MERTHYR TYDFIL
County Borough Council
Cyngor Bwrdeistref Sirol
MERTHYR TUDFUL

# MTCBC Flood Risk Management Plan

**June 2015**

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# MERTHYR TYDFIL COUNTY BOROUGH COUNCIL (MTCBC)

# FLOOD RISK MANAGEMNT PLAN (FRMP)

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# MERTHYR TYDFIL COUNTY BOROUGH COUNCIL

# FLOOD RISK MANAGEMNT PLAN

## 1 Introduction by the Chief Executive

Under The Flood Risk Regulations 2009 a responsibility was placed on Merthyr Tydfil County Borough Council to prepare a Flood Risk Management Plan. This document is our response to that requirement and I am pleased to present it to the residents of the Borough and our other risk partners.

The Flood Risk Management Plan gives an overview of the flood risk in the Borough as well as a community by community assessment.

Our high level objective for the next 6 years states that we will:

> **"Endeavour to reduce Flood Risk in all of the areas identified as being subject to significant flood risk".**

Detailed objectives are also given within the Plan together with a series of measures which will ensure flood risk in the Borough will be addressed and reduced during the 6 year period before the plan is reviewed.

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

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

We recognise that we cannot significantly reduce flood risk in isolation from our other risk partners. Merthyr Tydfil County Borough Council will therefore seek to work closely with Natural Resources Wales and Dwr Cymru / Welsh Water to endeavour to bring to our communities a seamless approach to all sources of flood risk no matter which organisation has the legal responsibility.

**Gareth Chapman**
**Chief Executive**

# 2 Purpose of Flood Risk Management Plans in Managing Flood Risk

## 2.1 What is a Flood Risk Management Plan (FRMP)

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

This FRMP has been developed with this in mind and sets out how Merthyr Tydfil County Borough Council (MTCBC) will, over the next 6 years, manage flood risk in the communities most at risk and to maximise the environment benefit. In doing so, this FRMP takes forward the objectives and actions set out in our **Local Flood Risk Management Strategy** (LFRMS). See link to page below.

http://merthyr.gov.uk/resident/parking-roads-and-travel/flooding-and-drainage/flood-risk-management/

This FRMP also aims to achieve some of the objectives set out in the Welsh Government's National Flood and Coastal Erosion Risk Management Strategy, which provides the national framework for flood and coastal erosion risk management in Wales through four overarching objectives:

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

## 2.2 What is included in this FRMP

The information included in MTCBC FRMP includes the components set out in the Flood Risk Regulations 2009 (see appendix 5). Most of this information has been gathered and updated through this first cycle, and has been drawn from the findings of our Preliminary Flood Risk Assessment (PFRA) and the objectives and measures we identified and set out in our LFRMS. See link to page below.

http://merthyr.gov.uk/resident/parking-roads-and-travel/flooding-and-drainage/flood-risk-management/

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

To do so, this FRMP highlights the areas most at risk from flooding by surface water and ordinary watercourse in MTCBC. It draws conclusions from these risks and sets

out the measures we will take over the next 6 years to mitigate these risks and make our communities more resilient.

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

- Prevention
- Protection
- Preparedness
- Recovery and Review

## 2.3 Legislative Context

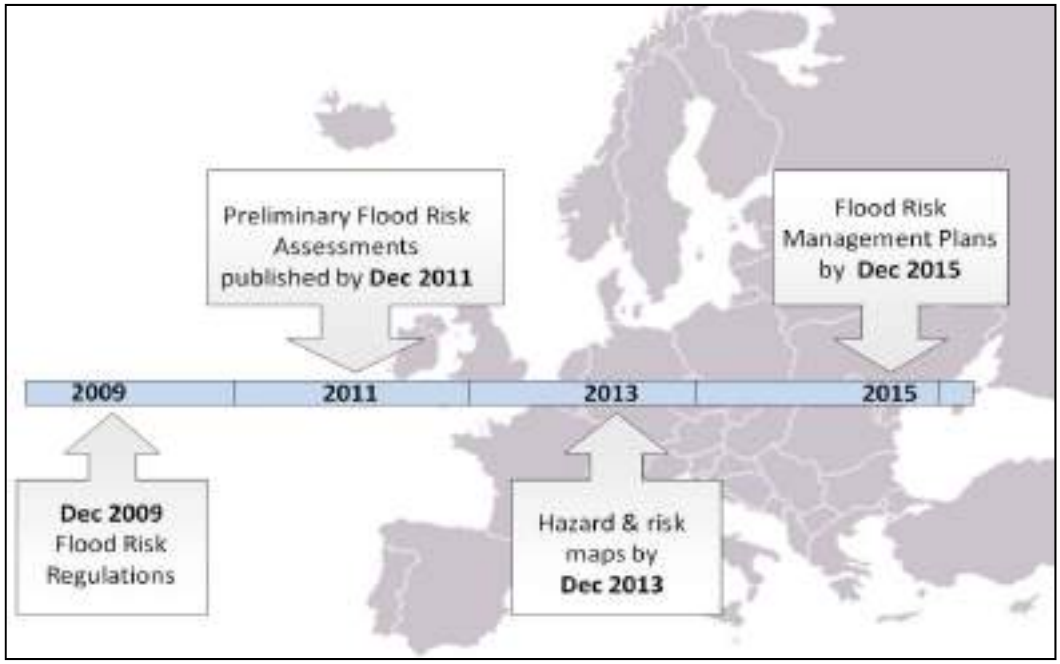
### 2.3.1 Flood Risk Regulations 2009

Under the Flood Risk Regulations 2009 (The Regulations), LLFAs are responsible for producing FRMPs for Flood Risk Areas that were identified in the Preliminary Flood Risk Assessments.

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

The Regulations set out a six year cycle with timescales for the publication of 3 key outputs as shown in Figure 1 below. Following the publication of the FRMP in December 2015 the second iteration of the six year cycle will commence in 2016.

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



#### 2.3.1.1 Preliminary Flood Risk Assessment (PFRA)

The PFRA is a high level screening exercise that compiled information on significant local flood risk from past and future floods, based on readily available information. The scope of the PFRA was to consider flooding from surface runoff, ground water and ordinary watercourses, and any interaction these sources have with main rivers with the aim of identifying flood risk areas as set out under the European Flood Directives (see section 3.3).

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

In 2013 the Environment Agency, working with NRW and LLFAs, produced the updated Flood Map for Surface Water.

The updated map represents a significant improvement on the previous surface water flood maps (2008 and 2010), both in terms of method and representation of the risk of flooding. (see section 3.4.2)

#### 2.3.1.3 Flood Risk Management Plans for Flood Risk Areas.

We are currently in the first cycle of the Regulations and FRMPs represent the final output of this cycle and must be published by 22nd December 2015.

### 2.3.2 Flood and Water Management Act

The Flood and Water Management Act was introduced in April 2010 in England and Wales. It was intended to implement Sir Michael Pitt's recommendations following the widespread flooding of 2007. The act was also intended to clarify roles and responsibilities between Risk Management Authorities (RMAs).

Under the Act, the Welsh Government was required to produce a National Strategy for Flood and Coastal Erosion Risk Management, and MTCBC to produce a Local Flood Risk Management Strategy (LFRMS) which was completed and published in June 2013.

### 2.3.3 Water Framework Directive (WFD)

The Water Framework Directive 2000 is a European Union directive which commits member states to achieve good qualitative and quantitative status of all water bodies by 2015.

One of the requirements of the WFD is that Natural Resources Wales and the Environment Agency must produce and update a River Basin Management Plan for each district. MTCBC lies within the catchment for the River Severn and is included in the South East Valleys Management Catchment.

**Objectives of the Directive**

The Directive aims for 'good status' for all rivers, lakes, ground and surface waters in the EU.

The ecological and chemical status of water bodies is assessed according to the following criteria:

- Biological quality (fish, benthic invertebrates, aquatic flora)
- Hydromorphological quality such as river bank structure, river continuity or substrate of the river bed
- Physical-chemical quality such as temperature, oxygenation and nutrient conditions
- Chemical quality that refers to environmental quality standards for river basin specific pollutants. These standards specify maximum concentrations for specific water pollutants. If even one such concentration is exceeded, the water body will not be classed as having a “good ecological status”.

**Consultation**

There is also a requirement for consultation between NRW and the EA and the LLFAs as the Flood Risk Management Plans and the River Basin Management Plans are developed.

# 3 Study Area

## 3.1 Administrative Area

3.1.1 Merthyr Tydfil County Borough Council (MTCBC) is a Unitary Authority situated within the valleys of South East Wales. See Figure 2 below – Location of MTCBC within Wales. The census of 2011 showed the population of MTCBC as 58,802 and the number of residential properties as 26,245. For the purpose of this FRMP, however, in order to comply with the requirements of the EA and NRW, we are using the National Receptor Database (NRD) with an average occupancy of 2.35 people per dwelling. The NRD lists 26,185 properties within MTCBC and using the multiplier of 2.35 this gives an estimated population of 61,534.

The Borough has an area of 11,189 hectares which is a mix of rural and urban land where the communities are generally built on the steeply sloping hillsides or within the valley basins.

**Figure 2: Location of MTCBC within Wales**

### 3.1.2 List of features used in counts to assess flood risk

Natural Resources Wales and The Environment Agency produced a document "Flood Risk Maps – Risk of Flooding from Surface Water – Severn River Basin District" in which they provided details of the features to be considered when studying flood risk from surface water and ordinary watercourses.

The features have been divided into three categories namely Risk to People, Risk to Economic Activity and Risk to Natural and Historic Environment. Table 1 below – show counts of those features within the whole of MTCBC and for the Flood Risk Area as identified by the PFRA. These counts have been calculated by the MTCBC Flood Risk Management Team. They have been checked against the counts provided by NRW/EA and have been found to coincide.

| People and Property | TOTALS FOR MTCBC | TOTALS FOR MTCBC FLOOD RISK AREA |
|---|---|---|
| Properties (n)<br>People (n) (multiplier 2.35) | 26,185<br>61,534 | 21,407<br>50,308 |
| Services (n) | 86 | 64 |
| **Economic Activity** | | |
| Non-Residential Properties (n) | 4,592 | 3,519 |
| Airports (n) | 0 | 0 |
| Primary/Trunk Roads (km) | 57 | 42 |
| Main Line Railways (km) | 11.5 | 8 |
| Agricultural Land – Grades 1, 2 and 3 (ha) | 0 | 0 |
| **Natural and Historic Environment** | | |
| Bathing Waters (n) | 0 | 0 |
| Environmental Permitting Regulations (EPR) Installations (n) | 2 | 2 |
| Special Areas of Conservation (SAC) (ha) | 0 | 0 |
| Special Protection Areas (SPA) (ha) | 0 | 0 |
| Ramsar Sites (ha) | 0 | 0 |
| World Heritage Sites (ha) | 0 | 0 |
| Sites of Special Scientific Interest (SSSI) (ha) | 283 | 228 |
| Parks and Gardens (ha) | 176 | 176 |
| Scheduled Ancient Monuments (ha) | 67 | 40 |
| Listed Buildings (n) | 235 | 203 |
| Licensed Abstractions (LA) (n) | 9 | 6 |
| Sites of Interest for Nature Conservation (SINC) (ha) | 3,382 | 1,906 |

**Table 1: Counts of Features in MTCBC and the Flood Risk Area**

### 3.1.3 River Catchments within MTCBC

Surface water from the upper reaches of the catchment drains into the Taf Fawr to the west and the Taf Fechan to the east. The confluence of the two rivers is at Cefn Coed-y-cymmer and below that point the river is referred to as the Afon Taf.

The south eastern sector of the catchment drains into the Bargod Taf which joins the Afon Taf at Quakers Yard.

There are two main reservoirs located partly within MTCBC. The eastern half of the Llwyn Onn Reservoir lies on the Taf Fawr in the north west of the catchment and the Pontsticill Reservoir is fed by the Taf Fechan in the north east.

## 3.2 Flood Risk in MTCBC

### 3.2.1 Summary of types of flood risk present in MTCBC

Local flood risk is defined within the Act as being a flood risk from:

1 Ordinary watercourses – all watercourses that are not designated Main River, and which are the responsibility of Local Authorities

2 Surface runoff - rainfall or other precipitation which is on the surface or ground and has not entered a watercourse, drainage system or public sewer.

3 Ground water - water that has percolated into the ground and may form underground ponds or streams, which may discharge above ground but lower down the catchment.

4 The interface between main rivers and surface water flows.

More detail of the flood risk is given below.

### 3.2.2 Catchment Characteristics

The terrain within MTCBC is typical of all the valleys of South East Wales. The catchments consist of steep hillsides, which are generally formed of impermeable clay based material overlaying various rock strata with steep fast flowing rivers in the valley floor. This combination of characteristics leads to the catchments being very “flashy”, meaning that runoff from storms is almost instantaneous giving rise to high peak flows which generally subside very quickly in a time scale of minutes rather than hours or days. This is particularly relevant to surface water runoff and ordinary watercourses.

NRW has a supervisory duty on Main River Watercourses e.g. Afon Taf, under the requirements of the Water Resources Act 1991. Whilst main rivers tend to be larger and have greater catchment areas than the ordinary watercourses, within MTCBC they still respond rapidly to rainfall taking hours to achieve peak flows as opposed to days.

### 3.2.3 Groundwater

Groundwater flow, although not a major problem in MTCBC, is somewhat different to surface water runoff. Rainwater has to penetrate through the sub-soil material before percolating through the rock strata and, in many instances, into the old mine workings. When the coalmines were operational most of the groundwater was controlled by pumping excess water into local drainage systems. Existing culverts or ordinary watercourses were used to take the flow before the water discharged into local rivers. Since the closure of the mines pumping has ceased and many of the mine workings have filled with water. The water generally escapes through old mine entrances such as adits and mine shafts. Occasionally water from old mine workings discharges at unexpected locations particularly on hillsides below the workings.

The FRMP will allow for investigation of the location of mine water flows and their likely volume where there is evidence to indicate that such flows could present a flood risk.

It is also common for mine water to be coloured red, which is usually a sign that the water is ferruginous, meaning that it contains iron salts which are detrimental to the quality of the watercourse below the discharge point. It is proposed that, if required, measures will be introduced which will remove the iron salts from the mine water and thus improve the quality of the water downstream of the discharge.

### 3.2.4 Surface Water Runoff

Flooding from surface water runoff is usually caused by intense rainfall either after periods of persistent rainfall, which has saturated the catchment, or following a period of dry weather, causing the ground surface to become hard and impermeable. Both scenarios result in high runoff from the catchment leading to high peak flows.

Flooding in these circumstances is often exacerbated by lack of cut off ditches and drains, ditches being filled in or piped, or the poor maintenance of ditches and watercourses by riparian owners. Damage to stream and other drains may also be caused by developers or livestock.

Increases to the runoff characteristics of the catchment may be caused by farmers ploughing at right angles to contours rather than parallel to them, removal of top soil, removal of vegetation, including the felling of trees or other site clearance. Generally these issues are all likely to give rise to increases in surface water flows.

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

### 3.2.5 Highway Drainage

Flooding from highway drainage systems usually takes place as a result of short duration storms of very high intensity. Flooding often commences due to the

inability of gullies to take the volume of water. This is usually as a result of gullies being blocked by debris washed off the roads filling the gullies. MTCBC mitigate the effects of gullies blocking by having an operational procedure that ensures that gullies are cleaned at least twice a year. They are also cleared when blockages are reported by members of the public.

Highway drainage may also be a source of pollution from hydrocarbons. This is particularly acute when prolonged dry periods are followed by intense rainfall. This is particularly adverse for the first flush of runoff.

Where appropriate this FRMP will look at the possibility of installing measures such as swales and reed beds that will reduce velocities and improve water quality.

### 3.2.6 Ordinary Watercourses

The most frequent form of flooding in MTCBC arises from the blockage of grids at the entrance to the culverts taking the water from ordinary watercourse. This usually occurs when intense rainfall causes leaf fall and other vegetation to enter the watercourse resulting in a build up of debris at the front of the grids. MTCBC have an operational procedure which is designed to minimise this risk by carrying out routine maintenance and pre-emptive cleaning prior to heavy rain when forecast.

Measures will be introduced to replace substandard grids with grids designed to modern standards including additional upstream sacrificial grids.

Flooding may also occur as a result of culvert failure due to the collapse of sidewalls, roofs or the scouring of culvert inverts. This is particularly prevalent in older systems, many of which have already exceeded their design life.

Flooding may also be caused by inadequate maintenance which is normally the responsibility of the riparian owners. Capacities of pipes are often significantly reduced by the build up of silt and debris within the culverts.

This type of flooding is difficult to manage proactively as it requires a significant level of resources to effectively inspect all culverts, therefore inspections are restricted to systems where there is evidence that the capacity has been adversely affected.

Although culvert capacity has not been found to be the most significant form of flooding within ordinary watercourses it has been considered as part of this FRMP. Surveys and calculations will be carried out to determine the maximum flow rates within significant culverts by consideration of intake conditions and hydraulic capacities. More detailed runoff calculations will be carried out for some catchments and where a pipe is shown to have inadequate capacity consideration will be given to improving the intake or in exceptional circumstances, their replacement with suitably sized alternatives or the construction of additional relief culverts or channels.

Illegal connections to existing culverts and the culverting of watercourses without consent, also presents a potential source of flooding and pollution. It is anticipated that where illegal works are identified the Council as the LLFA will utilise its recently acquired powers to remedy the situation. This will be a matter of discussion between MTCBC and Dwr Cymru / Welsh Water.

### 3.2.7 Channels

Flooding within channels is usually caused by lack of maintenance. Where channels are in the ownership of MTCBC operational procedures are in place to ensure that the capacity of the channel is not impaired. Inspection of channels, where there is a significant risk of flooding, is carried out on a regular basis and debris removed. The grass is not usually cut as the grass is helpful in the reduction of pollution. Trees and shrubs are not usually removed as their root system often helps to stabilise the ditches, however, where flows are impeded trees and shrubs will be cut back as appropriate.

### 3.2.8 Combined Sewers

The sewer network in the borough is mostly made up of combined sewers that take both foul sewage and surface water. These are all in the ownership of Dŵr Cymru / Welsh Water. Flows in these pipes are usually controlled through the installation of Combined Sewer Overflows (CSOs), which operate to allow excess flows to be removed from the system and discharged into natural drainage channels, protecting properties from sewer flooding.

This method of controlling flows can cause foul sewage, mixed with rainwater to be discharged into the surface water drainage systems and main rivers during periods of heavy rainfall. This can have an adverse affect on the quality of the water. The licensing and monitoring of all CSOs is managed by NRW regardless of whether they discharge to main river of ordinary watercourses.

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

Where necessary, MTCBC will work with NRW and Dŵr Cymru / Welsh Water to introduce measures which will reduce the quantity of foul sewage being discharged from the Combined Sewer System into surface water systems.

### 3.2.9 River Flooding

There are significant areas within MTCBC which are also subject to river flooding. River flooding remains within the remit of NRW and is covered in the Severn River Basin Flood Risk Management Plan. Figures for river flooding have not been included in this report as it could result in double counting of some flood risk.

## 3.3 Preliminary Flood Risk Assessment

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

In order to have a consistency of approach, the Department for the Environment Food and Rural Affairs (DEFRA) and the Welsh Government (WG) identified a number of key risk indicators and their thresholds to establish significant risk and to determine the existence of Flood Risk Areas.

3.3.2 The methodology was based on using the flood maps produced by the EA to identify 1km squares where flood risk exceeds a defined threshold. These squares are known as areas above Flood Risk Threshold (Blue Squares). The key flood risk indicators and their thresholds for a 1km square were set as follows:-

- a minimum of 200 people
- a minimum of 20 businesses
- 2 or more critical services

The EA identified 20 blue squares within MTCBC.

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

The key flood risk indicator for establishing an indicative Flood Risk Area was set as - numbers of people at risk of being affected by flooding exceeding 5,000.

On the basis of the 20 blue squares identified by the EA, and the methodology defined above, the EA identified an indicative Flood Risk Area within MTCBC of 45 $km^2$.

3.3.4 In order to review the indicative Flood Risk Area all 153 km squares within MTCBC were considered and MTCBC was satisfied that all the squares which were listed by the EA, as blue squares had been correctly identified.

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

| | |
|---|---|
| Human health consequences – Number of people (2.23 multiplier) | 7,071 |
| Other human health consequences – Number of critical services flooded | 25 |
| Economic consequences – number of non-residential properties flooded | 806 |

3.3.5 As part of the review carried out by MTCBC, two additional 1 km squares were identified as being Areas above the Flood Risk Threshold, namely X304Y207 and X307Y201.

Grid square X304Y207 was made into a blue square by MTCBC because there are 4 critical services which have been identified as being at risk of flooding.

Grid square X307Y201 was made into a blue square by MTCBC because there are 3 critical services which have been identified as being at risk of flooding.

As a result of the above amendment the blue square X307Y199 becomes contiguous with the MTCBC indicative Flood Risk Area and therefore it was considered appropriate that the Flood Risk Area should be increased to include this square.

3.3.6 On the basis of the 22 blue squares identified by MTCBC, and the methodology defined above, MTCBC have identified a Flood Risk Area of 58 $km^2$. Only 20 of the blue squares within the MTCBC are located within the indicative Flood Risk Area

See Fig.3 MTCBC - Flood Risk Area and Blue Squares.

The Key Flood Risk Indicators for the MTCBC Flood Risk Area have been calculated as follows:-

| | |
|---|---|
| Human health consequences<br>Number of people (2.23 multiplier) | 7,923 |
| Other human health consequences<br>Number of critical services flooded | 26 |
| Economic consequences – number of non-residential properties flooded | 818 |

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3.3.7 As part of the Preliminary Flood Risk Assessment process significant past flooding events within the borough were also considered.

To decide on the significance of an individual flood DEFRA, WG and NRW set key flood risk indicator which define a Flood Risk Area in Wales as having 5,000 people at risk or an individual 1km square where at least 200 people or 20 businesses or more than 1 critical service might be flooded to a depth of 0.3 metres and above by a rainfall event with a chance of 1 in 200 of occurring in any given year.

MTCBC as a LLFA has set the key flood risk indicator of people at risk of flood at a threshold of 200 (equivalent to 85 properties) to decide if a flood is of local significance.

A flood event of this magnitude is at least one level of consequence down from the national threshold but still represents a flood of considerable magnitude. Such a flood could occur at a very intense localised area such as a 1km square or cover the whole of the borough in a less intense rainfall event.

**Figure 3: MTCBC - Flood Risk Area and Blue Squares**

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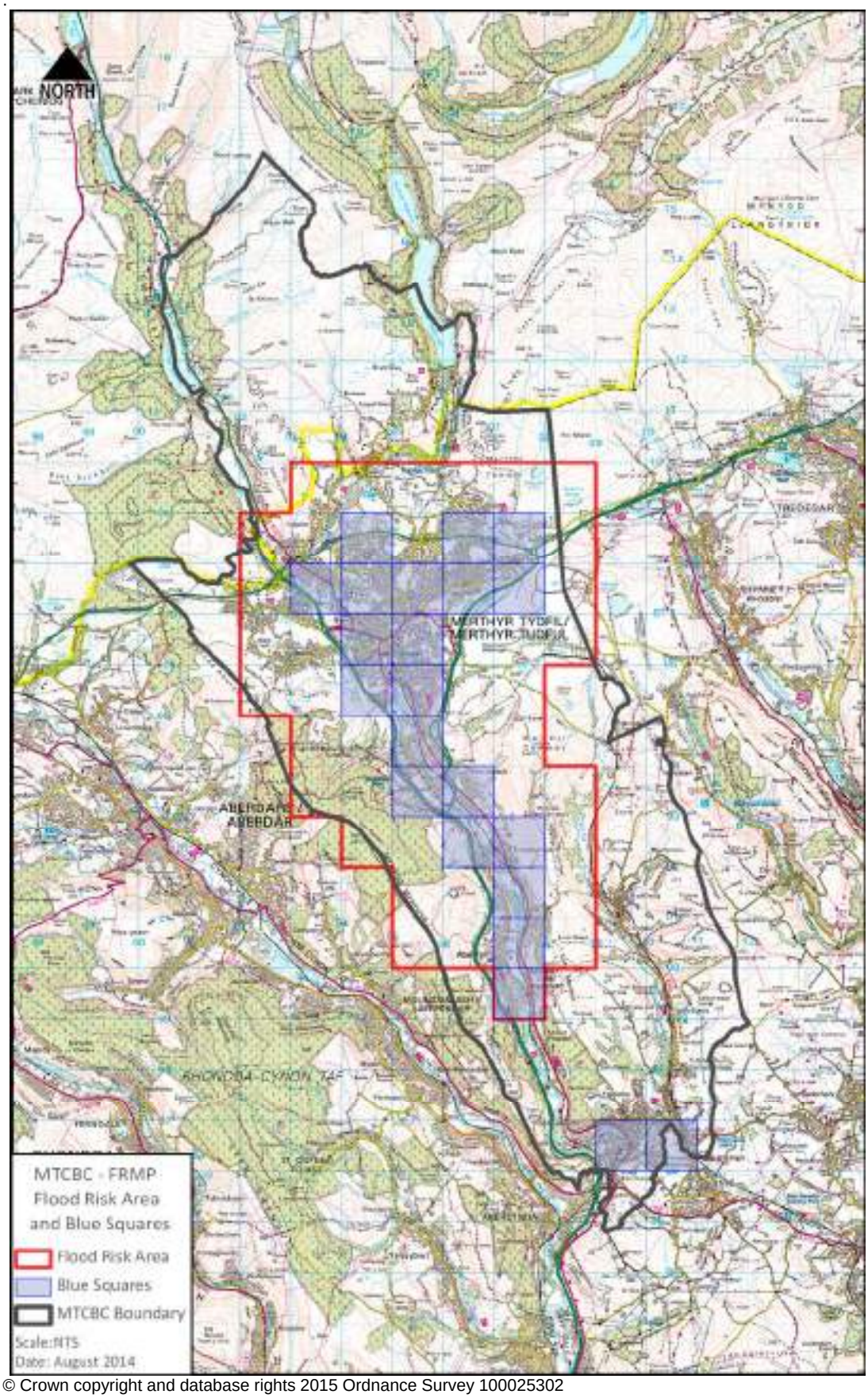


3.3.8 Two flood events were listed as being locally significant within Merthyr Tydfil County Borough Council. These were identified from reports prepared following major floods. The two floods are:-

1 4th December 1960 - Flooding covering the whole of the borough in which a total of 90 residential properties were flooded plus other commercial properties.

2 26th – 27th December 1979 - A total of 189 residential properties were flooded within Pentrebach, Troedyrhiw and Rhydycar plus a number of commercial properties. There were two fatalities as a result of a culvert collapse in Rhydycar.

## 3.4 Conclusions drawn from the Flood Risk Maps at a Borough Wide Level

### 3.4.1 Background

#### 3.4.1.1 Production of flood data and maps

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

A service level agreement was signed between Welsh Government (WG), Natural Resources Wales (NRW) and the Environment Agency (EA) for the production of the flood maps. JBA Consultants were contracted to produce the maps on behalf of EA, NRW and LLFAs. The maps were completed and published as required under the FRR in December 2013.

### 3.4.2 Updated Flood Maps for Surface Water:

#### 3.4.2.1 Viewing the maps

The Updated Flood Map for Surface Water (UFMfSW) can be viewed by the public on:
http://watermaps.environment-agency.gov.uk/wiyby/wiyby.aspx?topic=ufmfsw#x=357683&y=355134&scale=2

The UFMfSW data can be downloaded by LLFAs on:
http://www.geostore.com/environment-agency/

#### 3.4.2.2 The information in the maps

The updated Flood Map for Surface Water assesses flooding scenarios as a result of rainfall with the following chance of occurring in any given year (annual probability of flooding is shown in brackets):

- 1 in 30 (3.3%)
- 1 in 100 (1%)
- 1 in 1000 (0.1%)

It provides the following data for each flooding scenario:

- Extent – The total extent of land affected.
- Depth – The depth of flood water.
- Velocity – The velocity of flood water.
- Hazard - a function of depth and velocity.
- *Hazard rating = depth x (velocity + 0.5) + debris factor)*
- Flow direction (2m) - Directional flow of flood water using a 2m grid.
- Flow direction (25m) - Directional flow of flood water using a 25m grid.

For further details on how the maps were produced and the data contained within the maps follow the link below:

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/297432/LIT_8988_0bf634.pdf

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

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

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

#### 3.4.2.3 Surface water flood map data

For the purpose of this Flood Risk Management Plan (FRMP), the Extent map has been used. The extent map is a combination of depth, hazard and velocity which is deemed to demonstrate most accurately, the potential extent of flooding for each rainfall event; 1 in 30 (High), 1 in 100 (Medium), and 1 in 1000 (Low).

For any one probability there are three sets of raw model outputs: the 1, 3 and 6 hour rainfall durations. Three sets of raw data for each rainfall event were combined to give a ‘critical storm duration’ dataset. The critical storm duration data was then processed to remove:

- Lowest hazard: anywhere with a hazard rating less than 0.575 (equivalent to 150mm of still water, 100mm of water at around 0.5m/s, 50mm of water at 2m/s)
- Flooded areas of less than $100m^{2.}$
- Islands of dry areas surrounded by water less than $50m^{2.}$

This process was repeated for the 1 in 30, 1 in 100 and 1 in 1000, and the three extents published together to show areas at high, medium and low risk of flooding.

### 3.4.3 Counts

The MTCBC counts were generated in accordance with the revised EA methodology using data from a variety of sources.

#### 3.4.3.1 Reference data

The following datasets were used to generate the counts:

1 **National Receptors Database (NRD):** A dataset provided by the Environment Agency containing data on listed buildings, scheduled ancient monuments, registered parks and gardens, environmental permitting sites, trunk/primary roads, railways and SSSI's.

**2** **UMfSWF Property Point Dataset:** A dataset provided by the Environment Agency containing residential and non-residential property point data. The dataset uses Ordnance Survey Address Layer 2 property points and details. In the attributes table, the percentage of a property's perimeter wetted in a P30(High), P100(Medium) and P1000(Low) rainfall event is given at the following depths: 0mm, 150mm, 200mm, 300mm, 600mm, and 900mm.

**3** **Licensed Abstraction spreadsheet:** A spreadsheet provided under licence by Natural Resources Wales containing details and locations of all active water extraction licenses within MTCBC.

#### 3.4.3.2 Background Mapping

Vector Map District is the background mapping used to present the surface water flood maps. Vector Map District is a simplified open source mapping which is available free for download on the Ordnance Survey website.

#### 3.4.3.3 Counts included in this FRMP

All counts were generated using GIS software, a combination of the surface water flood maps and reference data listed in Clause 3.4.3.1 above. Each category includes a count for 3 flood risk scenarios; P30 (High), P100 (MEDIUM) and P1000 (Low).

**1 Risk to people and properties**

1 Number of people in areas at risk of flooding; depth => 0mm and => 50% wetted perimeter. (number)
2 Number of residential properties at risk of internal flooding; depth => 200mm and => 50% wetted perimeter. (number)
3 Number of services in areas at risk of flooding; depth => 0mm and =>50% wetted perimeter. (number)

**2 Risk to economic activity**

1 Non-residential properties in areas at risk of flooding; depth => 0mm and => 50% wetted perimeter. (number)
2 Airports (number)
3 Primary/Trunk Roads (length)
4 Main Line Railways (length)
5 Agricultural land – Grades 1, 2 and 3 (Area)

**3 Risk to Natural and Historic Environment**

1 Bathing Waters. (number)
2 Environmental Permitting Regulations (EPR) Installations. (number)
3 Special Areas of Conservation (SAC). (Area)
4 Special Protection Areas (SPA). (Area)
5 Ramsar Sites. (Area)
6 World Heritage Sites. (Area)
7 Sites of Special Scientific Interest (SSSI). (Area)
8 Parks and Gardens. (Area)
9 Scheduled Ancient Monuments. (Area)
10 Listed Buildings (Number)
11 Licensed Abstractions (LA). (Number)
12 Sites of Interest for Nature Conservation (SINC). (Area)

With the exception of 1.2 above, namely:- Number of residential properties at risk of internal flooding; depth => 200mm and => 50% wetted perimeter, all counts have been identified by EA/NRW as the relevant counts to be used in this FRMP to consider the risk of flooding from surface water.

MTCBC has included count 1.2 to evaluate properties that are likely to be affected by internal flooding.

Further details of counts included in the FRMP can be found in Appendix 3.

### 3.4.3.4 Measure Counts

MTCBC conducted a series of counts in order to quantify the potential reduction in flood risk as a result of implementing specific measures.

Counts were conducted by identifying areas susceptible to flood risk then calculating the numbers of residential, commercial and critical properties directly affected by a P30, P100 and P1000 rainfall event using depth => zero and =>50% wetted perimeter as the search criteria.

These counts will be used to prioritize the implementation of the measures identified in this FRMP.

### 3.4.3.5 Location of information for LLFAs with Flood Risk Areas:

In order to assist LLFA's to generate counts, the Environment Agency and Natural Resources Wales produced a set of maps and counts for the Severn River basin. Each LLFA with a Flood Risk Area could utilise these counts and maps as a basis for validating the methodology being used and producing counts in their own areas.

The document provided can be found using the link below:

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/297391/LIT8969_FloodRiskMaps_Severn_SurfaceWater_b2bf44.pdf

Each LLFA with a flood risk area was provided with access to a dataset containing the property point and percentage wetted perimeter data for each property.

Access was provided to a geodatabase containing an ESRI shape file and MapInfo .tab formats (for spatial querying), and an Access database format (for non-spatial querying).

The download also includes the following documentation:

- uFMfSW Property Points Summary Note - explains what the dataset is and what it can be used for.
- Detailed document about the uFMfSW Property Points dataset - contains further information about how it was created and how it can be used.

## 3.5 Community areas most at risk from surface water flooding within MTCBC

**3.5.1** For the purpose of flood risk analysis, MTCBC has been divided into fifteen Community Areas. See Table 2 - Community Areas and Figure 4: MTCBC Community Areas below. Eleven of the Community Areas are within the Flood Risk Area and details of the flood risk area given in Section 7 of this report. The remaining four Community Areas are dealt with in Section 8.

Community Areas have been based on Ward boundaries but in order to identify the flood risk more precisely, some of the wards have been divided into smaller Community Areas as follows:

1 Cyfarthfa Ward becomes the two Community Areas of Gellideg and Heolgerrig.

2 Merthyr Vale Ward becomes the two Community Areas of Aberfan and Merthyr Vale.

3 Plymouth Ward becomes the three Community Areas of Abercanaid, Troedyrhiw and Pentrebach.

4 Vaynor Ward becomes the two Community Areas of Vaynor and Cefn Coed-y-cymmer.

In addition the three wards of Gurnos, Park and Penydarren have been combined to form one Community Area of Merthyr (North) and the Town Ward has been renamed Merthyr (South).

| | Community Area | Area (ha) | Population | In FRA |
|---|---|---|---|---|
| 1 | Abercanaid | 858 | 1,234 | Yes |
| 2 | Aberfan | 439 | 2,686 | Yes |
| 3 | Bedlinog | 1,069 | 1,567 | No |
| 4 | Cefn Coed-y-cymmer | 501 | 3,238 | Yes |
| 5 | Dowlais | 1,081 | 7,414 | Yes |
| 6 | Gellideg | 311 | 3,419 | Yes |
| 7 | Heolgerrig | 394 | 3,415 | Yes |
| 8 | Merthyr (North) | 472 | 15,275 | Yes |
| 9 | Merthyr (South) | 766 | 8,439 | Yes |
| 10 | Merthyr Vale | 389 | 1,445 | Yes |
| 11 | Pentrebach | 641 | 1,347 | Yes |
| 12 | Treharris | 808 | 6,549 | No |
| 13 | Trelewis | 453 | 1,993 | No |
| 14 | Troedyrhiw | 615 | 3,013 | Yes |
| 15 | Vaynor | 2,393 | 500 | No |

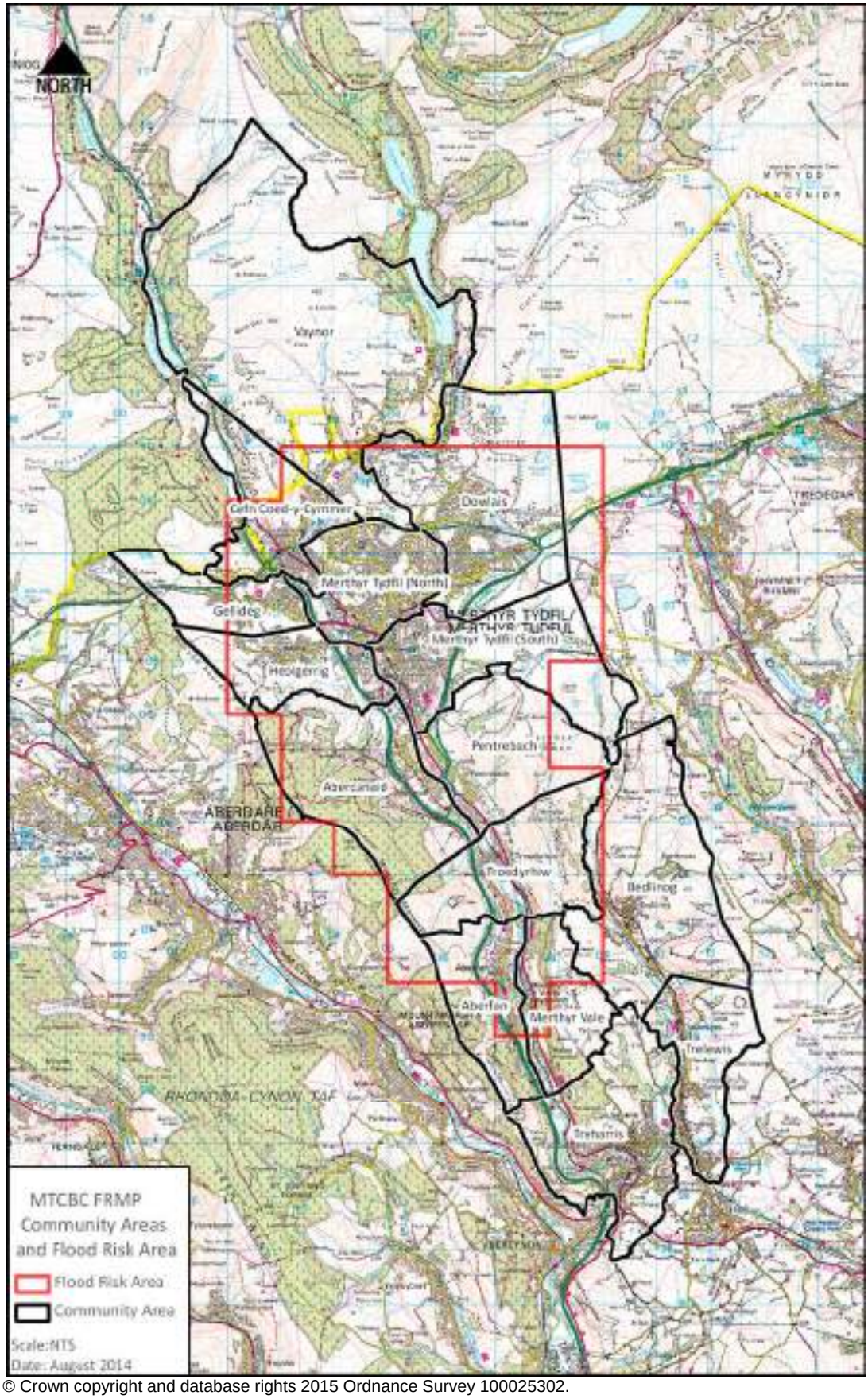
**Table 2: Community Areas**
Community Areas within the FRA have been highlighted in blue.

To allow a relatively straight forward way of comparing flood risk between Community Area Table 3 below has been produced to shown only counts for low level risk for all Community Areas.

| | Abercanaid | Aberfan | Cefn Coed-y-cymmer | Dowlais | Gellideg | Heolgerrig | Merthyr (North) | Merthyr (South) | Merthyr Vale | Pentrebach | Troeyrhiw | Bedlinog | Treharris | Trelewis | Vaynor |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Risk to People** | **IN FLOOD RISK AREA** | | | | | | | | | | | **NOT IN FRA** | | | |
| **Residents in areas at risk of flooding** (n) depth >0.0m (multiplier 2.35) | 190 | 203 | 129 | 1097 | 303 | 332 | 1,697 | 1,093 | 91 | 610 | 923 | 21 | 266 | 110 | 31 |
| **Residential Properties at risk of internal flooding** (n) depth >0.2m | 15 | 31 | 11 | 199 | 25 | 37 | 340 | 207 | 21 | 223 | 347 | 2 | 34 | 7 | 4 |
| Services (n) | 1 | 1 | 0 | 4 | 0 | 0 | 6 | 1 | 0 | 1 | 3 | 1 | 1 | 0 | 1 |
| **Risk to Economic Activity** | | | | | | | | | | | | | | | |
| Non-Residential Properties (n) | 33 | 15 | 22 | 97 | 17 | 32 | 99 | 253 | 1 | 95 | 52 | 16 | 19 | 18 | 11 |
| Primary/Trunk Roads (km) | 1.8 | 0.64 | 1.9 | 4.2 | 1.2 | 0.77 | 1.7 | 2.4 | 0 | 2.4 | 0.24 | 0 | 1.0 | 0 | 1.5 |
| Main Line Railways (km) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.13 | 0.31 | 0 | 0.17 | 0 | 0.26 | 0 | 0 |
| **Risk to Natural and Historic Environment** | | | | | | | | | | | | | | | |
| Environmental Permitting Regulations (EPR) Installations (n) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sites of Special Scientific Interest (SSSI) (ha) | 7.4 | 0 | 3.0 | 0.21 | 0 | 10.6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5.3 |
| Parks and Gardens (ha) | 0.06 | 3.6 | 0 | 0 | 0 | 0 | 3.3 | 0 | 0 | 0 | 2.4 | 0 | 0 | 0 | 0 |
| Scheduled Ancient Monuments (ha) | 0 | 0 | 0.11 | 0.11 | 1.00 | 0.13 | 0.75 | 0.43 | 0 | 0.60 | 0 | 0 | 0.02 | 0 | 0.02 |
| Listed Buildings (n) | 7 | 0 | 3 | 2 | 1 | 0 | 11 | 5 | 0 | 0 | 1 | 0 | 1 | 0 | 5 |
| Licensed Abstractions (LA) (n) | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sites of Interest for Nature Conservation (SINC) (ha) | 32 | 8.5 | 13.9 | 19.5 | 10.9 | 15.3 | 4.7 | 4.4 | 6.1 | 17.1 | 26 | 22 | 11.0 | 9.7 | 4.6 |

**Table 3: Effects of Risk for all Community Areas within MTCBC**

**Figure 4: MTCBC Community Areas**



# 4 How we currently manage flood risk in MTCBC

## 4.1 Procedures, Measures and Powers

Flood risk in MTCBC is managed through:-

1 Operational procedures which have been developed over years through good custom and practice.

2 Measures which were included in the Local Flood Risk Management Strategy.

3 Powers given to all LLFAs through the Flood and Water Management Act 2010 and the Land Drainage Acts 1991 and 1994.

4 As MTCBC is also the Highways Authority there are Powers under the Highways Act 1980.

### 4.1.1 Operational Procedures

The main operational procedures used to manage flood risk in MTCBC are listed below

1 Routine cleaning of gullies on a rota system.

2 Emergency cleaning of blocked gullies which have been notified to MTCBC Highways Department by members of the public.

3 Routine inspection and cleansing of intake grids to culverts and critical watercourses on a rota system.

4 Emergency inspection and clearance of critical grids prior to and during periods of intense rainfall.

5 Emergency cleansing of grids which have been notified to MTCBC Drainage Department by members of the public.

### 4.1.2 Measures contained within the LFRMS.

Measures contained within the LFRMS which are currently being used by MTCBC to manage and reduce flood risk are listed below and the detailed measures have been included in the in Appendix 2 of this report.

The measures include the following:

1 Sustainable and Strategic Development Planning – LFRMS Clause 6.13.1

2 Strategic Flood Risk Assessment (SFRA) / Strategic Flood Consequences Assessment (SFCA) – LFRMS Clause 6.13.2

3 Relocation – LFRMS Clause 6.13.4

4 Sustainable Drainage – LFRMS Clause 6.13.6

5 Flood Awareness – LFRMS Clause 6.14.1

6 Flood Warning – LFRMS Clause 6.14.2

7 Flood Forecasting – LFRMS Clause 6.14.3

8 Emergency Response Plans – LFRMS Clause 6.14.4

9 Community Flood Plans LFRMS Clause 6.14.5

10 Land Management – LFRMS – Clause 6.15.1

11 Resilience – LFRMS Clause 6.15.2

12 Resistance – LFRMS Clause 6.15.3

13 Restoration – LFRMS Clause 6.15.4

14 Environmental Enhancements – LFRMS Clause 6.15.5

15 System Asset Management Plans - LFRMS Clause 6.16.1

16 Defence/Structure Management – LFRMS Clause 6.16.2

17 Channel Construction and Maintenance – LFRMS Clause 6.16.3

18 Culvert Construction and Maintenance – LFRMS Clause 6.16.4

19 Investigation – LFRMS Clause 6.17.1

20 Local Property-level Flood Mitigation – Resilience - LFRMS – Clause 6.17.4

21 Local Property-level Flood Mitigation – Resistance – LFRMS – Clause 6.17.5

### 4.1.3 Additional powers given to MTCBC under the Flood and Water Management Act 20010

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

1. A duty to investigate all flooding within its area, insofar as a LLFA consider it necessary or appropriate. (Section 19)

2. A duty to maintain a register of structures and features likely to affect flood risk. (Section 21)

3. A duty to contribute to sustainable development. SuDS. (Section 32 of Schedule 3)

4. Consenting on Ordinary Watercourses. (Section 29 of Schedule 2)

## 4.2 How we prioritise our work

In order to satisfy the requirements of the National FCERM Strategy including their four overarching objectives a total of 17 detailed objectives were included in the MTCBC Local Flood Risk Management Strategy.

A total of 39 measures were included in the Strategy in order to implement the detailed objectives.

An Action plan was also included to prioritise the order in which the measures should be considered for implementation.

This information is included in Section 6 of this report.

## 4.3 Who we work with to manage flood risk in MTCBC

The guidance provided by Welsh government for the development of the LFRMS included a list of the Flood Risk Management Authorities. The updated list is given in clause 4.3.1 below.

All of these organisations will be contacted during the consultation for this FRMP.

More significant consultation will take place with the RMAs as detailed in Section 9 of this report.

