Neath Port Talbot
Castell-nedd Port Talbot
County Borough Council Cyngor Bwrdeistref Sirol

LEAD LOCAL FLOOD AUTHORITY

Preliminary Flood Risk Assessment Report

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Front cover Surface water flooding junction of Dulais Fach Road /Park Street/ Tonna Uchaf /Tonna Ward

Abbreviations

Acronym	Definition
AStSWF	Areas Susceptible to Surface Water Flooding
BCBC	Bridgend County Borough Council
BW	British Waterways
CCC	Carmarthen County Council
CCS	City and County of Swansea
CFMP	Catchment Flood Management Plan
DCWW	Dwr Cymru Welsh Water
Defra	Department for Environment, Food and Rural Affairs
DG5	Director General 5
EA	Environment Agency
EC	European Commission
FMfSW	Flood Map for Surface Water
FWMA	Flood & Water Management Act 2010
IUD	Integrated Urban Drainage
LLFA	Lead Local Flood Authority
LoSA	Local Service Agreement
LPA	Local Planning Authority
LRF	Local Resilience Forum
MAWWFS	Mid and West Wales Fire Service
MoU	Memorandums of Understanding
NPT or NPTCBC	Neath Port Talbot County Borough Council.
PAS	Project Appraisal Report
PFRA	Preliminary Flood Risk Assessment
PFS	Pre-Feasibility Study
PPS25	Planning Policy Statement 25
RBD	River Basin District
RFDC	Regional Flood Defence Committee
SAB	SuDS Approving Body
SEA	Strategic Environmental Assessment
SFRA	Strategic Flood Risk Assessment
SuDS	Sustainable Drainage Systems
SWMP	Surface Water Management Plan
TAN 15	Technical Advice Note 15 Development and Flood Risk.
WAG	Welsh Assembly Government

Executive Summary

Welcome to the Neath Port Talbot County Borough Council Preliminary Flood Risk Assessment Report. This document is a **high level review** of the current flood risk in the Neath Port Talbot area. It identifies areas most at risk and compares the information available from Environment Agency Flood Mapping with local information.

This report has been prepared to assist NPTCBC meet their duties in managing local flood risk and deliver the requirements of the Flood Risk Regulations (2009). NPTCBC is defined as a Lead Local Flood Authority (LLFA) under the Regulations and this document has links to the forthcoming Local Strategy for Flood and Risk Management which it is expected the LLFA will have to prepare in 2011/12.

The methodology for producing this PFRA is based on the EA's Final PFRA Guidance and Defra's Guidance on selecting Flood Risk Areas, both published in December 2010. The EA 'final' guidance was updated in March 2011 and re-distributed to LLFA's and is used as the basis for this report. Using this methodology indicative flood risk areas have been identified. The area identified for the Neath Port Talbot Council administrative area is one of eight identified within Wales.

The PFRA, comprising this document, the supporting spreadsheets and GIS layers represents the **first** stage of the requirements of the Regulations. The PFRA process provides a **high level overview** of flood risk from local flood sources, including surface water, groundwater, ordinary watercourses and, in the case of NPTCBC, canals. As a LLFA, NPTCBC **must** submit this PFRA to the Environment Agency for review by 22nd June 2011.

The outcome of this first stage in the exercise is, that by reference and comparison with available datasets, confirmation is given that the indicative national assessment of the flood risk in the Neath Port Talbot Council area is acceptable. Subsequent key stages, based on this PFRA, will involve the production of Flood Hazard and Flood Risk Maps and by 2015 the preparation of Flood Risk Management Plans.

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Tables

1.0 Introduction

1.1 Neath Port Talbot County Borough Council is a Lead Local Flood Authority (LLFA) as defined in the Flood Risk Assessment Regulations 2009 and the Flood and Water Act 2010. It is one of the statutory fluvial drainage and coastal defence authorities for South West Wales, the others being City and County of Swansea and Carmarthenshire County Council. This Authority's vision with respect to its drainage infrastructure is "*to maintain drainage systems and minimise flooding*".

1.2 The European Directive on the Assessment and Management of Flood Risks (2007/60/EC of 23 October 2007), 'the Floods Directive' is designed to help Member States prevent and limit floods and their damaging effects on human health, the environment, infrastructure and property. The Floods Directive came into force on 26 November 2007 and Member States have to transpose the Directive into domestic law. Defra and the Environment Agency in Wales are co-ordinating the transposition of the Directive into UK law and are ultimately responsible for its timely and compliant implementation.

The Flood Directive requires member states to prepare the following;

- Preliminary flood risk assessments to identify areas that are at potentially significant flood risk.

- Flood hazard maps (showing the likelihood and flow of the potential flooding and flood risk maps (showing the impact).

- Flood risk management plans (showing measures to decrease the likelihood or impact of flooding'

- Updates every 6 years that take into account the impact of climate change

The EU Floods Directive was transposed into UK law by the Flood and Water Act 2010 and requires that a Preliminary Flood Risk Assessment (PRFA) is undertaken by June 2011 to provide an assessment of the potential risks from flooding.

1.3 **Table 1-1** shows the elements of work required from NPTCBC under the Flood Risk Regulations 2009, along with the timescales for their respective delivery. The first two elements of work, highlighted in red, are covered by the preparation of this PFRA report.

Table 1-1: Elements of Work required under the Flood Risk Regulations 2009

22nd June 2011	Prepare Preliminary Assessment Report.	***The emphasis in the NPTCBC PFRA is on local flood risk from surface water, groundwater, and ordinary watercourses***
22nd June 2011	On the basis of the PFRA, identify Flood Risk Areas.	*Flood Risk Areas are areas of significant risk identified on the basis of the findings of the PFRA, national criteria set by the UK Government Secretary of State and guidance provided by the Environment Agency.*
22nd June 2013	Prepare **Flood Hazard Maps** and **Flood Risk Maps** for each Flood Risk Area.	*Used to identify the level of hazard and risk of flooding within each Flood Risk Area to inform Flood Risk Management Plans.*
22nd June 2015	Prepare **Flood Risk Management Plans** for each Flood Risk Area.	*Plans setting out risk management objectives and strategies for each Flood Risk Area.*

1.4 The PFRA considers past flooding and possible future flooding from the following local flood sources:

- Surface water;
- Groundwater;
- Ordinary watercourses
- Canals (in certain circumstances)

1.5 A PFRA is a strategic assessment of flood risk. It looks at historical flood events and the potential for future flood events. The PFRA report also considers floods which have significant harmful consequences for human health, economic activity and the environment. Flooding associated with the sea, main rivers and reservoirs are the responsibility of the Environment Agency and are **not** considered as of the PFRA, unless it is considered that there may be an affect of flooding from one of the sources listed above. Such information would then be used to prioritise future flood risk management measures. The NPT and CCS Resilience Partnership Flood Group have prepared a considerable amount of information in this respect which is summarized for information in **Table 6-3**. In NPT localised surface water flooding is considered to be a threat.. This occurs when drainage and sewerage systems are overwhelmed and when the ground is saturated and although, in many instances flooding events are on a small scale, affecting a comparatively small number of people or individual properties, the effect from such flooding events is equally as devastating as that from a large scale event.

1.6 In some areas of the County Borough, people and property are protected by flood defences, but there are some locations that remain at risk of flooding, especially from surface water flash flooding during short bursts of intense rainfall. Predictions for climate change suggest that flooding is likely to increase as the sea level is expected to rise and rainfall intensities increase. Winters are colder, with greater risk of white out events and the effects that may be generated by the eventual thaw.

1.7 The EU Floods Directive recognises the importance of sustainable flood risk management and aims to reduce the adverse consequences of flooding. It requires LLFA's to use the best information available when undertaking the PFRA.

1.8 The PFRA is **a high level screening** exercise to locate areas in which the risk of surface water and groundwater flooding is significant and warrants further examination through the production of maps and management plans.

The PFRA for Neath Port Talbot County Borough Council is intended to provide a high level assessment of local flood risk across the study area, including information on past floods and the potential consequences of future floods. It is not the intention to cover in any great detail instances of localised flooding.. The Local Drainage Strategy developed from WAG National Strategy will cover that aspect. Guidance on the development of a Local Strategy is expected to be issued in late Summer 2011.

The key objectives for the PFRA can be summarised as follows:

1. To identify relevant partner organisations involved in future assessment of flood risk; and summarise means of future and ongoing stakeholder engagement;

2. To describe arrangements for partnership and collaboration for ongoing collection, assessment and storage of flood risk data and information;

3. To provide a summary of the systems used for data sharing and storing, and provision for quality assurance, security and data licensing arrangements;

4. To summarise the methodology adopted for the PFRA with respect to data sources, availability and review procedures;

5. To assess historic flood events within the study area from local sources of flooding (including flooding from surface water, groundwater and ordinary watercourses), and the consequences and impacts of these events;

6. To establish an evidence base of historic flood risk information, which will be built up on in the future and used to support and inform the preparation of the Council's Local Flood Risk Strategy;

7. To assess the potential harmful consequences of future flood events within the study area; Review the provisional national assessment of indicative Flood Risk Areas provided by the Environment Agency and provide explanation and justification for any amendments required to the Flood Risk Areas.

1.9 The Environment Agency has used a national methodology, which has been set out by Defra, to identify indicative Flood Risk Areas across Wales. Of the eight areas identified one is located within the Neath Port Talbot County Boundary. Within this Flood Risk Area the Regulations require that the LLFA carries out two subsequent key stages in later years:-

- Flood hazard maps and flood risk maps; and
- Flood risk management plans.

1.10 In order to develop an overall understanding of the flood risk across Neath Port Talbot, flood risk data and records of historic flooding were collected, not only from internal Council sources but from a number of different other local sources including the Environment Agency, water companies, emergency services and other authorities.

2.0 Geographic Extent of the Report

2.1 The study area for this PFRA is defined by the administrative boundary of Neath Port Talbot County Borough Council. The whole of the County Borough has been considered by relating the Environment Agency's Indicative Flood Maps and maps of areas susceptible to surface water flooding to known areas within the County Borough that suffer from flash flooding. For the purposes of carrying out this assessment, the disposition of wards within the County Borough has also been used to examine areas of concern and a series of maps indicating flood risk from various sources has been produced. These are captured in a GIS database.

2.2 **Figure 2-1** is a map indicating the disposition of wards within the Neath Port Talbot County Borough administrative area.

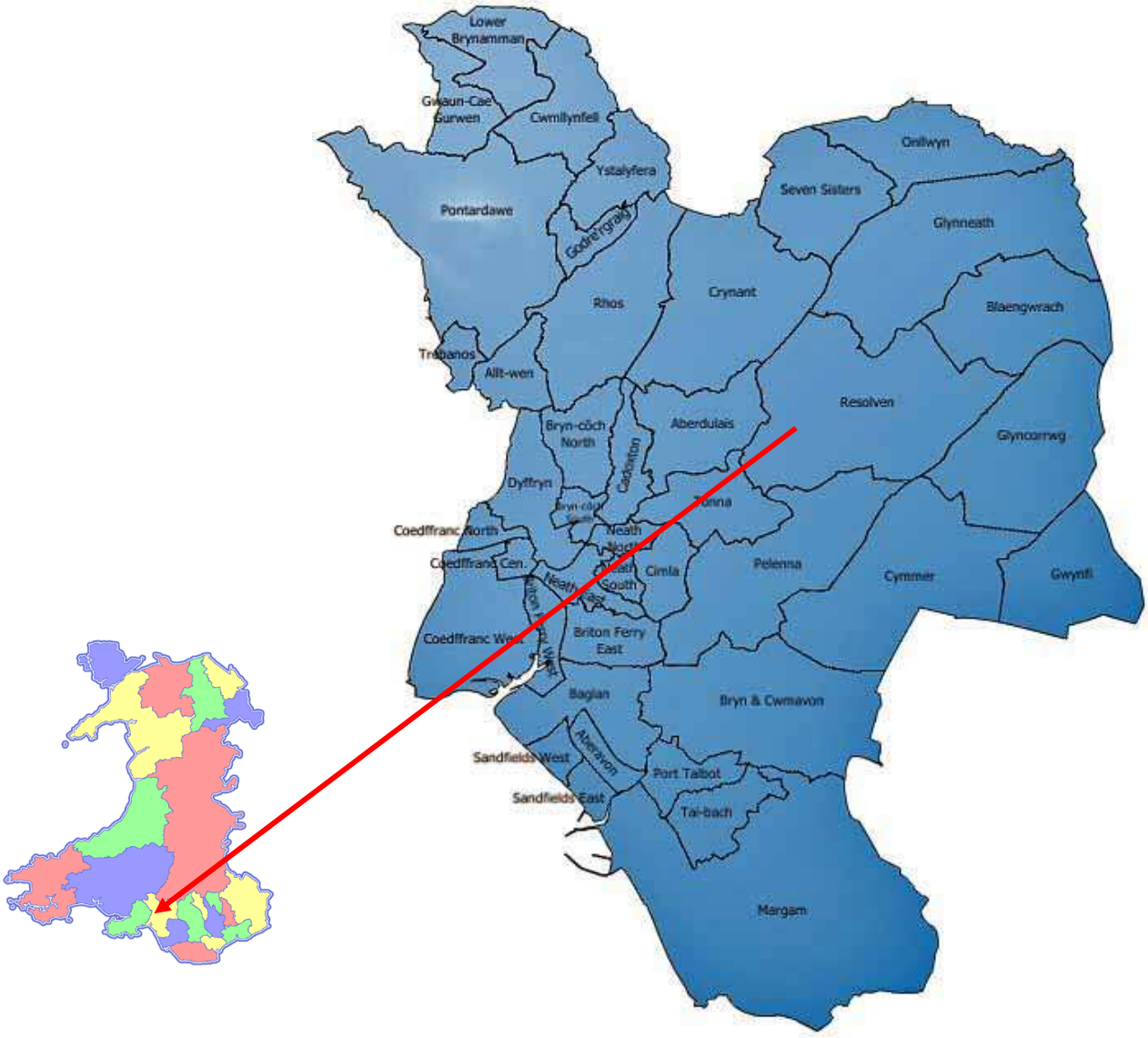


Figure 2-1 Neath Port Talbot CBC Administrative Area

2.3 The County Borough comprises an area of 44,217 hectares, with a mix of urban and rural settlements. Urban areas include the towns of Neath, Port Talbot and Pontardawe, while inland, there are the Afan, Neath, Dulais, Upper Swansea and Amman valley communities, many of which have their origins in coal mining. With a population of 137,400 (2007), Neath Port Talbot is the seventh largest unitary authority in Wales.

2.4 The study area falls within the Western Wales River Basin District and is served by Dwr Cymru Welsh Water, which is single purpose company privately owned by Glas Cymru, with no shareholders and run solely for the benefit of its customers. Neath Port Talbot is within the Environment Agency Wales region and is served by a Regional Flood Defence Committee which will become the Wales Flood and Coastal Committee from April 2011. Neath Port Talbot Council, City and County of Swansea and Bridgend County Borough Council have one Member jointly serving on this group, with the members serving in rotation on a three year basis.

2.5 Neath Port Talbot is bordered on the West by City and County of Swansea, on the East by Bridgend County Borough Council, on the North by Powys County Council and on the South by the sea.

