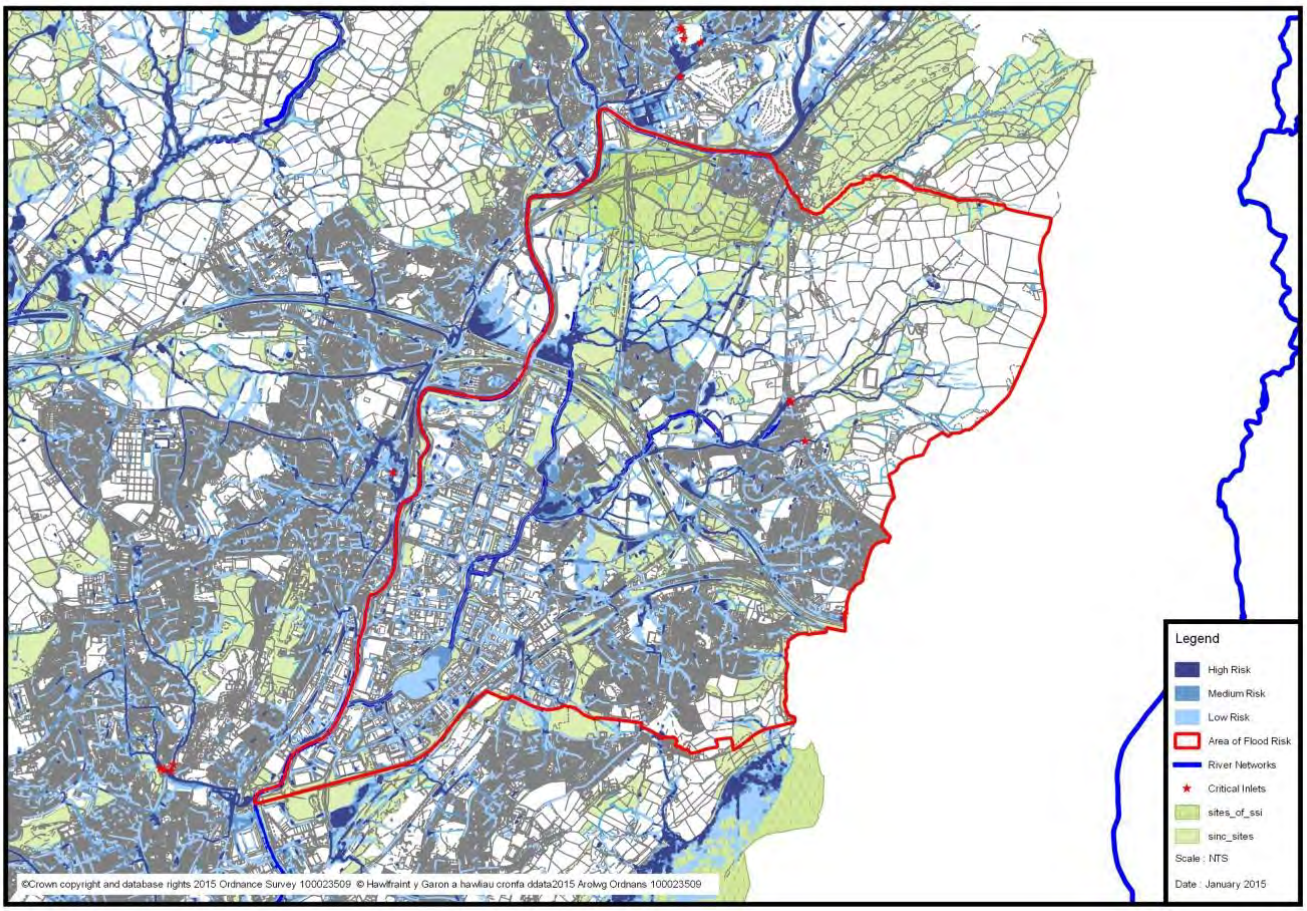
Approximately 6.5km north east of the city centre, the Llansamlet community area predominantly is a low lying community which situated adjacent to the river Tawe. The area is 1558 hectares with a topography sloping east to west from elevated areas of Birchgrove and Trallwn to the more flatter plain of Llansamlet and Swansea Vale.

The catchment drains via natural streams and culverts which convey flows from the higher elevations of Birchgrove and Trallwn areas to the main watercourses in the catchment known as the Nant Bran and Nant y Fendrod which discharge to the River Tawe on the western side of the catchment. Much of the lower lying area of the catchment which includes Swansea Vale and Enterprise Zone are protected by main river defences along the River Tawe in the Lower Swansea Valley. The lower Swansea Valley reservoir is used to drain the catchment locally from the developed areas of the Enterprise Zone and Winch Wen Industrial Estates. A series of culverts assist in conveying run-off in these areas.

Table 32: Llansamlet – Significant Intakes

Grid Ref	Address
E270402, N198917	Birchgrove Road, Birchgrove (s/o No. 400)
E270293, N198916	Birchgrove Road, Birchgrove (opp. No. 400)
E270510, N198614	Birchgrove Road, Birchgrove (s/o No. 330)
E270813, N197282	Birchgrove Road, Birchgrove (Bowen's Arms)
E269768, N198292	Gwernllwynchwyth Road (N of M4) Location 1
E269774, N198148	Gwernllwynchwyth Road (N of M4) Location 2
E269720, N198178	Gwernllwynchwyth Road (N of M4) Location 3
E269806, N197365	Frederick Place, Llansamlet (r/o No. 41)
E269865, N197344	Frederick Place, Llansamlet (s/o No. 31)
E270485, N198608	Clos Nant Bran, Birchgrove (r/o 313 Birchgrove Road)

Figure 16 Llansamlet –Flood Risk Map



Conclusions from the Flood Risk Maps

The Flood Risk Map for Llansamlet indicates that the main cause of flood risk for the area relates to ordinary watercourses and the intakes to existing surface water culverts. The areas prone to low to high flood risk from surface water flooding have been identified in Table 34 below. Generally this correlates with local knowledge although it is believed that the flood risk is overstated as the full capacity of the existing culverts was not included in the modelling process when the maps were prepared.

The community area is also characterised by having two main rivers, namely River Bran and Fendrod which transverse through the centre of the community with the flood extents map showing that these two rivers are susceptible to high flood risk. Natural Resources Wales are responsible for flooding from main rivers.

Table 33 Llansamlet– Counts for flood risk

COUNTS FOR CCS, LLANSAMLET WARD				
Risk to People	TOTAL	LOW	MED	HIGH
Residential Properties in areas at risk of flooding Properties at Risk (n) People at Risk (n) (multiplier 2.35)	14403	226	49	19
Residential Properties at risk of flooding Properties at Risk (n) People at Risk (n) (multiplier 2.35)	6129	96	21	8
Services (n)	12	0	0	0
Risk to Economic Activity				
Non-Residential Properties (n)	1682	43	9	3
Airports (n)	0	0	0	0
Primary / Trunk Roads (km)	7.85	1.01	0.52	0.14
Main Railway Lines (km)	9.94	0.27	0.80	0.05
Agricultural Land – Grades 1, 2 and 3 (ha)	506.66	27.08	99.47	0.01
Risk to Natural Environment and Historic Environment				
Bathing Waters (n)	0	0	0	0
Environmental Permitting Regulations (EPR) Installations (n)	13	3	1	0
Special Areas of Conservation (SAC) (ha)	0	0	0	0
Special Protection Areas (SPA) (ha)	0	0	0	0
Ramsar Sites (ha)	0	0	0	0
World Heritage Sites (ha)	0	0	0	0
Sites of Special Scientific Interest (SSSI) (ha)	90.78	1.02	0.43	0.68
Parks and Gardens (ha)	0	0	0	0
Scheduled Ancient Monuments (ha)	0.92	0.05	0.02	0
Listed Buildings (n)	11	2	1	0
Licensed Abstractions (LA) (n)				
Sites of Interest for Nature Conversation (SINC) (ha)	445.14	44.04	17.16	20.34

In addition to the existing borough wide measures to mitigate flood risk as stipulated in section 7.The following measures will be applied to the main sources of flood risk within the Llansamlet community area.

Table 34 -: Llansamlet- Measures to mitigate flood risk

Location	Risk Level	Risk to:	Measure	Measure Type	Link to FRMP Objective	Timing	Measure Status
Birchgrove road intakes	low to high	Residential properties Highway	CCS 500 Flood Asset Inspection	Other Prevention M24	1,2,7,8	2016-2021	Not started proposed
Gwernllwynchwyth Road	low to high	Residential properties Highway	CCS 500 Flood Asset Inspection	Other Prevention M24	1,2,7,8	2016-2021	Not started proposed
Parc yr helig	low to medium	Residential properties	CCS 400 Carry out further investigation of accumulations of surface water	Other Prevention M24	1,2,7,	2016-2021	Not started proposed
Peniel Green Road	low	Residential properties and Highway	CCS 400 Carry out further investigation of accumulations of surface water	Other Prevention M24	1,2,7,	2016-2021	Not started proposed
Trallwn Playing fields	low	Residential properties Highway	CCS 400 Carry out further investigation of accumulations of surface water	Other Prevention M24	1,2,7,	2016-2021	Not started proposed
Winch wen industrial estate	low to medium	Commercial property Highway	CCS 500 Flood Asset Inspection	Other Prevention M24	1,2,7,8	2016-2021	Not started proposed
Frederick place	low to medium	Residential properties, Railway line and Highway	CCS 400 Carry out further investigation of accumulations of surface water	Other Prevention M24	1,2,7,	2016-2021	Not started proposed
Heol Dulais	low	Residential properties and Highway	CCS 400 Carry out further investigation of accumulations of surface water	Other Prevention M24	1,2,7,	2016-2021	Not started proposed

In order for this Flood Risk Management Plan to be successful it is essential that significant additional funding be made available to City and County of Swansea on top of the normal funding arrangements from Welsh Government.

Failure to receive this additional funding could result in measures identified in this report not being implemented either in part or in full.

Number of Measures in each category

8.11 Mayals Community Area

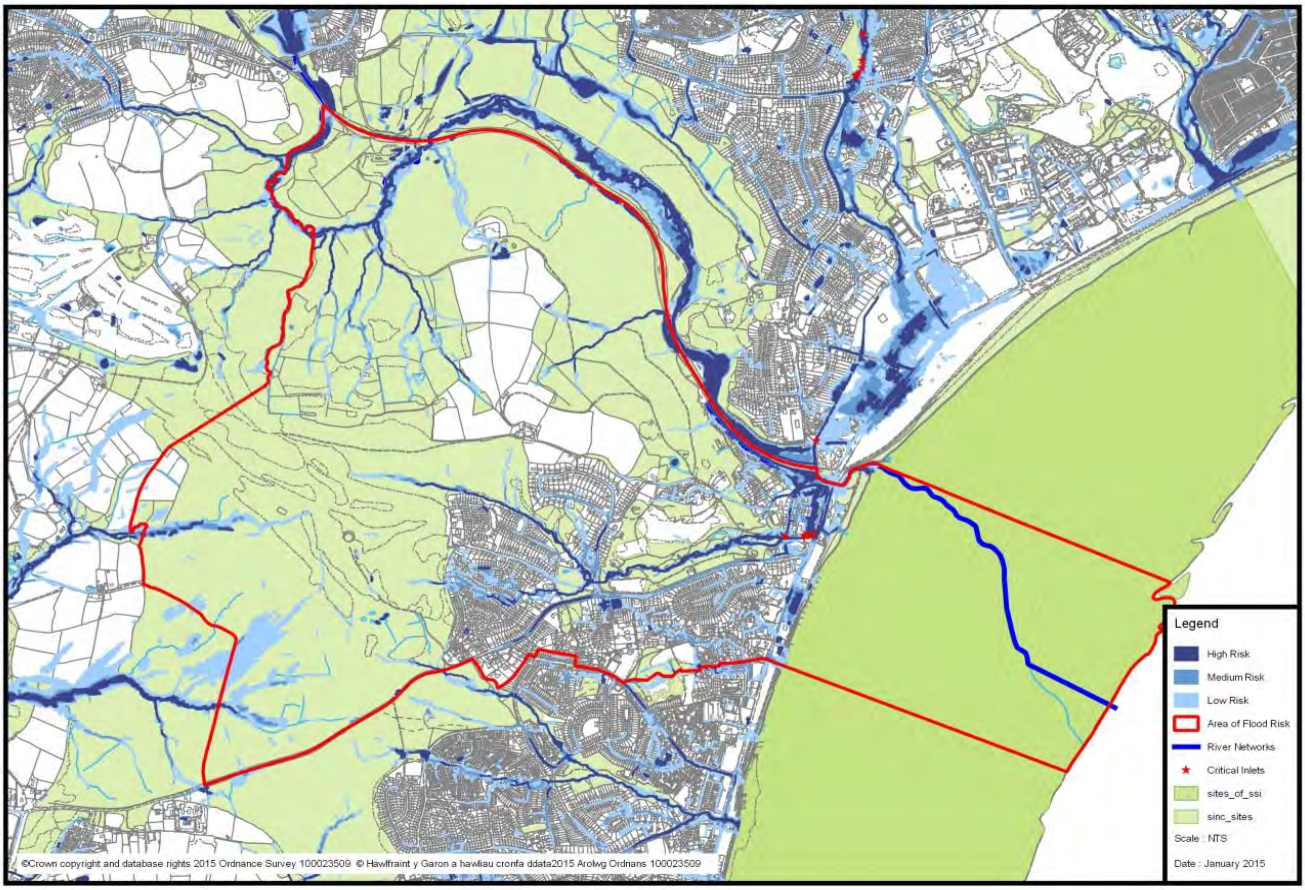
Overview

Mayals community area is situated 6km west of the city centre and contain within the Swansea Bay region. The area is 451 hectares and the topography uniformly slopes from the elevated area known as Fairwood common easterly onto Swansea Bay.
The catchment is relatively steep with an urban population situated to the most southerly part of the area. The main watercourse contained within this catchment is known as Brockhole stream which accepts flows from Fairwood common and to an extent small residential areas and then is route through to Clyne Park to outfall directly onto the beach at Blackpill. Running along the Northern boundary of the area is Clyne river which is classed as a designated main river which is regulated by Natural Resources Wales.
Historically, there has surface water flooding experienced emanating from the Brockhole stream at Blackpill. There are 4 critical grids which fall under the Lead Local Authority to maintain at this location.

Table 35: Mayals – Significant Intakes

Grid Ref	Address
E261741, N190482	Blackpill (s/o The Woodman) Location 1
E261827, N190486	Blackpill (s/o The Woodman) Location 2
E261853, N190491	Blackpill (s/o The Woodman) Location 3

Figure 17 Mayals –Flood Risk Map



Conclusions from the Flood Risk Maps

The Flood Risk Map for Mayals indicates that the main cause of flood risk for the area relates to ordinary watercourses and the intakes to existing surface water culverts with accumulations of surface water being shown to evident on the lower lying part of the catchment known as Blackpill. .Generally this correlates with local knowledge although it is believed that the flood risk is overstated as the full capacity of the existing culverts was not included in the modelling process when the maps were prepared.

Table 36 Mayals– Counts for flood risk

COUNTS FOR CCS, MAYALS WARD				
Risk to People	**TOTAL**	**LOW**	**MED**	**HIGH**
Residential Properties <u>in areas at risk of flooding</u> Properties at Risk (n) People at Risk (n) (multiplier 2.35)	2980	82	26	5
Residential Properties <u>at risk of flooding</u> Properties at Risk (n) People at Risk (n) (multiplier 2.35)	1268	35	11	2
Services (n)	1	0	0	0
Risk to Economic Activity				
Non-Residential Properties (n)	221	16	7	5
Airports (n)	0	0	0	0
Primary / Trunk Roads (km)	0	0	0	0
Main Railway Lines (km)	0	0	0	0
Agricultural Land – Grades 1, 2 and 3 (ha)	218.01	6.62	16.33	0
Risk to Natural Environment and Historic Environment				
Bathing Waters (n)	1	0	0	0
Environmental Permitting Regulations (EPR) Installations (n)	0	0	0	0
Special Areas of Conservation (SAC) (ha)	0	0	0	0
Special Protection Areas (SPA) (ha)	0	0	0	0
Ramsar Sites (ha)	0	0	0	0
World Heritage Sites (ha)	0	0	0	0
Sites of Special Scientific Interest (SSSI) (ha)	112.92	0.08	0.03	0
Parks and Gardens (ha)	73.12	2.37	0.67	1.91
Scheduled Ancient Monuments (ha)	8.24	0.08	0.02	0.12
Listed Buildings (n)	15	1	1	2
Licensed Abstractions (LA) (n)				
Sites of Interest for Nature Conversation (SINC) (ha)	434.07	15.72	3.29	5.63

In addition to the existing borough wide measures to mitigate flood risk as stipulated in section 7.The following measures will be applied to the main sources of flood risk within the Mayals community area.

Table 37: Mayals- Measures to mitigate flood risk

Location	Risk Level	Risk to:	Measure	Measure Type	Link to FRMP Objecti ve	Timing	Measure Status
Brockhole stream	high	Residential properties, commercial Highway	CCS 500 Flood Asset Inspection	Other prevention M24	1,2,7,8	2016-2021	Not started proposed
			CCS 100 Improve Flood warning service	Preparedness M41	1,2,5,6	2016-2021	Not started proposed

In order for this Flood Risk Management Plan to be successful it is essential that significant additional funding be made available to City and County of Swansea on top of the normal funding arrangements from Welsh Government. Failure to receive this additional funding could result in measures identified in this report not being implemented either in part or in full.

Number of Measures in each category

8.12 Morriston Community Area

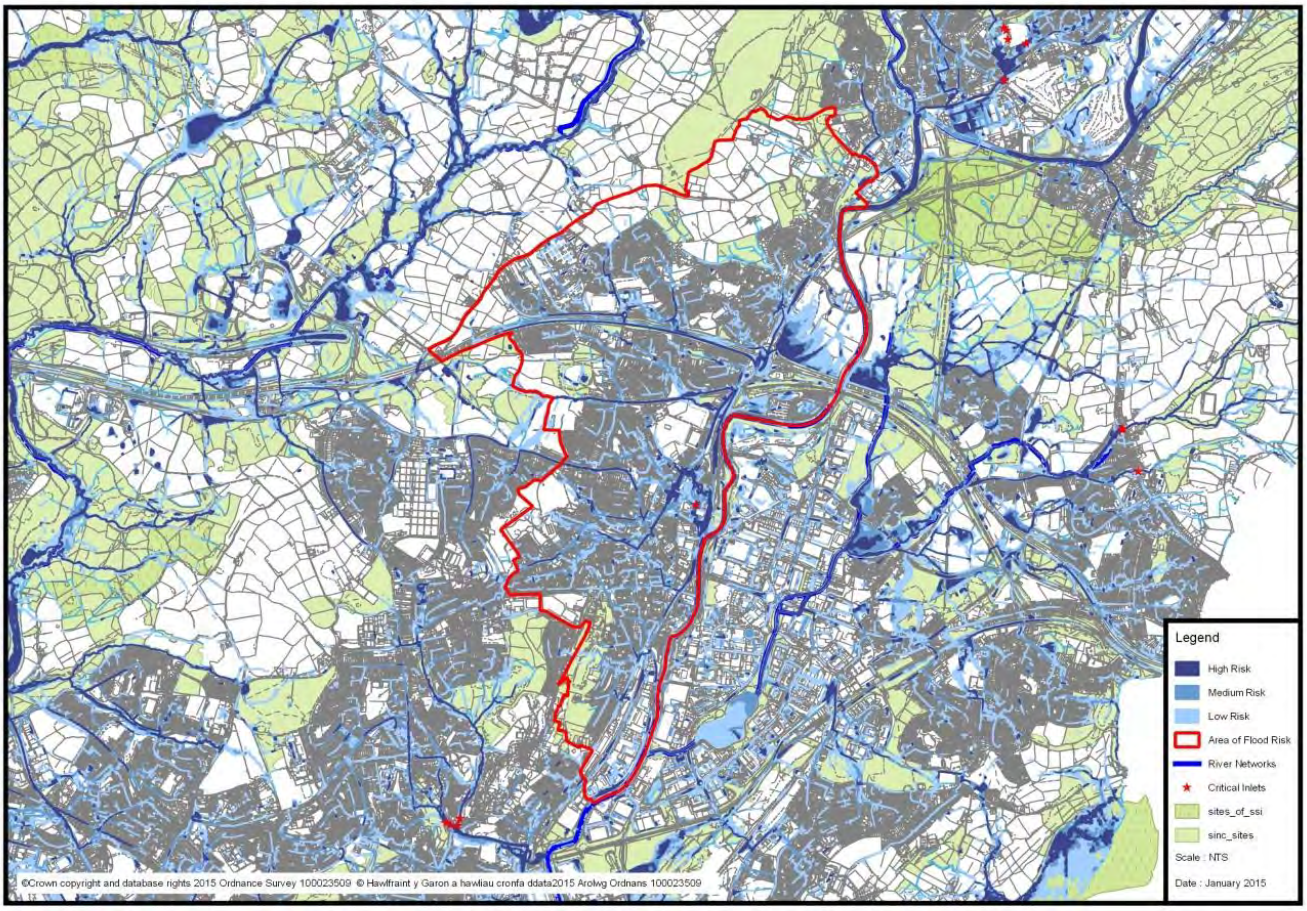
Overview

The community of Morriston is situated west of the river Tawe,4km northeast of the the City Centre. The ward is densely populated with a mixture of residential dwellings, terraced and semi-detached properties and contains a shopping centre. The area is 735 hectares and the topography is characterised by steeply sloping residential areas which adjoin a relatively gentler sloping shopping area situated on the eastern edge of the ward. There are many key infrastructure transport links contained within this community, these include the M4 motorway corridor, A4067 main dual carriageway and Western Wales railway line. The area also contains a main Hospital, emergency services, Mid and West Wales fire rescue service and a Police station. The area extends southerly to encompass the Beaufort retail park which is situated on low lying land alongside the river Tawe. Historically, there has been surface water flooding on the A4067 north of the Wychtree roundabout. There is one high priority grid located within this area and two other watercourses which the Authority currently maintains.

Table 38: Morriston – Significant Intakes

Grid Ref	Address
E267342, N198373	DFS – r/o 32 Cwrt Llwyn Fedwyn
E266887, N199521	Llanllienwen Road, Morriston – r/o 166/Deer's Leap

Figure 18 Morriston –Flood Risk Map



Conclusions from the Flood Risk Maps

The Flood Risk Map for Morriston indicates that the main cause of flood risk for the area relates to ordinary watercourses and the intakes to existing surface water culverts. Although the flood extent maps also shows extensive surface water flooding generated from the higher elevated urbanised slopes which results in high accumulation of surface water in Morriston town centre. Generally this correlates with local knowledge although it is believed that the flood risk is overstated as the full capacity of the existing culverts and highway drainage systems was not included in the modelling process when the maps were prepared.

Table 39 Morriston– Counts for flood risk

COUNTS FOR CCS, MORRISTON WARD				
Risk to People	**TOTAL**	**LOW**	**MED**	**HIGH**
Residential Properties in areas at risk of flooding Properties at Risk (n) People at Risk (n) (multiplier 2.35)	17594	374	94	33
Residential Properties at risk of flooding Properties at Risk (n) People at Risk (n) (multiplier 2.35)	7487	159	40	14
Services (n)	15	2	1	0
Risk to Economic Activity				
Non-Residential Properties (n)	1057	55	16	5
Airports (n)	0	0	0	0
Primary / Trunk Roads (km)	7.45	2.07	0.67	0.67
Main Railway Lines (km)	2.42	0.03	0.07	0.70
Agricultural Land – Grades 1, 2 and 3 (ha)	47.15	1.12	20.83	0
Risk to Natural Environment and Historic Environment				
Bathing Waters (n)	0	0	0	0
Environmental Permitting Regulations (EPR) Installations (n)	2	0	0	0
Special Areas of Conservation (SAC) (ha)	0	0	0	0
Special Protection Areas (SPA) (ha)	0	0	0	0
Ramsar Sites (ha)	0	0	0	0
World Heritage Sites (ha)	0	0	0	0
Sites of Special Scientific Interest (SSSI) (ha)	0	0	0	0
Parks and Gardens (ha)	0	0	0	0
Scheduled Ancient Monuments (ha)	0	0	0	0
Listed Buildings (n)	10	0	0	0
Licensed Abstractions (LA) (n)				
Sites of Interest for Nature Conversation (SINC) (ha)	102.12	4.87	2.34	4.62

In addition to the existing borough wide measures to mitigate flood risk as stipulated in section 7.The following measures will be applied to the main sources of flood risk within the Morriston community area.

Table 40: Morriston- Measures to mitigate flood risk

Location	Risk Level	Risk to:	Measure	Measure Type	Link to FRMP Objective	Timing	Measure Status
Sway Road	low to high	Residential properties Highway	CCS 100 Improve Flood warning service	Preparedness M41	1,2,5,6	2016-2021	Not started proposed
			CCS 300 Derive hydrology for catchment	Other Prevention M24	1,2,7,8	2016-2021	Not started proposed
			CCS 500: Flood Asset Inspection	Other Prevention M24	1,2,7,8	2016-2021	Not started proposed
			CCS 600 Flood Asset maintenance	Protection M35	1,4,7	2016-2021	Not started proposed
Clydach Road B4603	low to high	Highway	CCS 600 Flood Asset maintenance	Protection M35	1,4,7	2016-2021	Not started proposed
Clydach Road/ GlynHirnant	low to high	Residential properties and Highway	CCS 600 Flood asset Maintenance	Protection M35	1,4,7	2016-2021	Not started proposed
Cwmbath Road	low to high	Residential Properties Highway	CCS 400 Carry out further investigation of accumulations of surface water	Other Prevention M24	1,2,7	2016-2021	Not started proposed
A4067 DFS	low to high	Highway	CCS 600 Flood Asset maintenance	Protection M35	1,4,7	2016-2021	Ongoing
			CCS 100 Flood warning service	Prevention M41	1,2,5,6	2016-2021	Not started proposed

In order for this Flood Risk Management Plan to be successful it is essential that significant additional funding be made available to City and County of Swansea on top of the normal funding arrangements from Welsh Government. Failure to receive this additional funding could result in measures identified in this report not being implemented either in part or in full.

Number of Measures in each category

8.13 Mynyddbach Community Area

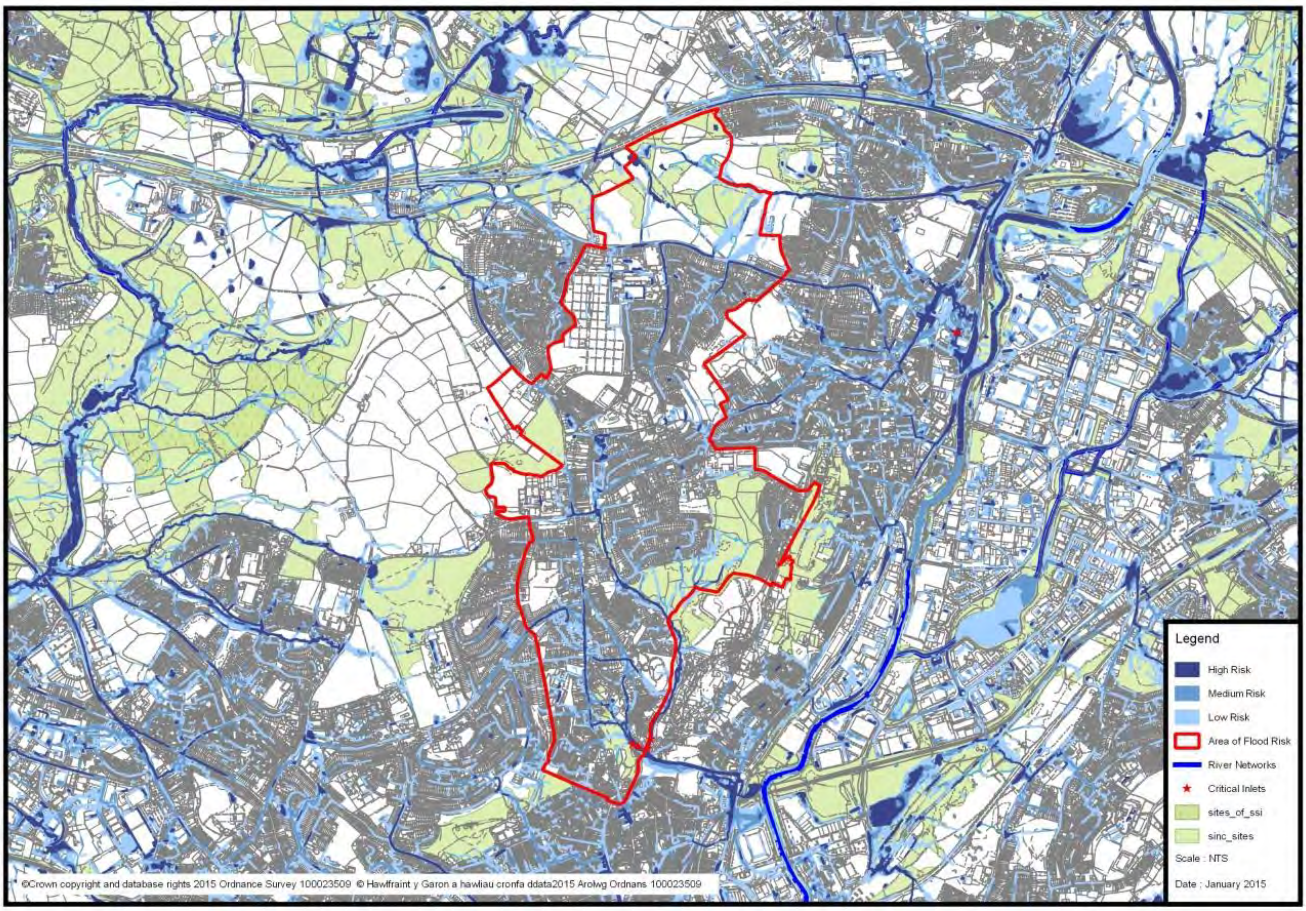
Overview

Mynyddbach community area is situated 5km north of the City centre. It has an area of 357hectares with the majority of the land on higher elevation in relation to its surrounding neighbouring communities of Morriston,Landore and Cwmbwrla. As a consequence the drainage infrastructure which serves this community generates run-off to discharge to into a mixture of manmade drainage infrastructure and naturally steep sloping watercourses and conveys the catchment's drainage to the lower levels of neighbouring wards. The catchment includes the Driver and Vehicle Licensing Agency and largest cemetery in Swansea in the northern part of the community. The M4 corridor and national rail network also exist in Mynyddbach.

