

MERTHYR TYDFIL COUNTY BOROUGH COUNCIL



Preliminary Flood Risk Assessment Report (PFRA)

April 2011

Preliminary Flood Risk Assessment Report

Executive Summary

Under the Flood Risk Regulations (2009) and the Flood and Water Management Act became law in April (2010) Merthyr Tydfil Council Borough Council (MTCBC) has been identified as a Lead Local Flood Authority (LLFA) and has been given a number of key responsibilities, including the preparation of a Preliminary Flood Risk Assessment Report (PFRA).

To satisfy the Regulations MTCBC have identified a number of Partners including The Environment Agency Wales (EAW), Dwr Cymru / Welsh Water and the emergency services from outside of the Authority and Emergency Planning Section, Planning Section, Highways Division and Land Drainage Division within the Authority. Significant quantities of data have been collected from these partners.

The Environment Agency has identified an indicative Flood Risk Area within MTCBC of 45 km². This area has been reviewed by MTCBC using all the information collected and consequently the Flood Risk Area has been increased to 58 km².

Preliminary Flood Risk Assessment Report

Contents	Page
Executive Summary	1
1 Introduction	3
2 Lead Local Flood Authority Responsibilities	5
3 Methodology and Data Review	7
4 Past Flood Risk	10
5 Future Flood Risk	12
6 Review of Indicative Flood Risk Area	14
7 Identification of Flood Risk Area	15
8 Next Steps	17
9 References	18

Figures

Fig. 1	All Wales Map	20
Fig. 2	EAW Indicative Flood Risk Area and Blue Squares for MTCBC	21
Fig. 3	MTCBC Flood Risk Area and Blue Squares for MTCBC	22
Fig. 4	MTCBC Flooding Incidents and Historic Flooding	23
Fig. 5	MTCBC Blue Square X304Y207	24
Fig. 6	MTCBC Blue Square X307Y201	25
Fig. 7	Areas Flooded during December 1979 Flood	26
Fig. 8	MTCBC Flood Map for Surface Water 1 in 200 year	27

Tables

Table 1 – Key Flood Risk Indicators	7
Table 2 – Data Collected	8
Table 3 – Details of the December 1960 Flood	11
Table 4 – Details of the December 1979 Flood	11

Annexes

Annex 1	Record of past floods	19
Annex 2	Future floods	19
Annex 3	Flood Risk Area	19
Annex 4	Review checklist	19
Annex 5	– GIS Layer of Flood Risk Area	19

Appendices

1	Information for reporting on Flood Risk Area	20
---	--	----

Preliminary Assessment Report

1 Introduction

1.1 The Flood Risk Regulations came into force in December 2009 and the Flood and Water Management Act became law in April 2010. Under this legislation Merthyr Tydfil Council Borough Council (MTCBC) has been identified as a Lead Local Flood Authority (LLFA) and has been given a number of key responsibilities.

1.2 The purpose of the Flood Risk Regulations is to transpose the European Commission (EC) Floods Directive (2007/60/EC), on the assessment and management of local flood risk, into domestic law in England and Wales and to implement its provisions. In particular it places duties on the LLFAs to prepare a number of documents including:-

Preliminary Flood Risk Assessment Report	22 nd June 2011
Flood Hazard and Flood Risk Maps	22 nd June 2013
Flood Risk Management Plans	22 nd June 2015

1.3 The purpose of this Preliminary Flood Risk Assessment Report is to identify areas subject to significant flood risk within Merthyr Tydfil County Borough Council. This information will then be used to inform the later stages of the Regulations including the Flood Hazard and Flood Risk Maps and the Flood Risk Management Plans.

1.4 It is the responsibility of the Lead Local Flood Authorities (LLFA) to consider the risk from the following sources:-

1. Ordinary watercourses
2. Surface runoff
3. Groundwater
4. And any interaction these have with drainage systems and other sources of flooding.

The report does not consider flooding from main rivers, the sea or large raised reservoirs, which are the responsibility of the Environment Agency.

1.5 The area identified as being subject to significant risk is referred to as **The Flood Risk Area**.

The PFRA report must consider floods which have significant harmful consequences for human health, economic activity and the environment.

1.6 Merthyr Tydfil County Borough Council (MTCBC) is a Unitary Authority situated within the valleys of South East Wales. It has a population of approximately 56,000 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 basins. See Fig 1. All Wales Map.

1.7 The study area is served by one water company – Dwr Cymru / Welsh Water and has one major catchment which drains into the River Taff.

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

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

The key objectives may be summarised as follows:-

1. Identify relevant partners involved in future assessment of flood risk and summarise means of stakeholder engagement.
2. Describe arrangements for partnership and collaboration for the collection, assessment and storage of flood risk data.
3. Provide a summary of the systems used for data sharing and storage, and provision for quality assurance, security and data licensing arrangements.
4. Summarise the methodology adopted for the PFRA with respect to data sources, availability and review procedures.
5. Assess historic flood events within the study area resulting from surface water, groundwater and ordinary watercourses together with the consequences and impact of these events.
6. Collect and integrate historic information, which will be built upon in the future and used to support and inform the preparation of the MTCBC Local Flood Risk Strategy.
7. Assess the potential harmful consequences of future flood events within the study area.
8. Review the provisional national assessment of the Indicative Flood Risk Area provided by the EAW and provide explanation and justification for any amendments required in order to produce the final Flood Risk Area.

2 Lead Local Flood Authority Responsibilities

- 2.1 In order to satisfy MTCBC's governance procedures a preliminary report outlining the requirements of the Flood Risk Regulations and the Flood and Water Management Act, and giving details of the responsibilities of MTCBC as a LLFA was presented to the Scrutiny Committee in March 2011.

The Preliminary Flood Risk Assessment Report, details of the Flood Risk Area and the Preliminary Assessment Report Spreadsheet will be placed before the Cabinet, full Council and Scrutiny Committee of Merthyr Tydfil Count Borough Council on prior to the final completion deadline of 19th August 2011.

- 2.2 As part of the PFRA MTCBC has sought to engage partners which includes those listed below:-

1. The Environment Agency Wales (EAW)
2. Dwr Cymru / Welsh Water (DCWW)
3. Local Emergency Services – including fire and police.

In addition significant collaboration has been stimulated between the various departments within MTCBC as listed below:-

1. Emergency Planning Section
2. Planning Section
3. Highways Division
4. Land Drainage Division.

In addition significant interaction and collaboration has been established with neighbouring LLFAs within South East Wales.

- 2.3 It is recognised that members of the public may also have valuable information to contribute to the PFRA and the Local Flood Risk Strategy. Collaboration with the public can afford significant benefits including building trust, gaining access to additional local knowledge and increasing the chance of stakeholder acceptance of the local risk management plans.

To date the public have not been engaged on this project but the importance of collaboration is recognised. It is proposed that MTCBC will follow the guidelines outlined in the Environment Agency's "Building Trust with Communities" publication which provides a useful process to communicate risk including the causes, probability and consequences to the general public and professional forums.

