Flood and Water Management Act 2010

Section 19 Report

Storm Bert – Flood Investigation Area 17

October 2025

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This report should be read in its entirety.

This report has been prepared in accordance with the requirements of Section 19 of the Flood and Water Management Act 2010. The Council assumes no responsibility or liability from any person in connection with its contents or findings.

RHONDDA CYNON TAF

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CONTENTS

EXECUTIVE SUMMARY

This report has been produced through the duties placed upon Rhondda Cynon Taf County Borough Council (RCTCBC) under Section 19 of the Flood and Water Management Act 2010. The Act states, “On becoming aware of a flood in its area, a Lead Local Flood Authority must, to the extent that it considers it necessary or appropriate, investigate:

a) Which Risk Management Authorities have relevant flood risk management functions and
b) Whether each of those Risk Management Authorities has exercised or is proposing to exercise those functions in response to the flood.”.

This Section 19 investigation provides a report of the storm event that occurred on 23 and 24 November 2024 within the RCT area, focusing investigation on the flooding that occurred at Eirw Road, Britannia Street and Brook Steet located in the village of Porth in the Rhondda catchment (referred to as Flood Investigation Area 17 (FIA 17), (Figure 1)).

This report was undertaken to identify the mechanisms of flooding, establish which Risk Management Authorities have relevant flood risk management functions under the Flood and Water Management Act 2010 and ascertain if those Risk Management Authorities have undertaken or are planning to undertake actions related to those functions to reduce/alleviate the risk of flooding.

The flooding that affected RCT on 23 and 24 November 2024 was a result of an extreme rainfall event, designated by the Met Office as ‘Storm Bert’. The impact of the event at FIA 17 resulted in internal flooding to 24 residential properties. Significant flooding to the highway also occurred within the investigation area.

These impacts were identified through inspections made by RCT's Flood Risk Management Team during the days following the storm event, as well as information collated by residents, RCT's Public Health team, RCT's Highway and Streetcare Depot, Natural Resources Wales (NRW) and Dŵr Cymru Welsh Water (DCWW).

It has been established from the evidence gathered within this report that the primary source of flooding in this incident was the River Rhondda overtopping its southern river bank at several locations following persistent and heavy rainfall.

River level gauge data at NRW's Trehafod monitoring station reveal that the River Rhondda was over 3 metres higher than its typical level during Storm Bert, reaching a peak level of 3.619 metres; approximately 0.36 metres lower than the highest peak recorded at the station during Storm Dennis in February 2020.

The investigation also identified surcharging flows from a manhole associated to a culverted ordinary watercourse network at Coedcae Road to have contributed the main river flooding at Brook Street. Obstructions caused by mobilised debris to the culvert outlet has been attributed as the primary cause of flooding to the manhole.

Surface water accumulation on the highway was also identified as exacerbating the main river and ordinary watercourse flooding at FIA 17. Main river flows entering the surface water drainage systems, the associated settling of fluvial deposits and the sheer intensity of rainfall during Storm Bert have been attributed as the causes of surface water flooding.

NRW has been determined as the relevant Risk Management Authority responsible for managing the main river flooding that occurred during Storm Bert. In response to the flooding at FIA 17, NRW propose to:

- Undertake a review of the resultant thresholds for this Flood Warning Area (FWA) following Storm Bert.
- Undertake an initial assessment of the viability of potential flood risk management options utilising the recently completed Rhondda Flood Model.
- Develop a long-term Strategic Flood Risk Management Plan for the Taf catchment to manage the impacts of flooding on people, property, infrastructure and the environment.

RCTCBC as the LLFA and Highway Authority has been determined as the relevant Risk Management Authority responsible for managing the ordinary watercourse and surface water flooding that occurred during Storm Bert. In response to the flooding at FIA 17, RCT propose to:

- Cooperate and collaborate with NRW to carry out a detailed study of the investigation area and help to deliver NRW's Strategic Flood Risk Management Plan for the Taf Catchment.
- Engage with landowners and property owners to provide advice and guidance to help make them aware of their personal flood risk from local sources, and the options available to improve flood resilience.

The event that occurred on 23 and 24 November 2024 was extreme, and it is unlikely flooding from a similar event could be prevented entirely. It is concluded that the LLFA, NRW and the Highway Authority have relevant flood risk management functions, and all three RMAs have outlined which functions have been exercised and which are proposed to be exercised in response to the Storm Bert flooding event.

ABBREVIATIONS

CaRR – Communities at Risk Register

DCWW – Dŵr Cymru Welsh Water

FIA 17– Flood Investigation Area 17

FWMA – Flood and Water Management Act 2010

LDA - Land Drainage Authority

LFRMS – Local Flood Risk Management Strategy

LLFA – Lead Local Flood Authority

NFD – Non-Flood Defence – A structure that provides a flood defence benefit, which is not designated or maintained as a Flood Defence Structure. Thereby the benefits derived from the structure cannot be depending upon to deliver a Flood Defence.

NRW – Natural Resources Wales

PFR – Property Flood Resistance / Resilience

Q – Return Period (1 in X chance of an event occurring in any given year)

RCT - Rhondda Cynon Taf

RCTCBC – Rhondda Cynon Taf County Borough Council

RMA – Risk Management Authority

SFRA– Strategic Flood Risk Area

TABLES AND FIGURES

1. INTRODUCTION

1.1. PURPOSE OF INVESTIGATION

On the 23 and 24 November 2024, Rhondda Cynon Taf County Borough Council (RCTCBC) was impacted by a severe weather event which was designated by the Met Office as 'Storm Bert' on 20 November 2024.

The storm resulted in widespread flooding to residential and non-residential properties within Rhondda Cynon Taf (RCT). This report will focus on Flood Investigation Area 17 (referred to as 'FIA 17' within this report) which covers the area of Eirw Road, Britannia Street, Brook Street, and Edmund Street, located in Porth in the River Rhondda catchment.

The purpose of RCTCBC's investigation is in response to the duties of the local authority as Lead Local Flood Authority (LLFA) in regard to Section 19 of the Flood and Water Management Act 2010 (FWMA), which states:

1. "On becoming aware of a flood in its area, a lead local flood authority must, to the extent that it considers it necessary or appropriate, investigate:

a) which risk management authorities have relevant flood risk management functions and
b) whether each of those risk management authorities has exercised or is proposing to exercise those functions in response to the flood.

2. When an authority carries out an investigation under subsection (1) it must (a) publish the results of its investigation, and (b) notify any relevant risk management authority".[1]

[1] Flood and Water Management Act 2010, Section 19

The purpose of the investigation is to determine which Risk Management Authorities (RMA) have relevant flood risk management functions and which functions have been exercised in response to a flood.

Current Welsh Government guidance outlined within the National Strategy for Flood and Coastal Erosion Risk Management[2] stipulate that a Section 19 report should be produced for flooding incidences where twenty or more properties experience internal flooding following a storm event. Due to the extent and impact of the event at FIA 17, the Lead Local Flood Authority (LLFA) have opted to undertake a formal Section 19 investigation for this area.

Specific details of Storm Bert, such as rainfall analysis and watercourse response, are covered within a separate overview report that covers the wider RCT area. The report is titled 'Storm Bert November 2024 – Overview Report'[3].

1.2. Site Location

The area investigated within this report (FIA17) forms part of the community of Porth in the electoral ward of Cymmer, located in the centre of the county borough (Figure 1). It falls within catchment of the River Rhondda, which flows west to east along the northern border of the investigation area.

The investigation area itself is confined to the base of the valley where residential and commercial development has been built on the floodplains of the River Rhondda.