3.0 Lead Local Flood Authority Responsibilities.

3.1 All watercourses - from small streams to major rivers - must be maintained to minimise the threat of flooding. Responsibility for maintenance rests, in law, with the "riparian" owner (the owner of the adjacent land and the watercourse itself), or, in the case of road drainage and culverts, the appropriate highway authority.

3.2 For "main rivers" (normally the larger watercourses and rivers) the Environment Agency have permissive powers (not duties) to maintain and improve. Local Authorities have similar powers for "ordinary watercourses" (ditches, streams etc. not designated as "main river"). Although there is no duty to *improve* a watercourse, the riparian owner is legally obliged to ensure the water can flow freely (e.g. remove debris, excess vegetation), maintain the banks and bed of the watercourse, and must accept flood flows through his or her land. Failure to comply with these and other responsibilities may result in legal action by other property owners.

3.3 Under the Land Drainage Act 1991, this Council, as LLFA, has permissive powers to undertake flood defence and prevention works as necessary and to maintain and improve such watercourses in default. The Council has in place a regular maintenance programme of inspection and cleansing of debris screens/grids that have been constructed at the inlet of highway culverts and on certain land drainage culverts. Some are in the Council's ownership and inspection and removal of debris is regularly undertaken to ensure that the build up of debris is kept to a minimum. Desilting of culverts which are the Council's responsibility to maintain has been undertaken on an ad hoc basis but this process is being reviewed and more regular inspection and cleansing of strategic culverts is likely top be introduced as part of asset management.

3.4 As LLFA, the Council ensures that regular maintenance is carried out on the flood defences and channels that are in the Council's ownership or for which responsibility is accepted. Where the responsibility for such features rests with a landowner, the Council aims to secure co-operation in ensuring appropriate maintenance takes place, drawing on enforcement powers if necessary and where appropriate.

3.5 The Council also has responsibility for maintaining the flow in highway drainage systems and for cleansing and unblocking road gullies.

3.6 In conjunctions with partner authorities Neath Port Talbot Council also has a role in respect of emergency planning to ensure that there is adequate preparation for flooding emergencies. The Council maintains an awareness of the Environment Agency's Flood Warning Plan and plays an agreed role in any flood warning emergency exercises. As a Planning Authority, the Council must consider the effects of new developments, particularly on flood plains and where there may be issues in respect of flooding to highways.

3.7 Governance and partnership arrangements

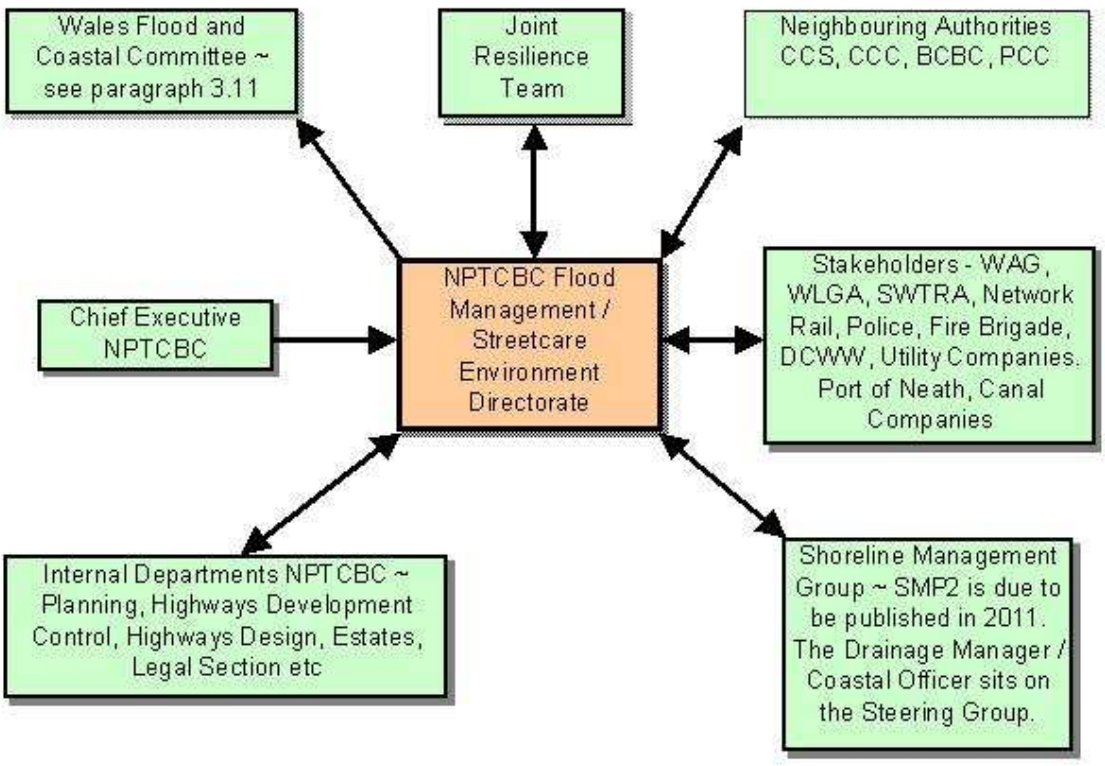
1. In his Review of the Summer 2007 flooding, Sir Michael Pitt stated that "*the role of local authorities should be enhanced so that they take on responsibility for leading the coordination of flood risk management in their areas*".

2. As the designated LLFA, NPTCBC is therefore responsible for leading local flood risk management across the County Borough.

3. Some of the local knowledge and technical expertise necessary for the Council to fulfil its duties as LLFA lies with other partner organisations. It is therefore essential that Council work alongside these groups and organisations as they undertake their responsibilities to ensure effective and consistent management of local flood risk throughout the county and to contribute to the provision of a coordinated and holistic approach to flood risk management across the area.

4. As LLFA, NPTCBC has forged effective partnerships with the adjacent Unitary Authorities, DCWW and the Environment Agency, as well as other key stakeholders and risk management authorities.

Typical Partnership Arrangement Structure.



5. Ideally these working arrangements should be formalised to ensure clear lines of communication, mutual co-operation and management through the provision of Level of Service Agreements (LoSA) or Memorandums of Understanding (MoU). Ad hoc partnership arrangements however presently exist with the adjacent Authorities, CCS, CCC, BCBC. Governance is on a local level, individually managed, with regular meetings between Officers in the adjacent authorities and the EA to ensure consistency. Assistance and advice was also given during the process by the WLGA and WAG.

6. Although there are no formal arrangements with utility and external companies for supply of data it is important to note that both DCWW and the MAWW Fire Service have supplied appropriate information from their own databases of flooding events. Network Rail and British Waterways have also been contacted in this respect and comprehensive data was supplied by this latter organisation. Data collection is also an ongoing process and continues by the acquisition of other relevant data from a variety of sources.

3.8 The scrutiny and review procedures that must be adopted when producing a PFRA are set out by the European Commission. Meeting quality standards is important in order to ensure that the appropriate sources of information have been used to understand flood risk and the most significant flood risk areas are identified. Another important aspect of the review procedure is to ensure that the guidance is applied consistently; a consistent approach will allow all partners to understand the risk and manage it appropriately. The scrutiny and review procedure will comprise two key steps, as outlined below.

3.9 **Local Authority Review**

The first part of the review procedure is an internal NPTCBC Scrutiny Committee review of the PFRA . In accordance with NPTCBC internal review procedures, approval is obtained to ensure the PFRA meets the required quality standards, before it is submitted to the Environment Agency.

3.10 The County Borough Council of Neath Port Talbot comprises 64 elected members representing 42 divisions of Neath, Northern Lliw and Port Talbot. There are also 19 Community Councils in the County Borough area. The principles of governance follow the executive system of local government, which includes five Cabinet Boards with the executive being responsible for most decisions in the Authority, though the full Council still approves major policies, e.g. the Annual Budget and the Council Tax, after receiving Cabinet proposals. The Council also annually appoints the Leader and Cabinet. There are a number of "watchdog" Scrutiny Committees to review the decisions and performance of the Executive. They can "call in" some Cabinet decisions before they are implemented. This report has been reviewed by the Environment and Transport Scrutiny Committee comprising a Chair, Vice Chair, and ten County Borough members.

3.11 **Environment Agency Review**

Under the Flood Risk Regulations, the Environment Agency have been given a role in reviewing, collating and publishing all of the PFRAs once submitted. The Environment Agency will undertake a technical review (area review and national review) of the PFRA,

which will focus on instances where Flood Risk Areas have been amended and ensure the format of these areas meets a provided standard. If satisfied, they will recommend submission to the relevant RFDC for endorsement. RFDCs will make effective use of their local expertise to ensure consistency at a regional scale. Once the RFDC has endorsed the PFRA, the relevant Environment Agency Regional Director will sign it off, before all PFRAs are collated, published and submitted to the European Commission.

3.12 The first review cycle of the PFRA will be led by Neath Port Talbot County Borough Council and **must** be submitted to the Environment Agency by the 22nd of June 2017. They will then submit it to the European Commission by the 22nd of December 2017 using the review procedure described above.

4.0 Methodology and Data Review

4.1 The PFRA is a **high-level screening** exercise used to identify areas where the risk of flooding is considered to be significant and warrants further examination and management through the production of flood risk and flood hazard maps and flood risk management plans. The approach for producing this PFRA is based upon the Environment Agency's PFRA Final Guidance, which was released in December 2010. The PFRA is based on readily available or derivable data and with this in mind, the following methodology has been used to undertake the PFRA.

4.2 For administrative purposes the County Borough Council is split into wards and within each of these areas, where available, information has been gathered on local surface water flood risk. The following authorities and organisations were also identified and contacted to share data for the preparation of the PFRA; Resilience Groups, CCS, BCBC, DCWW, Network Rail, the Environment Agency, MWWFS, and British Waterways, Local Canal Companies and Utility Companies. Phases of work were initially identified, but with the constraints of time and resources many if the tasks in the early stages of the review merged into one another. The ultimate aim was to submit a draft report to the EA and internal Council Departments for 'validation' prior to Council Scrutiny and submission of a final report to the EA by June 22nd 2011.

4.3 It was anticipated that information would be provided in a geo-referenced format. However, where this was not the case for some datasets, this data was geo-referenced by the end user i.e the Council. This made it possible to display this information using GIS software and overlay layers to identify the spatial distribution of historic flood events and relate these datasets to receptor information, in order to assess the overall flood risk.

4.4 The information collated has been used to check and confirm Flood Risk Areas. Flood risk indicators are used to determine the impacts of flooding on human health, economic activity, cultural heritage and the environment.

4.5 Key flood risk indicators are summarised in **Table 4-1,** and **Table 4-3** the basic programme of work in preparation of the PFRA report

Table 4-1: Key Flood Risk Indicators

Impacts of flooding on:	***Flood Risk Indicators***
Human Health	Number of residential properties. Critical services (Hospitals, Police/Fire/Ambulance Stations, Schools, Nursing Homes, etc).
Economic Activity	Number of non-residential properties. Length of road or rail. Area of agricultural land.
Cultural Heritage	Cultural heritage sites (World Heritage Sites).
Environment	Environment Designated sites (SSSIs, SACs, SPAs, etc) and BAP habitat.

The use of these indicators helps to develop understanding of the impacts and consequences of flooding and they have been selected and analysed **by Defra and the EA** in order to identify areas where flood risk and potential consequences exceed a pre-determined threshold. The areas that have been identified using this methodology and exceed **5000 people** at risk (for Wales) have been mapped and identified as **Indicative Flood Risk Areas.**

For further details, please refer to Defra's Guidance for selecting and reviewing Flood Risk Areas for local sources of flooding (December 2010) - (see Chapter 10 for web link).

4.6 Preliminary Feasibility Studies (PFS) and Project Appraisal Studies (PAS) undertaken between 2000 and 2009 have produced 16 PFS reports and 10 PAS reports These reports form the basis of the local specific relevant future surface water flooding risk information held by NPT. In addition the Council's own reporting on 'minor' flooding events and drainage issues identified by the public and local members has been factored into the statistics. Consideration has also been made of specific EA reporting of flood risk in the Glynneath area.

4.7 Where available computer models have been inspected for flood outline maps indicating where flooding is likely to occur. Account was taken of climate change predictions in the production of these maps.

4.8. Only major specific areas where a flood risk has been identified are referred to in this report.

4.9 EAW provided national flood risk data sets to supplement LLFA local data via their datastore web site indicating Flood Maps (Flood Defences, Flood Storage areas, areas benefiting from flood defences and flood zones), Main rivers, Historic Flood Maps, Areas susceptible Surface Water flooding and groundwater flooding and flood maps to a 1in 30 and 1:200 chance indicative standard.

4.10 Appropriate flood information is readily available from archived and day to day call center operations and in some instances partner authorities. All the information available is stored within GIS format and appropriate plan information can be easily inspected. The intention is to continue with this process. There are however data limitations and it is hoped that by continuous improvement and collaboration with partner authorities and organisations that improvements in the collection of flood risk data going forward can be made**.**

4.11 **Table 4-2** catalogues the relevant information and datasets held and provides a description of each of the datasets.

Table 4-2: Relevant Information and Datasets

	Dataset	***Description***
Environment Agency	Areas Susceptible to Surface Water Flooding	The first generation national mapping, outlining areas of risk from surface water flooding across the country with three susceptibility bandings (less, intermediate and more).
	Flood Map for Surface Water	The updated (second generation) national surface water flood mapping which was released at the end of 2010. This dataset includes two flood events (with a 1 in 30 and a 1 in 200 chance of occurring) and two depth bandings (greater than 0.1m and greater than 0.3m).
	Flood Map (Rivers and the Sea)	Shows the extent of flooding from rivers with a catchment of more than 3km^2 and from the sea. (used for information only not for review).
	Areas Susceptible to Groundwater Flooding	Coarse scale national mapping showing areas which are susceptible to groundwater flooding.
	National Receptors Dataset	A national dataset of social, economic, environmental and cultural receptors including residential properties, schools, hospitals, transport infrastructure and electricity substations.
	Indicative Flood Risk Areas	Nationally identified flood risk areas, based on the definition of 'significant' flood risk described by Defra and WAG.
	Historic Flood Map	Attributed spatial flood extent data for flooding from ail sources.
	Loughor to Taf and Ogmore to Tawe Catchment Flood Management Plans (CFMP)	CFMPs consider all types of inland flooding, from rivers, groundwater, surface water and tidal flooding and are used to plan and agree the most effective way to manage flood risk in the future.
County Borough Council	Strategic Flood Risk Assessments (SFRA)	SFRAs may contain useful information on historic flooding, including local sources of flooding from surface water, groundwater .
	Historical flooding records	Historical records of flooding from surface water, groundwater and ordinary watercourses.
	Preliminary Feasibility Studies (PFS) and Project Appraisal Studies (PAS)	Reporting carried out by Consulting Engineers on specific flooding issues in the NPT area. Undertaken circa 2008/2009
	Anecdotal information relating to local flood history and flood risk areas	Anecdotal information from authority members regarding areas known to be susceptible to flooding from excessive surface water, groundwater or flooding from ordinary watercourses.
	Highways Flooding Reports	Highways Flooding Reports for a number of locations within County Borough , including analysis of the flood risk at each location.