### 4.3.1 The Risk Management Authorities

**Natural Resources Wales – including the former bodies**
Environment Agency Wales
Forestry Commission Wales
Countryside Council for Wales

**Lead Local Flood Authority in Wales**
**Those abutting MTCBC**
Caerphilly CBC
Rhondda Cynon Taf CBC
Blaenau Gwent CBC
**Those authorities in the SEWFRMG**
Monmouthshire CBC
Powys CBC
Cardiff CC
Newport CC
Neath Port Talbot CBC
Torfaen CBC
Vale of Glamorgan CBC
Swansea CC

**Water Company**
**Dŵr Cymru – Welsh Water**

**Additional Risk Partners**
**Internal Partners**

Planning Department
Highways Department
Emergency Planning

**External Partners**

Flood Risk Management Wales (RFCC)
Emergency Services
- Fire
- Ambulance (Health Board)
- Police

Housing Associations
- Merthyr Valley Homes Ltd
- Merthyr Tydfil Housing Associations
- Wales and West Housing

National Flood Forum
National Farmers Union
- Welsh Office of NFU

Local Partnerships, forums, and community groups
Royal Society for the Protection of Birds
Land Owners and land/estate Managers
Universities
Developers Forum
National House Builders
National Parks Authorities
- Brecon Beacon National Park

Network Rail
Parish and Town Councils
Local Resilience Forum
Association of Drainage Authorities (ADA)
Country Land and Business Association (CLA**)**
SWTRA – South Wales Trunk Road Agency
CADW

### 4.3.2 Flood Risk Management Functions

The flood risk management functions that may be exercised by the Risk Management Authorities (RMA) in relation to Merthyr Tydfil County Borough Council are listed in the table below

| **All RMAs – General Requirements** |
|---|
| When exercising their flood erosion risk management functions, or in exercising any other function in a manner that may affect flood risk, all RMAs (except water companies), are required to act in a manner consistent with both the Local and National Strategies, and any associated guidance. |
| Effective joint working between RMAs is fundamental to the effective delivery of the obligations under the Act. The Act itself imposes a duty on all RMAs to co-operate to facilitate partnership working, the sharing of information and enhance communications. |

| **Natural Resources Wales (NRW)** |
| --- |
| NRW has a dual role of:-<br><br>1 Operational responsibilities for flooding from main rivers and reservoirs.<br><br>2 Oversight responsibilities in relation to all flood risk management in Wales. |
| NRW leads on the provision of technical advice and support to the other Risk Management Authorities. They also lead on national initiatives such as Flood Awareness Wales, the national raising awareness programme, and is the single point of contact for enquiries and information on flood risk. |
| The Flood and Water Management Act 2010 has placed a number of statutory duties on the NRW including:<br><br>1 Co-operating with other authorities, including sharing data.<br><br>2 Reporting to the Minister on flood risk in Wales including the application of the National Strategy.<br><br>3 The establishment of Regional Flood and Coastal Committees. |
| In addition to their statutory duties, NRW has a number of what are called permissive powers. These are powers that allow them to do something, but do not compel them to and include:<br><br>1 Powers to request information.<br><br>2 The ability to raise levies for local flood risk management works, via the Regional Flood and Coastal Committees.<br><br>3 Powers to designate certain structures or features that affect flood or coastal erosion risk.<br><br>4 The expansion of powers to undertake works to include broader risk management actions.<br><br>5 The ability to cause flooding or coastal erosion under certain conditions. |
| Under the Regulations NRW also take on an assessment and coordination role at a national level, ensuring the correct information is passed back to the European Commission. |

**Lead Local Flood Authority (LLFA)**

Within the Flood and Water Management Act 2010, Merthyr Tydfil County Borough Council has been established as a Lead Local Flood Authority for its administrative area. MTCBC is also the highway authority for the area having responsibility for managing all adopted highways which are not included within the remit of the National Trunk Road Agency.

Under the term of the Flood and Water Management Act 2010, MTCBC is responsible for what is termed 'local flood risk'. This includes the risk of flooding from ordinary watercourses, surface runoff and ground water.

The Flood and Water Management Act 2010 places a number of statutory duties on MTCBC in its new role as LLFA including:

1 The preparation of local flood risk management strategies. (completed)

2 A duty to comply with the National Strategy.

3 To co-operate with other authorities, including sharing data.

4 A duty to investigate all flooding within its area, insofar as a LLFA consider it necessary or appropriate.

5 A duty to maintain a register of structures and features likely to affect flood risk.

6 A duty to contribute to sustainable development.

7 Consenting on Ordinary Watercourses

In addition to these, each MTCBC has a number of what are called permissive powers

1 Powers to request information.

2 Powers to designate certain structures or features that affect flood risk.

3 The expansion of powers to undertake works to include broader risk management actions.

4 The ability to cause flooding under certain conditions.

LLFAs in Wales are likely to take on the role of the SuDS Adopting and Approving Body in relation to sustainable drainage systems. In this role they will be responsible for both approving the original design of the SuDS and adopting and maintaining the finished system.

| **Dŵr Cymru – Welsh Water** |
| --- |
| Water companies, when exercising their flood or coastal erosion risk management functions in relation to an area within Wales, must have regard to the relevant Local Strategies and any associated guidance. |
| Water and sewerage companies are responsible not only for the provision of water, but also for making appropriate arrangements for the drainage of foul water, the treatment of waste, surface water sewers and combined sewers. They have primary responsibility for floods from water and sewerage systems, which can include sewer flooding, burst pipes or water mains or floods causes by system failures. |
| The Flood and Water Management Act 2010 places a number of statutory duties on Water and sewerage companies including:<br><br>1 A duty to act consistently with the National Strategy;<br><br>2 A duty to have regard to the content of the relevant Local Strategy;<br><br>3 Co-operation with other Authorities, including sharing data. |

## 4.4 How this FRMP has been co-ordinated

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

1 South East Wales Flood Risk Management Group attended by all LLFAs in South Wales, NRW, WLGA and DC/WW.

2 Flood Risk Management Working Group attended by all LLFAs in South East Wales, WG, NRW and WLGA.

3 Task and Finish Group attended by Swansea City Council and Neath and Port Talbot, Rhondda Cynon Taf and Merthyr Tydfil County Borough Councils.

Frequent meetings have taken place with WLGA

Meetings have also taken place with Dwr Cymru / Welsh Water

Internal collaboration has also been achieved through meetings with the Flood Risk Management Team.

## 4.5 Measures already underway in MTCBC to manage flood risk

Details of the measures and operational procedures already underway have been listed under clause 4.1 above, details of which are included in Appendix 2 of this report.

There is a requirement that the measures should address the four categories of Prevention, Protection, Preparedness and Recovery and Review. Details of the type of measures for each category are given in the table below.

| | **Prevention** |
|---|---|
| **M21** | **Avoidance;** Measure to prevent the location of new or additional receptors in flood prone areas, such as land use planning policies or regulation. |
| **M22** | **Removal or relocation;** Measure to remove receptors from flood prone areas, or to relocate receptors to areas of lower risk. |
| **M23** | **Reduction;** Measures to adapt receptors to reduce the adverse consequences in the event of a flood action on buildings, public networks, etc... |
| **M24** | **Other prevention;** Other measures to enhance flood risk prevention (may include, flood risk modelling and assessment, flood vulnerability assessment, maintenance programmes or policies etc...) |
| | Issue Ordinary Watercourse Consents, Comment on Flood Consequence Assessments, Update and improve the accuracy of food risk mapping, understand local flood risk better. |

| Protection | |
|---|---|
| **M31** | **Natural flood management / runoff and catchment**; Measures to reduce the flow into natural or artificial drainage systems, such as overland flow interceptors and or storage, enhancement of infiltration, etc and including in- channel, flood plain works and the reforestation of banks, that restore natural systems to help slow flow and store water. |
| **M32** | **Water flow regulation;** Measures involving physical intervention to regulate flows, such as construction modification or removal of water retaining structures (e.g. dams or other on-line storage areas or development of existing flow regulation rules and which have significant impact on the hydrological regime. |
| **M33** | **Channel, Coastal and floodplain works;** Measures involving physical interventions to freshwater channels, mountain streams estuaries coastal waters and flood prone areas of land, such as construction, modification or removal of structures or the alteration of channels, sediment dynamics management, dykes etc. |
| **M34** | **Surface water management**; Measures involving physical interventions to reduce surface water flooding, typically, but not exclusively, in an urban environment, such as enhancing artificial drainage capacity or through sustainable drainage systems (SuDS). |
| **M35** | **Other protection;** Other measures to enhance protection against flooding, which may include flood defences asset maintenance programmes or policies. |
| | On-going maintenance programme |

| Preparedness | |
|---|---|
| **M41** | **Flood forecasting and warning;** Measures to establish or enhance a flood forecasting or warning system |
| **M42** | **Emergency Event;** Measures to establish or enhance flood event institutional emergency response planning. |
| **M43** | **Public awareness and preparedness;** Measures to establish the public awareness or preparedness for flood events. |
| **M44** | **Other preparedness;** Other measures to establish or enhance preparedness for flood events to reduce adverse consequences. |
| | Flood awareness programme |

| Recovery and Review | |
|---|---|
| **M51** | **Individual and societal recovery;** Clean up and restoration activities (buildings, infrastructure, etc) Health and mental health supporting actions, inc managing stress disaster financial assistance (grants, tax) inc disaster legal assistance, disaster unemployment assistance, temporary or permanent relocation, other |
| **M52** | **Environmental recovery;** Clean up and restoration activities (with several sub topics as mould protection, well-water safety and securing hazardous material containers) |
| **M53** | **Other recovery and review;** Other recovery and review, lessons learnt from flood events insurance policies. |

Each measure listed in the FRMS and used in this report has been placed into one of the above categories as noted within each measure.

# 5 Co-ordination with the Severn River Basin Management Plan

## 5.1 General

Under the Water Framework Directive (WFD), Environment Agency (EA) and Natural Resources Wales (NRW) have a duty to prepare River Basin Management Plans for each River Basin District. Wales is divided into three River Basin Districts as noted below.

1 Dee situated in the north east of Wales which extends over the border into England

2 Severn covering the central east and south east of Wales which also extend over the border into England

3 Western Wales covering the whole of the western sector of Wales from Anglesey to the south coast.

Merthyr Tydfil County Borough is located within the southern part of the Severn River Basin, South East Valleys Catchment.


**Figure 5: WFD Management Catchments for Wales**

## 5.2 Severn River Basin Districts Overview

The Severn River Basin District is home to over 5.3 million people and covers an area of 21,590km2, with about one third of the district in Wales. The River Severn is the longest river in Britain and flows into the Severn Estuary. As well as the River Severn and its main tributaries the district includes the rivers of South East Wales, including the Wye, Usk and Taff, and those of the counties of Avon and Somerset that drain into the Severn Estuary.

The district has several major urban centres, including Bristol, Cardiff and Coventry. However, much of the river basin district is rural in character, particularly within the Welsh Borders. About 80% of the land is managed for agriculture and forestry. The key economic sectors in the district are business services, wholesale and distribution, public administration and health. Transport equipment and metals manufacturing are also important industrial sectors.

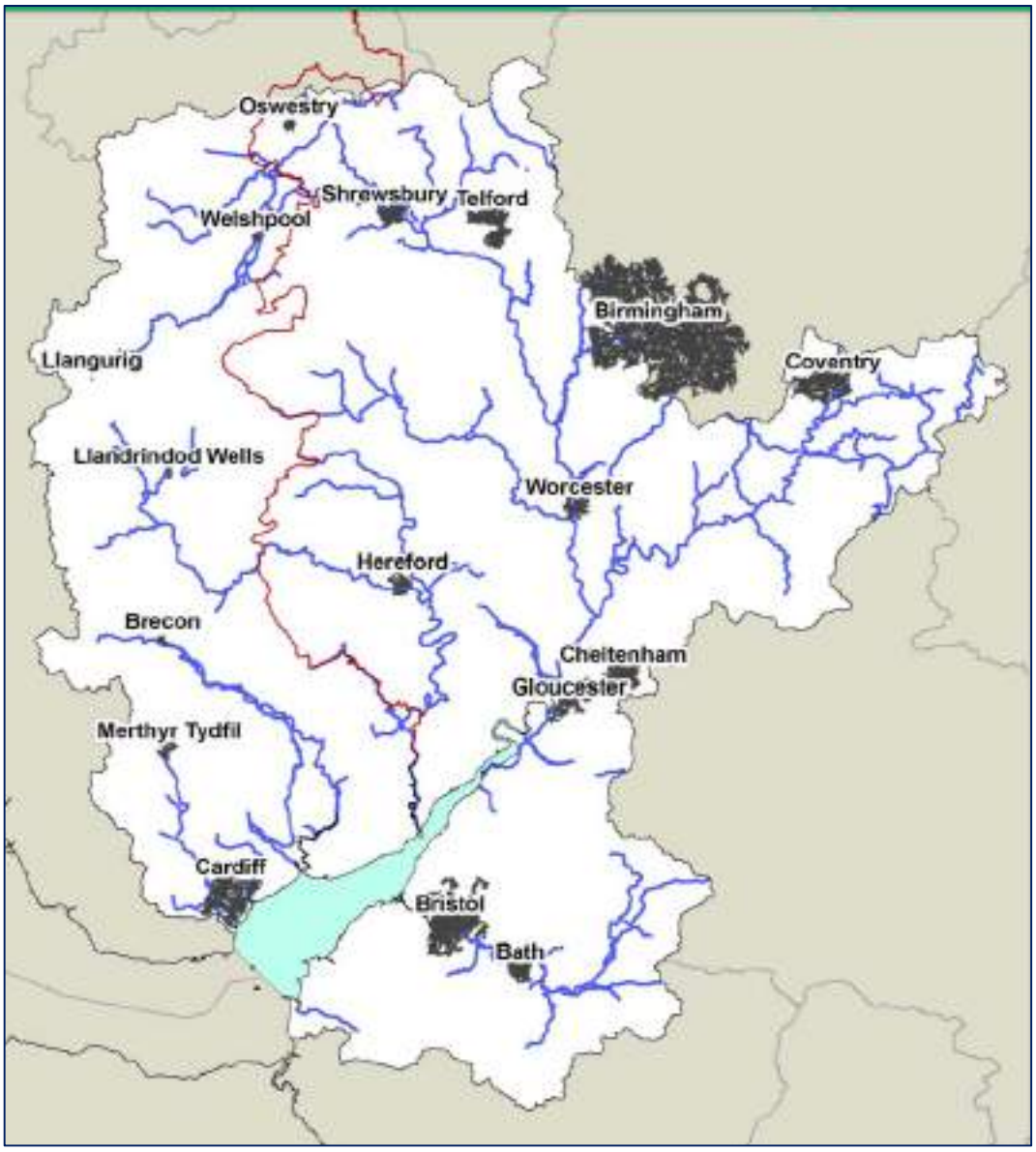



**Figure 6: Severn River Basin District Flood Risk Management Plan**

## 5.3 Summary of co-ordination of development and implementation of the FRMP with the River Basin Management Plan (RBMP) and the River Basin Flood Risk Management Plan (RBFRMP) for the River Severn.

### 5.3.1 Co-ordination with the Severn River Basin Management Plan

The draft Severn River Basin Management Plan, prepared jointly by the Environment Agency and Natural Resources Wales as a requirement of the Water Framework Directive, was published on the NRW website on 10 October 2014.

As part of the development on the RBMP a consultation process was carried out by NRW and EA. The consultation process commenced on 10th October 2014 and concluded on10th April 2015.

MTCBC has examined the objectives and measures proposed within the RMBP and have indicated, within section 7.1 of this report, details of the measures within the MTCBC FRMP which link with the measures proposed within the RBMP. See clause 5.3.5 below for details.

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

Link to RBMP

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

### 5.3.2 Co-ordination with the Severn River Basin Flood Risk Management Plan

The draft Severn River Basin Flood Risk Management Plan, prepared jointly by the Environment Agency and Natural Resources Wales as a requirement of The Flood Risk Regulations 2009, was published on the NRW website on 10 October 2014.

As part of the development on the RBFRMP a consultation process was carried out by NRW and EA. The consultation process commenced on 10th October 2014 and concluded on 31st January 2015. MTCBC responded to the consultation by completing and returning the questionnaire which came as part of the consultation.

In addition, MTCBC have examined the objectives and measures proposed within the RBFRMP relating specifically to MTCBC, and have indicated within section 7.1 of this report, details of the measures within the MTCBC FRMP which link with the measures proposed within the RBFRMP. See clause 5.3.5 below for details.

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

Link to RBFRMP

http://naturalresourceswales.gov.uk/about-us/Consultations/our-own-consultations/?lang=en

### 5.3.3 Links between MTCBC FRMP measures and Severn River Basin Management Plan and Flood Risk Management Plan

#### 5.3.3.1 Borough wide measures

1 MT – Whole Borough – MBC M01
Measure Name
Set up Flood Forum,
Raise flood awareness within the community,
Engage with community to establish community flood plan, Engage with house holders to establish personal flood plans.

**This measure links with:**

**The measure in the Severn River Basin District Flood Risk Management Plan – Table 1 – Catchment delivery plan**
**Raise flood awareness within the community**
**M4 - Preparedness**

2 MT – Whole Borough – MBC M04
Measure Name
Derive hydrology for catchment,
Carry out inspection and survey of existing drainage system,
Build hydraulic model for existing intake and culvert,
Check design of existing drainage system,
Design of flood alleviation scheme, where necessary

**This measure links with:**

**The measure in the Severn River Basin District Flood Risk Management Plan – Table 1 – Catchment delivery plan**
**Undertake initial assessment and feasibility work for reducing flood risk.**
**M2 - Prevention**

3 MT – Whole Borough – MBC M05
Measure Name
Carryout investigation of sources of accumulations of surface water,
Investigate drainage paths to and from the area of flood risk,
Investigate alternative proposals for the reduction of flood risk

**This measure links with:**

**The measure in the Severn River Basin District Flood Risk Management Plan – Table 1 – Catchment delivery plan**
**Undertake initial assessment and feasibility work for reducing flood risk.**
**M2 - Prevention**

#### 5.3.3.2 Measures taken from MTCBC Strategy

1 Land Management – LFRMS – Clause 6.15.1

**This measure links with:**

**The River Basin Management Plan for the Severn River Basin District – Table 9 Physical modifications - Measure 6 – Vegetation management**

**and**

**Table 14 Manage pollution from rural areas – Measure 3 – Sustainable woodland and forestry management.**

2 Environmental Enhancements – LFRMS – Clause 6.15.5

**This measure links with:**

**The River Basin Management Plan for the Severn River Basin District – Table 13 – Manage invasive non-native species – Measure 2 – Mitigation, control and eradication (to reduce extent)**

3 Channel Construction and Maintenance – LFRMS Clause 6.16.3

**This measure links with:**

**The River Basin Management Plan for the Severn River Basin District – Table 9 Physical modifications - Measure 3 – Improvement to channel/bed and/or banks.**

**and**

**Table 12 – Improve the natural flow and level of water – Measure 2 – Improvement to condition of channel/bed and or banks**

4 Culvert Construction and Maintenance – LFRMS Clause 6.16.4

**This measure links with**:

**The River Basin Management Plan for the Severn River Basin District – Table 9 Physical modifications - Measure 2 – Removal or modification of engineering structure**

5 Investigation – LFRMS Clause 6.17.1

**This measure links with:**

**The River Basin Management Plan for the Severn River Basin District – Table 9 - Physical Modifications - Measure 10 – Complete first cycle investigations**

# 6 MTCBC Flood Risk Management Objectives

## 6.1 Summary of Welsh Government National FCERM Strategy

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

As part of this process a list of objectives were agreed and the relevant section of the Strategy is given below.

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

The four overarching objectives are:

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

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

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

4 Prioritising investment in the most at risk communities.

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

**Flood Risk Management Objectives**

1 **Social:**

Reduce distress (No. of people exposed to flooding).
Reduce community disruption (No. of residential and commercial properties).
Reduce risk to life (No. of people exposed to depth x velocity of flow).
Reduce disruption to critical infrastructure (or maintain operation of).

2 **Economic:**

Reduce economic damage (e.g. Annual Average Damages AAD).
Reduce cost of management (note: a risk management outcome for use in appraisal).

3 **Environmental:**

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

## 6.2 MTCBC Objectives from Local Strategy

6.2.1 In considering the high level objective for the management of local flood risk within Merthyr Tydfil County Borough Council four options were considered, as listed below:-

**High Level Strategy Options**

**1 Do Nothing**
Potentially there would be greater social risk together with an increasing economic and environmental damage as existing flood risk management structures deteriorate and the effects of climate change occur.

**2 Maintain Flood Risk Management at Current Levels**
Existing flood defences would be maintained at their current standards but as a result of climate change the flood risk would be increased.

**3 Maintain**
Maintain existing structures to prevent deterioration and keep pace with climate change so that there is no net increase in flood risk. Existing flood risk management infrastructure will need to be improved over time and all new development will need to take climate change into account.

**4 Reduce Flood Risk**
Take action to reduce social, economic and environmental impact due to flooding.

6.2.2 Clause 3.3.4 of the Local Flood Risk Management Strategies guidance document produced by the WG, advised that high level strategic objectives should be developed around the reduction of potential adverse consequences of flooding for

1 human health
2 the environment
3 cultural heritage
4 economic activity

and if considered appropriate on local community facilities. MTCBC has adopted this approach to ensure that the objectives of their Local Strategy are consistent with those required under the Flood Risk Regulations 2009.

**In order to comply with these objectives and requirements of the National Strategy Merthyr Tydfil County Borough Council has set its high level strategy as follows:**

**"Endeavour to reduce Flood Risk in all of the areas identified as being subject to significant flood risk".**

**This high level objective is also the focus for the FRMP. It has been used to determining what measures should be included for implementation over the first 6 year cycle so that significant progress will be made towards attainment of this objective.**

6.2.3 The Welsh Government Guidance further stated that when developing Local Strategies, LLFAs may wish to consider both high level strategic objectives and more detailed objectives.

In considering high level and detailed objectives MTCBC, as the LLFA, has taken account of the requirements of the National Strategy and the strategic aims and objectives provided within the National Strategy have been translated into meaningful objectives for the local area of Merthyr Borough.

## 6.3 MTCBC Detailed Objectives

Merthyr Tydfil County Borough Council has set the following detailed objectives as part of the Local Flood Risk Management Strategy. These objectives are Specific, Measurable, Achievable, Reasonable and Time Constrained.

All objectives will be implemented using the most up to date and relevant information available.

**All the detailed objectives listed below were developed for the LFRMS and no amendments or additions have been made to those included in the Strategy. The objectives have been used to determine which measures should be implemented within this FRMP in order make significant progress towards achieving the MTCBC high level objective.**

### 6.3.1 Overarching Objective 1

**Reducing the impacts on individuals, communities businesses and the environment;**

1 Reduce distress by reducing the number of people exposed to the risk of flooding.

2 Reduce community disruption by reducing the number of residential and commercial properties affected by the risk of flooding.

3 Reduce risk to life by reducing the number of people exposed to risk of flooding of significant depth and velocity.

4 Reduce disruption to critical infrastructure or prepare plans to allow the operations to be maintained.

5 Protect and improve Sites of Special Scientific Interest (SSSIs) and Sites of Importance for Nature Conservation (SINCs).

6 Contribute to the delivery of Merthyr Tydfil Biodiversity Action Plan.

7 Minimise Damage to known Historic Assets.

### 6.3.2 Overarching Objective 2

**Raising awareness of and engaging people in the response to flood**

8 Provide systems to give early warning of potential flooding to individuals and communities.

9 Provide efficient systems for the management and maintenance of surface water assets.

10 Reduce economic damage.

11 Endeavour to reduce cost of management.

### 6.3.3 Overarching Objective 3

**Providing an effective and sustained response to flood events**

12 Improve naturalness including the creation/restoration/protection of natural channels and water bodies with minimal modifications.

13 Protect and where possible Improve water quality.

14 Provide Flood Risk Management Plans for each area subject to flood risk.

15 Ensure that measures are sustainable.

16 Ensure that MTCBC works in partnership with all other Risk Partners and works collaboratively with adjacent Authorities.

### 6.3.4 Overarching Objective 4 Prioritising investment in the most at risk communities.

17 Ensure that investment decisions for the implementation of flood risk management schemes are made on a consistent, defendable basis and are subject to cost benefit analysis.

## 6.4 Summary of the Process for the Selection and Prioritising Measures to Achieve Objectives

6.4.1 When considering the measures to be used to achieve the objectives the Action Plan listed below has been developed to decide on the priority to be given to each measure.

In addition those measures which satisfy multiple objectives will be given greater priority than those which satisfy only one.

Measures will also be given higher priority if the environmental effects are likely to improve biodiversity and they provide social improvements such as access to the public.

In considering each measure MTCBC has focused on

1 **Prevention**
2 **Protection**
3 **Preparedness**
4 **Recovery and Review -** including Climate Adaption.

6.4.2 The Welsh Government has also given the following seven high level themes which have been considered by MTCBC for the implementation of the Strategy:

1 Development planning and adaptation.

2 Flood forecasting, warning and response.

3 Land, cultural and environmental management.

4 Asset management and maintenance.

5 Studies assessments and plans.

6 High level awareness and engagement (to increase individual and community resilience).

7 Monitoring (of the local flood risk issues).

6.4.3 MTCBC has identified a total of 39 detailed measures which will ensure the delivery of the detailed objectives.

The measures have been identified within four categories namely:

1 Prevention of flooding.

2 Preparedness for flooding.

3 Protection against flooding.

4 Recovery and Review.

Each measure has been given a time scale for implementation as follows:

1 Short term 0 – 20 years.

2 Medium term 20 – 50 years.

3 Long term 50 – 100 years.

### 6.4.4 MTCBC – STRATEGY ACTION PLAN

1 Inform and ensure residents are aware of the level of risk they are facing.

2 Provide an early warning system to allow residents time to move to a safe area.

3 Encourage the residents to produce their own Flood Plan to reduce danger to themselves and damage to their property and its contents.

4 Provide systems to prevent floodwater entering properties at risk.

5 Endeavour to reduce flood risk by reducing the volume of water being generated by the upstream catchment.

6 Introduce new flood relief systems such as culverts or drainage ditches.

7 Build new flood defences or raise the level of existing flood defences.

**MERTHYR TYDFIL COUNTY BOROUGH COUNCIL**

**LOCAL FLOOD RISK MANAGEMENT STRATEGY OVERARCHING OBJECTIVES AND DETAILED OBJECTIVES**

| | Objective | Social | Economic | Environ-mental |
|---|---|---|---|---|
| | **Overarching Objective 1**<br><br>**Reducing the impacts on individuals, communities businesses and the environment.** | | | |
| 1 | Reduce distress by reducing the number of people exposed to the risk of flooding. | √ | √ | |
| 2 | Reduce community disruption by reducing the number of residential and commercial properties affected by the risk of flooding. | √ | √ | |
| 3 | Reduce risk to life by reducing the number of people exposed to risk of flooding of significant depth and velocity. | √ | √ | |
| 4 | Reduce disruption to critical infrastructure or prepare plans to allow the operations to be maintained. | √ | √ | |
| 5 | Protect and improve Sites of Special Scientific Interest (SSSIs) and Sites of Importance for Nature Conservation (SINCs). | √ | √ | √ |
| 6 | Contribute to the delivery of Merthyr Tydfil Biodiversity Action Plan. | √ | | √ |
| 7 | Minimise Damage to known Historic Assets. | √ | | √ |
| | | | | |
| | **Overarching Objective 2**<br><br>**Raising awareness of and engaging people in the response to flood.** | | | |
| 8 | Provide systems to give early warning of potential flooding to individuals and communities. | √ | √ | |
| 9 | Provide efficient systems for the management and maintenance of surface water assets. | √ | √ | |
| 10 | Reduce economic damage. | √ | √ | |
| 11 | Endeavour to reduce cost of management. | | √ | |

## LOCAL FLOOD RISK MANAGEMENT STRATEGY OVERARCHING OBJECTIVES AND DETAILED OBJECTIVES

| | Objective | Social | Economic | Environ-mental |
|---|---|---|---|---|
| | **Overarching Objective 3**<br><br>**Providing an effective and sustained response to flood events.** | | | |
| 12 | Improve naturalness including the creation/ restoration/protection of natural channels and water bodies with minimal modifications. | √ | √ | √ |
| 13 | Protect and Improve water quality. | √ | | √ |
| 14 | Provide Flood Risk Management Plans for each area subject to flood risk. | √ | √ | √ |
| 15 | Ensure that measures are sustainable. | | √ | √ |
| 16 | Ensure that MTCBC works in partnership with all other Risk Partners and works collaboratively with adjacent Authorities. | √ | √ | |
| | | | | |
| | **Overarching Objective 4**<br><br>**Prioritising investment in the most at risk communities.** | | | |
| 17 | Ensure that investment decisions for the implementation of flood risk management schemes are made on a consistent, defendable basis and are subject to cost benefit analysis. | | √ | |

# 7 How we will manage flood risk at a local level

## 7.1 MTCBC – Flood Risk Area

### 7.1.1 Overview

Merthyr Tydfil County Borough Council (MTCBC) is a Unitary Authority situated within the valleys of South East Wales. It has a population of approximately 61,500 and an area of 11,189 hectares. The Borough is a mix of rural and urban communities generally built on the steeply sloping hillsides or within the valley basin.

Surface water from the upper reaches of the catchment drains into the Taf Fawr in the west and the Taf Fechan to the east. The confluence of the two rivers is at Cefn Coed-y-cymmer and below that point the river is referred to as the Afon Taf.

The south eastern sector of the catchment drains into the Bargod Taf which joins the Afon Taf at Quakers Yard.

The Borough lies within the upper reaches of the River Taf Catchment and is contained within the Severn River Basin.

At a communities scale the borough is drained through numerous ordinary watercourses and culverts. The surface water from the watercourses enters the drainage system through a large number of intakes, some with grids and some without.

These features have been recorded in our Geo Environ Database for drainage structures and are also shown on our Geographic Information System (GIS) package. Other culverts are likely to be found as investigations continue.

Where the drainage system, including the culverts carrying the surface water, is deemed to be significant the intakes have also been designated as significant. These intakes are inspected on a regular basis and when appropriate the intakes are cleared of debris and vegetation to prevent blockages leading to flooding. Significant intakes have been listed in tables for each community area below.

Some of the significant intakes have also been classified as critical. These are the intakes most likely to block and cause flooding during an intense storm. If intense rainfall has been forecast these intakes are inspected as priority, cleaned where necessary, and inspections continue during and immediately after significant rainfall. A list of these 29 intakes classified as being critical is given in the table below. The table gives the name and location of the watercourse and whether or not it is within the Flood Risk Area.

From our experience at MTCBC, over a period of 25 years, the most likely source of flooding is from blocked grids at intakes to culverts and therefore there is considerable emphasis in this FRMP on this aspect of flood risk from surface water.

| | Community Area | Location | Co-ordinates | In FRA |
|---|---|---|---|---|
| 1 | Abercanaid | South of Anthony Grove - Canal Side to river | 305516, 203894 | Yes |
| 2 | Abercanaid | South corner of Quay Row | 305228, 204269 | Yes |
| 3 | Abercanaid | North corner of Quay Row | 305218, 204319 | Yes |
| 4 | Abercanaid | South corner of Quay Row to River | 305220, 204237 | Yes |
| 5 | Abercanaid | South of Anthony Grove - Canal Side to river | 305517, 203893 | Yes |
| 6 | Abercanaid | Access to Pitwood House - West of Dragon Industrial Estate | 305148, 204526 | Yes |
| 7 | Abercanaid | North of 11 Llwyn-yr-Eos to River | 305560, 203955 | Yes |
| 8 | Abercanaid | South corner of Quay Row | 305233, 204253 | Yes |
| 9 | Abercanaid | Pitwood House to Existing Culvert West of Multi-storey Car Park | 305151, 204526 | Yes |
| 10 | Bedlinog | North of Bedw Road | 308995, 201502 | No |
| 11 | Heolgerrig | Winchfawr Road - opposite 11 Worcester Close to 6 Exeter Close | 303003, 206025 | Yes |
| 12 | Heolgerrig | Shirley Gardens - Entrance | 303189, 206040 | Yes |
| 13 | Heolgerrig | Six Bells - rear opposite 51 | 303383, 206218 | Yes |
| 14 | Heolgerrig | Six Bells - rear near Hollymount | 303293, 206179 | Yes |
| 15 | Heolgerrig | 17 St David Close - rear | 303227, 206233 | Yes |
| 16 | Heolgerrig | Shirley Gardens - Entrance | 303216, 205999 | Yes |
| 17 | Heolgerrig | Winch Fawr Road | 302965, 206031 | Yes |
| 18 | Merthyr Tydfil (North) | Rear Alexandra Road to rear Garth Villas | 305113, 207060 | Yes |
| 19 | Pentrebach | Rear of St James Close, Greenfield Gardens to Outfall Plymouth Feeder | 306302, 204108 | Yes |
| 20 | Pentrebach | East of 12 Duffryn Fawr | 306730, 203547 | Yes |
| 21 | Pentrebach | West of 5 Rhydfach | 306523, 203382 | Yes |
| 22 | Pentrebach | East of 12 Duffryn Fawr - Overflow | 306732, 203548 | Yes |
| 23 | Pentrebach | Cricket Club, Dyffryn Road, Greenfield School, Outfall to Plymouth | 306284, 203919 | Yes |
| 24 | Treharris | Dan-y-Twyn Post Office | 309765, 196443 | No |
| 25 | Troedyrhiw | Corner - No 6 Bryncoed Cottages | 307498, 201785 | Yes |
| 26 | Troedyrhiw | Dynevor Arms | 306734, 202390 | Yes |
| 27 | Troedyrhiw | Dynevor Arms - Canal Bank | 306656, 202412 | Yes |
| 28 | Troedyrhiw | Chapel Street | 307317, 202346 | Yes |
| 29 | Troedyrhiw | Beech Grove | 307416, 201786 | Yes |

**Table 4: MTCBC - Critical Intakes**

### 7.1.2 Conclusions from the Flood Risk Maps

The Flood Risk Map for MTCBC indicate that the main cause of flood risk for the area relates to ordinary watercourses and the intakes to existing surface water culverts. Generally this correlates with the experience gained by the drainage team over the past 25 years however, it is believed that the risk is overstated as the full capacity of the existing culverts was not included in the modelling process when the Flood Risk Maps were prepared.

| COUNTS FOR FLOOD RISK AREA | | | | |
|---|---|---|---|---|
| **Risk to People and Property** | **Total in defined area** | **Risk Counts** | | |
| | | **LOW** | **MED** | **HIGH** |
| | | Residents in areas at risk of flooding depth >0.0m | | |
| People (n) (multiplier 2.35) | 50,308 | 4,485 | 1,083 | 1,053 |
| | | Residential Properties at risk of internal flooding depth >0.2m | | |
| Residential Properties (n) | 21,407 | 947 | 246 | 263 |
| Services (n) | 64 | 15 | 1 | 2 |
| **Risk to Economic Activity** | | | | |
| Non-Residential Properties (n) | 3,519 | 454 | 153 | 94 |
| Airports (n) | 0 | 0 | 0 | 0 |
| Primary/Trunk Roads (km) | 42 | 10.1 | 2.9 | 4.2 |
| Main Line Railways (km) | 8 | 0.31 | 0.14 | 0.11 |
| Agricultural Land – Grades 1, 2 and 3 (ha) | 0 | 0 | 0 | 0 |
| **Risk to Natural and Historic Environment** | | | | |
| Bathing Waters (n) | 0 | 0 | 0 | 0 |
| Environmental Permitting Regulations (EPR) Installations (n) | 2 | 1 | 0 | 0 |
| Special Areas of Conservation (SAC) (ha) | 0 | 0 | 0 | 0 |
| Special Protection Areas (SPA) (ha) | 0 | 0 | 0 | 0 |
| Ramsar Sites (ha) | 0 | 0 | 0 | 0 |
| World Heritage Sites (ha) | 0 | 0 | 0 | 0 |
| Sites of Special Scientific Interest (SSSI) (ha) | 228 | 13.0 | 3.1 | 7.1 |
| Parks and Gardens (ha) | 176 | 5.9 | 1.2 | 2.1 |
| Scheduled Ancient Monuments (ha) | 40 | 1.00 | 0.23 | 0.44 |
| Listed Buildings (n) | 203 | 18 | 4 | 9 |
| Licensed Abstractions (LA) (n) | 6 | 2 | 0 | 1 |
| Sites of Interest for Nature Conservation (SINC) (ha) | 1,906 | 64 | 21 | 49 |

The counts representing flood risk from surface water in MTCBC may be overstated as they also include properties at risk from river flooding.

**Table 5: Flood Risk Area - Counts for Various Risks**

### 7.1.3 Measures and objectives to mitigate flood risk Covering the whole Borough

**All the measures listed below, for inclusion in this FRMP, were developed for the Flood Risk Management Strategy (FRMS). Some extra information has been added to give clarity for the implementation of the measure at specific locations.**

| | |
|---|---|
| **Measure Code** | **MT – Whole Borough – MBC M01**<br><br>**This measure links with the measure in the Severn River Basin District Flood Risk Management Plan - Raise flood awareness within the community.** |
| **Measure Name** | Set up Flood Forum where appropriate and where there is local demand.<br>Look at innovative ways to raise awareness and community resilience in the most at risk areas.<br>Engage with community to establish community flood plan.<br>Engage with householders to establish personal flood plans. |
| **Measure Type** | M43 - Preparedness; Measures to establish the public awareness or preparedness for flood events. |
| **Measure Location** | Any area within MTCBC where there is a significant risk including:-<br>1 FF1 – Covering Bedlinog, Treharris and Trelewis. – outside flood risk area.<br>2 FF2 – Covering Merthyr Tydfil (North) and Merthyr Tydfil (South).<br>3 FF3 - Covering Abercanaid, Aberfan, Merthyr Vale, Pentrebach and Troedyrhiw. |
| **Responsible Authority** | MTCBC |
| **Objectives** | 1, 2, 3, 8 |
| **Time Scale** | 2016 - 2021 |
| **Progress of Implementation** | NS – Not started. |
| **Cost** | Cost of MTCBC staff time to set up the forum and to hold quarterly meetings.<br>The cost of implementation has been put against the measures within the community area plans. |
| **Effects on Risk** | By informing residents of the flood risk to their homes it will make residents more aware and enable them to be more prepared.<br>It is not possible to give a precise count of the reduction of risk for this measure. |

| | |
|---|---|
| **Measure Code** | **MT – Whole Borough – MBC M02** |
| **Measure Name** | Investigate feasibility for new flood warning service.<br>Develop new flood warning service. |
| **Measure Type** | M41 - Preparedness; Flood forecasting and warning; Measures to establish or enhance a flood forecasting or warning system. |
| **Measure Location** | Any area within MTCBC where there is a significant risk. |
| **Responsible Authority** | MTCBC |
| **Objectives** | 8 |
| **Time Scale** | 2016 - 2021 |
| **Progress of Implementation** | NS – Not started. |
| **Cost** | Cost of MTCBC staff time to investigate and set up the early warning system.<br>The cost of implementation has been put against the measures within the community area plans. |
| **Effects on Risk** | By informing residents of the flood risk to their homes it will allow individuals to be more aware and prepared.<br>It is not possible to give a precise count of the reduction of risk for this measure. |

| **Measure Code** | **MT – Whole Borough – MBC M03** |
|---|---|
| **Measure Name** | Survey work identified within the LFRM Strategy as listed below:<br>1 Where land containing SSSIs or SINCs is identified as being subject to flood risk surveys and reports will be carried out to identify the potential damaging effects of flooding and what measures could be implemented to reduce the flood risk.<br>2 Survey of water bodies with area greater than 2,000 $m^2$.<br>3 Additional information required for the database and GIS layers – regarding existing culverts and catchment.<br>**This area of investigation is now covered by the individual measures for each Community Area.**<br>4 Identify and survey all features, which act as flood defence structures.<br>5 Survey all channels, which are considered to be significant in terms of flood risk. The surveys will identify details of the construction materials, size and shape of the channel and its condition.<br>6 Survey all culverts, which are considered to be significant in terms of flood risk. The surveys will identify details of the construction materials, size and shape of the culvert and its condition.<br>7 Further survey work and site investigations will be carried out in order to improve the accuracy and completeness of the information available regarding contaminated land within areas subject to significant flood risk.<br>8 Surveys will be carried out to establish what measures will be required in order to provide additional resistance to flood water to Historic Assets including Scheduled Ancient Monuments and Historic Listed Buildings..<br>9 A survey will be carried out to identify where leachate is being discharged from refuse tips both current and historic and from cemeteries. The nature of the leachate will be established and its affect on the quality of surface water.<br>10 A survey will be carried out of all ground water discharges from all mine workings to establish the location and quality of the water.<br>11 A survey will be implemented in order to establish a list of the defences within the borough, details of their construction and condition.<br>12 Topographical surveys will be carried out where required to allow construction schemes to be designed as part of the Flood Risk Management Plans. |
| ` | M44 - Preparedness; Other preparedness; Survey work as listed in the MTCBC Strategy. |
| **Measure Location** | Whole Borough |
| **Responsible Authority** | MTCBC |
| **Objectives** | 9 |
| **Time Scale** | 2016 - 2021 |
| **Progress of Implementation** | NS – Not started |
| **Cost** | Cost of MTCBC staff time to carry out surveys as listed above. Estimate cost £100,000 to cover whole Borough. |
| **Effects on Risk** | The gathering of the information will not reduce flood risk but will enable measures to be designed which will reduce flood risk and improve the quality of water bodies under the WFD. |

| | |
|---|---|
| **Measure Code** | **MT – Whole Borough – MBC M04**<br><br>**This measure links with the measure in the Severn River Basin District Flood Risk Management Plan - Undertake initial assessment and feasibility work for reducing flood risk.** |
| **Measure Name** | Derive hydrology for catchment.<br>Carry out inspection and survey of existing drainage system.<br>Build hydraulic model for existing intake and culvert.<br>Check design of existing drainage system.<br>Design of flood alleviation scheme, where necessary. |
| **Measure Type** | M24 - Prevention; Measure to enhance flood risk prevention including, flood risk modelling and assessment, flood vulnerability assessment and maintenance programmes. |
| **Measure Location** | All significant intakes and associated culverts as detailed in the measures for each community area. |
| **Responsible Authority** | MTCBC as LLFA and riparian owners. |
| **Objectives** | 1, 2, 3, 4 |
| **Time Scale** | 2016 – 2021 |
| **Progress of Implementation** | NS – Not started. |
| **Cost** | Cost of MTCBC staff time to carry out these investigations and for the use of specialist sub-contractors has been included in the measure within the individual community area. |
| **Effects on Risk** | The study itself will not reduce flood risk but will indicate if the risk has been over stated. Further measures may be identified as a result of the investigation which could reduce flood risk in the area.<br>The potential for risk reduction has been included with the measure for the individual community areas. |

| | |
|---|---|
| **Measure Code** | **MT – Whole Borough – MBC M05**<br><br>**This measure links with the measure in the Severn River Basin District Flood Risk Management Plan - Undertake initial assessment and feasibility work for reducing flood risk.** |
| **Measure Name** | Carryout investigation of sources of accumulations of surface water.<br>Investigate drainage paths to and from the area of flood risk.<br>Investigate alternative proposals for the reduction of flood risk. |
| **Measure Type** | M24 - Prevention; Measure to enhance flood risk prevention including, flood risk modelling and assessment, flood vulnerability assessment and maintenance programmes. |
| **Measure Location** | Locations are identified in the individual plan for Community Areas. |
| **Responsible Authority** | MTCBC as LLFA and land owners. |
| **Objectives** | 1, 2, 3, 4 |
| **Time Scale** | 2016 – 2021 |
| **Progress of Implementation** | NS – Not started. |
| **Cost** | Cost of MTCBC staff time to carry out these investigations and for the use of specialist sub-contractors has been included in the measure within the individual community area. |
| **Effects on Risk** | The study itself will not reduce flood risk but will indicate if the risk has been over stated. Further measures may be identified as a result of the investigation which could reduce flood risk in the area.<br>The potential for risk reduction has been included with the measure for the individual community areas. |

**Cefn Viaduct built in 1866 to take the Brecon and Merthyr Railway over the Afon Taf**

**Measures currently being used by MTCBC to manage Flood Risk.**

**These measures, covering the whole of MTCBC, were included in the LFRMS – for the full details of these measures see Appendix 2.**

MBC M06 Sustainable and Strategic Development Planning – LFRMS Clause 6.13.1
Code/Category/Type: M21 - Prevention: Avoidance; Measure to prevent the location of new or additional receptors in flood prone areas, such as land use planning policies or regulation
Objectives: 1, 2, 3, 4, 5, 6, 12, 13, 15
Time Scale: Ongoing.

MBC M07 Strategic Flood Risk Assessment (SFRA) / Strategic Flood Consequences Assessment (SFCA) – LFRMS Clause 6.13.2
Code/Category/Type: M21 - Prevention: Avoidance; Measure to prevent the location of new or additional receptors in flood prone areas, such as land use planning policies or regulation
Or
Code/Category/Type: M23 - Prevention; Reduction; Measures to adapt receptors to reduce the adverse consequences in the event of a flood actions or buildings, public networks, etc.
Objectives: 1, 2, 3, 4, 10
Time Scale: Ongoing.

MBC M08 Relocation – LFRMS Clause 6.13.4
Code/Category/Type: M22 - Prevention; Removal or relocation; Measure to remove receptors from flood prone areas, or to relocate receptors areas of lower
Objectives: 1, 2, 3, 4, 10, 11
Time Scale: Ongoing.

MBC M09 Sustainable Drainage – LFRMS Clause 6.13.6
Code/Category/Type: M34 - Protection; Surface water management; Measures involving physical interventions to reduce surface water flooding, typically , but not exclusively, in an urban environment, such as enhancing artificial drainage capacity or through sustainable drainage systems (SuDS).
Objectives: 1, 2, 3, 4, 12, 13, 15
Time Scale: Ongoing.

MBC M10 Flood Awareness – LFRMS – Clause 6.14.1
Code/Category/Type: M43 - Preparedness; Public awareness and preparedness; Measures to establish the public awareness or preparedness for flood events.
Objectives: 1, 2, 3, 4, 7, 8, 10, 11
Time Scale: Ongoing.

MBC M11 Flood Warning – LRMS – Clause 6.14.2
Code/Category/Type: M41 - Preparedness; Flood forecasting and warning; Measures to establish or enhance a flood forecasting or warning system
Objectives: 1, 2, 3, 4, 7, 8, 10, 11
Time Scale: Ongoing.

MBC M12 Flood Forecasting – LRMS – Clause 6.14.2
Code/Category/Type: M41 - Preparedness; Flood forecasting and warning; Measures to establish or enhance a flood forecasting or warning system
Objectives: 1, 2, 3, 4, 7, 8, 10, 11
Time Scale: Ongoing.

MBC M13 Emergency Response Plans - LRMS – Clause 6.14.4
Code/Category/Type: M42 - Preparedness; Emergency Event; Measures to establish or enhance flood event institutional emergency response planning.
Objectives: 1, 2, 3, 4, 7, 8, 10, 11
Time Scale: Ongoing.

MBC M14 Community Flood Plan - LRMS – Clause 6.14.5
Code/Category/Type: M42 - Preparedness; Emergency Event; Measures to establish or enhance flood event institutional emergency response planning.
Objectives: 1, 2, 3, 4, 7, 8, 10, 11
Time Scale: Ongoing

MBC M15 Land Management – LFRMS – Clause 6.15.1
**This measure links with the River Basin Management Plan for the Severn River Basin District – Table 9 Physical modifications - Measure 6 – Vegetation management.**
**and**
**Table 14 Manage pollution from rural areas – Measure 3 – Sustainable woodland and forestry management.**
Code/Category/Type: M31 - Protection; Natural flood management / runoff and catchment; Measures to reduce the flow into natural or artificial drainage

systems, such as overland flow interceptors and or storage, enhancement of infiltration, etc and including in-channel, flood plain works and the reforestation of banks, that restore natural systems to help slow flow and store water.
Objectives: 1, 2, 3, 4, 5, 6, 10, 11, 12, 13, 16
Time Scale: Ongoing.

MBC M16 Resilience – LFRMS – Clause – 6.15.2
Code/Category/Type: M23 - Prevention; Reduction; Measures to adapt receptors to reduce the adverse consequences in the event of a flood action on buildings, public networks, etc...
Objectives: 5, 6, 12
Time Scale: Ongoing.