Table 41: Mynynddbach – Significant Intakes

Grid Ref	Address
E265584, N196086	Quarry Road, Treboeth (opp. No. 5) – Location 1
E265552, N196102	Quarry Road, Treboeth (opp. No. 5) – Location 2

Figure 19 Mynyddbach –Flood Risk Map



Conclusions from the Flood Risk Maps

The Flood Risk Map for Mynyddbach indicates that the main cause of flood risk for the area relates to ordinary watercourses and the intakes to existing surface water culverts. The extents map has shown the watercourse at Quarry Road to be of high flood risk and there is evidence of large amount of surface water accumulating on Mynydd Garnllwyd Road. Both areas have been highlighted in Table 43 for further action. Generally this correlates with local knowledge although it is believed that the flood risk is overstated as the full capacity of the existing culverts was not included in the modelling process when the maps were prepared.

Table 42 Mynyddbach– Counts for flood risk

COUNTS FOR MYNYDDBACH WARD				
risk to People	**TOTAL**	**LOW**	**MED**	**HIGH**
Residential Properties in areas at risk of flooding Properties at Risk (n) People at Risk (n) (multiplier 2.35)	9553	54	16	12
Residential Properties at risk of flooding Properties at Risk (n) People at Risk (n) (multiplier 2.35)	4065	23	7	5
Services (n)	8	0	0	0
Risk to Economic Activity				
Non-Residential Properties (n)	376	7	1	1
Airports (n)	0	0	0	0
Primary / Trunk Roads (km)	0	0	0	0
Main Railway Lines (km)	0.51	0	0.06	0.01
Agricultural Land – Grades 1, 2 and 3 (ha)	11.57	0.31	0.98	0
Risk to Natural Environment and Historic Environment				
Bathing Waters (n)	0	0	0	0
Environmental Permitting Regulations (EPR) Installations (n)	0	0	0	0
Special Areas of Conservation (SAC) (ha)	0	0	0	0
Special Protection Areas (SPA) (ha)	0	0	0	0
Ramsar Sites (ha)	0	0	0	0
World Heritage Sites (ha)	0	0	0	0
Sites of Special Scientific Interest (SSSI) (ha)	0	0	0	0
Parks and Gardens (ha)	0	0	0	0
Scheduled Ancient Monuments (ha)	0	0	0	0
Listed Buildings (n)	1	0	0	0
Licensed Abstractions (LA) (n)				
Sites of Interest for Nature Conversation (SINC) (ha)	59.05	3.77	1.12	1.23

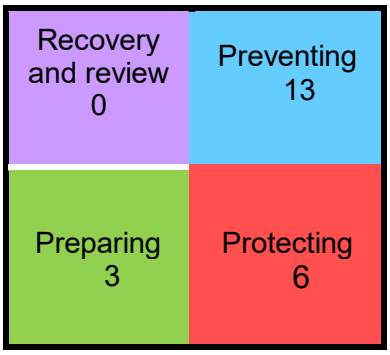
In addition to the existing borough wide measures to mitigate flood risk as stipulated in section 7.The following new measures will be applied to the main sources of flood risk within the Mynyddbach community area.

Table 43: Mynyddbach- Measures to mitigate flood risk

Location	Risk Level	Risk to:	Measure	Measure Type	Link to FRMP Objective	Timing	Measure Status
Mynydd-Garnllwyd Road	low to high	Residential properties Highway	CCS 400 Carry out further investigation of accumulations of surface water	Other Prevention M24	1,2,7	2016-2021	Not started proposed
Quarry Road	low to high	Highway	CCS 600 Flood Asset maintenance	Protection M35	1,4,7	2016-2021	Not started proposed

In order for this Flood Risk Management Plan to be successful it is essential that significant additional funding be made available to City and County of Swansea on top of the normal funding arrangements from Welsh Government. Failure to receive this additional funding could result in measures identified in this report not being implemented either in part or in full.

Number of Measures in each category



8.14 Penderry Community Area

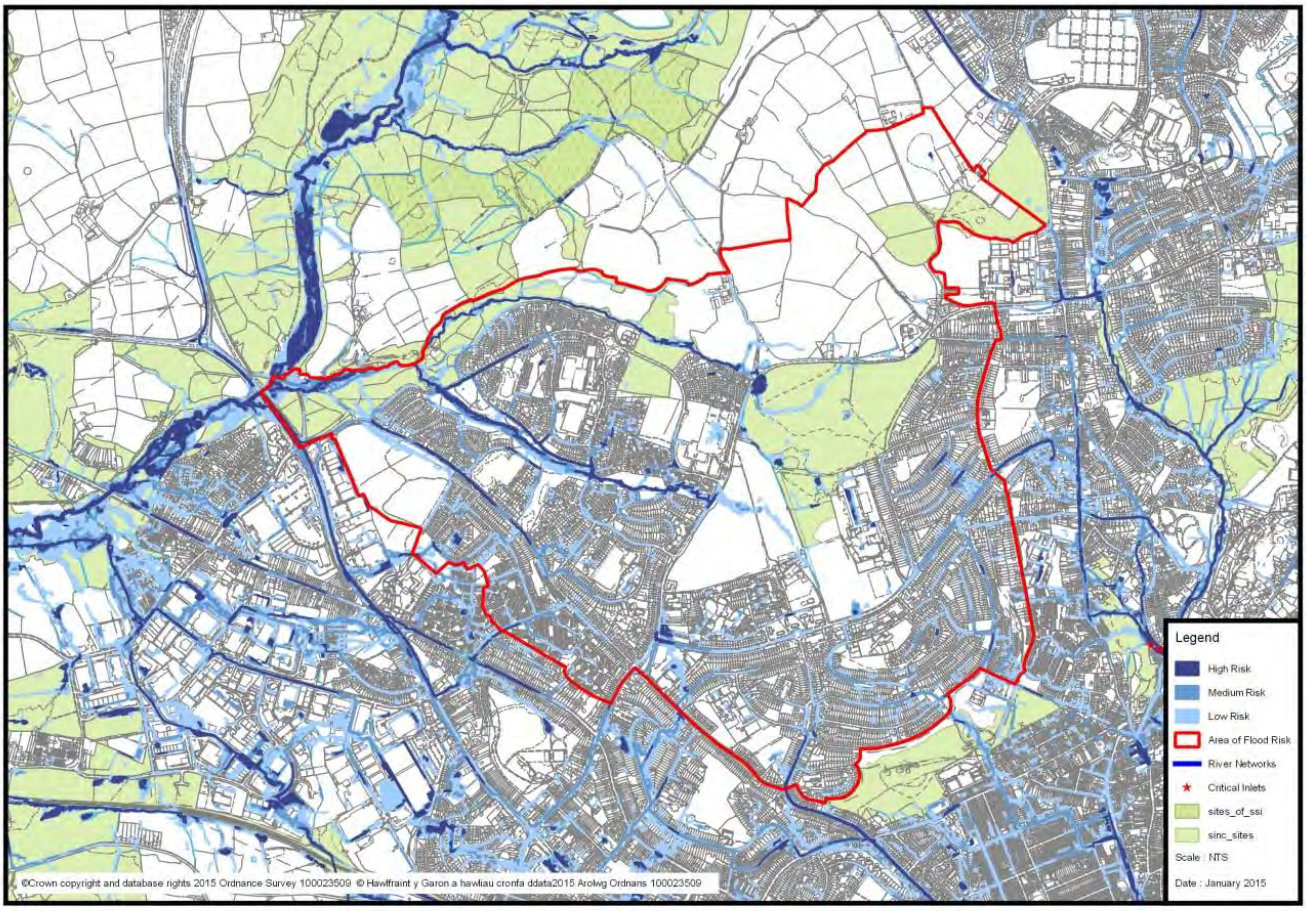
Overview

Penderry community is situated 4km north of the City centre consisting of the Penlan, Portmead and Blaenymaes localities, and parts of Fforestfach fach, Fforesthall and Ravenhill. Predominantly, the area is characterised by large housing estates designated by the Welsh government as 'communities First' areas due to relatively high levels of social-economic deprivation. The area is 405ha and in combination with the large residential estates there are substantial green spaces also present.
The catchment is drained to the Afon Llan situated on the western fringes of the ward by a number of large culverts and other pipe systems.

Table 44: Penderry – Significant Intakes

Grid Ref	Address
E263934, N196623	Mynydd Newydd Road, Penplas

Figure 20 Penderry –Flood Risk Map



Conclusions from the Flood Risk Maps

The Flood Risk Map for Penderry indicates that the main cause of flood risk for the area relates to ordinary watercourses and the intakes to existing surface water culverts. The extents maps shows high flood risk from the main watercourses in the ward but the flood risk although shown as high is contained mostly within green spaces. Other areas susceptible to low flood risk show the flooding to be conveyed within the confines of the highway networks. However, it is believed that the flood risk is overstated as the full capacity of the existing culverts and highway networks was not included in the modelling process when the maps were prepared.

Table 45 Penderry– Counts for flood risk

COUNTS FOR CCS, PENDERRY WARD				
Risk to People	**TOTAL**	**LOW**	**MED**	**HIGH**
Residential Properties in areas at risk of flooding Properties at Risk (n) People at Risk (n) (multiplier 2.35)	11846	94	35	35
Residential Properties at risk of flooding Properties at Risk (n) People at Risk (n) (multiplier 2.35)	5041	40	15	6
Services (n)	8	1	0	0
Risk to Economic Activity				
Non-Residential Properties (n)	200	6	2	1
Airports (n)	0	0	0	0
Primary / Trunk Roads (km)	0	0	0	0
Main Railway Lines (km)	0	0	0	0
Agricultural Land – Grades 1, 2 and 3 (ha)	108.17	2.70	4.48	0
Risk to Natural Environment and Historic Environment				
Bathing Waters (n)	0	0	0	0
Environmental Permitting Regulations (EPR) Installations (n)	1	0	0	0
Special Areas of Conservation (SAC) (ha)	0	0	0	0
Special Protection Areas (SPA) (ha)	0	0	0	0
Ramsar Sites (ha)	0	0	0	0
World Heritage Sites (ha)	0	0	0	0
Sites of Special Scientific Interest (SSSI) (ha)	0	0	0	0
Parks and Gardens (ha)	0	0	0	0
Scheduled Ancient Monuments (ha)	0	0	0	0
Listed Buildings (n)	1	0	0	0
Licensed Abstractions (LA) (n)				
Sites of Interest for Nature Conversation (SINC) (ha)	55.23	2.74	0.69	1.25

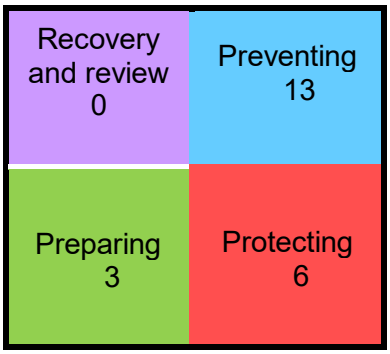
In addition to the existing borough wide measures to mitigate flood risk as stipulated in section 7.The following measures will be applied to the main sources of flood risk within the Penderry community area.

Table 46: Penderry - Measures to mitigate flood risk

Location	Risk Level	Risk to:	Measure	Measure Type	Link to FRMP Objective	Timing	Measure Status
Pontardulais Road	Low to high	Residential properties Highway	CCS 400 Carry out further investigation of accumulations of surface water	Other Prevention M24	1,2,7	2016-2021	Not started proposed
Mynydd Newydd	Low to high	Residential properties Highway	CCS 600 Flood Asset maintenance	Protection M35	1,4,7	2016-2021	ongoing

In order for this Flood Risk Management Plan to be successful it is essential that significant additional funding be made available to City and County of Swansea on top of the normal funding arrangements from Welsh Government. Failure to receive this additional funding could result in measures identified in this report not being implemented either in part or in full.

Number of Measures in each category



8.15 Sketty community area

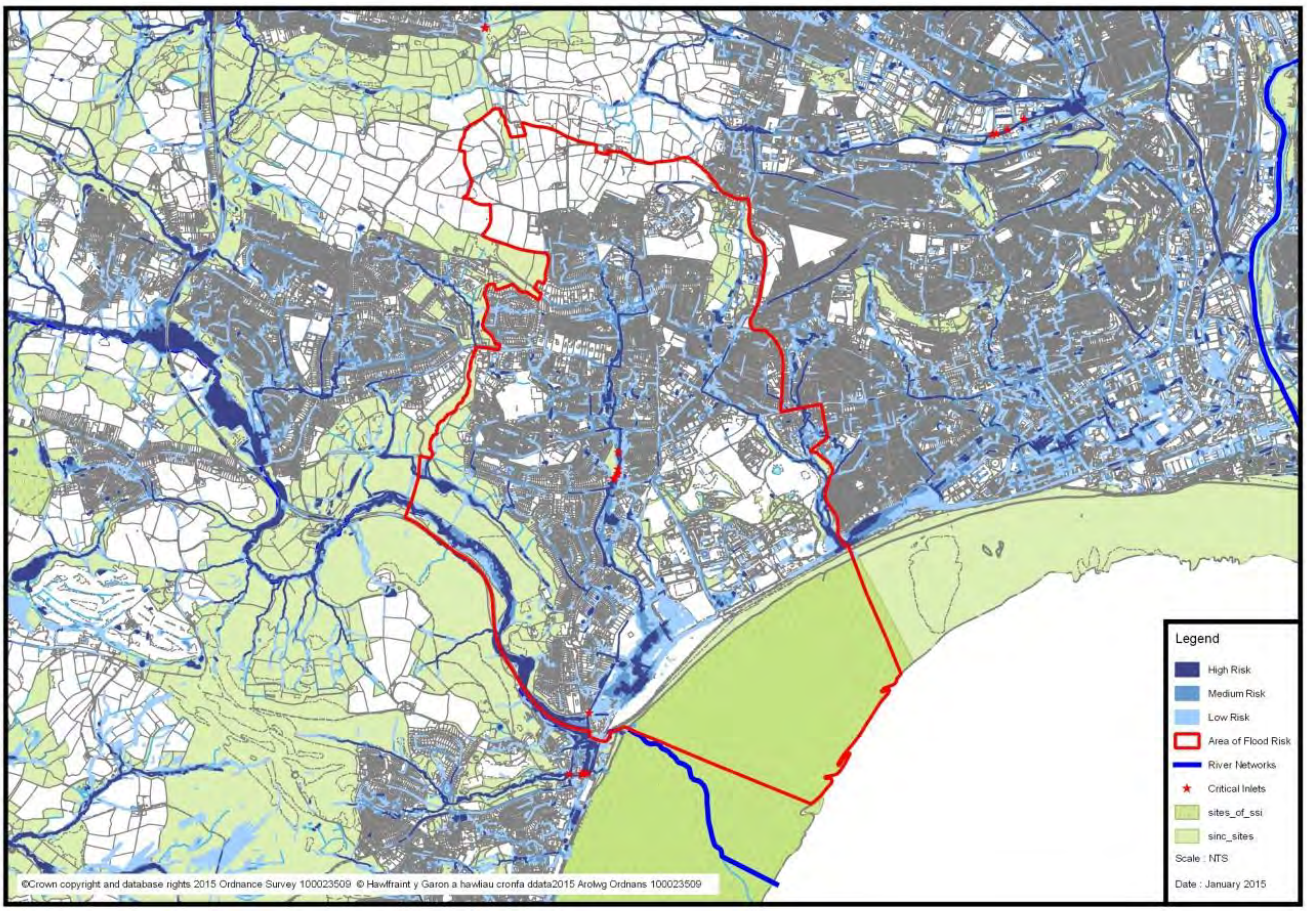
Overview

Approximately 3km west of Swansea city centre, consists of Tycoch, Sketty, Derwen Fawr and Sketty Park localities. It has an area of 680 hectares and predominantly a mix of large residential areas and green spaces. The topography of the catchment is highest in Tycoch, situated north of the catchment and slopes down to meet the coastline.
Key features of this area is Swansea University, Singleton Hospital situated on the coastal edge of the Ward and to the North in Tycoch, Cefn Coed hospital and Gower college are sited. The catchment is served by a number of small streams and culverts which convey the water from the Tycoch area through the catchment and discharge to the coastal waters of Swansea Bay.

Table 47: Sketty– Significant Intakes

Grid Ref	Address
E261864, N190872	Derwen Fawr Road (150m from Mumbles Road)
E262021, N192358	Derwen Fawr Road, Sketty (r/o No. 42)
E262051, N192526	Birch Tree Close, Sketty
E263435, N192066	Singleton Park (adj. Brynmill Lane)
E261988, N192996	Furzeland Drive, Sketty (r/o No. 21 Glan-yr-Afon)

Figure 21 Sketty –Flood Risk Map



Conclusions from the Flood Risk Maps

The Flood Risk Map for Sketty indicates that the main cause of flood risk for the area relates to ordinary watercourses and the intakes to existing surface water culverts. The flood extents map shows the main issue in this community area is the high flood risk from the Cwm stream which starts from the higher slopes of Sketty and discharges to the River Clyne close to the foreshore. The lower reaches of the stream are affected by a combination of tidal and fluvial flooding which results in large accumulations of surface water to pond on King George IV playing fields and adjacent land. Generally this correlates with local knowledge although it is believed that the flood risk is overstated as the full capacity of the existing culverts was not included in the modelling process when the maps were prepared.

Table 48 Sketty– Counts for flood risk

COUNTS FOR CCS, SKETTY WARD				
Risk to People	**TOTAL**	**LOW**	**MED**	**HIGH**
Residential Properties in areas at risk of flooding Properties at Risk (n) People at Risk (n) (multiplier 2.35)	17110	646	235	169
Residential Properties at risk of flooding Properties at Risk (n) People at Risk (n) (multiplier 2.35)	7281	275	100	72
Services (n)	31	0	0	0
Risk to Economic Activity				
Non-Residential Properties (n)	1010	55	17	6
Airports (n)	0	0	0	0
Primary / Trunk Roads (km)	0	0	0	0
Main Railway Lines (km)	0	0	0	0
Agricultural Land – Grades 1, 2 and 3 (ha)	195.10	8.85	43.38	0
Risk to Natural Environment and Historic Environment				
Bathing Waters (n)	1	0	0	0
Environmental Permitting Regulations (EPR) Installations (n)	3	0	0	0
Special Areas of Conservation (SAC) (ha)	0	0	0	0
Special Protection Areas (SPA) (ha)	0	0	0	0
Ramsar Sites (ha)	0	0	0	0
World Heritage Sites (ha)	0	0	0	0
Sites of Special Scientific Interest (SSSI) (ha)	0	0	0	0
Parks and Gardens (ha)	78.97	5.89	3.83	4.88
Scheduled Ancient Monuments (ha)	0.66	0	0.13	0.10
Listed Buildings (n)	22	2	0	0
Licensed Abstractions (LA) (n)				
Sites of Interest for Nature Conversation (SINC) (ha)	262.65	10.44	5.55	7.2

In addition to the existing borough wide measures to mitigate flood risk as stipulated in section 7.The following measures will be applied to the main sources of flood risk within the Sketty community area.

Table 49: Sketty - Measures to mitigate flood risk

Location	Risk Level	Risk to:	Measure	Measure Type	Link to FRMP Objective	Timing	Measure Status
Glanyr afon/Harlech area	low to medium	Residential properties Highway	CCS 400 Carry out further investigation of accumulations of surface water	Other Prevention M24	1,2,7	2016-2021	Not started proposed
Watercourse Furzeland	low to high	Residential properties Highway	CCS 500 Flood Asset Inspection	Other Prevention M35	1,2,7,8	2016-2021	Not started proposed
			CCS 600 Flood Asset maintenance	Protection M35	1,4,7	2016-2021	Ongoing
Watercourse Derwen fawr Road	low to high	Residential properties Highway	CCS 500 Flood Asset Inspection	Other Prevention M24	1,2,7,8	2016-2021	Not started proposed
			CCS 600 Flood Asset maintenance	Protection M35	1,4,7	2016-2021	Ongoing
King George playing Fields/Mumbles Road	low to high	Residential properties Highway	CCS 400 Carry out further investigation of accumulations of surface water	Other Prevention M24	1,2,7	2016-2021	Not started proposed
Singleton Park watercourse	low to high	Highway	CCS 500 Flood Asset Inspection	Other Prevention M24	1,2,7,8	2016-2021	Not started proposed
			CCS 600 Flood Asset maintenance	Protection M35	1,4,7	2016-2021	Ongoing

In order for this Flood Risk Management Plan to be successful it is essential that significant additional funding be made available to City and County of Swansea on top of the normal funding arrangements from Welsh Government. Failure to receive this additional funding could result in measures identified in this report not being implemented either in part or in full.

Number of Measures in each category

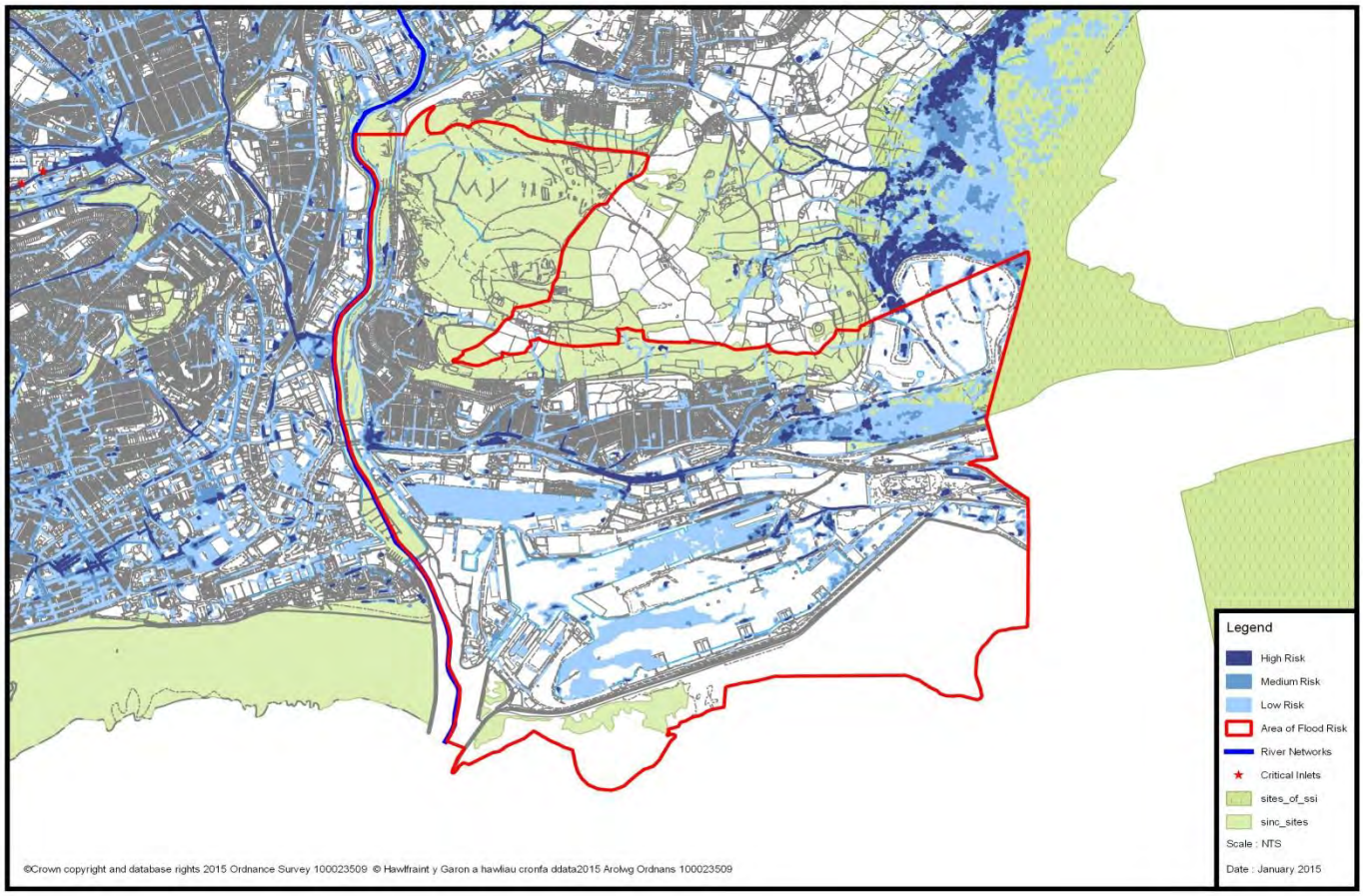
8.16 St Thomas Community Area

Overview

St. Thomas is situated 1km east of the city centre, consisting of the localities of St Thomas, Danygraig and Port Tennant and SA1swansea Waterfront. St Thomas is built on an elevated slope which extends down to meet fabian way dual carriageway. On the opposite side of the dual carriage which is recognised as the main gateway into the city from an Easterly direction there is Swansea Docks and the waterfront development of hotels, offices, apartments and restraurants.680hectares
The catchment drains from the higher elevation of Kilvey Hill by conveying water through small streams and culverts which discharge to the Rive Tawe of the most Western edge and to Swansea Docks to the South.

There are no significant intakes in the St. Thomas catchment.

Figure 22 St Thomas –Flood Risk Map



Conclusions from the Flood Risk Maps

The Flood Risk Map for St Thomas indicates that the main cause of flood risk for the area relates to ordinary watercourses and the intakes to existing surface water culverts. The flood extents map has shown high risk flooding on Fabian Way which is regarded as the main east gateway to the City Centre from the M4 motorway. This requires further investigation, although it is believed that the flood risk is overstated as the full capacity of the existing culverts was not included in the modelling process when the maps were prepared.

Table 50 St Thomas– Counts for flood risk

COUNTS FOR CCS, St. THOMAS WARD				
Risk to People	**TOTAL**	**LOW**	**MED**	**HIGH**
Residential Properties in areas at risk of flooding Properties at Risk (n) People at Risk (n) (multiplier 2.35)	8147	148	56	38
Residential Properties at risk of flooding Properties at Risk (n) People at Risk (n) (multiplier 2.35)	3467	63	24	16
Services (n)	5	0	0	0
Risk to Economic Activity				
Non-Residential Properties (n)	579	52	19	7
Airports (n)	0	0	0	0
Primary / Trunk Roads (km)	6.76	1.11	0.83	1.38
Main Railway Lines (km)	1.73	0.01	0.13	0.06
Agricultural Land – Grades 1, 2 and 3 (ha)	0	0	0	0
Risk to Natural Environment and Historic Environment				
Bathing Waters (n)	0	0	0	0
Environmental Permitting Regulations (EPR) Installations (n)	8	0	1	0
Special Areas of Conservation (SAC) (ha)	20.94	11.23	2.80	0.82
Special Protection Areas (SPA) (ha)	0	0	0	0
Ramsar Sites (ha)	20.94	11.21	2.80	0.82
World Heritage Sites (ha)	0	0	0	0
Sites of Special Scientific Interest (SSSI) (ha)	20.94	11.21	0	0.82
Parks and Gardens (ha)	0	0	0	0
Scheduled Ancient Monuments (ha)	3.72	0.82	0.82	0.82
Listed Buildings (n)	7	0	0	0
Licensed Abstractions (LA) (n)				
Sites of Interest for Nature Conversation (SINC) (ha)	157.45	1.94	0.31	0.21

In addition to the existing borough wide measures to mitigate flood risk as stipulated in section 7.The following measures will be applied to the main sources of flood risk within the St Thomas community area.