	Dataset	***Description***
MWWFS	Historic flooding records	Records of historic flooding events from the Fire Service's call out history records including location, incident type and response given.
	Anecdotal information	Anecdotal information from each of the Station Managers regarding local flood risk hotspots in their areas.
DCWW	DG5 Register for DCWW NPT	DG5 Register logs and records of sewer flooding incidents in each area.
British Waterways	British Waterway's canal network	Detailed GIS information on the British Waterway's canal network, including the location of canal centrelines, sluices, locks, culverts, etc.
	Records of canal breaches and overtopping events	Records of historical canal breaches and canal overtopping events.

4.12 Quality assurance, security, data licensing and restrictions

1. In undertaking its flood risk assessment duties, NPCBC acquires data and information from a range of sources and in a variety of formats. Some of this information is in the form of anecdotal reports, factual reports, survey data, modelling output, photographic records, records from call center archives, site inspections and Officer reports. It is essential that all this data and information is stored and maintained in a manner which guarantees availability for the foreseeable future and which provides maximum value in their interpretation. Old records such as plan information are treated with care and, wherever possible, conserved and transformed into more permanent media by electronic scanning.

2. Adequate indexing of file records or of electronic databases is provided for rapid access to relevant records, even by relatively inexperienced users. Databases are designed to be flexible enough to store a variety of formatted data and text and are compatible with other related systems either within the Council or externally. NPTCBC has a strategic commitment to operate a high quality data management system to protect its valuable public resource of flood risk assessment information and whenever possible the Council will enter and store flood risk data in a standard GIS database, compatible with its Information Technology standards

3. Data and information is held securely so that records cannot either purposely, or inadvertently be modified or edited by unauthorised individuals.

4. For electronic storage there will be regular back-up with duplicates held by the IT Section . Paper or other hard-copy storage media will be held in the Drainage Section. The security of data a key consideration when it comes to collecting, collating and storing sensitive data. All

data collected is stored on local servers which are password protected. NPTCBC adheres to data security measures to ensure that sensitive data is held in a secure manner.

5. The Council also retains its policy for retention of any archived flood risk information and plans inherited from its predecessor organisations.

6. Collection of New Data/Information - Many flood risk studies or flood alleviation studies have been carried out by, or on behalf of developers throughout the County Borough. The Council has access to certain copies through the Planning Process but, in most cases, does not have any right to reproduce or pass on the contents. For the same reason information in relation to potential new development sites has been omitted as this would impinge on the LDP process which is currently ongoing by Planning officers. Added value would however be gained in the future by holding information in coherent indexed files or archives with public access.

4.13 A summary table illustrating the restrictions on the use of this data is included in **Table 4-3** below.

Table 4-3: Summary of data restrictions and licensing details

Organisation	Restrictions on Use of Data
Dwr Cymru Welsh Water	The use of provided data is restricted to NPTCBC and their consultants for the preparation of its preliminary flood risk assessment and other documentation
British Waterways	The use of provided data is restricted to NPTCBC and their consultants for the preparation of its preliminary flood risk assessment and other documentation
Environment Agency	The use of provided data is restricted to NPTCBC and their consultants for the preparation of its preliminary flood risk assessment and other documentation. (Special Licence – Statutory Ref: z10649

4.14 Data standards in preparation of the GIS mapping undertaken conform to the requirements of EA PFRA annex to final guidance Ref GEH01210BTHF-E-E dated December 2010 and any amendments thereto.

Table 4-4 Basic programme of work in preparation of the PFRA report

Engagement with adjacent local authorities, other bodies and the Environment Agency	ongoing since Summer 2010
Determine appropriate data systems	Autumn 2010
County Borough Council collate its own flood data and that of partner organisations	January 2011
Determine locally agreed surface water information / assessment of significant risk	January / February 2011
Report drafting	January / February / March 2011
Draft report to EA for simple review prior to scrutiny	April 2011
Meeting of Scrutiny Committee.	12th May 2011
Final report submission to the EA	**22nd June 2011**
Re-submission (if necessary) to Scrutiny Committee at a later date	

5.0 Past Flood Risk

5.1 Overview of Flooding History - Neath Port Talbot County Borough Area

1. Surface Water Flooding

Surface water flooding occurs when heavy rainfall exceeds the capacity of local drainage networks and water flows across the ground. Information on surface water flooding incidents was obtained from a number of sources, Key sources being the Council's own day to day records and Catchment Flood Management Plans (CFMPs), which are high-level strategic plans published by the Environment Agency that focus on flooding in major river catchments.

2. Groundwater Flooding

Groundwater flooding occurs as a result of water rising up from the underlying aquifer or from water flowing from abnormal springs. This tends to occur after long periods of sustained high rainfall, and the areas at most risk are often low-lying where the water table is more likely to be at shallow depth. Groundwater flooding is known to occur in areas underlain by major aquifers, although increasingly it is also being associated with more localised floodplain sands and gravels. There are however no specific areas of historical groundwater flooding recorded in the NPT area.

3. Sewer Flooding

Sewer flooding is often caused by excess surface water entering the drainage network. DG5 registers from DCWW were analysed to investigate the occurrence of sewer flooding incidents across the County Borough. It was found that there were a total of 430 sewer flooding events that have been recorded by the water companies, of which 355 were identified as being at high risk with 34 suffering from internal flooding. Once a property is identified on the water companies DG5 register, it typically means that the water company can put funding in place to take properties off the DG5 register.

4. Canal and Ordinary Watercourse Flooding

Information was obtained from British Waterways which details the canal network through the NPT area at Pontardawe including the location of canals, weirs, sluices and locks. British Waterways also provided details of historic breaches or overtopping events that have occurred across the county. There are two other canals within the NPT area and enquiries were made from both the Neath Canal Company and the Tennant Canal Company although it is acknowledged that the topography of these latter two canals is vastly different from the Swansea Valley Canal at Pontardawe. In this area the canal is perched above part of the town and could be viewed as a 'significant' flood threat to the area under certain circumstances.

5. Interaction with Main Rivers and the Sea

There is good anecdotal evidence to suggest that surface water flooding may be exacerbated in some areas such as the Neath Abbey / Milland Road areas during high tidal cycles when gravity drains and outfalls are blocked with high tidal waters. (Rivers Neath and Ffrwydwyllt)

Table 5-1 Main Historical Events (Catchments are defined in accordance with CFMP)

Tawe Catchment			Consequences
Pontardawe	1979	Tawe and Upper Clydach	Industrial estate, Herbert Street and the confluence of the Upper Clydach.
Pontardawe	October 1998	River Tawe. Non Main River (canal breach).	On the 23rd October 1998, following heavy rainfall, water levels rose in the Swansea Canal in Pontardawe as it overfilled and caused the banks to fail under the extra pressure exerted on them. The resulting breach allowed the water in the Canal to escape and this caused serious and extensive flooding in the village . Some **30** residential properties, units on the nearby Industrial Estate including the Health Centre, together with the commercial centre of the village were affected by over 1.0m of floodwater and silt.
Ynysmeudwy Village	4th February 2004	River Flooding	On the 3rd and 4th of February 2004 sustained, heavy rain stretching across Wales brought many rivers into flood condition. At the height of the downpour on the 4th February there were 51 flood warnings in operation. A damaging flood tore through the village of Ynysmeudwy smashing rocks and trees through houses and swamping homes with ankle deep mud. The ground floors of 5 properties were submerged under 5'.0" – 6'.0" of water from the adjacent River Cwmdu (not a main river). The flood was the result of an embankment breach some 4.5 km north of Ynysmeudwy The River Cwmdu was culverted through the embankment at this location and the embankment failed when the culvert became blocked with silt and debris. The culvert has since been removed and a timber bridge erected across the river.
Trebanos	2008	Unnamed Watercourse above Pheasant Road	Blockage on culverted watercourse at intake (land drainage) caused extensive highway flooding and damage and inundation of one property.

Neath Catchment			Consequences
Neath	August 1768	River Neath	Quote from the British Hydrologlcal Society's website "and the torrents poured from the mountains swept away men, women, cattle (and), ruined the crops, and laid under water the little town of Neath".
Neath	September 1909	Unknown	"25year high rainfall - streets were completely flooded, town and much damage was done"
Neath	6 December 1910	Tidal	Observer at Neath noted "Heavy gale in conjunction with a high tide. The lower part of the town was flooded."
Glyn Neath	1911	River Neath	"Great Damage done by floods"
Neath	December 1979	River Neath	Understood to be the highest rainfall event on record in the Neath catchment
Aberdulais	22 -24 October 1998	River Neath (Overtopping of natural banks. Debris reduced flow under aqueduct)	29 properties at Canal Row and Railway Tavern, CalorGas Depot, 1 residential property and B4434 bridge.
Aberdulais	22 - 24 October 1998	River Dulais	Dulais Rock Public House (kitchen) and the National Trust Heritage Centre.
Canal Row, Neath	23 October 1998	Main river	25 properties were flooded by rises in the lower canal caused by floodwaters from the River Neath overflowing into the canal.
Rheola Ponds	22-24 October 1998	Surface water drainage	A465 dual carriageway flooded.
Jersey Marine	July 2007	Highway run-off	Ashleigh Terrace in Jersey Marine suffered extensive flooding from highway run off.
Neath	July 2007	Highway and surface water run-off	Incidents related to inefficiencies in combined public sewers, the most notable being in the **Victoria Road, Rockingham Terrace areas of Briton Ferry**. There were similar problems in the Mllland Road Industrial Estate where businesses were affected by highway flooding. At Old Road in Skewen a combination of sewage flooding and watercourse flooding caused inundation of three properties.
Nant Gwrach	July 2007	Highway run-off	Highway outlets to the Nant Gwrach (a critical watercourse enmained by EA) buried under silt and stone, causing a back up of flow in the highway system inundating private gardens during intense rainfall.
County Borough wide	July / August / September 2008	Highway Run off / Highway drainage issues/ culverted watercourses / intake grids	Numerous problems at **Briton Ferry, Tonmawr, Cimla, Milland Road Industrial Estate, Baglan, A483 route into Swansea cycleways.**

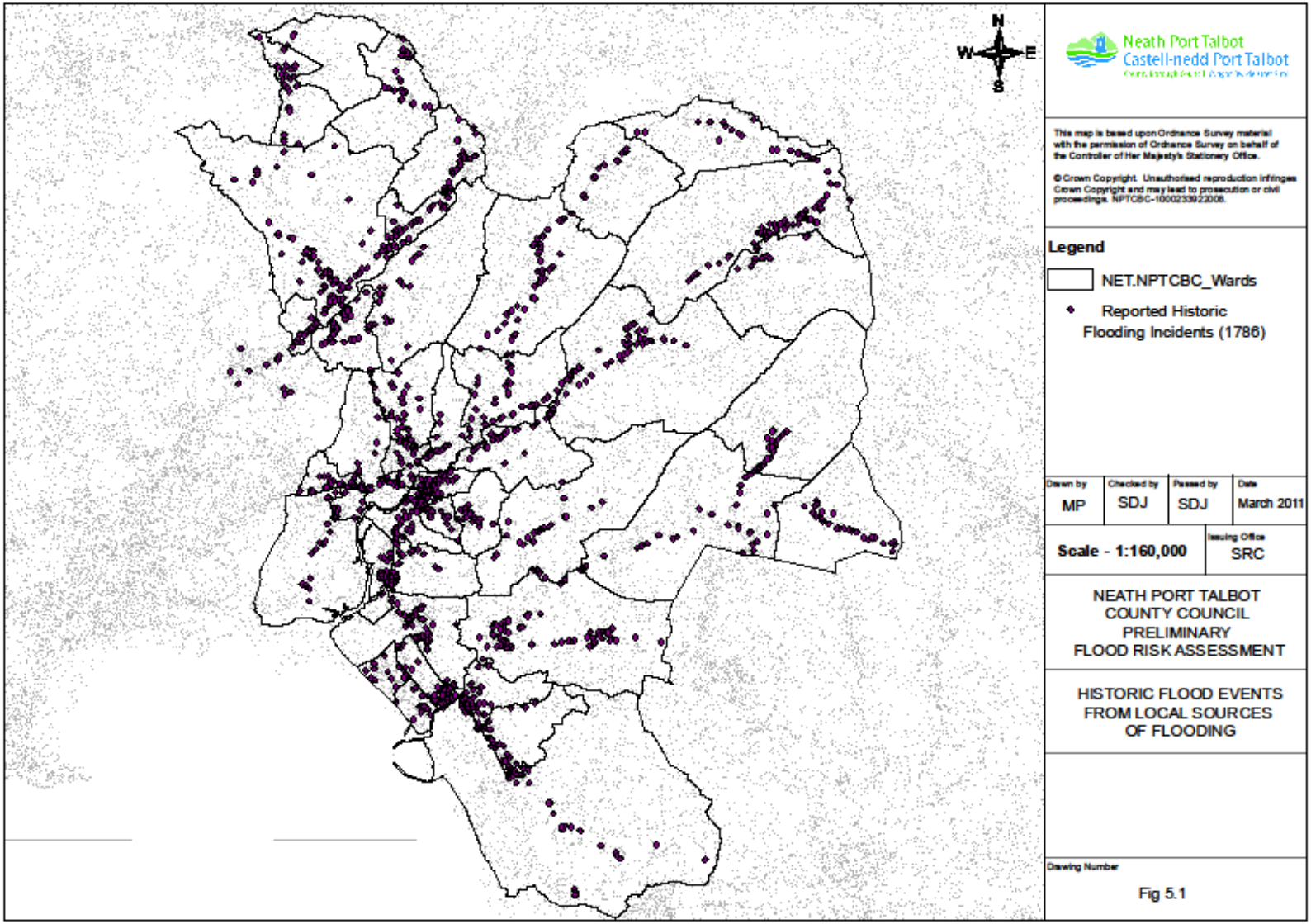
Afan Catchment			Consequences
Aberavon	28 September 1909	Afan (assumed)	Town devastated by more than 1.5m depth of flooding- 200 people made homeless
Glyncorrwg	15 October 1909	Afon Corrwg	Four cottages washed away & property damaged
Glyncorrwg	28 September 1909	Afon Corrwg	River rose 2m in an hour, considerable damage to property. Main girder bridge gave way killing one man.
Glyncorrwg	Oct 1910	Afon Corrwg	Seven cottages washed away and mine railway undermined in several places
Croeserw / Cymmer	July 2007	Surface flooding	Croeserw / Cymmer areas suffered surface flooding allegedly caused principally by deforestation.
Baglan – Heol y Nant area and at Pentwyn Road	2010	Unnamed Watercourse	Blockage causing surcharge at existing chamber on 1000mm diameter surface water culvert know as the Pentwyn Culvert**. Inundation of 5 properties** and highway flooding. Also extensive flooding to highway infrastructure in the Pentwyn Road area during heavy rainfall.

5.2 In the majority of cases of pure historical flooding there is insufficient data available to draw definitive conclusions on the impacts and consequences of flood events on people, the economy and the environment. Between April and December 2010 information relating to **749** surface water flood events from local sources, was collected and analysed to the best of the existing capabilities and compared with information supplied by the EA.

