



CYNGOR BWRDEISTREF SIROL
RHONDDA CYNON TAF
COUNTY BOROUGH COUNCIL

COMMITTEE SUMMONS

C Hanagan
Service Director of Democratic Services & Communication
Rhondda Cynon Taf County Borough Council
The Pavilions
Cambrian Park
Clydach Vale CF40 2XX

Meeting Contact: Ms J Nicholls - Democratic Services (01443 424098)

YOU ARE SUMMONED to a hybrid meeting of the **OVERVIEW AND SCRUTINY COMMITTEE** to be held on **MONDAY, 28TH FEBRUARY, 2022** at **5.00 PM.**

Non Committee Members and Members of the public may request the facility to address the Committee at their meetings on the business listed although facilitation of this request is at the discretion of the Chair. It is kindly asked that such notification is made to Democratic Services by Thursday, 24 February 2022 on the contact details listed above, including stipulating whether the address will be in Welsh or English.

AGENDA

**Page
No's**

SCRUTINY RESEARCH

A scrutiny research facility is available within the Council Business Unit to support Members' scrutiny responsibilities and their roles as Elected Members. Such research strengthens scrutiny Committees work programmes to ensure outcome-based topics are identified. For any scrutiny research requirements please contact Scrutiny@rhonddacynon-taff.gov.uk

1. DECLARATION OF INTEREST

To receive disclosures of personal interest from Members in accordance with the Code of Conduct

Note:

1. Members are requested to identify the item number and subject matter that their interest relates to and signify the nature of the personal interest: and
2. Where Members withdraw from a meeting as a consequence of the disclosure of a prejudicial interest they must notify the Chairman when

they leave.

2. MINUTES

To approve as an accurate record the minutes of the hybrid meeting of the Overview & Scrutiny Committee held on the 9th December 2021.

5 - 10

3. CONSULTATION LINKS

Information is provided in respect of relevant [consultations](#) for consideration by the Committee.

4. ANNUAL EQUALITY REPORT 2020-21

To undertake pre scrutiny of the of the Annual Equality Report 2020-21

11 - 94

5. SECTION 19 FLOOD INVESTIGATION REPORTS

To consider the Council's Section 19 Flood Investigation reports under the Flood and Water Management Act 2010.

95 - 554

6. CHAIR'S REVIEW AND CLOSE

To reflect on the meeting and actions to be taken forward.

7. URGENT BUSINESS

To consider any items, which the Chairman, by reason of special circumstances, is of the opinion should be considered at the meeting as a matter of urgency.

Service Director of Democratic Services & Communication

Circulation:-

The Chair and Vice-Chair of the Overview and Scrutiny Committee (County Borough Councillor M Adams and County Borough Councillor W Lewis respectively)

County Borough Councillors: Councillor J Brencher, Councillor A Cox, Councillor M Griffiths, Councillor G Hughes, Councillor J James, Councillor P Jarman, Councillor S Morgans, Councillor D Owen-Jones, Councillor W Jones, Councillor S Rees, Councillor E Stephens and Councillor W Treeby

Non-Committee Member -Councillor M Webber

Christian Hanagan, Service Director of Democratic Services & Communication

Education Co-Opted Members for information:-

Mr M Cleverley

Ms A Jones, Representing UNITE

Mr C Jones, Representing GMB

Mrs C Jones, Representing the National Union of Teachers and Teachers' Panel

Mr D Price, Representing UNISON

Mr A Rickett, Voting Diocesan Authorities' Representative

Mr L Patterson, Voting Elected Parent / Governor Representative

Chair of the Governance & Audit Committee, Mr C B Jones

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RHONDDA CYNON TAF COUNCIL OVERVIEW AND SCRUTINY COMMITTEE

Minutes of the hybrid meeting of the Overview and Scrutiny Committee held on Thursday, 9 December 2021 at 5.00 pm.

County Borough Councillors - Overview and Scrutiny Committee Members in attendance:-

Councillor M Adams (Chair)

Councillor W Lewis	Councillor J Bonetto
Councillor J Brencher	Councillor G Caple
Councillor A Cox	Councillor G Hughes
Councillor P Jarman	Councillor D Owen-Jones
Councillor W Jones	Councillor S Rees

Co-Opted Members in attendance:-

Mr J Fish, Voting Elected Parent / Governor Representative

Officers in attendance:-

Mr C Hanagan, Service Director of Democratic Services & Communication
Mr D Powell, Director Corporate Estates
Mr A Roberts, Head of Energy & Carbon Reduction

18 Welcome & Apologies

The Chair welcomed Members to the hybrid meeting of the Overview & Scrutiny. The following Members were present in the Council Chamber:

County Borough Councillors G Caple, G Hughes and W Lewis.

Apologies for absence were received from County Borough Councillors J James MS, M Griffiths and E Stephens.

19 Declaration of Interest

In accordance with the Council's Code of Conduct, there were no declarations made pertaining to the agenda.

20 Minutes

It was **RESOLVED** to approve the minutes of the Overview & Scrutiny Committee held on the 21st September 2021 and the Special Overview & Scrutiny Committee held on the 12th October 2021 as an accurate reflection of both meetings.

Matters Arising

21st September 2021 – A Member requested confirmation that the published Section 19 Investigation Report for Treherbert had been shared with the local Members in advance of its publication and the offer of an Officer/Member meeting had been made to them. (The Service Director Democratic Services & Communications advised that he would be able to confirm that this was the case in due course).

21 Consultation Links

Members acknowledged the information provided through the consultation links in respect of open consultations, Welsh Government consultations and those matters being consulted upon by the Local Authority.

The Service Director Democratic Services & Communication reminded Members that should they wish to form a scrutiny committee response to any consultation, they are welcome to raise that matter at any time.

With regards to the Welsh Government consultation listed 'Period Dignity Strategic Action Plan' ending on the 12th January 2022, and in light of the work that the Children & Young People Scrutiny Working Group had undertaken, leading the field on this matter; a query was raised as to whether the Council will engage and comment on the consultation and strategy to ensure it meets the expectations of the recommendations and issues highlighted by the working group.

The Service Director advised that the Children & Young People Scrutiny Committee would be looking for the opportunity to include and consider this matter as part of its forward work programme and confirmed that there would be a Service response.

22 Update Report on Electric Vehicle Charging Strategy & Implementation Plan

The Service Director Democratic Services & Communications presented his report which outlined the opportunity for Members to consider and challenge the objectives set out within the Strategy for Electric Vehicle Charging (EVC). The Strategy had been received and adopted by Cabinet at its meeting held on the [15th November 2021](#).

Members were reminded of the work of the Overview & Scrutiny working group to consider 'the development of Infrastructure to support low carbon vehicle ownership in Rhondda Cynon Taf' and the formulation of nine recommendations and its recent engagement on the wide-ranging consultation exercise which contributed to the Council's draft Climate Change Strategy 2021-2025.

The Director of Corporate Estates provided details of the internal consultation with stakeholders and two public consultation exercises which had been undertaken via the Council's engagement website 'Let's Talk RCT' to progress and inform the Strategy which has subsequently been approved by Cabinet.

The Director set out the ten ambitions of the strategy and highlighted the correlation with the ten recommendations that had been previously produced by the Scrutiny Working Group and agreed by Cabinet. He emphasised that the

earlier work of scrutiny had informed the current strategy and he advised how the strategy would help identify an RCT wide approach to promote and encourage the development of a robust and practical electric vehicle charging (EVC) network in the short, medium, and long term, whilst considering the wider issues such as the transition from petrol and diesel vehicles to electric vehicles (EVs) as part of the Council's wider sustainable transport goals.

Following the Director's introduction and comprehensive presentation of the Strategy for Electric Vehicle Charging (EVC) in RCT, he advised of recent guidance from Welsh Government which had been published today requesting that examples of good practice from this local authority are sought and taken forward.

The Director explained that to date all schemes underway across the local authority have been funded by the Cardiff Capital Region Deal such as charging points in public car parks however, there may be the need for additional funding to deliver new work streams in the future.

Members of the Overview & Scrutiny Committee were given the opportunity to raise queries:

A Member sought clarification on ambition number eight which they considered would be the biggest challenge of all with residents due to the high number of terraced houses across the county borough. Also, whether the funding from the Cardiff Capital Region Deal is for taxis or for the wider public use.

The Director acknowledged the issues around the particular ambition but assured Members that guidance and a road map will be available for residents at the time when questions about charging close to residential properties are raised. If there are insufficient taxis utilising the infrastructure and chargers, they will be available to the public to use as long as they can pay for the charging facility.

Another Member suggested the Council consider its public spaces where charging for terraced houses could become difficult. A query was raised as to whether residents and partners will be able to access the Council's workplace charging facilities and in the case of new and substantially refurbished buildings providing 10% of their parking spaces for charging, what is the Council doing to get the maximum benefits from its recent refurbishments.

With regards to quality of access to charging, it was suggested that the strategy needs to look at ways in which areas without identified site are supported to ensure those sites are identified and we don't allow the Heads of the Valley to be the last or worst provision in the county borough.

Other Members were in favour of the workplace car parking which in areas of high volumes of terraced housing offers a solution for residents to charge their vehicles at work and drive home. Is there evidence to show whether in those areas where the infrastructure is in place, the shift to electric vehicles has increased as that would be a contributing factor to influencing the decision to purchase an electric vehicle. The Member asked whether all options been considered such as grant funding to develop the rear of residents' gardens in terraced houses to allow for charging infrastructure.

The Director of Corporate Services confirmed that the Council's EV fleet vehicles

will soon be tested as part of a trial to track the distance of the vehicle during its working week following one charge. He explained that the Council's recently constructed schools and all new schools will provide EV charging facilities as part of the Council's forward-thinking approach as well as considering other, appropriate owned and operated council sites.

Other points made included:

- Will there be an app which will share the location of the local charging facilities to assist with journey planning?
- What is the collaboration with the Health Board?
- How will the pandemic impact on workplace charging as so many employees are working from home? Does the strategy take into account the shift from the sale of diesel engines from 2030 disallowing hybrid vehicles as an alternative, will the Strategic Plan take account of these matters?

The Director of Corporate Estates confirmed the close working relationship with Cwm Taf Morgannwg University Health Board. He also acknowledged that the implementation Plan would be brought back before the Scrutiny Committee in due course. The Director advised that both matters had been considered in the preparation of the strategy and residents consulted on the change in demands of their travel needs as a result of the pandemic.

The Director responded to a query regarding the workplace charging and advised that in due course, when the rapid charging infrastructure comes into place, partners will be invited to use the Council's facilities. He also advised that the maps within the strategy, set out at Appendix 3, are to be delivered in 2021/22, the pins in the maps represent those areas where the infrastructure has already been delivered this year but does not represent the final list, as recent additions such as the new Primary School in Hirwaun, with 2 new charging facilities, doesn't appear on the map. He added that the work will be progressed in consultation with residents and stakeholders.

In conclusion the Director advised that his team is working closely with colleagues in Planning and confirmed that planning policy guidelines are being updated. He also clarified that a refurbishment at a local Leisure Centre already includes ducts under the flooring in the car park to allow future infrastructure for charging facilities to be included at a later date.

Following consideration of the report, it was **RESOLVED**:

1. To acknowledge the report and appendices (attached) and the adoption of the [strategy](#) and its formal publication on the Council website, following consideration of the outcome of the public consultation undertaken; and
2. That the Overview & Scrutiny Committee will undertake pre-scrutiny of the implementation plan, which will propose how the development of electric vehicle charging infrastructure, across the County Borough, will be developed.

The Service Director of Democratic Services and Communications presented his report which provided Members of the Overview & Scrutiny Committee with an opportunity to review and where required, update its already agreed forward work programme for the 2021/22 Municipal Year, following consideration of the draft Cabinet forward plan attached in the report.

The Service Director of Democratic Services and Communications reminded Members that the work programme 2021/22 is the final report of the Cabinet and Scrutiny Committee developed to cover the period up to Local Elections in May 2022. Members were advised to consider any areas from the attached work programme 2021/22 in order for pre-scrutiny to reflect on the Committee's aims and objectives as well as to add value to the work of the Council for the remainder of the Municipal Year.

One Member raised concern regarding the '*Modernisation of Residential Care and Day Care for older People*' as set out within the draft Scrutiny work programme for the 2021/22 Municipal Year and the importance of receiving further updates to ensure work undertaken by the Overview and Scrutiny Committee had been implemented efficiently and effectively in dealing with social care issues within Rhondda Cynon Taf. Further it was noted that there was no reference to tip safety in the Cabinet forward work programme.

The Service Director of Democratic Services and Communications advised that an update could be provided to the Committee from the appropriate Director in relation to the Council's current position at the appropriate time. It was noted by the Chair that due to the volume of reports to the Overview and Scrutiny Committee in January 2022; the update report could be addressed later in the year.

The Service Director of Democratic Services and Communications advised that once published the Section 19 Investigation reports will be presented as a collective to the Overview & Scrutiny Committee.

Following discussion, it was **RESOLVED** to approve the Work Programme for the 2021-22 Municipal Year and to receive a further update on a 3-monthly basis.

(Note: The lost motion to bring a further report to the Overview & Scrutiny Committee prior to the end of the Municipal Year, relating to the '*Modernisation of Residential Care and Day Care for older People*', was proposed by Councillor P Jarman and seconded by Councillor D Owen-Jones. County Borough Councillors P Jarman and W Jones wished to have it recorded that they voted in favour of the lost motion).

24 Scrutiny Working Group Recommendations

The Service Director of Democratic Services and Communications presented his report which sought to provide Members of the Overview and Scrutiny Committee with the findings and recommendations agreed by the Scrutiny Working Group, which was established to progress the motion adopted by Council on the 18th of September 2019 as set out on paragraph 3.2 of the report.

The Service Director reminded Members of the progress made at the end of 2019 and early 2020, with the call for evidence from partners such as Transport

for Wales to support Members' deliberation. The Service Director recalled that with the advent of the Pandemic, progress was hampered resulting in the Working Group being reconvened in early 2021, during which time significant changes had been implemented in relation to the transport landscape, with the progress of the South Wales Metro.

The Service Director advised that the recommendations as set out in paragraph 6.1 of the report, and subject to consideration by the Overview & Scrutiny Committee, would be reported to full Council in the New Year.

One Member sought clarification on the last two recommendations, particularly dealing with the moratorium arrangements implemented by the Welsh Government. A query was also raised in relation to the rail line towards Tower Colliery to Zip World. The Member suggested that further consideration should be given to the travel lines for the Hirwaun community and hoped that that they would be involved in the final decision on the preferred location for the Station through a consultation process. The Chair pointed out that this matter had been addressed within the report at pages 149-151.

Following discussion, the Overview and Scrutiny Committee **RESOLVED** to endorse the conclusions and recommendations of the Working Group as set out on paragraph 6 of the report (subject to it being amended to reflect that Cllr G Caple is the local ward Member for Cymmer not Porth as set out within the report).

At this point in the meeting, the Service Director, Democratic Services & Communications commented that he was able to confirm that advance notice had been provided on the Section 19 Investigation report for Treherbert to the two local Members on the 16th November 2021, ahead of the publication date.

25 Chair's Review and Close

The Chair thanked Members for their attendance and contribution in the meeting. He summarised the key points to have arisen from the meeting, specifically acknowledging those Officers involved in producing the report for Electric Vehicle Charging and he welcomed the opportunity to pre scrutinise the implementation plan which would be presented to the Overview & Scrutiny Committee in due course.

This meeting closed at 6.25 pm

**CLLR M. ADAMS
CHAIR.**



RHONDDA CYNON TAF COUNTY BOROUGH COUNCIL

MUNICIPAL YEAR 2021 /22

OVERVIEW & SCRUTINY COMMITTEE

28th FEBRUARY 2022

ANNUAL EQUALITY REPORT 2020/21

REPORT OF THE SERVICE DIRECTOR OF DEMOCRATIC SERVICES & COMMUNICATIONS

1. PURPOSE OF THE REPORT

- 1.1 To pre-scrutinise the Council's Annual Equality Report, for the year 2020/21.

2. RECOMMENDATIONS

It is recommended that: -

- 2.1 Members undertake pre scrutiny on the report (attached at Appendix A), thus providing Scrutiny with an opportunity to contribute to this matter; and
- 2.2 The comments of the Overview & Scrutiny Committee form part of the reported feedback to Cabinet, at its meeting to be held on the 21st March 2022.

3. REASONS FOR RECOMMENDATIONS

- 3.1 The need for Cabinet to be aware of the comments and observations of the Overview & Scrutiny Committee prior to their consideration of the Council's Annual Equality Report, for the year 2020/21.

4. BACKGROUND INFORMATION

- 4.1 The Annual Equality Report has been developed to fulfil the Council's legal duties and obligations to report on its progress in delivering the General and Specific Equality Duties.

- 4.2 The report contains progress made in year 2020/21 in meeting the equality objectives contained in Council's Strategic Equality Plan
- 4.3 Members of the Overview & Scrutiny are being provided with the opportunity to undertake pre scrutiny on the Annual Equality Report in advance of Cabinet's consideration at its meeting on the 21st March 2022 and whether it agrees the publication of the Annual Equality Report 2020/21. Members will recall the identification of equality and diversity for greater scrutiny as part of scrutiny improvements identified in 2020.
- 4.4 In particular, Members may wish to consider whether the report has captured the relevant information required to fulfil the Council's legal duties and obligations to report on how it has met the General Equality Duty set out in the Equality Act 2010.

5. PRE SCRUTINY

- 5.1 Members are reminded that the purpose of pre scrutiny activity is to influence the decisions before they are made. The Council's Overview & Scrutiny continues to have the opportunity to explore and comment on a number of reports in advance of Cabinet's consideration to bring a different perspective to the decisions made and enabling Cabinet decisions to be more informed.
- 5.2 The Overview & Scrutiny Committee has a further opportunity to undertake pre scrutiny of the Annual Equality Report for the 2020/21 Municipal Year in advance of Cabinet on the 21st March 2022.

6. EQUALITY AND DIVERSITY IMPLICATIONS

- 6.1 Equality and diversity implications will be considered as part of the Overview & Scrutiny Committee's feedback and comments and any subsequent implementation arrangements.

7. CONSULTATION/INVOLVEMENT

- 7.1 The involvement of the Overview & Scrutiny Committee in the pre-scrutiny exercise will contribute to the quality and robustness of Cabinet decision-making

8. FINANCIAL AND RESOURCE IMPLICATIONS

- 8.1 Financial and resource implications will be considered as part of any feedback and subsequent implementation arrangements.

9. LINKS TO THE CORPORATE AND NATIONAL PRIORITIES AND THE WELLBEING OF FUTURE GENERATIONS ACT

9.1 Equality considerations feature throughout Corporate and National priorities and specifically the contents of the attached report contributes to a More Equal Wales and a Wales of Cohesive Communities.

10. CONCLUSION

10.1 The undertaking of pre scrutiny by the Overview & Scrutiny Committee in respect of the Council's Annual Equality Report, for the year 2020/21 strengthens accountability and assists Cabinet to assess whether progress made in year 2020/21 meets the equality objectives contained in Council's Strategic Equality Plan.

10.2 Any comments and feedback to the Cabinet will ensure that the Overview & Scrutiny Committee fully evaluates the effectiveness of its overview and scrutiny function.

LOCAL GOVERNMENT ACT 1972

as amended by

LOCAL GOVERNMENT (ACCESS TO INFORMATION) ACT 1985

RHONDDA CYNON TAF COUNTY BOROUGH COUNCIL

LIST OF BACKGROUND PAPERS:

OVERVIEW & SCRUTINY COMMITTEE

ANNUAL EQUALITY REPORT

28 February 2022

**REPORT OF THE SERVICE DIRECTOR DEMOCRATIC SERVICES &
COMMUNICATIONS**



Rhondda Cynon Taf Council

Annual Equality Report

1 April 2020 to 31 March 2021

This report is available in Welsh and can be made available in alternative formats and languages.

To make a request please telephone 01443 444529 or email equality@rctcbc.gov.uk

Contents

Page No.

1. Introduction	3
2. Who We Are	4
3. Reporting on Equality	4
4. The General Equality Duty	5
5. How We Meet The General Equality Duty	6
6. Equality Objectives	25
7. Equality Impact Assessments (EIA's)	62
8. Employment Monitoring Data	63
9. Procurement	64
10. Accessible Information	65
11. Future Work	65
12. Contact Details	65
APPENDIX 1	67
Employment Monitoring Data	67

1. Introduction

It gives me great pleasure to introduce the Council's Annual Equality Monitoring Report, which represents the Council's approach to providing information on its work in respect of equality and diversity.

The Council is required, under the Wales Specific Equality Duties, to report annually on how it has met the General Equality Duty set out in the Equality Act 2010, and this document contains the information required in order for the Council to meet these duties.

Publishing the information in one report covering all requirements will make it easier for interested parties to identify how the Council is delivering on its commitment to equality, its legal obligations and the action plans contained within its Strategic Equality Plan (SEP).

Each section of the report looks at the Council's progress and the final section contains details of future work the Council needs to do.

Once again Rhondda Cynon Taf County Borough Council has continued to make our County Borough a more equal place for people to live, work and access services, however we recognise that there are, and will continue to be, areas for improvement. Publishing this Annual Report will not only help the Council to meet its obligations under the Wales Specific Equality Duties, but will assist you, as citizens to identify these areas and monitor progress on them.

Councillor Maureen Webber
Deputy Leader / Cabinet Member for Council Business

2. Who We Are

Rhondda Cynon Taf Council covers a wide geographical area and has a population of over 241,264 people. The Council is the largest employer in the local area and the third largest local authority in Wales, over 80% of employees live within the Council boundaries.

The Council is committed to the principles of equality and diversity and we work to ensure that this is demonstrated in our service delivery and in our employment practices.

The Council reviewed its Corporate Plan in 2020. The Council's proposed priorities set out in the [Corporate Plan 2020-2024 'Making a Difference'](#) are:

- Ensuring **People**: are independent, healthy and successful;
- Creating **Places**: where people are proud to live, work and play;
- Enabling **Prosperity**: creating the opportunity for people and businesses to be innovative; be entrepreneurial; and fulfil their potential and prosper.

The Plan puts residents at the centre of what we do.

The Council is governed by 75 elected Members and operates a Cabinet system. It has a Senior Leadership Team headed by the Chief Executive and attended by Senior Directors, and employs over 10,000 employees in a variety of service areas and roles based within the following groups:

- Chief Executives
- Community & Children's Services
- Education & Inclusion Services
- Prosperity, Development & Frontline Services.

3. Reporting on Equality

The main purpose of this Annual Report is to fulfil the Council's legal duties and obligations to report on its progress in delivering the General and Specific Equality Duties.

The Public Sector Equality Duty requires that all public authorities covered under the specific duties in Wales should produce an Annual Equality Report by 31 March each year. This report covers the period 1 April 2020 to 31 March 2021.

What the regulations require:

The Annual Report for 2020-2021 must set out:

- The steps the authority has taken to identify and collect relevant information;
- How the authority has used this information in meeting the three aims of the general duty;
- Any reasons for not collecting relevant information;
- A statement on the effectiveness of the authority's arrangements for identifying and collecting relevant information;
- Specified employment information, including information on training and pay;
- Progress towards fulfilling each of the authority's equality objectives;
- A statement on the effectiveness of the steps that the authority has taken to fulfil each of its equality objectives.

4. The General Equality Duty

The Equality Act 2010 introduced a general duty on the Council (and other public sector organisations) when making decisions and delivering services to have due regard in how to:

- Eliminate discrimination, harassment, victimisation and any other conduct that is prohibited under the Act;
- Advance equality of opportunity between persons who share a relevant protected characteristic and persons who do not share it (protected characteristics are explained below);
- Foster good relations between persons who share a relevant protected characteristic and persons who do not share it.

Protected Characteristics

This is the term used in the Equality Act to identify the types of people who are more likely to experience detrimental treatment and/or discrimination simply because of who they are. The law is designed to protect them, they are:

- Age;
- Disability;
- Gender Reassignment;
- Marriage and Civil Partnership;

- Pregnancy and Maternity;
- Race;
- Religion or Belief;
- Sex;
- Sexual Orientation.

When thinking about how to advance equality of opportunity between persons who share a relevant protected characteristic and those who do not, the Council also has to think about the need to:

- Remove or minimise disadvantages suffered by persons who share a relevant protected characteristic and are connected to that characteristic;
- Meet the needs of persons who share a relevant protected characteristic that are different from the needs of persons who do not share it;
- Encourage persons who share a relevant protected characteristic to participate in public life or in any other activity in which participation by such persons is disproportionately low.

The Council also has to particularly think about how it will tackle prejudice and promote understanding. This report includes information on what the Council has done in order to meet the General Duty.

5. How We Meet The General Equality Duty

To demonstrate how the Council has met the General and Specific Duties relevant information is considered which may include data from local and/or internal sources such as customer surveys, community forums or Equality Impact Assessments (EIAs), as well as data from national and/or external sources such as census information, research reports and statistics on hate crime.

Identification and Collection of Relevant Information

When considering how to identify what information should be included in this report, the Council first looked at the information it considered when reviewing its SEP. This allowed the Council to reflect and monitor whether the information is still appropriate in assisting the Council to deliver on the General and Specific Duties.

When reviewing the Equality Objectives we looked at monitoring reports and emerging issues and trends from the previous Annual Equality Reports to identify whether the objectives were still relevant.

Full details can be found in the SEP which can be accessed on the Council website at: [Strategic Equality Plan | Rhondda Cynon Taf County Borough Council](#)

The information identified is still very relevant to the delivery of the General and Specific Duties; internal documents provide statistical information that can be used for determining action and enable comparison to identify improvements or areas for further improvement. Internal strategies and their action plans provide information on how the Council is delivering its priorities.

External information, including that with a national context, provides the Council with a raft of data that can assist in developing appropriate and relevant policies and approaches.

The Council recognises that the SEP is not the only area that can identify relevant information and that whilst it is very useful, service areas would also hold information that could assist the Council in identifying how it is meeting the General and Specific Duties. To collect this information a survey was undertaken to obtain relevant information from service areas.

The Council has an EIA process in place, the results of which contribute to the information contained within this report.

Employment monitoring data as provided from the Council's HR system 'Vision' and the e-recruitment system have also been included as part of the relevant information. It should be noted that employment monitoring information includes teachers and all school-based employees.

The Council's Performance

The Council's main strategic plan is the [Corporate Plan 'Making a Difference'](#). This Plan was implemented in March 2020 and sets out the Council's priorities for the 4 years between 2020-2024. The detailed actions to deliver these priorities are monitored and scrutinised by Councillors every quarter as part of the [Council's Performance Reports](#) to Cabinet. At the end of the year, the plans are also subject to more in depth challenge, review and evaluation, the results of which are then included in the Council's annual [Corporate Performance Report](#).

Non Collection and Effectiveness of Information

Whilst considerable relevant information has been collected for this report, it is acknowledged that it is sometimes difficult to collect and monitor all information in a Council as large as Rhondda Cynon Taf. A number of cross-Council networks already exist, such as the Disability Officers Group, to ensure that information and good practice

are monitored and shared, however it is recognised that improvements can always be made to encourage a consistent approach in information sharing.

Use of Information

When considering what information should be used it was important that areas of good practice were identified across service areas to demonstrate that a commitment to delivering equality exists throughout the Council.

Information used in this report includes:

- The Council's Corporate Plan (2020-2024)
- Service delivery/projects (2020-2021)
- Employment practices
- Consultation and engagement programme
- EIAs (2020-2021)
- Employment monitoring information (2020-2021)
- Monitoring and delivery of the SEP action plan (2020-2021).

Equality Information from Service Areas

Many service areas have examples of good practice which help the Council meet the Public Sector Equality Duties. The information is normally obtained through our internal performance management systems. This section highlights a snapshot of some of the good practice examples that the Council has in place to demonstrate our compliance and commitment to the Public Sector Equality Duties.

Children's Services

Following an independent review, inspection and staff consultation a revised model of supporting disabled children and their families was put in place and changes made to the staffing structure to facilitate delivery. All referrals for disabled children now follow the same process as any other referral into Children's Services and a specialist Social Worker is in place to carry out an assessment as required. This role is bringing consistency to decision making.

In other operational business:

- Translators are obtained to support families where English is not the first language.

- Meetings with family members are held in accessible locations and public transport links are taken into account.
- A Prevention Payment Policy (previously s.17) makes financial support available to prevent need and risk escalating due to resources.
- An employment scheme is in place to support care leavers into work.

Community Services

Community Services deliver a wide range of provision that focusses on people with disabilities, people who are vulnerable because of a range of issues or who are affected by poverty.

During the pandemic, once lockdown was initiated, services focused on ensuring that people in the following groups were prioritised for support:

- Individuals on the Shielded Patients List (SPL) now referred to as Clinically Extremely Vulnerable List (CEV)
- Non-shielding vulnerable individuals who were not on the SPL.

Individuals on the SPL were contacted individually, (the majority by phone, a small number by letter when no phone details were available) and their needs assessed. This included identifying whether they were eligible for a Welsh Government free food parcel, whether they had special dietary requirements (in which case they would be supported through the newly established Food Distribution Centre (FDC)), whether they were lonely or fearful and would like a weekly friendly phone call, whether they needed support to do their shopping/pick up prescriptions.

NHS Shielded/Clinically Extremely Vulnerable Patients

2020 - 2021	Children's records	Adult's records	Total
Shielding Period to August 15 th	435	11,203	11,638
31 March 2021	129	11,581	11,710

Non-shielding vulnerable individuals were able to contact the Council's Contact Centre by phone or complete an online form (or ask a third party to complete it on their behalf) and their request would be transferred to the relevant Hub Co-ordinator in their local area. Written information, developed to communicate with individuals was provided in easy read format for those who required it. A significant number of staff across Community Services have undertaken training on Easy Read formats.

For people on the SPL who received Welsh Government food parcels, an administrative process was adopted that ensured that if a parcel was delivered to an address and there was no response, the information was uploaded on to a database and the RCT Together Team contacted that person to ensure that they were well. If there was no response after 3 telephone calls a Community Response Volunteer was sent to the address to check on the status of the individual. 700 of these checks were undertaken by volunteers during lockdown.

Special arrangements were made locally for people who had mobility issues or dietary requirements that were not accommodated by the Welsh Government provision. These were dealt with by the FDC staff, who (using appropriate PPE) carried the food parcels into a person's home if they were unable to do so themselves and provided bespoke parcels for people with a wide range of dietary requirements due to allergies or religious requirements.

Residents are still able to request emergency food parcels with 64 parcels being delivered during this financial year to vulnerable residents, including those fleeing domestic violence.

Community Services have been working very closely with Citizens Advice (CA) and partners to promote the support available for Universal Credit (UC) claimants as the UK Government has removed the uplift provided to UC customers throughout the pandemic. This has included information on social media and the Council website, dissemination of information to all Council staff and distribution across a wide range of partner networks. In addition to the offer of welfare checks and debt advice from CA, the Adult Education service has developed free budgeting courses for those who need this support.

More generally, Community Services offer a range of support as part of their provision that focusses on improving the lives of those who are disadvantaged through ill-health, disability, economic circumstances as follows:

- All library staff have undertaken Dementia Friendly training and every library has a Dementia Champion.
- Library Managers have undergone Neurodiversity training so that they have a better understanding of how to support people with neuro difference.
- An expanded range of large print books, e-books and e-audiobooks ensure that materials are available for all sections of the community – there are also some braille materials and a facility where people can identify which books they would like to access in braille, and these can then be ordered.
- The Library Service actively supports local and national initiatives designed to promote inclusiveness and diversity, for example promoting books by Black and Minority Ethnic authors.

- The @home library service continued to provide access to reading and audio materials to people who were unable to access their local library due to temporary or permanent illness or frailty or who desperately required books for their mental health during the lockdown. This service continues as normal but with an increased number of residents registered for the service now.
- The Community Development Team have advocated for and facilitated the installation of adult changing places facilities in community hubs and other community venues. 5 Adult changing places have been sited within Community Resilience Hubs and community buildings.
- Community Development and Adult Social Care have collaborated with community groups to develop volunteering placements for people with a learning disability (8 are engaged currently).
- Specific provision was developed by the Adult Education Team for people with moderate to severe learning disabilities and this was maintained throughout 2020 for those who were happy to engage in online provision.
- Employment support provision continued albeit at a reduced rate up to July 2020 and since then the team have continued to have success in supporting people into work. 17% of the people supported into employment in 2020/21 have either a disability or a self-declared work limiting health condition.
- Employment support provision has been actively engaged in the Transformation programme for people with learning disabilities and will form part of a working group looking at work placement and employment opportunities for identified day centre clients.
- Communities for Work Plus managers are designated disability leads and attend Welsh Government Disability Network meetings and Employment Support staff teams have attended several training sessions.

Community Safety and Community Housing

Both core and grant funded services are available to our most vulnerable individuals, communities, and others most impacted by the effects of the COVID-19 pandemic. Housing Support Grant funded services cover those experiencing homelessness, rough sleepers, mental ill health, substance misuse, young people including those leaving care, domestic abuse. Additional support services such as Housing First have been commissioned to provide tenancy and outreach support services to individuals with complex needs.

The Homefinder Team have worked closely with the Diversity and Inclusion Team for advice and support on appropriate wording and use of language for those who wish to make an application for housing for applicants whose personal identity does not

correspond with their birth sex. Ongoing work is being undertaken with the Diversity and Inclusion Team for applicants seeking housing who have a disability.

We also work closely with the Cwm Taf Morgannwg Safeguarding Board and are members of their various sub-groups and participate in Client Strategy Meetings and Domestic Homicide Reviews.

The Cwm Taf Morgannwg Health Board Substance Misuse Lead and the Head of Community Safety and Community Housing are both members of the Co-occurring Steering Group led by Health. This will further explore how the most vulnerable members of our community with both a substance misuse and mental health need can be offered a single point of contact approach to seek the help they need.

The Oasis Centre service provision is available for both male and female individuals who are or have experienced domestic abuse. Women's Aid RCT are also commissioned to provide a housing related service to anyone in need of domestic abuse support in their own home.

The service area is also involved with the Serious Neglect Panel (SNPP) and the local multi-agency working arrangements agreed by the Cwm Taf Safeguarding Board to provide an escalation process for managing cases of serious self-neglect linked with vulnerable individuals. The SNPP will be chaired by the Local Authority area Adult Safeguarding Manager. The Vice Chair will be the Head of Community Safety and Community Housing.

The Community Safety Team place a large emphasis on supporting vulnerable and repeat victims of anti-social behaviour. They identify these victims at the earliest opportunity and put safeguarding measures in place to support the victim.

The Community Safety Team continue to work with families engaged in the Global Resettlement Programme. We also play a pivotal role in assisting dispersal areas and engaging in the Home Office Widening Asylum Dispersal Scheme.

We have also positively engaged at a strategic level with the Wales Strategic Migration Partnership (WSMP) and are a member of, and attend the WSMP Executive Board which covers many aspects of our wider immigration role and work for vulnerable migrants.

Community Well-being and Resilience Service (CWRS)

The primary driver for CWRS is the removal of barriers for children, young people and families to access the right support, at the right time, in the right place, and in doing so ensure that service provision is equitable and accessible for our most vulnerable residents. Equality, diversity and inclusion (EDI) is a fundamental pillar and principle across the service and all aspects of our work is focused on effective targeting of service

delivery and service improvements to reduce inequalities. This has enabled the service to respond quickly and efficiently to the needs of vulnerable individuals and families in light of the pandemic and tailor support according to differing needs.

Our Early Years Transformation work this year has delivered on our commitment to remove the two-tiered system in RCT as a result of the geographical limitations of the Flying Start Programme and already there is evidence that children and families who would not normally have been eligible for support are accessing and benefiting from this service change delivered by CWRS.

The Youth Engagement and Participation Service (YEPS) has a Youth Engagement Officer who is able to offer specialist support and advice to young people who are LGBT+. This specialist support includes working with young people who are transitioning, their families and schools to ensure that bespoke and robust plans are in place to provide practical and emotional support throughout the process of transition. The LGBT+ Youth Forum has also been relaunched this year.

In 2021 the Resilient Family Service (RFS) commissioned training to help support families marginalised by their status and to give staff the confidence and knowledge to better support families affected by this. Specifically, to provide RFS staff training to support participants to explore the needs of various groups of migrants and ensure a consistent response to their needs. It also aimed to support practitioners to work confidently when individuals are subject to the 'No Recourse to Public Funds' regime and to understand what services are able to support them when working with various groups of migrants. This will support the work RFS does with refugee and asylum seeker families in RCT.

RFS regularly link in with Umbrella Cymru to help support LGBTQ+ young people and their families and all RFS staff have completed training with Umbrella Cymru to assist in their knowledge base on all LGBTQ+ issues so that any RFS intervention provided is relevant, meaningful and inclusive.

Staff are encouraged to participate in staff networks and EDI sessions arranged by the Diversity and Inclusion Team. Advice on disability issues facing staff within the service has been sought from HR, working alongside the Diversity and Inclusion Team.

Travel training is delivered by YEPS Post-16 Team for young people in need of assistance with road safety awareness and knowledge of how to travel by public transport. Travel training is particularly beneficial to individuals who have Additional Learning Needs (ALN) who are often transported by arranged taxi until they leave school. Access to further education, work placements, training and other life opportunities can then become very daunting because they have no prior experience in preparing and planning journeys independently. Many will be unfamiliar with where to find the information or advice or even the skills to make journeys themselves. Whilst this work has been on hold during the pandemic, YEPS are in the process of restarting the

programme of training it delivers in partnership with the Council's Integrated Transport Unit.

A new youth forum subgroup has been established, Equality and Inclusion, at the request of young people in the County Youth Forum. The work of this group will feed into both the County Youth Forum, school councils and into the service improvement cycle of the YEP service. To date, the subgroup has undertaken a survey with young people via social media platforms, asking for their opinions on what is needed to make RCT a more inclusive county for LGBTQ+ young people. These results will influence the work-plan of the group.

Preventing youth homelessness continues to be a priority for the service, and whilst the number of young people presenting as homeless has reduced over the past year, it is likely that there are many young people who do not have a permanent residence and are temporarily living with other family members or friends. The service continues to develop its universal interventions to reduce the risk of homelessness, like awareness sessions and education programmes to improve life skills. These are delivered both in schools and youth clubs. The service has also piloted a project with Llamau called Upstream Cymru, to identify those most at risk of becoming homeless in the future. It was piloted in two secondary schools (Mountain Ash and Aberdare) with one year group in each. Pupils completed a survey comprising of questions regarding contributing factors to homelessness (well-being, resilience, bullying, family/home life, education achievement). The results helped to identify those most at risk of becoming homeless in the future and these were referred to Llamau workers based in the two schools (or virtual referrals during lockdown). The workers strived to build resilience and improve the family relationship with the aim of maintaining the placement in the family home. The learning from this pilot project has been used to develop a youth homelessness vulnerability profiling tool that can be rolled out to all schools in 2022. Once identified, YEPS will provide a series of young person centred and family interventions to improve relationships that allow the young person to remain within the family home. The level of demand for this intervention will be closely monitored and if required the potential for funding to provide additional resources will be explored.

YEPS has 5 Specialist Youth Workers to provide targeted and open access interventions focused on mental/emotional health and well-being. These Mental Health and Well-being Officers provide direct mentoring, support, information and guidance relating to health and well-being to young people as well as:

- Generate opportunities and services that are informed by mental health and well-being principles;
- Increase opportunities for support and progression for young people within localities;

- Improve the awareness of health and well-being needs amongst young people and professionals across RCT;
- Provide advice and guidance to other professionals, enabling them to better meet the needs of the young people they support.

This team has developed collaborations with private sector businesses to provide targeted support to vulnerable hard to reach groups identified following data analysis. An example of this is the weekly men's mental health and well-being drop-in sessions held in The National Cut Hut Barbers in Aberdare for young men aged 18-25 in response to high rates of attempted suicide and drug use in the locality. As with new ventures of this sort, initial uptake has been slow but both YEPS and The National Cut Hut Barbers are committed to establishing the service.

Care2Play is available for children and young people aged 5-25 years who require assistance, as a result of their personal or family circumstances, to access and/or engage in play opportunities and youth activities. The ethos of the service is to ensure that all children and young people have access to opportunities that are appropriate to their needs and wherever possible are delivered as part of mainstream universal provision. Over the period of the pandemic whilst universal play opportunities ceased, this service, with the support of commissioned providers, has continued to deliver targeted weekly play opportunities to over 300 of the most vulnerable children in RCT referred to the service by Children's Services, Disabled Children's Team and RFS. This service has provided invaluable support to children and families most affected by the removal of preventative support as a result of COVID-19 restrictions. It has played a key role in preventing family breakdown for children on the Child Protection Register and disabled children with care and support needs as well as maintaining the low step up rates from RFS to statutory teams during this time.

Well-being packs were created and distributed by YEPS during lockdown, aimed at helping young people with additional learning needs or in need of well-being support. The packs provided positive activities, advice on mindfulness and de-stressing techniques, as well as key contact information for them to use when in lockdown. Packs have been sent out to over 200 young people struggling with the social restrictions and included:

- Life journals
- Affirmation cards
- Art pads
- Colouring pens
- Stress ball
- Chatter box – providing daily tips on supporting well-being.

Feedback has been positive, and the life journals will become a legacy of the pandemic, to be used with future referrals as appropriate.

We have begun work on the Play Sufficiency Assessment (PSA), that is due to be submitted early 2022, part of which is to ensure that parks, playgrounds and other outdoor play settings are accessible to as many residents as possible. This includes wheelchair access to enter the parks and to access the play equipment. Funding for this is underpinned by the equality of access to services for all, including addressing barriers facing particular groups of people. The creation of a single point of access via the Resilient Families Service has facilitated equity of access to service delivery, enabling services to be responsive to any needs identified. Our vision of delivering the right services, to the right people, at the right time, in the right place, supports the delivery of equitable and easily accessible needs based services. Addressing, and where possible, removing barriers to access and engagement for particular groups, including, but not limited to, those with protected characteristics, is an ongoing priority. An Equality Impact Assessment was undertaken for the original 2019/20 CCG grant application and remains applicable.

Appropriate information sharing has continued to ensure appropriate packages of support are in place for those who remain vulnerable as a result of the pandemic.

Prioritising vulnerable children (including disabled children) for play provision continues to provide support for the child and wider family to prevent family breakdown and escalation of need, whilst also enabling services to maintain a level of contact with children and young people known to be at risk.

Services continue to use innovative solutions to remove barriers to access and engagement, including the use of digital solutions.

The Parenting through COVID-19 public survey identified barriers to accessing informal parenting support faced by families. The recommissioning of parenting support provision has been undertaken to address this in the longer term. Newly commissioned services include the provision of a virtual parenting offer as well as face-to-face informal parenting support (with clear pathways to accessing more formal or specialist support) delivered in local community settings available in the evenings as well as during the day.

The Funding Flexibilities Team regularly review commissioned services to ensure they are fit for purpose, deliver value for money and ensure that they continue to meet the needs of the community. Findings from consultations and reviews are then used to inform future commissioning decisions. The regular review of services provides an opportunity for a more co-ordinated approach to planning and service delivery with the aim of maximising resources and improving outcomes whilst ensuring better value for money and improved equal access for all service users.

Corporate Estates

The Director of Corporate Estates is the Council's senior lead for the Disability and Carers Staff Network. The role involves regular contact with the staff network and provision of advice and taking forward initiatives to the Senior Leadership Team for consideration.

Many Council public buildings are accessible and reasonable adaptations have been undertaken where practicable and reasonable to ensure services are accessible to all.

The Corporate Maintenance section have been involved with a number of projects which have incorporated Changing Places facilities, such as Dare Valley Country Park shower block extension, Ynysangharad Park Lido/Café and The Hwbs at Mountain Ash and Ferndale.

Democratic Services

Democratic Services have a key role in promoting equality, diversity and inclusion which includes:

- Promoting Equality Impact Assessments (EIAs) with Cabinet reports;
- Working in partnership with the Diversity and Inclusion Manager on the work undertaken in respect of diversity in democracy;
- Assisting in the creation and formation of the newly introduced Impact Assessment Review Panels which looks to strengthen impact assessments for the benefit of the community and its residents. This had included amending the Cabinet and committee reporting style to reflect the introduction of the Socio-economic Duty as well as the Welsh Language Standards;
- The work of the Diversity in Democracy Working Group and the Council's support of the diversity declaration to encourage a more diverse Council;
- The production of a draft Memorandum of Understanding which supports an intended outcome of demonstrating a mutual respect to other people with varying political opinions and a show of working together for the benefit of its communities, following the work of the Diversity in Democracy Working Group;
- Changes taken forward in the Council Chamber ensuring improvements to accessibility including dropping the kerb outside the Chamber and ramps to the top table within the Chamber.

Education & Inclusion Service

Support for Vulnerable Learners

During lockdown periods, close working relationships with Children’s Services allowed us to provide hub placements for vulnerable pupils, with daily attendance monitoring to ensure support could be implemented as swiftly as possible where families were not taking up placements.

Education and Children’s Services worked collaboratively to implement a Vulnerable Learner Protocol to ensure that the most vulnerable learners and families received a high level of contact in terms of safeguarding, well-being and continuity of learning. The Vulnerable Learner Protocol was used for the school closure period and the 3-week phased return to schools at the end of the summer period.

During the COVID-19 period of school closure 22,138 contacts were made with 1,970 individuals. Following implementation of the Vulnerable Learner Protocol (between 1st May and the end of the summer term), 132 referrals were made to the Attendance and Well-being Service (AWS) for collaborative action, of which 124 were successfully contacted by RCT officers with 8 resulting in 101 police welfare checks. An additional 4 pupils during this time were reported as ‘Children Missing Education’ with successful contact established.

This work informed changes to service delivery implemented during the autumn term 2020/21 for continued collaboration and improved data sharing between Council services and schools. This included regular Well-being Response visits by AWS (all settings on a rota every 3 days) and emergency visits for child protection pupils not sighted for 24 hours. This led to over 10,000 visits in the academic year, with referrals being made from these visits to counselling support, Youth Engagement and Participation Service and Resilient Families Services as part of the Integrated Well-being Pathway.

Data for vulnerable groups are now routinely provided by Education and Children’s Services and suggests that there has not been a significant growth in the number of vulnerable learners.

Month	Care and Support Plan	Children Looked After	Child Protection	Young Carer	Statemented
Jun 20	651	398	295	112	1262
Sep 20	661	403	272	117	1263
Jan 21	648	406	290	114	1320

Pupils with Complex Health and Medical Needs

During the pandemic the Access and Inclusion Service (A&IS) held termly meetings with Cwm Taf Morgannwg Health Board to discuss pupils with significant medical and health needs to ensure they were able to access school safely. Reasonable adjustments with enhanced risk assessments were put in place ensuring that pupils with the most complex medical needs were able to access specialist provision.

Specialist advice was provided to schools to write individual risk assessments for pupils with complex health and medical needs. Exemplar risk assessments were drafted for primary and secondary school settings to support their development. Operational guidance for schools is routinely updated to ensure this adequately reflects the current position for the most vulnerable learners.

Safeguarding

The Safeguarding Policy for schools is updated annually and is approved by the Safeguarding Board. Operation Encompass continues to provide early notification to schools of domestic violence incidents in the children's family homes to promote effective support and intervention.

Barriers to Attendance

We were aware from the attendance during summer term 2019/20 that absence figures would rise significantly due to the pandemic and without statutory instruments (prosecutions/fixed penalty notices for non-school attendance), that the AWS approach needed to change. The Education Psychology Service (EPS) undertook training with Headteachers and AWS staff in the summer term 2020 to assess the impact of COVID-19 on families and staff and how to approach support for families. This learning has helped schools and AWS to support families in re-engaging with school.

Staff have also been encouraged to focus on the positives for education and determine where needs and gaps exist within the resources of families to ensure barriers to attendance are removed.

Well-being Response visits as part of an Integrated Well-being Pathway with Children's Services were introduced in September 2020, providing an increased presence in communities to reassure parents of the measures settings have taken, to make them safe. The Integrated Well-being Pathway works in conjunction with YEPS, RFS, EPS and Eye 2 Eye Counselling Services and continues to operate into the 2021/22 academic year. Schools can refer to AWS for Well-being Response visits which involve a door-knocking service to families where learners are absent. Schools are prioritising vulnerable children for these visits alongside the support they are already offering. All settings were part of a 3-day rota for Well-being Response Visits to ascertain well-being needs and ensure effective safeguarding of pupils and their families as well as

encouraging learners to re-engage in education. During the last academic year, over 10,000 visits were made to ensure effective safeguarding and pupil/family support was in place.

AWS has operated Phase 1 of a revised service delivery model to enhance direct contact with families in need of support due to anxiety about returning to school. This approach is incorporating the YEPS pre-counselling support initiative as part of a collaborative approach to supporting learner well-being along an Integrated Well-being Pathway. In spring term 2021, a survey was undertaken with schools, 111 of 115 schools responded. 82% rated the current quality of AWS as either 'Good' or 'Very Good' with 91% stating they believe the current way of working had improved relationships with AWS; 86% stating the AWS process had helped sight vulnerable pupils who were not attending; and 72% believing the process had increased parental engagement.

Support for Well-being

The 2020/21 Well-being Action Plan, which was supported by a Welsh Government (WG) grant of £120,755 has been implemented and evaluated, demonstrating a positive impact upon building the capacity of schools to meet the emotional and mental health and well-being needs of learners.

The Educational Psychology Service and Children's Services have undertaken training in the trauma recovery model to provide enhanced case management approaches to support professionals to respond to our most vulnerable Children Looked After (CLA) pupils. Children's Services are monitoring the impact of this approach through the residential children's homes, and this will inform future practice.

Temporary Assistant Educational Psychologists provided additional support to pupils/families in Ty Gwyn in relation to well-being within a trauma informed approach. They supported the strategic development of therapeutic approaches within the Pupil Referral Unit (PRU). All staff within the PRU have now undertaken training in Trauma Informed Approaches, with 4 undertaking diploma training.

A range of courses including emotion coaching training, mental health and well-being training has been delivered across our schools.

A number of multi-agency working groups have been established including Black, Asian and Minority Ethnic, LGBTQ+ and Parents, Pupils, Staff Well-being Group for schools.

Data for exclusions and bullying as a result of racial incidents

Data for exclusions and bullying as a result of racial incidents shows that there were no permanent exclusions due to racial incidents over the last 3 academic years. However,

data relating to fixed term exclusions and bullying incidents demonstrates an increase in the percentage of racial incidents between 2018/19 and 2020/21.

Year	Racial Incidents			
	Fixed Term Exclusions	Percentage of Exclusions	Incidents of Bullying	Percentage of Bullying
2018/2019	20	0.74	20	5.33
2019/2020	10	0.67	4	2.94
2020/2021	20	1.40	9	7.20

The established Black, Asian and Minority Ethnic working group have conducted qualitative research into the lived experiences of Black pupils in RCT aged 13-18. This has identified key themes and priorities for us regarding racial equality in our schools.

Ongoing work is taking place with Stonewall Cymru relating to LGBTQ + awareness and support for schools. This work is now supported by an Assistant Educational Psychologist and will be evaluated to identify future priorities.

An EPS helpline was established during the pandemic. Following the positive feedback from schools, partners and parents, the EPS telephone line continues to form a central part of the EPS Service Delivery Model with 88 calls taking place between September and November 2021.

Special Educational Needs (SEN) Provision

We have invested in support for learners with significant social, emotional and behavioural needs. In addition to our provision in our special schools and PRUs, provision has been established in 10 secondary/through schools for Key stage 3/4 pupils.

We have modified our service delivery to maintain our statutory duties in relation to SEN, including virtual Annual Reviews and Access & Inclusion Panels. Effective liaison between Headteachers and Learner Support Service ensured continuous review of staffing capacity in Learner Support Classes (LSCs). No LSCs have been forced to close due to issues with staffing capacity throughout COVID-19 restrictions and staff were effectively deployed during lockdown.

To ensure families that have a child with a disability or additional support needs can fully benefit from family support interventions the RFS has a dedicated Children with Additional Needs Service (CANS). The service aims to improve their resilience levels with a focus on supporting families where the physical, learning or neurodevelopmental needs of a child within the family is impacting on family life to better understand any additional support needs and improve the relationships within the family. Without the constraints of threshold criteria the CANS Team are able to ensure those families most in

need are appropriately supported. The CANS Team supported 284 families during 2020/21.

Legal Services

Our Elections Team have worked to engage newly enfranchised voters (16–17 year olds) through promotion of a social media campaign and ongoing initiatives as part of Welsh Government's electoral reform agenda.

Prosperity and Development

The Housing Strategy and Investment Team ensures that the service they provide is inclusive, equal and fair for all service users.

All grant application processes are offered online however the service also worked with the Council's Diversity and Inclusion Team during 2020/21 in order to improve the online grant application process, ensuring that service users who require reasonable adjustments in order to complete the online application can access this support.

Disabled Facilities Grant (DFG) Feedback

The Housing Grants Department have engaged with 669 clients during 2020/21 in order to gain their views on the Disabled Facilities Grant they received from the Council. The following responses were collated from the applicants following the adaptations made to their home:

- 96% of applicants agreed that they were able to do things they couldn't before and feel more confident and independent;
- 97% of applicants agreed that after the adaptation was completed, it is now easier for their family/Carer to help with their daily needs;
- 99% of applicants agreed that their quality of life had improved;
- 98% of applicants were satisfied with the adaptation they had received.

Overall, the feedback received from applicants is very positive regarding the adaptations they received through the grant. The way in which this information is collated is currently through telephone calls however the service is reviewing this method and will be piloting an online feedback form in 2021/22 (however surveys over the telephone can still be made if required).

Wales Interpretation and Translation Service

The Council is a partner in the Wales Interpretation and Translation Service (WITS) and has a Service Level Agreement (SLA) for delivery of the service provided via the City of Cardiff Council. During 2020/21 there were 249 bookings made through the service using 28 languages and BSL interpreters.

The five most requested languages during 2020/21 were Arabic, Romanian, Mandarin, Urdu and Polish.

Delivery of Council Strategies

The Council consults and engages with its residents to collect information that is used to plan and prioritise, identify areas for improvement and service change, set and monitor performance standards and measure satisfaction on the quality of the services we provide.

The ongoing COVID-19 pandemic has brought challenges for public engagement and consultation. In Rhondda Cynon Taf we have developed a very successful face-to-face approach with residents and other stakeholders in recent years and we have had to develop a 'digital by default' approach in 2020 which continued into 2021. Face-to-face engagement with residents has been limited but we are hoping to bring back this approach going forward.

The approach we have used in 2021 continued the positive work by ensuring that all residents and service users had every opportunity to provide feedback. The 2021/22 budget consultation, for example used a 'digital by default' approach, whilst continuing to consider hard to reach groups, those having reduced or no access to the internet and those who prefer to engage through traditional methods.

In 2021 we introduced our Let's Talk RCT engagement website [Let's Talk RCTCBC](#). The site has a suite of engagement tools that has enhanced our offer and made our engagements more user friendly.

We started a conversation on Climate Change by setting up [Let's Talk Climate Change RCT | Let's Talk RCTCBC](#) and used a wide variety of tools to engage with members of the public including a survey, ideas, stories, quick polls and places (mapping tool). The new Let's Talk Engagement website supports the work of the Climate Change Steering Group and the results of this engagement have informed the Council's Climate Change Strategy.

Since introducing the website in 2021, we have engaged on a variety of projects including:

- Let's Talk Local Development Plan
- Let's Talk Welsh Language
- Let's Talk Armed Forces
- Let's Talk Wildflowers
- Let's Talk Electric Vehicle Charging
- Let's Talk Climate Change RCT.

During 2021, we supported or managed 66 engagement activities/consultations and supported a number of Budget and Climate Change face-to-face engagement events.

In 2021/22 the team will support the revised Impact Assessment process with the appointment of a new Community Data Analyst Officer, linking with the data requirements of equality and Welsh language impact assessments. The role also allows for the interpretation of statistical evidence to support services across the Council in their decision making.

Examples of how residents and communities have been involved in the Council's work in 2021 include:

- Engaging with over 1,000 residents on our budget consultation;
- Engaging with Schools and young people via Instagram;
- Consultation on a Welsh Language Strategy, where we held 3 public face-to-face engagement events in Libraries across Rhondda Cynon Taf. Members of the public were able to share their views on how to support the Welsh Language and suggest any additions or general comments;
- Continued engagement and involvement with residents and communities in matters that affect them so that their voices are heard in Council decisions;
- We supported Schools Consultations;
- Continued engagement with the Older People's Advisory Group about issues that could support their ability to get out and about. We have a joint SLA agreement with Age Connects Morgannwg and OPAG to support and engage with older people in RCT. During the pandemic this allowed older people to keep in touch with members through regular newsletters and information provision;
- We have linked in with the Council's Disability Forum in discussions and ongoing surveys;
- Considered a review of our Citizens' Panel and linking in with the Let's Talk Site to manage and promote consultations with registered users;
- We provided a freepost and telephone option for those who cannot engage digitally, in addition to our face-to-face approach;

- We linked in with other services whilst undertaking our face-to-face events, from joining up consultations, to providing waste bags and advice and information;
- We have continued to use online and social media engagement as one of our methods to obtain resident views and promote consultations.

All consultation and engagement documents are available in the Welsh language. We have an excellent working relationship with the Council's Welsh Language department as we translate the vast majority of the work we undertake. We also assist the Welsh Language department with their own consultations. The department continues to support staff members who want to learn Welsh to help them converse with Welsh speakers at the various engagements we deliver.

We have introduced a new question to be used in surveys, to assess the impact that any change will have on the Welsh language or Welsh speakers, which is in line with the requirements of the Welsh Language Act.

At all consultations that we undertake we attempt to engage with the widest range of people that we can. We aim to capture the views of all groups that live within the borough and aim to represent all their opinions and concerns. We have introduced a new question for service change consultations that allows the Council to assess the impact of any changes on a number of protected characteristics. We have also introduced Easy Read versions of all service change consultations, working with Learning Disability Wales.

6. Equality Objectives

In 2019 we launched our Strategic Equality Plan (2019-2022). To aid the development of appropriate and relevant equality objectives the Equality and Human Rights Commission report 'How Fair is Wales 2018' was the main reference source. Equality objectives were aligned to well-being goals contained in the Well-being of Future Generations (Wales) Act 2015, specifically a 'More Equal Wales' and a 'Wales of Cohesive Communities'.

A comprehensive engagement process was undertaken with the public and targeted engagement was undertaken with community groups that reflect the 'protected characteristics' contained within the Equality Act 2010. The full engagement report can be found [here](#).

From this engagement and consultation with a number of Council service areas the following equality objectives were identified and published in the [Strategic Equality Plan 2019-2022](#). The equality objectives are:

- Objective 1 To better understand the needs of our communities and understand the barriers they face to thrive;
- Objective 2 To reduce inequalities that exist within our communities;

- Objective 3 To promote safe communities;
- Objective 4 To reduce the gender pay gap;
- Objective 5 To create an inclusive workforce.

An action plan has been developed outlining specific actions in relation to each equality objective. These actions will be monitored through service area delivery plans.

Outlined below, we show our progress towards the equality objectives. It should be noted that not all actions were due to commence in the financial year 2019/20 and these will be progressed in following years.

Objective 1 – To better understand the needs of our communities and understand the barriers they face to thrive

Within this equality objective there are a number of areas that require action. The progress towards these actions are outlined below.

Action 1 - Identify community groups that represent the full diversity of the citizens of Rhondda Cynon Taf and develop accessible communication channels with them.

The Council has many well established links with community groups across RCT, for example, youth forums, Older People’s Advisory Groups and the Disability Forum. The focus of this action is to engage with under-represented minority groups and individuals that have not had regular communication routes with the Council.

Community Groups

The Community Cohesion Team continued to work closely with Valleys Ethnic Minority Support, whose members come from many different countries and have a wide ethnic diversity. The group works to overcome barriers to accessing local services, training and employment. Unfortunately, many groups stopped meeting during the pandemic, while others continued to do so virtually where possible. Many attempts were made to contact Project Unity (support for those who identify as LGBTQ+) for example, but we later found out that the charity had ceased operating during the pandemic. Unfortunately this was a common theme amongst many community groups during this time. The Cohesion Team continued to work with the Older People’s Advisory Groups to better understand the barriers that they face.

Disability Forum

It has been a challenge to hold fully accessible meetings with members of the Disability Forum during the pandemic due to members being digitally excluded and/or the

suitability of digital platforms. Telephone contact has been maintained with all members to discuss any concerns they have and to discuss their well-being.

European Union Settlement Scheme (EUSS)

During the initial pandemic (lockdown of March - late July 2020) Council officers could only signpost local residents wishing to apply for pre-settled or settled status to the EUSS via phone calls. After the lifting of restrictions the Community Cohesion Officer attended licenced premises in RCT with Council Licencing Officers to re-enforce the message to any EU nationals that they still had time to apply to the scheme up until 31 December 2020. Out of the 19 premises visited, all the staff had already been granted status or were in the process of applying. Throughout October and November 2020, the Community Cohesion Officer worked closely with Citizens Advice Newport to identify work places that may still have employees needing to apply. In early December 2020 information was provided to Cwm Taf Morgannwg Health Board advising of employees who still needed to apply to remain in the UK after the Brexit deadline.

Safeguarding Week

The Community Cohesion Team assisted South Wales Police in Operation BETSY across Cwm Taf, which was part of the Keep Safe Cymru Card Scheme. The aim of the operation was to identify people who may be vulnerable due to memory loss and who may not be known to services so may not be receiving adequate care and support. This involved visiting town centres to engage with the public in trying to gather intelligence in relation to the above. We were able to gather details from a substantial amount of people. We can now arrange for them to be visited by local PCSO's and provide them with information in relation to crime prevention.

Town Centre Engagement

Community Cohesion Officers and South Wales Police officers engaged with the general public in town centres throughout National Hate Crime Awareness Week. Officers encouraged conversations with the public and information packs were put together and distributed to provide education and information on Hate Crime, reporting routes and support services available.

Veterans

We have continued to develop our engagement with veterans across the borough. After successfully gaining funding from the Armed Forces Covenant we launched the Veteran Advice Service across Cwm Taf in April 2019. The service covers a range of areas, including benefits, adult social care, finances, employment and housing. Since the service launched in April 2019 the service has received over 900 referrals to date. 91% of veterans accessing our service are male, 72% had served in the British Army and 64%

are aged 51 to 80 years old. In addition to Council support, we have been successful in referring veterans to many organisations including: Veterans NHS Wales, Royal British Legion, Admiral Nurses, RNID and many more.

We have built on our support to local veteran groups across Rhondda Cynon Taf. Our Armed Forces Liaison Officer attends veteran groups to provide advice and support and has been successful in establishing 2 new veterans groups, the Taff Ely Group in Rhydyfelin and the Darran Las Veteran Group in Mountain Ash, in addition to the existing support provided to Valleys Veterans in Ton Pentre.

We had a successful bid for funding from the Armed Forces Covenant Fund Trust 'Forces for Change Programme' and have been able to deliver our Veterans Connected project throughout the pandemic. Through this project, veterans can hire a mobile tablet at any time, free-of-charge, through the Council's Armed Forces Veterans Service. This project enables veterans to stay in touch with family and friends with an overall aim of reducing social isolation. Training is provided to help veterans get connected and stay safe online.

In 2021/22 we will look to implement a Guaranteed Interview Scheme for veterans and reservists. This additional commitment demonstrates the Council's support for the Armed Forces Community and honours the spirit of the Armed Forces. The Guaranteed Interview Scheme is to guarantee an interview to veterans and reservists that meet the essential criteria set out in the job profile for roles that are advertised. The Council recognises that members of the Armed Forces Community can bring valuable transferable skills, qualities, and benefits.

Action 2 - Identify the number of refugees living in Rhondda Cynon Taf that are not already included in settlement programmes.

No refugees (excluding those who are part of the resettlement program) became known to the Council's Community Cohesion Team in 2020/21.

Action 3 - Undertake an employment needs assessment which will inform specific action points relating to young people, disability and ethnicity.

Following WG Guidance in December 2019, the priorities during 2020/21 which informed our Communities for Work Plus (CfW+) and Legacy delivery plans were to engage with specific customer groups. The aim was to meet the WG target of supporting 20% of people into employment who have a work limiting health condition or disability. We achieved 17% at year end with the actual number of 60 exceeding the target number of 50 due to engagement numbers exceeding the target set. Other priority customer groups were refugees, minority ethnic clients and ex-offenders. We reviewed the way we collected and recorded the equalities information for CfW+ and also gave guidance to

staff around ongoing recording of clients disclosures of having a work limiting health conditions and disability.

Due to the pandemic, all our employment support staff were re-deployed for 6 months to community hub work, offering support to vulnerable people in RCT with shopping, picking up prescriptions etc. and the ongoing restrictions did impact on us being able to make progress against this agenda.

However, these customer groups continue to be prioritised during 2020/21 with more progress being made.

Young People

We have opened our CfW+ programme to 16-24 year olds across RCT who were unable to receive employment support from any other ESF grant funded programme or through RCT's Youth Engagement and Participation Service (YEPS). Previously, CfW+ prioritised adult that re 25+ due to the low level of NEETs in RCT and the amount of support that was already available. However, due to the pandemic, the number of young people being referred from DWP for mentoring support increased so we increased the support on offer through CfW+ which included access to our training programmes as well.

Numbers of young people being referred onto our CfW mentoring programme also increased which has meant that we've exceeded our lifetime targets set for the programme.

We applied to become a Kickstart Gateway on behalf of the Council during March 2021 and we have successfully implemented the initiative in RCT. The scheme offers funding to businesses to provide six month paid work placements to young people claiming Universal Credit, for 25 hours a week at minimum wage. As well as providing training, the scheme should also provide practical support for the young person to search for alternative employment before the placement ends.

Ethnic Minorities

We attracted low numbers of clients from minority ethnic groups with 93% of participants identifying as White British, however participants continue to be supported by our employment support programmes. We will continue to work on attracting more ethnic minority people to the programmes.

Action 4 - A community profile to be undertaken for all library areas to better understand the needs of customers.

The service has identified the main catchment areas for each library and then undertaken a profile of each area by using the Community Insights programme which focusses on the following areas:

- population in the wards that fall into the library's catchment area;
- information on children in poverty, people out of work, people in deprived areas disability, pensioners and other vulnerable groups;
- information on housing characteristics: dwelling types, housing tenure, affordability, overcrowding, age of dwelling and communal establishments;
- information on recorded crime and crime rates;
- information on limited long-term illness, life expectancy and mortality, and general health;
- more information on qualifications, pupil attainment and absences;
- information on people's jobs, job opportunities, income and local businesses;
- information on transport, distances services and digital services;
- information on physical environment, air quality and neighbourhood classifications.

So there is a good understanding from the data of the differences between each library area. Use is also made of geographic information available about the level of Welsh speakers in various parts of the borough.

In addition to the above, the service profiles visitor numbers, book issues, downloads, attendance at events at each library as part of their performance meetings with branches and of course listens to feedback from staff and customers.

Evidently the pandemic has had a major impact on areas of delivery as footfall continues to be much lower than it was previously but the development of community hubs which was expanded during this period and the establishment of Neighbourhood Networks has provided more information to the service about local priorities.

Action 5 - Undertake research as part of the local housing market needs assessment into the demand for housing needs for disabled people.

The Council applies the data set out in the Local Housing Market Assessment (LHMA) when determining the mix of new schemes/properties that are being built with the use of the social housing grant (SHG). The service continues to apply this method in order to tackle the demand for housing among disabled people, which will allow them a stable home to enable them to thrive regardless of the barriers they may face. A full review of the LHMA will be completed by March 2022.

Action 6 - Undertake a review of the Homestep Scheme to ensure equality monitoring questions are appropriate to identify specific needs with an emphasis on the identification of housing needs for young disabled people.

The Housing Strategy and Investment Service are in the process of remodelling the Homestep application process, in line with the Department's digitisation of services agenda. It is within this process that the service plans will include questions in respect of young disabled people accessing open market housing that is affordable for them in line with the affordability test carried out at the application stage.

Action 7 - Improve and develop the collection and recording of customer equality monitoring information across Council service areas.

A comprehensive monitoring toolkit has been developed after compiling best practice examples. The new form reflects current best practice wording, question ordering and response options and takes into consideration GDPR requirements.

Unfortunately due to the pandemic the intended pilot in Leisure Services was unable to commence. We have however worked with individual service areas to improve their own data monitoring.

Equality monitoring data relating to people with protected characteristics is captured by our Community Services directorate as part of:

- NHS Clinically Extremely Vulnerable list;
- Enrolment forms and uploaded to the Capita and EBS systems;
- The equality monitoring section of Customer Satisfaction Surveys;
- Theatre booking systems;
- Employment Support programme delivery.

The data is reported to Welsh Government and forms part of their analysis in relation to whether the grant funding has been used in line with programme requirements.

More use is now being made of data to analyse resident needs and to assess demand for services than was previously the case.

We intend to launch the Equality Monitoring Toolkit across the Council in 2021/22.

Action 8 - To evaluate the experience of disabled people who are on the Homefinder register to understand any barriers to accessing adapted accommodation and to identify improvements to the process as a result.

The Housing Allocation scheme was due to be reviewed and updated in 2020/21, however the pandemic prevented this work from commencing. It is now scheduled to take place throughout 2022/23 and part of the process will involve focus groups with individuals who have applied to Homefinder to understand their experiences. Adapted housing for individuals with disabilities will be extensively reviewed as there has been an increase in the number of applicants who require adapted properties in RCT.

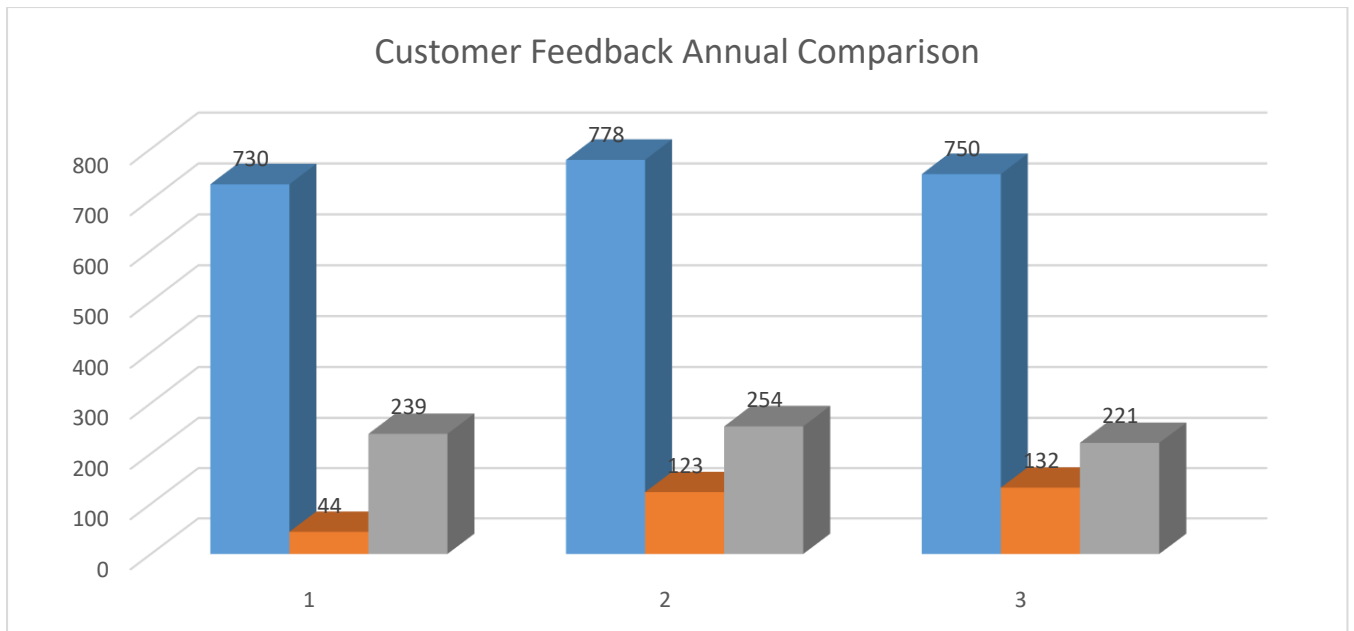
During 2021 many of the Housing Allocation Team have attended training to understand individual needs ranging from unconscious bias, domestic abuse awareness, protection of vulnerable adults, suicide prevention and mental health awareness.

Action 9 - Improve and develop monitoring of customer complaints.

This period has been a significantly challenging and unprecedented time for the Council in having to both deploy services specifically in response to flooding and the pandemic and to manage longer term initiatives to support communities and businesses across RCT. New ways of working have been introduced across all service areas with staff working from home and as a result, some of the development planned for the Customer Feedback Service has been delayed while the delivery of community support and front-line services has been prioritised.

Service areas and Complaints Co-ordinators have throughout the period and despite the presented challenges, continued to effectively manage customer contacts and complaints with some service areas noted to have made improvements to the consistency of complaint recording and for the second year reducing the number of complaints remaining open at the 6 month period from 2.4% in 2019/20 to 2.2% in 2020/21. 61% of complaints were dealt with in 10 working days compared to 56% in 2019/20. Whilst this may be a small improvement all service areas should be recognised for continuing to effectively manage complaints and customers' expectations as well as make improvements through what has been a difficult year.

Key Themes for Customer Feedback



	2018/19	2019/20	2020/21
• Complaints	730	778	750
• Comments	44	123	132
• Compliments	239	254	221
TOTAL	1013	1155	1103

A total of 1103 feedback items were logged for 2020/21. This number is consistent with the previous 2 years, however overall contacts to the Council significantly decreased during this period and this along with closed services may have affected the level of feedback received.

Customer feedback through the Council's website remains the preferred option for customers to communicate with 66% of feedback received through this channel. E-mail communication increased from 8.5% in 2019/20 to 20% and this significant rise can be attributed to COVID-19 restrictions and calls in to the contact centre being unavailable for a period of time.

37% of feedback items were not allocated to a queue at the point of reporting. These are cases which have been incorrectly allocated and are in the main complaints for Frontline Services. This is an increase on the figure for 2019/20 and may be attributable to the redeployment of key staff to other positions. It is hoped that the return of staff to their key posts and the development of a new record management system will offer greater flexibility and improve the allocation of feedback items after its implementation.

EXAMPLES OF COMPLAINTS AND SERVICE IMPROVEMENTS

Complaint area	Complaint detail	Service Improvement
Cemeteries	Complaint about appearance of cemetery staff.	This element of complaint was upheld and staff provided with new uniforms.
Contact Centre	Complaint regarding advice given by advisor on how to make a complaint.	Training for all contact advisors on complaints to be scheduled for 2021/22.
Leisure	Complaint about lack of classes in the Rhondda area.	Class programme to be reviewed and increased – achieved October 2020.
Refuse and recycling	Disabled lady unable to access steps to/from house as waste collections blocking access.	Crew advised and alternative collection point to be arranged.
Parks maintenance	Complaint about condition of park following grass cutting. Grass was cut during inappropriate ground conditions resulting in surface mud.	All staff reminded of their training and the need to ensure there is a site inspection to determine suitability of works being carried out.
Transportation	Complaint regarding inappropriate position of bus stop and no consultation with residents affected.	Bus stop signage removed and new location to be found subject to wider consultation.

Currently there is a new system being implemented for all customer complaints and we are reviewing the old system and making improvements to ensure we are collecting the information we require to drive improvements. This includes analysing complaints that relate to equality issues which are reported on separately along with Welsh Language complaints.

Action 10 - Improve local access to information advice and assistance provision for children, young people and families to promote their participation and engagement.

In March 2020, the **Youth Engagement and Participation Service (YEPS)** suspended all face-to-face work with young people and colleagues, as a direct result of the country entering lockdown. The situation required transforming the service's delivery methods almost overnight; virtual platforms were the only option for the first few months of the pandemic, a preferred method of communication for many young people.

The YEPS staff's previous engagement in service innovation and their confidence to use their expertise and knowledge of the needs of young people resulted in a comprehensive virtual youth offer of both targeted and universal services to assist young people to process and manage their situation.

Transforming service delivery methods required the active engagement of staff across the service to effect cultural change, supported by managers who were confident to let staff take measured risks. Focusing on service users, the team was tasked to assess needs and identify requirements, which were then used to reallocate resources and develop contingency plans. Their previous engagement in service innovation and their confidence to use their expertise and knowledge of the needs of young people resulted in a virtual youth work offer available within 72 hours of lockdown commencing. Service data demonstrates significant levels of online engagement with users in addition to the 1:1 support for over 1000 young people delivered remotely.

The service realigned its online offer, with a significant increase in the volume of information, advice and guidance, as well as universal activities available to young people via the website (www.wicid.tv) and social media platforms (Facebook, Twitter, Instagram and YouTube). The comprehensive offer was delivered by YEPS with significant contributions from delivery partners, including sexual health teams, substance misuse organisations, and commissioned providers.

The **Family Information Service (FIS)** played a key role in disseminating information to service users and families during the pandemic. It was the main conduit for the Resilient Families Service Parenting Team and the Talk and Play Team to connect with families and provide information, advice and assistance. The FIS made use of social media to notify parents of information to support them to access a range of services including childcare, play scheme timetables, parenting programmes. This contact with residents was central to the service's ability to maintain engagement with children, young people, parents and families during lockdown. The FIS social media platform played a critical role in enabling us to notify

parents and carers of changes to childcare arrangements, availability of Children and Family Centres and sources of advice and support. It also enabled us to deliver virtual parenting and speech and language support and well as engage children in virtual play opportunities. Our social media platforms were also used to ensure consistent messages were delivered to the public in terms of COVID-19 restrictions, school closures, home to school transport, testing centres to support the priorities of other Council Services such as Test, Trace and Protect, Transport and Education.

Analysis of the online traffic across social media channels during the pandemic showed a significant engagement in online support:

Between April 20 – September 20

- Online parenting videos - 38,523 views / 32,690 unique viewers
- Online early language videos - 44,287 views / 36,040 unique viewers

Changes to the delivery of the FIS were made in 2020/21 including securing agreement from the Chief Executive for the development of the **RCT Families website**, which will encompass the Council's statutory duty to deliver information, advice and assistance through an easy access single portal. The website is due to be launched in Spring 2022. This supports the principles of the Social Services and Well-being Act in empowering service users to use tools provided to meet their own needs.

During the pandemic, the three **Children and Family Centres** were repurposed for both staff and service user use. The sites were used to meet with service users when home visits were not feasible. This allowed key meetings to be held in a Covid-19 safe environment where virtual communication methods would not have been meaningful or would not have reduced the risk to a family/child. In addition, the service was able to maintain statutory duties such as contact centre visits, deliver emergency childcare, support frontline staff working during the pandemic from the safety of the centres.

YEPS has been proactive in **consulting with young people** throughout the pandemic. From seeking opinions during 1:1 sessions to surveys on social media platforms, YEPS staff have been committed to listening to young people to inform service developments.

The **County Youth Forum** was suspended during 2020/21 as a result of the pandemic, however, the locality fora were able to temporarily transition into meaningful consultation and participation events to inform recovery planning. Officers worked to transfer the physical local youth fora into online sessions. The three local youth fora have met 8 times to discuss the concerns young people have

as a result of COVID-19 and the support they would like to see implemented as part of the service's recovery plan. In addition, the fora met with, discussed and contributed towards:

- Votes@16 campaign #yepsisthisyourfirsttime
- Police and Crime Commissioner's "Young Voice Conversation" and the development of their young people's website
- Safer Wales "Champions of Wales" project
- Jigsaw Project, looking at how girls and women have been impacted by COVID-19
- Poetry Project, to create a series of short poems to change the negative views of young people within their wider community.

OBJECTIVE 2 – To reduce inequalities that exist within our communities

Within this equality objective there are a number of areas that require action. The progress towards these actions are outlined below:

Action 1 - A comprehensive review of the recruitment and selection process to increase the diversity of applicants.

A corporate recruitment improvement action plan has been developed with the aim of making our processes more accessible and attractive to job applicants from all backgrounds. The action plan covers the following areas:

- job analysis and job design
- advertising
- applications and selection
- appointment and induction
- alternative recruitment processes
- communication and training
- monitoring and evaluation.

Unfortunately there have been delays with this work, initially due to the pandemic with many key staff being redeployed to help with community support, followed by the implementation of a new HR/Payroll system which has been the priority. In 2020/21 we will be appointing a Graduate Officer to work on areas of this project.

Action 2 - Recommend within the adapted housing review that the Council commits to increasing the number of adapted and accessible homes being built in the area across all tenures.

The Adapted Housing Review provides a position statement on the current services provided or enabled by the Council in relation to adapted housing and the provision of adaptations. The draft RCT Adapted Housing Review makes a number of recommendations aimed at increasing the supply of adapted and accessible homes being built across all tenures. This includes exploring opportunities for the provision of adapted accommodation on Council owned land. This involves working closely with private developers to understand the barriers that exist in developing adapted bungalows on private housing developments and the implementation of new Supplementary Planning Guidance which will require a certain amount of private housing to be adapted or accessible. The review also recommends setting a local target for the number of adapted houses built per annum in the borough, as well as requesting Low Cost Home Ownership bungalows as part of the affordable housing contribution. The RCT Adapted Housing Review will be completed by the end of March 2022.

Action 3 - The implementation of the Develop, Invest and Grow project to improve Well-being and equality and diversity outcomes in over 100 small medium Enterprises (SMEs) in Rhondda Cynon Taf.

Our Staying Well at Work (formally Develop Invest & Grow) project is part funded by the European Social Fund and aims to provide support to small businesses and their employees. The support is offered at no cost and focusses on a bespoke range of products to improve employee health and well-being and provide support to businesses to manage employees with disabilities/work limiting health conditions.

The outcomes delivered

Over the course of the project, to the end of the period 100 Small Medium Enterprises (SMEs) participants have enrolled with the project, 78 have been through internal compliance checks and are eligible for the project, 22 have been compliance rejected and are therefore ineligible for the project.

78 SME's received direct support from the project up until 31 March 2021, to encourage a cultural change in organisations towards a more diverse and healthy workforce and the adoption of flexible working practices.

Shown in the chart (Table 1a) are the activities undertaken with SME's that have been through internal compliance checks and adopted or improved their strategies and/or monitoring systems.

56 have completed the project and recorded outcomes against the project indicators, 14 were early leavers, and 22 are still actively engaged in the project.

Table 1a

Outcome	Participants
01.Adopt HR H&S Policy for A&W	24
02.Absence Management Policy	25
03.Equality & Diversity Policy	25
04.Sys to Support Flexibility	3
05.Assessment to Monitor H&W	5
06.Pol / Proc Support H&W	23
07.Monitor Work on Health	2
08.Training to Support A&W	9
Early Leaver	14
No Outcome Recorded Yet	22
Total	78

Employee Participant Activity

Over the course of the project, to 31 March 2021, 301 employee participants have enrolled with the project.

359 employee participants have engaged with the project to date. Of those, internal verification checks have been carried out on 318 employee participants who have completed their engagement, 146 have returned to work, 79 have remained in work. Of the 101 early leavers, in the main intervention took place and participants returned to work or remained in work but failed to complete closure project paperwork. The reasons for referral are detailed below in Table 1b and a breakdown of the outcomes recorded are detailed below in Table 1c.

Employee participants 18% declared a disability and 82% a work limiting health condition.

Table 1b Reason for Referral

Reason	%	Participants
In Work Support	25%	76
Support RTW. to Work -28 Days	17%	50
Support Ret. to Work 28 Days+	58%	175
Total	100%	301

Table 1c Outcome

Outcome	%	Participants
Early Leaver	30%	89
NO-RTW 4 wks after completion	6%	19
Remained in Work	17%	52
RTW - Different	1%	2
RTW - Same	45%	136
RTW 4 wks after completion	1%	3
Total	100%	301

Table 1d Characteristic Summary

Participant Breakdown	2020/2021 Cumulative Total	
	Total	%
Disabled/Disability	57	17.9%
Work Limiting Condition (Includes MSD & MH)	261	82.1%
Female	247	77.7%
Male	71	22.3%
Care / Child Responsibilities	91	28.6%
Over 54	124	39.0%
Migrant / Non EU	0	0.0%
BME	2	0.6%
Total Referrals	318	100.0%

Action 4 - To provide accessible information to the public through a variety of formats with a specific focus on improving accessibility of information for the Deaf community.

We offer multi-channel access to information and Council services. This is provided via a range of formats and facilities including:

- Text Phone/Sensory Support Line number promoted via our website
- BSL Interpreters available to attend One4aLL appointments
- Hearing loop systems in place at One4aLL appointment desks
- Enquiries received via the Text Relay Service
- Material available in alternative formats e.g. application forms, consultation documents
- Browsealoud available on our website providing accessibility tools such as:
 - Text to speech (read aloud)
 - Screen mask
 - Text magnifier

- Web page simplifier
- MP3 maker (convert online content to audio)
- Picture dictionary.

During 2020/21 work continued towards meeting Web Content Accessibility Guidelines (WCAG) 2.1 web accessibility standards.

Action 5 - Undertake development of the use of assistive technology within the Digital Strategy.

We have continued to provide opportunities for people within our communities and organisation to develop their digital competency, confidence and where necessary provide access to assisted digital support, so that they are better equipped to access and use technology productively.

Those impacted by the pandemic were supported through ICT & Digital for example:

- Working with our partners we supported the Cwm Taf Morgannwg Health Board with a digital solution to manage the vaccination programmes and provided contact centre services.
- Enablement of a Digital Solution to provide a platform to deliver Shielding Support to our community via WCCIS and Web.
- Putting in place a more joined up way for businesses to apply and provide evidence for COVID-19 business grants. By putting the applications and the other grant requirements online in the same process, we were able to make quicker decisions and speedy payments to RCT businesses. We dealt with over 10,000 grant applications and paid out approximately £66 million in grants.
- As part of the Welsh Government's ['Hwb' digital Transformation Project](#), we made sure that every school was able to deliver the requirements for digital skills at the heart of the new curriculum through installing new IT systems. In addition, we worked closely with schools to provide over 5,500 laptops, tablets and Wi-Fi access to learners without home access during the pandemic.
- As part of the Council's Digital Strategy 2017-20 work was continually undertaken to support the inclusion agenda, with ICT & Digital playing a key role in supporting key initiatives such as ['Digital Fridays'](#) and [Get online in RCT](#) across our libraries and with services for the housebound.
- To support access to digital inclusion, FREE Public Wi-Fi is provided at approximately 90 Council and community buildings and also at our key [Town Centres](#). Public access PCs are available at several locations such as Libraries, Leisure & Community Centres. All PCs within Libraries will be refreshed with new devices during 2021.

- Our website incorporates elements that support those with visual impairment, content is scanned for errors and reports produced to facilitate their correction. Work to ensure the website meets accessibility [WCAG 2.1 AA compliance](#) continues. Our website accessibility rating has been increased from 68% to 86% on our Corporate Web presence.
- Contact Centre Advisor Services are accessible to customers.

Action 6 - To strengthen existing Homefinder processes to take into account equality and diversity best practice.

This will form part of the Housing Allocation Scheme review as the operational practices will also be reviewed to ensure that they align with the requirements of the scheme.

In 2020/21 a representative from Homefinder attended the Disability Forum to learn about the challenges facing individuals in the area.

Homefinder commenced 'surgeries' in Aberdare Library once a week. The focus was on providing a face-to-face service for individuals wishing to make enquiries directly with an advisor in an accessible space. The aim was to expand this service across the borough, however the pandemic sadly closed many of the offices for a time. We do hope to reintroduce this service when restrictions allow.

Not part of the Homefinder process, but of benefit for the Homefinder Team was the privilege of working with a young person with additional needs from Coleg Y Cymoedd on day placement one afternoon a week. The young person worked as part of the team and gained work experience and independence and the team gained an understanding of the challenges that this young person faced in his daily life.

Action 7 - To further develop an inclusive approach to apprenticeships.

We offer an award winning **appreenticeship scheme**. We have adapted and changed our apprentice assessments to incorporate a 2 level approach, giving equal opportunities to individuals with differing learning needs and in line with the post they are applying for. As a result we have recruited a number of apprentices with additional needs.

Our partnership programme with Coleg y Cymoedd, Elite and Learning Disability Wales has been working with the learners from the **Gateway to Employment 2020** and 2021 cohort. We have delivered a range of employability skills but due to the constraints of the pandemic these have mostly been delivered online. The programme aims to give the learners that are in their last academic year at College a

real insight into future career opportunities; this has been achieved by facilitating visits from employers and undertaking work placements.

Harry from the Gateway to Employment cohort 2020 secured an Apprenticeship with Vision Products at RCT Council and was awarded Gateway to Employment Intern of Year at Employment, Education and Training Team Celebration Event in 2021. You can watch Harry's story at

[Gateway to Employment, Supported Intern of the Year 2021 - YouTube](#)

Action 8 - Strengthen the scrutiny process for the Equality Impact Assessment process.

The Equality Impact Assessment documentation was reviewed to take into account the requirements of the Socio-economic Duty. As part of this review there was an opportunity to strengthen both the Equality Impact Assessment and Welsh Language Impact Assessment. A combined approach was taken to relaunch the impact assessment guidance. In addition a new process 'The Review Panel' was established to strengthen the scrutiny of completed impact assessments. Senior officers from across the Council sit on the Review Panel to review the impact assessment, checking that relevant data and evidence have been used to inform decision making. Agreement has been obtained to recruit a data analyst to support sourcing the relevant evidence for impact assessment documentation. The Cabinet reporting framework has also been enhanced to improve scrutiny of impact assessments.

A number of awareness raising sessions have been held with service areas to outline the requirements of equality duties and Welsh Language standards. The Review Panel was launched in April 2021, therefore progress will be reported in next year's report.

Action 9 - Encourage the uptake of Free School Meal (FSM) entitlement through reviewing service delivery models and an effective marketing strategy.

The 21st Century School Modernisation Programme has included the redesign of secondary school kitchens and dining halls to improve the dining experience and promote learner engagement and attendance. Evidence suggests the investment in school facilities is having a significant impact on the take up of school meals. Planning work has started on the Universal Primary Free School Meal implementation. Catering services are currently reviewing the existing meal provision in each of our primary and special schools and assessing the kitchen equipment and storage facilities in order to estimate the increase in meal numbers and the additional requirements for staff, equipment, storage and dining hall space.

Breakfast service is operational in the majority of secondary schools in order to encourage all pupils to eat a healthy breakfast and help promote early arrival in schools. Pupils FSM allowance is updated at the start of each school day to enable them to access this service.

An extensive choice of menus has been developed to assist in the take up of FSM. Secondary menus have been created with a wide range of products with flexible pricing options which allows pupils to purchase food items during breakfast, morning break and lunchtime. In addition, RCT provide bespoke menus for pupils with allergen requirements, a vegetarian main meal is available daily in all schools and a vegan menu has also been created and is accessible to all pupils on request.

Split lunch services have been implemented in a number of schools, these encourage pupils to eat a healthy lunch by reducing queues and creating a calm, social environment.

Online payments have been implemented in all schools to reduce the requirement of pupils bringing cash to schools. This reduces bullying and ensures that money provided to pupils is actually spent on breakfast or lunch, the use of cashless systems also ensures pupil FSM anonymity.

Action 10 - Take a strategic approach to our town centres which will benefit from investment to ensure an attractive and accessible environment for local businesses, shoppers, residents and visitors.

Prosperity and Development's Service Delivery Plan set out a number of key service priorities for 2020/21, one of which included:

Modernise our town centres by building on their role as centres for social inclusion, local economic opportunity and the provision of services. By recognising their changing role from retail centres to social destinations and helping them to adapt to changes in economic and customers' expectations.

In supporting the delivery of local economic activities whilst promoting social inclusivity the Council have continued to engage with a variety of groups and stakeholders in delivering new projects and initiatives across our town centres and to seek their views on implementing appropriate and timely temporary measures. These measures build on the "Signs & Lines" approach implemented in 2019/20 and continue to safeguard the public amidst the ongoing COVID-19 pandemic.

In response to changing Welsh Government guidance implemented to help mitigate the risk to public safety by the ongoing COVID-19 pandemic, the Council have implemented and where appropriate withdrawn a series of temporary measures across our town centres, these include:

- where necessary, renewal of directional arrows placed on the footways to direct pedestrian movement throughout the town centres.
- where appropriate removal and subsequent reinstatement of some street furniture from town centres.
- signage placed at bus stops / shelters throughout town centres re-enforcing COVID-19 safeguarding measures.
- signage placed on litter bins throughout the town centres re-enforcing social distancing measures.
- timely guidance distributed to businesses located within town centres (and the wider smaller retail areas) outlining their responsibility to implement and review appropriate safeguarding measures.
- administration of a Welsh Government COVID-19 Grant for businesses, enabling internal and external alterations to maximise use of outside space. A similar Valleys Taskforce Grant was also extended to businesses across 28 smaller retail areas within the county borough.
- signage placed at key points throughout town centres promoting a shop local message whilst retaining a strong COVID-19 safeguarding message through a “hands, face, space” approach.

In implementing the above measures the Council has continued to engage positively with a number of stakeholders including town centre businesses and representative groups, Elected Members and the RCT 50+ Forum. This considers the impact of such measures on accessibility and pedestrian movement and has enabled the Council to respond appropriately and considerately. It has also enabled the Council to provide appropriate and timely advice and guidance to businesses, to safeguard employees and customers.

We delivered a comprehensive “shop local” campaign to encourage consumers to utilise local businesses where possible. The campaign was delivered through a mixed approach and included the production of videos showcasing the many products and services on offer within RCT town centres, promotion via the Council’s website and social media platforms, as well as the placement of banners at key locations in and around the town centres. The campaign was also extended to include a more focused campaign to deliver a “shop local at Christmas” message.

We hosted a Santa’s Grotto within town centres enabling individuals and families to receive a positive experience within a managed environment, that complied with COVID-19 guidance. The grotto’s were well attended and positively received.

Following a successful launch of the **Hop, Shop and Save Scheme** in 2019, the Council has continued to work in partnership with Stagecoach South Wales to further develop and promote the scheme. The scheme enables Stagecoach passengers to receive a discount on a range of products and services across RCT town centres, upon the production of a valid bus ticket. The scheme is available for all residents of RCT, including those with a “bus pass” and with many older people and disabled people relying on a bus pass to travel to be able to access town centres, the scheme has continued to be popular.

We have continued to work collaboratively with business groups and other stakeholders to deliver a range of projects that improve the “look and feel” of our town centres. These include the installation of new public benches and free standing flower planters throughout Aberdare town centre and the development of an area of land adjacent to the Parc & Dare Theatre in Treorchy to provide additional public and community space.

Utilising the Welsh Government’s Transforming Towns Business Fund, the Council have worked collaboratively with town centre business groups to develop and deliver a range of projects aimed at improving and promoting the town centre offer. These include the production of town centre specific promotional videos, a facility providing test trading opportunities and piloting of alternative town centre data collection provisions to inform future strategic decisions.

OBJECTIVE 3 – TO PROMOTE SAFE COMMUNITIES

Within this equality objective there are a number of areas that require action. The progress towards these actions are outlined below.

Action 1 - Review, develop and re-implement the Hate Crime Strategy.

The Crown Prosecution Service defines a Hate Crime as:

“hate crime’ can be used to describe a range of criminal behavior where the perpetrator is motivated by hostility or demonstrates hostility towards the victim’s disability, race, religion, sexual orientation or transgender identity.

These aspects of a person’s identity are known as ‘protected characteristics’. A hate crime can include verbal abuse, intimidation, threats, harassment, assault and bullying, as well as damage to property. The perpetrator can also be a friend, carer or acquaintance who exploits their relationship with the victim for financial gain or some other criminal purpose.”

During 2020, 465 hate crimes were recorded in the Cwm Taf area (Rhondda Cynon Taf and Merthyr Tydfil).

The tables below show the breakdown across the 5 characteristics, area and month:

Table 1a. Hate Crimes by characteristic

Disability	64
Race	271
Religion	15
Sexual Orientation	98
Transgender	17

Table 1b. Hate Crimes by area

Rhondda	117
Cynon	90
Taf	134
Merthyr	105

Table 1c. Hate Crimes by month (2019)

January	28
February	25
March	33
April	31
May	38
June	57
July	48
August	43
September	53
October	39
November	31
December	20

Tackling Hate Crime in Rhondda Cynon Taf

We have continued to work closely with partner agencies including South Wales Police (SWP). Increased partnership working has enabled us to ensure that residents get a positive and consistent response.

National Hate Crime Awareness Week (NHCAW)

A series of 5 videos have been produced, one for each protected characteristic. They were released on social media (one per day) throughout NHCAW on the Council's, Merthyr Tydfil Council's and South Wales Police social media pages (Facebook and Twitter) and their respective websites as well as being shared by a number of other outlets including the local radio station social media pages. The videos were very well received by the public, being viewed by thousands of social media users throughout the week.

- Race – <https://youtu.be/BXgT19Echy4>
- Disability – <https://youtu.be/V147ZhuDcgc>
- Gender Identity – <https://youtu.be/8SqsTGloKZc>
- Sexual Orientation – <https://youtu.be/leS9vj20qKI>
- Religion – <https://youtu.be/Ugy6NkANnDY>

Cwm Taf Community Cohesion Officers and South Wales Police Community Safety Officers undertook interviews with local radio station GTFM to promote NHCAW to educate listeners about Hate Crime and provide information about how to report Hate Crime and where to access support.

Hate Crime Awareness Training

During the relaxation of the restrictions two Hate Crime awareness sessions were delivered to local primary school pupils.

Action 2 - Review the existing approach to tackling modern slavery.

Training on modern day slavery (including train the trainer) was due to be delivered in April 2020 by BAWSO. This sadly had to be rearranged to a later date. Modern day slavery continues to be discussed within the virtual Serious Organised Crime Board.

Action 3 - As part of Education's Well-being Strategy we will develop a programme for schools about raising awareness of emotional abuse in relationships.

The Senior Educational Psychologist for Well-being is working with Barnardos, the Police and Education representatives to develop a programme of support for schools. Project development will continue next year.

Action 4 - Pilot the PERMA model in secondary schools.

Embedded in Positive Psychology, Seligman's PERMA model is suggested as an effective framework for understanding and promoting well-being. Furthermore, PERMA tools are suggested as an easily understood measure which can assess various dimensions of pupil well-being and can account for fluctuations in well-being over time.

According to Seligman's PERMA model:

- **Positive emotions** refer to hedonic feelings of happiness (e.g. feeling joyful, content, and cheerful).
- **Engagement** refers to psychological connection to activities or organisations (e.g. feeling absorbed, interested, and engaged in life).
- **Relationships** include feeling socially integrated, cared about and supported by others, and satisfied with one's social connections.
- **Meaning** refers to believing that one's life is valuable and feeling connected to something greater than oneself.
- **Accomplishment** involves making progress toward goals, feeling capable to do daily activities, and having a sense of achievement.

Seligman proposes that these five pillars contribute to individual well-being.

- 80 schools are now registered and have been set-up to use the PERMA tools.
- 2 hour virtual training sessions have been conducted with all schools to complete the registration process and to demonstrate and discuss how the tools can be used in their setting.
- Pre-recorded training videos have also been developed and uploaded to support schools in using the products.
- Whole School training is due to be delivered via webinar and pre-recorded e-learning content.
- User guides and starter packs have been disseminated to every school following their registration.
- An initial training evaluation has been completed with each school to identify their perception of the products and how they intend to use them in their setting.

Action 5 - Strengthen collection and analysis of data for bullying incidents in schools.

The Access and Inclusion local authority Anti-Bullying Policy has been amended in line with the Welsh Government statutory guidance, Rights, Respect and Equalities. The updated RCT policy clarifies and strengthens expectations and processes in relation to data collection and analysis of bullying – particularly in relation to protected characteristics. The LA responsibilities within the revised guidance are to:

- Analyse the data from schools and identify patterns and trends and provide information to schools to ensure they are prepared to be responsive to trends.
- Have a specific focus on accurate recording of prejudice-related incidents to enable monitoring of patterns and prevent discrimination to ensure compliance with the Public Sector Equality Duty.
- Monitor equality data and advise schools on local trends.