2.4 In addition to the Preliminary Flood Risk Assessment Report, Flood Hazard and Flood Risk Maps and Flood Risk Management Plans the Flood and Water Management Act and the Flood Risk Regulation have placed on Lead Local Flood Authorities a number of other significant responsibilities including the following:-

1. **Investigating and recording flood incidents and significant flooding events** - including the identification of which authorities have flood risk management functions and what they have done or intend to do with respect to the incident. Notifying the risk management authorities where necessary and publishing the results of any investigations carried out.
2. **Maintain an Asset Register of features or structures** which are considered to have an affect on flood risk, including ownership and condition.
3. **SuDS Approving Body (SAB)** - to approve, adopt and maintain any new sustainable drainage system.
4. **Local Strategy for Food Risk Management** - develop, maintain, apply and monitor the strategy.
5. **Work Powers** - The LLFA have powers to undertake work to manage flood risk.
6. **Powers to Designate Structures** which may affect flooding in order to safeguard assets that are relied upon for flood risk management.

3 Methodology and Data Review

- 3.1 The following organisations were identified and contacted to obtain information for the preparation of the PFRA:-

Environment Agency – Wales
GeoStore
National Receptor Dataset

Utilities
Dwr Cymru/Welsh Water
Western Power
British Telecom

Emergency Services
Fire Service
Police

Within Merthyr Tydfil CB Council
Planning Section
Emergency Planning Section
IT Section - GIS
Land Drainage Division
Highways Division

Table 1 - Key Flood Risk Indicators

Impact of flooding on	Flood Risk Indicators
Human Health	Number of residential properties Critical Services including hospitals, police, fire and ambulance stations, schools, nursing homes
Economic Activity	Number of non-residential properties Length of road or rail Area of agricultural land
Cultural Heritage	Ancient Monuments Listed Buildings
Environmental	Designated sites – SSSIs and SINCs Nature reserves Landscape of historic interest

The above indicators have been selected by Defra, WAG and the Environment Agency Wales in order to identify areas where flood risk and potential consequences exceed a pre-determined threshold. Indicative Flood Risk Areas have been identified where more than 5,000 people are at risk of flooding.

Table 2 – Data Collected

	Data	Description
Environment Agency - Wales	Areas Susceptible to Surface Water Flooding	First generation national mapping, outlining areas of risk from surface water flooding with three susceptibility bandings - less, intermediate and more
	Flood Map for Surface Water	Second generation national surface water flood mapping which includes two sets of data - 1 in 30 and 1 in 200 year rain fall events with two bandings for each - greater than 0.1m and greater than 0.3m
	Flood Zones	Maps showing flood zones 2 and 3
	Areas Susceptible to Groundwater Flooding	Coarse scale mapping showing areas susceptible to groundwater flooding
	Historic Flood Map 22	Showing locations of areas of past flooding
	National Receptor Dataset	This data set gives details of social, economic, environmental and cultural receptors including residential properties, schools, hospitals, and electrical substations
	EAW Blue Square	Squares which the EAW have identified as being susceptible to flooding of significant consequences
	Indicative Flood Risk Area	Nationally identified flood risk area based on the Defra documentation
	River network	Map of main rivers
	Flood defences	Location of existing flood defences and land protected
	Historic Sewer Flooding	Location of incidents of fould sewer flooding
	Historic Surface Water Flooding	Location of incidents of surface water flooding
	Cultural	Coarse scale map of listed buildings and scheduled monuments at risk of flooding
	Environmental	Coarse scale maps of PPC sites with potential risk of flooding,
	Historic landfill	Areas used for land fill
Utilities	Welsh Water DG5 Register	Incidents of flooding within properties and severe external
	Welsh Water Services	Location of pumping stations, service reservoirs and treatment works
	Western Power	Location of substations
	British Telecom	Location of telephone exchanges
Emergency Services	Fire Service	Incidents of flooding
	Police	Incidents of flooding
Merthyr Tydfil CB Council	Land Drainage Division	Incidents of flooding to property Areas of historic flooding
	Planning Section - cultural	Listed buildings, ancient monuments,
	Planning Section - environmental	SSSI, nature reserve, SINC, landscape of historic interest
	IT Section - GIS	Contours at 5m intervals
	Emergency Planning Section	Incidents of flooding to property
	Emergency Planning Section	Location of schools, care homes, doctors surgeries, fire stations, police stations, ambulance stations,
	Highways Division	Highway classification and routes

- 3.2 Information from the Environment Agency Wales was readily available on CD, email and down loads from the EAW GeoStore. This information was in a form which allowed it to be easily imported into our GIS system.

Incidents of flooding from Dwr Cymru / Welsh Water were provided on request and were in a form which allowed easy importation into our GIS.

Their asset location data which arrived much later was also received in a suitable electronic format.

Locations of services from British Telecom and Western Power were in paper format with no grid references and therefore had to be transposed into a form suitable for use in a computerised GIS.

Flooding incidents from the emergency services were limited in number and in paper format without grid references. These data sets all had to be re-entered in electronic format.

Flooding incidents from the Engineers were limited in numbers, in paper format and without grid references. This data had to be re-entered in electronic format. There are considerable gaps in this information where years of records have been misplaced. Further searches may reveal additional data during the preparation of the Local Flood Risk Strategy. Although this information is incomplete the data we have is considered to have a high confidence rating in terms of its reliability.

The historic flooding areas have been identified from the personal knowledge of staff within the Drainage Section, and although incomplete, is it regarded as being of a high quality.

Information from the Emergency Planning Section was in a format incompatible with GIS and therefore had to be transposed into a suitable electronic format.

Information from the Highways Division and Planning Section was in electronic format and readily imported into GIS.

It is the intension of MTCBC to gather more information on future flooding incidents which will be in electronic format suitable for importation into our GIS system.

- 3.3 We currently operate with ArcMap GIS system and all our information is now stored in electronic format suitable for importation as layers within ArcMap. For easy input of data we are currently using Microsoft Excel Spreadsheets and Microsoft Word as a word processor.
- 3.4 Although the amount of data recording past incidents of flooding and historic flooding is limited, Fig. 4 MTCBC Flooding Incidents and Historic Flooding shows a high degree of correlation between these data sets and the Blue Squares identified by the EAW and MTCBC.
- 3.5 The information received from the EAW is restricted by the terms imposed by them.

Information provided by MTCBC on Ordnance Survey maps is subject to the normal licensing agreement with them.

We are not aware of any other restrictions on the data available to MTCBC.

4 Past Flood Risk

- 4.1 Data of incidents of past flooding has been collected for this report as detailed in Section 3 above.

To decide on the significance of an individual flood Defra/WAG/EA have 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 as a very intense localised area such as a 1km square or cover the whole of the borough in a less intense rainfall event.

The data readily available has been analysed to give the number of properties flooded in each incident and there are no records of flooding which affects 85 or more residential properties. And therefore no floods have been recorded as a result of this process.