MBC M17 Resistance – LFRMS – Clause – 6.15.3
Code/Category/Type: M23 - Prevention; Reduction; Measures to adapt receptors to reduce the adverse consequences in the event of a flood actions or buildings, public networks, etc...
Objectives: 5, 6, 12
Time Scale: Ongoing.

MBC M18 Restoration – LFRMS – Clause 6.15.4
Code/Category/Type: M52 - Recovery and Review; Environmental recovery; Clean up and restoration activities (with several sub topics as mould protection, well-water safety and securing hazardous material containers)
Objectives: 5, 6, 12, 13
Time Scale: Ongoing.

MBC M19 Environmental Enhancements – LFRMS – Clause 6.15.5
**This measure links with the River Basin Management Plan for the Severn River Basin District – Table 13 – Manage invasive non-native species – Measure 2 – Mitigation, control and eradication (to reduce extent).**
Code/Category/Type: M23: - Prevention; Reduction; Measures to adapt receptors to reduce the adverse consequences in the event of a flood actions or buildings, public networks, etc...
Objectives: 5, 6, 12, 13, 15
Time Scale: Ongoing.

MBC M20 System Asset Management - LFRMS Clause 6.16.1
Code/Category/Type: M44 - Preparedness; Other preparedness; Other measures to establish or enhance preparedness for flood events to reduce adverse consequences.
Objectives: 9, 11
Time Scale: Ongoing.

MBC M21 Defence/Structure Management – LFRMS Clause 6.16.2
Code/Category/Type: M32 - Protection; Water flow regulation; Measures involving physical intervention to regulate flows, such as construction modification or removal of water retaining structures (e.g. dams or other on-line storage areas or development of existing flow regulation rules and which have significant impact on the hydrological regime.
Objectives: 1, 2, 3, 4, 7, 9, 10, 11
Time Scale: Ongoing.

MBC M22 Channel Construction and Maintenance – LFRMS Clause 6.16.3
**This measure links with the River Basin Management Plan for the Severn River Basin District – Table 9 Physical modifications - Measure 3 – Improvement to channel/bed and/or banks.**
**And Table 12 – Improve the natural flow and level of water – Measure 2 – Improvement to condition of channel/bed and or banks.**
Code/Category/Type: M33 - Protection; Channel, Coastal and floodplain works; Measures involving physical interventions to freshwater channels, mountain streams estuaries coastal waters and flood prone areas of land, such as construction, modification or removal of structures or the alteration of channels, sediment dynamics management, dykes etc.
Objectives: 1, 2, 3, 4, 12
Time Scale: Ongoing.

MBC M23 Culvert Construction and Maintenance – LFRMS Clause 6.16.4
**This measure links with the River Basin Management Plan for the Severn River Basin District – Table 9 Physical modifications - Measure 2 – Removal or modification of engineering structure.**
Code/Category/Type: M33 - Protection; Channel, Coastal and floodplain works; Measures involving physical interventions to freshwater channels, mountain streams estuaries coastal waters and flood prone areas of land, such as construction, modification or removal of structures or the alteration of channels, sediment dynamics management, dykes etc.
Objectives: 1, 2, 3, 4, 10, 11, 15
Time Scale: Ongoing.

MBC M24 Investigation – LFRMS Clause 6.17.1
**This measure links with the River Basin Management Plan for the Severn River Basin District – Table 9 Physical modifications - Measure 10 – Complete first cycle investigations.**
Code/Category/Type: M44 - Preparedness; Other preparedness; Other measures to establish or enhance preparedness for flood events to reduce adverse consequences.
Objectives: 14
Time Scale: Ongoing.

MBC M25 Local Property-level Flood Mitigation – Resilience - LFRMS – Clause 6.17.4
Code/Category/Type: M44 - Preparedness; Other preparedness; Other measures to establish or enhance preparedness for flood events to reduce adverse consequences.
Objective: 10
Time Scale: Ongoing.

MBC M26 Local Property-level Flood Mitigation – Resistance – LFRMS – Clause 6.17.5
Code/Category/Type: M44 - Preparedness; Other preparedness; Other measures to establish or enhance preparedness for flood events to reduce adverse consequences.
Objectives: 1, 2, 3, 4, 10
Time Scale: Ongoing.

### 7.1.4 SEA and HRA

**All the detailed objectives and measures contained in this FRMP are the same as those contained within the Strategy and therefore the SEA, which was prepared for the Strategy, is still valid. It has not been considered necessary to review the SEA.**

**When preparing the Strategy the scoping for a full HRA concluded that no HRA was required and that remains the case for the FRMP.**

**No physical work will be constructed on site as part of this FRMP but the investigative work may highlight works which are necessary. Should that be the case a review of the SEA will be carried out on a site by site basis.**

**The SEA has been published on the MTCBC webpage together with this Flood Risk Management Plan, the spreadsheet of comments and responses, the Local Flood Risk Management Strategy and the Preliminary Flood Risk Assessment.**

**The link to the webpage is as follows:**

http://merthyr.gov.uk/resident/parking-roads-and-travel/flooding-and-drainage/flood-risk-management/

**Number of Measures in each Category**

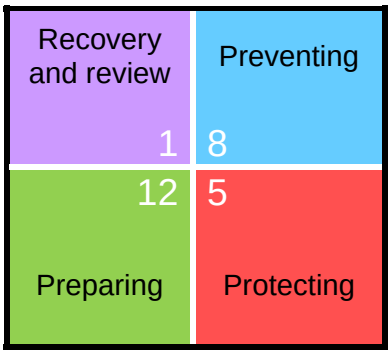


**Table 6: Total cost of measures for MTCBC Flood Risk Area**

| Community Area | Cost |
|---|---|
| Measure for Flood Risk Area MBC M03 - Survey work identified within the LFRMS | £100,000 |
| Abercanaid | £44,000 |
| Aberfan | £29,000 |
| Cefn Coed-y-cymmer | £19,000 |
| Dowlais | £34,000 |
| Gellideg | £27,000 |
| Heolgerrig | £32,000 |
| Merthyr Tydfil (North) | £33,000 |
| Merthyr Tydfil (South) | £34,000 |
| Merthyr Vale | £16,000 |
| Pentrebach | £19,000 |
| Troedyrhiw | £29,000 |
| **TOTAL** | **£416,000** |

**The costs shown in this table relates to the cost of implementing measures at current prices. (June 2015)**

**7.1.5 In order for the FRMP to be successful it is essential that significant additional funding be made available to MTCBC, on top of the normal funding arrangements from Welsh Government. Potential additional sources of funding are given below.**

Ring fenced funding has been received from Welsh Government for each of the financial years April 2010 to March 2015.

This funding has been used to prepare the PFRA, the LRFMS and this FRMP. Funding has also been used to develop a database and GIS system for the drainage assets and to carry out some implementations of measures identified.

It is anticipated that funding will also be provided by Welsh Government for the continued implementation of the responsibilities laid on LLFA under the Flood and Water Management Act and the Flood Risk Regulations.

**Options for further funding will also be investigated by MTCBC as listed below:-**

**7.1.5.1 Public Funding**

**Funding through the Community Infrastructure Levy**

The Community Infrastructure Levy came into force in April 2010 and provides Merthyr Tydfil County Borough Council with an alternative source of potential funding for flood defence schemes. It allows the borough to raise funds from new

development in their area in order to pay for the impact that the development has on local infrastructure

**Funding through the European Union**

European Union funding is available through the Interreg scheme.
As surface water management plans are created across the study area, options proposals from these reports will be used to inform future proposals to the ERDF.

### 7.1.5.2 Private funding

**Section 106 funding – Developer Contributions**

Section 106 of the Town and Country Planning Act 1990 allows a local planning authority, such as Merthyr Tydfil County Borough Council, to enter an agreement with a landowner or developer in association with the granting of planning permission.

**Water Company Funding**

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

**Local fundraising**

In addition to contributions from developers, another important funding mechanism may come from local fundraising from the local communities and businesses who stand to benefit from the proposed flood defence schemes.

### 7.1.5.3 Other sources of funding

In areas prone to flooding, where potential mitigation schemes are identified, Merthyr Tydfil County Borough Council will endeavour to liaise with the local Federation of Small Businesses (FSB) to assist in putting together funding to support projects. While the FSB will not have a significant budget, its support can be used to raise local business support.

### 7.1.5.4 Limitations on use of funding

This clause has identified options for additional funding, including funding through the Community Infrastructure Levy and Section 106/Planning Obligations. Whilst the inclusion of these potential sources of funding is supported by MTCBC, it should be noted that there are restrictions on their use.

In respect of CIL, funding should not be used to remedy existing deficiencies unless those deficiencies would be made more severe by new development. Where the former criteria is met, CIL can be used to increase the capacity of existing infrastructure or repair failing infrastructure.

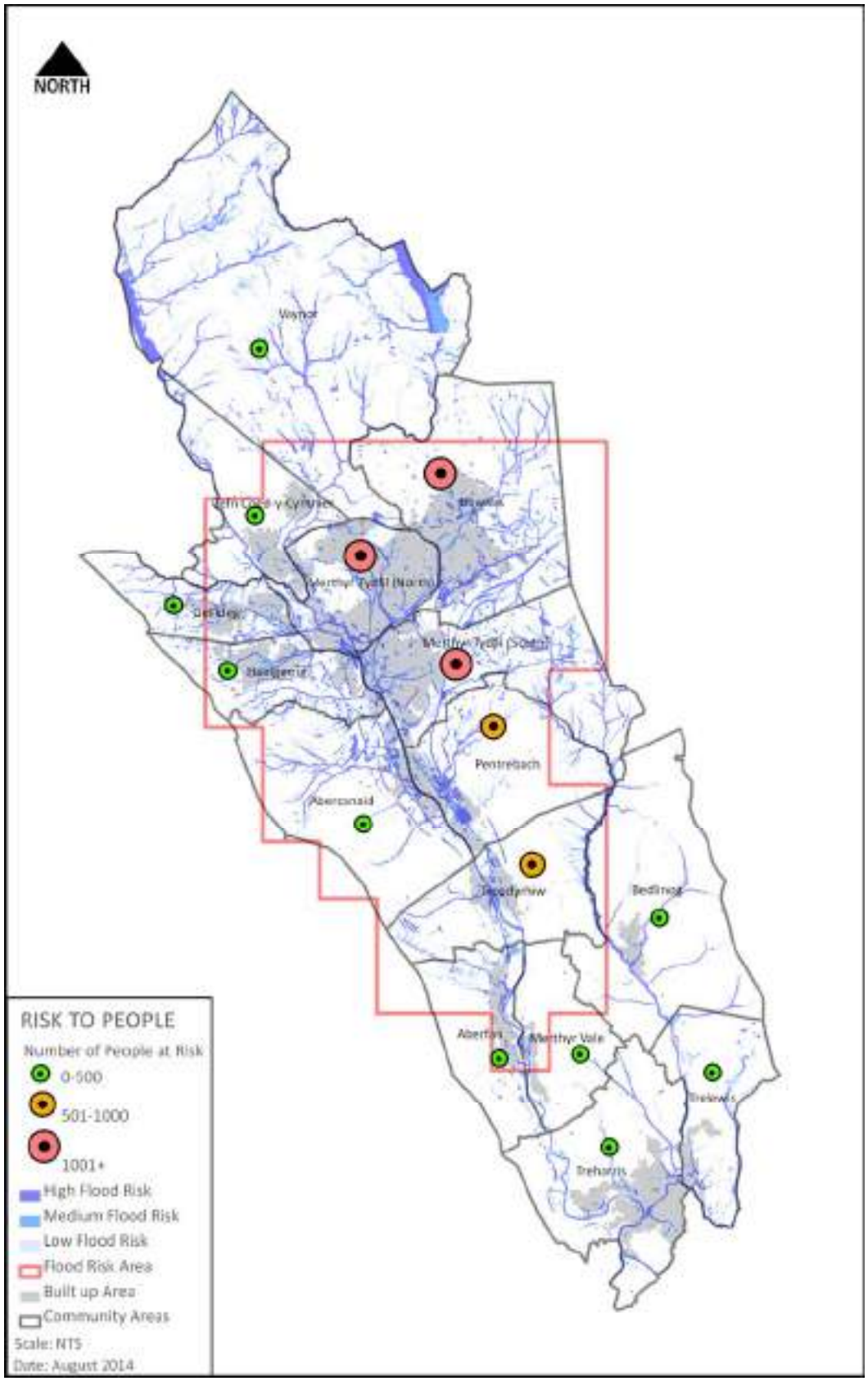
With regard to Section 106/Planning obligations, funding should only be used to mitigate the impact of a specific development. Planning obligations can only be secured where they meet the following tests: necessary to make the development acceptable in planning terms; directly related to the proposed development; and fairly and reasonably related in scale and kind to the development. There are also limits on the pooling of contributions from planning obligations.

#### 7.1.5.5 Failure to receive additional funding

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

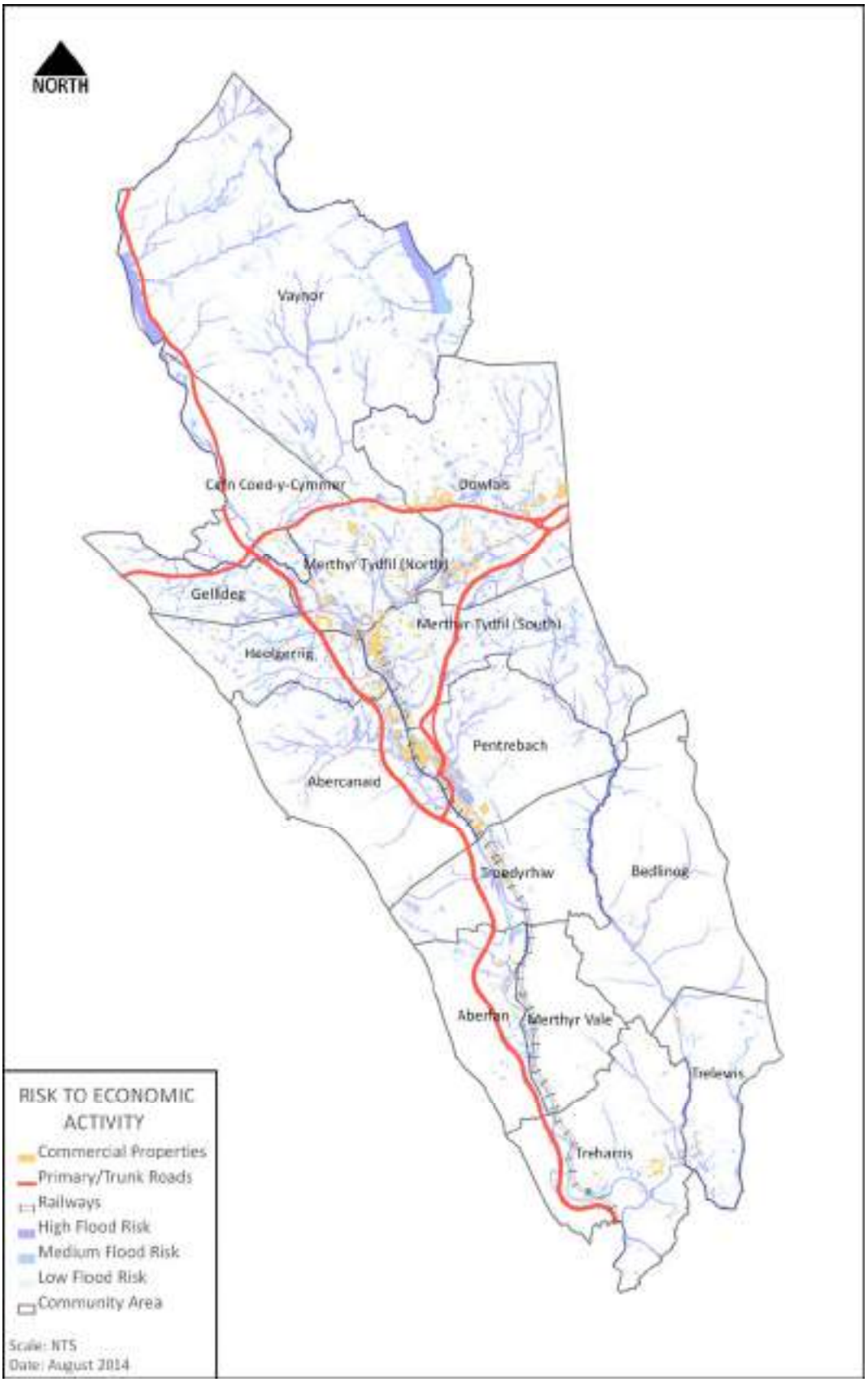
**7.1.6.1**

**Figure 7: MTCBC - Flood Risk Map – Risk to People**



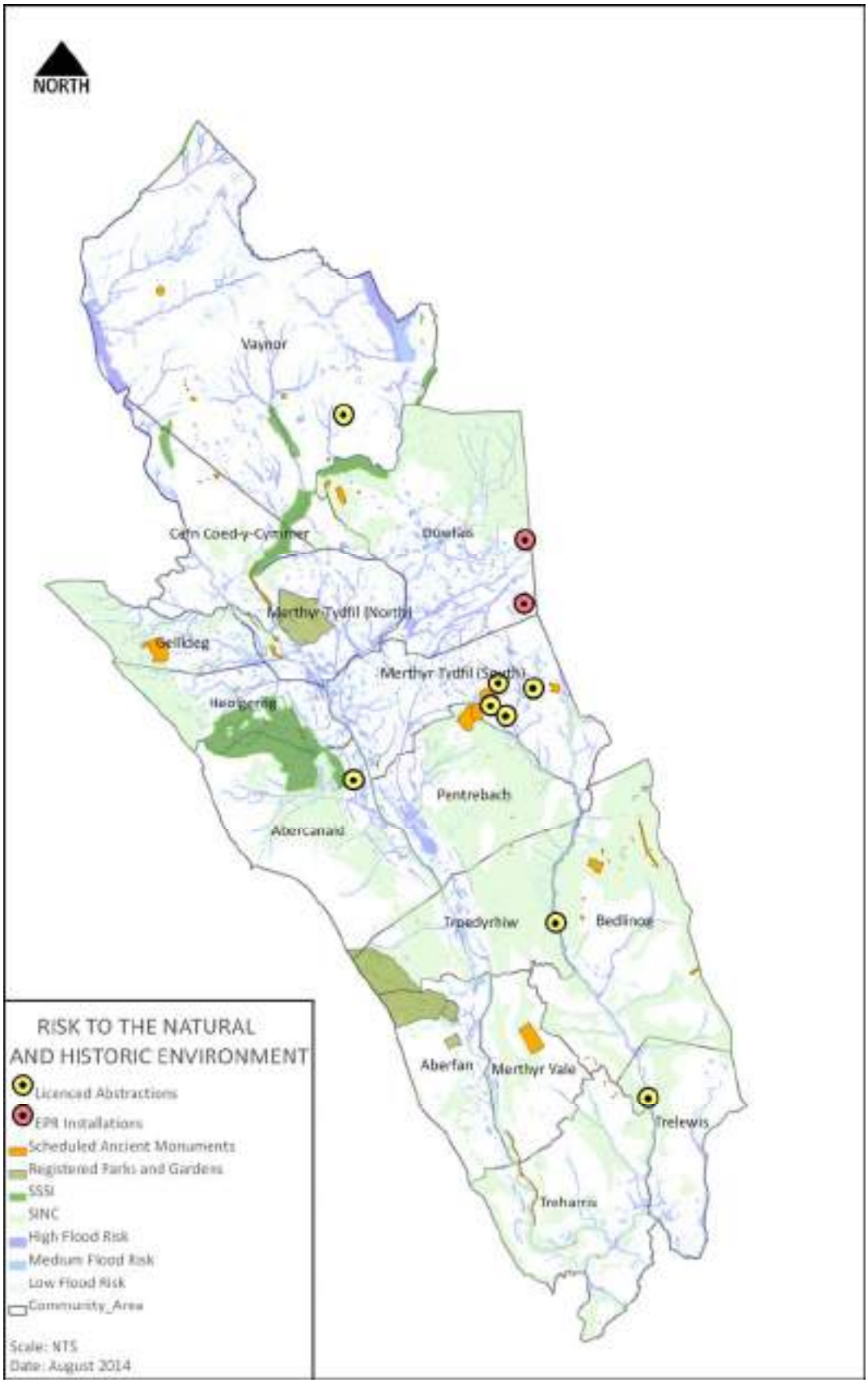
**7.1.6.2**

**Figure 8: MTCBC - Flood Risk Map – Risk to Economic Activity**



**7.1.6.3**

**Figure 9: MTCBC - Flood Risk Map – Risk to Natural and Historic Environment**



### 7.1.7 Links to documents referred to in this FRMP

Links to Emergency Planning (plans)
http://www.merthyr.gov.uk/english/adviceandbenefits/emergencies/pages/default.aspx

Link to the Local Development Plan
http://www.merthyr.gov.uk/english/environmentandplanning/planning/pages/localdevelopmentframework.aspx

Link to the Preliminary Flood Risk Assessment
http://merthyr.gov.uk/resident/parking-roads-and-travel/flooding-and-drainage/flood-risk-management/

Link to the Local Flood Risk Management Strategy
http://merthyr.gov.uk/resident/parking-roads-and-travel/flooding-and-drainage/flood-risk-management/

### 7.1.8 Joint schemes with other RMAs or stakeholders

Currently there are no joint schemes planned with other Risk Management Authorities or stakeholders**.**

## 7.2 Abercanaid Community Area

### 7.2.1 Overview

Abercanaid Community Area is situated in the central sector of MTCBC to the west of Merthyr Town. It covers an area of 858 hectares consisting mainly of hillside that slope steeply down from the west to east with the housing and commercial buildings concentrated in the valley floor on the western bank of the Afon Taf.

The hillside catchment is drained by the Nant Cannaid in the north, Nant Graig in the central region and other less significant and unnamed watercourses in the south. All of the watercourses discharge into the Afon Taf.

There are known to be 25 significant intakes in the area as listed below, nine of which are critical. These features have been recorded in our Geo Environ Database for drainage structures and are also shown on our Geographic Information System (GIS) package. Other culverts are likely to be found as investigations continue.

| | Location | Co-ordinates | Critical |
|---|---|---|---|
| 1 | West and north of Rhydycar Leisure Centre | 304736, 205151 | No |
| 2 | South corner of Quay Row to River | 305220, 204237 | Yes |
| 3 | Access to Pitwood House - West of Dragon Industrial Estate | 305148, 204526 | Yes |
| 4 | North of 11 Llwyn-yr-Eos to River | 305560, 203955 | Yes |
| 5 | Under A470 - 100m north of roundabout | 305952, 203089 | No |
| 6 | Under A470 - 300m north of roundabout | 305798, 203172 | No |
| 7 | Under A470 - 350m north of roundabout | 305745, 203213 | No |
| 8 | Under A470 - West of Newton Street | 305642, 203290 | No |
| 9 | South of Newton Street | 305892, 203407 | No |
| 10 | Under A470 - West of Newton Street | 305777, 203355 | No |
| 11 | Under A470 - West of Abercanaid Industrial Estate | 304975, 204818 | No |
| 12 | South of Anthony Grove - Canal Side to river | 305516, 203894 | Yes |
| 13 | South corner of Quay Row | 305228, 204269 | Yes |
| 14 | North corner of Quay Row | 305218, 204319 | Yes |
| 15 | Under A470 - South West of Anthony Grove | 305347, 203688 | No |
| 16 | South of Anthony Grove - Canal Side to river | 305517, 203893 | Yes |
| 17 | Under A470 - West of Lewis Square | 304990, 204292 | No |
| 18 | South corner of Quay Row | 305233, 204253 | Yes |
| 19 | South corner of Quay Row | 305229, 204276 | No |
| 20 | Pitwood House to Existing Culvert West of Multi-storey Car Park | 305151, 204526 | Yes |
| 21 | Under A470 - West of Newton Street | 305697, 203262 | No |
| 22 | Under A470 - West of Abercanaid Industrial Estate | 304996, 204641 | No |
| 23 | South of Anthony Grove - A470 to Canal Side | 305528, 203883 | No |
| 24 | Under A470 - south west of roundabout | 306199, 202990 | No |
| 25 | Under A470 - West of Abercanaid Industrial Estate | 304915, 204987 | No |

**Table 7: Abercanaid - Significant Intakes**

### 7.2.2 Conclusions from the Flood Risk Maps

The Flood Risk Map for Abercanaid indicate that the main cause of flood risk for the area relates to ordinary watercourses, the intakes to existing surface water culverts, accumulations of surface water and the Glamorganshire Canal Generally this correlates with the experience gained by the drainage team over the past 25 years however, it is believed that the risk is overstated as the full capacity of the existing culverts was not included in the modelling process when the Maps were prepared. Some risk may also be due to fluvial flooding from the Afon Taf.

| COUNTS FOR ABERCANAID COMMUNITY AREA | | | | |
|---|---|---|---|---|
| | **Total in defined area** | **Risk Counts** | | |
| | | **LOW** | **MED** | **HIGH** |
| **Risk to People and Property** | | Residents in areas at risk of flooding depth >0.0m | | |
| People (n) (multiplier 2.35) | 1,234 | 141 | 28 | 21 |
| | | Residential Properties at risk of internal flooding depth >0.2m | | |
| Residential Properties (n) | 525 | 12 | 2 | 1 |
| Services (n) | 4 | 1 | 0 | 0 |
| **Risk to Economic Activity** | | | | |
| Non-Residential Properties (n) | 140 | 18 | 9 | 6 |
| Airports (n) | 0 | 0 | 0 | 0 |
| Primary/Trunk Roads (km) | 7.4 | 1.4 | 0.19 | 0.22 |
| Main Line Railways (km) | 0 | 0 | 0 | 0 |
| Agricultural Land – Grades 1, 2 and 3 (ha) | 0 | 0 | 0 | 0 |
| **Risk to Natural and Historic Environment** | | | | |
| Bathing Waters (n) | 0 | 0 | 0 | 0 |
| Environmental Permitting Regulations (EPR) Installations (n) | 0 | 0 | 0 | 0 |
| Special Areas of Conservation (SAC) (ha) | 0 | 0 | 0 | 0 |
| Special Protection Areas (SPA) (ha) | 0 | 0 | 0 | 0 |
| Ramsar Sites (ha) | 0 | 0 | 0 | 0 |
| World Heritage Sites (ha) | 0 | 0 | 0 | 0 |
| Sites of Special Scientific Interest (SSSI) (ha) | 85 | 4.9 | 1.1 | 1.4 |
| Parks and Gardens (ha) | 2.6 | 0.05 | 0.01 | 0 |
| Scheduled Ancient Monuments (ha) | 0 | 0 | 0 | 0 |
| Listed Buildings (n) | 42 | 3 | 1 | 3 |
| Licensed Abstractions (LA) (n) | 2 | 1 | 0 | 1 |
| Sites of Interest for Nature Conservation (SINC) (ha) | 348 | 13.0 | 4.6 | 14.1 |

The counts representing flood risk from surface water in this area may be overstated as they include properties also at risk from river flooding.

**Table 8: Abercanaid - Counts for Various Risks**

### 7.2.3 Measures and objectives to mitigate flood risk

**Intake at Llwyn-yr-eos**

The main sources of flood risk in this area are listed below:-

AC01 Low level flood risk due to accumulations of surface water on the hillside to the west of the A470 trunk road. These do not appear to pose any risk of flooding to housing or commercial properties.
No measure is proposed.

AC02 Low to high level flood risk along the route of the old Glamorganshire canal. From the A4102 slip road off the A470 at Rhydycar to the A4060 slip road south of Abercanaid. Including factories south of the access road to Abercanaid and to west of the Afon Taf.
See measure MT M04
Category: M24 - Prevention
Objectives: 1, 2, 3, 4
Time Scale: 2016 - 2021
Cost: £5,000

AC03 Low to high level of flood risk affecting the factory units to the north of the access road feeding Abercanaid, immediately to the west of the Afon Taf and to the east of the Glamorganshire canal. Flood risk in this area is likely to be due to its proximity to the Afon Taf.
See measure MT M04
Category: M24 - Prevention
Objectives: 1, 2, 3, 4
Time Scale: 2016 - 2021
Cost: £5,000

AC04 Low to high level flood risk to factory units to the south and east of the access road feeding Abercanaid and immediately to the west of the Afon Taf. Flooding has occurred in this area on a number of occasions in the past mainly due to the Glamorganshire Canal overflowing from the intake at Pitwood House. A 600mm diameter relief culvert has been installed. Flood risk in this area is also likely due to its proximity to the Afon Taf.
See measure MT M04
Category: M24 - Prevention
Objectives: 1, 2, 3, 4
Time Scale: 2016 - 2021
Cost: £5,000

AC05 Low to high level flood risk is indicated at Anthony Grove immediately to the east of the A470 due to the potential flooding of Nant Graig.
See measure MT M04
Category: M24 - Prevention
Objectives: 1, 2, 3, 4
Time Scale: 2016 - 2021
Cost: £5,000

AC06 Low to high levels of flood risk is indicated at Llwyn-yr-Eos, Stanfield Close leading to Hopkins Close, River Row, Catherine Close, Canal Side and Nightingale Street, due to the potential flooding of the Nant Graig immediately to the west of its discharge into the Afon Taf. This section of culvert has been subject to flooding in the past particularly relating to the intake at the south eastern corner of Anthony Grove and the intake at Llwyn-yr-Eos.
See measure MBC M04.
Category: M24 – Prevention
Objectives: 1, 2, 3, 4
Time Scale: 2016 - 2021
Cost: £5,000

AC07 Low to high level of flood risk affecting housing around Lewis Square and Glyndyrus Close due to the potential of flooding of Nant Canaid. Flooding in this area has occurred in the past due to the inadequacy of the intake.
See measure MBC M04.
Category: M24 – Prevention
Objectives: 1, 2, 3, 4
Time Scale: 2016 - 2021
Cost: £5,000

AC08 Low to high level of flood risk affecting Quay Row due to the potential of flooding from the Glamorganshire Canal. Flooding in this area has occurred in the past due to the inadequacy of the intakes and a further intake has been added.
See measure MBC M04.
Category: M24 – Prevention
Objectives: 1, 2, 3, 4
Time Scale: 2016 - 2021
Cost: £5,000

AC09 Low to high level flood risk at Abernant-y-Gethin due to failure of intake and culvert to south of dismantled railway.
See measure MBC M04.
Category: M24 – Prevention
Objectives: 1, 2, 3, 4
Time Scale: 2016 – 2021
Cost: £5,000

AC10 Flood Forum - See measure MBC M01.
Category: M43 - Preparedness
Objectives: 1, 2, 3, 4, 10
Time Scale: 2016 – 2021
Cost: £2,000

AC11 Flood Warning - See measure MBC M02.
Category: M41 - Preparedness
Objectives: 8
Time Scale: 2016 – 2021
Cost: £2,000

**See also measures for whole borough as detailed in 7.1.3 above**

**Total cost of measures for Abercanaid Community Area £44,000**

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

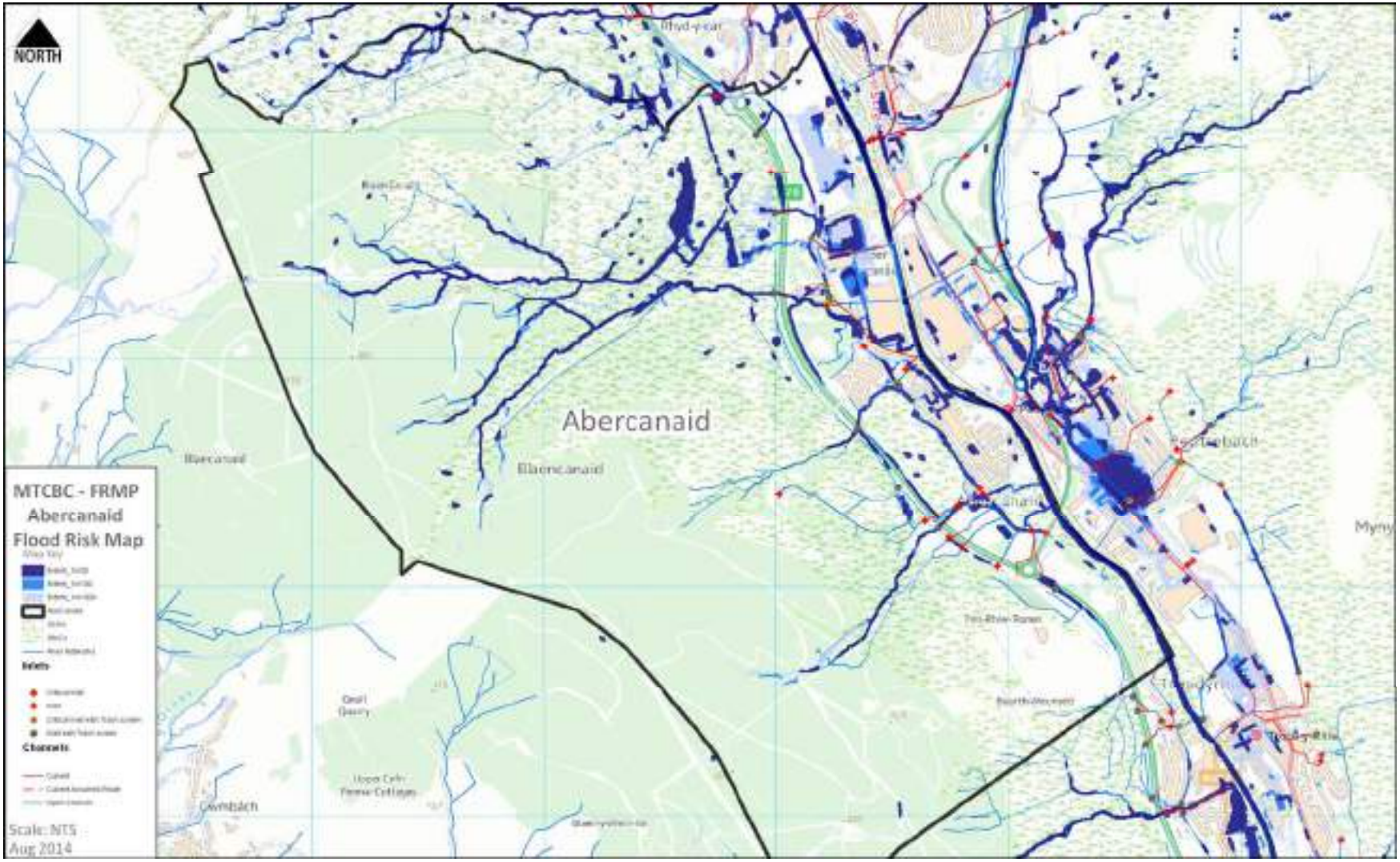
**Number of Measures in each Category**


| | ABERCANAID COMMUNITY AREA<br>Properties in areas at risk of flooding depth > 0.0m | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | LOW | | | MEDIUM | | | HIGH | | |
| Measure Code | RES | NON-RES | SER | RES | NON-RES | SER | RES | NON-RES | SER |
| AC01 | No counts required | | | | | | | | |
| AC02 | No counts required | | | | | | | | |
| AC03 | 0 | 5 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| AC04 | 0 | 5 | 0 | 0 | 9 | 0 | 0 | 1 | 0 |
| AC05 | 9 | 3 | 0 | 2 | 0 | 0 | 5 | 6 | 0 |
| AC06 | 32 | 2 | 0 | 9 | 0 | 0 | 31 | 0 | 0 |
| AC07 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| AC08 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| AC09 | 2 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| TOTAL | 44 | 17 | 0 | 12 | 9 | 0 | 40 | 7 | 0 |

**Table 9: Abercanaid - Potential Reduction in Flood Risk for Each Measure**

**7.2.4**

**Figure 10: Abercanaid - Flood Risk Map**



## 7.3 Aberfan Community Area

### 7.3.1 Overview

Aberfan Community Area is situated in the south western sector of MTCBC. It covers an area of 439 hectares consisting mainly of hillside that slopes steeply down from the west to east with the housing concentrated in the valley floor on the western bank of the Afon Taf.

The hillside catchment is drained by the Nant y Maen in the north, a substantial number of un-named watercourses in the central sector and Nant Aber-fan watercourse in the south. All watercourses discharge into the Afon Taf.

There are known to be 25 significant intakes in the area which are listed below, none of which are critical. These features have been recorded in our Geo Environ Database for drainage structures and are also shown on our Geographic Information System (GIS) package. Other culverts are likely to be found as investigations continue.

| | Location | Co-ordinates | Critical |
|---|---|---|---|
| 1 | Cemetery Hill | 306990, 199981 | No |
| 2 | West of South View | 307577, 198427 | No |
| 3 | North of Cemetry | 306702, 200042 | No |
| 4 | West of Oakfield Street | 306871, 200944 | No |
| 5 | Taff Trail West of Pantglas Fawr | 307084, 200879 | No |
| 6 | Taff Trail West of Pantglas Fawr | 307169, 201027 | No |
| 7 | West of Pantglas Fawr South under playing fields | 307235, 200830 | No |
| 8 | From Canal at Cross Street to north of Bryngoleu | 307252, 199509 | No |
| 9 | 64A Bryntaf | 307175, 199598 | No |
| 10 | South of No20 Kingsley Terrace | 307235, 199443 | No |
| 11 | Ynysygored Farm - rear | 307039, 200829 | No |
| 12 | West of No77 Moy Road - Cottrall Street - River Outfall | 306870, 200398 | No |
| 13 | Tip - East of Ynysowen Fach | 306969, 200668 | No |
| 14 | West of Springfield House | 307773, 197949 | No |
| 15 | Under A470 - Canal Lock Close | 307092, 199223 | No |
| 16 | West of Bryntaf Street | 307017, 199534 | No |
| 17 | West of Moy Street | 306593, 200301 | No |
| 18 | West of Moy Street | 306614, 200434 | No |
| 19 | Aberfan - West of Ynysowen Fach | 306723, 200659 | No |
| 20 | West of Ynysygored Road | 306798, 200767 | No |
| 21 | East of Perthygleision Terrace | 307402, 199435 | No |
| 22 | West of Oakfield Street | 307005, 200873 | No |
| 23 | West of South View | 307530, 198504 | No |
| 24 | West of South View | 307520, 198545 | No |
| 25 | West of Aberfan Fawr | 307207, 199075 | No |

**Table 10: Aberfan - Significant Intakes**

### 7.3.2 Conclusions from the Flood Risk Maps

The Flood Risk Map for Aberfan indicate that the main cause of flood risk for the area relates to ordinary watercourses and the intakes to existing surface water culverts. Generally this correlates with the experience gained by the drainage team over the past 25 years however, it is believed that the risk is overstated as the full capacity of the existing culverts was not included in the modelling process when the Maps were prepared. Some risk may also be due to fluvial flooding from the Afon Taf.

| COUNTS FOR ABERFAN COMMUNITY AREA | | | | |
|---|---|---|---|---|
| | **Total in defined area** | **Risk Counts** | | |
| | | **LOW** | **MED** | **HIGH** |
| **Risk to People and Property** | | Residents in areas at risk of flooding depth >0.0m | | |
| People (n) (multiplier 2.35) | 2,686 | 190 | 12 | 1 |
| | | Residential Properties at risk of internal flooding depth >0.2m | | |
| Residential Properties (n) | 1,143 | 31 | 0 | 0 |
| Services (n) | 5 | 1 | 0 | 0 |
| **Risk to Economic Activity** | | | | |
| Non-Residential Properties (n) | 149 | 14 | 1 | 0 |
| Airports (n) | 0 | 0 | 0 | 0 |
| Primary/Trunk Roads (km) | 7.4 | 0.61 | 0.02 | 0.01 |
| Main Line Railways (km) | 0 | 0 | 0 | 0 |
| Agricultural Land – Grades 1, 2 and 3 (ha) | 0 | 0 | 0 | 0 |
| **Risk to Natural and Historic Environment** | | | | |
| Bathing Waters (n) | 0 | 0 | 0 | 0 |
| Environmental Permitting Regulations (EPR) Installations (n) | 0 | 0 | 0 | 0 |
| Special Areas of Conservation (SAC) (ha) | 0 | 0 | 0 | 0 |
| Special Protection Areas (SPA) (ha) | 0 | 0 | 0 | 0 |
| Ramsar Sites (ha) | 0 | 0 | 0 | 0 |
| World Heritage Sites (ha) | 0 | 0 | 0 | 0 |
| Sites of Special Scientific Interest (SSSI) (ha) | 0 | 0 | 0 | 0 |
| Parks and Gardens (ha) | 63 | 2.6 | 0.46 | 0.51 |
| Scheduled Ancient Monuments (ha) | 0 | 0 | 0 | 0 |
| Listed Buildings (n) | 6 | 0 | 0 | 0 |
| Licensed Abstractions (LA) (n) | 0 | 0 | 0 | 0 |
| Sites of Interest for Nature Conservation (SINC) (ha) | 113 | 4.1 | 2.3 | 2.1 |

The counts representing flood risk from surface water in this area may be overstated as they include properties also at risk from river flooding.

**Table 11: Aberfan - Counts for Various Risks**

### 7.3.3 Measures and objectives to mitigate flood risk (Revenue & Capital)

**Stilling Basin and Intake above Aberfan**

The main sources of flood risk relates to the following:-

AF01 Low to high level flood risk to properties on Pantglas Fawr, Russell Villas and Bronheulog Terrace due to the failure of the intake and culvert east of Oakfield Street.
Flood risk in this area may also be as a result of river flooding.
See measure MBC M04.
Category: M24 - Prevention
Objectives: 1, 2, 3, 4
Time Scale: 2016 - 2021
Cost: £5,000

AF02 Low to high level flood risk to properties on Bronheulog Terrace, Aberfan Road, Moy Road and the industrial area to the east of Cottrell Street due to the failure of the two intakes and culverts on the hillside to the west of the town.
Flood risk in this area may also be as a result of river flooding.
See measure MBC M04.
Category: M24 - Prevention
Objectives: 1, 2, 3, 4
Time Scale: 2016 - 2021
Cost: £5,000

AF03 Low to high level of flood risk to properties on Woodland Drive, Pleasant View, Canal Lock Close, Canonobie Crescent and Bryngoleu due to the failure of the an intake and culvert taking the flow from the Nant Aber-fan.
Flood risk in this area may also be as a result of river flooding.
See measure MBC M04.
Category: M24 - Prevention
Objectives: 1, 2, 3, 4
Time Scale: 2016 - 2021
Cost: £5,000

AF04 Low to high level of flood risk to properties on Bridge Street and Riverside Close due to the failure of two intakes and culverts to the north of this area.
Flood risk in this area may also be as a result of river flooding.
See measure MBC M04.
Category: M24 - Prevention
Objectives: 1, 2, 3, 4
Time Scale: 2016 - 2021
Cost: £5,000

AF05 Low to high level of flood risk to properties on Cross Street, Canonbie Crescent and Ysgol Gymraeg Rhyd Grug due to the failure of two intakes and culverts to the west of this area.
Flood risk in this area may also be as a result of river flooding.
See measure MBC M04.
Category: M24 - Prevention
Objectives: 1, 2, 3, 4
Time Scale: 2016 - 2021
Cost: £5,000

AF06 Flood Forum - See measure MBC M01.
Category: M43 - Preparedness
Objectives: 1, 2, 3, 4, 10
Time Scale: 2016 - 2021
Cost: £2,000

AF07 Flood Warning - See measure MBC M02.
Category: M41 - Preparedness
Objectives: 8
Time Scale: 2016 - 2021
Cost: £2,000

**See also measures for whole borough as detailed in 7.1.3 above**

**Total cost of measures for Aberfan Community Area £29,000**

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

**Number of Measures in each Category**


| | ABERFAN COMMUNITY AREA<br>Properties in areas at risk of flooding depth > 0.0m | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | LOW | | | MEDIUM | | | HIGH | | |
| Measure | RES | NON-RES | SER | RES | NON-RES | SER | RES | NON-RES | SER |
| AF01 | 28 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| AF02 | 38 | 8 | 1 | 5 | 1 | 0 | 0 | 0 | 0 |
| AF03 | 10 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| AF04 | 1 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| AF05 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| AF06 | No counts required | | | | | | | | |
| AF07 | No counts required | | | | | | | | |
| **TOTAL** | **78** | **13** | **1** | **5** | **1** | **0** | **1** | **0** | **0** |

**Table 12: Aberfan - Potential Reduction in Flood Risk for Each Measure**

**7.3.4**

**Figure 11: Aberfan - Flood Risk Map**

## 7.4 Cefn Coed-y-cymmer Community Area

### 7.4.1 Overview

Cefn Coed-y-cymmer Community Area is situated in the north western sector of MTCBC immediately to the north west of Merthyr town. It covers an area of 501 hectares consisting mainly of steeply sloping hillside. There are two housing developments on the lower reaches of the catchment. Trefechan which lies immediately to the west of the Taf Fechan and Cefn Coed which is situated between the Taf Fechan and the Afon Taf.

The western and northern sectors of the catchment drain into the Taf Fawr and the south eastern sector into the Taf Fechan.