[2] National Strategy for Flood and Coastal Erosion Risk Management in Wales, October 2020
[3] RCTCBC Storm Bert Overview Report, March 2025

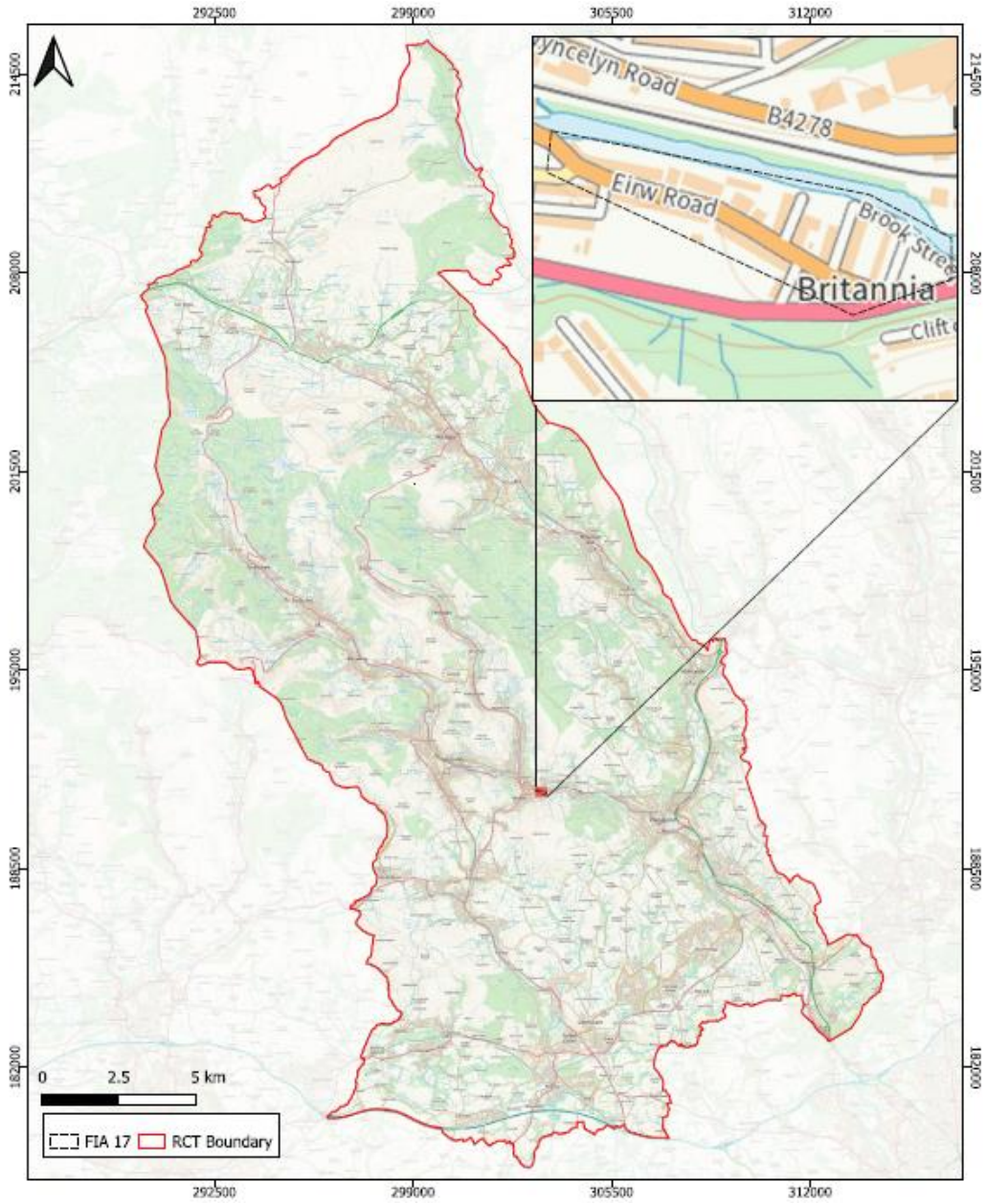

Figure 1: Location Plan of FIA 17.

FIA 17 falls within the Lower Rhondda Fach Strategic Flood Risk Area as defined by RCT's Local Flood Risk Management Strategy and Action Plan 2024[4]. These boundaries are based on the latest available datasets and tools, geographical

[4] RCTCBC Local Flood Risk Management Strategy and Action Plan, March 2024

knowledge of the catchment drainage basins and local flood history to assess flood risk in RCT.

According to Natural Resources Wales's (NRW) Flood Risk Assessment Wales (FRAW) maps, flood risk associated with main river flooding from the River Rhondda poses the most significant threat to people and properties within FIA 17 (Figure 2). Low to high main river flood risk is observed across the entirety of the investigation area.

Local flood risk at FIA 17 is also compounded by surface water and ordinary ('small') watercourse flood risk. This is attributed to culvert inlets, the overtopping of watercourse embankments and overland flows owing to the steep topography of the upper catchment conveying towards topographical low points across the investigation area.

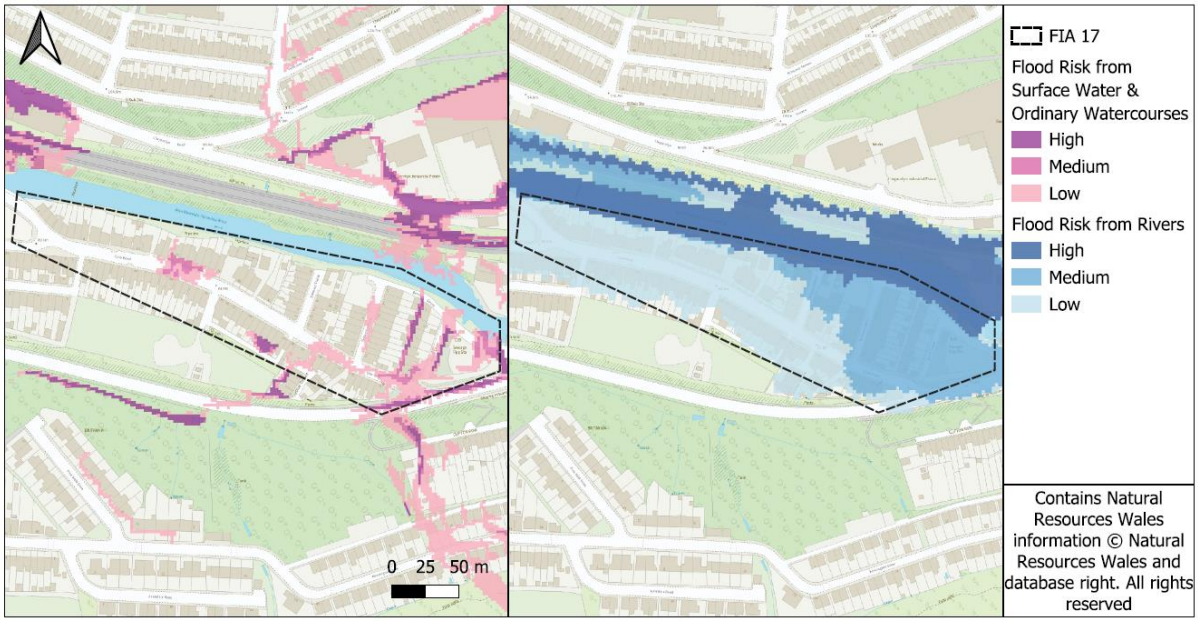

Figure 2: Natural Resources Wales's Flood Risk Assessment (FRAW) map for surface water and small watercourse, and main river flood risk at FIA 17.