- 4.2 Two floods have been identified as being locally significant within Merthyr Tydfil County Borough Council. These have been identified from reports prepared following major floods. The two floods are:-

- 1 4th December 1960
- 2 26th December 1979

Both these flood events have been entered into the Preliminary Assessment Report Spreadsheet – Annex 1 – Past floods and extracts from the spreadsheet are given below.

- 4.3 Details of December 1960 Flood.

Information about this flood event has been taken from a report prepared by the Glamorgan River Board.

Precise details of the areas flooded were not given and therefore no plan has been produced of this flood.

Table 3 – Details of the December 1960 Flood

Summary Description
<p>On 3 and 4 December 1960 serious flooding took place throughout MTCB Council and the whole of Wales. The flooding followed a period since June 1960, during which there were a record number of wet days.</p> <p>The ground was therefore super-saturated.</p> <p>During November 1960 263mm of rainfall was recorded at Dowlais, which is within the FRA, and 525mm at Brecon, which is 25 km north of the FRA. This was the highest monthly rainfall recorded since 1885. A further 132mm of rain was recorded at Brecon on 3 December 1960.</p> <p>The conditions in the Taff were the worse in living memory with water levels above the 1929 flood and had probably not been exceeded for over 100 years</p>
Human Health Consequences
<p>A total of 90 residential properties were flooded in addition to the following</p> <p>1 Public house flooded; 2 shops flooded; 22 major roads or supporting walls damaged; 2 culverts damaged; 2 footbridges over the River Taff damaged; 1 gas main damaged; 1 water main damaged</p>

4.4 Details of December 1979 Flood.

Information about this flood event has been taken from a report prepared by the Robinson Jones Partnership Ltd.

Details of the areas flooded are shown in Fig. 7 Areas Flooded during December 1979 Flood.

Table 4 – Details of the December 1979 Flood

Summary Description
<p>Following heavy rainfall on the 26th and 27th December 1979 flooding occurred over a wide area of Wales causing extensive damage. It is estimated from Welsh Water Authority records that, in Pentrebach and Troedyrhiw catchment areas, both of which are in the FRA, between 113mm and 140mm of rain fell.</p> <p>This storm was preceded by two other significant storms during the month of December. The first storm between 4th and 10th December caused rainfall of 175mm to be deposited on the Brecon Beacons. Records of the second storm between, 15th and 19th December, shows over 100mm of rainfall over the Brecon Beacons.</p> <p>As a result of these earlier storms the catchment was totally saturated prior to the storm on 26th and 27th December and significant parts of the upper catchments were frozen. These facts resulted in a 100% runoff causing higher flows than would normally be expected for a storm of this intensity.</p>
Human Health Consequences
<p>A total of 189 residential properties were flooded within 0.08323 km²</p> <p>In Pentrebach 43 houses, 1 Hotel and a cricket field flooded.</p> <p>In Troedyrhiw 146 houses flooded and a major culvert collapsed.</p> <p>In Rhydycar there were two fatalities as a result of a culvert collapse</p>

5 Future Flood Risk

- 5.1 MTCBC has no information currently available relating to future flooding other than that provided by the EAW, as listed below. It is the intension of MTCBC to carry out electronic modelling within the Flood Risk Area as part of the preparation of Flood Hazard and Flood Risk Maps and the Flood Risk Management Plan for the borough.
- 5.2 The Environment Agency has produced two sets of flood maps giving an assessment of flood risk for the whole of England and Wales. The first generation mapping referred to as Areas Susceptible to Surface Water Flooding (ASStSWF) containing three levels of banding with a 1 in 200 chance of occurring. A second generation of maps have since been prepared and issued by the EAW referred to as the Flood Map for Surface Water (FMfSW). This revised model contains two flood events 1) 1 in 30 and 2) 1 in 200 annual chance of occurring. Each data set is further subdivided to give areas likely to flood to a depth greater than 0.1m and greater than 0.3m.
- 5.3 The EAW have carried out validation checks on the two mapping system and for the type of terrain within MTCBC, which is mostly steeply sloping hillsides it is considered that the Flood Maps for Surface Water are the most appropriate to use for this PFRA. Fig. 8 MTCBC Flood Map for Surface Water 1 in 200 shows the flooding predicted by this model.
- 5.4 At this stage MTCBC does not have details of the capacity of the local drainage but this information will be calculated as part of the preparation work for the Flood Hazard and Flood Risk Maps and the Flood Risk Management Plans.
- 5.5 Annex 2 of the Preliminary Flood Risk Assessment Spreadsheet has been completed for a 1 in 200 year storm flooding to a depth greater than 0.3m.
- 5.6 As no other information is available the second generation of maps prepared and issued by the EAW referred to as the Flood Map for Surface Water (FMfSW). Have been accepted as the locally agreed surface water information.
- 5.7 **The impacts of climate change**
The impact of climate change on local flood risk is relatively poorly understood. Several national flood maps have informed the preliminary assessment report - specifically the Flood Map for Surface Water (surface runoff), Areas Susceptible to Surface Water Flooding (surface runoff), Areas Susceptible to Groundwater Flooding (groundwater) and Flood Map (ordinary watercourses). These do not show the impact of climate change on local flood risk.
There was consensus amongst climate model projections presented in the IPCC fourth assessment report for northern Europe suggesting that in winter high extremes of precipitation are very likely to increase in magnitude and frequency. These models project drier summers with increased chance of intense precipitation — intense heavy downpours interspersed with longer, relatively dry periods (Solomon et al., 2007).
- 5.8 **UKCP09**
United Kingdom Climate Projections 2009 (UKCP09) provides the most up to date projections of future climate for the UK (<http://ukclimateprojections.defra.gov.uk/>). In terms of precipitation, the key findings are:
By the 2080s, under Medium emissions, over most of lowland UK

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

By the 2080s, under Medium emissions, across regions in England & Wales
The central estimate (50% probability) for winter mean precipitation % change ranges from +14 to +23

Central estimate for summer mean precipitation % change ranges from -18 to -24.

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

5.9 Appraisal guidance

Current project appraisal guidance (Defra, 2006) provides indicative sensitivity ranges for peak rainfall intensity, for use on small catchments and urban/local drainage sites. These are due to be updated following the UKCP09 projections above. They describe the following changes in peak rainfall intensity; +5% (1990-2025), +10% (2025-2055), +20% (2055-2085) and +30% (2085-2115). This was reviewed by the Met Office in 2008 using UKCP09 models (Brown et al., 2008). They suggest that, on the basis of our current understanding, these levels represent a pragmatic but not a precautionary response to uncertainty in future climate impacts. In particular for a 1 in 5 year event, increases in precipitation intensity of 40% or more by the 2080s are plausible across the UK at the local scale.

5.10 Long term developments

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

In England, Planning Policy Statement 25 (PPS25) on development and flood risk aims to "ensure that flood risk is taken into account at all stages in the planning process to avoid inappropriate development in areas at risk of flooding, and to direct development away from areas at highest risk. Where new development is, exceptionally, necessary in such areas, policy aims to make it safe without increasing flood risk elsewhere and where possible, reducing flood risk overall."