5.3 For the purposes of this report a locally significant or adverse event is defined as one where generally 5 or more residential properties have been flooded in comparatively recent times. For that reason the only flooding events recorded in Annex 1 of the Preliminary Assessment Spreadsheet are that which affected Pontardawe from the canal breach in 1998, which caused flooding to 30 residential properties, a health centre and numerous business in the industrial sector of the town and the more recent flooding event in 2010 at Baglan, when **5 properties** were inundated. Details of all recent incidents are however maintained on the Council's database.

5.4 **Figure 5-1** is a map indicating the distribution of the main (recent) historical flood events from a local sources of flooding within the NPT Council administrative area.

Figure 5-1 Main (recent) historical flood events April to December 2010



6.0 Future Flood Risk

*This section summarises the relevant information on what are perceived as the **major** future flood risks affecting the Neath Port Talbot Area.*

Surface Water Flooding

6.1 The identification of flood risk areas through the PFRA takes into account future floods, **defined as any flood that could potentially occur in the future**. This definition includes predicted floods extrapolated from current conditions, in addition to those with an allowance for climate change. The assessment of future flood risk primarily relies on reporting undertaken internally by the Local Authority and a review of the Environment Agency's Flood Map for Surface Water that has been circulated to Lead Local Flood Authorities. The Flood Map for Surface Water uses a numerical hydraulic model to predict the extent of flood risk from two rainfall events, 1 in 30 annual chance and 1 in 200 annual chance with two depth bandings (greater than 0.1 metres and greater than 0.3 metres).

6.2 **Figure 6-1** highlights the areas considered to be at risk of surface water flooding in the future.

6.3 The following factors were considered when assessing *future* flood risk across the NPT area; topography, location of ordinary watercourses, location of flood plains that retain water, characteristics of watercourses (lengths, modifications), effectiveness of any works constructed for the purpose of flood risk management, location of populated areas, areas in which economic activity is concentrated, the current and predicted impact of climate change and the predicted impact of any long-term developments that might affect the occurrence or significance of flooding, such as proposals for future development.

6.4 Using this information and that provided by the EA the number of properties at risk of surface water flooding with the County Borough has been estimated. For a rainfall event with a 1:200 annual chance of occurring, 25,900 residential properties are at risk from flooding to a depth of 0.1 metres and 10,200 at risk from flooding to a depth of 0.3 metres.

Groundwater Flooding

6.5 There is no local information available which provides evidence on future groundwater flood risk in NPT and overall groundwater is not believed to be a major source of flooding in the County. When it is identified it is also difficult to deal with. The Environment Agency national dataset, Areas Susceptible to Groundwater Flooding, has been used to form the basis of the assessment of future flood risk from groundwater. This dataset is illustrated **in Figure 6-2.**

Canals and Ordinary Watercourses

6.6 There is no available information on future flood risk from canals. However, British Waterways are currently working on a study to better understand the future flood risk, which will be available to inform the second cycle of the PFRA process.

6.7 The fluvial flood map has been used to assess the risk of flooding from ordinary watercourses. The Detailed River Network was used to identify ordinary watercourses and this was cross referenced with the Flood Map for Rivers and the Sea and information from PAS and PFS reporting to assess future flood risk from this source.

6.8 A definition of 'locally agreed surface water information' has been considered with local conditions across the County Borough in mind. As there is no specific local information on future flooding available, the 'locally agreed surface water information' is the Flood Map for Surface Water dataset, which gives an overview of the future flood risk from surface water across the County Borough and is considered to be the most appropriate source of information. This dataset is illustrated in **Figure 6-3.**

6.9 The Environment Agency has used the Flood Map for Surface Water mapping and the National Receptors Database to identify a number of areas across the country that exceed a given threshold, described in **Table 6-1** below.

Table 6-1: Flood risk threshold used to identify future consequences of flooding

'Significant harmful consequences' defined as greater than…	**Description**
200 people *or*	*Flooded to a depth of 0.3m during a rainfall event with a 1 in 200 chance of occurring (or 0.5%)*
20 businesses *or*	
1 critical service	

6.10 This assessment was carried out based on 1 km^2 national grid squares, and the grid squares that exceed this criterion were identified. The grid squares within Neath Port Talbot where flood risk is considered to exceed this threshold are illustrated on **Figure 6-4** (the blue squares). These areas represent where flood risk is considered to be the most severe across the County Borough. The potential consequences on key flood risk indicators have been assessed by the Environment Agency; this information has been included in Annex 2 of the Preliminary Assessment Spreadsheet. It should however be noted that flooding from ordinary watercourses and surface water flow may take place almost anywhere within the County Borough should the specific circumstances prevail.

6.11 Local existing drainage capacity has been designed to accommodate a 1in 5 chance. Modern practice is however to design for a 1:30 chance, with SuDs schemes designed with attenuation to a minimum of 1:100 +30% for climate change.

6.12 **Figure 6.5** indicates a map representing the rainfall event with a 1:200 chance and flooding depth 0.300 metres county wide and the spreadsheet at Annex 2 has been prepared by reference and inspection of the data on this map for areas outside the general indicative flood area.

Figure 6-1 highlights the areas at risk of surface water flooding in the future

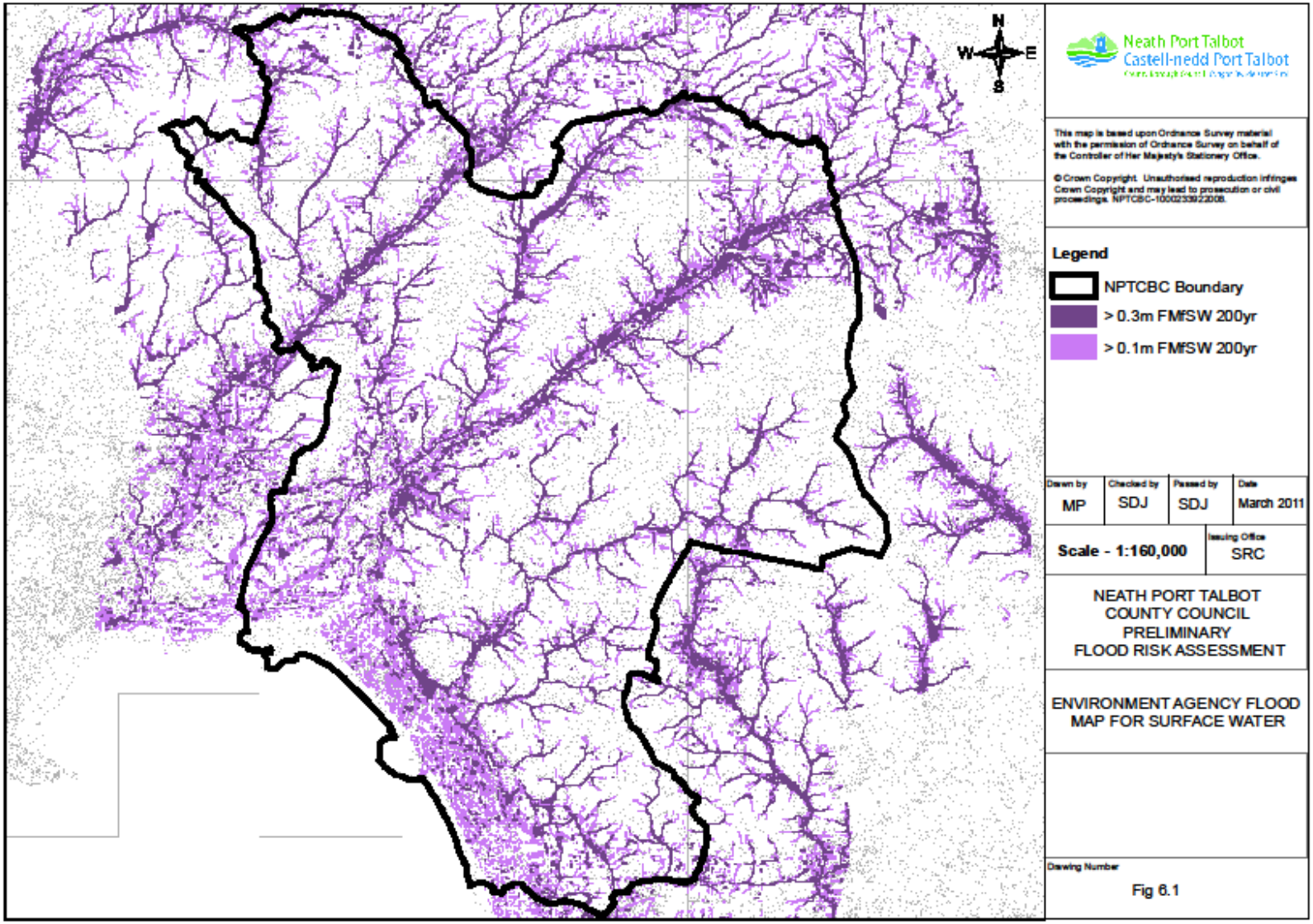
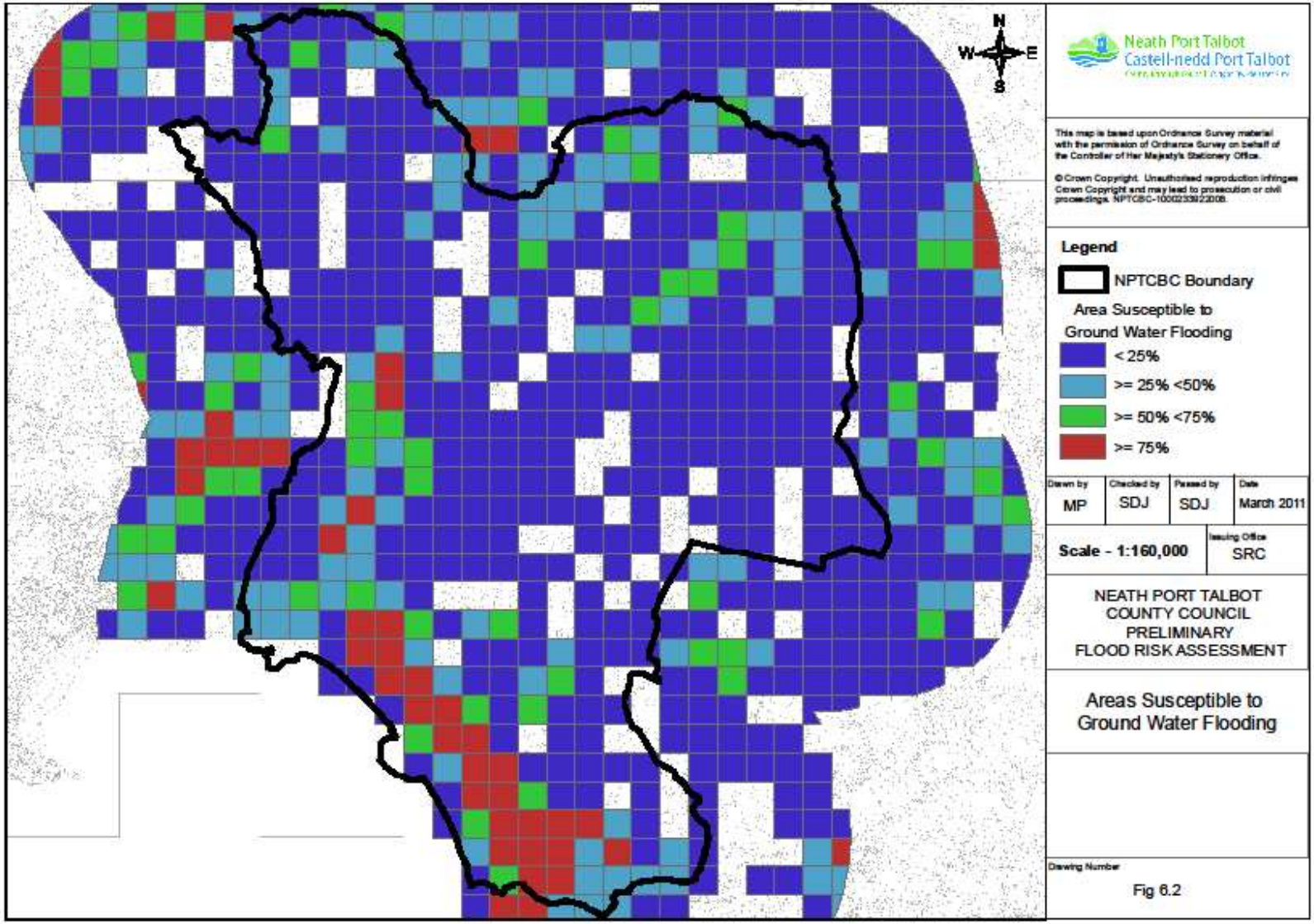


Figure 6.2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© Crown Copyright. Unauthorised reproduction infringes Crown Copyright and may lead to prosecution or civil proceedings. NPTCBC-100023392008.
Legend
NPTCBC Boundary
Area Susceptible to Ground Water Flooding
< 25%
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>= 50% <75%
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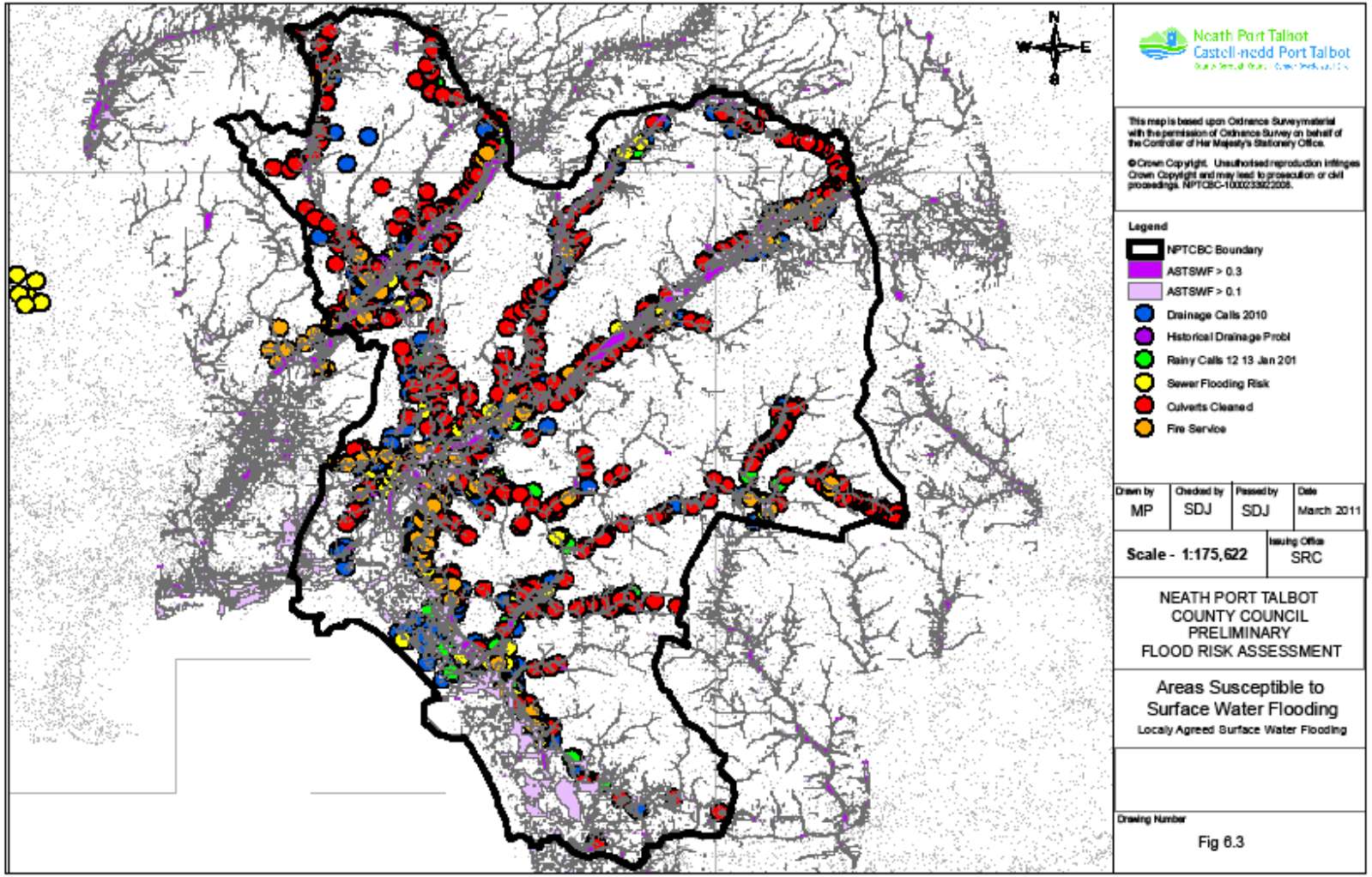
Scale - 1:160,000
Issuing Office SRC
NEATH PORT TALBOT COUNTY COUNCIL PRELIMINARY FLOOD RISK ASSESSMENT
Areas Susceptible to Ground Water Flooding
Drawing Number
Fig 6.2