There is one significant intake in the area which is listed below, which is not critical. This feature has been recorded in our Geo Environ Database for drainage structures and is also shown on our Geographic Information System (GIS) package. Other culverts are likely to be found as investigations continue.

| | Location | Co-ordinates | Critical |
|---|---|---|---|
| 1 | West side of A470 - north of A465 Roundabout | 302694, 207760 | No |

**Table 13: Cefn Coed-y-cymmer – Significant Intakes**

### 7.4.2 Conclusions from the Flood Risk Maps

The Flood Risk Map for Cefn-coed-y-cymmer indicates that flood risk is relatively low with a few small areas of high risk affecting residential properties and a small number of highways showing low risk due to accumulations of surface water. Flood risk relating to ordinary watercourses and the intakes to existing surface water culverts is also shown. Generally this correlates with the experience gained by the drainage team over the past 25 years however, it is believed that the risk is overstated as the full capacity of the existing culverts was not included in the modelling process when the Maps were prepared.

| COUNTS FOR CEFN COED-Y-CYMMER COMMUNITY AREA | | | | |
|---|---|---|---|---|
| **Risk to People and Property** | **Totals in defined area** | **Risk Counts** | | |
| | | **LOW** | **MED** | **HIGH** |
| | | Residents in areas at risk of flooding depth >0.0m | | |
| People (n) (multiplier 2.35) | 3,238 | 106 | 21 | 2 |
| | | Residential Properties at risk of internal flooding depth >0.2m | | |
| Residential Properties (n) | 1,378 | 10 | 0 | 1 |
| Services (n) | 2 | 0 | 0 | 0 |
| **Risk to Economic Activity** | | | | |
| Non-Residential Properties (n) | 280 | 11 | 6 | 5 |
| Airports (n) | 0 | 0 | 0 | 0 |
| Primary/Trunk Roads (km) | 5.7 | 1.33 | 0.20 | 0.33 |
| Main Line Railways (km) | 0 | 0 | 0 | 0 |
| Agricultural Land – Grades 1, 2 and 3 (ha) | 0 | 0 | 0 | 0 |
| **Risk to Natural and Historic Environment** | | | | |
| Bathing Waters (n) | 0 | 0 | 0 | 0 |
| Environmental Permitting Regulations (EPR) Installations (n) | 0 | 0 | 0 | 0 |
| Special Areas of Conservation (SAC) (ha) | 0 | 0 | 0 | 0 |
| Special Protection Areas (SPA) (ha) | 0 | 0 | 0 | 0 |
| Ramsar Sites (ha) | 0 | 0 | 0 | 0 |
| World Heritage Sites (ha) | 0 | 0 | 0 | 0 |
| Sites of Special Scientific Interest (SSSI) (ha) | 32 | 1.32 | 0.31 | 1.35 |
| Parks and Gardens (ha) | 0 | 0 | 0 | 0 |
| Scheduled Ancient Monuments (ha) | 0.89 | 0.06 | 0.02 | 0.03 |
| Listed Buildings (n) | 13 | 1 | 1 | 1 |
| Licensed Abstractions (LA) (n) | 0 | 0 | 0 | 0 |
| Sites of Interest for Nature Conservation (SINC) (ha) | 99 | 4.9 | 1.8 | 7.2 |

**Table 14: Cefn Coed-y-cymmer - Counts for Various Risks**

### 7.4.3 Measures and objectives to mitigate flood risk (Revenue & Capital)

**Cefn Viaduct**

The main sources of flood risk in this area are listed below:-

CC01 High level flood risk affecting properties immediately below Llwyn-on Reservoir in the northern tip of the area.
These properties are on low lying land immediately to the east of the Afon Taf so the risk may be associated with river flooding.
See measure MBC M04.
Category: M24 - Prevention
Objectives: 1, 2, 3, 4
Time Scale: 2016 - 2021
Cost: £5,000

CC02 Low to medium level flood risk to properties on west side of the A470 due to the failure of an intake and culvert.
See measure MBC M04.
Category: M24 - Prevention
Objectives: 1, 2, 3, 4
Time Scale: 2016 - 2021
Cost: £5,000

CC03 Low to high level of flood risk due to accumulations of surface water on highways at Lindon Way and Maple Crescent.
See measure MBC M05.
Category: M24 - Prevention
Objectives: 1, 2, 3, 4
Time Scale: 2016 - 2021
Cost: £2,000

CC04 Low level flood risk to properties in Upper Vaynor Road and Jobs Lane due to the failure of an intake and culvert.
See measure MBC M04.
Category: M24 - Prevention
Objectives: 1, 2, 3, 4
Time Scale: 2016 - 2021
Cost: £5,000

CC05 Low to high level of flood risk due to accumulations of surface water on highways south of the A465.
See measure MBC M05.
Category: M24 - Prevention
Objectives: 1, 2, 3, 4
Time Scale: 2016 - 2021
Cost: £2,000

CC06 Low to high level of flood risk due to accumulations of surface water on highways north of the A465.
See measure MBC M05.
Category: M24 - Prevention
Objectives: 1, 2, 3, 4
Time Scale: 2016 - 2021
Cost: £2,000

**See also measures for whole borough as detailed in 7.1.3 above**

**Total cost of measures for Cefn Coed-y-cymmer Community Area £19,000**

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

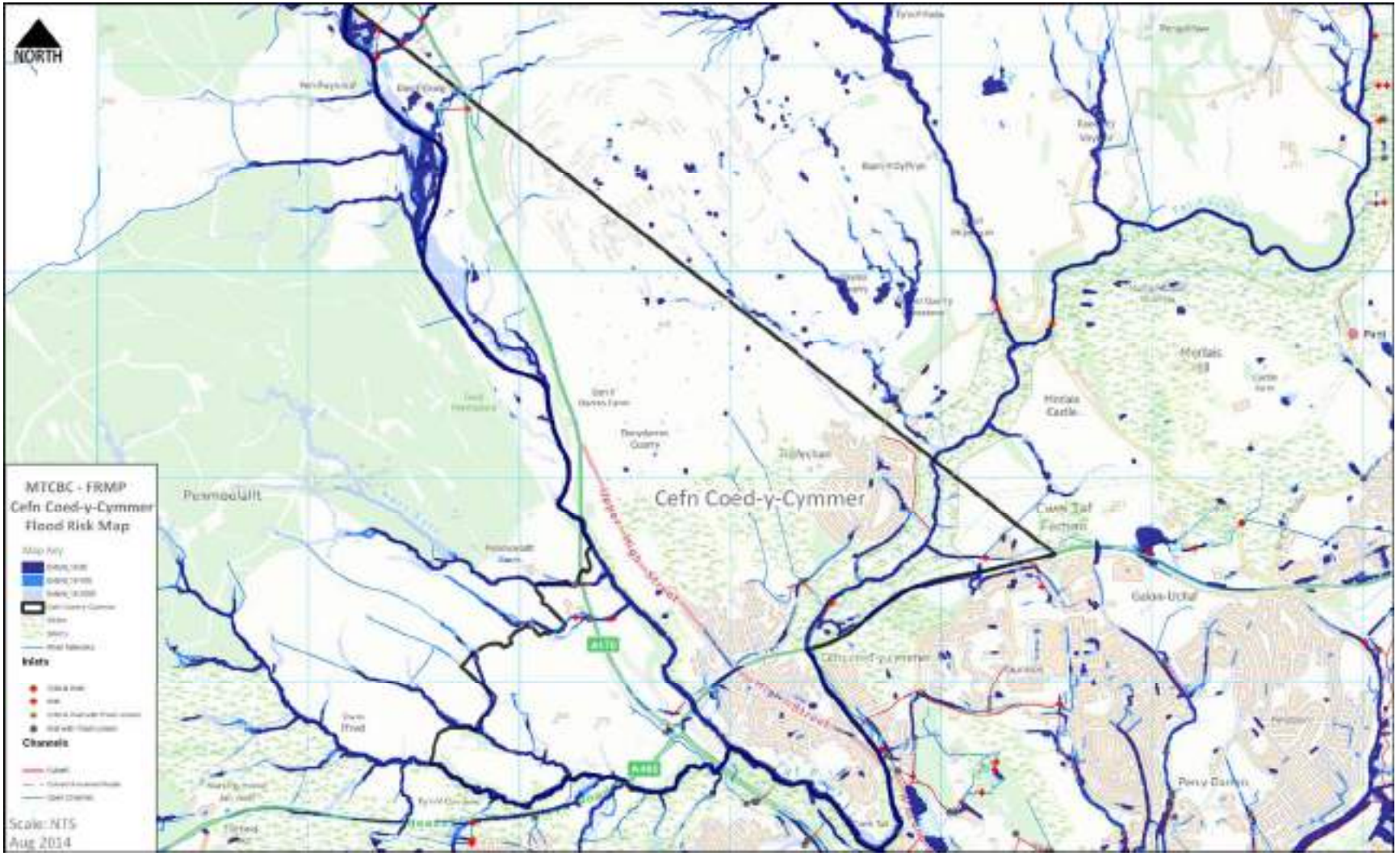
**Number of Measures in each Category**

| | CEFN COED-Y-CYMMER COMMUNITY AREA<br>Properties in areas at risk of flooding depth > 0.0m | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | LOW | | | MEDIUM | | | HIGH | | |
| Measure | RES | NON-RES | SER | RES | NON-RES | SER | RES | NON-RES | SER |
| CC01 | 0 | 2 | 0 | 0 | 4 | 0 | 0 | 4 | 0 |
| CC02 | 0 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 0 |
| CC03 | 8 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 |
| CC04 | 7 | 0 | 0 | 2 | 1 | 0 | 1 | 0 | 0 |
| CC05 | 17 | 1 | 0 | 2 | 0 | 0 | 0 | 0 | 0 |
| CC06 | 8 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **TOTAL** | **40** | **6** | **0** | **9** | **6** | **0** | **1** | **4** | **0** |

**Table 15: Cefn Coed-y-cymmer - Potential Reduction in Flood Risk for Each Measure**

**7.4.4**

**Figure 12: Cefn Coed-y-cymmer - Flood Risk Map**



## 7.5 Dowlais Community Area

### 7.5.1 Overview

Dowlais Community Area is situated in the north eastern sector of MTCBC immediately to the north east of Merthyr town. It covers an area of 1,081 hectares consisting mainly of housing, industrial and commercial development. The A465 Heads of the Valleys Road splits the area into two with the village of Pant to the north together with the Pant Industrial Estate and Dowlais Retail Park. The town of Dowlais lies to the south of the A465 together with Goat Mill Road Industrial Estate.

The catchment drains into the Dowlais Culvert which connects with the Nant Morlais culvert before discharging into the Afon Taf.

There are two reservoirs situated within the area. New Pond with a surface area of 3.5ha and a volume of 27,000cum to the north of the Heads of the Valleys Road and Middle Pond with an area of 0.58ha and a volume of 17,000cum to the south.

There are known to be 22 significant intakes in the area which are listed below, none of which are critical. These features have been recorded in our Geo Environ Database for drainage structures and are also shown on our Geographic Information System (GIS) package. Other culverts are likely to be found as investigations continue.

| | Location | Co-ordinates | Critical |
|---|---|---|---|
| 1 | Rocky Road - opposite Holly Cottage | 306011, 208197 | No |
| 2 | Rocky Road - opposite Holly Cottage | 306065, 208167 | No |
| 3 | North of Glanmorlais Football Field to South of Pant Primary School | 306913, 208920 | No |
| 4 | North East of Trevor Close | 306850, 209263 | No |
| 5 | Under Disused Railway - East of Tair Twynau | 307088, 209103 | No |
| 6 | Goat Mill Road | 306246, 207135 | No |
| 7 | Dowlais - South of Slip Road | 307295, 207518 | No |
| 8 | Goat Mill Road | 306077, 207038 | No |
| 9 | East Merthyr Reclamation Scheme | 306587, 207118 | No |
| 10 | Caeharris to O.P. Chocolates | 307199, 207701 | No |
| 11 | Ffynon Dwyn | 306101, 210556 | No |
| 12 | North East of Trevor Close Pant - West of playing field | 306748, 209164 | No |
| 13 | Rocky Road - opposite Holly Cottage | 306076, 208161 | No |
| 14 | Station Terrace - by Stables | 307545, 208147 | No |
| 15 | 25 Station Terrace - by Stables | 307607, 208198 | No |
| 16 | Pant Tai Twyniau - East Glanmorlais Football Field | 306922, 208841 | No |
| 17 | From Dismantled Railway to New Pond Outlet | 307004, 208750 | No |
| 18 | South of Heads of Valleys Road and North West of Station Terrace | 307282, 208234 | No |
| 19 | South of Heads of Valleys Road and North West of Station Terrace | 307291, 208094 | No |
| 20 | Caeharris to O.P. Chocolates | 307292, 208014 | No |
| 21 | Great Mills | 307533, 208515 | No |
| 22 | South West of Windsor Place | 306445, 208683 | No |

**Table 16: Dowlais – Significant Intakes**

### 7.5.2 Conclusions from the Flood Risk Maps

The Flood Risk Map for Dowlais indicate that the main cause of flood risk for the area relates to ordinary watercourses and the intakes to existing surface water culverts. Generally this correlates with the experience gained by the drainage team over the past 25 years however, it is believed that the risk is overstated as the full capacity of the existing culverts was not included in the modelling process when the Maps were prepared.

| COUNTS FOR DOWLAIS COMMUNITY AREA | | | | |
|---|---|---|---|---|
| | Total in defined area | Risk Counts | | |
| | | LOW | MED | HIGH |
| **Risk to People and Property** | | Residents in areas at risk of flooding depth >0.0m | | |
| People (n) (multiplier 2.35) | 7,414 | 752 | 216 | 129 |
| | | Residential Properties at risk of internal flooding depth >0.2m | | |
| Residential Properties (n) | 3,155 | 135 | 27 | 37 |
| Services (n) | 11 | 4 | 0 | 0 |
| **Risk to Economic Activity** | | | | |
| Non-Residential Properties (n) | 665 | 63 | 5 | 29 |
| Airports (n) | 0 | 0 | 0 | 0 |
| Primary/Trunk Roads (km) | 8.3 | 1.9 | 1.1 | 1.2 |
| Main Line Railways (km) | 0 | 0 | 0 | 0 |
| Agricultural Land – Grades 1, 2 and 3 (ha) | 0 | 0 | 0 | 0 |
| **Risk to Natural and Historic Environment** | | | | |
| Bathing Waters (n) | 0 | 0 | 0 | 0 |
| Environmental Permitting Regulations (EPR) Installations (n) | 2 | 0 | 0 | 0 |
| Special Areas of Conservation (SAC) (ha) | 0 | 0 | 0 | 0 |
| Special Protection Areas (SPA) (ha) | 0 | 0 | 0 | 0 |
| Ramsar Sites (ha) | 0 | 0 | 0 | 0 |
| World Heritage Sites (ha) | 0 | 0 | 0 | 0 |
| Sites of Special Scientific Interest (SSSI) (ha) | 22 | 0.15 | 0.04 | 0.02 |
| Parks and Gardens (ha) | 0 | 0 | 0 | 0 |
| Scheduled Ancient Monuments (ha) | 4.1 | 0.06 | 0.02 | 0.03 |
| Listed Buildings (n) | 19 | 2 | 0 | 0 |
| Licensed Abstractions (LA) (n) | 0 | 0 | 0 | 0 |
| Sites of Interest for Nature Conservation (SINC) (ha) | 408 | 12.8 | 2.7 | 4.0 |

**Table 17: Dowlais - Counts for Various Risks**

### 7.5.3 Measures and objectives to mitigate flood risk (Revenue & Capital)

**Discharge from Top Pond**

The main sources of flood risk relates to the following:-

DL01 Low to high level flood risk due to accumulations of surface water on the Pant Industrial Estate.
See measure MBC M05.
Category: M24 - Prevention
Objectives: 1, 2, 3, 4
Time Scale: 2016 - 2021
Cost: £2,000

DL02 Low to high level flood risk due to accumulations of surface water on the Dowlais Top Industrial Estate and Pengarnddu Industrial Estate.
See measure MBC M05.
Category: M24 - Prevention
Objectives: 1, 2, 3, 4
Time Scale: 2016 - 2021
Cost: £2,000

DL03 Low to high level flood risk on the Goat Mill Road Industrial Estate, High Street and Blaen Dowlais due to the failure of numerous intakes and culverts.
See measure MBC M04.
Category: M24 - Prevention
Objectives: 1, 2, 3, 4
Time Scale: 2016 - 2021
Cost: £5,000

DL04 Low to high level flood risk on Nant Morlais, Pant Road, Pant boulder trap, Francis Street, Wimborne Street, Bryntirion Street and Winifred Street due to the failure the intake to the Nant Morlais culvert.
See measure MBC M04.
Category M24 - Prevention
Objectives: 1, 2, 3, 4
Time Scale: 2016 - 2021
Cost: £5,000

DL05 Low to high level flood risk on Trevor Close, Pant Road, King Street, Heol-y-Bryniau, Heulwen Close, Primrose Close and St. Lukes Close due to the failure of the intake to the culvert to the north of the disused tramway.
See measure MBC M04.
Category: M24 - Prevention
Objectives: 1, 2, 3, 4
Time Scale: 2016 - 2021
Cost: £5,000

DL06 Low to high level flood risk on Jones Street, Upper Row, Barrack Row, Lower Row, and Cross Street due to the failure of intakes and culverts to the north of these Streets.
See measure MBC M04.
Category: M24 - Prevention
Objectives: 1, 2, 3, 4
Time Scale: 2016 - 2021
Cost: £5,000

DL07 Low to high level flood risk on Station Road and Blanche Street due to the failure of various intakes and culverts.
See measure MBC M04.
Category: M24 - Prevention
Objectives: 1, 2, 3, 4
Time Scale: 2016 - 2021
Cost: £5,000

DL08 Low to high level flood risk on Ivor Street, Market Street, Garden Street and Lower Row due to the failure of various intakes and culverts.
See measure MBC M04.
Category: M24 - Prevention
Objectives: 1, 2, 3, 4
Time Scale: 2016 - 2021
Cost: £5,000

**See also measures for whole borough as detailed in 7.1.3 above**

**Total cost of measures for Dowlais Community Area £34,000**

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

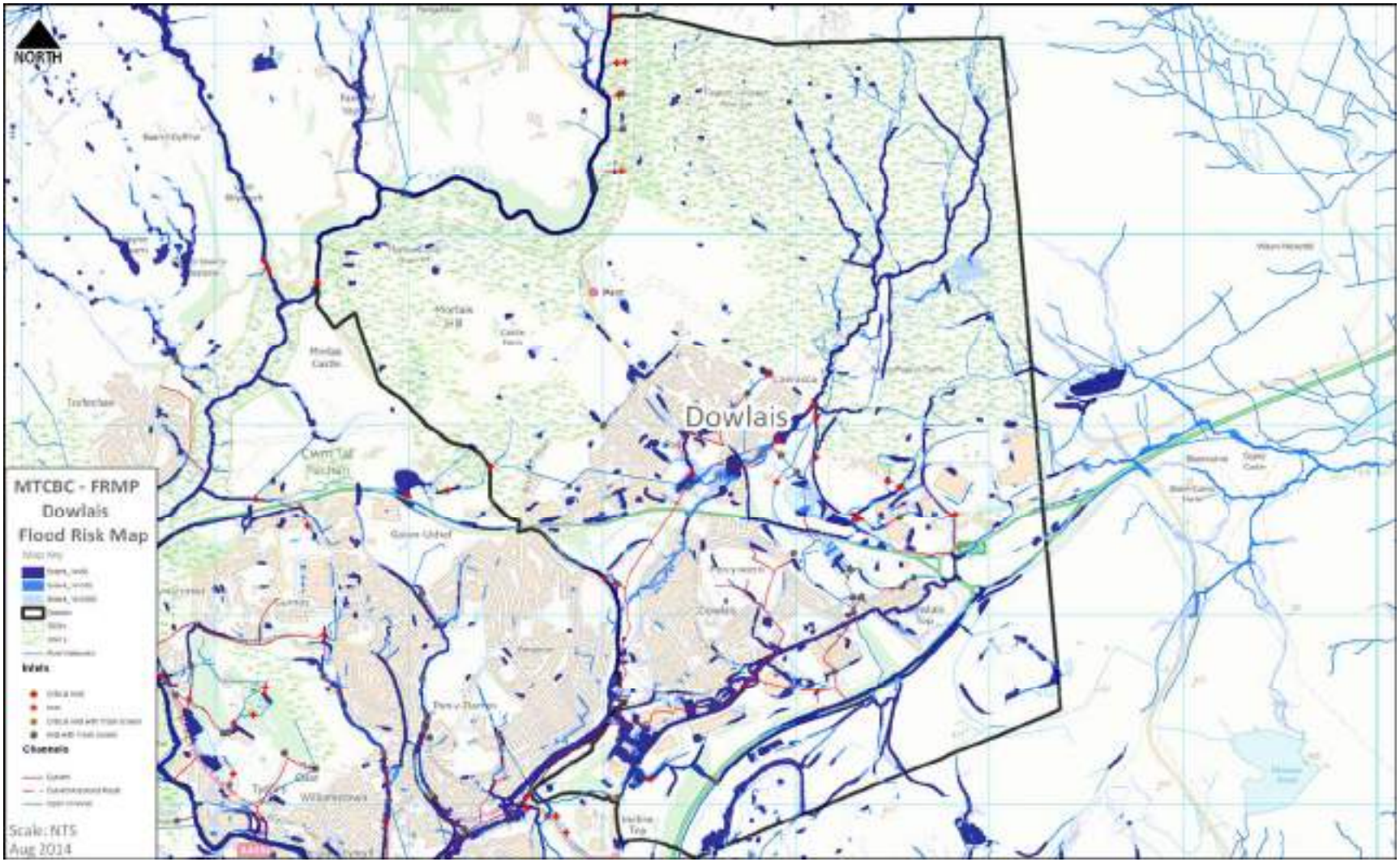
**Number of Measures in each Category**


| | DOWLAIS COMMUNITY AREA<br>Properties in areas at risk of flooding depth > 0.0m | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | LOW | | | MEDIUM | | | HIGH | | |
| Measure | RES | NON-RES | SER | RES | NON-RES | SER | RES | NON-RES | SER |
| DL01 | 0 | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| DL02 | 0 | 7 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| DL03 | 75 | 22 | 1 | 24 | 4 | 0 | 9 | 24 | 0 |
| DL04 | 132 | 1 | 0 | 50 | 0 | 0 | 27 | 0 | 0 |
| DL05 | 32 | 0 | 0 | 11 | 0 | 0 | 16 | 0 | 0 |
| DL06 | 27 | 2 | 0 | 4 | 0 | 0 | 2 | 0 | 0 |
| DL07 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| DL08 | 11 | 3 | 1 | 2 | 0 | 0 | 1 | 0 | 0 |
| **TOTAL** | **279** | **42** | **2** | **91** | **4** | **0** | **55** | **25** | **0** |

**Table 18: Dowlais - Potential Reduction in Flood Risk for Each Measure**

**7.5.4**

**Figure 13: Dowlais - Flood Risk Map**



## 7.6 Gellideg Community Area

### 7.6.1 Overview

Gellideg Community Area is situated in the north western sector of MTCBC immediately to the west of Merthyr town. It covers an area of 311 hectares consisting mainly of steeply sloping hillside and the two housing developments of Gellideg and Clwydyfagwr.

To the north the catchment drains into a series of ordinary watercourse which discharge into the Nant Ffrwd, which is a tributary of the Afon Taf. To the south the catchment drains into three culverts which pass under the A470 and ultimately also discharge into the Afon Taf.

There are known to be 13 significant intakes in the area as listed below, none of which are critical. These features have been recorded in our Geo Environ Database for drainage structures and are also shown on our Geographic Information System (GIS) package. Other culverts are likely to be found as investigations continue.

| | Location | Co-ordinates | Critical |
|---|---|---|---|
| 1 | Swansea Road, East of Heol Tai Mawr | 301779, 207329 | No |
| 2 | Swansea Road, West of Gellideg | 302637, 207100 | No |
| 3 | Swansea Road, East of Heol Tai Mawr | 301775, 207244 | No |
| 4 | Harlech Drive - Rear 73,83,91,99 | 301939, 206820 | No |
| 5 | North of 34A Swansea Road | 303203, 206799 | No |
| 6 | Tai Mawr Road - East of Gellideg Cottages | 303487, 206784 | No |
| 7 | Swansea Road, East of Heol Tai Mawr | 301773, 207224 | No |
| 8 | Harlech Drive - Rear 73,83,91,99 | 301943, 206873 | No |
| 9 | Harlech Drive - Rear 73,83,91,99 | 301944, 206915 | No |
| 10 | Harlech Drive - Rear 73,83,91,99 | 301947, 206957 | No |
| 11 | Harlech Drive - Rear 73,83,91,99 and end | 302073, 207350 | No |
| 12 | Tai Mawr Road - Rear of School | 303365, 207243 | No |
| 13 | Bryn Padell/Bryn Maen | 303124, 207432 | No |

**Table 19: Gellideg – Significant Intakes**

### 7.6.2 Conclusions from the Flood Risk Maps

The Flood Risk Map for Gellideg Communitry Area indicates that the main cause of flood risk for the area relates to the accumulation of surface water on highways. Ordinary watercourses and their intakes to existing surface water culverts show a relatively small amount of flood risk. Generally this correlates with the experience gained by the drainage team over the past 25 years, however, it is believed that the risk is overstated as the full capacity of the existing culverts was not included in the modelling process when the Maps were prepared.

| COUNTS FOR GELLIDEG COMMUNITY AREA | | | | |
|---|---|---|---|---|
| **Risk to People and Property** | **Total in defined area** | **Risk Counts** | | |
| | | **LOW** | **MED** | **HIGH** |
| | | Residents in areas at risk of flooding depth>0.0m | | |
| People (n) (multiplier 2.35) | 3,419 | 275 | 19 | 9 |
| | | Residential Properties at risk of internal flooding depth >0.2m | | |
| Residential Properties (n) | 1,455 | 21 | 2 | 2 |
| Services (n) | 1 | 0 | 0 | 0 |
| **Risk to Economic Activity** | | | | |
| Non-Residential Properties (n) | 115 | 15 | 2 | 0 |
| Airports (n) | 0 | 0 | 0 | 0 |
| Primary/Trunk Roads (km) | 2.5 | 0.50 | 0.21 | 0.51 |
| Main Line Railways (km) | 0 | 0 | 0 | 0 |
| Agricultural Land – Grades 1, 2 and 3 (ha) | 0 | 0 | 0 | 0 |
| **Risk to Natural and Historic Environment** | | | | |
| Bathing Waters (n) | 0 | 0 | 0 | 0 |
| Environmental Permitting Regulations (EPR) Installations (n) | 0 | 0 | 0 | 0 |
| Special Areas of Conservation (SAC) (ha) | 0 | 0 | 0 | 0 |
| Special Protection Areas (SPA) (ha) | 0 | 0 | 0 | 0 |
| Ramsar Sites (ha) | 0 | 0 | 0 | 0 |
| World Heritage Sites (ha) | 0 | 0 | 0 | 0 |
| Sites of Special Scientific Interest (SSSI) (ha) | 0 | 0 | 0 | 0 |
| Parks and Gardens (ha) | 0 | 0 | 0 | 0 |
| Scheduled Ancient Monuments (ha) | 11.7 | 0.69 | 0.16 | 0.15 |
| Listed Buildings (n) | 5 | 1 | 0 | 0 |
| Licensed Abstractions (LA) (n) | 0 | 0 | 0 | 0 |
| Sites of Interest for Nature Conservation (SINC) (ha) | 158 | 7.5 | 1.4 | 2.0 |

**Table 20: Gellideg - Counts for Various Risks**

### 7.6.3 Measures and objectives to mitigate flood risk (Revenue & Capital)

**Intake on Swansea Road**

The main sources of flood risk in the area are listed below:

GD01 Low to high levels of flood risk due to failure of various intakes and culverts and surface water accumulations throughout Castle Heights housing estate. Although not shown on the flood maps Harlech Drive is known to flood due to the failure of numerous intakes.
See measure MBC M04.
Category: M24 - Prevention
Objectives: 1, 2, 3, 4
Time Scale: 2016 - 2021
Cost: £5,000

GD02 Low to high levels of flood risk to properties due to surface water accumulation on Heol Tai Mawr, Heol Nantgau, Lansbury Road, Pen yr Enfus and Coed-y-Dderwen Community Primary School.
See measure MBC M05.
Category: M24 - Prevention
Objectives: 1, 2, 3, 4
Time Scale: 2016 - 2021
Cost: £2,000

GD03 High level of flood risk to cottages to the south of Swansea Road above the entrance to the Trago Mills Site, due to the potential failure of the Swansea Road intake.
See measure MBC M04.
Category: M24 - Prevention
Objectives: 1, 2, 3, 4
Time Scale: 2016 - 2021
Cost: £5,000

GD04 High level of flood risk at the entrance to the Swansea Road culvert at the rear of Erw Las.
See measure MBC M04.
Category: M24 - Prevention
Objectives: 1, 2, 3, 4
Time Scale: 2016 - 2021
Cost: £5,000

GD05 Low level of flood risk from surface water flooding from the rear of Old Winch Fawr Road to Swansea Road.
Category See measure MBC M04.
Category: M24 - Prevention
Objectives: 1, 2, 3, 4
Time Scale: 2016 - 2021
Cost: £5,000

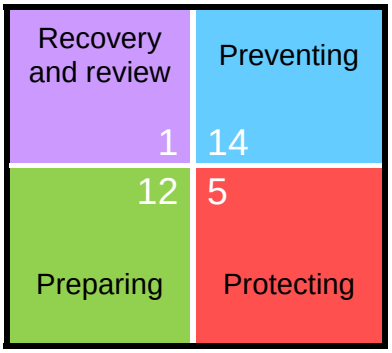
GD06 Low to high levels of flood risk to properties due to surface water accumulation on Heol Bryn Padell, Heol Bryn Man and Heol Bryn Selon.
See measure MBC M05.
Category: M24 - Prevention
Objectives: 1, 2, 3, 4
Time Scale: 2016 - 2021
Cost: £5,000

**See also measures for whole borough as detailed in 7.1.3 above**

**Total cost of measures for Gellideg Community Area £27,000**

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

**Number of Measures in each Category**

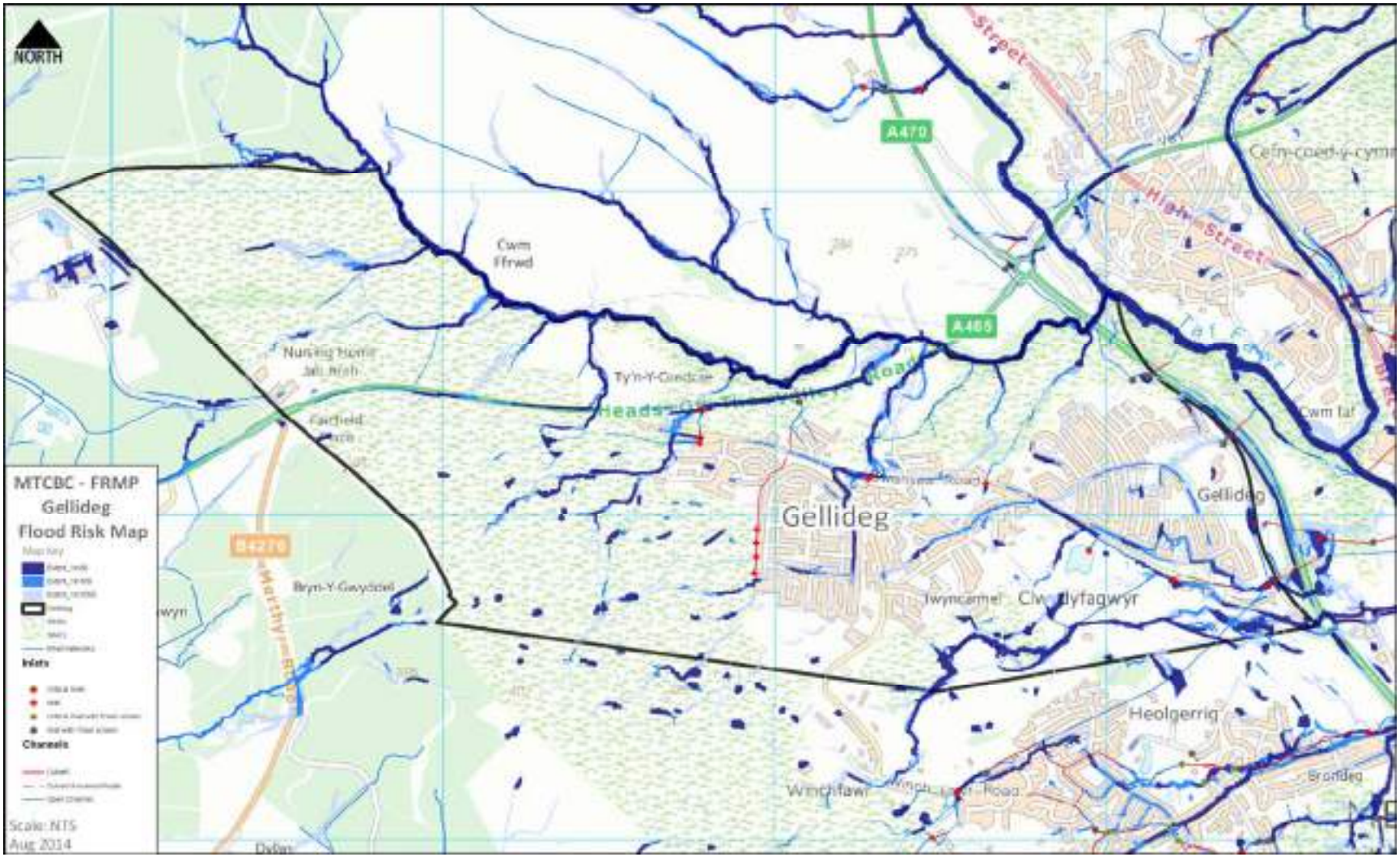



| | GELLIDEG COMMUNITY AREA<br>Properties in areas at risk of flooding depth > 0.0m | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | LOW | | | MEDIUM | | | HIGH | | |
| Measure | RES | NON-RES | SER | RES | NON-RES | SER | RES | NON-RES | SER |
| GD01 | 42 | 2 | 0 | 1 | 1 | 0 | 0 | 0 | 0 |
| GD02 | 26 | 1 | 0 | 4 | 0 | 0 | 0 | 0 | 1 |
| GD03 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 |
| GD04 | 9 | 2 | 0 | 3 | 0 | 0 | 0 | 0 | 0 |
| GD05 | 19 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| GD06 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| **TOTAL** | **97** | **10** | **0** | **8** | **1** | **0** | **3** | **0** | **0** |

**Table 21: Gellideg - Potential Reduction in Flood Risk for Each Measure**

7.6.4

**Figure 14: Gellideg – Flood Risk Map**



## 7.7 Heolgerrig Community Area

### 7.7.1 Overview

Heolgerrig Community Area is situated in the north western sector of MTCBC to the west of Merthyr Town. It covers an area of 394 hectares consisting mainly of hillside that slopes steeply down from the west to east.

The catchment drains into the Afon Taf via the Nant Cwm-pant-bach to the north, Nant Rhyd-y-car to the south, Nant Cwm-glo and Nant Llwynyreos in the central area. In addition there are a number of smaller and unnamed watercourses.

There are known to be 20 significant intakes in the area as listed below, seven of which are critical. These features have been recorded in our Geo Environ Database for drainage structures and are also shown on our Geographic Information System (GIS) package. Other culverts are likely to be found as investigations continue.

| | Location | Co-ordinates | Critical |
|---|---|---|---|
| 1 | Top section road end 111-117-side | 302642, 205829 | No |
| 2 | Playground - 111-117 on lane | 302473, 206008 | No |
| 3 | Winchfawr Road - New House | 302550, 206150 | No |
| 4 | Entrance to old Brickworks - now Trago Mills | 303789, 206329 | No |
| 5 | Bridge outlet to west | 304407, 205509 | No |
| 6 | Cwmglo Road | 303456, 205995 | No |
| 7 | South of Woodland Way | 303405, 205961 | No |
| 8 | Winch Fawr Road | 302965, 206031 | Yes |
| 9 | Cwmglo Road | 303487, 205997 | No |
| 10 | Upper Colliers Row to Great Western Culvert | 304014, 206142 | No |
| 11 | Pen Cerrig Rise - rear top houses | 302636, 206205 | No |
| 12 | Winchfawr Road - opposite 11 Worcester Close to 6 Exeter Close | 303003, 206025 | Yes |
| 13 | Shirley Gardens - Entrance | 303189, 206040 | Yes |
| 14 | Six Bells - rear opposite 51 | 303383, 206218 | Yes |
| 15 | Six Bells - rear near Hollymount | 303293, 206179 | Yes |
| 16 | South of Woodland Way | 303231, 205876 | No |
| 17 | Top section road end 111-117-side | 302745, 205915 | No |
| 18 | 17 St David Close - rear | 303227, 206233 | Yes |
| 19 | Shirley Gardens - Entrance | 303216, 205999 | Yes |
| 20 | Pantycelynen - below no 1 | 304371, 205494 | No |

**Table 22: Heolgerrig - Significant Intakes**

### 7.7.2 Conclusions from the Flood Risk Maps

The Flood Risk Map for Heolgerrig Community Area indicates that the main cause of flood risk for the area relates to ordinary watercourses and the intakes to existing surface water culverts. Generally this correlates with the experience gained by the drainage team over the past 25 years however, it is believed that the risk is overstated as the full capacity of the existing culverts was not included in the modelling process when the Maps were prepared.

| COUNTS FOR HEOLGERRIG COMMUNITY AREA | | | | |
|---|---|---|---|---|
| | **Total in defined area** | **Risk Counts** | | |
| | | **LOW** | **MED** | **HIGH** |
| **Risk to People and Property** | | Residents in areas at risk of flooding depth >0.0m | | |
| People (n) (multiplier 2.35) | 3,415 | 236 | 68 | 28 |
| | | Residential Properties at risk of internal flooding depth >0.2m | | |
| Residential Properties (n) | 1,453 | 30 | 5 | 2 |
| Services (n) | 8 | 0 | 0 | 1 |
| **Risk to Economic Activity** | | | | |
| Non-Residential Properties (n) | 217 | 25 | 5 | 2 |
| Airports (n) | 0 | 0 | 0 | 0 |
| Primary/Trunk Roads (km) | 2.8 | 0.67 | 0.08 | 0.02 |
| Main Line Railways (km) | 0 | 0 | 0 | 0 |
| Agricultural Land – Grades 1, 2 and 3 (ha) | 0 | 0 | 0 | 0 |
| **Risk to Natural and Historic Environment** | | | | |
| Bathing Waters (n) | 0 | 0 | 0 | 0 |
| Environmental Permitting Regulations (EPR) Installations (n) | 0 | 0 | 0 | 0 |
| Special Areas of Conservation (SAC) (ha) | 0 | 0 | 0 | 0 |
| Special Protection Areas (SPA) (ha) | 0 | 0 | 0 | 0 |
| Ramsar Sites (ha) | 0 | 0 | 0 | 0 |
| World Heritage Sites (ha) | 0 | 0 | 0 | 0 |
| Sites of Special Scientific Interest (SSSI) (ha) | 96 | 6.1 | 1.5 | 3.0 |
| Parks and Gardens (ha) | 0 | 0 | 0 | 0 |
| Scheduled Ancient Monuments (ha) | 0.54 | 0.05 | 0.02 | 0.06 |
| Listed Buildings (n) | 13 | 0 | 0 | 0 |
| Licensed Abstractions (LA) (n) | 0 | 0 | 0 | 0 |
| Sites of Interest for Nature Conservation (SINC) (ha) | 200 | 9.1 | 2.0 | 4.2 |

The counts representing flood risk from surface water in this area may be overstated as they include properties also at risk from river flooding.

**Table 23: Heolgerrig - Counts for Various Risks**

### 7.7.3 Measures and objectives to mitigate flood risk (Revenue & Capital)

**Cascade on Nant Rhyd-y-car to Afon Taf**

The main sources of flood risk relates to the following:-

HG01 Low to high level flood risk on Pencerrig Rise and St Davids Close due to failure of the intake and culvert at the north and rear of Pencerrig Rise.
See measure MBC M04.
Category: M24 - Prevention
Objectives: 1, 2, 3, 4
Time Scale: 2016 - 2021
Cost: £5,000

HG02 Low to high level risk between Farm Road and Heolgerrig due to the failure of numerous intakes and culverts to the north and rear of Shirley Gardens.
See measure MBC M04.
Category: M24 - Prevention
Objectives: 1, 2, 3, 4
Time Scale: 2016 - 2021
Cost: £5,000

HG03 Flood risk from surface water noted in 2 above is shown being combined with flood risk from the failure of intakes and culverts on Gernant Lane, the upper section of Heolgerrig, the intakes and culverts at the entrance to Shirley Drive and Winchfawr This risk is shown affecting housing both sides of Heolgerrig past the junctions with Six Bells Estate, Castle View, to the north and Farm View to the south.
See measure MBC M04.
Category: M24 - Prevention
Objectives: 1, 2, 3, 4
Time Scale: 2016 - 2021
Cost: £5,000

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HG04 Flood risk is shown affecting Pant Bach as a result of the failure of two intakes and culverts to the west of Cwmglo Road and Pant Bach. This flood risk follows the Nant Cwm-pant-bach until it reaches the intake to the west of Upper Colliers Row. It is shown affecting the houses both sides of Pantcelynen and it links with the risk from 3 above.
See measure MBC M04.
Category: M24 - Prevention
Objectives: 1, 2, 3, 4
Time Scale: 2016 - 2021
Cost: £5,000

HG05 Low to high level risk on Aberdare Road and the area to the west and north of Merthyr College which lies immediately to the west of the Afon Taf. Some of the risk shown in this area may also be associated with river flooding from the Afon Taf.
See measure MBC M04.
Category: M24 - Prevention
Objectives: 1, 2, 3, 4
Time Scale: 2016 - 2021
Cost: £5,000

HG06 Flood risk is shown at Rhyd-y-car as a result of the failure of two intakes and culverts to the northwest and south west of the roundabout on the A470 and flow along the western bank of the A470 from Upper Colliers Row. This area is relatively flat which appears to be the main reason for the risk being shown.
See measure MBC M04.
Category: M24 - Prevention
Objectives: 1, 2, 3, 4
Time Scale: 2016 - 2021
Cost: £5,000
.

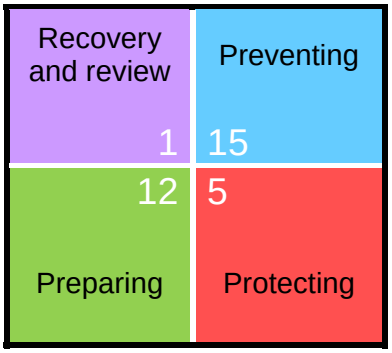
HG07 A low risk due to the accumulation of surface water is also shown on Ceir Wern which is relatively flat but is not considered to be prone to flooding.
See measure MBC M05.
Category: M24 - Prevention
Objectives: 1, 2, 3, 4
Time Scale: 2016 - 2021
Cost: £2,000

**See also measures for whole borough as detailed in 7.1.3 above**

**Total cost of measures for Heolgerrig Community Area £32,000**

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

**Number of Measures in each Category**

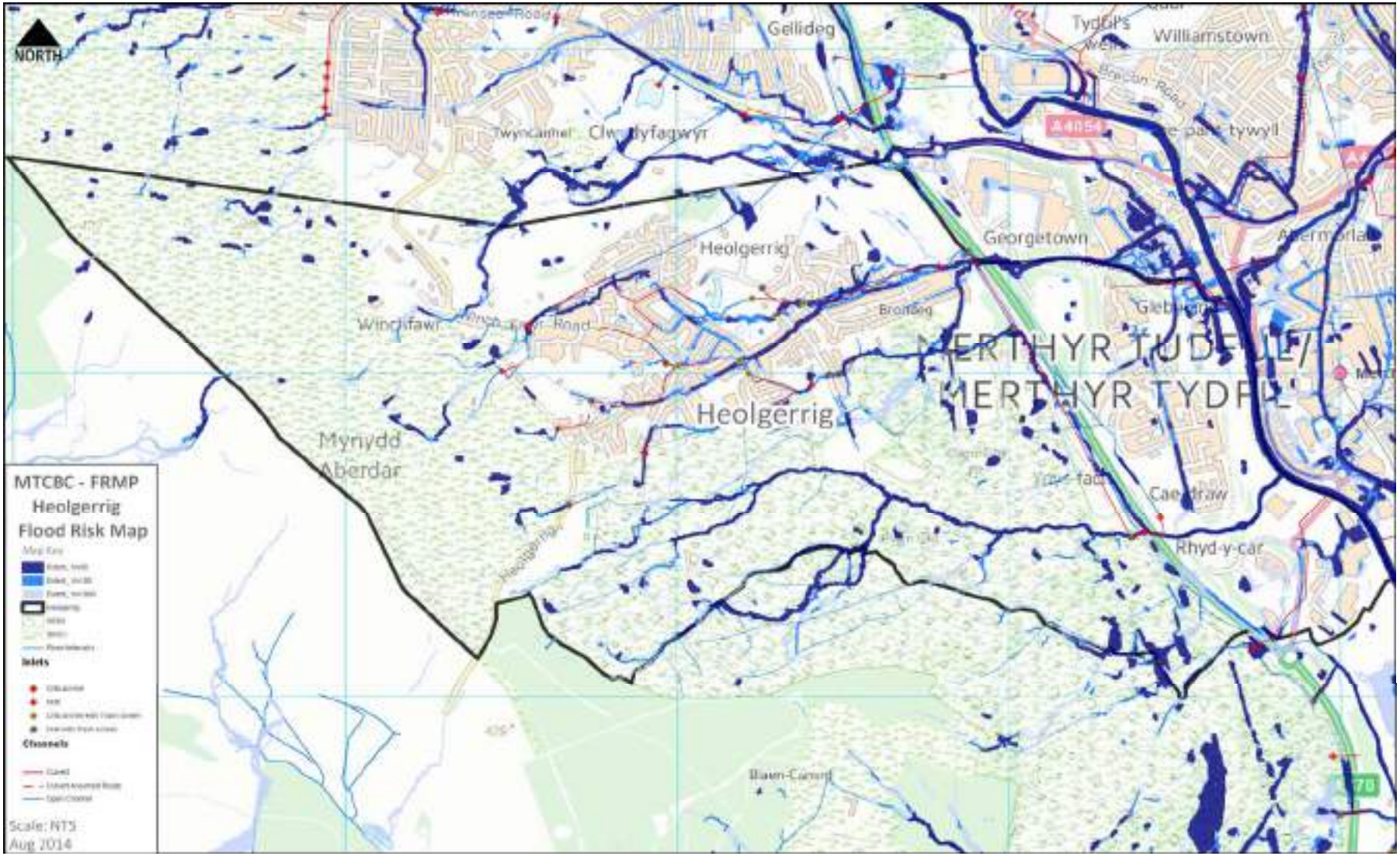



| | HEOLGERRIG COMMUNITY AREA<br>Properties in areas at risk of flooding depth > 0.0m | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | LOW | | | MEDIUM | | | HIGH | | |
| Measure | RES | NON-RES | SER | RES | NON-RES | SER | RES | NON-RES | SER |
| HG01 | 19 | 1 | 0 | 3 | 0 | 0 | 2 | 0 | 0 |
| HG02 | 25 | 0 | 0 | 7 | 0 | 0 | 1 | 0 | 0 |
| HG03 | 28 | 6 | 0 | 18 | 1 | 0 | 7 | 0 | 0 |
| HG04 | 3 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| HG05 | 0 | 5 | 0 | 0 | 2 | 0 | 0 | 2 | 0 |
| HG06 | 0 | 4 | 0 | 0 | 2 | 0 | 0 | 0 | 1 |
| HG07 | No counts required | | | | | | | | |
| TOTAL | 75 | 17 | 0 | 28 | 5 | 0 | 11 | 2 | 1 |

**Table 24: Heolgerrig - Potential Reduction in Flood Risk for Each Measure**

**7.7.4**

**Figure 15: Heolgerrig - Flood Risk Map**



## 7.8 Merthyr Tydfil (North) Community Area

### 7.8.1 Overview

Merthyr Tydfil (North) Community Area is situated in the north central sector of MTCBC. It covers an area of 472 hectares including Cyfarthfa Park, which is surrounded on three sides by various housing developments and schools. The Prince Charles Hospital lies to the north and the commercial sites are situated in the south west.

The area is drained by numerous culverts into the Afon Taf to the west and the Nant Morlais to the south. The Nant Morlais culvert is the most significant drainage structure within MTCBC.