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

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

6 Review of indicative Flood Risk Areas

6.1 In order to ensure consistence of approach, Defra and WAG have identified a number of key risk indicators and their thresholds to establish significant to determine the existence of indicative Flood Risk Areas.

6.2 The methodology is based on using the flood maps produced by the EAW 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 are as follows:-

- 1 a minimum of 200 people
- 2 a minimum of 20 businesses
- 3 2 or more critical services

The EAW has identified 20 blue squares within MTCBC which are Areas above the Flood Risk Threshold.

6.3 A cluster of these 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 has been 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 is numbers of people at risk of being affected by flooding. If there is a minimum of 5,000 people within a series of connecting 3km x 3km grids, as identified above, then an indicative Flood Risk Area has been established.

6.4 On the basis of the 20 blue squares, 16 of which are within the indicative Flood Risk Area, and the methodology defined above, the EAW have identified an indicative Flood Risk Area within MTCBC of 45 km².

The blue squares and indicative Flood Risk Area identified by the EAW within MTCBC are shown on Fig. - 3 EAW Indicative Flood Risk Area and Blue Squares for MTCBC.

6.5 In order to review the indicative Flood Risk Area all 153 km squares within MTCBC were reviewed by studying each layer of information as listed in Table 2 – Data Collected. MTCBC is satisfied that all the squares which have been identified, by the EAW, as Areas above the Flood above Flood Risk Threshold have been correctly identified.

6.6 The Key Flood Risk Indicators for MTCBC have been calculated by the EAW 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

See Appendix 1 – Flood Risk Area – Information for reporting on Flood Risk Area Data from EAW and MTCBC.

7 Identification of Flood Risk Areas

7.1 As part of the review carried out by MTCBC as noted above clause 6.5 two 1 km squares were identified as being Areas above the Flood Risk Threshold. They are X304Y207 and X307Y201.

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

- 1 Goetre Infants School
- 2 Goetre Junior School
- 3 Cyfarthfa Junior School.

All three are shown as being subject to flooding on the EAW Flood Map for Surface Water 1 in 200 year event depth >0.30m.

- 4 St Aloysius RC Primary School

This school has a culverted ordinary watercourse flowing through its grounds. If the grid blocks, the culvert collapses or the flow of water is above the culvert capacity the school would flood.

As a result this square is defined as an Area above Flood Risk Threshold

As a result of making this square blue, and using the Defra/WAG methodology, 5 additional squares have been brought into the MTCBC Flood Risk Area.
See Fig 3 MTCBC Flood Risk Area and Blue squares for MTCBC

7.3 Grid square X307Y201 has been made into a blue square by MTCBC because there are 3 critical services which have been identified as being at risk of flooding as listed below:-

- 1 Troedyrhiw Pumping Station - which pumps combined sewage from 61 residential properties
- 2 Haven Close which provides sheltered accommodation for vulnerable people
- 3 Afon Taf high School.

All three critical services are shown as being subject to flooding on the EAW Flood Map for Surface Water 1 in 200 year event flooding > 0.30m deep.

By making this square blue, and using the Defra/WAG methodology 6 additional squares have been brought into the MTCBC Flood Risk Area.
See Fig 3 MTCBC Flood Risk Area and Blue squares for MTCBC.

7.4 As a result of the above amendment the EAW blue square X307Y199 becomes contiguous with the MTCBC Flood Risk Area and therefore we consider it appropriate that the Flood Risk Area should be increased to include this square.
See Fig 3 MTCBC Flood Risk Area and Blue squares for MTCBC.

7.5 On the basis of the 22 blue squares identified by MTCBC, 20 of which are within the MTCBC Flood Risk Area, and the methodology defined above, MTCBC have identified an indicative Flood Risk Area of 58 km².

See Fig 3 MTCBC Flood Risk Area and Blue squares for MTCBC.

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

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

See Appendix 1 – Flood Risk Area – Information for reporting on Flood Risk Area Data from EAW and MTCBC.

8 Next steps

- 8.1 In order to continue to fulfil the role as Local Lead Flood Authority, Merthyr Tydfil CB Council are required to investigate future flood events and ensure continued collection, assessment and storage of flood risk data.

It is essential that all new records of flood events are documented in accordance with the INSPIRE Directive (2007/2/EC). The format of the records will be compatible between departments sections within MTCBC and will also be in an electronic format suitable for importation to our GIS system.

- 8.2 A preliminary report has been submitted to the Scrutiny Committee of MTCBC. The committee has decided that no further submission will be necessary before the Preliminary Flood Risk assessment report is submitted to the Environment Agency. Prior to the report being sent to the EAW it will be thoroughly reviewed within the Engineering Department.

- 8.3 Under the Flood Risk Regulations the Environment Agency has been given a role of reviewing, collating and publishing all PFRA's.

The EAW will undertake a technical review of the PFRA which will focus on instances where Flood Risk Areas have been amended and ensure the format of these areas meets the appropriate standards. The PFRA's will finally be signed off by the Environment Agency Regional Director before they are signed off, collated, published and submitted to the European Commission.

- 8.4 Following the submission of the PFRA by MTCBC, which must be completed by 22nd June 2011, work will commence on the flood Hazard and Flood Risk Maps, to be completed by 22nd June 2013 and finally the Flood Risk Management Plan to be finalised by 22nd June 2015.

Once this cycle has been completed the review procedure will commence which will result in a more detailed Flood Risk assessment report being submitted to the European Commission by 22nd December 2017.

9 References

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

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

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

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

Selecting and Reviewing Flood Risk Areas for local sources of flooding
Guidance to Lead Local Flood Authorities
Flood Risk Regulations 2009
Defra / Welsh assembly Government
<http://ww2.defra.gov.uk/environment/flooding/>