Table 51: St Thomas - Measures to mitigate flood risk

Location	Risk Level	Risk to:	Measure	Measure Type	Link to FRMP Objective	Timing	Measure Status
Fabian Way	low to high	Highway	CCS 400 Carry out further investigation of accumulations of surface water	Other Prevention M24	1,2,7	2016-2021	Not started proposed
Pentreguinea	low to medium	Highway	CCS 400 Carry out further investigation of accumulations of surface water	Other Prevention M24	1,2,7	2016-2021	Not started proposed

***See also measures for whole of the Borough as detailed in section 7**

In order for this Flood Risk Management Plan to be successful it is essential that significant additional funding be made available to City and County of Swansea on top of the normal funding arrangements from Welsh Government. Failure to receive this additional funding could result in measures identified in this report not being implemented either in part or in full.

Number of Measures in each category

8.17 Townhill community area

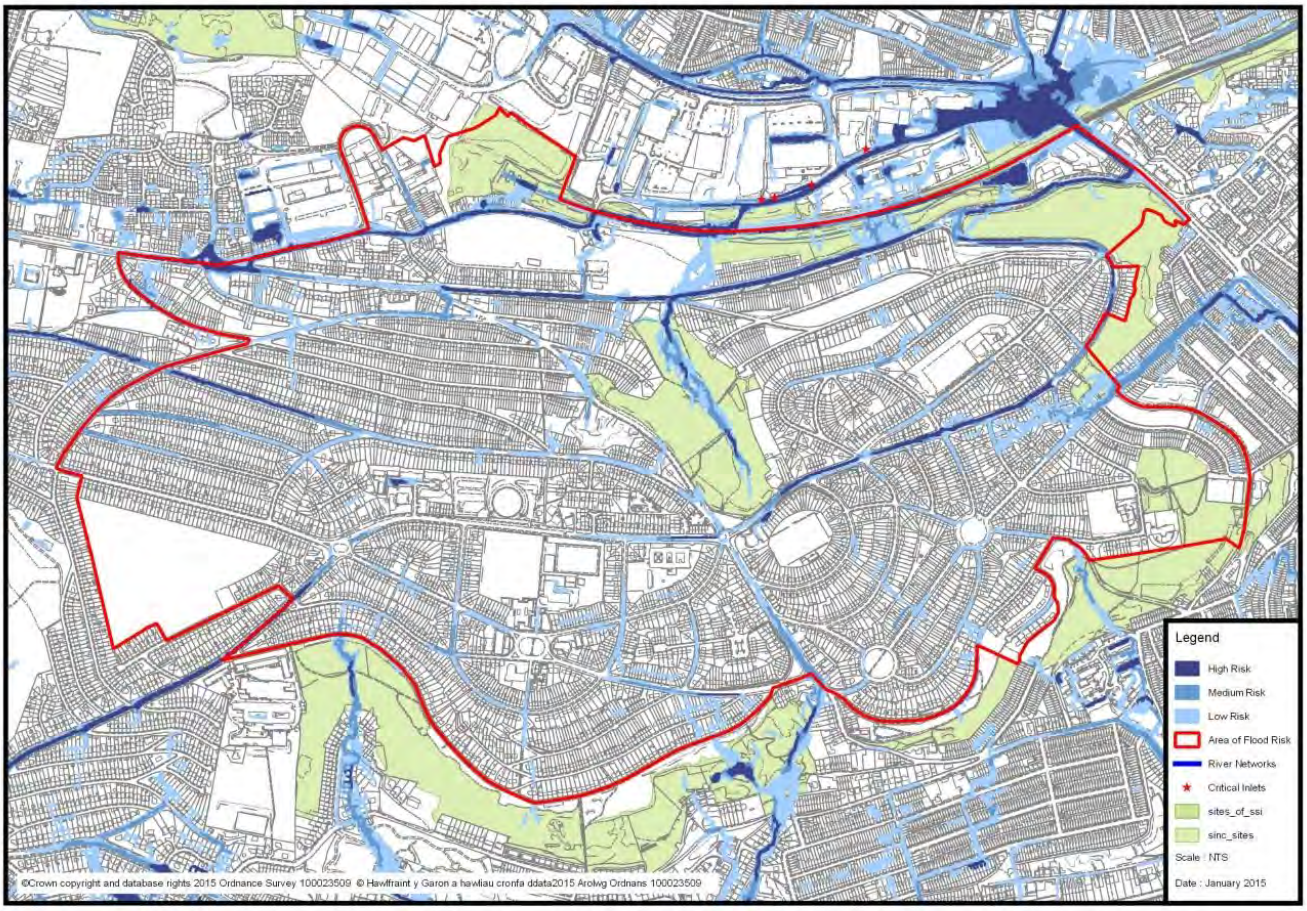
Overview

Townhill is situated 1km to the north of the city centre, consisting of the large residential areas of Townhill and Mayhill which overlook the city centre, SA1/docklands area and Swansea Bay. The entire ward has been designated as a 'communities first' area by Welsh Government in recognition of long-term social and economic disadvantage. The area is dominated by inter-war local Authority council housing. The area is 181hectares in size.

The topography is steep in parts with the catchment draining in circumferential directions off the hillside draining through a combination of surface water drainage systems until it discharges to open watercourses typically in Gors Road and Cockett vicinity and fully closed piped systems which are evident in the City Centre before surface water flows are discharged to sea.

There are no significant intakes in the Townhill catchment.

Figure 23 Townhill –Flood Risk Map



Conclusions from the Flood Risk Maps

The Flood Risk Map for Townhill indicates that the main cause of flood risk for the area relates to accumulations of surface water run-off which is generated from the steep urban catchment. High flood risk is evident on Gors Avenue with overland flow paths shown as conveying flood water onto the main rail network line. It is believed that the flood risk is overstated as the full capacity of the existing culverts and urban drainage systems was not included in the modelling process when the maps were prepared and historically there has been no significant flooding as the flood map suggests.

Table 52 Townhill– Counts for flood risk

COUNTS FOR CCS, TOWNHILL WARD				
Risk to People	**TOTAL**	**LOW**	**MED**	**HIGH**
Residential Properties in areas at risk of flooding Properties at Risk (n) People at Risk (n) (multiplier 2.35)	9539	28	0	0
Residential Properties at risk of flooding Properties at Risk (n) People at Risk (n) (multiplier 2.35)	4059	12	0	0
Services (n)	6	0	0	0
Risk to Economic Activity				
Non-Residential Properties (n)	173	1	0	0
Airports (n)	0	0	0	0
Primary / Trunk Roads (km)	0	0	0	0
Main Railway Lines (km)	0.95	0.17	0.21	0.14
Agricultural Land – Grades 1, 2 and 3 (ha)	0	0	0	0
Risk to Natural Environment and Historic Environment				
Bathing Waters (n)	0	0	0	0
Environmental Permitting Regulations (EPR) Installations (n)	0	0	0	0
Special Areas of Conservation (SAC) (ha)	0	0	0	0
Special Protection Areas (SPA) (ha)	0	0	0	0
Ramsar Sites (ha)	0	0	0	0
World Heritage Sites (ha)	0	0	0	0
Sites of Special Scientific Interest (SSSI) (ha)	0	0	0	0
Parks and Gardens (ha)	0	0	0	0
Scheduled Ancient Monuments (ha)	0	0	0	0
Listed Buildings (n)	0	0	0	0
Licensed Abstractions (LA) (n)				
Sites of Interest for Nature Conversation (SINC) (ha)	18.12	1.24	0.37	0.26

In addition to the existing borough wide measures to mitigate flood risk as stipulated in section 7.The following measures will be applied to the main sources of flood risk within the Townhill community area.

Table 53: Townhill - Measures to mitigate flood risk

Location	Risk Level	Risk to:	Measure	Measure Type	Link to FRMP Objective	Timing	Measure Status
Gors Avenue	low to high	Highway Railway line	CCS 400 Carry out further investigation of accumulations of surface water	Other Prevention M24	1,2,7	2016-2021	Not started proposed

In order for this Flood Risk Management Plan to be successful it is essential that significant additional funding be made available to City and County of Swansea on top of the normal funding arrangements from Welsh Government. Failure to receive this additional funding could result in measures identified in this report not being implemented either in part or in full.

Number of Measures in each category.

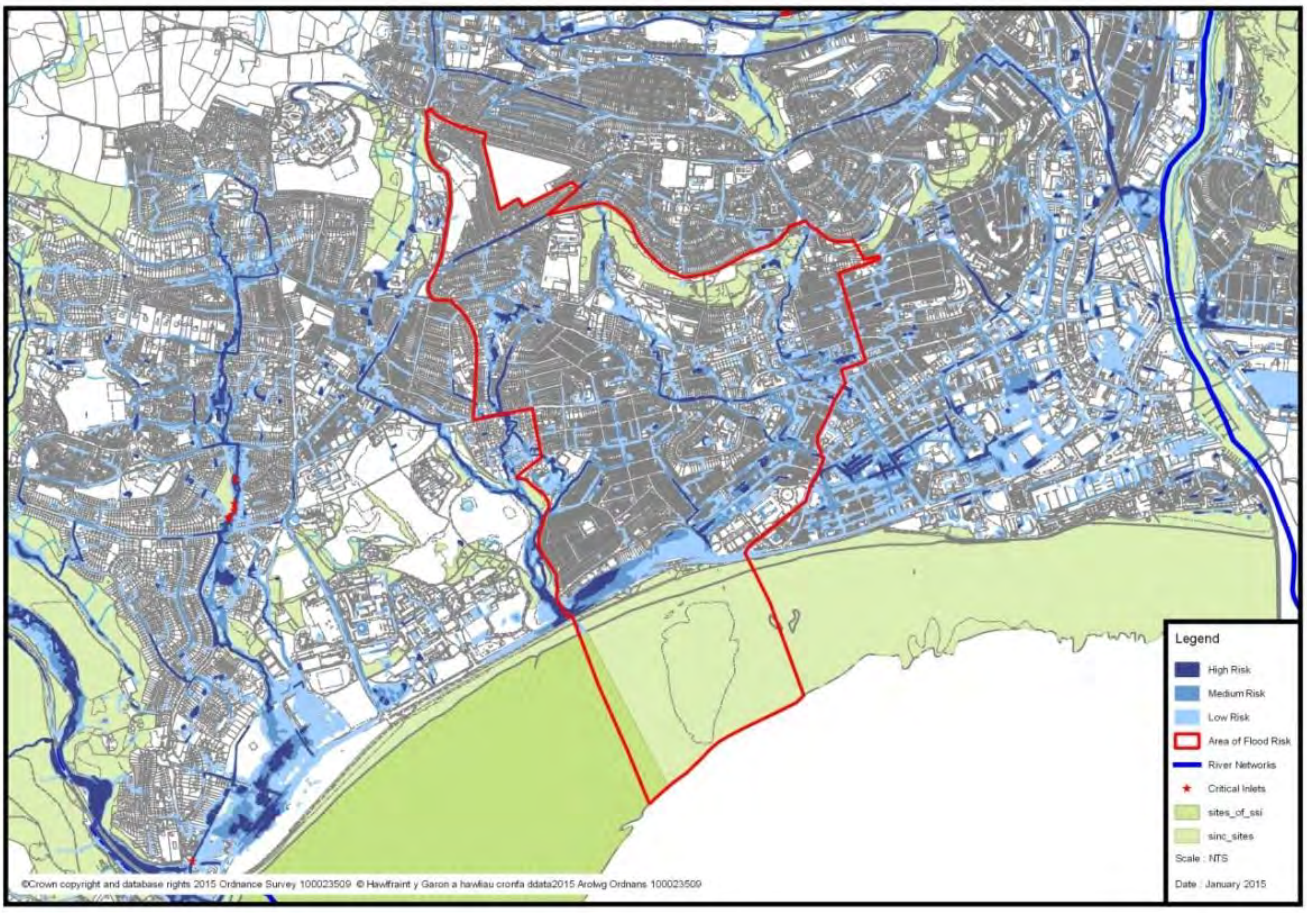
8.18 Uplands Community Area

Overview

Approximately 1km west of the city centre, and consisting mainly of Brynmill, St Helens, Uplands and Ffynone localities. This area is densely populated with student accommodation a key feature. The main shopping area is located in the uplands which situated centrally in the ward with sloping land southwards from the Northern part of the area to where it meets the coastal mumbles road. The Uplands community area is 230 hectares.
The area is drain via a series of small culverts which serves springs which start on the higher elevation and contributing urban areas drain naturally into these small culverts and discharge onto the foreshore.
Brynmill has a key drainage feature known as Brynmill reservoir. This reservoir is operated by the Local Authority who have a duty to comply with the reservoir Act 1975 to ensure that the safety of the reservoir is monitored closely.

There are no significant intakes in the Uplands catchment.

Figure 24 Uplands –Flood Risk Map



Conclusions from the Flood Risk Maps

The Flood Risk Map for Uplands indicates that the main cause of flood risk for the area relates to accumulations of surface water run-off which is generated from the steep urban catchment of the Uplands with the extents map showing High flood risk to the recreational ground at Brynmill. Most of the flood risk within the Uplands ward is considered low and constrained to road networks It is believed that the flood risk is overstated as the full capacity of the existing culverts or highway drainage networks was not included in the modelling process when the maps were prepared.

Table 54 Uplands– Counts for flood risk

COUNTS FOR CCS, UPLANDS WARD				
Risk to People	**TOTAL**	**LOW**	**MED**	**HIGH**
Residential Properties in areas at risk of flooding Properties at Risk (n) People at Risk (n) (multiplier 2.35)	14297	646	247	54
Residential Properties at risk of flooding Properties at Risk (n) People at Risk (n) (multiplier 2.35)	6084	275	105	23
Services (n)	18	0	0	0
Risk to Economic Activity				
Non-Residential Properties (n)	1011	82	25	5
Airports (n)	0	0	0	0
Primary / Trunk Roads (km)	0	0	0	0
Main Railway Lines (km)	0	0	0	0
Agricultural Land – Grades 1, 2 and 3 (ha)	1.22	0.06	0.32	0
Risk to Natural Environment and Historic Environment				
Bathing Waters (n)	1	0	0	0
Environmental Permitting Regulations (EPR) Installations (n)	0	0	0	0
Special Areas of Conservation (SAC) (ha)	0	0	0	0
Special Protection Areas (SPA) (ha)	0	0	0	0
Ramsar Sites (ha)	0	0	0	0
World Heritage Sites (ha)	0	0	0	0
Sites of Special Scientific Interest (SSSI) (ha)	5.62	0.01	0	0
Parks and Gardens (ha)	13.27	1.89	0.47	0.19
Scheduled Ancient Monuments (ha)	0	0	0	0
Listed Buildings (n)	84	4	0	0
Licensed Abstractions (LA) (n)				
Sites of Interest for Nature Conversation (SINC) (ha)	75.17	0.83	0.25	0.16

In addition to the existing borough wide measures to mitigate flood risk as stipulated in section 7.The following measures will be applied to the main sources of flood risk within the Uplands community area.

Table 55: Uplands - Measures to mitigate flood risk

Location	Risk Level	Risk to:	Measure	Measure Type	Link to FRMP Objective	Timing	Measure Status
Glanmor Road watercourse	low to high	Residential Properties Highway	CCS 600 Flood Asset maintenance	Protection M35	1,4,7	2016-2021	Not started proposed
Uplands Crescent	low to high	Highway	CCS 400 Carry out further investigation of accumulations of surface water	Other Prevention M24	1,2,7	2016-2021	Not started proposed

***See also measures for whole of the Borough as detailed in section 7**

In order for this Flood Risk Management Plan to be successful it is essential that significant additional funding be made available to City and County of Swansea on top of the normal funding arrangements from Welsh Government. Failure to receive this additional funding could result in measures identified in this report not being implemented either in part or in full.

Number of Measures in each category

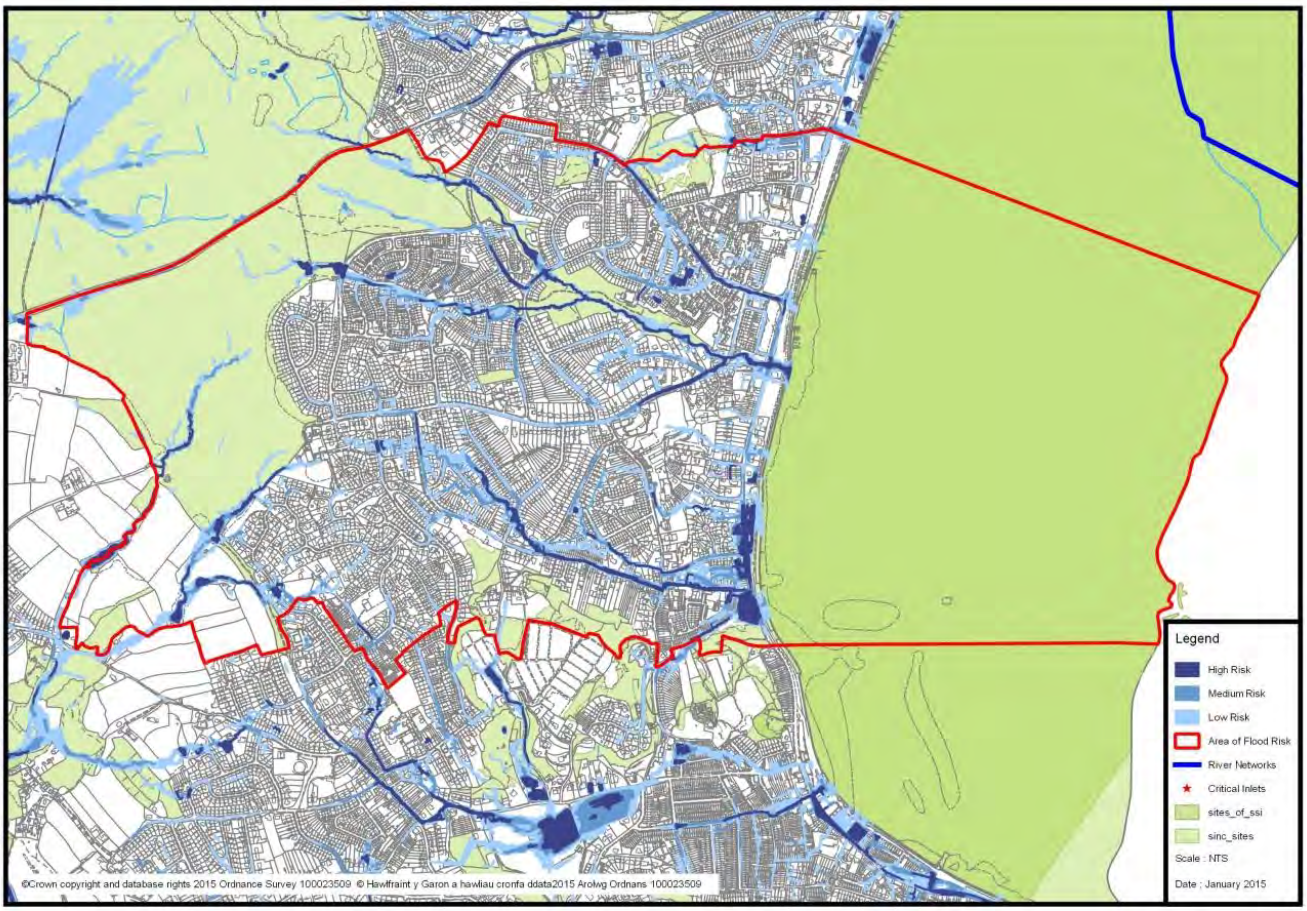
8.19 Westcross Community area

Overview

Westcross community is situated 6km southwest of the city centre, consisting of localities of Westcross, Norton and Newton. The area is 249 hectares and is typified for its steeply sloping developed land for residential use from the elevated area of Fairwood common to slope downwards to Swansea Bay on the eastern side of the ward.
The catchment is served by a number of watercourses, the largest watercourse being the Washinghouse brook. This watercourse in combination with other smaller streams conveys surface water flows from the residential areas of Westcross to directly discharging onto the foreshore by a series of outfalls.

There are no significant intakes in the Westcross catchment.

Figure 25 Westcross –Flood Risk Map



Conclusions from the Flood Risk Maps

The Flood Risk Map for Westcross indicates that the main cause of flood risk for the area relates to ordinary watercourses and the intakes to existing surface water culverts. The flood extents map shows high flood risk to Mumbles Road which is the lowest part of the community. Other flood risk areas have been identified and are included in Table 57 for additional measures to be implemented. Generally this correlates with local knowledge although it is believed that the flood risk is overstated as the full capacity of the existing culverts was not included in the modelling process when the maps were prepared.

Table 56 Westcross– Counts for flood risk

COUNTS FOR CCS, WEST CROSS WARD				
Risk to People	**TOTAL**	**LOW**	**MED**	**HIGH**
Residential Properties in areas at risk of flooding Properties at Risk (n) People at Risk (n) (multiplier 2.35)	7616	150	70	59
Residential Properties at risk of flooding Properties at Risk (n) People at Risk (n) (multiplier 2.35)	3241	64	30	25
Services (n)	6	0	0	0
Risk to Economic Activity				
Non-Residential Properties (n)	247	8	5	3
Airports (n)	0	0	0	0
Primary / Trunk Roads (km)	0	0	0	0
Main Railway Lines (km)	0	0	0	0
Agricultural Land – Grades 1, 2 and 3 (ha)	68.86	2.65	8.97	0
Risk to Natural Environment and Historic Environment				
Bathing Waters (n)	1	0	0	0
Environmental Permitting Regulations (EPR) Installations (n)	0	0	0	0
Special Areas of Conservation (SAC) (ha)	0	0	0	0
Special Protection Areas (SPA) (ha)	0	0	0	0
Ramsar Sites (ha)	141.95	0	0	0
World Heritage Sites (ha)	0	0	0	0
Sites of Special Scientific Interest (SSSI) (ha)	141.95	0.10	0.02	0.02
Parks and Gardens (ha)	0	0	0	0
Scheduled Ancient Monuments (ha)	0	0	0	0
Listed Buildings (n)	1	0	0	0
Licensed Abstractions (LA) (n)				
Sites of Interest for Nature Conversation (SINC) (ha)	209.46	3.49	0.76	1.13

In addition to the existing borough wide measures to mitigate flood risk as stipulated in section 7.The following measures will be applied to the main sources of flood risk within the Westcross community area.

Table 57: Westcross - Measures to mitigate flood risk in Westcross

Location	Risk Level	Risk to:	Measure	Measure Type	Link to FRMP Objective	Timing	Measure Status
Watercourse at Bellevue Road	low to high	Residential properties Highway	CCS 600 Flood Asset maintenance	Protection M35	1,4,7	2016-2021	Not started proposed
Mumbles Road	low to high	Residential properties Highway	CCS 400 Carry out further investigation of accumulations of surface water	Other Prevention M24	1,2,7	2016-2021	Not started proposed
Washinghouse Brook watercourse	low to high	Highway	CCS 600 Flood Asset maintenance	Protection M35	1,4,7	2016-2021	Not started proposed
Elmgrove Road	medium to high	Highway	CCS 400 Carry out further investigation of accumulations of surface water	Other Prevention M24	1,2,7	2016-2021	Not started propose

In order for this Flood Risk Management Plan to be successful it is essential that significant additional funding be made available to City and County of Swansea on top of the normal funding arrangements from Welsh Government. Failure to receive this additional funding could result in measures identified in this report not being implemented either in part or in full.

Number of Measures in each category

9.0 How we will manage flood risk in other areas

9.1 Bishopston Community area

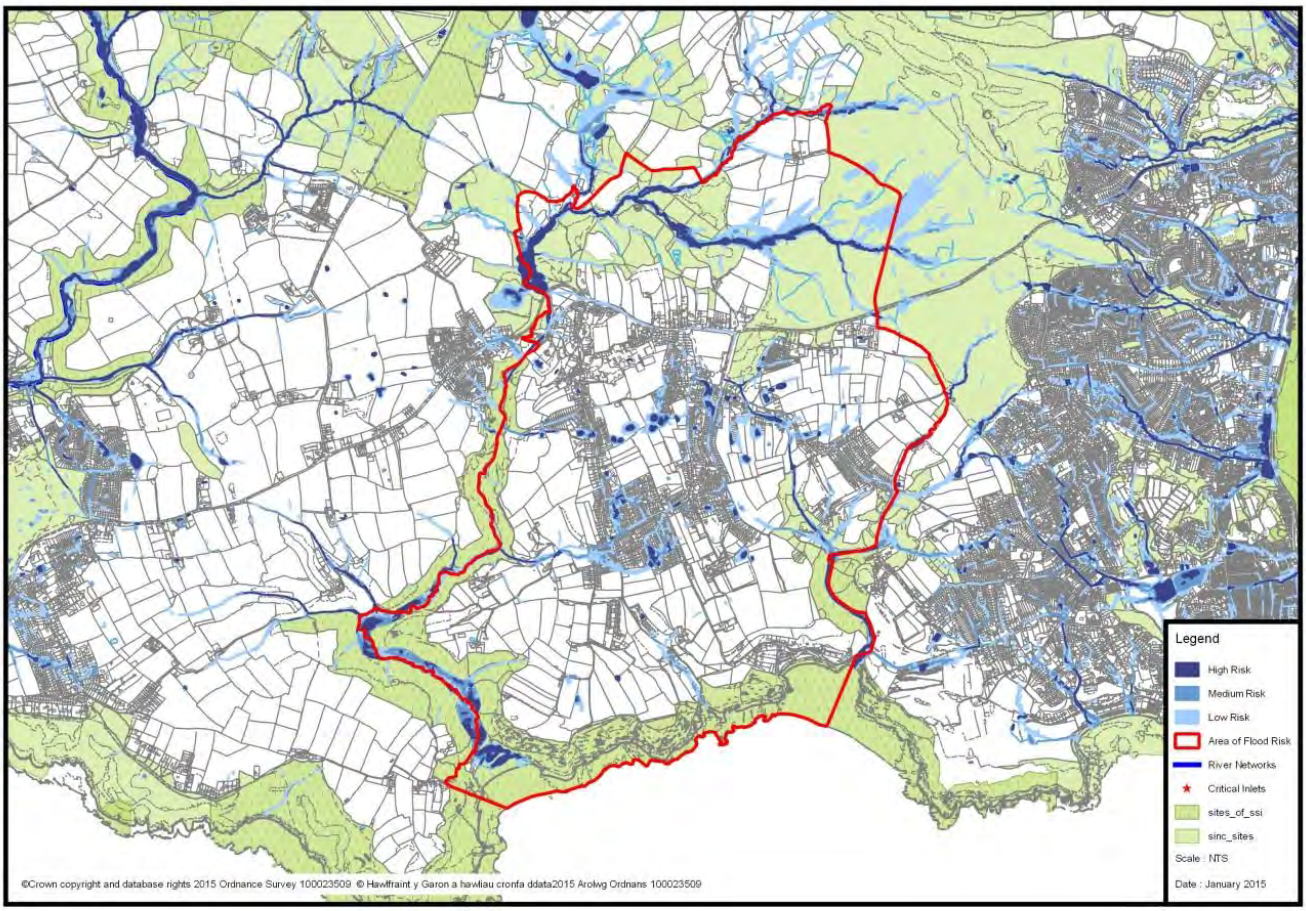
Overview

Bishopston Community area is situated 8km south west of the city centre of Swansea. Predominantly a rural area the two main settlements in the ward are Bishopston and Murton which are the main residential areas for the ward. The catchment covers an area 597 hectares with small streams draining common land above the Murton Green area situated north in the catchment southwards to the coastline between Pwll Du and Caswell Bay.