We require schools to provide a report of bullying incidents to us on a termly basis. We monitor the reports and provide support and challenge to schools to address issues. The next step is to improve practice through training and advice. Implicit in the updated policy is the need for more regular review and monitoring processes in the schools. The updated policy provides a document for all schools to use on the SIMS system which will support the collection of necessary data. The policy states that:

Governing bodies should monitor:

- an overview of recorded bullying incidents in their setting to see how long it takes on average for cases to be resolved
- the recurrence rates
- whether learners who have reported bullying incidents believe they got a satisfactory outcome
- whether there are any emerging trends or groups being discriminated against
- whether there are online cases that suggest work is required with the learners, parents/carers and staff to counter new forms of bullying
- absenteeism rates
- that the regularly collected data on reported incidents is showing progress towards the equality objectives.

Action 6 - Further develop the freedom programme with Women's Aid to better understand specific needs for victims of domestic violence from underrepresented groups.

The SAFE Project

Identifying domestic abuse at the earliest opportunity is key to keeping people safe. The SAFE project provides an accessible service based within the local community to support those who have experienced or are currently experiencing domestic violence and are identified through risk assessment or Public Protection Notices (PPN) as low to medium risk. The project aims to increase the opportunities available to victims of domestic violence by implementing early intervention and prevention strategies. The services provided by the project build capacity by increasing the service user's skills to identify the early warning signs of abusive behaviours within current or future relationships, increase their confidence and self-esteem and reduce isolation.

The project delivers this in a variety of ways including;

- One to one support / advocacy (short term)
- Life skills sessions including domestic abuse awareness programme and confidence building.
- Direct referral pathways to other support agencies.
- Access to legal advice and debt management surgeries.

The project enables victims of domestic violence to access information and support in a friendly and supportive environment and aims to reduce the risk to the individual, increase safety, prevent further crime, and keep people safe in their own homes – breaking the cycle of domestic abuse.

Group programmes

At the start of quarter 1 in 2020 the COVID-19 pandemic impacted the way in which the project could deliver its services. The adaptations included a reduction in face-to-face and group working sessions.

As a result, all educational, trauma informed, domestic abuse, educational sessions, such as the freedom programme, recovery toolkit, hope to recovery and well-being sessions were delivered online.

In total, 213 victims were supported to complete domestic abuse educational programmes.

Their feedback tells us that:

- 95% stated they were able to recognise the early warning signs of abusive behaviour and felt they had increased ability to keep safe within their relationships.
- 89% stated that they felt increased confidence in their ability to create a safe environment for themselves and their family.
- 100% stated an increased knowledge of appropriate agencies from which they could receive support for their emotional and physical well-being.
- 90% stated they felt an increase in their confidence and self-esteem as a result of attending the sessions.

Individual support

During the year 322 victims required additional individual support sessions. During these sessions our team were able to support victims to identify need and reduce risk through risk assessments and safety planning.

Surgeries

Throughout the year 74 victims required legal advice regarding their situations. The project supported them to access free 20-minute consultations with a solicitor within their local area.

Equality Monitoring Data

This data refers to 512 clients supported.

Sex

502 identified as female

7 identified as male

2 identified as transgender.

Ethnicity

African - 3

Black other - 6

Chinese - 4

Indian - 8

Mixed race – 27

White British – 153

White Welsh – 310

Age

16 – 21	32
21 – 30	125
31 – 40	117

41 – 50	96
51 – 60	65
61 – 70	52
71 – 80	22
81 – 90	3

Geographical Location

275 Pontypridd / Taf
236 Cynon.

OBJECTIVE 4 – TO REDUCE THE GENDER PAY GAP

Within this equality objective there are a number of areas that require action. The progress towards these actions are outlined below.

The Gender Pay Gap

An organisation’s gender pay gap is the difference between the average male and female pay rates. It is calculated by dividing the average female hourly pay rate by the average male hourly pay rate.

The Council is required to publish the gender pay gap between male and female employees. It is also required to publish this data separately on employees in Education (teaching employees).

The Equality and Human Rights Commission strongly advise publishing separate full-time and part-time gender pay gaps. It is considered that any pay gap of 5% or more is considered significant and in need of further analysis.

The Equal Pay Audit identified the following Equal Pay gaps:

2021

	Combined	Full Time	Part Time
All Employees	10.45%	-12.21%	7.03%
Non Teaching	11.37%	-10.23%	3.69%
Teaching	5.04%	3.87%	11.77%

The mean gender pay gap is the difference between the mean hourly rate of pay of male full-pay relevant employees and that of female full-pay relevant employees. A positive figure denotes a gap to the advantage of male employees. A negative figure denotes a gap to the advantage of female employees.

There has been no significant changes to the gender pay gap for March 2021.

Action 1 - Deliver the roll out of the performance review process for staff at all grades.

The Council's new performance review process for staff is being incrementally rolled-out to ensure effective implementation and understanding. Roll-out has been undertaken for Chief Officer post holders and for staff on Grades 11 to 15. Embedding the new performance review process and focusing on compliance has been the focus this year and has unfortunately delayed further roll-out to all staff. However service areas are continuing to use the previous performance review processes with their staff not on the grades mentioned above, although central monitoring for this is not undertaken.

We will continue to roll-out the revised performance reviews Council wide, with particular attention to ensuring that staff without access to work IT and no Council email address have a performance review.

Action 2 - Improve the monitoring of the performance review process.

As part of the new performance review process we monitor compliance, the training needs analysis and we review the process which includes obtaining feedback from managers and staff. We will continue to develop the monitoring process during further roll-out of the process.

Action 3 - Better understand whether barriers exist regarding the progression of women into senior positions.

Following feedback from our female staff we are exploring how we can encourage more women to apply for senior roles. We are developing a Women in Leadership Programme which aims to remove barriers to progression. The programme aims to provide a platform for women throughout the Council, regardless of role or job grade to embrace these unique skills, inspiring and empowering them to grow and develop to break through the 'glass ceiling'. The programme will be launched in 2021/22 where we will host a number of events that will look at barriers, dispelling commonly held myths and will look to generate inspiring discussion around women developing and bringing fresh insights to the table. The overarching aim is to create a culture shift by implementing initiatives such as mentoring, coaching and establishing networking opportunities, enabling women to feel confident and able to progress onto the next stage of their career within the Council.

Action 4 - Understand more about what prevents women returning to the workplace following maternity leave.

A research study was completed which provided a better understanding into the barriers to retention following maternity leave. The study explored social and organisational barriers that contribute to the issue. The recommendations of the study included:

- Undertake further organisational research particularly with women who have returned to work following maternity leave
- Increase awareness and support for women going on maternity leave
- Review and improve monitoring processes
- Provide opportunities for exit interviews.

Action 5 - Support the EHRC pledge 'Working Forward' and implement its recommendations.

Due to a number of factors which impact on the resources available to undertake this work it is likely this work will be carried over to the next Strategic Equality Plan in 2023.

OBJECTIVE 5 – TO CREATE AN INCLUSIVE WORKFORCE

Within this equality objective there are a number of areas that require action. The progress towards these actions are outlined below:

Action 1 - Develop a programme of sexual harassment training and awareness.

Unfortunately work in this area has not yet commenced due to priorities shifting due to the pandemic and the Black Lives Matter movement. We hope to commence this work in 2021/22. It is clear though that any work will now also have to take into account sexual harassment in the digital environment as many of our staff now work from home on a regular basis.

Action 2 - Undertake a review of all our mental health activities and develop annual plans which provide education, training and interventions.

We have undertaken several reviews of mental health activities and these are ongoing however, the pandemic has meant that these plans had to be adjusted in order to support the workforce throughout the pandemic.

We have consulted with the Senior Leadership Team, Senior Management Teams, trades unions, managers and staff throughout the organisation on a range of matters

such as the requirement for mental health training. We have introduced a range of activities in education, training and interventions for staff well-being including mental health.

These include:

- Mental health awareness training match funded by the Council and Welsh Union Learning funding. We continue to develop this each year.
- Over 600 managers attended mental health awareness training.
- 2 pilot groups for i-act mental health awareness training for staff was attended by 30 staff.
- The 'Pandemic and Beyond' series was developed and delivered over 5 modules looking at individual and team impact on mental health and psychological safety. Over 400 staff attended these sessions.
- The introduction of a confidential staff well-being software called Cari which provides staff and the organisation with an overall well-being score. Staff can access support and interventions through their Cari account.
- A staff well-being line was set up to support staff throughout the pandemic giving staff access to:
 - keyworker testing
 - self-referral for well-being assessments
 - self-referral for physiotherapy
 - a listening ear.
- Well-being assessments were introduced in Occupational Health to assess an individual's need, then refer into the most appropriate support.
- We introduced a bespoke school counselling service for all teachers.
- 600 Additional hours for counselling were provided.

Action 3 - Source and develop a suite of training for managers on equality and diversity topics.

Work commenced on this project this year and is due to be completed in 2021/22. A number of suitable e-learning courses have been identified and tested and discussions have taken place with the People Development Team regarding their roll-out across the Council. The internal learning platform 'RCT Source' will support the training material and a Diversity and Inclusion section has been developed to support staff learning with additional information and resources.

Action 4 - Become more disability confident as an organisation.

We continued to meet our responsibilities under the '[Disability Confident](#)' Scheme so that as an employer we make the most of the talents disabled people can bring. Examples of how we do this include:

- Providing support for dyslexic and neurodiverse colleagues via 'Read&Write' software. Key officers have received training in this software in order to advise other members of staff how to use the tools.
- Reviewing key accessibility policy and guidelines like the 'See it Right' guide. Since the transition to work from home during the pandemic, online and e-communication has become more and more prevalent. The guidance now contains information on contrast, colour usage, font and text size, as well as accessibility tips and features included in Microsoft products like Word and Teams.
- Electing a Senior Diversity Champion for Disability. The Senior Champion is a direct link for our Disability and Carers Staff Network to contact our Senior Leadership Team to share priorities and concerns. This representation and support from the Senior Leadership Team is vital to accessibility awareness and improvement.
- Raising awareness of disability awareness via internal staff communications.
- Working with the Business Disability Forum (BDF) to become a Disability Smart organisation. Criteria that needs to be met is in line with the Disability Confident Scheme, so will develop the Council in both areas.
- Keeping the HR Team updated with relevant disability awareness webinars and training.
- Proposal for Council service areas to become Autism Aware.

Action 5 - Undertake workplace equality monitoring.

As previously outlined in this report, an equality monitoring toolkit has been developed which highlights the best practice equality monitoring questions that should be completed by staff. Internally, equality monitoring data is vital to examine the Council's progress concerning its legal duties and equality objectives. It helps us to identify gaps and trends and consequently we can develop action plans to address those gaps.

The Council is implementing a new HR and Payroll system, unfortunately due to a number of factors the implementation date has been shifted to November 2021. This is a significant project covering all workforce data. The best practice equality monitoring fields outlined in the toolkit will be added onto this system. This provides us with an opportunity to collect data on characteristics such as non-binary identities. This is something which we have not been in a position to do previously due to

development limitations in the current system. Following implementation of the new system there will be a push to obtain up-to-date staff information.

Action 6 - Replicate existing good practice to reflect all protected characteristics.

In 2020/21 the Council marked a number of significant days either by raising awareness through articles and blogs on its internal intranet and with staff networks or by holding awareness raising events. Articles were written about the following, they appear in date order:

- International Day Against Homophobia, Biphobia and Transphobia
- Mental Health Awareness Week
- Statement response to the death of George Floyd
- Reserves Day
- Pride Cymru
- World Suicide Prevention Day
- Bi Visibility Day
- Black History Month
- International Day of Older Persons
- Dyslexia Awareness Week
- Baby Loss Awareness Week
- World Mental Health Day
- World Menopause Day
- Men's Mental Health Month
- Trans Awareness Week and Trans Day of Remembrance
- International Day of People with Disabilities
- Welsh Language Rights Day
- Holocaust Memorial Day
- LGBT+ History Month
- Time to Talk Day
- Zero Discrimination Day
- International Women's Day
- International Day for the Elimination of Racial Discrimination.

In addition to the above, a number of events were held across the Council to raise awareness and promote diversity and inclusion.

Men's Mental Health Month

For Men's Mental Health Month we felt it was important for staff to know they work in a safe and supportive environment and asked staff to help break the stigma. We did this by producing 3 short videos from male members of staff, including one of our Senior Managers, talking about their own experiences of mental health and why it's so important to seek help or talk about it. This was an incredibly powerful campaign and we have also shared these videos via our newsletter and intranet for all staff to access. This is [Paul's story](#)

Time to Talk Day

Time to Talk Day in February provided a focus for staff across the Council to have conversations about mental health without being judged. For 'Time to Talk' day this year we encouraged staff to bring the conversation into routine team meetings or to create a catch up via Microsoft Teams, whilst so many of us are working from home due to the pandemic. We shared resources to help staff such as a digital screen background to use in online meetings, posters and banners and numbers to call if you need specific help or further support.

Proud Councils

RCT lead 'Proud Council's'; a network of South Wales based local authorities in promoting and achieving an inclusive workplace and community for all LGBT+ people. This year we supported a virtual Pride Cymru event, which was a panel debate that was accessed by hundreds of people across the UK.

We created a digital calendar of events for LGBT+ History Month to highlight all the events and activities that were available during the month and we also organised events and resources ourselves. This included a lecture on LGBT+ Global Issues by Coleg y Cymoedd, a Workshop from the Author Norena Shopland, working in partnership with Cynon Valley Museum, and an online event run by RCT and Cardiff Council's Staff Networks.

Race Equality

The current Strategic Equality Plan does not feature a specific objective on Race Equality. Since the tragic killing of George Floyd and the subsequent Black Lives Matter campaign we acknowledged we needed to focus on Race Equality within the Council. To support this work we have appointed a Graduate Officer to work to develop this. We used positive action in the appointment of this role. We have established a Staff Network 'Spotlight' who are providing us with the lived experience of being a Black member of staff in the workplace and community. 'Spotlight'

members have identified a number of workplace areas that we need to focus on e.g. policy.

Education colleagues have also established a Black, Asian and Minority Ethnic Working Group, and have commissioned a research project looking at the experience of Black pupils in our secondary schools.

In March we signed the Zero Racism Wales pledge which was launched on the UN International Day for the Elimination of Racial Discrimination. This demonstrates our commitment to take a stand against racism.

Holocaust Memorial Day (HMD)

For HMD 2021, due to the COVID-19 restrictions, the public and Council staff were asked to spend some time on the day, in the safety of their own homes and workplaces, reflecting on the atrocities of the worst time in world history in which millions of people were brutally killed at the hands of Nazi Germany, and the subsequent genocides.

International Women's Day

We hosted a virtual event for International Women's Day themed around 'Choose to Challenge'. The event was a discussion about stereotypes, discrimination and women's experiences in work. Our guest speaker, [Georgina Gilbert](#), a firefighter with over 20 years' experience, co-founder of the [Antarctic Fire Angels](#) and inspirational speaker for [Ordinary Extraordinary](#), spoke about her story and breaking down barriers in gender inequality.

Staff Networks

Our staff networks have continued to grow and develop and they played an instrumental role in providing peer support during the pandemic. Network meetings went on-line and this encouraged greater attendance with more regular meet ups. All of our networks, Allies, Disability and Carers and Perthyn, our LGBTQ+ staff network help promote and raise awareness of specific days to all staff to help create a better culture in the workplace.

At the end of 2020 we also launched Spotlight, our staff network for Black, Asian and Minority Ethnic staff. The Council employs small numbers of this group. It is therefore essential that we understand their experience of being a minority in the workplace.

LGBTQ+ inclusion

The Council continues to be recognised as an inclusive employer by ranking in [Stonewall's Top 100](#) employers in 2020, demonstrating our commitment to LGBTQ+ inclusivity. Due to the pandemic there was no submission for 2021 but we endeavour to continue our good work in creating an inclusive workplace for all of our LGBTQ+ staff and service users.

In 2019 we were able to consult with the public at Rhondda Pride, where we identified some gaps in support for schools. Although we have been challenged with the pandemic and its effect on schools, we have still been able to offer support to schools to ensure our LGBT+ pupils feel more supported. We have worked closely with the Education Department to create LGBT+ specific resources to better educate teaching staff to feel confident to support and teach pupils on these specific topics. As part of our Stonewall Diversity Champion membership we have also been able to offer free training courses to our schools in regards to supporting LGBTQ+ pupils with mental health and other specific challenges and issues they might face.

An LGBTQ+ Education working group has been set up to ensure resources and communication, between different services across the Council, is more effective in regards to supporting young people and children who access services or attend any of our schools.

We have focused on LGBTQ+ inclusion within RCT by raising awareness and promoting specific campaigns and days that specifically raise awareness and acceptance of the LGBTQ+ community.

We have also run events to raise awareness, for example we organised specific events throughout LGBT+ History Month, some for internal staff only and others open to the community.

We have consulted with our LGBTQ+ staff network and decided to raise the Progress Flag on LGBTQ+ specific days across the Council. We have an LGBTQ+ Progress Flag flying at Llys Cadwyn in Pontypridd for the majority of the year to show how important we feel about LGBTQ+ inclusion in the Council. We will also be raising the trans, bi and Progress flag for all buildings across the Council to raise on specific days and events to ensure people can see that we recognise that some groups within the LGBTQ+ community can face more discrimination than others.

We have offered webinars and free events to our staff in relation to Bi Visibility and other LGBTQ+ topics and shared resources.

Overall Progress

The Council has made significant progress in many of the equality objectives. It is noted that some have not yet commenced and progress in these will be monitored in future annual reports. This report reflects the period of the initial lockdown due to the COVID-19 pandemic, as such progress on some projects had been delayed due to the pandemic response. However, due to the pandemic, much positive and innovative work has been done to improve the accessibility and inclusion of the services we provide across the borough.

Our work to deliver equality objectives contained in our Strategic Equality Plan helps us to show how we are contributing to [a more equal Wales](#) - 'a society that enables people to fulfil their potential no matter what their background or circumstances'. But it also seeks to support all the well-being goals including a Wales of Cohesive Communities and a Prosperous Wales.

7. Equality Impact Assessments (EIA's)

The Council has had an Equality Impact Assessment (EIA) process in place for a number of years which is carried out under the following circumstances:

- Where new policies or practices are developed (including corporate plans, annual business plans and the annual budget);
- Where changes to existing policies or practices are proposed, and when conducting expenditure reviews and programme evaluations;
- Where there are proposals to withdraw from or discontinue an existing policy or practice;
- Where the Business Planning process has identified relevance to or implications for equality.

The process is regularly reviewed and takes into account the protected characteristics identified in the Equality Act 2010.

The Council introduced a screening process in January 2012 which is designed to make the process as effective as possible and to ensure that any information gathered at the screening stage can be used if a full EIA is required. However, the Council automatically carries out a full EIA on its Change proposals process.

The table below includes a snapshot of EIA's carried out in 2020/21.

Equality Impact Assessments

Policy/Procedure	Date
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Proposed Extension and Variation to the Borough's Dog Control Public Spaces Protection Orders	June 2020
Safer Places – Social Distances in Town Centres and Public Places during Coronavirus	June 2020
Modernisation of the Council's Residential Care Home Service for Older People	December 2020
21 st Century Schools Programme – Proposals to Improve Education Provision for Ysgol Gynradd Gymraeg Llyn-Y-Forwyn	January 2021
21 st Century Schools Programme – Update on the Proposals to Improve Education Provision in the Cynon Valley	February 2021
The Council's 2021-2022 Revenue Budget Strategy	February 2021
The Council's 3 Years Capital Programme 2021/22 – 2023/24 Incorporating a Review of Earmarked Reserves	February 2021

Full details of decisions are included in Cabinet reports which are available on the following link:

<http://www.rctcbc.gov.uk/EN/Council/CouncillorsCommitteesandMeetings/Committees/Committees.aspx>

8. Employment Monitoring Data

The Council must collect and publish on an annual basis the number of:

- people employed by the authority on 31 March each year by protected characteristic;
- men and women employed, broken down by:
 - job;
 - grade (where grading system in place);
 - pay;
 - contract type (including permanent and fixed term contracts);
 - working pattern (including full-time, part-time and other flexible working patterns).
- people who have applied for jobs with the authority over the last year;
- employees who have applied to change position within the authority; identifying how many were successful in their application and how many were not;
- employees who have applied for training and how many succeeded in their application;

- employees who completed training;
- employees involved in grievance procedures either as a complainant or as a person against whom a complaint was made;
- employees subject to disciplinary procedures;
- employees who have left an authority's employment.

All of the information above must be presented for each of the separate protected groups. The exception to this requirement is the data on job, grade, pay, contract type and working pattern, which must be broken down only in relation to women and men.

This information is attached at Appendix 1 - Employment Monitoring Data.

9. Procurement

The Council operates the SQuID which is part of the National Procurement Website, www.Sell2Wales.co.uk.

It contains a set of core questions commonly asked at the selection stage and has a database of suppliers' answers stored for re-use, and a tool for buyers to generate a selection questionnaire using a risk-based wizard for each procurement project. The idea is that working together these three things deliver a number of benefits:

- Increased efficiency for both suppliers and buyers, by allowing standard questions and answers to be stored for future use, by keeping the number of questions to a minimum, and also by encouraging buyers to only seek information from suppliers if they can be clear about exactly how the information will be used;
- Greater standardisation of the selection stage, whilst also allowing for tailoring of questions to meet the specific requirements of the procurement;
- Increased transparency of the selection process and how responses will be evaluated – so that suppliers are able to work out easily whether or not they wish to bid for a particular opportunity, how to optimise their proposal and how to present it in an effective way;
- Improved opportunities for small-to-medium enterprises (SMEs) and local businesses to compete on a more equal footing as a result of a carefully considered question set that removes some of the barriers to entry for them.

It includes a section on equal opportunities and is in line with the guidance on procurement published by the Equality and Human Rights Commission at <http://www.equalityhumanrights.com/wales/>

10. Accessible Information

The Council produces information in a wide variety of formats according to need. Service areas record requests for alternative formats from service users to ensure that these are provided.

Accessibility Guidelines are available to employees on the Council's Intranet, these provide information on the types of accessible information available, what it is and does and includes a list of suppliers so that employees can source requested formats.

The Council has adopted the RNIB Clear Print Guidelines to increase readability of its documents.

11. Future Work

We will work towards further embedding and achieving the actions as outlined in the [Strategic Equality Plan Action Plan 2019-2022](#). Next year it will be important that we respond to emerging issues as a result of the COVID-19 pandemic and the Black Lives Matter movement.

12. Contact Details

Rhondda Cynon Taf welcomes comments on all aspects of this report, both in what it contains and what it may not make clear enough about the work and progress in delivering equality and removing discrimination.

If you have any comments or want to know more about the work the Council is doing please contact:

Melanie Warburton
Diversity and Inclusion Manager
Rhondda Cynon Taf Council
Ty Elai
Dinas Isaf East Industrial Estate
Williamstown
Tonypandy
CF40 1NY

Telephone: 01443 444531

email: equality@rctcbc.gov.uk

Employment Monitoring Data

Equality monitoring information is stored against all employees' records in the Council's payroll and human resources information system (Vision). The information is requested at the recruitment stage and entered on to their record at that point.

The Council encourages all employees to provide this information and an equality monitoring survey is carried out on all employees every two years in an attempt to increase the information held.

In preparation for the extended employee monitoring requirements being introduced as part of the Equality Act 2010, the Council carried out an equality monitoring survey of all employees in 2011. This survey included questions that covered all protected characteristics except pregnancy. This question was not asked as it was felt that information on pregnancy and maternity would already be held on employee records and the time period allowed for return could mean that the information provided would be out of date.

The Equality and Diversity Team worked with other service areas to identify other useful information which resulted in the questionnaire including sections on the use of British Sign Language, Welsh language ability and whether or not an employee had caring responsibilities. This information was provided statistically to the service areas to inform their work and strategies.

Statistical analysis of the information is contained in the following tables and covers all Council employees including teachers and school based employees.

People Employed by Protected Characteristic

The following information has been provided using employees' national insurance numbers; this ensures that where an employee may work in more than one job their details will be included only once to avoid duplication of information. It includes teachers and school based employees. Some comparisons will be made to the local demographic of the borough of Rhondda Cynon Taf as over 80% of employees live in the Council area.

Gender

The table below shows the gender breakdown of employees:

Gender	Total	% of Workforce
Male	2781	25.5%

Female	8123	74.5%
Total	10904	100.0%

This table clearly indicates that women make up the majority of the Council workforce, this has been consistent for a number of years.

Age

The table below shows the breakdown of employees by age group:

Age Group	Total	% of Workforce
16-24	614	5.6%
25-34	1944	17.8%
35-44	2580	23.7%
45-54	3117	28.6%
55-64	2261	20.7%
65+	388	3.6%
Total	10904	100.0%

This table indicates, as the figures did last year, that over half of Council employees are within the age range of 35-54.

Disability

The table below shows the breakdown of employees by disabled and non disabled:

Identification	Total	% of Workforce
Disabled	209	1.9%
Non Disabled	8800	80.7%
Prefer not to say	21	0.2%
Information not held	1874	17.2%
Total	10904	100.0%

Information is held on 83% of employees. A small percentage of employees have indicated that they are disabled but this is unlikely to give the true picture of disability in the workplace. Although the staff equality profile questionnaire gives the definition of disability, some employees with a 'defined' disability may not choose to identify as having a disability.

National Identify and Ethnicity

The table below shows the breakdown of employees by ethnicity:

Ethnicity	Number
Asian	8
Asian British	2
Asian Chinese	4
Asian Cornish	1
Asian Indian	6
Asian Pakistani	1
Asian Other	4
Black	4
Black African	7
Black British	4
Black Other	2
Chinese	4
Mixed Other	14
Mixed White & Asian	2
Mixed White & Black African	2
Mixed White & Black Caribbean	5
Other	26
Prefer not to say	17
White	4789
White British	2086
White Cornish	1
White English	37
White Irish	10
White Other	21
White Scottish	10
White Welsh	1749
Not Known	2088
Total	10904

The demographic of Rhondda Cynon Taf is 2%* of people identify themselves with an ethnicity other than White British, Welsh, English or Scottish.

*statswales.gov.wales at 30 June 2019

The table below shows the breakdown of employees by national identity:

National Identity	Number of Employees
African	4
Any Other Asian Background	2
Any Other Mixed Background	2
Any Other White Background	10
Bangladeshi	1
British	1317
Caribbean	1
Chinese	4
English	188
European	14

Indian	4
Irish	16
Other	5
Scottish	22
Welsh	4220
White and Asian	4
White and Black Caribbean	1
Not Known	5089
Total	10904

Information is held on 53% of employees with the majority of employees identifying themselves as Welsh followed by British.

Religion or Belief

The table below shows the breakdown of employees by religion or belief:

Religion	Total
Christian	2657
Muslim	14
Hindu	7
Buddhist	12
Sikh	2
Other	102
% of workforce identifying with a religion	25.6%
None	2857
Prefer not to say	338
Information not held	4915
Total	10904

Information is held on 55% of employees with the predominant faith being Christian.

Sexual Orientation

The table below shows the breakdown of employees by sexual orientation:

Sexual Orientation	Total
Heterosexual	3854
Gay Man	37
Gay Woman/Lesbian	40
Bisexual	25
% of workforce identifying a sexual orientation	36.3%
Prefer not to say	223
Information not held	6725
Total	10904

Information is held on 38% of employees. This is the same as reported last year. As part of the Stonewall Diversity Champion's Programme, work has and will continue to encourage more employees to complete this category on equality monitoring forms.

Pregnancy and Maternity

As at 31 March 2021 there were 132 employees on maternity. During the year 2020/21, 307 employees had been on maternity leave during this period of time.

Gender Reassignment

Specific information has not been published due to the possibility of identification. The Council has a Gender Reassignment Policy in place which was developed some years ago as a result of an employee asking for support. Since that time the policy has been accessed and support provided as and when required by employees.

Regulation Nine – Gender Specific Information

Regulation Nine of the Specific Equality Duties in Wales requires the following specific information to be provided in respect of gender breakdown.

The number of employees employed as at 31 March 2020 broken down by:

- Job
- Grade
- Pay
- Contract type
- Working pattern.

This information has been provided on the basis of actual job numbers so that those employees who work in more than one job are included in all the jobs they are employed in so the numbers may be different to those in the previous section. Once again the information includes teachers and school based employees.

The following table/s provides the specific information required:

Breakdown of Employees by Gender and Job

There are over a thousand job titles within the Council so for ease of demonstration they have been broken down into job families within the competency framework.

Job Family	Female	Male	Total
Administrator	917	264	1181
Ancillary	1512	497	2009
Assistant Headteacher	38	32	70
Community and Social Care	1383	264	1647
Deputy Headteacher	70	47	117
Frontline and Customer Care	366	282	648
Headteacher	83	38	121
Middle Manager	165	85	250
School Support	1489	85	1574
Skilled Manual Worker	32	123	155
Strategic Manager	31	40	71
Supervisor	168	210	378
Teacher	1345	395	1740
Technical, Specialist & Professional	484	402	886
Unqualified Teacher	40	17	57
Total	8123	2781	10904

As last year, the data provides very little surprises with the majority of women working in 'traditional' female areas, particularly in the Community & Social Care, Ancillary and School Support settings; this will be more closely examined as part of the Gender Pay Objective within the Strategic Equality Plan.

Breakdown of Employees by Gender & Grade

The Council operated the following grading systems as at 31 March 2021:

- Chief Officers (Head of Service and above)
- National Joint Council
- Teachers/Education

The tables below set out the breakdown of employees by gender and grade:

Employees by Gender & Grade – Chief Officers

Grade	Female	Male	Total
Chief Executive	0	1	1
Group Director	0	2	2

Director Level 1	0	2	2
Director Level 2	3	5	8
Service Director Level 1	1	2	3
Service Director Level 2	3	7	10
Head of Service Level 1	12	8	20
Head of Service Level 2	4	6	10
Total	23	33	56

There has been no significant change since the previous year, whereby the majority of Chief Officer posts are held by males. Those held by females are largely on the lower Chief Officer grades.

Employees by Gender and Grade – National Joint Council

Grade	Female	Male	Total
GR1	252	65	317
GR2	836	44	880
GR3	480	141	621
GR4	868	233	1101
GR5	789	422	1211
GR6	1151	334	1485
GR7	561	158	719
GR8	293	127	420
GR9	272	146	418
GR10	243	179	422
GR11	320	130	450
GR12	153	66	219
GR13	113	57	170
GR14	13	12	25
GR15	54	35	89
Total	6398	2149	8547

This information indicates that while 74.5% of the total Council workforce is female, it is females that dominate the lower pay grades. This will be an area that will be looked at within the Gender Pay objective in the Strategic Equality Plan.

Employees by Gender and Grade – Teachers/Education

Grade	Female	Male	Total
Education Psychologists and Advisers	89	28	117
Leadership Group/Headteachers	81	38	119
Deputy & Assistant Headteachers	134	87	221
Teachers	1357	402	1759

Total	1661	555	2216
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The figures above indicate that females make up 75% of the education profession.

Individual salary grades of Education staff is complex to summarise but on analysis there is a fairly even split of male/female across all salary points with no obvious discrepancies in respect of ability to move through the grades. The grades and salary points are based on nationally agreed pay scales and there are specific requirements for each grade and how employees move through them.

Employees by Contract Type/Working Pattern

Contract Type	Female	Male	Total
Permanent Full Time	2572	1879	4451
Permanent Part Time	1582	231	1813
Permanent Part Time Term Time	2154	83	2237
Permanent Term Time	134	25	159
Temporary Full Time	373	213	586
Temporary Part Time	138	43	181
Temporary Part Time Term Time	490	55	545
Temporary Term Time	13	3	16
Casuals	667	249	916
Total	8123	2781	10904

For permanent members of staff the breakdown of female/male is comparable to the overall workforce. Although 74.5% of the overall workforce is female, a much higher percentage of those females compared to males are working on part-time or term-time only basis.

Applicants for Employment and Promotion

A total of 446 vacancies were advertised during the year 2020/21. The following table indicates the results of the recruitment monitoring for the same period. Please note that more people are appointed to posts than the number of posts advertised. This is due to multiple post holders in the same job e.g. social workers.

Applicants for Employment and Promotion by Protected Characteristic

	Applicants	Shortlisted	Appointed
Female	4275	1345	336
Male	2795	695	141
Minority Ethnic	504	105	17
Disabled	409	123	19

LGB	429	120	25
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The numbers of people appointed in each category reflect the general makeup of the Council as a whole.

Training

Equality monitoring is normally carried out in respect of attendance at internal training courses only and has been undertaken by the use of equality monitoring forms that now monitor all protected characteristics. Sexual orientation and pregnancy and maternity were added during 2014/15.

Identification of the need for training, learning and development is carried out through the Council's workforce planning and performance review systems. During personal development interviews managers will discuss with employees their training, learning and development needs which are aligned to the performance review and job competencies. The results of these feed in to a departmental or divisional training plan.

The Council does not currently monitor whether training requests are refused as the process used to identify training, does not lend itself to this type of monitoring. This however will be considered.

Due the pandemic the delivery of formal training was reviewed, unfortunately it appears that equality monitoring was not undertaken. This will be reviewed for next year.

Disciplinary & Grievance

Disciplinary and Grievance cases are recorded and monitored through the Vision System. There were a total of 193 cases covering disciplinary, grievance and dignity at work and disciplinary action resulting from sickness absence in 2020/21. The tables below provide equality monitoring information for these cases:

Gender

	Total	Discipline	Discipline related to Sickness Absence	Grievance	Dignity at Work
Male	100	62	31	0	7
Female	95	60	21	0	14
Total	195	122	52	0	21

As can be seen from the table above there were more males involved, however when you break this down into percentages, 50.8% of disciplinary cases involved males and 49.2% involved females.

Age

	Total	Discipline	Sickness Absence	Grievance	Dignity at Work
16 – 24	15	7	6	0	2
25 – 34	31	20	7	0	4
35 – 44	50	33	11	0	6
45 – 54	50	29	14	0	7
55 – 64	42	29	11	0	2
65+	7	4	3	0	0
Total	195	122	52	0	21

Disability

	Total	Discipline	Sickness Absence	Grievance	Dignity at Work
Disabled	2	2	0	0	0
Non Disabled	157	99	42	0	16
Information not held	36	21	10	0	5
Total	195	122	52	0	21

Ethnicity

	Total	Discipline	Sickness Absence	Grievance	Dignity at Work
Asian	1	1	0	0	0
Black	0	0	0	0	0
Chinese	0	0	0	0	0
Mixed	0	0	0	0	1
White	145	96	37	0	13
Other	1	1	0	0	0
Information not held	46	24	15	0	7
Total	195	122	52	0	21

Religion or Belief

	Total	Discipline	Sickness Absence	Grievance	Dignity at Work
No Religion	57	34	20	0	3
Christian	41	28	8	0	5
Other	0	0	0	0	0
Prefer not to say	10	9	0	0	1
Information not held	87	51	24	0	12
Total	195	122	52	0	21

Sexual Orientation

	Total	Discipline	Sickness Absence	Grievance	Dignity at Work
Heterosexual	57	35	16	0	6
Gay/Lesbian	4	2	1	0	1
Bisexual	0	0	0	0	0
Prefer not to say	10	8	2	0	0
Information not held	124	77	33	0	14
Total	193	122	52	0	21

Gender Reassignment & Pregnancy and Maternity

There were 2 employees in these categories involved in disciplinary, sickness absence or grievance cases.

Leaving Employment

Information gained from the Vision System shows that a total of 688 employees left the employment of the Council in 2020/21, which included 7 employees who were made redundant. It should be noted that these employees were school based, where the decision on redundancy rests with the relevant school in accordance with School Governance Regulations. The tables below indicate the number of leavers and reasons for leaving during 2020/21

Reasons for Leaving by Gender

Reason for Leaving	Female	Male	Total
Age Retirement	55	16	71
Death in Service	7	5	12
Dismissed	3	4	7
Early Retirement (Teachers)	4	1	5

End of Contract	66	15	81
Failed Probationary Period	2	0	2
Ill Health	9	9	18
Inability to Attend Work	0	2	2
Mutual Agreement	64	13	77
Redundant	7	0	7
Transfer to another Council	19	13	32
Voluntary	254	87	341
Voluntary early retirement and redundancy	18	7	25
Voluntary redundancy	6	2	8
Total	514	174	688

The gender breakdown of those leaving reflects the gender breakdown of the Council as a whole.

Reason for Leaving by Age

Reason for leaving	18-24	25-34	35-44	45-54	55-64	65+	Total
Age Retirement	0	0	0	0	26	45	71
Death in Service	0	0	2	3	7	0	12
Dismissed	0	3	1	2	1	0	7
Early retirement (Teachers)	0	0	0	0	5	0	5
End of Contract	12	38	21	7	2	1	81
Failed probationary period	0	1	1	0	0	0	2
Ill health	0	0	1	3	11	3	18
Inability to Attend Work	0	1	1	0	0	0	2
Mutual agreement	0	3	6	16	29	23	77
Redundant	0	0	2	2	3	0	7
Transfer to another Council	0	6	15	9	2	0	32
Voluntary	41	99	77	69	39	16	341
VER and redundancy	0	0	0	0	20	5	25
Voluntary redundancy	0	1	1	5	1	0	8
Total	53	152	128	116	146	93	688

Reason for Leaving by Disability

Reason for Leaving	Total
Age Retirement	1
Death in Service	1
End of Contract	1

Ill health	2
Inability to Attend Work	1
Mutual agreement	4
Voluntary	3
Total	13

Reason for Leaving by Ethnicity

Reason	White	Ethnic Minority	Not Known	Total
Age retirement	67	0	4	71
Death in service	12	0	0	12
Dismissed	5	0	2	7
Early retirement (Teachers)	4	1	0	5
End of contract	63	2	16	81
Failed probationary period	2	0	0	2
Ill health	18	0	0	18
Inability to Attend Work	2	0	0	2
Mutual agreement	66	1	10	77
Redundant	7	0	0	7
Transfer to another Council	24	0	8	32
Voluntary	253	8	80	341
VER with redundancy	22	0	3	25
Voluntary redundancy	6	0	2	8
Total	551	12	125	688

Reason for Leaving by Religion or Belief

Reason	Buddhist	Christian	Muslim	No Religion	Other	Prefer not to say	Not Known	Total
Age Retirement	0	27	0	11	2	2	29	71
Death in Service	0	5	0	3	0	0	4	12
Dismissed	0	2	0	2	0	1	2	7
Early retirement (teachers)	0	3	0	1	0	0	1	5
End of contract	0	26	1	21	1	4	28	81

Failed probationary period	0	1	0	1	0	0	0	2
Ill health	0	5	0	3	0	1	9	18
Inability to Attend Work	0	1	0	1	0	0	0	2
Mutual agreement	0	20	0	10	0	0	47	77
Redundant	0	2	0	2	0	0	3	7
Transfer to another Council	0	11	0	8	0	2	11	32
Voluntary	2	63	2	126	3	16	129	341
VER with redundancy	0	13	0	2	1	3	6	25
Voluntary redundancy	0	3	0	2	0	0	3	8
Total	2	182	3	193	7	29	272	688

Reason for Leaving by Sexual Orientation

Reason	Hetero-sexual	Gay/Lesbian	Bi-sexual	Prefer not to say	Not Known	Total
Age retirement	36	0	0	1	34	71
Death in service	7	0	0	0	5	12
Dismissed	2	0	0	0	5	7
Early retirement (Teachers)	3	0	0	0	2	5
End of contract	10	1	0	0	70	81
Failed probationary period	1	0	0	0	1	2
Ill health	7	0	0	0	11	18
Inability to Attend Work		1	0	0	1	2
Mutual agreement	21	0	0	1	55	77
Redundant	3		0	0	4	7
Transfer to another Council	12	0	0	0	20	32
Voluntary	129	3	2	12	195	341
VER with redundancy	17	0	0	2	6	25
Voluntary redundancy	3	0	0	0	5	8
Total	251	5	2	16	414	688



RHONDDA CYNON TAF COUNTY BOROUGH COUNCIL

OVERVIEW & SCRUTINY COMMITTEE

28 FEBRUARY 2022

FLOOD INVESTIGATION REPORT & ACTION PLANS

REPORT OF THE SERVICE DIRECTOR, DEMOCRATIC SERVICES & COMMUNICATIONS

1. **PURPOSE OF THE REPORT**

- 1.1 To provide members with the opportunity to scrutinise the group of recently published Flood and Water Management Act 2010 Section 19 Flood Investigation Reports (Flood Investigation Area RCT 12-Treforest, RCT 14-Glyntaff & Hawthorn, RCT 17-Taffs Well, RCT 01-Hirwaun, RCT 11-Pontypridd, RCT 16 Upper Boat & Nantgarw , RCT10 Cilfynydd and RCT 27 Treherbert (attached at Appendices A-H).
- 1.2 To provide Members with the opportunity to comment on quarterly performance information relating to the actions contained in the review of the Council's response to Storm Dennis [Cabinet Report 18 December 2020](#) (attached at Appendix I)

2. **RECOMMENDATIONS**

It is recommended that Members:-

- 2.1 Consider the attached Section 19 Flood Investigation Reports collectively (as referred to above and as attached in Appendices A-H) and determine whether they have any matters Members may wish to scrutinise arising from the findings of these reports.
- 2.2 Scrutinise the action plans enclosed as set out at Appendix I;
- 2.3 Propose that the Overview & Scrutiny Committee of the next Council, determine its focus upon this matter, as part of its work programming for the 2022/23 Municipal Year.

3. REASONS FOR RECOMMENDATIONS

- 3.1 The Overview & Scrutiny Committee, as the Council's overarching Scrutiny Committee has considered, information to-date from partners, Council Officers and local members in advance of the internal review process considered by Cabinet in December 2020 and has continued to play its part in understanding the statutory responsibilities of the Council, how they are being met and how key agencies are working in partnership to manage flood risks.
- 3.2 Follow on from this work members requested the opportunity to scrutinise and challenge the Section 19 flood investigation reports which set out the storm events that occurred between February and August 2020 within the Rhondda Cynon Taf County Borough Council area.
- 3.3 The Overview & Scrutiny Committee will continue to maintain an interest in scrutinising the Council's flood risk management arrangements and monitor progress, including providing constructive scrutiny upon the action plans contained in Appendix I.

4. BACKGROUND

- 4.1 The Overview & Scrutiny Committee's timeline of engagement in respect of the Council's response to the severe flooding experienced during 2020 is set out below:
- [14th October 2020](#) Report and presentation from Council Officers on the scale of this weather event, the service and community response, and lessons learned to-date.
 - [9th November 2020](#) Scrutiny Inquiry Session – to facilitate the engagement of local members.
 - [Full Council on the 25th November 2020](#) briefing to all Elected Members
 - [9th December 2020](#) - Position Statement - Scrutiny of The Council's Response to Flooding During 2020
 - [21st September 2021](#) - Consideration of the Section 19 Flood Investigation Report (Pentre)
- 4.2 In addition to the Council's Section 19 reports into the February Floods as the Lead Local Flood Authority (LLFA) under the Flood and Water Management Act 2010 (FWMA) an internal assessment was also undertaken by the Senior Leadership Team (SLT).
- 4.3 The report to Cabinet set out a number of key actions from the lessons learned and work undertaken, including the internal Officer reviews and the work of scrutiny.
- 4.4 It was recommended that progress and implementation of the actions agreed by [Cabinet on the 18 December 2020](#), would form part of the Council's quarterly performance report. It was proposed that the monitoring of progress

updates would be scrutinised by the Overview & Scrutiny Committee moving forward.

- 4.5 Scrutiny indicated its wish to receive and comment upon the Section 19 statutory reports on conclusion of the ongoing investigations that the Council has undertaken into the February Floods as the Lead Local Flood Authority (LLFA) under the Flood and Water Management Act 2010. The recommendations contained within this report provide committee with the opportunity to do so.

5. FLOOD AND WATER MANAGEMENT ACT 2010 SECTION 19 FLOOD INVESTIGATION REPORTS

- 5.1 Members are reminded that the reports have been produced through the duties placed upon Rhondda Cynon Taf County Borough Council (RCT) under Section 19 of the Flood and Water Management Act 2010. The Act states, “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”.

- 5.2 Members will note that they previously considered the Section 19 flood investigation report for Pentre, at its meeting held on the [21st September 2021](#) and the commitment was made for Scrutiny to receive the group of Section 19 Flood and Water Management Act 2010 reports upon publication.

- 5.3 To assist with discussions, Council Officers together with representatives from Partner Agencies Natural Resources Wales (NRW) and Welsh Water will be in attendance at the meeting.

- 5.4 The published Section 19 flood investigation reports (in addition to the Storm Dennis Overview Report) can be viewed on the Council’s website here: [Flood Investigation Reports | Rhondda Cynon Taf County Borough Council \(rctcbc.gov.uk\)](#)

6. ADDITIONAL INFORMATION REQUESTED BY SCRUTINY

- 6.1 At its meeting in September 2021, Members requested legal advice on the role of scrutiny in holding Natural Resources Wales liable for the flooding to properties in Pentre caused by Storm Dennis. Attached at Appendix J is the response provided by the Council’s Head of Legal Services in respect of the position. This advise confirms the position outlined by the Head of Democratic Services at the said meeting.
- 6.2 Furthermore, a request was also made for any correspondence associated with the WLGA Leaders’ Meeting on the 28th May 2021 and any associated responses from the Local Authority be shared with the Overview & Scrutiny Committee. All correspondence relating to that meeting is attached at Appendix K.

6.3 For clarity the following appendices are attached:

- Flood Investigation Area RCT10 Cilfynydd **Appendix A**
- Flood Investigation Area RCT 27 Treherbert **Appendix B**
- Flood Investigation Area RCT 12-Treforest **Appendix C**
- Flood Investigation Area RCT 14-Glyntaff & Hawthorn **Appendix D**
- Flood Investigation Area RCT 17-Taffs Well **Appendix E**
- Flood Investigation Area RCT 01-Hirwaun **Appendix F**
- Flood Investigation Area RCT 11-Pontypridd **Appendix G**
- Flood Investigation Area RCT 16 Upper Boat & Nantgarw **Appendix H**

- Update of actions arising from the recommendations contained in the review of the Council's response to Storm Dennis Action Plans **Appendix I**

- Additional information as requested by the Overview & Scrutiny Committee
Legal advice **Appendix J**
Correspondence **Appendix K**

7. CONSULTATION / INVOLVEMENT

7.1 The process of engagement with key partners and local members has steered Scrutiny's consideration and methodology throughout this process.

8. EQUALITY AND DIVERSITY IMPLICATIONS

8.1 Equality and diversity implications are to be considered as part of the Scrutiny's ongoing activity with this matter.

9. FINANCIAL IMPLICATIONS

9.1 Financial and resource implications will be considered as part of scrutiny's recommendations as will any subsequent implementation arrangements going forward.

10. LEGAL IMPLICATIONS OR LEGISLATION CONSIDERED

10.1 There are no legal implications arising from the recommendations in this report.

11. LINKS TO THE COUNCILS CORPORATE PLAN / OTHER CORPORATE PRIORITIES.

11.1 The Well-being of Future Generations Act asks public bodies to work better with people, communities and each other to meet the Sustainable Development principle. The Council's approach to the implementation of the Act agreed by Cabinet is to make sure that its requirements are embedded into the everyday business.

11.2 Engagement with Stakeholders has enabled the Scrutiny review to apply the Sustainable Development principle of the Act through the five ways of working, namely, Integration, Collaboration, Long term thinking, Involvement and Prevention and maximise the contribution to the 7 national Well-being goals.

12. CONCLUSION

12.1 As the Council's overarching Scrutiny Committee, the Overview & Scrutiny Committee, in line with its terms of reference, has undertaken an extensive review into the Council's response to the severe flooding experienced during 2020 and contributed to the recommendations to the Cabinet. Scrutiny has a further opportunity to consider the published Section 19 Flood investigation reports to ensure that the issues which emerged from the flooding event and subsequent recommendations have been highlighted, reflected upon and actioned.

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Appendix A

**Flood and Water Management Act
2010**

**Section 19 Flood Investigation
Report**

**Storm Dennis –
Flood Investigation Area RCT10**

September 2021

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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 Flood and Water Management Act 2010. The Council assumes no responsibility or liability from any person in connection with its contents or findings.

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CONTENTS

EXECUTIVE SUMMARY	4
ABBREVIATIONS.....	6
TABLES AND FIGURES	7
1. INTRODUCTION.....	9
1.1. Purpose of Investigation.....	9
1.2. Site Location	10
1.3. Drainage System.....	11
1.4. Investigation Evidence	12
1.5. Public Engagement	12
2. FLOODING HISTORY	14
2.1. Previous Flood Incidents	14
2.2. Flood Incident.....	15
2.2.1. Pathway A.....	18
2.2.2. Pathway B.....	22
2.2.3. Pathway C	25
2.3. Rainfall Analysis.....	28
3. POSSIBLE CAUSES	29
3.1. Culvert Conditions.....	29
3.1.1. Culvert Inlet 1.....	30
3.1.2. Culvert Inlet 2.....	31
3.1.3. Culvert Inlet 3.....	32
3.2. Ordinary Watercourse Conditions	35
3.2.1. Nant Cae Dudwg Ordinary Watercourse.....	35
3.2.2. Heol Mynydd Unnamed Ordinary Watercourse	39
3.2.3. Ely Brook Ordinary Watercourse.....	40
3.3. Main River	41
3.4. Highway Drainage Conditions	42
3.5. Surface Water	43
3.6. Access Structures	44

3.7. System at Capacity	44
3.8. Summary of Possible Causes	47
4. RISK MANAGEMENT AUTHORITY ACTIONS.....	49
4.1. Lead Local Flood Authority	54
4.2. Natural Resources Wales	56
4.3. Water Company	56
4.4. Highway Authority	56
USEFUL LINKS/CONTACTS	58

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EXECUTIVE SUMMARY

This report has been produced through the duties placed upon Rhondda Cynon Taf County Borough Council (RCT) 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 factual report of the storm event that occurred on 15 and 16th of February 2020 within the Rhondda Cynon Taf County Borough Council area, focusing investigation on the flooding at Cilfynydd in the River Taff catchment, to the north-east of Pontypridd (Flood Investigation Area RCT 10, Figure 1). This report was undertaken to identify the mechanism for 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 had undertaken or were planning to undertake actions related to those functions to reduce/alleviate the risk of flooding.

The flooding that affected RCT on 15 and 16th of February 2020, was a result of an extreme rainfall event, designated by the Met Office as ‘Storm Dennis’. The impact of the event at investigation area RCT10 resulted in internal flooding to 23 residential properties, two commercial properties and flooding to the highway. 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, Natural Resources Wales and Dŵr Cymru Welsh Water.

It has been established from the evidence gathered within this report that the primary source of flooding at RCT10 on the 15 and 16th February 2020 was a result of significant overland runoff being generated from the steep hillsides above Cilfynydd draining to lower ground via a series of ordinary watercourses, many of which became overwhelmed with water and debris and eventually overtopped, impacting several properties on its course of flow.

On review of the hydraulic performance of the three culvert inlets known to have caused flooding to properties, it was confirmed that the Nant Cae Dudwg culvert inlet became hydraulically overloaded while the Heol Mynydd and Ely Brook networks were identified as having standard of protection of up to 1 in 100-year event. This confirms

that both inlets had sufficient capacity to manage the expected flows, but its capacities were significantly reduced due to blockages, resulting in flooding to several properties. The poor structural condition of the Ely Brook network is also considered to have contributed to the flooding at Pontshonnorton Road.

RCTCBC as the Lead Local Flood Authority (LLFA) and Land Drainage Authority (LDA) has been determined as the relevant Risk Management Authority responsible for managing the ordinary watercourse and surface water flooding that occurred in Cilfynydd during Storm Dennis.

In response to the flooding in Cilfynydd during Storm Dennis, the LLFA has undertaken 12 actions and have proposed to undertake a further 8. A summary of which include;

- Undertaken clearance works to the culvert inlet structures identified as sources of flooding prior to and following the storm event (assisted by the Highway Authority);
- Carried out survey, jetting and cleansing works to an estimated 1,229 metres of culverted watercourse network length within the investigation area;
- Led on the development of a central Control Room, to compliment the Council's Contact Centre and CCTV Centre, to provide a comprehensive and informed response to residents during storm events; and
- Initiated an interim Property Flood Resistance project offering expandable flood gates to properties deemed at high risk of ordinary watercourse and surface water flooding.

As the relevant Risk Management Authority for ordinary watercourse flooding, RCTCBC as the Lead Local Flood Authority will also look to better understand the catchment above investigation area RCT10 through the development of a Strategic Outline Business Case to provide recommendations for suitable management mechanisms to mitigate the wider risk of ordinary watercourse and surface water flooding in the community.

The event that occurred on 15 and 16th February 2020 was extreme, and it is unlikely flooding from a similar event could be prevented entirely. It is concluded that Risk Management Authorities satisfactorily carried out their flood risk management functions in response to the flood event, however, further functions have been proposed by RMAs to better address preparedness and response to surface water flood events.

ABBREVIATIONS

CaRR – Communities at Risk Register

DCWW – Welsh Water

FRMP – Flood Risk Management Plan

FWMA – Flood and Water Management Act 2010

LDA – Land Drainage Authority

LFRMS – Local Flood Risk Management Strategy

LLFA – Lead Local Flood Authority

NRW – Natural Resources Wales

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

RCT - Rhondda Cynon Taff CBC

RCT10 – Flood Investigation Area RCT 10

RMA – Risk Management Authority

SAB – Sustainable Drainage Approval Body

SuDs – Sustainable Drainage Systems

TABLES AND FIGURES

Table 1: Investigative evidence gathered in preparation of the Storm Dennis Section 19 report	12
Table 2: Summary of the source(s), pathway(s) and receptor(s) affected during Storm Dennis within investigation area RCT 10.....	15
Table 3: Summary of culvert capacity assessment results which indicate the current standard of protection of the culverted networks in free flowing and blockage conditions and whether flooding was observed during Storm Dennis	45
Table 4: Summary of the source(s) and possible cause(s) of flooding in investigation area RCT10 during Storm Dennis	47
Table 5: Risk Management Authority responsible for different flood types	49
Table 6: Recommendations provided by the LLFA to be considered by the relevant Risk Management Authority identified in response to the source(s) of flooding in Investigation Area RCT10 (as per Table 4)	50
Figure 1: Flood Investigation Area RCT10 Location Plan	10
Figure 2: Natural Resources Wales' Flood Risk Assessment Wales (FRAW) map for rivers and ordinary watercourse and surface water flood risk at investigation area RCT10. Contains Natural Resources Wales information © Natural Resources Wales and database right. All rights reserved. ...	11
Figure 3: Rainfall Topographic Watersheds of the three primary watercourses flowing through investigation area RCT10.....	18
Figure 4: Map illustrating flow path A and the Nant Cae Dudwg culvert inlet, 'Culvert Inlet 1'	19
Figure 5: View of the lane between the Nant Cae Dudwg inlet and the rear gardens of properties on Cilfynydd Road captured by FRM officers on 17 th February 2020.....	20
Figure 6: Damages left after the event to the rear of a property at Cilfynydd Road captured by FRM officers on 17 th February 2020	20
Figure 7: Water depth marks in a property at Cilfynydd Road following Storm Dennis (image provided by resident).....	21
Figure 8: Map illustrating flow path B the culvert inlet of the unnamed watercourse, 'Culvert Inlet 2' .	22
Figure 9: Damages to rear garden of a property at Heol Mynydd following the storm event (captured by FRM officers on 17 th February 2020).....	23
Figure 10: Road damages and debris deposited along Heol Cronfa following the storm event (captured by FRM officers on 17 th February 2020)	23
Figure 11: Evidence of damages to the top of the path looking up towards Heol Nant (captured by FRM officers on 17 th February 2020)	24
Figure 12: Evidence of deposited debris and damages to the bottom of the path looking down towards Brynderwen. Overland flows were observed flowing through land to the right behind the fencing (captured by FRM officers on 17 th February 2020).	25
Figure 13: Map illustrating flow path C and the Ely Brook culvert inlet, 'Culvert Inlet 3'	26

Figure 14: Damages to the driveway situated below the Ely Brook culvert inlet showing evidence of subterranean hydraulic pressure (captured by FRM officers on 17 th February 2020).....	26
Figure 15: Surveyed culverted watercourse networks within flood investigation area RCT10	29
Figure 16: Photo of 'Culvert Inlet 1' (Nant Cae Dudwg culvert inlet) captured by RCT's Flood Risk Management team prior to Storm Dennis on 13 th February 2020	30
Figure 17: Nant Cae Dudwg culvert inlet (captured by FRM officers on 17 th February 2020)	31
Figure 18: Culvert inlet to the rear of Heol Mynydd which surcharged during Storm Dennis due to blockages at the inlet (captured by FRM officers on 17 th February 2020 following clearance works)..	32
Figure 19: Ely Brook culvert inlet to the rear of Pontshonnorton Road which surcharged during Storm Dennis due to blockages at the inlet (captured by FRM officers on 17 th February 2020 following clearance works)	33
Figure 20: Hole in culvert 22.9 meters downstream of the Ely Brook inlet opposite Royal Oak Inn....	34
Figure 21: Map of Ordinary Watercourses which feed into investigation area RCT10	35
Figure 22: Initial upstream debris screen in the Nant Cae Dudwg watercourse (captured by RCT's Flood Risk Management team on 17 th February 2020)	36
Figure 23: Second upstream debris screen in the Nant Cae Dudwg watercourse (captured by RCT's Flood Risk Management team on 17 th February 2020)	36
Figure 24: Initial upstream debris screen in the Nant Cae Dudwg watercourse captured prior to Storm Dennis	37
Figure 25: Second upstream debris screen in the Nant Cae Dudwg watercourse captured prior to Storm Dennis	37
Figure 26: Photo of localised landslip on the embankment of the Nant Cae Dudwg watercourse (image captured by RCT's Flood Risk Management team on 02/03/2020)	38
Figure 27: Photo of embankment scour to the Nant Cae Dudwg watercourse (image captured by RCT's Flood Risk Management team on 02/03/2020)	38
Figure 28: Water level in the Nant Cae Dudwg ordinary watercourse during the 14 – 18th February 2020 captured by RCT's monitoring station. Dashed line represents the alarm trigger threshold (0.9m)	39
Figure 29: Tree collapse in the unnamed ordinary watercourse to the rear of Heol Mynydd (captured by FRM officers on 17 th February 2020)	40
Figure 30: Photo of stone deposition, bank erosion and undercutting of trees within the Ely Brook ordinary watercourse in the upper catchment (captured by RCT's Flood Risk Management team post Storm Dennis)	41
Figure 31: Debris left after the storm event at Pontshonnorton Road (captured by FRM officers on 17th February 2020).....	42
Figure 32: Photo of the drainage ditch overtopping (image captured by resident on 16/02/2020).....	43
Figure 33: Location of the identified land drainage ditch and observed surface water flow paths during Storm Dennis	44

1. INTRODUCTION

1.1. PURPOSE OF INVESTIGATION

On the 15 and 16th February 2020 Rhondda Cynon Taf County Borough Council (RCT) was impacted by an extreme weather event which was designated by the 'Met Office' as 'Storm Dennis'. Due to the extent and impact of the event, the LLFA opted to undertake a formal investigation.

The storm resulted in widespread residential and commercial flooding within the Rhondda Cynon Taf County Borough Council area. This report will focus on Flood Investigation Area RCT 10 which covers the village of Cilfynydd in the River Taff catchment.

The reason behind RCT's investigation is in response to the duties of the local authority in regard to Section 19; of the Flood and Water Management Act 2010, 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 the response to the flood."
2. "When an authority carries out an investigation under subsection (1) it must publish the results of its investigation, and notify any relevant risk management authority"¹

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

Specific details of Storm Dennis, such as rainfall analysis are covered within a separate overview report that covers the wider RCT area. The report is titled 'Storm Dennis February 2020 – Overview Report' and will be referred to as 'FRM – Storm Dennis – Overview Report'².

¹ Flood and Water Management Act 2010 – Section 19 - <https://www.legislation.gov.uk/ukpga/2010/29/section/19>

² [Flood Investigation Reports | Rhondda Cynon Taf County Borough Council \(rctcbc.gov.uk\)](https://www.rctcbc.gov.uk/flood-investigation-reports)

1.2. SITE LOCATION

The area investigated within this report covers the town of Cilfynydd and extends south towards the north of Pontypridd (Figure 1). Cilfynydd is located within the eastern sector of RCT in the River Taff catchment, on the eastern side of the river.

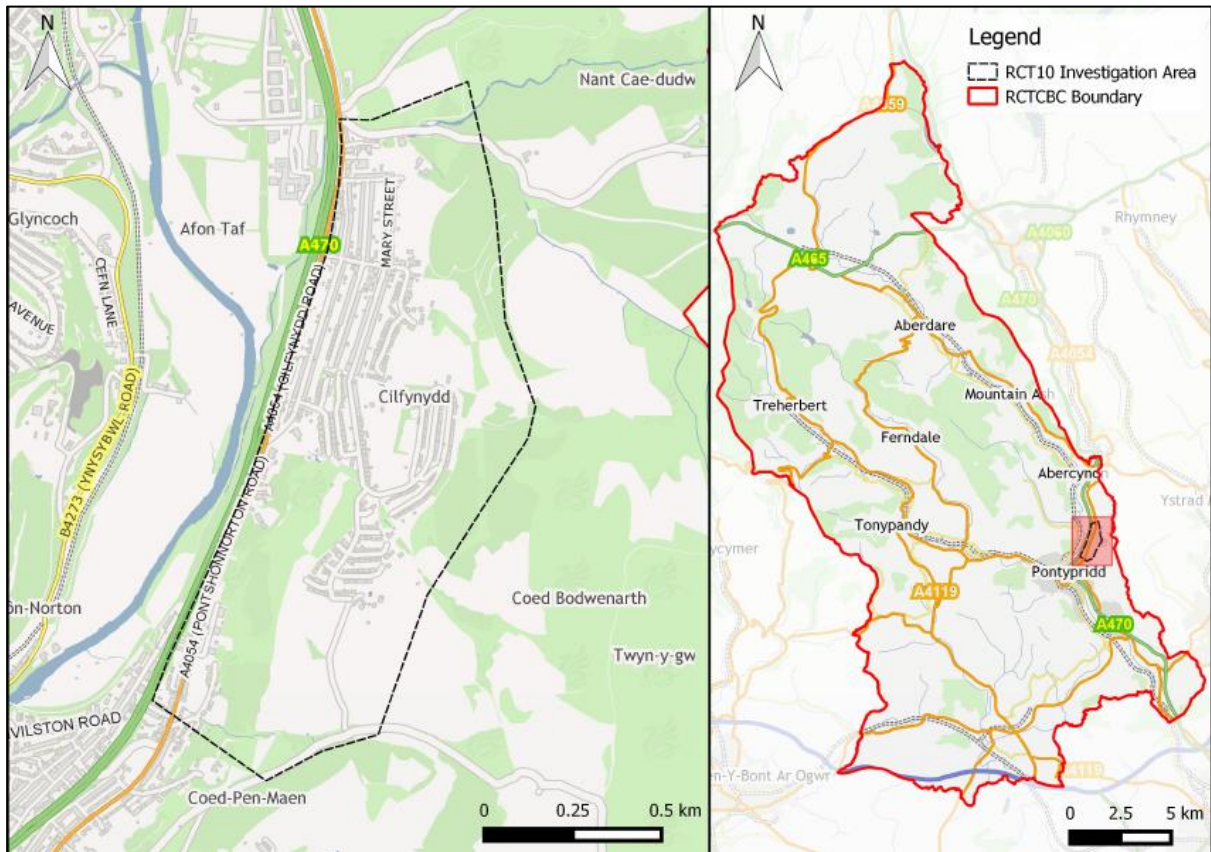


Figure 1: Flood Investigation Area RCT10 Location Plan

The catchment is predominantly a rural environment owing to the steep topography of the higher elevations in the east, consisting of exposed moorland and areas of forested land. Residential development is situated in the central western portion of the investigation area and is built back from the A470.

The most significant watercourse within Cilfynydd is the Nant Cae Dudwg which drains the north-east of the site and discharges into the River Taff. To the south of Cilfynydd, a small watercourse named Ely Brook flows east to west and is culverted beneath the A4054 and A470. Several other minor unnamed watercourses drain the steep slopes in the east of investigation area RCT10 and discharge into the River Taff. Large sections of these watercourses are culverted beneath residential development in the urban area.

The highest risk posed to people and properties according to RCT's Flood Risk Management Plan (FRMP)³ is broadly associated with the culvert inlet of the Nant Cae Dudwg where it crosses under Cilfynydd Road. The FRMP also notes a low to high risk of flooding sourced from the unnamed watercourses culverted beneath Cilfynydd. The risk of flooding from these watercourses is illustrated within Natural Resources Wales' Flood Risk Assessment Wales (FRAW) map presented in Figure 2. Flooding from the Main River is noted within the floodplains adjacent to the River Taff, however these areas fall outside of investigation area RCT10.



Figure 2: Natural Resources Wales' Flood Risk Assessment Wales (FRAW) map for rivers and ordinary watercourse and surface water flood risk at investigation area RCT10. Contains Natural Resources Wales information © Natural Resources Wales and database right. All rights reserved.

1.3. DRAINAGE SYSTEM

The surface water drainage system that serves investigation area RCT10 is that of the highway drainage network designed to manage the surface water within the highway and public surface water sewer and combined sewer networks operated by Dŵr Cymru Welsh Water.

³ [RCT's Flood Risk Management Plan \(rctcbc.gov.uk\)](http://rctcbc.gov.uk)

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 below within Table 1.

Table 1: Investigative evidence gathered in preparation of the Storm Dennis Section 19 report

Source	Data
Residents	Photos, videos, statements, email correspondence, public engagement survey responses
Responders' statements	Local responders' statements
CCTV Surveys	Internal surveys of the local drainage networks
Met Office Data	Weather Warning information (see FRM – Storm Dennis – Overview Report)
Rain Gauges	RCT and NRW operated gauge information (see FRM – Storm Dennis – Overview Report)
Natural Resources Wales	River Level and Flood Warning data
RCT Flood Risk Management Plan	Site specific information and data for each electoral ward in RCTCBC
Communities at Risk Register	Flood risk ranking and scores for all flood types based on community data in Wales
Flood Investigation Report (Redstart's FIR)	A summary of the source-pathway-receptors, culvert capacity assessment and hydraulic modelling work undertaken by Redstart. The Flood Investigation Report was commissioned by RCTCBC prior to writing the Section 19 report.

Evidence sourced from the 'Flood Investigation Report', commissioned by RCTCBC, will be further referred to as 'Redstart's FIR' throughout this report.

1.5. PUBLIC ENGAGEMENT

Following the initial flooding event that occurred on the 15th and 16th February during Storm Dennis, flood risk officers from RCT's Flood Risk Management department were deployed to areas across the borough to investigate reports of internal flooding by residents. Residents were engaged 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 pathway(s) of flood water during the event. Due to the volume

of calls received by RCT's Out of Hour department, visits were prioritised to those areas experiencing significant internal flooding to residential properties.

To support the flood investigations, a public engagement exercise was undertaken between 4th and 25th January 2021 by Redstart on behalf of RCTCBC. The aim of this was to engage with the local residents who were affected by the flood event to capture details 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. 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.

2. FLOODING HISTORY

2.1. PREVIOUS FLOOD INCIDENTS

Local knowledge of the investigation area notes that the Nant Cae Dudwg ordinary watercourse and culvert inlet has a history of flooding in times of extreme rainfall. This is corroborated by residents' accounts captured as part of the public engagement exercise, which identify that properties affected at Cilfynydd Road have experienced internal flooding prior to Storm Dennis, originating from the Nant Cae Dudwg watercourse and culvert inlet.

Since the development and construction of a Flood Alleviation Scheme (FAS) on the Nant Cae Dudwg in 2014, led by RCT as the Lead Local Flood Authority, flood risk sourced from the watercourse and culvert inlet has reduced significantly. The watercourse is not known to have overtopped or surcharged at the inlet since the FAS, and no instances of internal flooding to those properties at Cilfynydd Road has occurred, up until Storm Dennis.

Previous incidences of flooding to properties within the wider investigation area have occurred over the past twenty years however, nothing as extreme as the flooding that occurred during Storm Dennis. Information relating to historical flood incidences is limited, however a list of dates where flooding has occurred within RCT10 has been provided below;

- January 1998
- September 1998
- September 2000
- July 2001
- September 2004
- December 2007
- September 2008
- September 2009

These instances relate to the network of ordinary watercourses and culverted infrastructure which convey a substantial volume of water through the village of Cilfynydd. The most notable flood event occurred during September 2008 where residents at Oakland Terrace, Bedw Road and surrounding streets were impacted by flooding associated with culvert inlet blockages.

2.2. FLOOD INCIDENT

The flooding that occurred on the 15th and 16th February 2020 was a result of an extreme rainfall event, designated by the Met Office as ‘Storm Dennis’. The rainfall event affected the majority of RCT and caused widespread flooding to communities.

Specific details of Storm Dennis, such as rainfall and river level analysis are covered within a separate overview report that covers the wider RCT area, referenced ‘FRM – Storm Dennis – Overview Report’².

The post event inspections undertaken on the days following the storm event by RCT’s Flood Risk Management Team and RCT’s Public Health, Protection and Community team identified 23 residential properties and two commercial properties as internally flooded.

A summary of the source(s) and pathway(s) for flooding within the Cilfynydd investigation area during Storm Dennis have been outlined in Table 2 and further described throughout this section.

Table 2: Summary of the source(s), pathway(s) and receptor(s) affected during Storm Dennis within investigation area RCT 10

Source	Pathway	Receptor
Intense rainfall running off the steep hillsides to the east of Cilfynydd draining to lower ground via the Nant Cae Dudwg.	<p>The initial flow path for this incident was the routing of runoff from the steep hillside to the northeast of Cilfynydd. These flows are conveyed via the Nant Cae Dudwg Ordinary watercourse.</p> <p>The Nant Cae Dudwg ordinary watercourse overtopped its channel side/flood wall adjacent to Cilfynydd Road.</p> <p>Water flowed into the lane behind properties along Cilfynydd Road and then overtopped the rear garden walls and into the properties.</p>	Internal flooding to the basement level of 8 residential properties on Cilfynydd Road, situated adjacent the Nant Cae Dudwg ordinary watercourse and culvert inlet.

<p>Surface water accumulation on the A4054 Cilfynydd Road</p>	<p>Surface water ponding occurred along the Cilfynydd Road highway adjacent the junction of Park Place</p>	<p>Internal flooding to one commercial property situated at the junction of Park Place.</p>
<p>Intense rainfall running off the steep hillsides to the east of Cilfynydd draining to lower ground via an unnamed watercourse to the east of Heol Mynydd.</p> <p>The debris screen of the culvert inlet to the rear of Heol Mynydd became blocked during the event.</p>	<p>Surcharging flows from the culvert inlet overtopped the rear garden fences of two properties at Heol Mynydd and onto the road before continuing to flow towards Heol Nant and Heol Cronfa.</p> <p>Water travelled overland towards Brynderwen via a lane from Heol Nant.</p> <p>Water re-entered the watercourse network from Heol Cronfa towards Oakland Terrace.</p>	<p>Internal flooding to two residential properties at Heol Mynydd and a further two properties at Heol Nant.</p> <p>Several properties were affected at Brynderwen, including internal flooding to three properties and external flooding to at least a further three properties.</p> <p>Highway flooding also occurred along multiple streets due to surface water and ordinary watercourse flooding.</p>
<p>Intense rainfall running off the steep hillsides to the east of Cilfynydd draining to lower ground via a land drain to the east of Brynderwen.</p>	<p>Exceedance surface water flows overtopped the land drain and continued its pathway towards the lane located at the rear of Brynderwen.</p> <p>This flow path was observed to have occurred prior to the blockage at Heol Mynydd culvert inlet which also contributed flows down the lane towards Brynderwen.</p>	<p>Contributed to the external flooding of properties at Brynderwen and exacerbated the internal flooding of 3 properties</p>
<p>Intense rainfall running off the steep hillsides to the rear of the A4054 in the south of Cilfynydd draining to lower ground via the Ely Brook ordinary watercourse.</p> <p>The Ely Brook ordinary watercourse surcharged at</p>	<p>Water overflowed from the Ely Brook culvert inlet and travelled onto the A4054 Pontshonnorton Road.</p> <p>Water conveyed north down Pontshonnorton Road towards Norton Court and Evans Square which is</p>	<p>A commercial property directly opposite the Ely Brook culvert inlet was internally flooded.</p> <p>Internal flooding to 8 residential properties at Belgrave Terrace, Evans Square and Norton Court.</p>

the inlet due to debris blockages.	situated at a slightly lower elevation than the A4054.	
A section of the Ely Brook culvert network failed during the storm event, contributing to the flooding.	Water escaped from a culvert barrel, and conveyed north down Pontshonnorton Road, contributing to the flooding sourced by the surcharging Ely Brook culvert inlet.	Contributed to the flooding of properties at Pontshonnorton Road, Belgrave Terrace, Evans Square and Norton Court.

On review of Table 2, the principal source of flooding has been attributed to intense rainfall generating significant surface water runoff from the steep hillsides to the north and east of Cilfynydd draining to lower ground via several natural ditches and ordinary watercourses.

The principal sources of flooding, as depicted within Table 2, have been spatially represented within Figure 3, which depicts the topographic watershed of the three primary watercourses that drain towards the Cilfynydd urban area. The area of land that would expect to drain towards the three watercourses under investigation is shown in the hatched areas within Figure 3.

Residents of the affected properties in Cilfynydd reported the overtopping of the three watercourses flowing through the village, which resulted in flood water flowing overland towards the lower reaches of Cilfynydd and affecting several properties on its course. The primary flow paths that occurred during Storm Dennis have been identified as 'A' to the northeast (blue hatched area), 'B' on the eastern edge (green hatched area), and 'C' to the south (red hatched area) of investigation area RCT10 (Figure 3). These flow paths have been further described within their individual sections below.

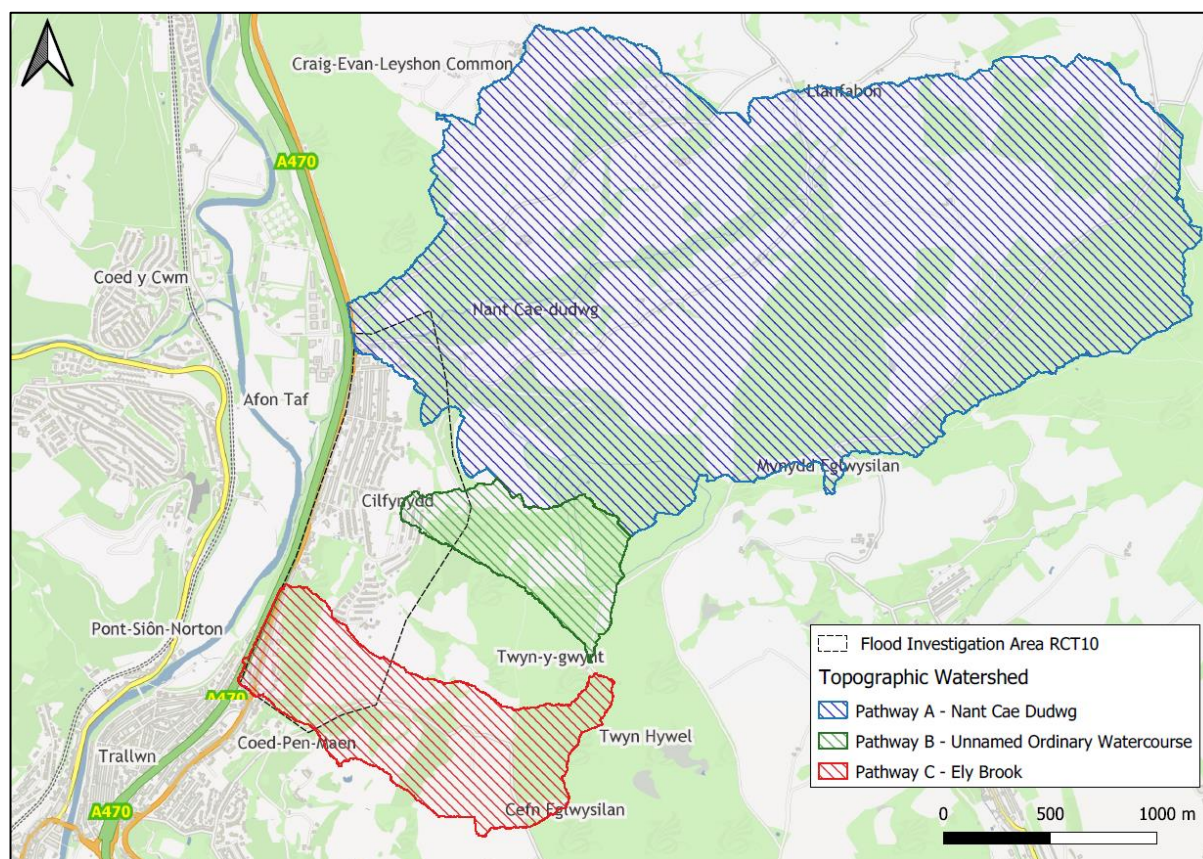


Figure 3: Rainfall Topographic Watersheds of the three primary watercourses flowing through investigation area RCT10

2.2.1. PATHWAY A

Pathway A shows where water enters the northeast of Cilfynydd via the Nant Cae Dudwg ordinary watercourse, which is the primary watercourse that runs through the town of Cilfynydd. The watercourse is culverted beneath Cilfynydd Road before discharging into the River Taff to the west of Cilfynydd.

Several calls were received from residents at Cilfynydd Road on the 16th February 2020, to report that water from the Nant Cae Dudwg watercourse had overtopped the flood wall at the inlet (labelled 'Culvert Inlet 1' in Figure 4) and was threatening to enter the rear gardens of properties situated directly downstream of the culvert inlet. The inlet location is provided in Figure 4.

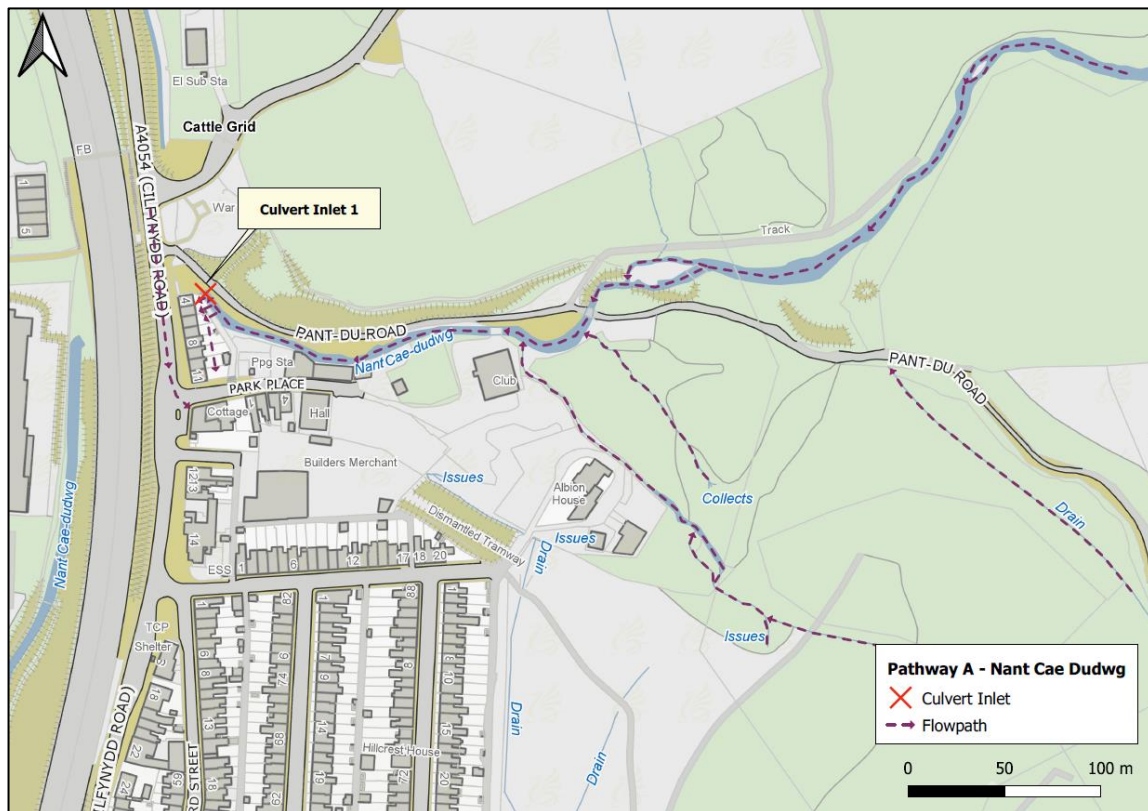


Figure 4: Map illustrating flow path A and the Nant Cae Dudwg culvert inlet, 'Culvert Inlet 1'

During the early hours of Sunday 16th February, the Nant Cae Dudwg ordinary watercourse overtopped the flood wall at the inlet, causing water to accumulate within the lane behind properties at Cilfynydd Road. The result of which saw riverine debris including silt and mud being deposited in the lane area. This resulted in blockages to the surface water drainage gullies in the lane, reducing the capacity of the drainage network to manage the excess water (Figure 5).

Following the initial overtopping of the lane, the Nant Cae Dudwg overtopped the properties rear retaining walls, flooding the gardens before entering the basement level of eight properties at Cilfynydd Road. Water levels were reported to have reached up to 1.5m - 1.8m within the basements of the properties (illustrated by the water depth marks in Figure 7).

Post event inspections found evidence of collapsed concrete boundary walls, exemplifying the force of the water emanating from the watercourse and flowing through the gardens during the event. The images below reveal the severe and long-lasting damages caused by the flood event to properties at Cilfynydd Road (Figure 6).



Figure 5: View of the lane between the Nant Cae Dudwg inlet and the rear gardens of properties on Cilfynydd Road captured by FRM officers on 17th February 2020.



Figure 6: Damages left after the event to the rear of a property at Cilfynydd Road captured by FRM officers on 17th February 2020



Figure 7: Water depth marks in a property at Cilfynydd Road following Storm Dennis (image provided by resident)

Further spells of heavy rain continued to impact Rhondda Cynon Taf when Storm Jorje, the fifth named storm of the 2019/20 season, brought strong winds and heavy rain across Wales and the UK from 28th February to 1st March 2020. Although the weather impacts from Storm Jorje were less severe than Storm Dennis, localised flooding problems continued in the aftermath of the earlier storms and as a result of further rainfall on already saturated ground⁴. During Storm Jorje, some residents at Cilfynydd Road reported that the Nant Cae Dudwg watercourse was beginning to overtop the flood wall at the inlet and into the rear lane once again, however, water did not enter the properties during this event.

Surface water was also observed to flow down the A4054 Cilfynydd Road and down Pant Ddu Road and Park Place during Storm Dennis, according to residents. Runoff travelled down the steep rural tracks leading from the hillsides in the east and onto the highway, resulting in minor internal flooding to one commercial property situated at the junction to Park Place. The affected property is situated slightly lower than the main road which resulted in the accumulation of overland flows within the low spot. Whilst the property benefits from a highway gully, this structure become overwhelmed as a result of overland flow, resulting in surface water entering through the front of the

⁴ [2020_04_storm_jorge.pdf \(metoffice.gov.uk\)](#)

property. Significant cleansing from the Council Highway and Streetcare Depot was carried out to clear the surface water networks following the storm event.

2.2.2. PATHWAY B

Pathway B, shown in Figure 3, shows where surface water flows from the east of Cilfynydd enter the town through an unnamed ordinary watercourse. The watercourse crosses the town via several culverts before discharging into the River Taff. Calls were received from residents at Heol Mynydd and Heol Nant to report that water from the unnamed watercourse to the rear of Heol Mynydd was overtopping near the inlet and beginning to flood properties. The inlet's location, labelled 'Culvert Inlet 2', is provided in Figure 8.

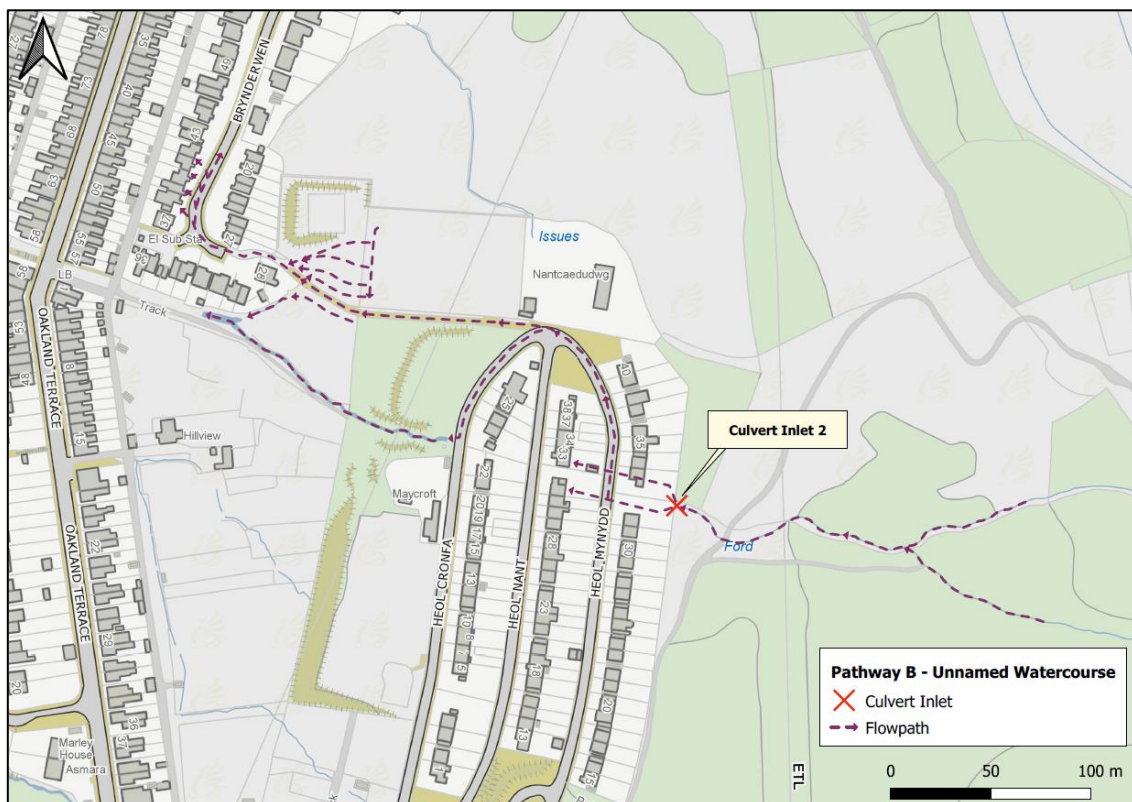


Figure 8: Map illustrating flow path B the culvert inlet of the unnamed watercourse, 'Culvert Inlet 2'

Post event inspections identified the inlet's debris screen as blocked with woody debris mobilised during the event, reducing the inlet's capacity to manage the flow and causing the inlet to surcharge and flood. According to residents, water was observed to have overtopped the garden walls to the rear of Heol Mynydd, flowing through the properties and out onto the street (Figure 9). Water then continued to flow downhill, flooding two properties on Heol Nant from the rear. As the water cascaded over the

roads and gardens of Heol Nant and Heol Cronfa, much of the water made its way back into the watercourse towards Oakland Terrace. Mud and silt deposited along the highway were identified by the inspection teams (Figure 10) indicating the flow path of the water during the storm event.

Four properties were identified as internally flooded due to the floodwater's initial pathway. Emergency clearance works were undertaken by the Council's Highway and Streetcare Depot to remove the debris from the inlet and cleanse the highway drainage infrastructure.



Figure 9: Damages to rear garden of a property at Heol Mynydd following the storm event (captured by FRM officers on 17th February 2020)



Figure 10: Road damages and debris deposited along Heol Cronfa following the storm event (captured by FRM officers on 17th February 2020)

Residents at Brynderwen, situated further downstream, reported significant surface water runoff travelling down the lane from Heol Nant towards the southern end of Brynderwen during Storm Dennis. The overtopping of the watercourse behind Heol Mynydd was likely the primary contributing source of flood water, however, discussions with the local community report that overland flows originating from the field behind Brynderwen contributed to the initial flooding. The area of land has been identified as falling under private ownership.

Water was observed coming out from the field before conveying onto the path towards Brynderwen. The path was badly damaged, assumed to be caused by the force of water flowing towards Brynderwen (Figure 11). Damages to the path were identified higher up than the gate, indicating that significant flows were also travelling from the overtopped watercourse at Heol Mynydd (Figure 12). The water entered the road, carrying debris in its flow which caused highway and private drainage infrastructure to block and surface water to pool. Properties on the western side of Brynderwen are situated slightly lower than the road, which resulted in internal flooding to three residential properties and external flooding to the front of several others.



Figure 11: Evidence of damages to the top of the path looking up towards Heol Nant (captured by FRM officers on 17th February 2020)



Figure 12: Evidence of deposited debris and damages to the bottom of the path looking down towards Brynderwen. Overland flows were observed flowing through land to the right behind the fencing (captured by FRM officers on 17th February 2020).

2.2.3. PATHWAY C

Pathway C, shown in Figure 3, shows where surface water flows enter the investigation area from the southeast corner of the catchment. The surface water flows through the Ely Brook ordinary watercourse, passes through the southern catchment via several culverts, and ultimately discharges into the River Taff. On its course of flow, the Ely Brook culvert ('Culvert Inlet 3', Figure 13) surcharged at the inlet opposite the Royal Oak Inn and resulted in flooding to properties and the highway during the storm event. The inlet location is shown in Figure 13.

The evidence suggests the inlet became blocked with debris during the storm event which caused water to overflow from the culvert inlet and flow down the driveway of a residential property opposite the Royal Oak Inn, and onto Pontshonnorton Road. Post event inspections also identified a section of the tarmac driveway to have suffered from subterranean hydraulic pressure, i.e., the driveway appears to indicate that water from the culvert network erupted, through the tarmac and contributed to the flooding along Pontshonnorton Road (Figure 14).

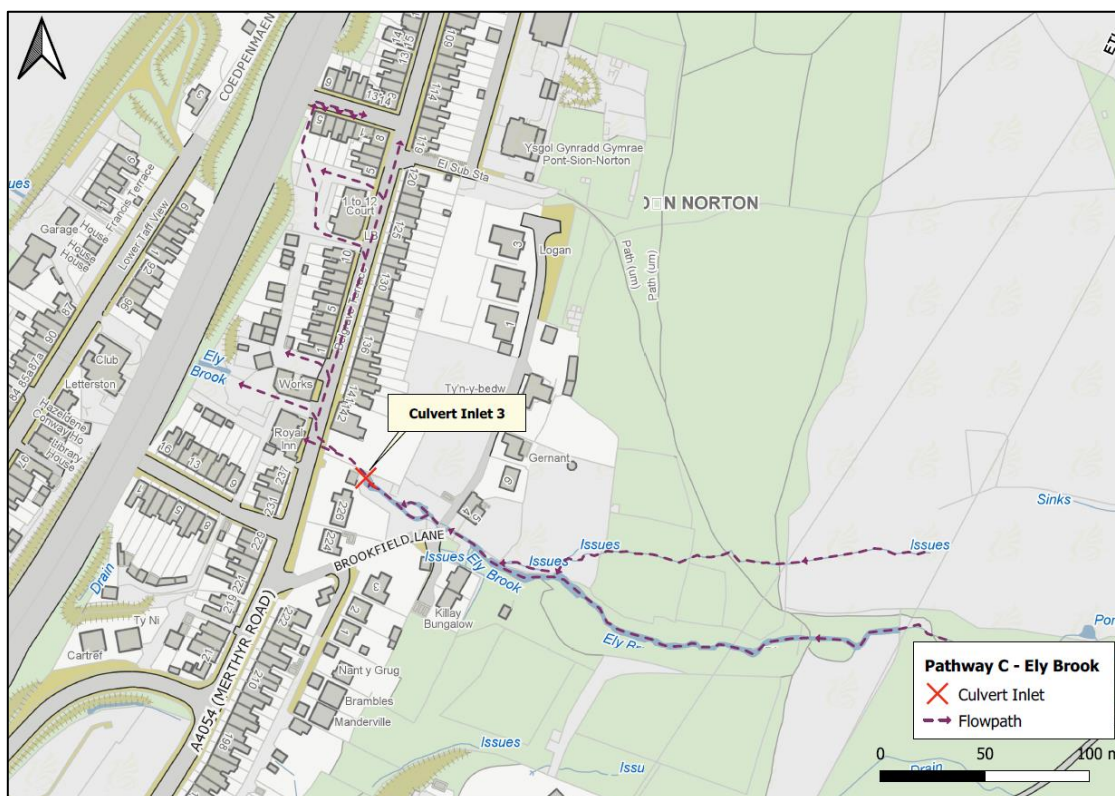


Figure 13: Map illustrating flow path C and the Ely Brook culvert inlet, 'Culvert Inlet 3'



Figure 14: Damages to the driveway situated below the Ely Brook culvert inlet showing evidence of subterranean hydraulic pressure (captured by FRM officers on 17th February 2020)

Water conveyed north along Pontshonnorton Road, affecting one commercial premise and a residential property at Belgrave Terrace. According to residents' accounts of the

storm event, the highway gullies along Pontshonnorton Road could not cope with the volume of water discharging from the Ely Brook watercourse and consequently flood water began to pond outside the front of properties, contributing to the internal flooding. Debris deposited from the Ely Brook was also evident along the western verge of Pontshonnorton Road which likely contributed to the ponding of flood water.

Water entered the two junctions of Norton Court which are situated slightly lower than the main road and initially flooded the ground floor flats at Norton Court. Water then cascaded through the rear garden of a property at Evans Square and onto the highway. Flood water entered properties on Evans Square from the front, resulting in internal flooding to five properties. Due to the slope of the road only properties on the southern side of the street were affected.

2.3. RAINFALL ANALYSIS

See RCT's 'Overview Report' of Storm Dennis, reference 'FRM – Storm Dennis – Overview Report'², for a detailed analysis of the rainfall and ordinary watercourse response.

3. POSSIBLE CAUSES

3.1. CULVERT CONDITIONS

Several unnamed watercourses flow through investigation area RCT10, many of which are culverted beneath Cilfynydd's urban settlements (previously described in Section 1.2).

Several culvert inlets were inspected by RCT's Flood Risk Management team after the flood event to assess their condition and to determine whether they served as a contributing factor to the flooding in Cilfynydd. CCTV survey inspections of the culvert networks were also undertaken to ascertain both the operational condition of the network, and its structural integrity along sections of the network. Figure 15 outlines the four networks surveyed and highlights the culvert inlets known to have surcharged.

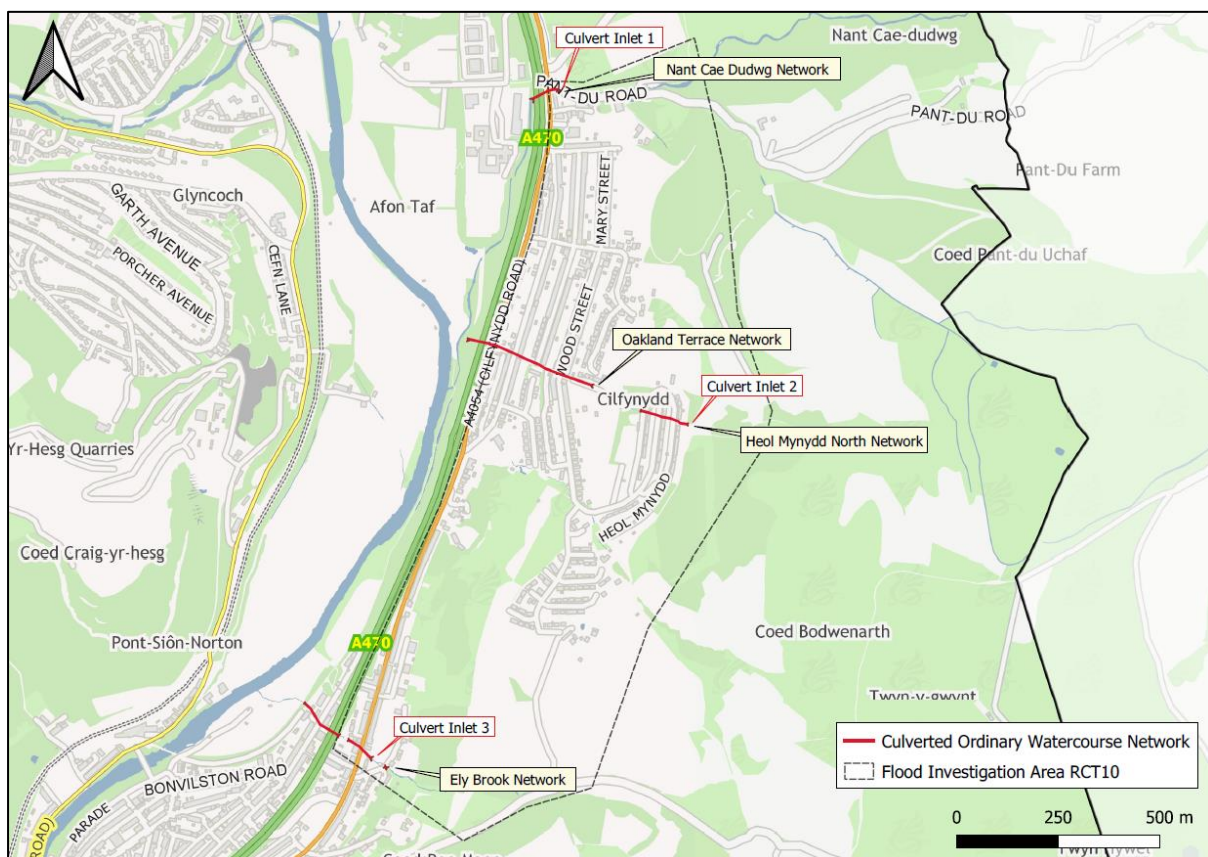


Figure 15: Surveyed culverted watercourse networks within flood investigation area RCT10

It should be noted that all surveys reported in this section were 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 necessarily be reflective of the condition of the assets prior to the onset of the storm event.

3.1.1. CULVERT INLET 1

The culvert inlet was inspected by RCT's Highway Authority prior to the storm event on the 13th February 2020 and was found to be in good condition with no significant blockages or debris present (Figure 16).



Figure 16: Photo of 'Culvert Inlet 1' (Nant Cae Dudwg culvert inlet) captured by RCT's Flood Risk Management team prior to Storm Dennis on 13th February 2020

Following reports that 'Culvert Inlet 1' which conveys the Nant Cae Dudwg ordinary watercourse beneath Cilfynydd Road was the source of flooding to eight residential properties at Cilfynydd Road, post event inspections were carried out. According to emergency responders, the culvert inlet debris screen was partially blocked with woody debris, suggesting some debris was likely deposited during Storm Dennis however, there was little evidence to suggest that the inlet surcharged due to blockage during the event.

The culvert inlet was cleared of debris on 17th February 2020 by the Council's Depot once the watercourse level had subsided and safe working conditions were available. Notably, the debris screen shows no evidence of damage caused by the flood event (Figure 17). Trash screens further upstream of the inlet had significant stonewash and debris trapped behind which would suggest that the largest debris did not reach the

inlet and cause significant blockage. The condition of the Nant Cae Dudwg watercourse upstream of the inlet is described in Section 3.2.



Figure 17: Nant Cae Dudwg culvert inlet (captured by FRM officers on 17th February 2020)

Although some settled coarse deposits was identified downstream of the inlet, the condition of both the inlet and culvert network is not considered to be the primary cause of flooding to properties at Cilfynydd Road. The water level within the Nant Cae Dudwg was high enough that debris likely travelled over the debris screen, avoiding any significant blockages, therefore the cause of flooding to Cilfynydd Road is considered to be related to the watercourse becoming overwhelmed during the storm event.

3.1.2. CULVERT INLET 2

The Heol Mynydd North culvert inlet (Culvert Inlet 2) was identified as the source of flooding to properties at Heol Mynydd and Heol Nant, and also contributed to the flooding at Brynderwen. The surcharging occurred at the inlet structure due to natural hillside debris, mobilised during the storm event, blocking the debris screen and reducing the inlet's hydraulic capacity to manage the flow of water. The inlet is identified as a privately owned asset, however the Council's Highway Authority maintain an inspection schedule of the asset pre storm events due to the inherent risk associated to the inlet. The inlet was inspected and cleared of debris on the 8th and 15th February 2020, respectively.