Annexes

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

Refer to Annex 1 of the Preliminary Assessment Spreadsheet

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

Refer to Annex 2 of the Preliminary Assessment Spreadsheet

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

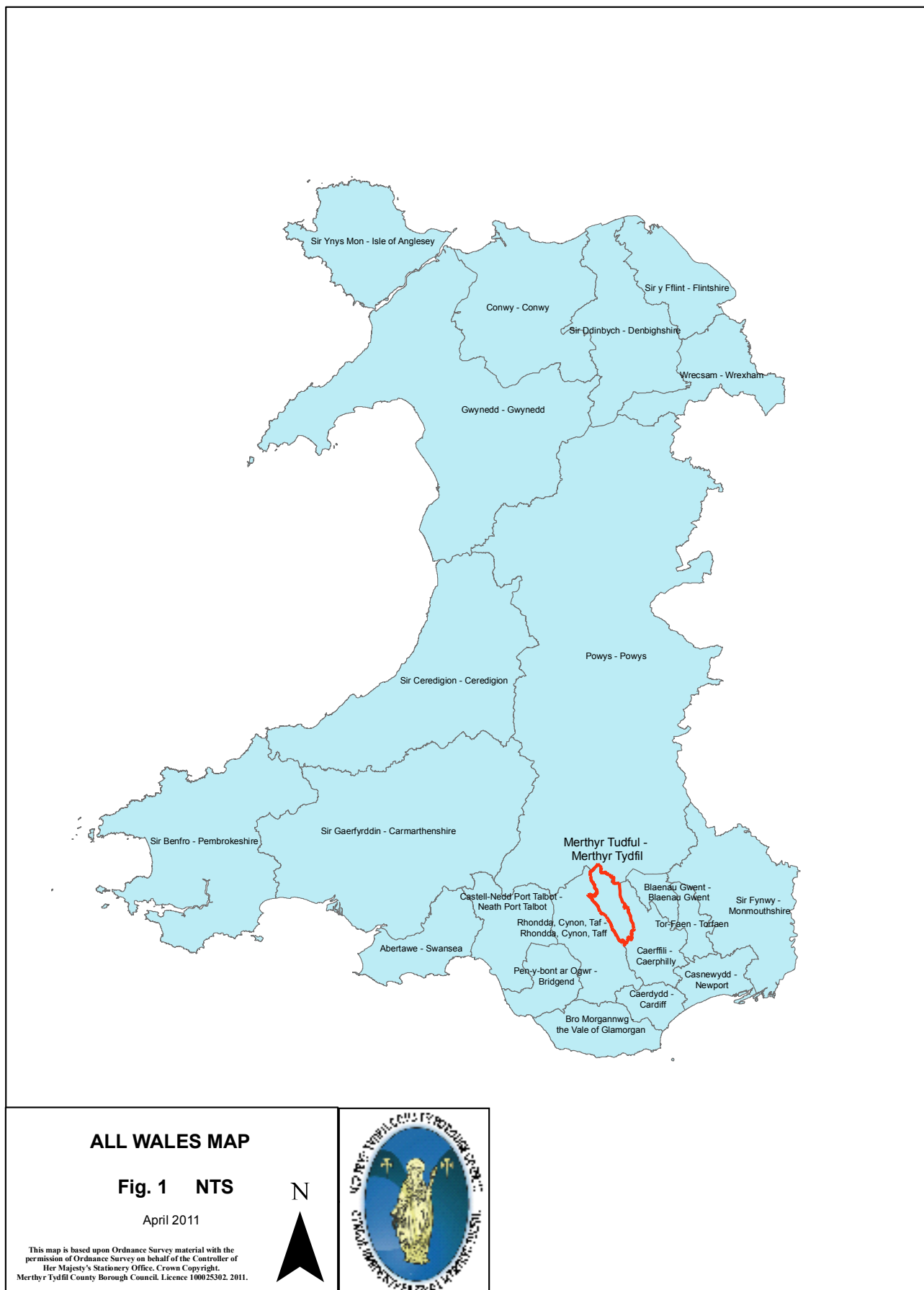
Refer to Annex 3 of the Preliminary Assessment Spreadsheet