Figure 6.3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Legend
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ASTSWF > 0.3
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Drainage Calls 2010
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NEATH PORT TALBOT
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PRELIMINARY
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Areas Susceptible to
Surface Water Flooding
Locally Agreed Surface Water Flooding
Drawing Number
Fig 6.3

Figure 6.4 Flood Risk Exceeding EA Thresholds

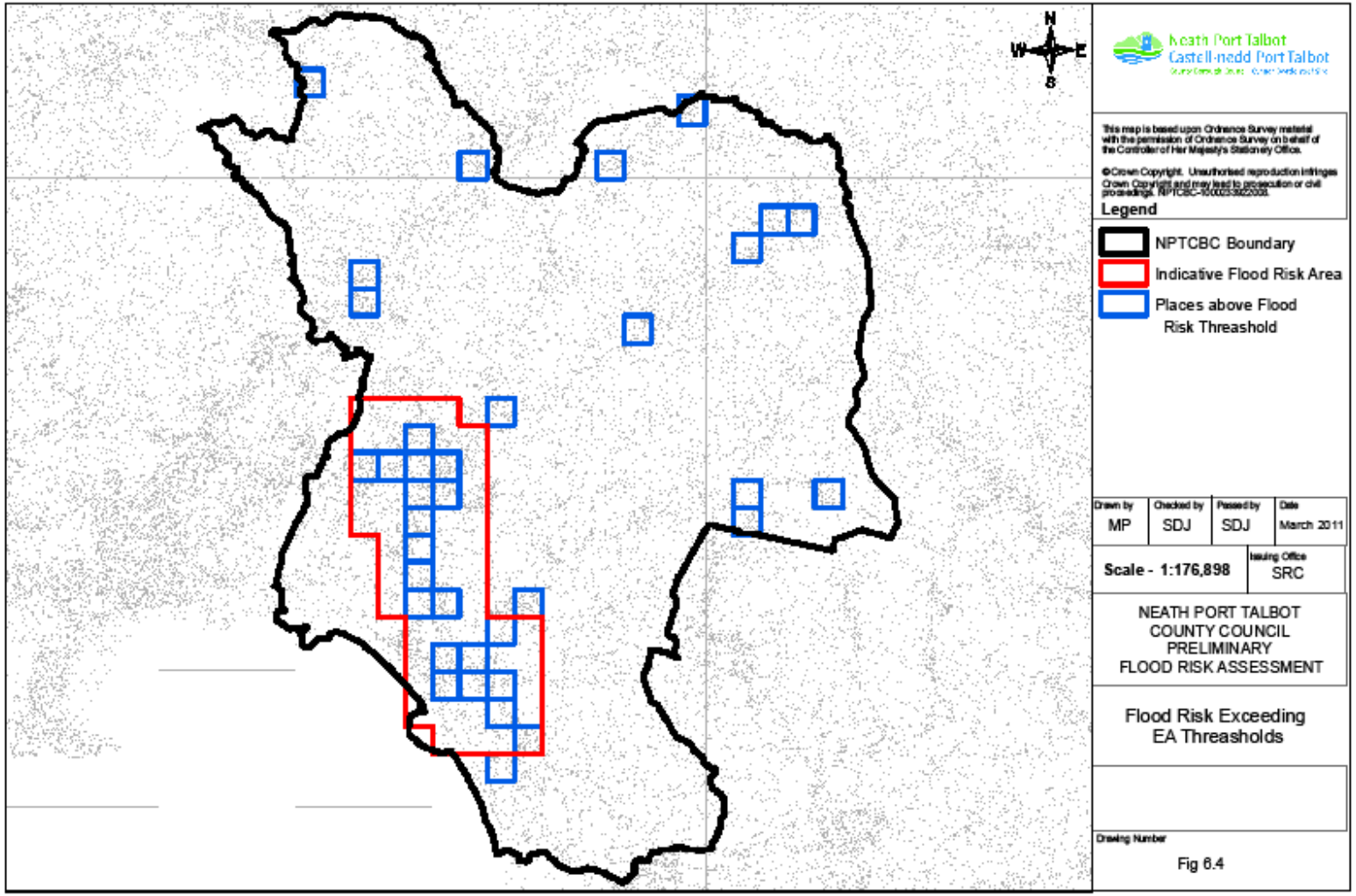
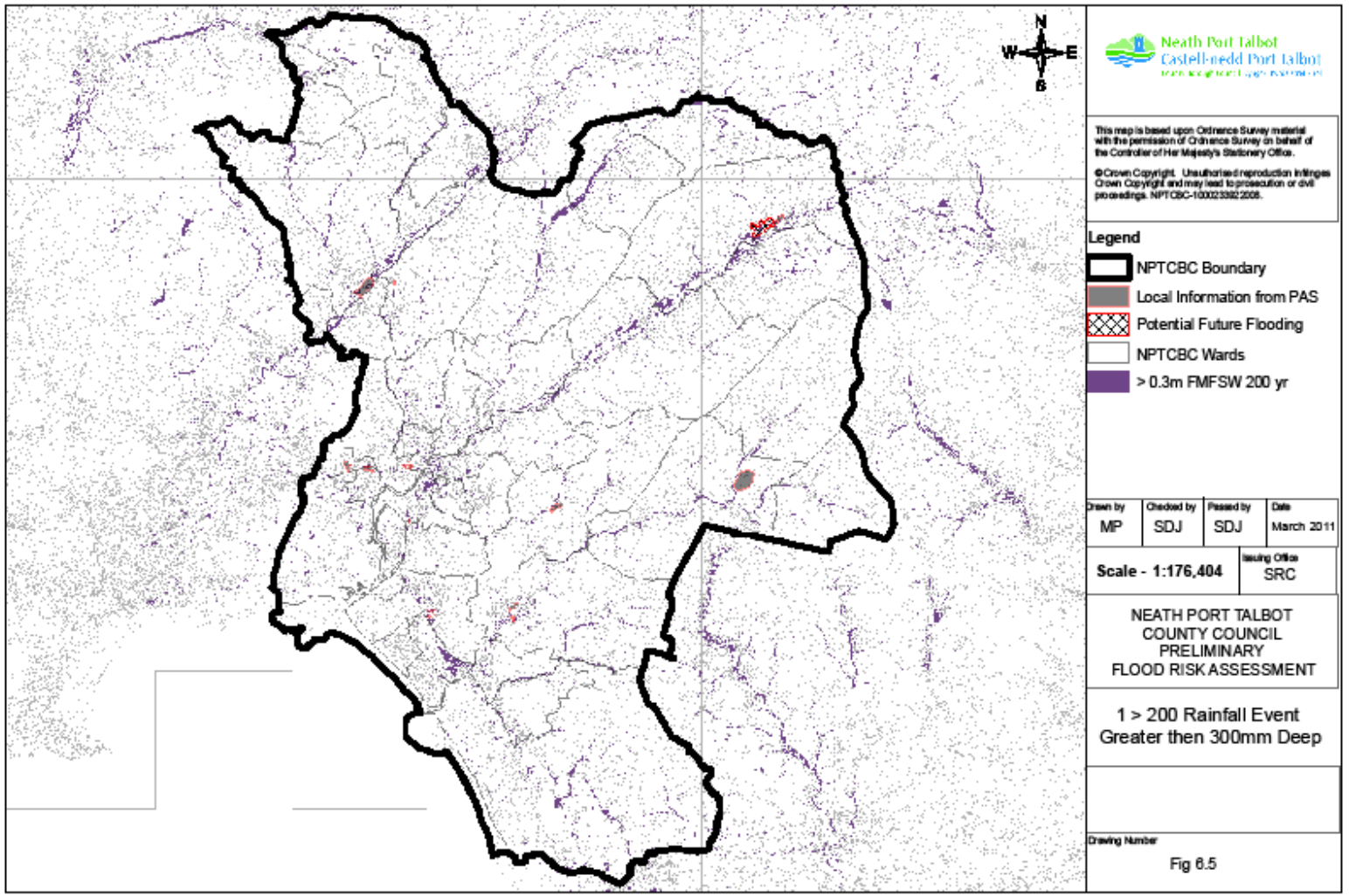


Figure 6.5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Legend
NPTCBC Boundary
Local Information from PAS
Potential Future Flooding
NPTCBC Wards
> 0.3m FMFSW 200 yr
Drawn by
MP
Checked by
SDJ
Passed by
SDJ
Date
March 2011
Scale - 1:176,404
Issuing Office
SRC
NEATH PORT TALBOT
COUNTY COUNCIL
PRELIMINARY
FLOOD RISK ASSESSMENT
1 > 200 Rainfall Event
Greater then 300mm Deep
Drawing Number
Fig 6.5

Table 6-2

Local information derived from Project Appraisal Scheme Reporting

1 Drummau Road / Ellens Row Skewen

1.1 The flooding problem involve the inability of an existing un-named watercourse, which goes into culvert at Ellens Row, to cope with prolonged and intensive rainfall. The risk to properties from inundation is heightened by the topography with considerable changes in elevation which potentially makes the consequential effects of flows escaping from the existing drainage system very serious. There are **31 residential and 6 commercial properties** are considered to be at risk.

2 Days Garage A474 Neath Abbey Road

2.1 The flooding problem involves the inability of the culverts to carry flows effectively due to obstructions of the watercourse downstream of the culvert and above its discharge point into the River Clydach (and subsequently into the River Neath about 0.5 km downstream). These and other obstructions in the watercourse slow the rate of flow and as a result widespread siltation has occurred as evidenced at and immediately above the culverts. A series of ponds downstream, with linking culverts, all exhibit signs of heavy siltation and an inability to discharge effectively. **12 residential properties** have the potential to be inundated under intensive rainfall thresholds.

3 Dan-y-Coed, Tonmawr, Neath

3.1 The flooding problem involves the structural integrity and inability of a number of small culverts, ranging in size from 300mm to 600 mm, constructed to convey numerous un-named watercourses and issues from the northwest facing hillside under properties erected between the issues and the receiving River Pelenna.. Should blockage of these culverts occur then approximately **96 residential properties**, **a Community Centre and 2 commercial properties** are at risk of flooding.

4 Gellinudd area, Alltwen, Pontardawe

4.1 Four un-named watercourses flow through the immediate area, partly in open ditches and partly culverted mainly under roads, accesses and/or property. These watercourses basically cannot cope with the run-off from storm events with floodwater emanating from the entry to the culverted sections to cause inundation to both highways and property. The Ashwood Drive area also suffers from more general flooding from a small watercourse passing under Ashwood Drive and then flowing down towards Gellinudd Hospital. All in all, it is expected that some **41 residential properties and 1 commercial property** to be at risk of inundation in a 1 in 100 year storm event, with the access to the **Gellinudd hospital also restricted.**

5 Rock Street Lancaster Close, Glynneath

5.1 A significant flooding event occurred in December 2007 when **2 residential properties** in Rock Street were **internally flooded** and emergency services attended to effect pumping. Sandbags were placed to prevent another 2 residential properties flooding and allow continued access to two commercial properties. **The highway serving Rock Street and Lancaster Close was flooded to a depth of 75mm with the existing highway drainage overwhelmed.** A later event in the Autumn of 2010 resulted in overland flooding but property inundation was not experienced.

5.2 **Morfa Glas area of Glynneath. The area is high on the EA 'Community Risk Register' and they have established, through extensive modelling, that there is likely to be an increased flood risk from the ordinary watercourse flowing through Council owned land at Morfa Glas. This area is highlighted on the map in Figure 6.5 as an area of potential future flooding.**

6 Grandison Brook, Briton Ferry, Neath

6.1 The flooding problem involves the inability of the Grandison Brook watercourse to cope with all but minor storm events. The problem area is the culverted section at the upstream approach to, and across, Pantyrheol Road i.e. the culverted section immediately before the open watercourse. **22 residential and 2 commercial properties are at risk.**

7 Depot Road, Cwmavon

7.1 The flooding problem involves the inability of two existing storm water culverts to cope with flows following blockage, causing water to flow down the western end of Depot Road and into School Terrace, flooding nearby properties There has been a history of flooding in the area particularly over the past 20 years when flooding not only affected the highway but entered both residential and commercial properties. **15 residential and 2 commercial properties are at risk.**

8 Graig Road, Trebanos

8.1 The flooding problem involves the concentration of fast land drainage runoff down Graig Road which is retained within the confines of the road by walls and high earth banks at the road edge and the inability of the existing drainage arrangements to cope with all but minor storm events in the area. **Up to 11 residential properties are at risk during a 1:100 flood event.**

9 Heol Crwys,Cwmavon

9.1 The flooding problem involves the inability of the culverted section of the Nant Cwm Mawr watercourse, to cope with storm events in the area. Maintenance of the culvert and the problematic manhole structure is difficult, due to access and safety considerations. **33 residential properties and 1 commercial property are at risk.**

10 Caenant Terrace, Skewen, Neath

10.1 The flooding problem involves the inability of the existing storm water drainage system to cope with flows from the watercourse, known locally as Caenant Brook, at times of intensive rain. Some **33 residential properties** are potentially at risk of inundation as result of periods of intense and sustained rainfall.

11 Pentwyn Baglan Area of Port Talbot

11.1 Flooding from an unnamed watercourse above the Pentwyn Estate, Baglan caused by extensive debris gathering in a culverted section of the watercourse before it discharges to watercourse reens at the side of the M4 Motorway. Effect from Dwr Cymru Welsh Water's Seaway Parade Surface Water Pumping Station – essential to keep water levels in the reen at acceptable levels is also a factor in flooding events. **Latest flooding event in August 2010 inundated 5 properties** and caused local highway disruption.