The Welsh Government's Communities at Risk Register (CaRR), produced by NRW, provides a national assessment of flood risk and hazard from all sources of flooding,

enabling flood risk and hazard to be ranked at a local level to identify those communities at highest risk. The national flood risk rankings for the community of Porth, which FIA 17 is located within, have been presented in Table 1 for the present day and climate change scenario (CaRR, 2024[5]).

Table 1: Surface water and ordinary watercourse, and main river (managed) flood risk ranking for the present day and climate change scenarios for the community of Porth according to the CaRR, 2024.

Community Name	Present Day Ranking		Climate Change Scenario Ranking	
	Surface Water & Ordinary Watercourse	Main River (Managed)	Surface Water & Ordinary Watercourse	Main River (Managed)
Porth	33	98	36	46

As illustrated in Table 1, the community of Porth is predicted to fall three places in ranking for surface water and ordinary watercourse flood risk. Crucially, however, this does not indicate that surface water and ordinary watercourse flood risk will naturally decrease but rather it will increase at a slower rate relative to certain communities in Wales. On the other hand, Porth is projected to rank 42 communities higher for main river flood risk, indicating a substantial increase when compared to other communities. Table 2 shows the projected change in flood risk in terms of the number of properties at risk in Porth. Properties at risk of both surface water & ordinary watercourse, and main river flood risk are projected to increase in line with climate change.

Table 2: Properties at Risk from surface water and ordinary watercourse, and main river flooding in the present day and climate change scenario, accoridng to the CaRR 2024.

Community Name	Properties at Risk- Present Day		Properties at Risk- Climate Change Scenario	
	Surface Water & Ordinary Watercourse	Main River (Managed)	Surface Water & Ordinary Watercourse	Main River (Managed)
Porth	735	438	942	532

[5] Communities at Risk Register 2024 – Present Day (CaRR) | DataMapWales

1.3. Drainage System

The surface water drainage systems that serve FIA 17 are that of the highway drainage network which is designed to manage the surface water within the highway, and public surface water sewer and combined sewer networks (foul and surface water) operated by Dŵr Cymru Welsh Water.

There are also sections of culverted watercourse network designed to convey ordinary watercourse flows from the upper catchment above the investigation area and beneath urban development towards the main River Rhondda.

1.4. INVESTIGATION EVIDENCE

To support the investigation, a range of qualitative and quantitative evidence has been gathered from numerous sources, the summary of which is listed in Table 3.

Table 3: Investigative evidence gathered in preparation of this Section 19 Investigation Report.

Source	Data
Residents	Photographs, videos, statements, email correspondence, public engagement survey responses
Responders' Statements	Local responders' statements
CCTV Surveys	Internal surveys of the local drainage networks
Risk Management Authority (RMA) Responses	In pursuant of Section 13 (1) of the FWMA, relevant RMAs provided RCTCBC with information to support the production of this report
Met Office Data	Weather Warning information (see FRM- Storm Bert-Overview Report)[3]
Natural Resources Wales	River Level and Flood Warning Data
RCT Local Flood Risk Management Strategy and Action Plan 2024	Site specific information and data for each electoral ward in RCT
Communities at Risk Register 2024	Flood risk ranking and scores for all flood types based on community data in Wales
Envirocheck Report	A comprehensive environmental risk assessment tool used by professionals to evaluate potential hazards on a site. These reports include historical maps, flood risk assessments, geology maps and contamination screening.

1.5. PUBLIC ENGAGEMENT

Following the initial flood event that occurred on 23 and 24 November 2024 during Storm Bert, flood risk officers from the RCT Flood Risk Management department were deployed to areas across the borough to investigate reports of internal flooding by residents. Residents were engaged with by the Flood Risk Management team to help determine the initial impacts caused by the flooding event and to investigate the potential source(s) and pathways(s) of flood water during the event. Due to the volume of calls received by RCT's Out of Hours department, visits were prioritised to those areas experiencing significant internal flooding to residential properties.

To support these investigations, a public engagement exercise was undertaken by RCTCBC between 17 March and 28 April 2025. This exercise comprised of an online survey which enabled residents who were affected by the flood event to provide further detail on how they were impacted, the source and movement of flood water within the area, how receptors were impacted as well as drawing on local knowledge to query how local conditions could have exacerbated the event. Residents were also encouraged to submit photo/video evidence of flooding to their properties. This data is useful to help the LLFA better understand and validate our assessment of the flood event to support the investigation under Section 19 of the FWMA.

During the consultation period, no responses were received from individuals within FIA 17.

2. FLOODING HISTORY

2.1. PREVIOUS FLOOD INCIDENTS

Table 4 lists the previous incidences of flooding to properties within FIA 17 based on resident's accounts and available historical information held by the Council and NRW.

Historical flood records held by NRW indicate that three unnamed storms between 1979 and 2000 resulted in internal flooding of properties within FIA 17. Information relating to the events is limited, however it is understood that 7 properties were internally flooded at Britannia Street during October 2000.

On the 15 and 16 of February 2020, Storm Dennis resulted in a flooding event which internally impacted 1,498 homes and businesses across RCT, of which 37 were impacted within the investigation area. Flooding was primarily attributed to the River Rhondda overtopping its banks at several locations. Worst affected areas in Porth associated to the overtopping of the River Rhondda during Storm Dennis include Eirw Road, Brook Street and Britannia Street. Further details of the flooding caused by Storm Dennis at this location can be found in the published Section 19 report titled "Storm Dennis- Flood Investigation Area RCT19 (Porth)"[6].

Since Storm Dennis and prior to Storm Bert, no further instances of internal flooding have been reported within FIA 17.

[6] Storm Dennis- Flood Investigation Area RCT19 (Porth), June 2022

Table 4: Record of historical flood events within FIA 17 prior to Storm Bert in November 2024.

Name & Date of Storm Event	Nr Receptors Impacted Internally	Streets Affected
Unnamed Storm- December 1979	Unknown	Unknown
Unnamed Storm- October 1998	Unknown	Unknown
Unnamed Storm- October 2000	7	Britannia Street.
Storm Dennis – February 2020	37	Eirw Road, Brook Street and Britannia Street.

2.2. FLOOD INCIDENT

The flooding incident that occurred on 23 and 24 November 2024 was a result of an extreme rainfall event, designated by the Met Office as 'Storm Bert'. The rainfall event affected the majority of RCT and caused widespread flooding to communities.

Specific details of Storm Bert, such as rainfall and watercourse level analysis, are covered within a separate overview report that coverts the wider RCT area, referenced 'Storm Bert November 2024 – Overview Report'[3].

The post event inspections undertaken on the days following the storm event by RCTCBC's Flood Risk Management team and RCTCBC's Public Health, Protection and Community teams identified 24 residential properties as internally flooded within FIA 17.

A summary of the source(s) and pathway(s) for flooding within FIA 17 during Storm Bert have been outlined in Table 5 and further described throughout this section.

Table 5: Summary of the source(s), pathway(s) and receptor(s) affected during Storm Bert within FIA 17.

Source	Pathway	Receptor
The River Rhondda overtopped its southern river bank at two locations within the investigation area, including Brook Street and Britannia Street.	Main river flood water conveyed onto adjacent highway networks, resulting in flood water entering the front and/or rear of properties on Brook Street and Britannia Street. Main river flood water was also observed to have infiltrated through the rear	The overtopping of the River Rhondda resulted in internal flooding of 8 residential properties at Brook Street, 15 residential properties at Britannia Street. The infiltration of the River Rhondda through the rear garden walls resulted in internal flooding to 1 property at Eirw Road.