There is only 1 intake which is maintained by the Authority situated on a stream crossing on Church Lane, where possible flooding of the lane may occur during times of heavy rainfall. There is no significant flood risk at this location and the grid will remain on a low priority list for maintenance.

There are no significant intakes in the Bishopston catchment.

Figure 26 Bishopston –Flood Risk Map



Conclusions from the Flood risk Maps

The conclusions derived from the flood risk maps indicate minimal high flood risk within this area, where predominantly flooding occurs in fields. Medium to low flood risk has been identified to limited urban areas where accumulation of surface water is indicated on the flood map

Table 58 Bishopston– Counts for flood risk

COUNTS FOR CCS, BISHOPSTON WARD				
Risk to People	**TOTAL**	**LOW**	**MED**	**HIGH**
Residential Properties in areas at risk of flooding Properties at Risk (n) People at Risk (n) (multiplier 2.35)	3816	113	35	9
Residential Properties at risk of flooding Properties at Risk (n) People at Risk (n) (multiplier 2.35)	1624	48	15	4
Services (n)	4	0	0	0
Risk to Economic Activity				
Non-Residential Properties (n)	425	6	2	0
Airports (n)	0	0	0	0
Primary / Trunk Roads (km)	0	0	0	0
Main Railway Lines (km)	0	0	0	0
Agricultural Land – Grades 1, 2 and 3 (ha)	515	0	0	0
Risk to Natural Environment and Historic Environment				
Bathing Waters (n)	1	0	0	0
Environmental Permitting Regulations (EPR) Installations (n)	0	0	0	0
Special Areas of Conservation (SAC) (ha)	36	3	2	2
Special Protection Areas (SPA) (ha)	0	0	0	0
Ramsar Sites (ha)	0	0	0	0
World Heritage Sites (ha)	0	0	0	0
Sites of Special Scientific Interest (SSSI) (ha)	91	4	3	4
Parks and Gardens (ha)	0	0	0	0
Scheduled Ancient Monuments (ha)	2.02	0	0	0
Listed Buildings (n)	8	0	0	0
Licensed Abstractions (LA) (n)				
Sites of Interest for Nature Conversation (SINC) (ha)	107.15	8.75	2.24	5.64

Existing county wide measures to mitigate flood risk as stipulated in section 7 will be applied in the Bishopston community area.

Number of Measures in each category

9.2 Clydach Community area

Overview

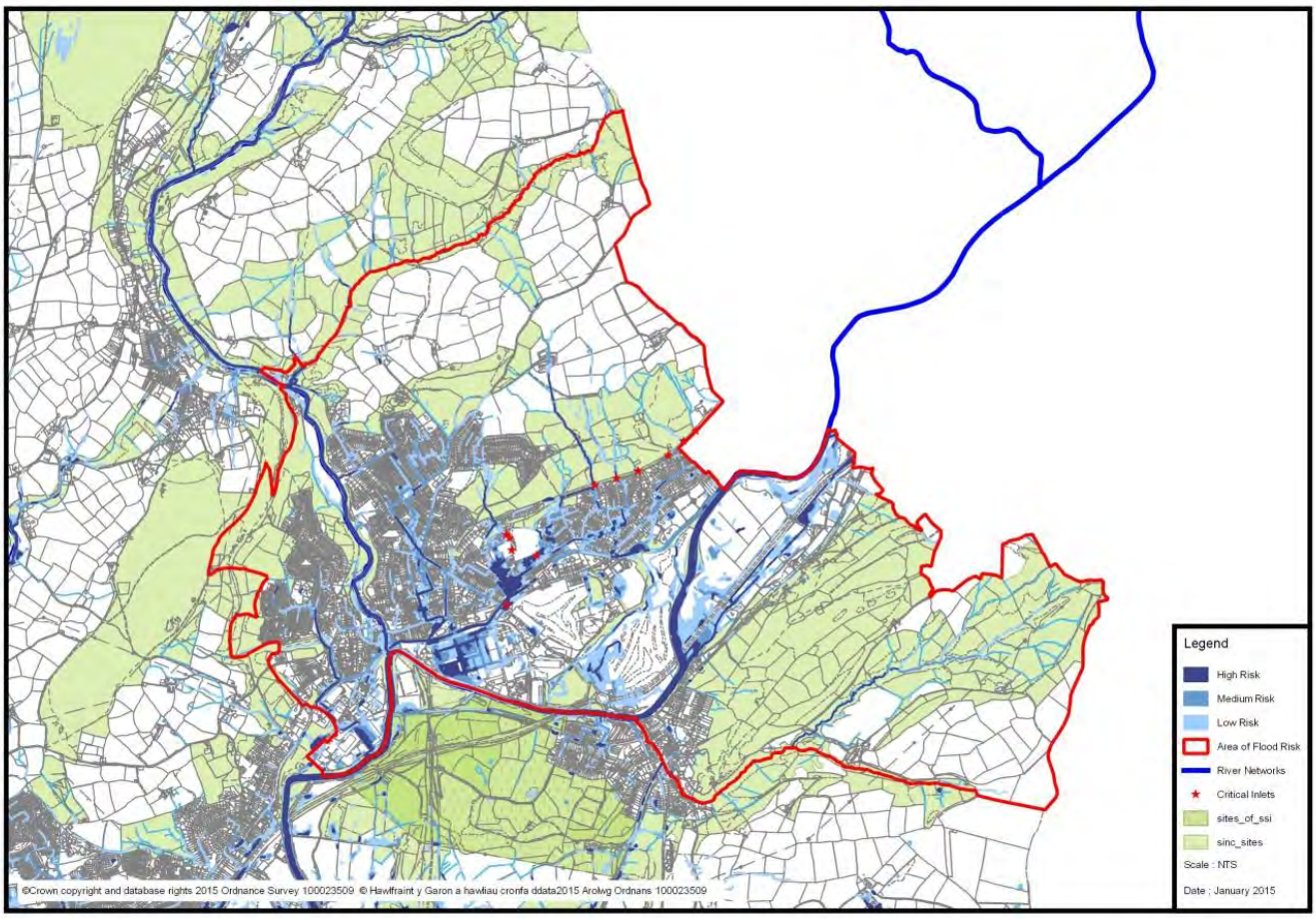
Approximately 9.5km north east of Swansea city centre, consisting of Graigfelin , Clydach and Glais localities. The community is 856hectares and is situated on the most Northern part of the Authority's administrative boundary with an upstream catchment of Trebanos contributing flows from a neighbouring Authority, Neath and Port Talbot County Council. Typically the catchment has many streams emanating from elevated steep sided slopes of the Valley sides which discharge to the two main Rivers, the Tawe and River Clydach.

The area has a mix of small urban areas but predominantly this is a rural catchment with topography one would expect with small valleys and streams One major component of the Clydach community is the Mond Nickel works which employs a local workforce. There is also a small industrial estate known as Players Industrial estate which is situated alongside the River Tawe.

Table 59: Clydach – Significant Intakes

Grid Ref	Address
E270018, N202050	Kingrosia Park, Clydach (r/o No. 93) Location 1
E270133, N202086	Kingrosia Park, Clydach (r/o No. 93) Location 2
E270247, N202125	Kingrosia Park, Clydach (r/o No. 93) Location 3
E270554, N202339	Heol y Llwynau, Trebanos (r/o No. 97)
E269547, N201787	Waverley Park, Clydach Location1
E269565, N201769	Waverley Park, Clydach Location 2
E269576, N201705	Waverley Park, Clydach Location 3
E269707, N201677	Capel Road, Clydach (r/o No. 59)
E269549, N201414	Mond Mini-Roundabout, Clydach
E268552, N201525	Bryn Teg, Clydach (s/o No. 31)
E268482, N201544	Graigfelen Primary School
E269376, N202178	Tanycoed Road, Clydach (beween No. 16 & 18)

Figure 27 Clydach –Flood Risk Map



Conclusions from the Flood Risk Maps

The Flood Risk Map for Clydach indicates that the main cause of flood risk for the area relates to ordinary watercourses and the intakes to existing surface water culverts. The worst affected areas have been listed in Table 61 below with the flood extents maps showing areas which have been affected by flooding in the past. However, it is believed that the flood risk is overstated as the full capacity of the existing culverts or local drainage systems was not included in the modelling process when the maps were prepared.

Table 60 Clydach– Counts for flood risk

COUNTS FOR CCS, CLYDACH WARD				
Risk to People	**TOTAL**	**LOW**	**MED**	**HIGH**
Residential Properties in areas at risk of flooding Properties at Risk (n) People at Risk (n) (multiplier 2.35)	8103	242	75	45
Residential Properties at risk of flooding Properties at Risk (n) People at Risk (n) (multiplier 2.35)	3448	103	32	19
Services (n)	8	0	0	0
Risk to Economic Activity				
Non-Residential Properties (n)	693	58	21	11
Airports (n)	0	0	0	0
Primary / Trunk Roads (km)	0	0	0	0
Main Railway Lines (km)	0.03	0.01	0.01	0
Agricultural Land – Grades 1, 2 and 3 (ha)	109.58	8.43	25.93	0
Risk to Natural Environment and Historic Environment				
Bathing Waters (n)	0	0	0	0
Environmental Permitting Regulations (EPR) Installations (n)	2	0	0	0
Special Areas of Conservation (SAC) (ha)	0	0	0	0
Special Protection Areas (SPA) (ha)	0	0	0	0
Ramsar Sites (ha)	0	0	0	0
World Heritage Sites (ha)	0	0	0	0
Sites of Special Scientific Interest (SSSI) (ha)	0.02	0	0.01	0.01
Parks and Gardens (ha)	0	0	0	0
Scheduled Ancient Monuments (ha)	0.16	0.02	0	0.09
Listed Buildings (n)	10	1	1	1
Licensed Abstractions (LA) (n)				
Sites of Interest for Nature Conversation (SINC) (ha)	340.23	8.13	3.09	11.60

In addition to the existing borough wide measures to mitigate flood risk as stipulated in section 7.The following measures will be applied to the main sources of flood risk within the Clydach community area.

Table 61: Clydach - Measures to mitigate flood risk in Clydach

Location	Risk Level	Risk to:	Measure	Measure Type	Link to FRMP Objective	Timing	Measure Status
Capel Road	low to high	Residential Properties Highway	CCS 400 Carry out further investigation of accumulations of surface water	Other Prevention M24	1,2,7	2016-2021	Not started proposed
			CCS 500 Flood Asset Inspection	Other Prevention M24	1,2,7,8	2016-2021	Ongoing
			CCS 600 Flood Asset maintenance	Protection M35	1,4,7	2016-2021	Ongoing
Kingrosia Park	low to high	Residential Properties Highway	CCS 500 Flood Asset Inspection	Other Prevention M24	1,2,7,8	2016-2021	Ongoing
			CCS 600 Flood Asset maintenance	Protection M35	1,4,7	2016-2021	Ongoing
Mond	low to medium	Private land - industrial	CCS 700 Liaison with owners of Significant flood Assets	Other Prevention M24	1,2,5,7	2016-2021	Not started proposed
Watercourse at Pont y Lon	low to high	Non residential properties Highway	CCS 500 Flood Asset Inspection	Other Prevention M24	1,2,7,8	2016-2021	Ongoing

In order for this Flood Risk Management Plan to be successful it is essential that significant additional funding be made available to City and County of Swansea on top of the normal funding arrangements from Welsh Government. Failure to receive this additional funding could result in measures identified in this report not being implemented either in part or in full.
Number of Measures in each category

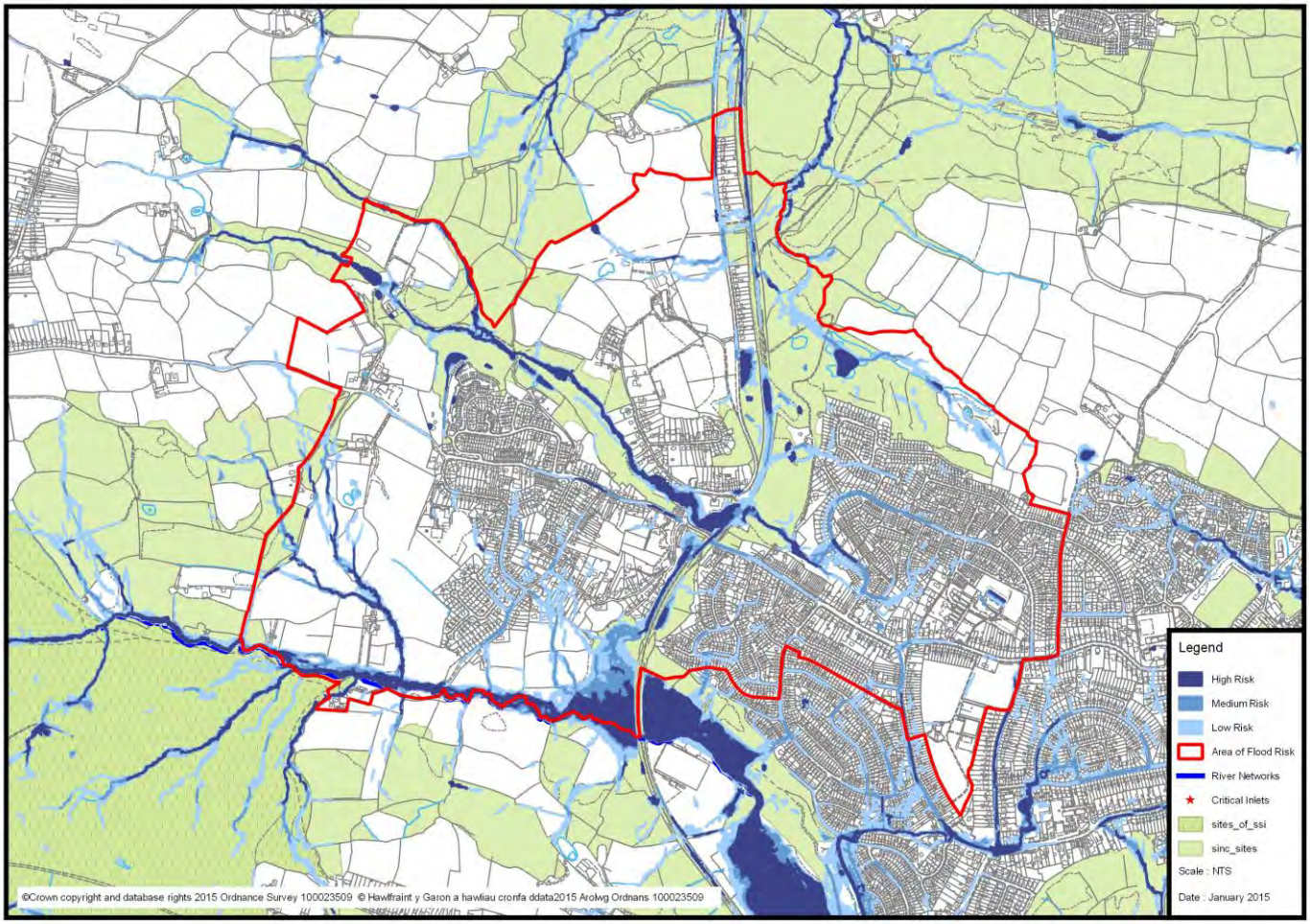
9.3 Dunvant Community Area

Overview

Dunvant community area is situated approximately 5.6km West of the City Centre, consisting of the Dunvant locality Northwest of Killay. This semi-rural area covers 241hectares with the majority of housing being built from the 1960s onwards to the east of the community consisting with a high proportion of semi-detached dwellings.
Notably, the Dunvant area slopes from two directions both westerly and easterly fringes of the area drain centrally to the main River Clyne.

There are no significant intakes in the Dunvant catchment.

Figure 28 Dunvant Community area



Conclusions from the Flood Risk Maps

The Flood Risk Map for Dunvant indicates that the main cause of flood risk for the area relates to ordinary watercourses and the intakes to existing surface water culverts. The flood extents maps generally show high flood risk in the areas lying adjacent to the main watercourse which runs through Dunvant Square and also floodwater escaping from the River Clyne to the most Southerly part of the Ward. The River Clyne is a main river with the responsibility for flooding falling under NRW 's remit. Other areas in the community which are affected by flooding are considered to be at low risk with flooding is contained within the confines of the highway networks. Generally this correlates with local knowledge although it is believed that the flood risk is overstated as the full capacity of the existing culverts and highway drainage networks was not included in the modelling process when the maps were prepared.

Table 62 Dunvant– Counts for flood risk

COUNTS FOR CCS, DUNVANT WARD				
Risk to People	**TOTAL**	**LOW**	**MED**	**HIGH**
Residential Properties in areas at risk of flooding Properties at Risk (n) People at Risk (n) (multiplier 2.35)	4477	14	2	2
Residential Properties at risk of flooding Properties at Risk (n) People at Risk (n) (multiplier 2.35)	1905	6	1	1
Services (n)	2	0	0	0
Risk to Economic Activity				
Non-Residential Properties (n)	239	5	1	0
Airports (n)	0	0	0	0
Primary / Trunk Roads (km)	0	0	0	0
Main Railway Lines (km)	0	0	0	0
Agricultural Land – Grades 1, 2 and 3 (ha)	128.03	7.17	28.95	0
Risk to Natural Environment and Historic Environment				
Bathing Waters (n)	0	0	0	0
Environmental Permitting Regulations (EPR) Installations (n)	0	0	0	0
Special Areas of Conservation (SAC) (ha)	0.58	0.04	0	0
Special Protection Areas (SPA) (ha)	0	0	0	0
Ramsar Sites (ha)	0	0	0	0
World Heritage Sites (ha)	0	0	0	0
Sites of Special Scientific Interest (SSSI) (ha)	0.58	0.04	0.03	0.21
Parks and Gardens (ha)	0	0	0	0
Scheduled Ancient Monuments (ha)	0	0	0	0
Listed Buildings (n)	1	0	0	0
Licensed Abstractions (LA) (n)				
Sites of Interest for Nature Conversation (SINC) (ha)	52.10	4.96	2.23	4.23

Table 63: Measures to mitigate flood risk in Dunvant

Location	Risk Level	Risk to:	Measure	Measure Type	Link to FRMP Objective	Timing	Measure Status
Dunvant Square	low to high	Highway	CCS 400 Carry out further investigation of accumulations of surface water	Other Prevention M24	1,2,7	2016-2021	Not started proposed

***See also measures for whole of the Borough as detailed in section 7**

In order for this Flood Risk Management Plan to be successful it is essential that significant additional funding be made available to City and County of Swansea on top of the normal funding arrangements from Welsh Government. Failure to receive this additional funding could result in measures identified in this report not being implemented either in part or in full.

Number of Measures in each category.

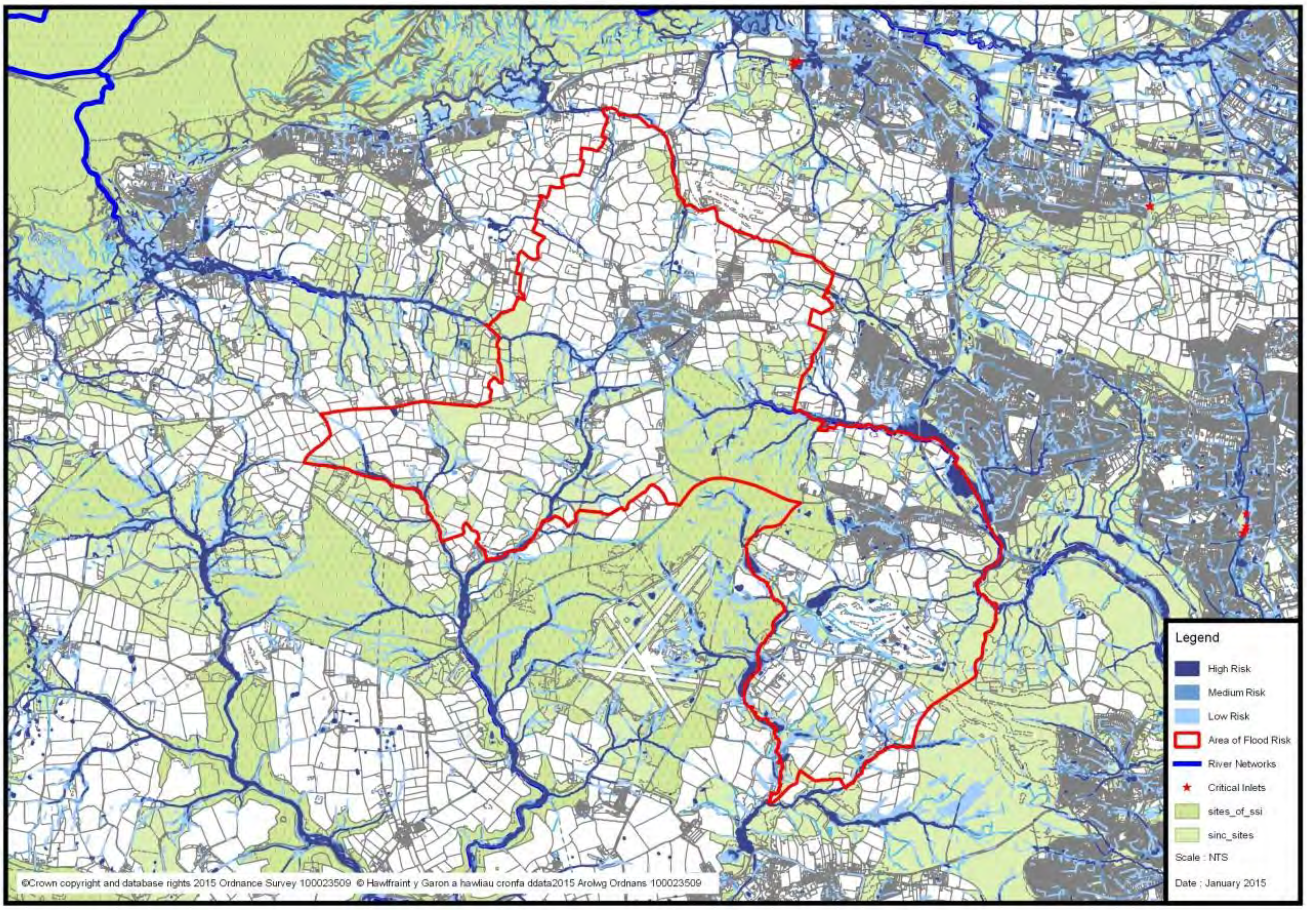
9.4 Fairwood Community Area

Overview

Fairwood community area is located 7km west of the city centre, consisting mainly of the settlements of three crosses and Upper Killay. Fairwood is predominantly a rural area consisting of 1,369hectares. The catchment drains naturally to adjacent lower lying land via a number of small steams and watercourses

There are no significant intakes in the Fairwood catchment.

Figure 29 Fairwood Flood Risk Map



Conclusions from the Flood Risk Maps

The Flood Risk Map for Fairwood indicates that the main cause of flood risk for the area relates to ordinary watercourses and streams which serve the rural catchment. The majority of flooding is considered low risk within the ward. Generally this correlates with local knowledge although it is believed that the flood risk is overstated as the full capacity of the existing culverts was not included in the modelling process when the maps were prepared.

Table 64 Fairwood– Counts for flood risk

COUNTS FOR CCS, FAIRWOOD WARD				
Risk to People	**TOTAL**	**LOW**	**MED**	**HIGH**
Residential Properties <u>in areas at risk of flooding</u> Properties at Risk (n) People at Risk (n) (multiplier 2.35)	2773	21	2	0
Residential Properties <u>at risk of flooding</u> Properties at Risk (n) People at Risk (n) (multiplier 2.35)	1180	9	1	0
Services (n)	2	0	0	0
Risk to Economic Activity				
Non-Residential Properties (n)	506	5	1	0
Airports (n)	0	0	0	0
Primary / Trunk Roads (km)	0	0	0	0
Main Railway Lines (km)	0	0	0	0
Agricultural Land – Grades 1, 2 and 3 (ha)	1065.29	27.66	28.95	0
Risk to Natural Environment and Historic Environment				
Bathing Waters (n)	0	0	0	0
Environmental Permitting Regulations (EPR) Installations (n)	1	1	0	0
Special Areas of Conservation (SAC) (ha)	132.31	6.37	1.24	1.93
Special Protection Areas (SPA) (ha)	0	0	0	0
Ramsar Sites (ha)	0	0	0	0
World Heritage Sites (ha)	0	0	0	0
Sites of Special Scientific Interest (SSSI) (ha)	132.52	6.34	1.26	2.06
Parks and Gardens (ha)	0	0	0	0
Scheduled Ancient Monuments (ha)	0	0	0	0
Listed Buildings (n)	6	0	0	0
Licensed Abstractions (LA) (n)				
Sites of Interest for Nature Conversation (SINC) (ha)	373.35	26.59	7.66	14.79

No new measures have been assigned to the Fairwood community area but borough wide as detailed in section 7 will still be implemented.

Number of Measures in each category.

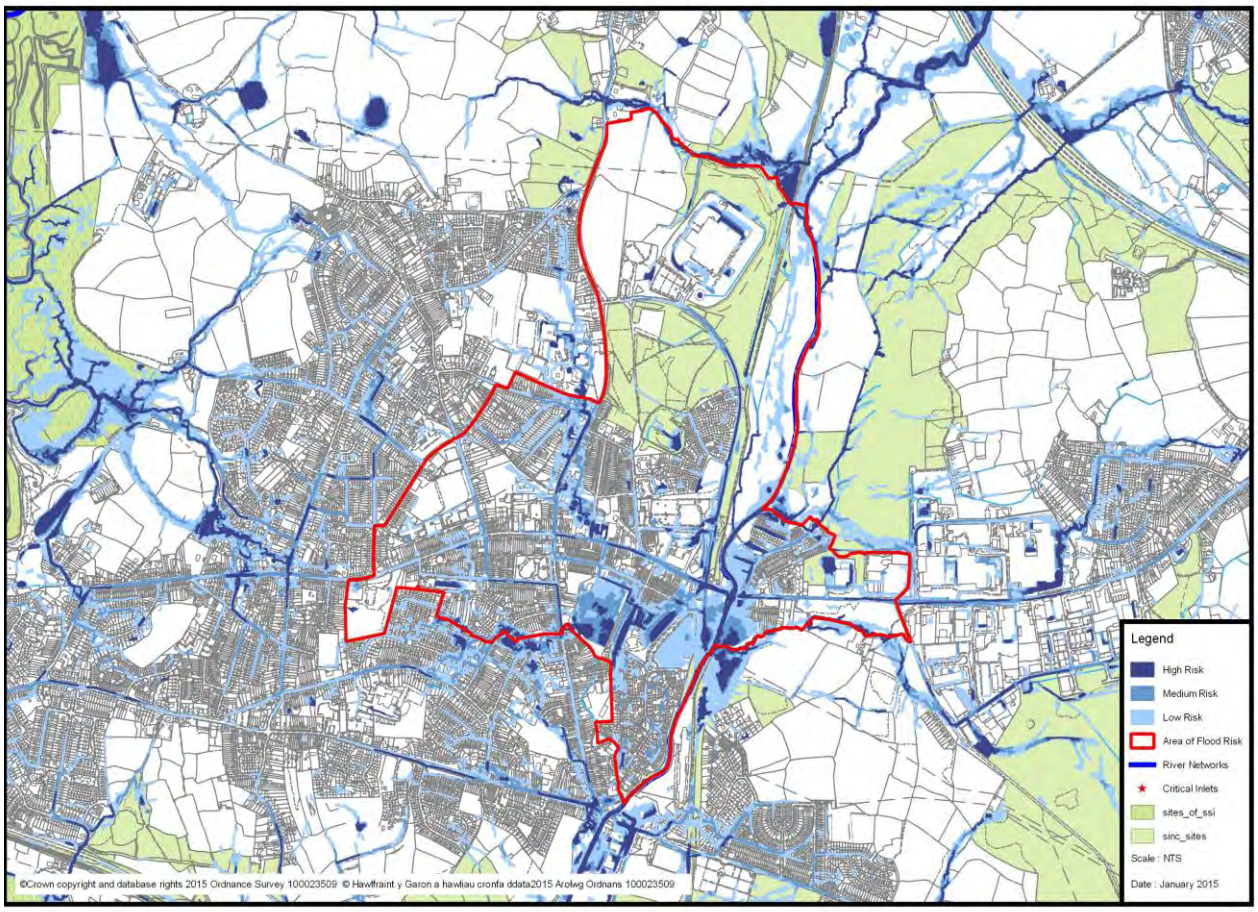
9.5 Gorseinon Community Area

Overview

Gorseinon community ward is11km north-west of the city Centre. The catchment is 226hectares which includes the town of Gorseinon which grew dramatically during the late 19th and 20th centuries with the establishment of several steel and tinplate works. The area is predominantly of urban characteristics with the large brownfield sites which were once occupied by industry now used for housing development.
The topography of Gorseinon is generally flat with urbanized areas draining through small drainage networks to eventually discharge to the River Lliw. Flows are generally of low velocities with shallow gradient experienced in much of the drainage network. Main watercourse include the river Lliw which runs centrally on the Eastern fringes of the catchment with one other important drainage feature being the Melyn Mynarch a smaller watercourse which serves majority of the older dwellings.
There are a number of intakes which are maintained by the Authority, the most critical intake situated on Libanus Road, the blockage of grids has resulted in historical flooding to nearby houses.

