



Newport City Council - Preliminary Flood Risk Assessment

Preliminary Assessment Report

Final Report
April 2011



Revision Schedule

Preliminary Flood Risk Assessment April 2011

Rev	Date	Details	Prepared by	Reviewed by	Approved by
01	February 2011	D135471 - Draft Report for comment	Dr. Rob Sweet Senior Flood Risk Specialist Patrick Goodey Flood Risk Consultant	Matthew R Graham Principal Consultant	Matthew Graham Principal Consultant
01	March 2011	D135471 – Final incorporating comments	Patrick Goodey Flood Risk Consultant	Matthew Graham Principal Consultant	Jon Robinson Technical Director
02	April 2011	D135471 – Draft for comment. Version 2 includes additional flood event info	Patrick Goodey Flood Risk Consultant	Matthew Graham Principal Consultant	Jon Robinson Technical Director
02	April 2011	D135471 – Final version incorporating comments	Patrick Goodey Flood Risk Consultant	Matthew Graham Principal Consultant	Jon Robinson Technical Director

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Glossary

Acronym	Definition
AAP	Area Action Plan
CDA	Critical Drainage Area
CIRIA	Construction Industry Research and Information Association
CFMP	Catchment Flood Management Plan
DCWW	Dŵr Cymru Welsh Water
Defra	Department for Environment, Food and Rural Affairs
EA	Environment Agency
ECC	Essex County Council
FWMA	Flood & Water Management Act 2010
IUD	Integrated Urban Drainage
LDP	Local Development Plan
LiDAR	Light Detection and Ranging (Topographic Data)
LLFA	Lead Local Flood Authority
LoSA	Level of Service Agreements
LPA	Local Planning Authority
LRF	Local Resilience Forum
PFRA	Preliminary Flood Risk Assessment
RBD	River Basin District
RFDC	Regional Flood Defence Committee
SFCA	Strategic Flood Consequence Assessment
TAN15	Technical Advice Note 15: Development and Flood Risk
RFDC	Regional Flood Defence Committee
SAB	SuDS Approving Body
SuDS	Sustainable Drainage Systems
SWMP	Surface Water Management Plan
UKCP09	United Kingdom Climate Predictions

Executive Summary

The EC Floods Directive, has been transposed into UK law through the Flood Risk Regulations (2009) and the Flood and Water Management Act (FWMA). Under the Flood Risk Regulations (2009), Newport City Council must prepare and undertake a Preliminary Flood Risk Assessment (PFRA) to assess the harmful consequences of past and potential future floods and to identify significant flood risk areas.

As Lead Local Flood Authority (LLFA), Newport City Council has responsibility for preparing the deliverables of the Flood Risk Regulations for local flood risks from surface water runoff, ordinary watercourses, Local Authority regulated reservoirs and groundwater. The Environment Agency are responsible for preparing the deliverables for Main River and the sea.

Under the FWMA, LLFAs have a number of defined responsibilities in the governance of local flood risk management, namely; leading coordination of flood risk management and leading governance, stakeholder engagement, developing and maintaining an asset register, being the SuDS Approving Body, undertaking local Flood Risk Management Strategies and gaining works or designation powers.

This Preliminary Report has been compiled to fulfil the requirements of the first stage in the PFRA process. It compiles and documents all available data relating to local flood risks in Newport on a strategic scale. Such data includes:

- Environment Agency Flood Map From Surface Water;
- Areas susceptible to Groundwater Flooding;
- Dŵr Cymru Welsh Water records of historic flooding;
- South Wales Fire and Rescue records of historic flooding; and
- Integrated Surface Water Management Group records of historic surface water and sewer flooding.

Historical flood information provided by Newport City Council indicates various areas that have flooded in the past, notably the City Centre in 1997 and Gaer Vale in 2000. However, these events, whilst causing disruption on a minor scale, are not deemed 'significant' according to the PFRA guidelines.

A significant aspect of the Preliminary Assessment Report is to evaluate the location of any Indicative Flood Risk Areas within the authority area and provide an assessment of present and future flood risks to this area.

There is only part of one Indicative Flood Risk Area within Newport, which is a cross boundary flood risk area shared with the neighbouring LLFA of Caerphilly County Borough Council. Investigation of the relevant data indicates that the present and future flood risks within this area would not be deemed significant. Therefore, it is recommended by this Preliminary Report to remove the Indicative Flood Risk Area from the Newport City Council boundary.

With the removal of the only Indicative Flood Risk Area from the Newport City Council boundary, the LLFA would not require additional work within the PFRA process. However, it is recommended that this area is included within the Local Flood Risk Management Strategy, which is required under the regulations of the FWMA.

1 Introduction

1.1 Newport City Council PFRA

This document provides a preliminary assessment report undertaken by URS/Scott Wilson on behalf of Newport City Council who is responsible for producing a Preliminary Flood Risk Assessment (PFRA) for their administrative area.

The main drivers behind this report are from recent legislation, these are:

- Flood Risk Regulations 2009; and
- Flood and Water Management Act 2010 (FWMA).

Under these pieces of legislation, all Unitary Authorities within Wales are designated 'Lead Local Flood Authorities' (LLFA) and have been formally allocated a number of key responsibilities with respect to local flood risk management. A full description of these responsibilities is provided in Section 2.

The purpose of the Flood Risk Regulations 2009 is to transpose the EC Floods Directive (Directive 2007/60/EC on the assessment and management of flood risks) into domestic law in England and Wales and to implement its provisions. In particular, it places duties on the Environment Agency and LLFAs to prepare, where required, a number of documents including:

- Preliminary Assessment Report;
- Flood hazard and flood risk maps; and
- Flood Risk Management Plans.

The duties of the LLFA with regard to this report are provided in Part 2 (Section 10) of the Flood Risk Regulations 2009¹ and are as follows:

Duty to prepare preliminary assessment reports: Lead Local Flood Authority

10.-(1) *A lead local flood authority must prepare a preliminary assessment report in relation to flooding in its area.*

(2) A lead local authority is not required to include in its report information about flooding from a source mentioned in regulation 9(1)(b) unless the authority thinks that it may affect flooding from another source.

(3) The Environment Agency –

- (a) must review a preliminary assessment report prepared under this regulations, and*
- (b) may recommend modifications.*

(4) Following a review, a lead local flood authority may revise its preliminary assessment report.

(5) The Agency's power to require information under regulation 36 includes power to require a lead local flood authority to provide a preliminary assessment report by a specified date.

(6) This regulation is subject to regulations 33 and 34.

Table 1-1 shows the elements of work required from Newport City Council under the Flood Risk Regulations 2009, along with the timescales of their respective delivery. The first two elements of work that are highlighted area covered by this preliminary assessment report.

¹ The Flood Risk Regulations can be viewed at: <http://www.legislation.gov.uk/ukSI/2009/3042/contents/made>

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

22nd June 2011	Prepare Preliminary Assessment Reports	<i>The PFRA should focus on local flood risk from surface water, groundwater, ordinary watercourses, canals and small impounded reservoirs.</i>
22nd June 2011	On the basis of the PFRA, identify Flood Risk Areas	<i>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.</i>
22nd June 2013	Prepare Hazard Maps and Risk Maps for each Flood Risk Area	<i>Used to identify the level of hazard and risk of flooding within each Flood Risk Area to inform Flood Risk Management Plans</i>
22nd June 2015	Prepare Flood Risk Management Plans	<i>Plans setting out risk management objectives and strategies for each of the Flood Risk Areas.</i>

It is noted that the scope of a PFRA for LLFAs is to consider past flooding and possible future flooding from the following local sources:

- Surface water;
- Groundwater;
- Ordinary watercourses; and
- Flooding from canals and small impounded reservoirs;

It is also noted that the PFRA must consider floods which have significant harmful consequences for human health, economic activity and the environment. Flooding associated with the sea, main rivers and reservoirs is the responsibility of the Environment Agency and does **not** need to be considered by the LLFA unless it is considered that it may affect flooding from one of the sources listed above. This is discussed in more detail in Section 4.

This version of the report has been updated to include reference to historical flood event information provided by Newport City Council in April 2011.

1.2 Study Area

The study area for this PFRA is defined by the administrative boundary of Newport City Council LPA and covers an area of 218 km². It is bordered by four other LLFAs, these are Monmouthshire County Council, Torfaen County Borough Council, Caerphilly County Borough Council and Cardiff City Council. The geographical extent and relationship to surrounding LLFAs is provided in Figure 1-1.



Figure 1-1: Newport City Council administrative area and surrounding LLFA areas.

The study area is within the Severn River Basin District and is served by Dŵr Cymru Welsh Water (DCWW), Caldicot and Wentlooge Level Internal Drainage Board (IDB) and by the Environment Agency Wales Region. In addition, the Flood Risk Management Wales (FRMW) committee advises on flood risk management in the Wales Region.

1.3 Aims and Objectives

The aim of the PFRA is therefore to provide an assessment of potential flood risk across the study area, including information on past floods and the potential consequences of future floods.