Figure 18 depicts the culvert inlet cleared from debris by the Council Highway and Streetcare Depot following the storm event.



Figure 18: Culvert inlet to the rear of Heol Mynydd which surcharged during Storm Dennis due to blockages at the inlet (captured by FRM officers on 17th February 2020 following clearance works)

The culvert network was found to be in acceptable operational and structural condition following internal CCTV surveys. It is considered that blockages to the debris screen itself was the primary cause of flooding to Heol Mynydd and not the condition of the culvert network.

Downstream of Heol Mynydd the unnamed watercourse flows towards Oakland Terrace before entering a further culverted section. The Oakland Terrace culvert network has multiple structural and operational defects throughout, including fractures, collapsed brickwork and holes in the pipework. Despite its poor condition there was no evidence to suggest that the network did in fact surcharge or cause any flooding to properties at Oakland Terrace.

3.1.3. CULVERT INLET 3

The source of the flooding at Pontshonnorton Road was initially identified as originating from a blocked culvert inlet located opposite the Royal Oak Inn. The inlet structure was identified by first responders as being blocked with debris and was subsequently cleansed. Figure 19 captured post event by FRM officers depicts the

inlet following clearance works. The inlet is identified as a privately owned inlet but similarly to the Heol Mynydd culvert, the Council's Highway Authority maintain an inspection schedule of the asset pre storm events. The inlet was also inspected and cleared of debris on the 8th and 15th February 2020, respectively.



Figure 19: Ely Brook culvert inlet to the rear of Pontshonnorton Road which surcharged during Storm Dennis due to blockages at the inlet (captured by FRM officers on 17th February 2020 following clearance works)

Internal surveys of the Ely Brook network have highlighted several sections of the culvert drainage system that are in poor condition following the flood event. The culvert section immediately downstream of the inlet known to surcharge is in the poorest condition, both structurally and operationally according to CCTV survey data.

A Grade 5 structural defect was identified approximately 23 meters downstream of the inlet (Figure 20), located on the driveway below the Ely Brook culvert inlet, and has been determined as a secondary source of flooding to properties along Pontshonnorton Road, Norton Court and Evans Square, whereby water breached the culvert system below the tarmac driveway due to hydraulic pressure, contributing to the flooding at Pontshonnorton Road.

The poor condition of the culvert network is considered to have contributed to the flooding, however, the blockage to the inlet structure has been determined as the most significant contributor to flood flow path C (Figure 3) during Storm Dennis.



Figure 20: Hole in culvert 22.9 meters downstream of the Ely Brook inlet opposite Royal Oak Inn

3.2. ORDINARY WATERCOURSE CONDITIONS

Several unnamed open watercourses and ditches which drain the steep catchment to the east and northeast of Cilfynydd are identified to flow through investigation area RCT10. The ordinary watercourses associated to the flooding at Cilfynydd are illustrated in Figure 21.

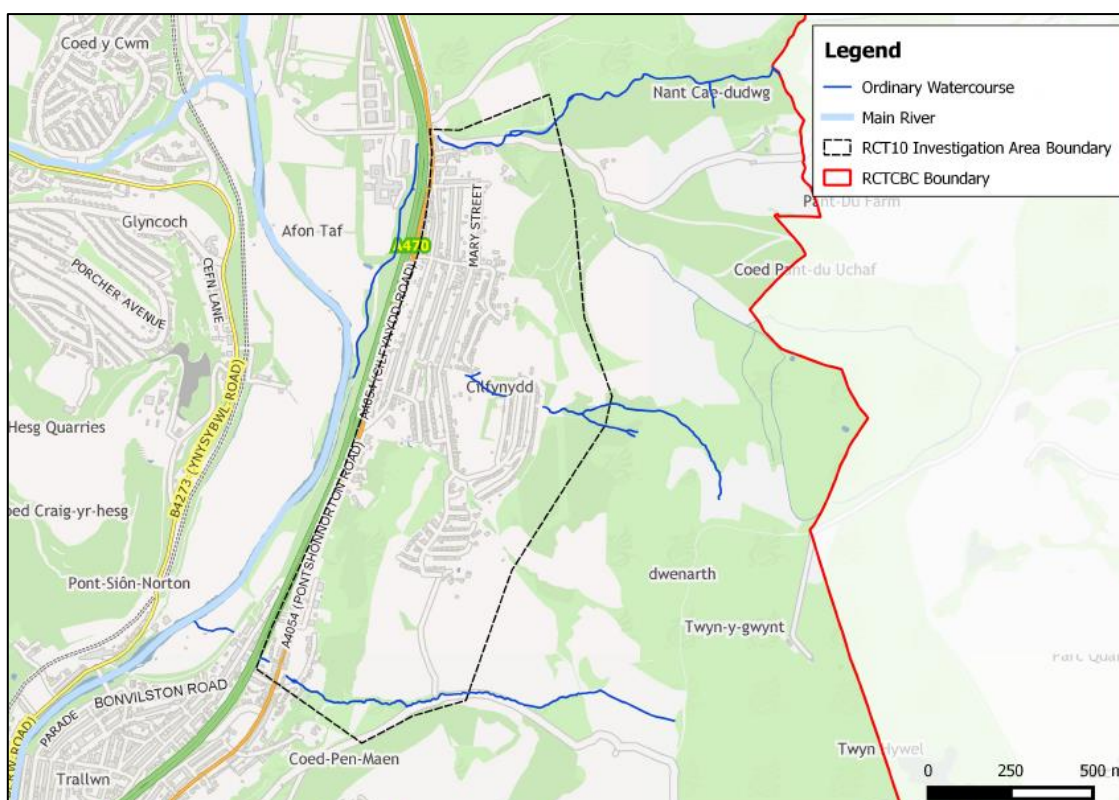


Figure 21: Map of Ordinary Watercourses which feed into investigation area RCT10

3.2.1. NANT CAE DUDWIG ORDINARY WATERCOURSE

A general assessment of the Nant Cae Dudwg watercourse revealed significant deposition of large stones and boulders within the channel. Figures 22 and 23 were captured on the 17th February 2020 and show significant accumulation of natural material across the full width of the upper catchment debris screens. A Council appointed contractor carried out the removal of all large debris from the watercourse following Storm Dennis which totaled approximately 350 tons.

Figures 24 and 25 have been provided to illustrate the condition of the upper catchment debris screens operating debris free prior to Storm Dennis.



Figure 22: Initial upstream debris screen in the Nant Cae Dudwg watercourse (captured by RCT's Flood Risk Management team on 17th February 2020)



Figure 23: Second upstream debris screen in the Nant Cae Dudwg watercourse (captured by RCT's Flood Risk Management team on 17th February 2020)



Figure 24: Initial upstream debris screen in the Nant Cae Dudwg watercourse captured prior to Storm Dennis

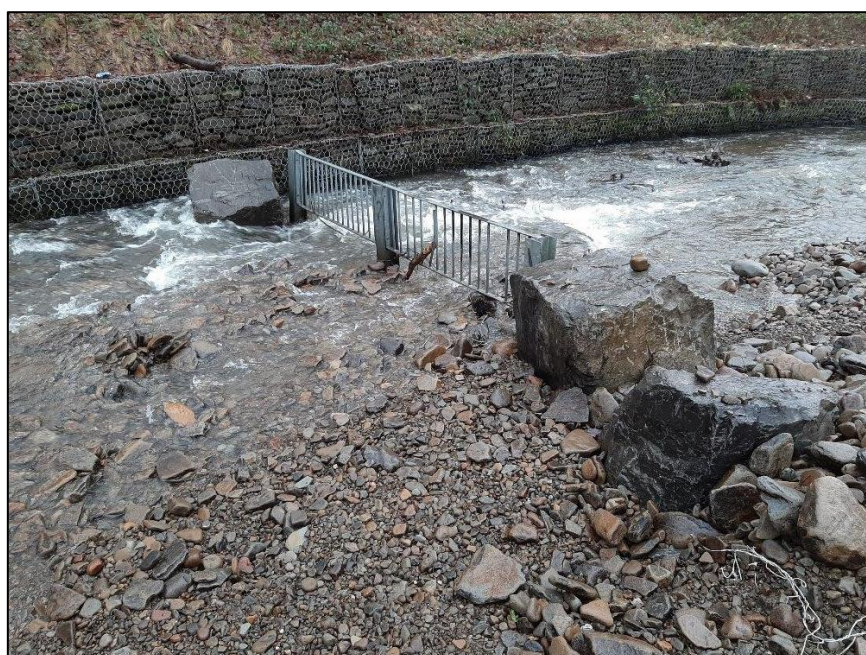


Figure 25: Second upstream debris screen in the Nant Cae Dudwg watercourse captured prior to Storm Dennis

Evidence of embankment scour and localised landslips were identified along sections of the Nant Cae Dudwg watercourse (Figures 26 and 27). It is considered that this scoured material contributed to the volume of debris deposited along the watercourses' upper debris screens.



Figure 26: Photo of localised landslip on the embankment of the Nant Cae Dudwg watercourse (image captured by RCT's Flood Risk Management team on 02/03/2020)



Figure 27: Photo of embankment scour to the Nant Cae Dudwg watercourse (image captured by RCT's Flood Risk Management team on 02/03/2020)

The images captured pre and post event highlight the extreme flows within the Nant Cae Dudwg during the storm event. These strong flows were able to convey a significant volume of debris downstream, however, the upstream debris screens and modified channel walls succeeded in minimising the volume of debris travelling downstream and onto the inlet grill near Cilfynydd Road.

Based on data captured by RCT's Nant Cae Dudwg monitoring station, the storm resulted in two significant peaks in the level of flow within the Nant Cae Dudwg watercourse. Both peaks are illustrated in Figure 28. The initial peak triggered the alarm system at 13:45 on 15th February 2020 which resulted in a peak watercourse level of 1.567 meters at 14:45. During this hour the Nant Cae Dudwg rose suddenly by 528mm. The second and most prominent peak activated the alarm system at 01:00 on 16th February 2020 and caused a peak level of 2.37m at 03:00.

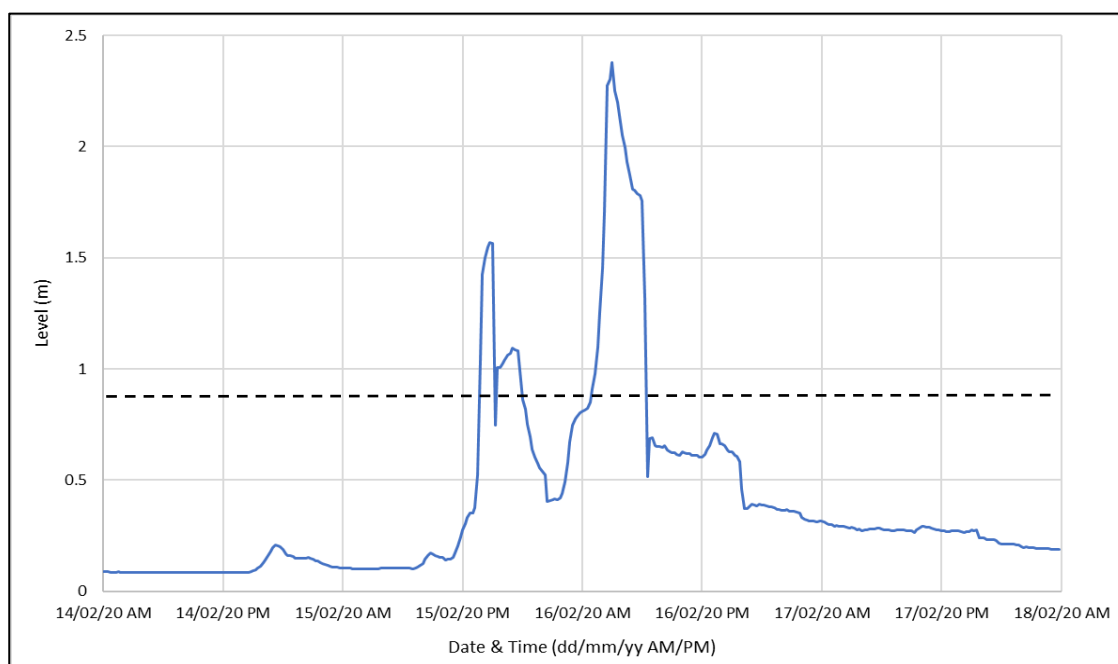


Figure 28: Water level in the Nant Cae Dudwg ordinary watercourse during the 14 – 18th February 2020 captured by RCT's monitoring station. Dashed line represents the alarm trigger threshold (0.9m)

Based on data captured by the monitoring station, and accounts provided by residents, it is considered that the volume of water in the Nant Cae Dudwg watercourse exceeded the capacity of the inlet and headwall structures during the early hours of Sunday 16th February 2020. This resulted in the watercourse backing up the channel where the flood water overtopped the flood wall before ultimately entering the affected properties from the rear.

3.2.2. HEOL MYNYDD UNNAMED ORDINARY WATERCOURSE

Upon a walkover assessment of the open watercourse to the rear of Heol Mynydd, undertaken by FRM officers following the storm event, it was noted that although the catchment is relatively flat, the ground is unconsolidated, with evidence of scour at the banks and old trees collapsed into the watercourses. Eroded woody material, silt and

stone from land to the rear of Heol Mynydd is considered to have been mobilised by heavy rainfall and washed down into the unnamed watercourses before accumulating and causing a blockage at the inlet. The reduction in the inlet's hydraulic capacity to manage the flow of water into the culverted system resulted in surcharging at the inlet and internal flooding to properties below.

Post event inspections undertaken by RCT's FRM officers also identified a collapsed tree within the watercourse (Figure 29), just upstream of the culvert inlet. It is not believed that the collapsed tree contributed to the flooding at Cilfynydd, however it does provide evidence of the powerful flows within the watercourse during the storm event which caused embankment scouring as well as mobilisation of debris, contributing to the inlet blockage downstream. Emergency clearance works were undertaken by the Council's Depot to remove the tree from the watercourse.



Figure 29: Tree collapse in the unnamed ordinary watercourse to the rear of Heol Mynydd (captured by FRM officers on 17th February 2020)

3.2.3. ELY BROOK ORDINARY WATERCOURSE

The Ely Brook watercourse was observed as having significant deposition of erosive debris along its length. The evidence suggests that the debris identified at the surcharged inlet originated from the upstream sections of watercourse where natural hillside material is likely to have been washed down onto the structure following intense rainfall.

Post event inspections of the Ely Brook watercourse identified large stonewash within the channel, as well as the undercutting of large trees caused by bank erosion in the upper catchment (depicted in Figures 30). The inspection also noted that the watercourse is very steep in its upper reaches, indicating that fast flowing water generating large debris mobilisation and sedimentation is likely in this part of the catchment during storm events.



Figure 30: Photo of stone deposition, bank erosion and undercutting of trees within the Ely Brook ordinary watercourse in the upper catchment (captured by RCT's Flood Risk Management team post Storm Dennis)

3.3. MAIN RIVER

The designated main river, the River Taff, flows in a southerly direction to the west of Cilfynydd (Figure 21). The River Taff falls outside of investigation area RCT10.

There is no evidence from this investigation to suggest that the River Taff significantly contributed to the recorded flooding of properties in Cilfynydd during Storm Dennis.

3.4. HIGHWAY DRAINAGE CONDITIONS

Anecdotal reports note surface water was observed to flow directly down several streets within the investigation area during Storm Dennis. Notably, much of the observed surface water originated from ordinary watercourse flooding.

Overland flows from private land and runoff originating from the surcharged inlet to the rear of Heol Mynydd caused water to travel towards Heol Nant and Heol Cronfa, and onwards toward Brynderwen via a small pathway. Deposited mud, silt and debris was evident across these streets, along with several reports of blocked highway drainage gullies, illustrating the flow path of water during the event. Likewise, water sourced by the Ely Brook watercourse travelled north along Pontshonnorton Road, depositing debris on its course, causing blockages to the highway drainage infrastructure (Figure 31).



Figure 31: Debris left after the storm event at Pontshonnorton Road (captured by FRM officers on 17th February 2020)

Reports of surface water flooding were also received at Park Place, near Cilfynydd Road, whereby runoff was observed to travel from the steep hillsides in the east via rural tracks and onto the highway, causing fine silt to block several gullies and reduce the capacity of the highway network to manage exceedance flows. Minor internal flooding to one commercial property located at a low point in the road was confirmed.

The condition of highway drainage infrastructure within investigation area RCT10 is considered to have been impacted by debris carried by ordinary watercourse and

surface water flows during Storm Dennis. In these instances, it is likely that highway drainage assets will have had a limited capacity to intercept the flows along Heol Mynydd, Heol Nant, Heol Cronfa, Brynderwen, Park Place and Pontshonnorton Road.

In addition, highway drainage is not designed to manage overland flows from private areas, parks or open space. In this instance, the capacity of the highway drainage was exceeded by the substantial surface water flows entering the drainage network across RCT10. Given the severity of the storm, the maintenance condition of the highway surface water drainage system is not considered to have significantly impacted on the flooding experienced within Cilfynydd.

3.5. SURFACE WATER

Surface water flooding from an area of land behind Brynderwen was observed by residents as a secondary source of flooding to properties at Brynderwen during Storm Dennis. Upon an inspection of the land by RCT's Flood Risk Management team a small land drainage channel was identified, within privately owned land.

The inspection noted that the land drainage channel is culverted beneath the lane before outfalling into the adjacent stream that flows towards Oakland Terrace culvert network. Residents report that the inlet became blocked during the event, resulting in water overtopping the channel (Figure 32) and flowing towards the downstream field and onwards to impact properties at Brynderwen. The land drainage channel and observed flow paths have been illustrated in Figure 33.



Figure 32: Photo of the drainage ditch overtopping (image captured by resident on 16/02/2020)

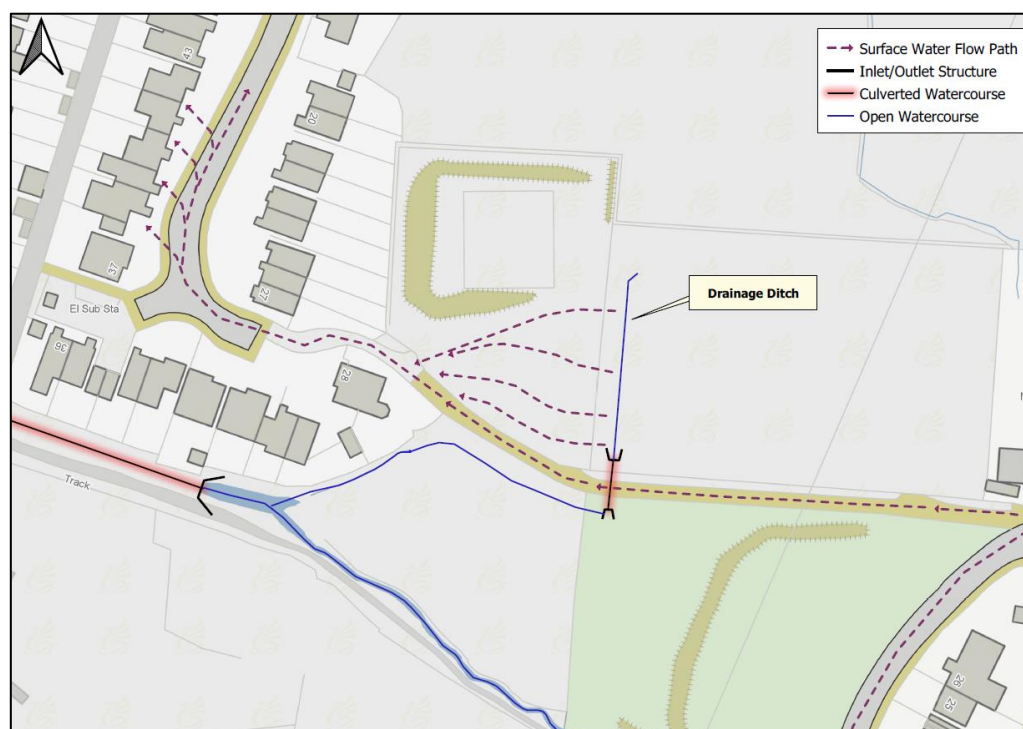


Figure 33: Location of the identified land drainage ditch and observed surface water flow paths during Storm Dennis

Despite the land drainage channel being identified as a secondary source of flooding, the primary source of flooding to properties in this area originated from the surcharged culvert inlet to the rear of Heol Mynydd.

3.6. ACCESS STRUCTURES

No access structures were identified during the asset investigations within the area, as such 'access structures' have not been considered within this report.

3.7. SYSTEM AT CAPACITY

Culvert networks within the flood investigation area (Figure 15) were surveyed post event to ascertain the internal condition of the network, the results of which fed into a review of the hydraulic performance of the network to ascertain its current standard of protection using Causeway Flow modelling. The results of the culvert inlet capacity assessments are summarised in the Table below, along with a determination of whether flooding was observed during Storm Dennis.

Table 3: Summary of culvert capacity assessment results which indicate the current standard of protection of the culverted networks in free flowing and blockage conditions and whether flooding was observed during Storm Dennis

Culvert Network	Standard of Protection (SOP) – Free Flowing	Standard of Protection (SOP) – Blockage Condition	Observed Flooding
Nant Cae Dudwg	Q50 - Q100 (2 - 1% AEP)	Q2 (50% AEP)	Yes
Ely Brook (Culvert Inlet 3)	Q100 (1% AEP)	Q2 (50% AEP)	Yes
Heol Mynydd North	Q1000 (0.1% AEP)	Q200 (0.5% AEP)	Yes

The results from the culvert capacity assessments and hydraulic modelling undertaken as part of Redstart’s FIR, in addition to previous modelling, infer that the Nant Cae Dudwg network has a SOP between Q50 - Q100. This variability is subject to the large extent of the Nant Cae Dudwg catchment area. The remaining culvert networks have been assessed as having a SOP in accordance with current design standards, as defined by CIRIA C786 or greater when considering the free-flowing scenario

On review of the hydraulic assessment, it is evidenced that in the free-flowing scenario, the Nant Cae Dudwg has the hydraulic capacity to accommodate storm events greater than Q50 but no greater than Q100 and as such would have been overwhelmed during Storm Dennis which was estimated to be a Q200 event according to NRW⁵.

On review of the condition of the Heol Mynydd and Ely Brook culvert inlets post Storm Dennis, a sensitivity analysis was undertaken to review the impact of flooding during both free-flowing and ‘medium’ (67%) blockage conditions⁶. The Heol Mynydd North culvert network was assessed as having adequate capacity in accordance with the design standards. In ‘medium’ blockage conditions the capacity is reduced to Q200, however it was concluded by on-site inspectors that the blockage to the Heol Mynydd culvert inlet was a full blockage (100%). Consequently, the capacity of the inlet would have been further reduced to below design standards. The blockage to the inlets’ debris screen which reduced the networks’ capacity to manage the flow of water has been determined as the primary cause of flooding.

The Ely Brook culvert network was also assessed as having adequate capacity; however, this is severely reduced to Q2 in blockage conditions, verifying that the blockage to the inlet significantly reduced the culvert networks’ capacity. It should also be noted that given the poor structural condition of the Ely Brook network downstream

⁵ [February 2020 Floods in Wales: Flood Event Data Summary \(cyfoethnaturiol.cymru\)](https://www.cyfoethnaturiol.cymru/)

⁶ Natural Resources Wales Guidance Note (Ref No GN43)

of 'Culvert Inlet 3' (noted in Figure 13), alongside evidence of culvert failure (Figure 14), it is likely that the networks' hydraulic capacity was further reduced.

3.8. SUMMARY OF POSSIBLE CAUSES

The above sections have identified and described the possible causes of flooding within investigation area RCT10 during Storm Dennis (15-16th February 2020). A summary of the identified sources and possible causes of flooding (issue) have been outlined below in Table 4.

Table 4: Summary of the source(s) and possible cause(s) of flooding in investigation area RCT10 during Storm Dennis

Ref No	Asset (Source)	Issue	Asset Owner	Type of Flooding
1	Nant Cae Dudwrg culvert inlet and flood wall	Water overtopped the flood defence wall adjacent to the culvert inlet after becoming hydraulically overwhelmed during the storm event. This resulted in internal flooding to several residential properties at Cilfynydd Road	Rhondda Cynon Taf CBC	Ordinary Watercourse
2	Heol Mynydd North culvert inlet	The culvert inlet to the rear of Heol Mynydd became blocked with debris during the storm event which caused water to overtop at the inlet resulting in internal flooding to properties at Heol Mynydd and Heol Nant before continuing on its path downstream to impact properties at Brynderwen.	Private Landowner	Ordinary Watercourse
3	Land Drainage Channel located to the rear of Brynderwen	A Land drainage channel located on land to the rear of Brynderwen was identified as overflowing during the storm event, resulting in additional surface water runoff conveying towards Brynderwen. A blockage was identified at the inlet.	Private Landowner	Surface Water
4	Ely Brook culvert inlet located opposite the Royal Oak Inn	The Ely Brook culvert inlet became blocked with debris during the storm event which led to surcharging at the inlet causing water to overtop and flow towards Pontshonnorton Road.	Private Landowner	Ordinary Watercourse
5	Section of the Ely Brook culvert network downstream of	The structural condition of the culvert barrel has been attributed to flooding in this location where a grade 5 structural defect enabled the ordinary watercourse to surcharge through a tarmac driveway which contributed to flooding along Pontshonnorton Road.	Private Landowner	Ordinary Watercourse

	the surcharged inlet			
6	Surface water drainage network across RCT10	<p>Ponding surface water across the highway was reported by several residents at Brynderwen, Heol Mynydd, Heol Nant, Heol Cronfa, Park Place and Pontshonnorton Road.</p> <p>The highway drainage network within RCT10 was over capacitated and was unable to convey the substantial surface water exceedance flows during Storm Dennis. Overland flow transporting silt and debris also contributed to the blockage of highway drainage infrastructure, limiting the capacity of the network further.</p>	Rhondda Cynon Taf CBC Highway Authority	Surface Water

4. RISK MANAGEMENT AUTHORITY ACTIONS

A Welsh Risk Management Authority is defined in Section 6 of the Flood and Water Management Act 2010 as NRW; a Lead Local Flood Authority, a district council for an area where there is no unitary authority, or a highway authority wholly in Wales; an internal drainage board for an internal drainage district that is wholly or mainly in Wales; a water company that exercises functions in relation to an area in Wales. As the LLFA, RCTCBC has the responsibility to coordinate the management of flood risk and the interaction of Risk Management Authorities across Rhondda Cynon Taf.

An overview of the responsible Risk Management Authority in relation to flood type is provided in Table 5. For further details of the roles and responsibilities of individual Risk Management Authorities in managing flooding, refer to 'FRM – Storm Dennis - Overview Report'.

Table 5: Risk Management Authority responsible for different flood types

Type of Flooding	Responsible Risk Management Authority
Flooding from Main River, reservoirs and the sea (including coastal erosion).	Natural Resources Wales
Flooding from ordinary watercourses, surface water and groundwater	Lead Local Flood Authority
Flooding from water and sewage systems	Water Companies (Dŵr Cymru Welsh Water)
Flooding from the highway	Highway Authority
Flooding from the highway (motorways and major trunk roads)	Welsh Government Trunk Road Agency

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 investigation area RCT10, 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 Cifynydd as a result of Storm Dennis have been previously identified and summarised within Table 6. The Risk Management Authority(ies) responsible for managing that flooding have been determined in Table 6, along with a series of recommendations presented by the LLFA.

Table 6: Recommendations provided by the LLFA to be considered by the relevant Risk Management Authority identified in response to the source(s) of flooding in Investigation Area RCT10 (as per Table 4)

Ref No	Asset (Source)	Asset Owner	Type of Flooding	RMA Responsible for Managing Risk	Recommendations	
1	Nant Cae Dudwg culvert inlet and flood defence wall	Rhondda Cynon Taf CBC	Ordinary Watercourse	Lead Local Flood Authority and Land Drainage Authority	R1A	The LLFA and LDA to investigate the standard of protection and the condition of the culvert structure and network as a whole.
					R1B	Jet and cleanse the ordinary watercourse network.
					R1C	The LLFA to review the current FAS infrastructure.
					R1D	The LLFA and LDA to review the risk of scour potential within the ordinary watercourse channel.
					R1E	The LLFA and LDA to work with riparian

						landowners to identify suitable management methods to reduce the risk of scour within the ordinary watercourse.
2	Heol Mynydd North culvert inlet	Private Landowner	Ordinary Watercourse	Lead Local Flood Authority and Land Drainage Authority	R2A	The LLFA and LDA to identify drainage asset ownership and responsibility.
					R2B	The LLFA and LDA to investigate the standard of protection and the condition of the culvert structure and network as a whole.
					R2C	Jet and cleanse the ordinary watercourse network.
					R2D	The LLFA and LDA to review the risk of scour potential within the ordinary watercourse channel.
					R2E	The LLFA and LDA to work with riparian landowners to identify suitable management methods to reduce the risk of scour within the ordinary watercourse.
3	Land Drainage Channel located on land to the rear of Brynderwen	Private Landowner	Surface Water and Ordinary Watercourse	Lead Local Flood Authority and Land Drainage Authority	R3A	The LLFA and LDA to identify drainage asset ownership and responsibility.
					R3B	The LLFA and LDA to exercise their permissive powers under Section 64 of the Land Drainage Act to investigate the surface water drainage

						arrangements on the area of land where the ditch is situated.
					R3C	The LLFA and LDA to regulate the land drainage channel to ensure the riparian owner maintains an unobstructed flow.
4	Ely Brook culvert inlet located opposite the Royal Oak Inn	Private Landowner	Ordinary Watercourse	Lead Local Flood Authority and Land Drainage Authority	R4A	The LLFA and LDA to identify drainage asset ownership and responsibility.
					R4B	The LLFA and LDA to investigate the standard of protection and the condition of the culvert structure and network as a whole.
					R4C	Jet and cleanse the ordinary watercourse network.
					R4D	The LLFA and LDA to review the risk of scour potential within the ordinary watercourse channel.
					R4E	The LLFA and LDA to work with riparian landowners to identify suitable management methods to reduce the risk of scour within the ordinary watercourse.
5	Section of the Ely Brook culvert network downstream of the	Private Landowner	Ordinary Watercourse	Lead Local Flood Authority and Land Drainage Authority	R5A	The LLFA and LDA to identify drainage asset ownership and responsibility.
					R5B	The LLFA and LDA to investigate the standard of protection and the

	surcharged inlet					condition of the culvert section.
					R5C	The LLFA and LDA to regulate the ordinary watercourse culvert to ensure the riparian owner maintains an unobstructed flow.
6	Surface water drainage network across RCT10	Rhondda Cynon Taf CBC Highway Authority	Surface Water	Highway Authority and Lead Local Flood Authority	R6A	The Highways Authority to jet and cleanse the highway drainage network and action repairs accordingly.

4.1. LEAD LOCAL FLOOD AUTHORITY

In review of Ref 1-6 Table 6, the LLFA and LDA have been determined as the responsible Risk Management Authorities in relation to the flooding which occurred at investigation area RCT10 during Storm Dennis.

The LLFA exercised the following functions in response to the flooding at investigation area RCT10;

- 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 carried out by Redstart, on behalf of RCTCBC as the LLFA, was undertaken in order to gain further local insight and anecdotal evidence to support the flood investigation
- The LLFA and LDA have exercised their permissive powers under Section 64 of the Land Drainage Act 1991 to investigate the culvert structures and network conditions and its impact on the flooding within the investigation area. **(R1A, R2B, R3B, R4B, R5B)**
- An estimated 1,229 meters of ordinary watercourse culvert network length within investigation area RCT10 has been surveyed following the event to ascertain both the operational condition of the network, and its structural integrity along sections of the network. **(R1A, R2B, R3B, R5B)**
- An estimated three tonnes of material and debris was removed from the culvert network within investigation area RCT10 during jetting and cleansing operations. **(R1B, R2C, R4C)**
- The LLFA and LDA have undertaken clearance works to the culvert inlet structures which fall under the responsibility of the Authority. In addition to this, the LLFA and LDA have carried out clearance works to the culvert inlet structures which fall under private land ownership utilising powers under Section 14A of the Land Drainage Act. **(R1B, R2B, R4C)**
- The LLFA commissioned Redstart to investigate the standard of protection of the existing culvert networks in Cilfynydd to determine their hydraulic capacity following the identification of several structural and operational defects within sections of the network. **(R1A, R2B, R3B, R5B)**

- The LLFA has set up a central Control Room, to compliment the Council's Contact Centre and CCTV centre which is based at the Council's offices, to provide a comprehensive and informed response to the residents of RCT as appropriate during storm events.
- The LLFA have initiated an interim Property Flood Resistance project offering expandable flood gates to those properties deemed at high risk of flooding from local sources.
- The LLFA and LDA have initiated engagement with riparian landowners to ensure the ordinary watercourse and land drainage infrastructure is free flowing and unobstructed **(R2A, R3A, R3C, R4A, R5A, R5C)**.
- In review of Ref 1 and following a review of the Nant Cae Dudwg ordinary watercourse conditions post Storm Dennis, the LLFA has secured funding from the Welsh Government to facilitate the rehabilitation of the scoured sections of ordinary watercourse channel. **(R1D)**

The LLFA propose to exercise the following functions in response to the flooding at investigation area RCT10;

- Following the surveying of culvert networks in investigation area RCT10, the LLFA propose to input and update all relevant asset data. **(R1A, R2A, R2B, R3A, R3B, R4A, R4B, R5A, R5B)**
- The LLFA will develop a Strategic Outline Business Case to better understand the risk of flooding using a whole catchment approach to provide recommendations for suitable management mechanisms to reduce the wider risk of flooding to people and properties from local sources (Ordinary Watercourse, Surface Water and Groundwater).
- The LLFA and LDA intend to clarify drainage asset owners and management responsibilities to make them aware of riparian responsibility. To ensure landowners manage the risk in compliance with the relevant legislation, a team of Flood Enforcement Officers including legal support is to be appointed. **(R2A, R3A, R3C, R4A, R5A)**
- The LLFA propose to install remote telemetry monitoring devices at key culvert structures to enable operators to ensure the drainage systems in Cilfynydd are operating effectively.
- As part of RCTCBC's comprehensive review of the County Borough's most at risk communities, the LLFA are proposing to undertake a formal Strategic Flood Risk Assessment (SFRA) of the Lower Cynon catchment area (which includes the community of Cilfynydd) to better understand the overall risk from ordinary

watercourse and surface water flooding in order to target investment to areas of highest risk. The SFRA also aim to encourage whole catchment measures, including working with natural processes, to alleviate flood risk in those areas of highest risk.

- The LLFA and LDA propose to undertake Geomorphological assessments of the upper catchments in Cilfynydd to determine the risk of culvert blockages as a result of scour and debris potential. In addition to this the LLFA and LDA will engage with Riparian landowners to identify suitable management methods to reduce the risk of scour within the ordinary watercourses. **(R1D, R1E, R2D, R2E, R4D, R4E)**
- The LLFA and LDA will continue to engage with riparian landowners and regulate the ordinary watercourse infrastructure to ensure the infrastructure is free flowing and unobstructed. **(R2A, R3A, R3C, R4A, R5A, R5C)**
- The LLFA are developing a scheme to facilitate the rehabilitation of the scoured section of the Nant Cae Dudwg ordinary watercourse channel which suffered significant scour and minor landslips during Storm Dennis. The scheme is programmed for completion by the end of the 2021-22 financial year. **(R1D)**

4.2. NATURAL RESOURCES WALES

Natural Resources Wales were not identified as a responsible authority in relation to the flooding at investigation area RCT10 on the 15th and 16th February 2020. Furthermore, the authority does not propose to undertake any functions in relation to the event.

4.3. WATER COMPANY

Welsh Water were not identified as a responsible authority in relation to the flooding at investigation area RCT10 on the 15th and 16th February 2020. Furthermore, the authority does not propose to undertake any functions in relation to the event.

4.4. HIGHWAY AUTHORITY

During the investigation into the flooding at investigation area RCT10 during Storm Dennis, the Highway was identified as flooding as a result of the ordinary watercourse flooding and surface water runoff flowing down the steep hillsides of Cilfynydd and

onto the highway at several locations, including the A4054 Cilfynydd Road, Pontshonnorton Road, Brynderwen, Heol Cronfa and Heol Nant. Mud and debris mobilised and deposited by overland flows caused partial blockages to highway gullies along the aforementioned roads, which limited the capacity of the highway drainage network to convey surface water and exceedance flows.

RCTCBC as the Highway Authority have exercised the following functions in response to the flooding at investigation area RCT10;

- 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 flood water to ensure the safety of the highway post event. **(R6A)**
- The Highway Authority also carried out maintenance works to clear any vegetation from the surrounding area of their drainage infrastructure to reduce the risk of further blockages.
- The Highway Authority has undertaken four separate phases of debris removal from the Nant Cae Dudwg watercourse and associated debris screens following Storm Dennis. This has resulted in the removal of approximately 350 tons of material from the watercourse. **(R1B)**
- The Highway Authority has undertaken emergency clearance works to the culvert inlets identified as sources of flooding. **(R1B, R2C, R4C)**

RCTCBC as the Highway Authority propose to undertake the following function in relation to the event at investigation area RCT10;

- The Highway Authority intend to increase their resource capacity by establishing a dedicated 'Pluvial Drainage Team' to focus entirely on the refurbishment and maintenance of RCT's existing and enhanced highway drainage infrastructure.

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 - <https://naturalresources.wales/flooding/check-flood-warnings/?lang=en>

Natural Resources Wales - Long Term Flood Risk - <https://naturalresources.wales/evidence-and-data/maps/long-term-flood-risk/?lang=en>

Rhondda Cynon Taf CBC - Local Flood Risk Management Plan - <https://www.rctcbc.gov.uk/EN/Resident/ParkingRoadsandTravel/Roadspavementsandpaths/FloodAlleviation/Floodriskregulations2009.aspx>

Rhondda Cynon Taf CBC - Local Flood Risk Management Strategy - <https://www.rctcbc.gov.uk/EN/Resident/ParkingRoadsandTravel/Roadspavementsandpaths/FloodAlleviation/LocalFloodRiskManagementStrategy.aspx>

Rhondda Cynon Taf CBC – Sustainable Drainage – <https://www.rctcbc.gov.uk/EN/Resident/ParkingRoadsandTravel/Roadspavementsandpaths/SustainableDrainage/SustainableDrainage.aspx>

Welsh Government - National Strategy for Flood and Coastal Erosion Risk Management - <https://gov.wales/sites/default/files/publications/2019-03/national-strategy-for-flood-and-coastal-erosion-risk-management-in-wales.pdf>

Welsh Water – How to Contact Us – <https://www.welshwater.com/en/Contact-Us.aspx>

Appendix B

**Flood and Water Management Act
2010**

**Section 19 Flood Investigation
Report**

**Storm Dennis –
Flood Investigation Area RCT27**

November 2021

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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 Flood and Water Management Act 2010. The Council assumes no responsibility or liability from any person in connection with its contents or findings.

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CONTENTS

EXECUTIVE SUMMARY	3
ABBREVIATIONS.....	6
TABLES AND FIGURES	7
1 INTRODUCTION.....	9
1.1. Purpose of Investigation.....	9
1.2. Site Location	10
1.3. Drainage System.....	12
1.4. Investigation Evidence	12
1.5. Public Engagement	13
2 FLOODING HISTORY	14
2.1. Previous Flood Incidents	14
2.2. Flood Incident.....	15
2.2.1. Treherbert West Sub-Catchment	18
2.2.2. Treherbert East Sub-Catchment	23
2.3. Rainfall Analysis.....	25
3 POSSIBLE CAUSES	26
3.1. Culvert Conditions.....	26
3.1.1. Treherbert West Sub-Catchment	26
3.1.1.1. Abertonllwyd Street Culvert Network 1	27
3.1.1.2. Abertonllwyd Street Culvert Network 2	30
3.1.1.3. Dumfries Street Culvert Network	31
3.1.2. Treherbert East Sub-Catchment	32
3.1.2.1. Tyn-y-Coedcae Culvert Network.....	33
3.1.2.2. Ross Rise Culvert Network	34
3.2. Ordinary Watercourse Conditions	35
3.2.1. Treherbert West Unnamed Ordinary Watercourses.....	35
3.2.2. Nant Coedcaetyllefforest Ordinary Watercourse	37
3.2.3. Nant Pwll-Brwyn Ordinary Watercourse and Tributaries.....	39
3.3. Main River	41

3.4. Highway Drainage Conditions	42
3.5. DCWW Apparatus	42
3.6. Surface Water	43
3.7. Groundwater	43
3.8. Access Structures	44
3.9. System at Capacity	44
3.10. Summary of Possible Causes	46
4. RISK MANAGEMENT AUTHORITY ACTIONS.....	48
4.1. Lead Local Flood Authority	57
4.2. Natural Resources Wales	59
4.3. Water Company	60
4.4. Highway Authority	60
USEFUL LINKS/CONTACTS	62

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EXECUTIVE SUMMARY

This report has been produced through the duties placed upon Rhondda Cynon Taf County Borough Council 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 factual report of the storm event that occurred on 15 and 16th of February 2020 within the Rhondda Cynon Taf County Borough Council area, focusing investigation on the flooding at Treherbert in the Rhondda Fawr valley (Flood Investigation Area RCT 27, Figure 1).

This report was undertaken to identify the mechanism for 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 had undertaken or were planning to undertake actions related to those functions to reduce/alleviate the risk of flooding.

The flooding that affected RCT on 15 and 16th of February 2020, was a result of an extreme rainfall event, designated by the Met Office as ‘Storm Dennis’. The impact of the event at investigation area RCT27 resulted in internal flooding to 21 residential properties, two commercial properties and flooding to the highway. 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, Public Health, Natural Resources Wales and Dŵr Cymru Welsh Water.

It has been established from the evidence gathered within this report that the primary source of flooding at RCT27 on the 15 and 16th February 2020 was a result of significant overland runoff being generated from the steep hillsides above Treherbert draining to lower ground via a series of ordinary watercourses, many of which became overwhelmed with water and debris and eventually overtopped, impacting several properties on its course of flow.

On review of the hydraulic performance of the five culvert inlets identified as sources of flooding to properties, it was confirmed that the two culvert inlets associated to the Abertonllwyd Street network became hydraulically overloaded during the storm event.

Both inlets were identified as being below current design standards, in addition to being in poor structural and operational condition. The remaining three culvert networks were assessed as having adequate standards of protection of up to 1 in 1000-year event. This confirms that the three inlets had sufficient capacity to manage the expected flows, but its capacities were significantly reduced due to blockages, resulting in flooding to several properties.

RCTCBC as the Lead Local Flood Authority and Land Drainage Authority has been determined as the relevant Risk Management Authority responsible for managing the ordinary watercourse, surface water and groundwater flooding that occurred in Treherbert during Storm Dennis.

In response to the flooding in Treherbert during Storm Dennis, the LLFA has undertaken 13 actions and have proposed to undertake a further 6. A summary of which include;

- Undertaken clearance works to the culvert inlet structures identified as sources of flooding following the storm event (assisted by the Highway Authority);
- Carried out survey, jetting and cleansing operations to an estimated 800 meters of culverted ordinary watercourse network length within the investigation area;
- Led on the development of a central Control Room, to compliment the Council's Contact Centre and CCTV Centre, to provide a comprehensive and informed response to residents during storm events;
- Initiated an interim Property Flood Resistance project offering expandable flood gates to properties deemed at high risk of ordinary watercourse and surface water flooding; and
- Developing a flood routing scheme along the A4061 (Abertonllwyd Street) to manage overland flows.

As the relevant Risk Management Authority for ordinary watercourse flooding, RCTCBC as the Lead Local Flood Authority will also look to better understand the catchment above Treherbert through the development of a Strategic Outline Business Case to provide recommendations for suitable management mechanisms to mitigate the wider risk of ordinary watercourse, surface water and groundwater flooding in the community.

The event that occurred on 15 and 16th February 2020 was extreme, and it is unlikely flooding from a similar event could be prevented entirely. It is concluded that Risk Management Authorities satisfactorily carried out their flood risk management functions in response to the flood event in area RCT27, however, further measures

have been proposed by RMAs to better address preparedness and response to surface water flood events.

ABBREVIATIONS

CaRR – Communities at Risk Register

DCWW – Welsh Water

FRMP – Flood Risk Management Plan

FWMA – Flood and Water Management Act 2010

LDA – Land Drainage Authority

LFRMS – Local Flood Risk Management Strategy

LLFA – Lead Local Flood Authority

NRW – Natural Resources Wales

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

RCT - Rhondda Cynon Taff CBC

RCT27 – Flood Investigation Area RCT 27

RMA – Risk Management Authority

SAB – Sustainable Drainage Approval Body

SFRA – Strategic Flood Risk Assessment

SOC – Strategic Outline Business Case

SuDs – Sustainable Drainage Systems

TABLES AND FIGURES

Table 1: Investigative evidence gathered in preparation of the Storm Dennis Section 19 report	12
Table 2: Summary of the source(s), pathway(s) and receptor(s) affected during Storm Dennis within investigation area RCT 27.....	15
Table 3: Summary of culvert capacity assessment results which indicate the current standard of protection of the culverted networks in free flowing and blockage conditions	44
Table 4: Summary of the source(s) and possible cause(s) of flooding in investigation area RCT27 during Storm Dennis	46
Table 5: Risk Management Authority responsible for different flood types	48
Table 6: Recommendations provided by the LLFA to be considered by the relevant Risk Management Authority identified in response to the source(s) of flooding in investigation area RCT27 (as per Table 4)	49
Figure 1: Flood Investigation Area RCT27 Location Plan.....	10
Figure 2: Natural Resources Wales' Flood Risk Assessment Wales (FRAW) map for rivers and ordinary watercourse and surface water flood risk at investigation area RCT27. Contains Natural Resources Wales information © Natural Resources Wales and database right. All rights reserved. ...	11
Figure 3: Rainfall Topographic Watershed and Sub-catchments above investigation area RCT27....	18
Figure 4: Observed flow paths within 'Treherbert West' sub-catchment during Storm Dennis (16 th February 2020)	19
Figure 5: Evidence of submerged 'Culvert Inlet 1' which surcharged during Storm Dennis (captured by RCT's Flood Risk Management team on 18 th February 2021)	20
Figure 6: 'Manhole 1' located at Abertonllwyd Street surcharged during Storm Dennis (captured by RCT's Flood Risk Management team on 18 th February 2021)	20
Figure 7: 'Culvert Inlet 3' to the rear of Dumfries Street which surcharged during Storm Dennis (captured by RCT's Flood Risk Management team on 19 th February 2021)	21
Figure 8: Overland runoff originating from 'Culvert Inlet 4' flowing along the track road to the rear of Dumfries Street (image captured by RCT's Flood Risk Management team post event on 18 th February 2020)	22
Figure 9: Observed flow paths within 'Treherbert East' sub-catchment during Storm Dennis (16 th February 2020).....	23
Figure 10: 'Culvert Inlet 5' (left) and 'Culvert Inlet 6' (right) located to the rear of Tyn-y-coedcae which surcharged during Storm Dennis (captured by RCT's Flood Risk Management team on 19 th February 2020)	24
Figure 11: Surveyed culverted ordinary watercourse network within the 'Treherbert West' sub-catchment.....	27
Figure 12: 'Culvert Inlet 1' captured during CCTV survey operations on 30/06/2020.....	28

Figure 13: Outfall pipe entering 'Culvert Inlet 2' (left) and standing water surrounding 'Culvert Inlet 2' (right) (captured during CCTV survey operations on 30/06/2020).....	28
Figure 14: Internal view of 'Abertonllwyd Street Culvert Network 1' looking up towards 'Culvert Inlet 2' (CCTV survey footage captured 23/10/2020)	29
Figure 15: Internal view of 'Abertonllwyd Street Culvert Network 1' downstream of 'Manhole 1' (CCTV survey footage captured 24/10/2020)	30
Figure 16: Debris removed from the 'Dumfries Street Culvert Network' during cleansing operations (image captured on 29/06/2020)	31
Figure 17: Surveyed culverted ordinary watercourses within the 'Treherbert East' sub-catchment	32
Figure 18: Photo of 'Culvert Inlet 6' captured by RCT's Flood Risk Management team following debris clearance post Storm Dennis (19/02/2020)	33
Figure 19: Map of Ordinary Watercourses which feed into investigation area RCT27	35
Figure 20: Image of debris accumulation within the unnamed ordinary watercourse channel upstream of 'Culvert Inlet 1' (Figure 4) (captured during CCTV operations on 30/06/2020)	36
Figure 21: Nant Coedcaetyllefforest ordinary watercourse inspection location plan	37
Figure 22: Photo of debris deposition behind the upper debris screen of the Nant Coedcaetyllefforest ordinary watercourse (captured by RCT's Flood Risk Management team on 19/02/2020).....	38
Figure 23: Photo of debris accumulation in the upper reaches of the Nant Coedcaetyllefforest ordinary watercourse (below the A4061) (captured by RCT's Flood Risk Management team on 19/02/2020) .	38
Figure 24: Culvert inlet at Area 2 which conveys the Nant Coedcaetyllefforest ordinary watercourse towards Area 3 (captured by RCT's Flood Risk Management team on 19/02/2020)	39
Figure 25: The Rhondda Fawr River levels at Tynewydd station between the 14 th and 17 th February 2020 (Natural Resources Wales).....	41

1 INTRODUCTION

1.1. PURPOSE OF INVESTIGATION

On the 15 and 16th February 2020 RCT was impacted by an extreme weather event which was designated by the Met Office as ‘Storm Dennis’. Due to the extent and impact of the event, the LLFA opted to undertake a formal investigation.

The storm resulted in widespread residential and commercial flooding within the Rhondda Cynon Taf County Borough Council area. This report will focus on Flood Investigation Area RCT 27 which covers the village and community of Treherbert in the Rhondda Fawr valley.

The reason behind RCT’s investigation is in response to the duties of the local authority in regard to Section 19; of the Flood and Water Management Act 2010, 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 the 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

The purpose of the investigation is to determine which RMA’s have relevant flood risk management functions and which functions have been exercised in response to a flood.

Specific details of Storm Dennis, such as rainfall analysis are covered within a separate overview report that covers the wider RCT area. The report is titled ‘Storm Dennis February 2020 – Overview Report’ and will be referred to as ‘FRM – Storm Dennis – Overview Report’².

¹ Flood and Water Management Act 2010 – Section 19 - <https://www.legislation.gov.uk/ukpga/2010/29/section/19>

² [Flood Investigation Reports | Rhondda Cynon Taf County Borough Council \(rctcbc.gov.uk\)](https://www.rctcbc.gov.uk/flood-investigation-reports)

1.2. SITE LOCATION

The area investigated within this report covers the village of Treherbert, located in the north-western sector of RCT in the Rhondda Fawr valley, to the north of Treorchy (Figure 1).

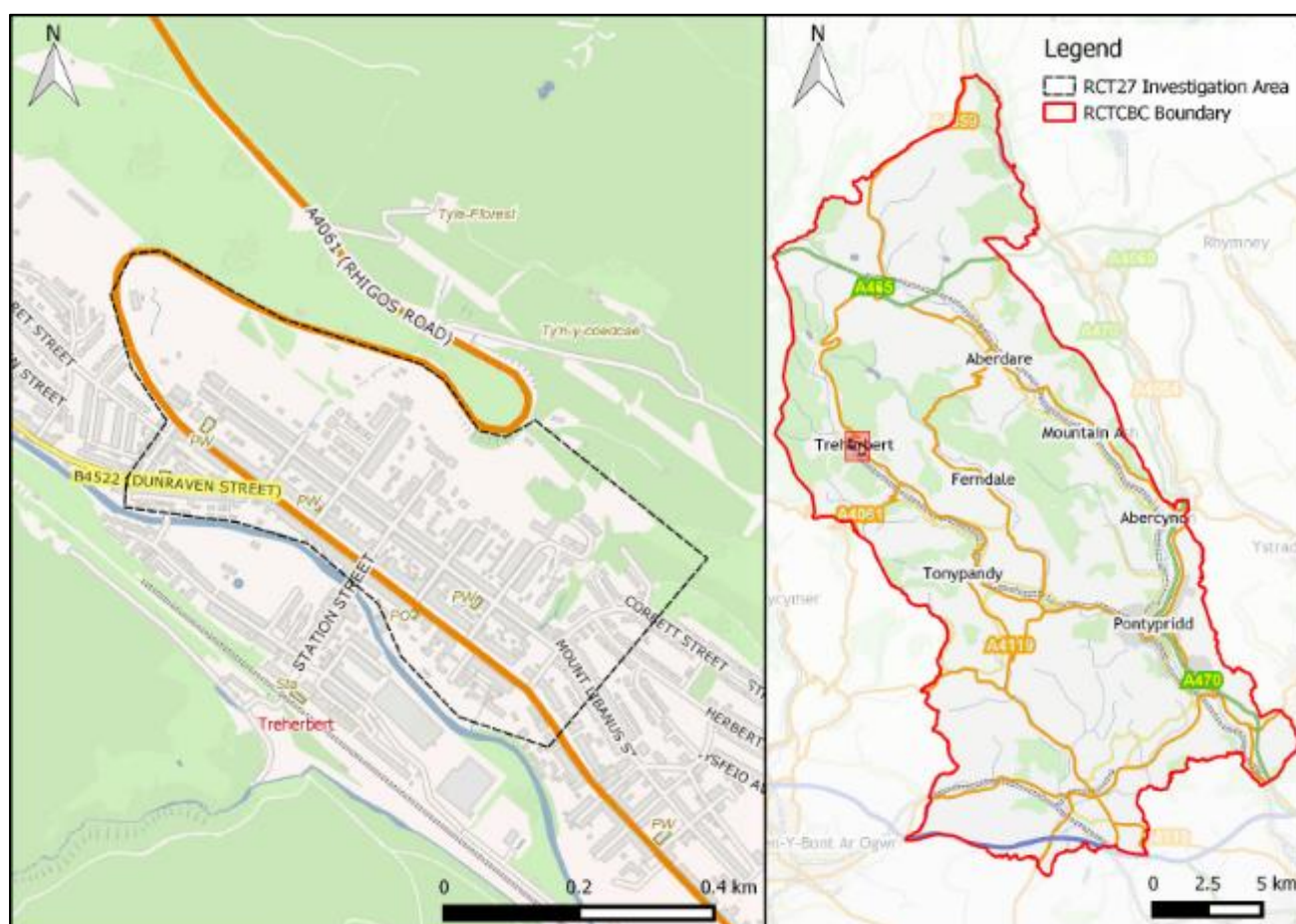


Figure 1: Flood Investigation Area RCT27 Location Plan

Treherbert is located within the River Rhondda catchment which flows north to south through the centre of the village. The area under investigation is bounded to the south west by the Rhondda Fawr River, and to the north and east by steep mountain sides of Mynydd Tynewydd and a large network of unnamed ordinary watercourses which form part of the River Rhondda Fawr catchment. Notable watercourses include the Nant Coedcaetylefforest, Nant Ton-Ilwyd and Nant Pwll-Brwyn which drain the hillsides above the investigation area and are partially culverted beneath Treherbert's urban settlements.

Investigation area RCT27 sits within the Electoral Ward and Community of ‘Treherbert’ which is ranked second highest risk of surface water flooding according to the FRMP and ranked 6th in Wales for surface water and ordinary watercourse flood risk according to the CaRR.

Treherbert has some of the steepest topography in RCT and as a result the highlands have remained undeveloped whilst residential development is confined to the valley floor. These steep slopes largely contribute to Treherbert’s significant ordinary watercourse and surface water flood risk.

The highest risk posed to people and properties according to the FRMP is broadly associated with culvert inlets located to the north of investigation area RCT27³. The risk of flooding from pluvial sources (surface water and ordinary watercourse) is illustrated within Natural Resources Wales’ Flood Risk Assessment Wales (FRAW) mapping (Figure 2). A low risk of flooding from the Main River is noted within the floodplains adjacent to the River Rhondda Fawr.

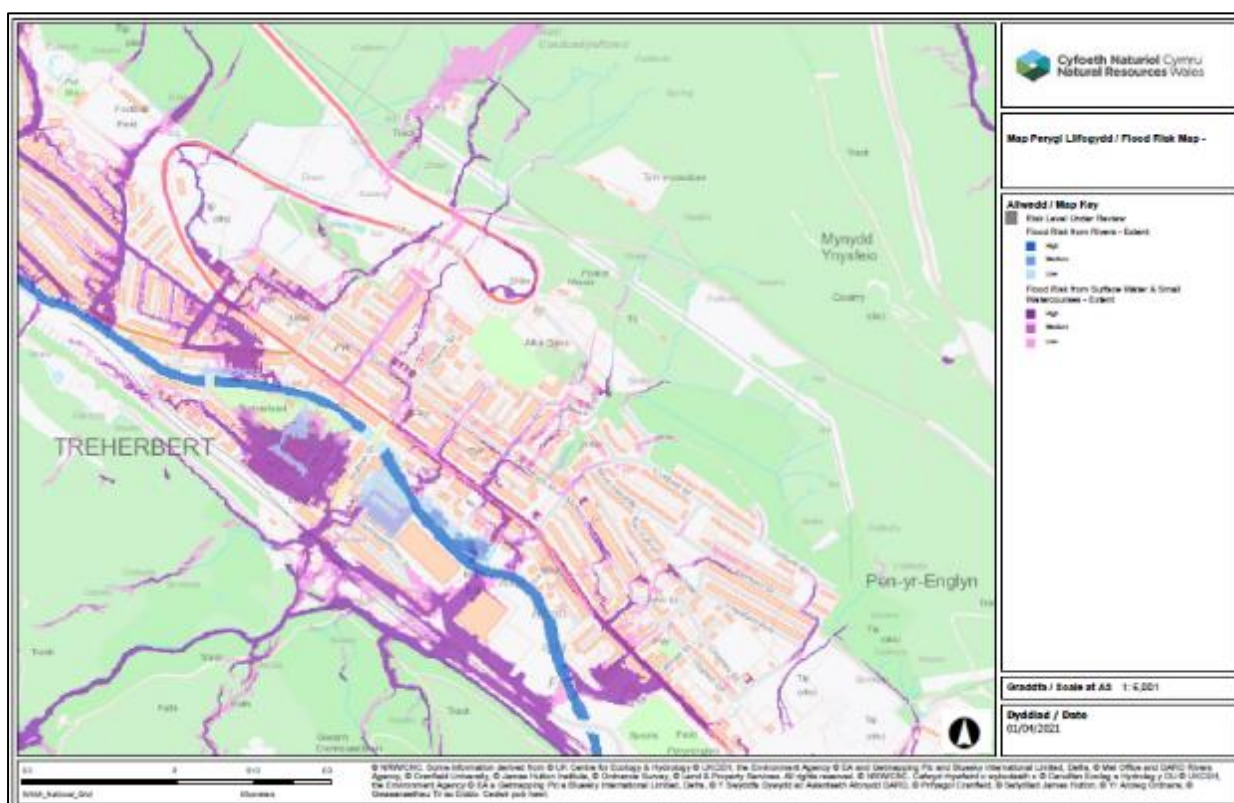


Figure 2: Natural Resources Wales’ Flood Risk Assessment Wales (FRAW) map for rivers and ordinary watercourse and surface water flood risk at investigation area RCT27. Contains Natural Resources Wales information © Natural Resources Wales and database right. All rights reserved.

³ [Flood Risk Management Plan, RCTCBC, December 2015](#)

1.3. DRAINAGE SYSTEM

The surface water drainage system that serves investigation area RCT27 is that of the highway drainage network designed to manage the surface water within the highway and public surface water sewer and combined sewer networks operated by Dŵr Cymru Welsh Water.

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 1.

Table 1: Investigative evidence gathered in preparation of the Storm Dennis Section 19 report

Source	Data
Residents	Photos, videos, statements, email correspondence, public engagement survey responses
Responders' statements	Local responders' statements
CCTV Surveys	Internal surveys of the local drainage networks
Met Office Data	Weather Warning information (see FRM – Storm Dennis – Overview Report ²)
Rain Gauges	RCT and NRW operated gauge information (see FRM – Storm Dennis – Overview Report ²)
Natural Resources Wales	River Level and Flood Warning data
RCT Flood Risk Management Plan	Site specific information and data for each electoral ward in RCTCBC
Communities at Risk Register	Flood risk ranking and scores for all flood types based on community data in Wales
Flood Investigation Report (Redstart's FIR)	A summary of the source-pathway-receptors, culvert capacity assessment and hydraulic modelling work undertaken by Redstart. The Flood Investigation Report was commissioned by RCTCBC prior to writing the Section 19 report.

Evidence sourced from the 'Flood Investigation Report', commissioned by RCT, will be further referred to as 'Redstart's FIR' throughout this report.

1.5. PUBLIC ENGAGEMENT

Following the initial flooding event that occurred on the 15th and 16th February during Storm Dennis, 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 determine the initial impacts caused by the flooding event and to investigate the potential source(s) and pathway(s) of flood water during the event. Due to the volume of calls received by RCT's Out of Hour department, visits were prioritised to those areas experiencing significant internal flooding to residential properties.

To support the flood investigations, a public engagement exercise was undertaken between 4th and 25th January 2021 by Redstart on behalf of RCT. The aim of this was to engage with the local residents who were affected by the flood event to capture details 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. 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.

2 FLOODING HISTORY

2.1. PREVIOUS FLOOD INCIDENTS

Previous incidences of flooding to properties within the wider investigation area have occurred over the past twenty years, often in relation to the network of ordinary watercourses and culverted infrastructure which convey a substantial volume of water through the village of Treherbert. Despite this, no storm event has resulted in flooding so extreme as the flooding that occurred during Storm Dennis.

Information relating to historical flood incidences prior to 2018 is limited however, in recent years the frequency and impact of property flooding has increased with the most notable flood events, being Storm Bronagh on 20-21st September and Storm Callum on 12-13th October 2018.

According to RCT's Flood Risk Management team, flooding at Abertonllwyd Street has been attributed to the culvert inlet adjacent to the New Park Garage. The result of which is overland flows that have internally flooded a number of residential properties within the Abertonllwyd Street and Dunraven Street area. Residents also report that flooding to properties along Abertonllwyd Street from groundwater sources has been an issue since the 2018 storms.

2.2. FLOOD INCIDENT

The flooding that occurred on the 15th and 16th February 2020 was a result of an extreme rainfall event, designated by the Met Office as ‘Storm Dennis’ which affected the majority of RCT and caused widespread flooding to communities.

Specific details of Storm Dennis, such as rainfall and river level analysis are covered within a separate overview report that covers the wider RCT area, referenced ‘FRM – Storm Dennis – Overview Report’².

The post event inspections undertaken on the days following the storm event by RCT’s Flood Risk Management Team and RCT’s Public Health, Protection and Community team identified 21 residential properties and two commercial properties as internally flooded.

A summary of the source(s) and pathway(s) of flooding within investigation area RCT27 during Storm Dennis have been outlined in Table 2 and further described throughout this section. For the purpose of this investigation, the flood incident at investigation area RCT27 will be described in two parts: the incident at ‘Treherbert West’ sub-catchment and the incident at ‘Treherbert East’ sub-catchment. The sub-catchment areas are illustrated below Table 2, within Figure 3.

Table 2: Summary of the source(s), pathway(s) and receptor(s) affected during Storm Dennis within investigation area RCT 27

Source	Pathway	Receptor
Treherbert West Sub-Catchment		
Intense rainfall running off the steep hillsides to the north of Treherbert draining to lower ground via a series of unnamed ordinary watercourses. A culvert inlet adjacent to New Park Garage surcharged during the storm event.	Surcharging flows from the culvert inlet adjacent to New Park Garage resulted in water conveyance into the commercial unit and onwards towards Abertonllwyd Street, Glenrhondda Court and Dunraven Street.	Directly caused internal flooding to 1 commercial property on Abertonllwyd Street. The flow path also contributed to the internal flooding of 18 residential properties on Abertonllwyd and Dunraven Streets.
Surcharged ordinary watercourse manhole on Abertonllwyd Street.	Surcharging flows from the ordinary watercourse manhole contributed additional overland flows	Contributed to the internal flooding of 18 residential properties on Abertonllwyd and Dunraven Streets.

	along Abertonllwyd Street and onwards towards Glenrhondda Court and Dunraven Street.	
Residents at Abertonllwyd Street reported water ingress through the basements of properties indicating a potential groundwater source contributed to the flooding.	The exact flow path is unknown however, the conveyance is attributed to Throughflow within the subsurface.	Contributed to the internal flooding of 9 residential properties on Abertonllwyd Street.
Intense rainfall running off the steep hillsides to the north of Treherbert draining to lower ground via the Nant Coedcaetylleforest ordinary watercourse. The Nant Coedcaetylleforest ordinary watercourse surcharged at the inlet due to debris blockages.	Surcharging flows from the culvert inlet flowed south down Dumfries Street before continuing its pathway towards Dunraven Street. On its course of flow surface water is considered to have travelled east along Dumfries Street due to local gradient.	Surface water flows along the highway contributed to the internal flooding of 9 residential properties at Dunraven Street. Flow paths along Dumfries Street caused internal flooding to 1 residential and 1 commercial property.
Intense rainfall running off the steep hillsides to the north and east of Treherbert draining to lower ground via a series of unnamed ordinary watercourses. A culvert inlet located below the A4061 was observed as fully submerged during the storm event.	Surcharging water flowed overland and conveyed via a track road leading to Dumfries Street. Water continued its pathway downhill towards Dunraven Street. On its course of flow surface water is considered to have travelled east along Dumfries Street due to local gradient.	Flowpaths along Dumfries Street caused internal flooding to 1 residential and 1 commercial property. Exceedance flows along the highway contributed to the flooding at Dunraven Street.
Treherbert East Sub-Catchment		
Intense rainfall running off the steep hillsides to the north and east of Treherbert draining to lower ground via a series of unnamed ordinary watercourses including the Nant Pwll-	Surcharging flows from both culvert inlets caused water to flow downhill directly towards Tyle-Fforest and onto Ross Rise with flows channelled through the gardens of several properties.	Internal flooding to 1 residential property at Tyle-Fforest and 1 property at Ross Rise. This flow path also externally impacted several properties in the area.

<p>brwyn ordinary watercourse.</p> <p>Two culvert inlets located near Tyn-y-Coedcae surcharged during the storm event.</p>		
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On review of Table 2, the principal source of flooding in this incident originated from intense rainfall generating significant surface water runoff from the steep hillsides to the north and east of Treherbert draining to lower ground. This runoff was routed towards the investigation area via several ordinary watercourses, many of which became overwhelmed during Storm Dennis and caused flooding associated to blocked culvert inlets.

Figure 3 depicts the topographic watershed of the Rhondda Fawr and Fach valleys (bold pink line), with rainfall to the south east of the watershed draining to the Rhondda Fawr catchment. The catchment above investigation area RCT27 can be sub-divided into further sub-catchments to illustrate the area of land that would expect to drain towards the investigation area (hatched areas in Figure 3). The flood incident at investigation area RCT27 will be further described in two parts: the incident at 'Treherbert West' sub-catchment (red hatched area, Figure 3) and the incident at 'Treherbert East' sub-catchment (blue hatched area, Figure 3).

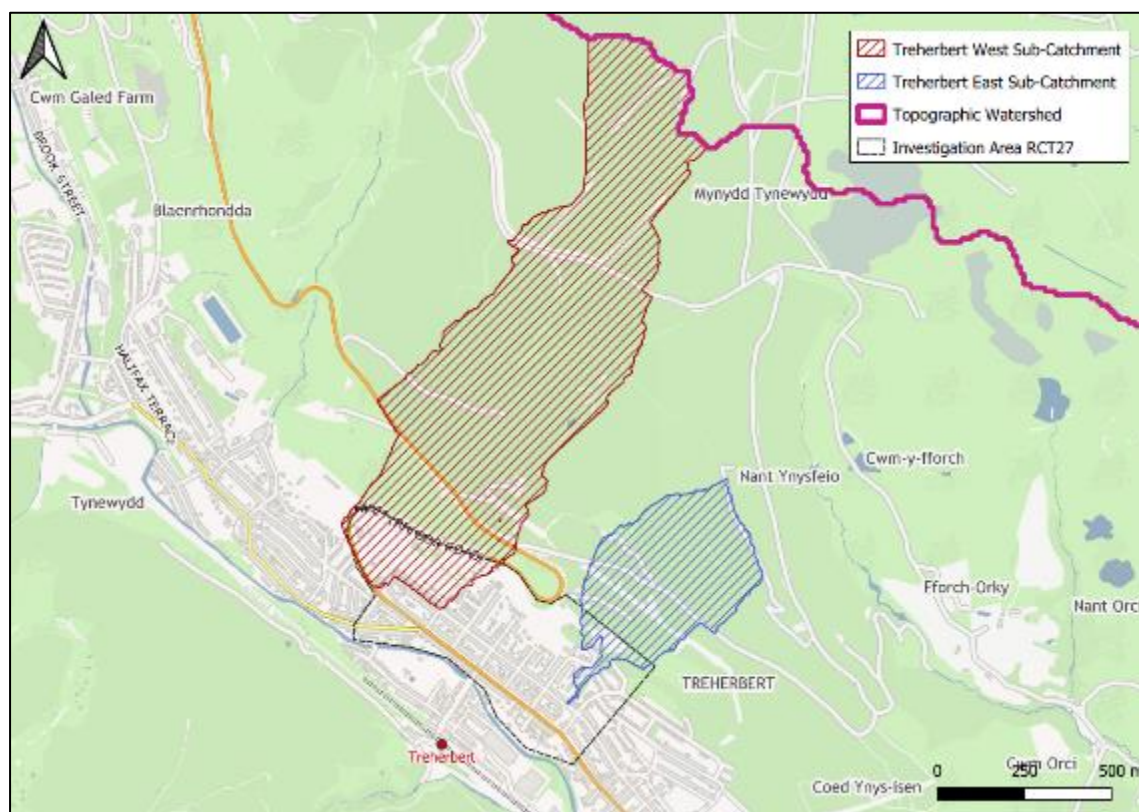


Figure 3: Rainfall Topographic Watershed and Sub-catchments above investigation area RCT27

2.2.1. TREHERBERT WEST SUB-CATCHMENT

The steep hillsides above the western half of investigation area RCT27 form the ‘Treherbert West’ sub-catchment. This area is drained by a network of ordinary watercourses, with the Nant Coedcaetylleforest ordinary watercourse being the most notable.

Figure 4 depicts the observed pathways of flooding within the ‘Treherbert West’ sub-catchment during Storm Dennis. The infrastructure known to have surcharged and contributed to the flooding are also illustrated in Figure 4.



Figure 4: Observed flow paths within 'Treherbert West' sub-catchment during Storm Dennis (16th February 2020)

Several calls were received from residents at Abertonllwyd Street and Dunraven Street on the 16th February 2020 to report water ingress into multiple residential properties. Upon a site inspection undertaken by RCT's Flood Risk Management team on the 18th February 2020, a culvert inlet adjacent to New Park Garage on Abertonllwyd Street (labelled 'Culvert Inlet 1' in Figure 4) was identified as half-submerged (Figure 5), indicating that the inlet was operating at a limited capacity post storm event.

The culvert inlet downstream of 'Culvert Inlet 1', labelled 'Culvert Inlet 2' in Figure 4, was also reported as surcharging by residents. It is considered that the surcharging flows from 'Culvert Inlet 1' overtopped the inlet structure and flowed overland towards 'Culvert Inlet 2', exacerbating the surcharging at this location.

Exceedance flows from both inlets resulted in water conveying through the commercial unit and continuing its pathway east along Abertonllwyd Street.



Figure 5: Evidence of submerged 'Culvert Inlet 1' which surcharged during Storm Dennis (captured by RCT's Flood Risk Management team on 18th February 2021)

A manhole located downstream of the surcharged inlets (labelled 'Manhole 1' in Figure 4) also showed evidence of surcharge. Exceedance flows from the ordinary watercourse manhole reportedly contributed additional overland flow towards Abertonllwyd Street. Water also conveyed down the path to the rear of Abertonllwyd Street towards Glenrhondda Court and onto Dunraven Street, as depicted in Figure 4.



Figure 6: 'Manhole 1' located at Abertonllwyd Street surcharged during Storm Dennis (captured by RCT's Flood Risk Management team on 18th February 2021)

Despite the significant pluvial flows travelling along the highway during Storm Dennis, residents at Abertonllwyd Street state no water conveyed into the fronts of their

properties from the surface. Residents reported water ingress primarily occurred through the basements of their properties, indicating a secondary source of flooding. Reports from residents demonstrated a combination of clear and dirty brown water was entering their properties during the storm event. This would suggest that the source of flooding was originating underground, from either groundwater sources or a defective drainage system (culverted ordinary watercourse/sewer system).

A total of nine residential properties along Abertonllwyd Street were internally flooded during Storm Dennis as a result.

The site inspection also identified evidence of a third surcharged culvert inlet located near Dumfries Street (labelled 'Culvert Inlet 3' in Figure 4). This culvert inlet conveys flows from the Nant Coedcaetylefforest ordinary watercourse. Evidence of cleared debris was identified (Figure 7) post event, indicating that the culvert inlet became blocked during Storm Dennis, resulting in surcharge.



Figure 7: 'Culvert Inlet 3' to the rear of Dumfries Street which surcharged during Storm Dennis (captured by RCT's Flood Risk Management team on 19th February 2021)

Furthermore, a culvert on private land to the rear of Dumfries Street was identified as fully submerged during RCT's site inspection (Figure 8), which resulted in overland flows travelling along the track road and contributing additional surface water flows towards Dunraven Street during the storm event.



Figure 8: Overland runoff originating from 'Culvert Inlet 4' flowing along the track road to the rear of Dumfries Street (image captured by RCT's Flood Risk Management team post event on 18th February 2020)

Exceedance flows from the surcharged inlet travelled down Dumfries Street and onwards to Dunraven Street, exacerbating the flooding in this area.

Surface water was also observed flowing west along Dumfries Street due to its declining gradient. One residential property and one commercial property at Dumfries Street is considered to have been impacted by internal flooding as a result of this overland flow.

The pathways of flood water conveying along Abertonllwyd Street and Dumfries Street combined to form a pathway onto Dunraven Street before ponding at a low point in the locality of the impacted properties. Nine residential properties at Dunraven Street were confirmed as internally flooded during Storm Dennis.

The surcharging of 'Culvert Inlet 4' is considered to have avoided the inlet downstream from surcharging. It was however, reported by residents at the western edge of

Dumfries Street, that overland flows originating from the hillside was contributing surface water flows to the highway, although no internal flooding to properties was confirmed as a result.

2.2.2. TREHERBERT EAST SUB-CATCHMENT

The steep hillsides above the eastern half of investigation area RCT27 form the 'Treherbert East' sub-catchment. This area is drained by a network of ordinary watercourses, with the Nant Pwll-Brwyn ordinary watercourse being the most notable.

Figure 9 shows the observed pathways of flooding within the 'Treherbert East sub-catchment during Storm Dennis. The infrastructure known to have surcharged and contributed to the flooding are also illustrated in Figure 9.



Figure 9: Observed flow paths within 'Treherbert East' sub-catchment during Storm Dennis (16th February 2020)

Calls were received by residents at Tyle Fforest on the 16th February 2020 to report water emanating from a culvert inlet situated to the rear of Tyn-y-coedcae. Upon wider inspection of the area, undertaken by RCT's Flood Risk Management team on 19th

February 2020, two culvert inlets, labelled 'Culvert Inlet 5' and 'Culvert Inlet 6' in Figure 9, located to the north of Ross Rise and Tyn-y-coedcae, showed evidence of surcharge (Figure 10).



Figure 10: 'Culvert Inlet 5' (left) and 'Culvert Inlet 6' (right) located to the rear of Tyn-y-coedcae which surcharged during Storm Dennis (captured by RCT's Flood Risk Management team on 19th February 2020)

Water from both culvert inlets flowed overland towards Tyle Fforest and Ross Rise, with some of the flow channelled via the highway and through the rear gardens of several properties, before discharging back into the Nant Pwll-brwyn ordinary watercourse downstream.

Internal flooding to two residential properties at Ross Rise and Tyle Fforest was confirmed by RCT officers during post event investigations. A further three properties suffered external flooding.

2.3. RAINFALL ANALYSIS

See RCT's 'Overview Report' of Storm Dennis, reference 'FRM – Storm Dennis – Overview Report'², for a detailed analysis of the rainfall and ordinary watercourse response.

3 POSSIBLE CAUSES

3.1. CULVERT CONDITIONS

Within investigation area RCT27 there are several unnamed watercourses which drain the hillsides above the village of Treherbert and discharge into the Rhondda Fawr River. Many of these watercourses are culverted beneath Treherbert's urban settlement (previously described in Section 1.2).

Several culvert inlets were inspected by RCT's Flood Risk Management team and the Council's Highways and Streetcare Depot following the flood event to assess their condition and help determine whether they served as a contributing factor to the flooding at Treherbert. CCTV survey inspections of the culvert networks were undertaken to ascertain both the operational condition of the network, and its structural integrity along sections of the network.

It should be noted that all surveys reported in this section were 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 necessarily be reflective of the condition of the assets prior to the onset of the storm event.

For the purpose of this investigation, the culvert conditions within investigation area RCT27 will be described in two parts: the 'Treherbert West' sub-catchment and the 'Treherbert East' sub-catchment.

3.1.1. TREHERBERT WEST SUB-CATCHMENT

Figure 11 outlines the three networks surveyed within the 'Treherbert West' sub-catchment and highlights the culvert inlets and manhole known to have surcharged.

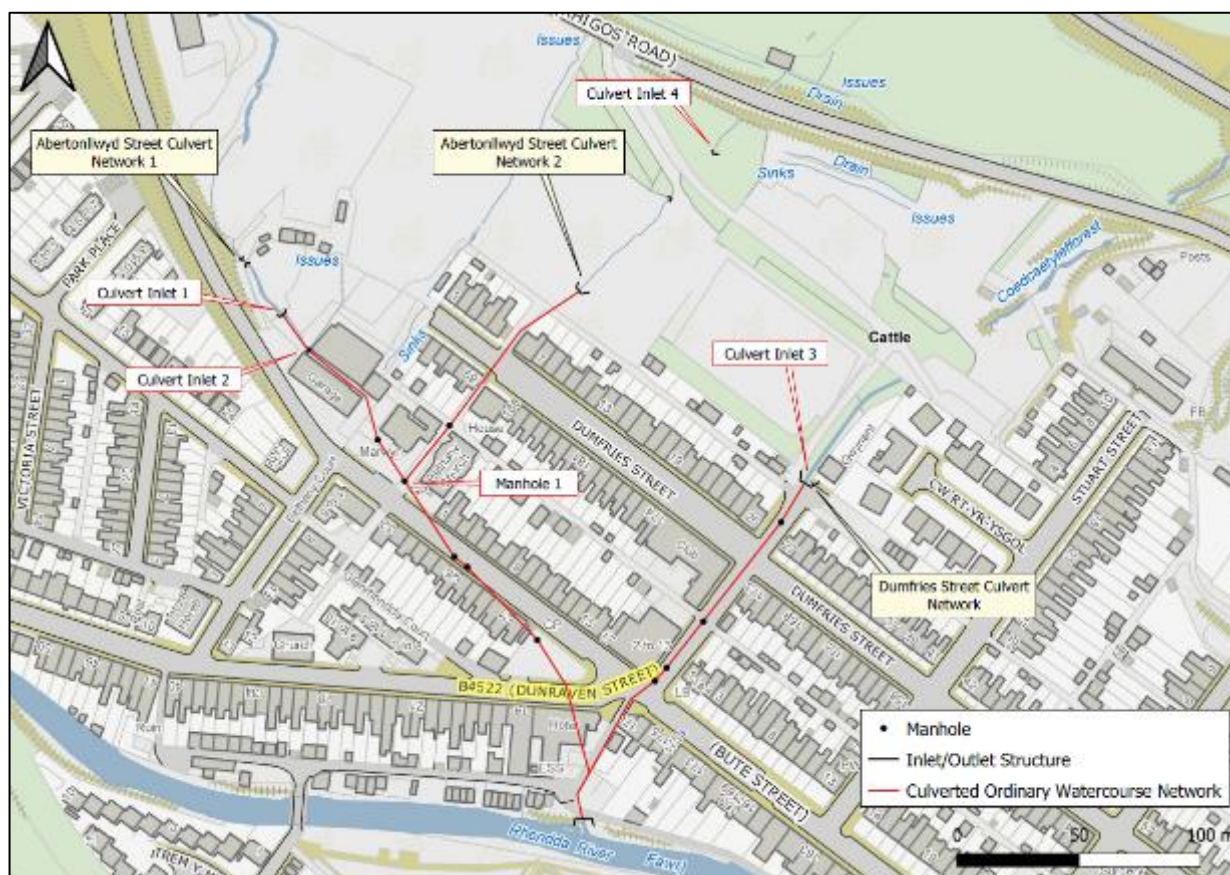


Figure 11: Surveyed culverted ordinary watercourse network within the 'Treherbert West' sub-catchment

3.1.1.1. ABERTONLLWYD STREET CULVERT NETWORK 1

Both 'Culvert Inlet 1' and 'Culvert Inlet 2', associated to 'Abertonllwyd Street Culvert Network 1', were identified as contributing sources of flooding to properties along Abertonllwyd and Dunraven Streets during Storm Dennis. Both inlets are identified as privately owned assets.

The culvert network length between 'Culvert Inlet 1' and 'Culvert Inlet 2', situated behind New Park Garage, consists of a 450mm plastic pipe which was noted as deformed during CCTV survey operations (Figure 12). Upon site inspections of the inlet during storm event conditions, water is observed to bypass 'Culvert Inlet 1' and flow over the top of the pipework towards 'Culvert Inlet 2'. This flow path is assumed to have occurred during Storm Dennis.



Figure 12: 'Culvert Inlet 1' captured during CCTV survey operations on 30/06/2020

'Culvert Inlet 2' primarily consists of an outfall pipe which discharges underneath New Park Garage (Figure 13). The inlet also receives flow from an ordinary watercourse which runs adjacent to the garage. As depicted in Figure 13, the outfall pipe is relatively level with the surface, resulting in standing water surrounding the inlet.



Figure 13: Outfall pipe entering 'Culvert Inlet 2' (left) and standing water surrounding 'Culvert Inlet 2' (right) (captured during CCTV survey operations on 30/06/2020)

The poor condition of both culvert inlets is considered to have contributed to the surcharging of both inlets.

The 'Abertonllwyd Street Culvert Network 1' was initially surveyed by a Council appointed contractor on 26th June 2020 following Storm Dennis. The survey identified multiple structural and operational defects within the system, which eventually led to the survey being abandoned at two locations; downstream of 'Culvert Inlet 2' and downstream of 'Manhole 1' due to debris identified in the network.

A second Council appointed contractor undertook a further survey of the culvert network on 21st October 2020. The survey had to be abandoned again approximately 27 meters downstream of 'Culvert Inlet 2' due to a high volume of settled debris reducing the networks cross-sectional area by 70% (depicted in Figure 14). This debris is considered to have reduced the culvert's hydraulic capacity to manage the flow of water entering the network, contributing to the surcharging at 'Culvert Inlet 2'.



Figure 14: Internal view of 'Abertonllwyd Street Culvert Network 1' looking up towards 'Culvert Inlet 2' (CCTV survey footage captured 23/10/2020)

Surcharging at 'Manhole 1' was also identified as a secondary source of flooding to properties at Abertonllwyd and Dunraven Streets during Storm Dennis. Both CCTV survey operations were also abandoned downstream of 'Manhole 1' due to settled deposits and large debris identified within the network (depicted in Figure 15). The culvert network downstream of 'Manhole 1' was also graded as being in very poor structural condition.



Figure 15: Internal view of 'Abertonllwyd Street Culvert Network 1' downstream of 'Manhole 1' (CCTV survey footage captured 24/10/2020)

The poor condition of the culvert network downstream of 'Manhole 1' is considered to have contributed to its surcharging during Storm Dennis. The debris identified within the network is also indicative of the high flow rates which enabled the erosion and transportation of a significant volume of debris from the upper catchment and subsequent deposition within the culvert network during the storm event.

Several jetting and cleansing operations to clear the internal culvert barrel of debris utilising specialised contractors were undertaken following both CCTV survey exercises, however, continued debris mobilisation in the network resulted in several phases of cleansing operations to complete the surveying of the network. It is estimated that approximately 15 tons of material was removed from the network during both exercises.

3.1.1.2. ABERTONLLWYD STREET CULVERT NETWORK 2

The 'Abertonllwyd Street Culvert Network 2' drains the hillside above Dumfries Street and enters the main culvert network at 'Manhole 1'. The network was surveyed to be in poor operational condition with settled deposits reducing the network's cross-sectional area by 40%.

Despite its poor condition, no flooding was observed along the culvert network. The observed surcharging at 'Culvert Inlet 4', upstream of the culvert network, is considered to have reduced the volume of water entering the network during the storm event, and thereby reduced the risk of surcharge downstream.

3.1.1.3. DUMFRIES STREET CULVERT NETWORK

Following reports that 'Culvert Inlet 3', which conveys the Nant Coedcaetyllefforest ordinary watercourse beneath Dumfries Street, was a contributing source of flooding to properties at Dumfries and Dunraven Streets, post event inspections were carried out. These inspections found evidence of debris surrounding the inlet structure, indicating that the inlet had surcharged due to blockage during the event (see Figure 7).

The inlet is identified as a privately owned asset, however the Council's Highway Authority maintain an inspection schedule of the asset pre storm events due to the inherent risk associated to the inlet.

The 'Dumfries Street Culvert Network' was also surveyed to be in poor condition, with significant operational and structural defects identified throughout the network. The volume of settled deposits led to operators abandoning the CCTV survey operations on two occasions. As a result, approximately 5 tonnes of debris was removed from the network (shown in Figure 16).



Figure 16: Debris removed from the 'Dumfries Street Culvert Network' during cleansing operations (image captured on 29/06/2020)

Similarly to the Abertonllwyd Street culvert networks, the debris identified within the Dumfries Street network highlights the strength of the ordinary watercourse flows that would have been travelling down the hillsides above RCT27 and entering the culvert networks during the storm event. Its poor condition is considered to have contributed to the surcharging of 'Culvert Inlet 3', however, the blockage to the inlet structure has been determined as the most significant contributor to the flood flow path along Dumfries and Dunraven Streets during Storm Dennis.

3.1.2. TREHERBERT EAST SUB-CATCHMENT

Figure 17 outlines both networks surveyed within the 'Treherbert East' sub-catchment and highlights the culvert inlets known to have surcharged.

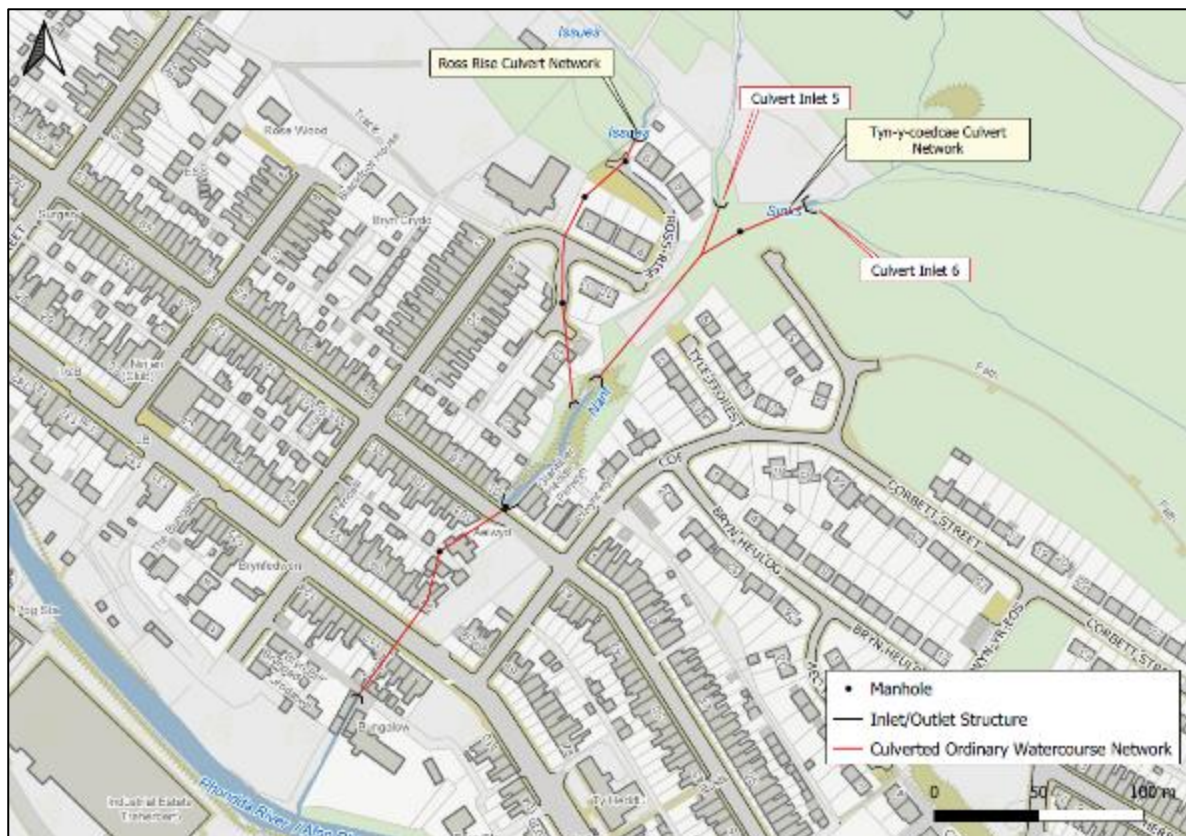


Figure 17: Surveyed culverted ordinary watercourses within the 'Treherbert East' sub-catchment

3.1.2.1. TYN-Y-COEDCAE CULVERT NETWORK

The source of flooding to three properties at Ross Rise and Tyle Fforest was identified as originating from two surcharged culvert inlets located to the north of Tyn-y-coedcae, labelled 'Culvert Inlet 5 and 6' in Figure 17.

The 'Culvert Inlet 6' structure was identified by first responders as being blocked with debris and was subsequently cleansed. Figure 18 captured post event by FRM officers depicts the inlet following clearance works.



Figure 18: Photo of 'Culvert Inlet 6' captured by RCT's Flood Risk Management team following debris clearance post Storm Dennis (19/02/2020)

The inlet is identified as a privately owned asset, however the Council's Highway Authority maintain an inspection schedule of the asset pre storm events due to the inherent risk associated to the inlet.

The 'Tyn-y-coedcae Culvert Network' downstream of 'Culvert Inlet 6' was surveyed to be in acceptable structural and operational condition, indicating that the blockage to the inlet structure caused by debris was the primary cause of surcharge.

'Culvert Inlet 5' was identified as being in very poor condition, with the surrounding area showing evidence of surcharge according to on site officers. The CCTV survey identified the network downstream of the inlet to be in acceptable condition, however

the condition of the 'Tyn-y-coedcae Culvert Network' downstream of the connecting networks was in poor condition, with settled deposits identified.

Despite its poor condition, no flooding was observed along the culvert network downstream of both inlets.

3.1.2.2. ROSS RISE CULVERT NETWORK

Although no flooding was observed along the Ross Rise culvert network, the culvert inlet was inspected by FRM officers post event to assess its condition. The inspection found no evidence of surcharge or blockage to the inlet.

It can be concluded that the Ross Rise culvert network did not contribute to the flooding that occurred within the 'Treherbert East' sub-catchment.

3.2. ORDINARY WATERCOURSE CONDITIONS

Several sections of natural ditches and open watercourses which drain the steep catchment above Treherbert are identified to flow through the investigation area, as illustrated in Figure 19. The most notable watercourses include the Nant Coedcaetylleforest, the Nant Ton-llwyd and Nant Pwll-brwyn.

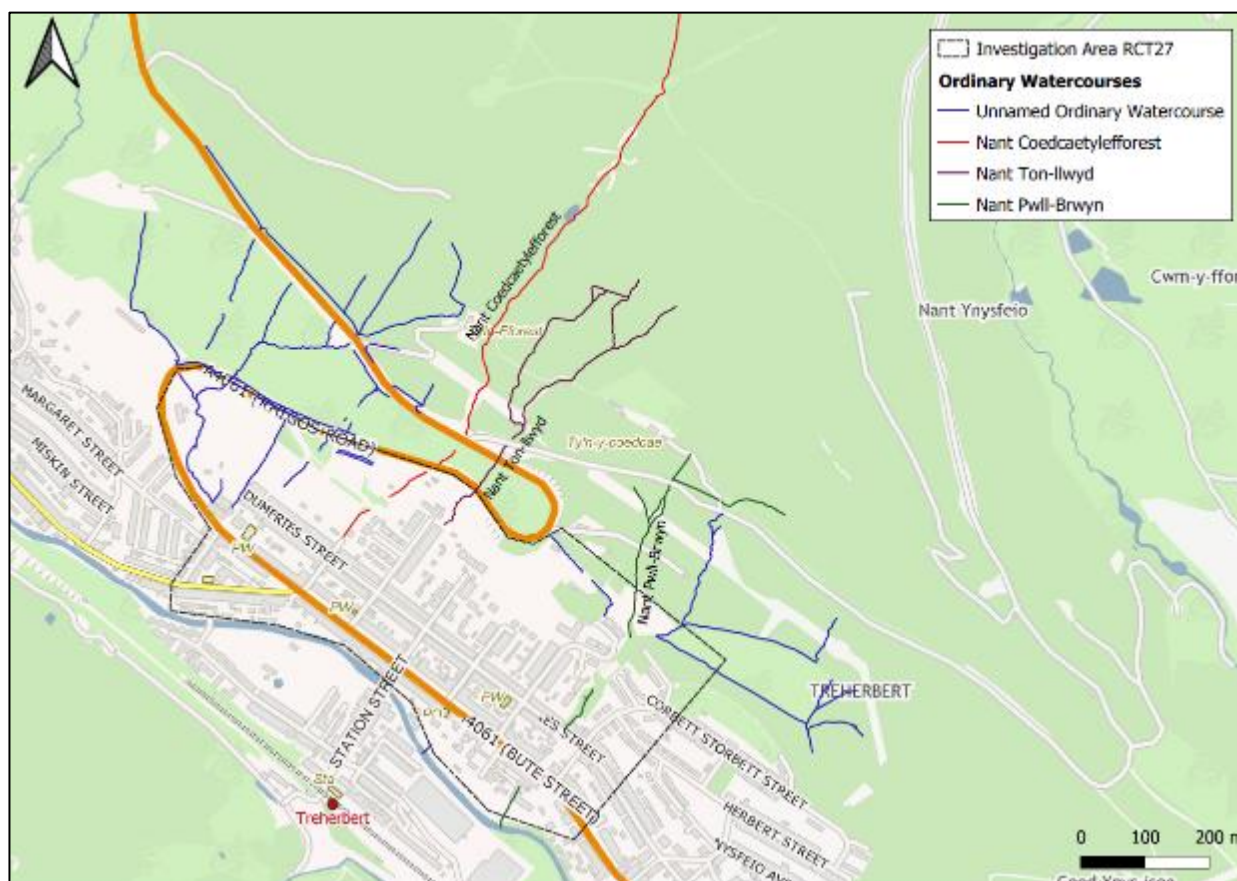


Figure 19: Map of Ordinary Watercourses which feed into investigation area RCT27

Following the storm event, RCT Flood Risk Management officers carried out a site walk-over assessment of the ordinary watercourses upstream of the culvert inlets identified as sources of flooding to assess the condition of the watercourses for any signs of overtopping, evidence of scour and any land movement of the hillsides.

3.2.1. TREHERBERT WEST UNNAMED ORDINARY WATERCOURSES

On review of the unnamed open watercourse conditions identified within the 'Treherbert West' sub-catchment, a large proportion were identified as heavily overgrown with dense vegetation restricting on-site inspections.

According to on-site officers, several sections of open watercourse upstream of the 'Abertonllwyd Street Culvert Network 1' (Figure 11) had significant build-up of debris within the channels, indicating significant mobilisation of debris occurred during the storm event (depicted in Figure 20). The conveyance of sediment, silt and stone downstream is considered to have contributed to the surcharging of 'Culvert Inlet 1' and 'Culvert Inlet 2' during Storm Dennis. This debris is also considered to have entered the culvert network, contributing to the surcharge of 'Manhole 1' during the event.



Figure 20: Image of debris accumulation within the unnamed ordinary watercourse channel upstream of 'Culvert Inlet 1' (Figure 4) (captured during CCTV operations on 30/06/2020)

The unnamed ordinary watercourses located above 'Abertonllwyd Street Culvert Network 2' (Figure 11) did not show evidence of significant debris mobilisation, however, it was apparent during post event inspections that significant overland flows had occurred along the hillside upon identifying evidence of flattened vegetation and saturated ground. The ordinary watercourse channel upstream of 'Culvert Inlet 4' (Figure 11), which surcharged during the storm event, was largely undefined and is considered to have contributed to the inlet becoming submerged, resulting in out-of-bank flows (Figure 8)

3.2.2. NANT COEDCAETYLEFFOREST ORDINARY WATERCOURSE

Following the surcharging of 'Culvert Inlet 3' (Figure 4) caused by debris blockage during Storm Dennis, the Nant Coedcaetylefforest ordinary watercourse was inspected by Flood Risk Management officers for signs of debris mobilisation. The watercourse was inspected at three areas, depicted in Figure 21.

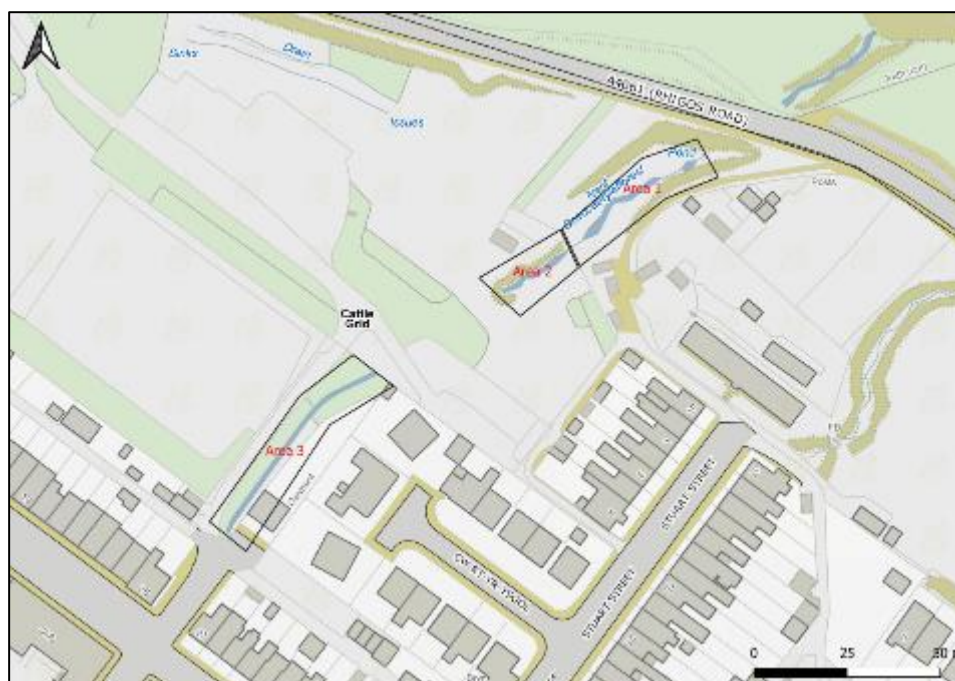


Figure 21: Nant Coedcaetylefforest ordinary watercourse inspection location plan

The upstream sections of the Nant Coedcaetylefforest ordinary watercourse (Area 1, Figure 21) showed evidence of debris deposition within the man-made channel, along with significant accumulation of material across the upper debris screens and headwall structure. Figure 22 and 23 depicts the material, which consists of coarse stone, silt and woody debris, within the upper channel. This material is assumed to have been mobilised from the upper reaches above the A4061 (Rhigos Road) and carried downstream by the high flows during Storm Dennis.