There are known to be 18 significant intakes in the area as listed below, one of which is critical. These features have been recorded in our Geo Environ Database for drainage structures and are also shown on our Geographic Information System (GIS) package. Other culverts are likely to be found as investigations continue.

| | Location | Co-ordinates | Critical |
|---|---|---|---|
| 1 | Waterloo House to West of Trevethick Street | 305615, 207049 | No |
| 2 | Goat Mill Road | 305607, 206981 | No |
| 3 | South of Gurnos Farm | 304477, 208470 | No |
| 4 | The Walk - Brunswick Street to Outfall West of Dixon Street | 304879, 206918 | No |
| 5 | Lane between Hirwain Terrace and Billingham Crescent | 305081, 207392 | No |
| 6 | Rear Alexandra Road to rear Garth Villas | 305113, 207060 | Yes |
| 7 | Opposite Junction of Hawthorne Avenue and Walnut Way | 305066, 207663 | No |
| 8 | Lane between Hirwain Terrace and Billingham Crescent | 305094, 207466 | No |
| 9 | Lane between Hirwain Terrace and Billingham Crescent | 305106, 207354 | No |
| 10 | The Walk - Gwaelodygarth Road to Brunswick Street | 304867, 207276 | No |
| 11 | 20 Royal Crescent - next to Bishop Hedley High School | 305462, 207371 | No |
| 12 | Pantycelynen - below no 1 | 303874, 206375 | No |
| 13 | Park - Adjacent to Rose Garden | 304517, 207190 | No |
| 14 | Park - Bottom of Canteen Hill | 304355, 207273 | No |
| 15 | Goat Mill Road, Dowlais | 305628, 207077 | No |
| 16 | Lane between Hirwain Terrace and Billingham Crescent | 305093, 207451 | No |
| 17 | Rear Alexandra Road to rear Garth Villas | 305285, 206874 | No |
| 18 | The Walk - Gwaelodygarth Road to Brunswick Street | 304896, 207023 | No |

**Table 25: Merthyr Tydfil (North) – Significant Intakes**

### 7.8.2 Conclusions from the Flood Risk Maps

The Flood Risk Map for Merthyr Tydfil (North )indicate that the main cause of flood risk for the area relates to ordinary watercourses and the intakes to existing surface water culverts. Generally this correlates with the experience gained by the drainage team over the past 25 years however, it is believed that the risk is overstated as the full capacity of the existing culverts was not included in the modelling process when the Maps were prepared.

| COUNTS FOR MERTHYR TYDFIL (NORTH) COMMUNITY AREA | | | | |
|---|---|---|---|---|
| | **Total in defined area** | **Risk Counts** | | |
| | | **LOW** | **MED** | **HIGH** |
| **Risk to People and Property** | | Residents in areas at risk of flooding depth >0.0m | | |
| People (n) (multiplier 2.35) | 15,,275 | 1,154 | 261 | 282 |
| | | Residential Properties at risk of internal flooding depth >0.2m | | |
| Residential Properties (n) | 6,500 | 221 | 89 | 30 |
| Services (n) | 18 | 5 | 1 | 0 |
| **Risk to Economic Activity** | | | | |
| Non-Residential Properties (n) | 668 | 63 | 25 | 11 |
| Airports (n) | 0 | 0 | 0 | 0 |
| Primary/Trunk Roads (km) | 3.8 | 1.2 | 0.19 | 0.30 |
| Main Line Railways (km) | 0 | 0 | 0 | 0 |
| Agricultural Land – Grades 1, 2 and 3 (ha) | 0 | 0 | 0 | 0 |
| **Risk to Natural and Historic Environment** | | | | |
| Bathing Waters (n) | 0 | 0 | 0 | 0 |
| Environmental Permitting Regulations (EPR) Installations (n) | 0 | 0 | 0 | 0 |
| Special Areas of Conservation (SAC) (ha) | 0 | 0 | 0 | 0 |
| Special Protection Areas (SPA) (ha) | 0 | 0 | 0 | 0 |
| Ramsar Sites (ha) | 0 | 0 | 0 | 0 |
| World Heritage Sites (ha) | 0 | 0 | 0 | 0 |
| Sites of Special Scientific Interest (SSSI) (ha) | 0 | 0 | 0 | 0 |
| Parks and Gardens (ha) | 60 | 1.6 | 0.29 | 1.4 |
| Scheduled Ancient Monuments (ha) | 3.1 | 0.29 | 0.06 | 0.40 |
| Listed Buildings (n) | 44 | 8 | 1 | 2 |
| Licensed Abstractions (LA) (n) | 0 | 0 | 0 | 0 |
| Sites of Interest for Nature Conservation (SINC) (ha) | 42 | 1.8 | 0.49 | 2.4 |

**Table 26: Merthyr Tydfil (North) – Counts for Various Risks**

### 7.8.3 Measures and objectives to mitigate flood risk (Revenue & Capital)

**Cyfarthfa Lake**

The main sources of flood risk relates to the following:-

MN01 Low to high level of flood risk to properties on Goitre Lane, Gwaunfarren Road, Gwaelodygarth Lane due to the failure of intakes and culverts taking the flow into the Nant Morlais.
See measure MBC M04.
Category: M24 - Prevention
Objectives 1, 2, 3, 4
Time Scale 2016 - 2021
Cost £5,000

MN02 Low to high level of flood risk to Goitre Infants School, Goitre Primary School, St Aloysius Primary School and properties on Gwaelodygarth Close, Brooklands Close, The Walk, Brecon Road, Bethesda Street, Vulcan Road, and Dixon Street.
See measure MBC M04.
Category: M24 - Prevention
Objectives: 1, 2, 3, 4
Time Scale: 2016 - 2021
Cost: £5,000

MN03 Low to high level of flood risk to properties in Trevethick Street due to the failure of critical intakes, culverts and open channels taking the flow in the Nant Morlais.
See measure MBC M04.
Category: M24 - Prevention
Objectives: 1, 2, 3, 4
Time Scale: 2016 - 2021
Cost: £5,000

MN04 Low to high level of flood risk to properties in Gwaenfarren Road, Plantation Close, Bishops Grove and Royal Crescent due to the failure of various intakes and culverts.
See measure MBC M04.
Category: M24 - Prevention
Objectives: 1, 2, 3, 4
Time Scale: 2016 - 2021
Cost: £5,000

MN05 Low to high level of flood risk to properties in Crabapple Close, Fernhill Close and Gurnos Ring Road due to the failure of various intakes and culverts.
See measure MBC M04.
Category: M24 - Prevention
Objectives: 1, 2, 3, 4
Time Scale: 2016 - 2021
Cost: £5,000

MN06 Low to high level of flood risk to properties in Gurnos Road, Sycamore Road and Maple Close due to the accumulation of surface water.
See measure MBC M05.
Category: M24 - Prevention
Objectives: 1, 2, 3, 4
Time Scale: 2016 - 2021
Cost: £2,000

MN07 Low to high level of flood risk to properties on Cyfarthfa Industrial Estate, EFI Industrial Estate, Pandy Close, Breacon Road, Cyfarthfa Junior School, Gwaelodygarth Lane and Riversiade Park due to the accumulation of surface water.
See measure MBC M05.
Category: M24 - Prevention
Objectives 1, 2, 3, 4
Time Scale 2016 - 2021
Cost £2,000

MN08 Flood Forum - See measure MBC M01 for whole borough.
Category: M43 - Preparedness
Time Scale: 2016 – 2021
Objectives: 1, 2, 3, 4, 10
Cost: £2,000

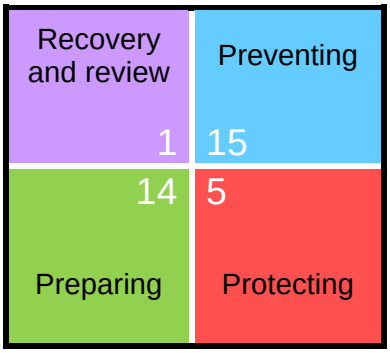
MN09 Flood Warning - See measure MBC M02 for whole borough.
Category: M41 – Preparedness
Time Scale: 2016 – 2021
Objectives: 8
Cost: £2,000

**See also measures for whole borough as detailed in 7.1.3 above**

**Total cost of measures for Merthyr Tydfil (North) Community Area £33,000**

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

**Number of Measures in each Category**

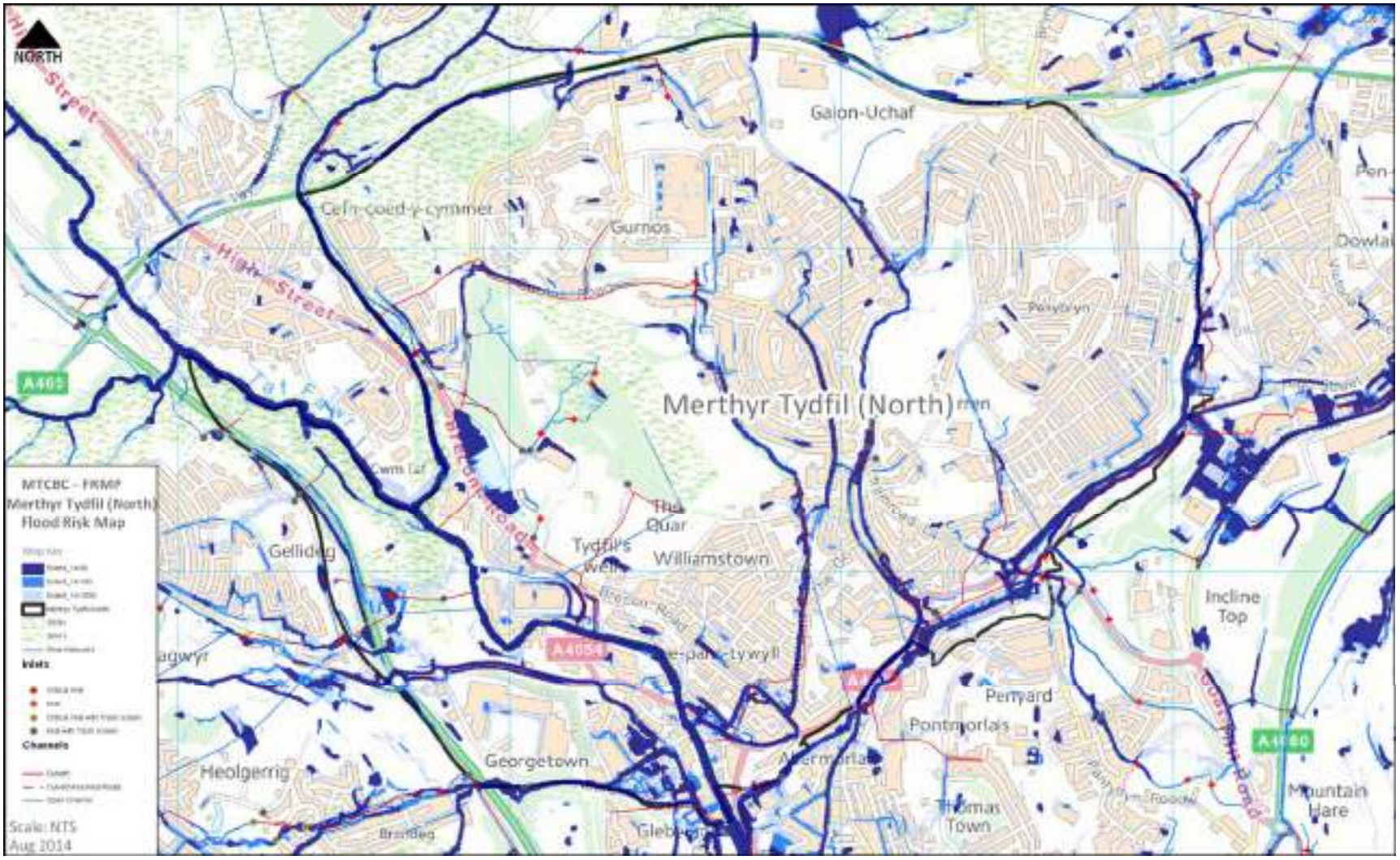



| | MERTHYR TYDFIL (NORTH) COMMUNITY AREA Properties in areas at risk of flooding depth > 0.0m | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | LOW | | | MEDIUM | | | HIGH | | |
| Measure | RES | NON-RES | SER | RES | NON-RES | SER | RES | NON-RES | SER |
| MN01 | 34 | 5 | 1 | 19 | 2 | 0 | 9 | 2 | 0 |
| MN02 | 69 | 14 | 1 | 12 | 9 | 1 | 11 | 2 | 0 |
| MN03 | 47 | 1 | 0 | 36 | 2 | 0 | 34 | 1 | 0 |
| MN04 | 15 | 1 | 0 | 3 | 1 | 0 | 1 | 0 | 0 |
| MN05 | 48 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 |
| MN06 | 11 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 |
| MN07 | 36 | 7 | 1 | 1 | 1 | 0 | 2 | 0 | 0 |
| MN08 | No counts required | | | | | | | | |
| MN09 | No counts required | | | | | | | | |
| TOTAL | 260 | 29 | 4 | 74 | 15 | 1 | 57 | 5 | 0 |

**Table 27: Merthyr Tydfil (North) - Potential Reduction in Flood Risk for Each Measure**

**7.8.4**

**Figure 16: Merthyr Tydfil (North) - Flood Risk Map**



## 7.9 Merthyr Tydfil (South) Community Area

### 7.9.1 Overview

Merthyr Tydfil (South) Community Area is situated in the north central sector of MTCBC. It covers an area of 766 hectares made up of two very distinct and contrasting areas. To the east of the A4060 road is the unpopulated hillside of Merthyr Common which also contains part of the Llys y fran opencast site. In the west the whole area has been developed for housing, schools, offices, shops and factory units. The commercial area is on relatively flat low laying land immediately to the east of the Afon Taf .

The hillside of Merthyr Common drains into the Nant Gyrawd in the east which feeds into the Bargod Taf and the central area drains directly into the Bargod Taf. The western part of the common drains into the Nant Cwmblacs which connects to the Afon Taf. The northern part of the town area drains into the Morlais brook which joins the Afon Taf but most of this area drains into the Afon Taf through a series of old culverts.

There are known to be 21 significant intakes in the area as listed below, none of which are critical. These features have been recorded in our Geo Environ Database for drainage structures and are also shown on our Geographic Information System (GIS) package. Other culverts are likely to be found as investigations continue.

| | Location | Co-ordinates | Critical |
|---|---|---|---|
| 1 | South and East of Oak Tree Rise - Hillside East of A4060 | 306153, 205577 | No |
| 2 | High Street Car Park | 305087, 206598 | No |
| 3 | East of Oak Tree Rise | 305420, 204966 | No |
| 4 | East of Oak Tree Rise | 305403, 204959 | No |
| 5 | East of Aneurin Crescent | 306236, 205433 | No |
| 6 | Ducks Pool | 305891, 206410 | No |
| 7 | Goat Mill Road, Dowlais | 305895, 206600 | No |
| 8 | Hoovers Roundabout | 305615, 204706 | No |
| 9 | Gwalia Place | 305158, 206676 | No |
| 10 | Goat Mill Road, Dowlais | 306168, 206523 | No |
| 11 | East of Aneurin Crescent | 306143, 205395 | No |
| 12 | South Link Road to Goatmill Road | 306362, 206572 | No |
| 13 | South West of 17 Penheolferthyr | 306221, 205983 | No |
| 14 | 2nd Culvert on Bogey Road from A4060 | 306696, 205960 | No |
| 15 | Car Park - rear Civic Centre to River Taff | 304819, 206372 | No |
| 16 | Pease Lane | 305498, 205269 | No |
| 17 | Front of Cosy Nook, Annes Close | 305299, 205591 | No |
| 18 | East of Aneurin Crescent | 306080, 205375 | No |
| 19 | Goat Mill Road, Dowlais | 305717, 206942 | No |
| 20 | Ducks Pool | 305782, 206556 | No |
| 21 | Pease Lane | 305457, 205277 | No |

**Table 28 Merthyr Tydfil (South) – Significant Intakes**

### 7.9.2 Conclusions from the Flood Risk Maps

The Flood Risk Map for Merthyr Tydfil (South) indicate that the main cause of flood risk for the area relates to ordinary watercourses and the intakes to existing surface water culverts. Generally this correlates with the experience gained by the drainage team over the past 25 years however, it is believed that the risk is overstated as the full capacity of the existing culverts was not included in the modelling process when the Maps were prepared.

| COUNTS FOR MERTHYR TYDFIL (SOUTH) COMMUNITY AREA | | | | |
|---|---|---|---|---|
| | Total in defined area | Risk Counts | | |
| | | LOW | MED | HIGH |
| **Risk to People and Property** | | Residents in areas at risk of flooding depth >0.0m | | |
| People (n) (multiplier 2.35) | 8,439 | 712 | 242 | 139 |
| | | Residential Properties at risk of internal flooding depth >0.2m | | |
| Residential Properties (n) | 3,591 | 135 | 49 | 23 |
| Services (n) | 9 | 1 | 0 | 0 |
| **Risk to Economic Activity** | | | | |
| Non-Residential Properties (n) | 824 | 132 | 89 | 32 |
| Airports (n) | 0 | 0 | 0 | 0 |
| Primary/Trunk Roads (km) | 4.1 | 1.6 | 0.43 | 0.37 |
| Main Line Railways (km) | 1.5 | 0.07 | 0.03 | 0.03 |
| Agricultural Land – Grades 1, 2 and 3 (ha) | 0 | 0 | 0 | 0 |
| **Risk to Natural and Historic Environment** | | | | |
| Bathing Waters (n) | 0 | 0 | 0 | 0 |
| Environmental Permitting Regulations (EPR) Installations (n) | 0 | 0 | 0 | 0 |
| Special Areas of Conservation (SAC) (ha) | 0 | 0 | 0 | 0 |
| Special Protection Areas (SPA) (ha) | 0 | 0 | 0 | 0 |
| Ramsar Sites (ha) | 0 | 0 | 0 | 0 |
| World Heritage Sites (ha) | 0 | 0 | 0 | 0 |
| Sites of Special Scientific Interest (SSSI) (ha) | 0 | 0 | 0 | 0 |
| Parks and Gardens (ha) | 0 | 0 | 0 | 0 |
| Scheduled Ancient Monuments (ha) | 15.8 | 0.27 | 0.04 | 0.12 |
| Listed Buildings (n) | 57 | 3 | 1 | 1 |
| Licensed Abstractions (LA) (n) | 4 | 1 | 0 | 0 |
| Sites of Interest for Nature Conservation (SINC) (ha) | 20 | 1.4 | 0.55 | 2.4 |

The counts representing flood risk from surface water in this area may be overstated as they include properties also at risk from river flooding.

**Table 29: Merthyr Tydfil (South) - Counts for Various Risks**

### 7.9.3 Measures and objectives to mitigate flood risk (Revenue & Capital)

**Intake to twin box culverts on the Nant Morlais**

The main sources of flood risk relates to the following:-

MS01 Low to high level of flood risk on Merthyr Common on the catchment to the Cwm Blacks watercourse due to the failure of existing intakes and culverts.
See measure MBC M04.
Category: M24 - Prevention
Objectives: 1, 2, 3, 4
Time Scale: 2016 - 2021
Cost: £5,000

MS02 Low to high level of flood risk on Queens Road, Lower Thomas Street, Church Street, Union Street and Tramroad Side North due to the failure of existing manhole and culverts.
See measure MBC M04.
Category: M24 - Prevention
Objectives: 1, 2, 3, 4
Time Scale: 2016 - 2021
Cost: £5,000

MS03 Low to high level of flood risk to properties on Ernest Street, Clare Street and David Street due to failure of intakes and culverts.
See measure MBC M04.
Category: M24 - Prevention
Objectives: 1, 2, 3, 4
Time Scale: 2016 - 2021
Cost: £5,000

MS04 Low to high levels of flood risk to commercial and residential properties on low lying land immediately to the east of the Afon Taf and adjacent to the Nant Morlais, including The Rink, Glyn Terrace, Penydarren Road, High Street, Castle Street, Glebeland Street, Victoria Street and Swan Street. Flood risk due to river flows is likely to be contributing to flood risk in this area.
See measure MBC M04.
Category: M24 - Prevention
Objectives: 1, 2, 3, 4
Time Scale: 2016 - 2021
Cost: £5,000

MS05 Low to high flood risk to residential and commercial properties due to the failure of the critical intake and culvert taking the Nant Cwm Blacks into the Afon Taf.
See measure MBC M04.
Category: M24 - Prevention
Objectives: 1, 2, 3, 4
Time Scale: 2016 - 2021
Cost: £5,000

MS06 Low to high level of flood risk on Twynrodyn Community School, TY Cwm, Gilfach-Cynon, Twynrodyn Road, Tramroad Side South, Hampton Street, Alma Street and Windsor Terrace due to the failure of existing intakes and culverts.
See measure MBC M04.
Category: M24 - Prevention
Objectives: 1, 2, 3, 4
Time Scale: 2016 - 2021
Cost: £5,000

MS07 Low to high level of flood risk on Merthyr Common on the catchment to the Bargod Taf due to the failure of existing intakes and culverts.
No further investigation is proposed.

MS08 Low level flood risk on highways and to residential properties due to the accumulation of surface water on Baden Terrace, Glasier Road and Lower Thomas Street.
No further investigation is proposed.

MS09 Flood Forum - See measure MBC M01 for whole borough.
Category: M43 - Preparedness
Objectives: 1, 2, 3, 4, 10
Time Scale: 2016 – 2021
Cost: £2,000

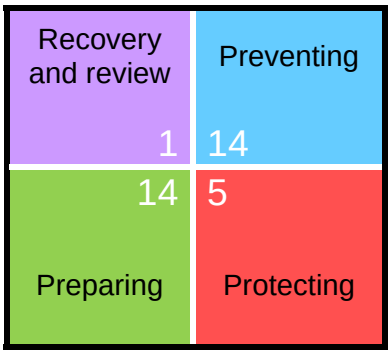
MS10 Flood Warning - See measure MBC M02 for whole borough.
Category: M41 - Preparedness
Objectives: 8
Time Scale: 2016 – 2021
Cost: £2,000

**See also measures for whole borough as detailed in 7.1.3 above**

**Total cost of measures for Merthyr Tydfil (South) Community Area £34,000**

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

**Number of Measures in each Category**

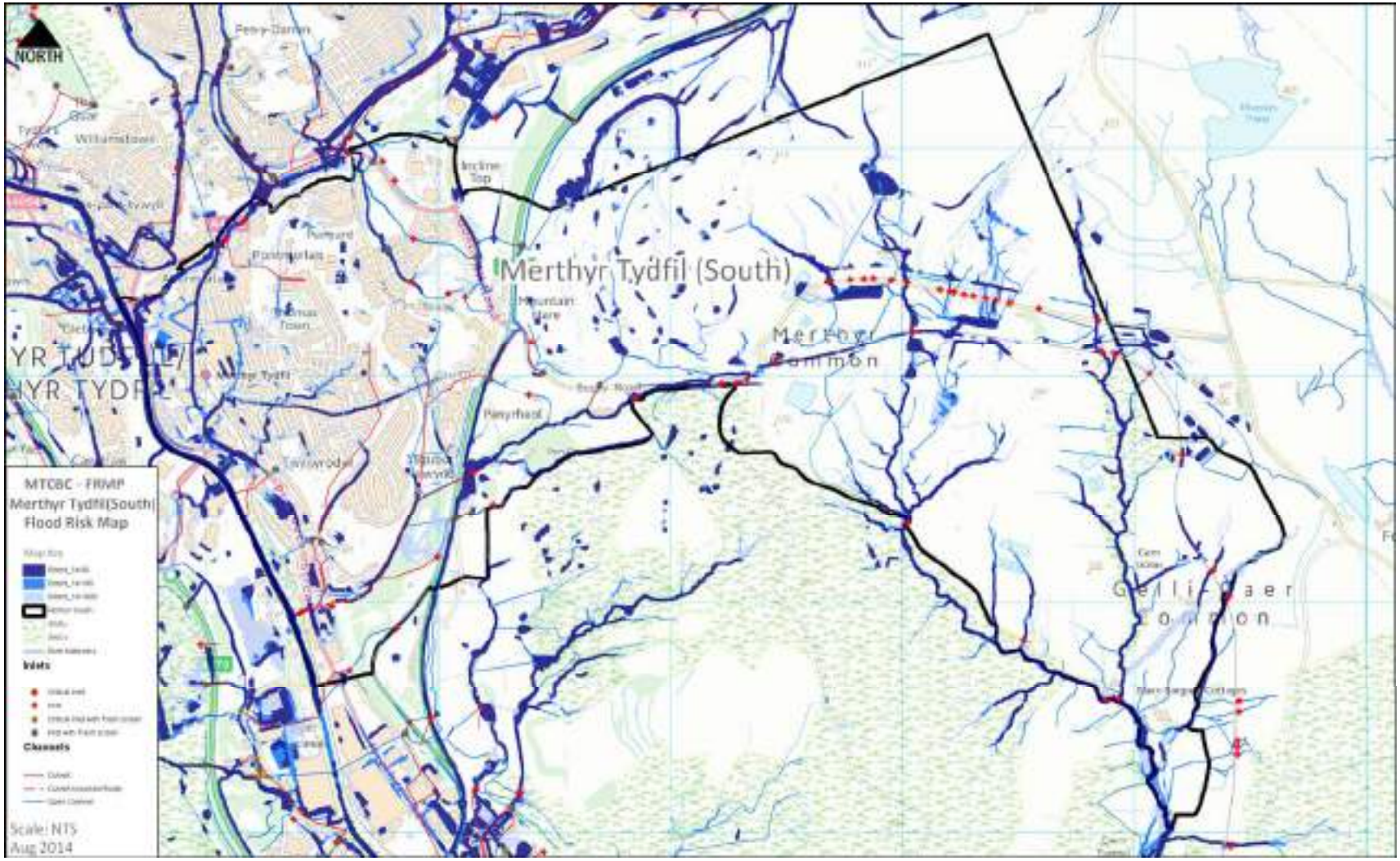



| | MERTHYR (SOUTH) COMMUNITY AREA Properties in areas at risk of flooding depth > 0.0m | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | LOW | | | MEDIUM | | | HIGH | | |
| Measure | RES | NON-RES | SER | RES | NON-RES | SER | RES | NON-RES | SER |
| MS01 | 1 | 4 | 0 | 1 | 1 | 0 | 3 | 5 | 0 |
| MS02 | 26 | 4 | 0 | 9 | 1 | 0 | 0 | 0 | 0 |
| MS03 | 30 | 1 | 0 | 17 | 0 | 0 | 19 | 1 | 0 |
| MS04 | 90 | 96 | 1 | 57 | 74 | 0 | 28 | 25 | 0 |
| MS05 | 25 | 6 | 0 | 8 | 5 | 0 | 2 | 0 | 0 |
| MS06 | 43 | 14 | 0 | 8 | 5 | 0 | 5 | 0 | 0 |
| MS07 | No counts required | | | | | | | | |
| MS08 | No counts required | | | | | | | | |
| MS09 | No counts required | | | | | | | | |
| MS10 | No counts required | | | | | | | | |
| TOTAL | 215 | 115 | 1 | 100 | 86 | 0 | 57 | 31 | 0 |

**Table 30: Merthyr Tydfil (South) - Potential Reduction in Flood Risk for Each Measure**

**7.9.4**

**Figure 17: Merthyr Tydfil (South) - Flood Risk Map**



## 7.10 Merthyr Vale Community Area

### 7.10.1 Overview

Merthyr Vale Community Area is situated in the south central sector of MTCBC. It covers an area of 389 hectares consisting mainly of hillside that slopes steeply down from the east to west with housing concentrated on the lower slopes and in the valley floor on the western bank of the Afon Taf.

The catchment drains into the Afon Taf through a number of un-named watercourses.

There are known to be 5 significant intakes in the area as listed below, none of which are critical. These features have been recorded in our Geo Environ Database for drainage structures and are also shown on our Geographic Information System (GIS) package. Other culverts are likely to be found as investigations continue.

| | Location | Co-ordinates | Critical |
|---|---|---|---|
| 1 | A4054 - Pennant House | 307633, 199922 | No |
| 2 | Colliery Site | 307575, 199612 | No |
| 3 | Action Garage - opposite | 307724, 199751 | No |
| 4 | Tram Road - Grays Place | 307712, 199673 | No |
| 5 | Tram Road - Grays Place | 307650, 199650 | No |

**Table 31: Merthyr Vale – Significant Intakes**

### 7.10.2 Conclusions from the Flood Risk Maps

The Flood Risk Map for Merthyr Vale indicates that there is only a small flood risk in this area due mainly to accumulations of surface water. Generally this correlates with the experience gained by the drainage team over the past 25 years, however, it is believed that the risk is overstated as the full capacity of the existing culverts was not included in the modelling process when the Maps were prepared. There is known to be a flood risk at Dan-y-Deri Farm which is not shown on the maps.

| COUNTS FOR MERTHYR VALE COMMUNITY AREA | | | | |
|---|---|---|---|---|
| | Totals in defined area | Risk Counts | | |
| | | LOW | MED | HIGH |
| **Risk to People and Property** | | Residential Properties in areas at risk of flooding depth >0.0m | | |
| People (n) (multiplier 2.35) | 1,445 | 61 | 21 | 9 |
| | | Residential Properties at risk of internal flooding depth >0.2m | | |
| Residential Properties (n) | 615 | 11 | 6 | 4 |
| Services (n) | 1 | 0 | 0 | 0 |
| **Risk to Economic Activity** | | | | |
| Non-Residential Properties (n) | 66 | 1 | 0 | 0 |
| Airports (n) | 0 | 0 | 0 | 0 |
| Primary/Trunk Roads (km) | | | | |
| Main Line Railways (km) | 3.5 | 0.15 | 0.07 | 0.09 |
| Agricultural Land – Grades 1, 2 and 3 (ha) | 0 | 0 | 0 | 0 |
| **Risk to Natural and Historic Environment** | | | | |
| Bathing Waters (n) | 0 | 0 | 0 | 0 |
| Environmental Permitting Regulations (EPR) Installations (n) | 0 | 0 | 0 | 0 |
| Special Areas of Conservation (SAC) (ha) | 0 | 0 | 0 | 0 |
| Special Protection Areas (SPA) (ha) | 0 | 0 | 0 | 0 |
| Ramsar Sites (ha) | 0 | 0 | 0 | 0 |
| World Heritage Sites (ha) | 0 | 0 | 0 | 0 |
| Sites of Special Scientific Interest (SSSI) (ha) | 0 | 0 | 0 | 0 |
| Parks and Gardens (ha) | 0 | 0 | 0 | 0 |
| Scheduled Ancient Monuments (ha) | 11.9 | 0 | 0 | 0 |
| Listed Buildings (n) | 0 | 0 | 0 | 0 |
| Licensed Abstractions (LA) (n) | 0 | 0 | 0 | 0 |
| Sites of Interest for Nature Conservation (SINC) (ha) | 115 | 1.8 | 1.8 | 2.5 |

The counts representing flood risk from surface water in this area may be overstated as they include properties also at risk from river flooding.

**Table 32: Merthyr Vale - Counts for Various Risks**

### 7.10.3 Measures and objectives to mitigate flood risk (Revenue & Capital)

**Dischage to Afon Taf with depth gauge**

The main sources of flood risk relates to the following:-

MV01 Low to high level flood risk on Taff Street, Tudor Close, Crescent Street and Grays Place due to the accumulation of surface water.
See measure MBC M05
Category: M24 - Prevention
Objectives: 1, 2, 3, 4
Time Scale: 2016 – 2021
Cost: £2,000

MV02 Low to high level flood risk on Cardiff Road due to the failure of intakes and culverts on the hillside to above.
See measure MBC M04.
Category: M24 - Prevention
Objectives: 1, 2, 3, 4
Time Scale: 2016 – 2021
Cost: £5,000

MV03 Although not shown on the Flood Risk Map there is known to be flood risk at Dan-y-Deri Farm due to problems with the existing intake and culvert.
See measure MBC M04.
Category: M24 - Prevention
Objectives: 1, 2, 3, 4
Time Scale: 2016 – 2021
Cost: £5,000

MV04 Flood Forum - See measure MBC M01 for whole borough.
Category: M43 - Preparedness
Objectives: 1, 2, 3, 4, 10
Time Scale: 2016 – 2021
Cost: £2,000

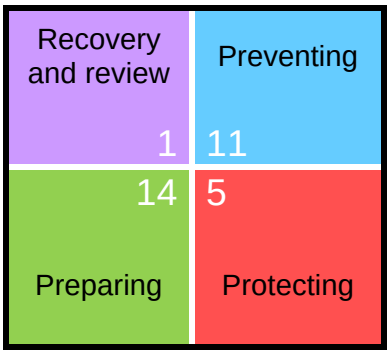
MV05 Flood Warning - See measure MBC M02 for whole borough.
Category: M41 - Preparedness
Time Scale: 2016 – 2021
Objectives: 8
Time Scale: 2016 – 2021
Cost: £2,000

**See also measures for whole borough as detailed in 7.1.3 above**

**Total cost of measures for Merthyr Vale Community Area £16,000**

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

**Number of Measures in each Category**

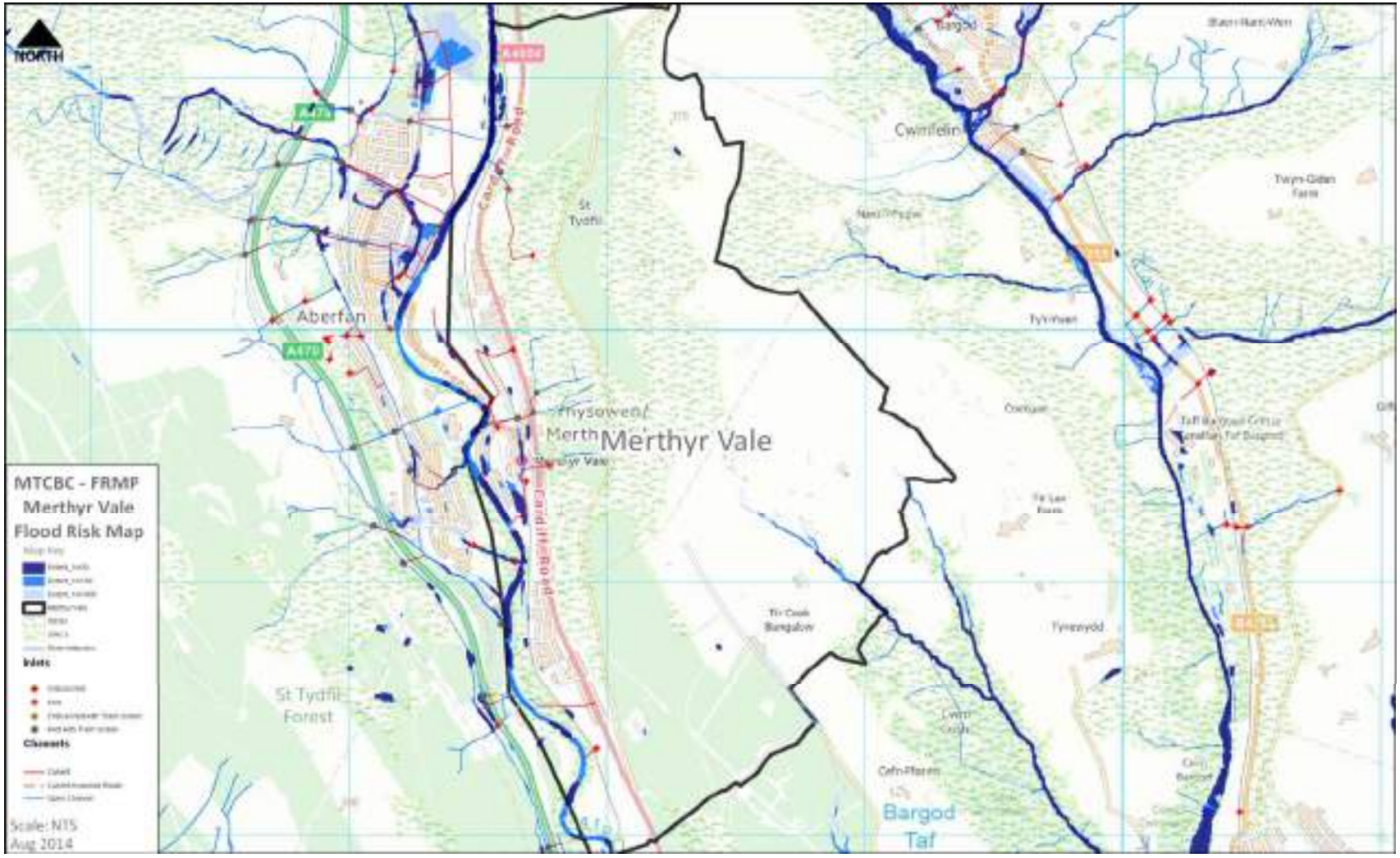


| | MERTHYR VALE COMMUNITY AREA<br>Properties in areas at risk of flooding depth > 0.0m | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | LOW | | | MEDIUM | | | HIGH | | |
| Measure | RES | NON-RES | SER | RES | NON-RES | SER | RES | NON-RES | SER |
| MV01 | 23 | 1 | 0 | 9 | 0 | 0 | 4 | 0 | 0 |
| MV02 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| MV03 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| MV04 | No counts required | | | | | | | | |
| MV05 | No counts required | | | | | | | | |
| TOTAL | 24 | 1 | 0 | 9 | 0 | 0 | 4 | 0 | 0 |

**Table 33: Merthyr Vale - Potential Reduction in Flood Risk for each Measure**

**7.10.4**

**Figure 18: Merthyr Vale - Flood Risk Map**



## 7.11 Pentrebach Community Area

### 7.11.1 Overview

Pentrebach Community Area is situated in the central sector of MTCBC to the south east of Merthyr town. It covers an area of 641 hectares consisting mainly of hillside that slopes steeply down from the east to west with housing concentrated in the valley floor on the western bank of the Afon Taf.

The catchment is drained by the Nany Yr Odyn and a number of un-named watercourses all of which discharge into the Afon Taf through the existing drainage system.

There are known to be 18 significant intakes in the area as listed below, five of which are critical. These features have been recorded in our Geo Environ Database for drainage structures and are also shown on our Geographic Information System (GIS) package. Other culverts are likely to be found as investigations continue.

| | Location | Co-ordinates | Critical |
|---|---|---|---|
| 1 | North of 12 Duffryn Fawr, Adjacent to Gate | 306747, 203552 | No |
| 2 | East of 17 St James Close | 306351, 204175 | No |
| 3 | Chapel Close Car Park, Plymouth Gardens to Greenfield Court Outfall | 306451, 203916 | No |
| 4 | East of 17 St James Close | 306354, 204173 | No |
| 5 | North of Glynmill | 305820, 204893 | No |
| 6 | Adjacent to No1 Maestaf Street | 306178, 203755 | No |
| 7 | Adjacent to No1 Maestaf Street | 306221, 203715 | No |
| 8 | Linde Industrial Park | 306794, 203116 | No |
| 9 | Linde Industrial Park | 306773, 203097 | No |
| 10 | Hillside above Wern Las Cottage | 306183, 204542 | No |
| 11 | Rear of St James Close, Greenfield Gardens to Outfall Plymouth Feed | 306302, 204108 | Yes |
| 12 | Hillside North of Cricket Club | 306315, 204098 | No |
| 13 | East of 12 Duffryn Fawr | 306730, 203547 | Yes |
| 14 | West of 5 Rhydfach | 306523, 203382 | Yes |
| 15 | East of Rhydfach | 306869, 203710 | No |
| 16 | East of 12 Duffryn Fawr - Overflow | 306732, 203548 | Yes |
| 17 | Cricket Club, Dyffryn Road, Greenfield School, Outfall to Plymouth | 306284, 203919 | Yes |
| 18 | East of Rhydfach | 306725, 203605 | No |

**Table 34: Pentrebach – Significant Intakes**

### 7.11.2 Conclusions from the Flood Risk Maps

The Flood Risk Map for Pentrebach indicate that the main cause of flood risk for the area relates to ordinary watercourses and the intakes to existing surface water culverts. Generally this correlates with the experience gained by the drainage team over the past 25 years, however, it is believed that the risk is overstated as the full capacity of the existing culverts was not included in the modelling process when the Maps were prepared.

| COUNTS FOR PENTREBACH COMMUNITY AREA | | | | |
|---|---|---|---|---|
| | Total in defined area | Risk Counts | | |
| | | LOW | MED | HIGH |
| **Risk to People and Property** | | Residents in areas at risk of flooding depth >0.0m | | |
| People (n) (multiplier 2.35) | 1,347 | 165 | 118 | 327 |
| | | Residential Properties at risk of internal flooding depth > 0.2m | | |
| Residential Properties (n) | 573 | 55 | 38 | 130 |
| Services (n) | 2 | 1 | 0 | 0 |
| **Risk to Economic Activity** | | | | |
| Non-Residential Properties (n) | 264 | 71 | 13 | 11 |
| Airports (n) | 0 | 0 | 0 | 0 |
| Primary/Trunk Roads (km) | 3.0 | 0.73 | 0.77 | 0.90 |
| Main Line Railways (km) | 2.3 | 0 | 0 | 0 |
| Agricultural Land – Grades 1, 2 and 3 (ha) | 0 | 0 | 0 | 0 |
| **Risk to Natural and Historic Environment** | | | | |
| Bathing Waters (n) | 0 | 0 | 0 | 0 |
| Environmental Permitting Regulations (EPR) Installations (n) | 0 | 0 | 0 | 0 |
| Special Areas of Conservation (SAC) (ha) | 0 | 0 | 0 | 0 |
| Special Protection Areas (SPA) (ha) | 0 | 0 | 0 | 0 |
| Ramsar Sites (ha) | 0 | 0 | 0 | 0 |
| World Heritage Sites (ha) | 0 | 0 | 0 | 0 |
| Sites of Special Scientific Interest (SSSI) (ha) | 0 | 0 | 0 | 0 |
| Parks and Gardens (ha) | 0 | 0 | 0 | 0 |
| Scheduled Ancient Monuments (ha) | 7.7 | 0.27 | 0.07 | 0.16 |
| Listed Buildings (n) | 2 | 0 | 0 | 1 |
| Licensed Abstractions (LA) (n) | 0 | 0 | 0 | 0 |
| Sites of Interest for Nature Conservation (SINC) (ha) | 372 | 10.0 | 2.3 | 4.8 |

The counts representing flood risk from surface water in this area may be overstated as they include properties also at risk from river flooding.

**Table 35: Pentrebach - Counts for Various Risks**

### 7.11.3 Measures and objectives to mitigate flood risk (Revenue & Capital)

**Intake at Rhydfach**

The main sources of flood risk relates to the following:-

PB01 Low to high level risk of flooding to factory units on both sides of Merthyr Road A4054 between the Abercanaid roundabout in the north and he Hoover roundabout in the south due to the failure of the Cwmblacks intake and culvert. The flood risk may also to contributed to by the failure of a number of intakes or culverts to the east and by river flooding.
See measure MBC M04
Category: M24 - Prevention
Objectives: 1, 2, 3, 4
Time Scale: 2016 – 2021
Cost: £5,000
.

PB02 Low to high flood risk to highways, houses, schools, superstore and commercial properties in Anthony Hill Court, Greenfield Gardens, St James Close, Greenfield School, Cwm Golau Integrated Children's Centre and Dyffryn Road. The main cause of flooding appears to be the failure of critical intakes and existing culverts taking surface water from the hillside above Pentrebach to the Afon Taf.
See measure MBC M04
Category: M24 - Prevention
Objectives: 1, 2, 3, 4
Time Scale: 2016 – 2021
Cost: £5,000

PB03 Low to high flood risk to highways, houses and commercial properties in Merthyr Tydfil Industrial Park, Plymouth Gardens, Castle Street, Hamilton Street, Dyffryn Road, Maestaf Street, Ceredig Street, Arthur Street, Penlan Street, George Terrace, Norman Terrace, Griffiths Terrace and Hafod Street due to the failure of intakes and culverts taking surface water from the hillside above Pentreback to the Afon Taf.
See measure MBC M04
Category: M24 - Prevention
Objectives 1, 2, 3, 4
Time Scale – 2016 – 2021
Cost £5,000
.

PB04 Flood Forum - See measure MBC M01 for whole borough.
Category: M43 - Preparedness
Objectives 1, 2, 3, 4, 10
Time Scale – 2016 – 2021
Cost £2,000

PB05 Flood Warning - See measure MBC M02 for whole borough.
Category: M41 - Preparedness
Objectives 8
Time Scale – 2016 – 2021
Cost £2,000

**See measures for whole borough as detailed in 7.1.3 above**

**Total cost of measures for Pentrebach Community Area £19,000**

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

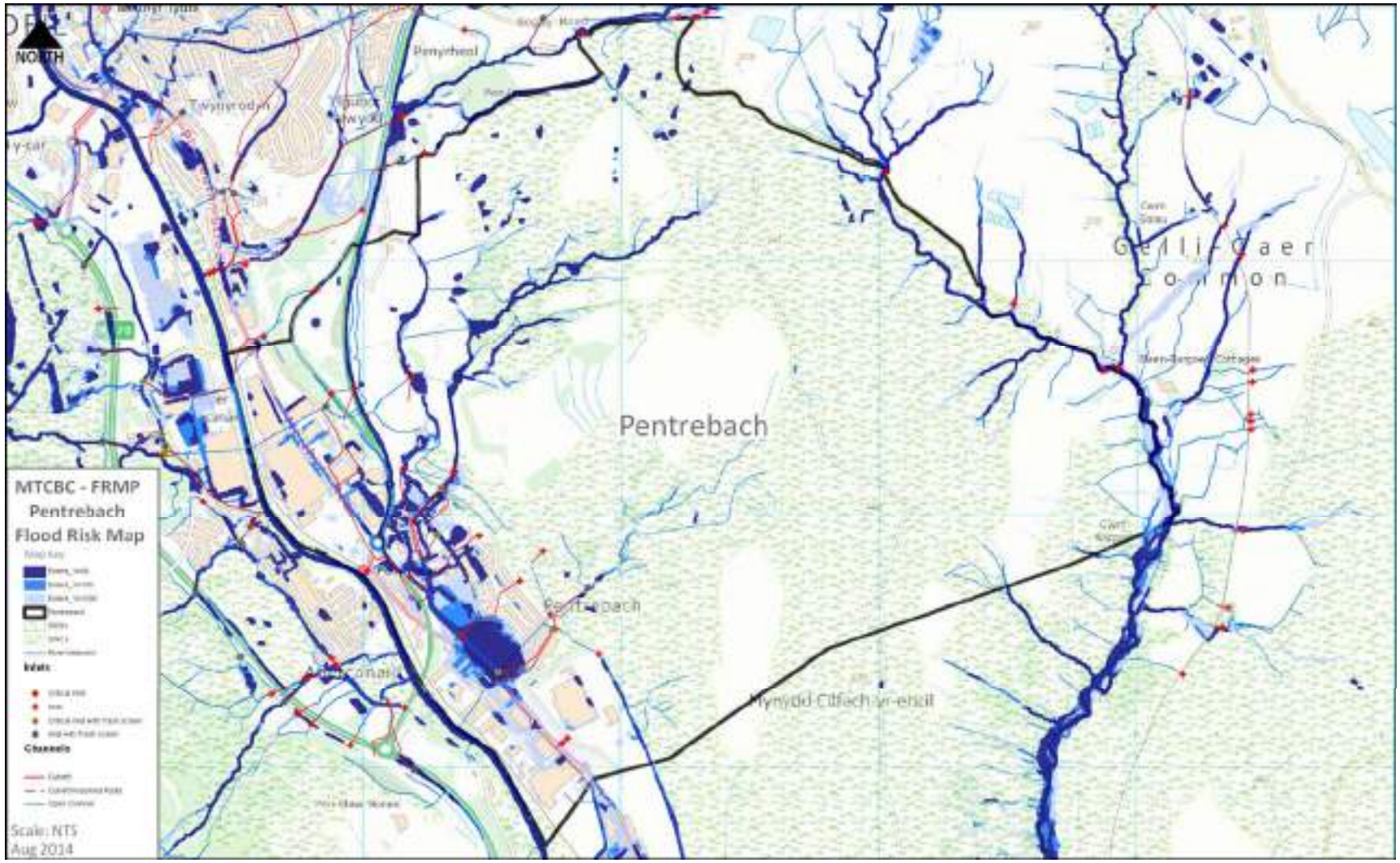
**Number of Measures in each Category**

| | PENTREBACH COMMUNITY AREA<br>Properties in areas at risk of flooding depth > 0.0m | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | LOW | | | MEDIUM | | | HIGH | | |
| Measure | RES | NON-RES | SER | RES | NON-RES | SER | RES | NON-RES | SER |
| PB01 | 0 | 18 | 0 | 0 | 2 | 0 | 0 | 2 | 0 |
| PB02 | 43 | 17 | 1 | 14 | 3 | 0 | 8 | 1 | 0 |
| PB03 | 27 | 31 | 0 | 36 | 8 | 0 | 131 | 7 | 0 |
| PB04 | No counts required | | | | | | | | |
| PB05 | No counts required | | | | | | | | |
| **TOTAL** | **70** | **66** | **1** | **50** | **13** | **0** | **139** | **10** | **0** |

**Table 36: Pentrebach - Potential Reduction in Flood Risk for Each Measure**

**7.11.4**

**Figure 19: Pentrebach - Flood Risk Map**



## 7.12 Troedyrhiw Community Area

### 7.15.1 Overview

Troedyrhiw Community Area is situated in the central sector of MTCBC. It covers an area of 615 hectares consisting mainly of hillside that slopes steeply down to the Afon Taf from both the east and west. The housing is concentrated on low lying land in the valley floor on both banks of the Afon Taf.