Source	Pathway	Receptor
	garden walls of properties on Eirw Road.	
An ordinary watercourse manhole at A4058 Coedcae Road surcharged during the event.	Surcharging flows from the manhole conveyed along the kerbside of the A4058 Coedcae Road and conveyed towards Brook Street. Flows accumulated within the topographic low point of Brook Street.	Surcharging ordinary watercourse flows are considered to have contributed to the main river flooding experienced at Brook Street which impacted 8 residential properties.
Intense rainfall and subsequent localised surface water runoff and accumulation from the surrounding area.	Surface water was observed along several highway networks within the investigation. This is considered to have contributed to the main river flooding throughout FIA 17.	Surface water is considered to have exacerbated the flooding experienced at many internally flooded properties across FIA 17 during Storm Bert.

On review of Table 5, the primary source of the recorded flooding within FIA 17 was a result of the River Rhondda overtopping its southern river bank at two locations during the storm event, including Brook Street and Britannia Street.

Reports of the River Rhondda overtopping its river bank at FIA 17 and entering properties along Brook Street and Britannia Street were received by residents to the Council during the morning of Sunday 24 November 2024, at approximately 07:00. Upon an investigation of the area by RCT Flood Risk Management officers, the River Rhondda was identified to have overtopped at two locations. The areas of main river overtopping are shown in Figure 3 and described in further detail below.

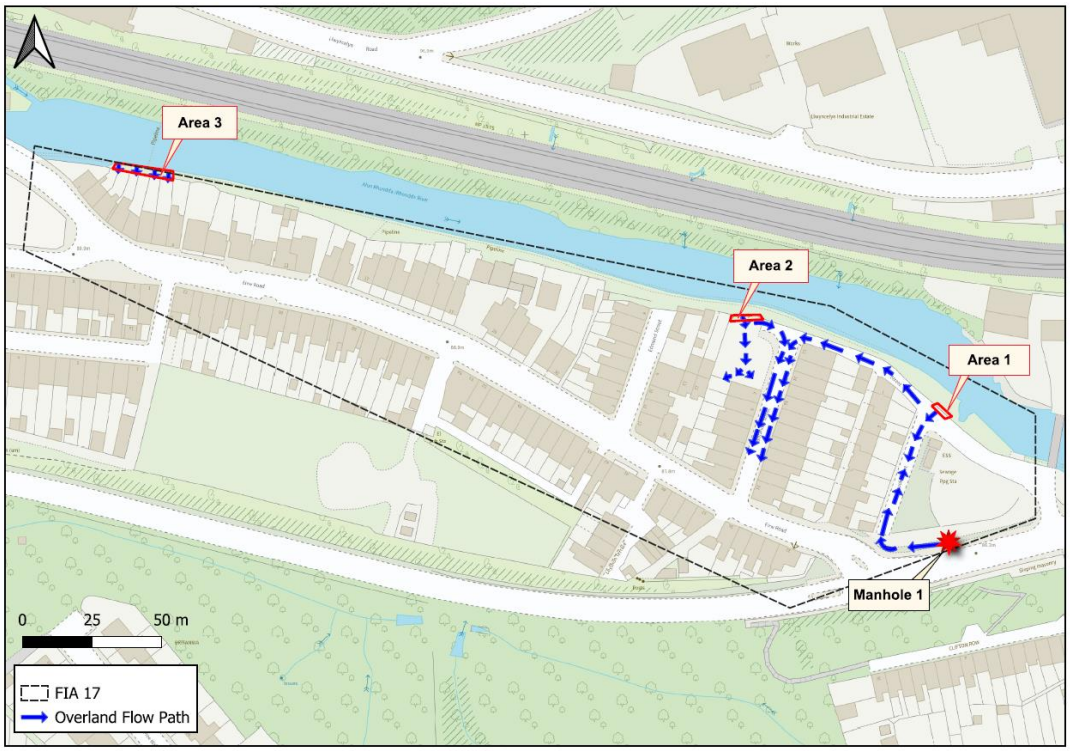

Figure 3: Indicative overland flow paths observed during Storm Bert within FIA 17.

The River Rhondda overtopped a Non-Flood Defence (NFD) highway wall at a point adjacent to Brook Street (labelled as ‘Area 1’ in Figure 3 and depicted in Figure 4). Main river flood water conveyed along the highway network towards properties at Brook Street and Britannia Street, resulting in internal flooding to 15 properties at Brook Street and 8 properties at Britannia Street. As a result of the overtopping of the River Rhondda at ‘Area 1’, a DCWW sewage pumping station was impacted during the event (Figure 5).

The River Rhondda also overtopped its southern river bank and conveyed through a palisade fence at the northern end of Britannia Street (labelled as ‘Area 2’ in Figure 3). Main river floodwater conveyed toward the front and rear of Britannia Street, contributing to the internal flooding of 8 properties.

Flood depths were observed to have reached approximately 1 metre in height in the worst affected areas of Brook Street and Britannia Street.

Figure 4: The River Rhondda overtopping the highway wall adjacent to Brook Street at 'Area 1' (image captured by a local resident).

Figure 5: A DCWW pumping station impacted by main river flows during Storm Bert (image captured by a local resident).

In addition to the two areas of overtopping, the River Rhondda was reported to have infiltrated the rear garden walls of properties at Eirw Road (labelled as ‘Area 3’ in Figure 3), causing internal flooding to 1 property and external water ingress to a further 6 properties.

A manhole associated to a culverted ordinary watercourse network and located at the A4058 Coedcae Road, was identified as surcharging during the storm event (labelled ‘Manhole 1’ in Figure 3 and depicted in Figure 6). Exceedance flows conveyed from the manhole along the kerbside and towards Brook Street, where they accumulated at a topographic low point and contributed to the main river flooding experienced at Brook Street.

Figure 6: Surcharging manhole at Coedcae Road (‘Manhole 1’) (image captured by a local resident).

Localised surface water runoff and subsequent accumulation as a consequence of the intense rainfall was also observed along several highway networks within FIA 17 and is considered to have exacerbated the main river and ordinary watercourse flooding in the area during Storm Bert.

2.3. RAINFALL ANALYSIS

See RCT's 'Storm Bert November 2024 – Overview Report'[3], for a detailed analysis of the rainfall and ordinary watercourse response.

3. POSSIBLE CAUSES

The below sections describe the possible causes of flooding that occurred within FIA 17 during Storm Bert.

3.1. CULVERT CONDITIONS

There are several ordinary watercourses which drain the hillside to the southwest of the investigation area. These watercourses enter into a culverted network above Coedcae Road before conveying beneath the highway and discharging into the River Rhondda to the east of FIA 17. The known culverted watercourse network present in FIA 17 is shown in Figure 7.