Figure 22: Photo of debris deposition behind the upper debris screen of the Nant Coedcaetylleforest ordinary watercourse (captured by RCT's Flood Risk Management team on 19/02/2020)



Figure 23: Photo of debris accumulation in the upper reaches of the Nant Coedcaetylleforest ordinary watercourse (below the A4061) (captured by RCT's Flood Risk Management team on 19/02/2020)

Below the headwall structure, the channel and culvert inlet (Area 2, Figure 21) did not show evidence of debris conveyance or blockage to the inlet, as shown in Figure 24. It is considered that the upstream debris screens at Area 1 succeeded in minimising the volume of debris travelling downstream.



Figure 24: Culvert inlet at Area 2 which conveys the Nant Coedcaetylleforest ordinary watercourse towards Area 3 (captured by RCT's Flood Risk Management team on 19/02/2020)

The channel immediately upstream of 'Culvert Inlet 3' (Area 3, Figure 21) is identified as man-made and therefore showed no signs of bank erosion. Upon an inspection of the surrounding area post Storm Dennis however, material on the banking area was evident (Figure 7). This material is not considered to have originated from Area 1.

It is assumed that the watercourse at Area 3 exceeded its usual capacity, resulting in out-of-bank flows mobilising debris from the surrounding bank area which caused the blockage at 'Culvert Inlet 3' (Figure 4), resulting in surcharge.

3.2.3. NANT PWLL-BRWYN ORDINARY WATERCOURSE AND TRIBUTARIES

The Nant Pwll-Brwyn ordinary watercourse and its tributaries convey towards the Rhondda Fawr River via 'Culvert Inlet 5' and 'Culvert Inlet 6' (Figure 9) which were identified as sources of flooding during Storm Dennis. The watercourses rise very steeply from the investigation area which restricted on-site inspections.

Despite this, on review of the Nant Pwll-Brwyn ordinary watercourse and its tributaries, the channels were identified as being very steep with significant embankment erosion evident in the upstream reaches. The debris removed from both culvert inlet structures was also indicative of natural scour material, indicating that the condition of the upstream ordinary watercourses contributed erosive material to both culvert inlets during Storm Dennis.

Following evidence from the Storm Dennis flooding event, it is clear that morphological processes can be a key contributor to flood risk. As a result, a geomorphological review of the upper catchment above Treherbert was carried out in early November 2020 by JBA Consulting, on behalf of RCT, which identified evidence of “localised hillslope failure” and “multiple areas of active bank erosion” which were “seen to be inputting sediment to the watercourses” during surveying exercises⁴.

Observations made during the geomorphic assessment indicates a high availability of sediment in the mid-hillslope area which has resulted in severe bed incision in places, particularly in the upper ‘Treherbert East’ sub-catchment. The delivery of sediment and stone towards the investigation area during Storm Dennis has primarily been attributed to “natural erosional processes associated with an extreme flood event” which is exacerbated by the steep slope profiles of the ordinary watercourses flowing towards Treherbert which produce faster velocities and increased shear stresses.

The material in the upper reaches of Treherbert is believed to have contributed to the surcharging of several culverts during Storm Dennis.

⁴ Fluvial Geomorphology Assessment: Treherbert, JBA Consulting, December 2020

3.3. MAIN RIVER

The designated main river Rhondda Fawr flows through the village of Treherbert (Figure 1), to the south of the investigation area.

The hydrograph in Figure 25 illustrates the rapid rise in levels of the River Rhondda Fawr in response to rainfall, captured at NRW's Tynewydd station. The River Rhondda Fawr at Tynewydd reached its highest peak ever recorded at 02:45 on 16th February 2020, reaching 1.62 meters.

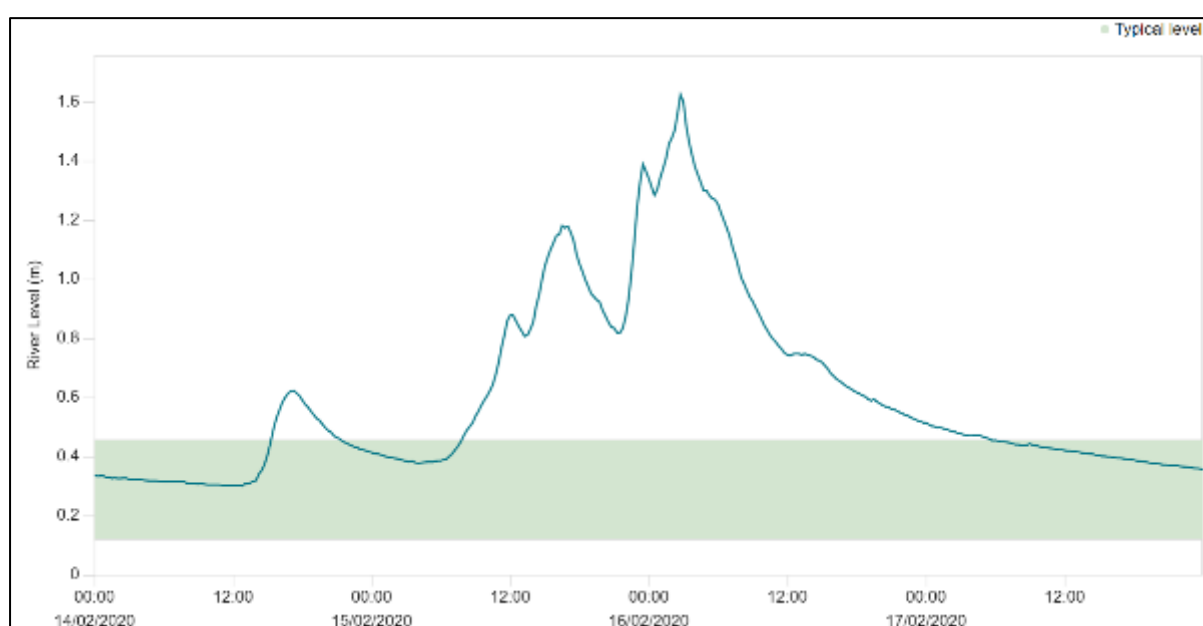


Figure 25: The Rhondda Fawr River levels at Tynewydd station between the 14th and 17th February 2020 (Natural Resources Wales)

The green bar displayed on the hydrograph shows the typical level of the River Rhondda Fawr at Tynewydd station, ranging between 0.1 and 0.5 meters. At its peak, the River Rhondda Fawr was over twice its average level, stressing the extreme and unprecedented levels that RCT's rivers rose to during the storm's peak intensity.

There is no evidence from this investigation to suggest that the main River Rhondda Fawr significantly contributed to the recorded flooding of properties at RCT27 during Storm Dennis.

3.4. HIGHWAY DRAINAGE CONDITIONS

Anecdotal reports note surface water was observed to convey down several streets within the investigation area during Storm Dennis. Notably, much of the observed surface water originated from ordinary watercourse flooding associated to culvert inlets surcharging.

Overland flows from areas of hillside and runoff originating from surcharged culvert inlets across RCT27 resulted in deposition of mud, silt and debris across several streets which is assumed to have entered the highway drainage network via gullies. In these instances, it is likely that highway drainage assets will have had a limited capacity to intercept flows within the investigation area.

Highway drainage is not designed to manage overland flows from private areas, parks or open space. In this instance, the capacity of the highway drainage was exceeded by the substantial surface water flows entering the drainage network across RCT27. Given the severity of the storm, the maintenance condition of the highway surface water drainage system is not considered to have significantly impacted on the flooding experienced within Treherbert.

3.5. DCWW APPARATUS

Six incidences of flooding to properties within the investigation area were reported to DCWW during Storm Dennis, namely at Abertonllwyd Street and Dumfries Street.

DCWW attended Abertonllwyd Street on the 16th February 2020. Upon an investigation into DCWW's network in the area, it was found to be coping albeit with very high flows. DCWW also inspected the private surface water network in the area which was also operating with no issues.

Based on their findings, and in addition to RCT's post event investigations, it was concluded that the surcharging of 'Culvert Inlet 1' and 'Culvert Inlet 2' (Figure 4) caused water to discharge overland along Abertonllwyd Street and enter the sewer system in the rear gardens of several properties. These additional flows would have been unable to drain away quick enough, resulting in internal flooding to properties on Abertonllwyd Street.

It has been concluded that the groundwater source of flooding reported by residents at Abertonllwyd Road did not originate from a defective sewer system.

3.6. SURFACE WATER

Surface water runoff as a result of ordinary watercourse flooding associated to blocked and overwhelmed culvert inlets has been determined as a contributing source of flooding to properties within the lower reaches of Treherbert, along Abertonllwyd and Dunraven Streets, where water naturally accumulates.

The volume of water conveying to these low points within RCT27 during Storm Dennis would have been unable to drain away via surface water drainage systems, resulting in surface water accumulation on the highway which entered the front and rear of several properties.

3.7. GROUNDWATER

Residents at Abertonllwyd Street referenced clear water entering the basements of their properties during the storm event, indicating a potential groundwater source contributed to the flooding of nine residential properties. The exact flow path is unknown however, the conveyance is attributed to Throughflow within the subsurface.

Throughflow is the lateral flow of water within the soil layer which normally takes place when the ground is completely saturated with water following heavy and persistent rainfall. This process causes water to return to the surface before entering a watercourse, drainage system or returning as groundwater flow. Given the prolonged period of rainfall during February 2020, it is considered likely that the groundwater table was high during Storm Dennis, indicating Throughflow conveyance of groundwater likely impacted those properties at Abertonllwyd Street.

A review of available geological information indicates that RCT27 is underlain by superficial deposits consisting of Glacial Till and River Deposits, overlying Lower and Middle Carboniferous Coal Measures, consisting of mudstone, sandstone and siltstone³. Superficial deposits associated with fluvial deposition, such as river gravels and alluvial clays and sands, are found at the base of the main river valleys. According to the Environment Agency, flooding from groundwater is most common in these areas with sand and gravel in the river valleys⁵, again indicating that the investigation area is susceptible to groundwater flooding.

⁵ [Floding from Groundwater, Environment Agency, September 2011 \(publishing.service.gov.uk\)](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/241247/Floding_from_Groundwater.pdf)

3.8. ACCESS STRUCTURES

No access structures were identified during the asset investigations within the area, as such 'access structures' have not been considered within this report.

3.9. SYSTEM AT CAPACITY

Culvert networks within the investigation area (Figure 11 and 17) were surveyed post event to ascertain the internal condition of the networks, the results of which fed into a review of the hydraulic performance of the network to ascertain its current standard of protection using Causeway Flow modelling. The results of the culvert inlet capacity assessments are summarized in the Table below (refer to Figures 4 and 9 for culvert labels).

Table 3: Summary of culvert capacity assessment results which indicate the current standard of protection of the culverted networks in free flowing and blockage conditions

Culvert Network	Standard of Protection (SOP) – Free Flowing	Standard of Protection (SOP) – Blockage Conditions
Culvert Inlet 1 (Abertonllwyd Street)	Q2 (50% AEP)	<Q2 (50% AEP)
Culvert Inlet 2 (Abertonllwyd Street)	<Q2 (50% AEP)	<Q2 (50% AEP)
Culvert Inlet 3 (Dumfries Street)	Q1000 (0.1% AEP)	Q200 (0.5% AEP)
Culvert Inlet 5 (Tyn-y-coedcae)	Q1000 (0.1% AEP)	Q1000 (0.1% AEP)
Culvert Inlet 6 (Tyn-y-coedcae)	Q1000 (0.1% AEP)	Q1000 (0.1% AEP)

The results from the culvert capacity assessments and hydraulic modelling undertaken as part of Redstart's FIR, infer that 'Culvert Inlet 1' and 'Culvert Inlet 2' associated to the Abertonllwyd Street culvert network, has a SOP of Q2, which is further reduced with the presence of blockage.

The remaining culvert networks have been assessed as having a SOP in accordance with current design standards, as defined by CIRIA C786, or greater when considering the free-flowing scenario.

On review of the culvert capacity assessments, it is inferred that both 'Culvert Inlet 1' and 'Culvert Inlet 2' surcharged due to hydraulic overload. It is also considered that the poor condition of both culvert inlet structures contributed to the surcharging of both inlets. Furthermore, the significant volume of debris identified within the culvert network and consequently reducing its hydraulic capacity to manage the flow of water entering the network, has been attributed to the surcharging of 'Manhole 1' during Storm Dennis.

On review of the condition of 'Culvert Inlet 3' post Storm Dennis, a sensitivity analysis was undertaken to review the impact of flooding during both free-flowing and 'medium' (67%) blockage conditions⁶. The network was assessed as having adequate capacity in accordance with the design standards. In 'medium' blockage conditions the capacity is reduced to Q200, however it was concluded by on-site inspectors that the blockage to 'Culvert Inlet 3' was akin to a full blockage (100%). Consequently, the capacity of the inlet would have been further reduced to below design standards. The blockage to the inlets' debris screen which reduced the networks' capacity to manage the flow of water has been determined as the primary cause of flooding.

Both 'Culvert Inlet 5' and 'Culvert Inlet 6' have been assessed as having adequate capacity in both free-flowing and 'medium' (67%) blockage conditions. On review of both inlets post storm event, it was also concluded that the total blockage percentage on the structure was greater than 67%, thus reducing the capacity of both culvert inlets to manage the flow of water, which would account for the surcharging at both locations.

⁶ Natural Resources Wales Guidance Note (Ref No GN43)

3.10. SUMMARY OF POSSIBLE CAUSES

The above sections have identified and described the possible causes of flooding within investigation area RCT27 during Storm Dennis (15-16th February 2020). A summary of the identified sources and possible cause(s) of flooding (issue) has been outlined below in Table 4.

Table 4: Summary of the source(s) and possible cause(s) of flooding in investigation area RCT27 during Storm Dennis

Ref No	Asset (Source)	Issue	Asset Owner	Type of Flooding
1	Culvert Inlet 1 (Abertonllwyd Street)	The culvert inlet became hydraulically overloaded during the storm event, causing water to overtop the inlet structure and convey overland towards 'Culvert Inlet 2', exacerbating the surcharging at this location.	Private Landowner	Ordinary Watercourse
2	Culvert Inlet 2 (Abertonllwyd Street)	The culvert inlet became hydraulically overloaded during the storm event, causing water to overtop the inlet structure and convey overland towards Abertonllwyd Street and onwards to Dunraven Street.	Private Landowner	Ordinary Watercourse
3	Manhole 1 (Abertonllwyd Street)	The manhole showed evidence of surcharge during post event inspections. This has been attributed to debris accumulation within the culvert network reducing the cross-sectional area by up to 70%.	RCT Corporate Estate	Ordinary Watercourse and Surface Water
4	Culvert Inlet 3 (Dumfries Street)	The culvert inlet surcharged during the storm event after becoming blocked with debris mobilised from the surrounding bank area. This resulted in water flowing down Dumfries Street and accumulating at Dunraven Street.	Private Landowner	Ordinary Watercourse
5	Culvert Inlet 4	The culvert inlet was identified as submerged during post event inspections. This resulted in	Private Landowner	Ordinary Watercourse

		water flowing overland and contributing surface water flows towards Dumfries and Dunraven Streets.		and Surface Water
6	Culvert Inlet 5 (Tyn-y-coedcae)	The culvert inlet became hydraulically overloaded during the storm event, causing it to surcharge towards properties at Tyle Fforest and Ross Rise.	Private Landowner	Ordinary Watercourse
7	Culvert Inlet 6 (Tyn-y-coedcae)	The culvert inlet became hydraulically overloaded during the storm event, resulting in surcharge towards properties at Tyle Fforest and Ross Rise. Debris accumulation at the inlet has also been determined as a contributing factor as to the cause of surcharge.	Private Landowner	Ordinary Watercourse
8	Groundwater	Residents at Abertonllwyd Street referenced clear water entering the basements of their properties during the storm event, indicating potential groundwater source of flooding.	Private Landowner	Groundwater

4. RISK MANAGEMENT AUTHORITY ACTIONS

A Welsh Risk Management Authority is defined in Section 6 of the Flood and Water Management Act 2010 as NRW; a LLFA, a district council for an area where there is no unitary authority, or a highway authority wholly in Wales; an internal drainage board for an internal drainage district that is wholly or mainly in Wales; a water company that exercises functions in relation to an area in Wales. As the LLFA, RCT has the responsibility to coordinate the management of flood risk and the interaction of Risk Management Authorities across Rhondda Cynon Taf.

An overview of the relevant Risk Management Authority in relation to flood type is provided in Table 5. For further details of the roles and responsibilities of individual Risk Management Authorities in managing flooding, refer to 'FRM – Storm Dennis - Overview Report'².

Table 5: Risk Management Authority with relevant functions for different flood types

Type of Flooding	Relevant Risk Management Authority
Flooding from Main River, reservoirs and the sea (including coastal erosion).	Natural Resources Wales
Flooding from ordinary watercourses, surface water and groundwater	Lead Local Flood Authority
Flooding from water and sewage systems	Water Companies (Dŵr Cymru Welsh Water)
Flooding from the highway	Highway Authority
Flooding from the highway (motorways and major trunk roads)	Welsh Government Trunk Road Agency

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 Highways Act 1980. Through the investigation of the flooding that impacted investigation area RCT27, the flood risk management functions exercised, or proposed to exercise, by relevant RMA's was recorded in response to the duties placed on the local authority in regard 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 cause(s) of flooding in investigation area RCT27 as a result of Storm Dennis has been previously identified and summarised within Table 4. The Risk Management Authority(ies) responsible for managing that flooding have been determined as the Lead Local Flood Authority and Land Drainage Authority (Table 6). Table 6 also presents a series of recommendations put forward by the LLFA.

Table 6: Recommendations provided by the LLFA to be considered by the relevant Risk Management Authority identified in response to the source(s) of flooding in investigation area RCT27 (as per Table 4)

Ref No	Asset (Source)	Asset Owner	Type of Flooding	Risk Management Authority Responsible for Managing Risk	Recommendations	
1	Culvert Inlet 1 (Abertonllwyd Street)	Private Landowner	Ordinary Watercourse	Lead Local Flood Authority and Land Drainage Authority	R1A	The LLFA and LDA to identify drainage asset ownership and responsibility.
					R1B	The LLFA and LDA to investigate the standard of protection and the condition of the culvert structure and network as a whole.
					R1C	Jet and cleanse the ordinary watercourse network.

					R1D	The LLFA and LDA to engage and work with the riparian landowner to regulate the ordinary watercourse infrastructure to ensure the infrastructure is free flowing and unobstructed.
					R1E	The LLFA to develop a SOC to identify suitable management methods to reduce the risk of ordinary watercourse and surface water flooding in Treherbert.
2	Culvert Inlet 2 (Abertonllwyd Street)	Private Landowner	Ordinary Watercourse	Lead Local Flood Authority and Land Drainage Authority	R2A	The LLFA and LDA to identify drainage asset ownership and responsibility.
					R2B	The LLFA and LDA to investigate the standard of protection and the condition of the culvert structure and network as a whole.
					R2C	Jet and cleanse the ordinary

						watercourse network.
						R2D The LLFA and LDA to engage and work with the riparian landowner to regulate the ordinary watercourse infrastructure to ensure the infrastructure is free flowing and unobstructed.
						R2E The LLFA to develop a SOC to identify suitable management methods to reduce the risk of ordinary watercourse and surface water flooding in Treherbert.
3	Manhole 1 (Abertonllwyd Street)	RCTCBC Corporate Estate	Ordinary Watercourse and Surface Water	Lead Local Flood Authority and Land Drainage Authority	R3A	The LLFA and LDA to identify drainage asset ownership and responsibility.
					R3B	The LLFA and LDA to investigate the standard of protection and the condition of the culvert structure and network as a whole.

					R3C	Jet and cleanse the ordinary watercourse network.
					R3D	The LLFA to develop a SOC to identify suitable management methods to reduce the risk of ordinary watercourse and surface water flooding in Treherbert.
4	Culvert Inlet 3 (Dumfries Street)	Private Landowner	Ordinary Watercourse	Lead Local Flood Authority and Land Drainage Authority	R4A	The LLFA and LDA to identify drainage asset ownership and responsibility.
					R4B	The LLFA and LDA to investigate the standard of protection and the condition of the culvert structure and network as a whole.
					R4C	Jet and cleanse the ordinary watercourse network.
					R4D	The LLFA and LDA to engage and work with the riparian landowner to regulate the ordinary watercourse

						infrastructure to ensure the infrastructure is free flowing and unobstructed.
						R4E The LLFA to develop a SOC to identify suitable management methods to reduce the risk of ordinary watercourse and surface water flooding in Treherbert.
						R4E The LLFA to install remote telemetry monitoring at Culvert Inlet 3 to monitor the risk of blockage.
5	Culvert Inlet 4	Private Landowner	Ordinary Watercourse and Surface Water	Lead Local Flood Authority and Land Drainage Authority	R5A	The LLFA and LDA to identify drainage asset ownership and responsibility.
					R5B	The LLFA and LDA to exercise their permissive powers under Section 64 of the Land Drainage Act to investigate the drainage arrangements on the area of land where the watercourse and inlet is situated.

					R5C	The LLFA and LDA to engage and work with the riparian landowner to regulate the ordinary watercourse infrastructure to ensure the infrastructure is free flowing and unobstructed.
					R5D	The LLFA to develop a SOC to identify suitable management methods to reduce the risk of ordinary watercourse and surface water flooding in Treherbert.
6	Culvert Inlet 5 (Tyn-y-coedcae)	Private Landowner	Ordinary Watercourse	Lead Local Flood Authority and Land Drainage Authority	R6A	The LLFA and LDA to identify drainage asset ownership and responsibility.
					R6B	The LLFA and LDA to investigate the standard of protection and the condition of the culvert structure and network as a whole.
					R6C	Jet and cleanse the ordinary

						watercourse network.
						R6D The LLFA and LDA to engage and work with the riparian landowner to regulate the ordinary watercourse infrastructure to ensure the infrastructure is free flowing and unobstructed.
						R6E The LLFA to develop a SOC to identify suitable management methods to reduce the risk of ordinary watercourse and surface water flooding in Treherbert.
7	Culvert Inlet 6 (Tyn-y-coedcae)	Private Landowner	Ordinary Watercourse	Lead Local Flood Authority and Land Drainage Authority	R7A	The LLFA and LDA to identify drainage asset ownership and responsibility.
					R7B	The LLFA and LDA to investigate the standard of protection and the condition of the culvert structure and network as a whole.

					R7C	Jet and cleanse the ordinary watercourse network.
					R7D	The LLFA and LDA to engage and work with the riparian landowner to regulate the ordinary watercourse infrastructure to ensure the infrastructure is free flowing and unobstructed.
					R7E	The LLFA to develop a SOC to identify suitable management methods to reduce the risk of ordinary watercourse and surface water flooding in Treherbert.
8	Groundwater	Private Landowners	Groundwater	Lead Local Flood Authority and Land Drainage Authority	R8A	The LLFA and LDA to exercise their permissive powers under Section 64 of the Land Drainage Act to investigate the source and possible causes of groundwater flooding to properties at

						Abertonllwyd Street.
					R8B	The LLFA to develop a SOC to identify suitable management methods to reduce the risk of flooding from all local sources (ordinary watercourse, surface water and groundwater) in Treherbert.

4.1. LEAD LOCAL FLOOD AUTHORITY

In review of Ref 1-8 Table 6, the LLFA and LDA have been determined as the responsible Risk Management Authorities in relation to the flooding which occurred at investigation area RCT27 during Storm Dennis.

The LLFA exercised the following functions in response to the flooding at investigation area RCT27;

- 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 carried out by Redstart, on behalf of RCT as the LLFA, was undertaken in order to gain further local insight and anecdotal evidence to support the flood investigation.
- The LLFA and LDA have exercised their permissive powers under Section 64 of the Land Drainage Act 1991 to investigate the culvert structures and network conditions and its impact on the flooding within the investigation area. **(R1B, R2B, R3B, R4B, R5B, R6B, R7B)**

- An estimated 800 meters of culvert network length within RCT27 has been surveyed following the event to ascertain both the operation condition of the network, and its structural integrity along sections of the network. **(R1B, R2B, R3B, R4B, R6B, R7B)**
- An estimated 40 tonnes of material and debris was removed from the culvert networks within RCT27 during jetting and cleansing operations. **(R1C, R2C, R3C, R4C, R6C, R7C)**
- The LLFA and LDA have undertaken clearance works to the culvert network systems which fall under the responsibility of the Authority **(R3C)**. In addition to this, the LLFA and LDA have carried out clearance works to the culvert inlet structures which fall under private land ownership utilising powers under Section 14A of the Land Drainage Act. **(R1C, R2C, R4C, R6C, R7C)**
- The LLFA commissioned Redstart to investigate the standard of protection of the existing culvert networks in Treherbert to determine their hydraulic capacity following the identification of several structural and operational defects within sections of the network. **(R1B, R2B, R3B, R4B, R6B, R7B)**
- The LLFA has set up a central Control Room, to compliment the Council's Contact Centre and CCTV centre which is based at the Council's offices, to provide a comprehensive and informed response to the residents of RCT as appropriate during storm events.
- The LLFA have initiated an interim Property Flood Resistance project offering expandable flood gates to those properties deemed at high risk of flooding from local sources.
- The LLFA and LDA have initiated engagement with riparian landowners to ensure the ordinary watercourse infrastructure is free flowing and unobstructed. **(R1D, R2D, R4D, R5C, R6D, R7D)**
- The LLFA have installed remote telemetry monitoring devices at key culvert structures to enable operators to ensure the drainage systems in Treherbert are operating effectively. **(R4E)**
- The LLFA have commissioned JBA Consulting to undertake a formal SFRA of the Upper Rhondda catchment area to better understand the overall risk from ordinary watercourse and surface water flooding and make recommendations for suitable measures to alleviate the risk. The SFRAs also aim to encourage whole catchment measures, including working with natural processes, to alleviate flood risk in those areas of highest risk. As part of this, JBA were also commissioned to carry out a geomorphic assessment of the upper catchment above Treherbert to determine the risk of culvert blockages due to geomorphic instability of the hillside. **(R1E, R2E, R3D, R4E, R5D, R6E, R7E)**

The LLFA propose to exercise the following functions in response to the flooding at investigation area RCT27;

- Following the surveying of culvert networks in RCT27, the LLFA propose to input and update all relevant asset data. **(R1A, R2A, R3A, R4A, R5A, R6A, R7A)**
- The LLFA propose to develop a SOC to better understand the risk of flooding using a whole catchment approach to provide recommendations for suitable management mechanisms to reduce the wider risk of flooding to people and properties from local sources (Ordinary Watercourse, Surface Water and Groundwater). **(R1E, R2E, R3D, R4E, R5D, R6E, R7E, R8B)**
- The LLFA propose to develop a flood routing scheme along the A4061 (Abertonllwyd Street). The scheme will involve working with the Highway Authority to make improvements to the highway drainage infrastructure of surrounding street to intercept overland flow routes and alleviate flooding to the A4061 (Abertonllwyd Street). **(R1E, R2E, R3D, R4E, R5D, R6E, R7E)**
- The LLFA and LDA propose to undertake further investigations to identify the source(s) and possible cause(s) of groundwater flooding at Abertonllwyd Street following reports of clear water entering their basements, indicative of underground source(s) of water. **(R8A)**
- The LLFA and LDA intend to clarify drainage asset owners and management responsibilities to make them aware of riparian responsibility. To ensure landowners manage the risk in compliance with the relevant legislation, a team of Flood Enforcement Officers including legal support is to be appointed. **(R1A, R2A, R3A, R4A, R5A, R6A, R7A)**
- The LLFA and LDA will continue to engage with riparian landowners and regulate the ordinary watercourse infrastructure to ensure the infrastructure is free flowing and unobstructed. **(R1D, R2D, R4D, R5C, R6D, R7D)**

4.2. NATURAL RESOURCES WALES

Natural Resources Wales were not identified as a responsible authority in relation to the flooding at investigation area RCT27 on the 15th and 16th February 2020. Furthermore, the authority does not propose to undertake any functions in relation to the event.

4.3. WATER COMPANY

Following the results into the investigation of flooding at Treherbert, DCWW were not identified as a responsible authority in relation to the flooding at investigation area RCT27 on the 15th and 16th February 2020. Despite this, calls were received by DCWW in relation to the flooding at RCT27.

DCWW have exercised the following functions in response to the flooding at investigation area RCT27;

- DCWW carried out their own investigations in response to the incidents of flooding that were reported by residents directly to DCWW.
- DCWW contacted residents affected by flooding to offer support and advice to assist in the recovery following Storm Dennis.
- DCWW investigated the performance of their network at Abertonllwyd Street during the storm event to ensure their assets were operating with no issues.

DCWW do not propose to undertake any further functions in relation to the event at investigation area RCT27.

4.4. HIGHWAY AUTHORITY

During the investigation into the flooding at investigation area RCT27 during Storm Dennis, the Highway was identified as flooding as a result of ordinary watercourse flooding associated to blocked and overwhelmed culvert inlets.

RCT as the Highway Authority have exercised the following functions in response to the flooding at investigation area RCT27;

- 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 flood water to ensure the safety of the highway post event.

- The Highway Authority also carried out maintenance works to clear any vegetation from the surrounding area of their drainage infrastructure to reduce the risk of further blockages.
- The Highway Authority has undertaken emergency clearance works to the culvert inlets identified as sources of flooding. **(R4C, R7C)**

RCT as the Highway Authority propose to undertake the following functions in relation to the event at investigation area RCT27;

- The Highway Authority intend to increase their resource capacity by establishing a dedicated 'Pluvial Drainage Team' to focus entirely on the refurbishment and maintenance of RCT's existing and enhanced highway drainage infrastructure.

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 - <https://naturalresources.wales/flooding/check-flood-warnings/?lang=en>

Natural Resources Wales - Long Term Flood Risk - <https://naturalresources.wales/evidence-and-data/maps/long-term-flood-risk/?lang=en>

Rhondda Cynon Taf CBC - Local Flood Risk Management Plan - <https://www.rctcbc.gov.uk/EN/Resident/ParkingRoadsandTravel/Roadspavementsandpaths/FloodAlleviation/Floodriskregulations2009.aspx>

Rhondda Cynon Taf CBC - Local Flood Risk Management Strategy - <https://www.rctcbc.gov.uk/EN/Resident/ParkingRoadsandTravel/Roadspavementsandpaths/FloodAlleviation/LocalFloodRiskManagementStrategy.aspx>

Rhondda Cynon Taf CBC – Sustainable Drainage – <https://www.rctcbc.gov.uk/EN/Resident/ParkingRoadsandTravel/Roadspavementsandpaths/SustainableDrainage/SustainableDrainage.aspx>

Welsh Government - National Strategy for Flood and Coastal Erosion Risk Management - <https://gov.wales/sites/default/files/publications/2019-03/national-strategy-for-flood-and-coastal-erosion-risk-management-in-wales.pdf>

Welsh Water – How to Contact Us – <https://www.welshwater.com/en/Contact-Us.aspx>

Appendix C

Flood and Water Management Act 2010

Section 19 Flood Investigation Report

Storm Dennis – Flood Investigation Area RCT12

January 2022

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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 Flood and Water Management Act 2010. The Council assumes no responsibility or liability from any person in connection with its contents or findings.

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CONTENTS

EXECUTIVE SUMMARY	3
ABBREVIATIONS.....	6
TABLES AND FIGURES	7
1. INTRODUCTION.....	9
1.1. Purpose of Investigation.....	9
1.2. Site Location	10
1.3. Drainage System.....	11
1.4. Investigation Evidence	12
1.5. Public Engagement	12
2. FLOODING HISTORY	14
2.1. Previous Flood Incidents	14
2.2. Flood Incident.....	15
2.3. Rainfall Analysis.....	20
3. POSSIBLE CAUSES	21
3.1. Culvert Conditions.....	21
3.2. Ordinary Watercourse Conditions	21
3.3. Main River	22
3.3.1. Main River Levels And Flood Warnings	22
3.3.2. Main River Flood Risk.....	24
3.3.3. Main River Flood Defences.....	26
3.4. Highway Drainage Conditions	28
3.5. DCWW Apparatus Conditions	29
3.6. Surface Water	31
3.7. Summary of Possible Causes	33
4. RISK MANAGEMENT AUTHORITY ACTIONS.....	34
4.1. Lead Local Flood Authority	38
4.2. Natural Resources Wales	40
4.3. Water Company	42
4.4. Highway Authority	42

USEFUL LINKS/CONTACTS 44

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EXECUTIVE SUMMARY

This report has been produced through the duties placed upon Rhondda Cynon Taf County Borough Council 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 factual report of the storm event that occurred on the 15th and 16th of February 2020 within the Rhondda Cynon Taf County Borough Council area, focusing the investigation on the flooding that occurred within the area of Treforest adjacent to the western bank of the River Taf (Flood Investigation Area RCT 12, 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 manage the risk of flooding.

The flooding that affected RCT on the 15 and 16th of February 2020 was a result of an extreme rainfall event, designated by the Met Office as ‘Storm Dennis’. The impact of the event at investigation area RCT12 resulted in internal flooding to at least 50 properties: including 43 residential properties and 7 non-residential properties. Significant flooding to the highway throughout the investigation area also occurred.

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 and RCT’s Highway and Streetcare Depot; Natural Resources Wales and Dŵr Cymru Welsh Water.

It has been established from the evidence gathered within this report that the primary source of flooding at RCT12 in this incident was the overtopping of the main River Taf following persistent and heavy rainfall. River level gauge data from NRW’s Pontypridd monitoring station reveal that the River Taf was almost four times its typical level during Storm Dennis, reaching a peak level of 5.32 metres; the highest river level recorded at the station since its opening in 1970.

On review of NRW's FRAW maps, the impacted properties within RCT12 are identified at medium and low risk of flooding from the main river. Despite formal flood defences being in place at RCT12, they only provide protection from a 1 in 75 annual flood event and were overtopped during the Storm Dennis event.

The investigation also identified surface water accumulation on the highway to have contributed to the flooding of one non-residential property, as well as exacerbating existing fluvial flooding within RCT12. Flooding from the combined sewer network at James Street was also identified during the storm event.

NRW has been determined as the relevant Risk Management Authority responsible for managing the main river flooding that occurred during Storm Dennis. In response to the flooding at investigation area RCT12, NRW have;

- Carried out their own post event investigative analysis work to understand the mechanism of flooding from the River Taf at Treforest;
- Commissioned a Lower Taf Flood Modelling Project, the outcomes of which will include an initial assessment of the viability of potential flood risk management options; and
- Developed a series of recommendations and a detailed action plan to address areas of improvement for future storm events, including the performance of NRW's Flood Warning Service and incident management response.

RCT as the Lead Local Flood Authority, Land Drainage Authority and Highway Authority has been determined as the relevant Risk Management Authority responsible for managing the surface water flooding that occurred during Storm Dennis. In response to the flooding at investigation area RCT12, RCT has;

- Carried out survey, jetting and cleansing operations to highway drainage infrastructure.
- Led on the development of a central Control Room to compliment the Council's Contact Centre and CCTV Centre; and to provide a comprehensive and informed response to residents during storm events;
- Exercised its powers, under Section 13 of the Flood and Water Management Act 2010, to engage with NRW and DCWW in relation to their responsibilities as Risk Management Authorities; and
- Working in partnership with NRW, the LLFA have expanded their interim Property Flood Resistance project, offering expandable flood gates to those properties deemed at high risk of river flooding as per NRW's determination.

The event that occurred on 15 and 16th February was extreme, and it is unlikely flooding from a similar event could be prevented entirely. It is concluded that Risk Management Authorities satisfactorily carried out their flood risk management functions in response to the flood event at RCT12; however, further measures have been proposed by all RMAs to improve preparedness and response to future flood events.

ABBREVIATIONS

CaRR – Communities at Risk Register

DCWW – Welsh Water

FRMP – Flood Risk Management Plan

FWMA – Flood and Water Management Act 2010

LDA – Land Drainage Authority

LFRMS – Local Flood Risk Management Strategy

LLFA – Lead Local Flood Authority

NRW – Natural Resources Wales

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

RCT - Rhondda Cynon Taf

RCT12 – Flood Investigation Area RCT 12

RCTCBC – Rhondda Cynon Taf County Borough Council

RMA – Risk Management Authority

SAB – Sustainable Drainage Approval Body

SFRA – Strategic Flood Risk Assessment

SuDs – Sustainable Drainage Systems

TABLES AND FIGURES

Table 1: Investigative evidence gathered in preparation of this Storm Dennis Section 19 report	12
Table 2: Summary of the source(s), pathway(s) and receptor(s) affected during storm Dennis within RCT 12	15
Table 3: Flood Warnings issued by NRW for the River Taf at Pontypridd during Storm Dennis	23
Table 4: Summary of source(s) and possible cause(s) of flooding in Treforest during Storm Dennis (15-16th February 2020)	33
Table 5: Risk Management Authority with relevant functions to manage the risk for different flood types	34
Table 6: Recommendations provided by the LLFA to be considered by the relevant Risk Management Authority identified in response to the source(s) of flooding in RCT12 (as per Table 4).	35
Figure 1: Flood Investigation Area RCT12 Location Plan.....	10
Figure 2: Natural Resources Wales' Flood Risk Assessment Water (FRAW) map for rivers and ordinary watercourse and surface water flood risk at RCT12. Contains Natural Resources Wales information © Natural Resources Wales and database right. All rights reserved.....	11
Figure 3: A view of the River Taf and southern riverbank, looking north-east (Redstart's Flood Investigation Report)	16
Figure 4: Image capturing the damage to property and belongings at RCT12 following Storm Dennis (Image: WalesOnline/Rob Browne)	17
Figure 5: Image capturing South Wales Fire and Rescue Service undertaking evacuations within Egypt Street on 16 th February 2020, (Image: Huw Evans Picture Agency Ltd).....	17
Figure 6: A view of Nile Road from Broadway. (Redstart's Flood Investigation Report)	18
Figure 7: Observed flow paths that caused internal flooding within RCT12 during Storm Dennis	19
Figure 8: The River Taf levels at Pontypridd station between the 14 th and 17 th February 2020 (Natural Resources Wales)	23
Figure 9: NRW's Flood Risk Assessment Wales (FRAW) map for River sources in RCT12. Contains Natural Resources Wales information © Natural Resources Wales and database right. All rights reserved.	25
Figure 10: NRW's National Hazard map for Low Risk River Flood Depth in RCT12. Contains Natural Resources Wales information © Natural Resources Wales and database right. All rights reserved. ..	26
Figure 11: Natural Resources Wales' map for Main River Flood Defences and areas benefiting at RCT12. Contains Natural Resources Wales information © Natural Resources Wales and database right. All rights reserved	27
Figure 12: Location of surcharging manhole on DCWW's Combined Sewer network.....	29
Figure 13: Topographic Watershed above RCT12	31

1. INTRODUCTION

1.1. PURPOSE OF INVESTIGATION

On the 15th and 16th of February 2020, RCT was impacted by an extreme weather event which was named ‘Storm Dennis’ by the Met Office. Due to the extent and impact of the event, the LLFA opted to undertake a formal investigation.

The storm resulted in widespread residential and commercial flooding within the Rhondda Cynon Taf County Borough Council area. This report will focus on Flood Investigation Area RCT12 which comprises of an area within the north-west of the Treforest Ward.

The reason behind RCT’s investigation is in response to the duties of the local authority regarding Section 19 of the Flood and Water Management Act 2010, 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 the 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

The purpose of the investigation is to determine which RMAs have relevant flood risk management functions and which functions have been exercised in response to the flood event in question.

Specific details of Storm Dennis, such as rainfall analysis are covered within a separate overview report that covers the wider RCT area. The report is titled ‘Storm Dennis February 2020 – Overview Report’ and will be referred to as ‘FRM – Storm Dennis – Overview Report’².

¹ Flood and Water Management Act 2010 – Section 19 - <https://www.legislation.gov.uk/ukpga/2010/29/section/19>

² [Flood Investigation Reports | Rhondda Cynon Taf County Borough Council \(rctcbc.gov.uk\)](https://www.rctcbc.gov.uk/flood-investigation-reports)

1.2. SITE LOCATION

The area investigated within this report covers part of the Treforest ward that lies on the western side of the River Taf, located to the south-east of Pontypridd within the southern region of the county borough.

RCT12 is located within the River Taf catchment and is situated on the western floodplains of the main river which flows from north to south above the investigation area (Figure 1). The community is also situated immediately downstream of the confluence of the River Taf and the River Rhondda.

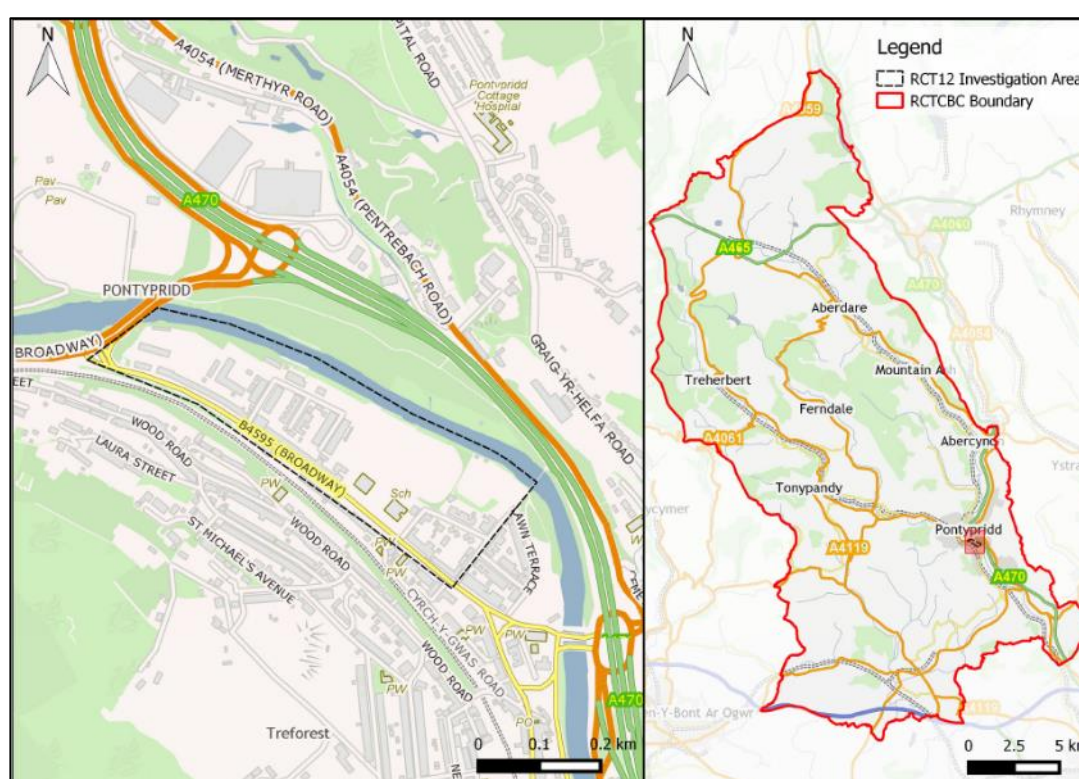


Figure 1: Flood Investigation Area RCT12 Location Plan

RCT12 falls within the community area of Glyntaff. According to the Welsh Government's CaRR, Glyntaff is ranked 91st for surface water flood risk and 129th for main river flooding in Wales.

NRW's Flood Risk Assessment Wales (FRAW) maps indicate that there are areas of low to high flood risk from both fluvial and surface water and ordinary watercourse sources within the investigation area. This is illustrated in Figure 2, which is an excerpt from the FRAW maps.

The highest risk posed to people and properties within RCT12 is broadly associated with the River Taf, with low to high fluvial flood risk observed along the length of the watercourse. Flood risk from surface water and ordinary watercourse sources is also noted across parts of the investigation area, albeit less severe, as illustrated in Figure 2. Areas adjacent to the main river may be at risk of both surface water flooding and main river flooding, as illustrated within RCT's FRMP³.

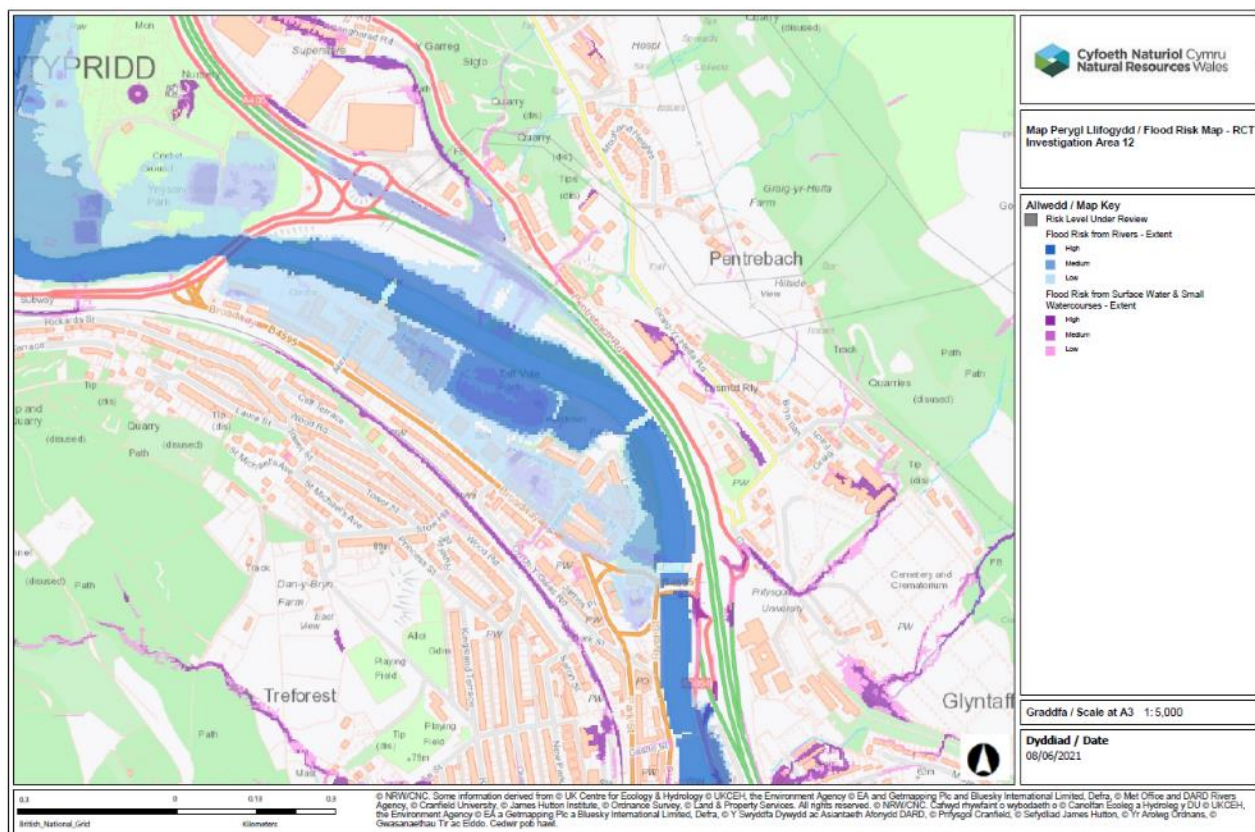


Figure 2: Natural Resources Wales' Flood Risk Assessment Water (FRAW) map for rivers and ordinary watercourse and surface water flood risk at RCT12. Contains Natural Resources Wales information © Natural Resources Wales and database right. All rights reserved

1.3. DRAINAGE SYSTEM

The surface water drainage systems that serve investigation area RCT12 are that of the highway drainage network designed to manage the surface water within the

³ [RCT'S Flood Risk Management Plan \(rctcbc.gov.uk\)](https://www.rctcbc.gov.uk)

highway and public surface water sewer and combined sewer networks operated by Dŵr Cymru Welsh Water.

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 below within Table 1.

Table 1: Investigative evidence gathered in preparation of this Storm Dennis Section 19 report

Source	Data
Residents	Photos, videos, statements, email correspondence, public engagement survey responses
Responders' statements	Local responders' statements
CCTV Surveys	Internal surveys of the local drainage networks
Met Office Data	Weather Warning information (see FRM – Storm Dennis – Overview Report)
Rain Gauges	RCT and NRW operated rain gauge information (see FRM – Storm Dennis – Overview Report)
Natural Resources Wales	River Level and Flood Warning data
RCT Flood Risk Management Plan	Site specific information and data for each electoral ward in RCT
Communities at Risk Register	Flood risk ranking and scores for all flood types based on community data in Wales
Flood Investigation Report (Redstart's FIR)	A summary of the source-pathway-receptors, culvert capacity assessment and hydraulic modelling work undertaken by Redstart. The Flood Investigation Report was commissioned by RCT prior to writing the Section 19 report.

Evidence sourced from the 'Flood Investigation Report', commissioned by RCT, will be further referred to as 'Redstart's FIR' throughout this report.

1.5. PUBLIC ENGAGEMENT

Following the initial flooding event that occurred on the 15 and 16th of February during Storm Dennis, flood risk officers from RCT's Flood Risk Management department were deployed to areas across the borough to investigate reports of internal flooding by

residents. Residents engaged with the Flood Risk Management team to help determine the initial impacts caused by the flooding event and to investigate the potential source(s) and pathway(s) of flood water. 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 the flood investigations, a public engagement exercise was undertaken between the 4th and 25th of January 2021 by Redstart, on behalf of RCT. The aim of this exercise was to engage with local residents who were affected by the flood event to capture details 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. 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.

2. FLOODING HISTORY

2.1. PREVIOUS FLOOD INCIDENTS

Historical flood records and residents accounts captured by RCT's Flood Risk Management officers following Storm Dennis indicate that the majority of properties within the investigation area had not experienced internal flooding prior to Storm Dennis.

Anecdotal information supplied by long-term residents of Niagara Street and Egypt Street suggest that areas of RCT12 flooded on multiple occasions between 1960 and 1998; however, flooding was largely external and confined to areas adjacent to the main River Taf.

2.2. FLOOD INCIDENT

The flooding that occurred on the 15th and 16th February 2020 was a result of an extreme rainfall event, designated by the Met Office as ‘Storm Dennis’. The rainfall event affected the majority of RCT and caused widespread flooding to communities.

Specific details of Storm Dennis, such as rainfall and river level analysis are covered within a separate overview report that covers the wider RCT area, referenced ‘FRM – Storm Dennis – Overview Report’².

Post event inspections undertaken on the days following the storm event by RCT’s Flood Risk Management team and RCT’s Public Health, Protection and Community team identified 43 residential properties and 7 non-residential properties as internally flooded within the investigation area.

A summary of the source(s) and pathway(s) of flooding within RCT12 during Storm Dennis have been outlined in Table 2 and further described throughout this section.

Table 2: Summary of the source(s), pathway(s) and receptor(s) affected during Storm Dennis within RCT 12

Source(s)	Pathway(s)	Receptor(s)
The primary source of flooding for this incident was the River Taf, which flows adjacent to the investigation area, overtopping its banks.	The primary flow path saw river flood water flow across Nile Street and onto Egypt Street and Niagara Street.	The overtopping of the River Taf resulted in the flooding of 42 receptors, including 24 residential properties at Egypt Street and a further 18 properties at Niagara Street. 6 non-residential properties were also flooded on Nile Street and Niagara Street.
Intense rainfall and subsequent surface water runoff from the surrounding area.	Flow pathways within the Treforest area were associated with the conveyance of surface water along Broadway.	A non-residential property on Broadway was internally flooded.
The surcharging of a combined sewer was identified as the source of flooding at James Street.	Surface water originating from the surcharged manhole conveyed to the rear of the impacted property at James Street. Surface water was	A residential property on James Street was internally flooded.

	contained within property's boundary as it's situated lower than the adjacent highway.	
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On review of Table 2, the primary source of the recorded flooding within the investigation area originated from the adjacent main river, the River Taf, overtopping its western embankment during the storm event.

During the early hours of Sunday 16th February, RCT received several calls from residents at Treforest reporting the overtopping of the River Taf which was causing water ingress into properties. The primary flow paths observed during the event saw fluvial flood water convey beyond the western riverbank of the River Taf (Figure 3) and onto Nile Street, following local topography. Flood water subsequently flowed onto Egypt Street and Niagara Street before subsiding at the rear of Broadway (B4595) (illustrated in Figure 7).



Figure 3: A view of the River Taf and southern riverbank, looking north-east (Redstart's Flood Investigation Report)

Significant flood depths of over 1.5 metres were reported by residents at Egypt, Niagara and Nile Streets, where at least 42 residential and 6 non-residential properties were internally impacted by the River Taf. Figure 4 depicts the damages caused to property at Treforest following the flood event.

Emergency rescue efforts by the Fire Service were in operation following the overtopping of the River Taf on the 16th February 2020 to evacuate residents from their homes (Figure 5).



Figure 4: Image capturing the damage to property and belongings at RCT12 following Storm Dennis
(Image: WalesOnline/Rob Browne)



Figure 5: Image capturing South Wales Fire and Rescue Service undertaking evacuations within Egypt Street on 16th February 2020, (Image: Huw Evans Picture Agency Ltd)

Post event inspections undertaken on the days following the storm event by RCT's Flood Risk Management team identified evidence of deposited riverine mud and silt along several streets within RCT12 following the receding flood water. The inspections suggest that surface water flooding resulting from intense rainfall and overwhelmed drainage infrastructure also impacted the aforementioned streets, exacerbating the flooding incident at RCT12.

Surface water was also identified as a primary source of flooding at an end of terrace property on Broadway (B4595), whereby pluvial flows from the highway network accumulated on the access road west of Parc Lewis Primary School (Nile Road), depicted in Figure 6, due to local topography.



Figure 6: A view of Nile Road from Broadway. (Redstart's Flood Investigation Report)

A further residential property located at James Street, to the west of RCT12, reported internal flooding during Storm Dennis. Upon a site inspection to the property by RCT's Flood Risk Management team in the days following the storm event, the source of flooding was identified as a surcharging DCWW combined sewer system. The DCWW system surcharged via a manhole to the rear of James Street, resulting in the internal flooding of one property.

The observed flow pathways that resulted in the internal flooding of properties within the investigation area are illustrated in Figure 7.

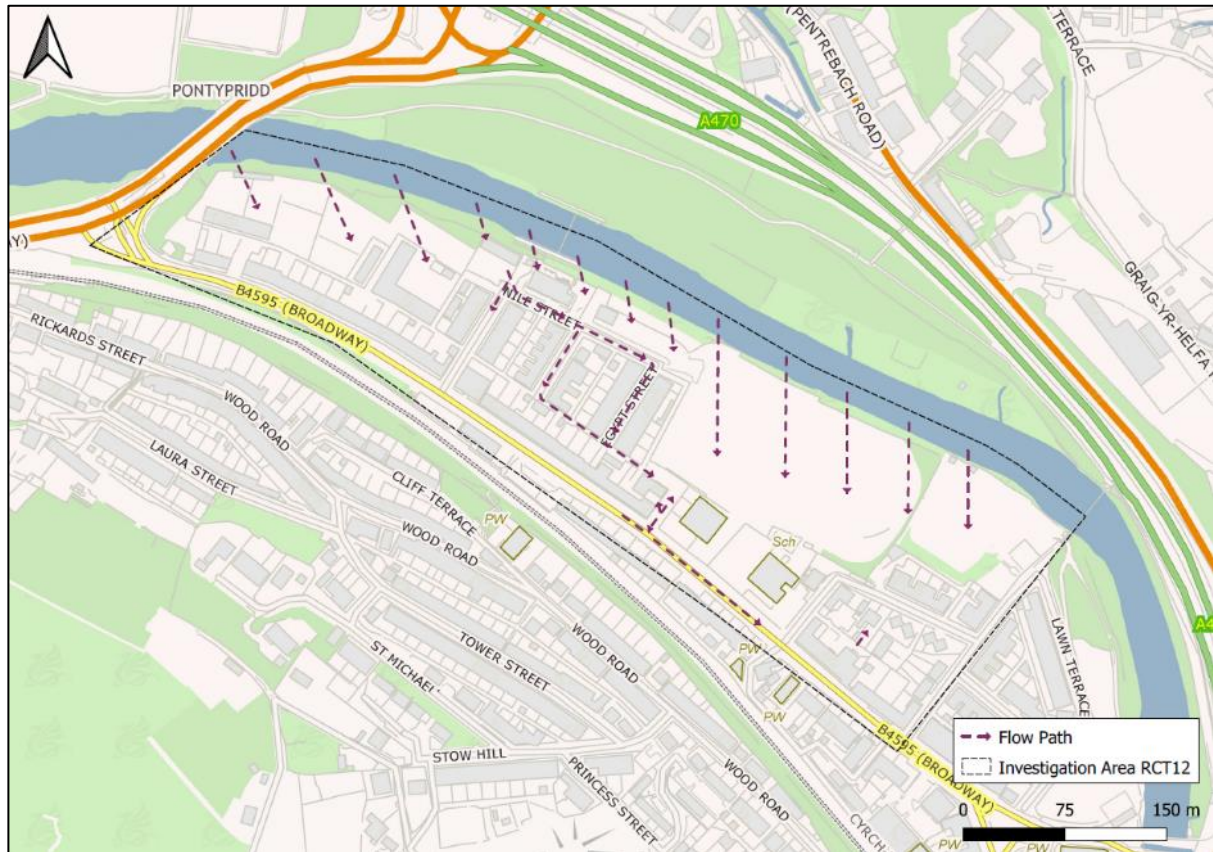


Figure 7: Observed flow paths that caused internal flooding within RCT12 during Storm Dennis

2.3. RAINFALL ANALYSIS

See RCT's 'Overview Report' of Storm Dennis, reference 'FRM – Storm Dennis – Overview Report'², for a detailed analysis of the rainfall and ordinary watercourse response.

3. POSSIBLE CAUSES

3.1. CULVERT CONDITIONS

There is no evidence from this investigation to suggest that culverted ordinary watercourses within investigation area RCT12 significantly contributed to the recorded flooding of properties in RCT12 during Storm Dennis.

As such, the condition of culverted ordinary watercourse infrastructure within the investigation area has not been investigated as part of this investigation.

3.2. ORDINARY WATERCOURSE CONDITIONS

There are no known ordinary watercourses within the investigation area. As such, ordinary watercourse conditions have not been investigated as part of this investigation.

3.3. MAIN RIVER

The designated main River Taf flows in a southeasterly direction through Treforest. The investigation area itself is situated on the western bank of the river (Figure 1).

3.3.1. MAIN RIVER LEVELS AND FLOOD WARNINGS

The hydrograph in Figure 8 illustrates the significant rise in the River Taf's levels in response to rainfall between the 14 – 17th February 2020. River level data was captured at NRW's Pontypridd river level gauge, located adjacent to Nile Street within the investigation area.

NRW issued a 'Flood Alert' (indicating possible flooding) for the entirety of the River Taf at approximately 13:30 on the 15th of February; at which point the main river was over 2 metres in depth and continuing to rise at Pontypridd station. At approximately midnight on the 16th February the River Taf began to rise again, reaching a peak river level of 5.32 metres at 04:45 on the 16th of February; the highest level recorded for the River Taf at Pontypridd since 1970.

The green bar displayed on the hydrograph shows the typical level of the River Taf at the Pontypridd station, ranging between 0.4 and 1.3 metres. The river level was above this green line for over 48 hours, highlighting the severity of the storm event and its unprecedented nature. At its peak, the River Taf at Pontypridd was almost four meters higher than its average level.

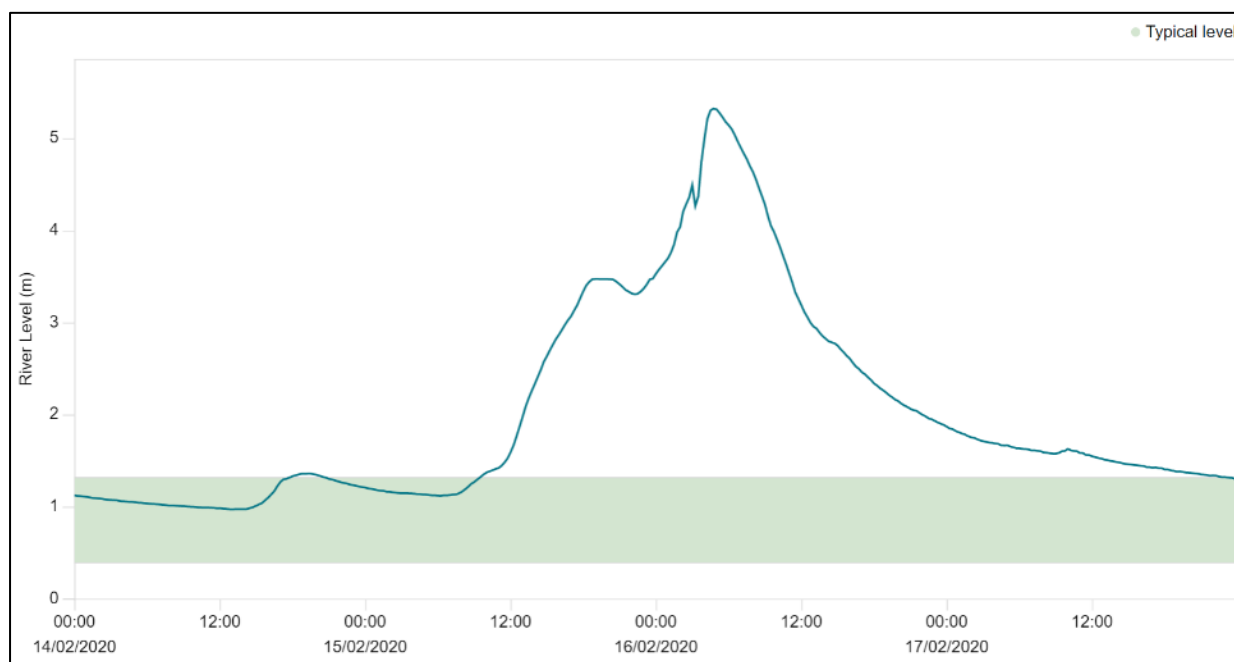


Figure 8: The River Taf levels at Pontypridd station between the 14th and 17th February 2020 (Natural Resources Wales)

With significantly high river levels being recorded upstream in both the River Taf and the River Rhondda, it is accepted that the River Taf reached record-high levels beyond the confluence of the two rivers at Pontypridd. As a result, the river overtopped its banks downstream of the confluence, resulting in significant flooding to Treforest.

Investigation area RCT12 falls within the Pontypridd NRW Flood Warning Area. The Flood Warnings issued by NRW, and associated river levels, for the River Taf at Pontypridd (nearest gauging station to RCT12) during Storm Dennis are shown in Table 3.

Table 3: Flood Warnings issued by NRW for the River Taf at Pontypridd during Storm Dennis

Flood Warning Type	Location	Start Time	River Level (m) at Pontypridd
Flood Alert	River Taf	13:27 15/02/2020	2.178
Flood Warning	River Taf at Pontypridd	20:48 15/02/2020	3.443
Severe Flood Warning	River Taf at Pontypridd	06:33 16/02/2020	5.039

NRW issued a 'Flood Warning' alert (indicating flooding is expected) for the River Taf at Pontypridd at 20:48 on the 15th February, prior to the overtopping of the main river. A 'Severe Flood Warning' alert (indicating Community-wide flooding and possible risk to life) for the River Taf at Pontypridd was issued by NRW nine hours later at 06:33 on the 16th February; at which point the River Taf was 5.039 metres in height; 0.285 metres lower than its peak level. According to residents however, significant main river flooding to properties had already commenced at several locations along the River Taf by this time, including at Treforest.

NRW have acknowledged within their 'Flood Incidence Response Review'⁴ that the operation of the Flood Warning service "came under significant pressure during February and at times became overwhelmed" resulting in flood warnings being issued late (after the onset of flooding) or not issued at all. At this location (RCT12), this is in reference to the 'Severe Flood Warning' alert issued at Pontypridd.

Improvements to their flood forecasting and warning services are being internally investigated by NRW and where feasible implemented to deliver the recommendations outlined within their Flood Incident Response Review⁴.

3.3.2. MAIN RIVER FLOOD RISK

As outlined in Section 2, the overtopping of the River Taf resulted in the internal flooding of 42 properties within the investigation area.

Figure 9 is an excerpt from NRW's Flood Risk Assessment Wales (FRAW) mapping exercise which depicts the main river flood extents for the 'Defended' 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 RCT12 during Storm Dennis is largely consistent with the modelled outputs of NRW's FRAW map (Figure 9), with the majority of the impacted areas within RCT12 falling within an area of medium and low risk of fluvial 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%).

⁴ [February 2020 Floods in Wales: Flood Incident Management Review \(cyfoethnaturiol.cymru\)](https://www.nrw.gov.uk/February-2020-Floods-in-Wales-Flood-Incident-Management-Review)

Considering Storm Dennis has been estimated as a 1 in 200 annual probability (Q200) flood event, the area of flooding aligns with those depicted by the low main river flood risk extent (Figure 9).

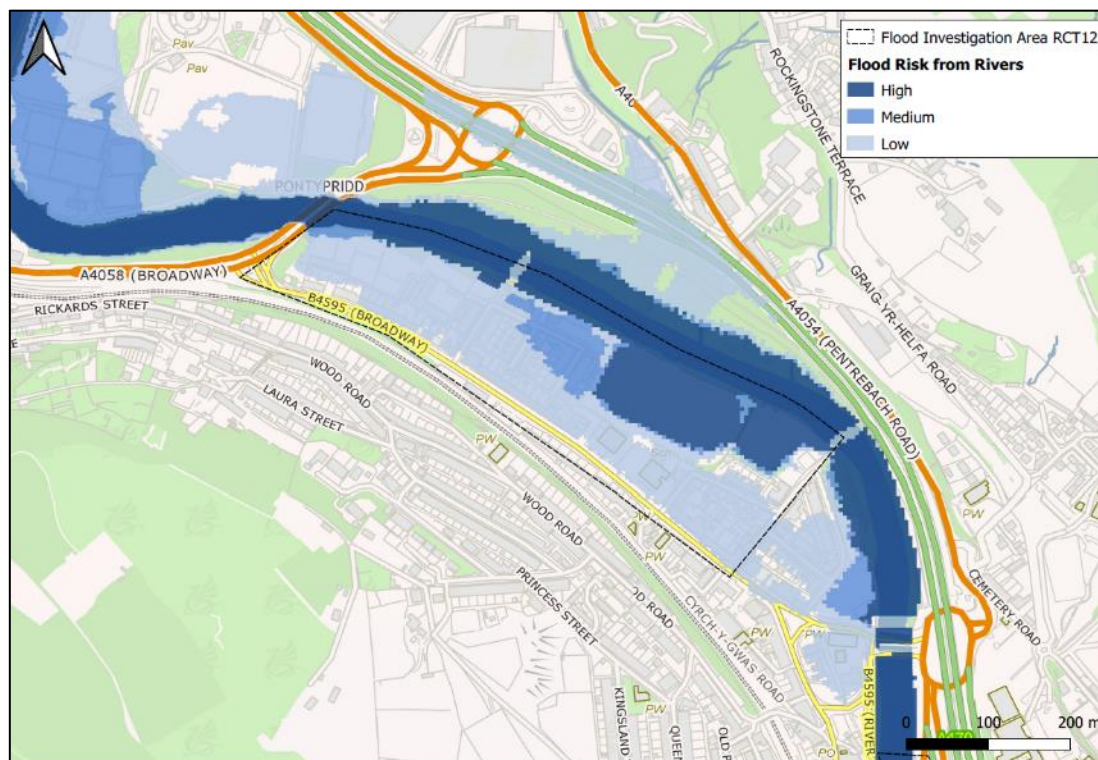


Figure 9: NRW's Flood Risk Assessment Wales (FRAW) map for River sources in RCT12. Contains Natural Resources Wales information © Natural Resources Wales and database right. All rights reserved.

Flooding up to 1.5 - 1.8 metres was observed across the worst affected streets at RCT12, including at Egypt, Niagara and Nile Streets. These observed flood depths also correlate well with NRW's Flood and Hazard map outputs for the low flood risk event (Figure 10).

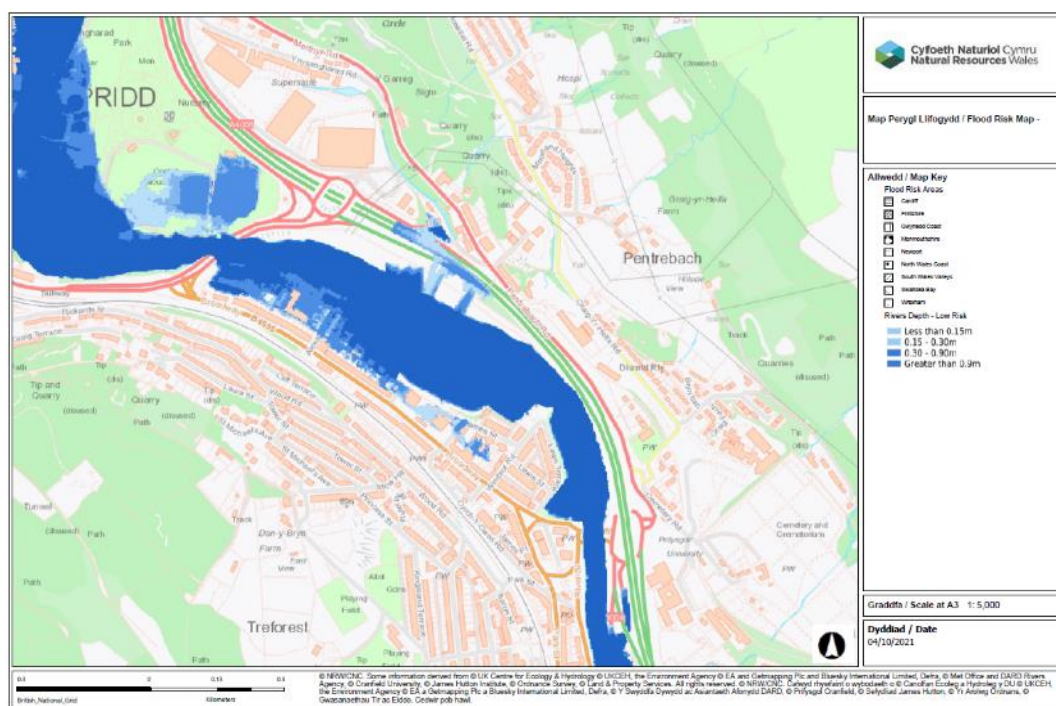


Figure 10: NRW's National Hazard map for Low Risk River Flood Depth in RCT12. Contains Natural Resources Wales information © Natural Resources Wales and database right. All rights reserved.

3.3.3. MAIN RIVER FLOOD DEFENCES

As illustrated in Figure 11 (demarcated by a bold red line), there are approximately 150 metres of formally designated flood defence infrastructure along the western bank of the River Taf at RCT12. This infrastructure is operated and maintained by NRW.

According to NRW, this infrastructure provides a standard of protection up to 1 in 75 annual probability flood event (Q75) to several properties within the investigation area (black hatched area in Figure 11), including properties at Alexandra Road, Nile Street, Egypt Street and Niagara Street.

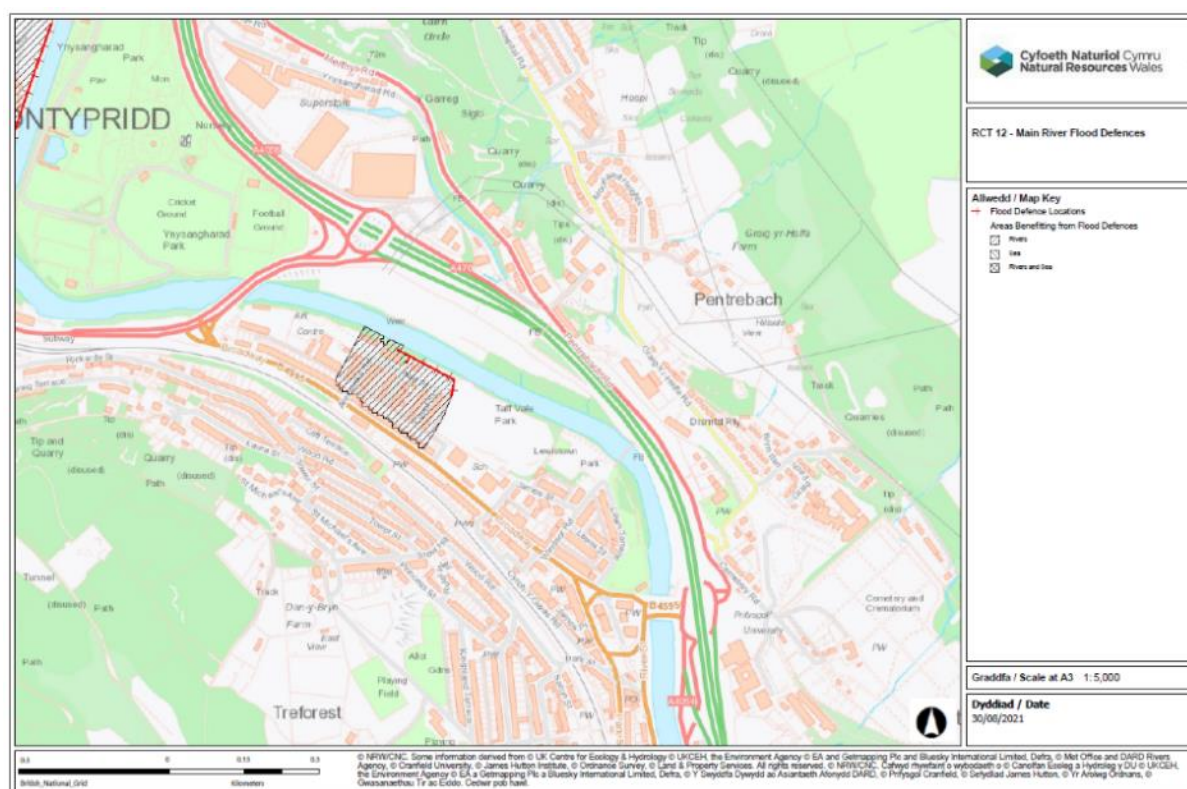


Figure 11: Natural Resources Wales’ map for Main River Flood Defences and areas benefiting at RCT12. Contains Natural Resources Wales information © Natural Resources Wales and database right. All rights reserved

The current indicative design standard of protection for flood defences on a main river is 1 in 100 annual probability (Q100) flood event plus, for new defences, an allowance for climate change. This is stated within the Welsh Government’s National Strategy for Flood and Coastal Erosion Risk Management which encourages main river flood alleviation schemes to provide a Standard of Protection (SOP) up to Q100⁵. It is thereby inferred that the current SOP of flood defence infrastructure at RCT12 is below current indicative standards.

Whilst the flood defences identified at RCT12 are below the current indicative standard, the unprecedented rise of river levels in the Taf during Storm Dennis resulted in the overtopping of assets up to Q100 SOP. NRW’s ‘Flood Incidence Response Review’⁴ does in fact outline that no flood defences failed in the lower Taf region and that the flooding was the result of river flows exceeding the construction design standard.

⁵ [National Strategy for Flood and Coastal Erosion Risk Management in Wales \(English\) \(gov.wales\)](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/544222/national-strategy-for-flood-and-coastal-erosion-risk-management-in-wales-english.pdf)

3.4. HIGHWAY DRAINAGE CONDITIONS

Several streets, including Nile Street, Egypt Street and Niagara Street, were observed to be flooded by the overtopping of the River Taf during Storm Dennis. These fluvial flows deposited mud, silt and debris across the investigation area which are assumed to have entered the highway drainage system, leading to blockages and a reduction in the hydraulic capacity of the surface water network.

Surface water conveyance along the highway network at Broadway (B4595) was also noted by residents during the storm event. Given the intensity of rain falling on a largely impermeable catchment, it is considered that the highway drainage infrastructure in the affected regions of RCT12 became overwhelmed during the storm event, resulting in exceedance surface water flows along the highway.

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 in RCT12 was exceeded as a result of a both main river and surface water flows entering the network. The maintenance condition of the highway drainage infrastructure is not considered to have significantly impacted the flooding experienced.

3.5. DCWW APPARATUS CONDITIONS

In addition to the highway drainage infrastructure within RCT12, the overtopping of the River Taf and the intensity of rainfall during Storm Dennis is considered to have overwhelmed parts of DCWW's combined drainage infrastructure during the storm event. This is evidenced by the surcharging of a DCWW combined sewer manhole on James Street (illustrated in Figure 12), resulting in the internal flooding of a nearby residential property which is also situated at a localised low point.

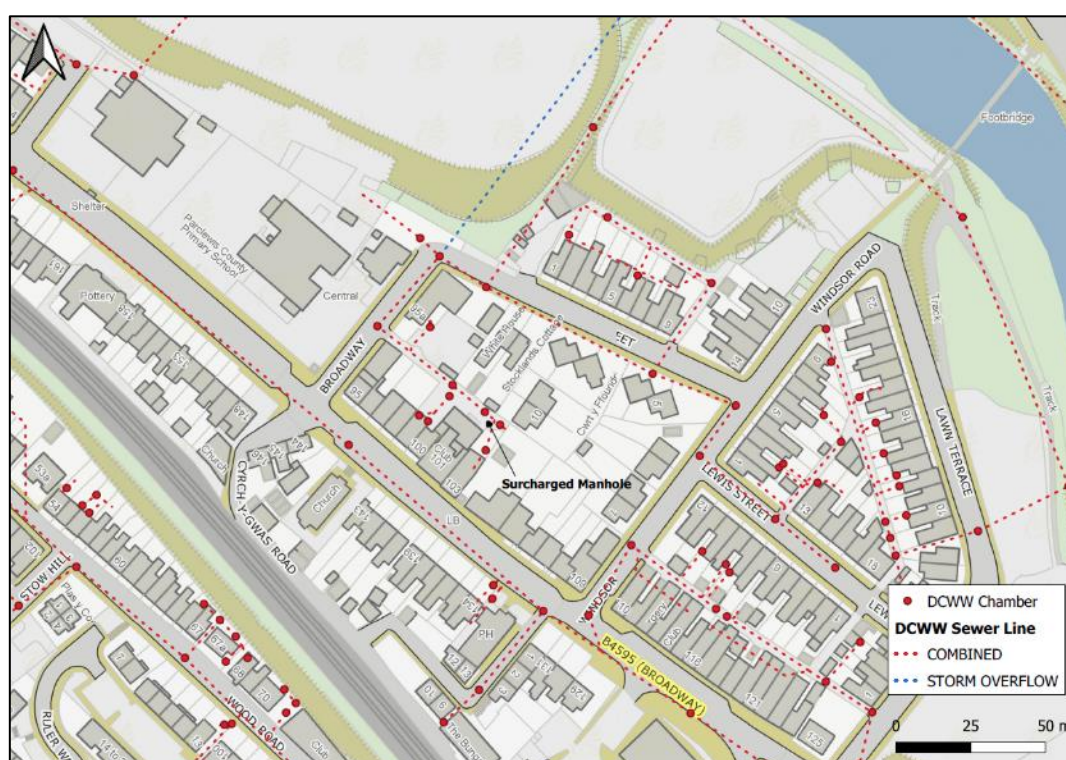


Figure 12: Location of surcharging manhole on DCWW's Combined Sewer network

Furthermore, reports from properties on Niagara Street during the flood event also refer to being impacted by sewage. Surcharging from the combined sewer network in this area may have occurred during the storm event, however, this cannot be confirmed due to the dominant impact of fluvial flooding sourced by the River Taf during the event. The unprecedented height of main river levels within the River Taf may have also impacted the ability of DCWW's infrastructure to manage the discharge of water during the storm event.

As outlined in 'FRM – Storm Dennis – Overview Report'², DCWW sewers have a current design standard of Q30, as per the 'Sewers for Adoption 7th Edition'⁶ guidance document. Given that the design standard was markedly exceeded during Storm Dennis, the maintenance condition of DCWW apparatus is not considered to have significantly impacted the flooding experienced.

⁶ WRC., 2012. Sewers for Adoption: 7th edition

3.6. SURFACE WATER

To estimate the area of land that would be expected to drain from the hillsides surrounding RCT12 towards the investigation area, a rolling ball assessment (a Geographical Information System (GIS) technique used to delineate a watershed using topographical data) was undertaken as part of Redstart's FIR. Figure 13 illustrates the estimated topographic watershed.

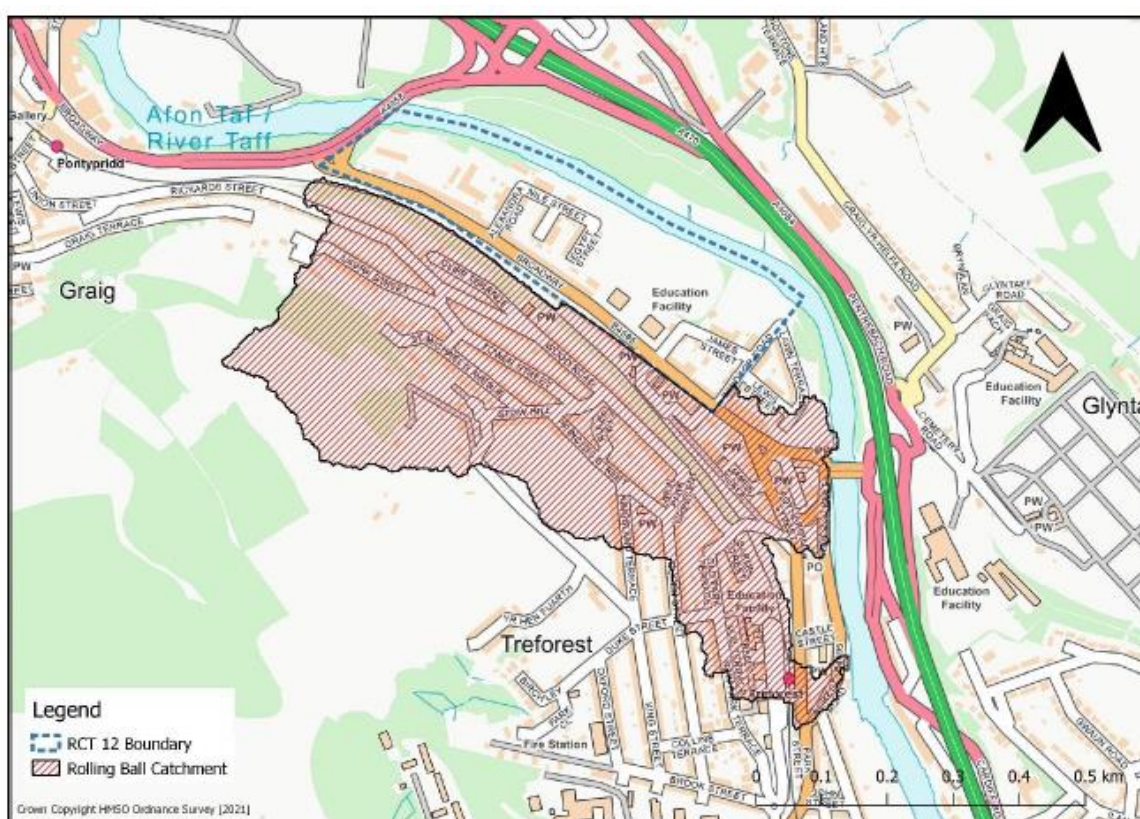


Figure 13: Topographic Watershed above RCT12

Figure 13 shows that surface water runoff originating from the hillsides to the south and southwest of Treforest are separated from the investigation area by the railway embankment running alongside Broadway. This suggests that whilst overland flows may have contributed to the pluvial flooding that occurred at Broadway, it is considered that surface water flooding within RCT12 was predominantly localised and not a consequence of the dominant valley gradient.

Surface water flows generated by intense rainfall and conveying via local topography and the highway network has been identified as the primary cause of flooding to one property at Broadway (B4595). Surface water is also considered to have contributed

to and exacerbated the main river and sewer flooding observed across the investigation area.

3.7. SUMMARY OF POSSIBLE CAUSES

The above sections have identified and described the possible causes of flooding within RCT12 during Storm Dennis which occurred on the 15th and 16th of February 2020. A summary of the identified source(s) and possible cause(s) of flooding (issue) has been outlined below in Table 4.

Table 4: Summary of source(s) and possible cause(s) of flooding in RCT12 during Storm Dennis (15-16th February 2020)

Ref No	Asset (Source)	Issue	Asset Owner	Type of Flooding
1	River Taf	Unprecedentedly high river levels within the River Taf resulted in the main river overtopping its banks at several locations and conveying into several properties.	Mixed Ownership	Main River
2	Surface water drainage network across RCT12	Intense rainfall across RCT combined with the overtopping of the River Taf severely overwhelmed highway drainage infrastructure, resulting in the accumulation of surface water on several streets throughout the investigation area.	Rhondda Cynon Taf CBC Highway Authority	Surface Water
3	Surcharging combined sewer infrastructure	A surcharging manhole on DCWW's combined sewer network caused internal flooding to one property.	DCWW	Sewer Flooding

4. RISK MANAGEMENT AUTHORITY ACTIONS

A Welsh Risk Management Authority is defined in Section 6 of the Flood and Water Management Act 2010 as NRW; a LLFA, a district council for an area where there is no unitary authority, or a highway authority wholly in Wales; an internal drainage board for an internal drainage district that is wholly or mainly in Wales; a water company that exercises functions in relation to an area in Wales. As the LLFA, RCT has the responsibility to coordinate the management of flood risk and the interaction of Risk Management Authorities across Rhondda Cynon Taf.

An overview of the relevant Risk Management Authority in relation to flood type is provided in Table 5. For further details of the roles and responsibilities of individual Risk Management Authorities in managing flooding, refer to the Welsh Government's National Strategy for Flood and Coastal Erosion Risk Management, Section 4 'Roles and Responsibilities'⁵, and RCT's 'FRM – Storm Dennis - Overview Report'².

Table 5: Risk Management Authority with relevant functions to manage the risk for different flood types

Type of Flooding	Risk Management Authority
Flooding from Main River, reservoirs and the sea (including coastal erosion).	Natural Resources Wales
Flooding from ordinary watercourses, surface water and groundwater	Lead Local Flood Authority
Flooding from water and sewage systems	Water Companies (Dŵr Cymru Welsh Water)
Flooding from the highway	Highway Authority
Flooding from the highway (motorways and major trunk roads)	Welsh Government Trunk Road Agency

Risk Management Authorities have direct flood risk management functions under the Flood and Water Management Act 2010, as well as the Water Resources Act 1991, Land Drainage Act 1991 and the Highways Act 1980. Through analysis of the flooding that impacted RCT12, the flood risk management functions exercised or proposed to be exercised by relevant RMAs were recorded 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 cause(s) of flooding in RCT12 during Storm Dennis have been previously identified and summarised within Table 4. The Risk Management Authorities responsible for managing that flooding have been listed in Table 6 below, along with a series of recommendations put forward by the LLFA.

Table 6: Recommendations provided by the LLFA to be considered by the relevant Risk Management Authority identified in response to the source(s) of flooding in RCT12 (as per Table 4).

Ref No	Asset (Source)	Asset Owner	Type of Flooding	Relevant Risk Management Authority	Recommendations
1	River Taf	Mixed Ownership	Main River	Natural Resources Wales	R1A NRW to “complete detailed investigative analysis work to understand the mechanisms of flooding in areas known to have flooded from main rivers”, including the River Taf at Treforest. Aligns with recommendation ‘Action FD2’ within NRW’s Flood Incident Management Review.

					R1B	<p>NRW to investigate the standard of protection provided by flood defences at RCT12 and “consider improvements to NRW flood alleviation schemes and structures on a prioritised basis”. Aligns with recommendation ‘Action FD3’ within NRW’s Flood Incident Management Review.</p>
					R1C	<p>NRW to review its flood warning service provision, especially for extreme events. This will form part of NRW’s Flood Warning Service Review Implementation Programme and aligns with the recommendations set out in their ‘Flood Incidence Management Review’.</p>
2	Surface water drainage network across RCT12	Rhondda Cynon Taf CBC Highway Authority	Surface Water	Highway Authority and Lead Local Flood Authority	R2A	<p>The Highways Authority to jet and cleanse the highway drainage network and action repairs accordingly.</p>

					R2B	The LLFA and Highway Authority to evaluate surface water management options to alleviate pluvial flooding at locations across the investigation area.
3	DCWW combined sewer and associated manhole	DCWW	Sewer	DCWW	R3A	DCWW to evaluate the standard of service and the condition of the combined sewer network servicing RCT12.

4.1. LEAD LOCAL FLOOD AUTHORITY

In review of Ref 2 in Table 6, the LLFA has been determined as a relevant Risk Management Authority in relation to the surface water flooding which occurred in Treforest during Storm Dennis.

The LLFA exercised the following functions in response to the flooding at investigation area RCT12:

- 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 carried out by Redstart, on behalf of RCT as the LLFA, was undertaken in order 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 Dennis.
- The LLFA has set up a central Control Room, to compliment the Council's Contact Centre and CCTV centre which is based at the Council's offices, to provide a comprehensive and informed response to the residents of RCT as appropriate during storm events.
- The LLFA, working in partnership with NRW, have expanded their interim Property Flood Resistance project offering expandable flood gates to those properties deemed at high risk of flooding from the main river, as per NRW's determination.

The LLFA also propose to exercise the following functions in response to the flooding at RCT12:

- The LLFA and LDA intend to clarify drainage asset owners and management responsibilities to make them aware of their personal risk. To ensure landowners manage the risk in compliance with the relevant legislation, a team of Flood Enforcement Officers including legal support is to be appointed.

- The LLFA and LDA will work with landowners and property owners to manage their personal flood risk through local measures, such as property resilience and resistance measures.
- As part of RCT's comprehensive review of the County Borough's most at risk communities, the LLFA are proposing to undertake a formal SFRA of the Lower Taf catchment area to better understand the overall risk from ordinary watercourse and surface water flooding in order to target investment to areas of highest risk. The SFRA also aim to encourage whole catchment measures, including working with natural processes, to alleviate flood risk in those areas of highest risk. **(R2B)**
- The LLFA will cooperate and collaborate with NRW to ensure a detailed study of the investigation area is completed and that appropriate actions to mitigate the impacts of river flooding are undertaken in accordance with NRW's Flood Incident Management Review.

4.2. NATURAL RESOURCES WALES

In review of Ref 1 in Table 6, NRW has been identified as the relevant Risk Management Authority in relation to the main river flooding from the River Taf during Storm Dennis.

NRW have exercised the following functions in response to the flooding at RCT12:

- 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.
- Following Storm Dennis NRW undertook an inspection of the River Taf at Treforest to ensure it was clear of blockages.
- NRW specifically outline within their ‘Flood Incident Management Review’⁴ that “more Severe Flood Warnings should have been issued based on the flooding impacts experienced” in the Lower Taf region. Utilising post event data and information, NRW have reviewed the Resultant Thresholds for the River Taf at Pontypridd Flood Warning Area. This is critical for assessing the performance, timeliness and accuracy of the warning service after a flood. **(R1C)**.
- NRW has introduced improved digital services to provide comprehensive flood risk, river level and rainfall information to households, businesses and communities across Wales. The improved service was launched in September 2020 on the NRW website and will improve how live flood warning and water level data is shared before and during flood events. **(R1C)**
- NRW have commissioned a Lower Taf Flood Modelling Project which is currently ongoing. **(R1A)**
- Following the flooding events of February 2020, NRW published a review of its incident response to Storm Ciara and Dennis in October 2020⁷. This review contains several recommendations for improvements to their ways of working and services which NRW are in the process of implementing through an internal delivery programme.
- NRW have developed a detailed Implementation Programme to address the areas of improvement work required to deliver the recommendations of the Flood Warning Service Review carried out by NRW in 2018. Several of the recommendations directly link to the recommendations set out by NRW within their Flood Incident Management Review **(R1C)**.

⁷ [Natural Resources Wales / Our response to Storm Ciara and Storm Dennis](#)

NRW propose to exercise the following functions in response to the flooding at investigation area RCT12:

- NRW to undertake minor repairs to Egypt Street flood wall.
- Following the completion of NRW's Lower Taf Flood Modelling Project, NRW propose to undertake an initial assessment of the viability of potential flood risk management options. Consideration should be given to areas at high risk of flooding from rivers on a prioritised basis. **(R1A, R1B)**
- Following the completion of NRW's Lower Taf Flood Modelling Project, NRW propose further threshold work and flood warning area amendments. **(R1A, R1C)**
- NRW will undertake a review of the modelled outputs and adopt changes to their maintenance program within the investigation area if required. **(R1A)**

4.3. WATER COMPANY

In review of Ref 3 in Table 6, DCWW has been identified as the relevant Risk Management Authority in relation to the sewer flooding associated with a surcharging manhole within the combined sewer network.

DCWW have exercised the following functions in response to the flooding at RCT12;

- DCWW have carried out their own investigations in response to the incidence of flooding that was reported by residents to RCT during the storm event.
- DCWW have investigated the performance of their network and telemetry systems during the storm event to ensure their assets were operating with no issues.

4.4. HIGHWAY AUTHORITY

During the investigation into the flooding at investigation area RCT12 during Storm Dennis, the Highway was identified as flooding from a combination of sources, notably as a result of surface water runoff and main river flooding from the River Taf.

Ref 2 of Table 6 identified the Highway Authority as a relevant Risk Management Authority in relation to the surface water flooding that occurred along the highway across RCT12.

RCT as the Highway Authority have exercised the following functions in response to the flooding at investigation area RCT12:

- 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. **(R2A)**

RCT as the Highway Authority propose to undertake the following function in relation to the storm event at investigation area RCT12:

- The Highway Authority intend to increase their resource capacity by establishing a dedicated 'Pluvial Drainage Team' to focus entirely on the refurbishment and maintenance of RCT's existing and enhanced highway drainage infrastructure.

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 - <https://naturalresources.wales/flooding/check-flood-warnings/?lang=en>

Natural Resources Wales - Long Term Flood Risk - <https://naturalresources.wales/evidence-and-data/maps/long-term-flood-risk/?lang=en>

Rhondda Cynon Taf CBC - Local Flood Risk Management Plan - <https://www.rctcbc.gov.uk/EN/Resident/ParkingRoadsandTravel/Roadspavementsandpaths/FloodAlleviation/Floodriskregulations2009.aspx>

Rhondda Cynon Taf CBC - Local Flood Risk Management Strategy - <https://www.rctcbc.gov.uk/EN/Resident/ParkingRoadsandTravel/Roadspavementsandpaths/FloodAlleviation/LocalFloodRiskManagementStrategy.aspx>

Rhondda Cynon Taf CBC – Sustainable Drainage – <https://www.rctcbc.gov.uk/EN/Resident/ParkingRoadsandTravel/Roadspavementsandpaths/SustainableDrainage/SustainableDrainage.aspx>

Welsh Government - National Strategy for Flood and Coastal Erosion Risk Management - <https://gov.wales/sites/default/files/publications/2019-03/national-strategy-for-flood-and-coastal-erosion-risk-management-in-wales.pdf>

Welsh Water – How to Contact Us – <https://www.welshwater.com/en/Contact-Us.aspx>

Appendix D

Flood and Water Management Act 2010

Section 19 Flood Investigation Report

Storm Dennis –
Flood Investigation Area RCT14

January 2022

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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 Flood and Water Management Act 2010. The Council assumes no responsibility or liability from any person in connection with its contents or findings.

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CONTENTS

EXECUTIVE SUMMARY	3
ABBREVIATIONS.....	6
TABLES AND FIGURES	7
1. INTRODUCTION.....	9
1.1. Purpose of Investigation.....	9
1.2. Site Location	10
1.3. Drainage System.....	12
1.4. Investigation Evidence	12
1.5. Public Engagement	13
2. FLOODING HISTORY	14
2.1. Previous Flood Incidents	14
2.2. Flood Incident.....	15
2.2.1. Glyn-taf Rhydyfelin North.....	17
2.2.2. Glyn-taf Rhydyfelin South	19
2.2.3. River Taf Western Riverbank.....	21
2.3. Rainfall Analysis.....	22
3. POSSIBLE CAUSES	23
3.1. Culvert Conditions.....	23
3.2. Ordinary Watercourse Conditions	26
3.3. Main River	27
3.3.1. Main River Levels And Flood Warnings.....	27
3.3.2. Main River Flood Risk.....	29
3.3.3. Main River Flood Defences.....	32
3.4. Highway Drainage Conditions	34
3.5. Dŵr Cymru Welsh Water Apparatus	35
3.6. Surface Water	36
3.7. Access Structures	38
3.8. System at Capacity	39
3.9. Summary of Possible Causes	41

4. RISK MANAGEMENT AUTHORITY ACTIONS.....	42
4.1. Lead Local Flood Authority	46
4.2. Natural Resources Wales	48
4.3. Water Company	49
4.4. Highway Authority	49
USEFUL LINKS/CONTACTS	51

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EXECUTIVE SUMMARY

This report has been produced through the duties placed upon Rhondda Cynon Taf County Borough Council 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 factual report of the storm event that occurred on the 15th and 16th of February 2020 within the Rhondda Cynon Taf County Borough Council area, focusing the investigation on the flooding that occurred within the regions of Glyn-taf, Rhydyfelin and Hawthorn adjacent to the River Taf (Flood Investigation Area RCT 14, 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 manage the risk of flooding.

The flooding that affected RCT on the 15 and 16th of February 2020 was a result of an extreme rainfall event, designated by the Met Office as ‘Storm Dennis’. The storm event resulted in the internal flooding of at least 27 properties across Glyn-taf, Rhydyfelin and Hawthorn: including 23 residential properties and 4 non-residential properties. Significant flooding to the highway throughout the investigation area also occurred.

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 and Dŵr Cymru Welsh Water.

It has been established from the evidence gathered within this report that the primary source of flooding at RCT14 in this incident was the overtopping of the main River Taf at several locations along the eastern and western embankments following persistent and heavy rainfall. River level gauge data from NRW’s Pontypridd monitoring station reveal that the River Taf was almost four times its typical level during Storm Dennis,

reaching a peak level of 5.32 metres; the highest river level recorded at the station since its opening in 1970.

On review of NRW's Flood Risk Assessment Wales Maps, the impacted properties within RCT14 are identified at high risk of flooding from the main river, however there are no formal flood defences currently in place.

The investigation also identified surface water accumulation on the highway to have contributed to the flooding that occurred within RCT14. The overtopping of the River Taf, the associated settling of fluvial deposits and the sheer intensity of rainfall during Storm Dennis resulted in the surface water drainage infrastructure throughout RCT14 becoming overwhelmed, leading to the accumulation of surface water and the internal flooding of additional properties. A manhole, associated to the Ilan Avenue culvert network, at Cardiff Road is also believed to have surcharged during the storm event, further exacerbating the issues faced.

NRW has been determined as the relevant Risk Management Authority responsible for managing the main river flooding that occurred during Storm Dennis. In response to the flooding at investigation area RCT14, NRW have;

- Carried out their own post event investigative analysis work to understand the mechanism of flooding from the River Taf at Glyn-taf, Rhydyfelin and Hawthorn;
- Commissioned a Lower Taf Flood Modelling Project, the outcomes of which will include an initial assessment of the viability of potential flood risk management options; and
- Developed a series of recommendations and a detailed action plan to address the areas of improvement for future storm events, including the performance of NRW's Flood Warning Service and incident management response.

RCTCBC as the Lead Local Flood Authority, Land Drainage Authority 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 Dennis. In response to the flooding at investigation area RCT14, the LLFA has;

- Carried out survey, jetting and cleansing operations to an estimated 242 metres of culvert network within the investigation area;
- Led on the development of a central Control Room to compliment the Council's Contact Centre and CCTV Centre; and to provide a comprehensive and informed response to residents during storm events;

- Exercised its powers, under Section 13 of the Flood and Water Management Act 2010, to engage with NRW in relation to their responsibilities as the Risk Management Authority for main river flooding; and
- Working in partnership with NRW, the LLFA have expanded their interim Property Flood Resistance project offering expandable flood gates to those properties deemed at high risk of river flooding, as per NRW's determination.

The event that occurred on 15 and 16th February was extreme, and it is unlikely flooding from a similar event could be prevented entirely. It is concluded that Risk Management Authorities satisfactorily carried out their flood risk management functions in response to the flood event at RCT14, however, further measures have been proposed by all RMAs to improve preparedness and response to future flood events.