There are no significant intakes in the Gorseinon catchment.

Figure 30 Gorseinon Flood Risk Map



Conclusions from the Flood Risk Maps

The Flood Risk Map for Gower indicates that the main cause of flood risk for the area relates to ordinary watercourses and the intakes to existing surface water culverts. The flood extents maps shows high flood risk to Gorseinon town centre and also on the land immediately adjacent to the main river Lliw where fluvial flood risk is evident. Generally this correlates with local knowledge although it is believed that the flood risk is overstated as the full capacity of the existing culverts was not included in the modelling process when the maps were prepared.

Table 65 Gorseinon– Counts for flood risk

COUNTS FOR CCS, GORSEINON WARD				
Risk to People	**TOTAL**	**LOW**	**MED**	**HIGH**
Residential Properties in areas at risk of flooding Properties at Risk (n) People at Risk (n) (multiplier 2.35)	4731	526	118	24
Residential Properties at risk of flooding Properties at Risk (n) People at Risk (n) (multiplier 2.35)	2013	224	50	10
Services (n)	8	1	0	0
Risk to Economic Activity				
Non-Residential Properties (n)	542	58	13	8
Airports (n)	0	0	0	0
Primary / Trunk Roads (km)	0	0	0	0
Main Railway Lines (km)	0	0	0	0
Agricultural Land – Grades 1, 2 and 3 (ha)	0.17	0.02	0.01	0
Risk to Natural Environment and Historic Environment				
Bathing Waters (n)	0	0	0	0
Environmental Permitting Regulations (EPR) Installations (n)	1	0	0	0
Special Areas of Conservation (SAC) (ha)	0	0	0	0
Special Protection Areas (SPA) (ha)	0	0	0	0
Ramsar Sites (ha)	0	0	0	0
World Heritage Sites (ha)	0	0	0	0
Sites of Special Scientific Interest (SSSI) (ha)	0	0	0	0
Parks and Gardens (ha)	0	0	0	0
Scheduled Ancient Monuments (ha)	0.36	0.03	0	0
Listed Buildings (n)	3	0	0	0
Licensed Abstractions (LA) (n)				
Sites of Interest for Nature Conversation (SINC) (ha)	33.94	1.49	0.40	1.48

In addition to the existing county wide measures to mitigate flood risk as stipulated in section 7.The following measures will be applied to the main sources of flood risk within the Gorseinon community area.

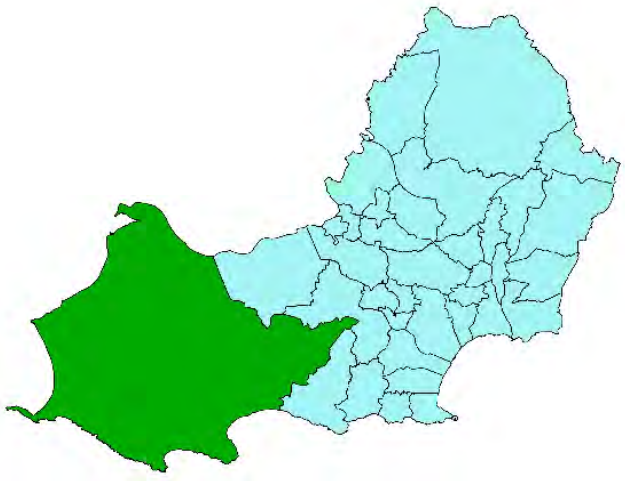
Table 66: Measures to mitigate flood risk in Gorseinon

Location	Risk Level	Risk to:	Measure	Measure Type	Link to FRMP Objective	Timing	Measure Status
Trinity Street	low to high	Residential properties Highway	CCS 400 Carry out further investigation of accumulations of surface water	Other Prevention M24	1,2,7	2016-2021	Ongoing
High street	medium	Highway	CCS 400 Carry out further investigation of accumulations of surface water	Other Prevention M24	1,2,7	2016-2021	Not started proposed
Land adjacent to Afon Lliw	low	Residential properties Highway	CCS 400 Carry out further investigation of accumulations of surface water	Other Prevention M24	1,2,7	2016-2021	Not started proposed

In order for this Flood Risk Management Plan to be successful it is essential that significant additional funding be made available to City and County of Swansea on top of the normal funding arrangements from Welsh Government. Failure to receive this additional funding could result in measures identified in this report not being implemented either in part or in full.

Number of measures in each category.

9.6 Gower Community area



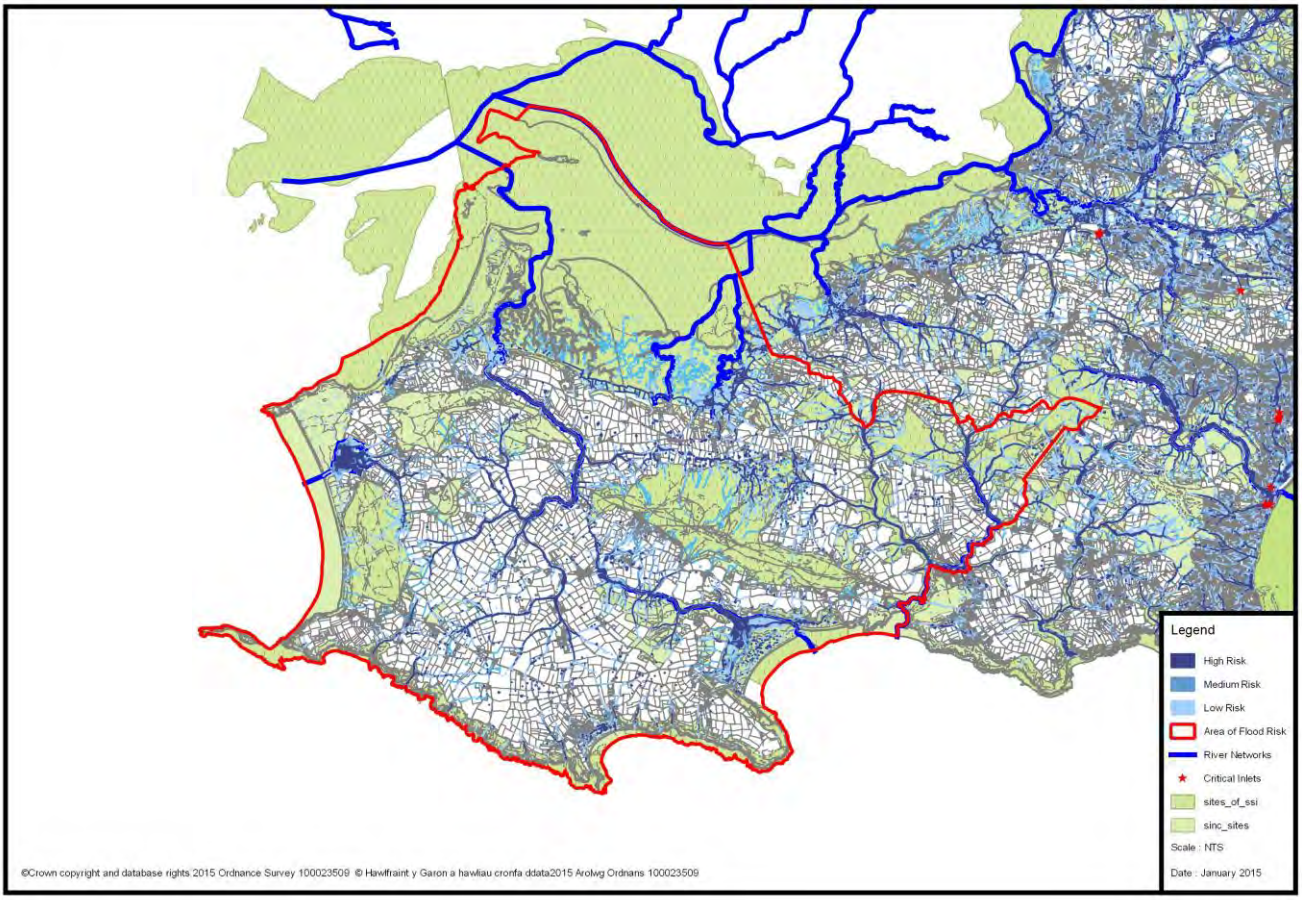
Overview

The most westerly ward in Swansea, and part of the gower Peninsula. In 1956 , Gower was the first Area of Outstanding Natiral Beauty (AONB) to be designated in the UK chosen for its outstanding landscape and coastline. The area is 11,484 hectares characterised by extensive coastline of natural rock defences, sublime beaches and inland rural areas.
The Gower community area drains naturally to coastline fringes via open watercourses and ditches. Areas of particular concern with historical surface water flooding is Llandewi and Scurlage which is affected by natural surface water run-off from the surrounding agricultural land which in times can lead to extensive flooding of the road network.

Table 67 Gower – Significant Intakes

Grid Ref	Address
E246358, N188813	Llandewi (Ivanhoe to Lake Farm House) Location 1
E246343, N188849	Llandewi (Ivanhoe to Lake Farm House) Location 2
E246331, N188945	Llandewi (Ivanhoe to Lake Farm House) Location 3
E246315, N188981	Llandewi (Ivanhoe to Lake Farm House) Location 4
E246283, N189036	Llandewi (Ivanhoe to Lake Farm House) Location 5
246713, N185367	Port Eynon (s/o St. Cadoc's Church)

Figure 31 Gower Flood Risk Map



Conclusions from the Flood Risk Maps

The Flood Risk Map for Gower indicates that the main cause of flood risk for the area relates to ordinary watercourses and the intakes to existing surface water culverts. The flood extents map has shown high risk of flooding to the highway between Llandewi and Scurlage which needs further examination. Other areas have been included in Table 69 below. Generally this correlates with local knowledge although it is believed that the flood risk is overstated as the full capacity of the existing culverts was not included in the modelling process when the maps were prepared.

Table 68 Gower– Counts for flood risk

COUNTS FOR CCS, GOWER WARD				
Risk to People	**TOTAL**	**LOW**	**MED**	**HIGH**
Residential Properties in areas at risk of flooding Properties at Risk (n) People at Risk (n) (multiplier 2.35)	3814	76	12	12
Residential Properties at risk of flooding Properties at Risk (n) People at Risk (n) (multiplier 2.35)	1623	33	5	5
Services (n)	11	0	0	0
Risk to Economic Activity				
Non-Residential Properties (n)	2615	48	12	6
Airports (n)	0	0	0	0
Primary / Trunk Roads (km)	0	0	0	0
Main Railway Lines (km)	0	0	0	0
Agricultural Land – Grades 1, 2 and 3 (ha)	5894.24	129.97	384.36	16.45
Risk to Natural Environment and Historic Environment				
Bathing Waters (n)	5	0	0	0
Environmental Permitting Regulations (EPR) Installations (n)	0	0	0	0
Special Areas of Conservation (SAC) (ha)	5174.86	75.86	13.94	21.45
Special Protection Areas (SPA) (ha)	2952.49	25.93	3.96	6.53
Ramsar Sites (ha)	2949.59	25.93	3.96	6.53
World Heritage Sites (ha)	0	0	0	0
Sites of Special Scientific Interest (SSSI) (ha)	5720.59	118.71	33.40	49.29
Parks and Gardens (ha)	162.82	16.99	11.41	15.43
Scheduled Ancient Monuments (ha)	58.35	0.22	0.07	0.14
Listed Buildings (n)	86	1	1	1
Licensed Abstractions (LA) (n)				
Sites of Interest for Nature Conversation (SINC) (ha)	2017.84	62.14	24.91	71.62

In addition to the existing county wide measures to mitigate flood risk as stipulated in section 7.The following measures will be applied to the main sources of flood risk within the Gower community area.

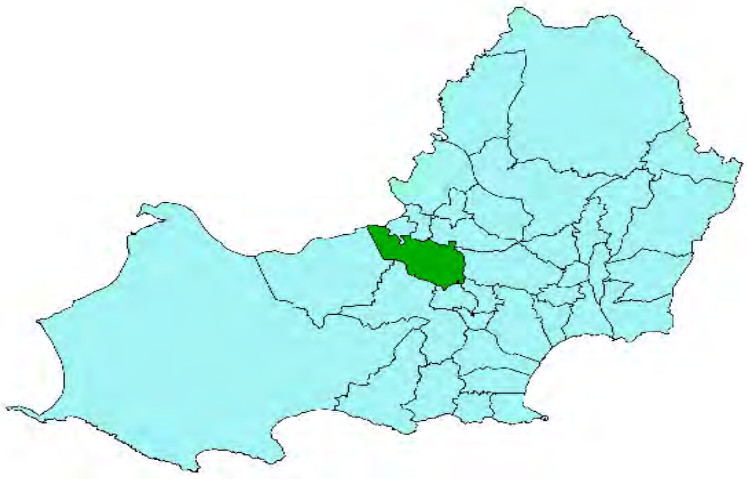
Table 69: Measures to mitigate flood risk in Gower

Location	Risk Level	Risk to:	Measure	Measure Type	Link to FRMP Objective	Timing	Measure Status
Llandewi	low to high	Residential properties Highway	CCS 300 Derive hydrology for catchment	Other Prevention M24	1,2,7,8	2016-2021	Not started proposed
			CCS 600 Flood Asset maintenance	Protection M35	1,4,7	2016-2021	Ongoing
A4118 Knelston – Frogmoor lane	low to high	Highway	CCS 600 Flood Asset maintenance	Protection M35	1,4,7	2016-2021	Not started proposed
Port Eynon	low to medium	Highway	CCS 600 Flood Asset maintenance	Protection M35	1,4,7	2016-2021	Not started proposed

In order for this Flood Risk Management Plan to be successful it is essential that significant additional funding be made available to City and County of Swansea on top of the normal funding arrangements from Welsh Government. Failure to receive this additional funding could result in measures identified in this report not being implemented either in part or in full

Number of Measures in each category.

9.7 Gowerton Community Area



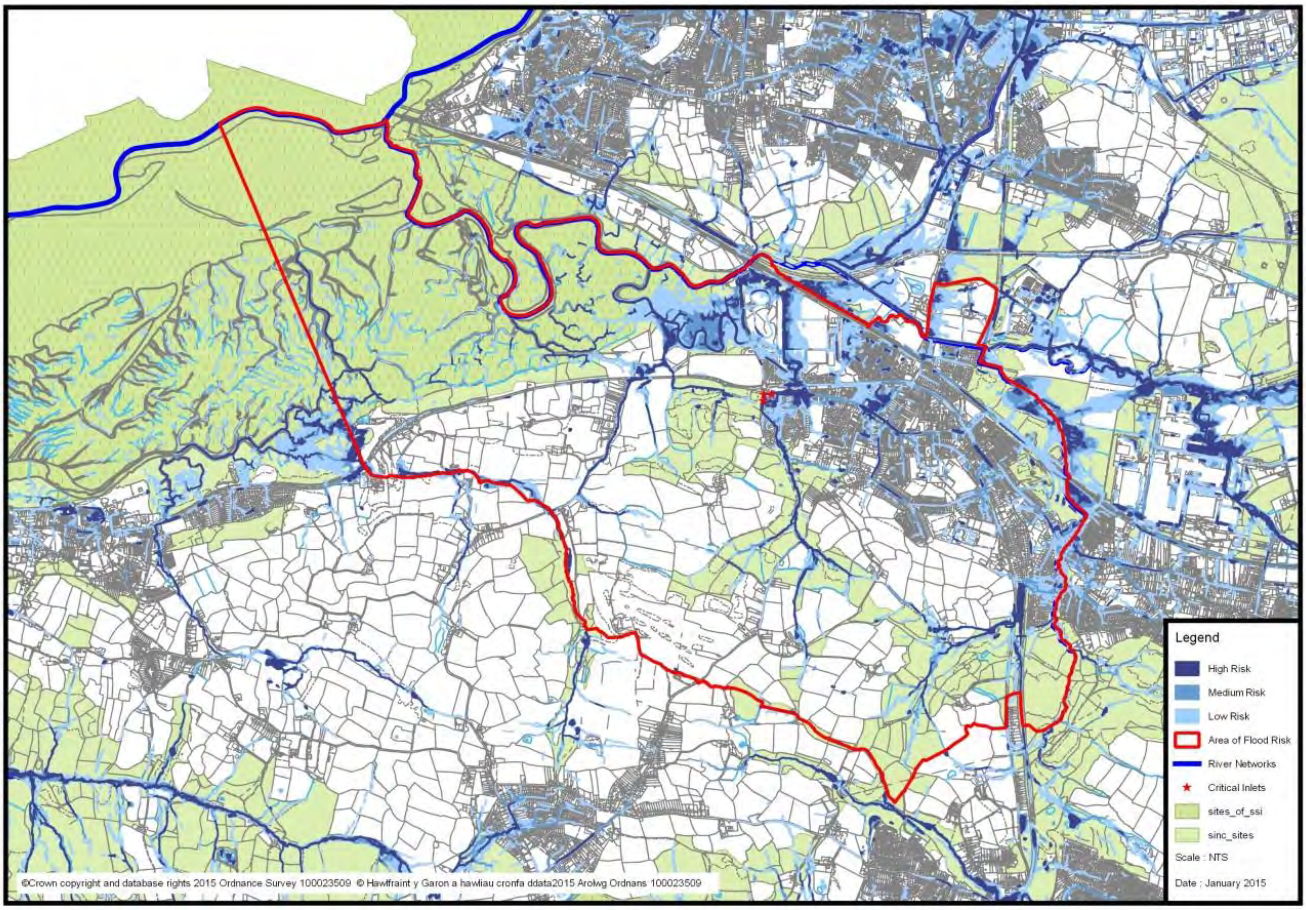
Overview

Gowerton is situated 6.4km north west of the City Centre. The community area adjoins the Loughor Estuary to the Western fringes. Key infrastructure is the Gower Waste Water treatment works which is owned by DCWW (Welsh Water) and the Western Wales Rail Network with a station located in Gowerton. The catchment is 765 hectares in size and drains to the Loughor Estuary via small open water courses and a number of smaller culverts. The most urbanised area is the town of Gowerton with the surround areas tending to be of rural land use.
Significant Intakes in the Gowerton catchment area are situated on Bryn-y-mor Road where historical flooding has led to some flooding of properties in this locality.

Table 70: Gowerton – Significant Intakes

Grid Ref	Address
E258127, N196492	Bryn y Mor Road, Gowerton (r/o Clos y Gweydd)
E257305, N196375	Cefn Stylle, Gowerton (opp. No. 38)
E257378, N196566	Cefn Stylle, Gowerton (opp. No. 2)
E256491, N195666	Cefn Stylle, Gowerton (adj. Springwood)
E259398, N195069	Garrod Avenue, Dunvant

Figure 32 Gowerton Flood Risk Map



Conclusions from the Flood Risk Maps

The Flood Risk Map for Gowerton indicates that the main cause of flood risk for the area relates to ordinary watercourses and the intakes to existing surface water culverts. The surface water flood map shows high flood risk in the Brynymor Road area and through historical knowledge there has past flooding incidents in this area related to the watercourse which serves the catchment. Also, Gowerton Cross is susceptible to flood risk and further examination of the local area is required in order to fully understand the nature and extent of flooding at this location. Generally this correlates with local knowledge although it is believed that the flood risk is overstated as the full capacity of the existing culverts was not included in the modelling process when the maps were prepared.

Table 71 Gowerton– Counts for flood risk

COUNTS FOR CCS, GOWERTON WARD				
Risk to People	**TOTAL**	**LOW**	**MED**	**HIGH**
Residential Properties in areas at risk of flooding Properties at Risk (n) People at Risk (n) (multiplier 2.35)	5241	430	115	47
Residential Properties at risk of flooding Properties at Risk (n) People at Risk (n) (multiplier 2.35)	2230	183	49	20
Services (n)	4	0	0	0
Risk to Economic Activity				
Non-Residential Properties (n)	418	25	4	3
Airports (n)	0	0	0	0
Primary / Trunk Roads (km)	0	0	0	0
Main Railway Lines (km)	2.07	0.07	0.48	0.06
Agricultural Land – Grades 1, 2 and 3 (ha)	367.68	9.14	24.42	0
Risk to Natural Environment and Historic Environment				
Bathing Waters (n)	0	0	0	0
Environmental Permitting Regulations (EPR) Installations (n)	0	0	0	0
Special Areas of Conservation (SAC) (ha)	208.23	9.27	2.88	2.62
Special Protection Areas (SPA) (ha)	208.03	25.93	2.88	2.62
Ramsar Sites (ha)	208.03	9.42	2.88	2.62
World Heritage Sites (ha)	0	0	0	0
Sites of Special Scientific Interest (SSSI) (ha)	208.03	9.24	2.88	2.62
Parks and Gardens (ha)	0	0	0	0
Scheduled Ancient Monuments (ha)	0	0	0	0
Listed Buildings (n)	3	0	0	0
Licensed Abstractions (LA) (n)				
Sites of Interest for Nature Conversation (SINC) (ha)	174.44	15.07	4.81	7.31

In addition to the existing borough wide measures to mitigate flood risk as stipulated in section 7.The following measures will be applied to the main sources of flood risk within the Gowerton community area.

Table 72: Measures to mitigate flood risk in Gowerton

Location	Risk Level	Risk to:	Measure	Measure Type	Link to FRMP Objective	Timing	Measure Status
Brynymor Road	low to high	Residential properties and Highway	CCS 600 Flood Asset maintenance	Protection M35	1,4,7	2016-2021	Not started proposed
			CCS 100 Improve Flood warning service	Preparedness M43	1,2,5,6	2016-2021	Not started proposed
Gowerton Cross	low to high	Residential properties and Highway	CCS 400 Carry out further investigation of accumulations of surface water	Other Prevention M24	1,2,7	2016-2021	Not started proposed
Victoria Road	low to high	Highway	CCS 400 Carry out further investigation of accumulations of surface water	Other Prevention M24	1,2,7	2016-2021	Not started proposed

In order for this Flood Risk Management Plan to be successful it is essential that significant additional funding be made available to City and County of Swansea on top of the normal funding arrangements from Welsh Government. Failure to receive this additional funding could result in measures identified in this report not being implemented either in part or in full.

Number of Measures in each category

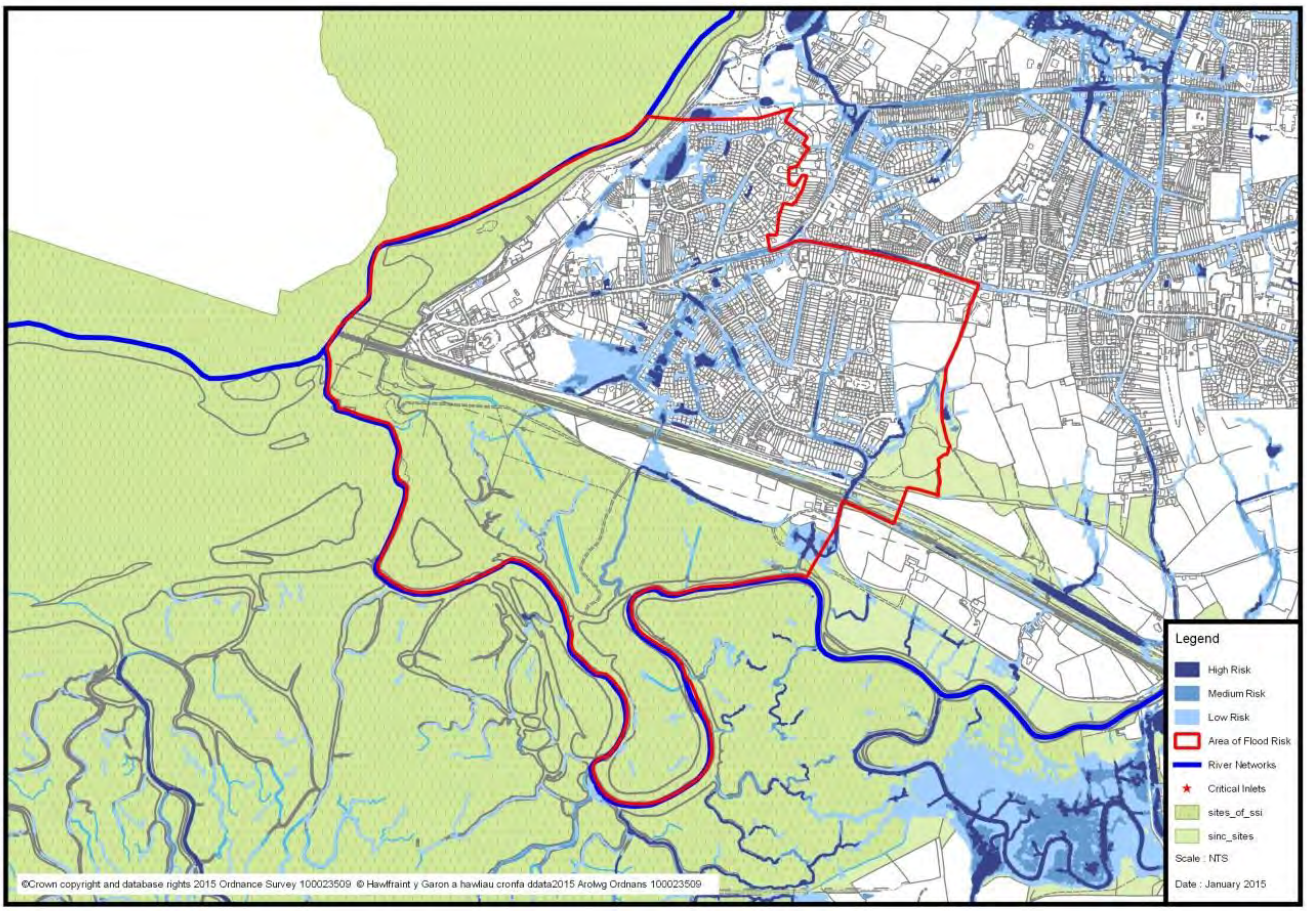
9.8 Lower Loughor community area

Overview

The lower Loughor Community area is situated 9km northwest of the city centre and adjoins the Loughor estuary on the western boundary edge of the administrative boundary. The area is 104 hectares with majority of residential area located to the north of the Gowerton bypass, and to the south estuarine low-lying marshland.
The catchment drains via a network of small pipe systems some of which are mostly protected from tidal influence by number of flap valves before discharging into the estuary.

There are no significant intakes in the Lower Loughor catchment.

Figure 33 Lower Loughor Flood Risk Map



Conclusions from the Flood Risk Maps

The Flood Risk Map for Lower Loughor indicates flood risk in the area low risk. There are areas of high flood risk but these areas are considered to have low consequences from flooding. Generally the flood risk is overstated as the full capacity of the existing culverts or highway drainage networks was not included in the modelling process when the maps were prepared.

Table 73 Lower Loughor Counts for flood risk

COUNTS FOR CCS, LOWER LOUGHOR WARD				
Risk to People	**TOTAL**	**LOW**	**MED**	**HIGH**
Residential Properties in areas at risk of flooding Properties at Risk (n) People at Risk (n) (multiplier 2.35)	2437	56	5	2
Residential Properties at risk of flooding Properties at Risk (n) People at Risk (n) (multiplier 2.35)	1037	24	2	1
Services (n)	1	0	0	0
Risk to Economic Activity				
Non-Residential Properties (n)	1060	5	1	0
Airports (n)	0	0	0	0
Primary / Trunk Roads (km)	0	0	0	0
Main Railway Lines (km)	1.28	0	0	0
Agricultural Land – Grades 1, 2 and 3 (ha)	0	0	0	0
Risk to Natural Environment and Historic Environment				
Bathing Waters (n)	0	0	0	0
Environmental Permitting Regulations (EPR) Installations (n)	0	0	0	0
Special Areas of Conservation (SAC) (ha)	50.59	0.59	0.15	0.09
Special Protection Areas (SPA) (ha)	42.17	0.59	0.15	0.09
Ramsar Sites (ha)	42.17	0.59	0.15	0.09
World Heritage Sites (ha)	0	0	0	0
Sites of Special Scientific Interest (SSSI) (ha)	50.59	0.59	0.15	0.09
Parks and Gardens (ha)	0	0	0	0
Scheduled Ancient Monuments (ha)	0.32	0	0	0
Listed Buildings (n)	3	0	0	0
Licensed Abstractions (LA) (n)				
Sites of Interest for Nature Conversation (SINC) (ha)	5.87	0.61	0.15	0.14

In addition to the existing borough wide measures to mitigate flood risk as stipulated in section 7.The following measures will be applied to the main sources of flood risk within the Lower Loughor community area.