The key objectives can be summarised as follows:

- Summarise the methodology adopted for the PFRA with respect to data sources, availability and review procedures;
- Provide a summary of the systems used for data sharing and storing, and provision for quality assurance, security and data licensing arrangements;
- Assess historical flood events within the study area for the sources previously mentioned and the consequences and impacts of these events;

- 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;
- Describe arrangements for partnership and collaboration for ongoing collection, assessment and storage of flood risk data and information;
- Identify relevant partner organisations involved in future assessment of flood risk; and summarise means of future and ongoing stakeholder engagement.

2 Lead Local Flood Authority Responsibilities

The Pitt Review states 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'*. The FWMA facilitates this through the roles of the LLFA. This section of the Preliminary Assessment Report provides a summary and brief explanation of the various roles of the LLFA, as defined by the FWMA.

2.1 Leading Coordination of Flood Risk Management

As the designated LLFA, Newport City Council is therefore responsible for leading local flood risk management across their administrative area. Figure 2-1 below shows the arrangement of local governance regarding the PFRA within Newport.

2.2 Stakeholder Engagement

As part of the PFRA key stakeholders have been engaged within the process and are as follows:

- Newport City Council
- Environment Agency
- Dŵr Cymru Welsh Water
- Internal Drainage Board (IDB) Alliance (Caldicot and Wentlooge Levels IDB)
- South Wales Fire and Rescue
- British Waterways
- South Wales Trunk Road Authority
- Network Rail

It is important to note that within Newport City Council that we have communicated with and collated data from various sector/department leads including Civil Contingencies, Strategic Planning and Highways and Drainage departments.

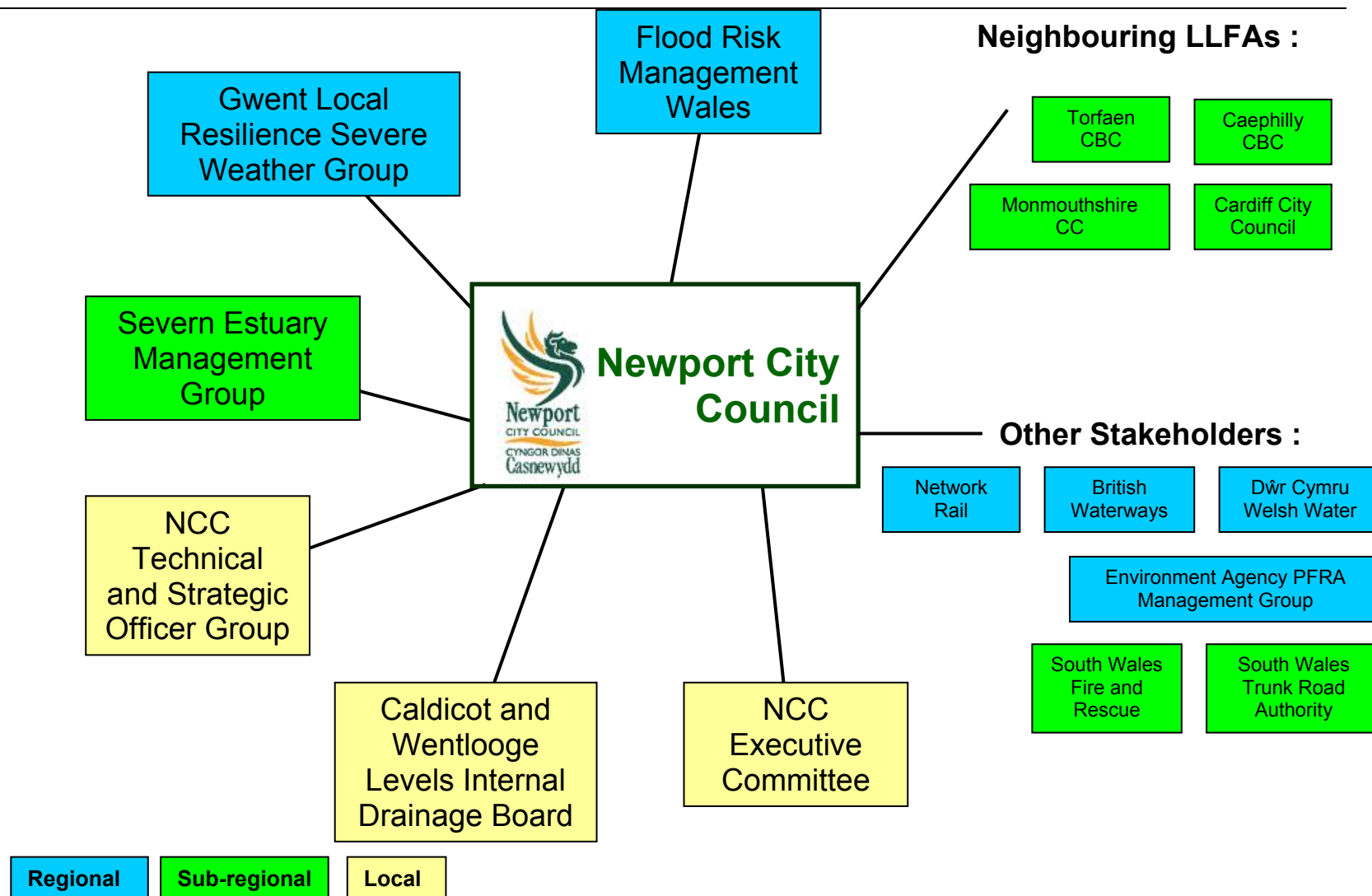


Figure 2-1: The arrangement of local PFRA Governance within Newport City Council

2.3 Public Engagement

It is recognised that members of the public may also have valuable information to contribute to the PFRA process and to the Local Flood Risk Management Strategy (see Section 8.1 for more details) more generally across the administrative area. Stakeholder engagement can afford significant benefits to local flood risk management including building trust, gaining access to additional local knowledge and increasing the chances of stakeholder acceptance of options and decisions proposed in future flood risk management plans.

However, it is also recognised that it is crucial to plan the level and timing of engagement with communities predicted to be at risk of flooding from surface water, groundwater and ordinary watercourses. This is to ensure that the potential for future management options and actions is adequately understood and costed without raising expectations before solutions can reasonably be implemented.

It is important to undertake some public engagement when formulating local flood risk management plans, following the designation of Flood Risk Areas within the study area as this will help to inform future levels of public engagement. It is recommended that Newport City Council follow the guidelines outlined in the Environment Agency's "Building Trust with Communities" which provides a useful process of how to communicate risk including the causes, probability and consequences to the general public and professional forums such as local resilience forums.

2.4 Additional Responsibilities

Aside from forging partnerships and coordinating and leading on local flood management, there are a number of other key responsibilities that have arisen for LLFAs from the Flood & Water Management Act 2010, and the Flood Risk Regulations 2009. These responsibilities include:

- **Investigating Flood Incidents** – LLFAs have a duty, where considered necessary or appropriate, to investigate and record details of 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. Further information with respect to this duty is provided in Section 8.1.
- **Asset Register** – LLFAs have a duty to maintain a register of structures or features which are considered likely to have a **significant** effect on flood risk, including details on ownership and condition as a minimum. The register must be available for inspection and Welsh Ministers will be able to make regulations about the content of the register and records. Further information with respect to this duty is provided in Section 8.2.
- **SuDS Approving Body** – LLFAs are designated the Sustainable Drainage System (SuDS) Approving Body (SAB) for any new drainage system, and therefore must approve, adopt and maintain any new SuDS within their area. Further information with respect to this duty is provided in Section 8.3.
- **Local Flood Risk Management Strategies** – LLFAs are required to develop, maintain, apply and monitor a strategy for local flood risk management in their area. The local strategy will build upon information such as national risk assessments and will use consistent risk based approaches across the administrative area and catchments. The Local Flood Risk Management Strategy is a requirement of the FWMA.

- **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.
- **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.

3 Methodology and Data Review

3.1 PFRA Methodology

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

Indicative Flood Risk Areas should be identified on the basis of readily available or derivable data and with this in mind, the following methodology has been undertaken for the PFRA:

3.1.1 Data Collection from Stakeholders

As identified in Section 2.2, key stakeholders were identified and contacted to share data for the preparation of the PFRA and this preliminary assessment report. Part of this data collection exercise was undertaken as part of the Strategic Flood Consequence Assessment (SFCA) process. The data provided was primarily stored and disseminated using MapInfo, version 9.5 Geographical Information System (GIS) software.

3.1.2 Assessing Historic Flood Risk

Existing datasets, reports and anecdotal information from the key stakeholders has been reviewed to identify details of major past flood events and the associated consequences including economic damage, environmental and cultural consequences and impact on the local population.

3.1.3 Assessing Future Flood Risk

The identification of Flood Risk Areas through the PFRA process should also take into account future floods, defined as any flood that could potentially occur in the future. This definition includes predicted floods extrapolated from current condition in addition to those with an allowance for climate change. The assessment of future flood risk will primarily rely on a technical review of the Environment Agency 'Flood Map for Surface Water Flooding' (FMfSW) that has been provided to LLFAs. This mapping identifies the indicative extent of surface water flooding from two rainfall events with return periods of 1 in 30 years and 1 in 200 years.

When assessing 'future' flood risk, the following factors should be taken into consideration:

- Local information on flooding from ordinary watercourses;
- Location of proposed developments (based on potential Candidate Development Sites from the SFCA);
- Information provided by other groups or parties (e.g. the IDB Alliance).