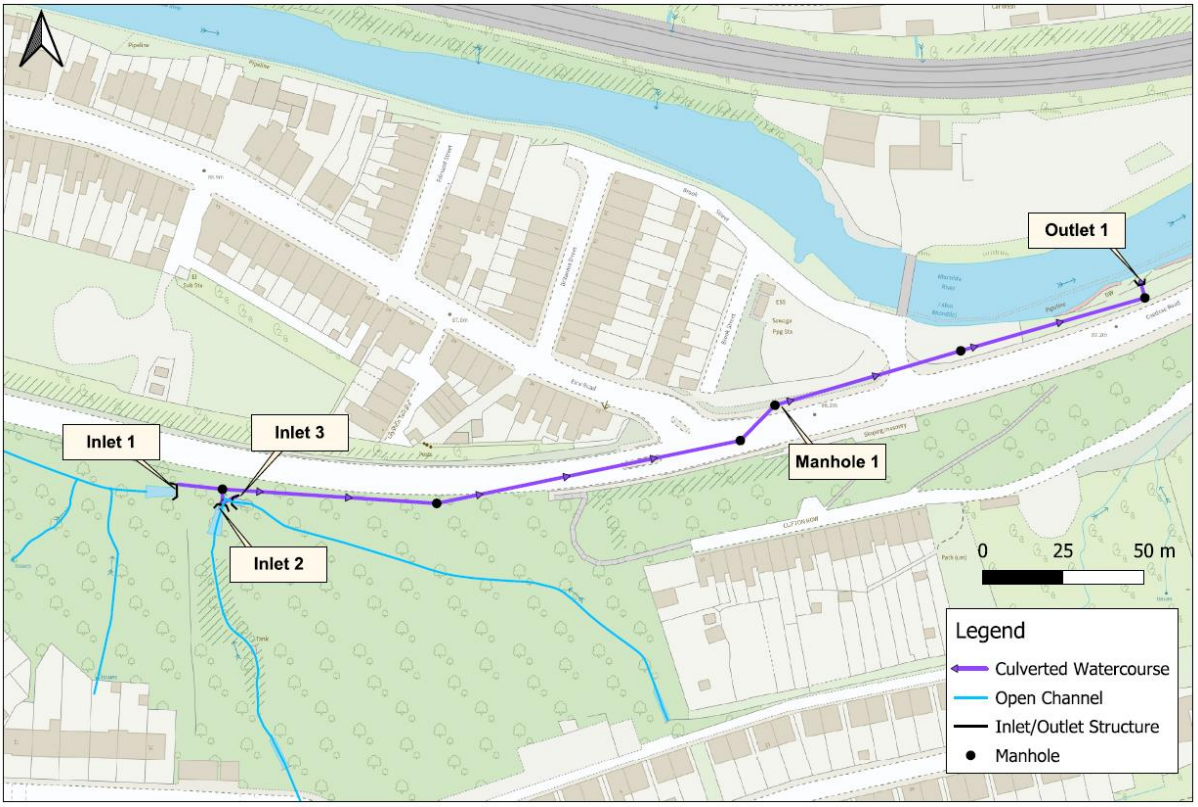

Figure 7: Culverted ordinary watercourse network within FIA 17.

Following the events of Storm Bert, an inspection of the culverted network identified 'Outlet 1' as obstructed by a significant buildup of debris (as shown in Figure 8). This debris consisted primarily of natural scour material (silt, stone, woody debris) and urban litter. The identified obstruction is considered to have reduced the culverted ordinary watercourse's ability to discharge flows into the River Rhondda, resulting in the surcharging of 'Manhole 1'.

In response to the identified obstruction, the material was removed from the network by the Council's appointed contractors during survey and jetting works post event.

Figure 8:(Left) Significant debris accumulation at the culvert out post event. (Right) Culvert outlet post cleansing utilising appropriate silt control measures (images captured by RCT's FRM team post event).

A CCTV survey inspection of the culvert network was undertaken to ascertain both the operational condition and structural integrity along sections of the network and to help determine whether they served as a contributing factor to the surcharging of 'Manhole 1'.

It should be noted that the survey reported in this section was undertaken post flood event. It's not possible to say what debris identified in the survey was mobilised and deposited as a result of the storm event and what had been deposited by previous

events. As such, the following should be considered to be reflective of the asset condition at the end of the storm event and may not be necessarily reflective of the condition of the assets prior to the onset of the storm event.

The CCTV survey identified volumes of settled debris present within the culverted network, both upstream and downstream of ‘Manhole 1’. The settled debris was observed as reducing the culvert’s cross-sectional area by up to 40% in some sections. The structural condition of the culvert network was observed to be in acceptable condition with some minor fracturing and joint displacements present in the lower section of the network. Despite the operational and structural defects present in the culvert network, the blockage at ‘Outlet 1’ (shown in Figure 8) is considered the primary cause of surcharge at ‘Manhole 1’ during Storm Bert.

Post event investigations carried out by RCT’s Flood Risk Management team inspected ‘Inlet 1’, ‘2’ and ‘3’ to determine their condition and whether they served as contributing factors to the obstructions present within the culvert network. Figures 9-11 show the condition of the three culvert inlets which were all identified to be in acceptable condition, with minor woody debris and natural scour material observed on the debris screens. This material is similar to the material cleansed from the downstream culvert network.

The debris identified within the culvert network and the obstruction at ‘Outlet 1’ is considered to have been mobilised by previous storm events, including Storm Bert, and resulted in the accumulation of debris in the lower sections of the network. The condition of culvert ‘Inlets 1-3’ are not considered to have contributed to the surcharging of ‘Manhole 1’.

Figure 9: Photo of 'Inlet 1' (image captured by RCT's FRM team post event).

Figure 10: Photo of 'Inlet 2' (image captured by RCT's FRM team post event).

Figure 11: Photo of 'Inlet 3' (image captured by RCT's FRM team post event).

3.2. CULVERT CAPACITY

An assessment of the hydraulic capacity of the culverted watercourse network identified as a source of flooding within FIA 17 during Storm Bert has been undertaken to ascertain its current standard of protection in free-flowing condition. The results of the capacity assessment are summarised in Table 6 below (refer to Figure 7 for culvert labels).

Table 6: Culvert capacity assessment results which indicate the current standard of protection of the culvert networks in free-flowing condition in FIA 17.

Culvert Network	Current Standard of Protection – Free Flowing
Culvert Inlet 1	Q1000 (0.1% AEP)
Culvert Inlet 2	Q1000 (0.1% AEP)
Culvert Inlet 3	Q1000 (0.1% AEP)

The results infer that the drainage infrastructure associated to the culvert network downstream of 'Culvert Inlets 1-3' has an acceptable standard of protection in accordance with current design standard, as defined by CIRIA C786F[7], assuming free-flowing conditions.

Based on the available evidence presented within this report, it can be concluded that 'Manhole 1' associated to the culvert network downstream of 'Culvert Inlets 1-3', surcharged during the storm event as a result of blockages to 'Outlet 1', which reduced the networks capacity to manage the flow of water conveying from the hillsides above FIA 17 towards the River Rhondda.

[7] CIRIA Culvert, Screen and Outfall Manual (C786F)

3.3. ORDINARY WATERCOURSE CONDITIONS

Sections of open ordinary watercourses which drain the hillside to the southwest of FIA 17 have been identified to enter into the culverted network above Coedcae Road.

According to on-site officers, post-event investigations found no evidence of significant debris mobilisation from the upstream catchments, nor indication of significant scour to the watercourse channel. This further supports the determination that the primary cause of surcharging at ‘Manhole 1’ was a result of the obstruction at ‘Outlet 1’.

3.4. Main River

The River Rhondda, designated as a main river by NRW, borders the northern boundary of the investigation area, flowing from the west at its confluence with the River Rhondda Fach, in an easterly direction toward Pontypridd.

As stated in Section 2.2, many residential properties across FIA 17 were internally impacted as a result of the main River Rhondda overtopping its river banks at several locations during Storm Bert.

3.4.1. Main River Levels and Flood Warnings

The hydrograph in Figure 12 illustrates the significant rise in the River Rhondda's levels in response to rainfall between 23 and 25 November 2024. River level data was captured at the nearest NRW river monitoring station, located approximately 2 kilometres downstream of FIA 17 at NRW's Trehafod station.

The green bar displayed in Figure 13 shows the typical level of the River Rhondda at Trehafod, ranging between approximately 0.4 and 0.7 metres. The River Rhondda was above this green line for over 48 hours before falling back to typical levels by the 26 November 2024, highlighting the severity of the storm. At its peak, the River Rhondda at Trehafod was approximately 3 metres higher than its typical level.