Table 74: Measures to mitigate flood risk in Lower Loughor

Location	Risk Level	Risk to:	Measure	Measure Type	Link to FRMP Objective	Timing	Measure Status
Bwrw Road	low	Residential properties and Highway	CCS 400 Carry out further investigation of accumulations of surface water	Other Prevention M24	1,2,7	2016-2021	Not started proposed

In order for this Flood Risk Management Plan to be successful it is essential that significant additional funding be made available to City and County of Swansea on top of the normal funding arrangements from Welsh Government. Failure to receive this additional funding could result in measures identified in this report not being implemented either in part or in full.

Number of Measures in each category

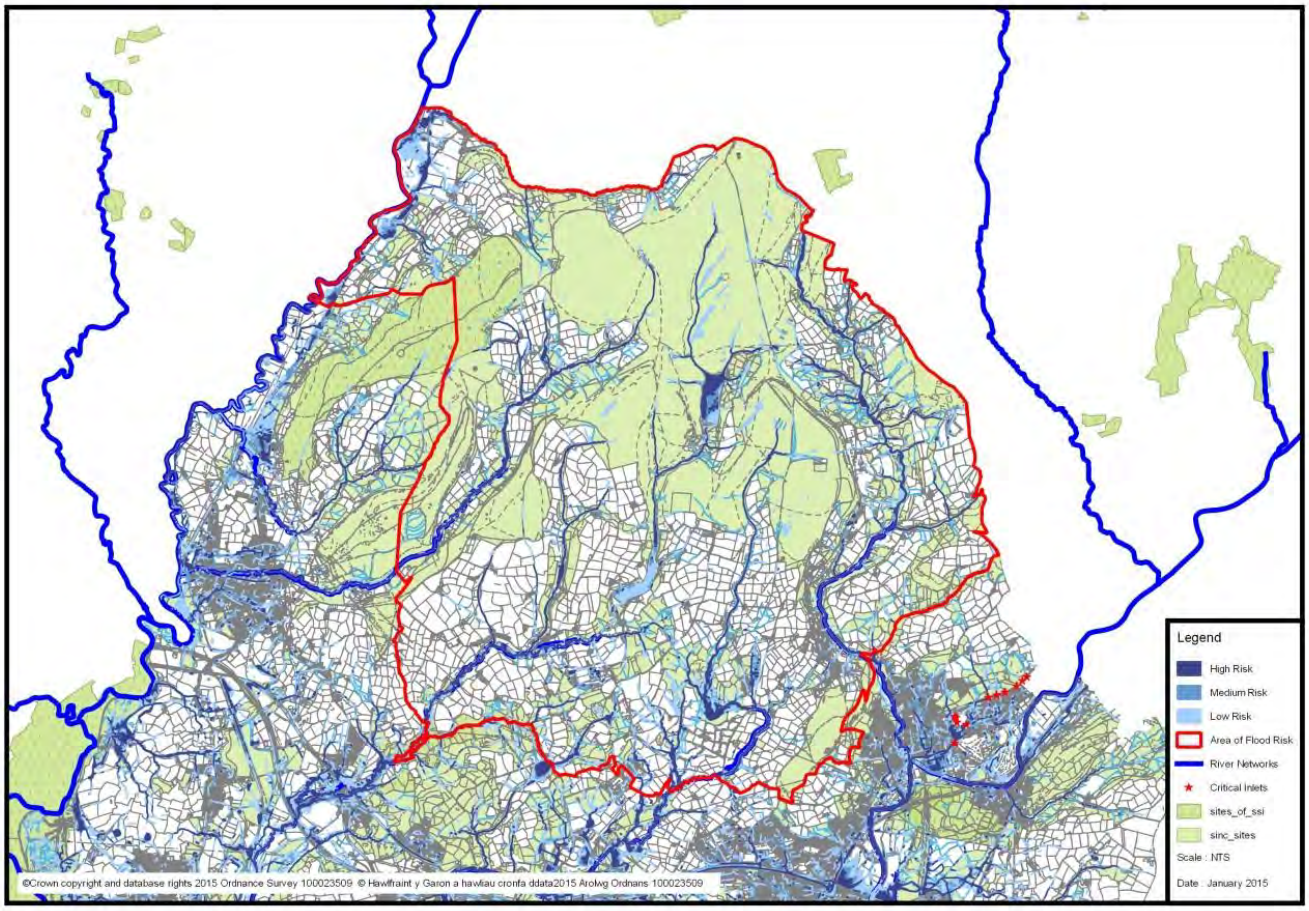
9.9 Mawr Community Area

Overview

Mawr community area is situated 16km north of city centre. The area is 5,781 and consists of the most elevated region of the administrative area and is typified with rural land use, elevated and steep sloped terrain.
The catchment drains in the lower neighbouring area of Clydach, Morriston, Llangyfelach and Pontardulais by naturally flow stream and watercourse.
There are two main rivers which emanate for the Mawr area, namely, the river Dulais in the west and River Clydach to the east. Natural flows generated from springs and run-off from in the main farmland contributes to these main rivers via open channels and streams.

There are no significant intakes in the Mawr catchment.

Figure 34 Mawr Flood Risk Mawr



Conclusions from the Flood Risk Maps

The Flood Risk Map for Mawr indicates that the main cause of flood risk for the area relates to ordinary watercourses and the intakes to existing surface water culverts. Generally this correlates with local knowledge although it is believed that the flood risk is overstated as the full capacity of the existing culverts was not included in the modelling process when the maps were prepared.

Table 75 Mawr Counts for flood risk

COUNTS FOR CCS, MAWR WARD				
Risk to People	**TOTAL**	**LOW**	**MED**	**HIGH**
Residential Properties in areas at risk of flooding Properties at Risk (n) People at Risk (n) (multiplier 2.35)	1842	7	0	0
Residential Properties at risk of flooding Properties at Risk (n) People at Risk (n) (multiplier 2.35)	784	3	0	0
Services (n)	2	0	0	0
Risk to Economic Activity				
Non-Residential Properties (n)	951	17	7	1
Airports (n)	0	0	0	0
Primary / Trunk Roads (km)	0	0	0	0
Main Railway Lines (km)	3.15	0.02	0.12	0.03
Agricultural Land – Grades 1, 2 and 3 (ha)	592.12	25.57	92.31	4.35
Risk to Natural Environment and Historic Environment				
Bathing Waters (n)	0	0	0	0
Environmental Permitting Regulations (EPR) Installations (n)	2	0	0	0
Special Areas of Conservation (SAC) (ha)	0	0	0	0
Special Protection Areas (SPA) (ha)	0	0	0	0
Ramsar Sites (ha)	0	0	0	0
World Heritage Sites (ha)	0	0	0	0
Sites of Special Scientific Interest (SSSI) (ha)	130.33	4.93	1.25	2.82
Parks and Gardens (ha)	0	0	0	0
Scheduled Ancient Monuments (ha)	1.22	0.03	0.01	0.02
Listed Buildings (n)	8	0	1	1
Licensed Abstractions (LA) (n)				
Sites of Interest for Nature Conversation (SINC) (ha)	3126.13	97.51	29.73	68.05

In addition to the existing borough wide measures to mitigate flood risk as stipulated in section 7.The following measures will be applied to the main sources of flood risk within the Mawr community area.

Table 76: Measures to mitigate flood risk in Mawr

Location	Risk Level	Risk to:	Measure	Measure Type	Link to FRMP Objective	Timing	Measure Status
River Cathan	low	Residential properties	CCS 600 Asset maintenance	Protection M35	1,4,7	2016-2021	Ongoing

In order for this Flood Risk Management Plan to be successful it is essential that significant additional funding be made available to City and County of Swansea on top of the normal funding arrangements from Welsh Government. Failure to receive this additional funding could result in measures identified in this report not being implemented either in part or in full.

Number of Measures in each category.

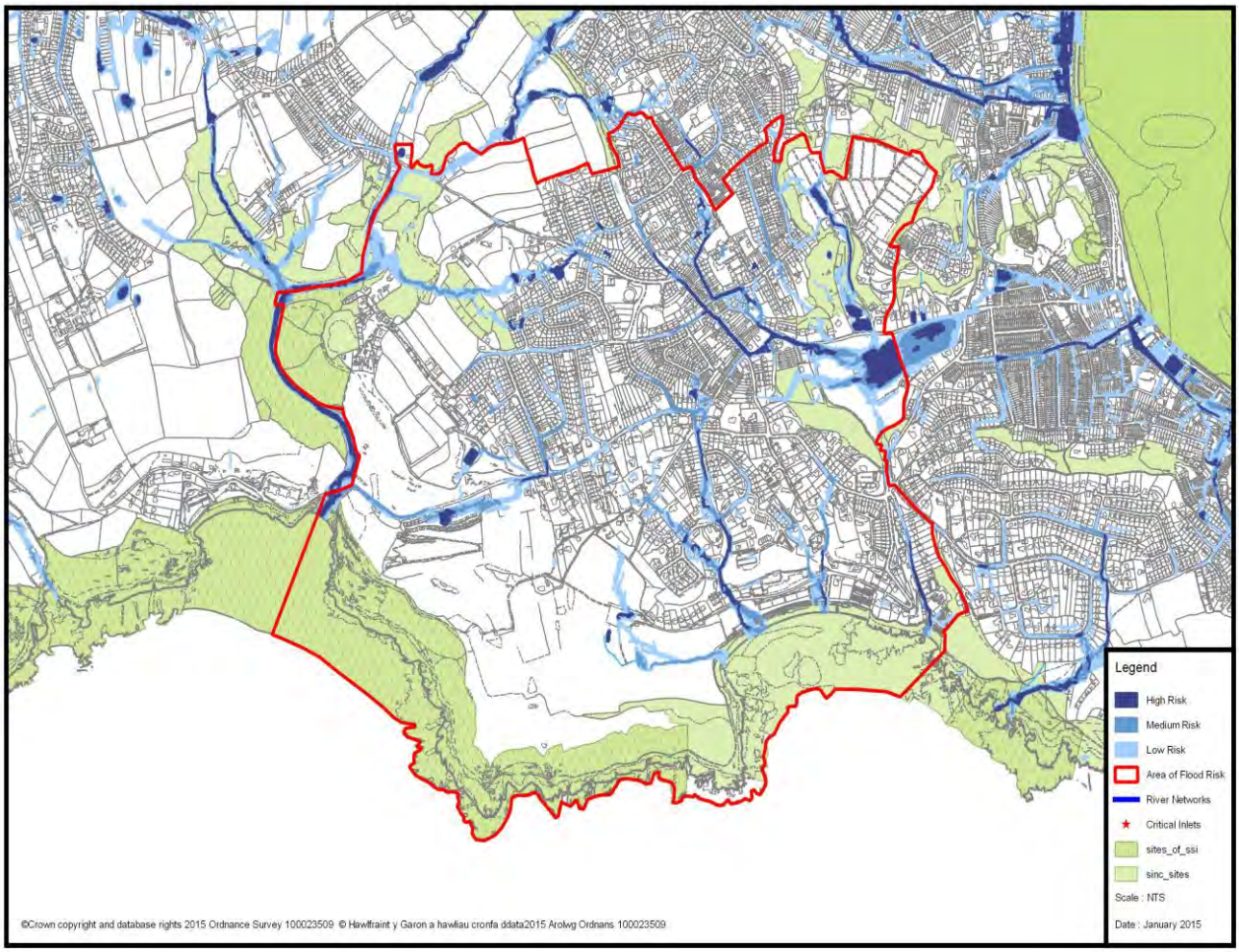
9.10 Newton Community Area

Overview

The community of area of Newton lies 7km southeast to the city centre consisting of the coastal communities of Caswell, Langland and Newton. The area is 237hectares and contains number of medium sized residential areas situated centrally and large greener areas which are used for amenity purposes on the western and southern regions of the community. The topography of the land slopes southerly from the higher regions of Newton to the coastal bays of Caswell and Langland.

There are no significant intakes in the Newton catchment.

Figure 35 Newton Flood Risk Map



Conclusions from the Flood Risk Maps

The Flood Risk Map for Newton indicates that the main cause of flood risk for the area relates to surface water run-off generated from the steep urban areas with high risk of flooding experienced in Underhill Park Playing fields. Generally this correlates with local knowledge although it is believed that the flood risk is overstated as the full capacity of the existing culverts and urban drainage systems was not included in the modelling process when the maps were prepared.

Table 77 Newton Counts for flood risk

COUNTS FOR CCS, NEWTON WARD				
Risk to People	**TOTAL**	**LOW**	**MED**	**HIGH**
Residential Properties in areas at risk of flooding Properties at Risk (n) People at Risk (n) (multiplier 2.35)	4101	54	14	7
Residential Properties at risk of flooding Properties at Risk (n) People at Risk (n) (multiplier 2.35)	1745	23	6	3
Services (n)	5	0	0	0
Risk to Economic Activity				
Non-Residential Properties (n)	313	7	2	0
Airports (n)	0	0	0	0
Primary / Trunk Roads (km)	0	0	0	0
Main Railway Lines (km)	0	0	0	0
Agricultural Land – Grades 1, 2 and 3 (ha)	33.17	2.37	5.64	0
Risk to Natural Environment and Historic Environment				
Bathing Waters (n)	1	0	0	0
Environmental Permitting Regulations (EPR) Installations (n)	0	0	0	0
Special Areas of Conservation (SAC) (ha)	2.31	0.02	0	0
Special Protection Areas (SPA) (ha)	0	0	0	0
Ramsar Sites (ha)	0	0	0	0
World Heritage Sites (ha)	0	0	0	0
Sites of Special Scientific Interest (SSSI) (ha)	33.37	0.25	0.14	0.18
Parks and Gardens (ha)	0	0	0	0
Scheduled Ancient Monuments (ha)	0	0	0	0
Listed Buildings (n)	2	0	0	0
Licensed Abstractions (LA) (n)				
Sites of Interest for Nature Conversation (SINC) (ha)	33.76	1.48	0.29	0.06

In addition to the existing borough wide measures to mitigate flood risk as stipulated in section 7.The following measures will be applied to the main sources of flood risk within the Newton community area.

Table 78: Measures to mitigate flood risk in Newton

Location	Risk Level	Risk to:	Measure	Measure Type	Link to FRMP Object	Timing	Measure Status
Underhill Park	low to high	Residential Property Highway	CCS 400 Carry out further investigation of accumulations of surface water	Other Prevention M24	1,2,7	2016-2021	Not yet started proposed

In order for this Flood Risk Management Plan to be successful it is essential that significant additional funding be made available to City and County of Swansea on top of the normal funding arrangements from Welsh Government. Failure to receive this additional funding could result in measures identified in this report not being implemented either in part or in full.

Number of Measures in each category.

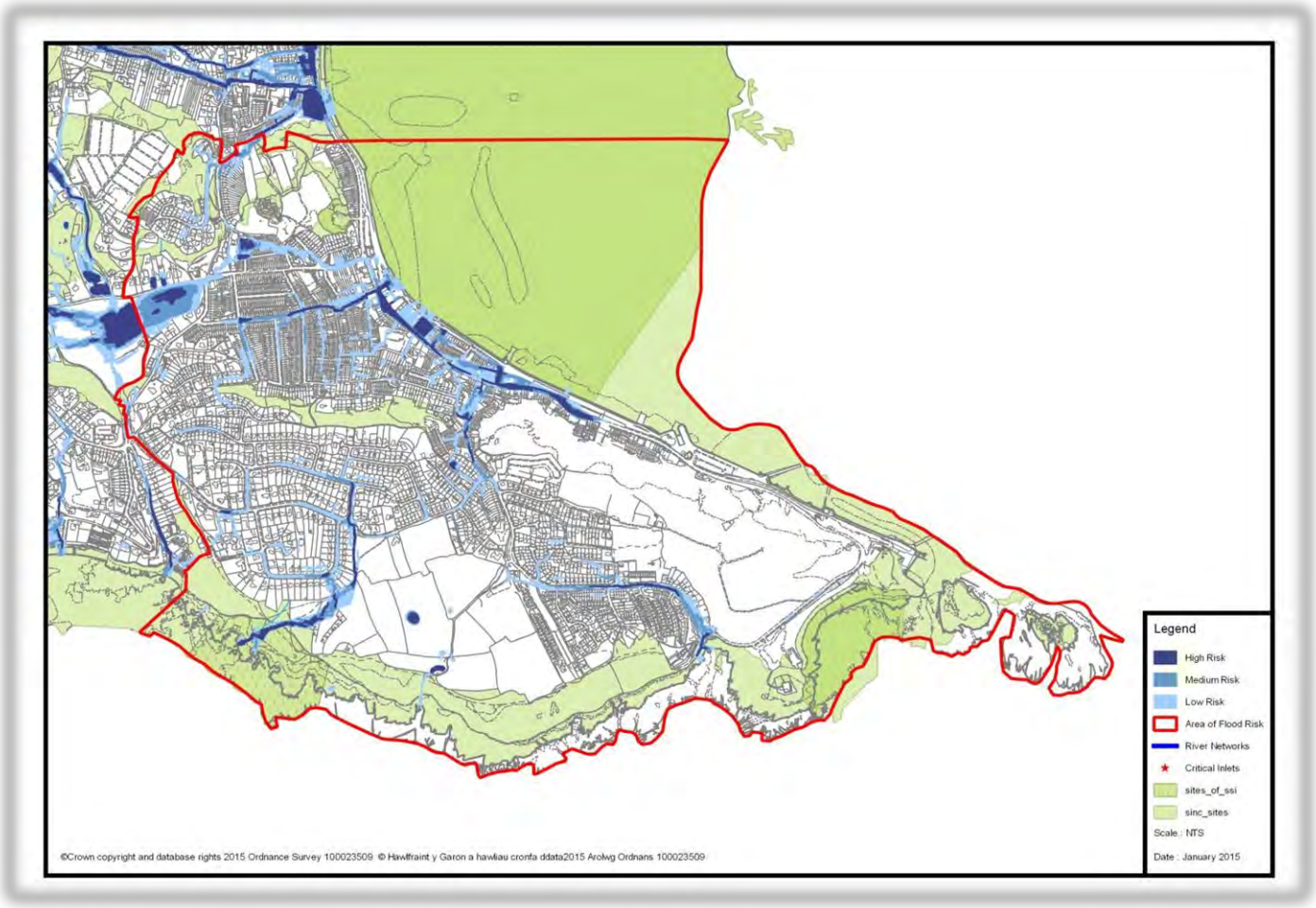
9.11 Oystermouth community area

Overview

Oystermouth ward is situated approximately 7km southwest of the city centre, consisting mainly of the seaside tourist destination of Mumbles.
The area consists of 205 hectares with urban development located form the Thistleboon on the Western higher elevated edge of the community with land sloping eastwards to meet the sea at Knab rock and surrounding coastline paths.
The catchment drains from the higher elevations of Newton and Thistleboon by a series of culverts which discharge surface water run-off from the developed area directly to the foreshore.

There are no significant intakes in the Oystermouth catchment.

Figure 36 Oystermouth Flood Risk Map



Conclusions from the Flood Risk Maps

The Flood Risk Map for Oystermouth indicates that the main cause of flood risk for the area relates to surface water run-off generated from the steep urban areas with high risk of flooding experienced in Underhill Park Playing fields and also high accumulations of surface water on the Mumbles Road in Oystermouth. Generally it is believed that the flood risk is overstated as the full capacity of the existing culverts and highway drainage networks was not included in the modelling process when the maps were prepared.

Table 79 Oystermouth Counts for flood risk

COUNTS FOR CCS, OYSTERMOUTH WARD				
Risk to People	**TOTAL**	**LOW**	**MED**	**HIGH**
Residential Properties in areas at risk of flooding Properties at Risk (n) People at Risk (n) (multiplier 2.35)	5382	87	33	7
Residential Properties at risk of flooding Properties at Risk (n) People at Risk (n) (multiplier 2.35)	2290	37	14	3
Services (n)	5	0	0	0
Risk to Economic Activity				
Non-Residential Properties (n)	4930	28	13	3
Airports (n)	0	0	0	0
Primary / Trunk Roads (km)	0	0	0	0
Main Railway Lines (km)	0	0	0	0
Agricultural Land – Grades 1, 2 and 3 (ha)	48.70	0.24	3.06	0
Risk to Natural Environment and Historic Environment				
Bathing Waters (n)	1	0	0	0
Environmental Permitting Regulations (EPR) Installations (n)	0	0	0	0
Special Areas of Conservation (SAC) (ha)	0	0	0	0
Special Protection Areas (SPA) (ha)	0	0	0	0
Ramsar Sites (ha)	0	0	0	0
World Heritage Sites (ha)	0	0	0	0
Sites of Special Scientific Interest (SSSI) (ha)	63.58	0.13	0.05	0.12
Parks and Gardens (ha)	0	0	0	0
Scheduled Ancient Monuments (ha)	0.76	0	0	0
Listed Buildings (n)	20	0	0	0
Licensed Abstractions (LA) (n)				
Sites of Interest for Nature Conversation (SINC) (ha)	109.03	0.22	0.04	0.05

In addition to the existing borough wide measures to mitigate flood risk as stipulated in section 7.The following measures will be applied to the main sources of flood risk within the Oystermouth community area.

Table 80: Measures to mitigate flood risk in Oystermouth

Location	Risk Level	Risk to:	Measure	Measure Type	Link to FRMP Objective	Timing	Measure Status
Mumbles Road	low to high	Residential and non-residential properties , Highway	CCS 400 Carry out further investigation of accumulations of surface water	Other Prevention M24	1,2,7	2016-2021	Not started proposed
Recreation Ground	low to high	Residential and non-residential properties , Highway	CCS 400 Carry out further investigation of accumulations of surface water	Other Prevention M24	1,2,7	2016-2021	Not started proposed

In order for this Flood Risk Management Plan to be successful it is essential that significant additional funding be made available to City and County of Swansea on top of the normal funding arrangements from Welsh Government. Failure to receive this additional funding could result in measures identified in this report not being implemented either in part or in full.

Number of Measures in each category.

9.12 Penclawdd community area

Overview

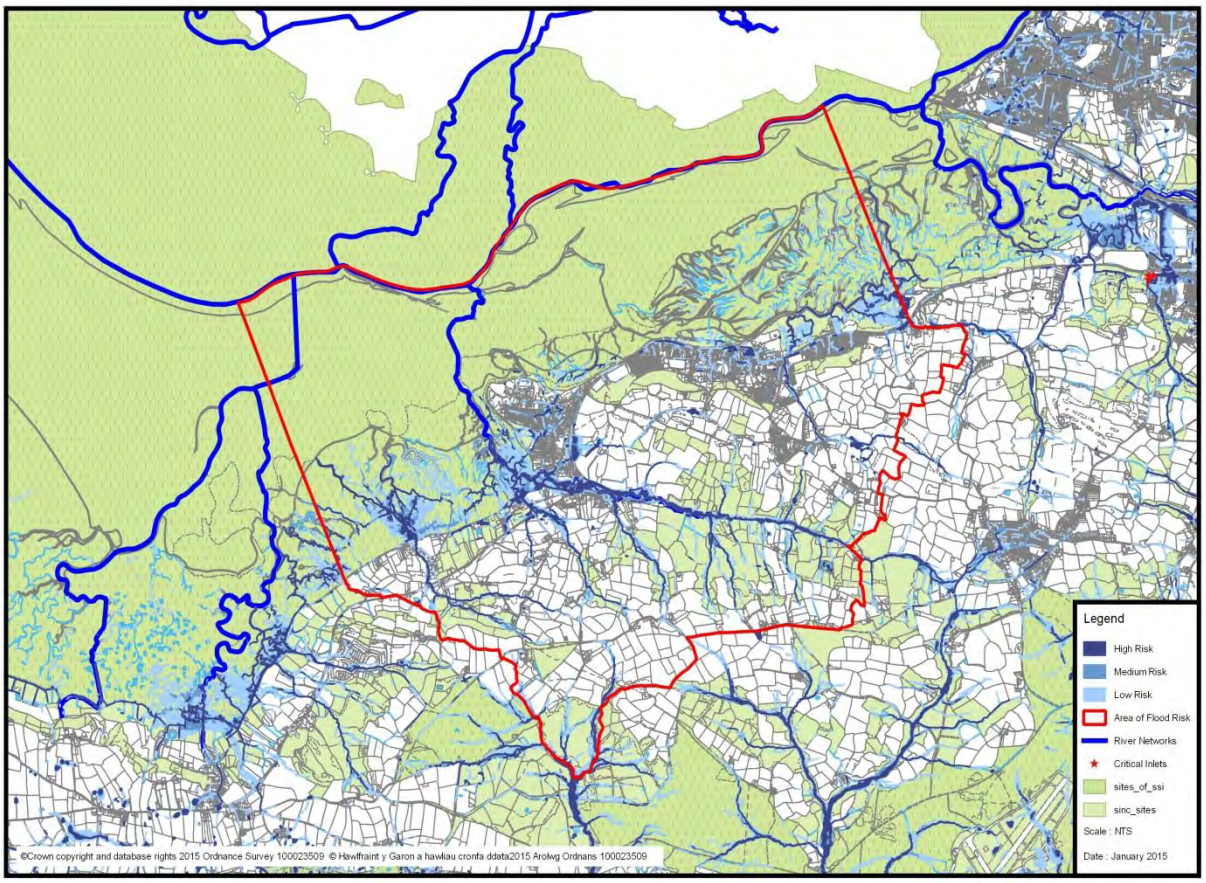
Penclawdd is situated 12km west of the city centre, consisting of the Penclawdd, Crofty, Llanmorlais, Wernffrwd, Blue Anchor and Wernbwll localities. Beyond these main villages the community is a rural in character and has much in common with the rest of the Gower peninsula to its west and south.Penclawdd is most famous for it's cockle industry which have been collected from the extensive sandy flats in the Burry Estuary which goes back to Roman times. Historically, Penclawdd was also a thriving sea port , exporting goods from the local coal mines, copper, tinplate and brass works. Today these industries have long gone, and replace by a relatively small industrial estate in Crofty. The area is 1412hecatres with topography steeply sloping from the farmland which is situated above the villages of Penclawdd and Crofty until it reaches the Burry Estuary.

Drainage of the catchment is primarily in the form of natural streams and culverts which convey surface water from the higher rural elevations of Penclawdd to discharge directly to the estuary. In many cases the outfalls are protected by tidal flaps valves.

Table 81: Penclawdd – Significant Intakes

Grid Ref	Address
E255942, N196098	Penclawdd Road, Penclawdd (Dove Lodge)

Figure 37 Penclawdd Flood Risk Map



Conclusions from the Flood Risk Maps

The Flood Risk Map for Penclawdd indicates that the main cause of flood risk for the area relates to ordinary watercourses and the intakes to existing surface water culverts. Generally this correlates with local knowledge although it is believed that the flood risk is overstated as the full capacity of the existing culverts was not included in the modelling process when the maps were prepared. Consequently, areas identified of being susceptible to high flood risk as shown on the surface water flood map will require further examination to verify the extent of flooding.

Table 82 Penclawdd for flood risk

COUNTS FOR CCS, PENCLAWDD WARD				
Risk to People	**TOTAL**	**LOW**	**MED**	**HIGH**
Residential Properties in areas at risk of flooding Properties at Risk (n) People at Risk (n) (multiplier 2.35)	3838	139	45	19
Residential Properties at risk of flooding Properties at Risk (n) People at Risk (n) (multiplier 2.35)	1633	59	19	8
Services (n)	2	0	0	0
Risk to Economic Activity				
Non-Residential Properties (n)	617	26	15	11
Airports (n)	0	0	0	0
Primary / Trunk Roads (km)	0	0	0	0
Main Railway Lines (km)	0	0	0	0
	735.58	4.61	60.25	0
Risk to Natural Environment and Historic Environment				
Bathing Waters (n)	0	0	0	0
Environmental Permitting Regulations (EPR) Installations (n)	1	0	0	0
Special Areas of Conservation (SAC) (ha)	968.73	30.76	5.16	7.89
Special Protection Areas (SPA) (ha)	968.67	0.59	5.15	7.85
Ramsar Sites (ha)	968.67	29.49	5.15	0.09
World Heritage Sites (ha)	0	0	0	0
Sites of Special Scientific Interest (SSSI) (ha)	29.50	0.13	0.14	7.89
Parks and Gardens (ha)	0	0	0	0
Scheduled Ancient Monuments (ha)	4.02	0.41	0.01	0.01
Listed Buildings (n)	5	0	0	0
Licensed Abstractions (LA) (n)				
Sites of Interest for Nature Conversation (SINC) (ha)	311.90	20.63	5.05	8.22

In addition to the existing borough wide measures to mitigate flood risk as stipulated in section 7.The following measures will be applied to the main sources of flood risk within the Penclawdd community area.