ABBREVIATIONS

CaRR – Communities at Risk Register

DCWW – Welsh Water

FRMP – Flood Risk Management Plan

FWMA – Flood and Water Management Act 2010

LDA – Land Drainage Authority

LFRMS – Local Flood Risk Management Strategy

LLFA – Lead Local Flood Authority

NRW – Natural Resources Wales

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

RCT - Rhondda Cynon Taf

RCT14 – Flood Investigation Area RCT 14

RCTCBC – Rhondda Cynon Taf County Borough Council

RMA – Risk Management Authority

SAB – Sustainable Drainage Approval Body

SFRA – Strategic Flood Risk Assessment

SOC – Strategic Outline Business Case

SuDs – Sustainable Drainage Systems

TABLES AND FIGURES

Table 1: Investigative evidence gathered in preparation of this Storm Dennis Section 19 report.....	12
Table 2: Summary of the source(s), pathway(s) and receptor(s) affected during Storm Dennis within investigation area RCT14.....	15
Table 3: Flood Warnings issued by NRW for the River Taf at RCT14 during Storm Dennis	28
Table 4: Summary of the culvert capacity assessment results which indicate the current standard of protection of the Ilan Avenue culvert network in free flowing and blockage conditions.....	39
Table 5: Summary of source(s) and possible cause(s) of flooding in RCT investigation area 14 during Storm Dennis (15-16th February 2020)	41
Table 6: Risk Management Authority with relevant functions to manage the risk for different flood types.....	42
Table 7: Recommendations provided by the LLFA to be considered by the relevant Risk Management Authority identified in response to the source(s) of flooding in investigation area RCT14 (as per Table 5).....	43
Figure 1: RCT Flood Investigation Area RCT14 Location Plan	10
Figure 2: Natural Resources Wales' Flood Risk Assessment Water (FRAW) map for rivers and ordinary watercourse and surface water flood risk at investigation area RCT14. Contains Natural Resources Wales information © Natural Resources Wales and database right. All rights reserved. ...	11
Figure 3: Flood Investigation Area RCT14 Sub-Catchments.....	16
Figure 4: A downstream view of the River Taf at Castle Inn Bridge, Cardiff Road prior to its overtopping during Storm Dennis (Image: Storm Dennis, pontypriddtowncouncil.gov.uk)	17
Figure 5: Photo of the rapid onset of flooding from the River Taf at Cardiff Road during Storm Dennis (Image: Wales Online)	18
Figure 6: Flow Pathways that caused internal flooding within Glyn-taf Rhydyfelin North sub-catchment	19
Figure 7: Image showing main river flooding to the south of Nant-y-Dall Avenue during Storm Dennis (image provided by resident).....	20
Figure 8: Flow pathways that caused flooding within Glyn-taf Rhydyfelin South.....	21
Figure 9: Ilan Avenue culverted ordinary watercourse location plan	23
Figure 10: Photo of 'Manhole 1' surcharging during Storm Jorje (captured by RCT's Flood Risk Management team on 28 th February 2020)	24
Figure 11: Map outlining main river and ordinary watercourse locations throughout RCT14 and the surrounding region.	26
Figure 12: The River Taf levels at Pontypridd station between the 14 th and 17 th February 2020 (Natural Resources Wales)	27
Figure 13: Natural Resources Wales' Flood Risk Assessment Wales (FRAW) map for River sources. Contains Natural Resources Wales information © Natural Resources Wales and database right. All rights reserved.	30

Figure 14: NRW's National Flood Hazard map for Medium Risk River Flood Depth in RCT14 Northern Sub-Catchment. Contains Natural Resources Wales information © Natural Resources Wales and database right. All rights reserved 31

Figure 15: NRW's National Flood Hazard map for Medium Risk River Flood Depth in RCT14 Southern Sub-Catchment. Contains Natural Resources Wales information © Natural Resources Wales and database right. All rights reserved. 31

Figure 16: Natural Resources Wales' Flood Risk Assessment Wales (FRAW) map for River sources, including flood defence locations at investigation area RCT14. Contains Natural Resources Wales information © Natural Resources Wales and database right. All rights reserved..... 32

Figure 17: Natural Resources Wales' Flood Risk Assessment Wales (FRAW) map for Surface Water and Ordinary Watercourse flood sources. Contains Natural Resources Wales information © Natural Resources Wales and database right. All rights reserved. 36

Figure 18: Ilan Avenue culverted ordinary watercourse network with annotated Manhole labels 39

1. INTRODUCTION

1.1. PURPOSE OF INVESTIGATION

On the 15 and 16th of February 2020, RCT was impacted by an extreme weather event which was named ‘Storm Dennis’ by the Met Office. Due to the extent and impact of the event, the LLFA opted to undertake a formal investigation.

The storm resulted in widespread residential and commercial flooding within the Rhondda Cynon Taf County Borough Council area. This report will focus on Flood Investigation Area RCT14, stretching from Glyn-taf to Hawthorn in the Lower Taf region.

The reason behind RCT’s investigation is in response to the duties of the local authority regarding Section 19 of the Flood and Water Management Act 2010, 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 the 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

The purpose of the investigation is to determine which RMAs have relevant flood risk management functions and which functions have been exercised in response to the flood event in question.

Specific details of Storm Dennis, such as rainfall analysis are covered within a separate overview report that covers the wider RCT area. The report is titled ‘Storm Dennis February 2020 – Overview Report’ and will be referred to as ‘FRM – Storm Dennis – Overview Report’².

¹ Flood and Water Management Act 2010 – Section 19 - <https://www.legislation.gov.uk/ukpga/2010/29/section/19>

² [Flood Investigation Reports | Rhondda Cynon Taf County Borough Council \(rctcbc.gov.uk\)](https://www.rctcbc.gov.uk/flood-investigation-reports)

1.2. SITE LOCATION

The area investigated within this report stretches from the south of Glyn-taf to parts of Hawthorn below the A470. The area falls within the electoral wards of Treforest, Rhydyfelin and Hawthorn and is situated to the south-east of Pontypridd within the southern region of the county borough.

Glyn-taf, Rhydyfelin and Hawthorn are all located within the River Taf catchment and are predominantly situated to the east of the River Taf. As illustrated in Figure 1, the investigation area also includes a small amount of land to the west of the main river.

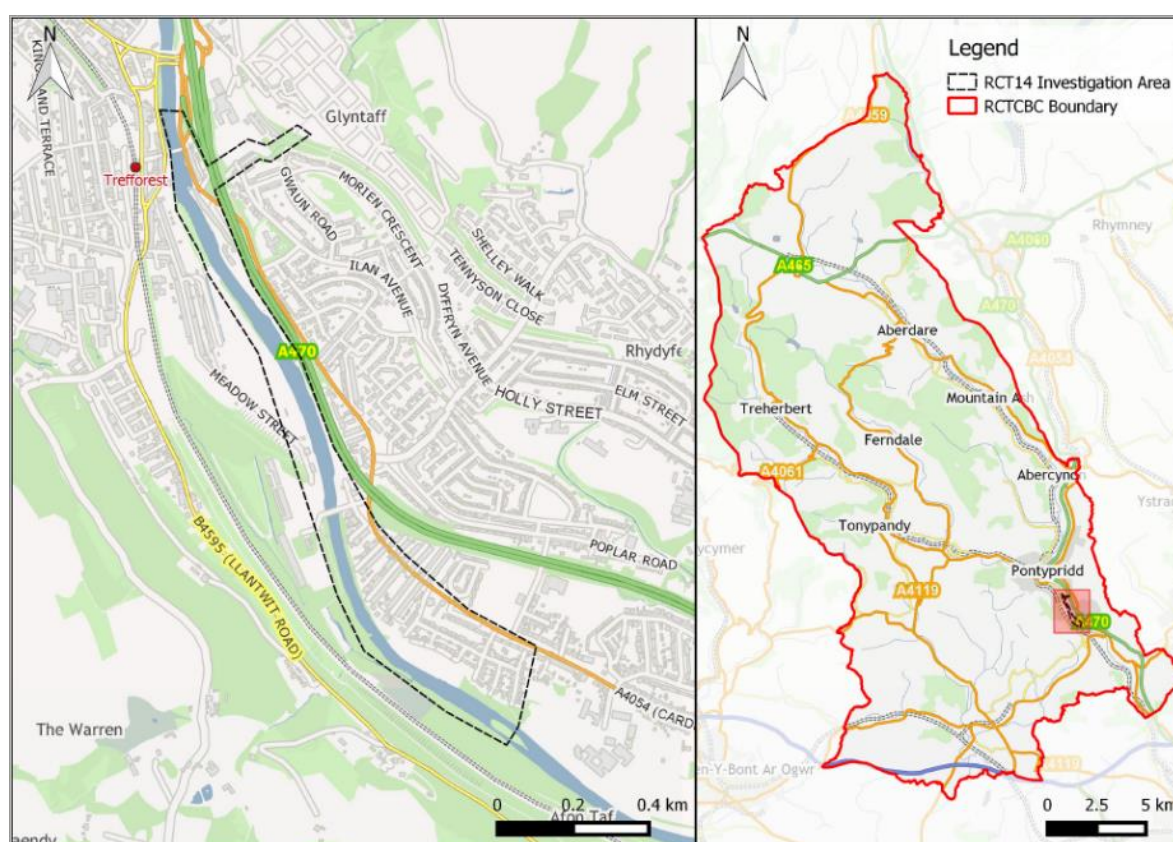


Figure 1: RCT Flood Investigation Area RCT14 Location Plan

RCT14 falls within the community areas of Glyntaf and Rhydyfelin. According to Welsh Government's CaRR, Glyn-taf and Rhydyfelin community areas are ranked 91st and 8th for surface water flood risk and 113th and 172nd for main river flooding in Wales, respectively.

NRW's Flood Risk Assessment Wales (FRAW) maps indicate that there are areas of low to high flood risk from both fluvial and surface water and ordinary watercourse

sources within the investigation area. This is illustrated in Figure 2, which is an excerpt from the FRAW maps.

RCT14 sits primarily on the eastern floodplains of the River Taf, with low to high fluvial flood risk sourced by the main river present across much of the investigation area. Flood risk from surface water and ordinary watercourse sources is also noted within parts of the investigation area, as illustrated in Figure 2. This is broadly associated with bank breaches of the unnamed watercourses which drain the north of the site, as outlined within RCT's FRMP³. Within some areas adjacent to the main river, it is considered that people may be at risk from both surface water flooding and main river flooding.

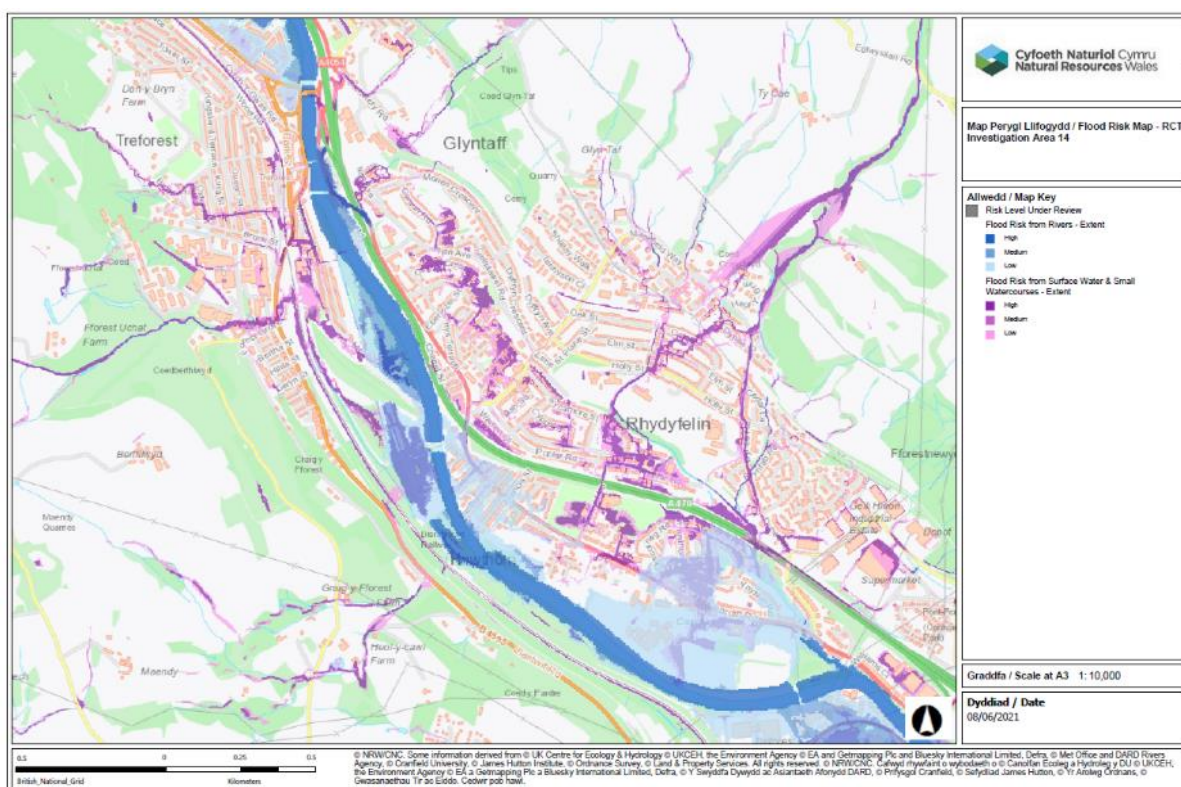


Figure 2: Natural Resources Wales' Flood Risk Assessment Water (FRAW) map for rivers and ordinary watercourse and surface water flood risk at investigation area RCT14. Contains Natural Resources Wales information © Natural Resources Wales and database right. All rights reserved.

Aside from the culverted ordinary watercourse to the north of RCT14, there are no further known ordinary watercourses within the investigation area. Several named and unnamed ordinary watercourses drain the hillsides above Glyn-taf, Rhydyfelin and Hawthorn but flow outside the investigation area. These include the Nant Y Fforest, Nant Lonydd and Nant Corrwg.

³ [RCT'S Flood Risk Management Plan \(rctcbc.gov.uk\)](http://rctcbc.gov.uk)

1.3. DRAINAGE SYSTEM

The surface water drainage systems that serve investigation area RCT14 are that of the highway drainage network designed to manage the surface water within the highway and public surface water sewer and combined sewer networks operated by Dŵr Cymru Welsh Water.

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 below within Table 1.

Table 1: Investigative evidence gathered in preparation of this Storm Dennis Section 19 report

Source	Data
Residents	Photos, videos, statements, email correspondence, public engagement survey responses
Responders' statements	Local responders' statements
CCTV Surveys	Internal surveys of the local drainage networks
Met Office Data	Weather Warning information (see FRM – Storm Dennis – Overview Report)
Rain Gauges	RCT and NRW operated gauge information (see FRM – Storm Dennis – Overview Report)
Natural Resources Wales	River Level and Flood Warning data
RCT Flood Risk Management Plan	Site specific information and data for each electoral ward in RCT
Communities at Risk Register	Flood risk ranking and scores for all flood types based on community data in Wales
Flood Investigation Report (Redstart's FIR)	A summary of the source-pathway-receptors, culvert capacity assessment and hydraulic modelling work undertaken by Redstart. The Flood Investigation Report was commissioned by RCT prior to writing the Section 19 report.

Evidence sourced from the 'Flood Investigation Report', commissioned by RCT, will be further referred to as 'Redstart's FIR' throughout this report.

1.5. PUBLIC ENGAGEMENT

Following the initial flooding event that occurred on the 15 and 16th of February during Storm Dennis, flood risk officers from RCT's Flood Risk Management department were deployed to areas across the borough to investigate reports of internal flooding by residents. Residents engaged with the Flood Risk Management team to help determine the initial impacts caused by the flooding event and to investigate the potential source(s) and pathway(s) of flood water. 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 the flood investigations, a public engagement exercise was undertaken between the 4th and 25th of January 2021 by Redstart, on behalf of RCT. The aim of this exercise was to engage with local residents who were affected by the flood event to capture details 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. 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.

2. FLOODING HISTORY

2.1. PREVIOUS FLOOD INCIDENTS

Historical flood information and residents accounts captured by RCT's Flood Risk Management officers following Storm Dennis indicate that parts of the investigation area have experienced internal flooding prior to February 2020.

Several reports of surface water flooding have been recorded across the investigation area, particularly along the A4054 Cardiff Road in the northernmost section of RCT14. Since 2010, flooding on Cardiff Road has resulted in the internal flooding of properties on at least two occasions, whereas reports of flooding at other locations within the investigation area have been exclusively external.

Residents affected by main river flooding during Storm Dennis state they had not experienced flooding from the River Taf prior, with all historic flood reports deriving from surface water flooding as a result of overwhelmed highway drainage and intense rainfall.

2.2. FLOOD INCIDENT

The flooding that occurred on the 15th and 16th February 2020 was a result of an extreme rainfall event, designated by the Met Office as ‘Storm Dennis’. The rainfall event affected the majority of RCT and caused widespread flooding to communities.

Specific details of Storm Dennis, such as rainfall and river level analysis are covered within a separate overview report that covers the wider RCT area, referenced ‘FRM – Storm Dennis – Overview Report’².

Post event inspections were undertaken by RCT’s Flood Risk Management team and RCT’s Public Health, Protection and Community team during the days following the storm event. They identified 23 residential properties and 4 non-residential properties as internally flooded within the investigation area.

A summary of the source(s) and pathway(s) of flooding within RCT14 during Storm Dennis have been outlined in Table 2 and further described throughout this section.

Table 2: Summary of the source(s), pathway(s) and receptor(s) affected during Storm Dennis within investigation area RCT14

Source(s)	Pathway(s)	Receptor(s)
The primary source of flooding for this incident was the River Taf, adjacent to the investigation area, overtopping its banks.	There were numerous pathways related to the overtopping of the River Taf and the conveyance of fluvial flood water into adjacent streets and properties on both eastern and western riverbanks.	A total of 21 residential and 4 non-residential properties across Cardiff Road, Nant y Dall Avenue, De Barri Street and Old Tinworks Road were internally flooded by the overtopping of the main river.
Intense rainfall and subsequent surface water runoff, both locally and from the hillsides to the north-east of the investigation area, also contributed to the flooding that occurred.	The accumulation of surface water on Cardiff Road and adjacent streets resulted in the creation of pluvial flows throughout the investigation area.	2 residential properties, one on Owen Street and one on Alexon Way, were internally flooded by surface water. Pluvial flows are also likely to have contributed to the internal flooding of properties impacted by main river flooding across RCT14.

On review of Table 2, the primary source of the recorded flooding within the investigation area was the overtopping of the main river, the River Taf. The main river overtopped both its eastern and western banks at several locations throughout RCT14.

The impacts of the overtopping were exacerbated by intense rainfall and subsequent surface water flows throughout the investigation area, with surface water flows from the surrounding watershed and localised surface water accumulation both contributing sources.

Regarding the surrounding watershed, a rolling ball assessment (a Geographical Information System technique used to delineate a watershed using topographical data) was undertaken as part of Redstart's FIR to estimate the area of land that would be expected to drain from the hillsides surrounding investigation area RCT14 into the River Taf. Figure 3 illustrates the estimated topographic watershed determined using the rolling ball assessment, with two sub catchments identified within the area.

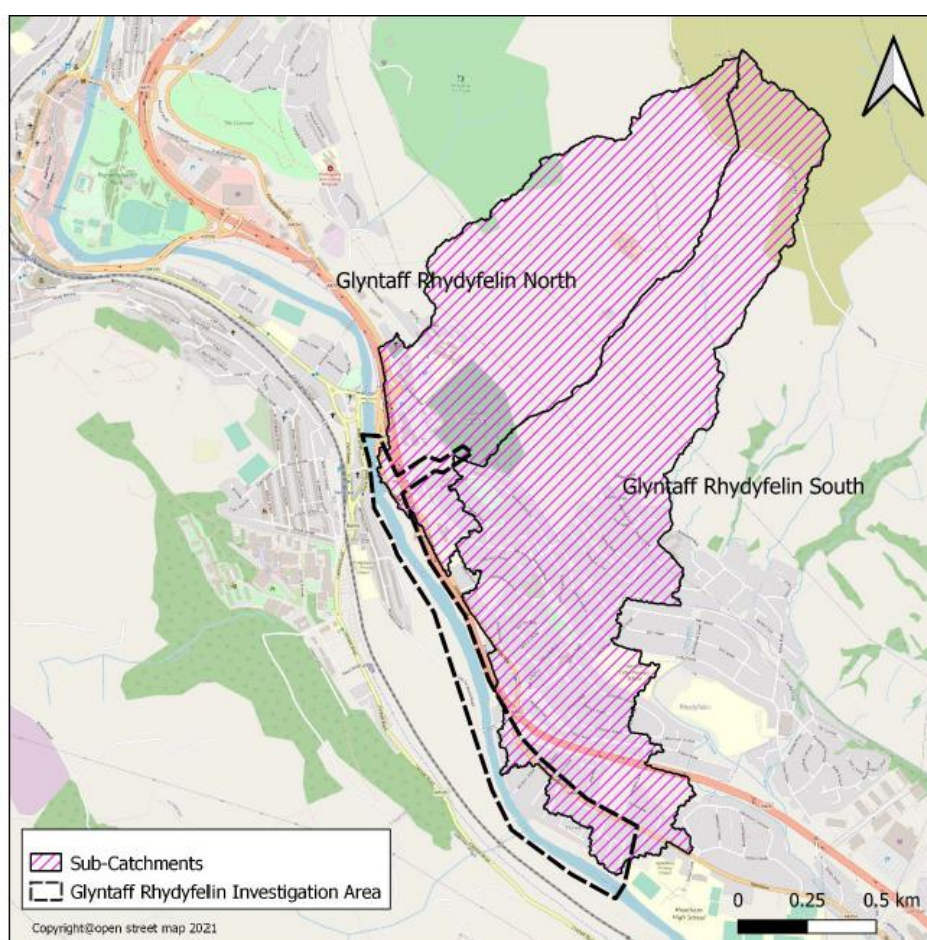


Figure 3: Flood Investigation Area RCT14 Sub-Catchments

For the purpose of this investigation, the flood incident at investigation area RCT14 will be described in three parts: the flood incident at ‘Glyn-taf Rhydyfelin North’ (sub-catchment 1), the flood incident at ‘Glyn-taf Rhydyfelin South’ (sub-catchment 2) and the flood incident on the western bank of the River Taf.

2.2.1. GLYN-TAF RHYDYFELIN NORTH

Glyn-taf Rhydyfelin North is an area of approximately 97 hectares that originates at the River Taf and extends northeastwards (Figure 3). All areas of the surrounding hillside that form the northern sub-catchment drain towards the main river.

The primary source of internal flooding within the sub-catchment was the overtopping of the River Taf during the early hours of Sunday 16th February. Figure 4 depicts the swollen River Taf flowing rapidly through Treforest prior to its overtopping.

The primary flow pathway was the conveyance of fluvial flood water over the main river’s eastern embankment and onto the A4054 (Cardiff Road) at multiple locations near the Castle Inn Bridge footbridge. Figure 5 illustrates the rapid onset of flooding from the River Taf at Cardiff Road once it had overtopped.

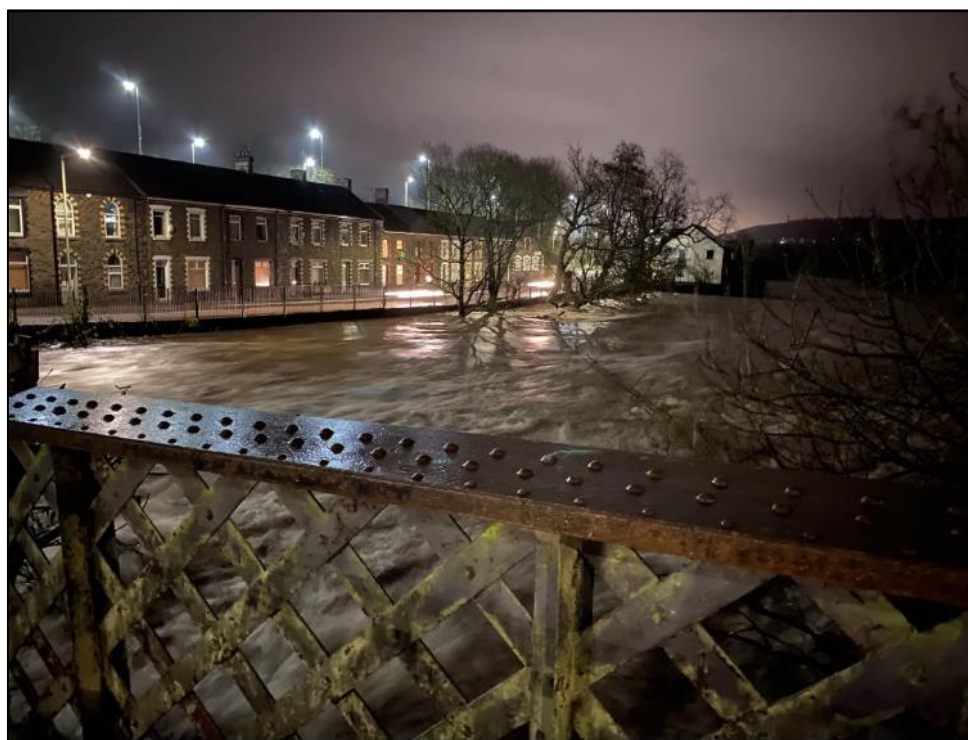


Figure 4: A downstream view of the River Taf at Castle Inn Bridge, Cardiff Road prior to its overtopping during Storm Dennis (Image: Storm Dennis, pontypriddtowncouncil.gov.uk)



Figure 5: Photo of the rapid onset of flooding from the River Taf at Cardiff Road during Storm Dennis
(Image: Wales Online)

Surface water flooding also occurred as a result of intense rainfall and subsequent pluvial flows. Whilst not as distinct in their impact, the pluvial flows are believed to have contributed to the internal flooding that occurred at Cardiff Road and resulted in external flooding throughout the wider catchment. The pathways of flooding within 'Glyn-taf Rhydyfelin North' sub-catchment have been depicted in Figure 6.

A total of 17 residential and 2 non-residential properties were internally flooded within Glyn-taf Rhydyfelin North during Storm Dennis. All flooded properties were located adjacent to the River Taf along Cardiff Road, highlighting the significant impact of the main river overtopping and the subsequent flooding that occurred in the area.

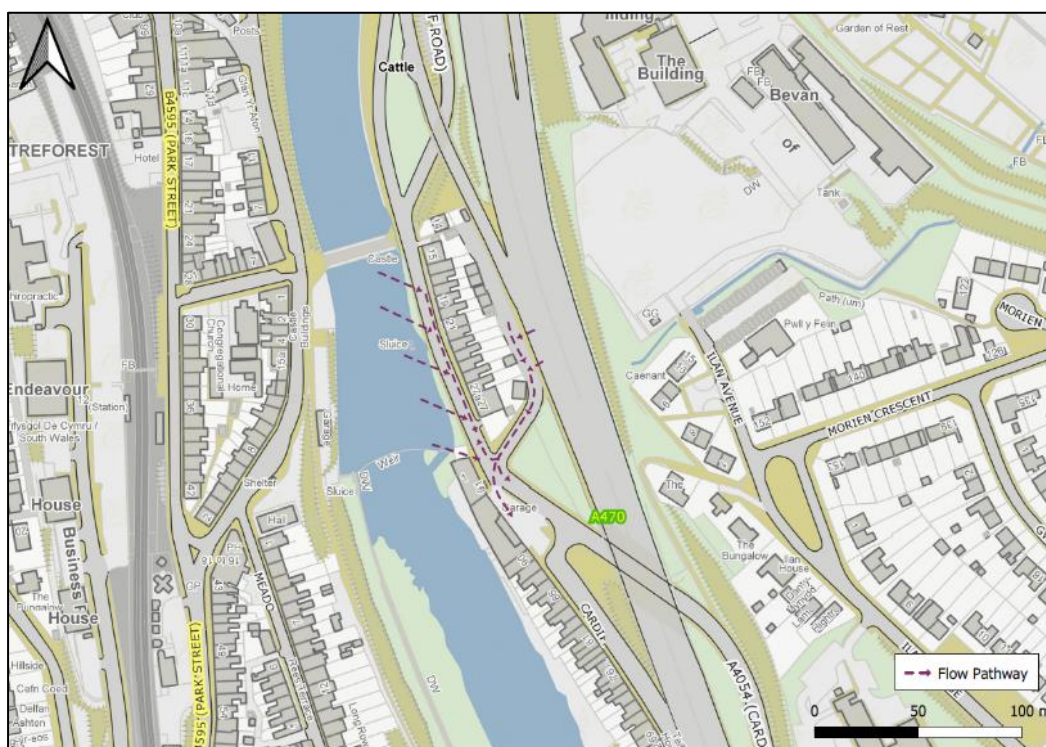


Figure 6: Flow Pathways that caused internal flooding within Glyn-taf Rhydyfelin North sub-catchment

2.2.2. GLYN-TAF RHYDYFELIN SOUTH

Glyn-taf Rhydyfelin South sub-catchment covers an area of approximately 140 hectares across the east and southeast of the study area and also includes areas of the surrounding hillside that drain towards the River Taf (Figure 3).

Alike Glyn-taf Rhydyfelin North, the primary source of flooding within the sub-catchment was the overtopping of the River Taf. The primary flow pathway saw flood water convey beyond the eastern riverbank onto De Barri Street and into the rear of properties on Nant Y Dall Avenue, with flood water reaching approximately 1.8 metres in some areas (Figure 7).

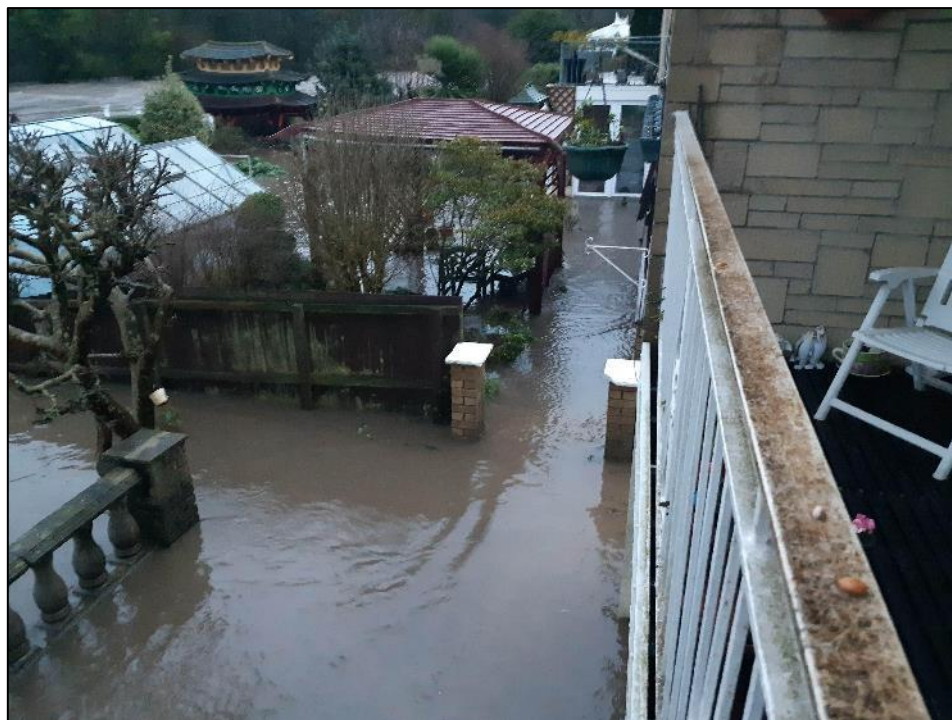


Figure 7: Image showing main river flooding to the south of Nant-y-Dall Avenue during Storm Dennis (image provided by resident)

Of the six properties within Glyn-taf Rhydyfelin South that were internally flooded, four were as a result of the River Taf overtopping its banks. The remaining two residential properties that reported internal flooding, one on Owen Street and one on Alexon Way, were flooded by surface water. The pathways of observed flooding within 'Glyn-taf Rhydyfelin South' sub-catchment have been depicted in Figure 8 below.

Owen Street is approximately 130 metres away from the River Taf and, whilst it is possible that fluvial flood water conveyed along the rear of De-Barri Street and into Owen Street, this is unlikely due to the lack of evidence and limited reports of flooding along the conveyance route. Surface water is believed to have accumulated on both Owen Street and Cardiff Road, resulting in the internal flooding of an end-of-terrace property on Owen Street.

The localised accumulation of surface water is believed to have been responsible for the internal flooding of a residential property on Alexon Way. Resident reports during the storm event suggest that the River Taf did overtop its banks south of Ymyl yr Afon (Figure 8); however, evidence suggests that fluvial flows did not convey a large enough distance to internally flood any nearby properties.

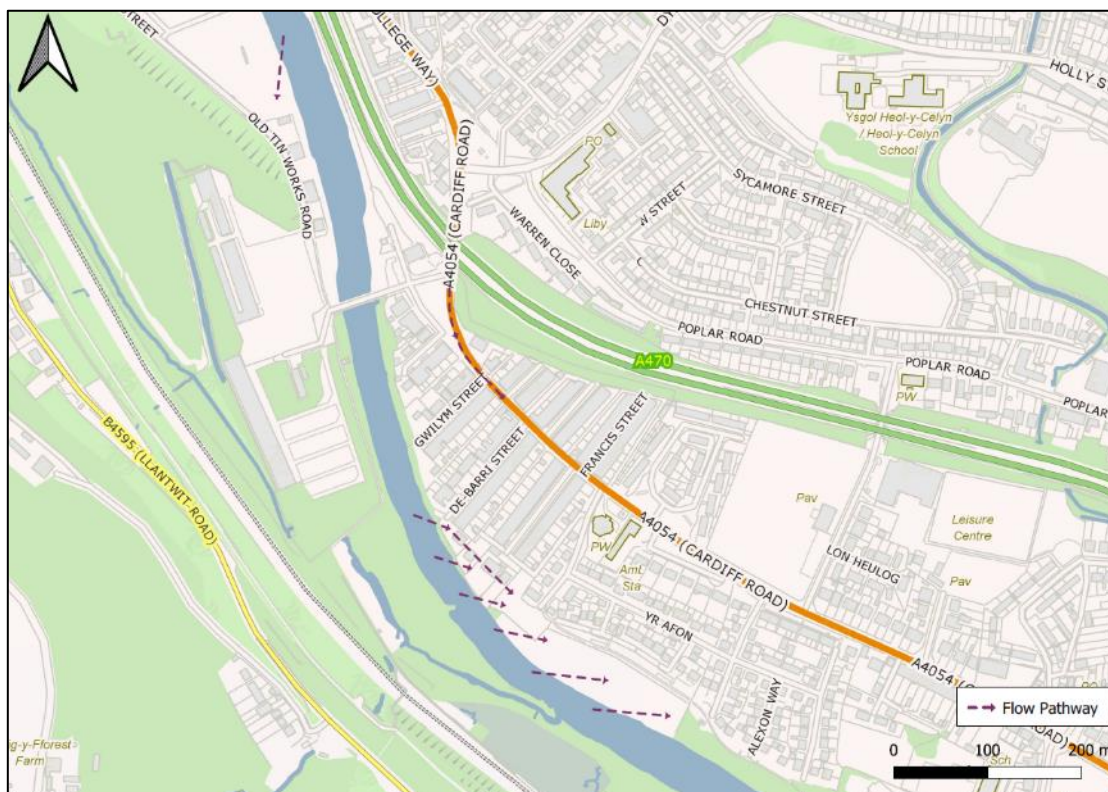


Figure 8: Flow pathways that caused flooding within Glyn-taf Rhydyfelin South

2.2.3. RIVER TAF WESTERN RIVERBANK

Within RCT14, a single property on the western bank of the River Taf was internally flooded during Storm Dennis. The non-residential property, located on Old Tin Works Road, is situated within 25 metres of the main river channel and is considered to have been impacted by the River Taf overtopping its western banks at this location.

2.3. RAINFALL ANALYSIS

See RCT's 'Overview Report' of Storm Dennis, reference 'FRM – Storm Dennis – Overview Report'², for a detailed analysis of the rainfall and ordinary watercourse response.

3. POSSIBLE CAUSES

3.1. CULVERT CONDITIONS

There are several unnamed watercourses which drain the upper catchment areas to the east of investigation area RCT14. These watercourses are culverted beneath Glyn-taf before discharging into the River Taf downstream. The most notable culverted watercourse in relation to our investigation is known as 'Ilan Avenue' culvert network which conveys water from the hillside above Glyn-taf Rhydyfelin North sub-catchment, beneath the A470, and discharges into the River Taf at Cardiff Road (illustrated in Figure 9).

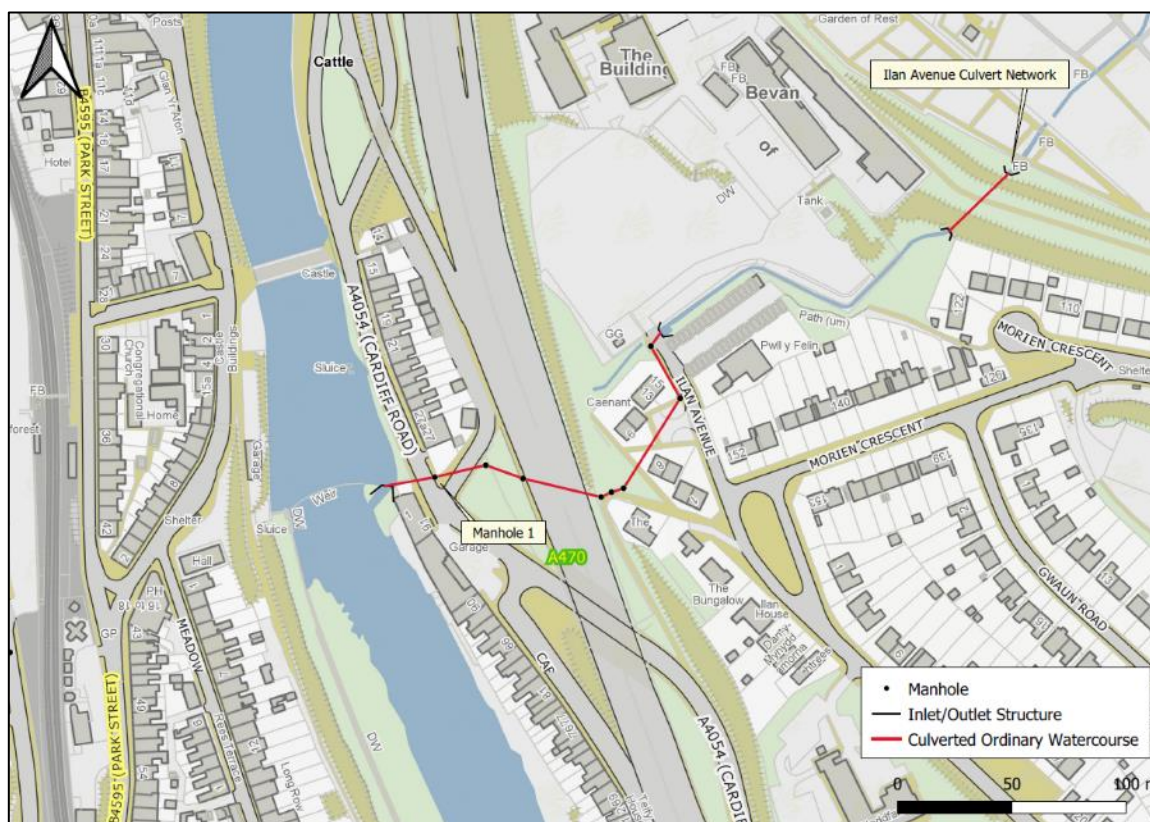


Figure 9: Ilan Avenue culverted ordinary watercourse location plan

Following Storm Dennis, a CCTV survey inspection of the culvert network was undertaken to ascertain both the operational condition of the network and its structural integrity. The survey identified some debris within the Ilan Avenue culvert network, with approximately two tonnes of material being removed from the system following the inspection. Little to no debris was identified at both culvert inlets following the storm event, indicating that the identified debris was already present in the network prior to

the storm event. Due to the lack of pre-storm survey data, it is not possible to conclusively determine whether this debris was present in the system prior to the storm event, if the material entered the system as a result of the exceptional weather conditions, or whether they are influenced by the outfall arrangement into the Main River.

Site inspections undertaken by RCT's Flood Risk Management team during Storm Jorge (February 28th to March 1st) identified a manhole adjacent to the affected properties on Cardiff Road (labelled 'Manhole 1' in Figure 9) surcharging. This resulted in repeat surface water flooding to the external extents of several properties at Cardiff Road.

The surcharging of 'Manhole 1' approximately two weeks after Storm Dennis has been attributed to the raised river levels within the River Taf which prevented water from outfalling from the culverted network and into the River Taf. Figure 10, taken during RCT's site inspection following the receding of flood water, shows 'Manhole 1' surcharging within the chamber.



Figure 10: Photo of 'Manhole 1' surcharging during Storm Jorge (captured by RCT's Flood Risk Management team on 28th February 2020)

Following the observations made at 'Manhole 1' during Storm Jorje, it is considered that the downstream culvert network may have contributed to surface water flooding on Cardiff Road during Storm Dennis; however, the overtopping of the River Taf has been determined as the primary cause of flooding to properties at Cardiff Road in the northern sub-catchment during Storm Dennis.

3.2. ORDINARY WATERCOURSE CONDITIONS

Whilst there are several unnamed watercourses within the upper catchment of the investigation area, many of these watercourses convey into the Nant Corrwg and Nant Lonydd before discharging into the River Taf (highlighted in Figure 11). These watercourses and their tributaries fall outside of the investigation area.

The unnamed ordinary watercourse associated to the 'Ilan Avenue' culvert network water (Figure 9) was inspected post event and found no evidence of recent scour to the channel.

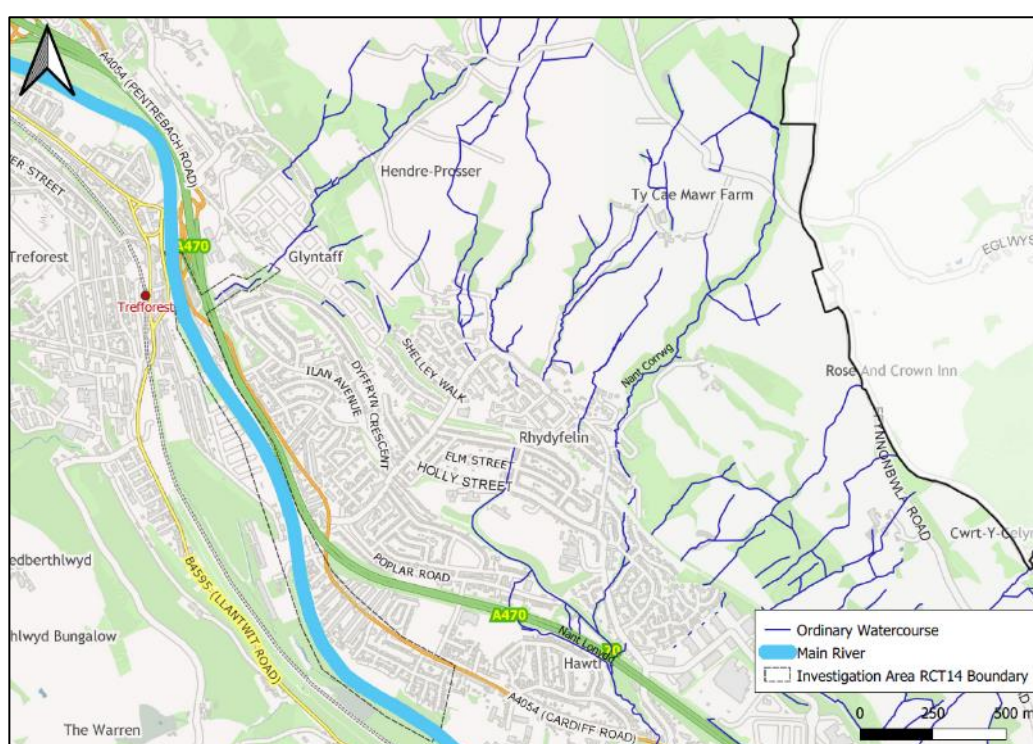


Figure 11: Map outlining main river and ordinary watercourse locations throughout RCT14 and the surrounding region.

There is no evidence to suggest that the ordinary watercourses outlined in Figure 11 contributed to the flooding experienced in RCT14 during Storm Dennis.

3.3. MAIN RIVER

The designated main River Taf flows in a southeasterly direction through Glyn-taf, Rhydyfelin and Hawthorn (Figure 11). Areas on both the western and eastern embankments of the River Taf were impacted during Storm Dennis.

3.3.1. MAIN RIVER LEVELS AND FLOOD WARNINGS

The hydrograph in Figure 12 illustrates the significant rise in the River Taf's levels in response to rainfall between the 14 – 17th February 2020. River level data was captured at NRW's Pontypridd river level gauge, located approximately 750m north-west of the northern boundary of the investigation area.

NRW issued a 'Flood Alert' (indicating possible flooding) for the entirety of the River Taf at approximately 13:30 on the 15th of February; at which point the main river was over 2 metres in depth and continuing to rise at Pontypridd station. At approximately midnight on the 16th February the River Taf began to rise again, reaching a peak river level of 5.32 metres at 04:45 on the 16th of February; the highest level recorded for the River Taf at Pontypridd since 1970.

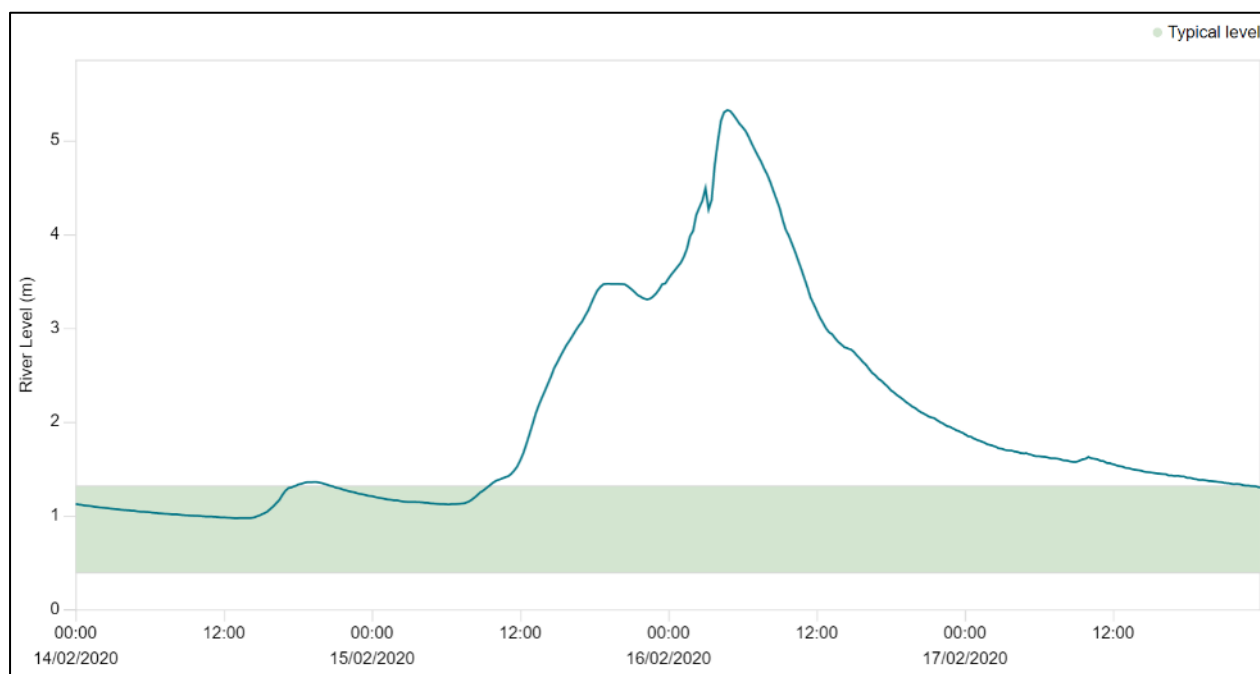


Figure 12: The River Taf levels at Pontypridd station between the 14th and 17th February 2020 (Natural Resources Wales)

The green bar displayed on the hydrograph shows the typical level of the River Taf at the Pontypridd station, ranging between 0.4 and 1.3 metres. The river level was above this green line for over 48 hours, highlighting the severity of the storm event and its unprecedented nature. At its peak, the River Taf at Pontypridd was almost four meters higher than its average level.

With significantly high river levels being recorded upstream in both the River Taf and the River Rhondda, it is accepted that the River Taf reached record-high levels beyond the confluence of the two rivers at Pontypridd. As a result, the river overtopped its banks downstream of the confluence, initially at Glyn-taf and then continued to overtop at several locations downstream, including adjacent to Cardiff Road on the eastern bank and adjacent to Old Tinworks Road on the western bank.

Investigation area RCT14 falls within two NRW Flood Warning Areas; the River Taf at Pontypridd and the River Taf at Hawthorn and Rhydyfelin. The Flood Warnings issued by NRW, and associated river levels at Pontypridd gauging station (i.e., nearest gauging station to RCT14), for the River Taf at investigation area RCT14 during Storm Dennis are shown in Table 3.

Table 3: Flood Warnings issued by NRW for the River Taf at RCT14 during Storm Dennis

Flood Warning Type	Location	Start Time	River Level (m) at Pontypridd
Flood Alert	River Taf	13:27 15/02/2020	2.178
Flood Warning	River Taf at Pontypridd	20:48 15/02/2020	3.443
Flood Warning	River Taf at Hawthorn and Rhydyfelin	04:00 16/02/2020	4.991
Severe Flood Warning	River Taf at Pontypridd	06:33 16/02/2020	5.039

NRW issued a 'Flood Warning' alert (indicating flooding is expected) for the River Taf at Pontypridd at 20:48 on the 15th February; at which point the main river was almost 3.5 metres in depth. A 'Flood Warning' alert was also issued for the River Taf at Hawthorn and Rhydyfelin at approximately 04:00 on the 16th of February; at which point the main river was 4.991 metres in depth (at Pontypridd gauging station); only 0.329 metres from the recorded peak level. By this time significant flooding had already commenced at several properties along the River Taf, with residents at Nant-Y-Dall Avenue observing flood water entering their properties from approximately 01:30 onwards.

A 'Severe Flood Warning' alert (indicating Community-wide flooding and possible risk to life) for the River Taf at Pontypridd was also issued by NRW at 06:33 on the 16th February; at which point the River Taf was 5.039 metres in height.

NRW have acknowledged within their 'Flood Incidence Response Review'⁴ that the operation of the Flood Warning service "came under significant pressure during February and at times became overwhelmed", resulting in flood warnings being issued late (after the onset of flooding) or not issued at all. At this location (RCT14), this is in reference to both the 'Flood Warning' alert at Hawthorn and Rhydyfelin and the 'Severe Flood Warning' alert issued at Pontypridd.

Improvements to their flood forecasting and warning services are being internally investigated by NRW and where feasible implemented to deliver the recommendations outlined within their Flood Incident Response Review⁴.

3.3.2. MAIN RIVER FLOOD RISK

As outlined in Section 2, the overtopping of the River Taf resulted in the internal flooding of several properties in close proximity to the watercourse, with properties up to 60 metres inland reporting internal flooding directly as a result of the overtopping.

Figure 13 is an excerpt from NRW's Flood Risk Assessment Wales (FRAW) mapping exercise which depicts the main river flood extents for the 'Defended' 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 RCT14 during Storm Dennis is largely consistent with the modelled outputs of NRW's FRAW map (Figure 13), with the majority of investigation area RCT14 identified at high and medium risk of fluvial flooding.

A high risk of flooding means that an area has a chance of flooding of greater than 1 in 30 (3.3%) 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%).

⁴ [February 2020 Floods in Wales: Flood Incident Management Review \(cyfoethnaturiol.cymru\)](https://www.cyfoethnaturiol.cymru/)

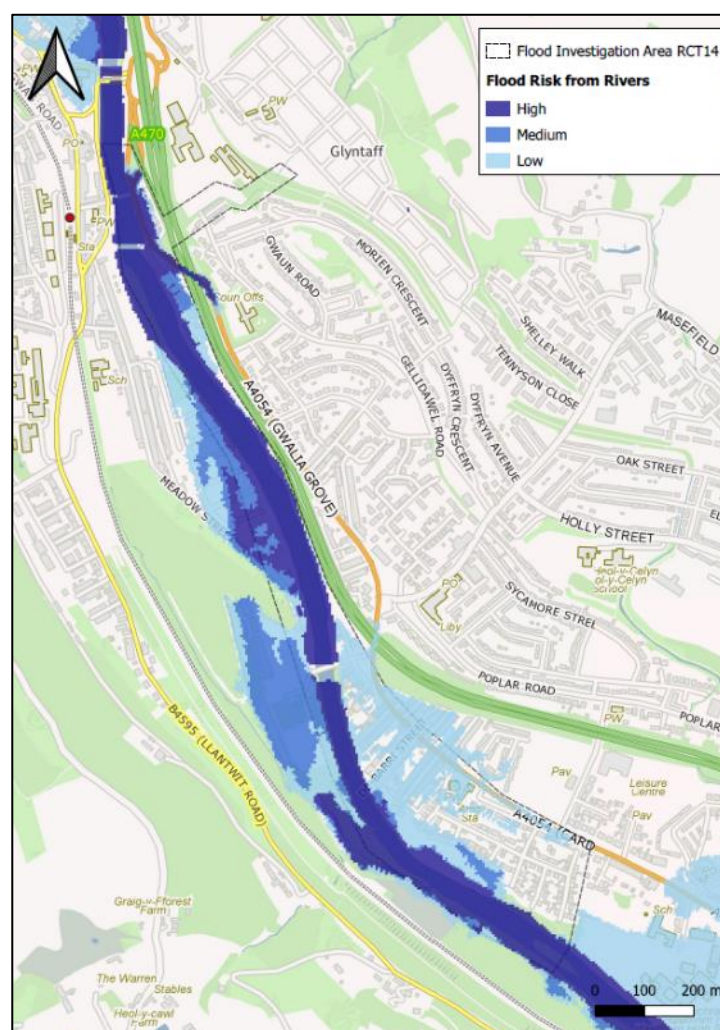


Figure 13: Natural Resources Wales' Flood Risk Assessment Wales (FRAW) map for River sources. Contains Natural Resources Wales information © Natural Resources Wales and database right. All rights reserved.

Based on NRW's Flood Hazard maps, flooding to a depth greater than 0.9 metres is predicted along parts of Cardiff Road in the northern sub-catchment (Figure 14), as well as areas south of Nant-y-Dall Avenue in the southern catchment during a medium risk event (Figure 15). Flooding of this depth and greater was observed at these locations during Storm Dennis.

Figure 15 does not identify Alexon Way as an area of main river flood risk, further supporting the notion that fluvial flows did not reach the impacted property. Surface water flooding has been determined as the likely cause of internal flooding at this location.

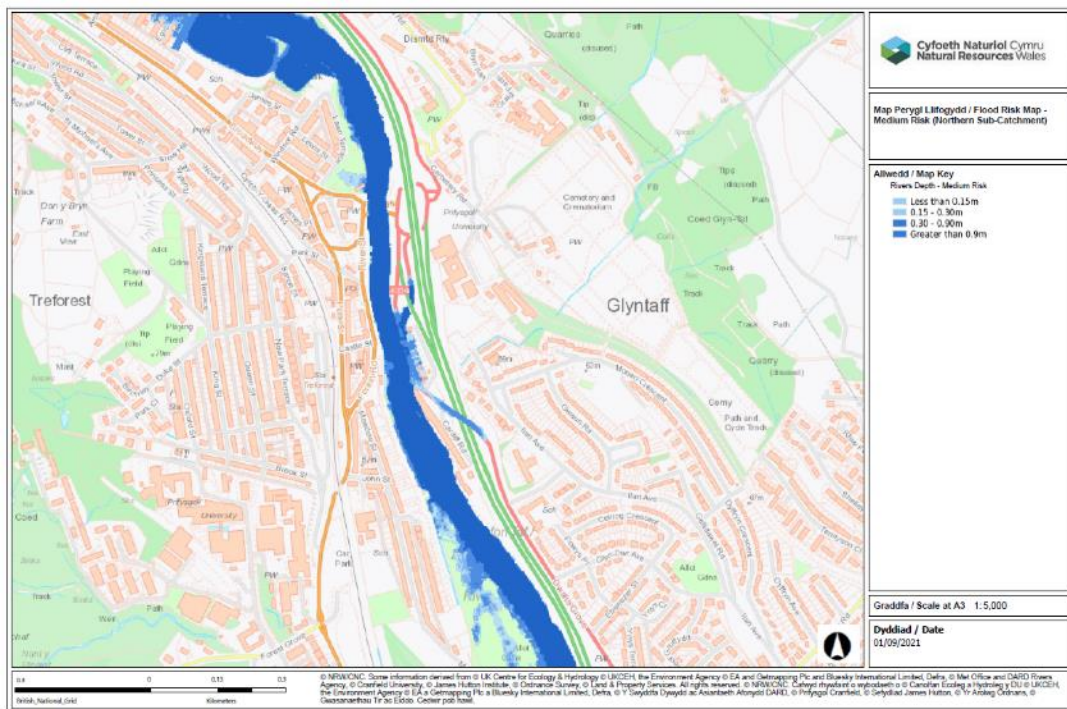


Figure 14: NRW's National Flood Hazard derived map for Medium Risk River Flood Depth in RCT14 Northern Sub-Catchment. Contains Natural Resources Wales information © Natural Resources Wales and database right. All rights reserved

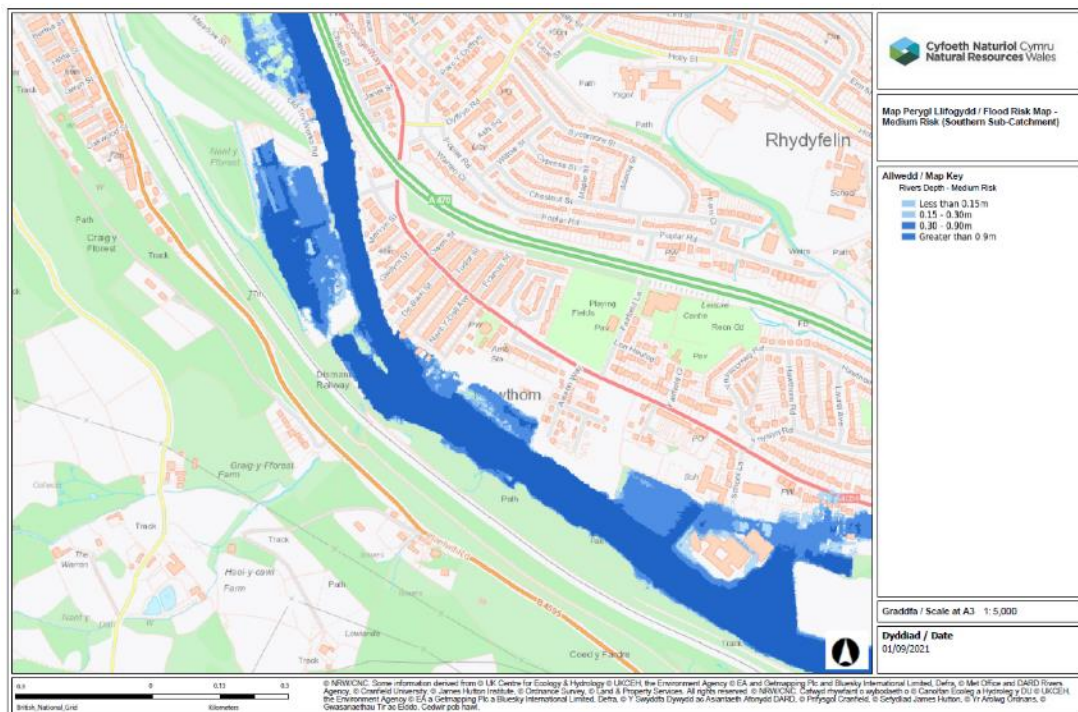


Figure 15: NRW's National Flood Hazard map for Medium Risk River Flood Depth in RCT14 Southern Sub-Catchment. Contains Natural Resources Wales information © Natural Resources Wales and database right. All rights reserved.

3.3.3. MAIN RIVER FLOOD DEFENCES

There are no formally designated flood defences along the River Taf at investigation area RCT14, i.e., there are no flood defences operated or maintained by NRW. The closest flood defence, demarcated on Figure 16 by a bold red line, is immediately downstream of Alexon Way at the southern extent of the investigation area boundary.

Figure 16 illustrates the reduction in flood risk that derives from the presence of a flood defence structure, with the defended area of Hawthorn identified at low risk of main river flooding in comparison to areas of Glyn-taf and Rhydyfelin upstream that are identified at high and medium risk of fluvial flooding.

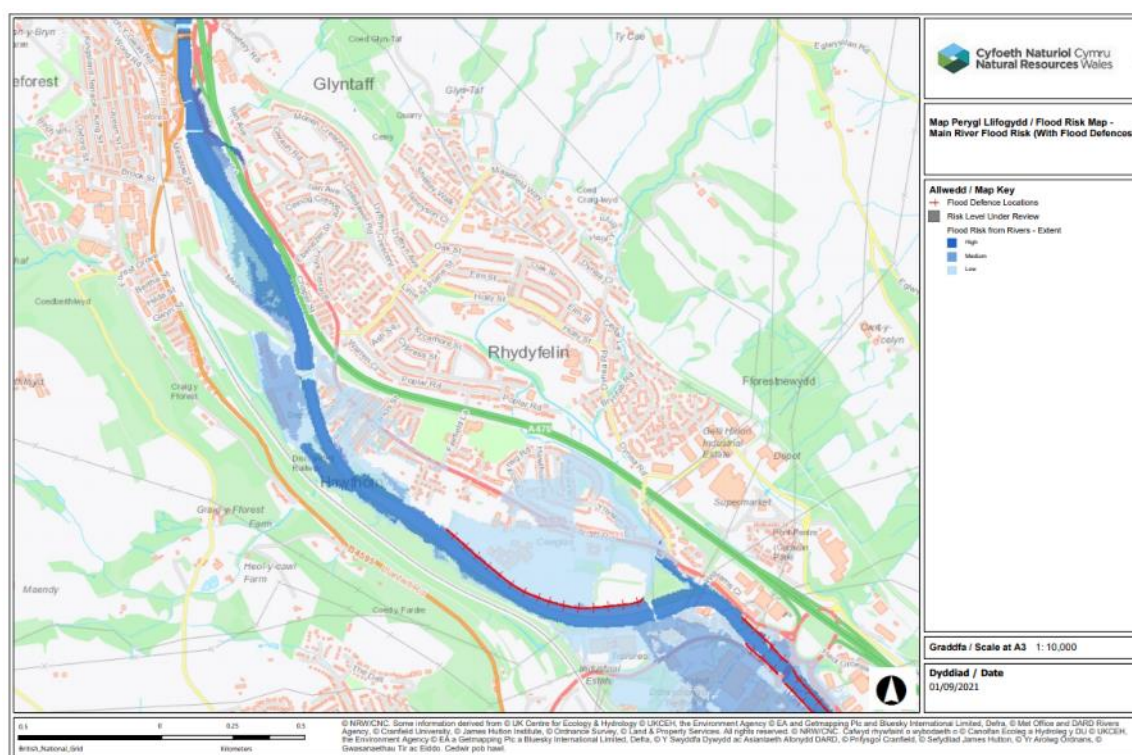


Figure 16: Natural Resources Wales' Flood Risk Assessment Wales (FRAW) map for River sources, including flood defence locations at investigation area RCT14. Contains Natural Resources Wales information © Natural Resources Wales and database right. All rights reserved.

The current indicative design standard of protection (SOP) for flood defences on a main river is 1 in 100 annual probability (Q100) flood event plus, for new schemes, an allowance for climate change. This is stated within the Welsh Government's National Strategy for Flood and Coastal Erosion Risk Management which encourages main river flood alleviation schemes to provide a SOP up to Q100⁵.

⁵ [National Strategy for Flood and Coastal Erosion Risk Management in Wales \(English\) \(gov.wales\)](https://www.gov.wales/national-strategy-for-flood-and-coastal-erosion-risk-management-in-wales)

Despite there being no formal flood defences at RCT14, Storm Dennis has been estimated as a 1 in 200 (Q200) flood event according to NRW, therefore the unprecedented rise in river levels within the Taf during the storm event would have resulted in the overtopping of assets up to Q100 SOP.

NRW's 'Flood Incidence Response Review'⁴ does in fact outline that no flood defences failed in the lower Taf region and that the flooding was the result of river flows exceeding the construction design standard.

3.4. HIGHWAY DRAINAGE CONDITIONS

Several streets, including Cardiff Road, Nant-y-Dall Avenue and De Barri Street, were observed to be flooding as a result of the overtopping of the River Taf during Storm Dennis. These fluvial flows deposited mud, silt and debris across the investigation area which are assumed to have entered the highway drainage system, leading to blockages and a reduction in the hydraulic capacity of the surface water network. Accompanied by intense rainfall and significant surface water conveyance, it is considered that the highway drainage infrastructure in the affected regions of RCT14 became overwhelmed during the storm event.

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 in RCT14 was exceeded as a result of a both main river and surface water flows entering the network. The maintenance condition of the highway drainage infrastructure is not considered to have significantly impacted the flooding experienced during Storm Dennis.

3.5. DŴR CYMRU WELSH WATER APPARATUS

There is no evidence from this investigation that DCWW apparatus contributed to the flooding that occurred during Storm Dennis within investigation area RCT14.

DCWW reported no issues within RCT14 during Storm Dennis and it is not believed that any DCWW infrastructure was damaged during the storm event. Whilst DCWW have concluded that their assets performed well during Storm Dennis, the majority of drainage infrastructure within the investigation area is comprised of combined sewer networks which are likely to have become overwhelmed during the storm event for the reasons outlined in Section 3.4.

3.6. SURFACE WATER

Whilst surface water is believed to have been the primary cause of internal flooding at two properties within RCT14, surface water is considered to have contributed to and exacerbated the main river flooding observed across the investigation area.

The pathways for surface water runoff during the storm event were observed primarily along the highway network within RCT14. The exact flow routes have not been confirmed due to lack of anecdotal evidence, however, NRW's national surface water and ordinary watercourse flood maps (Figure 17) provide a reasonable indication of the pathways and areas most at risk of flooding from local sources.

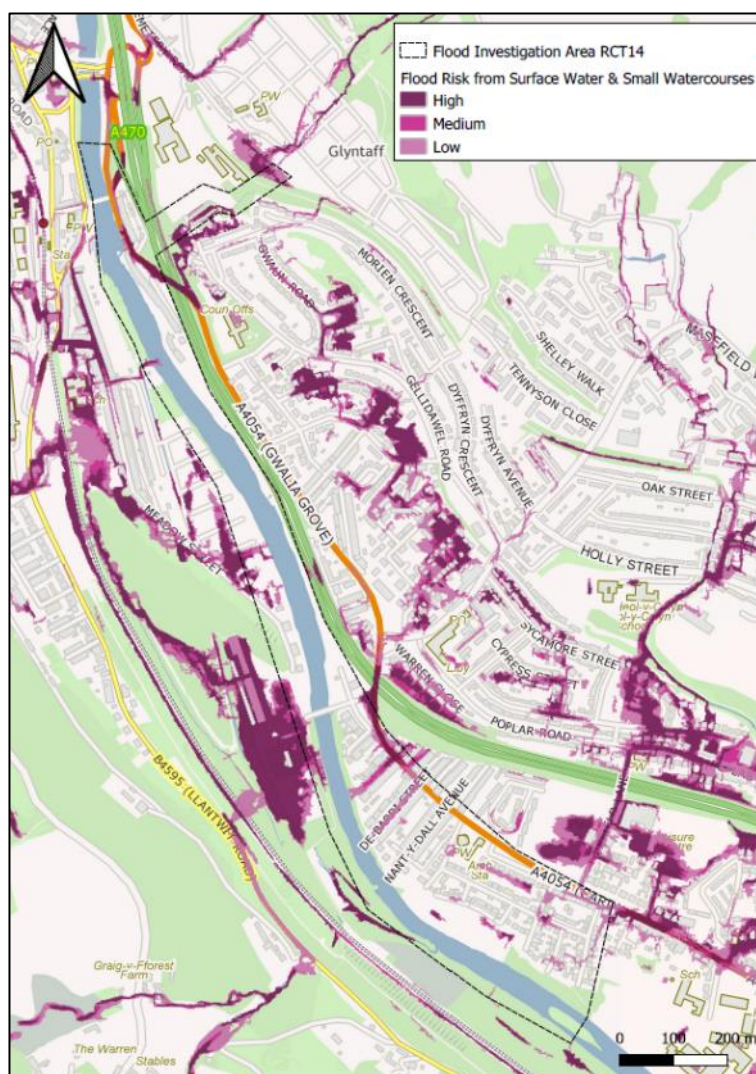


Figure 17: Natural Resources Wales' Flood Risk Assessment Wales (FRAW) map for Surface Water and Ordinary Watercourse flood sources. Contains Natural Resources Wales information © Natural Resources Wales and database right. All rights reserved.

With the exception of Owen Street, which is denoted as an area of medium surface water flood risk in Figure 17, the majority of high and medium surface water flood risk areas which experienced internal flooding were also flooded by the overtopping of the River Taf. This further reinforces the notion that surface water was a secondary influence on the flooding that occurred in RCT14, with areas that were solely impacted by surface water, such as Gwilym Street, primarily experiencing external flooding rather than internal flooding.

3.7. ACCESS STRUCTURES

No access structures were identified during the asset investigations within the area, as such 'access structures' have not been considered within this report.

3.8. SYSTEM AT CAPACITY

Whilst the overtopping of the River Taf has been determined as the primary cause of flooding to the majority of properties within RCT14, the capacity of the ‘Ilan Avenue’ culvert network (illustrated in Figure 18) has also been assessed to ascertain its current standard of protection following the observed surcharging of a manhole at Cardiff Road following Storm Dennis (Figure 10).

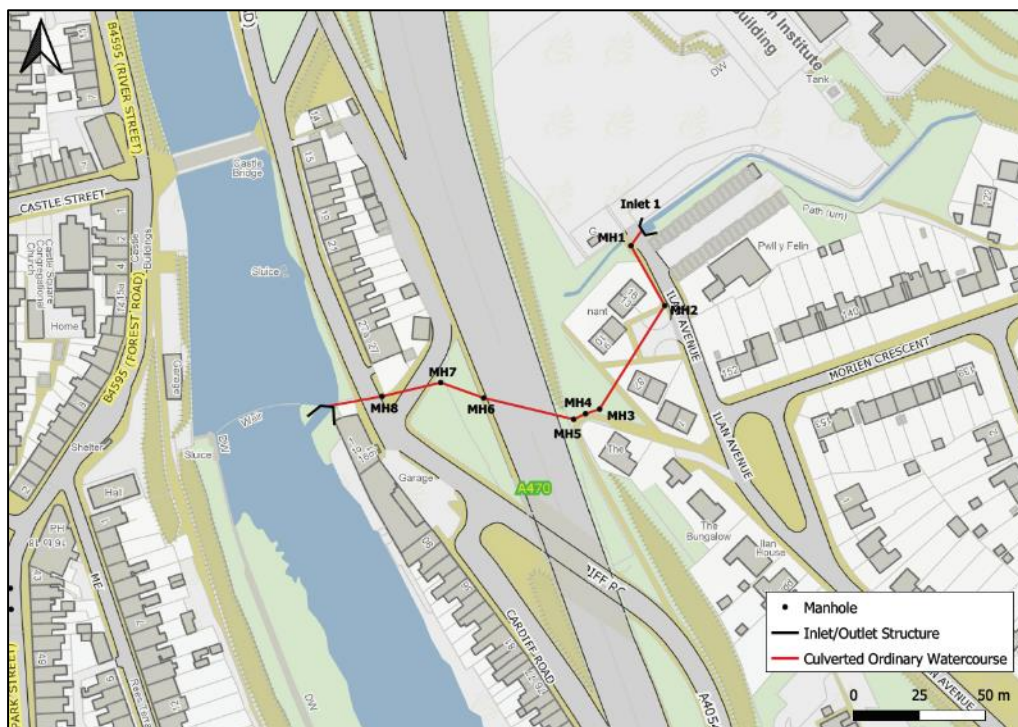


Figure 18: Ilan Avenue culverted ordinary watercourse network with annotated Manhole labels

The results of the culvert capacity assessment are summarised in Table 4.

Table 4: Summary of the culvert capacity assessment results which indicate the current standard of protection of the Ilan Avenue culvert network in free flowing and blockage conditions

Culvert Network	Standard of Protection (SOP) – Free Flowing	Standard of Protection (SOP) – Blockage Condition
Ilan Avenue Upstream (Inlet 1 – MH3)	Q200 (0.5% AEP)	Q2 (50% AEP)
Ilan Avenue Downstream (MH4 – MH8)	Q30 (3.3% AEP)	Q2 (50% AEP)

The assessment infers that the upstream section of the network, at the culvert inlet adjacent to Ilan Avenue, has adequate hydraulic capacity to accommodate storm events up to Q200 in free-flowing conditions. This is significantly reduced to Q2 in blockage conditions however, no blockage to the upstream inlets was observed during Storm Dennis.

The capacity of the Ilan Avenue downstream network (which conveys flows beneath the A470 and Cardiff Road) was assessed as having a SOP below current design standards for new culverts as defined by CIRIA C789. This is further reduced to Q2 in blockage conditions.

The results suggest that the downstream network likely became overwhelmed during Storm Dennis due to the reduction in hydraulic capacity within the downstream culvert network, and high river levels in the River Taf further restricting the downstream networks' hydraulic capacity to discharge the flow of water. These findings support the post event observations which identified 'Manhole 1' as surcharging during Storm Jorje due to hydraulic overload.

3.9. SUMMARY OF POSSIBLE CAUSES

The above sections have identified and described the possible causes of flooding within RCT investigation area 14 during Storm Dennis which occurred on the 15th and 16th of February 2020. A summary of the identified source(s) and possible cause(s) of flooding (issue) has been outlined below in Table 5.

Table 5: Summary of source(s) and possible cause(s) of flooding in RCT14 during Storm Dennis (15-16th February 2020)

Ref No	Asset (Source)	Issue	Asset Owner	Type of Flooding
1	River Taf	Unprecedentedly high river levels within the River Taf resulted in the main river overtopping its banks at several locations and conveying into several properties.	Mixed Ownership	Main River
2	Surface water drainage network across RCT14	Intense rainfall across RCT combined with the overtopping of the River Taf severely overwhelmed highway drainage infrastructure, resulting in the accumulation of surface water on many streets throughout the investigation area.	Rhondda Cynon Taf CBC Highway Authority	Surface Water
3	Ilan Avenue Culvert Network – Manhole 1	A manhole near Cardiff Road associated with Ilan Avenue culvert network was witnessed surcharging in the weeks following the storm event. This manhole is also considered to have surcharged during Storm Dennis, exacerbating the internal flooding experienced at nearby properties.	Rhondda Cynon Taf CBC Highway Authority	Surface Water & Ordinary Watercourse

4. RISK MANAGEMENT AUTHORITY ACTIONS

A Welsh Risk Management Authority is defined in Section 6 of the Flood and Water Management Act 2010 as NRW; a LLFA, a district council for an area where there is no unitary authority, or a highway authority wholly in Wales; an internal drainage board for an internal drainage district that is wholly or mainly in Wales; a water company that exercises functions in relation to an area in Wales. As the LLFA, RCT has the responsibility to coordinate the management of flood risk and the interaction of Risk Management Authorities across Rhondda Cynon Taf.

An overview of the relevant Risk Management Authority in relation to flood type is provided in Table 6. For further details of the roles and responsibilities of individual Risk Management Authorities in managing flooding, refer to the Welsh Government's National Strategy for Flood and Coastal Erosion Risk Management, Section 4 'Roles & Responsibilities'⁵, and RCT's 'FRM – Storm Dennis - Overview Report'².

Table 6: Risk Management Authority with relevant functions to manage the risk for different flood types

Type of Flooding	Risk Management Authority
Flooding from Main River, reservoirs and the sea (including coastal erosion)	Natural Resources Wales
Flooding from ordinary watercourses, surface water and groundwater	Lead Local Flood Authority
Flooding from water and sewage systems	Water Companies (Dŵr Cymru Welsh Water)
Flooding from the highway	Highway Authority
Flooding from the highway (motorways and major trunk roads)	Welsh Government Trunk Road Agency

Risk Management Authorities have direct flood risk management functions under the Flood and Water Management Act 2010, as well as the Water Resources Act 1991, Land Drainage Act 1991, the Water Resources Act 1991 and the Highways Act 1980. Through analysis of the flooding that impacted investigation area RCT14, the flood risk management functions exercised or proposed to be exercised by relevant RMAs were recorded 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 cause(s) of flooding in investigation area RCT14 during Storm Dennis have been previously identified and summarised within Table 5. The Risk Management Authorities responsible for managing that flooding have been listed in Table 7 below, along with a series of recommendations put forward by the LLFA.

Table 7: Recommendations provided by the LLFA to be considered by the relevant Risk Management Authority identified in response to the source(s) of flooding in investigation area RCT14 (as per Table 5)

Ref No	Asset (Source)	Asset Owner	Type of Flooding	Relevant Risk Management Authority	Recommendations
1	River Taf	Mixed Ownership	Main River	Natural Resources Wales	R1A NRW to “complete detailed investigative analysis work to understand the mechanisms of flooding in areas known to have flooded from main rivers”, including the River Taf at Glyn-taf, Rhydyfelin and Hawthorn. Aligns with recommendation ‘Action FD2’ within NRW’s Flood Incident Management Review.
					R1B NRW to work with landowners to assess and review the risk of flooding from the River Taf at RCT14, an area deemed at high risk of fluvial flooding,

						to identify the viability of risk management options.
					R1C	NRW to review its flood warning service provision, especially for extreme events. This will form part of NRW's Flood Warning Service Review Implementation Programme and aligns with the recommendations set out in their 'Flood Incidence Management Review'.
2	Surface water drainage network across RCT14	Rhondda Cynon Taf CBC Highway Authority	Surface Water	Highway Authority and Lead Local Flood Authority	R2A	The Highways Authority to jet and cleanse the highway drainage network and action repairs accordingly.
					R2B	The LLFA to develop a Strategic Outline Business Case to identify suitable management methods to reduce the risk of flooding from local sources (ordinary watercourse, surface water, groundwater).
3	Ilan Avenue culvert network - Manhole 1	Rhondda Cynon Taf CBC Highway Authority	Ordinary Watercourse and Surface Water	Land Drainage Authority and Lead Local Flood Authority	R3A	The LLFA and LDA to identify drainage asset ownership and responsibility.
					R3B	The LLFA and LDA to investigate the standard of protection and the condition of the culvert structure and network as a whole.
					R3C	The LLFA to jet and cleanse the ordinary watercourse culvert network.

					R3D	The LLFA to develop a Strategic Outline Business Case (SOC) to identify suitable management methods to reduce the risk of flooding from local sources (ordinary watercourse, surface water, groundwater).
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4.1. LEAD LOCAL FLOOD AUTHORITY

In review of Ref 2 and Ref 3 of Table 7, the LLFA has been determined as the relevant Risk Management Authority in relation to the ordinary watercourse and surface water flooding which occurred at investigation area RCT14 during Storm Dennis.

The LLFA exercised the following functions in response to the flooding at investigation area RCT14:

- 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 carried out by Redstart, on behalf of RCT as the LLFA, was undertaken in order to gain further local insight and anecdotal evidence to support the flood investigation.
- The LLFA and LDA have exercised their permissive powers under Section 64 of the Land Drainage Act 1991 to investigate the culvert structures and network conditions and its impact on the flooding within the investigation area. **(R3B)**
- An estimated 242 metres of ordinary watercourse culvert network length within investigation area RCT14 has been surveyed following the storm event to ascertain both the operational condition and structural integrity along sections of the network. **(R3B)**
- An estimated 2 tonnes of debris was removed from the culverted watercourse network within investigation area RCT14 during cleansing operations. **(R3C)**
- The LLFA and LDA have undertaken clearance works to the Ilan Avenue culvert inlet structures which fall under the responsibility of the Authority. **(R3C)**
- The LLFA commissioned Redstart to investigate the standard of protection of the Ilan Avenue culvert network in RCT14 to determine its hydraulic capacity following the identification of operational defects within sections of the network. **(R3B)**
- The LLFA has exercised its powers, under Section 13 of the FWMA, to request information and co-operation from NRW and South Wales Trunk Road Agency (SWTRA) in relation to their responsibilities as a RMA in response to Storm Dennis.
- The LLFA has set up a central Control Room, to compliment the Council's Contact Centre and CCTV centre which is based at the Council's offices, to

provide a comprehensive and informed response to the residents of RCT as appropriate during storm events.

- The LLFA, working in partnership with NRW, have expanded their interim Property Flood Resistance project offering expandable flood gates to those properties deemed at high risk of flooding from the main river, as per NRW's determination.

The LLFA also propose to exercise the following functions in response to the flooding at RCT14:

- Following the surveying of the Ilan Avenue culvert network in RCT14, the LLFA propose to input and update all relevant asset data. **(R3A)**
- The LLFA propose to develop a SOC to better understand the risk of flooding within RCT14 using a whole catchment approach to provide recommendations for suitable management mechanisms to reduce the wider risk of flooding to people and properties from local sources (Ordinary Watercourse, Surface Water and Groundwater). **(R2B, R3D)**
- The LLFA and LDA intend to clarify drainage asset owners and management responsibilities to make them aware of their personal risk. To ensure landowners manage the risk in compliance with the relevant legislation, a team of Flood Enforcement Officers including legal support is to be appointed. **(R3A)**
- The LLFA and LDA will work with landowners and property owners to manage their personal flood risk through local measures, such as property resilience and resistance measures.
- As part of RCT's comprehensive review of the County Borough's most at risk communities, the LLFA are proposing to undertake a formal SFRA of the Lower Taf catchment area to better understand the overall risk from ordinary watercourse and surface water flooding in order to target investment to areas of highest risk. The SFRA also aim to encourage whole catchment measures, including working with natural processes, to alleviate flood risk in those areas of highest risk. **(R2B, R3D)**
- The LLFA will cooperate and collaborate with NRW to ensure a detailed study of the investigation area is completed and that appropriate actions to mitigate the impacts of river flooding are undertaken in accordance with NRW's Flood Incident Management Review.

4.2. NATURAL RESOURCES WALES

In review of Ref 1 in Table 7, NRW has been identified as the relevant Risk Management Authority in relation to the main river flooding from the River Taf during Storm Dennis.

NRW has exercised the following functions in response to the flooding at investigation area RCT14:

- 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.
- Following Storm Dennis NRW undertook an inspection of the River Taf at Glyn-
taf, Rhydyfelin and Hawthorn to ensure it was clear of blockages.
- NRW specifically outline within their 'Flood incident Management Review'⁴ that "more Severe Flood Warnings should have been issued based on the flooding impacts experienced" in the Lower Taf region. Utilising post event data and information, NRW have reviewed the Resultant Thresholds for the River Taf at Pontypridd Flood Warning Area. This is critical for assessing the performance, timeliness and accuracy of the warning service after a flood. **(R1C)**.
- NRW has introduced improved digital services to provide comprehensive flood risk, river level and rainfall information to households, businesses and communities across Wales. The improved service was launched in September 2020 on the NRW website and will improve how live flood warning and water level data is shared before and during flood events. **(R1C)**
- NRW have commissioned a Lower Taf Flood Modelling Project which is currently ongoing. **(R1A)**
- Following the flooding events of February 2020, NRW published a review of its incident response to Storm Ciara and Dennis in October 2020⁶. This review contains several recommendations for improvements to their ways of working and services which NRW are in the process of implementing through an internal delivery programme.
- NRW have developed a detailed Implementation Programme to address the areas of improvement work required to deliver the recommendations of the Flood Warning Service Review carried out by NRW in 2018. Several of the

⁶ [Natural Resources Wales / Our response to Storm Ciara and Storm Dennis](#)

recommendations directly link to the recommendations set out by NRW within their Flood Incident Management Review **(R1C)**.

NRW propose to exercise the following functions in response to the flooding at investigation area RCT14:

- Following the completion of NRW's Lower Taf Flood Modelling Project, NRW propose to undertake an initial assessment of the viability of potential flood risk management options. Consideration should be given to areas at high risk of flooding from rivers on a prioritised basis. **(R1A, R1B)**
- Following the completion of NRW's Lower Taf Flood Modelling Project, NRW propose further threshold work and flood warning area amendments. **(R1A, R1C)**
- NRW will undertake a review of the modelled outputs and adopt changes to their maintenance program within the investigation area if required. **(R1A)**

4.3. WATER COMPANY

Dŵr Cymru Welsh Water were not identified as a relevant authority in relation to the flooding at investigation area RCT14 during Storm Dennis. DCWW do not propose to undertake any actions in relation to the event within the investigation area.

4.4. HIGHWAY AUTHORITY

During the investigation into the flooding at investigation area RCT14 during Storm Dennis, the Highway was identified as flooding from a combination of sources, notably as a result of surface water runoff and main river flooding from the River Taf.

Ref 2 of Table 7 identifies the Highway Authority as a relevant Risk Management Authority in relation to the surface water flooding that occurred along the highway across RCT14.

RCT as the Highway Authority have exercised the following functions in response to the flooding within investigation area RCT14:

-
- 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 and associated silty material, to ensure the safety of the highway post event. **(R2A)**

RCT as the Highway Authority propose to undertake the following function in relation to the storm event at RCT14:

- The Highway Authority intend to increase their resource capacity by establishing a dedicated 'Pluvial Drainage Team' to focus entirely on the refurbishment and maintenance of RCT's existing and enhanced highway drainage infrastructure.

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 - <https://naturalresources.wales/flooding/check-flood-warnings/?lang=en>

Natural Resources Wales - Long Term Flood Risk - <https://naturalresources.wales/evidence-and-data/maps/long-term-flood-risk/?lang=en>

Rhondda Cynon Taf CBC - Local Flood Risk Management Plan - <https://www.rctcbc.gov.uk/EN/Resident/ParkingRoadsandTravel/Roadspavementsandpaths/FloodAlleviation/Floodriskregulations2009.aspx>

Rhondda Cynon Taf CBC - Local Flood Risk Management Strategy - <https://www.rctcbc.gov.uk/EN/Resident/ParkingRoadsandTravel/Roadspavementsandpaths/FloodAlleviation/LocalFloodRiskManagementStrategy.aspx>

Rhondda Cynon Taf CBC – Sustainable Drainage – <https://www.rctcbc.gov.uk/EN/Resident/ParkingRoadsandTravel/Roadspavementsandpaths/SustainableDrainage/SustainableDrainage.aspx>

Welsh Government - National Strategy for Flood and Coastal Erosion Risk Management - <https://gov.wales/sites/default/files/publications/2019-03/national-strategy-for-flood-and-coastal-erosion-risk-management-in-wales.pdf>

Welsh Water – How to Contact Us – <https://www.welshwater.com/en/Contact-Us.aspx>

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Appendix E

**Flood and Water Management Act
2010**

**Section 19 Flood Investigation
Report**

**Storm Dennis –
Flood Investigation Area RCT17**

January 2022

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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 Flood and Water Management Act 2010. The Council assumes no responsibility or liability from any person in connection with its contents or findings.

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CONTENTS

EXECUTIVE SUMMARY	3
ABBREVIATIONS.....	6
TABLES AND FIGURES	7
1. INTRODUCTION.....	8
1.1. Purpose of Investigation.....	8
1.2. Site Location	9
1.3. Drainage System.....	10
1.4. Investigation Evidence	11
1.5. Public Engagement	11
2 FLOODING HISTORY	13
2.1. Previous Flood Incidents	13
2.2. Flood Incident.....	14
2.3. Rainfall Analysis.....	20
3. POSSIBLE CAUSES	21
3.1. Culvert Conditions.....	21
3.2. Ordinary Watercourse Conditions	21
3.3. Main River	22
3.3.1. Main River Levels and Flood Warnings	22
3.3.2. Main River Flood Risk.....	24
3.3.3. Main River Flood Defences.....	26
3.4. Highway Drainage Conditions	29
3.5. DCWW Apparatus Conditions	30
3.6. Surface Water	31
3.7. Summary of Possible Causes	32
4. RISK MANAGEMENT AUTHORITY ACTIONS.....	33
4.1. Lead Local Flood Authority	37
4.2. Natural Resources Wales	39
4.3. Water Company	41
4.4. Highway Authority	41

USEFUL LINKS/CONTACTS 42

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EXECUTIVE SUMMARY

This report has been produced through the duties placed upon Rhondda Cynon Taf County Borough Council 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 factual report of the storm event that occurred on the 15th and 16th of February 2020 within the Rhondda Cynon Taf County Borough Council area, focusing the investigation on the impacted areas of the Taff’s Well community (Flood Investigation Area RCT 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 manage the risk of flooding.

The flooding that affected RCT17 on the 15 and 16th of February 2020 was a result of an extreme rainfall event, designated by the Met Office as ‘Storm Dennis’. The storm event resulted in the internal flooding of at least 36 properties: including 25 residential properties and 11 non-residential properties. Significant flooding to the highway throughout the investigation area also occurred.

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 and Dŵr Cymru Welsh Water.

It has been established from the evidence gathered within this report that the primary source of flooding in this incident was the overtopping of the main River Taf following persistent and heavy rainfall. River level gauge data from NRW’s Upper Boat monitoring station reveal that the River Taf was over four times its typical level during Storm Dennis, reaching a peak level of 5.49 metres; the highest river level recorded at the station since its opening in 2001.

A review of NRW's Flood Risk Assessment Wales Maps identifies the impacted properties within RCT17 at low risk of flooding from the main river due to the presence of formal defences along the eastern embankment providing a standard of protection up to Q200. A section of the northern riverbank was however identified as having no formal flood protection. This information, paired with accounts provided by residents, infers that the River Taf initially overtopped at this location, allowing significant conveyance of flood water to flow south behind the formal defences towards Cardiff Road, resulting in significant property flooding.

The investigation also identified surface water accumulation on the highway to have caused internal flooding to two non-residential properties, in addition to exacerbating existing fluvial flooding within RCT17.

NRW has been determined as the relevant Risk Management Authority responsible for managing the river flooding that occurred during Storm Dennis. In response to the flooding at investigation area RCT17, NRW have;

- Carried out their own post event investigative analysis work to understand the mechanism of flooding from the River Taf at Taff's Well;
- Completed inspection and restoration works to the River Taf embankment at Taff's Well;
- Commissioned a Lower Taf Flood Modelling Project, the outcomes of which will include an initial assessment of the viability of potential flood risk management options; and
- Developed a series of recommendations and a detailed action plan to address areas of improvement for future storm events, including the performance of NRW's Flood Warning Service and incident management response.

RCT as the Lead Local Flood Authority, Land Drainage Authority and Highway Authority has been determined as the relevant Risk Management Authority responsible for managing the surface water flooding that occurred during Storm Dennis. In response to the flooding at investigation area RCT17, RCT has;

- Carried out survey, jetting and cleansing operations to highway drainage infrastructure.
- Led on the development of a central Control Room to compliment the Council's Contact Centre and CCTV Centre; and to provide a comprehensive and informed response to residents during storm events;

- Exercised its powers, under Section 13 of the Flood and Water Management Act 2010, to engage with NRW and DCWW in relation to their responsibilities as Risk Management Authorities; and
- Working in partnership with NRW, the LLFA have expanded their interim Property Flood Resistance project offering expandable flood gates to those properties deemed at high risk of river flooding, as per NRW's determination.

The event that occurred on 15 and 16th February was extreme, and it is unlikely flooding from a similar event could be prevented entirely. It is concluded that Risk Management Authorities satisfactorily carried out their flood risk management functions in response to the flood event, however, further measures have been proposed by all RMAs to improve preparedness and response to future flood events.

ABBREVIATIONS

CaRR – Communities at Risk Register

DCWW – Welsh Water

FRMP – Flood Risk Management Plan

FWMA – Flood and Water Management Act 2010

LDA – Land Drainage Authority

LFRMS – Local Flood Risk Management Strategy

LLFA – Lead Local Flood Authority

NRW – Natural Resources Wales

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

RCT - Rhondda Cynon Taf

RCT17 – Flood Investigation Area RCT 17

RCTCBC – Rhondda Cynon Taf County Borough Council

RMA – Risk Management Authority

SAB – Sustainable Drainage Approval Body

SFRA – Strategic Flood Risk Assessment

SOC – Strategic Outline Business Case

SuDs – Sustainable Drainage Systems

TABLES AND FIGURES

Table 1: Investigative evidence gathered in preparation of this Storm Dennis Section 19 report.....	11
Table 2: Summary of the source, pathway and receptors affected during storm Dennis within investigation area RCT 12.....	14
Table 3: Flood Warnings issued by NRW for the River Taf at RCT17 during Storm Dennis	23
Table 4: Summary of source(s) and possible cause(s) of flooding in RCT investigation area 14 during Storm Dennis (15-16th February 2020)	32
Table 5: Risk Management Authority with relevant functions to manage the risk for different flood types.....	33
Table 6: Recommendations provided by the LLFA to be considered by the relevant Risk Management Authority identified in response to the source(s) of flooding in RCT17 (as per Table 4)	34
Figure 1: Flood Investigation Area RCT17 Location Plan.....	9
Figure 2: Natural Resources Wales' Flood Risk Assessment Water (FRAW) map for rivers and ordinary watercourse and surface water flood risk at investigation area RCT17. Contains Natural Resources Wales information © Natural Resources Wales and database right. All rights reserved. ...	10
Figure 3: Observed flow paths during Storm Dennis in the north of investigation area RCT17	16
Figure 4: Observed flow paths during Storm Dennis in the south of investigation area RCT17.....	16
Figure 5: Image showing the overtopping of the River Taf to the rear of Cardiff Road which submerged the rear gardens and ground floor of several properties during Storm Dennis (image provided by resident).....	18
Figure 6: Images capturing the rear garden of a property on Cardiff Road before (left) and during Storm Dennis (right) (images provided by resident)	18
Figure 7: Image capturing the rescue efforts by the Fire Service to evacuate residents at Park Lane on 16 th February 2020 (image provided by resident)	19
Figure 8: The River Taf levels at Upper Boat station between the 14 th and 17 th February 2020 (Natural Resources Wales)	23
Figure 9: NRW's Flood Risk Assessment Wales (FRAW) map for River sources. Contains Natural Resources Wales information © Natural Resources Wales and database right. All rights reserved. ...	25
Figure 10: NRW's Flood Risk Assessment Wales (FRAW) map for Medium Risk River Flood Depth in RCT17. Contains Natural Resources Wales information © Natural Resources Wales and database right. All rights reserved	26
Figure 11: Natural Resources Wales' map for Main River Flood Defences and areas benefiting at RCT17. Contains Natural Resources Wales information © Natural Resources Wales and database right. All rights reserved	27
Figure 12: Photo shows deposits of mud blocking the surface water drainage infrastructure at Park Lane following the flooding during Storm Dennis (image provided by resident).....	29
Figure 13: Topographic Watershed above investigation area RCT17	31

1 INTRODUCTION

1.1. PURPOSE OF INVESTIGATION

On the 15th and 16th of February 2020, RCT was impacted by an extreme weather event which was named ‘Storm Dennis’ by the Met Office. Due to the extent of the event’s impact, the LLFA opted to undertake a formal investigation.

The storm resulted in widespread residential and commercial flooding within the Rhondda Cynon Taf County Borough Council area. This report will focus on Flood Investigation Area RCT17, encompassing the Taff’s Well community in the River Taf catchment.

The reason behind RCT’s investigation is in response to the duties of the local authority regarding Section 19 of the Flood and Water Management Act 2010, 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 the 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

The purpose of the investigation is to determine which RMAs have relevant flood risk management functions and which functions have been exercised in response to the flood event in question.

Specific details of Storm Dennis, such as rainfall analysis are covered within a separate overview report that covers the wider RCT area. The report is titled ‘Storm Dennis February 2020 – Overview Report’ and will be referred to as ‘FRM – Storm Dennis – Overview Report’².

¹ Flood and Water Management Act 2010 – Section 19 - <https://www.legislation.gov.uk/ukpga/2010/29/section/19>

² [Flood Investigation Reports | Rhondda Cynon Taf County Borough Council \(rctcbc.gov.uk\)](https://www.rctcbc.gov.uk/flood-investigation-reports)

1.2. SITE LOCATION

The area investigated within this report covers the community of Taff's Well, located in the southern region of the county borough, to the south of Treforest. Taff's Well is situated within the River Taf catchment which bounds investigation area RCT17 to the west (Figure 1).

The steep topography to the east of RCT17 is drained by the catchment of the Nant y Brynau ordinary watercourse which is partially culverted beneath Taff's Well and discharges into the River Taf.

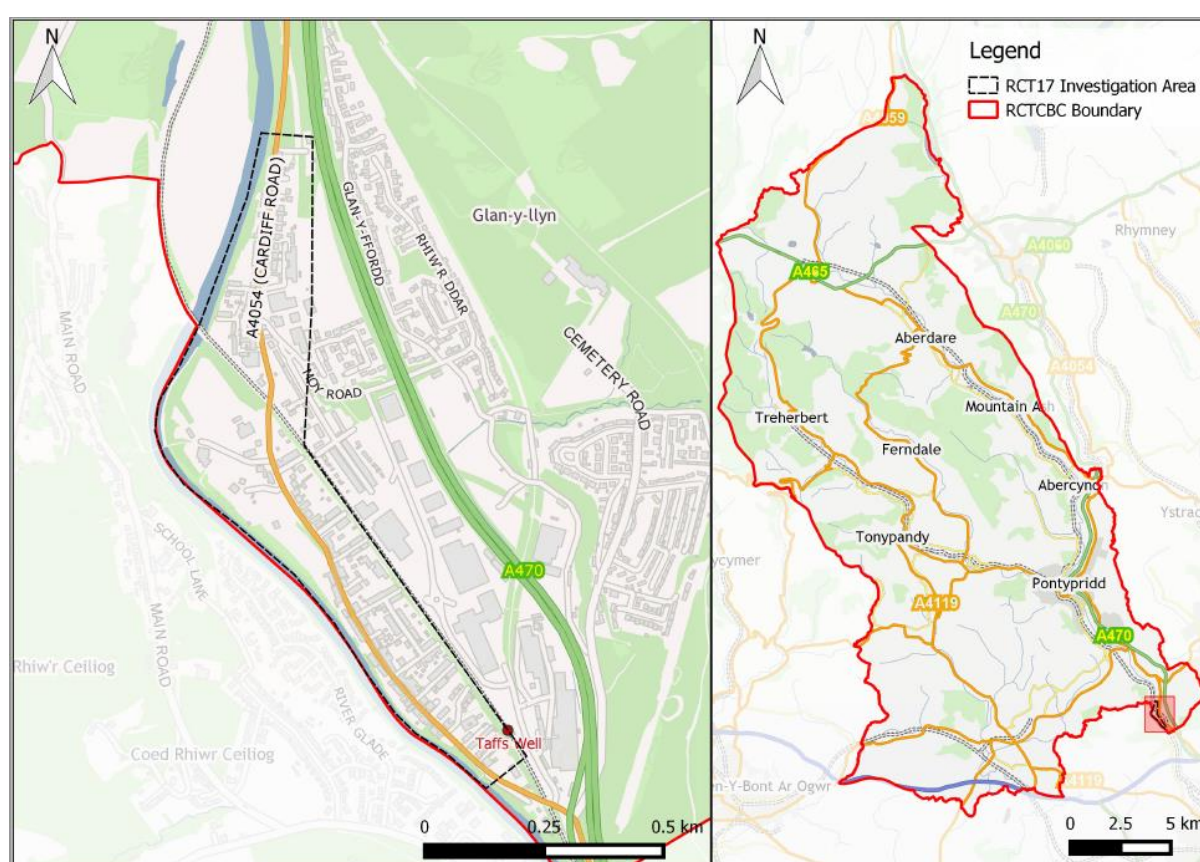


Figure 1: Flood Investigation Area RCT17 Location Plan

According to Welsh Government's CaRR, the community area of Taff's Well is ranked 198th for main river flooding and 151st for surface water flooding in Wales.

NRW's Flood Risk Assessment Wales (FRAW) map indicates that there are areas of low to high flood risk from both fluvial and surface water and ordinary watercourse sources within the investigation area. This is illustrated in Figure 2, which is an excerpt from the FRAW maps.