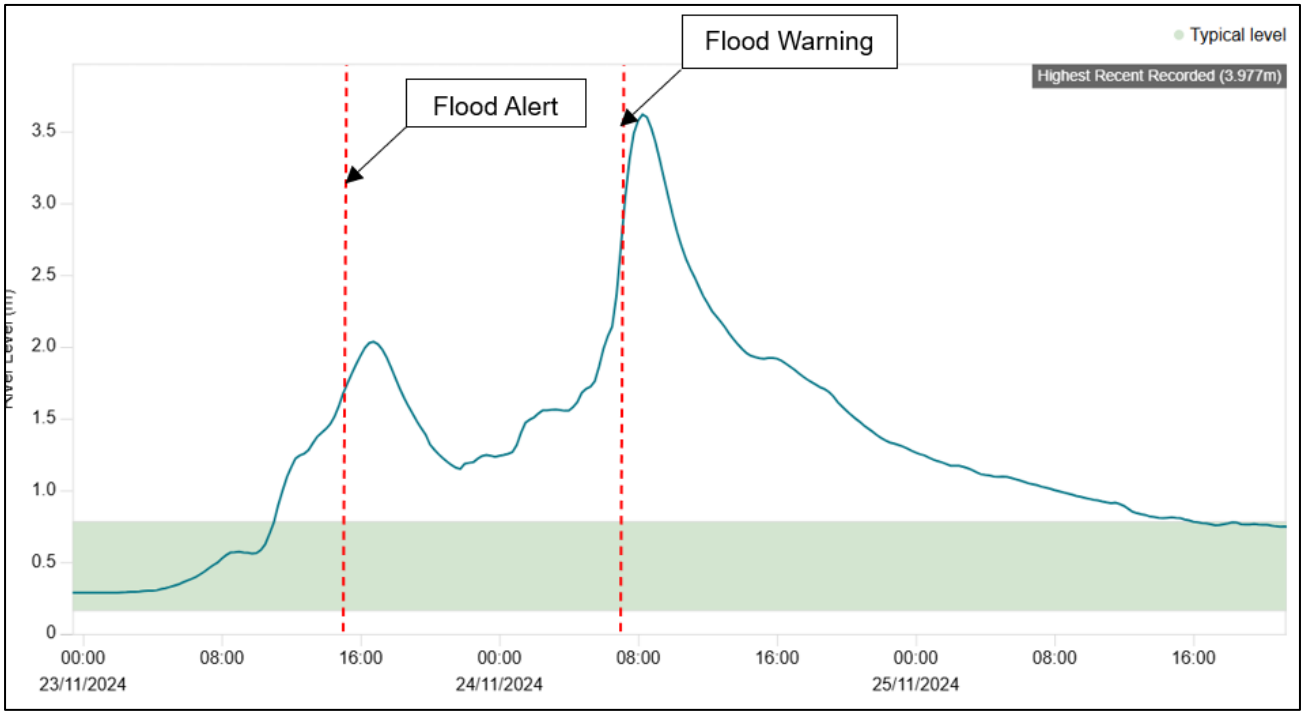

Figure 12: The River Rhondda levels at Trehafod station between 23 and 25 November 2024 (Natural Resources Wales).

Investigation area FIA 17 falls within NRW's 'Rhondda Rivers' Flood Alert Area and 'River Rhondda at Porth' Flood Warning Area. The 'Flood Alerts' (indicating possible flooding) and 'Flood Warnings' (indicating flooding is expected) issued by NRW for the River Rhondda at FIA 17 during Storm Bert are shown in Table 7 and have also been illustrated in Figure 12 above.

Table 7: Flood Alert and Warnings issued by NRW for the main river flowing through FIA 17 during Storm Bert.

Flood Warning Type	Location	Start Date & Time	River Level (m)	NRW Station Name
Flood Alert	Rhondda Rivers	23/11/2024 15:10	1.748	Trehafod
Flood Warning	River Rhondda at Porth	24/11/2024 7:13	3.035	Trehafod

NRW issued a ‘Flood Alert’ (indicating possible flooding) for the Rhondda Rivers at 15:10 on Saturday 23 November 2024; at which point the main river at Trehafod monitoring station was between 1.677 and 1.748m in depth and rising quickly in response to rainfall. Following a short drop in levels, at approximately 01:00 on Sunday 24 November 2024, the River Rhondda began to rise again, reaching its peak level of 3.619 metres at 08:15. The peak river level recorded at Trehafod station was 0.358 metres lower than the peak recorded during Storm Dennis in February 2020.

The ‘Flood Warning’ was issued by NRW for the River Rhondda at Porth less than an hour prior to the peak, at 07:13 on Sunday 24 November 2024. Based on anecdotal information provided by residents, the River Rhondda overtopped at Britannia at approximately 7:00.

3.4.2. Main River Flood Risk

As outlined in Section 2, main river flooding resulted in the internal flooding of 24 residential receptors within the investigation area.

Figure 13 is an excerpt from NRW's Flood Risk Assessment Wales (FRAW) mapping exercise which depicts the main river flood risk extents for the 'Managed' scenario, i.e., with the presence of flood defence infrastructure. The darker shading identifies areas at higher risk of flooding (more frequent/less extreme rainfall events) and lighter shading showing the lower risk areas (less frequent/more extreme rainfall events).

The flooding that occurred within FIA 17 during Storm Bert correlates closely with the modelled outputs of NRW's FRAW map (Figure 13), with impacted receptors at Brook Street and Britannia Street falling within an area of medium main river flood risk. The remaining impacted receptor at Eirw Road is modelled to be at low risk of main river flooding.

A low risk of flooding means that an area has a chance of flooding of between 1 in 1000 (0.1%) and 1 in 100 (1%) each year; meanwhile, a medium risk of flooding signifies a yearly chance of flooding between 1 in 100 (1%) and 1 in 30 (3.3%).

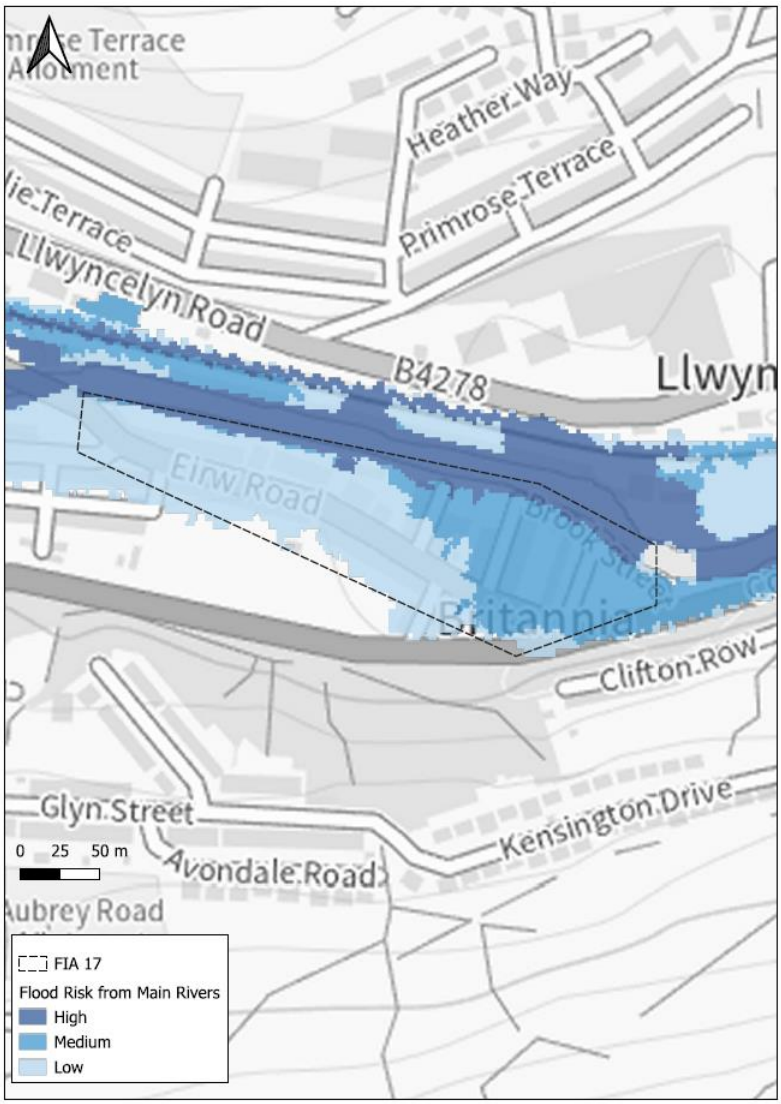

Figure 13: NRW's FRAW map for river sources at FIA 17. Natural Resources Wales.