3.1.4 Identifying Flood Risk Areas

Information regarding historic and future flood risk will be used to formally identify Flood Risk Areas. Existing datasets, reports and anecdotal information from the key stakeholders has been reviewed to identify details of major past flood events and the associated consequences including economic damage, environmental and cultural consequences and impact on the local population. In order to identify the Flood Risk Areas, flood risk indicators have been used to identify significant consequences within this preliminary assessment report, these indicators are shown in Table 3-1 below.

Table 3-1: Key Flood Risk Indicators²

Impacts of flooding on:	Flood Risk Indicators
Human Health	Number of people Number of critical services (Hospitals, Police/Fire/Ambulance Stations, Doctors surgeries, Schools, Nursing Homes, etc).
Economic Activity	Number of non-residential properties. Infrastructure network (length of road or rail). Area of agricultural land.
Cultural Heritage	Cultural heritage sites (Scheduled Monuments, Listed buildings or registered parks or gardens).
Environment	The consequences of pollution. The impact on internationally and nationally designated environmental sites (e.g. Ramsar, SACs, SPAs, SSSIs, etc).

3.2 Data Sources

Table 3-2 catalogues the relevant information and datasets held by stakeholders and a description of the dataset including an indication of its availability at the time of writing.

Table 3-2 Datasets provided by stakeholders and their description

	Dataset	Description
Environment Agency	Environment Agency Flood Maps	Shows extent of flooding from rivers with a catchment of more than 3km ² during 1% annual probability (1 in 100yr) and 0.1% annual probability (1 in 1000yr) flood. Shows extent of flooding from the sea during 0.5% annual probability (1 in 200yr) and 0.1% annual probability flood events.
	Areas Susceptible to Surface Water Flooding	A national outline of surface water flooding held by the EA and developed in response to Pitt recommendations.
	Flood Map for Surface Water (replacing Areas Susceptible to Surface Water Flooding)	A second generation of surface water flood mapping, shows the likely areas of inundation during a 0.33% (1 in 30yr) and 0.5% annual probability, 1.5 hour storm. The dataset divides inundation areas into areas of 'deep' and 'shallow' flooding
	Areas Susceptible to Groundwater Flooding	Mapping showing areas susceptible to groundwater flooding.
	National Receptor Dataset	A nationally consistent dataset of social, economic, environmental and cultural receptors. E.g. residential properties, water supply sites, SSSIs, AONB, agricultural land by grade, transport infrastructure, electricity substations.
	Indicative Flood Risk Areas	National mapping highlighting key flood risk areas, based on the definition of 'significant' flood risk agreed with the Government.
	Recorded Flood Event Outlines (FEOs)	Attributed spatial flood extent data for flooding from all sources.

² Flood risk indicators have been identified by a National Receptor Database, which is a collection of risk receptors primarily intended for use in flood and coastal erosion risk management. The indicators are included on the Environment Agency's Datashare website, with additional explanation provided in the Environment Agency PFRA Guidance main report and Annex 6.

	Dataset	Description
	Eastern Valleys and Wye and Usk Catchment Flood Management Plans (CFMPs)	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.
Newport City Council	Strategic Flood Consequence Assessments (SFCA)	The Stage 1 and 2 SFCA is being produced alongside the PFRA and contain useful information on historic flooding, including local sources of flooding from surface water, groundwater and flooding from canals.
	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.
Dŵr Cymru Welsh Water	DG5 Register	DG5 Register logs and records of sewer flooding incidents in each area.
South Wales Fire & Rescue	Historic flooding records	Records of historic flooding events from the Fire Service's call out history records including location, incident type and response given.
Integrated Surface Water Management Group	Sewer flooding hotspots (obtained using data provided by DCWW) and historical surface water flooding incidents	Records of historic flooding events from surface water incidents and sewer flooding, including the number of properties affected and approximate return period of the events. This data was provided by the Integrated Surface Water Management Group (2009)

3.3 Data Collection Limitations

A brief assessment of the data collection process is included in this section to provide transparency with respect to the methodology. By flagging up the issues identified in the data collection phase, it is hoped this could serve as a catalyst to improve the collection of future flood risk data. A number of issues arose during the data collection process, as described below.

3.3.1 Varied Data Quality

Based upon the data collected, there is a varied quality in historic flood records and information. For example, due to sensitivities surrounding the information provided by DCWW, only generic areas of sewer flooding can be identified, rather than specific locations of flood events.

3.3.2 Inconsistent Recording Systems

The lack of consistent flood data recording system across the administrative area has led to inconsistencies in the recording of flood event data. This has resulted in incomplete flood

record datasets and corresponding gaps in flood data which hinders the identification and delineation of flood risk areas. For example, data provided by South Wales Fire and Rescue does not provide full details of the flood event that caused the flooding.

3.4 Quality Assurance, Security and Data Restrictions

Data collected was subject to quality assurance measures to monitor and record the quality and accuracy of acquired information and datasets. A data quality score was given, which is a qualitative assessment based on the Data Quality System provided in the Defra Surface Water Management Plan (SWMP) Technical Guidance document (March 2010). A breakdown of this system is provided in Table 3-3.

Table 3-3: Data Quality System from the SWMP Technical Guidance (March 2010).

Data Quality Score	Description	Explanations	Example
1	Best available	No better available; not possible to improve in the near future	High resolution LiDAR, river flow data, rain gauge data.
2	Data with known deficiencies	Best replaced as soon as new data is available	Typical sewer or river model that is a few years old.
3	Gross assumptions	Not invented but based on experience and judgement	Location, extent and depth of surface water flooding.
4	Heroic assumptions	An educated guess	Ground roughness for 2D models.

The use of this system provides a basis for analysing and monitoring the quality of data that is being collected and used in the preparation of the PFRA. As mentioned in section 3.3, the overall quality of data collected data was poor, which was identified and recorded using this system.

The security of data is also a key consideration during collection, collation and storage of sensitive information. All data collected is stored on local servers which are password protected. Newport City Council must adhere to these data security measures to ensure that sensitive data is held in a secure manner. Table 3-4 illustrates the restrictions on the use of data from key stakeholders. Table 3-4 below summarises the restrictions set out by each data holder.

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

Organisation	Restrictions on the use of data
Environment Agency	The use of some data is restricted to Newport City Council and their consultants, for the preparation of its PFRA. The use of other data is unrestricted.
DCWW	Necessary precautions must be taken to ensure that all information given to third parties is treated as confidential. The information must not be used for anything other than the purpose stated in the agreement.
Network Rail	The use of provided data is restricted to Newport City Council and their consultants, for the preparation of its PFRA.

Organisation	Restrictions on the use of data
British Waterways	Data subject to an End User License agreement. The use of provided data is restricted to Newport City Council and their consultants, for the preparation of its PFRA.
South Wales Fire and Rescue	The use of provided data is restricted to Newport City Council and their consultants, for the preparation of its PFRA.
IDB Alliance	No specific licensing agreements, data not considered sensitive or restricted

3.5 Data Sharing and Storage

The data received as part of the PFRA (and the SFCA) process has mostly been stored and disseminated through GIS software. It is therefore proposed that Newport CC would continue to use such software to store, disseminate and share existing data sets. A major advantage of the use of GIS software to store and disseminate data is the ease at which data can be updated with future or additional data. In addition, data stored within GIS can be easily shared between users or parties. Therefore, it is proposed to continue to use such GIS systems to store, share and disseminate future data.

3.6 PFRA Review Procedures

The Environment Agency has a duty under the Flood Risk Regulations 2009 to review, collate and publish all of the PFRAs. Figure 3-1 provides an overview of the review process. LLFAs should apply their own internal processes prior to submitting the PFRA to the Environment Agency. This may be through consideration by Cabinet, Council or an overview and scrutiny committee and is to ensure that the PFRA is fit for purpose in meeting the requirements of the Flood Risk Regulations 2009.