12 Caegroes Terrace, Cadoxton

12.1 An unnamed watercourse drains towards the Tennant Canal, passing under the main highway at Caegroes Terrace, through residential gardens, then via a deep back drop manhole adjacent to a Network rail mineral railway line before reaching its outfall point which is largely indeterminate. It may siphon under the canal. The highway system discharges to the culvert. Flooding events occur when the culvert becomes blocked with silt and debris during heavy rainfall, flash flooding occurs inundating the highway and causing sever disruption to a main route to Neath and point of access to the A465 Trunk Road. **Up to 5 residential properties may be at risk**

6.13 Climate change and long term developments

6.13.1 The Evidence

a) There is clear scientific evidence that global climate change is happening now. It cannot be ignored.

b) Over the past century around the UK we have seen sea level rise and more of our winter rain falling in intense wet spells. Seasonal rainfall is highly variable. It seems to have decreased in summer and increased in winter, although winter amounts changed little in the last 50 years. Some of the changes might reflect natural variation, however the broad trends are in line with projections from climate models.

c) Greenhouse gas (GHG) levels in the atmosphere are likely to cause higher winter rainfall in future. Past GHG emissions mean some climate change is inevitable in the next 20-30 years. Lower emissions could reduce the amount of climate change

further into the future, but changes are still projected at least as far ahead as the 2080s. We have enough confidence in large scale climate models to say that we must plan for change. There is more uncertainty at a local scale but model results can still help us plan to adapt. For example we understand rain storms may become more intense, even if we can't be sure about exactly where or when. By the 2080s, the latest UK climate projections (UKCP09) are that there could be around three times as many days in winter with heavy rainfall (defined as more than 25mm in a day). It is plausible that the amount of rain in extreme storms (with a 1 in 5 annual chance, or rarer) could increase locally by 40%.

6.13.2 River Basin District Specific

Key Projections for Western Wales River Basin District

a) If emissions follow a medium future scenario, UKCP09 projected changes by the 2050s relative to the recent past are:

• Winter precipitation increases of around 15% (very likely to be between 3 and 33%)
• Precipitation on the wettest day in winter up by around 12% (very unlikely to be more than 27%)
• Relative sea level at Swansea very likely to be up between 10 and 40cm from 1990 levels (not including extra potential rises from polar ice sheet loss)
• Peak river flows in a typical catchment likely to increase between 12 and 20%

b) Increases in rain are projected to be greater near the coast than inland.

Implications for Flood Risk

a) Climate changes can affect local flood risk in several ways. Impacts will depend on local conditions and vulnerability.

b) Wetter winters and more of this rain falling in wet spells may increase river flooding especially in the steep, rapidly responding catchments typical of Western Wales. More intense rainfall causes more surface runoff, increasing localised flooding and erosion. In turn, this may increase pressure on drains, sewers and water quality. Storm intensity in summer could increase even in drier summers, so we need to be prepared for the unexpected.

c) Rising sea or river levels may increase local flood risk inland or away from major rivers because of interactions with drains, sewers and smaller watercourses.

d) Where appropriate, we need local studies to understand climate impacts in detail, including effects from other factors like land use. Sustainable development and drainage will help us adapt to climate change and manage the risk of damaging floods in future.

6.13.3 Adapting to Change

a) Past emission means some climate change is inevitable. It is essential we respond by planning ahead. We can prepare by understanding our current and future vulnerability to flooding, developing plans for increased resilience and building the capacity to adapt. Regular review and adherence to these plans is key to achieving long-term, sustainable benefits.

b) Although the broad climate change picture is clear, we have to make local decisions against deeper uncertainty. We will therefore consider a range of measures and retain flexibility to adapt. This approach, embodied within flood risk appraisal guidance, will help to ensure that we do not increase our vulnerability to flooding.

6.13.4 Long Term Developments

a) It is possible that long term developments might affect the occurrence and significance of flooding. However current planning policy aims to prevent new development from increasing flood risk.

b) In Wales, Technical Advice Note 15 (TAN15) on development and flood risk sets out a precautionary framework to guide planning decisions. The overarching aim of the precautionary framework is "to direct new development away from those areas which are at high risk of flooding."

c) Adherence to Government policy ensures that new development does not increase local flood risk. However, in exceptional circumstances the Local Planning Authority may accept that flood risk can be increased contrary to Government policy, usually because of the wider benefits of a new or proposed major development. Any exceptions would not be expected to increase risk to levels which are "significant" (in terms of the Government's criteria).

6.14 Neath Port Talbot Council planning officers are currently working on the Local Development Plan and initial assessments of flood risk at various residential development sites within Neath, Port Talbot, Pontardawe and the Neath Valley are being undertaken which may have, subject to WAG and EA guidelines, the potential to increase flood risk. It is however too early a stage to list these development sites within this report.

6.15 Although the detail is outside the limits of this report, The South Wales Local Resilience Forum Community Risk Register and the Neath Port Talbot & Swansea Resilience Partnership Risk Register have highlighted the risk of flooding as very high within the Neath Port Talbot area from Main River flooding. The following statistics are given for general information only.

Table 6-3 Resilience Statistics

FLOOD RISK COMMUNITY	RIVER FLOODING SOURCE	PROPERTIES AT RISK
Aberdulais	Neath/Dulais	34
Neath	Neath	1244
Pontardawe Tawe	Upper Clydach	4355
Port Talbot	Afan/Ffrwdwyllt	457
Resolven	Neath/Clydach Brook	713
Ystalyfera	Tawe	322
Cwmtwrch	Twrch	74

7.0 Review of Indicative Flood Risk Areas

7.1 In order to ensure a consistent national approach, Defra and WAG have identified significance criteria and thresholds to be used for defining flood risk areas. Guidance on applying these thresholds has been released in Defra's document **"Selecting and reviewing Flood Risk Areas for local sources of flooding".** In this guidance document, Defra have set out agreed key risk indicators and threshold values which **must** be used to determine Flood Risk Areas.

7.2 The methodology is based on using national flood risk information to identify 1km squares where local flood risk exceeds a defined threshold. Where a cluster of these grid squares leads to an area where flood risk is most concentrated, and over 5,000 people are predicted to be at risk of flooding, this area has been identified as an Indicative Flood Risk Area. This is the base starting point for LLFA's , the information provided has then be reviewed against available local data gathered from the resources and organisation identified elsewhere in this report.

7.3 To ensure a consistent and proportionate approach Defra have identified 1km square places above flood risk thresholds (informally referred to as "blue squares"), using new Flood Map for Surface Water (based on the scenario of deep flooding from a rainfall event with a 1 in 200 chance of occurring in any year) based on:

1) number of people > 200 or

2) critical services > 1 or

3) number of non-residential properties > 20

7.4 **Figure 7-1** indicates the disposition of indicative flood areas throughout Wales and **Figure 7-2** the disposition within the County Borough of Neath Port Talbot.

7.5 Clusters of these 1km grid squares were formed on the basis of 4 or more touching blue squares in Wales in a 3km by 3km (9km²) grid. The clusters were ranked on the basis of the total number of people at risk, the number of critical services and the number of non-residential properties. A threshold of **5,000 people in Wales** was applied to determine the indicative Flood Risk Areas.

7.6 These thresholds only relate to local flood risks i.e. from surface runoff, groundwater and ordinary watercourses. There are no significant thresholds for flooding from main rivers, the sea and large raised reservoirs as the Environment Agency will be preparing flood risk and hazard maps and flood risk management plans for these sources across the country.

7.7 The following surface water flood map was then used to review the flood risk across the Neath Port Talbot area and confirm the information supplied.

Flood Map for Surface Water 1:200 chance 0.300 metre deep flood event.

7.8 Outside the general indicative flood risk area studies (indicated in **Table 6-2**) have previously identified a flood risk in both the Dan-y-Coed area of Tonmawr and the Gellinudd area of Pontardawe from surface run–off and ordinary watercourses. There are however no specific amendments required to indicative flood areas as threshold for population and properties are not met. All other areas in this table fall within (or partly within flood risk areas identified by mapping).

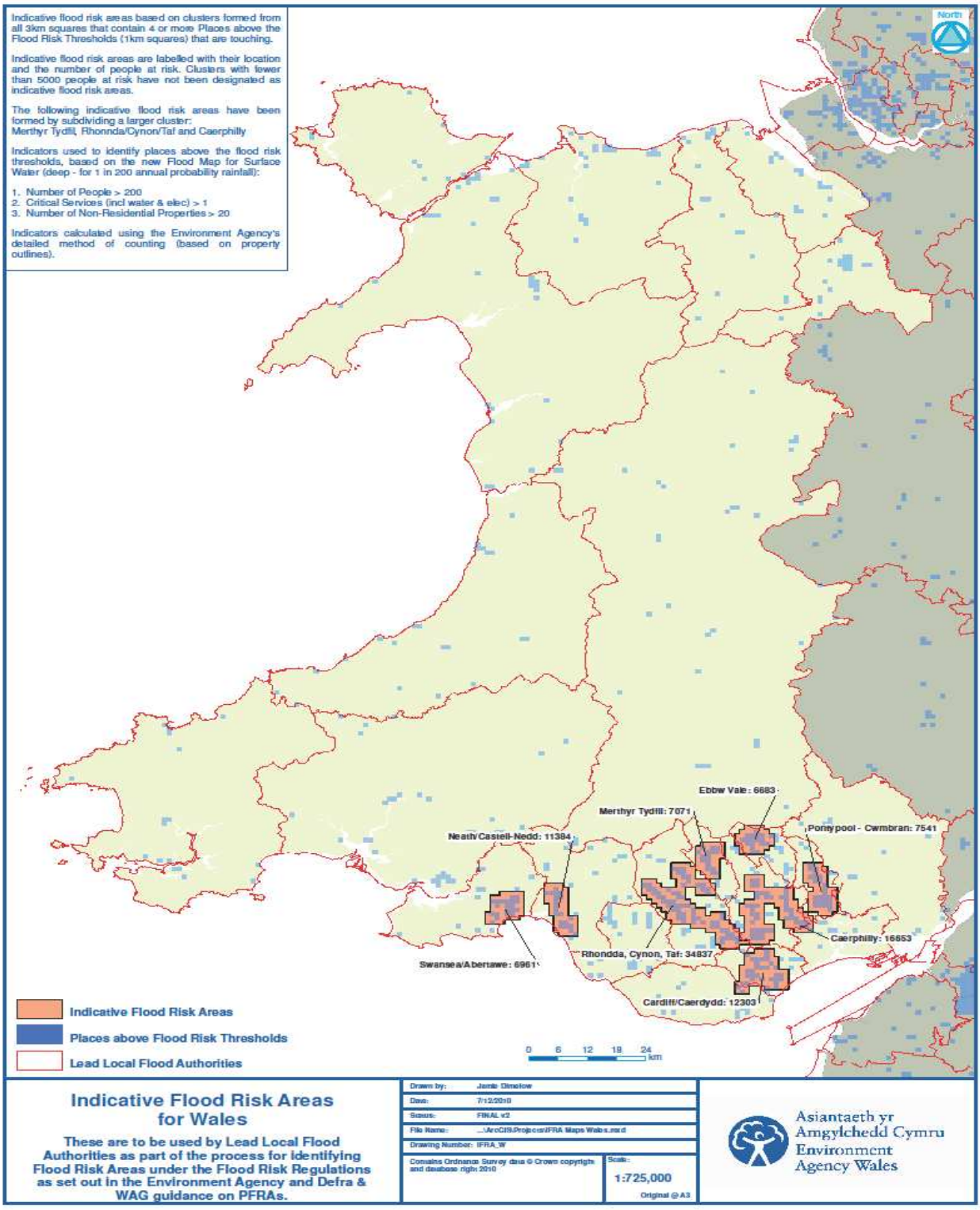
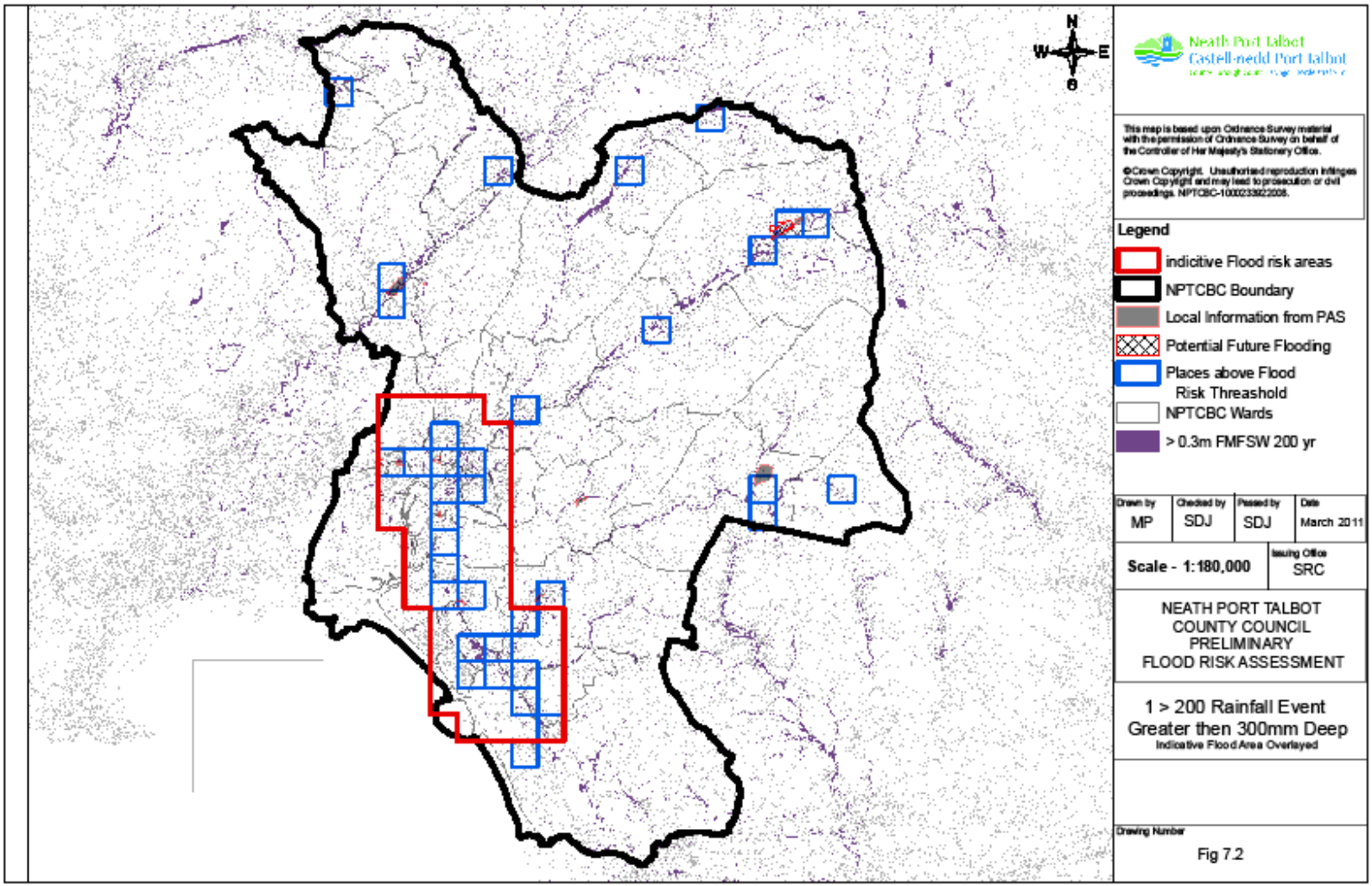


Figure 7-1 Disposition of indicative flood areas throughout Wales

Figure 7.2


N
W
E
S
Neath Port Talbot
Castell-nedd Port Talbot
This map is based upon Ordnance Survey material with the permission of Ordnance Survey on behalf of the Controller of Her Majesty's Stationery Office.
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Legend
indicitive Flood risk areas
NPTCBC Boundary
Local Information from PAS
Potential Future Flooding
Places above Flood Risk Threashold
NPTCBC Wards
> 0.3m FMFSW 200 yr
Drawn by MP
Checked by SDJ
Passed by SDJ
Date March 2011
Scale - 1:180,000
Issuing Office SRC
NEATH PORT TALBOT COUNTY COUNCIL PRELIMINARY FLOOD RISK ASSESSMENT
1 > 200 Rainfall Event Greater then 300mm Deep
Indicative Flood Area Overlayed
Drawing Number
Fig 7.2

8.0 Identification of Flood Risk Areas

8.1 In chapter 7, **Figure 7-2** shows the geographical extent of the indicative flood risk area for the Neath Port Talbot administrative area. As discussed information has been received from an number of partner organizations regarding flood risk and this information has been used to review the indicative flood areas. Following this review of the maps and information provided there are no amendments proposed to indicative flood areas which meet the thresholds quoted.