Table 83: Measures to mitigate flood risk in Penclawdd

Location	Risk Level	Risk to:	Measure	Measure Type	Link to FRMP Objective	Timing	Measure Status
New Road/Station Road Llanmorlais	low to high	Residential and non- residential properties , highway	CCS 400 Carry out further investigation of accumulations of surface water	Other Prevention M24	1,2,7	2016-2021	Not started proposed
Nant y cedi Watercourse	low to high	Residential and non- residential properties , Highway	CCS 600 Flood Asset maintenance	Protection M35	1,4,7	2016-2021	Not started proposed
SeaView	low to high	Residential and non- residential properties , highway	CCS 400 Carry out further investigation of accumulations of surface water	Other Prevention M24	1,2,7	2016-2021	Not started proposed

In order for this Flood Risk Management Plan to be successful it is essential that significant additional funding be made available to City and County of Swansea on top of the normal funding arrangements from Welsh Government. Failure to receive this additional funding could result in measures identified in this report not being implemented either in part or in full.

Number of Measures in each category.

9.13 Penllergaer Community area

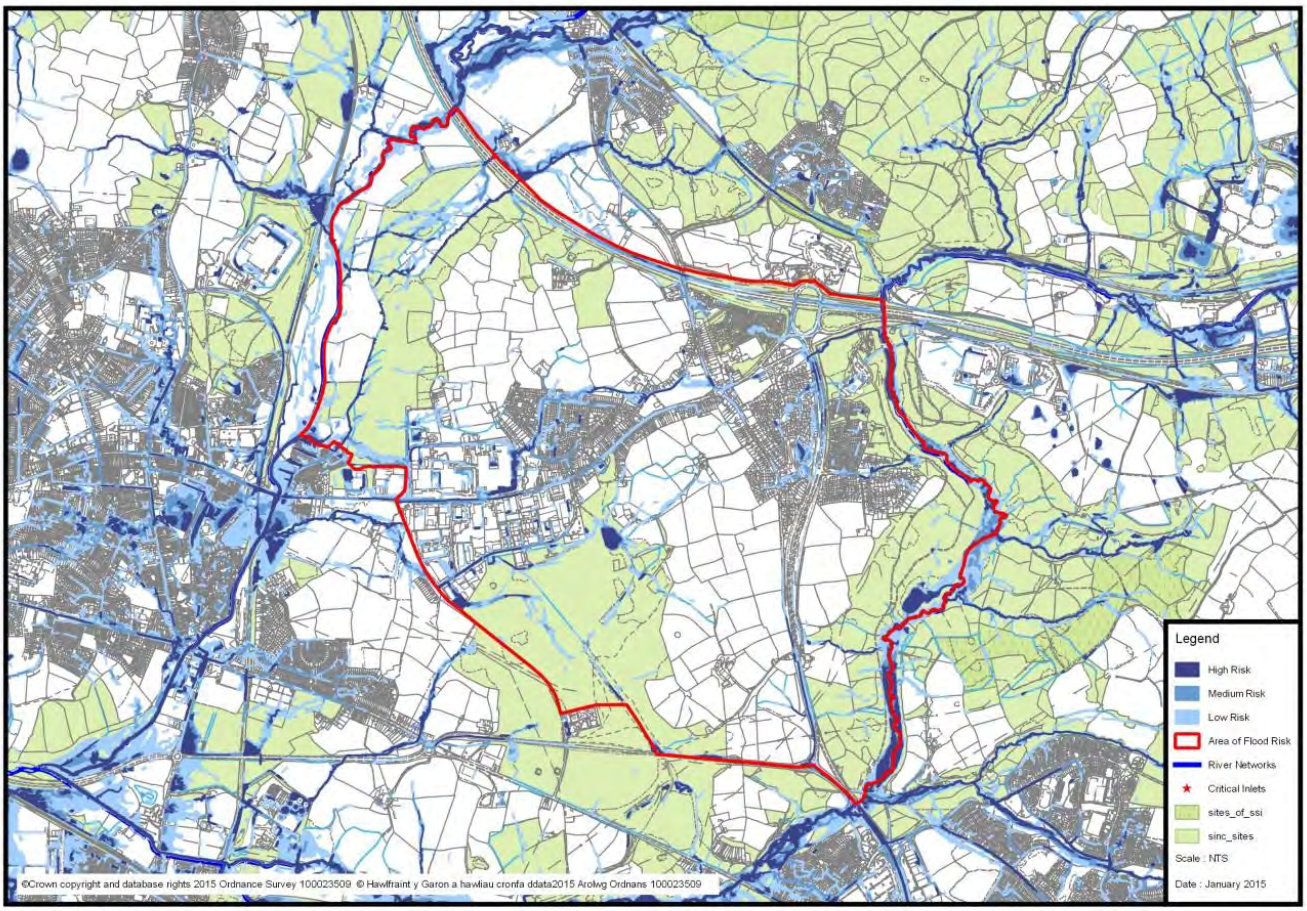
Overview

Penllergaer is situated 9km northwest of Swansea City centre, adjacent to the M4 motorway.The area is 601ha with most of the land use being characterised by grassed common land and two small urban areas. The ward contain one major employer of the area known as 3Ms PLC and contain small industrial and commercial units on the Garngoch Industrial Estate.
The catchment drains by conveying flows through the existing stream and piped watercourses transfers flows from the higher elevation of the eastern fringes to the lower lying land in Gorseinon situated on the most westerly edge where it discharges to the Afon Lliw.

Table 84 Penllergaer – Significant Intakes

Grid Ref	Address
E260808, N199016	Llewellyn Road, Penllergaer (s/o No. 62)
E260565, N198211	Phoenix Way, Garngoch (Industrial Estate)

Figure 38 Penllergaer Flood Risk Map



Conclusions from the Flood Risk Maps

The Flood Risk Map for Penllergaer indicates that the main cause of flood risk for the area relates to ordinary watercourses and the intakes to existing surface water culverts. Generally this correlated with local knowledge although it is believed that the flood risk is overstated as the full capacity of the existing culverts was not included in the modelling process when the maps were prepared.

Table 85 Penllergaer for flood risk

COUNTS FOR CCS, PENLLERGAER WARD				
Risk to People	**TOTAL**	**LOW**	**MED**	**HIGH**
Residential Properties in areas at risk of flooding Properties at Risk (n) People at Risk (n) (multiplier 2.35)	2876	106	9	0
Residential Properties at risk of flooding Properties at Risk (n) People at Risk (n) (multiplier 2.35)	1224	45	4	0
Services (n)	1	0	0	0
Risk to Economic Activity				
Non-Residential Properties (n)	457	26	15	14
Airports (n)	0	0	0	0
Primary / Trunk Roads (km)	6.17	0.95	0.47	0.11
Main Railway Lines (km)	0	0	0	0
Agricultural Land – Grades 1, 2 and 3 (ha)	365.79	9.11	33.78	0
Risk to Natural Environment and Historic Environment				
Bathing Waters (n)	0	0	0	0
Environmental Permitting Regulations (EPR) Installations (n)	2	1	0	0
Special Areas of Conservation (SAC) (ha)	0	0	0	0
Special Protection Areas (SPA) (ha)	0	0	0	0
Ramsar Sites (ha)	0	0	0	0
World Heritage Sites (ha)	0	0	0	0
Sites of Special Scientific Interest (SSSI) (ha)	0	0	0	0
Parks and Gardens (ha)	67.84	4.17	1.74	4.66
Scheduled Ancient Monuments (ha)	0.13	0	0	0
Listed Buildings (n)	5	0	0	0
Licensed Abstractions (LA) (n)				
Sites of Interest for Nature Conversation (SINC) (ha)	231.34	12.00	3.19	7.3

In addition to the existing borough wide measures to mitigate flood risk as stipulated in section 7.The following measures will be applied to the main sources of flood risk within the Penllergaer community area.

Table 86: Measures to mitigate flood risk in Penllergaer

Location	Risk Level	Risk to:	Measure	Measure Type	Link to FRMP Objective	Timing	Measure Status
Watercourse Llewellyn Road	low to medium	Residential, non-residential properties Highway	CCS 600 Asset maintenance	Protection M35	1,4,7	2016-2021	Not started proposed
Gwalia Close	low	Residential, non-residential properties Highway	CCS 400 Carry out further investigation of accumulations of surface water	Other Prevention M24	1,2,7	2016-2021	Not started proposed

In order for this Flood Risk Management Plan to be successful it is essential that significant additional funding be made available to City and County of Swansea on top of the normal funding arrangements from Welsh Government. Failure to receive this additional funding could result in measures identified in this report not being implemented either in part or in full.

Number of Measures in each category.

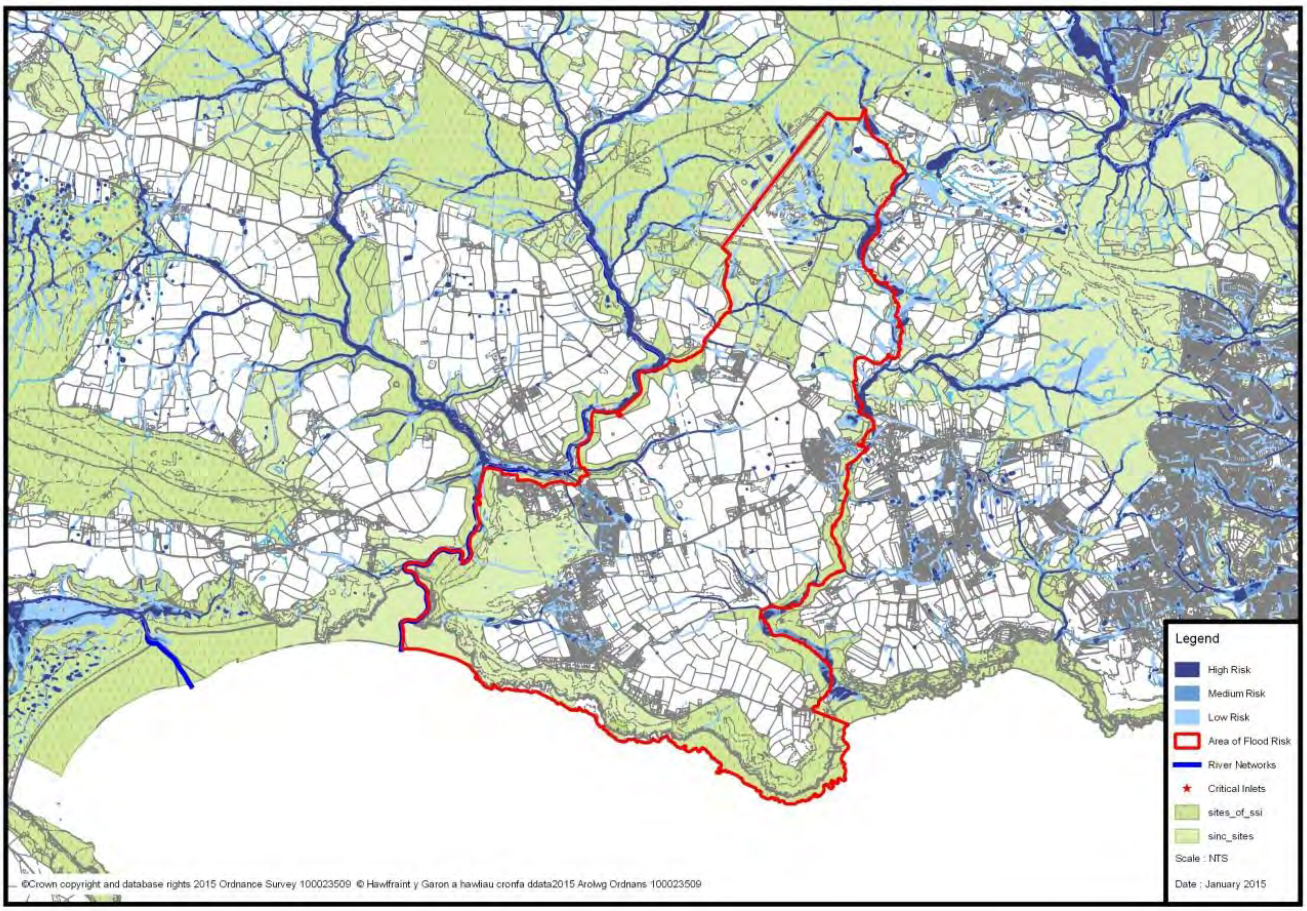
9.14 Pennard Community area

Overview

Pennard community area is situated 11km Southwest of City Centre consisting mainly of the Kittle, Pennard and Southgate villages. Apart from these three localities the remainder of the catchment is rural and typifies the characteristics one would expect on the Gower Peninsula.
The catchment drains naturally from the high rural areas by conveyance using natural ditches and streams to discharge directly to the sea.

There are no significant intakes in the Pennard catchment.

Figure 39 Pennard Flood Risk Map



Conclusions from the Flood Risk Maps

The Flood Risk Map for Pennard indicates that the main cause of flood risk for the area relates to ordinary watercourses and streams in this ward. High flood risk is identified on Black Hills lane which will require further verification. Generally this correlates with local knowledge although it is believed that the flood risk is overstated as the full capacity of the existing drainage network was not included in the modelling process when the maps were prepared.

Table 87 Pennard counts for flood risk

COUNTS FOR CCS, PENNARD WARD				
Risk to People	**TOTAL**	**LOW**	**MED**	**HIGH**
Residential Properties in areas at risk of flooding Properties at Risk (n) People at Risk (n) (multiplier 2.35)	2902	35.25	9	2
Residential Properties at risk of flooding Properties at Risk (n) People at Risk (n) (multiplier 2.35)	1235	15	4	1
Services (n)	2	0	0	0
Risk to Economic Activity				
Non-Residential Properties (n)	395	0	0	0
Airports (n)	1	0	0	0
Primary / Trunk Roads (km)	0	0	0	0
Main Railway Lines (km)	0	0	0	0
Agricultural Land – Grades 1, 2 and 3 (ha)	632.34	7.84	37.71	0
Risk to Natural Environment and Historic Environment				
Bathing Waters (n)	1	0	0	0
Environmental Permitting Regulations (EPR) Installations (n)	0	0	0	0
Special Areas of Conservation (SAC) (ha)	202.83	8.25	2.26	3.21
Special Protection Areas (SPA) (ha)	0	0	0	0
Ramsar Sites (ha)	0	0	0	0
World Heritage Sites (ha)	0	0	0	0
Sites of Special Scientific Interest (SSSI) (ha)		9.16	3.15	3.87
Parks and Gardens (ha)	17.79	0.72	0.38	0.35
Scheduled Ancient Monuments (ha)	1.66	0	0	0
Listed Buildings (n)	12	1	0	0
Licensed Abstractions (LA) (n)				
Sites of Interest for Nature Conversation (SINC) (ha)	251.32	10.91	2.33	4.70

In addition to the existing borough wide measures to mitigate flood risk as stipulated in section 7.The following measures will be applied to the main sources of flood risk within the Pennard community area.

Table 88: Measures to mitigate flood risk in Pennard

Location	Risk Level	Risk to:	Measure	Measure Type	Link to FRMP Objective	Timing	Measure Status
A4118 Blackhills Lane	low to high	Highway	CCS 400 Carry out further investigation of accumulations of surface water	Other Prevention M24	1,2,7	2016-2021	Not started proposed

In order for this Flood Risk Management Plan to be successful it is essential that significant additional funding be made available to City and County of Swansea on top of the normal funding arrangements from Welsh Government. Failure to receive this additional funding could result in measures identified in this report not being implemented either in part or in full.

Number of Measures in each category.

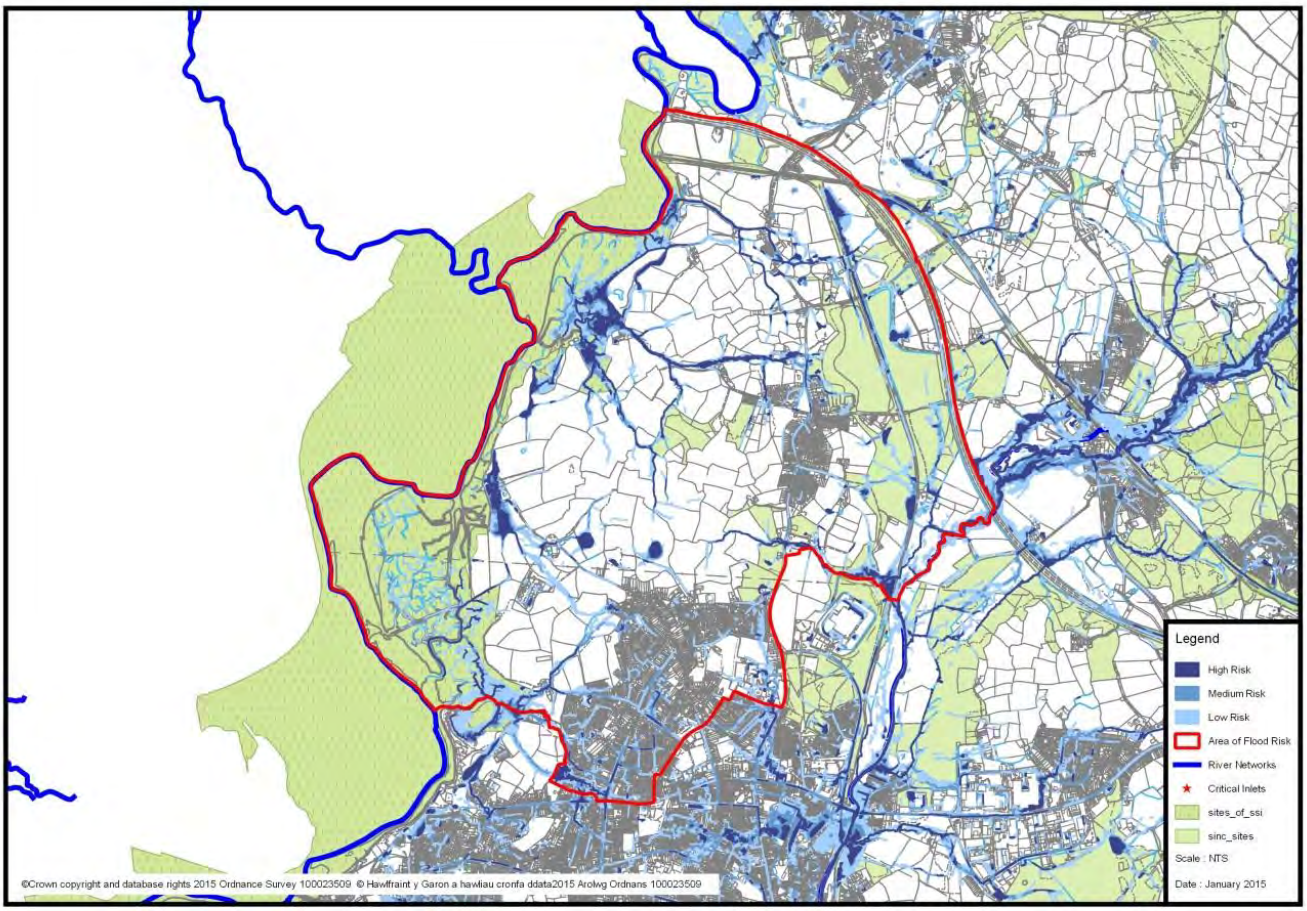
9.15 Penyrheol Community area

Overview

Penyrheol is approximately 9km northwest of the City Centre consisting of the Penyrheol , Grovesend and Waungron localities. The area is 865 hectares and predominantly the land use is farmland essentially low lying extends to the West to meet the Loughor Estuary. The M4 corridor is to the most northern Eastern part of the area. Penhyrheol is closely linked to the adjoining district centre of Gorseinon. The catchment is served by a number of small stream and pipe surface water networks.

There are no significant intakes in the Penyrheol catchment.

Figure 40 Penyrheol Flood Risk Map



Conclusions from the Flood Risk Maps

The Flood Risk Map for Penyrheol indicates that the main cause of flood risk for the area relates to ordinary watercourses and the intakes to existing surface water culverts. The flood extents map indicates three areas susceptible to high flood risk and these have been included in Table 90 below for further investigation. Generally this correlates with local knowledge although it is believed that the flood risk is overstated as the full capacity of the existing culverts was not included in the modelling process when the maps were prepared.

Table 89 Penyrheol counts for flood risk

COUNTS FOR CCS, PENYRHEOL WARD				
Risk to People	**TOTAL**	**LOW**	**MED**	**HIGH**
Residential Properties in areas at risk of flooding Properties at Risk (n) People at Risk (n) (multiplier 2.35)	5617	155	45	23
Residential Properties at risk of flooding Properties at Risk (n) People at Risk (n) (multiplier 2.35)	2390	66	19	10
Services (n)	4	0	0	0
Risk to Economic Activity				
Non-Residential Properties (n)	451	29	15	14
Airports (n)	0	0	0	0
Primary / Trunk Roads (km)	6.95	0.16	0.04	0.03
Main Railway Lines (km)	1.30	0	0	0
Agricultural Land – Grades 1, 2 and 3 (ha)	373.45	5.16	44.26	0
Risk to Natural Environment and Historic Environment				
Bathing Waters (n)	0	0	0	0
Environmental Permitting Regulations (EPR) Installations (n)	3	0	0	0
Special Areas of Conservation (SAC) (ha)	185.92	15.63	4.96	5.33
Special Protection Areas (SPA) (ha)	0	0	0	0
Ramsar Sites (ha)	0	0	0	0
World Heritage Sites (ha)	0	0	0	0
Sites of Special Scientific Interest (SSSI) (ha)	185.92	15.31	4.96	5.33
Parks and Gardens (ha)	0	0	0	0
Scheduled Ancient Monuments (ha)	0.32	0	0	0
Listed Buildings (n)	1	0	0	0
Licensed Abstractions (LA) (n)				
Sites of Interest for Nature Conversation (SINC) (ha)	126.09	3.01	1.61	3.01

In addition to the existing borough wide measures to mitigate flood risk as stipulated in section 7.The following measures will be applied to the main sources of flood risk within the Penyrheol community area.

Table 90: Measures to mitigate flood risk in Penyrheol

Location	Risk Level	Risk to:	Measure	Measure Type	Link to FRMP Objective	Timing	Measure Status
Waungron	low to high	Residential properties Highway	CCS 400 Carry out further investigation of accumulations of surface water	Other Prevention M24	1,2,7	2016-2021	Not started proposed
Frampton Road	low to high	Residential properties Highway	CCS 400 Carry out further investigation of accumulations of surface water	Other Prevention M24	1,2,7	2016-2021	Not started proposed
Coalbrook Road	low to high	Highway	CCS 500 Flood Asset Inspection	Other Prevention M24	1,2,7,8	2016-2021	Not started proposed

In order for this Flood Risk Management Plan to be successful it is essential that significant additional funding be made available to City and County of Swansea on top of the normal funding arrangements from Welsh Government. Failure to receive this additional funding could result in measures identified in this report not being implemented either in part or in full.

Number of Measures in each category

9.16 Pontardulais Community area

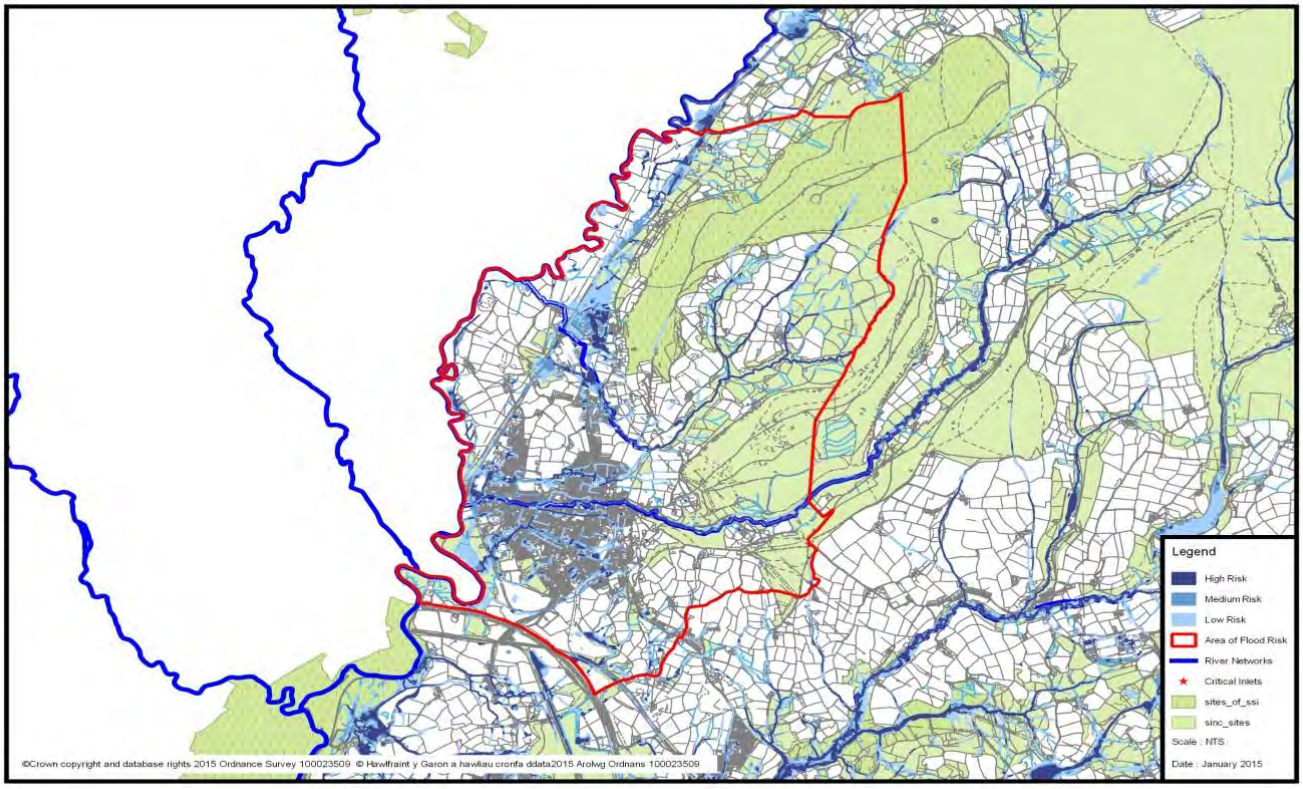
Overview

Pontardulais is 12km north west of the city centre. It is devided from the Penyrheol ward by the M4 corridor. The main town of Pontardulais is situated in the southwest part of the community. The remainder of the area is of rural nature with the topography steeply falling from the Mynydd Yr Gwair mountainous region to the more gentler sloping locality of the main residential and shopping areas adjacent to the river Loughor. The heart of Wales railway line runs on the western fringe of the catchment and the M4 to the most southerly part. The area has two main river which drain the catchment the river Loughor and Dulais which are regulated by Natural Resources Wales. The area of Pontardulais is 1558ha.

The catchment is drained by a number of small watercourses which are piped as flows are conveyed through the town centre.

There are no significant intakes in the Pontardulais catchment.

Figure 41 Pontardulais Flood Risk Map



Conclusions from the Flood Risk Maps

The Flood Risk Map for Pontardulais indicates that the main cause of flood risk for the area relates to ordinary watercourses and the intakes to existing surface water culverts. The map indicates high flood risk in Station Road, Dantwyn and St Teilo street which needs further assessment in order to understand the validity of the flooding as shown on the flood map. Generally this correlates with local knowledge although it is believed that the flood risk is overstated as the full capacity of the existing culverts was not included in the modelling process when the maps were prepared.