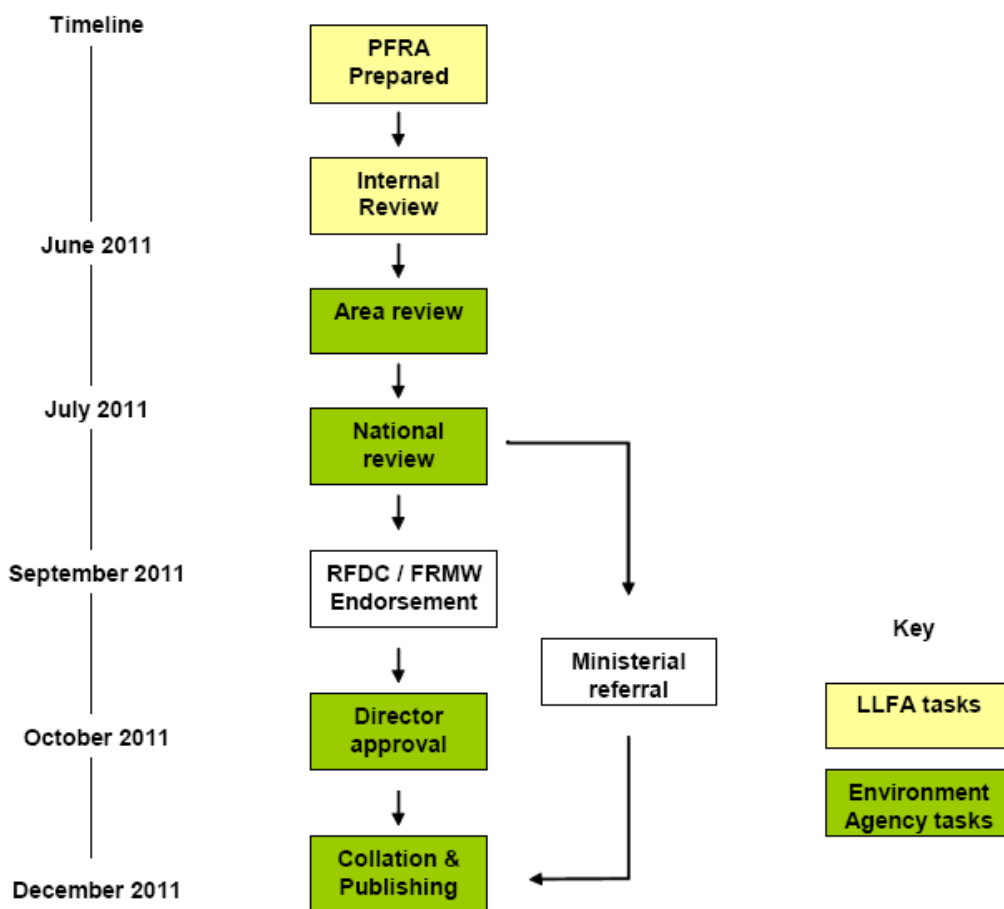


Figure 3-1: Overview of Review Process

Once the review is completed by the LLFA, the preliminary assessment report is passed to the Local Environment Agency Office for review and to ensure they meet the minimum standard required by the European Commission. In addition, they will provide an opinion on the selection of Flood Risk Areas and confirmation that appropriate evidence has been provided to support changes to Indicative Flood Risk Areas.

At a national level, the Environment Agency review will focus on Flood Risk Areas, in particular, where Indicative Flood Risk Areas have been amended. This will ensure that changes are justified and nationally consistent. The review panel will make recommendations to FRMW for endorsement. Following consideration by FRMW, the final stage of the Environment Agency review is sign off by the relevant Regional Director prior to submission to the European Commission.

4 Past Flood Risk

4.1 Overview of Historical Flood Risk in Newport

In general, liaison with the relevant stakeholders along with other flood risk studies (such as the SFCA) indicates that the predominant flood risks throughout Newport are from fluvial and tidal sources. These sources of flood risk are the responsibility of the Environment Agency. Flooding from surface water and ordinary watercourses is not considered significant within Newport. Figure 4.1 shows a map of historical records of flooding relevant to the PFRA collected from the various stakeholders identified in Section 2.2. These events caused economic damage, environmental and cultural consequences and an impact on population. Figure 4.2 and 4.3 shows these historical incidents with the Environment Agency's Flood Maps from Surface Water Flooding, which identifies areas at risk from surface water flooding using a national surface water modelling methodology.

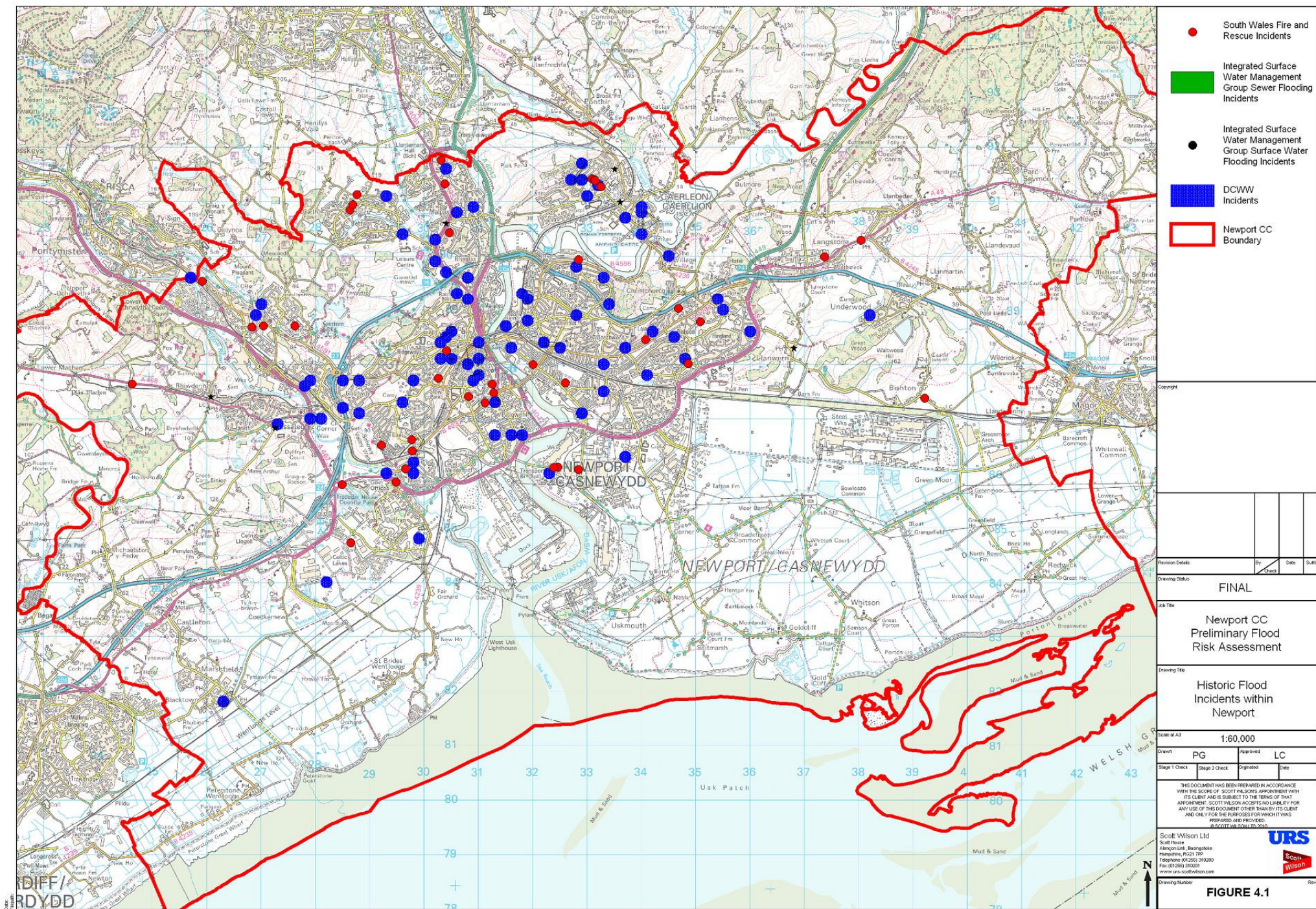
4.2 Consequences of Historic Flooding

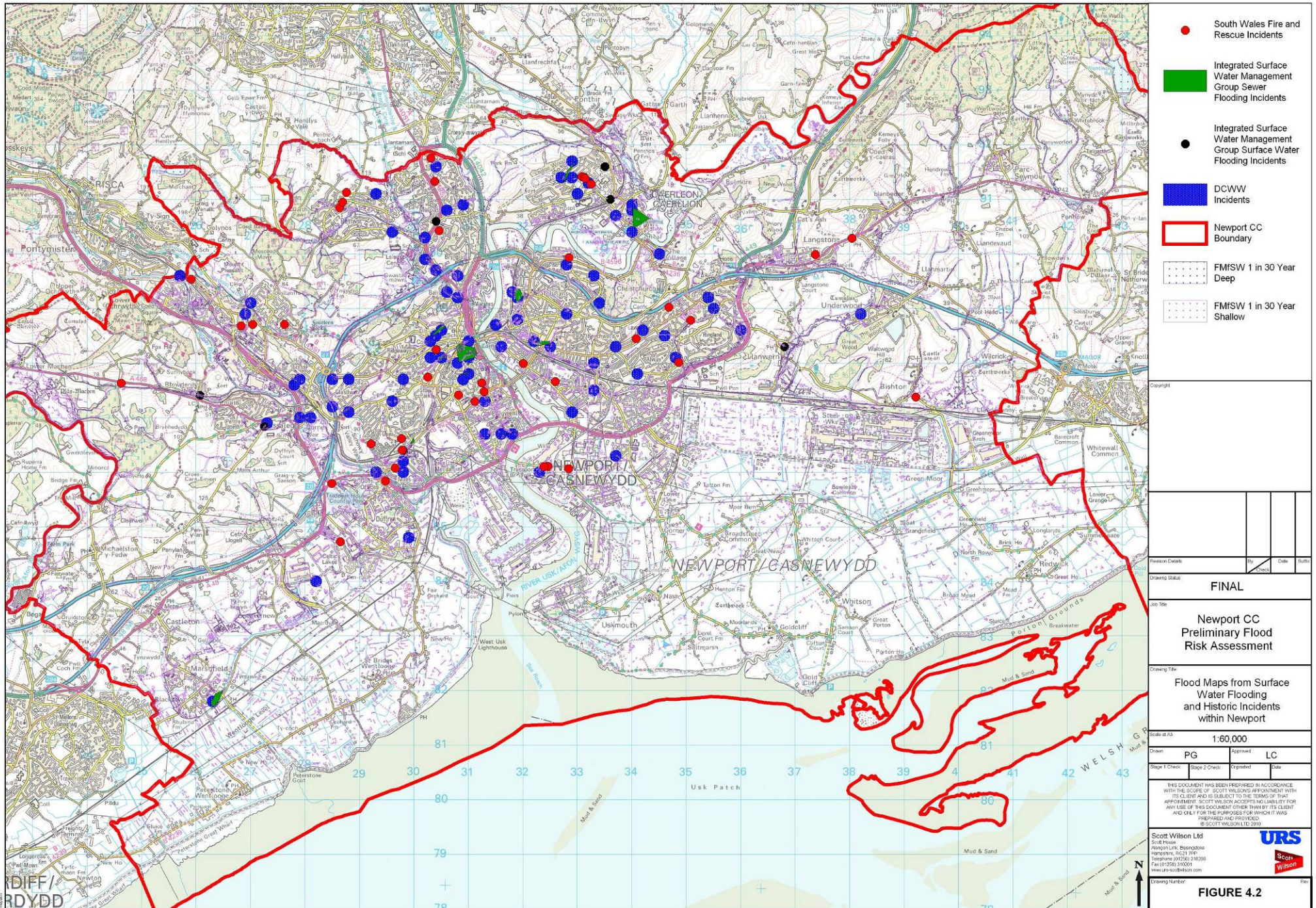
As a result of the issues discussed in Section 3.1.1, insufficient data is available to draw conclusions on the impacts and consequences of historic flood events on people and the economy. Factors such as road closures, properties flooded, schools closed and hospitals affected would have been considered had the information been available.