9.0 Next Steps

9.1 A review of the information contained within this report will be undertaken by 22nd June 2017 and then every six years thereafter.

9.2 In order to continue to fulfill the role as Local Lead Flood Authority, the requirements of the Flood and Water Management Act and the Flood Risk Regulations there are a number of key responsibilities that NPTCBC is required to undertake:-

1. **Investigating flood incidents** – LLFAs have a duty to investigate and record details of significant flood events within their area. This duty includes identifying which authorities have flood risk management functions and what they have done or intend to do with respect to the incident, notifying risk management authorities where necessary and publishing the results of any investigations carried out.

2. **Asset Register** – LLFAs also have a duty to maintain a register of structures or features which are considered to have an effect on flood risk, including details on ownership and condition as a minimum. The register must be available for inspection and the Secretary of State will be able to make regulations about the content of the register and records.

3. **SuDS Approving Body** – LLFAs are designated the SuDS Approving Body (SAB) for any new drainage system, and therefore must approve, adopt and maintain any new sustainable drainage systems (SuDS) within their area when this function commences (expected April 2012)

4. **Local Strategy for Flood Risk Management** – LLFAs are required to develop, maintain, apply and monitor a local strategy for flood risk management in its area. The local strategy will build upon information such as national risk assessments and will use consistent risk based approaches across different local authority areas and catchments. Further guidance on this aspect will be issued by WAG in 2011 and built upon by LLFAs during the twelve months following the publication of this report.

5. **Works powers** – LLFAs have powers to undertake works to manage flood risk from surface runoff and groundwater, consistent with the local flood risk management strategy for the area.

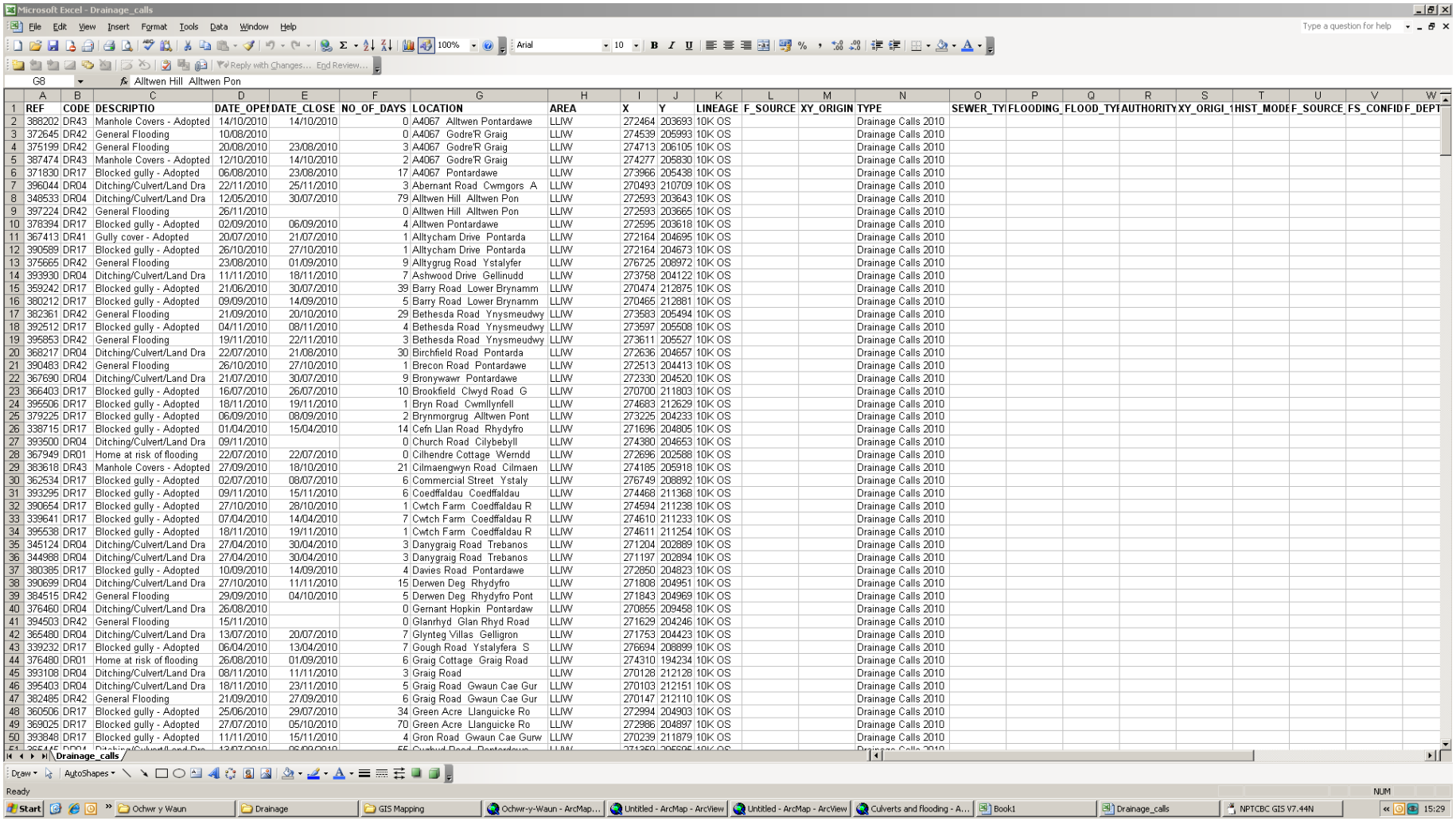
6. **Designation powers** – LLFAs, as well as the Environment Agency have powers to designate structures and features that affect flooding or coastal erosion in order to safeguard assets that are relied upon for flood or coastal erosion risk management.

9.3 It is crucial that all records of flood events are documented consistently and in accordance with the INSPIRE Directive (2007/2/EC). It is suggested that a centralised database should be kept up to date by the LLFA, who have the overall responsibility to manage flood data through the whole of the administrative area. This could then be used as an evidence base to inform future assessments and reviews and for input into the mapping and planning stages as time progresses. It is likely however that in the short term a database will be kept up to date by continual collaboration between partner organistaions.

9.4 A method for flood event data collection and management is shown below. A simple spreadsheet system has been created in which can record details of flooding in the area. **Figure 9.1** indicates a typical spreadsheet. There are synergies with the Councils' Service First Customer Complaints recording system and improvements in the general operation and recording of drainage (and other) calls are being investigated by corporate information technology teams.

9.5 **Figure 9-2** show a typical spreadsheet system used for recording the location and condition of culverted watercourses. Council's highway and land drainage assets are scheduled and there is direct link to a location plan giving salient details about the asset. The intention is to develop this database further to meet the requirements of Section 21 of the Flood and Water Management Act which was implemented in April 2011.

9.6 This preliminary assessment report will be used to inform the next stages in the process – the preparation of flood hazard maps and flood risk management plans. The hazard maps will show the likely extent, depth, direction, speed of flow and probability of possible flood events and their consequences. The flood management plans will set out what the management objectives are, the measures proposed to achieve these objectives and how the measures can be implemented. The information collated for this initial **high level** review will also be used to develop SEA documentation for the next part of the process.



Microsoft Excel - Drainage_calls

File Edit View Insert Format Tools Data Window Help

G8 Alltwen Hill Alltwen Pon

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W
1	REF	CODE	DESCRIPTIO	DATE_OPEI	DATE_CLOSE	NO_OF_DAYS	LOCATION	AREA	X	Y	LINEAGE	F_SOURCE	XY_ORIGIN	TYPE	SEWER_TY	FLOODING	FLOOD_TY	AUTHORITY	XY_ORIGI_1	HIST_MODE	F_SOURCE	FS_CONFID	F_DEPT
2	388202	DR43	Manhole Covers - Adopted	14/10/2010	14/10/2010	0	A4067 Alltwen Pontardawe	LLIW	272464	203693	10K OS			Drainage Calls 2010									
3	372645	DR42	General Flooding	10/08/2010		0	A4067 Godre'R Graig	LLIW	274539	205993	10K OS			Drainage Calls 2010									
4	375199	DR42	General Flooding	20/08/2010	23/08/2010	3	A4067 Godre'R Graig	LLIW	274713	206105	10K OS			Drainage Calls 2010									
5	387474	DR43	Manhole Covers - Adopted	12/10/2010	14/10/2010	2	A4067 Godre'R Graig	LLIW	274277	205830	10K OS			Drainage Calls 2010									
6	371830	DR17	Blocked gully - Adopted	06/08/2010	23/08/2010	17	A4067 Pontardawe	LLIW	273968	205438	10K OS			Drainage Calls 2010									
7	396044	DR04	Ditching/Culvert/Land Dra	22/11/2010	25/11/2010	3	Abernant Road Cwmgors A	LLIW	270493	210709	10K OS			Drainage Calls 2010									
8	348533	DR04	Ditching/Culvert/Land Dra	12/05/2010	30/07/2010	79	Alltwen Hill Alltwen Pon	LLIW	272593	203643	10K OS			Drainage Calls 2010									
9	397224	DR42	General Flooding	26/11/2010		0	Alltwen Hill Alltwen Pon	LLIW	272593	203665	10K OS			Drainage Calls 2010									
10	378394	DR17	Blocked gully - Adopted	02/09/2010	06/09/2010	4	Alltwen Pontardawe	LLIW	272595	203618	10K OS			Drainage Calls 2010									
11	367413	DR41	Gully cover - Adopted	20/07/2010	21/07/2010	1	Alltycham Drive Pontarda	LLIW	272164	204695	10K OS			Drainage Calls 2010									
12	390589	DR17	Blocked gully - Adopted	26/10/2010	27/10/2010	1	Alltycham Drive Pontarda	LLIW	272164	204673	10K OS			Drainage Calls 2010									
13	375665	DR42	General Flooding	23/08/2010	01/09/2010	9	Alltygrug Road Ystalyfer	LLIW	276725	208972	10K OS			Drainage Calls 2010									
14	393930	DR04	Ditching/Culvert/Land Dra	11/11/2010	18/11/2010	7	Ashwood Drive Gellinudd	LLIW	273758	204122	10K OS			Drainage Calls 2010									
15	359242	DR17	Blocked gully - Adopted	21/06/2010	30/07/2010	39	Barry Road Lower Brynamm	LLIW	270474	212875	10K OS			Drainage Calls 2010									
16	380212	DR17	Blocked gully - Adopted	09/09/2010	14/09/2010	5	Barry Road Lower Brynamm	LLIW	270465	212881	10K OS			Drainage Calls 2010									
17	382361	DR42	General Flooding	21/09/2010	20/10/2010	29	Bethesda Road Ynysmeudwy	LLIW	273583	205494	10K OS			Drainage Calls 2010									
18	392512	DR17	Blocked gully - Adopted	04/11/2010	08/11/2010	4	Bethesda Road Ynysmeudwy	LLIW	273597	205508	10K OS			Drainage Calls 2010									
19	395853	DR42	General Flooding	19/11/2010	22/11/2010	3	Bethesda Road Ynysmeudwy	LLIW	273611	205527	10K OS			Drainage Calls 2010									
20	368217	DR04	Ditching/Culvert/Land Dra	22/07/2010	21/08/2010	30	Birchfield Road Pontarda	LLIW	272636	204657	10K OS			Drainage Calls 2010									
21	390483	DR42	General Flooding	26/10/2010	27/10/2010	1	Brecon Road Pontardawe	LLIW	272513	204413	10K OS			Drainage Calls 2010									
22	367690	DR04	Ditching/Culvert/Land Dra	21/07/2010	30/07/2010	9	Bronywawr Pontardawe	LLIW	272330	204520	10K OS			Drainage Calls 2010									
23	366403	DR17	Blocked gully - Adopted	16/07/2010	26/07/2010	10	Brookfield Clwyd Road G	LLIW	270700	211803	10K OS			Drainage Calls 2010									
24	395506	DR17	Blocked gully - Adopted	18/11/2010	19/11/2010	1	Bryn Road Cwmllynfell	LLIW	274683	212629	10K OS			Drainage Calls 2010									
25	379225	DR17	Blocked gully - Adopted	06/09/2010	08/09/2010	2	Brynmorgrug Alltwen Pont	LLIW	273225	204233	10K OS			Drainage Calls 2010									
26	338715	DR17	Blocked gully - Adopted	01/04/2010	15/04/2010	14	Cefn Llan Road Rhydyfro	LLIW	271696	204805	10K OS			Drainage Calls 2010									
27	393500	DR04	Ditching/Culvert/Land Dra	09/11/2010		0	Church Road Cilybebyll	LLIW	274380	204653	10K OS			Drainage Calls 2010									
28	367949	DR01	Home at risk of flooding	22/07/2010	22/07/2010	0	Cilhendre Cottage Werndd	LLIW	272696	202588	10K OS			Drainage Calls 2010									
29	383618	DR43	Manhole Covers - Adopted	27/09/2010	18/10/2010	21	Cilmaengwyn Road Cilmaen	LLIW	274185	205918	10K OS			Drainage Calls 2010									
30	362534	DR17	Blocked gully - Adopted	02/07/2010	08/07/2010	6	Commercial Street Ystaly	LLIW	276749	208892	10K OS			Drainage Calls 2010									
31	393295	DR17	Blocked gully - Adopted	09/11/2010	15/11/2010	6	Coedffaldau Coedffaldau	LLIW	274468	211368	10K OS			Drainage Calls 2010									
32	390654	DR17	Blocked gully - Adopted	27/10/2010	28/10/2010	1	Cwtch Farm Coedffaldau R	LLIW	274594	211238	10K OS			Drainage Calls 2010									
33	339641	DR17	Blocked gully - Adopted	07/04/2010	14/04/2010	7	Cwtch Farm Coedffaldau R	LLIW	274610	211233	10K OS			Drainage Calls 2010									
34	395538	DR17	Blocked gully - Adopted	18/11/2010	19/11/2010	1	Cwtch Farm Coedffaldau R	LLIW	274611	211254	10K OS			Drainage Calls 2010									
35	345124	DR04	Ditching/Culvert/Land Dra	27/04/2010	30/04/2010	3	Danygraig Road Trebanos	LLIW	271204	202889	10K OS			Drainage Calls 2010									
36	344988	DR04	Ditching/Culvert/Land Dra	27/04/2010	30/04/2010	3	Danygraig Road Trebanos	LLIW	271197	202894	10K OS			Drainage Calls 2010									
37	380385	DR17	Blocked gully - Adopted	10/09/2010	14/09/2010	4	Davies Road Pontardawe	LLIW	272850	204823	10K OS			Drainage Calls 2010									
38	390699	DR04	Ditching/Culvert/Land Dra	27/10/2010	11/11/2010	15	Derwen Deg Rhydyfro	LLIW	271808	204951	10K OS			Drainage Calls 2010									
39	384515	DR42	General Flooding	29/09/2010	04/10/2010	5	Derwen Deg Rhydyfro Pont	LLIW	271843	204969	10K OS			Drainage Calls 2010									
40	376460	DR04	Ditching/Culvert/Land Dra	26/08/2010		0	Gernant Hopkin Pontardaw	LLIW	270855	209458	10K OS			Drainage Calls 2010									
41	394503	DR42	General Flooding	15/11/2010		0	Glanrhyd Glan Rhyd Road	LLIW	271629	204246	10K OS			Drainage Calls 2010									
42	365480	DR04	Ditching/Culvert/Land Dra	13/07/2010	20/07/2010	7	Glynteg Villas Gelligron	LLIW	271753	204423	10K OS			Drainage Calls 2010									
43	339232	DR17	Blocked gully - Adopted	06/04/2010	13/04/2010	7	Gough Road Ystalyfera S	LLIW	276694	208899	10K OS			Drainage Calls 2010									
44	376480	DR01	Home at risk of flooding	26/08/2010	01/09/2010	6	Graig Cottage Graig Road	LLIW	274310	194234	10K OS			Drainage Calls 2010									
45	393108	DR04	Ditching/Culvert/Land Dra	08/11/2010	11/11/2010	3	Graig Road	LLIW	270128	212128	10K OS			Drainage Calls 2010									
46	395403	DR04	Ditching/Culvert/Land Dra	18/11/2010	23/11/2010	5	Graig Road Gwaun Cae Gur	LLIW	270103	212151	10K OS			Drainage Calls 2010									
47	382485	DR42	General Flooding	21/09/2010	27/09/2010	6	Graig Road Gwaun Cae Gur	LLIW	270147	212110	10K OS			Drainage Calls 2010									
48	360506	DR17	Blocked gully - Adopted	25/06/2010	29/07/2010	34	Green Acre Llangwicke Ro	LLIW	272994	204903	10K OS			Drainage Calls 2010									
49	369025	DR17	Blocked gully - Adopted	27/07/2010	05/10/2010	70	Green Acre Llangwicke Ro	LLIW	272986	204897	10K OS			Drainage Calls 2010									
50	393848	DR17	Blocked gully - Adopted	11/11/2010	15/11/2010	4	Gron Road Gwaun Cae Gurw	LLIW	270239	211879	10K OS			Drainage Calls 2010									