A low to high risk of flooding from the River Taf is noted across the investigation area and is largely confined to the west of the A4054 (Cardiff Road). Flood risk from surface water and ordinary watercourses is also noted within the investigation area, however less substantial. RCT's FRMP³ suggests that historical surface water flooding incidents are associated with gully obstructions and resultant highway flooding. Within some areas adjacent to the main river, it is considered that people may be at risk from both surface water flooding and main river flooding.

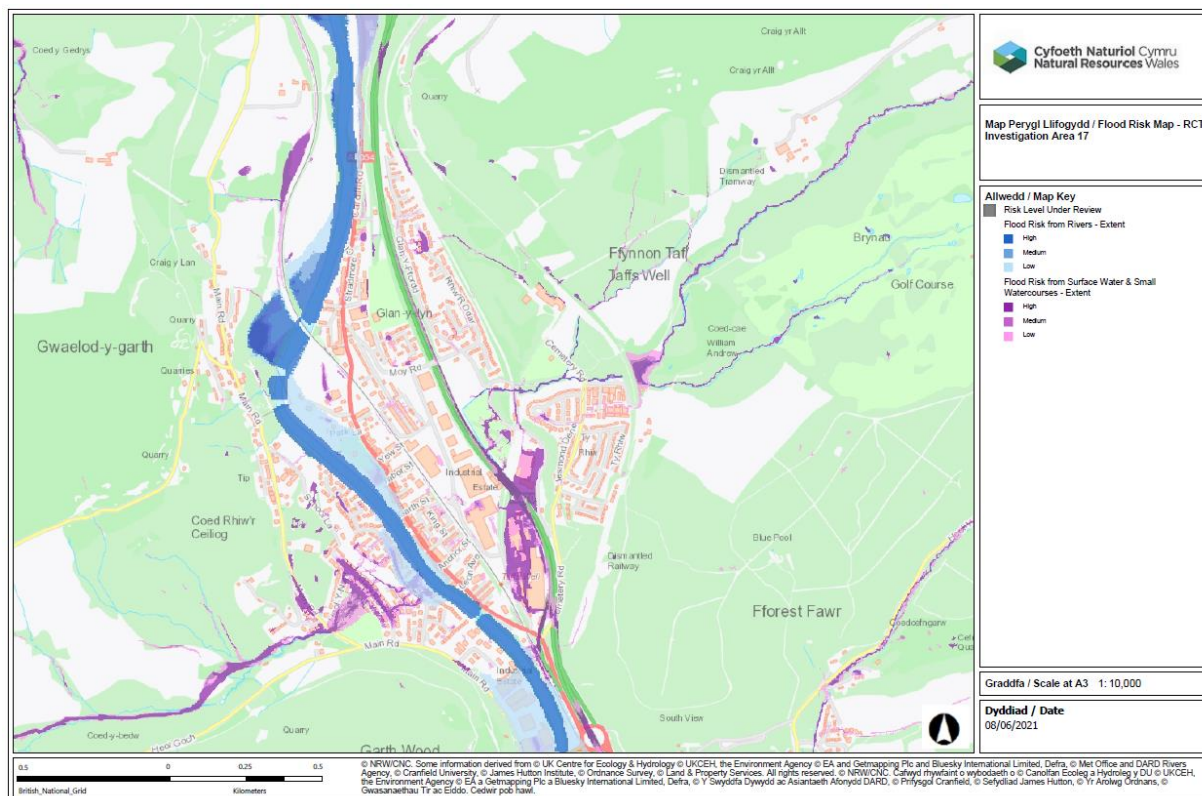


Figure 2: Natural Resources Wales' Flood Risk Assessment Water (FRAW) map for rivers and ordinary watercourse and surface water flood risk at investigation area RCT17. Contains Natural Resources Wales information © Natural Resources Wales and database right. All rights reserved.

1.3. DRAINAGE SYSTEM

The surface water drainage systems that serve investigation area RCT17 are that of the highway drainage network designed to manage the surface water within the highway and public surface water sewer and combined sewer networks operated by Dŵr Cymru Welsh Water.

³ [RCT'S Flood Risk Management Plan \(rctcbc.gov.uk\)](https://www.rctcbc.gov.uk)

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 below within Table 1.

Table 1: Investigative evidence gathered in preparation of this Storm Dennis Section 19 report

Source	Data
Residents	Photos, videos, statements, email correspondence, public engagement survey responses
Responders' statements	Local responders' statements
CCTV Surveys	Internal surveys of the local drainage networks
Met Office Data	Weather Warning information (see FRM – Storm Dennis – Overview Report)
Rain Gauges	RCT and NRW operated gauge information (see FRM – Storm Dennis – Overview Report)
Natural Resources Wales	River Level and Flood Warning data
RCT Flood Risk Management Plan	Site specific information and data for each electoral ward in RCTC
Communities at Risk Register	Flood risk ranking and scores for all flood types based on community data in Wales
Flood Investigation Report (Redstart's FIR)	A summary of the source-pathway-receptors, culvert capacity assessment and hydraulic modelling work undertaken by Redstart. The Flood Investigation Report was commissioned by RCT prior to writing the Section 19 report.

Evidence sourced from the 'Flood Investigation Report', commissioned by RCT, will be further referred to as 'Redstart's FIR' throughout this report.

1.5. PUBLIC ENGAGEMENT

Following the initial flooding event that occurred on the 15 and 16th of February during Storm Dennis, flood risk officers from RCT's Flood Risk Management department were deployed to areas across the borough to investigate reports of internal flooding by

residents. Residents engaged with the Flood Risk Management team to help determine the initial impacts caused by the flooding event and to investigate the potential source(s) and pathway(s) of flood water. 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 the flood investigations, a public engagement exercise was undertaken between the 4th and 25th of January 2021 by Redstart, on behalf of RCT. The aim of this exercise was to engage with local residents who were affected by the flood event to capture details 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. 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.

2 FLOODING HISTORY

2.1. PREVIOUS FLOOD INCIDENTS

Historical flood information and residents accounts captured by RCT's Flood Risk Management officers following Storm Dennis indicate that parts of the investigation area had not experienced flooding from the River Taf in over 40 years prior to Storm Dennis. The flooding experienced during Storm Dennis was noted as the most significant flood incident to impact Taff's Well since the floods of December 1979.

Previous incidences of surface water flooding to the highway have been recorded across the investigation area during smaller scale events, in particular along the A4054 Cardiff Road and Moy Road. Many of these flood incidences have been deemed the result of blocked highway drainage infrastructure. These events are not known to have impacted properties.

2.2. FLOOD INCIDENT

The flooding that occurred on the 15th and 16th February 2020 was a result of an extreme rainfall event, designated by the Met Office as ‘Storm Dennis’. The rainfall event affected the majority of RCT and caused widespread flooding to communities.

Specific details of Storm Dennis, such as rainfall and river level analysis are covered within a separate overview report that covers the wider RCT area, referenced ‘FRM – Storm Dennis – Overview Report’².

Post event inspections were undertaken by RCT’s Flood Risk Management team and Public Health Wales during the days following the storm event. They identified 25 residential properties and 11 non-residential properties as internally flooded within the investigation area.

A summary of the source(s) and pathway(s) of flooding within the Taff’s Well area during Storm Dennis have been outlined in Table 2 and further described throughout this section.

Table 2: Summary of the source, pathway and receptors affected during Storm Dennis within investigation area RCT17

Source(s)	Pathway(s)	Receptor(s)
<p>The primary source of flooding for this incident was the River Taf, which flows adjacent to the investigation area, overtopping its banks.</p>	<p>The primary flow pathway, caused by the overtopping of the River Taf, saw the main river breach its eastern bank in the northernmost part of the investigation area, before conveying in a southerly direction towards Park Lane and eventually into the rear gardens of properties on Cardiff Road.</p> <p>The River Taf also overtopped directly into the rear of properties on Cardiff Road, exacerbating the fluvial flooding that had already occurred.</p>	<p>The overtopping of the River Taf resulted in the internal flooding of 25 residential and 9 non-residential properties on Cardiff Road and Park Lane.</p> <p>Taff’s Well Park was also impacted by the River Taf.</p>

<p>Intense rainfall and subsequent surface water runoff from the surrounding area.</p>	<p>The accumulation of surface water on Cardiff Road resulted in the conveyance of pluvial flows towards lower elevations resulting in surface water ponding along Cardiff Road and Park Lane</p> <p>Additional pluvial flows were identified at Glan-Y-Llyn industrial estate.</p>	<p>A non-residential property on Cardiff Road, adjacent to Church Street, was internally flooded by surface water during Storm Dennis.</p> <p>Surface water flows contributed to the internal flooding of 2 residential properties impacted by main river flooding on Park Lane.</p> <p>A non-residential unit was reported to have internally flooded at Glan-Y-Llyn industrial estate.</p>
--	---	--

On review of Table 2, the primary source of the recorded flooding within investigation area RCT17 was the overtopping of the main river, the River Taf, which flows north to south to the west of Taff's Well. The impacts of the overtopping were exacerbated due to intense rainfall and subsequent surface water flows throughout the investigation area.

During the early hours of Sunday 16th February 2020, RCT received several calls from residents at Taff's Well reporting the overtopping of the River Taf which was causing water ingress into properties at multiple locations. Several flow paths were observed as properties adjacent to the main river experienced internal flooding. These flow paths are illustrated in Figures 3 and 4.

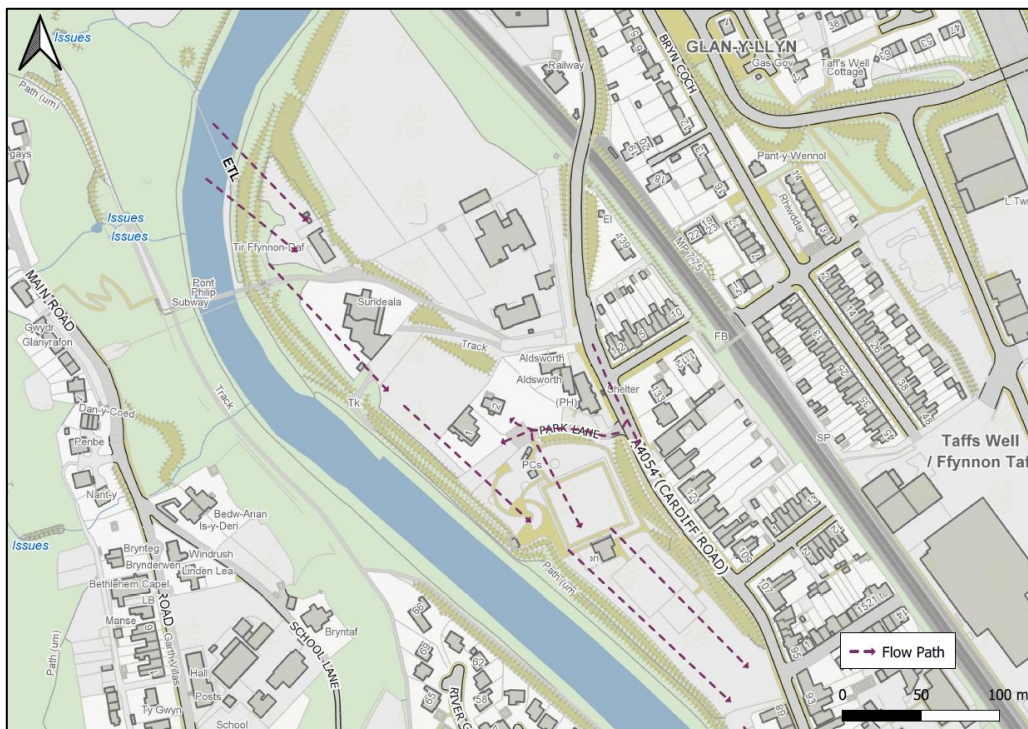


Figure 3: Observed flow paths during Storm Dennis in the north of investigation area RCT17

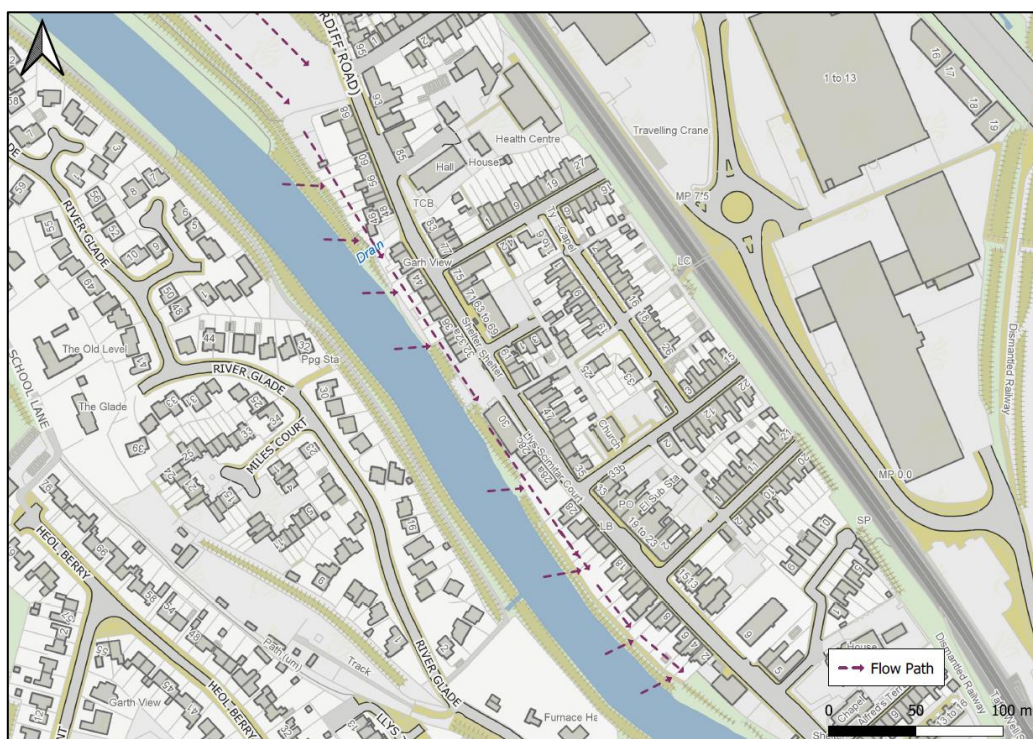


Figure 4: Observed flow paths during Storm Dennis in the south of investigation area RCT17

It was reported by residents that the River Taf initially overtopped its eastern riverbank to the north of the investigation area (depicted in Figure 3), resulting in between 1.5 metres and 2.5 metres of internal flooding to those properties situated on the floodplain at this location.

Following the overtopping, large amounts of fluvial flood water conveyed south along the riverbank towards Park Lane and Taff's Well Park. On its course of flow, a further two residential properties at Park Lane were internally flooded. The affected residents reported flood depths of between 1.5 and 2.5 metres due to the properties being positioned at localised low points.

Surface water is also considered to have contributed to the internal flooding of two properties at Park Lane, with resident accounts highlighting pluvial flows that originated from overwhelmed highway drainage on Cardiff Road and conveyed downhill towards the impacted properties in accordance with local topography.

Beyond Taff's Well Park, river flood water continued to convey south adjacent to the embankment towards the rear gardens of properties along Cardiff Road. Based on residents' reports captured by RCT's Flood Risk Management team post event, it is estimated that flood water travelled approximately 800 metres from the point of riverbank breach. Indicative flow paths of water are illustrated in Figure 4.

The River Taf was also observed to have overtopped its embankments directly into the rear gardens of adjacent properties along Cardiff Road, exacerbating the flooding that was already ongoing due to the initial flow path depicted in Figure 3. Figure 5 shows the complete submergence of the river embankment to the north of Cardiff Road during the storm event.

Once flood water had entered the rear gardens of properties on Cardiff Road, it was unable to recede due to the difference in height between the gardens and the existing flood defences, as depicted in Figure 6. This resulted in up to 2.5 metres of fluvial flood water becoming trapped in the rear gardens of properties on Cardiff Road for approximately 12 hours during the storm event.

A total of 25 residential and 9 non-residential properties were internally flooded by the River Taf, with several properties on Cardiff Road reporting basement flooding of between 1.5 and 2 metres in depth.



Figure 5: Image showing the overtopping of the River Taf to the rear of Cardiff Road which submerged the rear gardens and ground floor of several properties during Storm Dennis (image provided by resident)

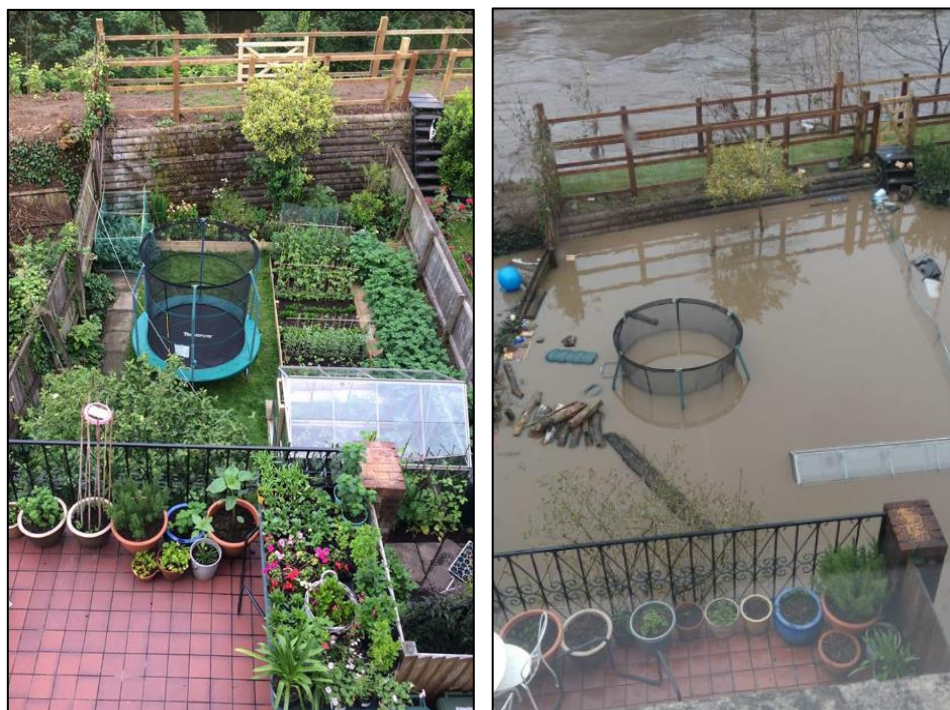


Figure 6: Images capturing the rear garden of a property on Cardiff Road before (left) and during Storm Dennis (right) (images provided by resident)

Emergency rescue efforts by the Fire Service were in operation following the overtopping of the River Taf on the 16th February 2020 to evacuate residents from their homes (Figure 7).



Figure 7: Image capturing the rescue efforts by the Fire Service to evacuate residents at Park Lane on 16th February 2020 (image provided by resident)

An isolated incident of surface water flooding occurred to the south of the investigation area, where a non-residential property on Cardiff Road experienced internal flooding during the storm event as a result of nearby highway drainage infrastructure becoming overwhelmed.

Furthermore, a commercial property located at Glan-Y-Llyn Industrial Estate, to the north of the investigation area, reported internal flooding during Storm Dennis. Whilst the source of flooding is unconfirmed, the isolated nature of the incident and the distance of the site from the River Taf (approximately 140 metres) suggests that internal flooding was also caused by localised surface water flooding.

2.3. RAINFALL ANALYSIS

See RCT's 'Overview Report' of Storm Dennis, reference 'FRM – Storm Dennis – Overview Report'², for a detailed analysis of the rainfall and ordinary watercourse response.

3. POSSIBLE CAUSES

3.1. CULVERT CONDITIONS

There is no evidence from this investigation to suggest that culverted ordinary watercourses within investigation area RCT17 significantly contributed to the recorded flooding of properties in RCT17 during Storm Dennis.

As such, the condition of culverted ordinary watercourse infrastructure within the investigation area has not been investigated as part of this investigation.

3.2. ORDINARY WATERCOURSE CONDITIONS

There are multiple ordinary watercourses, such as the Nant y Brynau and Nant Cwmllydrew, that convey into the River Taf within or near to the investigation area; however, there is no evidence to suggest that ordinary watercourses contributed to the recorded flooding of properties in RCT17 during Storm Dennis.

As such, the condition of ordinary watercourse infrastructure within the investigation area has not been investigated as part of this investigation.

3.3. MAIN RIVER

The designated main river, the River Taf, flows in a southerly direction through Taff's Well. The investigation area itself is situated on the eastern bank of the river (Figure 1).

3.3.1. MAIN RIVER LEVELS AND FLOOD WARNINGS

The hydrograph in Figure 8 illustrates the significant rise in the River Taf's levels in response to rainfall between the 14 – 17th February 2020. River level data was captured at NRW's Upper Boat monitoring station, located approximately 3km northwest of the northern boundary of the investigation area.

NRW issued a 'Flood Alert' (indicating possible flooding) for the entirety of the River Taf at approximately 13:30 on the 15th of February; at which point the main river was over 2 meters in depth and continuing to rise at Upper Boat station. At approximately midnight on the 16th February the River Taf began to rise again, reaching a peak level of 5.49 meters at 06:00 on 16th February; the highest level recorded for the River Taf at Upper Boat since 2001.

The green bar displayed on the hydrograph shows the typical level of the River Taf at the Upper Boat station, ranging between 0.2 and 1.2 meters. The river level was above this green line for over 48 hours, highlighting the severity of the storm event and its unprecedented nature. At its peak, the River Taf at Upper Boat was over four meters higher than its average level.

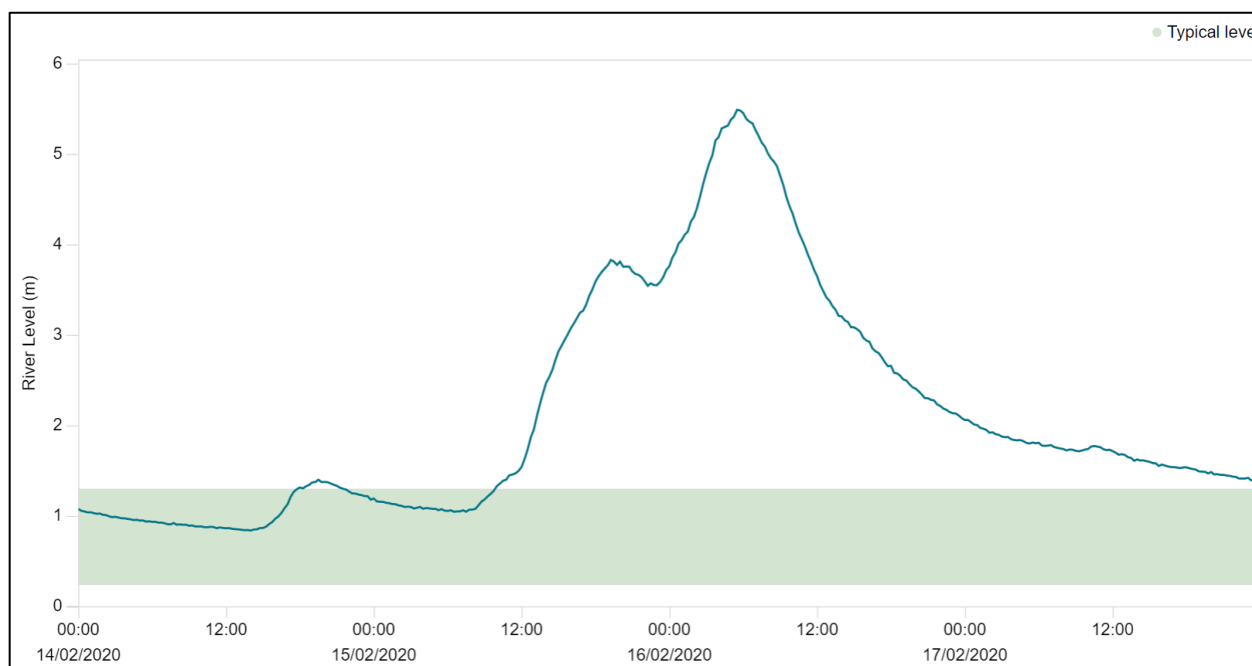


Figure 8: The River Taf levels at Upper Boat station between the 14th and 17th February 2020 (Natural Resources Wales)

Investigation area RCT17 falls within NRW’s Taff’s Well and Industrial Areas of Gwaelod y Garth Flood Warning Area. The Flood Warnings issued by NRW, and associated river levels at Upper Boat gauging station (i.e., nearest gauging station to RCT17), for the River Taf at investigation area RCT17 during Storm Dennis are shown in Table 3.

Table 3: Flood Warnings issued by NRW for the River Taf at RCT17 during Storm Dennis

Flood Warning Type	Location	Start Time	River Level (m) at Upper Boat
Flood Alert	River Taf	13:27 15/02/2020	2.24
Flood Warning	River Taf at Taff’s Well and Industrial Areas of Gwaelod y Garth	20:52 15/02/2020	3.754

NRW issued a ‘Flood Warning’ alert (indicating flooding is expected) for the River Taf at Taff’s Well at 20:52 on the 15th of February, prior to the overtopping of the main river.

A ‘Severe Flood Warning’ alert (indicating Community-wide flooding and possible risk to life) was not issued by NRW for the River Taf at Taff’s Well during the storm event.

A 'Severe Flood Warning' was issued by NRW for the River Taf at Pontypridd at approximately 06:30 on the 16th February; at which point the River Taf at Upper Boat was 5.358 metres in height. According to residents, significant main river flooding had already commenced at several locations along the River Taf by this time, including at Taff's Well.

NRW have acknowledged within their 'Flood Incidence Response Review'⁴ that the operation of the Flood Warning Service "came under significant pressure during February and at times became overwhelmed", resulting in flood warnings being issued late (after the onset of flooding) or not issued at all. At this location (RCT17), this is in reference to the 'Severe Flood Warning' alert that was not issued for Taff's Well.

Improvements to their flood forecasting and warning services are being internally investigated by NRW and where feasible implemented to deliver the recommendations outlined within their Flood Incident Response Review⁴.

3.3.2. MAIN RIVER FLOOD RISK

As outlined in Section 2, the fluvial flooding that occurred at RCT17 during Storm Dennis reached external depths of up to 2.5 metres in the worst affected areas of Park Lane and Cardiff Road.

Figure 9 is an excerpt from NRW's Flood Risk Assessment Wales (FRAW) mapping exercise which depicts the main river flood risk extents for the 'Defended' scenario, i.e., with the presence of flood defence assets. 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 majority of the affected properties within RCT17 fall within an area of low main river flood risk. 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. Considering Storm Dennis was probably in excess of a 1 in 200 annual probability (Q200) flood event⁴, the area of flooding during Storm Dennis compared to the low flood risk extents, depicted in Figure 9, are considered to be underestimated, suggesting that Storm Dennis impacted a wider area than identified within the FRAW.

Whilst the FRAW map depicts the 'Defended' scenario, NRW's Flood Hazard maps (Figure 10) represents the 'Undefined' scenario. The Flood Hazard map indicates

⁴ [February 2020 Floods in Wales: Flood Incident Management Review \(cyfoethnaturiol.cymru\)](https://www.cyfoethnaturiol.cymru/)

that the flooded area within investigation area RCT17 is in fact at high risk of flooding from the main river without the presence of flood defences. A high risk of flooding means that an area has a chance of flooding greater than 1 in 30 (3.3%) each year. This highlights the potential impact of the overtopping of the River Taf at Taff's Well during extreme storm events.

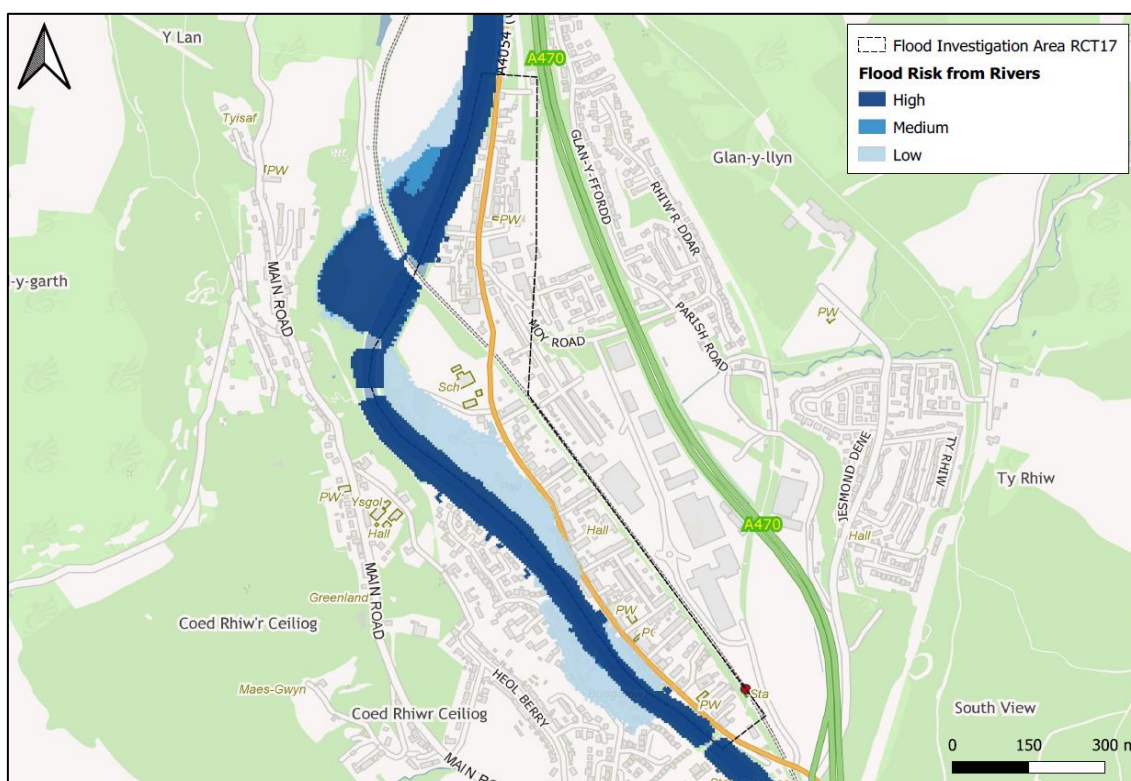


Figure 9: NRW's Flood Risk Assessment Wales (FRAW) map for River sources. Contains Natural Resources Wales information © Natural Resources Wales and database right. All rights reserved.

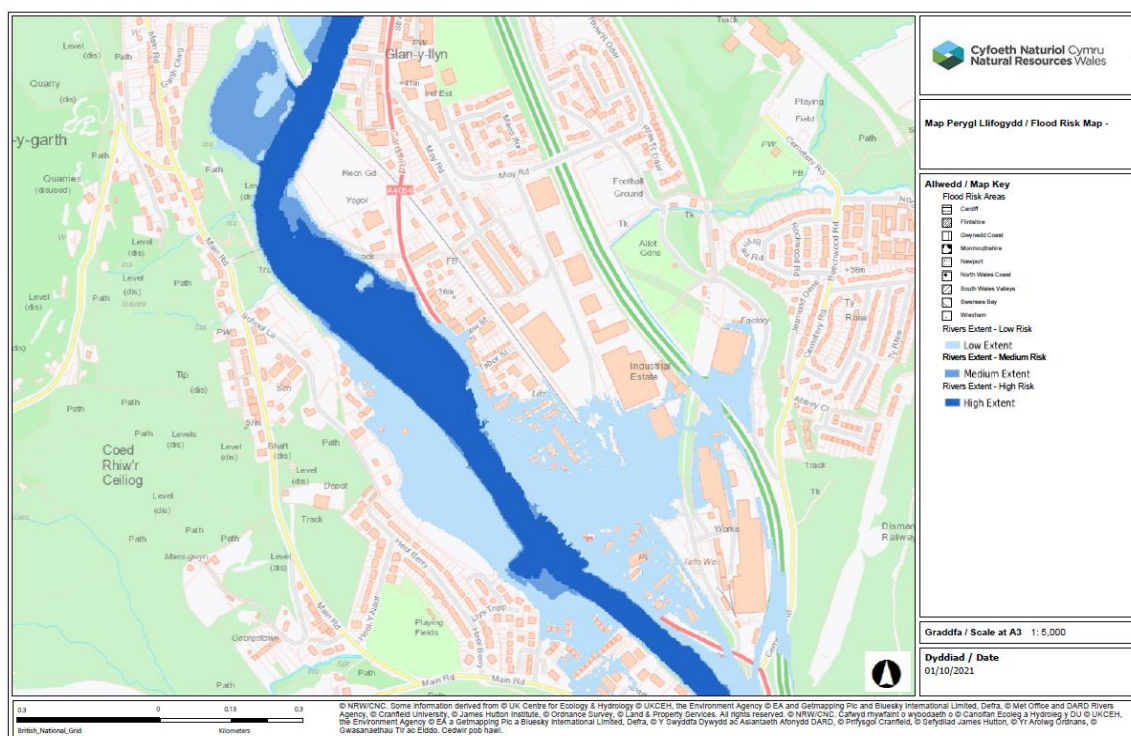


Figure 10: NRW's Flood Risk Assessment Wales (FRAW) map for Medium Risk River Flood Depth in RCT17. Contains Natural Resources Wales information © Natural Resources Wales and database right. All rights reserved

3.3.3. MAIN RIVER FLOOD DEFENCES

As illustrated in Figure 11 (demarcated by a bold red line), there are approximately 1.5 kilometres of formally designated flood defence infrastructure along the eastern bank of the River Taf at RCT17. This infrastructure is operated and maintained by NRW.

According to NRW, this infrastructure provides a Standard of Protection (SOP) of 1 in 100+ annual probability flood event (Q100+) to the majority of the impacted properties within the investigation area (black hatched area in Figure 11).

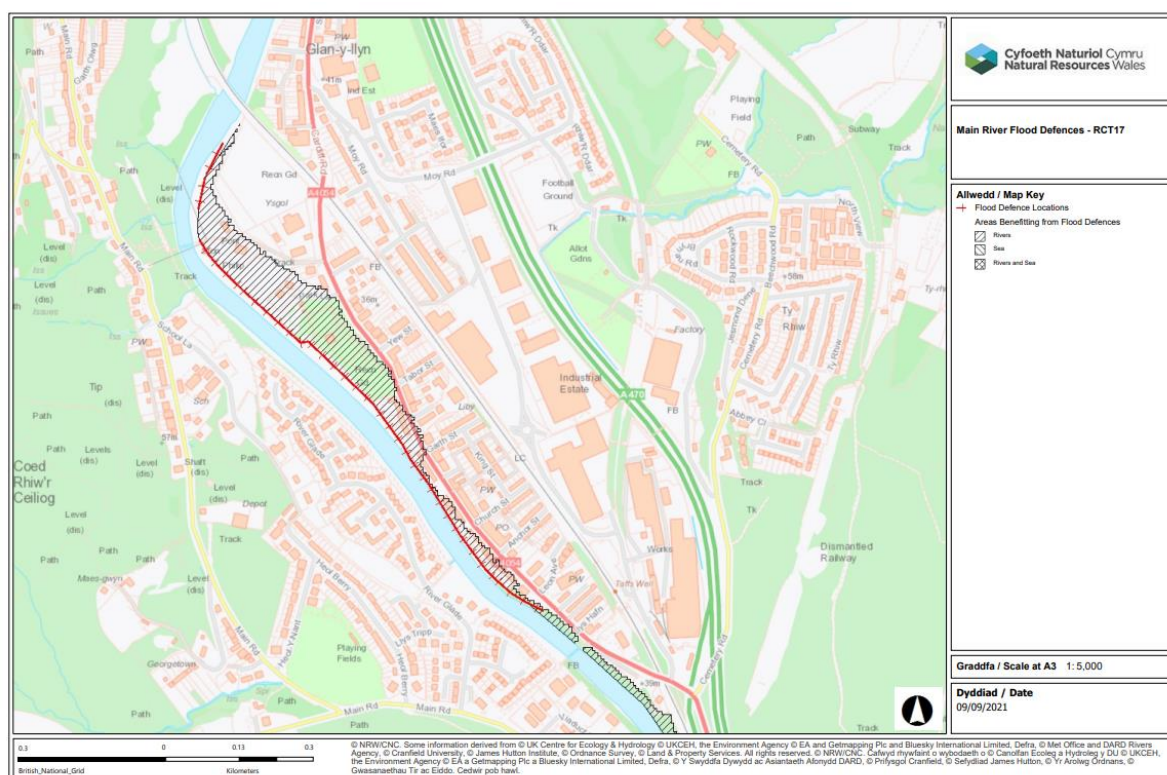


Figure 11: Natural Resources Wales' map for Main River Flood Defences and areas benefiting at RCT17. Contains Natural Resources Wales information © Natural Resources Wales and database right. All rights reserved

The current indicative design standard of protection for flood defences on a main river is 1 in 100 annual probability (Q100) flood event plus, for new schemes, an allowance for climate change. This is stated within the Welsh Government's National Strategy for Flood and Coastal Erosion Risk Management which encourages main river flood alleviation schemes to provide a SOP up to Q100⁵. It is thereby inferred that the current SOP of flood defence infrastructure at RCT17 is in accordance with current indicative standards.

Whilst the majority of the investigation area is shown to be protected against a 1 in 200 annual probability (Q200) flood event, a section of the northern riverbank, adjacent to where Pont Sion Phillip footbridge connects Taff's Well with Gwaelod y Garth, has no formal flood defence. Based on accounts provided by residents, it is considered that the River Taf overtopped at this location, allowing significant conveyance of flood water to flow south behind the formal defences towards Park Lane and Cardiff Road.

Although this provides an explanation to the main river flooding that occurred throughout Taff's Well, several residents at Cardiff Road also reported flood defences

⁵ [National Strategy for Flood and Coastal Erosion Risk Management in Wales \(English\) \(gov.wales\)](https://www.gov.wales/national-strategy-for-flood-and-coastal-erosion-risk-management-in-wales)

at the rear of their gardens being overtopped by flood water during the peak intensity of the storm.

NRW's 'Flood Incidence Response Review'⁴ outlines that no flood defences failed in the lower Taf region and that the flooding was the result of river flows exceeding the construction design standard.

3.4. HIGHWAY DRAINAGE CONDITIONS

Park Lane was primarily flooded by the overtopping of the River Taf during Storm Dennis. The resultant fluvial flows deposited mud, silt and debris across the impacted area. These sediments are assumed to have entered the highway drainage system, leading to blockages and a reduction in the hydraulic capacity of the surface water network. Figure 12 depicts the deposits of mud left behind following the receding river water.



Figure 12: Photo shows deposits of mud blocking the surface water drainage infrastructure at Park Lane following the flooding during Storm Dennis (image provided by resident)

Resident accounts also highlighted the surcharging of highway drainage in central and southern regions of the investigation area, such as on sections of Cardiff Road above Park Lane and Taff's Well Park. Given the intensity of rain falling on a largely impermeable catchment, it is considered that sections of highway drainage infrastructure in RCT were overwhelmed by surface water during the storm event, resulting in exceedance surface water flows along the highway as well as localised surface water ponding.

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 in RCT17 was exceeded at different locations as a result of main river and surface water flows entering the network. The maintenance condition of the highway drainage infrastructure is not considered to have significantly impacted the flooding experienced.

3.5. DCWW APPARATUS CONDITIONS

There is no evidence from this investigation that DCWW apparatus contributed to the flooding that occurred during Storm Dennis within investigation area RCT17.

DCWW reported no issues within RCT17 during Storm Dennis and it is not believed that any DCWW infrastructure was damaged during the storm event. Whilst DCWW have concluded that their assets performed well during Storm Dennis, the majority of drainage infrastructure within the investigation area is comprised of combined sewer networks which are likely to have become overwhelmed during the storm event for the reasons outlined in Section 3.4.

3.6. SURFACE WATER

RCT17 has a large topographic watershed (Figure 13) and a high potential for significant overland flows; however, the investigation area is separated from the watershed by the A470 dual carriageway. With the A470 acting as a barrier to the conveyance of surface water, it is believed that the majority of surface water flooding within Taff's Well during Storm Dennis was localised and not a consequence of the predominant valley gradient.

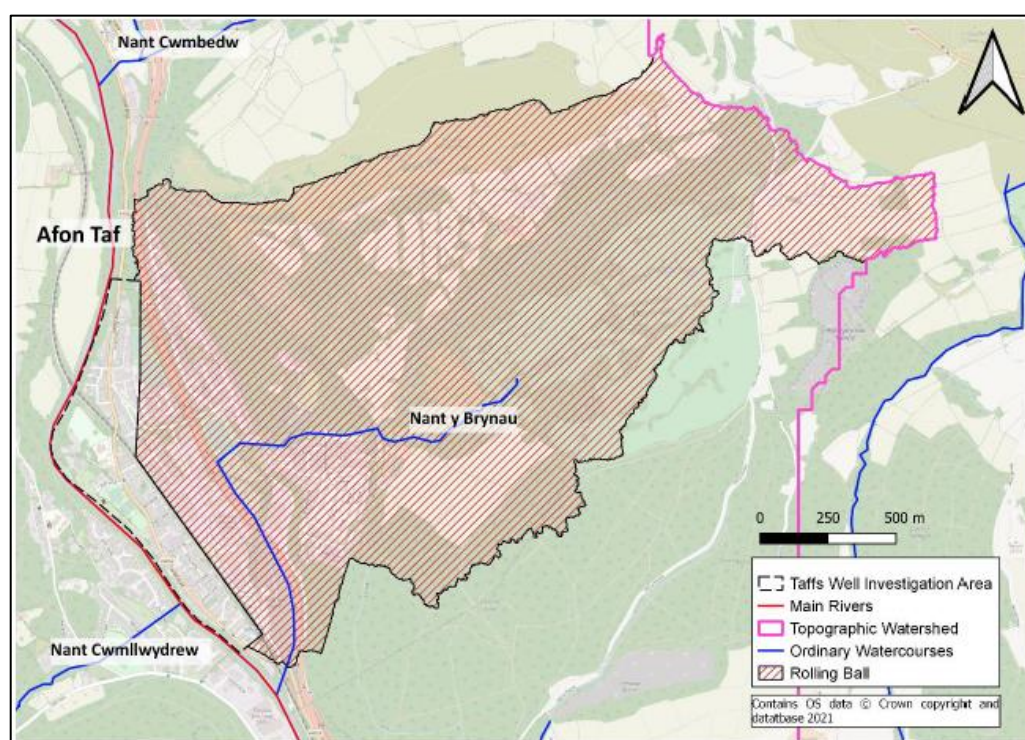


Figure 13: Topographic Watershed above investigation area RCT17

As outlined in Section 3.4, surface water flows generated by intense rainfall is believed to have caused localised surface water ponding as a result of highway and private surface water drainage systems becoming overwhelmed during the storm event. This is considered to have been the primary cause of internal flooding to two non-residential properties within RCT17; one at Glan-Y-Llyn Industrial Estate and the other situated at a low point along Cardiff Road.

3.7. SUMMARY OF POSSIBLE CAUSES

The above sections have identified and described the possible causes of flooding within RCT investigation area 17 during Storm Dennis which occurred on the 15th and 16th of February 2020. A summary of the identified source(s) and possible cause(s) of flooding (issue) has been outlined below in Table 4.

Table 4: Summary of source(s) and possible cause(s) of flooding in RCT17 during Storm Dennis (15-16th February 2020)

Ref No	Asset (Source)	Issue	Asset Owner	Type of Flooding
1	River Taf	Unprecedentedly high river levels within the River Taf resulted in the main river overtopping its banks at several locations and flood water conveying into neighbouring properties.	Natural Resources Wales	Main River
2	River Taf	Unprecedentedly high river levels within the River Taf resulted in the main river overtopping its banks to the north of the investigation area, resulting in flood water conveying south towards several properties.	Private Landowner	Main River
3	Surface water drainage network across RCT17	Intense rainfall across RCT severely overwhelmed highway drainage infrastructure, resulting in the accumulation of surface water on many streets throughout Taff's Well.	Rhondda Cynon Taf CBC Highway Authority	Surface Water Flooding

4. RISK MANAGEMENT AUTHORITY ACTIONS

A Welsh Risk Management Authority is defined in Section 6 of the Flood and Water Management Act 2010 as NRW; a LLFA, a district council for an area where there is no unitary authority, or a highway authority wholly in Wales; an internal drainage board for an internal drainage district that is wholly or mainly in Wales; a water company that exercises functions in relation to an area in Wales. As the LLFA, RCT has the responsibility to coordinate the management of flood risk and the interaction of Risk Management Authorities across Rhondda Cynon Taf.

An overview of the relevant Risk Management Authority in relation to flood type is provided in Table 5. For further details of the roles and responsibilities of individual Risk Management Authorities in managing flooding, refer to the Welsh Government's National Strategy for Flood and Coastal Erosion Risk Management, Section 4 'Roles & Responsibilities'⁵, and RCT's 'FRM – Storm Dennis - Overview Report'².

Table 5: Risk Management Authority with relevant functions to manage the risk for different flood types

Type of Flooding	Risk Management Authority
Flooding from Main River, reservoirs and the sea (including coastal erosion).	Natural Resources Wales
Flooding from ordinary watercourses, surface water and groundwater	Lead Local Flood Authority
Flooding from water and sewage systems	Water Companies (Dŵr Cymru Welsh Water)
Flooding from the highway	Highway Authority
Flooding from the highway (motorways and major trunk roads)	Welsh Government Trunk Road Agency

Risk Management Authorities have direct flood risk management functions under the Flood and Water Management Act 2010, as well as the Water Resources Act 1991, Land Drainage Act 1991 and the Highways Act 1980. Through analysis of the flooding that impacted RCT17, the flood risk management functions exercised or proposed to be exercised by relevant RMAs were recorded 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 cause(s) of flooding in RCT17 during Storm Dennis have been previously identified and summarised within Table 4. The Risk Management Authorities responsible for managing that flooding have been listed in Table 6 below, along with a series of recommendations put forward by the LLFA.

Table 6: Recommendations provided by the LLFA to be considered by the relevant Risk Management Authority identified in response to the source(s) of flooding in RCT17 (as per Table 4)

Ref No	Asset (Source)	Asset Owner	Type of Flooding	Relevant Risk Management Authority	Recommendations
1	River Taf	Natural Resources Wales	Main River	Natural Resources Wales	R1A NRW to “complete detailed investigative analysis work to understand the mechanisms of flooding in areas known to have flooded from main rivers”, including the River Taf at Taff’s Well. Aligns with recommendation ‘Action FD2’ within NRW’s Flood Incident Management Review.

					<p>R1B</p> <p>NRW to investigate the standard of protection provided by flood defences throughout RCT17 and “consider improvements to NRW flood alleviation schemes and structures on a priorities basis”. Aligns with recommendation ‘Action FD3’ within NRW’s Flood Incident Management Review.</p>
					<p>R1C</p> <p>NRW to review its flood warning service provision, especially for extreme events. This will form part of NRW’s Flood Warning Service Review Implementation Programme and aligns with the recommendations set out in their ‘Flood Incidence Management Review’.</p>
2	River Taf	Private Landowner	Main River	Natural Resources Wales	<p>R2A</p> <p>NRW to work with the landowner to assess and review the risk of flooding from the River Taf at the location known to have overtopped during the event to identify the viability</p>

						of risk management options.
3	Surface water drainage network across RCT17	Rhondda Cynon Taf CBC Highway Authority	Surface Water	Highway Authority and Lead Local Flood Authority	R3A	The Highways Authority to jet and cleanse the highway drainage network and action repairs accordingly.
					R3B	The LLFA and Highway Authority to evaluate surface water management options to alleviate pluvial flooding at locations across the investigation area.

4.1. LEAD LOCAL FLOOD AUTHORITY

In review of Ref 2 of Table 6, the LLFA has been determined as the relevant Risk Management Authority in relation to the ordinary watercourse and surface water flooding which occurred at investigation area RCT17 during Storm Dennis.

The LLFA exercised the following functions in response to the flooding at investigation area RCT17:

- 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 carried out by Redstart, on behalf of RCT as the LLFA, was undertaken in order 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 NRW in relation to their responsibilities as a RMA in response to Storm Dennis.
- The LLFA has set up a central Control Room, to compliment the Council's Contact Centre and CCTV centre which is based at the Council's offices, to provide a comprehensive and informed response to the residents of RCT as appropriate during storm events.
- The LLFA, working in partnership with NRW, have expanded their interim Property Flood Resistance project offering expandable flood gates to those properties deemed at high risk of flooding from the main river, as per NRW's determination.

The LLFA also propose to exercise the following functions in response to the flooding at RCT17:

- The LLFA and LDA intend to clarify drainage asset owners and management responsibilities to make them aware of their personal risk. To ensure landowners manage the risk in compliance with the relevant legislation, a team of Flood Enforcement Officers including legal support is to be appointed.

- The LLFA and LDA will work with landowners and property owners to manage their personal flood risk through local measures, such as property resilience and resistance measures.
- As part of RCT's comprehensive review of the County Borough's most at risk communities, the LLFA are proposing to undertake a formal SFRA of the Lower Taf catchment area to better understand the overall risk from ordinary watercourse and surface water flooding in order to target investment to areas of highest risk. The SFRA also aim to encourage whole catchment measures, including working with natural processes, to alleviate flood risk in those areas of highest risk. **(R3B)**
- The LLFA will cooperate and collaborate with NRW to ensure a detailed study of the investigation area is completed and that appropriate actions to mitigate the impacts of river flooding are undertaken in accordance with NRW's Flood Incident Management Review.

4.2. NATURAL RESOURCES WALES

In review of Ref 1-2 in Table 6, NRW has been identified as the relevant Risk Management Authority in relation to the main river flooding from the River Taf during Storm Dennis.

NRW have exercised the following functions in response to the flooding at RCT17:

- 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.
- Following Storm Dennis NRW undertook an inspection of the River Taf at Taff's Well, removing debris and vegetation from the NRW flood embankment.
- NRW undertook a T98 inspection of the main river embankment and undertook restoration works. Following restorations, further ground investigations were undertaken to determine the embankment's structural integrity.
- NRW specifically outline that "more Severe Flood Warnings should have been issued based on the flooding impacts experienced" in the Lower Taf region. Utilising post event data and information, NRW have reviewed the Resultant Thresholds for the River Taf at Taff's Well and Industrial Areas of Gwaelod Y Garth Flood Warning Area. This is critical for assessing the performance, timeliness and accuracy of the warning service after a flood. **(R1C)**.
- NRW has introduced improved digital services to provide comprehensive flood risk, river level and rainfall information to households, businesses and communities across Wales. The improved service was launched in September 2020 on the NRW website and will improve how live flood warning and water level data is shared before and during flood events. **(R1C)**
- NRW have commissioned a Lower Taf Flood Modelling Project which is currently ongoing. **(R1A)**
- Following the flooding events of February 2020, NRW published a review of its incident response to Storm Ciara and Dennis in October 2020⁶. This review contains several recommendations for improvements to their ways of working and services which NRW are in the process of implementing through an internal delivery programme.
- NRW have developed a detailed Implementation Programme to address the areas of improvement work required to deliver the recommendations of the

⁶ [Natural Resources Wales / Our response to Storm Ciara and Storm Dennis](#)

Flood Warning Service Review carried out by NRW in 2018. Several of the recommendations directly link to the recommendations set out by NRW within their Flood Incident Management Review **(R1C)**.

NRW also propose to exercise the following actions in response to the flooding at RCT17:

- Following the completion of NRW's Lower Taf Flood Modelling Project, NRW propose to undertake an initial assessment of the viability of potential flood risk management options. Greatest consideration should be given to areas at high risk of flooding from rivers on a prioritised basis. **(R1A, R1B)**
- Following the completion of NRW's Lower Taf Flood Modelling Project, NRW propose further threshold work and flood warning area amendments. **(R1A, R1C)**
- NRW will undertake a review of the modelled outputs and adopt changes to their maintenance program within the investigation area if required. **(R1A)**
- NRW to undertake scheduled T98 inspections of the embankment on a 6-monthly basis.

4.3. WATER COMPANY

Dŵr Cymru Welsh Water were not identified as a relevant authority in relation to the flooding at investigation area RCT17 during Storm Dennis. DCWW do not propose to undertake any actions in relation to the event within the investigation area.

4.4. HIGHWAY AUTHORITY

During the investigation into the flooding at investigation area RCT17 during Storm Dennis, the Highway was identified as flooding from a combination of sources at different locations, most notably as a result of surface water runoff and main river flooding from the River Taf.

Ref 3 of Table 6 identifies the Highway Authority as a relevant Risk Management Authority in relation to the surface water flooding that occurred along the highway across RCT17.

RCT as the Highway Authority have exercised the following functions in response to the flooding within investigation area RCT17:

- 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. **(R3A)**

RCT as the Highway Authority propose to undertake the following function in relation to the storm event at RCT17:

- The Highway Authority intend to increase their resource capacity by establishing a dedicated 'Pluvial Drainage Team' to focus entirely on the refurbishment and maintenance of RCT's existing and enhanced highway drainage infrastructure.

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 - <https://naturalresources.wales/flooding/check-flood-warnings/?lang=en>

Natural Resources Wales - Long Term Flood Risk - <https://naturalresources.wales/evidence-and-data/maps/long-term-flood-risk/?lang=en>

Rhondda Cynon Taf CBC - Local Flood Risk Management Plan - <https://www.rctcbc.gov.uk/EN/Resident/ParkingRoadsandTravel/Roadspavementsandpaths/FloodAlleviation/Floodriskregulations2009.aspx>

Rhondda Cynon Taf CBC - Local Flood Risk Management Strategy - <https://www.rctcbc.gov.uk/EN/Resident/ParkingRoadsandTravel/Roadspavementsandpaths/FloodAlleviation/LocalFloodRiskManagementStrategy.aspx>

Rhondda Cynon Taf CBC – Sustainable Drainage – <https://www.rctcbc.gov.uk/EN/Resident/ParkingRoadsandTravel/Roadspavementsandpaths/SustainableDrainage/SustainableDrainage.aspx>

Welsh Government - National Strategy for Flood and Coastal Erosion Risk Management - <https://gov.wales/sites/default/files/publications/2019-03/national-strategy-for-flood-and-coastal-erosion-risk-management-in-wales.pdf>

Welsh Water – How to Contact Us – <https://www.welshwater.com/en/Contact-Us.aspx>

Appendix F

Flood and Water Management Act 2010

Section 19 Flood Investigation Report

Storm Dennis –
Flood Investigation Area RCT01
(Hirwaun)

January 2022

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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 Flood and Water Management Act 2010. The Council assumes no responsibility or liability from any person in connection with its contents or findings.

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CONTENTS

EXECUTIVE SUMMARY	1
ABBREVIATIONS & GLOSSARY	4
TABLES AND FIGURES	5
1. INTRODUCTION.....	7
1.1. Purpose of Investigation.....	7
1.2. Site Location	8
1.3. Drainage System.....	9
1.4. Investigation Evidence	10
1.5. Public Engagement	10
2. FLOODING HISTORY	12
2.1. Previous Flood Incidents	12
2.2. Flood Incident.....	13
2.3. Rainfall Analysis.....	19
3. POSSIBLE CAUSES	20
3.1. Culvert Conditions.....	20
3.2. Open Watercourse Conditions	23
3.3. Main River	26
3.3.1. Main River Levels and Flood Warnings	26
3.3.2. Main River Flood Risk.....	28
3.3.3. Main River Flood Defences.....	30
3.4. Highway Drainage Conditions	31
3.5. DCWW Apparatus Conditions	32
3.6. Surface Water	33
3.7. Access Structures	37
3.8. System at Capacity	38
3.9. Summary of Possible Causes	39
4. RISK MANAGEMENT AUTHORITY ACTIONS.....	40
4.1. Lead Local Flood Authority	44
4.2. Natural Resources Wales	47

4.3. Water Company	49
4.4. Highway Authority	50
USEFUL LINKS/CONTACTS	51

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EXECUTIVE SUMMARY

This report has been produced through the duties placed upon Rhondda Cynon Taf County Borough Council 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 an investigative report of the storm event that occurred on 15 and 16th February 2020 within Rhondda Cynon Taf County Borough Council area, focusing investigation on the flooding at Hirwaun in the Cynon valley (Flood Investigation Area RCT01, Figure 1).

This report was undertaken to identify the mechanism for 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 were planning to undertake actions related to those functions to manage the risk of flooding.

The flooding that affected RCT on 15 and 16th of February 2020, was a result of an extreme rainfall event, designated by the Met Office as ‘Storm Dennis’. The impact of the event at investigation area RCT01 resulted in internal flooding to 30 residential properties, one commercial property and extensive flooding to the highway. 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 and Dŵr Cymru Welsh Water.

It has been established from the evidence gathered within this report that the primary cause of internal flooding at RCT01 in this incident was a result of water levels on the River Cynon exceeding river bank levels to the rear of Cae Felin Parc and passing through privately owned boundary walls, resulting in water flowing towards and into several properties. A review of NRW’s Flood Risk Assessment Wales Maps identifies the properties impacted at Cae Felin Parc at high risk of flooding from the main river, however there are no formal flood defences currently in place.

The investigation also noted surface water flooding as a primary source of flooding at RCT01 during Storm Dennis. The sheer volume of water falling on the catchment resulted in significant overland flows within the investigation area, with many roads acting as channels for the water. The volume of surface water, combined with main river flooding in areas, overwhelmed the existing surface water drainage infrastructure and resulted in flooding to several properties.

NRW has been determined as the relevant Risk Management Authority responsible for managing the river flooding that occurred during Storm Dennis. In response to the flooding at investigation area RCT01, NRW have;

- Carried out their own post event investigative analysis work to understand the mechanism of flooding from the River Cynon at Hirwaun;
- Commissioned a Cynon Flood Modelling Study for completion by March 2022. The outcomes of which will be utilised to undertake an initial economic assessment of the viability of potential flood risk management options.
- Developed a series of recommendations and a detailed action plan to address the areas of improvement required by NRW for future storm events, including the performance of NRW's Flood Warning Service and incident management response.

RCT as the Lead Local Flood Authority and Land Drainage Authority has been determined as the relevant Risk Management Authority responsible for managing the ordinary watercourse and surface water flooding that occurred during Storm Dennis. In response to the flooding at investigation area RCT01, the LLFA has;

- Carried out survey, jetting and cleansing operations to an estimated of culvert network length within the investigation area;
- Led on the development of a central Control Room, to compliment the Council's Contact Centre and CCTV Centre, to provide a comprehensive and informed response to residents during storm events;
- Exercised its powers, under Section 13 of the Flood and Water Management Act 2010, to engage with NRW in relation to their responsibilities as the Risk Management Authority for main river flooding; and
- Initiated an interim Property Flood Resistance project offering expandable flood gates to those properties deemed at high risk of flooding from local sources. Working in partnership with NRW, the LLFA have expanded the project to include properties at high risk of river flooding also.

The event that occurred on 15 and 16th February was extreme, and it is unlikely flooding from a similar event could be prevented entirely. It is concluded that Risk Management Authorities satisfactorily carried out their flood risk management functions in response to the flood event at RCT01, however, further measures have been proposed by all RMAs to improve preparedness and response to future flood events.

ABBREVIATIONS & GLOSSARY

CaRR – Communities at Risk Register

DCWW – Welsh Water

FRMP – Flood Risk Management Plan

FWMA – Flood and Water Management Act 2010

LDA – Land Drainage Authority

LFRMS – Local Flood Risk Management Strategy

LLFA – Lead Local Flood Authority

NRW – Natural Resources Wales

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

RCT - Rhondda Cynon Taf

RCT01 – Flood Investigation Area RCT 01

RMA – Risk Management Authority

SAB – Sustainable Drainage Approval Body

SFRA – Strategic Flood Risk Assessment

SuDs – Sustainable Drainage Systems

TABLES AND FIGURES

Table 1: Investigative evidence gathered in preparation of the Storm Dennis Section 19 report	10
Table 2: Summary of the source(s), pathway(s) and receptor(s) affected during Storm Dennis within investigation area RCT 01.....	13
Table 3: Flood Warnings issued by NRW for the River Cynon at Hirwaun during Storm Dennis	27
Table 4: Pre and post mining discharge rates for the Q100 + 30% climate change allowance event per sub-catchment	35
Table 5: Summary of culvert capacity assessment results for Culverts 1-3 (Figure 16) based on post mining conditions which indicate the current standard of protection of the structure in free-flowing conditions	38
Table 6: Summary of the source(s) and possible cause(s) of flooding in Hirwaun during Storm Dennis	39
Table 7: Risk Management Authority with relevant functions to manage the risk for different flood types.....	40
Table 8: Recommendations provided by the LLFA to be considered by the relevant Risk Management Authority identified in response to the source(s) of flooding in RCT01 (as per Table 6)	41
Figure 1: Flood Investigation Area RCT01 Location Plan.....	8
Figure 2: Natural Resources Wales' Flood Risk Assessment Wales (FRAW) map for rivers and ordinary watercourse and surface water flood risk at investigation area RCT01. Contains Natural Resources Wales information © Natural Resources Wales and database right. All rights reserved.	9
Figure 3: Observed flow paths at Cae Felin Parc and Swansea Road in Hirwaun during Storm Dennis	15
Figure 4: Landslip of the hillside above the railway line, Hirwaun on the 16 th February 2020 (image captured by resident)	16
Figure 5: Dropped kerb and highway gully at Meadow Lane, to the rear of the impacted properties at Beacons View (image captured by RCT's Flood Risk Management officers on 26/02/2020)	18
Figure 6: Swansea Road culverted watercourse network in investigation area RCT01	20
Figure 7: Obstruction identified approximately 6 meters downstream of the Swansea Road culvert inlet.....	21
Figure 8: Meadow Lane culverted watercourse network in investigation area RCT01.....	22
Figure 9: Rainfall Topographic Catchment area and named ordinary watercourses draining into the River Cynon at investigation area RCT01.....	23
Figure 10: Ordinary watercourses and culverted networks identified at Meadow Lane in the southwest of investigation area RCT01. The ordinary watercourses identified as possible causes of flooding during Storm Dennis are shown in red.....	24
Figure 11: Undefined and overgrown ordinary watercourse channel above Meadow Lane Culvert Inlet 2 (image captured by RCT's Flood Risk Management team following Storm Dennis).....	25

Figure 12: The River Cynon levels at Hirwaun station between the 14 th and 17 th February 2020 (Natural Resources Wales)	26
Figure 13: Natural Resources Wales' Flood Risk Assessment Wales (FRAW) map for River sources at RCT01. Contains Natural Resources Wales information © Natural Resources Wales and database right. All rights reserved.	28
Figure 14: Damage to property caused by the River Cynon to the rear of Richmond Drive, Hirwaun on the 16 th February 2020 (image captured by resident).....	29
Figure 15: Natural Resources Wales' FRAW map for surface water and ordinary watercourse sources and indicative surface water flow paths within investigation area RCT01. Contains Natural Resources Wales information © Natural Resources Wales and database right. All rights reserved.....	33
Figure 16: Tower Colliery sub-catchments and associated culvert inlets	34
Figure 17: Surface water flooding to the A4061 Rhigos Road caused by surcharging culvert inlets associated to sub-catchment TIP 107A and TIP 107B (captured by RCT's Highways and Streetcare Depot on 16 th February 2020)	36

1. INTRODUCTION

1.1. PURPOSE OF INVESTIGATION

On the 15 and 16th February 2020 RCT was impacted by an extreme weather event which was designated by the Met Office as ‘Storm Dennis’. Due to the extent and impact of the event, the LLFA opted to undertake a formal investigation.

The storm resulted in widespread residential and commercial flooding within the Rhondda Cynon Taf County Borough Council area. This report will focus on Flood Investigation Area RCT 01 which covers the village of Hirwaun in the Cynon valley.

The reason behind RCT’s investigation is in response to the duties of the local authority in regard to Section 19; of the Flood and Water Management Act 2010, 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 the 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

The purpose of the investigation is to determine which RMAs have relevant flood risk management functions and which functions have been exercised in response to the flood event in question.

Specific details of Storm Dennis, such as rainfall analysis are covered within a separate overview report that covers the wider RCT area. The report is titled ‘Storm Dennis February 2020 – Overview Report’ and will be referred to as ‘FRM – Storm Dennis – Overview Report’².

¹ Flood and Water Management Act 2010 – Section 19 - <https://www.legislation.gov.uk/ukpga/2010/29/section/19>

² [Flood Investigation Reports | Rhondda Cynon Taf County Borough Council \(rctcbc.gov.uk\)](https://www.rctcbc.gov.uk/flood-investigation-reports)

1.2. SITE LOCATION

The area investigated within this report covers the village of Hirwaun located within the River Cynon catchment in the north of Rhondda Cynon Taf, just north of Aberdare (Figure 1).

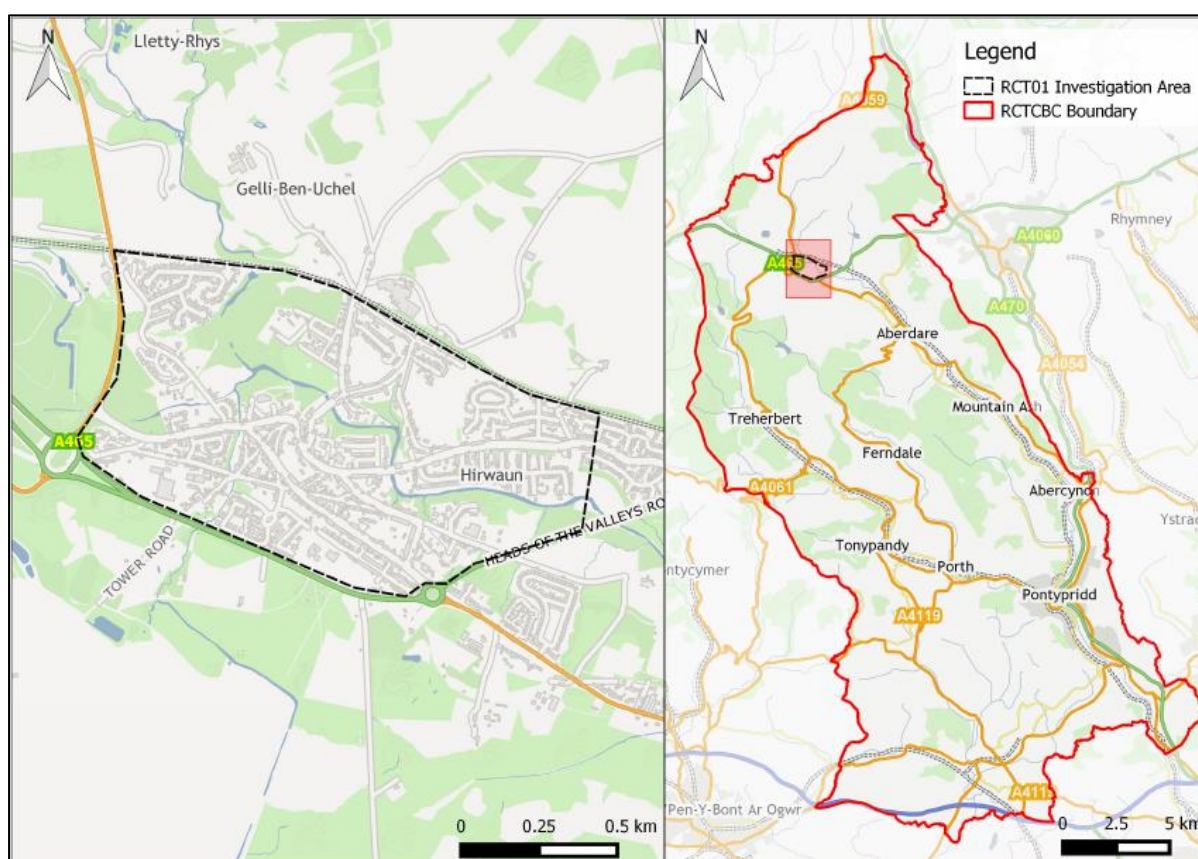


Figure 1: Flood Investigation Area RCT01 Location Plan

Hirwaun is predominantly a rural environment owing to the steep topography to the south of the investigation area. The investigation area itself is bounded to the south by the A4059 with residential development situated north of the primary road. The electoral ward of Rhigos bounds investigation area RCT01 to the north.

The River Cynon flows northwest to southeast through the centre of investigation area RCT01. The Nant y Bwlch watercourse drains the higher elevations in the south along with a number of minor unnamed watercourses which discharge into the River Cynon. Many of these watercourses are partially culverted beneath Hirwaun's residential development.

The highest risk posed to people and properties is broadly associated with the River Cynon across the length of the watercourse, with significant risk along sections of Cae Felin Parc and Llys Cynon. A risk of flooding is also noted in the north of the site, sourced from the River Cynon culvert inlet³. Natural Resources Wales' Flood Risk Assessment Wales (FRAW) map also notes a low to high risk of surface water and ordinary watercourse flooding sources from various culvert inlets (Figure 2).

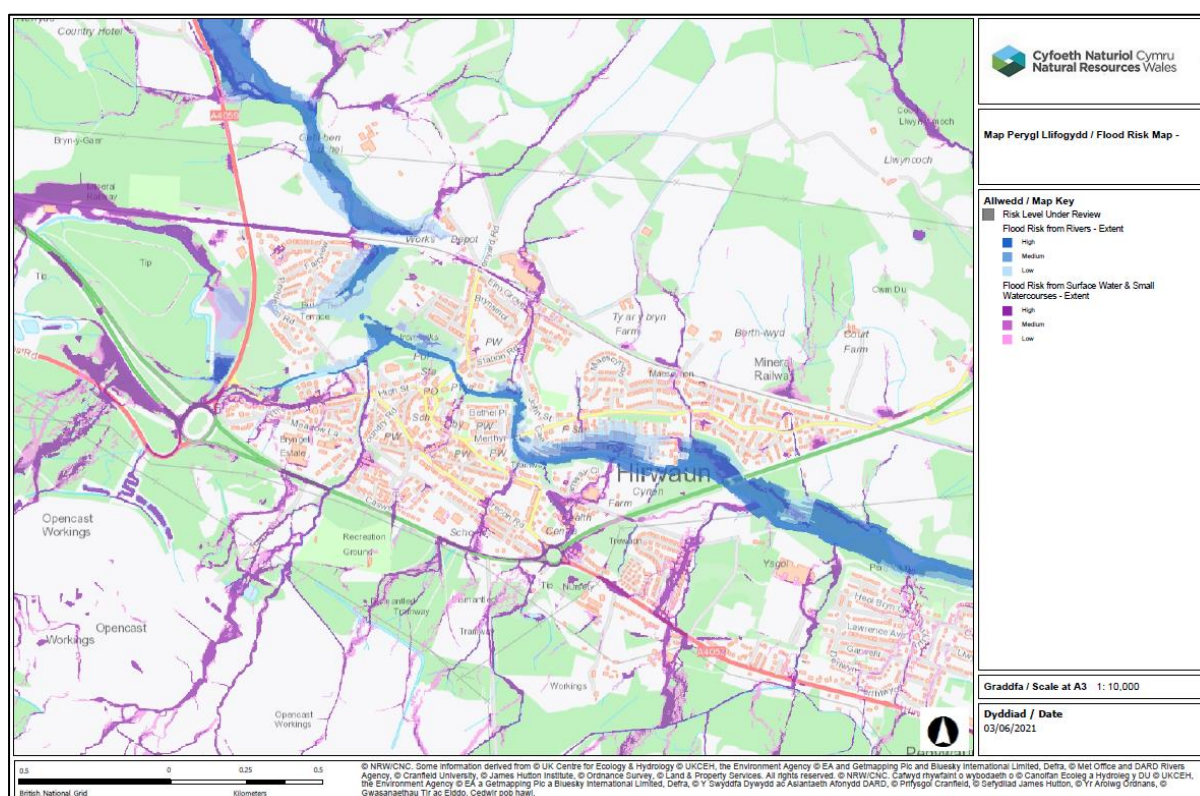


Figure 2: Natural Resources Wales' Flood Risk Assessment Wales (FRAW) map for rivers and ordinary watercourse and surface water flood risk at investigation area RCT01. Contains Natural Resources Wales information © Natural Resources Wales and database right. All rights reserved.

1.3. DRAINAGE SYSTEM

The surface water drainage system that serves investigation area RCT01 is that of the highway drainage network designed to manage the surface water within the highway and public surface water sewer and combined sewer networks operated by Dŵr Cymru Welsh Water.

³ [RCT's Flood Risk Management Plan \(rctcbc.gov.uk\)](http://rctcbc.gov.uk)

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 below within Table 1.

Table 1: Investigative evidence gathered in preparation of the Storm Dennis Section 19 report

Source	Data
Residents	Photos, videos, statements, email correspondence, public engagement survey responses
Responders' statements	Local responders' statements
CCTV Surveys	Internal surveys of the local drainage networks
Met Office Data	Weather Warning information (see FRM – Storm Dennis – Overview Report)
Rain Gauges	RCT and NRW operated gauge information (see FRM – Storm Dennis – Overview Report)
Natural Resources Wales	River Level and Flood Warning data
RCT Flood Risk Management Plan	Site specific information and data for each electoral ward in RCT
Communities at Risk Register	Flood risk ranking and scores for all flood types based on community data in Wales
Flood Investigation Report (Redstart's FIR)	A summary of the source-pathway-receptors, culvert capacity assessment and hydraulic modelling work undertaken by Redstart. The Flood Investigation Report was commissioned by RCT prior to writing the Section 19 report.

Evidence sourced from the 'Flood Investigation Report', commissioned by RCT, will be further referred to as 'Redstart's FIR' throughout this report.

1.5. PUBLIC ENGAGEMENT

Following the initial flooding event that occurred on the 15 and 16th February during storm Dennis, 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 determine the initial impacts caused by the flooding event and to investigate the potential source(s) and pathway(s) of flood water during the event. Due to the volume

of calls received by RCT's Out of Hour department, visits were prioritised to those areas experiencing significant internal flooding to residential properties.

To support the flood investigations, a public engagement exercise was undertaken between the 4th and 25th of January 2021 by Redstart, on behalf of RCT. The aim of this was to engage with the local residents who were affected by the flood event to capture details 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. 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.

2. FLOODING HISTORY

2.1. PREVIOUS FLOOD INCIDENTS

Residents affected by main river flooding state that they had not experienced flooding from the River Cynon in over 40 years prior to Storm Dennis. The last known main river flood event at Hirwaun occurred in December 1979. Residents added that they had observed significant erosion of the River Cynon bank to the rear of properties at Cae Felin Parc over the past twenty years.

Surface water flooding to the highway occurs frequently within the investigation area and surrounding areas during downpours, particularly along the A4061 Rhigos Road and the A465. These are often attributed to highway drainage infrastructure becoming hydraulically overwhelmed. Residents also stated that they have observed an increase in overland flows originating from the hillside above Hirwaun over the last few years. Notably, surface water and ordinary watercourse flooding originating from the Tower Colliery site has been a long-standing issue at Hirwaun.

2.2. FLOOD INCIDENT

The flooding that occurred on the 15th and 16th February 2020 was a result of an extreme rainfall event, designated by the Met Office as ‘Storm Dennis’ which affected the majority of RCT and caused widespread flooding to communities.

Specific details of Storm Dennis, such as rainfall and river level analysis are covered within a separate overview report that covers the wider RCT area, referenced ‘FRM – Storm Dennis – Overview Report’².

The post event inspections undertaken on the days following the storm event by RCT’s Flood Risk Management Team and RCT’s Public Health, Protection and Community team identified 32 residential and 1 commercial property as internally flooded.

A summary of the source(s) and pathway(s) of flooding within investigation area RCT01 during Storm Dennis have been outlined in the Table 2 and further described throughout this section.

Table 2: Summary of the source(s), pathway(s) and receptor(s) affected during Storm Dennis within investigation area RCT 01

Source(s)	Pathway(s)	Receptor(s)
Water levels on the River Cynon exceeded river bank levels to the rear of properties along Cae Felin Parc	Floodwater, which overtopped the banks of the River Cynon, travelled through the rear of several properties along Cae Felin Parc and onto the highway before entering properties from the front and rear.	The floodwater contributed to the internal flooding of 20 properties at Cae Felin Parc including 1 commercial property. Several other properties along Cae Felin Parc and Llys Cynon were affected by external flooding due to water accumulation on the highway.
Intense rainfall led to significant surface water runoff along several streets	Surface water flowed down a number of highway networks including Swansea Road, Cae Felin Parc, Tramway, Tramway Close, Station Road, Garth Grove,	Surface water contributed to the internal flooding of 20 properties at Cae Felin Parc including one commercial property.

	<p>Fairview, Penmark Row, Meadow Lane and Rhigos Road.</p> <p>Flow pathways within the investigation area followed local topography towards the lower elevations</p>	<p>Surface water runoff also resulted in internal flooding to 8 residential properties, including one at Tramway, two at Tramway Close, 2 properties at Station Road, 1 at Fairview, 2 at Penmark Row and a further property at Beacons View</p> <p>Several properties were also impacted externally by surface water accumulation along the highway network which was unable to drain away.</p>
<p>Overland flow originating from the hillside below the A465</p>	<p>Surface water runoff flowed overland down the hillside below the A465 and onwards towards properties at Rhigos Road and Meadow Lane.</p>	<p>Internal flooding to 1 residential property on Rhigos Road from the front.</p> <p>A 1 further residential property at Rhigos Road was externally affected.</p>

On review of Table 2, the primary source of the recorded flooding observed at RCT01 in this incident originated from the main River Cynon when river levels exceeded riverbank levels to the rear of properties at Cae Felin Parc. The River Cynon flows northwest to southeast through the centre of Hirwaun, just south of Cae Felin Parc.

Several calls were reported by residents at Cae Felin Parc on Sunday 16th February to report that the River Cynon had “breached” its banks and floodwater was entering several properties. According to residents, water entered the rear of multiple properties before continuing its flow path onto the highway and travelling in an easterly direction towards Llys Cynon before reaching elevated ground. On its flow path several properties were internal flooding through the front of the properties as a result of the overland flows.

Twenty properties along Cae Felin Parc, situated on the northern bank of the River Cynon, were confirmed as internally flooded by RCT officers. Water was reported to have reached flood depths over 1 metre within some properties. It was noted during

on-site investigations that there was some compartmentalisation of flooding to properties at Cae Felin Road due to some properties' rear garden boundary walls causing some avoidance of internal flooding.

It was also reported by residents that a secondary source of flooding, identified as surface water runoff travelling along the roads above Cae Felin Parc, also contributed to the flooding of properties at Cae Felin Parc during Storm Dennis. Surface water was unable to drain via the highway and private surface water drainage network because the networks were overwhelmed by the intense rainfall.

The associated flow paths observed during Storm Dennis at Cae Felin Parc and Swansea Road are illustrated in Figure 3.



Figure 3: Observed flow paths at Cae Felin Parc and Swansea Road in Hirwaun during Storm Dennis

Reports of a suspected surcharged culvert inlet located at Swansea Road (labelled 'Swansea Road Culvert Inlet' in Figure 3) were also received by some residents, however following further engagement with RCT's Highways and Streetcare Depot and the Hirwaun Fire Station, it was confirmed that the inlet did not surcharge during Storm Dennis.

Additionally, there was a landslide reported upstream of the investigation area, to the rear of the railway track, with no properties reported as being affected by flooding. Further downstream, to the east of Devonshire Drive, eroded material sourced by the landslide was identified at the River Cynon culvert inlet, causing flooding onto the Village Green however no properties were affected at this location. Evidence of the landslide is provided in Figure 4.



Figure 4: Landslip of the hillside above the railway line, Hirwaun on the 16th February 2020 (image captured by resident)

Isolated incidences of surface water flooding to properties was also identified as a significant source of flooding within investigation area RCT01. On the southern bank of the River Cynon, two residential properties at Tramway Close and one property at Tramway were confirmed as internally flooded. The source of flooding was identified as surface water runoff originating from the hillside to the rear of the affected property at Tramway which was channeled towards the property by local topography. Surface water continued its path towards lower ground at Tramway Close, resulting in internal flooding to two properties situated at lower elevations than the road.

Two properties at Station Road were confirmed by RCT's Public Health team to have been internally flooded. The evidence suggests that surface water flowing down the steep road entered the basement of one property as it's situated at a lower elevation than the road itself. Overland flow from land to the rear of Station Road is also considered to have entered the rear of one property due to the influence of local topography channeling surface water to this location.

Surface water runoff flowing down the steep roads to the northwest of investigation area RCT01 was also identified as a source of internal flooding to one property at Fairview. The area to the rear of the affected property is at a low point causing surface water to accumulate here before flowing onwards to reach the rear of the property. Surface water runoff is also reported to have flowed along Fairview and Penderyn Road causing external flooding to the fronts of some properties.

Two residential properties located at Penmark Row were internally flooded during the event. The properties were initially investigated by DCWW following reports of sewer flooding from residents, however DCWW confirmed no restrictions or defects had been identified within their network at this location. The affected properties are located at a low point in the road where surface water would naturally accumulate. The evidence indicates that the surface water drainage network became overwhelmed during the storm event and caused water to pond and enter both properties from the front.

To the southwest of investigation area RCT01, two properties were reportedly flooded internally, and a further two suffering external flooding, at Rhigos Road and Beacons View during the storm event. According to the affected residents, water originated from the hillside to the rear of the affected properties and conveyed towards the front of the properties. The area of hillside immediately to the rear of the affected properties is located below the A465 trunk road and is identified under private landownership.

A highway gully fronting one of the properties was reportedly overwhelmed by the volume of surface water, resulting in water ingress from the front. Ponding surface water on Meadow Lane is believed to have overtopped the dropped kerbs behind Beacons View and enter properties from the rear. Figure 5 shows the lowered section of pavement at Meadow Lane which allowed surface water to overtop and enter the impacted properties from the rear.



Figure 5: Dropped kerb and highway gully at Meadow Lane, to the rear of the impacted properties at Beacons View (image captured by RCT's Flood Risk Management officers on 26/02/2020)

2.3. RAINFALL ANALYSIS

See RCT's 'Overview Report' of Storm Dennis, reference 'FRM – Storm Dennis – Overview Report'², for a detailed analysis of the rainfall and ordinary watercourse response.

3. POSSIBLE CAUSES

3.1. CULVERT CONDITIONS

It was suggested by residents that the 'Swansea Road Culvert Inlet' (Figure 3) surcharged during the storm event and caused additional flows towards Cae Felin Parc, however it has since been confirmed that the culvert was not identified as a source of flooding. Despite this, following Storm Dennis, CCTV survey inspections of the culvert network was undertaken to ascertain both the operational condition of the network, and its structural integrity along sections of the network.

The culvert network drains the hillside above investigation area RCT01 which is culverted beneath Hirwaun's residential development and ultimately outfalls into the River Cynon at Cae Felin Parc (illustrated in Figure 6). The culvert network is also identified as falling under mixed public and private ownership.

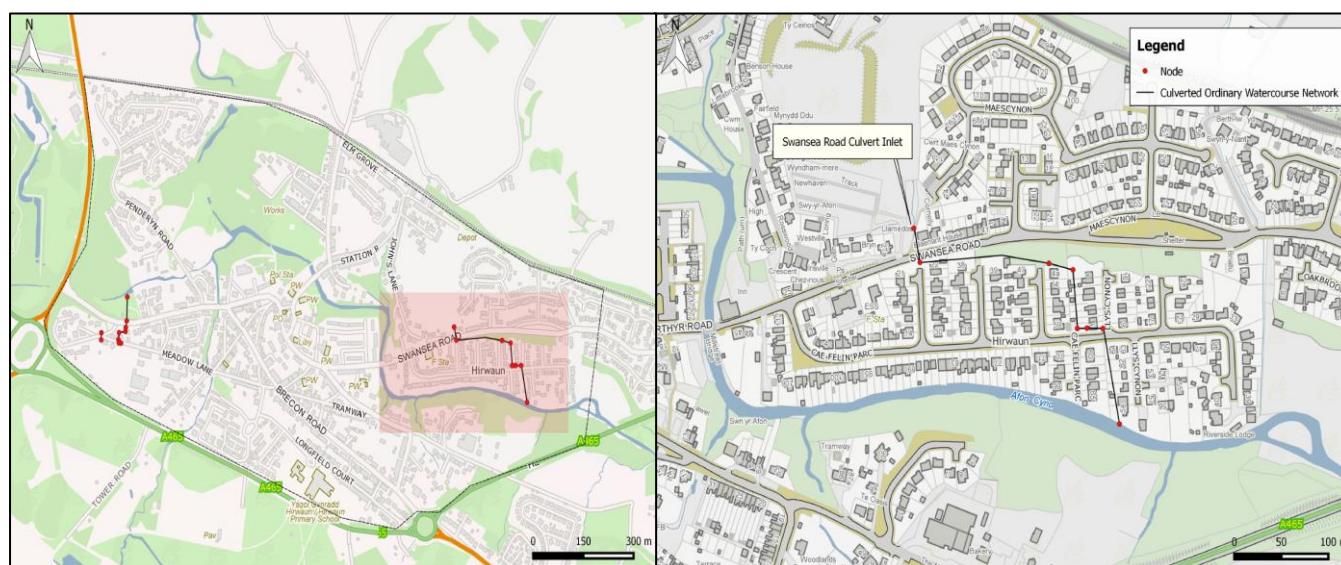


Figure 6: Swansea Road culverted watercourse network in investigation area RCT01

It should be noted that all surveys reported in this section were 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 necessarily be reflective of the condition of the assets prior to the onset of the storm event.

The condition of the Swansea Road culvert network was surveyed to be in poor condition, with multiple sections graded as 4-5 due to settled debris, fractures and

cracks reducing the culvert's cross-sectional area. Approximately 6 meters downstream of the culvert inlet the CCTV survey was abandoned due to a large obstruction identified in the network (Figure 7).



Figure 7: Obstruction identified approximately 6 meters downstream of the Swansea Road culvert inlet

Although the network was identified in poor condition, flooding was not observed from the inlet or anywhere along the network.

An additional two culvert networks at Meadow Lane (labelled 'Meadow Lane Culvert Inlet 1 and 2' in Figure 8) were also surveyed and assessed as a potential contributing source of flooding to properties at Rhigos Road and Beacons View. Both culvert inlets fall under the ownership and responsibility of private landowners.

The Meadow Lane culvert networks and inlets under review are illustrated in Figure 8. Both culvert networks were surveyed to be in poor condition, with silt accumulation and obstacles reducing the networks' cross-sectional area. Despite its poor condition, 'Meadow Lane culvert inlet 1 and 2' was not identified as a source of flooding during Storm Dennis. Residents affected by flooding in this area confirmed that no flooding was observed from either inlet.

Flooding is therefore considered to have been as a result of overland runoff flowing from the area of hillside behind the affected properties at Rhigos Road. The area of hillside is discussed in Sections 3.2 and 3.6.

In response to the settled debris identified within the culvert networks, several jetting and cleansing operations were undertaken by a Council appointed contractor to clear the debris from within the culvert networks. An estimated 205 tonnes of material was removed from the Swansea Road and Meadow Lane culvert networks during cleansing exercises.



Figure 8: Meadow Lane culverted watercourse network in investigation area RCT01

3.2. OPEN WATERCOURSE CONDITIONS

There are several named and unnamed ordinary watercourses which flow through investigation area RCT01. Notable watercourses include the Nant y Cnapiau and Nant y Bwlch which both drain the catchment area to the south and southwest of Hirwaun before discharging into the River Cynon (Figure 9).

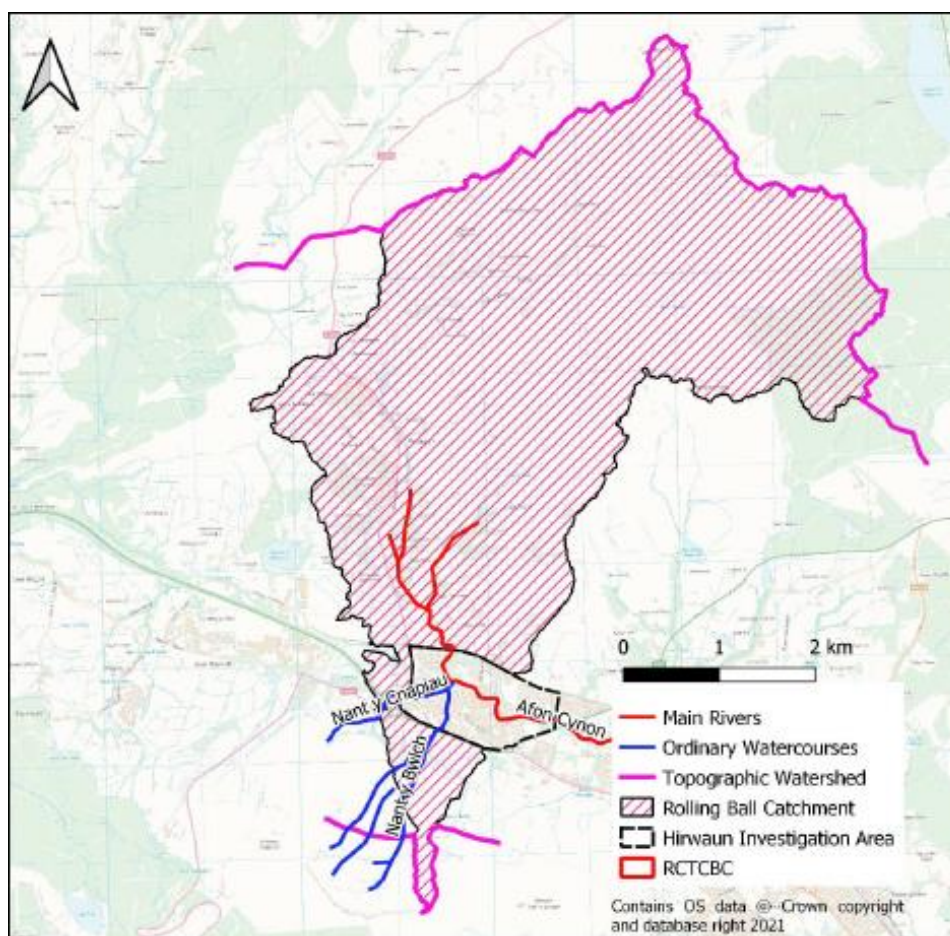


Figure 9: Rainfall Topographic Catchment area and named ordinary watercourses draining into the River Cynon at investigation area RCT01

The unnamed watercourses flowing down the hillside below the A465 (highlighted red in Figure 10), before discharging into the Nant y Cnapiau, were investigated by RCT Flood Risk Management officers as potential sources of flooding to properties at Rhigos Road and Beacons View following reports that water originated from the hillside.

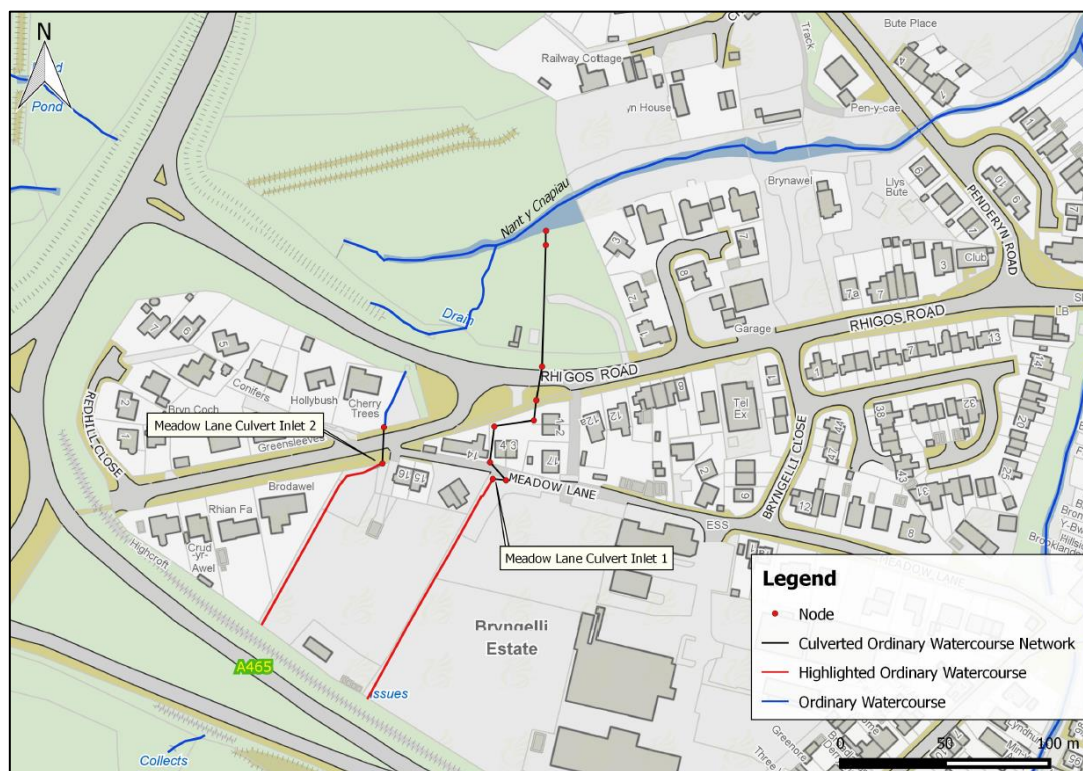


Figure 10: Ordinary watercourses and culverted networks identified at Meadow Lane in the southwest of investigation area RCT01. The ordinary watercourses identified as possible causes of flooding during Storm Dennis are shown in red.

The hillside and associated watercourses were inspected to assess their condition for any evidence of scour or land movement of the hillside which would indicate potential overland flows had occurred. The assessment found no significant erosion of the channels, however both watercourses were mostly undefined and overgrown with dense vegetation which impacted the on-site assessment (Figure 11).

LIDAR data reveals that the watercourse and hillside which drains into 'Meadow Lane Culvert Inlet 2' is relatively flat in the upper section, directly below the A465, which would allow water to pond in this area before flowing overland. There is also a hedge line adjacent to the watercourse which is considered to have aided in the diversion of surface water directly towards the impacted properties. The area of hillside is identified under private landownership.

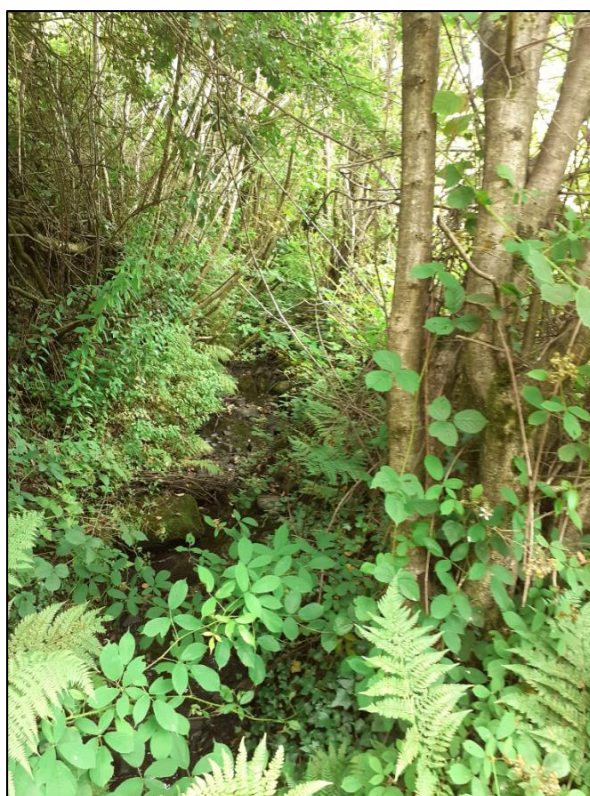


Figure 11: Undefined and overgrown ordinary watercourse channel above Meadow Lane Culvert Inlet 2 (image captured by RCT's Flood Risk Management team following Storm Dennis)

The intensity of rain falling on the already saturated catchment of Hirwaun during Storm Dennis is considered to have overwhelmed the unnamed watercourse below the A465 causing water to spill out of bank and flow overland towards the properties below.

Further engagement with residents in the area described the water coming from the hillside as “muddy water” and went on to suggest that the water was originating from the former Tower Colliery coal mining site. Based on historical flood incidences and Flood Risk Management investigations (described in Section 3.5) relating to Tower Colliery, there is evidence to suggest that water may have originated from the former colliery site and exacerbated flooding issues to the properties affected at Rhigos Road.

There is no other evidence to suggest that ordinary watercourse conditions within the rest of investigation area RCT01 contributed to the flooding of properties during Storm Dennis.

3.3. MAIN RIVER

The designated main River Cynon flows through the centre of investigation area RCT01 (Figure 1). The river was identified as a primary source of flooding to several properties within the investigation area.

3.3.1. MAIN RIVER LEVELS AND FLOOD WARNINGS

The hydrograph in Figure 12 illustrates the rapid rise in levels of the River Cynon in response to rainfall between the 14 – 17th February 2020, captured at NRW's Hirwaun monitoring station which is situated near Cae Felin Parc.

NRW issued a 'Flood Alert' (indicating possible flooding) for the entirety of the River Cynon at 12:51 on the 15th February, during that time the River Cynon at Hirwaun had reached almost a metre in depth. The River Cynon continued to rise during the early hours of Sunday 16th February morning before reaching a peak level of 1.333 metres at 02:15 on 16th February 2020; the highest level recorded for the Cynon at Hirwaun.

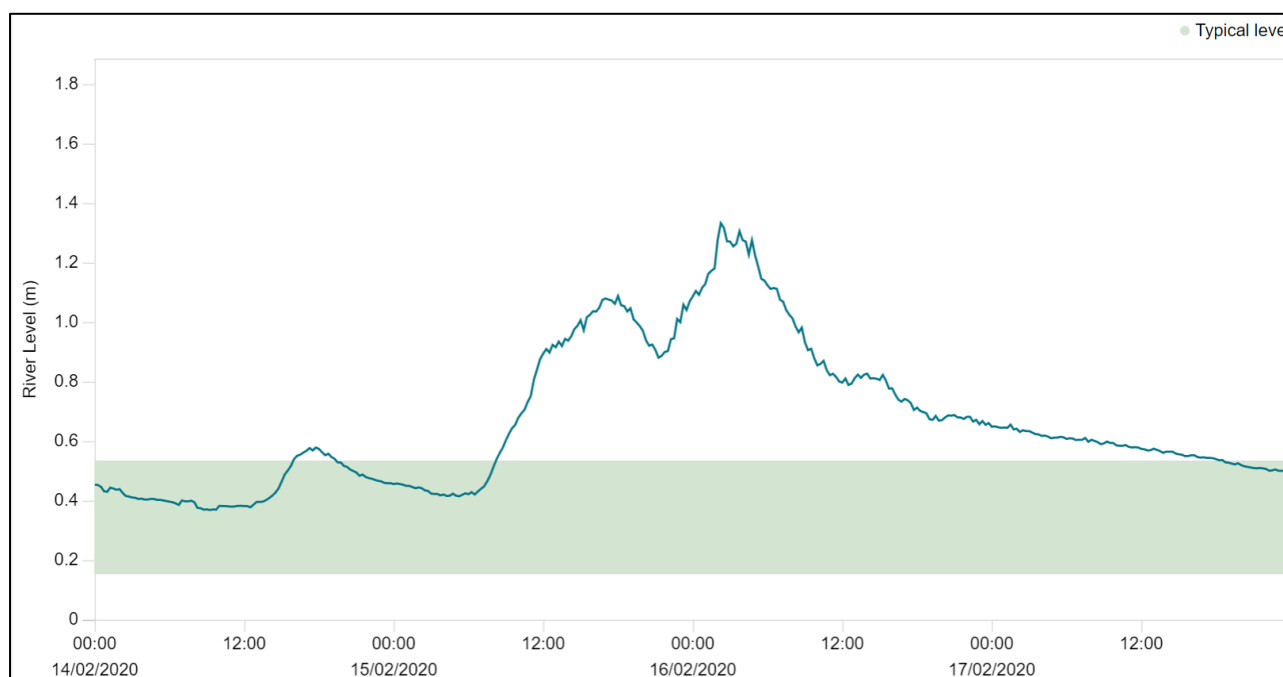


Figure 12: The River Cynon levels at Hirwaun station between the 14th and 17th February 2020 (Natural Resources Wales)

The green bar displayed on the hydrograph shows the typical level of the River Cynon at Hirwaun station, ranging between 0.15 and 0.55 metres. At its peak, the River Cynon at Hirwaun was almost a meter higher than its average level, stressing the

extreme and unprecedented levels that RCT's rivers rose to during the storm's peak intensity. As a result of the significant rise in river levels following heavy and persistent rainfall, the River Cynon overtopped its banks to the rear of Cae Felin Parc, leading to property flooding.