An assessment of the consequences of significant historic flooding events is also dependent on the definition of a 'significant' flood event. For the purposes of this assessment, the definition of significant has been based on the significance criteria outlined within the Environment Agency PFRA Guidance, i.e.:

- Location of 200 people within a flood risk area (based on number of properties multiplied by 2.34). Flood risk area is defined as:
 - Fluvial flooding from an event with a 1% annual probability of occurrence;
 - Surface water flooding from an event with a 0.5% annual probability of occurrence.
- Location of critical services (see Table 3-1 for details) within a flood risk

Information provided by Newport City Council in April 2011 indicates various historical flooding events that have inundated areas of Newport. These events are summarised in Table 4-1.





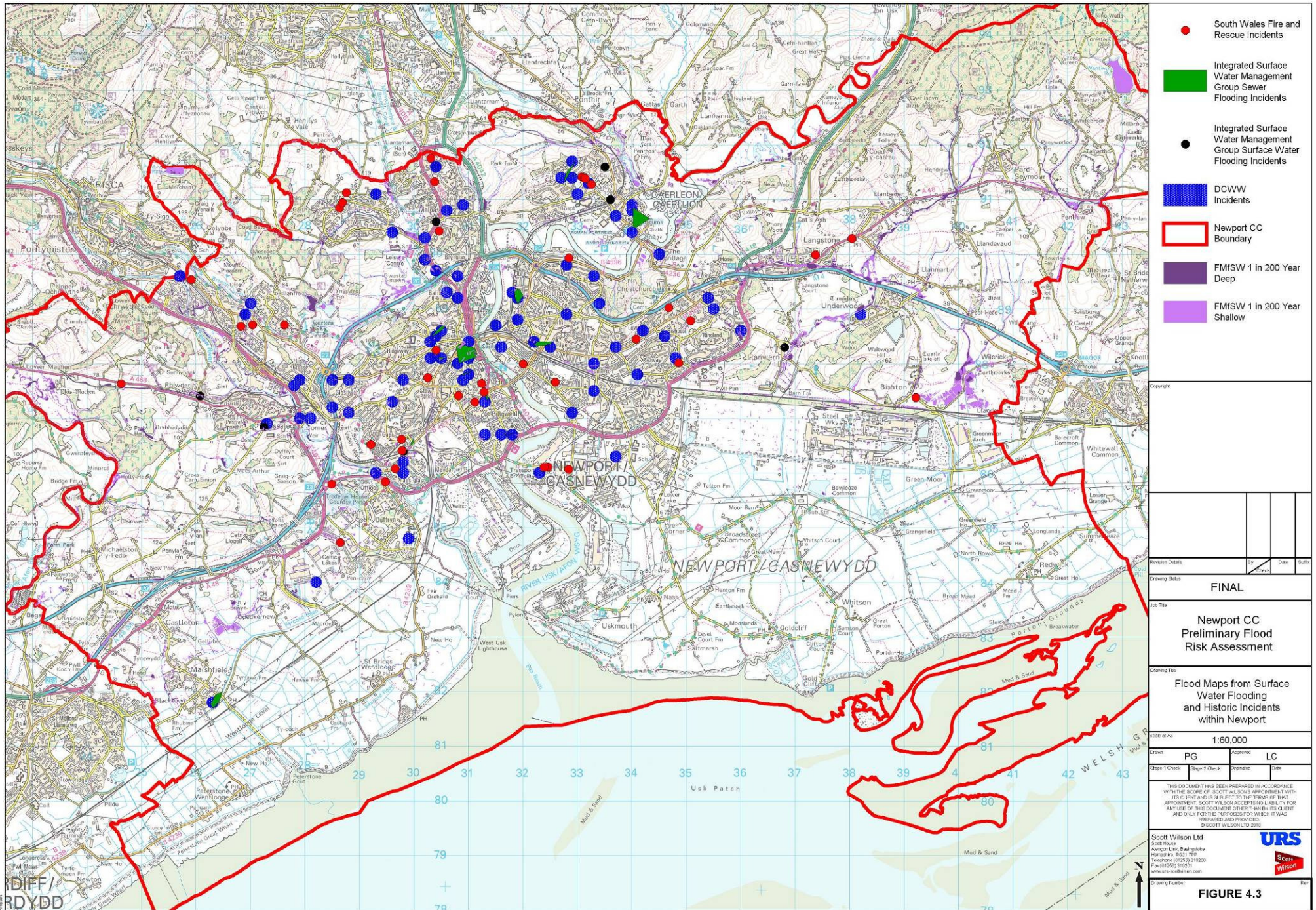


Table 4-1 Summary of historical flood events within Newport and their 'significance' according to the PFRA guidance

Location	Date	Number and type of properties affected	Approximate Magnitude of Event	Source of Flooding
City centre	9/7/1997	Unknown, likely to be mainly commercial and residential	160 year return period (c. 0.63% annual probability)	Surface water, flash flooding. Approx 46mm of rain fell in a 15 minute period
Gaer Vale, Goodrich Crescent	30/10/2000	50-60 residential	100 – 120 year return period (1 – 0.83% annual probability)	Mostly Main River (Crindau Pill), defence exceedance
Ringland Circle	Unknown	Approx. 28 residential	Unknown	Surface water caused by blocked trash screen
St. Julians	Unknown	16	Unknown	Surface water from Lotteries Reen overflowing
Duffryn	Unknown	10 (including elderly persons complex)	Unknown	Tredegar Reen overflowing
Others minor events, including	Rogerstone, Bassaleg, Marshfield, Llanwern	Less than 10	All events unknown	Typically surface water runoff

As shown in Table 4-1, none of the events can be deemed 'significant' under the PFRA guidance. Two of the events (City Centre in 1997 and Gaer Vale) almost meet the criteria to be deemed 'significant'. However, for the City Centre, in the absence of information relating to the actual infrastructure, properties or designated areas inundated, no definition or significance decision can be made. In the case of the Gaer Vale event, up to 60 properties were believed to have been effected. This equates to approximately 140 people and would therefore not be deemed 'significant'. In addition, the flooding during this event was mostly from Main River sources and therefore is the responsibility of the Environment Agency. In addition, it is understood that since this event some upgrade to the flood defences in Gaer Vale have been implemented, potentially reducing the likelihood of a repeat event. The event in Duffryn was believed to have affected a residential development that is an elderly person's complex. Such a complex would not be deemed a particularly vulnerable development, using the PFRA guidelines (unlike for example a residential care home). Therefore, flooding of 10 properties in this complex would not be 'significant'.

It is recommended that as none of the flood events indicated in Table 4-1 would be deemed 'significant', no further assessment of them would be required as part of this Preliminary Report. However, it is recommended that they are further investigated and included within future work such as the Local Flood Risk Management Strategy, which is required under the regulations of the FWMA.

Liaison with the other relevant stakeholders and data providers has confirmed that none of the historical flood incidents identified in Figure 4.1 would be deemed significant using the above criteria.

The data collected and reviewed therefore supports the notion that flooding from surface water, groundwater and ordinary watercourses is not significant in Newport.

4.3 Groundwater Flood Risk

Solid Geology and Hydrogeology

The solid geology of the study area is relatively uniform and is dominated by mudstone, siltstone and sandstones.

On a strategic scale in Newport, groundwater is not considered to be a significant flood risk and is considered to rise and fall relatively slowly. In addition, the local geology is not considered to yield significant volumes of groundwater.