Table 91 Pontardulais counts for flood risk

COUNTS FOR CCS, PONTARDULAIS WARD				
Risk to People	**TOTAL**	**LOW**	**MED**	**HIGH**
Residential Properties in areas at risk of flooding Properties at Risk (n) People at Risk (n) (multiplier 2.35)	6573	320	68	42
Residential Properties at risk of flooding Properties at Risk (n) People at Risk (n) (multiplier 2.35)	2797	136	29	18
Services (n)	7	0	0	0
Risk to Economic Activity				
Non-Residential Properties (n)	918	38	17	10
Airports (n)	0	0	0	0
Primary / Trunk Roads (km)	0	0	0	0
Main Railway Lines (km)	4.85	0.12	0.68	0.05
Agricultural Land – Grades 1, 2 and 3 (ha)	492.61	25.29	117.21	0.36
Risk to Natural Environment and Historic Environment				
Bathing Waters (n)	0	0	0	0
Environmental Permitting Regulations (EPR) Installations (n)	1	0	0	0
Special Areas of Conservation (SAC) (ha)	0	0	0	0
Special Protection Areas (SPA) (ha)	0	0	0	0
Ramsar Sites (ha)	0	0	0	0
World Heritage Sites (ha)	0	0	0	0
Sites of Special Scientific Interest (SSSI) (ha)	229.43	1.03	0.17	5.33
Parks and Gardens (ha)	0	0	0	0
Scheduled Ancient Monuments (ha)	1.10	0	0	0
Listed Buildings (n)	5	0	0	0
Licensed Abstractions (LA) (n)				
Sites of Interest for Nature Conversation (SINC) (ha)	487.28	9.46	8.48	27.37

In addition to the existing borough wide measures to mitigate flood risk as stipulated in section 7.The following measures will be applied to the main sources of flood risk within the Pontardulais community area.

Table 92: Measures to mitigate flood risk in Pontardulais

Location	Risk Level	Risk to:	Measure	Measure Type	Link to FRMP Objective	Timing	Measure Status
St Teilo Street	low to high	Residential properties Highway	CCS 500: Flood Asset Inspection	Other prevention M24	1,2,7,8	2016-2021	Not started proposed
Station Road	low to high	Residential and non- residential properties Highway	CCS 400 Carry out further investigation of accumulations of surface water	Other Prevention M24	1,2,7	2016-2021	Not started proposed
Dantwyn	low to high	Residential and non- residential properties Highway	CCS 500 Flood Asset Inspection	Other prevention M24	1,2,7,8	2016-2021	Not started proposed

In order for this Flood Risk Management Plan to be successful it is essential that significant additional funding be made available to City and County of Swansea on top of the normal funding arrangements from Welsh Government. Failure to receive this additional funding could result in measures identified in this report not being implemented either in part or in full.

Number of Measures in each category

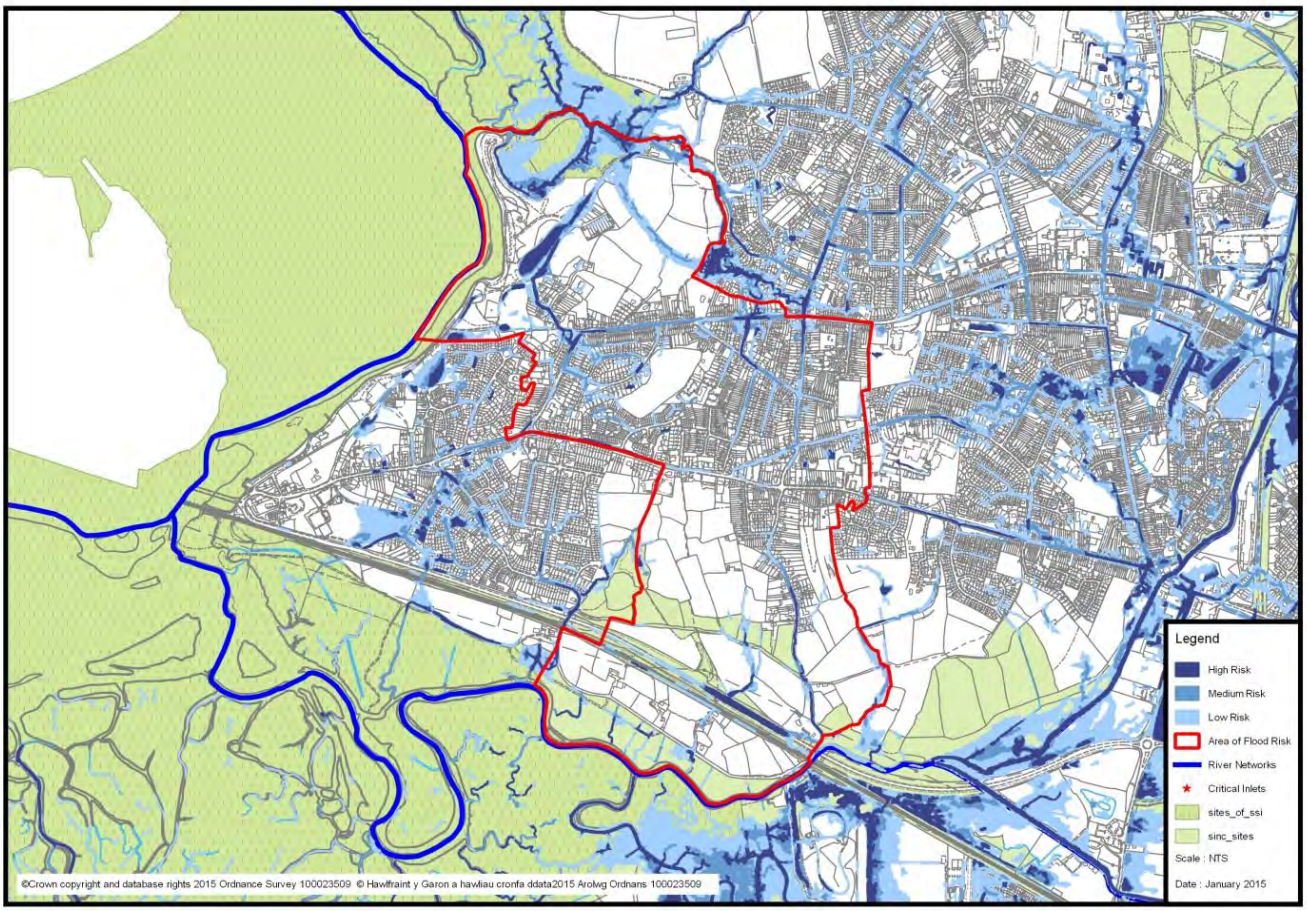
9.17 Upper Loughor Community area

Overview

Upper Loughor Community is situated 9km northwest of the city centre, consisting of the north and east parts of the Loughor locality. The residential area is centrally located with lands sloping both northwards and southwards from the residential area to meet the Loughor estuary. The catchment drains via a series of culverts which discharge directly to the estuary. Although there are no significant intakes in this ward, the Authority currently maintain a number of flap valves on some of the outfalls on surface water drainage systems which serve the catchment in order to protect against the effects of tidal flooding.

There are no significant intakes in the Upper Loughor catchment.

Figure 42 Upper Loughor Flood Risk Map



Conclusions from the Flood Risk Maps

The Flood Risk Map for Upper Loughor indicates that the main cause of flood risk for the area relates to ordinary watercourses and culverts with the extents map showing accumulations of surface water on the Loughor foreshore. Generally this correlates with local knowledge although it is believed that the flood risk is overstated as the full capacity of the existing culverts was not included in the modelling process when the maps were prepared.

Table 93 Upper Loughor - counts for flood risk

COUNTS FOR CCS, UPPER LOUGHOR WARD				
Risk to People	**TOTAL**	**LOW**	**MED**	**HIGH**
Residential Properties in areas at risk of flooding Properties at Risk (n) People at Risk (n) (multiplier 2.35)	2797	68	9	0
Residential Properties at risk of flooding Properties at Risk (n) People at Risk (n) (multiplier 2.35)	1190	29	4	0
Services (n)	2	0	0	0
Risk to Economic Activity				
Non-Residential Properties (n)	215	2	0	0
Airports (n)	0	0	0	0
Primary / Trunk Roads (km)	0	0	0	0
Main Railway Lines (km)	0.81	0	0.02	0.01
Agricultural Land – Grades 1, 2 and 3 (ha)	16.88	2.65	7.56	0
Risk to Natural Environment and Historic Environment				
Bathing Waters (n)	0	0	0	0
Environmental Permitting Regulations (EPR) Installations (n)	0	0	0	0
Special Areas of Conservation (SAC) (ha)	12.57	2.83	0.76	0.72
Special Protection Areas (SPA) (ha)	1.14	0	0	0
Ramsar Sites (ha)	1.14	0	0	0
World Heritage Sites (ha)	0	0	0	0
Sites of Special Scientific Interest (SSSI) (ha)	12.57	2.79	0.76	0.72
Parks and Gardens (ha)	0	0	0	0
Scheduled Ancient Monuments (ha)	0	0	0	0
Listed Buildings (n)	4	0	0	0
Licensed Abstractions (LA) (n)				
Sites of Interest for Nature Conversation (SINC) (ha)	17.89	0.99	0.14	0.36

In addition to the existing borough wide measures to mitigate flood risk as stipulated in section 7.The following measures will be applied to the main sources of flood risk within the Upper Loughor community area.

Table 94: Measures to mitigate flood risk in Upper Loughor

Location	Risk Level	Risk to:	Measure	Measure Type	Link to FRMP Objective	Timing	Measure Status
Gwynfe Road	low to high	Highway	CCS 400 Carry out further investigation of accumulations of surface water	Other Prevention M24	1,2,7	2016-2021	Not started proposed
Corporation Road	low to high	Highway	CCS 400 Carry out further investigation of accumulations of surface water	Other Prevention M24	1,2,7	2016-2021	Not started proposed
Borough Road	low to high	Residential properties ,Highway	CCS 400 Carry out further investigation of accumulations of surface water	Other Prevention M24	1,2,7	2016-2021	Not started proposed

In order for this Flood Risk Management Plan to be successful it is essential that significant additional funding be made available to City and County of Swansea on top of the normal funding arrangements from Welsh Government. Failure to receive this additional funding could result in measures identified in this report not being implemented either in part or in full.

Number of Measures in each category.

10.0 Public Consultation

The Public Consultation of this plan will take place October 2015 for a period of 6 weeks. The draft Flood Risk Management Plan will be published on the Authority's web page. A facility allowing our Flood Risk Partners to comment on the document will also be made available. All Flood Risk Partners are encouraged to respond to the consultation and make comments on the document with the Risk Management Authorities being encouraged to provide more in depth responses.

All responses that are received during the consultation period will be incorporated into a spread sheet and will be reviewed by officers for comment. Any response which identifies a potential change in the document will be considered and the consequent change will be made if relevant. The spread sheet will then be published on the Authority's web page approximately 12 weeks after the close of the consultation period

10.1 Public Consultation Response

The Consultation period took place between 23rd October to 5th December 2015 with a total of five responses in the feedback/ comments. Five members of the public registered their comments with the majority agreeing that the Draft Flood Risk Management Plan sets out the most significant flood risk in the City and County of Swansea and agreed that the measures contained within the plan were satisfactory. A summary of the public consultation response is attached in Appendix 2.

10.2 Consultation with Flood Risk Management Authorities

Natural Resources Wales

There has been significant interaction and collaboration between CCS and NRW through the South West Wales Flood Risk Management Group and the Flood Risk Management Plan Working Group. Attendance to all scheduled meetings has been achieved by both parties providing opportunities for continued collaborative working.

NRW feedback does directly refer to the content of the report and its relevance and conformance with the template and legislative requirements. Each point has been addressed and the detail of these can be found in Appendix 2.

Welsh Government

There has been collaboration with Welsh Government through attendance at the South West Wales Flood Risk Management Group and the Flood Risk Management Plan Working Group.

Dŵr Cymru Welsh Water

CCS have held quarterly meetings with DCWW to discuss the progress of the FRMP along with any other areas where partnership working is a possibility. During each of these meetings DCWW provide the Authority with updated details of their network. Both organisations also meet regularly through the South West Wales Flood Risk Management Group.

11.0 Implementation, Monitoring and review

11.1 Funding

For the FRMP to be implemented fully it is essential that funding continues to be made available from Welsh Government as existing revenue funding is not sufficient.

In order to fund work identified as a result of the proposed investigations the City and County of Swansea will seek funding from the Welsh Government Capital Grant programme and the following sources:

Funding through European Union

The new Structural Fund Programme in Wales 2014-2020 for West Wales and the Valleys identifies funding for prioritised local infrastructure under ERDF Priority 4: Connectivity. Information from investigations identified in this report will be used to inform future funding bids.

Private Funding

Section 106 of the Town and Country Planning Act 1990 allows a local planning authority to enter into an agreement with a landowner or developer in association with the granting of planning permission. This funding would only be available if the required works were directly related to the proposed scheme.

Water Company Funding

Water companies invest money in flood alleviation schemes as part of their duties to remove properties from the sewer flooding (DG5) register. Sometimes the most cost effective way to do this is to work in partnership with risk management authorities on flood alleviation schemes in other areas which can help reduce surface water pressure downstream.

Local Fundraising

It may be possible that some funding will be made available from the local communities and businesses that stand to benefit from the proposed flood scheme.

11.2 Monitoring

Natural Resources Wales must review this FRMP before publication.

This draft Plan sets out on-going, agreed and proposed measures to manage flood risk within City and County of Swansea. Implementing the measures set out will take place over the 2015-2021 planning cycle.

The first review of the FRMP will be completed by 22nd June 2021 and subsequent reviews will be carried out at 6 year intervals.

Following the review CCS will prepare a revised FRMP which will take into account the following:-

- The impact of climate change on the occurrence of flooding.
- An assessment of the progress made towards implementing the measures contained in this FRMP.
- If measures have not been implemented a statement of reasons why those measures have not been implemented.

In the December of each year following completion of this FRMP the current position regarding the implementation of each measure listed will be monitored. Appropriate action will be taken where possible to complete the implementation in accordance with the time scale.

In order for this FRMP to be successful it is essential that significant additional funding be made available to CCS on top of the normal funding arrangements from Welsh Government. Failure to receive this additional funding could result in measures identified in this report not being implemented either in part or in full.

12.0 Strategic Environmental Assessment (SEA)

To meet strategic environmental assessment (SEA) requirements we are relying on the SEA work undertaken on the Flood Risk Management Strategy. We do not believe there are any significant changes that require us to update the SEA. The SEA can be viewed by contacting the Authority's Drainage and Coastal Management Section at the following email address. Drainagecoastal@swansea.gov.uk

13.0 References

National strategy for flood and coastal erosion risk management:
http://wales.gov.uk/topics/environmentcountryside/epq/flooding/nationalstrategy/strategy/?lang= en

National Strategy for Flood and Coastal Erosion Risk Management in Wales
http://wales.gov.uk/docs/desh/publications/111114floodingstrategyen.pdf

Local strategy for flood risk management:
http://www.swansea.gov.uk/article/8031/Flooding-advice
http://www.swansea.gov.uk/floodstrategy

EU Floods Directive: http://ec.europa.eu/environment/water/flood_risk/

Western Wales River Basin Management Plan:
https://www.gov.uk/government/collections/river-basin-management-plans

Flood Risk Regulations 2009:
http://webarchive.nationalarchives.gov.uk/20140328084622/http://www.legislation.gov.uk/uksi/20 09/3042/contents/made

Flood and Water management Act 2010:
http://www.legislation.gov.uk/ukpga/2010/29/contents

Water Framework Directive: http://ec.europa.eu/environment/water/water-framework/index_en.html

Appendix 1 – Risk Management Authority and Partner Contact Details

Flood Risk Management Authorities in City and County Of Swansea

Risk Management Authority	Contact Details
Natural Resources Wales	**Head Office** Tŷ Cambria House 29 Newport Road Cardiff CF24 0TP **South West Area Office** Neath Port Talbot Maes Newydd Llandarcy Neath Port Talbot SA10 6JQ Website: www.naturalresourceswales.gov.uk **Floodline** Phone Number: 0845 988 1188 (24 hour service) Type Talk: 0845 602 6340
Lead Local Flood Authority City and County of Swansea	**City and County of Swansea** Civic Centre Oystermouth Road Swansea SA1 3SN United Kingdom Phone Number: 01792 636000 Email: contact@swansea.gov.uk.gov.uk Web: www.swansea.gov.uk
Welsh Government	Contact: Richard Williams Email: Richard.Williams2@wales.gsi.gov.uk
Water Company	Dwr Cymru – Welsh Water Pentwyn Road Nelson Treharris CF46 6LY Head Office Phone Number: 01443 452300 Customer Services: 0800 052 0140 Web: www.dwrcymru.co.uk

Appendix 2- Consultation Responses

City and County of Swansea Flood Risk Management Plan Consultation Draft LLFA FRMP Review comments from NRW

Comments in relation to the compliance of the City and County of Swansea draft Flood Risk Management Plan with requirements as set out in legislation (The Flood Risk Regulations 2009) or European legislation (The Floods Directive 2007/60/EC). The final review will be undertaken by NRW in accordance with the before mentioned legislation once the final version of the FRMP has been submitted to NRW.

FRMP Requirement	NRW comments based upon draft plan	Feedback
A map showing the boundaries of the Flood Risk Area	There is a map included on page 10 that shows the coverage of the Swansea flood risk area. The map is included again on page 14. Initial review of this draft has deemed this appropriate to meet the requirements.	No change required
The conclusions drawn from the flood hazard and risk maps published under Regulation 22 of the Flood Risk Regulations 2009	The conclusions begin on page 15 and continue with conclusions for each community area. It is suggested that you consider quantifying some of the conclusions - i.e. add extracts from the flood risk stats table to the section on page 15 or the conclusions for each community. For example, 'we estimate there to be 261 people, 4km of main road, 2km of railway and x sssi's/sacs/parks/etc at risk at high risk of flooding in x community'. Initial review of this draft has suggested that minor amendments are needed.	Additional extracts from flood risk stats table added to conclusions on page 15 for Flood Risk Area.
Objectives for the purpose of managing the flood risk	There is a list of 8 objectives included on page 31 of the FRMP. These are referred to as objectives from the	Line added on page 31 to state that the objectives as listed have been adopted

	LFRMS. We assume these to be adopted as FRMP objectives, but it doesn't state as such. We recommend adding a sentence to explain this (similar to the text for measures on page 32). Initial review of this draft has suggested that minor amendments are needed.	by the City and County of Swansea.
Proposed measures for achieving those objectives, and description of the proposed timing and manner of implementing the measures including details of who is responsible for implementation	Borough wide measures are included on pages 33 to 40, with specific community measures throughout pages 41 to 117. All measures are coded with the correct fields for European reporting. Initial review of this draft has deemed this appropriate to meet the requirements.	No changes needed
A description of the way implementation of the measures will be monitored	There will be the formal review undertaken every 6 years with an annual review of measure implementation. Initial review of this draft has deemed this appropriate to meet the requirements.	No changes needed
A report of the consultation	To be completed following consultation.	Report of the consultation added in section 10 and Appendix 2.
Where the person preparing the report thinks it appropriate, information about how the implementation of measures under the flood risk management plan and the river basin management plan for the area will be co-ordinated at a river basin level	The measures in section 7 are linked to the RBD FRMP and RBMP measures / objectives. Initial review of this draft has deemed this appropriate to meet the requirements.	No changes needed
How were the SEA and HRA requirements considered and met?	The plan states that Swansea are relying on the SEA completed for the Flood Risk	Line added to signpost where SEA can be viewed.

	Management Strategy as no significant changes to require updating. We recommend that you signpost to where this SEA is published in the final FRMP. Initial review of this draft has suggested that minor amendments are needed.	

Fisheries Specific Comments

- Any consents issued for ordinary watercourses must follow NRW Fisheries Team advice below:
- The free passage of fish is to be maintained at all times.
- Under the terms of the Salmon and Freshwater Fisheries Act 1975, it is an offence to cause or knowingly permit to flow or put into any waters containing fish, any liquid or solid matter to such an extent as to cause the water to be poisonous or injurious to fish or the spawning grounds, spawn or food of fish.
- The works shall not be carried out in the watercourse between 15th October and 15th of April inclusive without prior written approval of Natural Resources Wales. This is to avoid damage to fish spawning and migration during this high risk period of fish spawning and recruitment.
- These works should be carried out in such a way as to minimise disturbance to the existing bed and banks of the watercourse.
- No bank vegetation within 7m of the watercourse is to be removed unless strictly necessary. In such cases trees and shrubs should be limbed or coppiced and the rootball left intact. As much scrub vegetation as possible should be retained as this provides valuable wildlife habitat that directly benefits fish populations.
- If works are likely to involve any of the above mentioned activities, then you are advised to discuss this with Natural Resources Wales at your earliest convenience. This will avoid any potential delays arising from consultation, notification or registration of activities.
- NRW Fisheries Technical team keen to collaborate with Land Drainage Team on FRM projects that help to meet WFD objectives for fish populations.

Section 3 Environmental flood risk management objectives: Includes reference to WFD, under which WG, local authorities and government bodies are committed to achieving ‘Good Ecological Status’ for waterbodies by 2027. Fish populations are integral to relevant waterbodies achieving ‘Good Ecological Status’.

Public Consultation Responses

createdon	Q1 Do you agree or disagree that the Draft Flood Risk Management Plan sets out the most significant flood risk in City and County of Swansea? Please select one option.	Please give reasons for your answer	Q2 What do you consider to be the greatest cause of flood risk in the City and County of Swansea? Select all that apply	If other, please specify	Q3 What do you consider to be the highest priority for managing flood risk in the City and County of Swansea? Please select one option	If other, please specify	Q4 Do you agree or disagree with the above statement: Please select one option	Please tell us any reasons for your selection	Q5 Do you agree or disagree that the measures contained within the Draft Flood Risk Management Plan satisfactorily address these categories? Please select one option	Please tell us any reasons for your selection	Q6 How do you think you, as an individual/organisation can support the work set out in the Draft Flood Risk Management plan to reduce flood risk? *
30-11-2015 17:23:48	Disagree	The plan provides a useful starting point, however, without sight of further detail it is difficult to determine if it sets out the most significant flood risks.<<insufficient word count for the full reply >>	Highway drainage,Ordinary water courses or streams (not rivers),Other	Ordinary watercourses being "flood locked" from discharging to Main Rivers or the Sea.	Maintenance of culvert inlet grids, drainage channels and gullies	I suspect the analysis has not picked up all properties at risk - it is not picking up properties where the flood extents has not covered the centre (building seed) of a building outline. As a result property counts are under represented.	Disagree	The above Objectives are listed in Section 6.1, I was not able to interpret how related measures support which specific Objective. Slightly amending Table 9 to set out which Overarching Objective each LFRMS Objective relates to could suffice.	Disagree	Community Level measures are not reflective of the supporting dara. Example Upper Loughor - specific measure for investigating flooding of Residential properties on Corporation Road at high-risk, yet zero properties are shown to be high at-risk.	report and record flooding in my area, through a direct reporting page on CCS website
13-11-2015 22:52:12	Agree		Surface water run off		Improvement of existing drainage infrastructure		Agree		Agree		Utilising and implementing effective planning guidance and correctly maintaining existing drainage systems
13-11-2015 22:52:10	Agree		Surface water run off		Improvement of existing drainage infrastructure		Agree		Agree		Utilising and implementing effective planning guidance and correctly maintaining existing drainage systems
12-11-2015 17:18:27	Agree		Drainage channels		Maintenance of culvert inlet grids, drainage channels and gullies		Agree		Agree		Phone the council when the stream/culvert starts to get clogged up with shopping trolleys and rubbish.
03-11-2015 17:32:23	Strongly agree		Surface water run off,Blocked culvert inlet grids,Other	Swansea Bay flooding.	Maintenance of culvert inlet grids, drainage channels and gullies		Strongly agree		Agree		Clean drains and guttering. Stop incorrect materials from entering sewers e.g. nappies. Report blockages.

Glossary of Terms

Act	A Bill approved by both the House of Commons and the House of Lords and formally agreed to by the reigning monarch (known as Royal Assent).
Bill	A proposal for a new law, or a proposal to change an existing law that is presented for debate before Parliament.
Catchment	An area that serves a river with rainwater that is every part of land where the rainfall drains to a single watercourse is in the same catchment.
CCS	City and County of Swansea
CFMP	**Catchment Flood Management Plans** – plans that provide an overview of the flood risk across each river catchment and estuary. They recommend ways of managing those risks now and over the next 50 – 100 years.
Climate Change	Change in average conditions of the atmosphere near the earth‟s surface over a long period of time.
Culvert	A covered structure under road, embankment etc, to direct the flow of water.
Defences	A structure that is used to reduce the probability of floodwater or coastal erosion affecting a particular area.
Drainage Authorities	Organisations involved in water level management, including IDBs, the Environment Agency and RFCCs
EA	Environment Agency a Government sponsored Public Body responsible to the Secretary of State for Environment, Food and Rural Affairs.
NRW	Government sponsored Public Body responsible to the Secretary of State for Environment, Food and Rural Affairs.in Wales
FCERM	Flood and Coastal Erosion Risk Management.
Flood	Any case where land not normally covered with water becomes covered by water.
Flood and Water Management Act 2010	An Act of Parliament updating and amending legislation to address the threat of flooding and water scarcity, both of which are predicted to increase with climate change.
Flood Risk Management	The activity of understanding the probability and consequences of flooding, and seeking to modify these factors to reduce flood risk to people, property and the environment. This should take account of other water level management and environmental requirements, and opportunities and constraints.
Flood Risk Regulations 2009	Regulations which transpose the EC Floods Directive (Directive 2007/60/EC on the assessment and management of flood risks) into domestic law and to implement its provisions.
FRMP	Flood Risk Management Plan
Groundwater	Water held underground in the soil or in pores and crevices in rock.
Groundwater Flooding	Occurs when water levels in the ground rise above the natural surface. Low lying areas underlain by permeable strata are particularly susceptible.

Habitats Regulation Assessment (HRA)	The Conservation of Habitats and Species Regulations (SI 490, 2010), Termed the „Habitats Regulations", implements the EU „Habitats Directive" (Directive 92/43/EEC) on the Conservation of natural habitats and of wild flora and fauna) and certain elements of the „Birds Directive" – (2009/147/EC). This legislation provides the legal framework for the protection of habitats and species of European importance in Wales.
LLFA – Lead Local Flood Authority	(Local Authority) the County Council or the County Borough Council for the area.
Local Flood Risk	Defined within the Flood and Water Management Act 2010 as including surface runoff, groundwater and ordinary watercourses.
Main River	A watercourse shown as such on the Main River Map, and for which the Environment Agency has responsibilities and powers.
Main River Map –	The definitive map showing which watercourses have been classified as a Main River.
MTCBC	Merthyr Tydfil County Borough Council
National Strategy	The "National Strategy for Flood and Coastal Erosion Risk Management: Wales" produced by the Welsh Government in response to the requirement under Section 8 of the Flood and Water Management Act.
NRW	Natural Resources Wales
NPTCBC	Neath Port Talbot County Borough Council
Ordinary Watercourse	All watercourses that are not designated Main River, and which are the responsibility of Local Authorities or, where they exist, Internal Drainage Boards.
PRFA	Preliminary Flood Risk Assessment as required by the Flood Risk Regulations 2009.
RCTCBC	Rhondda Cynon Taff County Borough Council
Reservoir	An artificial lake where water is collected and stored until needed. Reservoirs can be used for irrigation, recreation, providing water for municipal needs, hydroelectric power or controlling water flow.
Resilience	The ability of the community, services, area or infrastructure to avoid being flooded, lost to erosion or to withstand the consequences of flooding or erosion taking place.
Risk	Measures the significance of a potential event in terms of likelihood and impact.
Risk Assessment	A structured and auditable process of identifying potential significant events, assessing their likelihood and impacts and then combining these to provide an overall assessment of risk to inform further decisions and actions.
Risk Management	Anything done for the purpose of analysing, assessing and reducing a risk.
Risk Management Authority	A Welsh risk management authority is defined in Section 6 of the Flood and Water Management Act 2010 as the Environment Agency, a lead local flood authority, a district council for an area for which there is no unitary authority, an IDB for an internal drainage district that is wholly or mainly in Wales and a water company that exercises functions in relation to an area in Wales.

SEA - Strategic Environmental Assessment	A legal requirement in the UK for certain plans and programmes stipulated by the SEA Directive (2001/42/EC), to undergo Strategic Environmental Assessment (SEA). The SEA Directive is implemented in Wales by the Environmental Assessment of Plans and Programmes (Wales) Regulations 2004 (SI 2004No. 1656, W170). The purpose of SEA is to provide for a high level of protection of the environment, to ensure the integration of environmental considerations into the preparation and adoption of plans and programmes, and to contribute to the promotion of sustainable development and environmental protection.
Sewer	An artificial conduit, usually underground, for carrying off sewage off
WG	Welsh Government
WLGA	Welsh Local Government Association