River levels in the Cynon at Hirwaun subsided relatively quickly following the peak, returning to its typical levels the following day on the 17th February 2020.

Investigation area RCT01 falls within NRW's Hirwaun Flood Warning Area. The Flood Warnings issued by NRW, and associated river levels, for the River Cynon at Hirwaun during Storm Dennis are shown in Table 3.

Table 3: Flood Warnings issued by NRW for the River Cynon at Hirwaun during Storm Dennis

Flood Warning Type	Location	Start Time	River Level (m) at Hirwaun
Flood Alert	River Cynon	12:51 15/02/2020	0.924
Flood Warning	River Cynon at Hirwaun	02:45 16/02/2020	1.272

A 'Flood Warning' alert (indicating flooding is expected) for the River Cynon at Hirwaun was issued by NRW at 02:45 on 16th February; 30 minutes after the River Cynon reached its peak level at 02:15. By this time however, main river flooding to properties at Cae Felin Parc had already commenced.

NRW have acknowledged within their 'Flood Incidence Response Review'⁴ that the operation of the Flood Warning Service "came under significant pressure during February and at times became overwhelmed" resulting in flood warnings being issued late (after the onset of flooding) or not issued at all. At this location (RCT01), this is in reference to the 'Flood Warning' alert at Hirwaun.

Improvements to their flood forecasting and warning services are being internally investigated by NRW and where feasible implemented to deliver the recommendations outlined within their Flood Incident Response Review⁴.

⁴ [February 2020 Floods in Wales: Flood Incident Management Review \(cyfoethnaturiol.cymru\)](https://www.cyfoethnaturiol.cymru/en/February-2020-Floods-in-Wales-Flood-Incident-Management-Review)

3.3.2. MAIN RIVER FLOOD RISK

The main river flooding that occurred within investigation area RCT01 during Storm Dennis is largely consistent with the modelled outputs of NRW's Flood Risk Assessment Wales (FRAW) mapping.

Properties impacted by flooding at Cae Felin Parc are identified at high risk of fluvial flooding, as depicted within Figure 13, which is an extract from NRW's FRAW mapping exercise and depicts the main river flood extents for the 'Defended' 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).

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

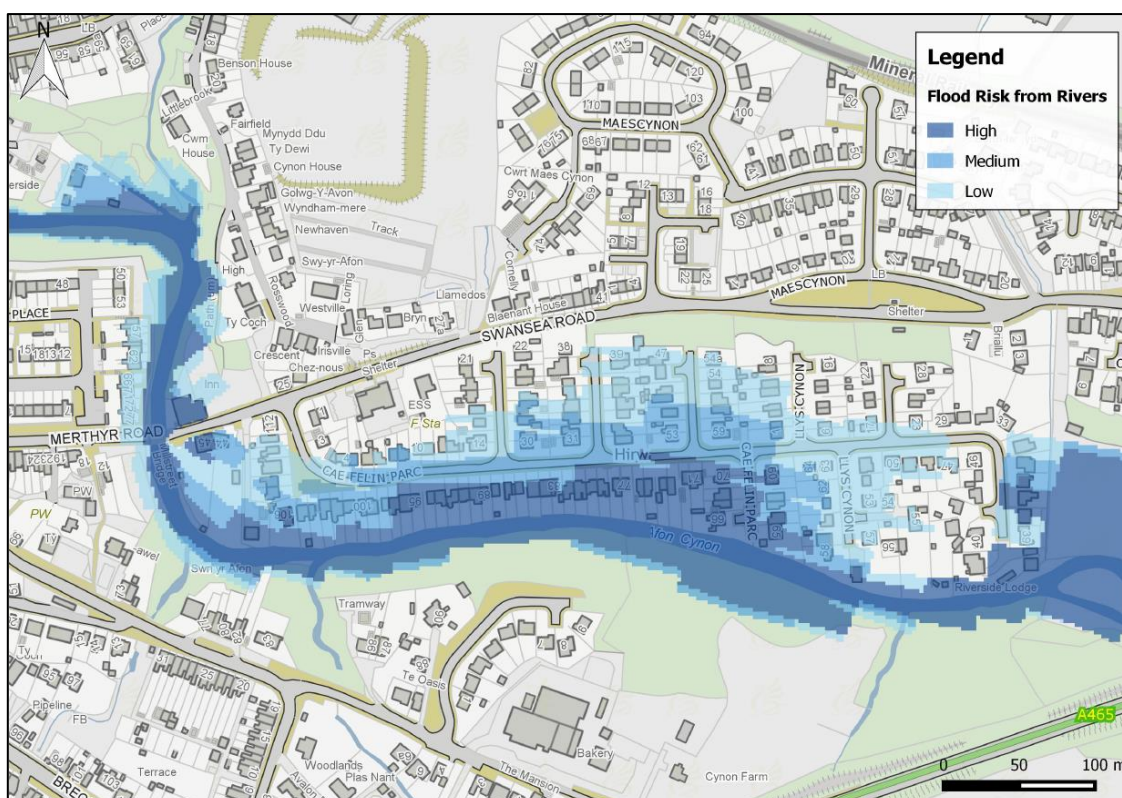


Figure 13: Natural Resources Wales' Flood Risk Assessment Wales (FRAW) map for River sources at RCT01. Contains Natural Resources Wales information © Natural Resources Wales and database right. All rights reserved.

Those properties directly adjacent to the River Cynon suffered the most severe impacts, with reported flood depths up to 1 metre in height observed at those properties falling in the high flood risk zone.

Elsewhere within the investigation area, and in addition to the flood damage at Cae Felin Parc, the River Cynon also impacted the rear of properties further upstream at Richmond Drive, to the north of investigation area RCT01, causing significant erosion of the banks in some locations. Figure 14 depicts an image of property damage caused by significant erosion of the riverbanks.

Residents reported significant deposition of large stones and debris mobilised by extreme flows within the River Cynon during the storm event. It is likely that the landslide that occurred above the railway track (Figure 4) supplied additional eroded material into the watercourse, however this is not considered to have contributed to the flooding at Cae Felin Parc.

Flood risk from main rivers is noted across the length of the River Cynon that flows through RCT01, however Cae Felin Parc is identified as an area of significant risk in terms of impact to people and properties. No incidences of internal flooding sourced by the River Cynon were reported at RCT01, other than at Cae Felin Parc.



Figure 14: Damage to property caused by the River Cynon to the rear of Richmond Drive, Hirwaun on the 16th February 2020 (image captured by resident)

3.3.3. MAIN RIVER FLOOD DEFENCES

The properties impacted by the River Cynon at Cae Felin Parc are currently 'Undefended', i.e., there are no formally designated flood defence infrastructure under the operation and maintenance of NRW in place along the River Cynon at Hirwaun. It was noted by residents within the public engagement exercise that a lack of formal flood defences and the poor condition of the riverbanks in some locations was exacerbating flooding issues at Cae Felin Parc.

There are no formally designated flood defence assets at Cae Felin Parc. River levels on the River Cynon exceeded the river bank levels and resulted in water ingress through privately owned assets, i.e., rear boundary walls of properties. Due to variations in the height and structural condition of the properties' rear boundary walls, some properties backing on to the River Cynon at Cae Felin Parc were more affected in comparison to others.

Based on evidence provided by the FRAW map and the lack of formal flood defences, properties at Cae Felin Parc are identified at high risk of flooding from the main river (Figure 13).

3.4. HIGHWAY DRAINAGE CONDITIONS

Surface water runoff along the highway was reported by residents at various locations within the investigation area, however there is no evidence to suggest that the condition of the highway drainage within RCT01 significantly contributed to the flooding of properties. The highway drainage infrastructure was overwhelmed by intense rainfall and subsequent surface water flows which led to the accumulation of standing water entering properties at Fairview, Penmark Row, Rhigos Road, Beacons View, Tramway Close and Station Road.

Several residents reported surface water accumulation on the highway at Cae Felin Parc during the storm event. The surface water drainage network at this location was surveyed by a Council appointed contractor following the flood event which identified the network as heavily silted. Widespread deposits of mud, silt and debris are assumed to have entered the highway drainage system at Cae Felin Parc following the overtopping of the River Cynon, leading to a reduction in the hydraulic capacity of the 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 in RCT01 was exceeded as a result of both main river and surface water flows entering the network. The maintenance condition of the highway drainage infrastructure is not considered to have significantly impacted the flooding experienced during Storm Dennis.

3.5. DCWW APPARATUS CONDITIONS

There is no evidence from this investigation that DCWW apparatus contributed to the Storm Dennis event within investigation area RCT01.

DCWW reported no issues within RCT01 during Storm Dennis and it is not believed that any DCWW infrastructure was damaged during the storm event. Whilst DCWW have concluded that their assets performed well during Storm Dennis, the majority of drainage infrastructure within the investigation area is comprised of combined sewer networks which are likely to have become overwhelmed during the storm event for the reasons outlined in Section 3.4.

3.6. SURFACE WATER

Surface water flooding was identified as a predominant source of flooding within investigation area RCT01, causing internal flooding to at least 10 confirmed properties across Hirwaun and contributing to the flooding of a further twenty properties at Cae Felin Parc.

The pathways for surface water runoff during the storm event was observed primarily along the highway network, but also as overland flows originating from areas of hillside within the investigation area. It should be noted that the exact flow routes have not been confirmed due to limited anecdotal evidence, however, NRW's national surface water and ordinary watercourse flood maps provide a reasonable indication of the pathways that would have occurred during the storm event. These indicative surface water flow paths are illustrated in Figure 15 and correlate well with NRW's surface water flood map.

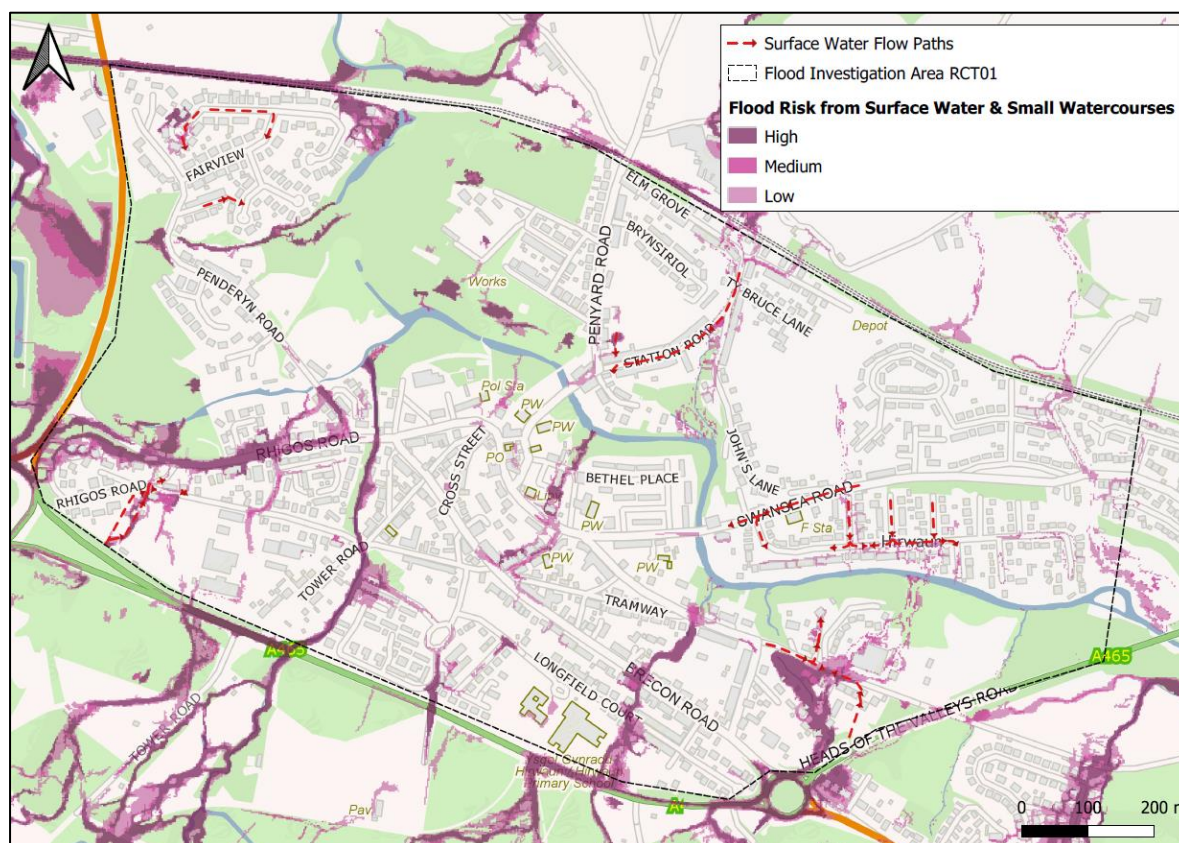


Figure 15: Natural Resources Wales' FRAW map for surface water and ordinary watercourse sources and indicative surface water flow paths within investigation area RCT01. Contains Natural Resources Wales information © Natural Resources Wales and database right. All rights reserved.

Runoff was channeled via several roads, towards properties at Cae Felin Parc, Tramway, Penmark Row, Fairview and Station Road. The gradient of the roads, elevation of properties relative to the road, and the extent of impermeable surfaces surrounding the affected streets is considered to have; increased surface water flows along the highway and attributed to the pooling of water outside properties. In most cases, the surface water flooding at RCT01 was primarily caused by intense rainfall falling on already saturated catchments following Storm Ciara on 7-8th February 2020.

Based on residents' accounts captured during the public engagement exercise (described in Section 3.2.), excess water is observed to be conveying towards the investigation area from the Tower Colliery site, situated to the south west of the investigation area, above the A465 trunk road. This excess water is considered to have contributed to the overland runoff that was observed by residents flowing down the hillside below the A465 and towards two properties at Rhigos Road.

Land reclamation and restoration works have been ongoing at Tower Colliery since its closure in 2008. These works include the re-profiling of the former colliery site back to its pre-mining conditions, which involves the reduction of discharge rates from the site to post-mining conditions, as accepted by the Local Planning Authority. The sub-catchment areas associated to the Tower Colliery planning application are illustrated in Figure 16.

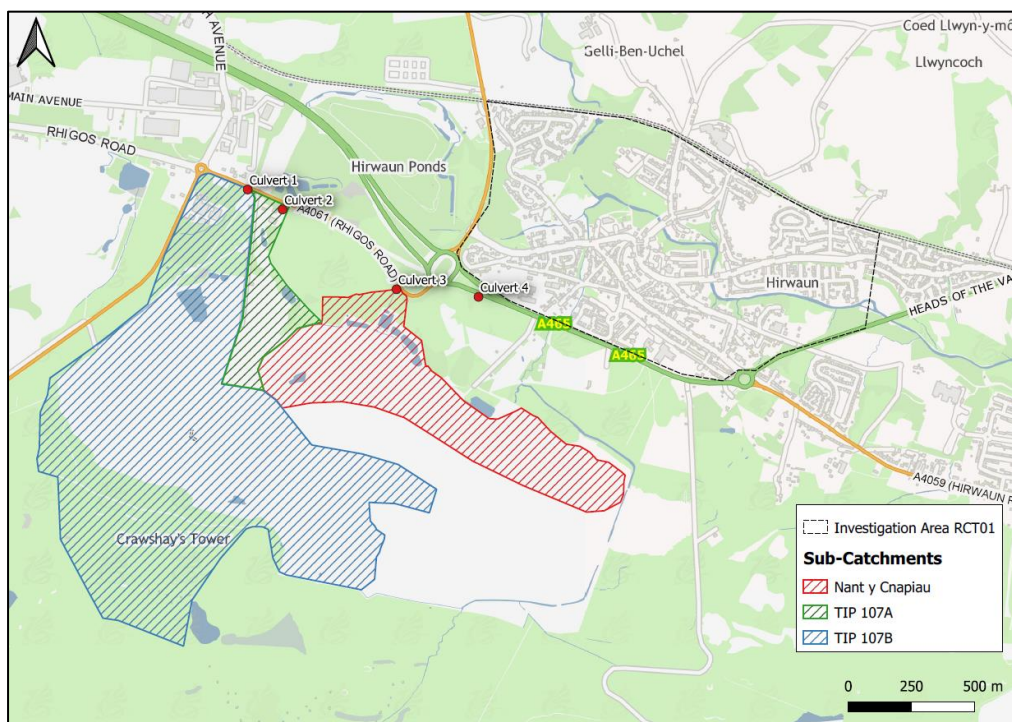


Figure 16: Tower Colliery sub-catchments and associated culvert inlets

An assessment of the pre and post mining discharge rates for the development site has been investigated by RCT's Flood Risk Management team. The results of the assessment for each sub-catchment are depicted within Table 4.

Table 4: Pre and post mining discharge rates for the Q100 + 30% climate change allowance event per sub-catchment

Sub-Catchment	Pre-Mining Discharge Rates (l/s)	Post Mining Discharge Rates (l/s)	Variance (l/s)
Nant y Cnapiau	3363.21	2370.29	-992.92
TIP 107A	1187	766	-421
TIP 107B	4950	4691	-259

The assessment has determined that the post-mining discharge rates will reduce the flow of water discharging from the Tower Colliery site by 29% for the Nant y Cnapiau catchment, 36% for TIP 107A and 5% for TIP 107B.

At the time of the storm event however, the catchment areas were known to have not been arranged and re-profiled as post mining conditions stipulate. This means that the surface water and ordinary watercourse flows conveying down the sub-catchments towards 'Culverts 1, 2 & 3' (illustrated in Figure 16) were being exacerbated due to the arrangements of the catchment on site.

As a result of which flooding was reported along Rhigos Road by residents. A site inspection undertaken by RCT officers several hours after the peak of the storm event identified 'Culvert 1 & 2', to be flooding the highway (Figure 17). The cause of which was attributed to the volume of water identified at the culvert inlets rather than any debris accumulation. Based on available evidence, it is assumed that 'Culvert 3' was also surcharging due to excess flows travelling down the Nant y Cnapiau sub-catchment during the storm event.

The area immediately downstream of the Nant y Cnapiau inlet (Culvert 3) is served by an existing land drainage channel which acts as a dedicated overflow channel to 'Culvert 3', i.e., the land drainage channel conveys flows both east and west at the A4061 Rhigos Road. The routing of excess water to the west of 'Culvert 3' conveys towards 'Culvert 4' where the routing to the east enters into a highway culvert that crosses Rhigos Road and outfalls into the unnamed ordinary watercourse channel. The indicative exceedance flow paths to the west and east of 'Culvert 3' are illustrated in Figure 18. The routing of water east towards 'Culvert 4' however, is considered to have exacerbated the flow of water at this location, contributing to the overland flows towards properties at Rhigos Road.



Figure 17: Surface water flooding to the A4061 Rhigos Road caused by surcharging culvert inlets associated to sub-catchment TIP 107A and TIP 107B (captured by RCT's Highways and Streetcare Depot on 16th February 2020)

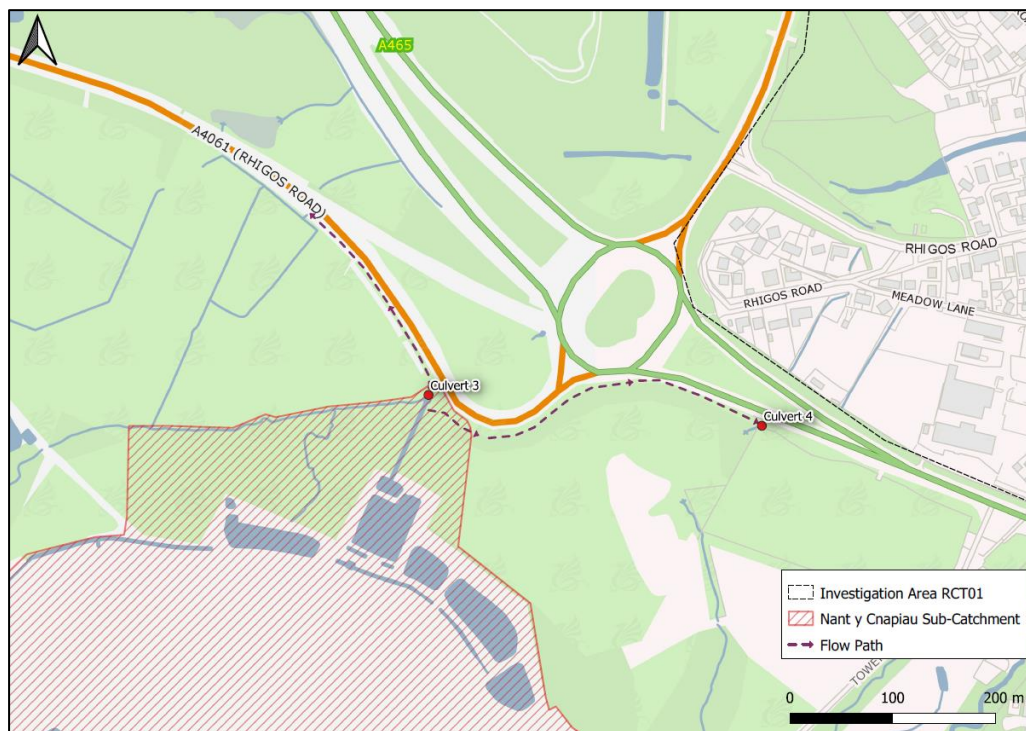


Figure 18: Exceedance flow paths to the east and west of Culvert 3

3.7. ACCESS STRUCTURES

No access structures were identified during the asset investigations within the area, as such 'access structures' have not been considered within this report.

3.8. SYSTEM AT CAPACITY

The capacity of the culverted ordinary watercourse structures associated to the discharge of water from the Tower Colliery site (introduced in Section 3.6), which falls outside of RCT01, has been described below.

Culvert capacity assessments of the existing infrastructure (illustrated in Figure 16) based on post-mining discharge rates was undertaken as part of the Flood Risk Managements' team investigations. The results of which are summarised in Table 5.

Table 5: Summary of culvert capacity assessment results for Culverts 1-3 (Figure 16) based on post mining conditions which indicate the current standard of protection of the structure in free-flowing conditions

Culvert Inlet	Associated Catchment	Standard of Protection (SOP) – Free Flowing
Culvert 1	Nant Y Cnapiau	Q2
Culvert 2	Tip 107A	Q30
Culvert 3	Tip 107B	Q30

Based on the results of the culvert capacity assessment, the SOP of the existing infrastructure is below current design standards, as defined by CIRIA C786⁵, and cannot accommodate the discharge of water from both pre and post mining conditions. This is considered to have exacerbated the flooding at Culvert 4.

Design and construction work to upgrade the SOP of culvert structures 'Culvert 1, 2 & 3' to 1 in 100 annual probability flood event (Q100) are in development by both the Highway Authority and the Welsh Government, respectively.

Based on the available evidence presented in the above sections, it is concluded that exceedance flows from the Tower Colliery site are considered to have contributed to the surface water flooding that impacted two properties at Rhigos Road during the storm event.

On review of the available evidence gathered as part of this investigation, the culverted ordinary watercourse structures identified within investigation area RCT01 have not been identified as sources of flooding during Storm Dennis and their hydraulic capacities have not been assessed.

⁵ CIRIA C786 Culvert, screen and outfall manual (2019)

3.9. SUMMARY OF POSSIBLE CAUSES

The above sections have identified and described the possible causes of flooding within investigation area RCT01 during Storm Dennis which occurred on the 15 and 16th February 2020. A summary of the identified sources and possible causes of flooding (issue) has been outlined below in Table 6.

Table 6: Summary of the source(s) and possible cause(s) of flooding in Hirwaun during Storm Dennis

Ref No	Asset (Source)	Issue	Asset Owner	Type of Flooding
1	River Cynon	Levels on the River Cynon exceeded river bank levels to the rear of properties at Cae Felin Parc causing internal flooding to at least 20 properties and extensive flooding to the highway. Flood water passed through/over several privately owned assets (boundary walls) before entering properties.	Various Private Landowners	Main River
2	Overland flow from the hillside to the rear of Rhigos Road	Significant flows entering the unnamed ordinary watercourse that flows down the hillside behind Rhigos Road are considered to have caused the ordinary watercourse channel to overtop, resulting in overland flows towards the rear of properties at Rhigos Road.	Private Landowner	Ordinary Watercourse and Surface Water
3	Surface water runoff and accumulation across several streets within RCT01	Surface water runoff was channeled down the steep roads within the investigation area towards several properties situated at localised low points. This resulted in internal flooding to 10 residential properties and external flooding to several more.	Rhondda Cynon Taf Highway Authority	Surface Water

4. RISK MANAGEMENT AUTHORITY ACTIONS

A Welsh Risk Management Authority is defined in Section 6 of the Flood and Water Management Act 2010 as NRW; a LLFA, a district council for an area where there is no unitary authority, or a highway authority wholly in Wales; an internal drainage board for an internal drainage district that is wholly or mainly in Wales; a water company that exercises functions in relation to an area in Wales. As the LLFA, RCT has the responsibility to coordinate the management of flood risk and the interaction of Risk Management Authorities across Rhondda Cynon Taf.

An overview of the relevant Risk Management Authority in relation to flood type is provided in Table 7. For further details of the roles and responsibilities of individual Risk Management Authorities in managing flooding, refer to the Welsh Government's National Strategy for Flood and Coastal Erosion Risk Management, Section 4 'Roles and Responsibilities'⁶, and RCT's 'FRM – Storm Dennis - Overview Report'².

Table 7: Risk Management Authority with relevant functions to manage the risk for different flood types

Type of Flooding	Risk Management Authority
Flooding from Main River, reservoirs and the sea (including coastal erosion).	Natural Resources Wales
Flooding from ordinary watercourses, surface water and groundwater	Lead Local Flood Authority
Flooding from water and sewage systems	Water Companies (Dŵr Cymru Welsh Water)
Flooding from the highway	Highway Authority
Flooding from the highway (motorways and major trunk roads)	Welsh Government Trunk Road Agency

Risk Management Authorities have direct flood risk management functions under the Flood and Water Management Act 2010, as well as the Water Resources Act 1991, Land Drainage Act 1991 and the Highways Act 1980. Through analysis of the flooding that impacted RCT01, the flood risk management functions exercised, or proposed to be exercised, by relevant RMAs were recorded pursuant to Section 19 of the Flood and Water Management Act 2010, which states;

⁶ [National Strategy for Flood and Coastal Erosion Risk Management in Wales \(English\) \(gov.wales\)](#)

“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 cause(s) of flooding in investigation area RCT01 as a result of Storm Dennis has been previously identified and summarised within Table 6. The Risk Management Authorities responsible for managing that flooding have been listed within Table 8 below, along with a series of recommendations presented by the LLFA.

Table 8: Recommendations provided by the LLFA to be considered by the relevant Risk Management Authority identified in response to the source(s) of flooding in RCT01 (as per Table 6)

Ref No	Asset (Source)	Asset Owner	Type of Flooding	Relevant Risk Management Authority	Recommendations
1	River Cynon	Various Private Landowners	Main River	Natural Resources Wales	R1A NRW to “complete detailed investigative analysis work to understand the mechanisms of flooding in areas known to have flooding from main rivers”, including the River Cynon at Hirwaun. Aligns with recommendation ‘Action FD2’ within NRW’s Flood Incident Management Review.

					R1B	NRW to work with landowners to assess and review the risk of flooding from the River Cynon at Hirwaun, an area deemed at high risk of fluvial flooding, to identify the viability of risk management options.
					R1C	NRW to review its flood warning service provision, especially for extreme events. This will form part of NRW's Flood Warning Service Review Implementation Programme and aligns with the recommendations set out in their 'Flood Incidence Management Review'.
2	Overland flow from the hillside to the rear of Rhigos Road	Private Landowner	Ordinary Watercourse and Surface Water	Lead Local Flood Authority and Land Drainage Authority	R2A	The LLFA and LDA to identify asset ownership and responsibility.
					R2B	The LLFA and LDA to investigate and assess the ordinary watercourse conditions and surface water drainage

						arrangements on the area of hillside.
					R2C	The LLFA to work with the Local Planning Authority to ensure the post mining arrangements and discharge flows are regulated.
3	Surface water runoff and accumulation across several streets within RCT01	Rhondda Cynon Taf Highway Authority	Surface Water	Highway Authority and Lead Local Flood Authority	R3A	The LLFA and the Highway Authority to evaluate surface water management options to alleviate flooding from the highway at several locations across the investigation area.

4.1. LEAD LOCAL FLOOD AUTHORITY

In review of Ref 2 – 3 in Table 8, the LLFA has been determined as the relevant Risk Management Authority in relation to the ordinary watercourse and surface water flooding which occurred at investigation area RCT01 during Storm Dennis.

The LLFA exercised the following functions in response to the flooding at investigation area RCT01;

- 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 carried out by Redstart, on behalf of RCT as the LLFA, was undertaken in order to gain further local insight and anecdotal evidence to support the flood investigation.
- The LLFA and LDA have exercised their permissive powers under Section 64 of the Land Drainage Act 1991 to investigate the culvert structures and network conditions and its impact on the flooding within the investigation area.
- An estimated 861 meters of ordinary watercourse culvert network length within investigation area RCT01 has been surveyed following the storm event to ascertain both the operational condition and structural integrity along sections of the network. **(R2B)**
- An estimated 207 tonnes of material and debris was removed from the culverted watercourse network within investigation area RCT01 during jetting and cleansing operations.
- The LLFA and LDA have undertaken clearance works to the culvert inlet structures which fall under the responsibility of the Authority.
- The LLFA have expanded their asset inspection and maintenance schedule to include culvert inlets within the investigation area in its response to extreme weather event planning.
- The LLFA commissioned a consultant (Redstart) to investigate the standard of protection of the existing culvert networks in RCT01 to determine their hydraulic capacity following the identification of several structural and operational defects within sections of the network.

- The LLFA has exercised its powers, under Section 13 of the FWMA, to request information and co-operation from NRW in relation to their responsibilities as a RMA in response to Storm Dennis.
- The LLFA has set up a central Control Room, to compliment the Council's Contact Centre and CCTV Centre which is based at the Council's offices, to provide a comprehensive and informed response to the residents of RCT as appropriate during storm events.
- The LLFA have initiated an interim Property Flood Resistance project offering expandable flood gates to those properties deemed at high risk of flooding from local sources.
- The LLFA, working in partnership with NRW, have expanded their interim Property Flood Resistance project offering expandable flood gates to those properties deemed at high risk of flooding from the main river, as per NRW's determination.

The LLFA propose to exercise the following functions in response to the flooding at investigation area RCT01;

- Following the surveying of culvert networks in RCT01, the LLFA propose to input and update all relevant asset data.
- The LLFA and LDA intend to clarify drainage asset owners and management responsibilities to make them aware of their personal risk. To ensure landowners manage the risk in compliance with the relevant legislation, a team of Flood Enforcement Officers including legal support is to be appointed. **(R3A)**
- The LLFA and LDA will work with landowners and property owners to manage their personal flood risk through local measures, such as property resilience and resistance measures.
- The LLFA propose to install remote telemetry monitoring devices at key culvert structures to enable operators to ensure the drainage systems in investigation area RCT01 are operating effectively.
- In response to the grade 4 and 5 structural defects identified within the Swansea Road culvert network, the LLFA and LDA have applied for Welsh Government funding to utilise their permissive power under Section 64 of the Land Drainage Act 1991 to undertake rehabilitation works to the culverted ordinary watercourse network.
- As part of RCT's comprehensive review of the County Borough's most at risk communities, the LLFA are proposing to undertake a formal SFRA of the Upper

Cynon catchment area to better understand the overall risk from ordinary watercourse and surface water flooding in order to target investment to areas of highest risk. The SFRAs also aim to encourage whole catchment measures, including working with natural processes, to alleviate flood risk in those areas of highest risk. **(R2B, R3A)**

4.2. NATURAL RESOURCES WALES

In review of Ref 1 in Table 8, NRW has been identified as the relevant Risk Management Authority in relation to the main river flooding from the River Cynon during Storm Dennis.

NRW has exercised the following functions in response to the flooding at investigation area RCT01;

- 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.
- Following Storm Dennis NRW undertook an inspection of the River Cynon at Hirwaun to ensure it was clear of blockages.
- During the post flood event recovery, NRW were in attendance at Cae Felin Parc to aid the Council in the removal of debris from the highway drainage network and DCWW infrastructure.
- Utilising post event data and information, NRW have reviewed the Resultant Thresholds for the River Cynon at Hirwaun Flood Warning Area. This is critical for assessing the performance, timeliness and accuracy of the warning service after a flood. **(R1C)**
- NRW has introduced improved digital services to provide comprehensive flood risk, river level and rainfall information to households, businesses and communities across Wales. The improved service was launched in September 2020 on the NRW website and will, according to NRW, improve how live flood warning and water level data is shared before and during flood events. **(R1C)**
- NRW arranged a community meeting with residents to discuss flood plans and flood warning service. **(R1C)**
- NRW have commissioned a Cynon Flood Modelling Study which is programmed for completion by the end of March 2022. **(R1A)**
- Following the flooding events of February 2020, NRW published a review of its incident response to Storm Ciara and Dennis in October 2020⁷. This review contains several recommendations for improvements to their ways of working and services which NRW are in the process of implementing through an internal delivery programme.

⁷ [Natural Resources Wales / Our response to Storm Ciara and Storm Dennis](#)

-
- NRW have developed a detailed Implementation Programme to address the areas of improvement work required to deliver the recommendations of the Flood Warning Service Review carried out by NRW in 2018. Several of the recommendations directly link to the recommendations set out by NRW within their Flood Incident Management Review. **(R1C)**

NRW propose to exercise the following functions in response to the flooding at investigation area RCT01;

- Following the completion of NRW's Cynon Flood Modelling Study, NRW propose to undertake an initial economic assessment of the viability of potential flood risk management options. Greatest consideration should be given to areas at high risk of flooding from rivers on a prioritised basis, such as Cae Felin Parc. **(R1A, R1B)**
- Following the completion of NRW's Cynon Flood Modelling Study, NRW propose further threshold work and flood warning area amendments. **(R1A, R1C)**
- NRW will undertake a review of the modelled outputs and adopt changes to their maintenance program within the investigation area if required. **(R1A)**

4.3. WATER COMPANY

DCWW were not identified as a relevant authority in relation to flooding at investigation area RCT01 during Storm Dennis. Despite this, calls were received by DCWW in relation to the flooding at Hirwaun.

DCWW have exercised the following functions in response to the flooding at investigation area RCT01;

- DCWW carried out their own investigations in response to incidents of flooding that were reported by residents directly to DCWW.
- DCWW contacted residents affected by flooding to offer support and advice to assist in the recovery following Storm Dennis.

DCWW do not propose to undertake any further functions in relation to the event at investigation area RCT01.

4.4. HIGHWAY AUTHORITY

During the investigation into the flooding at investigation area RCT01 during Storm Dennis, the Highway was identified as flooding from a combination of sources, notably as a result of surface water runoff, ordinary watercourse flows and flooding from the River Cynon.

Ref 3 of Table 8 identified the Highway Authority as a relevant Risk Management Authority in relation to the surface water flooding that occurred along the highway across RCT01.

RCT as the Highway Authority have exercised the following functions in response to the flooding at investigation area RCT01;

- 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 flood water to ensure the safety of the highway post event.
- The Highway Authority have undertaken clearance works to the culvert inlet structures which fall under the responsibility of the Highway Authority.

RCT as the Highway Authority propose to undertake the following functions in relation to the event at investigation area RCT01;

- The Highway Authority intend to increase their resource capacity by establishing a dedicated 'Pluvial Drainage Team' to focus entirely on the refurbishment and maintenance of RCT's existing and enhanced highway drainage infrastructure.
- Upgrade works to 'Culvert 1' and 'Culvert 2', associated to the Tower Colliery sub-catchments (illustrated in Figure 16), to increase the SOP to Q100, are currently on the Highway Authority's development programme for construction in 2022/23. **(R3A)**

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 - <https://naturalresources.wales/flooding/check-flood-warnings/?lang=en>

Natural Resources Wales - Long Term Flood Risk - <https://naturalresources.wales/evidence-and-data/maps/long-term-flood-risk/?lang=en>

Rhondda Cynon Taf CBC - Local Flood Risk Management Plan - <https://www.rctcbc.gov.uk/EN/Resident/ParkingRoadsandTravel/Roadspavementsandpaths/FloodAlleviation/Floodriskregulations2009.aspx>

Rhondda Cynon Taf CBC - Local Flood Risk Management Strategy - <https://www.rctcbc.gov.uk/EN/Resident/ParkingRoadsandTravel/Roadspavementsandpaths/FloodAlleviation/LocalFloodRiskManagementStrategy.aspx>

Rhondda Cynon Taf CBC – Sustainable Drainage – <https://www.rctcbc.gov.uk/EN/Resident/ParkingRoadsandTravel/Roadspavementsandpaths/SustainableDrainage/SustainableDrainage.aspx>

Welsh Government - National Strategy for Flood and Coastal Erosion Risk Management - <https://gov.wales/sites/default/files/publications/2019-03/national-strategy-for-flood-and-coastal-erosion-risk-management-in-wales.pdf>

Welsh Water – How to Contact Us – <https://www.welshwater.com/en/Contact-Us.aspx>

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Appendix G

Flood and Water Management Act 2010

Section 19 Flood Investigation Report

Storm Dennis –
Flood Investigation Area RCT11
(Pontypridd)

January 2022

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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 Flood and Water Management Act 2010. The Council assumes no responsibility or liability from any person in connection with its contents or findings.

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CONTENTS

EXECUTIVE SUMMARY	3
ABBREVIATIONS & GLOSSARY	6
TABLES AND FIGURES	7
1. INTRODUCTION.....	9
1.1. Purpose of Investigation.....	9
1.2. Site Location	10
1.3. Drainage System.....	12
1.4. Investigation Evidence	12
1.5. Public Engagement	13
2. FLOODING HISTORY	14
2.1. Previous Flood Incidents	14
2.2. Flood Incident.....	15
2.3. Rainfall Analysis.....	21
3. POSSIBLE CAUSES	22
3.1. Culvert Conditions.....	22
3.2. Ordinary Watercourse Conditions	22
3.3. Main River	23
3.3.1. Main River Levels And Flood Warnings	23
3.3.2. Main River Flood Risk.....	25
3.3.3. Main River Flood Defences.....	26
3.4. Highway Drainage Conditions	29
3.5. Dŵr Cymru Welsh Water Apparatus	30
3.6. Surface Water	31
3.7. Access Structures	32
3.8. Summary of Possible Causes	33
4. RISK MANAGEMENT AUTHORITY ACTIONS.....	34
4.1. Lead Local Flood Authority	37
4.2. Natural Resources Wales	39
4.3. Water Company	41

4.4. Highway Authority	42
USEFUL LINKS/CONTACTS	43

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EXECUTIVE SUMMARY

This report has been produced through the duties placed upon Rhondda Cynon Taf County Borough Council 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 factual report of the storm event that occurred on the 15th and 16th of February 2020 within the Rhondda Cynon Taf County Borough Council area, focusing the investigation on the flooding that occurred within the impacted areas of Pontypridd (Flood Investigation Area RCT 11, 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 manage the risk of flooding.

The flooding that affected RCT on the 15 and 16th of February 2020 was a result of an extreme rainfall event, designated by the Met Office as ‘Storm Dennis’. The impact of the event at investigation area RCT11 resulted in internal flooding to at least 158 properties in Pontypridd: including 80 residential properties and 78 non-residential properties. Significant flooding to the highway throughout the investigation area also occurred.

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 and Dŵr Cymru Welsh Water.

It has been established from the evidence gathered within this report that the primary source of flooding at RCT11 in this incident was the overtopping of the main River Taf following persistent and heavy rainfall. River level gauge data from NRW’s Pontypridd monitoring station reveal that the River Taf was almost four times its typical level during Storm Dennis, reaching a peak level of 5.32 metres; the highest river level recorded at the station since its opening in 1970.

On review of NRW's FRAW Maps, the majority of the impacted properties within RCT11 are identified at low risk of flooding from the main river due to the presence of formal flood defences along sections of the eastern embankment at Sion Street and the western embankment at Pontypridd town centre. However, areas of medium main river flood risk were noted at Berw Road, where no formal flood defences are present.

Storm Dennis has been estimated as in excess of a 1 in 200 annual probability (Q200) flood event according to NRW, therefore it has been concluded that the flood defences along the River Taf became overwhelmed and were overtopped at several locations, resulting in widespread fluvial flooding to residential and commercial properties.

The investigation also identified surface water accumulation on the highway to have contributed to the fluvial flooding that occurred at RCT11. The overtopping of the River Taf, the associated settling of fluvial deposits and the sheer intensity of rainfall during Storm Dennis 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 Dennis. In response to the flooding at investigation area RCT11, NRW has;

- Carried out their own post event investigative analysis work to understand the mechanism of flooding from the River Taf at Pontypridd;
- Commissioned a Lower Taf Flood modelling project and a Pontypridd-specific in-house modelling project, the outcomes of which will include an initial assessment of the viability of potential flood risk management options; and
- Developed a series of recommendations and a detailed action plan to address areas of improvement for future storm events, including the performance of NRW's Flood Warning Service and incident management response.

RCT as the Lead Local Flood Authority, Land Drainage Authority and Highway Authority has been determined as the relevant Risk Management Authority responsible for managing the surface water flooding that occurred during Storm Dennis. In response to the flooding at investigation area RCT11, RCT has;

- Carried out survey, jetting and cleansing operations to highway drainage infrastructure;
- Led on the development of a central Control Room to compliment the Council's Contact Centre and CCTV Centre; and to provide a comprehensive and informed response to residents during storm events;

- Exercised its powers, under Section 13 of the Flood and Water Management Act 2010, to engage with NRW and DCWW in relation to their responsibilities as Risk Management Authorities; and
- Working in partnership with NRW, the LLFA have expanded their interim Property Flood Resistance project offering expandable flood gates to those properties deemed at high risk of river flooding, as per NRW's determination.

The event that occurred on 15 and 16th February was extreme, and it is unlikely flooding from a similar event could be prevented entirely. It is concluded that Risk Management Authorities satisfactorily carried out their flood risk management functions in response to the flood event at RCT11, however, further measures have been proposed by all RMAs to improve preparedness and responses to future flood events.

ABBREVIATIONS & GLOSSARY

CaRR – Communities at Risk Register

DCWW – Welsh Water

FRMP – Flood Risk Management Plan

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 Defense – A structure that provides a flood defense benefit, which is not designed or maintained as a Flood Defense Structure. Thereby the benefits derived from the structure cannot be depending upon to deliver a Flood Defense.

NRW – Natural Resources Wales

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

RCT - Rhondda Cynon Taf

RCT11 – Flood Investigation Area RCT 11

RCTCBC – Rhondda Cynon Taf County Borough Council

RMA – Risk Management Authority

SAB – Sustainable Drainage Approval Body

SFRA – Strategic Flood Risk Assessment

SuDs – Sustainable Drainage Systems

TABLES AND FIGURES

Table 1: Investigative evidence gathered in preparation of this Storm Dennis Section 19 report	12
Table 2: Summary of the source(s), pathway(s) and receptor(s) affected during storm Dennis within RCT11	15
Table 3: Flood Warnings issued by NRW for the River Taf at Pontypridd during Storm Dennis	24
Table 4: Summary of source(s) and possible cause(s) of flooding in investigation area RCT11 during Storm Dennis (15-16 th February 2020)	33
Table 5: Risk Management Authority with relevant functions to manage risk from different flood types	34
Table 6: Recommendations provided by the LLFA to be considered by the relevant Risk Management Authority identified in response to the source(s) of flooding in RCT11 (as per Table 4)	35
Figure 1: Flood Investigation Area RCT11 Location Plan.....	10
Figure 2: Natural Resources Wales' FRAW map for rivers and ordinary watercourse and surface water flood risk at RCT11. Contains Natural Resources Wales information © Natural Resources Wales and database right. All rights reserved	11
Figure 3: Image of the River Taf overtopping its western embankment onto Sion Street during the early hours on Sunday 16 th February 2020 during Storm Dennis (image provided by resident).....	16
Figure 4: Flooding at Sion Street following Storm Dennis (Image: BBC News)	17
Figure 5: Collapsed river wall on Berw Road following Storm Dennis (captured by RCT's Flood Risk Management team on 17 th February 2020)	17
Figure 6: Collapsed river wall at the southern end of Sion Street, near Bridge Street, during Storm Dennis (image provided by resident)	18
Figure 7: Flooding to commercial properties on Taff Street following Storm Dennis (Image: BBC News)	19
Figure 8: Image showing the flood damage to the National Lido of Wales at Ynysangharad Park following Storm Dennis (Image: Jonathan Lawrence/WalesOnline)	19
Figure 9: Indicative flow paths observed at RCT11 during Storm Dennis	20
Figure 10: The River Taf levels at Pontypridd station between the 14 th and 17 th February 2020 (Natural Resources Wales)	24
Figure 11: NRW's FRAW map for River sources at RCT11. Contains Natural Resources Wales information © Natural Resources Wales and database right. All rights reserved.....	26
Figure 12: Natural Resources Wales' map for Main River Flood Defences and areas benefiting at RCT11. Contains Natural Resources Wales information © Natural Resources Wales and database right. All rights reserved.	27
Figure 13: Photo of silt accumulation within the Mill Street surface water drainage network prior to cleansing operations	29

Figure 14: NRW's FRAW map for Surface Water and Ordinary Watercourse flood sources at RCT11.
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1. INTRODUCTION

1.1. PURPOSE OF INVESTIGATION

On the 15th and 16th of February 2020, RCT was impacted by an extreme weather event which was named ‘Storm Dennis’ by the Met Office. Due to the extent and impact of the event, the LLFA opted to undertake a formal investigation.

The storm resulted in widespread residential and commercial flooding within the Rhondda Cynon Taf County Borough Council area. This report will focus on Flood Investigation Area RCT11 (further referred to as RCT11) which is comprised of areas adjacent to the River Taf within Pontypridd Town.

The reason behind RCT’s investigation is in response to the duties of the local authority regarding Section 19 of the Flood and Water Management Act 2010, 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 the 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

The purpose of the investigation is to determine which RMAs have relevant flood risk management functions and which functions have been exercised in response to the flood event in question.

Specific details of Storm Dennis, such as rainfall analysis are covered within a separate overview report that covers the wider RCT area. The report is titled ‘Storm Dennis February 2020 – Overview Report’ and will be referred to as ‘FRM – Storm Dennis – Overview Report’².

¹ Flood and Water Management Act 2010 – Section 19 - <https://www.legislation.gov.uk/ukpga/2010/29/section/19>

² [Flood Investigation Reports | Rhondda Cynon Taf County Borough Council \(rctcbc.gov.uk\)](https://www.rctcbc.gov.uk/flood-investigation-reports)

1.2. SITE LOCATION

The area investigated within this report covers the town of Pontypridd, located in the central sector of the county borough, to the south of Abercynon.

Pontypridd is situated within the River Taf catchment which flows north to south through the centre of RCT11. The confluence of the River Taf and River Rhondda is located at the southern point of RCT11.

The investigation area itself is confined to the base of valley where residential and commercial development has been built on the floodplain of the River Taf on both the eastern and western riverbanks, as illustrated in Figure 1.

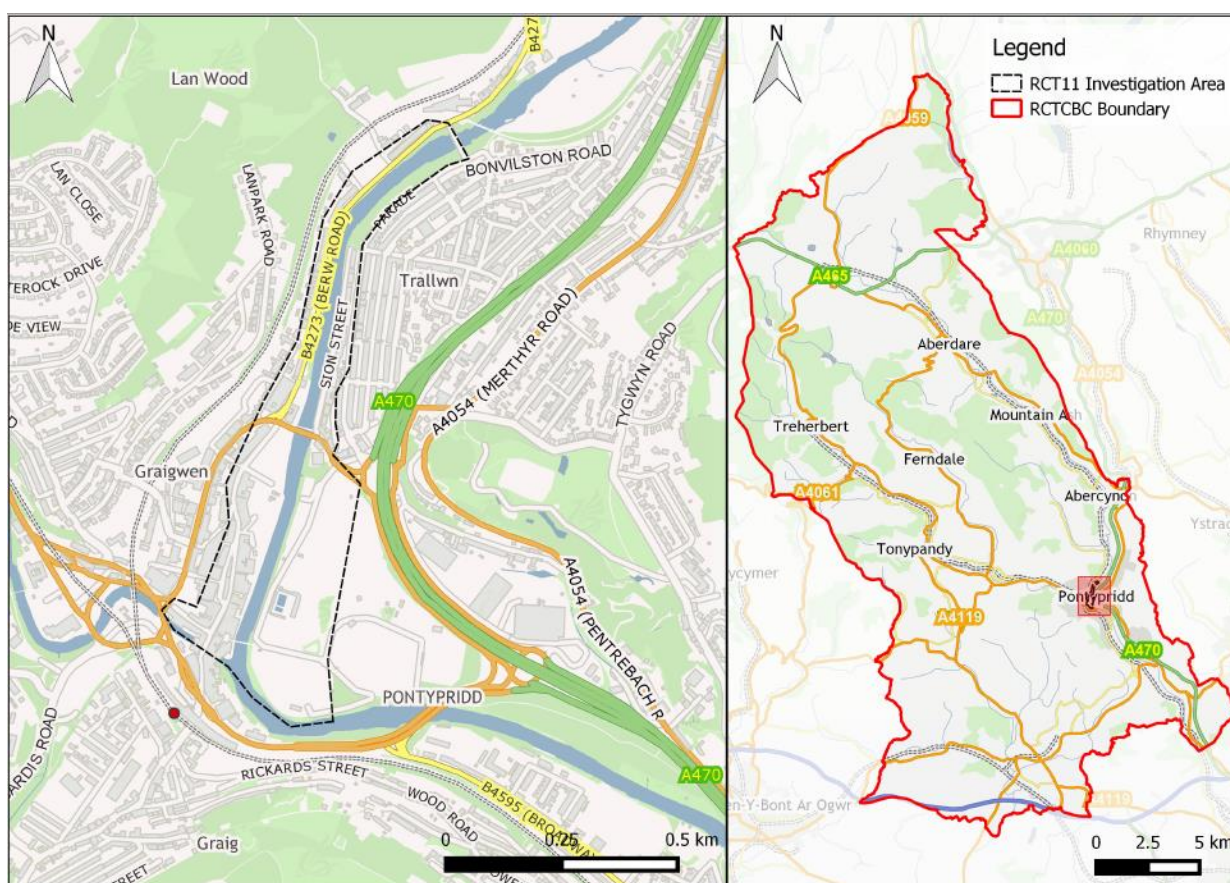


Figure 1: Flood Investigation Area RCT11 Location Plan

According to the Welsh Government's CaRR, Pontypridd is ranked 49th for surface water flood risk and 147th for main river flood risk in Wales.

NRW's Flood Risk Assessment Wales (FRAW) maps indicate that there are areas of low to high flood risk from both the main river and surface water and ordinary watercourse sources within the investigation area. This is illustrated in Figure 2, which is an excerpt from the FRAW maps.

The highest risk posed to people and properties within RCT11 is broadly associated with the River Taf, with low to high fluvial flood risk observed along the length of the watercourse, particularly at the confluence of the River Taf and Rhondda. Flood risk from surface water and ordinary watercourse sources is also noted across parts of the investigation area, although not as widespread or severe, as illustrated in Figure 2. Areas adjacent to the main river may be at risk of both surface water and main river flooding, as illustrated within RCT's FRMP³.

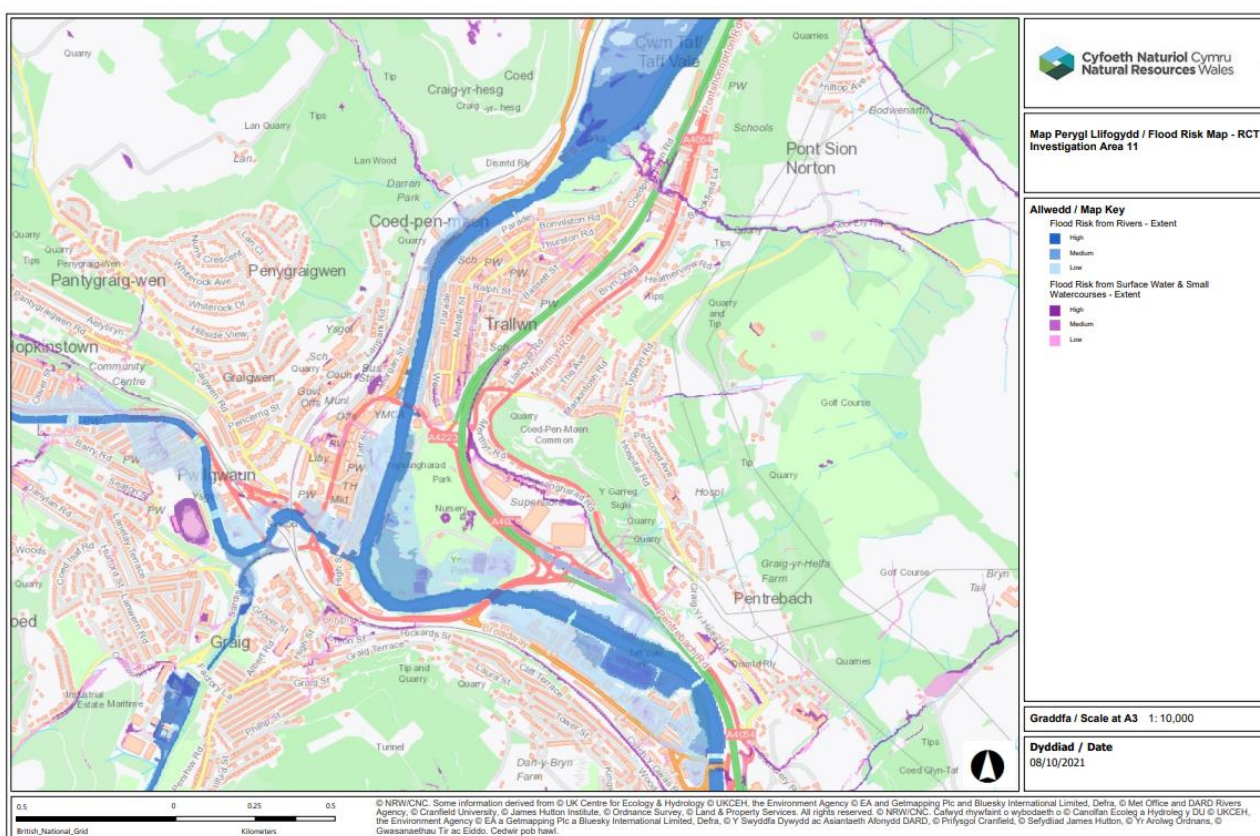


Figure 2: Natural Resources Wales' FRAW map for rivers and ordinary watercourse and surface water flood risk at RCT11. Contains Natural Resources Wales information © Natural Resources Wales and database right. All rights reserved

³ [RCT'S Flood Risk Management Plan \(rctcbc.gov.uk\)](http://rctcbc.gov.uk)

1.3. DRAINAGE SYSTEM

The surface water drainage systems that serve investigation area RCT11 are that of the highway drainage network designed to manage the surface water within the highway and public surface water sewer and combined sewer networks operated by Dŵr Cymru Welsh Water.

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 below within Table 1.

Table 1: Investigative evidence gathered in preparation of this Storm Dennis Section 19 report

Source	Data
Residents	Photos, videos, statements, email correspondence, public engagement survey responses
Responders' statements	Local responders' statements
CCTV Surveys	Internal surveys of the local drainage networks
Met Office Data	Weather Warning information (see FRM – Storm Dennis – Overview Report)
Rain Gauges	RCT and NRW operated rain gauge information (see FRM – Storm Dennis – Overview Report)
Natural Resources Wales	River Level and Flood Warning data
RCT Flood Risk Management Plan	Site specific information and data for each electoral ward in RCT
Communities at Risk Register	Flood risk ranking and scores for all flood types based on community data in Wales
Flood Investigation Report (Redstart's FIR)	A summary of the source-pathway-receptors, culvert capacity assessment and hydraulic modelling work undertaken by Redstart. The Flood Investigation Report was commissioned by RCT prior to writing the Section 19 report.

Evidence sourced from the 'Flood Investigation Report', commissioned by RCT, will be further referred to as 'Redstart's FIR' throughout this report.

1.5. PUBLIC ENGAGEMENT

Following the initial flooding event that occurred on the 15 and 16th of February during Storm Dennis, flood risk officers from RCT's Flood Risk Management department were deployed to areas across the borough to investigate reports of internal flooding by residents. Residents engaged with the Flood Risk Management team to help determine the initial impacts caused by the flooding event and to investigate the potential source(s) and pathway(s) of flood water. 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 the flood investigations, a public engagement exercise was undertaken between the 4th and 25th of January 2021 by Redstart, on behalf of RCT. The aim of this exercise was to engage with local residents who were affected by the flood event to capture details 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. 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.

2. FLOODING HISTORY

2.1. PREVIOUS FLOOD INCIDENTS

Historical flood information and residents accounts captured by RCT's Flood Risk Management officers following Storm Dennis indicate that the majority of properties within the investigation area had not experienced internal flooding from the River Taf in over 40 years prior to Storm Dennis. The flooding experienced during Storm Dennis was noted as the most significant flood incident to impact Pontypridd since the floods of December 1979.

Previous incidences of surface water flooding to the highway and external extents of properties have been recorded across the investigation area during smaller scale storm events, in particular along Sion Street, Berw Road and Taff Street. Many of these incidences have been deemed the result of blocked highway drainage infrastructure. These events are not known to have impacted properties, although anecdotal information supplied by residents at Sion Street reported minor internal flooding to properties had occurred prior to February 2020 due to surface water ingress.

2.2. FLOOD INCIDENT

The flooding that occurred on the 15th and 16th February 2020 was a result of an extreme rainfall event, designated by the Met Office as ‘Storm Dennis’. The rainfall event affected the majority of RCT and caused widespread flooding to communities.

Specific details of Storm Dennis, such as rainfall and river level analysis are covered within a separate overview report that covers the wider RCT area, referenced ‘FRM – Storm Dennis – Overview Report’².

Post event inspections undertaken on the days following the storm event by RCT’s Flood Risk Management team and RCT’s Public Health, Protection and Community team identified 80 residential properties and 78 non-residential properties as internally flooded within the investigation area.

A summary of the source(s) and pathway(s) of flooding within RCT11 during Storm Dennis have been outlined in Table 2 and further described throughout this section.

Table 2: Summary of the source(s), pathway(s) and receptor(s) affected during Storm Dennis within RCT11

Source(s)	Pathway(s)	Receptor(s)
The primary source of flooding for this incident was the River Taf overtopping its eastern and western banks at multiple locations throughout the investigation area.	Main river flood water conveyed onto several streets including Berw Road, Taff Street and Mill Street on the western embankment, and Sion Street and Ynysangharad Park on the eastern embankment, before entering the front and rear of several residential and commercial properties.	The overtopping of the River Taf resulted in internal flooding to at least 158 receptors, including 80 residential properties across Berw Road and Sion Street, and 78 non-residential properties, primarily located at Taff and Mill Streets. Ynysangharad Park and footbridge were also impacted by the overtopping of the River Taf.
Intense rainfall and subsequent surface water runoff from the surrounding area.	Surface water was observed along several highway networks within the investigation area. This is considered to have contributed to the main river flooding throughout RCT11.	Surface water is considered to have exacerbated the flooding experienced at many internally flooded properties throughout RCT11 during Storm Dennis.

On review of Table 2, the primary source of the recorded flooding within RCT11 was the main river, the River Taf, overtopping its eastern and western embankments at several locations during the storm event. The impacts of the overtopping were exacerbated by intense rainfall and subsequent surface water flows throughout the investigation area.

During the early hours of Sunday 16th of February 2020, RCT received several calls from residents and business owners at Pontypridd reporting the overtopping of the River Taf at multiple locations and the ingress of water into several properties. Several flow paths were observed as properties adjacent to the main river on both the eastern and western embankments experienced significant internal flooding from both the front and rear.

The primary flow paths observed north of Bridge Street remained confined to areas immediately adjacent to the River Taf. Berw Road, on the western embankment, and Sion Street, on the eastern embankment, suffered severe flooding following the overtopping of the River Taf (Figures 3 and 4). A total of 82 receptors, including two commercial properties, were internally flooded across both streets, with reported flood depths of up to 1.8 metres. Post-event inspections also identified significant mud and debris deposition, along with the displacement of several cars along both highway networks.

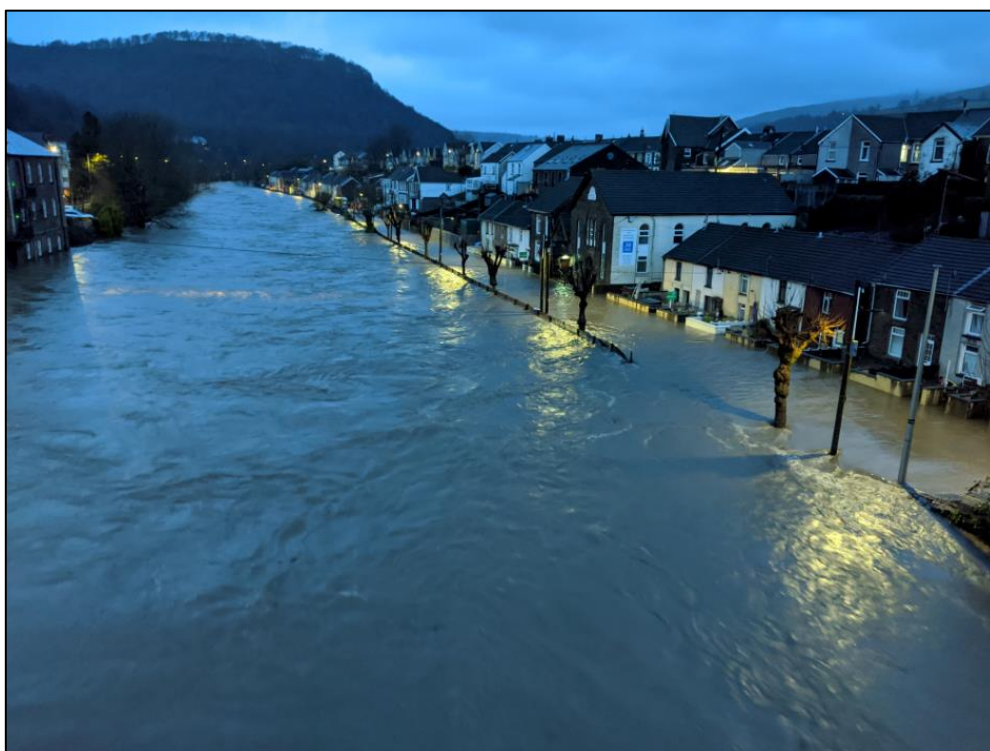


Figure 3: Image of the River Taf overtopping its eastern embankment onto Sion Street during the early hours on Sunday 16th February 2020 during Storm Dennis (image provided by resident)



Figure 4: Flooding at Sion Street following Storm Dennis (Image: BBC News)

Anecdotal information provided by residents indicate that the River Taf overtopped its embankment at several locations along both streets, however it was noted that the overtopping initially occurred in those areas without concrete retaining walls. The resultant fluvial flooding contributed to the partial collapse of retaining walls (Classified as Non-Flood Defence (NFD) Structures) at several locations further downstream during the storm event (Figure 5 and 6).



Figure 5: Collapsed river wall (NFD) on Berw Road following Storm Dennis (captured by RCT's Flood Risk Management team on 17th February 2020)

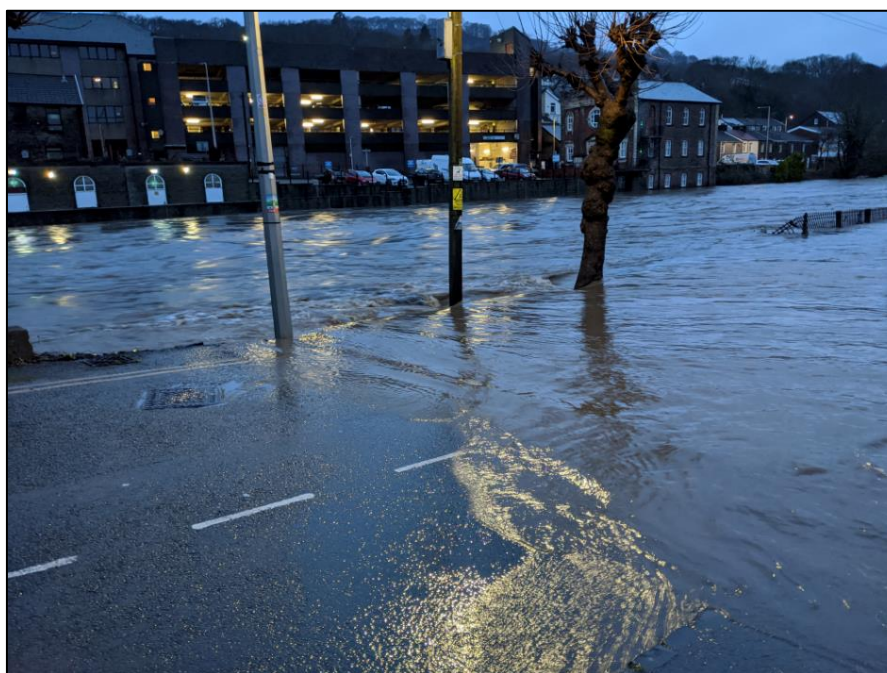


Figure 6: Collapsed river wall at the southern end of Sion Street, near Bridge Street, during Storm Dennis (image provided by resident)

Water ingress through the fronts of properties on Berw Road and Sion Street were confirmed as the primary pathways of flooding, however, residents also noted the surcharging of private drainage networks also contributed to the flooding of some properties.

South of Bridge Street, the River Taf also overtopped both its eastern and western banks, resulting in significant flooding to Pontypridd Town Centre and Ynysangharad Park. A total of 75 commercial properties on Taff Street and Mill Street (Figure 7), in addition to the National Lido of Wales at Ynysangharad Park, were internally flooded as a result of the overtopping (Figures 8). A footbridge connecting Taff Street and Ynysangharad Park was also damaged during the event.

As illustrated in Figure 9, the River Taf overtopped immediately adjacent to Gas Road Car Park, resulting in the internal flooding of nearby properties as fluvial flows conveyed into the rear basements of buildings on Taff Street. Further south, flood water entered properties from both the rear and the front as fluvial flows conveyed over 100 metres from the River Taf onto Taff Street and Mill Street. Flood depths of up to 1 metre were recorded throughout Taff Street and Mill Street as flood water accumulated for several hours at localised low points.



Figure 7: Flooding to commercial properties on Taff Street following Storm Dennis (Image: BBC News)



Figure 8: Image showing the flood damage to the National Lido of Wales at Ynysangharad Park following Storm Dennis (Image: Jonathan Lawrence/WalesOnline)

In addition to the main river flooding, intense rainfall and resultant surface water flows exacerbated flooding across Pontypridd during Storm Dennis. This was particularly evident in areas not immediately adjacent to the River Taf, such as Mill Street, where surface water pooled for several hours after the storm event.

The indicative flow paths and points of overtopping within the investigation area are illustrated in Figure 9.

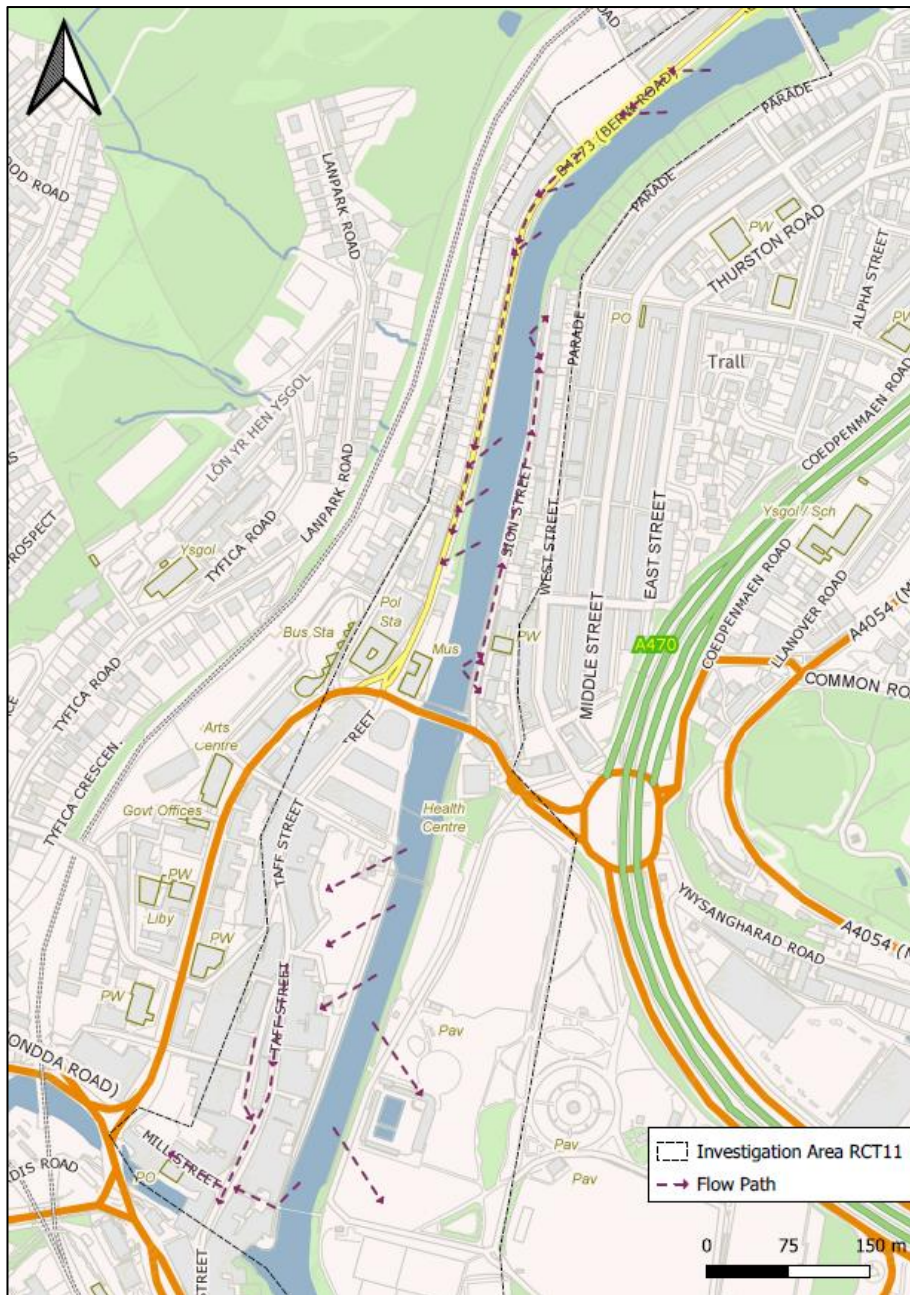


Figure 9: Indicative flow paths observed at RCT11 during Storm Dennis

2.3. RAINFALL ANALYSIS

See RCT's 'Overview Report' of Storm Dennis, reference 'FRM – Storm Dennis – Overview Report'², for a detailed analysis of the rainfall and ordinary watercourse response.

3. POSSIBLE CAUSES

3.1. CULVERT CONDITIONS

There is no evidence from this investigation to suggest that culverted ordinary watercourses within investigation area RCT11 significantly contributed to the recorded flooding of properties in RCT11 during Storm Dennis.

As such, the condition of culverted ordinary watercourse infrastructure within the investigation area has not been investigated as part of this investigation.

3.2. ORDINARY WATERCOURSE CONDITIONS

There are no ordinary watercourses within the investigation area. As such, ordinary watercourse conditions have not been investigated as part of this investigation.

3.3. MAIN RIVER

The designated main River Taf flows in a southwesterly direction through Pontypridd. Areas on both the western and eastern embankments of the River Taf were impacted during Storm Dennis.

3.3.1. MAIN RIVER LEVELS AND FLOOD WARNINGS

The hydrograph in Figure 10 illustrates the significant rise in the River Taf's levels in response to rainfall between the 14 and 17th of February 2020. River level data was captured at NRW's Pontypridd river level gauge, located adjacent to Nile Street approximately 600 metres southeast of the investigation area.

NRW issued a 'Flood Alert' (indicating possible flooding) for the entirety of the River Taf at approximately 13:30 on the 15th of February; at which point the main river was over 2 metres in depth and continuing to rise at Pontypridd station. At approximately midnight on the 16th February the River Taf began to rise again, reaching a peak river level of 5.32 metres at 04:45 on the 16th of February; the highest level recorded for the River Taf at Pontypridd since 1970.

The green bar displayed on the hydrograph shows the typical level of the River Taf at the Pontypridd station, ranging between 0.4 and 1.3 metres. The river level was above this green line for over 48 hours, highlighting the severity of the storm event and its unprecedented nature. At its peak, the River Taf at Pontypridd was almost four meters higher than its average level.

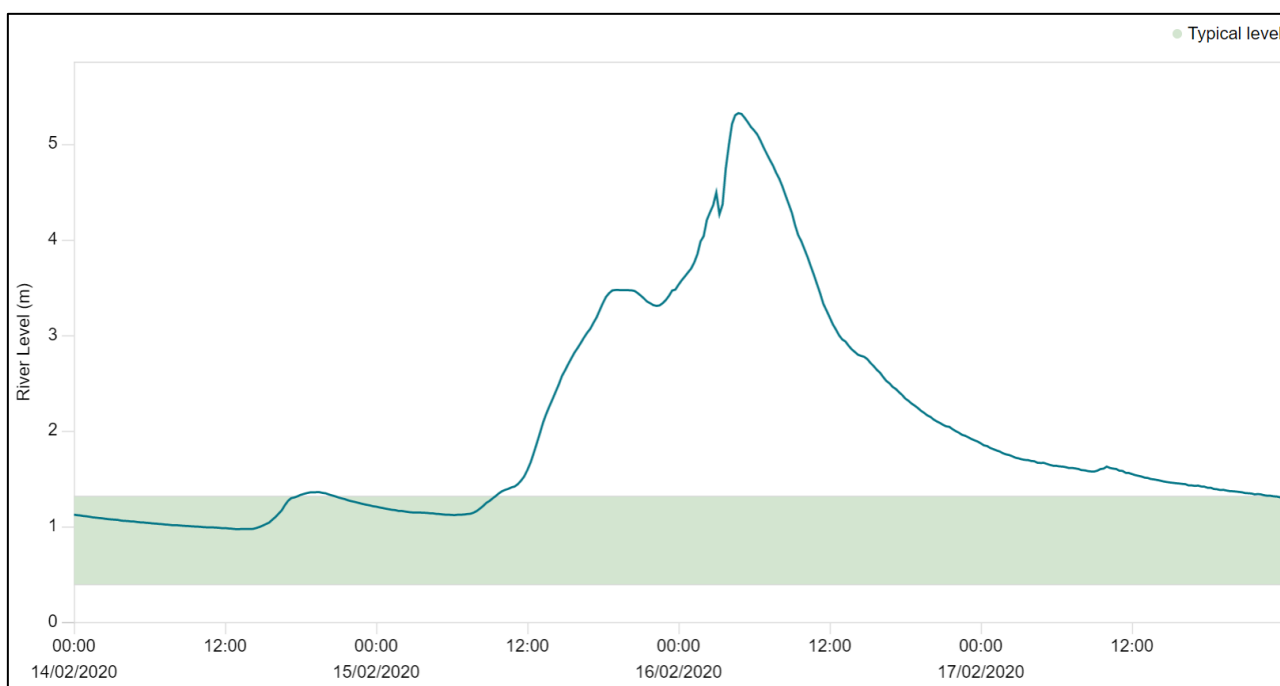


Figure 10: The River Taf levels at Pontypridd station between the 14th and 17th February 2020 (Natural Resources Wales)

Investigation area RCT11 falls within NRW’s Pontypridd Flood Warning Area. The Flood Warnings issued by NRW, and associated river levels, for the River Taf at Pontypridd during Storm Dennis are shown in Table 3.

Table 3: Flood Warnings issued by NRW for the River Taf at Pontypridd during Storm Dennis

Flood Warning Type	Location	Start Time	River Level (m) at Pontypridd
Flood Alert	River Taf	13:27 15/02/2020	2.178
Flood Warning	River Taf at Pontypridd	20:48 15/02/2020	3.443
Severe Flood Warning	River Taf at Pontypridd	06:33 16/02/2020	5.039

NRW issued a ‘Flood Warning’ alert (indicating flooding is expected) for the River Taf at Pontypridd at 20:48 on the 15th February, prior to the overtopping of the main river. A ‘Severe Flood Warning’ alert (indicating Community-wide severe flooding and possible risk to life) for the River Taf at Pontypridd was issued by NRW nine hours later at 06:33 on the 16th February; at which point the River Taf was 5.039 metres in height, 0.285 metres lower than its peak level. According to residents, significant main

river flooding to properties had already commenced at several locations along the River Taf by this time, including at Pontypridd.

NRW have acknowledged within their 'Flood Incidence Response Review'⁴ that the operation of the Flood Warning service "came under significant pressure during February and at times became overwhelmed" resulting in flood warnings being issued late (after the onset of flooding) or not issued at all. At this location (RCT11), this is in reference to the 'Flood Warning' and 'Severe Flood Warning' alerts issued at Pontypridd.

Improvements to their flood forecasting and warning services are being internally investigated by NRW and where feasible implemented to deliver the recommendations outlined within their Flood Incident Response Review⁴.

3.3.2. MAIN RIVER FLOOD RISK

As outlined in Section 2, the overtopping of the River Taf resulted in the internal flooding of 158 receptors, with properties up to 100 metres inland reporting internal flooding directly as a result of the overtopping.

Figure 11 is an excerpt from NRW's Flood Risk Assessment Wales (FRAW) mapping exercise which depicts the main river flood risk extents for the 'Defended' scenario, i.e., with the presence of flood defence assets. 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 RCT11 during Storm Dennis is largely consistent with the modelled outputs of NRW's FRAW map (Figure 11), with the majority of the affected properties falling within an area of low main river flood risk. Notably, a small area of Berw Road, in addition to Ynysangharad Park, are identified at medium 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%). Considering Storm Dennis was estimated as in excess of a 1 in 200 annual probability (Q200) flood event, the area of flooding during Storm Dennis aligns with those depicted by the low flood risk extents (Figure 11).

⁴ [February 2020 Floods in Wales: Flood Incident Management Review \(cyfoethnaturiol.cymru\)](https://www.cyfoethnaturiol.cymru/February-2020-Floods-in-Wales-Flood-Incident-Management-Review)

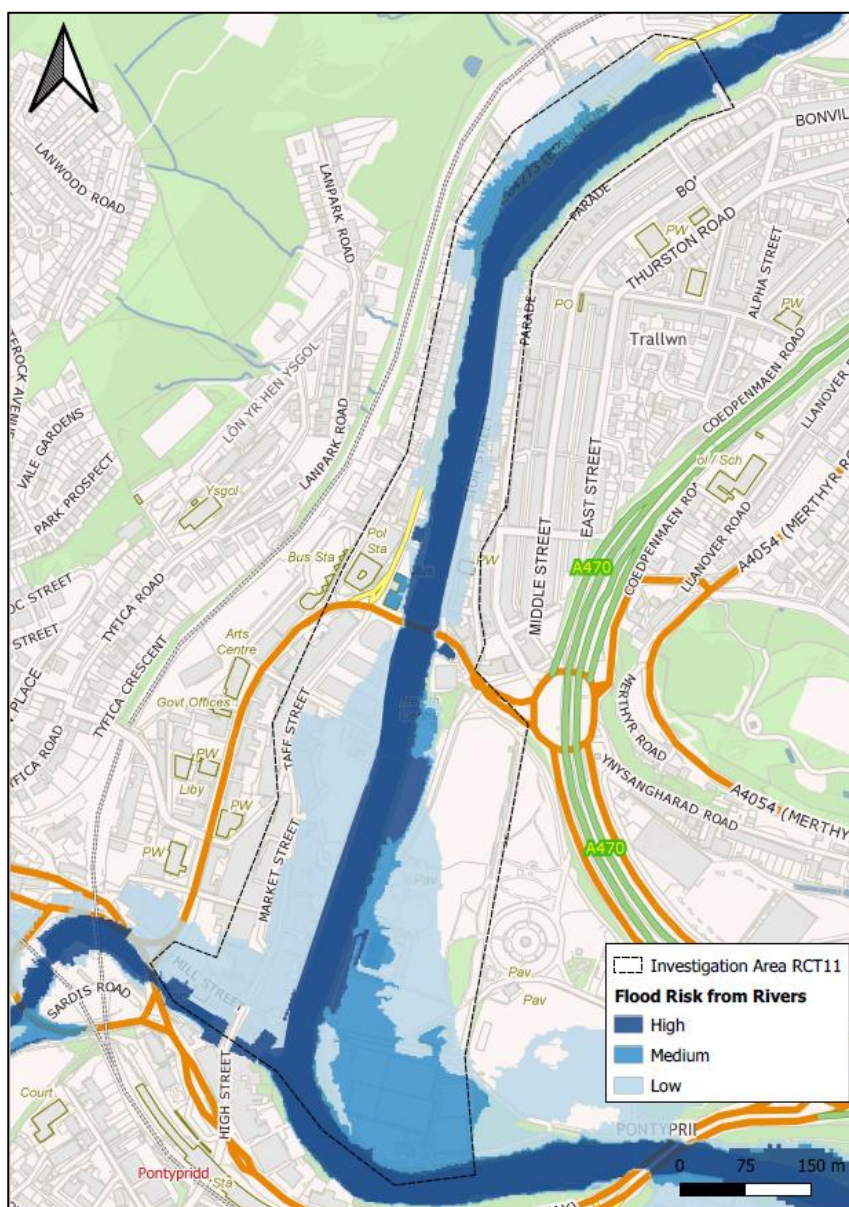


Figure 11: NRW's FRAW map for River sources at RCT11. Contains Natural Resources Wales information © Natural Resources Wales and database right. All rights reserved.

3.3.3. MAIN RIVER FLOOD DEFENCES

As illustrated in Figure 12 (demarcated by a bold red line), there are approximately 400 metres and 300 metres of formally designated flood defence infrastructure along the eastern and western banks of the River Taf at RCT11, respectively. This infrastructure is operated and maintained by NRW.

According to NRW, flood defence infrastructure throughout Pontypridd town centre and Sion Street provides a standard of protection up to a 1 in 100 annual probability flood event (Q100) to several properties within the investigation area (black hatched area in Figure 12). There are no formal flood defenses under the operation and maintenance of NRW on the western river embankment at Berw Road, any pre-existing highway walls are considered NFD Structures.

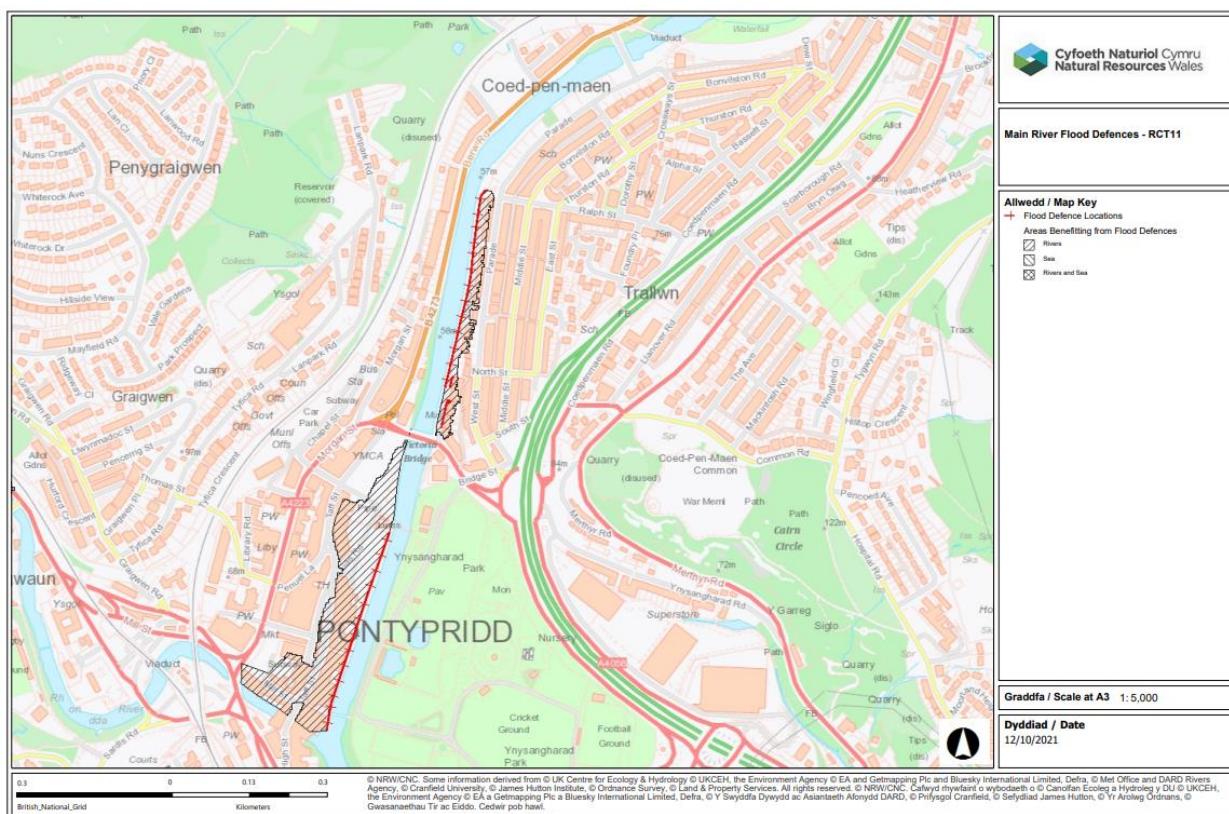


Figure 12: Natural Resources Wales’ map for Main River Flood Defences and areas benefiting at RCT11. Contains Natural Resources Wales information © Natural Resources Wales and database right. All rights reserved.

The current indicative design standard of protection (SOP) for flood defences on a main river is 1 in 100 annual probability (Q100) flood event plus, for new defences, an allowance for climate change. This is stated within the Welsh Government’s National Strategy for Flood and Coastal Erosion Risk Management which encourages main river flood alleviation schemes to provide a SOP up to Q100⁵. It is thereby inferred that the existing flood defence infrastructure at RCT11 is in accordance with current indicative standards.

⁵ [National Strategy for Flood and Coastal Erosion Risk Management in Wales \(English\) \(gov.wales\)](https://www.gov.wales/national-strategy-for-flood-and-coastal-erosion-risk-management-in-wales)

As stipulated above, some sections of RCT11 benefit from formally designated main river flood defences which provide a SOP up to a 1 in 100 annual probability (Q100) flood event, however Storm Dennis was estimated as being in excess of a 1 in 200 annual probability (Q200) flood event, therefore the unprecedented risk in river levels within the Taf during the storm event resulted in the overtopping of assets up to Q100 SOP.

NRW's 'Flood Incidence Response Review' does in fact outline that no flood defences failed in the lower Taf region and that the flooding was the result of river flows exceeding the construction design standard⁴.

3.4. HIGHWAY DRAINAGE CONDITIONS

Several streets throughout RCT11 were observed to be flooding as a result of the overtopping of the River Taf during Storm Dennis. These fluvial flows deposited mud, silt and debris across the investigation area which are assumed to have entered the highway drainage system, leading to blockages and a reduction in the hydraulic capacity of the surface water network. Accompanied by intense rainfall and significant surface water conveyance, it is considered that the highway drainage infrastructure in the affected regions of RCT11 became overwhelmed during the storm event.

CCTV inspections undertaken in the months following the storm event confirm this, with surveys completed on Mill Street identifying settled deposits of silt and debris within the highway drainage network. Figure 13 depicts the operational condition of the highway drainage at Mill Street prior to its cleansing. A cross-sectional area loss of 60% was observed due to silt accumulation within the network.

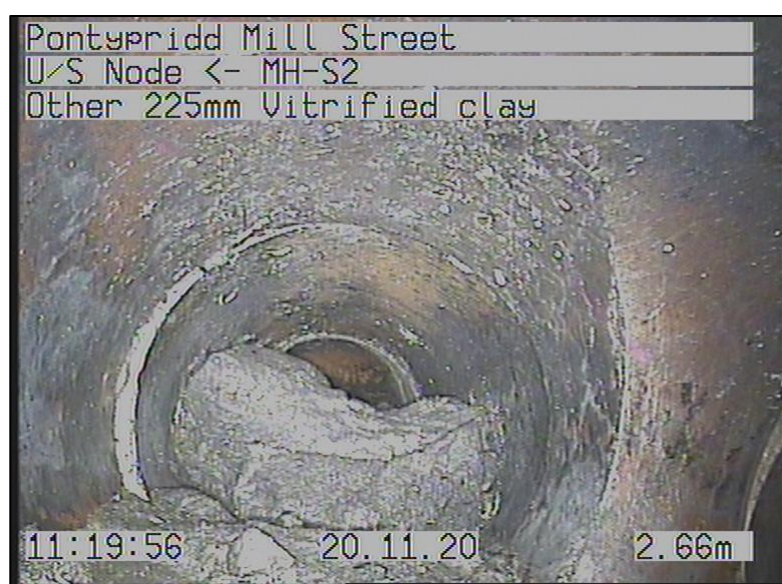


Figure 13: Photo of silt accumulation within the Mill Street surface water drainage network prior to cleansing operations

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 in RCT11 was exceeded as a result of both main river and surface water flows entering the network. The maintenance condition of the highway drainage infrastructure is not considered to have significantly impacted the flooding experienced during Storm Dennis.

3.5. DŴR CYMRU WELSH WATER APPARATUS

There is no evidence from this investigation that DCWW apparatus contributed to the flooding that occurred during Storm Dennis within investigation area RCT11.

DCWW reported no issues within RCT11 during Storm Dennis and it is not believed that any DCWW infrastructure was damaged during the storm event. Whilst DCWW have concluded that their assets performed well during Storm Dennis, the majority of drainage infrastructure within the investigation area is comprised of combined sewer networks which are likely to have become overwhelmed during the storm event for the reasons outlined in Section 3.4.

3.6. SURFACE WATER

Whilst surface water is not considered to have been the primary cause of flooding at any locations within RCT11, surface water is considered to have contributed to and exacerbated the main river flooding observed across the investigation area.

On review of NRW's national surface water and ordinary watercourse flood map (Figure 14), the extent of flooding from pluvial sources is minimal, with only small, localised areas of high to low flood risk observed along parts of Taff Street, Mill Street and Ynysangharad Park within the town centre. Despite the FRAW map indicating little to no surface water and ordinary watercourse flood risk across RCT11, surface water conveyance was observed along several highway networks and pedestrian footways within Pontypridd Town Centre. The conveyance of surface water within RCT11 has been attributed to intense and persistent rainfall resulting in the accumulation of runoff towards localised low points.

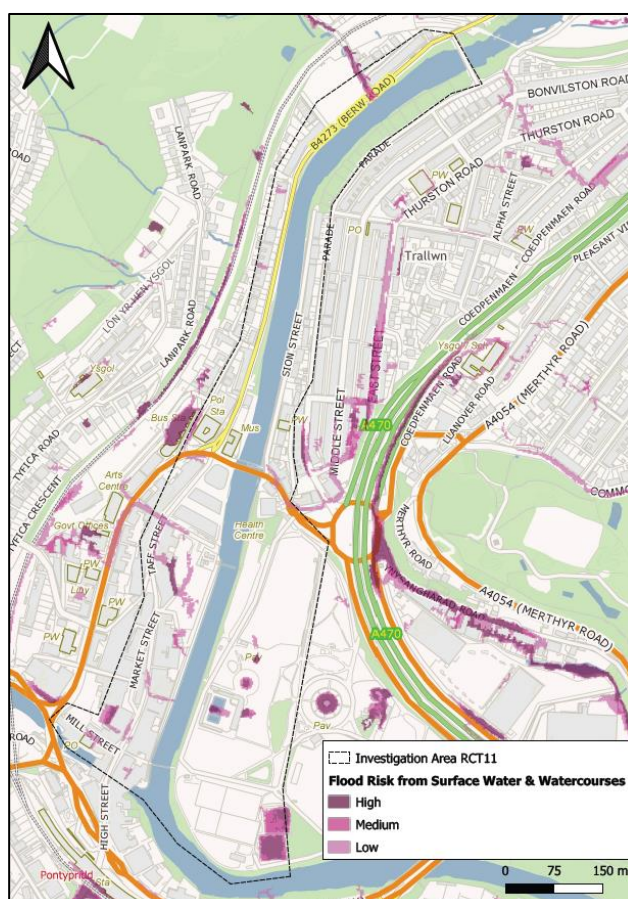


Figure 14: NRW's FRAW map for Surface Water and Ordinary Watercourse flood sources at RCT11. Contains Natural Resources Wales information © Natural Resources Wales and database right. All rights reserved.

3.7. ACCESS STRUCTURES

No access structures were identified during the asset investigations within the area, as such 'access structures' have not been considered within this report.

3.8. SUMMARY OF POSSIBLE CAUSES

The above sections have identified and described the possible causes of flooding within investigation area RCT11 during Storm Dennis which occurred on the 15th and 16th of February 2020. A summary of the identified source(s) and possible cause(s) of flooding (issue) has been outlined below in Table 4.

Table 4: Summary of source(s) and possible cause(s) of flooding in investigation area RCT11 during Storm Dennis (15-16th February 2020)

Ref No	Asset (Source)	Issue	Asset Owner	Type of Flooding
1	River Taf	Unprecedentedly high river levels within the River Taf resulted in the main river overtopping its banks at several locations and flood water conveying into several properties.	Natural Resources Wales	Main River
2	River Taf	Unprecedentedly high river levels within the River Taf resulted in the main river overtopping its banks at several locations and flood water conveying into several properties.	Private Landowner(s)	Main River
3	Surface water drainage network across RCT11	Intense rainfall across RCT combined with the overtopping of the River Taf severely overwhelmed highway drainage infrastructure, resulting in the accumulation of surface water on several streets throughout the investigation area.	Rhondda Cynon Taf CBC Highway Authority	Surface Water

4. RISK MANAGEMENT AUTHORITY ACTIONS

A Welsh Risk Management Authority is defined in Section 6 of the Flood and Water Management Act 2010 as NRW; a LLFA, a district council for an area where there is no unitary authority, or a highway authority wholly in Wales; an internal drainage board for an internal drainage district that is wholly or mainly in Wales; a water company that exercises functions in relation to an area in Wales. As the LLFA, RCT has the responsibility to coordinate the management of flood risk and the interaction of Risk Management Authorities across Rhondda Cynon Taf.

An overview of the relevant Risk Management Authority in relation to flood type is provided in Table 5. For further details of the roles and responsibilities of individual Risk Management Authorities in managing flooding, refer to the Welsh Government's National Strategy for Flood and Coastal Erosion Risk Management, Section 4 'Roles and Responsibilities'⁵, and RCT's 'FRM – Storm Dennis - Overview Report'².

Table 5: Risk Management Authority with relevant functions to manage risk from different flood types

Type of Flooding	Risk Management Authority
Flooding from Main River, reservoirs and the sea (including coastal erosion).	Natural Resources Wales
Flooding from ordinary watercourses, surface water and groundwater	Lead Local Flood Authority
Flooding from water and sewage systems	Water Companies (Dŵr Cymru Welsh Water)
Flooding from the highway	Highway Authority
Flooding from the highway (motorways and major trunk roads)	Welsh Government Trunk Road Agency

Risk Management Authorities have direct flood risk management functions under the Flood and Water Management Act 2010, as well as the Water Resources Act 1991, Land Drainage Act 1991 and the Highways Act 1980. Through analysis of the flooding that impacted RCT11, the flood risk management functions exercised or proposed to be exercised by relevant RMAs were recorded 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 cause(s) of flooding in RCT11 during Storm Dennis have been previously identified and summarised within Table 4. The Risk Management Authorities responsible for managing that flooding have been listed in Table 6 below, along with a series of recommendations put forward by the LLFA.

Table 6: Recommendations provided by the LLFA to be considered by the relevant Risk Management Authority identified in response to the source(s) of flooding in RCT11 (as per Table 4).

Ref No	Asset (Source)	Asset Owner	Type of Flooding	Relevant Risk Management Authority	Recommendations
1	River Taf	Natural Resources Wales	Main River	Natural Resources Wales	R1A NRW to “complete detailed investigative analysis work to understand the mechanisms of flooding in areas known to have flooded from main rivers”, including the River Taf at Pontypridd. Aligns with recommendation ‘Action FD2’ within NRW’s Flood Incident Management Review.
					R1B NRW to investigate the standard of protection provided by flood defences at RCT11 and “consider improvements to NRW flood alleviation schemes and structures on a prioritised basis”. Aligns with recommendation ‘Action FD3’ within NRW’s Flood Incident Management Review.

					R1C	NRW to review its flood warning service provision, especially for extreme events. This will form part of NRW's Flood Warning Service Review Implementation Programme and aligns with the recommendations set out in their 'Flood Incidence Management Review'.
2	River Taf	Private Landowner	Main River	Natural Resources Wales	R2A	NRW to work with the landowner(s) to assess and review the risk of flooding from the River Taf at locations known to have overtopped during the event but are currently 'undefended', to identify the viability of risk management options.
3	Surface water drainage network across RCT11	Rhondda Cynon Taf CBC Highway Authority	Surface Water	Highway Authority and Lead Local Flood Authority	R3A	The Highways Authority to jet and cleanse the highway drainage network and action repairs accordingly.
					R3B	The LLFA and Highway Authority to evaluate surface water management options to alleviate pluvial flooding at locations across the investigation area.

4.1. LEAD LOCAL FLOOD AUTHORITY

In review of Ref 3 in Table 6, the LLFA has been determined as a relevant Risk Management Authority in relation to the surface water flooding which occurred in investigation area RCT11 during Storm Dennis.

The LLFA exercised the following functions in response to the flooding at investigation area RCT11:

- 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 carried out by Redstart, on behalf of RCT as the LLFA, was undertaken in order 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 Dennis.
- RCT carried out an initial phase of repair works to rebuild the section of damaged retaining wall at Sion Street during Autumn 2021.
- The LLFA has set up a central Control Room to compliment the Council's Contact Centre and CCTV centre which is based at the Council's offices, to provide a comprehensive and informed response to the residents of RCT as appropriate during storm events.
- The LLFA, working in partnership with NRW, have expanded their interim Property Flood Resistance project offering expandable flood gates to those properties deemed at high risk of flooding from the main river, as per NRW's determination.

The LLFA also propose to exercise the following functions in response to the flooding at investigation area RCT11:

- The LLFA and LDA intend to clarify drainage asset owners and management responsibilities to make them aware of their personal risk. To ensure

landowners manage the risk in compliance with the relevant legislation, a team of Flood Enforcement Officers including legal support is to be appointed.

- The LLFA and LDA will work with landowners and property owners to manage their personal flood risk through local measures, such as property resilience and resistance measures.
- RCT propose to carry out a second phase of repair works to the section of damaged retaining wall at Sion Street. These works will involve repointing the brickwork and railing replacement to the RCT owned length of retaining wall. This work is expected to be completed in Summer 2022.
- As part of RCT's comprehensive review of the County Borough's most at risk communities, the LLFA are proposing to undertake a formal SFRA of the Lower Taf catchment area to better understand the overall risk from ordinary watercourse and surface water flooding in order to target investment to areas of highest risk. The SFRA also aim to encourage whole catchment measures, including working with natural processes, to alleviate flood risk in those areas of highest risk. **(R3B)**
- The LLFA will cooperate and collaborate with NRW to ensure a detailed study of the investigation area is completed and that appropriate actions to mitigate the impacts of river flooding are undertaken in accordance with NRW's Flood Incident Management Review.

4.2. NATURAL RESOURCES WALES

In review of Ref 1 and 2 in Table 6, NRW has been identified as the relevant Risk Management Authority in relation to the main river flooding from the River Taf during Storm Dennis.