Drainage_calls

Ready

NUM

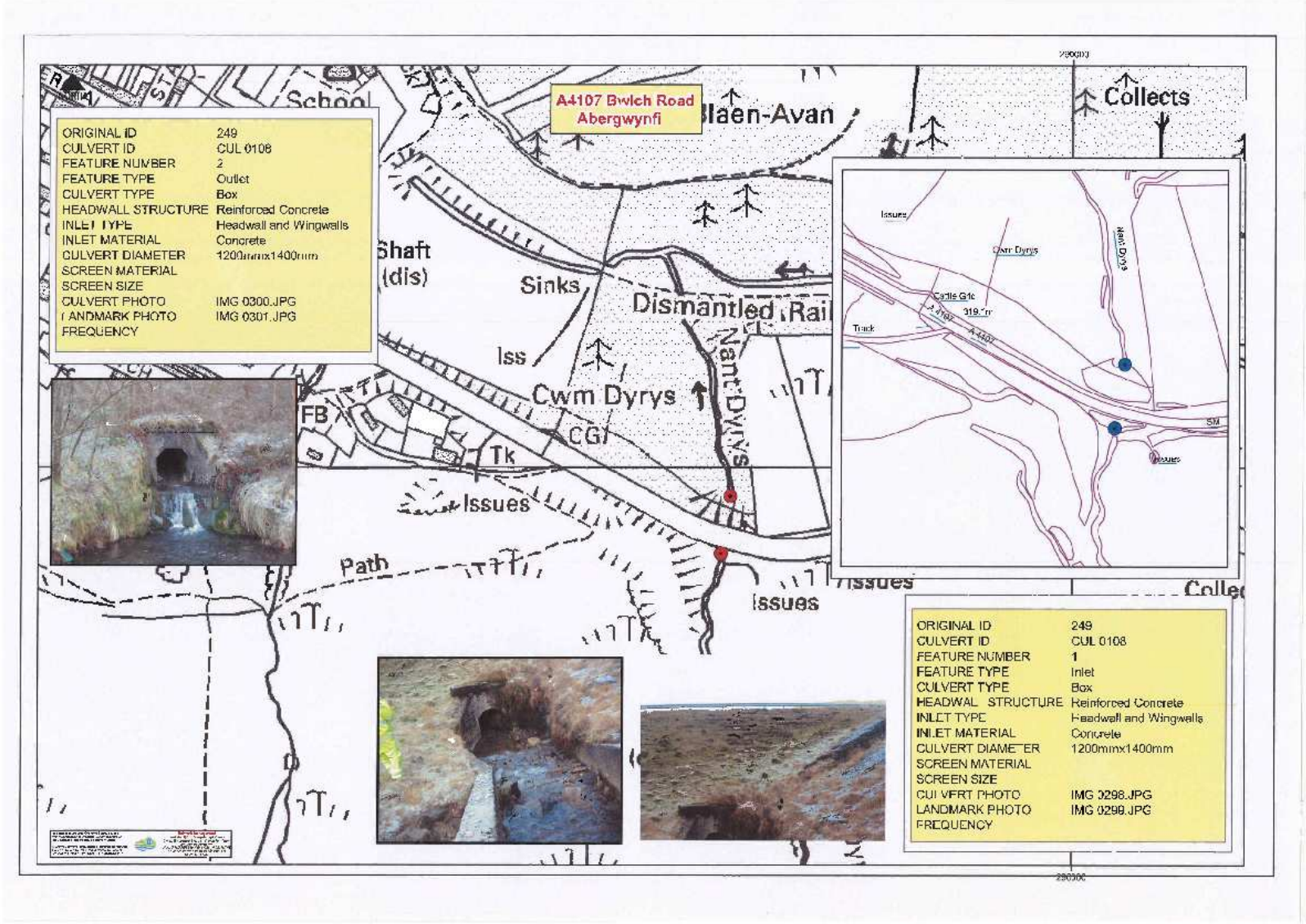
Start | Ochwr y Waun | Drainage | GIS Mapping | Ochwr-y-Waun - ArcMap... | Untitled - ArcMap - ArcView | Untitled - ArcMap - ArcView | Culverts and flooding - A... | Book1 | Drainage_calls | NPTCBC GIS V7.44N | 15:29

Figure 9-1 Flood Event Data Recording system

Figure 9-2 Culvert database

CULVERT/INTAKE STRUCTURES WITHIN THE COUNTY BOROUGH	Location	Area	Frequency	Situation	Original ID Number
108 Graig Rd, Godergraig (below no.108)	HIGHWAYS/PRIVATE	LLW	MONTHLY	Highways /Private land	ID 209
A4107 (above Graig Rd, Abergwynfi - St Gabriels Church)	HIGHWAYS	PORT TALBOT	YEARLY	Highways	ID 252
A4107 (above nos. 40 & 41 High St, Abergwynfi)	HIGHWAYS	PORT TALBOT	YEARLY	Highways	ID 250
A4107 (adj to no.5 Cwm Ifan Bach) Port Talbot	HIGHWAYS	PORT TALBOT	QUARTERLY	Highways	ID 254
A4107 (o/p Western Logs, Port Talbot)	HIGHWAYS	PORT TALBOT	QUARTERLY	Highways	ID 253
A4107 Bwlch Mountain Road	HIGHWAYS	PORT TALBOT	MONTHLY		
A4109 Aberdulais (Gas valve compound) 150m North "Dell"	HIGHWAYS	NEATH	MONTHLY	Private land	ID 29
A4109 Aberdulais (Tir Isaf Farm)	HIGHWAYS	NEATH	MONTHLY	Private land	ID 30
A4109 Crynant (adj to no. 13 Ynysewen Tce)	HIGHWAYS	NEATH	MONTHLY	Highways	ID 237
A4109 Crynant (Main Rd - adj to no. 125)	HIGHWAYS	NEATH	QUARTERLY	Highways	ID 268
A4109 Crynant (Main Rd - between nos 109 & The Gradon Public House)	HIGHWAYS	NEATH	MONTHLY	Highways	ID 267
A4109 Crynant (Main Rd x 2 - o/p property known as Cyntala House)	HIGHWAYS	NEATH	QUARTERLY	Highways	ID 193 & 269
A4109 Crynant (o/p no. 24 Penybont)	HIGHWAYS/PRIVATE	NEATH	MONTHLY	Highways/Private land	ID 331
A4109 Crynant (o/p Ty'n Wern)	HIGHWAYS	NEATH	QUARTERLY	Highways	ID 236
A4109 Intervalley Road	HIGHWAYS	NEATH	MONTHLY		
A4109 Intervalley Road (Fin Glas Bungalow Onllwyn)	HIGHWAYS	NEATH	QUARTERLY	Highways	ID 229
A4109 Near Celn Coed Museum	HIGHWAYS	NEATH	MONTHLY	Private land	ID 21
A4109 Seven Sisters (below properties Wern and Hillside)	HIGHWAYS	NEATH	YEARLY	Highways	ID 33
A465 OPPOSITE CHAIN RD GNEATH	HIGHWAYS	NEATH	WEEKLY	h/w culvert	
Abergarwed Farm Abergarwed SA3A3	HIGHWAYS	NEATH	WEEKLY		
Abernant Road Cwmgors X 2 (R/O NO. 5 & NO. 45)	U/D	LLW	MONTHLY	Council/private land	ID 285 (L14)
Addoldy House rear of Min y Coed Glynneath SA11 5ES	U/D	NEATH	MONTHLY	Council/private land	
Addoldy Rd (above Forest Lodge)	U/D	NEATH	MONTHLY	Private land	
Ael y Fro Pontardawe (rear of no 12 & no. 18)	U/D	LLW	MONTHLY	Council land	ID 213 & 214 (L10)
Allan Terrace/Aneddfan Cwmafon (between no. 20 Aneddfan & no.1 Allan Tce)	U/D	PORT TALBOT	MONTHLY	Council/Highways	
Allan Valley Road Cwmavon	HIGHWAYS	PORT TALBOT			
Alltwen (O/P no. 2 Gwyn St)	HIGHWAYS	LLW	MONTHLY	Private land	ID 27
Alltwen 150m east of Cilhendre Ganol	HIGHWAYS	LLW	QUARTERLY	Private land	ID 28

Figure 9-3 Plan linked to Culvert Database.



10.0 References

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

The Flood Risk Regulations 2009
http://www.legislation.gov.uk/uksi/2009/3042/contents/made

Preliminary Flood Risk Assessment (PFRA) Final Guidance Report – GEH01210BTGH-E-E
Environment Agency
http://publications.environment-agency.gov.uk/

Preliminary Flood Risk Assessment (PFRA) Annexes to the final guidance
Report – GEH01210BTHF-E-E
Environment Agency
http://publications.environment-agency.gov.uk/

Selecting and Reviewing Flood Risk Areas for local sources of flooding
Guidance to Lead Local Flood Authorities Flood Risk Regulations 2009
DEFRA / Welsh Assembly Government.
http://archive.defra.gov.uk/environment/flooding/documents/research/flood-risk-method.pdf
http://ww2.defra.gov.uk/environment/flooding/

United Kingdom Climate Projections 2009 (UKCP09)
http://ukclimateprojections.defra.gov.uk/

Solomon, S., D. Qin, M. Manning, Z. Chen, M. Marquis, K.B. Avery, M. Tignor and H.L. Miller (eds.). Summary for Policymakers. Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA. 9. Available for download from http://www.ipcc.ch/ipccreports/ar4-wg1.htm

SJ Brown, M Beswick, E Buonomo, R Clark, D Fereday, D Hollis, RG Jones, EJ Kennett, M Perry, J Prior and AA Scaife. Met Office Submission to the Pitt Review – Executive Summary, The extreme rainfall of Summer 2007 and future extreme rainfall in a changing climate. 08/01/2008

Defra (2006) Flood and Coastal Defence Appraisal Guidance, FCDPAG3 Economic Appraisal, Supplementary Note to Operating Authorities – Climate Change Impacts October 2006.
http://www.defra.gov.uk/environment/flooding/documents/policy/guidance/fcdpag/fcd3climate.pdf

The Environment Agency Ogmore to Tawe Catchment Flood Management Plan March 2009

The Environment Agency Loughor to Taf Catchment Flood Management Plan March 2009

Environment Agency River Basin Management Plan, Western Wales River Basin
December 2009

The Pitt Review (2008) ~ Learning Lessons from the 2007 Floods.

Reference to various other Local Authority PFRA reports for general guidance including those prepared by Essex County Council and Gwynedd Council

Reference to Project Appraisal Reporting for NPTCBC undertaken by Martin Wright Associates.

11.0 Annexes

Annex 1 - Records of past floods and their significant consequences (preliminary assessment report spreadsheet)

Refer to Annex 1 of the preliminary assessment spreadsheet attached to this report and the discussion in Chapter 5.

Annex 2 - Records of future floods and their consequences (preliminary assessment report spreadsheet)

Refer to Annex 2 of preliminary assessment spreadsheet attached to this report. This spreadsheet records the risk from future flooding within Neath Port Talbot and is based on the best information available at the time this report was prepared.

Annex 3 - Records of Flood Risk Areas and their rationale (preliminary assessment report spreadsheet)

Refer to Annex 3 of the preliminary assessment spreadsheet attached to this report. This spreadsheet includes information and details about the identified flood risk within the Neath Port Talbot Council indicative flood area

Annex 4 - Review checklist

Refer to annex 4, attached to this report, which contains the review checklist that has been provided by the Environment Agency to act as a checklist for reviewing PFRA submissions.