3.4.3. Main River Flood Defences

The properties impacted by the River Rhondda at FIA 17 are currently 'Undefended', i.e., there are no formally designated flood defence infrastructure under the operation and maintenance of a Risk Management Authority in place along the River Rhondda at Porth.

During the storm event, a section of retaining highway wall at Brook Street was identified as overtopped. The retaining wall is identified as a NFD structure and is therefore not a designated flood defence structure.

3.5. HIGHWAY DRAINAGE CONDITIONS

During Storm Bert, Eirw Road, Brook Street and Britannia Street were observed as flooding as a result of the overtopping of the River Rhondda. As illustrated in Figure 14, the resultant fluvial flows deposited mud, silt and debris across the investigation area which are considered to have entered the highway drainage system, leading to blockages and a reduction in the hydraulic capacity of the surface water network.

Figure 14: Debris deposited at Brook Street as a result of the overtopping of the River Rhondda during Storm Bert (image captured by a local resident).

Jetting and surveying works to the highway surface water drainage networks in FIA 17 was carried out post event by Council appointed contractors. Approximately 70 tonnes of debris was removed from the surface water drainage network (inclusive of the culverted watercourse network).

Highway drainage is not designed to manage overland flows from private areas, parks or open space, nor is it designed to accommodate fluvial flows that may arise during storm events. In this instance, the capacity of the highway drainage across FIA 17 was exceeded as a result of main river and ordinary watercourse flows entering the network. The maintenance condition of the highway drainage infrastructure is not considered to have significantly impacted the flooding experienced.

3.6. DCWW Apparatus

There is no evidence from this investigation that DCWW apparatus contributed to the flooding that occurred during Storm Bert within investigation area FIA 17.

As discussed in Section 2.2, a DCWW foul water pumping station at Brook Street was observed to be inundated by the River Rhondda, which overtopped the adjacent NFD highway wall. The upwelling of water (Figure 5) was the result of air cyclically releasing from the pumping station as it was operating, however became over capacitated by main river flows entering the system. This is reported to have contributed to the flooding of the DCWW trunk sewer network further downstream. The pumping station at Brook Street is identified as a receptor of the flooding that occurred within FIA 17, not a contributary source.

DCWW also identified one of their manholes associated to the combined sewer network to have surcharged during the storm event. The surcharging was contained within the rear garden of a residential property and according to DCWW, posed no risk of flooding to properties.

3.7. SURFACE WATER

Whilst surface water is not considered to have been the primary cause of flooding to properties within FIA 17, it is considered to have contributed to and exacerbated the main river and ordinary watercourse flooding observed at this location.

On review of NRW's national surface water and ordinary ("small") watercourse flood map (Figure 15), several streets within the investigation area are noted to be at high to low risk of flooding from these sources. The modelled risk is primarily associated with the network of ordinary watercourses and culverted infrastructure conveying through FIA 17, with high risk noted across Coedcae Road and Brook Street.

The pathways of surface water runoff during the storm event were observed along the highway network at FIA 17. The exact flow routes have not been confirmed due to lack of anecdotal evidence, however, NRW's FRAW maps provide a reasonable indication of the pathways and areas most at risk of surface water accumulation.

Surface water flooding as a contributing source of flooding to properties within the investigation area has been primarily attributed to intense and persistent rainfall resulting in the accumulation of runoff towards localised low points, paired with overwhelmed surface water drainage infrastructure restricting the ability to manage surface water accumulation.

Figure 15: NRW's FRAW Map for Surface Water and Ordinary Watercourse flood risk at FIA 17. Natural Resources Wales data.

3.8. SUMMARY OF POSSIBLE CAUSES

The above sections have identified and described the possible causes of flooding within FIA 17 during Storm Bert. A summary of the identified sources and possible causes of flooding (issue) have been outlined below in Table 8.

Table 8: Summary of the source(s) and possible cause(s) of flooding in FIA 17 during Storm Bert

Ref Nr	Asset (Source)	Issue	Asset Owner	Type of Flooding
1	River Rhondda	High river levels within the River Rhondda resulted in the main river overtopping the southern river bank and a NFD highway wall and conveying through palisade fencing. This resulted in internal flooding to 23 residential properties at Britannia Street and Brook Street.	RCTCBC Highway Authority	Main River
2	River Rhondda	High river levels within the River Rhondda resulted in the main river infiltrating a rear garden wall, resulting in internal flooding of 1 property at Eirw Road.	Private Landowner	Main River
3	Manhole 1	'Manhole 1', associated to a culverted watercourse at Coedcae Road, surcharged during the storm event due to an obstruction to 'Outlet 1'. Exceedance flows from the manhole contributed to the flooding at Brook Street.	RCTCBC	Ordinary Watercourse
4	Surface water drainage network across FIA 17	Intense rainfall across FIA 17, combined with the overtopping of the River Rhondda and deposition of mud, silt and debris overwhelmed the highway drainage	RCTCBC Highway Authority	Surface Water

Ref Nr	Asset (Source)	Issue	Asset Owner	Type of Flooding
		infrastructure and resulted in the accumulation of surface water on several streets throughout the investigation area.		

4. Risk Management Authority Functions

4.1. Risk Management Authorities and their Functions

The term 'Risk Management Authority' refers to the organisation(s) that have legislative powers concerning flood risk management. Risk Management Authorities (RMA) across Wales include NRW, the 22 Local Authorities as Lead Local Flood Authority (LLFA) and highway authority, water companies, and the Welsh Government as highway authority for trunk roads. Each RMA is required to fulfil a number of statutory duties, as defined under the FWMA. In addition to these statutory duties, the Act sets out a range of permissive powers for RMAs, enabling them to undertake defined activities if they so wish.

RCTCBC work in partnership with those organisations to investigate and manage flood risk. Whilst RCTCBC as the LLFA has a duty to investigate flood incidents in its area, it may be the responsibility of another RMA, or land/property owner, to take actions to resolve an issue.

Table 9 summarises which RMAs are primarily responsible for managing flood risk dependent on the type of flooding.

Further information pertaining to the roles and responsibilities of each individual RMA to manage flood risk is described in Section 5 of RCTCBC's Local Flood Risk Management Strategy and Action Plan[4].

Table 9: Risk Management Authorities responsible for managing different types of flooding in RCT.

Source of Flooding	Lead Local Flood Authority	Natural Resources Wales	Water Company	Highway Authority	South Wales Trunk Road Agency (Trunk Roads & Motorway)
Main River		✓			
Surface Water	✓			✓ (on or coming from the Highway)	✓ (on or coming from the Highway (Trunk Roads & Motorway)
Ordinary Watercourse	✓				
Groundwater	✓				
Sewer Flooding			✓		
Reservoirs		✓			

Risk Management Authorities have direct flood risk management functions under the Flood and Water Management Act 2010, as well as the Land Drainage Act 1991 and the Highways Act 1980. Through analysis of the flooding that impacted FIA 17, the flood risk management functions exercised or proposed to be exercised by relevant RMAs was recorded in pursuant to Section 19 of the Flood and Water Management Act 2010, which states;

“On becoming aware of a flood in its area, a lead local flood authority must, to the extent that it considers it necessary or appropriate, investigate:

a) Which risk management authorities have relevant flood risk management functions and,

b) Whether each of those risk management authorities has exercised, or is proposing to exercise, those functions in the response to the flood."