Superficial Geology and Hydrogeology

The solid geology is blanketed by drift deposits across much of the study area. With regard to superficial deposits, the southern and western area of Newport is dominated by Alluvium and Glacial Till. The area around the River Usk contains superficial deposits typical of such features, for example alluvial and river terrace deposits

4.4 Sewer Flood Risk

Data provided by DCWW indicates a total of 78 locations across the council area that have suffered from historical sewer flooding. In addition, data provided by the Integrated Surface Water Management Group indicates several small sewer flooding hotspots throughout Newport. However, none of the above data suggests flooding from sewer sources has significant consequences at this strategic scale.

4.5 Flood Risk from Artificial Sources

Newport City Council own and maintain two reservoirs within their authority boundary, however, there are no records of flooding from these water bodies.

The Council does however, own and maintain (in co-operation with British Waterways) the branches of Monmouthshire and Brecon Canal that flow through their administrative boundary. There are no records of historical flood events from the canal within the Newport City Council authority boundary.

4.6 Interaction with Main Rivers and the Sea

Insufficient data is available to draw definitive conclusions at this point. However, there is anecdotal evidence to suggest that surface water flooding is exacerbated when high rainfall events occur during high tidal cycles when gravity drains and outfalls are blocked with high tidal waters. Typically, these issues occur on and around the Caldicot Levels where the consequences are not deemed significant. Interactions with Main Rivers and tidally influenced areas may also be identified within central Newport where surface water systems discharge into the River Usk in areas such as Crindau, the City Centre, Victoria and Reevesland. The formal and anecdotal data provided indicates that such interaction does not cause flooding with significant harmful consequences.

5 Future Flood Risk

5.1 Assessment of Future Flood Risk

The principal national datasets available for the identification of future flood risk are the Flood Maps for Surface Water flooding (FMfSW) and Areas Susceptible to Surface Water Flooding (ASTSWF) maps. These have been generated using a 0.5% annual probability (1 in 200 year return period) storm event for the present day. As a notional assumption and in the absence of further data, an event of this magnitude is likely to be similar to the 1% annual probability (1 in 100 year return period) storm, inclusive of the impacts of climate change. The 1% annual probability event is the design standard applied by TAN15 for decision making purposes.

The ASTSWF and FMfSW extents are not significant on a strategic scale throughout Newport, hence future flood risks are also not considered significant within Newport (see Section 6 for more information).

Locally Agreed Surface Water Information

It was agreed with Newport City Council that surface water and groundwater flooding within Newport is not deemed to be significant at a strategic scale. In addition, locally derived data at present is not deemed sufficient to be used as an evidence base to support locally agreed surface water information. Therefore, the principal source of locally agreed surface water information at present is the Environment Agency's FMfSW, which can be seen in Figures 4.2 and 4.3.

When developing the Local Flood Risk Management Strategy, it is envisaged that the following datasets will be utilised and would therefore comprise the locally agreed surface water information:

- Environment Agency FMfSW;
- DCWW surface water flooding incidents;
- South Wales Fire and Rescue incidents;
- Ongoing surface water flooding incidents recorded by Newport City Council drainage engineers.

5.2 The Impacts of Climate Change

Although the broad climate change picture is clear, we have to make local decisions against deeper uncertainty. Several national flood maps have informed the preliminary assessment report, specifically the Flood Map for Surface Water (surface runoff), Areas Susceptible to Surface Water Flooding (surface runoff), Areas Susceptible to Groundwater Flooding (groundwater) and Flood Map (ordinary watercourses). These do not show the impact of climate change on local flood risk.

There was consensus amongst climate model projections presented in the IPCC fourth assessment report for northern Europe suggesting that in winter high extremes of precipitation are very likely to increase in magnitude and frequency. These models project drier summers with increased chance of intense precipitation – intense heavy downpours interspersed with longer, relatively dry periods (Solomon et al., 2007).

5.2.1 UKCP09

United Kingdom Climate Projections 2009 (UKCP09) provides the most up to date projections of future climate for the UK³. In terms of precipitation, the key findings are:

By the 2080s, under Medium emissions, over most of lowland UK.

- Central estimates are for heavy rain days (rainfall greater than 25 mm) to increase by a factor of between 2 and 3.5 in winter, and 1 to 2 in summer.

By the 2080s, under Medium emissions, across regions in England & Wales.

- Central estimate (50% probability) for winter mean precipitation % change ranges from +14 to +23.
- Central estimate for summer mean precipitation & change ranges from -18 to -24.

Certain key processes such as localised convective rainfall are not represented within this modelling so there is still considerable uncertainty about rarer extreme rainfall events for the UK. We can be more certain that heavy rainfall will intensify in winter compared to summer. The proportion of summertime rainfall falling as heavy downpours may increase. The impact of these changes on local flood risk is not yet known.

5.2.2 Appraisal Guidance

Current project appraisal guidance (Defra, 2006) provides indicative sensitivity ranges for peak rainfall intensity, for use on small catchments and urban/local drainage sites. There are due to be updated following the UKCP09 projections above. They describe the following changes in peak rainfall intensity;

- +5% - 1990 to 2025;
- +10% - 2025 to 2055;
- +20% - 2055 to 2085; and
- +30% - 2085 to 2115.

This was reviewed by the Met Office in 2008 using UKCP09 models (Brown et al., 2008). They suggest that, on the basis of our current understanding, these levels represent a pragmatic but not a precautionary response to uncertainty in future climate impacts. In particular for a 1 in 5 year event, increase in precipitation intensity of 40% or more by the 2080s are plausible across the UK at the local scale.

5.3 Long Term Developments

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

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'.

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

³ <http://ukclimateprojections.defra.gov.uk/>

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), but should be recorded here so that they can be reviewed in the future.

Newport City Council is currently completing the Local Development Plan (LDP) which will define the potential development needs across the council area for the next 20 years. As part of the LDP process, a number of potential Candidate Development Sites have been proposed. The Candidate Development Sites have been used within this PFRA to assist the definition and assessment of future flood risks. Not all of the Candidate Development Sites will be pursued through the LDP process for many reasons, potentially including flood risk. All of these sites have been included in this assessment to ensure a conservative assessment to future flooding is undertaken at this stage. It is likely that during future PFRA works, such as the local strategies, that the proposed developments will be revised and future flood risks redefined accordingly.

6 Review of Indicative Flood Risk Areas

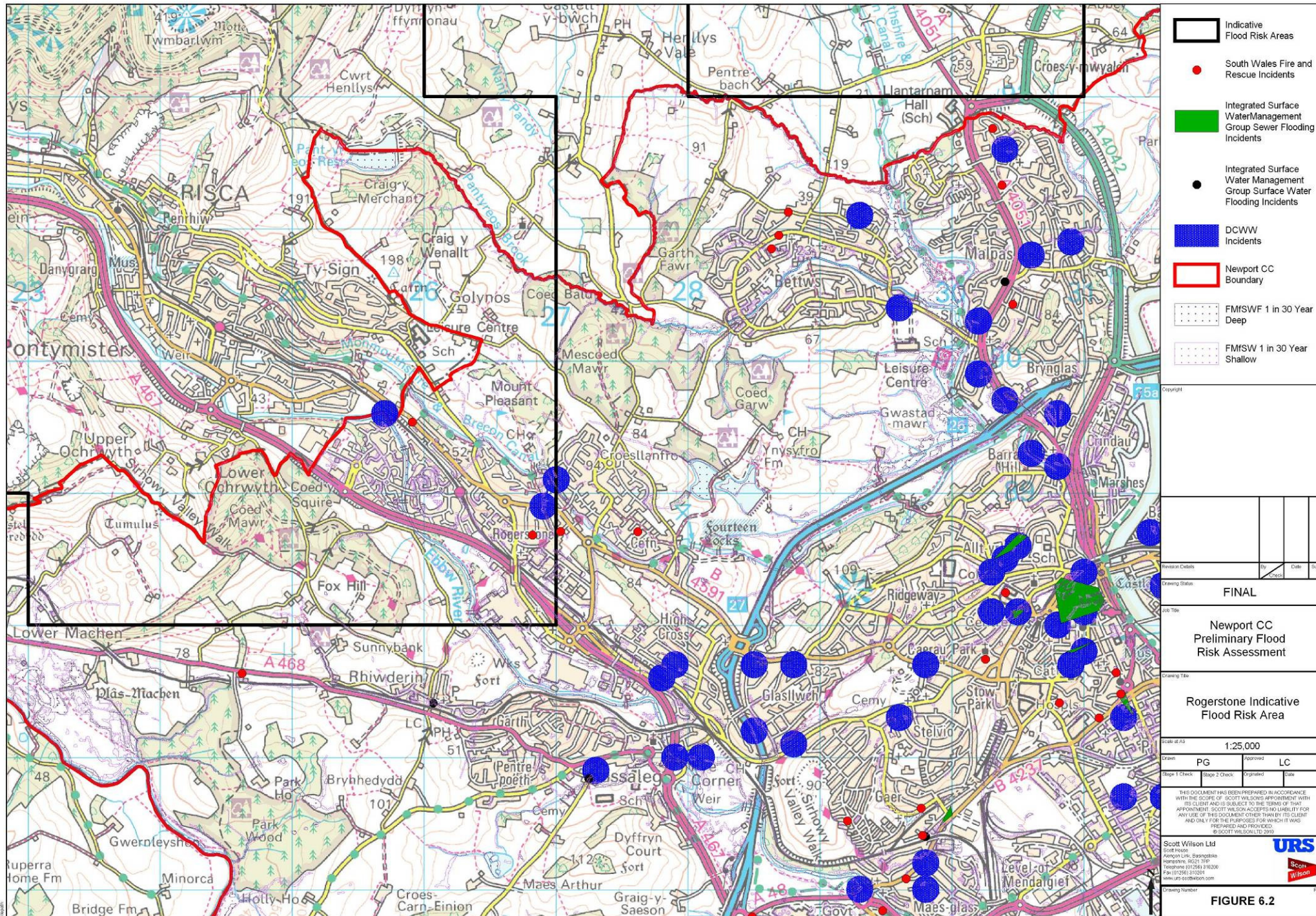
6.1 Overview

The Indicative Flood Risk Area map provided by the Environment Agency shows the location of one Indicative Flood Risk Area within Newport. This Flood Risk Area is a cross-boundary area shared with Caerphilly County Borough Council and is associated with the areas of Rogerstone in Newport and Risca in Caerphilly.