The western catchment is drained by the Nant Cwmddu in the north and a number of un-named watercourses in the south. The eastern catchment is drained by a number of un-named watercourses. All watercourses discharge into the Afon Taf.

There are known to be 23 significant intakes in the area as listed below, five of which are critical. These features have been recorded in our Geo Environ Database for drainage structures and are also shown on our Geographic Information System (GIS) package. Other culverts are likely to be found as investigations continue.

| | Location | Co-ordinates | Critical |
|---|---|---|---|
| 1 | 6-8, Upper Mount Pleasant | 307347, 202263 | No |
| 2 | 3 - 4, Upper Mount Pleasant | 307342, 202240 | No |
| 3 | Dynevor Arms - Canal Bank | 306656, 202412 | Yes |
| 4 | Harriet Town - Falls Cottage | 306699, 202448 | No |
| 5 | Plantation Cottages/Square | 306695, 202385 | No |
| 6 | Railway to River Outfall | 306880, 202610 | No |
| 7 | Cwmdu Road - Upper | 306674, 202017 | No |
| 8 | Railway to River Outfall | 306834, 202419 | No |
| 9 | Corner - No 6 Bryncoed Cottages | 307498, 201785 | Yes |
| 10 | Cwmdu Road - Canal Bank North | 306743, 202052 | No |
| 11 | Cwmdu Road - canal bank south | 306749, 202010 | No |
| 12 | Dynevor Arms | 306734, 202390 | Yes |
| 13 | Merthyr Road to rear of Taldwyn Terrace | 307248, 202625 | No |
| 14 | Cartref Bungalow - Aberfan Road | 307263, 201177 | No |
| 15 | West of Park Place - South | 306896, 201456 | No |
| 16 | Cwmdu Road | 306615, 202075 | No |
| 17 | South West of Plantation Square | 306591, 202311 | No |
| 18 | Merthyr Road to rear of Taldwyn Terrace | 307290, 202566 | No |
| 19 | Chapel Street | 307317, 202346 | Yes |
| 20 | Beech Grove | 307416, 201786 | Yes |
| 21 | North West of Plantation Square | 306534, 202519 | No |
| 22 | North West of Plantation Square | 306552, 202454 | No |
| 23 | West of Park Place - South | 306853, 201538 | No |

**Table 37: Troedyrhiw – Significant Intakes**

### 7.12.2 Conclusions from the Flood Risk Maps

The Flood Risk Map for Troedyrhiw indicate that the main cause of flood risk for the area relates to ordinary watercourses and the intakes to existing surface water culverts. Generally this correlates with the experience gained by the drainage team over the past 25 years, however, it is believed that the risk is overstated as the full capacity of the existing culverts was not included in the modelling process when the Maps were prepared.

| COUNTS FOR TROEDYRHIW COMMUNITY AREA | | | | |
|---|---|---|---|---|
| | Total in defined area | Risk Counts | | |
| | | LOW | MED | HIGH |
| **Risk to People and Property** | | Residents in areas at risk of flooding depth >0.0m | | |
| People (n) (multiplier 2.35) | 3,013 | 740 | 80 | 103 |
| | | Residential Properties at risk of internal flooding depth >0.2m | | |
| Residential Properties (n) | 1,282 | 286 | 28 | 33 |
| Services (n) | 5 | 2 | 0 | 1 |
| **Risk to Economic Activity** | | | | |
| Non-Residential Properties (n) | 172 | 46 | 3 | 3 |
| Airports (n) | 0 | 0 | 0 | 0 |
| Primary/Trunk Roads (km) | 3.0 | 0.22 | 0.01 | 0.01 |
| Main Line Railways (km) | 1.8 | 0.11 | 0.05 | 0.01 |
| Agricultural Land – Grades 1, 2 and 3 (ha) | 0 | 0 | 0 | 0 |
| **Risk to Natural and Historic Environment** | | | | |
| Bathing Waters (n) | 0 | 0 | 0 | 0 |
| Environmental Permitting Regulations (EPR) Installations (n) | 0 | 0 | 0 | 0 |
| Special Areas of Conservation (SAC) (ha) | 0 | 0 | 0 | 0 |
| Special Protection Areas (SPA) (ha) | 0 | 0 | 0 | 0 |
| Ramsar Sites (ha) | 0 | 0 | 0 | 0 |
| World Heritage Sites (ha) | 0 | 0 | 0 | 0 |
| Sites of Special Scientific Interest (SSSI) (ha) | 0 | 0 | 0 | 0 |
| Parks and Gardens (ha) | 51 | 1.7 | 0.45 | 0.29 |
| Scheduled Ancient Monuments (ha) | 0.09 | 0.00 | 0.00 | 0.00 |
| Listed Buildings (n) | 3 | 1 | 0 | 0 |
| Licensed Abstractions (LA) (n) | 1 | 0 | 0 | 0 |
| Sites of Interest for Nature Conservation (SINC) (ha) | 460 | 12.7 | 4.1 | 8.8 |

The counts representing flood risk from surface water in this area may be overstated as they include properties also at risk from river flooding.

**Table 38: Troedyrhiw - Counts for Various Risks**

### 7.12.3 Measures and objectives to mitigate flood risk (Revenue & Capital)

**Channel adjacent to war memorial with flood defence embankment on left**

The main sources of flood risk relates to the following:-

TD01 Low to high level flood risk covering the whole of the area between the Afon Taf and Cardiff Road - A4054 including Phyllis Street, Bridge Street, South Street, Pembroke Street, Archer Street and Troedyrhiw Junior School due to the failure of the Rhydfach intake and culvert and numerous other intakes on the hillside above. Flood risk in this area may also be caused by river flooding.
See measure MBC M04
Category: M24 - Prevention
Objectives: 1, 2, 3, 4
Time Scale: 2016 – 2021
Cost: £10,000

TD02 Low to high level risk covering the whole of the area around Haven Close on the west bank of the Afon Taf including Bridge Street, Elm Street, Poplar Street, Yew Street, Tyntaldwyn Road, Beach Greove, Henry Richard Street and Upper Mount Pleasant due to the failure of a numerous intakes and culverts. Flood risk in this area may also be caused by river flooding.
See measure MBC M04
Category: M24 - Prevention
Objectives: 1, 2, 3, 4
Time Scale: 2016 – 2021
Cost: £10,000

TD03 Low to high level risk on Cwmdu Road, Carlton Terrace, Queens Terrace and Haven Close due to the failure of the Nant Cwm Ddu intake and culvert and other numerous intakes. Flood risk in this area may also be caused by river flooding.
See measure MBC M04
Category: M24 - Prevention
Objectives: 1, 2, 3, 4
Time Scale: 2016 – 2021
Cost £5,000

TD04 Flood Forum - See measure MBC M01 for whole borough.
Category: M43 - Preparedness
Objectives: 1, 2, 3, 4, 10
Time Scale: 2016 – 2021
Cost: £2,000

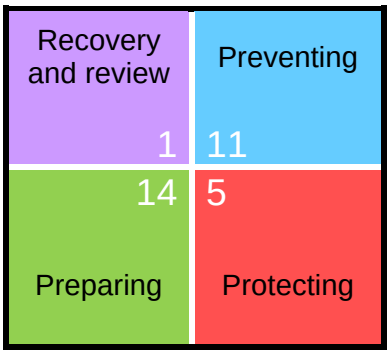
TH05 Flood Warning - See measure MBC M02 for whole borough.
Category: M41 - Preparedness
Objectives: 8
Time Scale: 2016 – 2021
Cost: £2,000

**See measures for whole borough as detailed in 7.1.3 above**

**Total cost of measures for Troedyrhiw Community Area £29,000**

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

**Number of Measures in each Category**

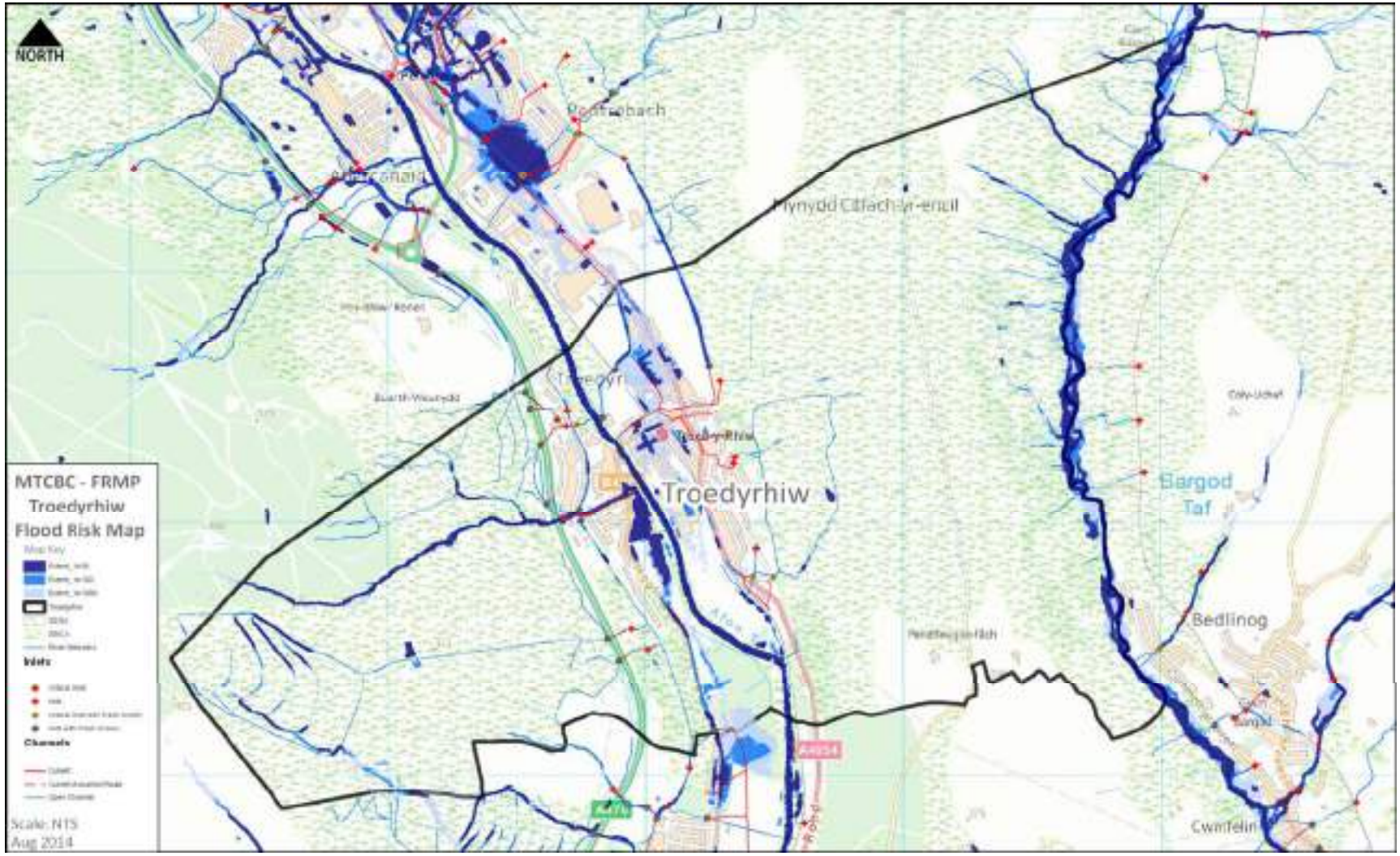


| | TROEDYRHIW COMMUNITY AREA<br>Properties in areas at risk of flooding depth > 0.0m | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | LOW | | | MEDIUM | | | HIGH | | |
| Measure | RES | NON-RES | SER | RES | NON-RES | SER | RES | NON-RES | SER |
| TD01 | 122 | 11 | 1 | 24 | 0 | 0 | 7 | 0 | 0 |
| TD02 | 177 | 32 | 1 | 7 | 3 | 0 | 10 | 0 | 0 |
| TD03 | 14 | 1 | 0 | 3 | 0 | 0 | 27 | 3 | 1 |
| TD04 | No counts required | | | | | | | | |
| TD05 | No counts required | | | | | | | | |
| **TOTAL** | **313** | **44** | **2** | **34** | **3** | **0** | **44** | **3** | **1** |

**Table 39: Troedyrhiw - Potential Reduction in Flood Risk for Each Measure**

**7.15.4**

**Figure 20: Troedyrhiw - Flood Risk Map**



# 8 MTCBC – Whole Borough (Community Areas outside the FRA)

## 8.1 Overview

This section covers the whole of MTCBC which includes the FRA and the four Community Areas outside the FRA. These community areas have been presented separately as they are not required for reporting to the EU.

### 8.1.2 Conclusions from the Flood Risk Maps

| COUNTS FOR MTCBC | | | | |
|---|---|---|---|---|
| | Totals in defined area | Risk Counts | | |
| | | LOW | MED | HIGH |
| **Risk to People and Property** | | Residents in areas at risk of flooding depth >0.0m | | |
| People (n) (multiplier 2.35) | 61,534 | 4,862 | 1,140 | 1,100 |
| | | Residential Properties at risk of internal flooding depth >0.2m | | |
| Residential Properties (n) | 26,185 | 981 | 253 | 269 |
| Services (n) | 86 | 18 | 1 | 2 |
| **Risk to Economic Activity** | | | | |
| Non-Residential Properties (n) | 4,592 | 494 | 169 | 117 |
| Airports (n) | 0 | 0 | 0 | 0 |
| Primary/Trunk Roads (km) | 57 | 11.7 | 3.7 | 4.4 |
| Main Line Railways (km) | 11.5 | 0.51 | 0.19 | 0.16 |
| Agricultural Land – Grades 1, 2 and 3 (ha) | 0 | 0 | 0 | 0 |
| **Risk to Natural and Historic Environment** | | | | |
| Bathing Waters (n) | 0 | 0 | 0 | 0 |
| Environmental Permitting Regulations (EPR) Installations (n) | 2 | 1 | 0 | 0 |
| Special Areas of Conservation (SAC) (ha) | 0 | 0 | 0 | 0 |
| Special Protection Areas (SPA) (ha) | 0 | 0 | 0 | 0 |
| Ramsar Sites (ha) | 0 | 0 | 0 | 0 |
| World Heritage Sites (ha) | 0 | 0 | 0 | 0 |
| Sites of Special Scientific Interest (SSSI) (ha) | 283 | 14.9 | 3.6 | 9.1 |
| Parks and Gardens (ha) | 176 | 5.9 | 1.2 | 2.2 |
| Scheduled Ancient Monuments (ha) | 67 | 1.7 | 0.39 | 0.60 |
| Listed Buildings (n) | 235 | 21 | 5 | 13 |
| Licensed Abstractions (LA) (n) | 9 | 2 | 0 | 1 |
| Sites of Interest for Nature Conservation (SINC) (ha) | 3,382 | 102 | 34 | 77 |

**Table 40: MTCBC - Counts for Various Risks**

The Flood Risk Map for MTCBC indicate that the main cause of flood risk for the area relates to ordinary watercourses and the intakes to existing surface water culverts. Generally this correlates with the experience gained by the drainage team over the past 25 years, however, it is believed that the risk is overstated as the full capacity of the existing culverts was not included in the modelling process when the Maps were prepared.

The counts representing flood risk from surface water in MTCBC may be overstated as they also include properties at risk from river flooding.

### 8.1.3 Measures and objectives to mitigate flood risk (Revenue & Capital)

**See details of measures and objectives in 7.1.3**

**Number of Measures in each Category**

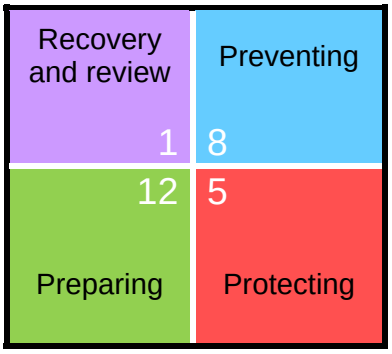



**Table 41: Total cost of measures for MTCBC outside the Flood Risk Area**

| Community Area | Cost |
|---|---|
| Bedlinog | £24,000 |
| Treharris | £27,000 |
| Trelewis | £19,000 |
| Vaynor | £20,000 |
| **TOTAL** | **£90,000** |

**The costs shown in this table relates to the cost of implementing measures at current prices. (June 2015)**

**Adding this sum to the cost of measures within the FRA (see section 7.1.3) gives a total financial requirement of £506,000 to implement all the measures within MTCBC.**

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

## 8.2 Bedlinog Community Area

### 8.2.1 Overview

Bedlinog Community Area is situated in the south eastern sector of MTCBC. It covers an area of 1,069 hectares consisting mainly of hillside that slopes steeply down from the east to west. Bedlinog village is situated on steeply sloping hillside immediately to the east of the Bargod Taf.

The northern sector is drained by the Nant Gruffydd and the Nant Fawr. The central and southern sector is drained by the Nant Llwynog, Nant Wen and the Nant y Garth and a number of un-named watercourses. All the watercourses discharge into the Bargod Taf.

There are known to be 14 significant intakes in the area as listed below, one of which is critical. These features have been recorded in our Geo Environ Database for drainage structures and are also shown on our Geographic Information System (GIS) package. Other culverts are likely to be found as investigations continue.

| | Location | Co-ordinates | Critical |
|---|---|---|---|
| 1 | East of High Street | 309661, 201534 | No |
| 2 | East of High Street | 309674, 201382 | No |
| 3 | North West of Bedw Road | 309101, 201648 | No |
| 4 | South East of Oakland Street | 309856, 200655 | No |
| 5 | The Square - War Memorial | 309527, 200945 | No |
| 6 | East of High Street | 309660, 201535 | No |
| 7 | East of High Street | 309672, 201382 | No |
| 8 | Commercial Street -Ty Nant | 309361, 201035 | No |
| 9 | Edwards Terrace | 309324, 201254 | No |
| 10 | Edwards Terrace | 309280, 201224 | No |
| 11 | 14 Oakland Street. | 309610, 200710 | No |
| 12 | North of Bedw Road | 308995, 201502 | Yes |
| 13 | Commercial Street - South of Bedlinog Primary School | 309202, 201198 | No |
| 14 | 1 Oakland Street. | 309583, 200804 | No |

**Table 42: Bedlinog – Significant Intakes**

### 8.2.2 Conclusions from the Flood Risk Maps

The Flood Risk Map for Bedlinog indicate that the main cause of flood risk for the area relates to ordinary watercourses and the intakes to existing surface water culverts. Generally this correlates with the experience gained by the drainage team over the past 25 years, however, it is believed that the risk is overstated as the full capacity of the existing culverts was not included in the modelling process when the Maps were prepared.

| COUNTS FOR BEDLINOG COMMUNITY AREA | | | | |
|---|---|---|---|---|
| | Total in defined area | Risk Counts | | |
| | | LOW | MED | HIGH |
| **Risk to People and Property** | | Residents in areas at risk of flooding depth >0.0m | | |
| People (n) (multiplier 2.35) | 1,567 | 14 | 2 | 5 |
| | | Residential Properties at risk of internal flooding depth >0.2m | | |
| Residential Properties (n) | 667 | 0 | 0 | 2 |
| Services (n) | 6 | 1 | 0 | 0 |
| **Risk to Economic Activity** | | | | |
| Non-Residential Properties (n) | 200 | 8 | 5 | 3 |
| Airports (n) | 0 | 0 | 0 | 0 |
| Primary/Trunk Roads (km) | 0 | 0 | 0 | 0 |
| Main Line Railways (km) | 0 | 0 | 0 | 0 |
| Agricultural Land – Grades 1, 2 and 3 (ha) | 0 | 0 | 0 | 0 |
| **Risk to Natural and Historic Environment** | | | | |
| Bathing Waters (n) | 0 | 0 | 0 | 0 |
| Environmental Permitting Regulations (EPR) Installations (n) | 0 | 0 | 0 | 0 |
| Special Areas of Conservation (SAC) (ha) | 0 | 0 | 0 | 0 |
| Special Protection Areas (SPA) (ha) | 0 | 0 | 0 | 0 |
| Ramsar Sites (ha) | 0 | 0 | 0 | 0 |
| World Heritage Sites (ha) | 0 | 0 | 0 | 0 |
| Sites of Special Scientific Interest (SSSI) (ha) | 0 | 0 | 0 | 0 |
| Parks and Gardens (ha) | 0 | 0 | 0 | 0 |
| Scheduled Ancient Monuments (ha) | 7.2 | 0 | 0 | 0 |
| Listed Buildings (n) | 1 | 0 | 0 | 0 |
| Licensed Abstractions (LA) (n) | 0 | 0 | 0 | 0 |
| Sites of Interest for Nature Conservation (SINC) (ha) | 572 | 10.1 | 4.3 | 7.7 |

**Table 43: Bedlinog - Counts for Various Risks**

### 8.2.3 Measures and objectives to mitigate flood risk (Revenue & Capital)

**Intake at Maes y Bedu**

The main sources of flood risk relates to the following:-

BL01 Low to high flood risk to properties on Oakland Street and Commercial Street due to the failure of intakes on the Nant Llwynog.
See measure MBC M04
Category: M24 - Prevention
Objectives: 1, 2, 3, 4
Time Scale: 2016 – 2021
Cost: £5,000

BL02 Low to high flood risk to properties on High Street, Edward Street and George Street due to the failure of intakes and culverts on un-named watercourse.
See measure MBC M04
Category: M24 - Prevention
Objectives: 1, 2, 3, 4
Time Scale: 2016 – 2021
Cost: £5,000

BL03 Although not shown on the maps a significant risk of flooding is known to exist to properties on Bedw Road, Coly Row, Hilton Terrace and Maes-y-Bedw due to the failure of a critical intake above Maes-y-Bedw.
See measure MBC M04
Category: M24 - Prevention
Objectives: 1, 2, 3, 4
Time Scale: 2016 – 2021
Cost: £5,000

BL04 Low to high flood risk is shown to properties immediately to the east of Bargod Taf at Garth Terrace. Flood risk in this area may be contributed to by the Bargod Taf.
See measure MBC M04
Category: M24 - Prevention
Objectives: 1, 2, 3, 4
Time Scale: 2016 – 2021
Cost: £5,000

BL05 Flood Forum - See measure MBC M01 for whole borough.
Category: M43 - Preparedness
Objectives: 1, 2, 3, 4, 10
Time Scale: 2016 – 2021
Cost: £2,000

BL06 Flood Warning - See measure MBC M02 for whole borough.
Category: M41 - Preparedness
Objectives: 8
Time Scale: 2016 – 2021
Cost: £2,000

**See also details of measures and objectives in 7.1.3**

**Total cost of measures for Bedlinog Community Area £24,000**

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

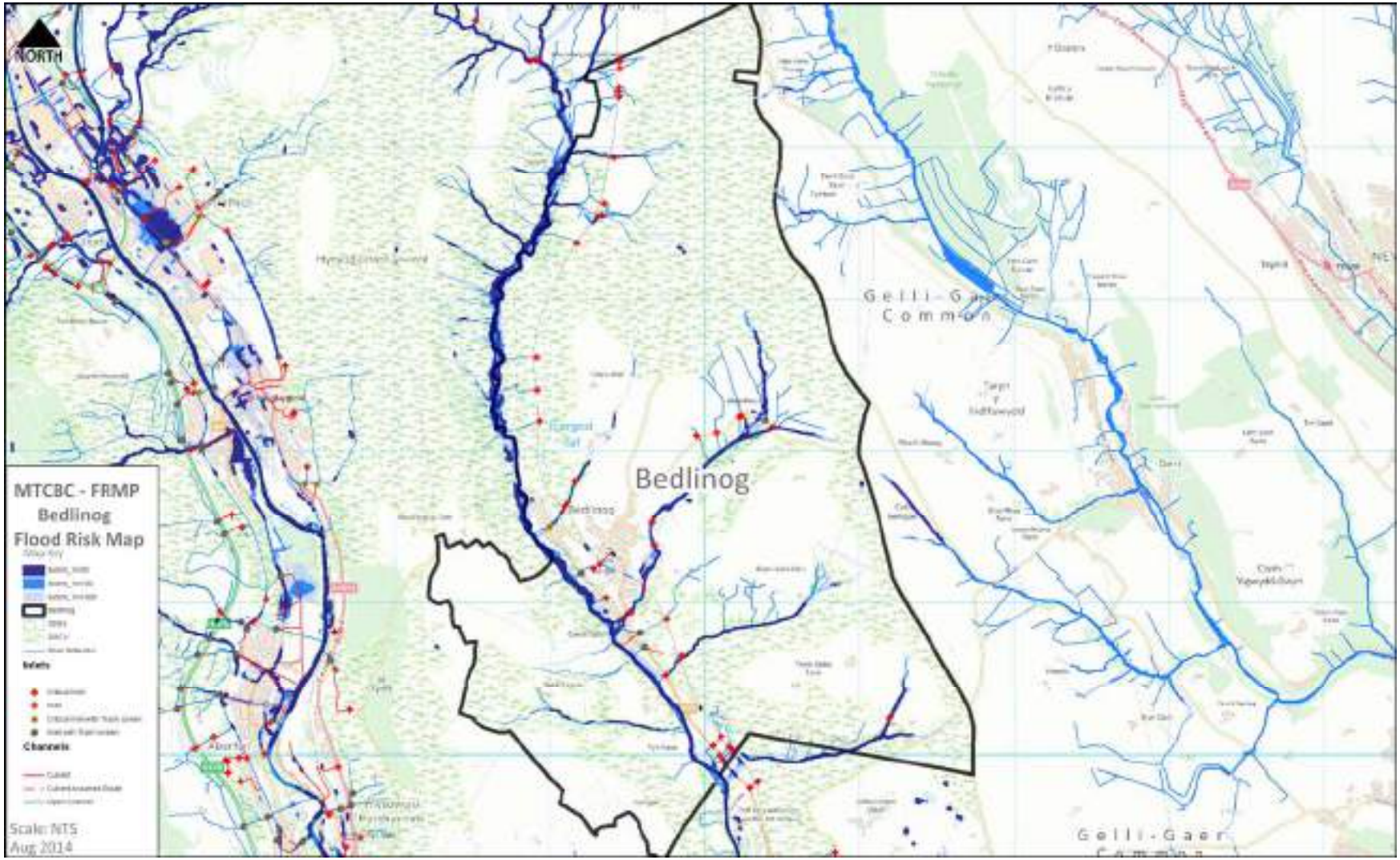
**Number of Measures in each Category**


| | BEDLINOG COMMUNITY AREA<br>Properties in areas at risk of flooding depth > 0.0m | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | LOW | | | MEDIUM | | | HIGH | | |
| Measure | RES | NON-RES | SER | RES | NON-RES | SER | RES | NON-RES | SER |
| BL01 | 0 | 2 | 0 | 1 | 1 | 0 | 0 | 3 | 0 |
| BL02 | 4 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 |
| BL03 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| BL04 | 0 | 2 | 1 | 0 | 1 | 0 | 0 | 0 | 0 |
| BL05 | No counts required | | | | | | | | |
| BL06 | No counts required | | | | | | | | |
| **TOTAL** | **6** | **4** | **1** | **1** | **2** | **0** | **2** | **3** | **0** |

**Table 44: Bedlinog - Potential Reduction in Flood Risk for Each Measure**

**8.2.4**

**Figure 21: Bedlinog - Flood Risk Map**



## 8.3 Treharris Community Area

### 3.3.1 Overview

Treharris Community Area is situated at the southern extremity of MTCBC. It covers an area of 808 hectares consisting mainly of steeply sloping hillside. The communities of Edwardsville, Treharris, Craig Berthwyd and Quakers Yard are situated in the south of the area in the lower reaches of the catchment, separated by the Afon Taf and Bargod Taf

The western and southern sectors of the catchment above Edwardsville and Treharris are drained by the Nant Ddu and a number of unnamed watercourses which discharge into the Afon Taf. The eastern sector drains into the Nant Cothi which discharges into the Bargod Taf. In the extreme south the catchment is drain into the Afon Taf via the Nant Mafon.

There are known to be 14 significant intakes in the area as listed below, one of which is critical. These features have been recorded in our Geo Environ Database for drainage structures and are also shown on our Geographic Information System (GIS) package. Other culverts are likely to be found as investigations continue.

| | Location | Co-ordinates | Critical |
|---|---|---|---|
| 1 | Mill Street | 310293, 197019 | No |
| 2 | Taf Bargod Millenium Park | 310180, 197669 | No |
| 3 | The Beeches | 309306, 197104 | No |
| 4 | Under Cardiff Road, A4054 and Gresham Place | 309312, 197080 | No |
| 5 | 9 Pentwyn Deintyr | 309481, 195783 | No |
| 6 | South of Pontygwaith Farm | 308120, 197117 | No |
| 7 | Adjacent to Fiddlers Elbow Roundabout Viaduct | 309469, 195724 | No |
| 8 | Park - 5 Black Brook | 309144, 197003 | No |
| 9 | Dan-y-Twyn Post Office | 309765, 196443 | Yes |
| 10 | West of Taff Vale | 308082, 196631 | No |
| 11 | West of Manor Court | 308123, 196881 | No |
| 12 | West of Pontygwaith Farm | 307904, 197669 | No |
| 13 | Rear of Petrol Station | 309151, 196968 | No |
| 14 | South of Quakers Yard Station | 308530, 196262 | No |

**Table 45: Treharris – Significant Intakes**

### 8.3.2 Conclusions from the Flood Risk Maps

The Flood Risk Map for Treharris Community Area indicates that the main cause of flood risk for the area relates to ordinary watercourses and the intakes to existing surface water culverts. There is also a risk from accumulations of surface water on highways. Generally this correlates with the experience gained by the drainage team over the past 25 years, however, it is believed that the risk is overstated as the full capacity of the existing culverts was not included in the modelling process when the Maps were prepared.

| COUNTS FOR TREHARRIS COMMUNITY AREA | | | | |
|---|---|---|---|---|
| | Total in defined area | Risk Counts | | |
| | | LOW | MED | HIGH |
| **Risk to People and Property** | | Residents in areas at risk of flooding depth >0.0m | | |
| People (n) (multiplier 2.35) | 6,549 | 202 | 40 | 24 |
| | | Residential Properties at risk of internal flooding depth >0.2m | | |
| Residential Properties (n) | 2,787 | 27 | 4 | 3 |
| Services (n) | 11 | 1 | 0 | 0 |
| **Risk to Economic Activity** | | | | |
| Non-Residential Properties (n) | 490 | 12 | 3 | 4 |
| Airports (n) | 0 | 0 | 0 | 0 |
| Primary/Trunk Roads (km) | 5.3 | 0.54 | 0.28 | 0.22 |
| Main Line Railways (km) | 2.4 | 0.18 | 0.05 | 0.03 |
| Agricultural Land – Grades 1, 2 and 3 (ha) | 0 | 0 | 0 | 0 |
| **Risk to Natural and Historic Environment** | | | | |
| Bathing Waters (n) | 0 | 0 | 0 | 0 |
| Environmental Permitting Regulations (EPR) Installations (n) | 0 | 0 | 0 | 0 |
| Special Areas of Conservation (SAC) (ha) | 0 | 0 | 0 | 0 |
| Special Protection Areas (SPA) (ha) | 0 | 0 | 0 | 0 |
| Ramsar Sites (ha) | 0 | 0 | 0 | 0 |
| World Heritage Sites (ha) | 0 | 0 | 0 | 0 |
| Sites of Special Scientific Interest (SSSI) (ha) | 0 | 0 | 0 | 0 |
| Parks and Gardens (ha) | 0 | 0 | 0 | 0 |
| Scheduled Ancient Monuments (ha) | 1.17 | 0.004 | 0.0003 | 0.009 |
| Listed Buildings (n) | 8 | 1 | 0 | 2 |
| Licensed Abstractions (LA) (n) | 0 | 0 | 0 | 0 |
| Sites of Interest for Nature Conservation (SINC) (ha) | 267 | 7.6 | 4.5 | 9.4 |

The counts representing flood risk from surface water in this area may be overstated as they include properties also at risk from river flooding.

**Table 46: Treharris - Counts for Various Risks**

### 8.3.3 Measures and objectives to mitigate flood risk (Revenue & Capital)

**Dan y Twyn intake - Quakers Yard**

The main sources of flood risk relates to the following:-

TH01 Flood risk on highways and to properties due to the accumulation of surface water, low level at Taff Vale and high level at Forest Grove and Windsor Road in Edwardsville.
See measure MBC M05
Category: M24 - Prevention
Objectives: 1, 2, 3, 4
Time Scale: 2016 – 2021
Cost: £2,000

TH02 Flood risk on highways and to properties due to the accumulation of surface water low level risk at Forest Road, Fox Street, Perrott Street and Windsor Place and high risk off Edwards Street and Railway Terrace in Treharris.
See measure MBC M05
Category: M24 - Prevention
Objectives: 1, 2, 3, 4
Time Scale: 2016 – 2021
Cost: £2,000

TH03 Flood risk on highways and to properties due to the accumulation of surface water low level risk at Woodlands Avenue at Quakers Yard.
See measure MBC M05
Category: M24 - Prevention
Objectives: 1, 2, 3, 4
Time Scale: 2016 – 2021
Cost: £2,000

.

TH04 Flood risk on highways and to properties due to the accumulation of surface water low level risk at The Oaks and the Hollies in Craig Berthwyd.
See measure MBC M05
Category: M24 - Prevention
Objectives: 1, 2, 3, 4
Time Scale: 2016 – 2021
Cost: £2,000

TH05 Low to high level of flood risk due to the failure of numerous intakes above Cardiff Road between Edwardsville and Treharris.
See measure MBC M04
Category: M24 - Prevention
Objectives: 1, 2, 3, 4
Time Scale: 2016 – 2021
Cost: £5,000

TH06 Low to high level of flood risk to properties adjacent to the Bargod Taf due to failure of an intake on The Oaks. Flood risk in this area may also be due to river flooding.
See measure MBC M04
Category: M24 - Prevention
Objectives: 1, 2, 3, 4
Time Scale: 2016 – 2021
Cost: £5,000

TH07 Low to high level of flood risk on Cardiff Road and south of Treharris Park due to the failure of numerous intakes.
See measure MBC M04
Category: M24 - Prevention
Objectives 1, 2, 3, 4
Cost £5,000

TH08 Flood Forum - See measure MBC M01 for whole borough.
Category: M43 - Preparedness
Objectives: 1, 2, 3, 4, 10
Time Scale: 2016 – 2021
Cost: £2,000

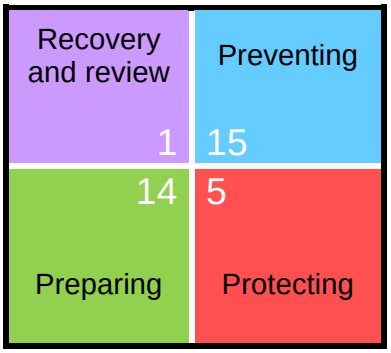
TH09 Flood Warning - See measure MBC M02 for whole borough.
Category: M41 - Preparedness
Objectives: 8
Time Scale: 2016 – 2021
Cost: £2,000

**See details of measures and objectives in 7.1.3**

**Total cost of measures for Treharris Community Area £27,000**

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

**Number of Measures in each Category**

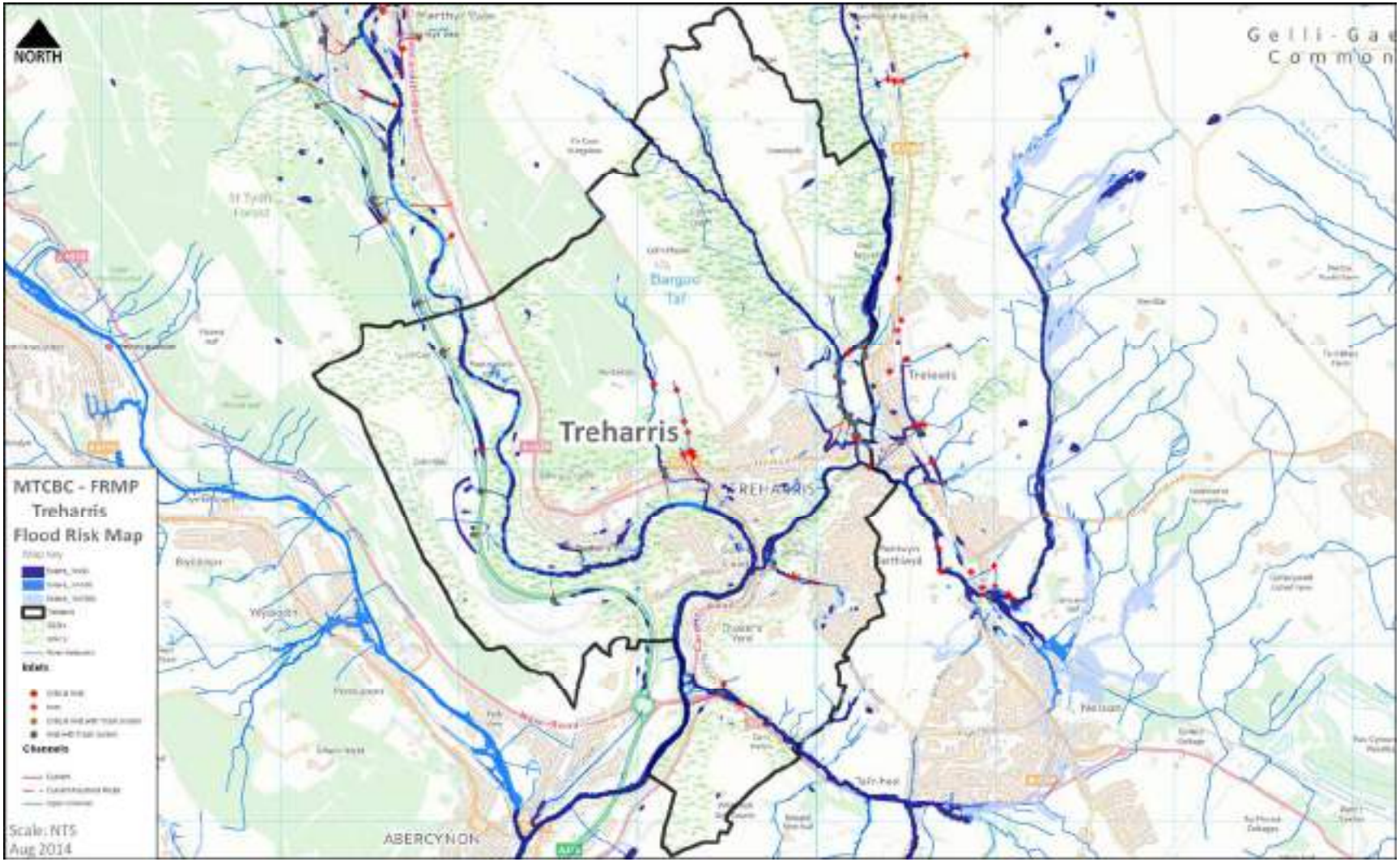



| | TREHARRIS COMMUNITY AREA<br>Properties in areas at risk of flooding depth > 0.0m | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | LOW | | | MEDIUM | | | HIGH | | |
| Measure | RES | NON-RES | SER | RES | NON-RES | SER | RES | NON-RES | SER |
| TH01 | 19 | 1 | 0 | 4 | 0 | 0 | 3 | 0 | 0 |
| TH02 | 2 | 7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| TH03 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| TH04 | 15 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| TH05 | 4 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| TH06 | 3 | 0 | 0 | 7 | 3 | 0 | 0 | 4 | 0 |
| TH07 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| TH08 | No counts required | | | | | | | | |
| Th09 | No counts required | | | | | | | | |
| TOTAL | 48 | 9 | 0 | 13 | 3 | 0 | 3 | 4 | 0 |

**Table 47: Treharris - Potential Reduction in Flood Risk for Each Measure**

**8.3.4**

**Figure 22: Treharris - Flood Risk Map**



## 8.4 Trelewis Area of Flood Risk

### 8.4.1 Overview

Trelewis Community Area is situated at the southern extremity of MTCBC. It covers an area of 453 hectares consisting mainly of steeply sloping hillside with the housing development of Trelewis situated in the valley floor to the east of the Bargod Taf.

The northern sector of the catchment drains into the Bargod Taf through the Nant Garth and Nant Ddu. A series of unnamed watercourses drains the central area. The southern and eastern sectors of the catchment drain into the Nant Caeach which joins the Bargod Taf at Treharris.

There are known to be 17 significant intakes in the area as listed below, none of which are critical. These features have been recorded in our Geo Environ Database for drainage structures and are also shown on our Geographic Information System (GIS) package. Other culverts are likely to be found as investigations continue.

| | Location | Co-ordinates | Critical |
|---|---|---|---|
| 1 | Ti'r Bach Farm | 310602, 197259 | No |
| 2 | Rear of Pant Cottages | 310680, 196551 | No |
| 3 | Culvert near Llancaiach Cottages | 311088, 196274 | No |
| 4 | Allotments - gate - Railway Station | 310551, 197257 | No |
| 5 | Rear No 9 Cherry Tree Way | 310409, 197560 | No |
| 6 | B4255 East of Tyr-y-wen | 310290, 199788 | No |
| 7 | South of Darren Terrace | 310925, 196327 | No |
| 8 | South of Darren Terrace | 310865, 196417 | No |
| 9 | North of Stoneleigh Way | 310452, 197797 | No |
| 10 | South of Heol Isaf | 310475, 197855 | No |
| 11 | West of Brondeg | 310457, 198090 | No |
| 12 | East of Sherwood Hundleton, High Street | 310649, 197049 | No |
| 13 | Tir Bach Farm | 310570, 197253 | No |
| 14 | B4255 South East of Warren Terrace | 310965, 196279 | No |
| 15 | Railway Station - Ffaldcaiach Inn | 310716, 196930 | No |
| 16 | East of Glenbrook High Street to West Rose Dale High Street | 310565, 197228 | No |
| 17 | West Rose Dale High Street to Shiraz | 310475, 197158 | No |

**Table 48: Trelewis – Significant Intakes**

### 8.4.2 Conclusions from the Flood Risk Maps

The Flood Risk Map for Trelewis Community Area indicates that the main cause of flood risk for the area relates to ordinary watercourses and the intakes to existing surface water culverts. Generally this correlates with the experience gained by the drainage team over the past 25 years although it is believed that the risk is overstated as the full capacity of the existing culverts was not included in the modelling process when the Maps were prepared.

| COUNTS FOR TRELEWIS COMMUNITY AREA | | | | |
|---|---|---|---|---|
| | Total in defined area | Risk Counts | | |
| | | LOW | MED | HIGH |
| **Risk to People and Property** | | Residents in areas at risk of flooding depth >0.0m | | |
| People (n) (multiplier 2.35) | 1,993 | 92 | 9 | 9 |
| | | Residential Properties at risk of internal flooding depth >0.2m | | |
| Residential Properties (n) | 848 | 3 | 3 | 1 |
| Services (n) | 1 | 0 | 0 | 0 |
| **Risk to Economic Activity** | | | | |
| Non-Residential Properties (n) | 147 | 6 | 3 | 9 |
| Airports (n) | 0 | 0 | 0 | 0 |
| Primary/Trunk Roads (km) | 0 | 0 | 0 | 0 |
| Main Line Railways (km) | 0 | 0 | 0 | 0 |
| Agricultural Land – Grades 1, 2 and 3 (ha) | 0 | 0 | 0 | 0 |
| **Risk to Natural and Historic Environment** | | | | |
| Bathing Waters (n) | 0 | 0 | 0 | 0 |
| Environmental Permitting Regulations (EPR) Installations (n) | 0 | 0 | 0 | 0 |
| Special Areas of Conservation (SAC) (ha) | 0 | 0 | 0 | 0 |
| Special Protection Areas (SPA) (ha) | 0 | 0 | 0 | 0 |
| Ramsar Sites (ha) | 0 | 0 | 0 | 0 |
| World Heritage Sites (ha) | 0 | 0 | 0 | 0 |
| Sites of Special Scientific Interest (SSSI) (ha) | 0 | 0 | 0 | 0 |
| Parks and Gardens (ha) | 0 | 0 | 0 | 0 |
| Scheduled Ancient Monuments (ha) | 0 | 0 | 0 | 0 |
| Listed Buildings (n) | 0 | 0 | 0 | 0 |
| Licensed Abstractions (LA) (n) | 0 | 0 | 0 | 0 |
| Sites of Interest for Nature Conservation (SINC) (ha) | 117 | 3.9 | 1.2 | 4.6 |

The counts representing flood risk from surface water in this area may be overstated as they include properties also at risk from river flooding.