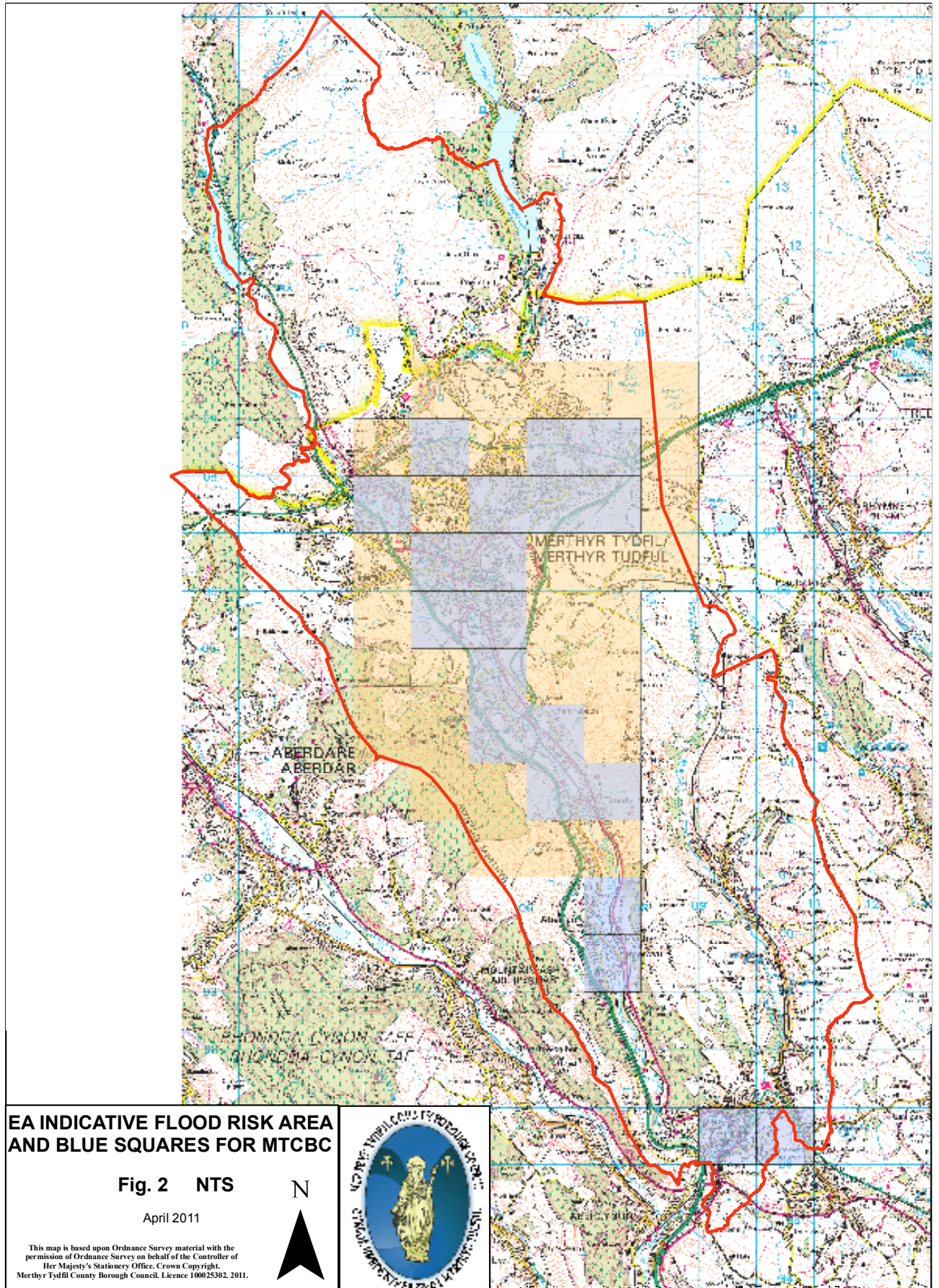
Annex 4 - Review checklist

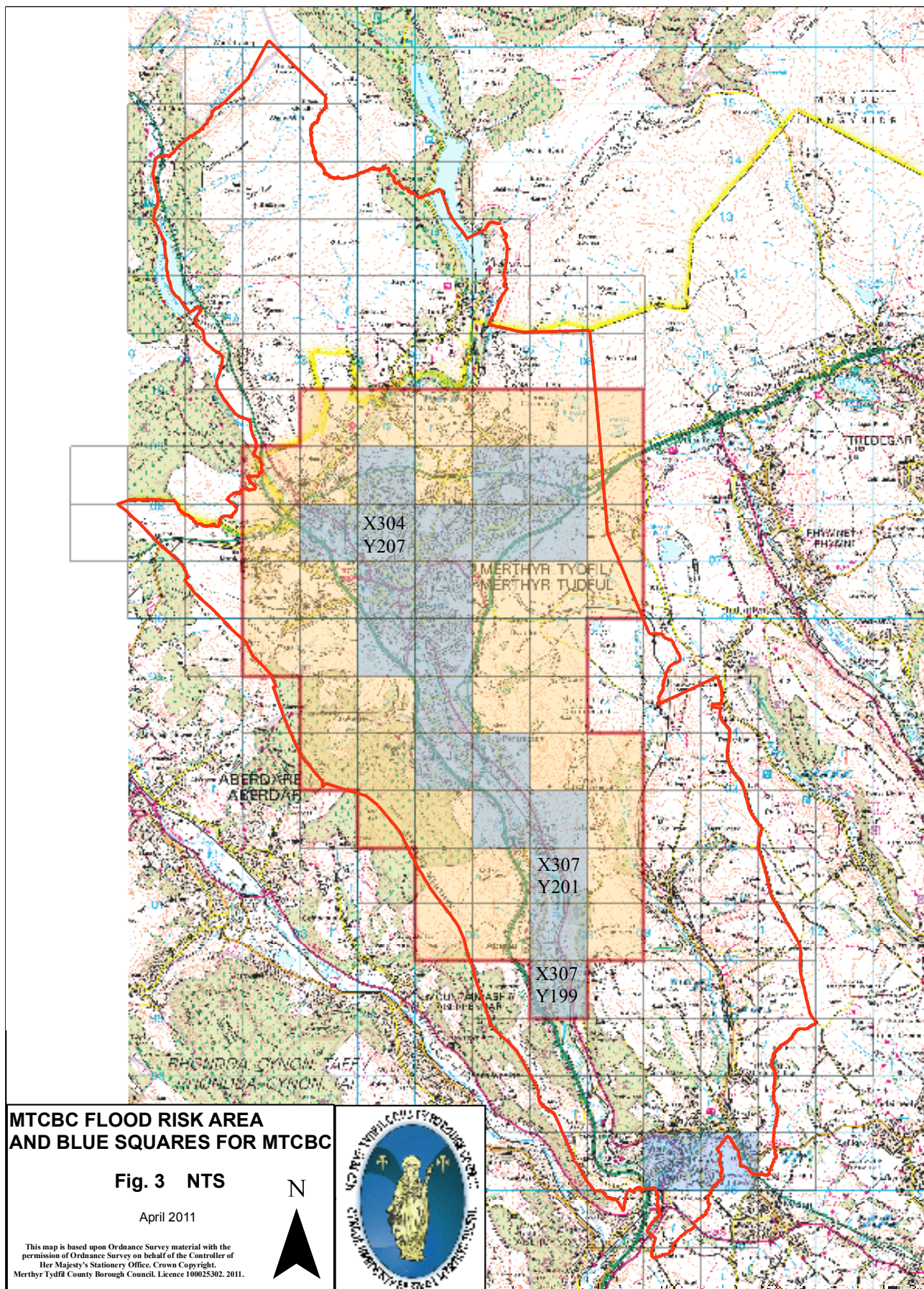
Refer to Annex 4 of the Preliminary Assessment Spreadsheet