There are no other Indicative Flood Risk Areas within Newport. However, there are 13 places (blue squares) above the defined Flood Risk Threshold. These are not sufficient to generate an Indicative Flood Risk Area and hence have not been included within this Preliminary Assessment Report. However, the places above the Flood Risk Threshold would be used as part of the evidence base for later work such as the local strategies and Flood Risk Management Plans.

6.2 Mapping of Indicative Flood Risk Area

Figure 6.1 below shows the location of the Indicative Flood Risk Area within Newport. Figures 6.2 and 6.3 provide a more detailed view of the area and show the area in relation to the FMfSW extents as well as other datasets.



- Indicative Flood Risk Areas
- South Wales Fire and Rescue Incidents
- Integrated Surface Water Management Group Sewer Flooding Incidents
- Integrated Surface Water Management Group Surface Flooding Incidents
- DCWW Incidents
- Newport CC Boundary
- FMSWF 1 in 30 Year Deep
- FMSW 1 in 30 Year Shallow

Revision Details	By	Date	Status
1	SCOTT WILSON	10/10/2019	Final

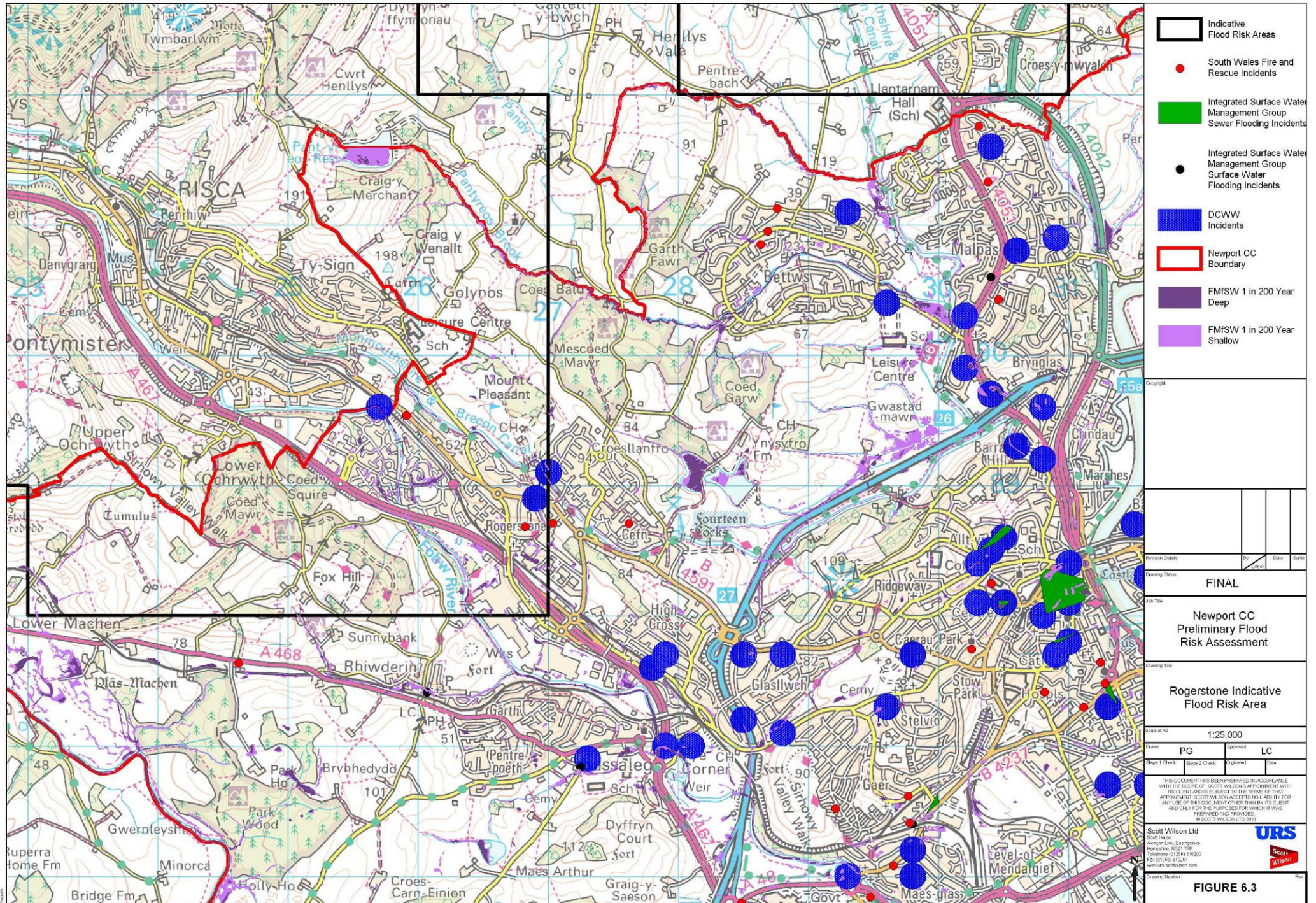
Job Title	FINAL
Project Name	Newport CC Preliminary Flood Risk Assessment
Client Name	Rogerstone Indicative Flood Risk Area

Scale at A3	1:25,000
Drawn	PG
Stage 1 Check	Stage 2 Check
Original	LC

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- Indicative Flood Risk Areas
- South Wales Fire and Rescue Incidents
- Integrated Surface Water Management Group Sewer Flooding Incidents
- Integrated Surface Water Management Group Surface Water Flooding Incidents
- DCWW Incidents
- Newport CC Boundary
- FMSW 1 in 200 Year Deep
- FMSW 1 in 200 Year Shallow

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Revision Details	By: Date: Status:
Drawing Status	FINAL
Job Title	Newport CC Preliminary Flood Risk Assessment
Drawing Title	Rogerstone Indicative Flood Risk Area
Scale at A3	1:25,000
Drawn	PG
Approved	LC
Stage 1 Check	Stage 2 Check
Original	Date:

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FIGURE 6.3

7 Identification of Flood Risk Areas

7.1 Amendments to the Indicative Flood Risk Area

The only Indicative Flood Risk Area within Newport City Council is in the area of Rogerstone and is a cross boundary flood risk area shared with Caerphilly County Borough Council. Inspection of the relevant datasets and liaison with relevant stakeholders provides the following observations:

- The ASTSWF extents within the Indicative Flood Risk Area in Newport is limited;
- The FMfSW 3.33% annual probability (1 in 30 year return period) and 0.5% annual probability (1 in 200 year return period) extents are also limited;
- Inspection of relevant Ordnance Survey mapping identifies the following properties are located within a FMfSW extent:
 - Approximately 30 – 40 residential dwellings; and
 - One commercial property, which is identified as a bridge over the Monmouthshire and Brecon Canal.
- There are only four historic incidents (two from South Wales Fire and Rescue and two from DCWW) within the Flood Risk Area, none of which indicate significant flooding; and
- There is no data provided by the Integrated Surface Water Management Group to indicate the area has suffered from historic surface water or sewer flooding incidents.

As a result of the above, and using the human health multiplier of 2.34 (see the Environment Agency's PFRA Guidance), it can be estimated that approximately 93 people would be potentially at risk from flooding, which is below the 200 people required to identify an Area Above Flood Risk Threshold. In addition, there are only four historical flood incidents within the Indicative Flood Risk Area, which are disconnected from the FMfSW extents. Liaison with the various stakeholders has also confirmed that this area (Rogerstone) is not known to have suffered from past flooding.

With regard to future flooding, inspection of the potential candidate development locations within Rogerstone identifies two potential development locations within the Indicative Flood Risk Area. The FMfSW extents only cover a very small portion of these sites, which could be easily designed out of the proposed development during the design phase and as part of a drainage strategy for the site (which would need to meet the requirements of TAN15 due to the site of the sites).

It is therefore recommended that the Indicative Flood Risk Area is removed from the Newport City Council boundary as part of this Preliminary Report. With the Indicative Flood Risk Area removed, the future PFRA work identified in Table 1-1 (i.e. production of Flood Risk Maps, Hazard Maps and production of Flood Risk Management Plans) would not be required. In addition, as described in Section 4.1, no additional Indicative Flood Risk Areas have been identified due to a lack of historical 'Significant' flood events. However, it is recommended that Rogerstone, along with the other area identified in Table 4-1 should be further investigated as part of the Local Flood Risk Management Strategy, required under the Flood and Water Management Act (FWMA) rather than through the PFRA process.