**Table 49: Trelewis - Counts for Various Risks**

### 8.4.3 Measures and objectives to mitigate flood risk (Revenue & Capital)

**Cascade on Nant Cothi**

The main sources of flood risk relates to the following:-

TL01 Low to high levels of flood risk on Ebenezer Close, High Street, Bontnewydd Terrace, Filed Street and Trelewis Primary School due to failure of numerous intakes and associated culverts to the east of the railway line.
See measure MBC M04
Category: M24 - Prevention
Objectives: 1, 2, 3, 4
Time Scale: 2016 – 2021
Cost: £10,000

TL02 Flood risk from low to high affecting properties adjacent to Nant Caeach at Gelligaer Road.
See measure MBC M04
Category: M24 - Prevention
Objectives: 1, 2, 3, 4
Time Scale: 2016 – 2021
Cost: £5,000

TL03 Flood Forum - See measure MBC M01 for whole borough.
Category: M43 - Preparedness
Objectives: 1, 2, 3, 4, 10
Time Scale: 2016 – 2021
Cost: £2,000

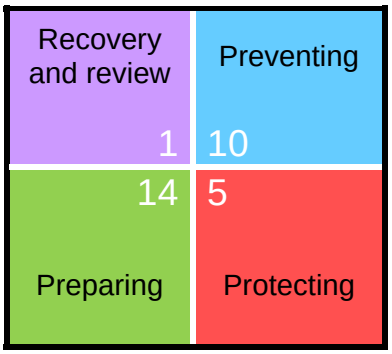
TL04 Flood Warning - See measure MBC M02 for whole borough.
Category: M41 - Preparedness
Objectives: 8
Time Scale: 2016 – 2021
Cost: £2,000

**See also details of measures and objectives in 7.1.3**

**Total cost of measures for Trelewis Community Area £19,000**

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

**Number of Measures in each Category**

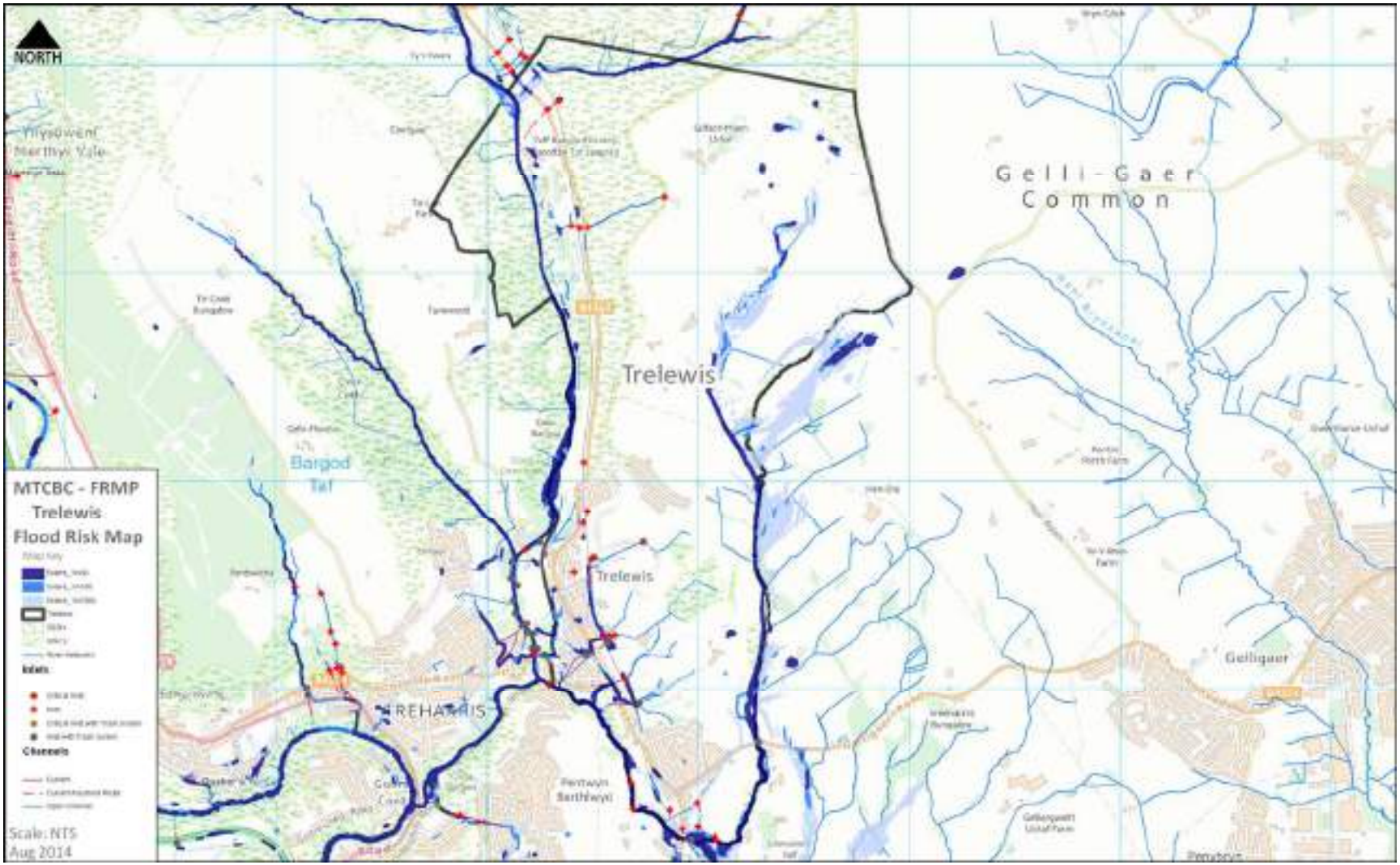



| | TRELEWIS COMMUNITY AREA Properties in areas at risk of flooding depth > 0.0m | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | LOW | | | MEDIUM | | | HIGH | | |
| Measure | RES | NON-RES | SER | RES | NON-RES | SER | RES | NON-RES | SER |
| TL01 | 28 | 3 | 0 | 2 | 1 | 0 | 3 | 1 | 0 |
| TL02 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| TL03 | No counts required | | | | | | | | |
| TL04 | No counts required | | | | | | | | |
| TOTAL | 29 | 4 | 0 | 2 | 1 | 0 | 3 | 1 | 0 |

**Table 50: Trelewis - Potential Reduction in Flood Risk for Each Measure**

**8.4.4**

**Figure 23: Trelewis - Flood Risk Map**



## 8.5 Vaynor Community Area

### 8.5.1 Overview

Vaynor Community Area is situated at the northern extremity of MTCBC. It covers an area of 2,393 hectares of very sparsely populated steeply sloping hillside.

The northern sector is drained by the Nant Gwinau, Nant Cat and Nant y Grawen, all of which discharge into the Taf Fawr. The central section of the area drains into the Taf Fechan via the Nant Cwm-moel. The eastern sector is drained by the Nant Car and Nant-y-Ffrwd, both of which discharge into the Taf Fechan.
The Llwyn-on Reservoir is situated on the Taf Fawr in the west and the Pontstycill Reservoir lies on the Taf Fechan to the East.

There are known to be 3 significant intakes in the area as listed below, none of which are critical. These features have been recorded in our Geo Environ Database for drainage structures and are also shown on our Geographic Information System (GIS) package. Other culverts are likely to be found as investigations continue.

| | Location | Co-ordinates | Critical |
|---|---|---|---|
| 1 | Pontsarn - West of Pontsarn Hotel | 304249, 209864 | No |
| 2 | West of Pontsarn Hotel | 304270, 209820 | No |
| 3 | Vaynor Quarry | 303790, 209355 | No |

**Table 51: Vaynor – Significant Intakes**

### 8.5.2 Conclusions from the Flood Risk Maps

The Flood Risk Map for Vaynor indicates that the main cause of flood risk for the area relates to ordinary watercourses and the intakes to existing surface water culverts. Generally this correlates with the experience gained by the drainage team over the past 25 years however, it is believed that the risk is overstated as the full capacity of the existing culverts was not included in the modelling process when the Maps were prepared.

| COUNTS FOR VAYNOR COMMUNITY AREA | | | | |
|---|---|---|---|---|
| | Totals in defined area | Risk Counts | | |
| | | LOW | MED | HIGH |
| **Risk to People and Property** | | Residents in areas at risk of flooding depth >0.0m | | |
| People (n) (multiplier 2.35) | 500 | 26 | 2 | 9 |
| | | Residential Properties at risk of internal flooding depth >0.2m | | |
| Residential Properties (n) | 213 | 4 | 0 | 0 |
| Services (n) | 2 | 1 | 0 | 0 |
| **Risk to Economic Activity** | | | | |
| Non-Residential Properties (n) | 195 | 9 | 0 | 2 |
| Airports (n) | 0 | 0 | 0 | 0 |
| Primary/Trunk Roads (km) | 4.3 | 1.0 | 0.18 | 0.31 |
| Main Line Railways (km) | 0 | 0 | 0 | 0 |
| Agricultural Land – Grades 1, 2 and 3 (ha) | 0 | 0 | 0 | 0 |
| **Risk to Natural and Historic Environment** | | | | |
| Bathing Waters (n) | 0 | 0 | 0 | 0 |
| Environmental Permitting Regulations (EPR) Installations (n) | 0 | 0 | 0 | 0 |
| Special Areas of Conservation (SAC) (ha) | 0 | 0 | 0 | 0 |
| Special Protection Areas (SPA) (ha) | 0 | 0 | 0 | 0 |
| Ramsar Sites (ha) | 0 | 0 | 0 | 0 |
| World Heritage Sites (ha) | 0 | 0 | 0 | 0 |
| Sites of Special Scientific Interest (SSSI) (ha) | 44 | 2.0 | 0.63 | 2.7 |
| Parks and Gardens (ha) | 0 | 0 | 0 | 0 |
| Scheduled Ancient Monuments (ha) | 3.1 | 0.02 | 0 | 0 |
| Listed Buildings (n) | 22 | 1 | 1 | 3 |
| Licensed Abstractions (LA) (n) | 1 | 0 | 0 | 0 |
| Sites of Interest for Nature Conservation (SINC) (ha) | 91 | 2.2 | 0.48 | 1.9 |

**Table 52: Vaynor - Counts for Various Risks**

### 8.5.3 Measures and objectives to mitigate flood risk (Revenue & Capital)

**Stone arch bridge taking road over the Taf Fechan**

The main sources of flood risk relates to the following:-

VA01 Low to high flood risk in area immediately below Pontstycill Reservoir to the east of the Taf Fechan due to accumulation of surface water. This area is also likely to be affected by river flooding.
See measure MBC M04
Category: M24 - Prevention
Objectives: 1, 2, 3, 4
Time Scale: 2016 – 2021
Cost: £10,000

VA02 Low to high flood risk in area immediately below Pontstycill Reservoir to the west of the Taf Fechan due to accumulation of surface water. This area is also likely to be affected by river flooding.
See measure MBC M04
Category: M24 - Prevention
Objectives: 1, 2, 3, 4
Time Scale: 2016 – 2021
Cost: £10,000

**See details of measures and objectives in 7.1.3**

**Total cost of measures for Trelewis Community Area £20,000**

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

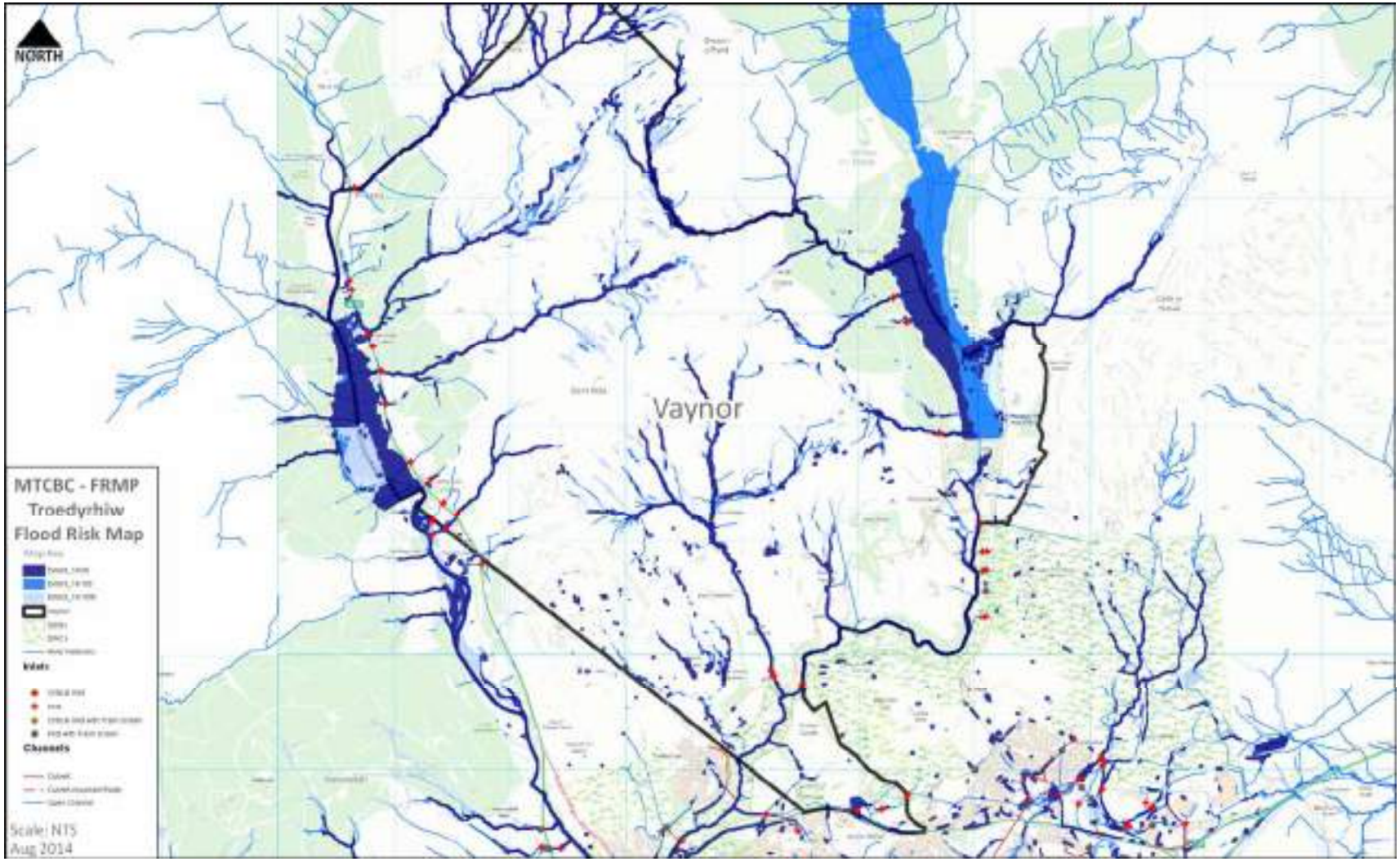
**Number of Measures in each Category**


| | VAYNOR COMMUNITY AREA<br>Properties in areas at risk of flooding depth > 0.0m | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | LOW | | | MEDIUM | | | HIGH | | |
| Measure | RES | NON-RES | SER | RES | NON-RES | SER | RES | NON-RES | SER |
| VY01 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| VY02 | 9 | 2 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| **TOTAL** | **9** | **2** | **0** | **1** | **0** | **0** | **0** | **0** | **0** |

**Table 53: Vaynor - Potential Reduction in Flood Risk for Each Measure**

**8.5.4**

**Figure 24: Vaynor - Flood Risk Map**



# 9 Public Consultation

## 9.1 MTCBC Flood Risk Partners

A six week period of consultation on the MTCBC Flood Risk Management Plan was carried out between Monday 5th January 2015 and Monday 16th February 2015.

The following Flood Risk Partners were contacted

1 All Risk Management Authorities (RMAs), as listed in Appendix 2

2 All MTCBC employees

3 All Council Members

4 Attempts were made to engage with members of the public using the following means:-

a. The 200+ members of the MTCBC Viewpoint Citizens Panel

b. Social media including Facebook and Twitter

c. An eye catcher was placed on the MTCBC Webpage

## 9.2 Method of Consultation

The Draft Flood Risk Management Plan was published on the MTCBC webpage prior to the commencement of the consultation period. A questionnaire was also published, which all Flood Risk Partners were encouraged to complete.

A total of 19 people completed the questionnaire and an additional 7 email comments were received.

All comments received have been placed into a spreadsheet but no personal data has been included. Against each comment a response from MTCBC Flood Risk Management Team has been put into the spreadsheet and where appropriate the FRMP has been amended in line with the comments. The spreadsheet containing all comments and responses has been published on the MTCBC webpage.

Once the RFMP has been reviewed and accepted for publication it will be uploaded to the MTCBC webpage together with the Preliminary Flood Risk Assessment (PFRA), the Local Flood Risk Management Strategy (LFRMS) and Summary and the Strategic Environmental Assessment (SEA).

In addition printed copies of the FRMP together with the PFRA, the LFRMS and the SEA will be placed in all libraries and leisure centres and at the MTCBC Civic Centre as listed below.

1. Aberfan Community Library

2. Treharris Library

3. Dowlais Library

4. Merthyr Tydfil Central Library

5. Merthyr Tydfil Leisure Centre

6. MTCBC Civic Centre

7. MTCBC Unit 5

8. MTCBC Unit 20

All questionnaires received have been analysed details of which are given in clause 9.4 below.

## 9.3 Consultation and Engagement with Flood Risk Management Authorities (FRMAs) and the Public

### Schools

Presentations on flood risk and water as a resource have been given in two schools namely:

1 Twynyrodyn Community School which was visited on Monday 3rd February 2014 when a presentation was given to three separate age groups.
and
2 Treharris Primary School on Wednesday 29th April 2015.

There are plans to extend this programme to cover as many schools as possible within the Borough, including the Welsh School at Thomas Town. This links in with the teaching programme “Bends and Flows” which is currently being used in many of our schools.

### Emergency Planning

A meeting was held with MTCBC Emergency Planning Team on Wednesday 8th October 2014. The main topics related to the existing systems of early warning and how they could be extended to surface water flooding.

### Dwr Cymru / Welsh Water

Meetings have been held between MTCBC and DC/WW, as one of our most significant flood risk partners, to discuss the development of the FRMP. DC/WW has also been in attendance at the South East Wales Flood Risk Management Group.

- DC/WW have provided details of their network of water supply mains, foul sewers, combined sewers and surface water pipes covering the whole of MTCBC. Updated information will be provided by DC/WW on a six monthly basis.

- Currently there are no plans under the AMP6 programme, for capital improvement works at CSOs on ordinary watercourses. However, there is a potential scheme at Cefn Coed High Street CSO, which discharges into the

Taf Fechan. This work has provisionally been identified for delivery in 2018/19, but will be subject to change as a result of continued assessment by DC/WW of schemes using their prioritisation methodology.

- DC/WW has a plan for a flooding scheme, as part of AMP6, at the Trelewis Welsh International Climbing Centre. This scheme has been provisionally identified for delivery in 2016/17. DC/WW are finalising their internal processes for delivery of investment to resolve sewer flooding over the course of AMP6 (2015-2020). They are continuing with their established prioritisation methodology to target investment at customers with the highest suffering. Using this methodology, DC/WW has already identified the majority of schemes for delivery in 2015-16 and 2016-17. They are also developing solutions for more recent issues which, subject to cost-benefit assessment, will form the remainder of their AMP6 programme. Their programme remains provisional as it is dependent on OFWAT's final endorsement of their Final Business Plan. This is expected to be completed in December 2014, after which they will formalise their investment programme.

- It was agreed that MTCBC and DC/WW will collaborate on the introduction of SuDS on new developments and there will be a free exchange of knowledge and experience.

- A database of water ingress to foul sewers is being prepared by DC/WW. There is potential for a scheme on the Shirley Gardens estate where there is known to be very high levels of water ingress.

- It was agreed that before surface water sewers are removed from DC/WW ownership, as culverted watercourses, discussion will take place the riparian land owner and MTCBC.

**Welsh Government**

Some limited collaboration was established with WG through their attendance at the Flood Risk Management Working Group.

**Natural Resources Wales**

Significant interaction with NRW was established through their attendance at the Flood Risk Management Working Group and South East Wales Flood Risk Management Group.

## 9.4 Analysis of Response to Consultation in Completed Questionnaires

### Organisation or Group

| Response | Number of Respondents |
|---|---|
| Dwr Cymru Welsh Water | 1 |
| Merthyr College | 1 |
| Merthyr Tydfil Biodiversity Partnership | 1 |
| Merthyr Tydfil County Borough Council | 1 |
| MTCBC | 4 |
| MTCBC Lifeline 24/7 | 1 |
| MTCBC Property Services Dep. | 1 |
| N'A | 1 |
| Network Rail | 1 |
| NRW | 1 |
| Paddlers Ltd | 1 |
| PUBLIC | 1 |
| Resident | 2 |
| South Wales Fire & Rescue Service | 2 |
| **Total Responses** | **19** |

### The draft Flood Risk Management Plan sets out the most significant flood risk in MTCBC

| Response | Number of Respondents | Percentage of Respondents |
|---|---|---|
| Agree | 10 | 83% |
| Partially Agree | 2 | 17% |
| Disgaree | | |
| **Total Responses** | **12** | |

**What do you consider to be the greatest flood risk in MTCBC?**

| Response | Number of Respondents | Percentage of Respondents |
|---|---|---|
| Ground Water | | |
| Surface Water Run-off | 5 | 45% |
| Blocked Culvert Inlet Grids | 2 | 18% |
| Highway Drainage | | |
| Ordinary Water Courses or Streams (NOT Rivers) | 2 | 18% |
| Drainage Channels | 1 | 9% |
| Combined Sewers (Foul and Surface Water) | | |
| OTHER | 1 | 9% |
| **Total Responses** | **11** | |

**What do you consider to be the highest priorities for managing flood risk in MTCBC**

| Response | Number of Respondents | Percentage of Respondents |
|---|---|---|
| Maintenance of culvert inlet grids, drainage channels and gullies | 9 | 82% |
| Improvement of existing drainage infrastructure | 1 | 9% |
| Construction / Improvement of flood defence systems | 1 | 9% |
| Sustainable drainage systems (SuDS) for new developments | 2 | 18% |
| Retrofitting of sustainable drainage systems (SuDS) | 1 | 9% |
| Better land management (reducing run off at the source) | 4 | 36% |
| OTHER | | |
| **Total Responses** | **18** | |

**Do you feel that this FRMP effectively targets and aims to achieve the objectives set out by the WG National Flood and Coastal Erosion Risk Management Strategy?**

| Response | Number of Respondents | Percentage of Respondents |
|---|---|---|
| Agree | 8 | 73% |
| Partially Agree | 3 | 27% |
| Disagree | | |
| **Total Responses** | **11** | |

**The draft FRMP describes four categories of measures. Do you think the measures contained within the draft FRMP satisfactorily addresses these categories**

| Response | Number of Respondents | Percentage of Respondents |
|---|---|---|
| Agree | 8 | 80% |
| Partially Agree | 2 | 20% |
| Disagree | | |
| **Total Responses** | **10** | |

**How do you think you can support the work set out in the draft FRMP to reduce flood risk?**

| Response | Number of Respondents |
|---|---|
| By ensuring that due dilligence is carried out by all stakeholders | 1 |
| Continued collaboration with the drainage engineering service. | 1 |
| Maintaining our structure assets within the region to clear to any blocked culverts, ditches and watercourses. | 1 |
| Report any issues that might cause flooding e.g. blocked drains/culvets | 1 |
| SWRFS have established a cohort of Tactical Advisors in relati flooding. Contribution to emergency flooding situations feedbac following incidents. Suggestion: Utilise social media to remind p they are able to notify MTCBC of blocked culverts etc. | 1 |
| We are keen to work with MTCBC wherever possible in line with our duties as a risk management authority. | 1 |
| **Total Responses** | 6 |

**In which area of MTCBC do you live?**

| Response | Number of Respondents | Percentage of Respondents |
|---|---|---|
| Abercanaid | | |
| Aberfan | | |
| Cefn Coed-Y-Cymmer | | |
| Dowlais | 1 | 10% |
| Gellideg | | |
| Heolgerrig | 1 | 10% |
| Merthyr North (Gurnos, Park and Penydarren) | 2 | 20% |
| Merthyr South (Town Ward) | 1 | 10% |
| Merthyr Vale | | |
| Pentrebach | | |
| Troedyrhiw | | |
| Bedlinog | | |
| Treharris | | |
| Trelewis | | |
| Vaynor | | |
| Not Applicable | 5 | 50% |
| **Total Responses** | 10 | |

## 10 Monitoring and Review

Natural Resources Wales must review this FRMP before publication.

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

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

1 The impact of climate change on the occurrence of flooding.

2 An assessment of the progress made towards implementing the measures contained in this FRMP.

3 If measures have not been implemented a statement of reasons why those measures have not been implemented.

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

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

# MERTHYR TYDFIL COUNTY BOROUGH COUNCIL (MTCBC)

# FLOOD RISK MANAGEMNT PLAN (FRMP)

## APPENDICES

## Appendix 1 - The Risk Management Authorities

**1.1 Natural Resources Wales**

**Head Office**
Tŷ Cambria House
29 Newport Road
Cardiff
CF24 0TP

**South East Area Office**
Rivers House
St Mellons Business Park
Cardiff
CF3 0EY
**Contact**
Name: Rachel Sion
Phone Number: (029) 20466052
Email: Rachel.Sion@naturalresourceswales.gov.uk

**Floodline**
Phone Number: 0845 988 1188 (24 hour service)
Type Talk: 0845 602 6340

**1.2 Welsh Assembly Government**

**Contact**
Name: Richard Williams
Email: Richard.williams2@wales.gsi.gov.uk

**1.3 Lead Local Flood Authority in Wales**

**Merthyr Tydfil County Borough Council**
Civic Centre
Castle Street
Merthyr Tydfil
CF47 8AN
**Contact**
Name: Gareth Chapman – Chief Executive
Email: Gareth.Chapman@merthyr.gov.uk

**Contact**
Name: Ellis Cooper – Head of Customer Service ICT and Transformational Change
Email: Ellis.Cooper@merthyr.gov.uk

**Customer Care**
**Contact**
Phone Number: 01685 725000
Email: customer.care@merthyr.gov.uk
Website: www.merthyr.gov.uk

**Merthyr Tydfil County Borough Council**
Engineering and Highways Department
Unit 20, Merthyr Tydfil Industrial Park
Pentrebach
Merthyr Tydfil
CF48 4DR
**Contact**
Name: Jeremy Morgan
Telephone Number: 01685 724931
Email: Jeremy.Morgan@merthyr.gov.uk

**1.4 Water Company**

**Dŵr Cymru – Welsh Water**
Pentwyn Road
Nelson
Treharris
CF46 6LY

Head Office Phone Number: 01443 452300
Customer Services: 0800 052 0140
Website: www.dwrcymru.co.uk

**Contact**
Name: Nick Holt
Email: nick.holt@dwrcymru.com
Telephone Number:

**Contact**
**Name: Michelle Russ**
Email: Michelle.Russ@dwrcymru.com

**Contact**
Name: Martin Chatham
Telephone Number:
Email: martin.chatham@dwrcymru.com

**1.5 Additional Risk Partners**

**1.5.1 Internal Partners**

Planning Department
**Merthyr Tydfil County Borough Council**
Civic Centre, Castle Street, Merthyr Tydfil, CF47 8AN

**Contact**
Name: Judith Jones
Telephone Number: 01685 726201
Email: Judith.Jones@merthyr.gov.uk

Name: Justin Waite
Telephone Number: 01685 727053
Email: Justin.Waite@merthyr.gov.uk

Emergency Planning
**Merthyr Tydfil County Borough Council**
Civic Centre, Castle Street, Merthyr Tydfil, CF47 8AN
**Contact**
Name: Robert Gough
Telephone Number: 01685 725162
Email: Robert.Gough@merthyr.gov.uk

Environmental Health
**Merthyr Tydfil County Borough Council**
Civic Centre, Castle Street, Merthyr Tydfil
CF47 8AN
**Contact**
Name: Andrew Walters
Telephone Number: 01685 725086
Email: Andrew.Walters@merthyr.gov.uk

Finance
**Merthyr Tydfil County Borough Council**
Civic Centre, Castle Street, Merthyr Tydfil
CF47 8AN
**Contact**
Name: Stephen Jones
Telephone Number: 01685 725220
Email: Stephen.Jone@merthyr.gov.uk

### 1.5.2 External Partners

## Emergency Services

### Fire
Dynevor Street
Merthyr Tydfil
CF48 1BA
Email: performance@southwales-fire.gov.uk

**Ambulance (Health Board)**
**Cwm Taf Health Board**
Headquarters Ynysmeurig House Navigation Park
Abercynon CF45 4SN
Telephone: 01443 744800
**Contact**
Name: Debbie Owen
Email: Debbie.owen2@wales.nhs.uk

**Police**
Police Station, Swan Street, Merthyr Tydfil
Mid Glamorgan, CF47 8ES
Telephone: 01685 722 541
Email: PublicServiceCentre@south-wales.pnn.police.uk

**Housing Associations**

**Merthyr Valley Homes Ltd**
Martin Evans House Riverside Court Avenue De Clichy Abermorlais Merthyr Tydfil CF47 8LD
Telephone Number 01685 727727
Email: info@mvhomes.org.uk

**Merthyr Tydfil Housing Associations**
11-12 Lower High Street Merthyr Tydfil Merthyr Tydfil
Telephone Number: 01685 352800
Email: mtha@mtha.org.uk

**Wales and West Housing**
Head Office 3 Alexandra Gate Ffordd Pengam Tremorfa
Cardiff CF24 2UD
Telephone: 0800 052 2526
Email: contactus@wwha.co.uk

**National Flood Forum**
Old Snuff Mill Warehouse, Park Lane, Bewdley
Worcestershire, DY12 2EL
**Contact**
Chief Executive
Name: Paul Cobbing
Telephone Number: 0777 3355181
Email: Paul.cobbing@floodforum.org.uk

**National Farmers Union**
**Head Office**
Agricultural House, Stoneleigh Park, Stoneleigh
Warwickshire, CV8 2TZ
Telephone Number: 02476 58500

South East Wales Office of NFU

**Contact**
Name: Stella Owen
Telephone Number: 01982 554222
Email: Stella.Owen@nfu.org.uk

**Royal Society for the Protection of Birds**
Sutherland House, Cowbridge Road East
Cardiff, CF11 9AB
**Contact**
Name
Telephone Number: 029 2035 3000
Email: cymru@rspb.org.uk

**Land Owners and land/estate Managers**

**National House Building Council**
NHBC House, Davy Avenue, Knowlhill
Milton Keynes, MK5 8FP
**Contact**
Name: Steve Evans
Telephone Number: 02476 328868
Email: sevans@NHBC.co.uk

**National Parks UK**
126 Bute Street,Cardiff, CF10 5LE
**Contact**
Name
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## Appendix 2 – Measures Contained within the LFRMS

1 Sustainable and Strategic Development Planning – LFRMS Clause 6.13.1

2 Strategic Flood Risk Assessment (SFRA) / Strategic Flood Consequences Assessment (SFCA) – LFRMS Clause 6.13.2

3 Relocation – LFRMS Clause 6.13.4

4 Sustainable Drainage – LFRMS Clause 6.13.6

5 Flood Awareness – LFRMS Clause 6.14.1

6 Flood Warning – LFRMS Clause 6.14.2

7 Flood Forecasting – LFRMS Clause 6.14.3

7 Emergency Response Plans – LFRMS Clause 6.14.4

8 Community Flood Plans LFRMS Clause 6.14.5

9 Land Management – LFRMS – Clause 6.15.1

10 Resilience – LFRMS Clause 6.15.2

11 Resistance – LFRMS Clause 6.15.3

12 Restoration – LFRMS Clause 6.15.4

13 Environmental Enhancements – LFRMS Clause 6.15.5

14 System Asset Management Plans - LFRMS Clause 6.16.1

16 Defence/Structure Management – LFRMS Clause 6.16.2

17 Channel Construction and Maintenance – LFRMS Clause 6.16.3

18 Culvert Construction and Maintenance – LFRMS Clause 6.16.4

19 Investigation – LFRMS Clause 6.17.1

20 Local Property-level Flood Mitigation – Resilience - LFRMS – Clause 6.17.4

21 Local Property-level Flood Mitigation – Resistance – LFRMS – Clause 6.17.5

**1 Sustainable and Strategic Development Planning LFRMS Clause 6.13.1 Prevention**
**Objectives 1, 2, 3, 4, 5, 6, 12, 13, 15**

The Merthyr Tydfil Local Development Plan 2006-2021 sets out the Council's priorities for the development and use of land in the County Borough and the policies to implement them up until 2021. New development allocations have avoided floodplain areas (zones C1 and C2) within Merthyr Tydfil County Borough and an appropriate policy (BW8: Development and the Water Environment) has been incorporated into the plan which continues to direct new development away from zone C and towards suitable land in zone A and zone B.

**Policy BW8 states:**

Proposals for built development will only be permitted where:-

1 They avoid identified river flood plains in order that these areas continue to fulfil their flood flow and water storage functions.

2 They do not have an adverse effect on the quality and/or quantity of surface waters or groundwater resources, and where opportunities exist, they incorporate measures to improve existing water quality.

3 Adequate water and sewerage systems exist, or are reasonably accessible, or are capable of being provided prior to the development becoming operational without placing unacceptable pressure on existing capacity or causing unacceptable environmental harm.

In addition, development proposals will be required to avoid exacerbating flood risk locally and elsewhere within the river catchment by incorporating sustainable drainage systems (SuDS) for the disposal of surface water.

Alternative methods of surface water disposal will only be considered where a developer demonstrates that the incorporation of SuDS is inappropriate for practical or environmental reasons.

As The Strategy is implemented through the Plans it may become evident that there is a potential conflict between the LDP and the Strategy. Areas of land identified within the LDP as being suitable for development may be deemed unsuitable when the detailed Plans are produced. The LDP cannot be altered until the next review but the Planning Department would be made aware of the potential conflict and at the next review the LDP will be amended to take the Plans into account.

**Text added January 2015 (A full review of the LDP will formally begin in May 2015 and as such, it will be necessary to consider the implications of the LFRMP for undeveloped development plan allocations as part of this process)**

**The Welsh Government has defined the zones in Tan 15: Development and Flood Risk as follows:**

1 Zone A – Considered to be at little or no risk of fluvial or tidal/coastal flooding

2 Zone B – Areas known to have been flooded in the past evidenced by sedimentary deposits

3 Zone C – Based on Environment Agency extreme flood outline, equal to or greater than 0.1% (river, tidal or coastal)

4 Zone C1 – Areas of the floodplain which are developed and served by significant infrastructure, including flood defences

5 Zone C2 – Areas of the floodplain without significant flood defence infrastructure

**Benefits**

1 The Local Development Plan (LDP) provides a strategic policy framework which facilitates the effective management of flood risk by directing new development away from those areas which are at a high risk of flooding.

2 New developments will be encouraged within areas that are at low risk of flooding

**Time Scale for Implementation**
2006-2021
**Short Term 0-20 Years**

**2 Strategic Flood Risk Assessment (SFRA) / Strategic Flood Consequences Assessment (SFCA) LFRMS Clause 6.13.2**
**Prevention**
**Objective 1, 2, 3, 4, 10**

A Strategic Flood Consequence Assessment (SFCA) was undertaken as part of the LDP process (See Appendix 9 of LDP). This process will be repeated and updated for future versions of the LDP.

Environment Agency (EA) Wales recommends a 3-stage approach to completing an SFCA. In preparing the Merthyr Tydfil LDP, the Council made use of existing data sources and carried out an informal analysis based on engineering judgements in line with the precautionary principle outlined in TAN 15: Development and Flood Risk (2004). This stage utilised existing information to determine:-

1 Whether flooding is a significant issue within the plan area.

2 Where in the plan area flooding occurs.

3 How new development can avoid adding to that risk.

4 which of the potential allocations lie outside zone C

The following were considered:-

1 Flooding from all potential sources at a strategic scale, including fluvial flooding, groundwater flooding, flooding from overland flows, flooding from artificial drainage systems, and flooding from infrastructure failure, including reservoirs and sewers.

2 Existing flood risk management infrastructure including the standard of protection provided by existing defences together with an assessment of any physical features which would increase or reduce flooding.

3 The potential increase in flood risk to existing developments due to the increased run-off from developments in all flood zones, and potential solutions, such as those offered by Sustainable Drainage Systems (SuDS).

4 Any physical features, either natural or man-made, which could breach or would convey flood flow to other areas not considered to be directly at risk from the source.

In undertaking a desktop analysis that equates to the first stage of the SFCA, the Council successfully achieved the allocation of development sites in the lowest risk areas of the County Borough whilst still fulfilling the LDP's overall strategy for growth. Further stages of SFCA were therefore not required.

**Benefits**

1 SFCA allowed the consequences of flooding to inform the location of new development in the LDP.

2 SFCA also enabled consideration of potential increases in surface water runoff arising from new development, including the potential application of sustainable drainage systems.

**Time Scale for Implementation**
2006 – 2021
**Short Term 0-20 Years**

**3 Relocation – LFRMS Clause 6.13.4**
**Prevention**
**Objectives 1, 2, 3, 4, 10, 11**

MTCBC do not have a policy relating to the relocation of residents living in housing which is subject to flood risk and it is not anticipated that significant numbers of properties, if any, will be identified which will be requiring the relocation of residents.

If houses are identified as being in areas of significant flood risk, which would endanger life, then the following procedure will be followed to endeavour to reduce flood risk:

1 Inform and ensure residents are aware of the level of risk they are facing.

2 Provide an early warning system to allow residents time to move to a safe area.

3 Encourage the residents to produce their own Flood Plan to reduce danger to themselves and damage to their property and its contents.

4 Provide systems to prevent floodwater entering the property.

5 Endeavour to reduce flood risk by reducing the volume of water being generated by the upstream catchment.

6 Introduce new flood relief systems such as culverts or drainage ditches.

7 Build new flood defences or raise the level of existing flood defences.

If after implementing or assessing the effectiveness, these measures are considered impracticable for reasons of cost or engineering then MTCBC will endeavour to relocate residents to the most convenient available vacant housing. If there are significant numbers of properties involved then MTCBC will consider how alternative houses may be provided on locally available land which has been allocated for housing.

It is anticipated that the property owner would be responsible for the cost of relocation or that their properties would be compulsory purchased by MTCBC at current market value.

**Benefits**

1 Reduce the risk to residents by removing them form from housing in areas which are subject to severe flood risk

**Time Scale for Implementation**
**Long term 50 – 100 years**

**4 Sustainable Drainage (SuDS) – LFRMS Clause 6.13.6**
**Prevention**
**Objective 1, 2, 3, 4, 12, 13, 15**

**Engineering Issues**
Within the Flood and Water Management Act 2010, Merthyr Tydfil County Borough Council has been designated as a Lead Local Flood Authority for its administrative area.
LLFA in Wales will take on the role of the SuDS Adopting and Approving Body in relation to sustainable drainage systems. In this role MTCBC will be responsible for both approving the original design of the SUDS and adopting and maintaining the finished system.

MTCBC have a commitment to promote the use of SuDS wherever new sites are developed or brown field sites are re-developed.

The philosophy of SUDS is to replicate, as closely as possible, the natural drainage from a site before development.

The objectives of sustainable drainage are quality, quantity and amenity and biodiversity.

It is anticipated that SUDS will achieve the following:

1 Reduce runoff rates, thus reducing the risk of downstream flooding.

2 Reducing the additional runoff volumes and runoff frequencies that tend to be increased as a result of urbanisation, and which can exacerbate flood risk and damage receiving water quality.

3 Encourage natural groundwater recharge to minimise the impact on aquifers and river base flows in the receiving catchment.

4 Reducing pollutant concentration in stormwater, thus protecting the quality of the receiving water body.

5 Acting as a buffer for the accidental spills by preventing direct discharge of high concentrations of contaminants to the receiving water body.

6 Reducing the volume of surface water runoff discharging to combined sewer systems, thus reducing discharges of polluted water to watercourses via Combined Overflows (CSO) spills.

7 Contributing to the enhanced amenity and aesthetic value of developed areas.

8 Providing habitats for wildlife in urban areas and opportunities for biodiversity enhancement.

The following techniques will be considered as part of SUDS – filter strips, swales, infiltration basins, wet ponds, extended detention basins, constructed wetlands, filter drains and perforated drainpipes, infiltration devices, pervious surfaces and green roofs.

Extracts above have been taken from The SUDS Manual prepared by CIRIA.

**Planning Issues**

Policy BW8 of the LDP requires new developments to incorporate SUDS to avoid exacerbating local flood risk locally and elsewhere within the river catchment.

**Benefits**

1 Policy framework contributes to managing flood risk, protecting water quality and reducing environmental damage.

2 Improve the quality of surface water

**Time Scale for Implementation**
2006 – 2021
**Short term 0 - 20 years**

## 5 Flood Awareness – LFRMS Clause 6.14.1
**Preparedness**
**Objective 1, 2, 3, 4, 7, 8, 10, 11**

Both the EA and Local Resilience Unit (LRU) have continually worked closely together over the past couple of years in raising awareness of flooding to communities within Merthyr Tydfil County Borough. The production of leaflets (by Both the EA and MTCBC LRU) also a production of an e-tool CD disc that has template plans targeted at the family and community levels, as well as information on incidents such as flooding. In the summer of 2008 the EA and MTCBC produced an awareness drive within the council's Contact Paper/ Newsletter for the autumn addition. The Contact Newsletter is a free supplement where every household

within the County Borough receives a copy. In additional to the above the Environment Agency also embarked on their Big Welly Tour with an event held in Merthyr Tydfil Town Centre on 6th August 2010 - **Flooded with good advice.**

It is proposed that this scheme will be extended to cover areas subject to flood risk from ordinary watercourses and surface water.

**Benefits**

1 Raise awareness of flood risk within the communities of MTCBC

**Time Scale for Implementation**
Ongoing
**Short term 0 20 years**

## 6 Flood Warning – LFRMS Clause 6.14.2
**Preparedness**
**Objective 1, 2, 3, 4, 7, 8, 10, 11**

On Receipt of Severe Weather Warning via the Met Office this goes into a specially setup mailbox which then distributes the warning to relevant officers and departments of the council. If the warning is received outside office hours the warning is sent to the council's Lifeline Control Room who then contact the “on call” duty Engineers and Emergency Planning Officers.

The appetite for the Extended Floodline Service (EFS) was originally born out of the recommendation within the Lessons Learned Report (Autumn 2000) that Floodline should be developed to become a “one stop shop” to help with all flooding problems.

In response to this, a Pilot Study which involved 26 Local Authorities was undertaken in Devon, Cambridgeshire and Hertfordshire between April 2003 and September 2004. Due to budgetary and resource constraints during 2005 and 2006 implementation of the service was delayed. The pilot looked at the value of the extension, provided a variety of lessons learned, and helped to refine the objectives of the project and reduce the number of risks to delivery.

The motivation behind the pilot project was based upon the need to provide Floodline customers with more localised information previously not available through the service. Local authorities were approached to provide contact numbers and information on commonly asked questions related to:

1 Roads affected by flooding.

2 Local services and amenities affected by flooding.

3 Local flooding information contact details.

4 Flooding evacuation plans.

5 Sandbag distribution schemes.

The pilot study indicated that a scripted service and an optional call transfer facility could be implemented without compromising the existing quality of the Floodline service. The pilot study also highlighted the complications of maintaining correct information and the limited scope of the information provided.

The new EFS Project is focussing on extending the service to Local Authorities in England and Wales only. The EFS infrastructure will complement future expansion into other areas like Scotland and Northern Ireland but this will depend on the available infrastructure in these areas. Scotland will remain on the main Floodline Service only. The final number of English and Welsh Local Authorities included in the EFS will depend on their commitment to a set of minimum standards and their ability to handle call transfers from Floodline.

The project does not change the Environment Agency's remit to provide information about fluvial and coastal flooding only. The additional information listed above will be provided to Floodline by the Local Authorities. The project's overall objective will be to provide a vehicle for localised flood information and contact details to be given to Floodline callers.

**Benefits**

1 To give local communities as much warning of potential flooding as possible to allow residents to take appropriate action.

**Time Scale for Implementation**
Currently in place and will be continued
**Short term 0 – 20 years**

**7 Flood Forecasting – LRFMS Clause 6.14.3**
**Preparedness**
**Objective 1, 2, 3, 4, 7, 8, 10, 11**

It is unlikely that advance warning would be possible for flooding resulting from surface water drainage problems or a breach in a canal bank, reservoir dam or sea wall.

However, the Flood Guidance Statement is issued daily by the Flood Forecasting Centre which shows a rolling five day forecast of flood risk at county level for England and Wales. These are categorised into fluvial and coastal and/or surface water flooding risk Awareness of this type of problem is dependent upon Local Authorities monitoring potential trouble spots together with information received from the general public.

**Benefits**

1 To give local communities and individuals the maximum amount of warning possible

**Time Scale for Implementation**
Currently in place and ongoing
**Short term 0-20 years**

## 8 Emergency Response Plans – LFRMS Clause 6.14.1 Preparedness Objective 1, 2, 3, 4, 7, 8, 10, 11

At present there are three response plans in place, two specifically for any flooding incidents, which are at three different levels:

1 Merthyr Tydfil CBC Emergency Response Flood Plan.

2 South Wales Local Resilience Forum Multi Agency Plan.

3 Merthyr Tydfil CBC Major Incident Plan.

**Merthyr Tydfil CBC Emergency Response Flood Plan**:-

As a Category 1 Responder under the Civil Contingencies Act 2004 Merthyr Tydfil County Borough Council (the Council), has to recognise its responsibilities to all its communities when they suffer disruption which affects their social and economic well being. The Council is fully committed to its community leadership role in assisting members of the public to react to and cope with these disruptions. Implicit to the Community Leadership role is the identifications of and partnership working with other concerned or involved agencies.

In flooding incidents within its area the Council considers its partners to be :-

1 The Environment Agency Wales.

2 Glas Cymru.

3 The South Wales Police Force.

4 The South Wales Fire and Rescue Service.

5 The Welsh Ambulance Service NHS Trust.

6 Capita Glamorgan.

In order to fulfil its responsibilities the Council has established in partnership with the above mentioned organisations a joint forum which is intended to manage the planning for and response to flooding in its area.

The forum will be known as The Merthyr Tydfil Flood Review Group. The Group will meet quarterly under the joint chair of the Environment Agency Wales and Merthyr Tydfil Count Borough Council.

The Group will:-

1 Assess the flood risks from all sources within the County Borough's boundaries.

2 Examine and canvass for or sponsor flood prevention schemes.

3 Arrange joint training and exercising.

4 Act as a focal point for debate and public interaction.

5 Identify the roles and responsibilities of all bodies which have a role in flood management.

6 Review flooding incidents.

7 Review and prepare plans for flood defence and response.

**Benefits**

1 To manage the response of MTCBC and its Risk Partners to various emergencies including flooding.

2 To give support to the communities during and after emergencies.

**Time Scale for Implementation**
Ongoing
**Short term 0 – 20 years**

## 9 Community Flood Plans LFRGS Clause 6.14.5
**Preparedness**
**Objective 1, 2, 3, 4, 7, 8, 10, 11**

MTCBC has only one Community Flood Plan in place covering Troedyrhiw community. This area was chosen by the Environment Agency as it is considered to be one of the communities at greatest risk of river flooding within Wales.

A Flood forum was set up by the EA bringing together representatives of the community of Troedyrhiw, local Councillors, Environment Agency employees and staff members from MTCBC Emergency Planning Group.

Although the forum was established to produce a Community Plan relating to main river, in this case the Afon Taf, it is considered as an appropriate grouping to consult as part of the preparation of the FRM Plans as the same community is also subject to flooding from surface water, ordinary watercourses and their interface with the Afon Taf. It is anticipated, therefore, that the Troedyrhiw Flood Forum will be reconvened as part of the public consultation required to produce the Plans.

During the preparation of the Community Flood Plans consideration should be given to including environmental improvements where appropriate.

In addition MTCBC Emergency Planning department is planning to establish Flood Forums at Abercanaid and Pentrebach, Plymouth Ward, Bedlinog, Aberfan/Merthyr Vale, Heolgerrig and Quakers yard in order to produce Community Flood Plans for these areas.

These additional Flood Forums will be set in place within the next two years and therefore consultation will not be possible as part of the preparation of this Strategy, however, the time scale will allow consultation with these group as part of the preparation of the Flood Risk Management Plans.

**Benefits**

1 The local communities will be made more aware of the risks of flooding to their properties.

2 The plans will allow individual house holders to prepare their own Flood Risk Plans.

3 The social, and economic effects of any likely flooding will be reduced

**Time Scale for Implementation**

It is anticipated that the additional Community Flood Plans proposed for MTCBC will be completed in collaboration with the Environment Agency and MTCBC Emergency Planning Department within the next 5 years
**Short term 0-20 years**

## 10 Land Management – LFRMS Clause 6.15.1
**Prevention**
**Objective 1, 2, 3, 4, 5, 6, 10, 11, 12, 13, 16**

**Planning Issues**

Land management across the County Borough of Merthyr Tydfil is implemented by a wide range of individuals and organisations with no effective ability to strictly control these matters. The vast majority of land management will be influenced by European and national strategic decisions, particularly agricultural policy and funding.

Where there are opportunities to influence land managers, such as currently through grant funded initiatives, then it will be possible to encourage continuation or changes in land management where land managers are supportive.

Unfortunately there is little certainty on the future extent and direction of such grant schemes, however, wherever possible partner organisations and land managers will certainly be required to maximise the use of such grant funding so as to integrate land management solutions to include consideration of contributions to flood minimisation.

The Local Authority has included the consideration of flooding and erosion matters in the Open Spaces Strategy Audit of sites in order that these matters are encouraged to be considered by the relevant land manager.

**Engineering Issues**

In order to reduce total runoff and/or control peak flows from catchments above areas identified as being subject to flood risk, MTCBC will consider introducing various methods of catchment management.

Where forestry planting has been introduced, MTCBC will enter into discussions with land owner to discuss felling and tree planting programmes to minimise increases in runoff after felling or reductions to peak flows in the medium term. It is anticipated that the Forestry Commission as one of the Risk Partners with MTCBC will be engaged in consultation to control these processes.