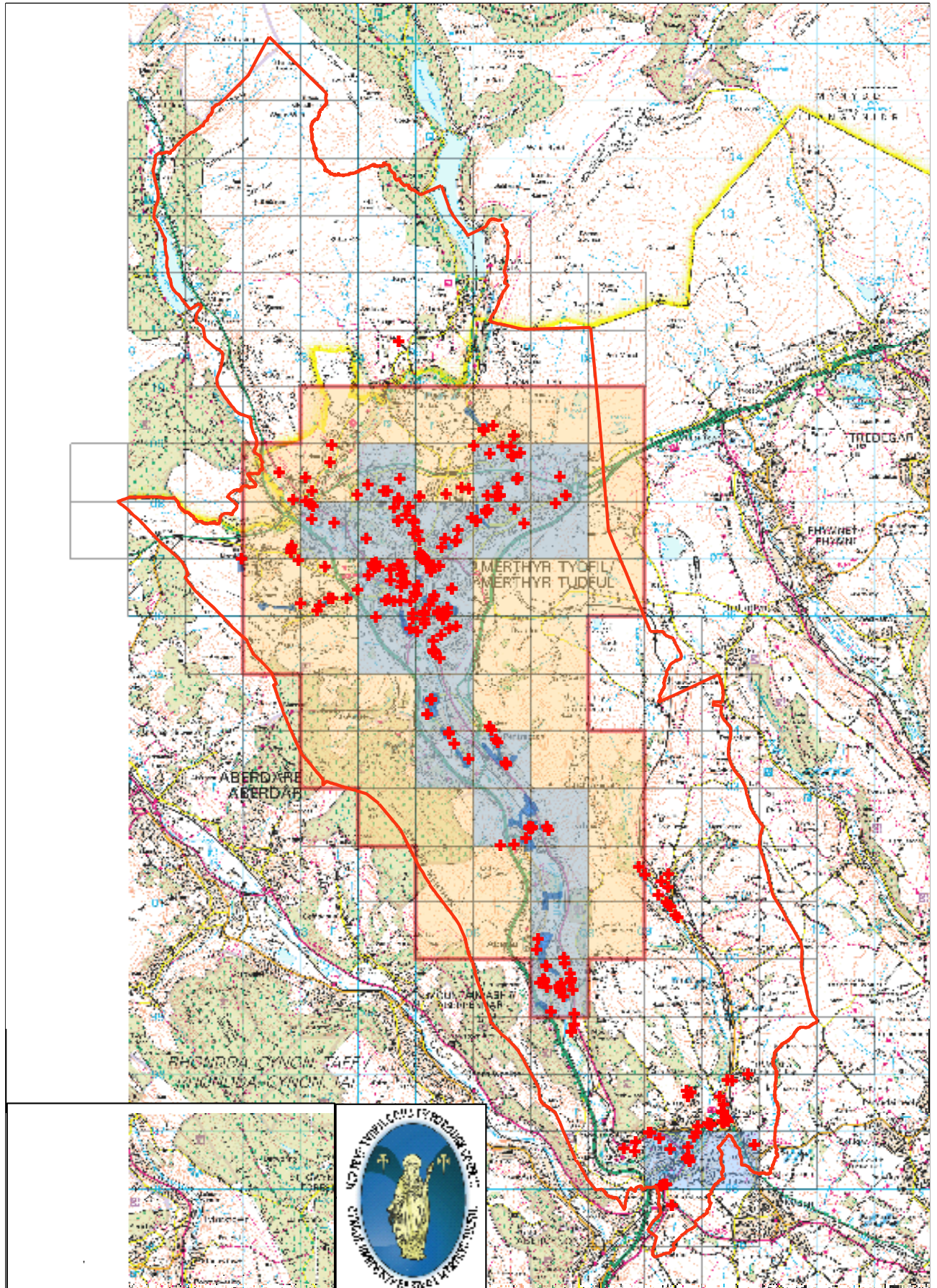
Annex 5 - GIS layer of flood risk area

GIS layer sent separately to the Environment Agency

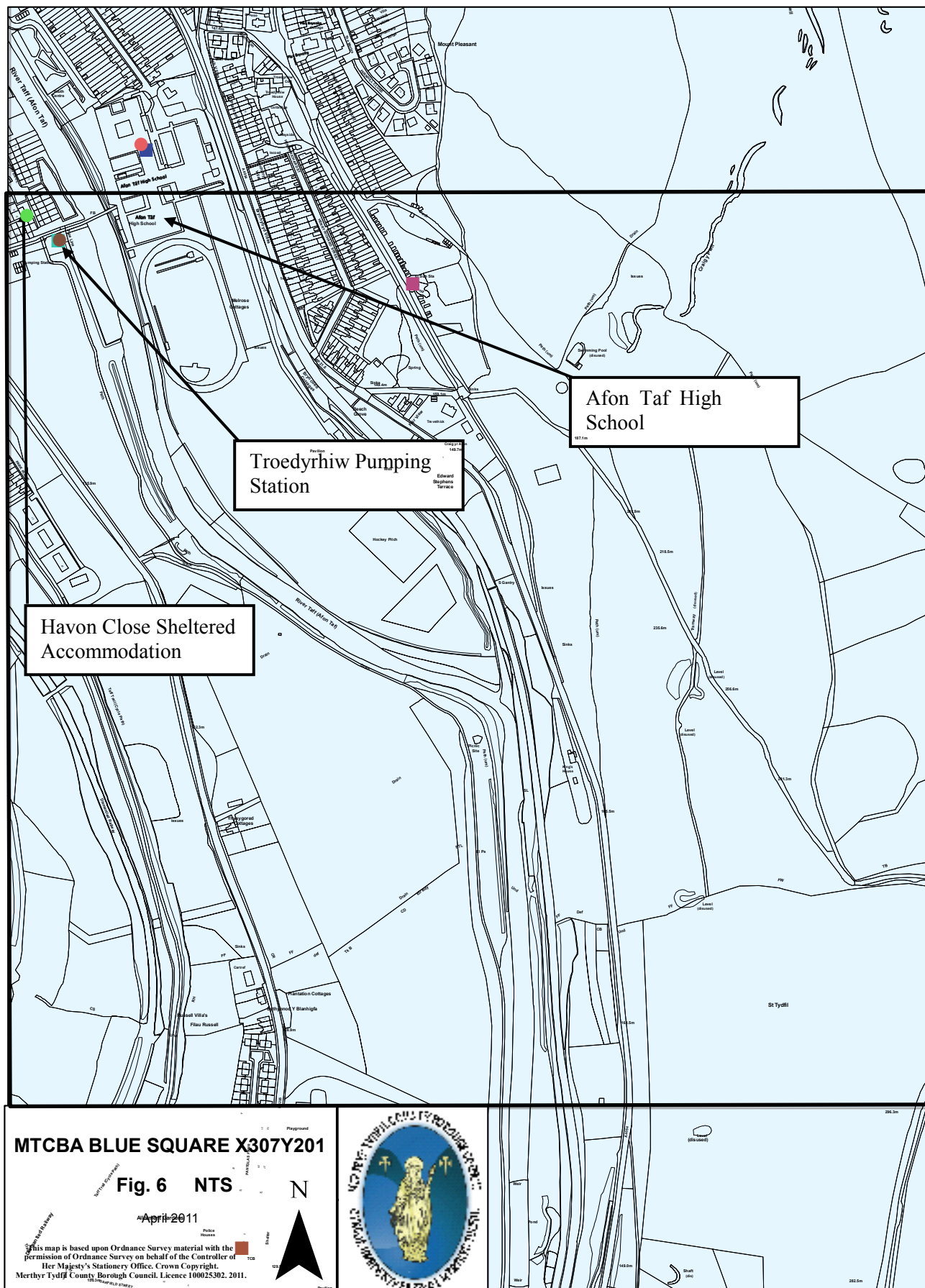


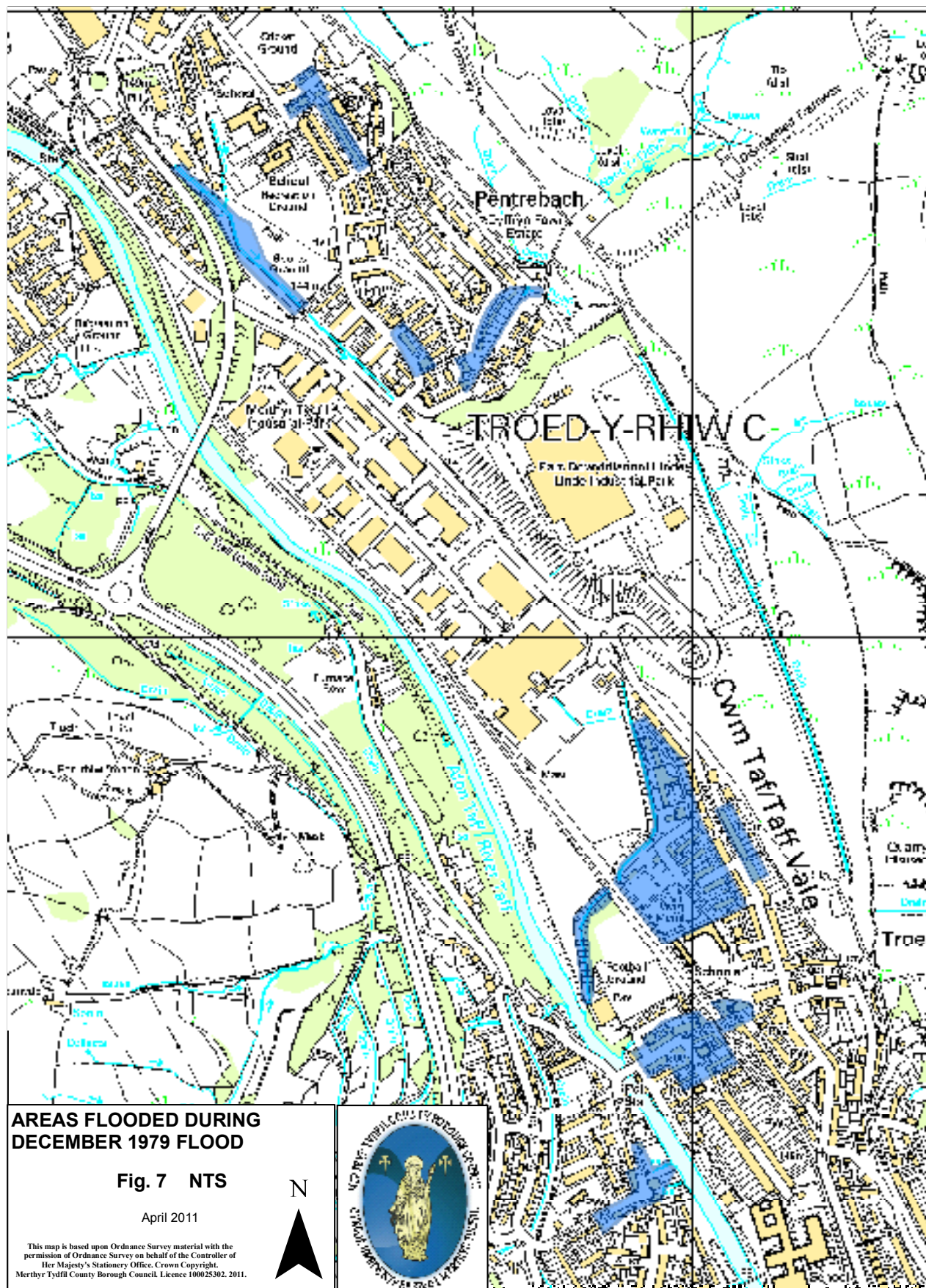


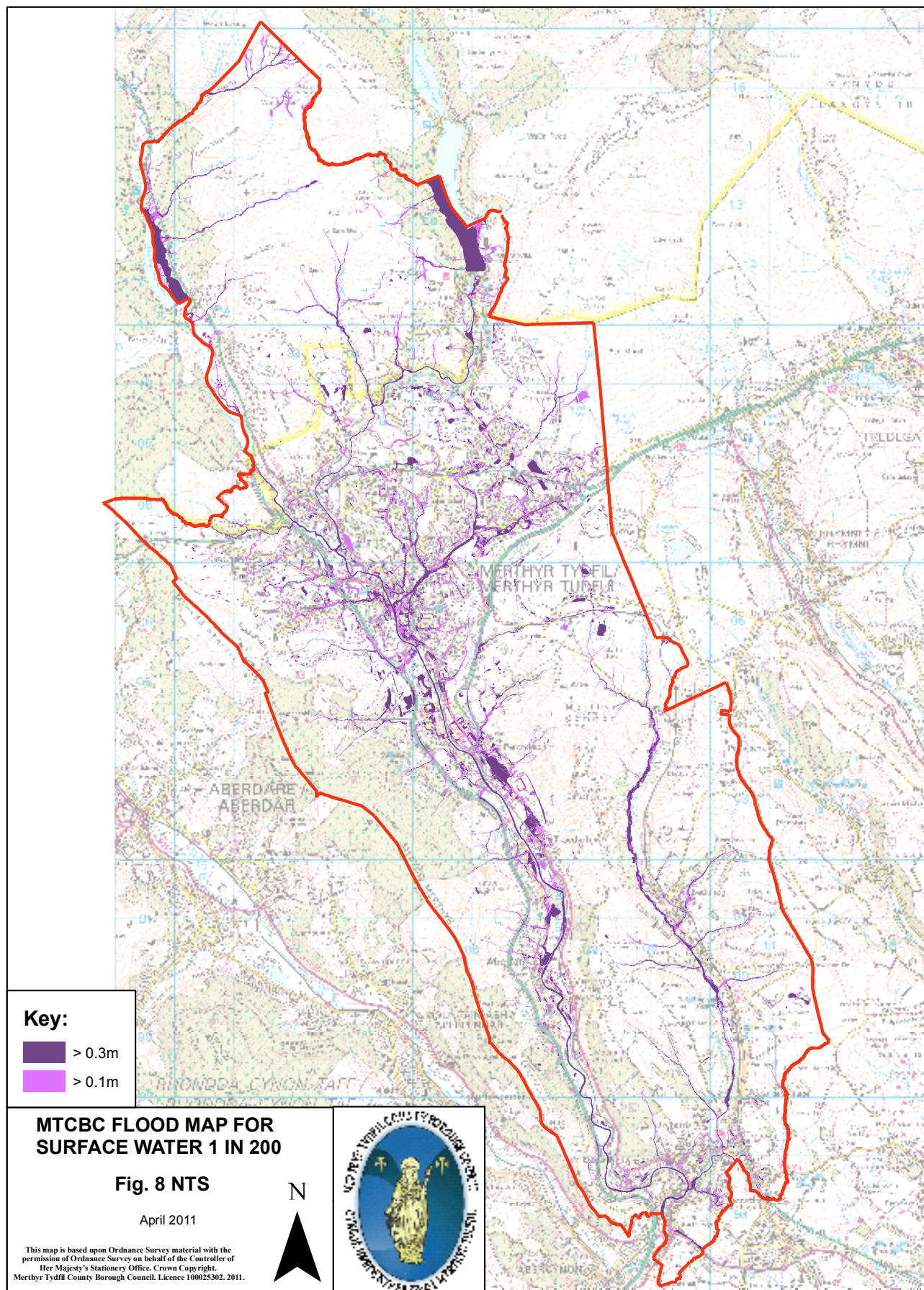












Grid Reference	Human health consequences - residential properties	Human health consequences - Number of people (2.34 multiplier)	Property count method	Other human health consequences - Number of critical services flooded	Economic consequences - number of non-residential properties flooded	Property count method
Indication Flood Risk Area - Information Provided by the Environment Agency						
SO0592205878	3022	7071	Detailed GIS	25	806	Detailed GIS
Areas added to Indicative Flood Risk Area by MTCBC						
Areas added by making square X304Y207 into a Blue square						
X303Y209	0	0	Estimated from map	1	0	Estimated from map
X302Y208	1	2	Estimated from map	0	0	Estimated from map
X302Y207	9	21	Estimated from map	0	0	Estimated from map
X302Y206	17	40	Estimated from map	0	0	Estimated from map
X302Y205	0	0	Estimated from map	0	0	Estimated from map
Additional Count	27	63		1	0	
Areas added by making square X307Y201 into a Blue square						
X308Y203	0	0	Estimated from map	0	0	Estimated from map
X308Y202	0	0	Estimated from map	0	0	Estimated from map
X308Y201	21	49	Estimated from map	0	0	Estimated from map
X308Y200	0	0	Estimated from map	0	0	Estimated from map
X307Y199	152	356	Detailed GIS	0	6	Detailed GIS
X306Y200	12	28	Estimated from map	0	0	Estimated from map
X305Y200	0	0	Estimated from map	0	0	Estimated from map
Additional Count	185	433		0	6	
EA Blue Square added to Flood Risk Area						
X307Y199	152	356	Detailed GIS	0	6	Detailed GIS
TOTALS FOR FLOOD RISK AREA	3386	7923		26	818	

Appendix 1 - Information for Reporting on Flood Risk Area EAW and MTCBC