8 Next Steps for Lead Local Flood Authorities

8.1 Future Data Management Arrangements

In order to continue to fulfil their role as Local Lead Flood Authority, Newport City Council are required to investigate future flood events and ensure continued collection, assessment and storage of flood risk data and information. In addition, Newport City Council is required to establish data management arrangements, including a framework for the collation, storage and maintenance of flood risk information.

The format for this data collection and storage has been provided by the Environment Agency in spreadsheet format. This Preliminary Report has identified there the only Indicative Flood Risk Area within Newport could be removed. Therefore, the Preliminary Report Spreadsheet (Annex 1) reflects this by not recording any significant flood events. However, the spreadsheet has been populated with data collected during the PFRA process that identifies flooding on a smaller scale.

It will also be a requirement to continue using the Preliminary Report Spreadsheet to record future flood events in the future to provide a consistent recording system in the future and with other LLFAs. The LLFA will also be required to undertake a review of the PFRA (namely the Preliminary Report) every six years on a cyclic basis. The review would also include a review and update of the data sets utilised within the report.

8.2 Development and Maintenance of an Asset Register

Under the FWMA, Newport City Council is required to establish and maintain a complete record of all flood risk related assets in their administrative area. This register must also contain details of the condition and ownership of each of the assets. Although not explicitly part of the PFRA process, the development of an Asset Register is a key responsibility for Newport City Council. Some of the base data collected as part of the PFRA data collation process can be used to begin to populate the Council's Asset Register.

8.3 SUDS Adoption Procedures

The FWMA makes Newport City Council responsible for adopting and maintaining Sustainable Drainage Systems (SuDS), giving them the role of 'SuDS Approving Body' (SAB). There will be two approval routes for the SAB, through formal planning application or through direct application with the SAB. Therefore, any applications which have drainage implications must be approved by the SAB before work can commence. Although this element of the FWMA is anticipated to be commenced in April 2011, the designation of areas susceptible to groundwater flooding may prove useful in informing SuDS selection.

9 References

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>

Environment Agency (2010) Preliminary Flood Risk Assessment Final Guidance. Available via <http://www.environment-agency.gov.uk/research/planning/125459.aspx>

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Pitt, M 2008. The Pitt Review: Lesson Learnt from the 2007 Floods. Cabinet Office publication. Available via <http://webarchive.nationalarchives.gov.uk/20100807034701/http://archive.cabinetoffice.gov.uk/pittreview/thepittreview.html>

10 Annexes

- 10.1 Annex 1 – Records of past floods (preliminary assessment report spreadsheet)
- 10.2 Annex 2 – Records of Future Floods and Their Consequence (preliminary assessment report spreadsheet)
- 10.3 Records of Flood Risk Areas and their Rationale (preliminary assessment report spreadsheet)

Annex 3 Flood Risk Areas

ANNEX 3: Records of Flood Risk Areas and their rationale (preliminary assessment report spreadsheet)								
Field:	Flood Risk Area ID	Name of Flood Risk Area	National Grid Reference	Main source of flooding	Additional source(s) of flooding	Confidence in main source of flooding	Main mechanism of flooding	Main characteristic of flooding
Mandatory / optional: Format:	Mandatory Unique number between 1-9999	Mandatory Max 250 characters	Mandatory 12 characters: 2 letters, 10 numbers	Mandatory Pick from drop-down	Optional Max 250 characters, same source terms	Optional Pick from drop-down	Mandatory Pick from drop-down	Mandatory Pick from drop-down
Notes:	A sequential number starting at 1 and incrementing by 1 for each record.	Name of the locality associated with the Flood Risk Area; a town, city, or county.	National Grid Reference of the centroid (centre point, falls within polygon) of the Flood Risk Area.	Pick the source from which there is a significant flood risk. Refer to the PFRA guidance for definitions of sources.	If there is also significant flood risk generated by another source (other than the <u>Main source of flooding</u>), report the source(s) here, using the same source terms.	Pick a broad level of confidence in the <u>Main source of flooding</u> from; 'High' (compelling evidence of source - about 80% confident that source is correct), 'Medium' (some evidence of source but not compelling - about 50% confident that source is correct) 'Low' (source assumed - about 20% confident that source is correct) or 'Unknown'. High	Pick a mechanism from; 'Natural exceedance' (of capacity), 'Defence exceedance' (floodwater overtopping defences), 'Failure' (of natural or artificial defences or infrastructure, or of pumping), 'Blockage or restriction' (natural or artificial blockage or restriction of a conveyance channel or system), or 'No data'. Natural exceedance	Pick a characteristic from; 'Flash flood' (rises and falls quite rapidly with little or no advance warning), 'Natural flood' (due to significant precipitation, at a slower rate than a flash flood), 'Snow melt flood' (due to rapid snow melt), 'Debris flow' (conveying a high degree of debris), or 'No data'. Most UK floods are 'Natural floods'. Natural flood
Example:	1	London	SX1234512345	Surface runoff	NA			
Records begin here:								

Annex 3 Flood Risk Areas

Significant consequences to human health	Human health consequences - residential properties	Property count method	Other human health consequences	Significant economic consequences	Number of non-residential properties flooded	Property count method	Other economic consequences	Significant consequences to the environment	Environment consequences	Significant consequences to cultural heritage	Cultural heritage consequences
Mandatory Pick from drop-down	Optional Number between 1-10,000,000	Optional Pick from drop-down	Optional Max 250 characters	Mandatory Pick from drop-down	Optional Number between 1-10,000,000	Optional Pick from drop-down	Optional Max 250 characters	Mandatory Pick from drop-down	Optional Max 250 characters	Mandatory Pick from drop-down	Optional Max 250 characters
Has the Flood Risk Area been identified as a result of significant consequences to human health?	Record the number of residential properties where the building structure would be affected either internally or externally by the flood.	Where residential or non-residential properties have been counted, it is important to record the method of counting, to aid comparisons between counts. Choose from; 'Detailed GIS' (using property outlines, as per Environment Agency guidance), 'Simple GIS' (using property points), 'Estimate from map', or 'Observed number'.	If the Flood Risk Area has been identified as a result of other <u>Significant consequences to human health</u> , describe them (such as information about the number of critical services flooded).	Has the Flood Risk Area been identified as a result of significant economic consequences?	Record the number of non-residential properties where the building structure would be affected either internally or externally by the flood.	Where residential or non-residential properties have been counted, it is important to record the method of counting, to aid comparisons between counts. Choose from; 'Detailed GIS' (using property outlines, as per Environment Agency guidance), 'Simple GIS' (using property points), 'Estimate from map', or 'Observed number'.	If the Flood Risk Area has been identified as a result of other <u>Significant economic consequences</u> , describe them (such as information about the area of agricultural land flooded, length of roads and rail flooded).	Has the Flood Risk Area been identified as a result of significant consequences to the environment?	If the Flood Risk Area has been identified as a result of <u>Significant consequences to the environment</u> , describe them (such as information about national and international designated sites flooded, and pollution sources flooded).	Has the Flood Risk Area been identified as a result of significant consequences to cultural heritage?	If the Flood Risk Area has been identified as a result of <u>Significant consequences to cultural heritage</u> , describe them (such as information about the number and type of heritage assets flooded).
Yes	50000	Detailed GIS		No				No		No	

Origin of Flood Risk Area	Amended Flood Risk Area rationale	New Flood Risk Area rationale	Rationale detail	European Flood Risk Area Code
Mandatory Pick from drop-down	Mandatory Pick from drop-down	Mandatory Pick from drop-down	Mandatory Max 1,000 characters	Auto-populated Max 42 characters
Pick the origin from either; 'Indicative' Flood Risk Area, 'Amended' Flood Risk Area (in which case <u>Amended Flood Risk Area rationale</u> is mandatory), or 'New' Flood Risk Area (in which case <u>New Flood Risk Area rationale</u> is mandatory).	Pick the main rationale from either; 'Geography', 'Past floods', or 'Future floods'. Then provide further detail in <u>Rationale detail</u> . This is not mandatory if the Flood Risk Area was an indicative Flood Risk Area and has not been amended, or is a new Flood Risk Area.	Pick the main rationale from either 'Past floods', or 'Future floods'. Then provide further detail in <u>Rationale detail</u> . This is not mandatory if the Flood Risk Area was an indicative Flood Risk Area.	Summarise the rationale for amending an indicative Flood Risk Area, or identifying a new Flood Risk Area. Refer to Defra & WAG guidance to LLFAs on "Selecting and reviewing Flood Risk Areas for local sources of flooding". If the Flood Risk Area was an indicative Flood Risk Area and has not been amended, record "indicative Flood Risk Area".	<p>This field will autopopulate using the LLFA name provided on the "Instructions" tab, and the <u>Flood Risk Area ID</u>. It is an EU-wide unique identifier and will be used to report the Flood Risk Area information.</p> <p>Format: UK<ONS Code><A><LLFA Flood ID>. "ONS Code" is a unique reference for each LLFA. "A" indicates it is a Flood Risk Area. "LLFA Flood ID" is a sequential number beginning with 0001.</p>
Indicative	NA	NA	indicative Flood Risk Area	UKE10000012A0001