Through the investigation process, the source(s) and possible causes of flooding in FIA 17 as a result of Storm Bert have been previously identified and summarised within Table 8. The RMAs responsible for managing that flooding have been determined in Table 10.

Table 10: Risk Management Authorities identified in response to the source(s) and type of flooding in FIA 17 (as per Table 8).

Ref Nr	Asset (Source)	Asset Owner	Type of Flooding	RMA responsible for managing risk
1	River Rhondda	RCTCBC Highway Authority	Main River	NRW
2	River Rhondda	Private Landowner(s)	Main River	NRW
3	Manhole 1	RCTCBC	Ordinary Watercourse	LLFA
4	Surface water drainage network across FIA 17	RCTCBC Highway Authority	Surface water	Highway Authority and LLFA

4.2. Lead Local Flood Authority

In review of Ref 3 and 4 in Table 10, the LLFA has been determined as the relevant Risk Management Authority in relation to the surface water and ordinary watercourse flooding which occurred in FIA 17 during Storm Bert.

The LLFA exercised the following functions in response to the flooding at FIA 17:

- Officers investigated the initial flooding and have produced this report in line with Section 19 of the Flood and Water Management Act 2010
- Officers contacted residents affected by flooding to offer support and advice to assist in the recovery following the event.
- A public engagement exercise was carried out by the LLFA to gain further local insight and anecdotal evidence to support the flood investigation.
- The LLFA has exercised its powers, under Section 13 of the FWMA, to request information and co-operation from the relevant Risk Management Authorities (NRW and DCWW) in relation to their responsibilities as RMAs in response to Storm Bert.
- The LLFA have exercised their permissive powers under Section 64 of the Land Drainage Act 1991 to investigate the condition of culvert structures, network conditions, ordinary watercourse conditions and surface water drainage arrangements to determine their impacts on the flooding within the investigation area.
- An estimated 1369 metres of culverted ordinary watercourse and surface water network length within FIA 17 has been surveyed following the event to ascertain both the operational condition of the network, and its structural integrity along sections of the network.

- An estimated 70 tonnes of material and debris was removed from the culverted watercourse and surface water drainage networks within RCT17 during jetting and cleansing operations.
- The LLFA has developed a revised "Flood Response Protocol", designed to pro-actively determine the agreed requisite response and resource levels related to potential storm events.
- The Council's central Control Room, which was established following Storm Dennis, was in operation during Storm Bert to provide a comprehensive and informed response to the residents of RCT as appropriate during storm events, and to accommodate multi departmental / agency meetings where required.
- The Council introduced a Community Flood Recovery Grant (Hardship Payment) programme, with support from the Welsh Government, to provide financial assistance to residents who were subjected to internal flooding as a result of Storm Bert.
- The LLFA, working alongside the Council's Prosperity & Development Directorate, supported businesses impacted by Storm Bert by establishing a Flood Recovery Grant and Flood Resilience Grant, providing financial assistance during the recovery phase and longer-term measures to enhance resilience against future events.
- Notwithstanding that NRW are the relevant RMA for main river flooding, the LLFA have expanded their interim Property Flood Resistance project offering expandable flood gates to those properties who have suffered repeat flooding from the main river during Storm Dennis and Bert.

The LLFA also propose to exercise the following functions in response to the flooding at FIA 17:

- Following a review of Met Office and NRW warning systems and their effectiveness when applied to localised weather events, the Council will

establish internal trigger levels for extreme weather to provide a more robust warning and informing arrangement and improve the Council's standby protocol.

- The LLFA will cooperate and collaborate with NRW to carry out a detailed study of the investigation area in accordance with NRW's Strategic Flood Risk Management Plan for the Taf Catchment.
- The LLFA will engage with landowners and property owners to provide advice and guidance to help make them aware of their personal flood risk from local sources, and the options available to improve flood resilience.

4.3. NATURAL RESOURCES WALES

In review of Ref 1 and 2 in Table 10, NRW have been identified as the relevant Risk Management Authority in relation to the main river flooding from the River Rhondda during Storm Bert.

NRW have exercised the following functions in response to the flooding at FIA 17:

- NRW have carried out post event data collection including an assessment of the properties impacted by main river flooding and a survey of wrack marks, i.e., the marked high-water level.

NRW propose to exercise the following functions in response to the flooding at FIA 17:

- NRW are undertaking a review of Resultant Thresholds for this Flood Warning Area (FWA) following Storm Bert. This is critical for assessing the performance, timeliness and accuracy of the warning service after a flood.
- NRW propose to undertake an initial assessment of the viability of potential flood risk management options utilising the recently completed Rhondda Flood Model.
- NRW are developing a long-term Strategic Flood Risk Management Plan for the Taf catchment to manage the negative impacts of flooding on people, property, infrastructure and the environment. The Strategic Plan will identify where NRW need to act and who is best placed to action the opportunities identified.

4.4. WATER COMPANY

Dŵr Cymru Welsh Water were not identified as a relevant authority in relation to the flooding at FIA 17 during Storm Bert. DCWW do not propose to undertake any actions in relation to the event within the investigation area.

4.5. HIGHWAY AUTHORITY

In review of Ref 4 in Table 10, the Highway Authority has been identified as the relevant Risk Management Authority in relation to the surface water flooding that occurred across the highway at FIA 17 during Storm Bert.

RCTCBC as the Highway Authority have exercised the following functions in response to the flooding within FIA 17:

- The Highway Authority assisted with the emergency response during the event by supplying equipment and sandbags, some to individual properties and using sandbags to redirect flood water away from properties.
- The Highway Authority exercised their functions under Section 100 of the Highways Act 1980, to arrange for all gullies and open drains in the highway to be inspected and cleansed following the influx of fluvial flood water to ensure the safety of the highway post event.
- Since Storm Bert, the Highway Authority have sourced and deployed an additional gulley cleansing vehicle for 6 months annually to increase gulley cleansing activities ahead of winter to improve the resilience of their highway drainage infrastructure to the impacts of heavy rainfall.
- The Highway Authority has jetted, cleansed and mapped an estimated 1369 metres of surface water drainage and culverted ordinary watercourse network length within FIA 17 following Storm Bert to ascertain both the operational condition and structural integrity along sections of the network.

RCTCBC as the Highway Authority propose to undertake the following functions in relation to the storm event at FIA 17:

- The Highway Authority's Pluvial Drainage Team, which was established following Storm Dennis, are to be reviewed and restructured to create increased

response and resilience including staff, stores, machinery and materials deployment.

USEFUL LINKS/CONTACTS

Blue Pages – property Resilience - http://bluepages.org.uk/

Flood Re – Flooded Property Insurance Scheme - https://www.floodre.co.uk/

Natural Resources Wales – Check Flood Warnings – Natural Resources Wales / Check flood warnings

Natural Resources Wales – Check your flood risk on a map (Flood Risk Assessment Wales Map) - Natural Resources Wales / Check your flood risk on a map (Flood Risk Assessment Wales Map)

Natural Resources Wales – Sign up to receive flood warnings – Natural Resources Wales / Sign up to receive flood warnings

Rhondda Cynon Taf County Borough Council – Flood Risk Management - Flood Risk Management | Rhondda Cynon Taf County Borough Council