Control over the construction of drainage systems within the forestry will also be discussed.

MTCBC as the LLFA will also consult with Farm Unions and local farmers to discuss methods of farming, such as the direction of ploughing, which affects the nature of the runoff from farmland. The planting of shelter belts will also be considered.

The use of fertiliser and other chemicals used in the farming industry will also be discussed in an attempt to limit contamination of downstream watercourses.

When considering the various options to implement this measure the possibility of including public access will be reviewed and those options which provide the most beneficial access will be given higher priority.

**Benefits**

1 Integrated land management opportunities benefitting a range of themes simultaneously, theoretically broadening the scope and increasing the likelihood of funding for projects that will improve land water management.

2 Reduction of surface water runoff and peak flows.

3 Reduction of contamination to surface water runoff.

**Time Scale for Implementation**
Ongoing
**Short Term and medium term 0 – 50 years**

## 11 Resilience – LFRMS Clause 6.15.2
**Preparedness**
**Objectives 5, 6, 12**

Resilience relating to properties is covered in 5.4 below.

Within MTCBC a culture of resilience to flood will be adopted in relation to property and land subject to flood risk. This will entail the restoration of land and property as quickly as possible following a flood event. The standard of restoration will be set appropriately to return habitats to their previous condition without significant change.

Where land contains Sites of Special Scientific Interest (SSSIs), Sites of Importance for Nature Conservation (SINCs) or BAP habitats, measures will be adopted which will minimise the risk of flooding where flooding is considered to be of detriment to the habitat. It must however be accepted, that total removal of risk will not be possible. As such the sites will be appropriately managed to increase the ability of the environments to cope with any changing conditions that may arise.

Where land containing SSSIs or SINCs is identified as being subject to flood risk, surveys and reports will be carried out to identify the potential damaging effects of flooding and what measures could be implemented to reduce the flood risk and/or increase the resilience to long-term changes.

Such measures may include the construction of swales, drainage ditches or small earth bunds to divert surface water from the most sensitive areas, or altering land management (3.1).

**Benefits**

1 To maintain, enhance and increase the resilience of existing habitats particularly SSSIs, BAP habitats and SINCs.

2 To restore habitats to their original condition as soon as possible.

**Time Scale for Implementation**
**Short term 0 – 20 years**

**12 Resistance – LFRMS Clause 6.15.3**
**Protection**
**Objectives 5, 6, 12**

Within MTCBC a culture of resistance to flood risk will be adopted in relation to property and land subject to flood risk. This will entail the implementation of measures which will reduce the risk of flood water entering properties and land which would be adversely affected by flooding. Resistance relating to properties is covered in 5.5 below.

**Benefits**

1 To maintain, enhance and increase the resilience of existing habitats particularly SSSIs, BAP habitats and SINCs.

**Time Scale for Implementation**
**Short term 0 – 20 years**

**13 Restoration – FLRMS Clause 6.15.4**
**Prevention**
**Objective 5, 6, 12, 13**

**Planning Issues**

Most restoration is envisaged to be dealt with via the Planning system, as such there will be opportunities for relevant statutory bodies to contribute. Notwithstanding this matter there will be a preference for using ‘soft’ engineering solutions (rather than ‘hard’) for the management of water on restoration sites. Only when there is clear evidence that such solutions are not appropriate due to site specific or localised issues will ‘hard’ landscaping options be considered.

**Engineering Issues**

Traditionally MTCBC has been subject to extensive mining for coal and iron ore. Various forms of deep mining have been used resulting in numerous large deposits of waste material on the surface in the form of tips. All coal and iron ore extraction by this method has now ceased within the Borough.

In more recent years coal extraction by opencast mining has been adopted and although significant excavations are carried out as part of the extraction process the sites are typically progressively restored, before works are completed. A number of opencast sites are currently in operation including Ffros y Fran at Cwm Bargod.

In addition there has been a tradition of quarrying for building stone and aggregates. This type of operation generally leaves a vertical excavation forming a scar on the landscape.

Over the last 50 years the Welsh Government and its predecessors have funded numerous schemes within the Borough to restore sites which have been subject to mineral extraction and where significant derelict land has been left untreated. When such engineering works are planned it is the policy of MTCBC to restore sites to a land form which blends well with the surrounding landscape and produces a natural land appearance. This form of restoration usually includes planting trees and seeding for stabilisation, which reduce surface water runoff. These sites will be managed, particularly the woodlands, in order to maximise the stabilisation of the restored land and to minimise surface water flow.

Drainage on these sites usually takes the form of drainage ditches, swales, French drains, surface water sewers and lined channels. These techniques usually restore the surface water runoff to a level similar to green field values particularly after the vegetation has been established and the site matured.

Any site subjected to major earthworks is likely to cause significant silt pollution to the local surface water and ordinary watercourses. In order to control the discharge from the site and to ensure that the quality of the water meets the Environment Agency standards for Discharge Consent the developer will have to install a series of settlement ponds. The ponds will need to be cleared of silt on a regular basis and the discharge will be monitored.
It is the policy of MTCBC to restore all derelict land, where appropriate, to beneficial use.

**Benefits**

1 To create semi-natural environments and appropriate management which are the two main factors which will influence the ecological benefits.

2 To restore land to prior use or sustainable communal use wherever possible.

**Time Scale for Implementation**
**Short and medium term 0- 50 years**

## 14 Environmental Enhancement – LFRMS Clause 6.15.5
**Prevention**
**Objective 5, 6, 12, 13, 15**

Typically environmental enhancements schemes are either linked to development sites or are publicly funded grants to improve existing, predominantly urban areas. As such there is a high potential impact that can be gained from careful consideration on such schemes. The Local Authority will:

1 Include improvements in surface water management in all publicly funded schemes.

2 Request demonstration of water management techniques in all Landscaping Masterplans submitted as part of Planning Conditions.

3 Request the removal of invasive non-native species from/bordering enhancement/development sites followed by secondary planting to minimise re-growth and erosion.

4 To create semi-natural environments and appropriate management which are the two main factors which will influence the ecological benefits.

**Benefits**

1 Decreased surface water runoff on new developments and publicly funded environmental enhancements.

**Time Scale for Implementation**
**Short, Medium and Long term 0 – 100 years**

**15 System Asset Management Plans LFRMS Clause 6.16.1**
**Protection**
**Objectives 9, 11**

Under the Flood and Water management Act 2010 MTCBC as a LLFA is required to maintain a register of structures or features, which in the opinion of the authority, are likely to have a significant effect on a flood risk in the borough. Information must be recorded about each of the structures and features including ownership and the state of repair.

In order to satisfy this requirement MTCBC has set up a database using Microsoft Access and layers within ArcMap Geographic Information System (ArcMap GIS), which have the following information recorded:

1 An Excel spreadsheet and GIS layer showing all Dŵr Cymru / Welsh Water surface water sewers and combined sewers above 400mm diameter and the associated manholes.

2 Records within the Access database and GIS layer showing all known culverted watercourses 400mm diameter and above and all associated manholes, intakes and outlets, owned by MTCBC, Network Rail, SWTRA and other land owners.

3 Records within the Access database and GIS layer showing all significant open channels, ponds and reservoirs.

More recently MTCBC has purchased three modules of a bespoke system for Asset Management from STM. It is this system, which will be used in the future for the management of drainage structures including the following:

1 Database of all pipes, culverts, channels, drainage ditches, manholes, intakes and outfalls.

2 GIS layers of all pipes, culverts, channels, drainage ditches, manholes, intakes and outfalls.

3 Records of all inspections carried out to grids or culverts

4 Records of cleaning of grids and gullies.

To date MTCBC has used their Access database to keep the following information:

1 A register of those structures and features likely to have a significant effect on flooding.

2 The replacement cost of culverts owned by MTCBC.

3 List of all MTCBC owned culvert intake structures.

The system of database and GIS layers will be used by MTCBC to manage drainage assets. Further information is required and the following surveys and calculations will be carried out:

1 Calculation of capacity of each culvert.

2 Identification of intake structures below current currently acceptable design standards, which will need to be upgraded.

3 Identification of all owners and their contact details.

4 Current condition of each significant culvert.

Where areas are identified which are subject to a high level of flood risk one of the measures which will be considered in order to reduce flood risk will be the construction of new surface water culverts or channels.

**Benefits**

1 Provide details of all existing drainage structures which are likely to affect flood risk.

2 Give easy and efficient access to available information.

3 Provide condition surveys and maintenance records for all drainage structures.

Maintain records of cleaning and inspection of grids and gullies.

Time Scale for Implementation
Short term – 0 – 20 years

## 16 Defence/Structure Management – LFRMS Clause 6.16.2
**Protection**
**Objective 1, 2, 3, 4, 7, 9, 10, 11**

MTCBC has a number of formal flood defences, which have been plotted within the GIS system. These defences are largely earth formed embankments, which have been constructed by the Environment Agency.

A survey will be implemented in order to establish a list of the defences within the borough, details of their construction and condition.

In addition MTCBC has a number of informal flood defences, which may include items such as boundary walls to properties, embankments constructed for highway schemes, individual properties, or even kerb lines. Although these features were not constructed as flood defences, in some cases they defend properties against flooding and in others they affect the route of surface water during floods and therefore can significantly affect flood risk.

It is proposed that some informal structures controlled by individuals or government organisations be identified as part of the Hazard and Risk Management Plans to be prepared by June 2012. This information will then be included in the MTCBC database of drainage assets.

Where it is established that existing flood defences need to be raised or new flood defences constructed “soft engineering” solutions will be given priority.

**Benefits**

1 To exclude flood water from areas identified as subject to flood risk.

**Time Scale for Implementation**
Sort and Medium term 0 – 50 years

## 17 Channel Construction and Maintenance – LFRMS Clause 6.16.3
**Protection**
Objectives 1, 2, 3, 4, 12

Drainage channels, which have been identified as being significant to flood risk, have been included in the MTCBC database of drainage structures and the appropriate GIS layers.

Where these structures are in the ownership of MTCBC they are maintained by the MTCBC Drainage Department. Channels may include ordinary watercourses, lined channels, drainage ditches and swales.

Maintenance is carried out on an “as required” basis and may include the following:

1 Cutting of grass and shrubs where this may impede flows and reduce channel capacity.

2 Repairs to concrete inverts or bank protection where damage has occurred, which could undermine the integrity of the channel.

It is proposed as part of this strategy that surveys will be carried out of all channels, which are considered to be significant in terms of flood risk. The surveys will identify details of the construction materials, size and shape of the channel and its condition.

From this survey information a detailed programme of work will be drawn up for the maintenance and/or replacement of all existing channels. Works will be considered which will improve the naturalness of existing channels including the protection and restoration of channels and corridors.

Following the next round of surface water modelling and the preparation of Hazard and Risk Maps, the Flood Risk Management Plans will be prepared. These plans will identify individual measures to be implemented in each flood risk area, which may include the construction of additional channels to carry excess surface water from areas of high flood risk.

Where channels have been constructed to “hard” engineering design, consideration will be given to restoring these channels to a more natural construction.

**Benefits**

1 To bring all channels on significant watercourses to be fit for purpose.

2 To ensure that all channels are well maintained.

**Time Scale for Implementation**
Short term 0 – 20 years

## 18 Culvert Construction and Maintenance – LFRMS Clause 6.16.4 Protection Objectives 1, 2, 3, 4, 10, 11, 15

Culverts and pipes, which have been identified as being significant to flood risk, have been included in the MTCBC database of drainage structures and on the GIS layers.

Where these structures are in the ownership of MTCBC or have been classified as being of strategic importance they are maintained by the MTCBC Drainage Department.

Where access inside the culverts is relatively easy and the culvert is regarded as being of strategic importance they are inspected on an annual basis.

Most of the culverts, which are in MTCBC ownership, do not fall into this category and therefore their condition is unknown and maintenance is carried out on an “as required” basis and may include the following:

1 Repairs to culvert inverts and walls where the construction is in masonry.

2 Replacement of sections of culvert, which have collapsed using modern pipes.

3 Replacement or repair of existing structures such as manholes, intakes and outlets.

4 Construct new or improved intakes to culverts where existing structures are reducing the operational capacity of culverts or causing risk of flooding due to blockage. The new structures will be designed and built in accordance with the Environment Agency Code of Practise for intakes.

It is proposed as part of this strategy that surveys will be carried out of all culverts, which are considered to be significant in terms of flood risk. The surveys will identify details of the construction materials, size and shape of the culvert and its condition.

From this survey information a detailed programme of work will be drawn up for the maintenance and/or replacement of all existing culverts.

Following the next round of surface water modelling and the preparation of Hazard and Risk Maps, the Flood Risk Management Plans will be written. These plans will identify individual measures to be implemented in each flood risk area, which may include the construction of additional culverts designed to modern standards to carry excess surface water from areas of high flood risk.

Where existing culverts need to be replaced due to inadequate capacity or the structure is failing, consideration will be given to their replacement with open channels in order to improve the naturalness of the system. Where this is not possible they will be replaced with culverts to modern design.

Within MTCBC there is a presumption against the culverting of watercourses and therefore culverting of new watercourses will only be considered as a measure of last resort.

**Benefits**

1 To bring all culverts on significant watercourses to be fit for purpose.

2 To ensure that all culverts are well maintained.

**Time Scale for Implementation**
Short term 0 – 20 years

**19 Investigation – LFRMS Clause 6.17.1**
**Preparedness**
**Objective 14**

In the preparation of this strategy and identification of measures, which may be implemented as part of the Risk Management Plans a number of issues have been identified in terms of the lack of information currently available within MTCBC. It is proposed that numerous surveys and investigations will be carried out in order to supplement the information already available.

A list of the surveys required is given below:

1 Where land containing SSSIs or SINCs is identified as being subject to flood risk surveys and reports will be carried out to identify the potential damaging effects of flooding and what measures could be implemented to reduce the flood risk.

2 Survey of water bodies with area greater than 2,000 $m^2$.

3 Additional information required for the database and GIS layers:

1 Calculation of capacity of each culvert and determine details of the catchment served.

2 Identification of intake structures below current EA standards, which will need to be upgraded.

3 Identification of all owners and their contact details.

4 Current condition of each significant culvert.

4 Identify all features, which act as flood defence structures.

5 Survey all channels, which are considered to be significant in terms of flood risk. The surveys will identify details of the construction materials, size and shape of the channel and its condition.

6 Survey all culverts, which are considered to be significant in terms of flood risk. The surveys will identify details of the construction materials, size and shape of the culvert and its condition.

7 Further survey work and site investigations will be carried out in order to improve the accuracy and completeness of the information available regarding contaminated land within areas subject to significant flood risk.

8 Surveys will be carried out to establish what measures will be required in order to provide additional resistance to flood water to Historic Assets including Scheduled Ancient Monuments and Historic Listed Buildings.

9 A survey will be carried out to identify where leachate is being discharged from refuse tips both current and historic and from cemeteries. The nature of the leachate will be established and its affect on the quality of surface water.

10 A survey will be carried out of all ground water discharges from all mine workings to establish the location and quality of the water.

11 A survey will be implemented in order to establish a list of the defences within the borough, details of their construction and condition.

12 Topographical surveys will be carried out where required to allow construction schemes to be designed as part of the Flood Risk Management Plans

**Benefits**

1 To have information available to identify where measures may be required.

2 To have information available to design new measures.

**Time Scale for Implementation**
Short term 0 – 20 years

## 20 Local Property-level flood Mitigation - Resilience LFRMS Clause 6.17.4 Preparedness Objective 10

MTCBC do not own Council Houses. Their housing stock was transferred to Merthyr Valley Homes in 2009. They do however own offices, schools, health centres, sheltered accommodation and other council related buildings.

The buildings vary in age but none of them have been built to withstand flooding. It is proposed that once the detailed flood modelling has been completed all Council owned buildings at risk will be identified. When these properties are due for refurbishment two quotations will be obtained, one designed with flood resilience in mind and one designed to "normal" building standards. A cost benefit analysis will then be carried out to decide if the additional cost of building in flood resilience is deemed beneficial in that case. Funding will have to be identified to cover the additional cost.

Where new buildings are planned within areas at risk of flooding MTCBC will adopt a policy of using building standards which are resilient to water inundation.

Methods of achieving building resilience in flood risk areas may include the following:-

**Use of flood resilient materials**

Ceramic tiled floors, flood proof skirting, steel kitchens units. Replace chipboard kitchens and bathroom units with plastic, steel or solid wood. Fit water resistant door and window frames. Replace usual plaster with a more water-resistant version such as lime plaster or cement render. Always use waterproof sealant on external walls and water resistant paint on internal walls. Use denser concrete screeds on concrete floors. Replace insulation with cell insulation which will survive flooding. Install concrete floors instead of timber suspended. Wall joints to be protected by installing a chemical damp proof course below joist level.

**Use of flood resilient building techniques**

Walls re-plastered up to 1 metre above floor level with water resilient plaster, all main appliances on plinths, kitchens units with base units raised off the ground and raise electrical points and other services above flood level. Use tiled floors with rugs that can be removed easily. Buy airbricks with removable covers – put them on during flood, but remove afterwards to help drying process. Install expensive electric equipment such as boilers upstairs.

**Benefits**

1 Less damaged will be caused to properties subject to flooding.

2 Buildings will be renovated and brought back into use more quickly.

3 The overall cost of the building life cycle will be reduced.

**Time Scale for Implementation**

Building in resilience to existing properties will take place as properties are programmed for refurbishment and will only be considered when it has been established that they are within an area subject to flood risk. The time scale therefore for all Council owned properties to be refurbished is likely to be up to 50 years

**Time Scale for Implementation**
**Medium term 20-50 years**

**21 Local Property-level flood Mitigation – Resistance LFRMS Clause 6.17.5 Protection**
**Objectives 1, 2, 3, 4, 10**

Where areas of flood risk are identified giving flood water levels below 600mm in depth then measures will be considered which will prevent the ingress of water into individual properties.

Measures may include portable flood walls, flood guards to doors or the replacement of existing doors with doors with seals which will withstand the depth of water predicted by the modelling. These measures would need to be installed with non-return valves or double-check valves in the foul sewers to prevent flood water entering the properties through the sewer systems.

**Benefits**

1 To ensure that properties damaged by flooding will be brought back to a habitable state as quickly as possible.

**Time Scale for Implementation**
**Sort and medium term 0 – 50 years**

## Appendix 3 – MTCBC FRMP Risk Counting methodology - overview

Data Sources
This section of the document details the data used to generate counts and maps for people, economic activity, and natural/historic environment. Although the majority of data has been provided by the Environment Agency, data used to generate the risk count was sourced from a variety of locations as detailed below.

1 Data Type: *National Receptors database*.
Source: Environment Agency Geo-store.
Date downloaded: 08 August 2014.
Data type: ESRI polygon, point and polyline shapefiles.
Contents: Data containing, listed buildings, scheduled ancient monuments, registered parks and gardens, environmental permitting sites, trunk/primary roads, railways, SSSI's.

2 Data Type: *UMfSWF Flood Extent Map.*
Source: Environment Agency Geo-store.
Date downloaded: 11 August 2014.
Data type: ESRI polygon shapefile.
Contents: Map displaying maximum flood extents based on a combination of depth, hazard and velocity for 3 rainfall return periods; *P1000 (Low Risk); P100 (Medium Risk); P30 (High Risk).* The extent map excludes flood mapping with a hazard rating of 0.575 or less as well as any flooded areas of less than $100m^2$.

3 Data Type: *UMfSWF Property point data set.*
Source: Environment Agency. (Link to data provided by Louise Pennington of Natural Resources Wales).
Data type: ESRI point shapefile.
Date downloaded: 04 August 2014.
Contents: Residential and Commercial property point data within a defined local authority area, derived from the Environment Agencies national receptors database. In addition to the standard Ordnance Survey address layer 2 property data, the dataset details of the percentage of the perimeter that is wetted in a P30, P100 and P1000 rainfall event at 6 different depths; 0mm, 150mm, 200mm, 300mm, 600mm, 900mm.

4 Data Type: *Licensed Abstractions spreadsheet.*
Source: Natural Resources Wales.
Date received: 21st August 2014.
Data type: Microsoft Excel spreadsheet.
Contents: Spreadsheet containing details of all active water extraction licenses within the Merthyr Tydfil borough with map references for approximate site locations. The data was provided under a special license agreement from Natural Resources Wales.

5 Data Type: *Vector Map District.*
Source: Ordnance Survey.
Data type: Raster (.tif) image file.
Date downloaded: 23rd December 2013.
Contents: Open data from the Ordnance Survey containing simplified background mapping for reference purposes.

## Analysing the Data

The following section details the risk counts that have been generated to assist in identifying people, economic activity and natural/historic environments in areas at risk from surface water flooding. The methodology used has been derived from the three documents below:

1 **Updated Flood Map for Surface Water – What is the uFMfSW Property Point dataset?**
Document source: The Environment Agency – July 2014.

2 **The updated Flood Map for Surface Water Property Point dataset.**
Document source: The Environment Agency – July 2014.

3 **Risk of flooding from Surface Water – Severn River Basin District.**
Document source: The Environment Agency – July 2014.

Counts are spit into three main categories - Flood Risk Area, Merthyr Tydfil Borough and individual Community Areas. Each count type is then assessed on its spatial relationship to the Environment Agency flood extent maps for three rainfall return periods; 1in30 year - P30 - HIGH; 1in100 - P100 - MEDIUM and 1in1000 - P1000 - LOW.

1 Count type: Risk to properties and people.
Primary software: ESRI ARC map.
Primary dataset: *UMfSWF Property point data set.*
Process overview: In total, 136 counts were conducted for Properties and People. 8 counts for the Flood Risk area, 8 counts for Merthyr Tydfil Borough and 8 counts for the each of the 15 community areas within the borough. In order to assess the number of people at risk of flooding as well as the number of properties likely to flood internally, the counts were split into two categories; “People in areas at risk of flooding” and “Properties at risk of flooding”. In order to determine the number of people affected, a factor of 2.35, derived from the 2011 UK census, was applied to the total number of properties. Details of parameters used for the people and property counts are as follows:

**Flood risk area:**
- Total number of people and properties within the defined area.
- Number of people in areas at risk of flooding for, P30 (HIGH), P100 (MED), and P1000 (LOW) rainfall event at a zero flood depth => 50% wetted perimeter multiplied by 2.35.
- Number of properties at risk of flooding for, P30 (HIGH), P100 (MED) and P1000 (LOW) rainfall event at a 200mm flood depth => 50% wetted perimeter.

**Merthyr Borough**:
- Total number of people and properties within the defined area.
- Number of properties in areas at risk of flooding for, P30 (HIGH), P100 (MED) and P1000 (LOW) rainfall event at a zero flood depth => 50% wetted perimeter multiplied by 2.35.
- Number of properties at risk of flooding for, P30 (HIGH), P100 (MED) and P1000 (LOW) rainfall event at a 200mm flood depth => 50% wetted perimeter.

**Community areas**
- Total number of people and properties within the defined area.
- Number of properties in areas at risk of flooding within each of the 15 community areas for a P30 (HIGH), P100 (MED) and P1000 (LOW) rainfall event at a zero flood depth => 50% wetted perimeter multiplied by 2.35.
- Number of properties at risk of flooding within each of the 15 community areas of the borough for a P30 (HIGH), P100 (MED) and P1000 (LOW) rainfall event at a 200mm flood depth => 50% wetted perimeter.

2 Count type: Risk to non residential properties**.**
Primary software: ESRI ARC map.
Primary dataset: *UMfSWF Property point data set.*
Process overview: 68 non-residential property counts were conducted. 4 counts for the flood risk area, 4 counts for Merthyr Tydfil borough and 4 counts for the each of the 15 community areas within the borough. Details of parameters used for the counts are as follows:

Flood risk area:
- Total number of non-residential properties within the defined area.
- Number of non-residential properties in areas at risk of flooding for a, P30 (HIGH), P100 (MED) and P1000 (LOW) rainfall event at a zero flood depth => 50% wetted perimeter.

Merthyr Borough:
- Total number of non-residential properties within the defined area.
- Number of non-residential properties in areas at risk of flooding for a , P30 (HIGH), P100 (MED) and P1000 (LOW) rainfall event at a zero flood depth => 50% wetted perimeter.

Community Areas
- Total number of non-residential properties within the defined area.
- Number of non-residential properties in areas at risk of flooding within each of the 15 community areas of the borough for a, P30 (HIGH), P100 (MED) and P1000 (LOW) rainfall event at a zero flood depth => 50% wetted perimeter.

**3 Count type: Risk to *Services**
Primary software: ESRI ARC map.
Primary dataset: *UMfSWF Property point data set.*
Process overview: 68 counts for Services were conducted. 4 counts for the flood risk area, 4 counts for Merthyr Tydfil borough and 4 counts for the each of the 15 community areas within the borough. Details of parameters used for the counts are as follows:

- *Services can be defined as the following; Police stations, Fire stations, Ambulance stations, Residential/Care homes, Education establishments and Sewage treatment works.*

**Flood risk area**:
- Total number of services within the defined area.
- Number of services in areas at risk of flooding for, P30 (HIGH), P100 (MED) and P1000 (LOW) rainfall event at a zero flood depth => 50% wetted perimeter.

**Merthyr Borough:**
- Total number of services within the defined area.
- Number of services in areas at risk of flooding for, P30 (HIGH), P100 (MED) and P1000 (LOW) rainfall event at a zero flood depth => 50% wetted perimeter.

**Community Areas**
- Total number of services within the defined area.
- Number of services in areas at risk of flooding within each of the 15 community areas of the borough for a, P30 (HIGH), P100 (MED) and P1000 (LOW) rainfall event at a zero flood depth => 50% wetted perimeter.

**Note: Counts for services also appear in the total count for non-residential properties.**

4 Count type: Risk to Primary/Trunk roads and motorways.
Primary software: ESRI ARC map.
Primary dataset: *National Receptors database*.
Process overview: 68 counts for Primary/Trunk roads were conducted. 4 counts for the Flood Risk area, 4 counts for Merthyr Tydfil borough and 4 counts for each of the 15 community areas within the borough. Details of parameters used for the counts are as follows:

Flood risk area
- Total length of road within the defined area.
- Total length of Primary/Trunk roads at risk within the Flood Risk area that intersect a, P30 (HIGH), P100 (MED) and P1000 (LOW) flood extent.

Merthyr Borough
- Total length of road within the defined area.
- Total length of Primary/Trunk roads at risk within the Merthyr Tydfil borough that intersect a P30 (HIGH), P100 (MED) and P1000 (LOW) flood extent.

Community Areas
- Total length of road within the defined area.
- Total length of Primary/Trunk roads at risk within each of the 15 community areas of the borough that intersect a P30 (HIGH), P100 (MED) and P1000 (LOW) flood extent.

5 Count type: Risk to main line railways.
Primary software: ESRI ARC map.
Primary dataset: *National Receptors database*.
Process overview: 68 counts for railways roads were conducted. 4 counts for the Flood Risk area, 4 counts for Merthyr Tydfil borough and 4 counts for each of the 15 community areas within the borough. Details of parameters used for the counts are as follows:

Flood risk area
- Total length of railway within the defined area.
- Total length of railways within the flood risk area that intersect a, P30 (HIGH, P100 (MED) and P1000 (LOW) flood extent.

Merthyr Borough
- Total length of railway within the defined area.
- Total length of affected railways within the county borough that intersect a, P30 (HIGH), P100 (MED) and P1000 (LOW) flood extent.

Community Areas
- Total length of railway within the defined area.
- Total length of Railways at risk within each of the 15 community areas of the borough that intersect a, P30 (HIGH), P100 (MED) and P1000 (LOW) flood extent.

6 Count type: Risk to Environmental Permitting Regulation installations.
Primary software: ESRI ARC map.
Primary dataset: *National Receptors database*.
Process overview: 68 counts for environmental permitting regulation installations were conducted. 4 counts for the Flood Risk area, 4 counts for Merthyr Tydfil borough and 4 counts for each of the 15 community areas within the borough. Details of the parameters are as follows:

Flood risk area
- Total number of EPR installations that exists within the Flood Risk area.
- Total number of EPR installation point features within the flood risk area that exists within a 50 metre radius of a, P30 (HIGH), P100 (MED) and P1000 (LOW) flood extent.

Merthyr Borough
- Total number of EPR installations that exists within the Merthyr Tydfil borough.
- Total number of EPR installation point features within the county borough that exists in a 50 metre radius of a, P30 (HIGH), P100 (MED) and P1000 (LOW) flood extent.

Community Areas
- Total number of EPR installations that exist within each of the 15 community areas.
- Total number of EPR installation point features within each of the 15 community areas that exist in a 50 metre radius of a, P30 (HIGH), P100 (MED) and P1000 (LOW) flood extent.

7 Count type: Risk to Sites of Special Specific Interest.
Primary software: ESRI ARC map.
Primary dataset: *National Receptors database*.
Process overview: 68 counts for sites of specific scientific interest were conducted. 4 counts for the Flood Risk area, 4 counts for Merthyr Tydfil borough and 4 counts for each of the 15 community areas within the borough. Details of the parameters used are as follows.

Flood risk area
- Total area (ha) of SSSI's that exist within the defined area.
- Total area (ha) of SSSI within the flood risk area that intersected a, P30 (HIGH), P100 (MED) and P1000 (LOW) flood extent.

Merthyr Borough
- Total area (ha) of SSSI's that exist within the defined area.
- Total area (ha) of SSSI's within the Merthyr Tydfil borough that intersected a, P30 (HIGH), P100 (MED) and P1000 (LOW) flood extent.

Community Areas
- Total area (ha) of SSSI's that exist within the defined area.
- Total area (ha) of SSSI's within each of the 15 community areas that intersected a, P30 (HIGH), P100 (MED) and P1000 (LOW) flood extent.

8 Count type: Risk to Sites of Importance for Nature Conservation.
Primary software: ESRI ARC map.
Primary dataset: *MTCBC public database.*
Process overview: 68 counts for Sites Important to Nature Conservation were conducted. 4 counts for the Flood Risk area, 4 counts for Merthyr Tydfil borough and 4 counts for each of the 15 community areas within the borough. Details of the parameters used are as follows.

Flood risk area
- Total area (ha) of SINC's that exist within the defined area.
- Total area (ha) of SINC's within the flood risk area that intersected a, P30 (HIGH), P100 (MED) and P1000 (LOW) flood extent.

Merthyr Borough
- Total area (ha) of SINC's that exist within the defined area.
- Total area (ha) of SINC's within Merthyr Tydfil borough that intersected a, P30 (HIGH), P100 (MED) and P1000 (LOW) flood extent.

Community Areas
- Total area (ha) of SINC's that exist within the defined area.
- Total area (ha) of SINC's within each of the 15 community areas that intersected a, P30 (HIGH), P100 (MED) and P1000 (LOW) flood extent.

9 Count type: Risk to parks and gardens.
Primary software: ESRI ARC map.
Primary dataset: *National Receptors database*.
Process overview: 68 counts for Parks and Gardens were conducted. 4 counts for the Flood Risk area, 4 counts for Merthyr Tydfil borough and 4 counts for each of the 15 community areas within the borough. Details of the parameters used are as follows.

Flood risk area
- Total area (ha) of Parks and Gardens that exist within the defined area.
- Total area (ha) of Parks and Gardens within the flood risk area that intersected a, P30 (HIGH), P100 (MED) and P1000 (LOW) flood extent.

Merthyr Borough
- Total area (ha) of Parks and Gardens that exist within the defined area.
- Total area (ha) of Parks and Gardens within Merthyr Tydfil borough that intersected a, P30 (HIGH), P100 (MED) and P1000 (LOW) flood extent.

Community Areas
- Total area (ha) of Parks and Gardens that exist within the defined area.
- Total area (ha) of Parks and Gardens within each of the 15 community areas that intersected a, P30 (HIGH), P100 (MED) and P1000 (LOW) flood extent.

10 Count type: Risk to Scheduled Ancient Monuments.
Primary software: ESRI ARC map.
Primary dataset: *National Receptors database*.
Process overview: 68 counts for Scheduled Ancient Monuments were conducted. 4 counts for the Flood Risk area, 4 counts for Merthyr Tydfil borough and 4 counts for each of the 15 community areas within the borough. Details of the parameters used are as follows.

Flood risk area

- Total area (ha) of Scheduled Ancient Monuments that exist within the defined area.
- Total area (ha) of Scheduled Ancient Monuments within the flood risk area that intersected a, P30 (HIGH), P100 (MED) and P1000 (LOW) flood extent.

Merthyr Borough:

- Total area (ha) of Scheduled Ancient Monuments that exist within the defined area.
- Total area (ha) of Scheduled Ancient Monuments within the Merthyr Tydfil borough that intersected a, P30 (HIGH), P100 (MED) and P1000 (LOW) flood extent.

Community Areas

- Total area (ha) of Scheduled Ancient Monuments that exist within the defined area.
- Total area (ha) of Scheduled Ancient Monuments within each of the 15 community areas that intersected a, P30 (HIGH), P100 (MED) and P1000 (LOW) flood extent.

11 Count type: Risk to listed buildings.
Primary software: ESRI ARC map.
Primary dataset: *National Receptors database*.
Process overview: 68 counts for Listed Buildings were conducted. 4 counts for the Flood Risk area, 4 counts for Merthyr Tydfil borough and 4 counts for each of the 15 community areas within the borough. Details of the parameters are as follows:

Flood risk area:

- Total number of Listed Buildings that exist within the defined area.
- Total number of Listed Building point features within the flood risk area that exist within a 2 metre radius of a, P30 (HIGH), P100 (MED) and P1000 (LOW) flood extent.

Merthyr Borough:

- Total number of Listed Buildings that exist within the defined area.
- Total number of Listed Building point features within Merthyr Tydfil borough that exist within a 2 metre radius of a, P30 (HIGH), P100 (MED) and P1000 (LOW) flood extent.

Community Areas

- Total number of Listed Buildings that exist within the defined area.
- Total number of Listed Building point features within each of the 15 community areas that exist within a 2 metre radius of a, P30 (HIGH), P100 (MED) and P1000 (LOW) flood extent.

12 Count type: Risk to licensed abstractions
Primary software: Microsoft Excel/ESRI ARC map.
Primary dataset: Microsoft Excel spreadsheet from NRW.
Process overview: 64 counts for Licensed Abstraction were conducted. 4 counts for the Flood Risk area, 4 counts for Merthyr Tydfil borough and 4 counts for each of

the 15 community areas within the borough. Details of the parameters are as follows:

Flood risk area

- Total number of Licensed Abstractions that exist within the defined area.
- Total number of Licensed Abstraction point features within the flood risk area that exist within a 2 metre radius of, P30 (HIGH), P100 (MED) and P1000 (LOW) flood extent.

Merthyr Borough

- Total number of Licensed Abstractions that exist within the defined area.
- Total number of Licensed Abstraction point features within Merthyr Tydfil borough that exist within a 2 metre radius of, P30 (HIGH), P100 (MED) and P1000 (LOW) flood extent.

Community Areas

- Total number of Licensed Abstractions that exist within the defined area.
- Total number of Licensed Abstraction point features within each of the 15 community areas that exist within a 2 metre radius of, P30 (HIGH), P100 (MED) and P1000 (LOW) rainfall event.

Although the Environment Agency provided further counts in their document, "*Risk of flooding from Surface Water – Severn River Basin District",* the items below totalled zero within the Merthyr Tydfil Borough and have therefore been omitted from the count process:

- Airports
- Agricultural Land (Grades 1, 2, 3)
- Bathing Waters
- Special Areas of Conservation
- Special Protection Areas
- Ramsar sites
- World Heritage Sites

## Appendix 4 – Glossary of Terms

| Mnemonics | Full Name |
|---|---|
| | |
| CSOs | Combined Sewer Overflows |
| DEFRA | Department of the Environment and Rural Affairs |
| EA | Environment Agency |
| FRMP | Flood Risk Management Plan |
| FRR 2009 | Flood Risk Regulations 2009 |
| LFRMS | Local Flood Risk Management Strategy |
| LLFA | Lead Local Flood Authority |
| MTCBC | Merthyr Tydfil County Borough Council |
| NRD | National Receptor Database |
| NRW | Natural Resources Wales |
| PFRA | Preliminary Flood Risk Assessment |
| RMAs | Risk Management Authorities |
| SEA | Special Environmental Assessment |
| uFMfSW | Updated Flood Maps for Surface Water |
| WFD | Water Framework Directive |
| WG | Welsh Government |
| WLGA | Welsh Local Government Association |

**A**

**Act –** a Bill approved by both the House of Commons and the House of Lords and formally agreed to by the reigning monarch (known as Royal Assent).

**B**

**Bill** – a proposal for a new law, or a proposal to change an existing law that is presented for debate before Parliament.

**C**

**Catchment** – An area that serves a river with rainwater that is every part of land where the rainfall drains to a single watercourse is in the same catchment.

**CCW** – Countryside Council for Wales

**CFMP – Catchment Flood Management Plans** – plans that provide an overview of the flood risk across each river catchment and estuary. They recommend ways of managing those risks now and over the next 50 – 100 years.

**Climate Change** – the change in average conditions of the atmosphere near the Earths surface over a long period of time.

**Coastal erosion** – the wearing away of coastline, usually by wind and/or wave action.

**Coastal erosion risk** – measures the significance of potential coastal erosion in terms of likelihood and impact.

**Coastal erosion risk management** – anything done for the purpose of analysing, assessing and reducing a risk of the wearing away of coastline.
**Coastal Flooding** – Occurs when coastal defences are unable to contain the normal predicted high tides that can cause flooding, possible when a high tide combines with a storm surge (created by high winds or very low atmospheric pressure).
**Culvert** – a covered structure under road, embankment etc, to direct the flow of water.

**D**
**Defences** – A structure that is used to reduce the probability of floodwater or coastal erosion affecting a particular area.
**Draft Bill** – a Bill published in draft before introduction before Parliament.
**Drainage Authorities** – Organisations involved in water level management, including IDBs, the Environment Agency and RFCCs.

**E**
**EAW /EA – Environment Agency Wales and Environment Agency** – a Welsh Government sponsored Public Body responsible to the Welsh Ministers and an Executive Non-departmental Public Body responsible to the Secretary of State for Environment, Food and Rural Affairs.

**F**
**FCERM** – Flood and Coastal Erosion Risk Management.

**FCERM Function** – defined by Sections 4 and 5 of the Flood and Water Management Act 2010 as being a function, which may be exercised by a risk management authority for a purpose connected with either flood risk management or coastal erosion.
**Flood** – any case where land not normally covered with water becomes covered by water.
**Flood and Water Management Act 2010** – an Act of Parliament updating and amending legislation to address the threat of flooding and water scarcity, both of which are predicted to increase with climate change.
**Flood risk** – product of the probability of flooding occurring and the consequences when flooding happens.
**Flood risk management** – the activity of understanding the probability and consequences of flooding, and seeking to modify these factors to reduce flood risk to people, property and the environment. This should take account of other water level management and environmental requirements, and opportunities and constraints.
**Flood risk management measures** – The way in which flood risks are to be managed.
**Flood Risk Management Wales (FRMW)** – The Regional Flood and Coastal Committee (RFCC) for Wales
**Flood Risk Regulations 2009** – Regulations which transpose the EC Floods Directive (Directive 2007/60/EC on the assessment and management of flood risks) into domestic law and to implement its provisions.
**Floodline Warnings Direct** – is a free service that provides flood warnings direct to you by telephone, mobile, email, SMS text message and fax.

**G**
**Groundwater** – water held underground in the soil or in pores and crevices in rock.
**Groundwater Flooding** – Occurs when water levels in the ground rise above the natural surface. Low lying areas underlain by permeable strata are particularly susceptible.

**H**
**Habitats Regulation Assessment (HRA)** – the Conservation of Habitats and Species Regulations (SI 490, 2010), Termed the 'Habitats Regulations', implements the EU 'Habitats Directive' (Directive 92/43/EEC) on the Conservation of natural habitats and of wild flora and fauna) and certain elements of the 'Birds Directive' (2009/147/EC). This legislation provides

the legal framework for the protection of habitats and species of European importance in Wales.

**I**

**IDB – Internal Drainage Board** – Independent statutory bodies responsible for land drainage in areas of special drainage need in Wales and England. They are long established bodies operating predominantly under the Land Drainage Act 1991 and have permissive powers to undertake work to secure drainage and water level management of their districts.

**L**

**LLFA – Lead Local Flood Authority** – (Local Authority) the County Council or the County Borough Council for the area.
**Local Flood Risk**: defined within the Flood and Water Management Act 2010 as including surface runoff, groundwater and ordinary watercourses.
**Local Flood Risk Strategy**: required in relation to Wales by Section 10 of the Flood and Water Management Act 2010 local flood risk strategies are to be prepared by lead local flood authorities and must set out how they will manage local flood risks within their areas.

**M**

**Main River** – A watercourse shown as such on the Main River Map, and for which the Environment Agency has responsibilities and powers.
**Main River Map** – the definitive map showing which watercourses have been classified as a Main River.

**N**

**National Strategy** – the "National Strategy for Flood and Coastal Erosion Risk Management: Wales" produced by the Welsh Government in response to the requirement under Section 8 of the Flood and Water Management Act.

**O**

**Ordinary Watercourse** – all watercourses that are not designated Main River, and which are the responsibility of Local Authorities or, where they exist, Internal Drainage Boards.

**P**

**PFRA** – Preliminary Flood Risk Assessment as required by the Flood Risk Regulations 2009.

**R**

**Reservoir** – an artificial lake where water is collected and stored until needed. Reservoirs can be used for irrigation, recreation, providing water for municipal needs, hydroelectric power or controlling water flow.
**Resilience** – The ability of the community, services, area or infrastructure to avoid being flooded, lost to erosion or to withstand the consequences of flooding or erosion taking place.
**RFCC – Regional Flood and Coastal Committee** – an Environment Agency committee, responsible for consenting medium and long term plans and operational plans to the Agency's Board and Head Office. Monitors and reports on progress. In Wales there is only one RFCC and this is the FRMW (Flood Risk Management Wales) group.
**Risk** – measures the significance of a potential event in terms of likelihood and impact. In the context of the Civil Contingencies Act 2004, the events in question are emergencies.
**Risk Assessment** – A structured and auditable process of identifying potential significant events, assessing their likelihood and impacts and then combining these to provide an overall assessment of risk to inform further decisions and actions
**Risk Management** – anything done for the purpose of analysing, assessing and reducing a risk

**Risk Management Authority** – A Welsh risk management authority is defined in Section 6 of the Flood and Water Management Act 2010 as the Environment Agency, a lead local flood authority, a district council for an area for which there is no unitary authority, an IDB for an internal drainage district that is wholly or mainly in Wales and a water company that exercises functions in relation to an area in Wales.
**Risk Management Schemes** – a range of actions to reduce flood frequency an/or the consequences of flooding to acceptable or agreed levels.
**River flooding** – occurs when water levels in a river channel overwhelms the capacity of the channel.

**S**
**SEA – Strategic Environmental Assessment** – A legal requirement in the UK for certain plans and programmes stipulated by the SEA Directive (2001/42/EC), to undergo Strategic Environmental Assessment (SEA). The SEA Directive is implemented in Wales by the Environmental Assessment of Plans and Programmes (Wales) Regulations 2004 (SI 2004No. 1656, W170). The purpose of SEA is to provide for a high level of protection of the environment, to ensure the integration of environmental considerations into the preparation and adoption of plans and programmes, and to contribute to the promotion of sustainable development and environmental protection.
**Sewer** – An artificial conduit, usually underground, for carrying off sewage off sewage (a foul sewer) or rainwater (a storm sewer) or both (a combined sewer).
**SMPs** – Shoreline Management Plans – A large-scale assessment of the risks associated with coastal processes and helps reduce these risks to people and the developed, historic and natural environments.
**Squeeze** – In relation to costal squeeze, is the term used to describe what happens to coastal habitats that are trapped between a fixed landward boundary, such as a sea wall and rising sea levels and/or increased storminess. The habitat is effectively 'squeezed' between the two forces and can diminish in quantity and or quality.
**Surface Water Flooding** – In the urban context, usually means that surface water runoff rates exceed the capacity of drainage systems to remove it. In the rural context, it is where surface water runoff floods something or someone.
**Surface water runoff** – This occurs when the rate of rainfall exceeds the rate that water can infiltrate the ground or soil.
**Sustainable Drainage systems (SuDS**) – Helps to deal with excesses of water by mimicking natural drainage patterns.

**T**
**Technical Advice Note 15: Development and Flood Risk** – TAN 15 supports Planning Policy Wales and makes it clear how local authorities should make decisions about different types of development on flood plains, providing clear tests for justification and acceptability of flooding consequences, and enabling the consideration of risks over the lifetime of the new development.

**W**
**Watercourse** – A channel natural or otherwise along which water flows.
**Water company** – a company which hold an appointment under Chapter 1 of Part 2 of the Water Industry Act 1991 or a licence under Chapter 1A of Part 2 of that Act.
**Welsh Local Government Association (WLGA**) – represents the interests of Local Authorities in Wales. The three fire and rescue authorities, four police authorities and three national park authorities are associate members.
**WFD** – Water Framework Directive

## Appendix 5 – Components of the FRMP as detailed in the Flood Risk Regulations 2009 – Part 4

1 Each Lead Local Flood Authority (LLFA) has a duty to prepare a Flood Risk Management Plan (FRMP) in relation to each relevant Flood Risk Area (FRA).

2 Natural Resources Wales must review the FRMP and may recommend modifications.

3 Each FRMP must include the following:

a. Objectives for the purpose of managing flood risk.

b. Measures for achieving the objectives.

c. Objectives must be set to reduce the adverse consequences of flooding for
   i) human health,
   ii) economic activity or
   iii) the environment (including cultural heritage) and reducing the likelihood of flooding, whether by exercising powers to carry out structural work or otherwise.

d. Measures must include measures for
   i) prevention of flooding,
   ii) protection of individuals, communities and the environment against the consequences of flooding and
   iii) arrangements for forecasting and warning.

e. Measures must have regard to
   i) the cost and benefits of different methods of managing flood risk
   ii) the information included in the flood hazard maps and the flood risk maps
   iii) the river basin management plan for the area
   iv) the effect of floodplains that retain flood water
   v) the environmental objectives vi) the likely effect of a flood, and of different methods of managing a flood, on the local area and the environment.

f. The FRMP must include
   i) a map showing the boundaries of the flood risk area
   ii) a summary of the conclusions drawn from the flood the flood hazard maps and flood risk maps
   iii) a description of the proposed timing and manner of implementing the measures, including details of the bodies responsible for implementation
   iv) a description of the way in which implementation of the measures will be monitored
   v) a report of the consultation and
   vi) details of the co-ordination between the measures in the FRMP and the river basin management plan

4 MTCBC must consult with the following about the proposed content of the FRMP:-

a. The following authorities
   i) other LLFAs ii) the highways authorities,
   ii) Dwr Cymru / Welsh Water
   iii) the reservoir undertaker
   iv) CADW
   v) NRW – division dealing with Countryside Council of Wales responsibilities
   vi) The Welsh Ministers.

b. The public

5 LLFAs must have regard to any guidance issued by NRW about the form of the FRMP.

6 LLFAs must complete a review their FRMP

a. First review by 22nd June 2021

b. Subsequent reviews must be carried out at intervals of no more than 6 years

c. Following a review LLFAs must prepare a revised FRMP which must
   i) take account of the likely impact of climate change on the occurrence of floods
   ii) include an assessment of the progress made towards implementing the measures
   iii) if ant measures included in the previous FRMP have not been implemented, include a statement of the reasons why those measures have not been implemented.