NRW have exercised the following functions in response to the flooding at investigation area RCT11:

- 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.
- Following Storm Dennis, NRW undertook an inspection of the River Taf at Pontypridd to ensure it was clear of blockages.
- NRW specifically outline within their 'Flood Incident Management Review'⁴ that "more Severe Flood Warnings should have been issued based on the flooding impacts experienced" in the Lower Taf region. Utilising post event data and information, NRW have reviewed the Resultant Thresholds for the River Taf at Pontypridd Flood Warning Area. This is critical for assessing the performance, timeliness and accuracy of the warning service after a flood. **(R1C)**.
- NRW has introduced improved digital services to provide comprehensive flood risk, river level and rainfall information to households, businesses and communities across Wales. The improved service was launched in September 2020 on the NRW website and will, according to NRW, improve how live flood warning and water level data is shared before and during flood events. **(R1C)**
- Following the flooding events of February 2020, NRW published a review of its incident response to Storm Ciara and Dennis in October 2020⁶. This review contains several recommendations for improvements to their ways of working and services which NRW are in the process of implementing through an internal delivery programme.
- NRW have developed a detailed Implementation Programme to address the areas of improvement work required to deliver the recommendations of the Flood Warning Service Review carried out by NRW in 2018. Several of the recommendations directly link to the recommendations set out by NRW within their Flood Incident Management Review **(R1C)**.

⁶ [Natural Resources Wales / Our response to Storm Ciara and Storm Dennis](#)

NRW propose to exercise the following functions in response to the flooding at investigation area RCT11:

- Alongside NRW's commissioned Lower Taf modelling project, NRW are looking to complete an in-house modelling project specifically for the Pontypridd region which is programmed for completion by the end of 2022. **(R1A)**
- Following the completion of NRW's Pontypridd Flood Modelling Project, NRW propose to undertake an initial economic assessment of the viability of potential flood risk management options. Consideration should be given to areas at high risk of flooding from rivers on a prioritised basis. **(R1A, R1B)**
- Following the completion of NRW's in-house Pontypridd modelling project, NRW propose further threshold work and flood warning area amendments. **(R1A, R1C)**
- NRW will undertake a review of the modelled outputs and adopt changes to their maintenance program within the investigation area if required. **(R1A)**
- NRW will carry out future refurbishment of flood gates around the access footbridge to Ynysangharad Park, located to the south of Pontypridd Town Centre.

4.3. WATER COMPANY

Dŵr Cymru Welsh Water were not identified as a relevant authority in relation to the flooding at investigation area RCT11 during Storm Dennis. DCWW do not propose to undertake any actions in relation to the event within the investigation area.

4.4. HIGHWAY AUTHORITY

During the investigation into the flooding at investigation area RCT11 during Storm Dennis, the Highway was identified as flooding from both surface water runoff and main river flooding from the River Taf.

Ref 3 of Table 6 identifies the Highway Authority as a relevant Risk Management Authority in relation to the surface water flooding that occurred along the highway across RCT11.

RCT as the Highway Authority have exercised the following functions in response to the flooding at investigation area RCT11:

- 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. **(R3A)**
- An estimated 47 metres of surface water drainage network length within RCT11 has been surveyed and cleansed following Storm Dennis to ascertain the condition of the network and to remove the identified silt and debris. **(R3A)**

RCT as the Highway Authority propose to undertake the following function in relation to the storm event at investigation area RCT11:

- The Highway Authority intend to increase their resource capacity by establishing a dedicated 'Pluvial Drainage Team' to focus entirely on the refurbishment and maintenance of RCT's existing and enhanced highway drainage infrastructure.

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 - <https://naturalresources.wales/flooding/check-flood-warnings/?lang=en>

Natural Resources Wales - Long Term Flood Risk - <https://naturalresources.wales/evidence-and-data/maps/long-term-flood-risk/?lang=en>

Rhondda Cynon Taf CBC - Local Flood Risk Management Plan - <https://www.rctcbc.gov.uk/EN/Resident/ParkingRoadsandTravel/Roadspavementsandpaths/FloodAlleviation/Floodriskregulations2009.aspx>

Rhondda Cynon Taf CBC - Local Flood Risk Management Strategy - <https://www.rctcbc.gov.uk/EN/Resident/ParkingRoadsandTravel/Roadspavementsandpaths/FloodAlleviation/LocalFloodRiskManagementStrategy.aspx>

Rhondda Cynon Taf CBC – Sustainable Drainage – <https://www.rctcbc.gov.uk/EN/Resident/ParkingRoadsandTravel/Roadspavementsandpaths/SustainableDrainage/SustainableDrainage.aspx>

Welsh Government - National Strategy for Flood and Coastal Erosion Risk Management - <https://gov.wales/sites/default/files/publications/2019-03/national-strategy-for-flood-and-coastal-erosion-risk-management-in-wales.pdf>

Welsh Water – How to Contact Us – <https://www.welshwater.com/en/Contact-Us.aspx>

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Appendix H

Flood and Water Management Act 2010

Section 19 Flood Investigation Report

Storm Dennis –
Flood Investigation Area RCT16
(Upper Boat & Nantgarw)

January 2022

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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 Flood and Water Management Act 2010. The Council assumes no responsibility or liability from any person in connection with its contents or findings.

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CONTENTS

EXECUTIVE SUMMARY	3
ABBREVIATIONS & GLOSSARY	6
TABLES AND FIGURES	7
1 INTRODUCTION.....	9
1.1. Purpose of Investigation.....	9
1.2. Site Location	10
1.3. Drainage System.....	12
1.4. Investigation Evidence	12
1.5. Public Engagement.....	13
2. FLOODING HISTORY	14
2.1. Previous Flood Incidents	14
2.2. Flood Incident.....	15
2.3. Rainfall Analysis.....	21
3. POSSIBLE CAUSES	22
3.1. Culvert Conditions.....	22
3.2. Ordinary Watercourse Conditions	24
3.3. Main River	25
3.4. Main River Levels and Flood Warnings.....	25
3.5. Highway Drainage Condition.....	32
3.6. DCWW Apparatus Conditions	34
3.7. Surface Water	35
3.8. Access Structures	37
3.9. System at Capacity	38
3.9. Summary of Possible Causes	40
4. RISK MANAGEMENT AUTHORITY ACTIONS.....	42
4.2. Natural Resources Wales	48
4.3. Water Company	50
4.4. Highway Authority	51
USEFUL LINKS/CONTACTS	52

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EXECUTIVE SUMMARY

This report has been produced through the duties placed upon Rhondda Cynon Taf County Borough Council 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 factual report of the storm event that occurred on the 15th and 16th of February 2020 within the Rhondda Cynon Taf County Borough Council area, focusing the investigation on the flooding that occurred within the impacted areas of Upper Boat and Nantgarw (Flood Investigation Area RCT 16, 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 manage the risk of flooding.

The flooding that affected RCT on the 15 and 16th of February 2020 was a result of an extreme rainfall event, designated by the Met Office as ‘Storm Dennis’. The storm event resulted in the internal flooding of at least 306 properties: including 121 residential properties and 185 non-residential properties. Significant flooding to the highway throughout the investigation area also occurred.

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 and Dŵr Cymru Welsh Water.

It has been established from the evidence gathered within this report that the primary source of flooding in this incident was the overtopping of the main River Taf following persistent and heavy rainfall. River level gauge data from NRW’s Upper Boat monitoring station reveal that the River Taf was over four times its typical level during Storm Dennis, reaching a peak level of 5.49 metres; the highest river level recorded at the station since its opening in 2001.

On review of NRW's FRAW maps, the majority of the impacted properties within RCT16 are identified at low risk of flooding from the main river due to the presence of formal flood defences along sections of both the eastern and western embankments. Despite the majority of formal flood defences within RCT16 providing protection from a 1 in 100 annual probability (Q100) flood event, flood defences at Upper Boat have been identified as providing protection from only a 1 in 20 annual probability (Q20) flood event. This means the area to the north of RCT16 is at medium risk of main river flooding.

Storm Dennis has been estimated as in excess of a 1 in 200 annual probability (Q200) flood event according to NRW, therefore it has been concluded that the flood defences along the River Taf became overwhelmed and were overtopped at several locations, resulting in widespread fluvial flooding to residential and commercial properties.

The investigation also identified ordinary watercourse flooding as a contributing source of flooding to properties at Cardiff Road following the surcharging of a culvert inlet associated to the Nant Garw ordinary watercourse. On review of its hydraulic performance, it was confirmed that the culvert inlet became hydraulically overloaded during the storm event. Surface water accumulation on the highway was also identified as the primary cause of flooding to two residential properties, in addition to contributing to existing fluvial flooding throughout RCT16.

NRW has been determined as the relevant Risk Management Authority responsible for managing the main river flooding that occurred during Storm Dennis. In response to the flooding at investigation area RCT16, NRW has;

- Carried out their own post event investigative analysis work to understand the mechanism of flooding from the River Taf at Upper Boat and Nantgarw;
- Commissioned a Lower Taf Flood Modelling Project, the outcomes of which will include an initial assessment of the viability of potential flood risk management options; and
- Developed a series of recommendations and a detailed action plan to address areas of improvement for future storm events, including the performance of NRW's Flood Warning Service and incident management response.

RCT as the Lead Local Flood Authority, Land Drainage Authority 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 Dennis. In response to the flooding at investigation area RCT16, the LLFA has;

- Carried out survey, jetting and cleansing operations to highway drainage and ordinary watercourse infrastructure.
- Led on the development of a central Control Room to compliment the Council's Contact Centre and CCTV Centre; and to provide a comprehensive and informed response to residents during storm events;
- Exercised its powers, under Section 13 of the Flood and Water Management Act 2010, to engage with NRW and DCWW in relation to their responsibilities as Risk Management Authorities; and
- Working in partnership with NRW, the LLFA have expanded their interim Property Flood Resistance project offering expandable flood gates to those properties deemed at high risk of river flooding, as per NRW's determination.

The event that occurred on 15 and 16th February was extreme and it is unlikely flooding from a similar event could be prevented entirely. It is concluded that Risk Management Authorities satisfactorily carried out their flood risk management functions in response to the flood event at RCT16, however, further measures have been proposed by all RMAs to improve preparedness and response to future flood events.

ABBREVIATIONS & GLOSSARY

CaRR – Communities at Risk Register

DCWW – Welsh Water

FRMP – Flood Risk Management Plan

FWMA – Flood and Water Management Act 2010

LDA – Land Drainage Authority

LFRMS – Local Flood Risk Management Strategy

LLFA – Lead Local Flood Authority

NRW – Natural Resources Wales

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

RCT - Rhondda Cynon Taf

RCT16 – Flood Investigation Area RCT 16

RCTCBC – Rhondda Cynon Taf County Borough Council

RMA – Risk Management Authority

SAB – Sustainable Drainage Approval Body

SFRA – Strategic Flood Risk Assessment

SOC – Strategic Outline Business Case

SuDs – Sustainable Drainage Systems

TABLES AND FIGURES

Table 1: Investigative evidence gathered in preparation of the Storm Dennis Section 19 report	12
Table 2: Summary of the source(s), pathway(s) and receptor(s) affected during Storm Dennis within investigation area RCT 16.....	15
Table 3: Flood Warnings issued by NRW for the River Taf at RCT16 during Storm Dennis	26
Table 4: Summary of the culvert capacity assessment results which indicate the current standard of protection of the 'Cross Keys' culvert at Cardiff Road in free flowing and blockage conditions	38
Table 5: Summary of source(s) and possible cause(s) of flooding in investigation area RCT16 during Storm Dennis (15-16 th February 2020)	40
Table 6: Risk Management Authority with relevant functions to manage the risk for different flood types.....	42
Table 7: Recommendations provided by the LLFA to be considered by the relevant Risk Management Authority identified in response to the source(s) of flooding in RCT16 (as per Table 5)	43
Figure 1: Flood Investigation Area RCT16 Location Plan.....	10
Figure 2: Natural Resources Wales' Flood Risk Assessment Water (FRAW) map for rivers and ordinary watercourse and surface water flood risk at investigation area RCT16. Contains Natural Resources Wales information © Natural Resources Wales and database right. All rights reserved. ...	11
Figure 3: Aerial view of Treforest Industrial Estate and Upper Boat following Storm Dennis (Image: National Police Air Service).....	17
Figure 4: Photo showing main river flooding along the A4054 Oxford Road during Storm Dennis (image provided by resident).....	18
Figure 5: Image of the flooding on Cardiff Road near A4054/A468 roundabout during Storm Dennis, looking south. (Image: Tom Martin/Wales News Service)	19
Figure 6: Image of the flooding on Cardiff Road near A4054/A468 roundabout during Storm Dennis, looking north. (Image: PA/Wales Online).....	20
Figure 7: Indicative flow paths observed during Storm Dennis to the south of RCT16	20
Figure 8: The Nant Garw culverted ordinary watercourse which runs beneath the A4054 Cardiff Road	22
Figure 9: Map of ordinary watercourses that feed into investigation area RCT16.....	24
Figure 10: The River Taf River levels at Upper Boat station between the 14 th and 17 th February 2020 (Natural Resources Wales)	26
Figure 11: NRW's FRAW map for River sources at RCT16. Contains Natural Resources Wales information © Natural Resources Wales and database right. All rights reserved.....	28
Figure 12: NRW's National Hazard map for Medium Risk River Flood Depth in RCT16. Contains Natural Resources Wales information © Natural Resources Wales and database right. All rights reserved.	29

Figure 13: NRW's National Hazard map for Low Risk River Flood Depth in RCT16. Contains Natural Resources Wales information © Natural Resources Wales and database right. All rights reserved. ...	30
Figure 14: Natural Resources Wales' map for Main River Flood Defences and areas benefiting at RCT16. Contains Natural Resources Wales information © Natural Resources Wales and database right. All rights reserved	31
Figure 15: Photo of a manhole at Oxford Street captured before (left) and after (right) surveying and cleansing operations during June 2020	32
Figure 16: NRW's Flood Risk Assessment Wales (FRAW) map for Surface Water and Ordinary Watercourse flood sources at RCT16. Contains Natural Resources Wales information © Natural Resources Wales and database right. All rights reserved.	35

1 INTRODUCTION

1.1. PURPOSE OF INVESTIGATION

On the 15th and 16th of February 2020, Rhondda Cynon Taf County Borough Council was impacted by an extreme weather event which was named ‘Storm Dennis’ by the Met Office. Due to the extent of the event’s impact, the LLFA opted to undertake a formal investigation.

The storm resulted in widespread residential and commercial flooding within the Rhondda Cynon Taf County Borough Council area. This report will focus on Flood Investigation Area RCT16 (further referred to as RCT16) which encompasses the Upper Boat and Nantgarw region of the county borough in the River Taf catchment.

The reason behind RCT’s investigation is in response to the duties of the local authority regarding Section 19 of the Flood and Water Management Act 2010, 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 the 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

The purpose of the investigation is to determine which RMAs have relevant flood risk management functions and which functions have been exercised in response to the flood event in question.

Specific details of Storm Dennis, such as rainfall analysis are covered within a separate overview report that covers the wider RCT area. The report is titled ‘Storm Dennis February 2020 – Overview Report’ and will be referred to as ‘FRM – Storm Dennis – Overview Report’².

¹ Flood and Water Management Act 2010 – Section 19 - <https://www.legislation.gov.uk/ukpga/2010/29/section/19>

² [Flood Investigation Reports | Rhondda Cynon Taf County Borough Council \(rctcbc.gov.uk\)](https://www.rctcbc.gov.uk/flood-investigation-reports)

1.2. SITE LOCATION

The area investigated within this report covers the villages of Nantgarw and, Upper Boat which comprises part of the Treforest Industrial Estate, located within the southern region of the brough. The investigation area falls within the electoral wards of Hawthorn, Taff's Well and Tonteg, situated to the south-east of Pontypridd.

RCT16 is located within the River Taf catchment and encompasses both the western and eastern banks of the main river, as illustrated in Figure 1.

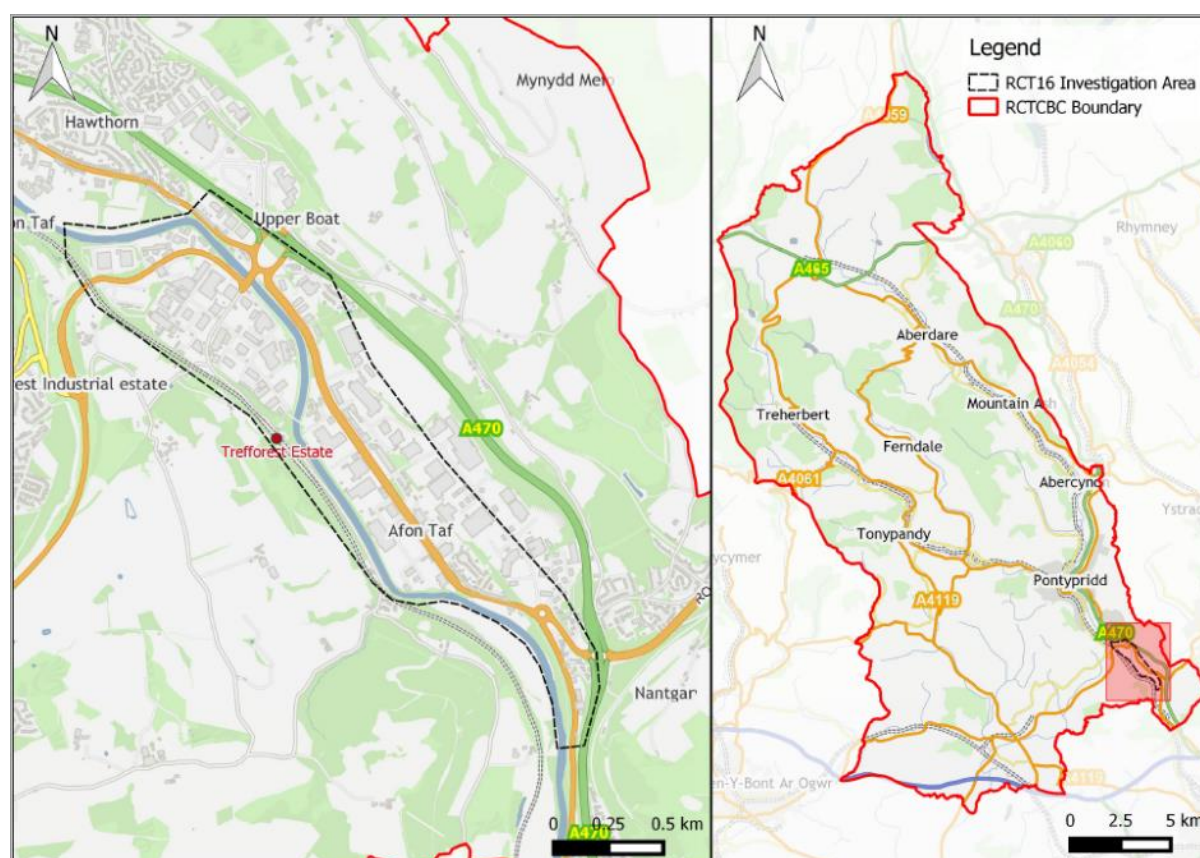


Figure 1: Flood Investigation Area RCT16 Location Plan

According to Welsh Government's CaRR, Nantgarw is ranked 124th for main river flooding and 101st for surface water flooding in Wales.

NRW's Flood Risk Assessment Wales (FRAW) maps indicate that there are areas of low to high flood risk from both fluvial and surface water and ordinary watercourse sources within the investigation area. This is illustrated in Figure 2, which is an excerpt from the FRAW maps.

The highest risk posed to people and properties within RCT16 is associated with the River Taf, with a low risk of fluvial flooding observed across the eastern embankments and a medium to low risk of fluvial flooding present on the western floodplains at Treforest Industrial Estate.

Flood risk from surface water and ordinary watercourse sources is also noted across many parts of the investigation area, although not to the same degree and extent as main river flood risk. RCT's FRMP³ identifies areas of low to high surface water and ordinary watercourse flood risk within RCT16 associated with culvert inlets and potential bank breaches.

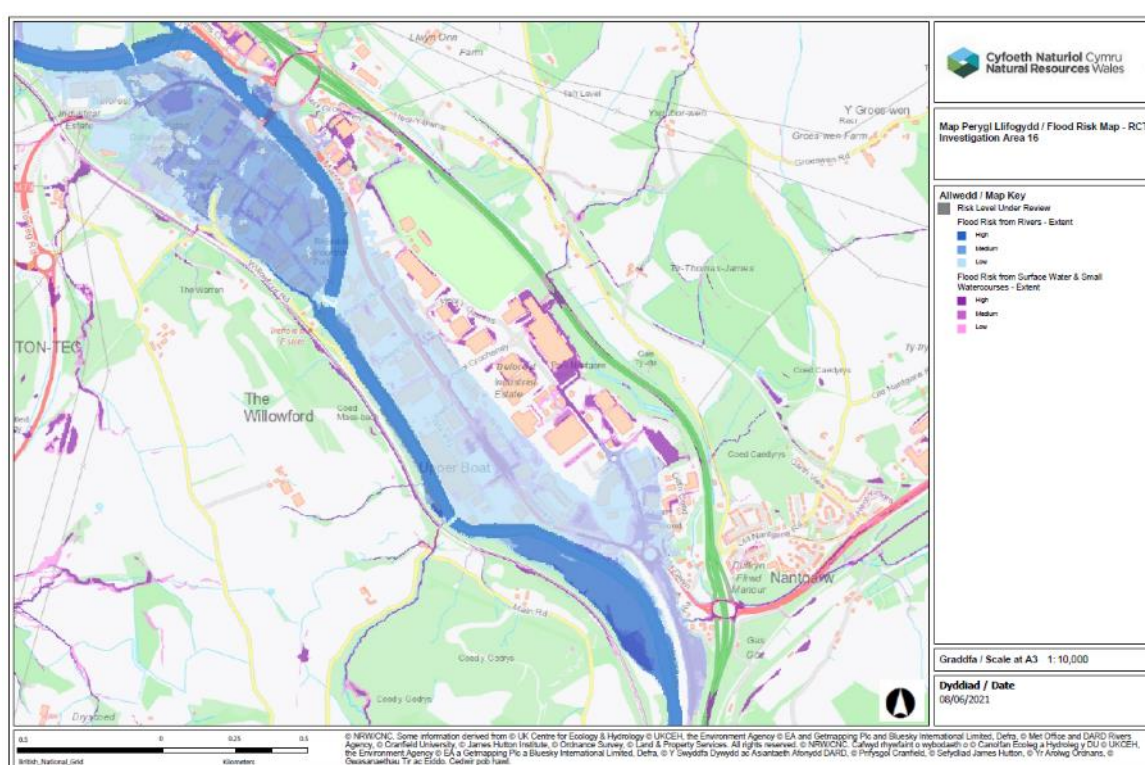


Figure 2: Natural Resources Wales' Flood Risk Assessment Water (FRAW) map for rivers and ordinary watercourse and surface water flood risk at investigation area RCT16. Contains Natural Resources Wales information © Natural Resources Wales and database right. All rights reserved.

There are multiple ordinary watercourses within the investigation area, both open and culverted beneath residential development. These include the Nant Garw, Nant Lonydd and several unnamed watercourses which convey towards the River Taf via the A470 dual carriageway.

³ [RCT'S Flood Risk Management Plan \(rctcbc.gov.uk\)](https://www.rctcbc.gov.uk)

1.3. DRAINAGE SYSTEM

The surface water drainage systems that serve investigation area RCT16 are that of the highway drainage network designed to manage the surface water within the highway and public surface water sewer and combined sewer networks operated by Dŵr Cymru Welsh Water.

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 below within Table 1.

Table 1: Investigative evidence gathered in preparation of the Storm Dennis Section 19 report

Source	Data
Residents	Photos, videos, statements, email correspondence, public engagement survey responses
Responders' statements	Local responders' statements
CCTV Surveys	Internal surveys of the local drainage networks
Met Office Data	Weather Warning information (see FRM – Storm Dennis - Overview Report)
Rain Gauges	RCT and NRW operated gauge information (see FRM – Storm Dennis – Overview Report)
Natural Resources Wales	River Level and Flood Warning data
RCT Flood Risk Management Plan	Site specific information and data for each electoral ward in RCT
Communities at Risk Register	Flood risk ranking and scores for all flood types based on community data in Wales
Flood Investigation Report (Redstart's FIR)	A summary of the source-pathway-receptors, culvert capacity assessment and hydraulic modelling work undertaken by Redstart. The Flood Investigation Report was commissioned by RCT prior to writing the Section 19 report.

Evidence sourced from the 'Flood Investigation Report', commissioned by RCT, will be further referred to as 'Redstart's FIR' throughout this report.

1.5. PUBLIC ENGAGEMENT

Following the initial flooding event that occurred on the 15 and 16th of February during Storm Dennis, flood risk officers from RCT's Flood Risk Management department were deployed to areas across the borough to investigate reports of internal flooding by residents. Residents engaged with the Flood Risk Management team to help determine the initial impacts caused by the flooding event and to investigate the potential source(s) and pathway(s) of flood water. 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 the flood investigations, a public engagement exercise was undertaken between the 4th and 25th of January 2021 by Redstart, on behalf of RCT. The aim of this exercise was to engage with local residents who were affected by the flood event to capture details 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. 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.

2. FLOODING HISTORY

2.1. PREVIOUS FLOOD INCIDENTS

Historical flood records and residents accounts captured by RCT's Flood Risk Management officers following Storm Dennis indicate that the majority of properties within the investigation area had not experienced internal flooding prior to Storm Dennis.

An area of RCT16 which is an exception to this is the A4054 (Cardiff Road) in the southernmost part of the investigation area which has experienced flooding on numerous occasions as a result of the Nant Garw ordinary watercourse. Historical flood records indicate at least 15 instances of flooding at the location between 1998 and 2012.

Anecdotal information supplied by long-term residents of Rhyd-Yr-Helyg suggests that properties within areas of RCT16 also internally flooded on at least two occasions between 1960 and 1970; however, this was prior to the enhancement of nearby main river flood defences.

2.2. FLOOD INCIDENT

The flooding that occurred on the 15th and 16th February 2020 was a result of an extreme rainfall event, designated by the Met Office as ‘Storm Dennis’. The rainfall event affected the majority of RCT and caused widespread flooding to communities.

Specific details of Storm Dennis, such as rainfall and river level analysis are covered within a separate overview report that covers the wider RCT area, referenced ‘FRM – Storm Dennis – Overview Report’².

Post event inspections undertaken on the days following the storm event by RCT’s Flood Risk Management team and RCT’s Public Health, Protection and Community team identified 121 residential properties and 185 non-residential properties as internally flooded within the investigation area.

A summary of the source(s) and pathway(s) of flooding within RCT16 during Storm Dennis have been outlined in Table 2 and further described throughout this section.

Table 2: Summary of the source(s), pathway(s) and receptor(s) affected during Storm Dennis within investigation area RCT 16

Source(s)	Pathway(s)	Receptor(s)
The River Taf overtopping its eastern and western banks at multiple locations throughout the investigation area.	Main river flood water conveyed into the front and/or back of properties across RCT16 via several highway networks including the A4054 (Cardiff Road / Oxford Street / Main Avenue) and the A473 (Tonteg Road).	The overtopping of the River Taf resulted in internal flooding to at least 280 receptors, including 113 residential and 167 non-residential properties, across the Treforest Industrial Estate, Williams Place, Oxford Street and Rhyd-yr-Helyg. Main river flooding also contributed to the flooding of 6 residential and 18 non-residential properties on Cardiff Road, near the Nant Garw watercourse inlet.
Intense rainfall running off the steep hillsides to the east of RCT16 draining to lower ground via the Nant Garw ordinary watercourse.	Water overflowed from the Nant Garw ordinary watercourse inlet, known as Cross Keys Inlet, onto the A4054 Cardiff Road.	Contributed to the internal flooding of 6 residential properties and 18 non-residential properties along the A4054 Cardiff Road.

<p>A Nant Garw ordinary watercourse inlet adjacent to Cardiff Road became overwhelmed and surcharged during the storm event.</p>		
<p>Intense rainfall and subsequent surface water runoff from the surrounding area.</p>	<p>Surface water runoff was observed along several highway networks including the A4054 (Main Avenue / Oxford Street / Cardiff Road), the A468 (Caerphilly Road), Tyla Gwyn, Quarry Street.</p> <p>Furthermore, surface water contributed to the main river and ordinary watercourse flows throughout the investigation area.</p>	<p>Two residential properties on Quarry Street were flooded primarily due to localised surface water ponding.</p> <p>Surface water flows are also considered to have exacerbated the flooding experienced at many internally flooded properties throughout RCT16 during Storm Dennis.</p>

On review of Table 2, the primary source of flooding throughout the majority of RCT16 was the overtopping of the main river, the River Taf, which flows from north to south through the investigation area. In the southernmost section of the investigation area, a surcharging ordinary watercourse culvert inlet was also identified as a source of flooding. Across the entirety of RCT16, the impacts of main river and ordinary watercourse flooding were exacerbated due to intense rainfall and subsequent surface water flows conveying via the highway network.

During the early hours of Sunday 16th February 2020, RCT received several calls from residents at Nantgarw and Upper Boat reporting the overtopping of the River Taf at multiple locations and the ingress of water into properties. Several flow paths were observed as properties located on the western and eastern floodplains of the River Taf were impacted. Internal flooding to 113 residential and 167 commercial properties across RCT16 were confirmed as directly attributed to the River Taf overtopping its banks. Main river flooding was also confirmed as a contributing source of flooding to a further 6 residential and 18 commercial properties within RCT16.

To the north of RCT16, the overtopping of the River Taf resulted in the conveyance of riverine flood water through several streets within the Upper Boat area on the eastern embankment, and Treforest Industrial Estate on the western embankment.

At Upper Boat, properties immediately adjacent to the main river were most severely impacted by the overtopping, with resident accounts reporting flood depths of up to 1.8 metres at localised low points on Williams Place. Nine residential properties and one commercial premise at Williams Place were internally affected by the River Taf overtopping at this location. Resident accounts also highlighted surcharging highway drainage at Upper Boat Interchange as a contributing source of flooding. The associated surface water flows along the highway have been attributed as the primary cause of flooding to two commercial properties located at low points at Williams Place.

The flooding that occurred at Treforest Industrial Estate did not remain confined to areas adjacent to the main river channel, with commercial properties up to 450 metres inland from the River Taf reporting internal flooding. The main river overtopped both its eastern and western banks, resulting in internal flooding to the majority of commercial premises throughout the industrial estate. Figure 3 depicts an aerial view of the flooding at Treforest Industrial Estate and Upper Boat, to the north of RCT16.



Figure 3: Aerial view of Treforest Industrial Estate and Upper Boat following Storm Dennis (Image: National Police Air Service)

Further south, the overtopping of the River Taf along the eastern embankment resulted in the conveyance of fluvial flood water through Treforest Industrial Estate and onto

the A4054 (Main Avenue). Water travelled south onto the A4054 (Oxford Street) before entering Rhyd-yr-Helyg cul-de-sac.

Based on the available evidence, the River Taf is considered to have overtopped its defences adjacent to the A4054 (Oxford Street) during the night of 16th February 2020 when river levels were at their peak, however the primary pathway of fluvial flood water, as stated by residents, was via the highway network.

Accounts from residents at Oxford Street and Rhyd-Yr-Helyg note a significant amount of water conveyed along the highway network towards their properties during the storm event. This flow path is considered to have originated further upstream following the overtopping of the River Taf at Treforest Industrial Estate and Upper Boat, which then conveyed behind formal flood defences towards Oxford Street and Rhyd-yr-Helyg during the storm event. Photographic evidence provided by residents at Oxford Street show water flowing south along the highway, behind the eastern embankment, during the morning of Sunday 16th February 2020 (Figure 4).



Figure 4: Photo showing main river flooding along the A4054 Oxford Road during Storm Dennis (image provided by resident)

A total of 103 residential properties at Oxford Street and Rhyd-yr-Helyg were internally impacted by the River Taf, with residents reporting flood depths of over 1.8 meters.

A detached residential property on the western floodplain of the River Taf also experienced internal flooding as a result of the River Taf overtopping its banks.

Fluvial flood water reportedly continued to flow south along the A4054 Oxford Street towards Cardiff Road, where a further 6 residential and 18 commercial properties were internally affected.

The impacts of flooding from the main river at Cardiff Road were exacerbated by the surcharging of the 'Cross Keys' culvert inlet (Figure 8) associated to the Nant Garw ordinary watercourse. Exceedance flows from the surcharged inlet conveyed onto Cardiff Road, contributing the flooding of properties in this area. Flood depths along Cardiff Road reportedly reached over a metre in depth, as depicted in Figures 5 and 6.



Figure 5: Image of the flooding on Cardiff Road near A4054/A468 roundabout during Storm Dennis, looking south. (Image: Tom Martin/Wales News Service)



Figure 6: Image of the flooding on Cardiff Road near A4054/A468 roundabout during Storm Dennis, looking north. (Image: PA/Wales Online)

An isolated incident of surface water flooding occurred at Quarry Street, where two residential properties experienced internal flooding during Storm Dennis as a result of localised pluvial flows from the adjacent street, Tyla Gwyn. The observed flow pathways resulting in internal flooding at Cardiff Road are illustrated in Figure 7.



Figure 7: Indicative flow paths observed during Storm Dennis to the south of RCT16

2.3. RAINFALL ANALYSIS

See RCT's 'Overview Report' of Storm Dennis, reference 'FRM – Storm Dennis – Overview Report'², for a detailed analysis of the rainfall and ordinary watercourse response.

3. POSSIBLE CAUSES

3.1. CULVERT CONDITIONS

There are several named and unnamed watercourses which drain the upper catchment areas surrounding RCT16, however, only the Nant Garw ordinary watercourse to the southeast of the investigation area was identified as a source of flooding during Storm Dennis.

The majority of the Nant Garw ordinary watercourse is open channel, however the watercourse is culverted beneath sections of the A468 (Caerphilly Road), the A470 dual carriageway and the A4054 (Cardiff Road) before it discharges into the River Taf downstream. Following Storm Dennis, a CCTV survey inspection of the culverted ordinary watercourse beneath the A4054 Cardiff Road (Figure 8), known as 'Cross Keys' culvert, was undertaken to ascertain both the operational condition of the network and its structural integrity.



Figure 8: The Nant Garw culverted ordinary watercourse which runs beneath the A4054 Cardiff Road

Comprising of four culvert sections in a double-barrel configuration, the survey revealed that the culvert was in good structural condition, with only one of the four

sections having structural defects present. However, the serviceable condition of the culvert network identified accumulated debris within three of the four culvert sections and both outfall sections were unable to be fully inspected due to the level of the outfall within the main river at the time of the survey, which suggests the culverts are subject to debris settlement and outfall control.

In response to the identified debris, approximately 5 tonnes of material was removed from the inlets by a Council appointed contractor following the inspection.

3.2. ORDINARY WATERCOURSE CONDITIONS

There are several named and unnamed ordinary watercourse that convey towards the River Taf through the investigation area (illustrated in Figure 9).

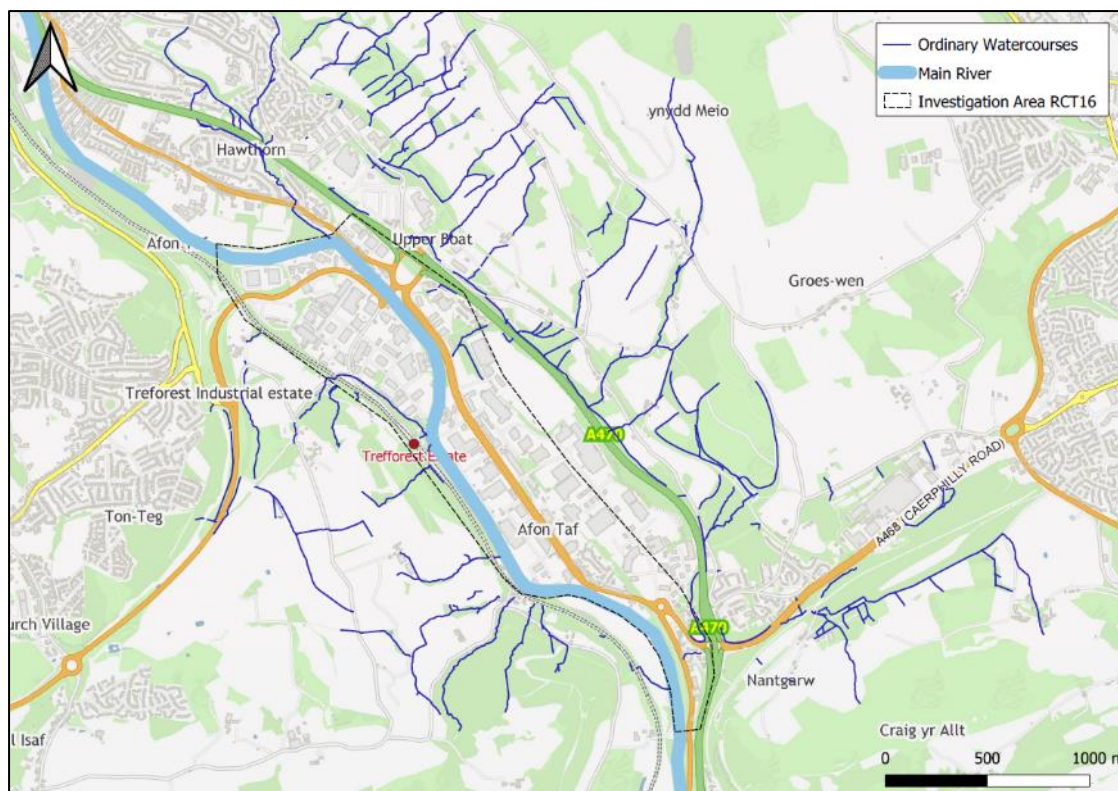


Figure 9: Map of ordinary watercourses that feed into investigation area RCT16

With the exception of the Nant Garw ordinary watercourse in the south of the investigation area, there is no evidence to suggest that the network of ordinary watercourses illustrated in Figure 8 contributed to the flooding experienced during Storm Dennis.

3.3. MAIN RIVER

The designated main River Taf flows from the north east of the investigation area at Upper Boat, through Treforest Industrial Estate and towards Nantgarw, in the southeast of RCT16 (Figure 9). Areas on both the western and eastern embankments of the River Taf were impacted during Storm Dennis

3.4. MAIN RIVER LEVELS AND FLOOD WARNINGS

The hydrograph in Figure 10 illustrates the significant rise in the River Taf's levels in response to rainfall between the 14 – 17th February 2020. River level data was captured at NRW's Upper Boat river level gauge, located in the northwest of the investigation area.

NRW issued a 'Flood Alert' (indicating possible flooding) for the entirety of the River Taf at approximately 13:30 on the 15th February; at which point the main river was over 2 metres in depth and continuing to rise at Upper Boat station. At approximately midnight on the 16th February the River Taf began to rise again, reaching a peak river level of 5.49 metres at 06:00 on the 16th February; the highest level recorded for the River Taf at Upper Boat since 2001.

The green bar displayed on the hydrograph shows the typical level of the River Taf at the Upper Boat station, ranging between approximately 0.2 and 1.2 metres. The river level was above this green line for over 48 hours, highlighting the severity of the storm event and its unprecedented nature. At its peak, the River Taf at Upper Boat was over four meters higher than its average level.

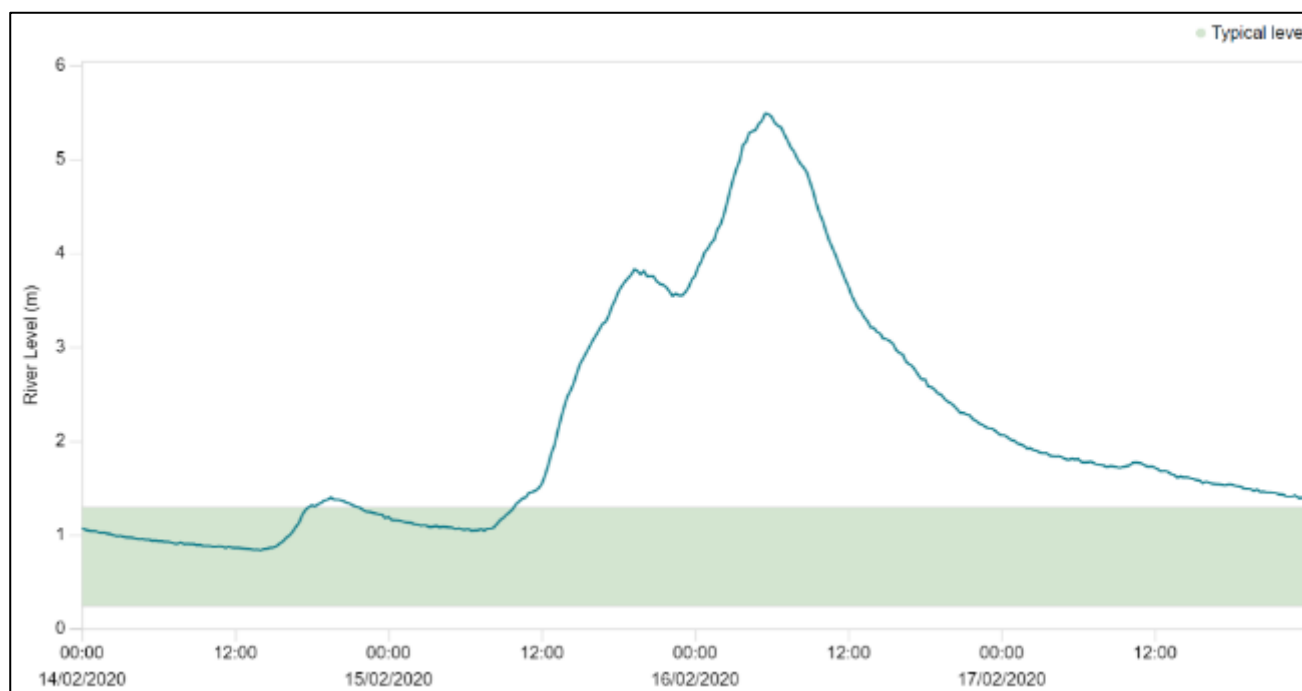


Figure 10: The River Taf River levels at Upper Boat station between the 14th and 17th February 2020 (Natural Resources Wales)

Investigation area RCT16 encompasses two NRW Flood Warning Areas; the River Taf at Upper Boat and the River Taf at Nantgarw. The Flood Warnings issued by NRW, and associated river levels at Upper Boat gauging station (i.e., nearest gauging station to RCT16), for the River Taf at investigation area RCT16 during Storm Dennis are shown in Table 3.

Table 3: Flood Warnings issued by NRW for the River Taf at RCT16 during Storm Dennis

Flood Warning Type	Location	Start Time	River Level (m) at Upper Boat
Flood Alert	River Taf	13:27 15/02/2020	2.24
Flood Warning	River Taf at Upper Boat	02:10 16/02/2020	4.306
Flood Warning	River Taf at Nantgarw	05:19 16/02/2020	5.414

NRW issued a ‘Flood Warning’ alert (indicating flooding is expected) for the River Taf at Upper Boat (north of RCT16) at 02:10 on the 16th February; at which point the main river was over 4.3 metres in depth. A ‘Flood Warning’ alert was also issued for the River Taf at Nantgarw (south of RCT16) at approximately 05:20 on the 16th February; at which point the main river was over 5.4 metres in depth. Based on the available

evidence, main river flooding at RCT16 had already commenced prior to both 'Flood Warning' alerts being issued.

A 'Severe Flood Warning' alert (indicating Community-wide severe flooding and possible risk to life) was not issued by NRW for the River Taf at Upper Boat or Nantgarw during the storm event.

However, a 'Severe Flood Warning' was issued by NRW for the River Taf at Pontypridd (outside of RCT16) at approximately 06:30 on the 16th February. Based on accounts of residents and responders, significant main river flooding to properties had already commenced at several locations along the River Taf, including at investigation area RCT16.

NRW have acknowledged within their 'Flood Incidence Response Review'⁴ that "the operation of the Flood Warning Service came under significant pressure during February and at times became overwhelmed", resulting in flood warnings being issued late (after the onset of flooding) or not issued at all. At this location (RCT16), this is in reference to the 'Flood Warning' alerts at Upper Boat and Nantgarw, in addition to the 'Severe Flood Warning' alert that was not issued for RCT16.

Improvements to their flood forecasting and warning services are being internally investigated by NRW and where feasible implemented to deliver the recommendations outlined within their Flood Incident Response Review⁴.

3.4.1. MAIN RIVER FLOOD RISK

As outlined in Section 2, the overtopping of the River Taf that occurred at RCT16 during Storm Dennis has been identified as the primary cause of flooding to at least 280 receptors within the investigation area.

Figure 13 is an extract from NRW's Flood Risk Assessment Wales (FRAW) mapping exercise which depicts the main river flood risk extents for the 'Defended' 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 RCT16 during Storm Dennis is largely consistent with the modelled outputs of NRW's FRAW map (Figure 11), with the majority of the

⁴ [February 2020 Floods in Wales: Flood Incident Management Review \(cyfoethnaturiol.cymru\)](https://www.nrw.gov.uk/February-2020-Floods-in-Wales-Flood-Incident-Management-Review)

affected properties falling within an area of at least a low to medium main river flood risk.

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%). Considering Storm Dennis has been estimated as a 1 in 200 annual probability (Q200) flood event, the area of flooding during Storm Dennis aligns with those depicted by the low flood risk extents (Figure 11).

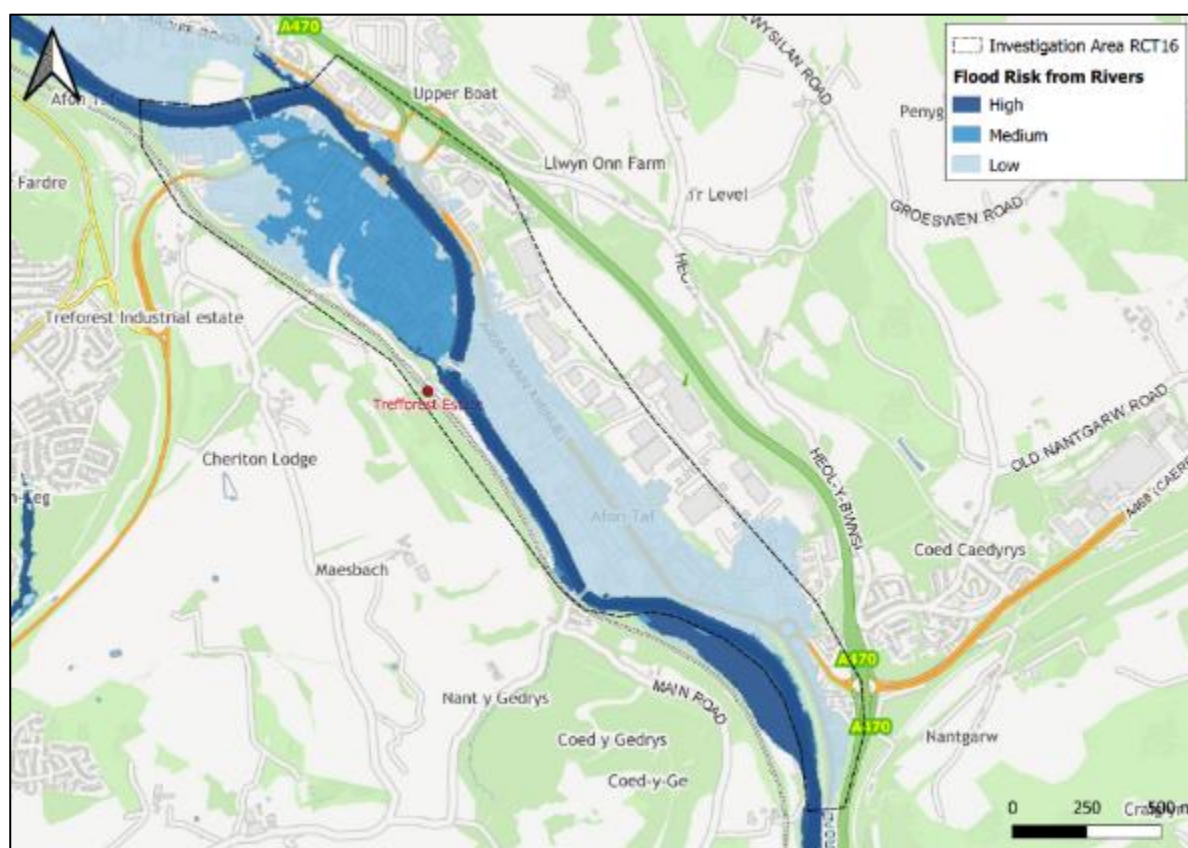


Figure 11: NRW's FRAW map for River sources at RCT16. Contains Natural Resources Wales information © Natural Resources Wales and database right. All rights reserved.

NRW's Flood Hazard maps (Figures 12 and 13) illustrate the modelled flood depth predictions for a medium (Figure 12) and low (Figure 13) risk flood event.

The figures below highlight the substantial difference in predicted flood extents and impacts between a medium risk storm event and a low risk storm event, with the latter being more representative of the flooding that occurred during Storm Dennis, where flooding to a depth of greater than 0.9 metres was observed across most of RCT16.

Figure 13 also identifies a fluvial flow path from Oxford Street towards Cardiff Road, which supports the notion that main river flooding did not occur immediately adjacent to Cardiff Road in the south of the investigation area but was as a result of fluvial flows conveying southwards along the highway network.

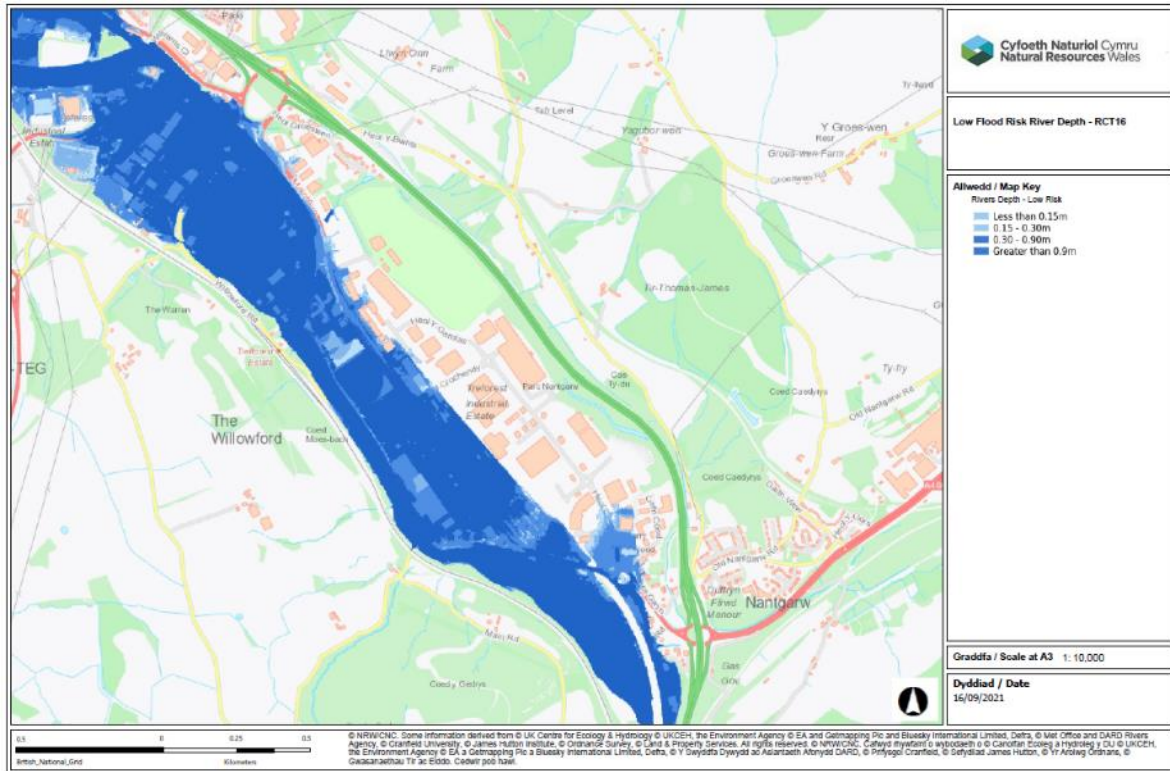


Figure 12: NRW's National Hazard map for Medium Risk River Flood Depth in RCT16. Contains Natural Resources Wales information © Natural Resources Wales and database right. All rights reserved.

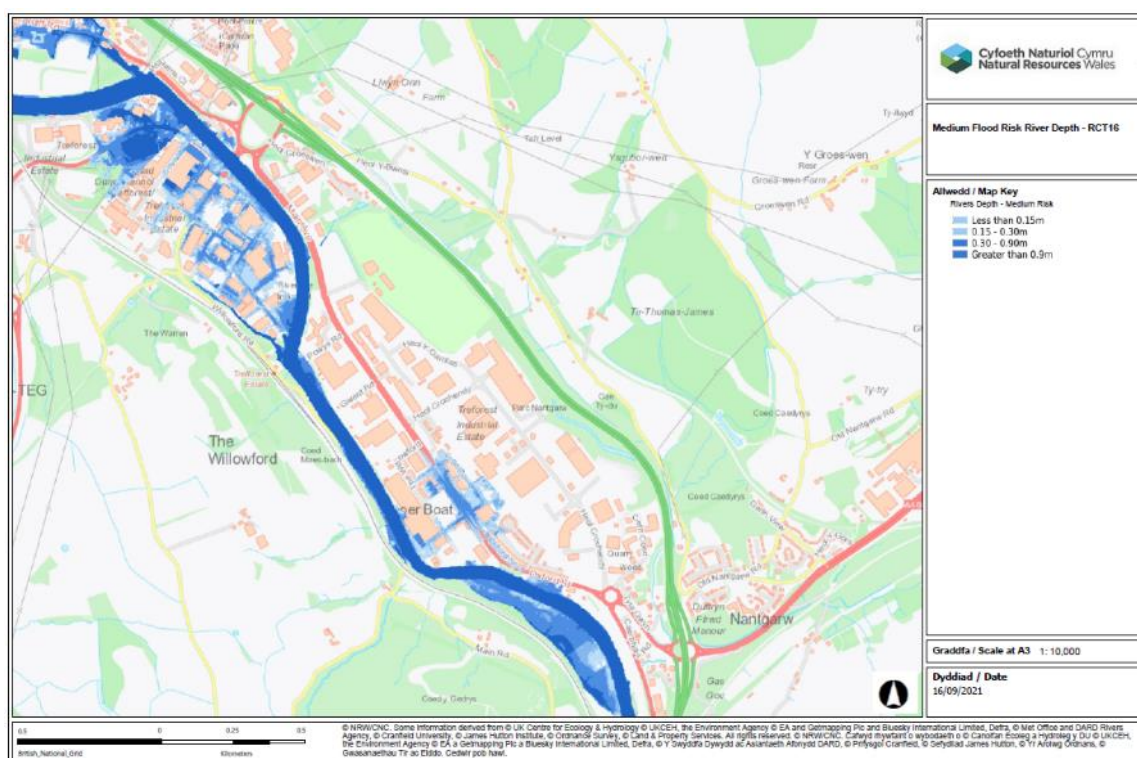


Figure 13: NRW’s National Hazard map for Low Risk River Flood Depth in RCT16. Contains Natural Resources Wales information © Natural Resources Wales and database right. All rights reserved.

3.4.2. MAIN RIVER FLOOD DEFENCES

As illustrated in Figure 14 (demarcated by a bold red line), there are approximately 2.5 kilometres, and 1.25 kilometres, of formally designated flood defence infrastructure along the eastern, and western banks, of the River Taf at RCT16, respectively. This infrastructure is operated and maintained by NRW.

According to NRW, flood defence infrastructure throughout the Treforest Industrial Estate, including at Oxford Street and Rhyd-yr-Helyg, provides a standard of protection up to a 1 in 100 annual probability flood event (Q100) (black hatched area in Figure 16). Flood defence infrastructure at Upper Boat and William’s Place provide a reduced standard of protection of 1 in 20 annual probability (Q20) flood event.

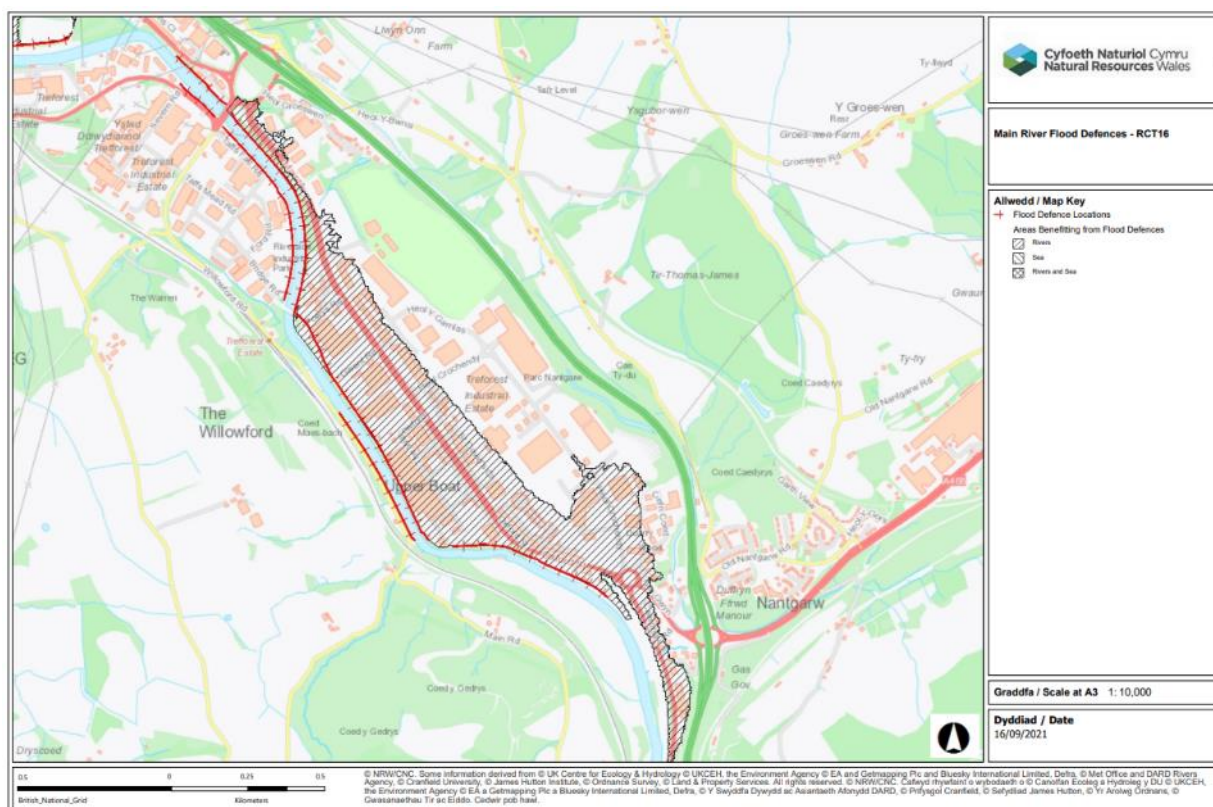


Figure 14: Natural Resources Wales’ map for Main River Flood Defences and areas benefiting at RCT16. Contains Natural Resources Wales information © Natural Resources Wales and database right. All rights reserved

The current indicative design standard of protection for flood defences on a main river is Q100 flood event plus, for new defences, an allowance for climate change. This is stated within the Welsh Government’s National Strategy for Flood and Coastal Erosion Risk Management which encourages main river flood alleviation schemes to provide a SOP up to 1 in 100 annual probability (Q100)⁵. It is thereby inferred that the majority of the existing flood defence infrastructure at RCT16 is in accordance with current indicative standards, with the exception of the defences at Upper Boat, which are below indicative design standards.

Whilst some of the flood defences identified at RCT16 are below the current indicative standard, the unprecedented rise of river levels in the Taf during Storm Dennis resulted in the overtopping of assets up to Q100 SOP. NRW’s ‘Flood Incidence Response Review’⁴ does in fact outline that no flood defences failed in the lower Taf region and that the flooding was the result of river flows exceeding the design standard of the defences.

⁵ [National Strategy for Flood and Coastal Erosion Risk Management in Wales \(English\) \(gov.wales\)](https://www.gov.wales/national-strategy-for-flood-and-coastal-erosion-risk-management-in-wales)

3.5. HIGHWAY DRAINAGE CONDITION

Several streets that flooded throughout RCT16 during Storm Dennis were impacted by the overtopping of the River Taf. These fluvial flows deposited mud, silt and debris across the investigation area which are assumed to have entered the highway drainage system, leading to blockages and a reduction in the hydraulic capacity of the surface water network.

CCTV inspections undertaken in the months following the storm event confirm this, with surveys completed on Oxford Street and Rhyd-Yr-Helyg identifying large silt and debris deposits within many sections of the highway drainage network. Figure 15 depicts the operational condition of the highway drainage at Oxford Street before and after cleansing operations took place. A total of 25 tonnes of silt and debris was removed by a Council appointed contractor during cleansing operations.



Figure 15: Photo of a manhole at Oxford Street captured before (left) and after (right) surveying and cleansing operations during June 2020

CCTV inspections also identified structural defects within the drainage network on Oxford Street, including collapses within the drainage infrastructure near to the system's main river outlet. A section of the outlet structure was also damaged during Storm Dennis.

Whilst a lack of baseline highway drainage inspection data restricts the determination of whether the identified structural defects were caused during Storm Dennis or present beforehand, the severity of the flood incident at RCT16, caused by the overtopping of the River Taf, indicates that the condition of the highway drainage infrastructure would have had little to no impact on the extent of flooding observed.

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 in RCT16 was exceeded as a result of both main river and surface water 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 CONDITIONS

There is no evidence from this investigation that DCWW apparatus contributed to the flooding that occurred during Storm Dennis within investigation area RCT16.

DCWW reported no issues within RCT16 during Storm Dennis and it is not believed that any DCWW infrastructure was damaged during the storm event. Whilst DCWW have concluded that their assets performed well during Storm Dennis, the majority of drainage infrastructure within the investigation area is comprised of combined sewer networks which are likely to have become overwhelmed during the storm event for the reasons outlined in Section 3.4.

3.7. SURFACE WATER

Surface water is considered to have been the primary cause of internal flooding to two properties at Quarry Street, however surface water is considered to have exacerbated the main river flooding observed across the investigation area, as well as the ordinary watercourse flooding observed at Cardiff Road.

The pathways for surface water runoff during the storm event were observed along the highway network within RCT16. The exact flow routes have not been confirmed due to lack of anecdotal evidence, however, NRW's national surface water and ordinary watercourse flood maps (Figure 16) provide a reasonable indication of the pathways and areas most at risk of flooding from local sources.

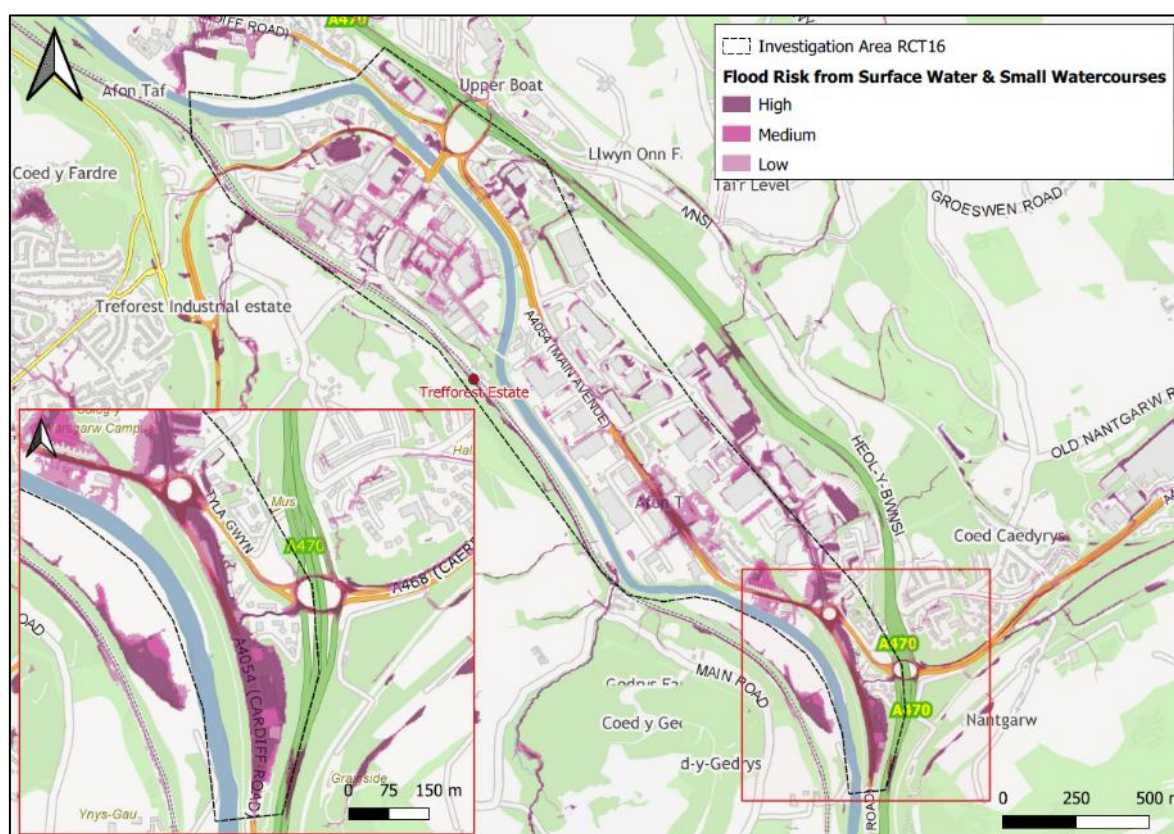


Figure 16: NRW's Flood Risk Assessment Wales (FRAW) map for Surface Water and Ordinary Watercourse flood sources at RCT16. Contains Natural Resources Wales information © Natural Resources Wales and database right. All rights reserved.

Notable areas where surface water flows are considered to have exacerbated the main river flooding include Williams Place, Cardiff Road, and parts of Rhyd-yr-Helyg and Oxford Street, where the FRAW map indicates a high to low risk of pluvial flooding (Figure 16). At Quarry Street, localised surface water flows generated by intense

rainfall and conveying via local topography from Tyla Gwyn and the A4054/A468 roundabout are considered the primary cause of flooding to two residential properties.

Investigation area RCT16 sits on a floodplain, meaning the area is predominantly flat. This suggests that the areas of high to low flood risk are primarily associated to the conveyance of pluvial flows towards localised low points across the investigation area and not a consequence of the dominant valley gradient above RCT16.

3.8. ACCESS STRUCTURES

No access structures were identified during the asset investigations within the area, as such 'access structures' have not been considered within this report.

3.9. SYSTEM AT CAPACITY

Whilst the overtopping of the River Taf has been determined as the primary cause of flooding to the majority of properties within RCT16, the capacity of the Nant Garw culvert network at Cardiff Road has also been assessed to ascertain its current standard of protection following the observed surcharging of the culvert inlet during Storm Dennis.

The results of the culvert capacity assessment are summarised in Table 4.

Table 4: Summary of the culvert capacity assessment results which indicate the current standard of protection of the ‘Cross Keys’ culvert at Cardiff Road in free flowing and blockage conditions

Culvert Network	Standard of Protection (SOP) – Free Flowing	Standard of Protection (SOP) – Blockage Condition
Inlet 1 – Cross Keys Culvert	Q10 (10% AEP)	<Q2 (>50% AEP)
Inlet 2 – Cross Keys Culvert	<Q2 (>50% AEP)	<Q2 (>50% AEP)

The results from the culvert capacity assessments and hydraulic modelling undertaken as part of Redstart’s FIR infer that both ‘Inlet 1’ and ‘Inlet 2’, associated to the ‘Cross Key’ culvert (Figure 10), have a standard of protection below current design standards, as defined by CIRIA C786⁶ (minimum standard of protection of Q100 + 40% climate change allowance for new culverts). The hydraulic capacity of the culvert sections is further reduced when accounting for outfall control and its serviceable condition i.e., blockages caused by debris observed during the CCTV inspections.

The primary cause of debris accumulation within the culvert network is believed to be the low positioning of the structure with respect to the main river, leading to significant ‘outlet control’⁶ and the settling of fluvial deposits. During Storm Dennis, it is likely that the unprecedentedly high river levels resulted in the culvert outlet becoming completely submerged, thus resulting in ‘full flow outlet control’ and an increased risk of blockage and/or surcharge.

Whilst settled deposits within the culvert structure are likely to have exacerbated flooding at the ‘Cross Keys’ inlet, the ‘full flow outlet control’⁶ and resultant surcharging are likely to have occurred without the presence of debris in the culvert. Furthermore, the hydraulic control present at the culvert outlet due to its low positioning with respect

⁶ Culvert, screen and outfall manual, CIRIA, C786 (2019)

to the adjacent main river indicates that the settlement of fluvial deposits is inevitable without reconfiguring the culvert gradient. This infers that a cleansing of the culvert inlet would not have prevented the flooding which occurred during Storm Dennis as new material would have subsequently begun accumulating within the culvert barrel soon after due to its low gradient at the outfall.

Upon review of the CCTV inspection data discussed in Section 3.1, as well as the culvert capacity assessments stipulated above, it is considered that the primary cause of surcharge to the 'Cross Keys' culvert inlet during Storm Dennis was due to hydraulic overload, which contributed to the internal flooding of 6 residential and 18 non-residential properties along Cardiff Road.

3.9. SUMMARY OF POSSIBLE CAUSES

The above sections have identified and described the possible causes of flooding within investigation area RCT16 during Storm Dennis which occurred on the 15th and 16th of February 2020. A summary of the identified source(s) and possible cause(s) of flooding (issue) has been outlined below in Table 5.

Table 5: Summary of source(s) and possible cause(s) of flooding in investigation area RCT16 during Storm Dennis (15-16th February 2020)

Ref No	Asset (Source)	Issue	Asset Owner	Type of Flooding
1	River Taf	Unprecedentedly high river levels within the River Taf resulted in the main river overtopping its banks at several locations and flood water conveying into multiple properties, resulting in internal flooding of 304 receptors	Natural Resources Wales	Main River
2	River Taf	Unprecedentedly high river levels within the River Taf resulted in the main river overtopping its banks at several locations and flood water conveying into multiple properties, resulting in internal flooding of 304 receptors.	Private Landowner(s)	Main River
3	Nant Garw Culvert Network at Cardiff Road ('Cross Keys' culvert inlet)	Intense rainfall across the wider RCT16 catchment resulted in the 'Cross Keys' culvert inlet, which conveys the Nant Garw watercourse beneath Cardiff Road, becoming hydraulically overwhelmed. This resulted in the culvert inlet surcharging, contributing to the internal flooding of 24 properties at Cardiff Road.	Rhondda Cynon Taf Highway Authority	Ordinary Watercourse

4	Surface water drainage network across RCT16	Intense rainfall across RCT combined with the overtopping of the River Taf severely overwhelmed highway drainage infrastructure, resulting in the accumulation of surface water on many streets throughout the investigation area.	Rhondda Cynon Taf Highway Authority	Surface Water
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4. RISK MANAGEMENT AUTHORITY ACTIONS

A Welsh Risk Management Authority is defined in Section 6 of the Flood and Water Management Act 2010 as NRW; a LLFA, a district council for an area where there is no unitary authority, or a highway authority wholly in Wales; an internal drainage board for an internal drainage district that is wholly or mainly in Wales; a water company that exercises functions in relation to an area in Wales. As the LLFA, RCT has the responsibility to coordinate the management of flood risk and the interaction of Risk Management Authorities across Rhondda Cynon Taf.

An overview of the relevant Risk Management Authority in relation to flood type is provided in Table 6. For further details of the roles and responsibilities of individual Risk Management Authorities in managing flooding, refer to the Welsh Government's National Strategy for Flood and Coastal Erosion Risk Management, Section 4 'Roles and Responsibilities'⁵, and RCT'S 'FRM – Storm Dennis - Overview Report'**Error! Bookmark not defined..**

Table 6: Risk Management Authority with relevant functions to manage the risk for different flood types

Type of Flooding	Risk Management Authority
Flooding from Main River, reservoirs and the sea (including coastal erosion).	Natural Resources Wales
Flooding from ordinary watercourses, surface water and groundwater	Lead Local Flood Authority
Flooding from water and sewage systems	Water Companies (Dŵr Cymru Welsh Water)
Flooding from the highway	Highway Authority
Flooding from the highway (motorways and major trunk roads)	Welsh Government Trunk Road Agency

Risk Management Authorities have direct flood risk management functions under the Flood and Water Management Act 2010, as well as the Water Resources Act 1991, Land Drainage Act 1991 and the Highways Act 1980. Through analysis of the flooding that impacted RCT16, the flood risk management functions exercised or proposed to be exercised by relevant RMAs were recorded 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 cause(s) of flooding in RCT16 during Storm Dennis have been previously identified and summarised within Table 5. The Risk Management Authorities responsible for managing that flooding have been listed in Table 7 below, along with a series of recommendations put forward by the LLFA.

Table 7: Recommendations provided by the LLFA to be considered by the relevant Risk Management Authority identified in response to the source(s) of flooding in RCT16 (as per Table 5)

Ref No	Asset (Source)	Asset Owner	Type of Flooding	Relevant Risk Management Authority	Recommendations
1	River Taf	Natural Resources Wales	Main River	Natural Resources Wales	R1A NRW to “complete detailed investigative analysis work to understand the mechanisms of flooding in areas known to have flooded from main rivers”, including the River Taf at Upper Boat and Nantgarw. Aligns with recommendation ‘Action FD2’ within NRW’s Flood Incident Management Review.
					R1B NRW to investigate the standard of protection provided by flood defences throughout RCT16 and “consider

						<p>improvements to NRW flood alleviation schemes and structures on a prioritised basis”. Aligns with recommendation ‘Action FD3’ within NRW’s Flood Incident Management Review.</p>
					R1C	<p>NRW to work with the landowner(s) to assess and review the risk of flooding from the River Taf at locations known to have overtopped during the event but are currently ‘undefended’, to identify the viability of risk management options.</p>
2	River Taf	Private Landowner	Main River	Natural Resources Wales	R2A	<p>NRW to work with the landowner(s) to assess and review the risk of flooding from the River Taf at locations known to have overtopped during the event but are currently ‘undefended’, to identify the viability of risk management options.</p>
3	Nant Garw Culvert Network at Cardiff Road (‘Cross Keys’ culvert inlet)	Rhondda Cynon Taf Highway Authority	Ordinary Watercourse	Highway Authority, Lead Local Flood Authority and Land Drainage Authority	R3A	<p>The LLFA and LDA to identify drainage asset ownership and responsibility.</p>
					R3B	<p>The LLFA and LDA to investigate the standard of protection and the condition of the culvert structure and network as a whole.</p>
					R3C	<p>The LLFA to jet and cleanse the ordinary watercourse culvert network.</p>

					R3D	The LLFA to develop a Strategic Outline Business Case (SOC) to identify suitable management methods to reduce the risk of flooding from local sources (ordinary watercourse, surface water, groundwater).
4	Surface water drainage network across RCT16	Rhondda Cynon Taf Highway Authority	Surface Water	Highway Authority and Lead Local Flood Authority	R4A	The Highways Authority to jet and cleanse the highway drainage network and action repairs accordingly.
					R4B	The LLFA and Highway Authority to evaluate surface water management options to alleviate pluvial flooding at locations across the investigation area.

4.1 LEAD LOCAL FLOOD AUTHORITY

In review of Ref 3 and Ref 4 of Table 7, the LLFA has been determined as the relevant Risk Management Authority in relation to the ordinary watercourse and surface water flooding which occurred in investigation area RCT16 during Storm Dennis.

The LLFA exercised the following functions in response to the flooding at investigation area RCT16:

- 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 carried out by Redstart, on behalf of RCT as the LLFA, was undertaken in order to gain further local insight and anecdotal evidence to support the flood investigation.
- The LLFA and LDA have exercised their permissive powers under Section 64 of the Land Drainage Act 1991 to investigate the culvert structures and network conditions and its impact on the flooding within the investigation area. **(R3B)**
- An estimated 98 metres of culverted ordinary watercourse and 580 metres of surface water drainage network length within RCT16 has been surveyed following Storm Dennis to ascertain both the operational condition and structural integrity along sections of the network. **(R3B)**
- An estimated 30 tonnes of debris was removed from the culverted watercourse and surface water drainage network within RCT16 during cleansing operations. **(R3C)**
- The LLFA have commissioned Redstart to investigate the standard of protection of the Cross Keys culvert network in RCT16 to determine its hydraulic capacity following the observed surcharging at the inlet during Storm Dennis. **(R3B)**
- 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 Dennis.
- The LLFA has set up a central Control Room, to compliment the Council's Contact Centre and CCTV centre which is based at the Council's offices, to

provide a comprehensive and informed response to the residents of RCT as appropriate during storm events.

- The LLFA, working in partnership with NRW, have expanded their interim Property Flood Resistance project offering expandable flood gates to those properties deemed at high risk of flooding from the main river, as per NRW's determination.

The LLFA also propose to exercise the following functions in response to the flooding at investigation area RCT16:

- Following the surveying of the Cross Keys culvert network in RCT16, the LLFA propose to input and update all relevant asset data. **(R3A)**
- The LLFA propose to develop a Strategic Outline Business Case (SOC) to better understand the risk of flooding within RCT16 using a whole catchment approach to provide recommendations for suitable management mechanisms to reduce the wider risk of flooding to people and properties from local sources (Ordinary Watercourse, Surface Water and Groundwater). **(R3D, R4C)**
- The LLFA and LDA intend to clarify drainage asset owners and management responsibilities to make them aware of their personal risk. To ensure landowners manage the risk in compliance with the relevant legislation, a team of Flood Enforcement Officers including legal support is to be appointed.
- The LLFA and LDA will work with landowners and property owners to manage their personal flood risk through local measures, such as property resilience and resistance measures.
- As part of RCT's comprehensive review of the County Borough's most at risk communities, the LLFA are proposing to undertake a formal SFRA of the Lower Taf catchment area to better understand the overall risk from ordinary watercourse and surface water flooding in order to target investment to areas of highest risk. The SFRA also aim to encourage whole catchment measures, including working with natural processes, to alleviate flood risk in those areas of highest risk. **(R3D, R4B)**
- The LLFA will cooperate and collaborate with NRW to ensure a detailed study of the investigation area is completed and that appropriate actions to mitigate the impacts of river flooding are undertaken in accordance with NRW's Flood Incident Management Review.

4.2 NATURAL RESOURCES WALES

In review of Ref 1 and 2 in Table 7, NRW has been identified as the relevant Risk Management Authority in relation to the main river flooding from the River Taf during Storm Dennis.

NRW have exercised the following functions in response to the flooding at investigation area RCT16:

- 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 specifically outline within their ‘Flood Incident Management Review’⁴ that “more Severe Flood Warnings should have been issued based on the flooding impacts experienced” in the Lower Taf region. Utilising post event data and information, NRW have reviewed the Resultant Thresholds for the River Taf at Nantgarw and Upper Boat Flood Warning Area. This is critical for assessing the performance, timeliness and accuracy of the warning service after a flood. **(R1C)**.
- NRW has introduced improved digital services to provide comprehensive flood risk, river level and rainfall information to households, businesses and communities across Wales. The improved service was launched in September 2020 on the NRW website and will, according to NRW, improve how live flood warning and water level data is shared before and during flood events. **(R1C)**
- NRW have commissioned a Lower Taf Flood Modelling Project which is currently ongoing. **(R1A)**
- Following the flooding events of February 2020, NRW published a review of its incident response to Storm Ciara and Dennis in October 2020⁷. This review contains several recommendations for improvements to their ways of working and services which NRW are in the process of implementing through an internal delivery programme.
- NRW have developed a detailed Implementation Programme to address the areas of improvement work required to deliver the recommendations of the Flood Warning Service Review carried out by NRW in 2018. Several of the recommendations directly link to the recommendations set out by NRW within their Flood Incident Management Review **(R1C)**.

⁷ [Natural Resources Wales / Our response to Storm Ciara and Storm Dennis](#)

NRW also propose to exercise the following actions in response to the flooding at investigation area RCT16:

- Following the completion of NRW's Lower Taf Flood Modelling Project, NRW propose to undertake an initial economic assessment of the viability of potential flood risk management options. Greatest consideration should be given to areas at high risk of flooding from rivers on a prioritised basis. **(R1A, R1B)**
- Following the completion of NRW's Lower Taf Flood Modelling Project, NRW propose further threshold work and flood warning area amendments. **(R1A, R1C)**
- NRW will undertake a review of the modelled outputs and adopt changes to their maintenance program within the investigation area if required. **(R1A)**
- NRW to undertake repairs and upgrades to the concrete revetments along the River Taf at RCT16.

4.3. WATER COMPANY

Dŵr Cymru Welsh Water were not identified as a relevant authority in relation to the flooding at investigation area RCT16 during Storm Dennis. DCWW do not propose to undertake any actions in relation to the event within the investigation area.

4.4. HIGHWAY AUTHORITY

During the investigation into the flooding at investigation area RCT16 during Storm Dennis, the Highway was identified as flooding from a combination of sources at different locations, most notably as a result of main river flooding from the River Taf and the surcharging of the Nant Garw ordinary watercourse at 'Cross Keys' culvert inlet.

Ref 3 and 4 of Table 7 identifies the Highway Authority as a relevant Risk Management Authority in relation to the surface water flooding that occurred along the highway across RCT16.

RCT as the Highway Authority have exercised the following functions in response to the flooding within investigation area RCT16:

- 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. **(R4A)**
- The Highway Authority completed repairs to the damaged highway drainage infrastructure at Oxford Street following the storm event. This included repairs to the partially damaged outlet structure. **(R4A)**
- The Highway Authority has undertaken emergency clearance works to the culvert inlet identified as a source of flooding. **(R3C)**

RCT as the Highway Authority propose to undertake the following function in relation to the storm event at RCT16:

- The Highway Authority intend to increase their resource capacity by establishing a dedicated 'Pluvial Drainage Team' to focus entirely on the refurbishment and maintenance of RCT's existing and enhanced highway drainage infrastructure.

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 - <https://naturalresources.wales/flooding/check-flood-warnings/?lang=en>

Natural Resources Wales - Long Term Flood Risk - <https://naturalresources.wales/evidence-and-data/maps/long-term-flood-risk/?lang=en>

Rhondda Cynon Taf CBC - Local Flood Risk Management Plan - <https://www.rctcbc.gov.uk/EN/Resident/ParkingRoadsandTravel/Roadspavementsandpaths/FloodAlleviation/Floodriskregulations2009.aspx>

Rhondda Cynon Taf CBC - Local Flood Risk Management Strategy - <https://www.rctcbc.gov.uk/EN/Resident/ParkingRoadsandTravel/Roadspavementsandpaths/FloodAlleviation/LocalFloodRiskManagementStrategy.aspx>

Rhondda Cynon Taf CBC – Sustainable Drainage – <https://www.rctcbc.gov.uk/EN/Resident/ParkingRoadsandTravel/Roadspavementsandpaths/SustainableDrainage/SustainableDrainage.aspx>

Welsh Government - National Strategy for Flood and Coastal Erosion Risk Management - <https://gov.wales/sites/default/files/publications/2019-03/national-strategy-for-flood-and-coastal-erosion-risk-management-in-wales.pdf>

Welsh Water – How to Contact Us – <https://www.welshwater.com/en/Contact-Us.aspx>

No	Agreed Actions	Update
		<p><i>At its meeting on 21 September, Cabinet agreed to update the Strategic Risk Register to include a new Strategic Risk (26) in respect of the physical impacts of climate change as a result of the likelihood of increased frequency of extreme weather events. “If the Council does not plan and invest resources to mitigate the physical impacts of climate change, then the risk of increased frequency of extreme weather events that will adversely impact residential and business properties; spoil tips; infrastructure; health, safety and well-being; and economic activity will be heightened”. Progress outlined in respect of the actions below will help to demonstrate how the Council is mitigating and managing this risk. Regular updates on the risk will be included as part of the Strategic Risk Management updates to Cabinet as part of the quarterly Performance Report.</i></p> <p><i>Progress outlined in the actions below also helps to demonstrate the Council’s operational progress in responding to extreme weather events.</i></p>
2.	<p>Undertake a further comprehensive review of the County Borough to identify the high risk residential and industrial areas likely to be at most risk of flooding in the future as climate change takes effect and identify the possible longer-term</p>	<p>Quarter 3 21/22 Update</p>

No	Agreed Actions	Update
	alleviation and mitigation measures that could be put in place.	<p>Quarter 2 21/22 Update</p> <p><i>We continue to make good progress in our comprehensive review of high risk residential and industrial areas likely to be at most risk of future flooding that will inform the Council's revised Flood Risk Management Plan. We are also responding to the early findings of the review which is indicating a need for wider awareness raising and involvement with residents and businesses to support them to better manage their risk. See Item 3 & 4 below.</i></p> <p><i>Welsh Government continues to consider the possibility of aligning the Flood Risk Management Plan, required later this year, with the review of the Local Flood Risk Strategy that is required by October 2022. This integrated approach will allow for all areas of flood risk to be considered within a single updated strategy. In the meantime, we are continuing to develop longer term flood alleviation and mitigation measures.</i></p> <p><i>The evaluation of feedback from the online Flood Survey, and the stories, is continuing for the 28 flood investigation areas. This feedback has been invaluable in providing qualitative evidence to support the findings of the specialist consultants. Information from Natural Resources Wales (NRW) on each of the 28 flood investigation areas will also help to inform the lead Local Flood Authority (LLFA) reports under Section 19 of the Flood and Water Management Act 2010.</i></p> <p><i>The third Section 19 report, on the flooding in Cilfynydd, was published in September 2021.</i></p> <p><i>Following a detailed review of progress of these reports, it is anticipated that twelve of the seventeen remaining reports will be published before Christmas, and the remaining five reports in early 2022.</i></p>
3.	Create a Flood Support Team alongside the Housing Grants Service, that supports landowners, residents and businesses in high-risk flood areas to procure local flood prevention measures, provides advice and guidance.	<p>Quarter 3 21/22 Update</p> <p>Quarter 2 21/22 Update</p> <p><i>The findings of public engagement confirmed the need to promote flood awareness and provide advice and guidance on many aspects of flooding and flood risk management. To meet these needs, on 21 September as part of a wider report 'Review of regulation, awareness and enforcement of flood and water legislation', Cabinet considered and approved proposals for new posts to strengthen enforcement activities and flood risk awareness support:</i></p> <ul style="list-style-type: none"> • <i>Enforcement Officer</i>

No	Agreed Actions	Update
		<ul style="list-style-type: none"> • <i>Enforcement Assistant</i> • <i>Flood Risk Awareness and Support Officer</i> <p><i>Legal support that may be required to assist enforcement will be reviewed after the new enforcement posts have been in place for 12 months.</i></p>
4.	<p>Request that individual landowners and property owners, particularly in high flood risk areas, consider and evidence how best they can protect their land, homes, and businesses through local measures.</p>	<p>Quarter 3 21/22 Update</p> <hr/> <p>Quarter 2 21/22 Update <i>We continue to:</i></p> <ul style="list-style-type: none"> • <i>Analyse the feedback from our Flood Risk Management public engagement to inform future information requirements of individual land and property owners.</i> • <i>Provide information on our website including key contact numbers, advice on being prepared, where to look for additional information e.g. Natural Resources Wales, advice on being safe, and what to do in the event of a flood.</i> <p><i>Progress this quarter includes:</i></p> <ul style="list-style-type: none"> • <i>Agreeing to put in place Flood Support and Enforcement Team that will support residents, businesses, and landowners to comply with legislation and also enforce if necessary, see item 3 above.</i> <p><i>Continuing delivery of the equipment for Phase 2 of the interim Flood Resistance project using Welsh Government funding. Phase 2 is a collaborative project with Natural Resources Wales for main river flooding. The project provides the opportunity for residents/owners to receive floodgates, vents (on loan) and 'floodsax' to enable them to better protect their properties against flooding. 367 residential properties at risk of flooding were invited to participate with 105 returning the agreement and participating in the project. Of the 105 who responded, 99 properties have been surveyed and equipment</i></p>

No	Agreed Actions	Update
		<i>delivered. Throughout October 2021, we will deliver and install equipment to best prepare residents for potential flooding in the coming winter months.</i>
5.	Further update the Emergency Plan to ensure that in the event of a major incident we provide local community responses centres within the communities most affected.	<p>Quarter 3 21/22 Update</p> <p>Quarter 2 21/22 Update <i>The draft plan and overview of potential premises have been considered by the Senior Leadership Team. The draft plan is now being considered by Legal and Estates Teams with a view to formalising the next steps required to reach agreement with building owners and managers.</i></p>
6.	Maximise the benefits of our current infrastructure by undertaking comprehensive maintenance and introducing some enhancement so this infrastructure operates at the optimum level in its response to extreme weather events.	<p>Quarter 3 21/22 Update</p> <p>Quarter 2 21/22 Update <i>We continue to enhance our infrastructure maintenance arrangements in response to extreme weather events. These include:</i></p> <ul style="list-style-type: none"> <li>• <i>Prioritised general inspections scheduled for completion in Autumn 2021. A review is necessary to determine whether any specialist inspections are required and examine the risk assessments that are being conducted as part of project planning.</i> <li>• <i>Preparation and review of the draft Confined Space Culvert Maintenance Contract. These Contract documents are being further developed prior to inviting tenders.</i>

No	Agreed Actions	Update
		<ul style="list-style-type: none"> • <i>Ongoing discussions with Natural Resources Wales to identify river walls that serve as flood defences. The outcome of these discussions will inform the Risk Assessment. A programme to strengthen and improve key river walls will then be developed, subject to funding. Discussions between NRW and the Council continue.</i> <p><i>To be resourced:</i></p> <ul style="list-style-type: none"> • <i>Development of a prioritised programme of specialist inspections of key highways river walls and structures.</i> • <i>Consideration of how long-term vegetation management can be incorporated into the highway's structural asset maintenance strategy.</i> <p><i>Programme of prioritised culvert inspections (900mm+).</i></p>
7.	Digitalise and remotely monitor key flood defences, which will include key culverts, outlets, and other drainage systems via a central control room.	<p>Quarter 3 21/22 Update</p> <hr/> <p>Quarter 2 21/22 Update <i>The implementation of the monitoring and installation equipment obtained following successful bid for Welsh Government grant funding has commenced. Seven installations have been completed with a further six in development. By Autumn 2021, an estimated 35 additional monitoring stations are expected to be deployed and operational. The Council will have 50 locations digitalised and remotely monitored once the project is completed.</i></p>
8.	Create the capacity to be able to provide timely Elected Member and Public Information during Major Emergencies	<p>Quarter 3 21/22 Update</p> <hr/> <p>Quarter 2 21/22 Update <i>We continue to invest in and implement the technology needed to enable the intelligence gathering required for use in the Emergency Control Centre. This intelligence will continue to inform critical operational and strategic decisions, as well as direct timely communication with local residents and businesses etc.</i></p>
9.	Create two dedicated Pluvial Drainage Teams, an East and a West team. The teams will increase the staffing compliment in the Drainage teams from 20 to	<p>Quarter 3 21/22 Update</p>

No	Agreed Actions	Update
	<p>31 staff, comprising a service manager, two senior drainage engineers and 8 additional operational staff.</p>	<p>Quarter 2 21/22 Update <i>A new graduate Civil Engineer is now in post. Four GR5 drainage operatives have been recruited. One of four GR6 drainage operatives have been appointed from the first recruitment drive. The remaining GR6 posts will be now readvertised.</i></p> <p><i>The 'Vactor' high pressure cleaning unit is now in operation. The CCTV 5-year contract which forms part of the 5-year contract for Vactor cleaning has been let. The CCTV is required so that the surface water sewer system is mapped. This was approved and agreed by Senior Leader Team early this calendar year.</i></p>
10.	<p>Produce on-line information and booklets for flooded households that set out the support available from the Council, and its partners in responding to a household's needs, from securing alternative accommodation, financial support and advice, applications for home repairs assistance, health and wellbeing support, environmental health advice on how to safely clean your home after a flood, and other offers of support from the third sector.</p>	<p>Quarter 3 21/22 Update</p> <p>Quarter 2 21/22 Update <i>Additional resources to supplement the Flood Risk Team have been agreed by Cabinet, see item 3 above. The new Flood Risk Awareness and Support Officer will create the capacity to focus on communication and coordination of the information and support identified.</i></p>

No	Agreed Actions	Update
11.	<p>Publish a comprehensive Environmental Strategy by 31 March 2021 that sets out the action the Council will take to ensure it is a Net Zero organisation by 2030 and how it will engage with local communities and businesses to change behaviours to significantly reduce the carbon footprint of the County Borough.</p>	<p>Quarter 3 21/22 Update</p> <hr/> <p>Quarter 2 21/22 Update <i>As part of the ongoing engagement and involvement with residents and communities ‘Face to Face’ Climate Conversations took place between late July and early September. These conversations took place in Aberdare Park, Ynysangharad Park, Mountain Ash, Rhydyfelin, Tonypany and Treorchy. The feedback and findings will supplement the early survey findings reported to the Climate Change Cabinet Steering Group in June 2021 and will help to inform the Council’s final Climate Change strategy. It is likely that the strategy will also be informed and shaped by the WG Clean Air Bill, UK initiatives announced in the lead up to COP 26 which is being hosted by UK Government and also COP Cymru the arrangements for which consist of:</i></p> <ul style="list-style-type: none"> • Launch of Net Zero Wales Plan 28 October 2021. • COP26 Regional Roadshows 4,6,8,10 November 2021. • Wales Climate Week 22 -26 November 2021. <p><i>The final Climate Change/Environmental strategy is likely to be available in late 2021. This is will allow the Climate Change strategy to be clearly aligned to national climate initiatives above. In the meantime, work is continuing on projects to reduce Carbon Emissions across the Council and the County Borough through the Climate Change Steering Group and Officer Working Groups.</i></p>

**LEGAL ADVICE TO OVERVIEW & SCRUTINY COMMITTEE ON 28TH
FEBRUARY 2022.**

RE: SECTION 19 REPORT – PENTRE FLOODS – NRW LIABILITY

At the Overview & Scrutiny Committee on 21st September 2021 the Committee asked for legal advice on holding Natural Resources Wales liable for the flooding to properties in Pentre caused by Storm Dennis.

As Mr. Hanagan advised during the meeting there is nothing to stop Committee coming to a view on the responsibility (in full or in part) for the cause of the flooding to properties in Pentre, however, it is ultimately for the courts to make a determination on liability.

The Committee is entitled, after considering the matter, to come to a view on who is responsible and the Committee may express and publicise that view, however, any determination made by the Committee is not binding on Natural Resources Wales. The Courts would be the ultimate arbiter in the matter and may impose a section depending on the nature of any claim brought.

Simon Humphreys

Head of Legal Services

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Dyddiad /Date:
Gofynnwch am/Please ask for:
Llinell uniongyrchol/Direct line:
Ebost/Email:

7th June 2021
 Tim Peppin
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tim.peppin@wlg.gov.uk

Julie James MS
 Minister for Climate Change
 Welsh Government
 5th Floor, Ty Hywel
 Cardiff Bay
 CF99 1NA



Dear Julie

Natural Resources Wales: call for a review of their powers and remit

Since NRW was established in 2013, local authorities have developed working relationships with NRW on a number of fronts. At a strategic level there have been some very good examples of joint working and information sharing. This has included agreement on a joint working protocol. However, when dealing with events at a local level there can still be tensions over decisions and choices that have to be made, related to wider governance issues.

At the Leaders' meeting on 28th May we considered a report on local authorities' (LAs') relationship with Natural Resources Wales (NRW) – copy attached.

A number of Leaders suggested that all is not well in terms of their local experiences. Whilst NRW seeks to be an 'enabler', LAs report that, too often, they find them to be either a barrier or unable to assist. We fully appreciate that, like LAs, they are under financial pressure. However, this is creating difficulties for LAs in trying to manage programmes and fill gaps.

At the time of NRW's formation it was accepted there was a case for bringing together the work of three bodies all charged broadly with the sustainable management of natural resources. There were, nevertheless, questions raised about the prospects of successfully merging organisations with quite distinct and different cultures. It is important that the body's progress and performance are subject to regular review. This should include input from key stakeholders including locally elected Members who deal day-to-day with issues arising on the front line in their areas.

At the meeting, Leaders unanimously backed a proposal to write to you, as the Minister responsible, calling for a review of the powers and remit of NRW. It was felt this should look at the range of

Dr Chris Llewelyn
 Prif Weithredwr
 Chief Executive

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**Croesawn ohebiaeth yn y Gymraeg a'r Saesneg a byddwn yn ymateb i ohebiaeth yn yr un iaith.
 Ni fydd defnyddio'r naill iaith na'r llall yn arwain at oedi.**

We welcome correspondence in Welsh and English and will respond to correspondence in the same language.
 Use of either language will not lead to a delay.

functions undertaken by NRW, consider how well they are being performed and if there might be alternative, more effective arrangements for their delivery. This would require consideration of improvements that could be made within existing legislation (e.g. The Natural Resources Body for Wales (Functions) Order 2013; Environment (Wales) Act 2016) as well as considering the case for any future changes in legislation.

I would be grateful for your thoughts on this. Perhaps we could discuss further at a bilateral meeting between us and/or at a future Leaders' meeting?

I look forward to hearing from you.

Yours sincerely,



Councillor Andrew Morgan
Leader of WLGA and Spokesperson for Transport, Environment and Sustainability

Croesawn ohebiaeth yn y Gymraeg a'r Saesneg a byddwn yn ymateb i ohebiaeth yn yr un iaith.

Ni fydd defnyddio'r naill iaith na'r llall yn arwain at oedi.

We welcome correspondence in Welsh and English and will respond to correspondence in the same language.

Use of either language will not lead to a delay.

Julie James AS/MS
Y Gweinidog Newid Hinsawdd
Minister for Climate Change



Llywodraeth Cymru
Welsh Government

Ein cyf/Our ref JJ/10391/21

Councillor Andrew Morgan
Leader of WLGA and
Spokesperson for Transport, Environment and Sustainability

3 August 2021

Dear Councillor Morgan,

Thank you for your letter of 7 June 2021 regarding Natural Resources Wales (NRW).

I have noted your concerns and the issues raised in the report from the Welsh Local Government Association Leaders' meeting of 28 May 2021. Thank you for bringing this to my attention.

The Deputy Minister and I have recently met with the Chief Executive and Chair of Natural Resources Wales. I have made my expectations clear on resource management, prioritisation and the manner in which I expect NRW to engage with public authorities in delivering their functions and supporting delivery of the Welsh Government's strategic objectives, not least when dealing with emergency circumstances. Specifically, I have asked the Chief Executive and Chair to ensure NRW adopts a 'Team Wales' approach in its dealings with the public and its partners. I intend to work very closely with NRW and will be meeting regularly with the Chair and Chief Executive to monitor delivery.

In relation to flood risk management specifically, the Welsh Government has commissioned Wales' independent Flood and Coastal Erosion Committee to review the delivery of statutory flood functions and responsibilities. I will be assessing the Committee's findings when they are available early in 2022, alongside Local Authority leaders' feedback as well as that of other delivery partners and the public to inform decisions on the way forward. The Welsh Government will then look to bring forward whatever proposals are necessary to secure efficiencies and improvements and enhance delivery to the benefit of our communities.

I am committed to working with NRW and all our partners across Wales to ensure we can effectively meet the challenges of climate change, including responding to serious flooding incidents. The objectives NRW has to deliver on this are ambitious, but key to NRW's success is working in partnership with many other organisations throughout Wales.

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Rydym yn croesawu derbyn gohebiaeth yn Gymraeg. Byddwn yn ateb gohebiaeth a dderbynnir yn Gymraeg yn Gymraeg ac ni fydd gohebu yn Gymraeg yn arwain at oedi.

We welcome receiving correspondence in Welsh. Any correspondence received in Welsh will be answered in Welsh and corresponding in Welsh will not lead to a delay in responding.

Together with my colleague Rebecca Evans, MS, Minister for Finance and Local Government, I am keen to continue working closely with you and the other Local Authority leaders to understand your concerns and how we can work together on a way forward.

Yours sincerely.

A handwritten signature in blue ink that reads "Julie James". The signature is written in a cursive, flowing style.

Julie James AS/MS
Y Gweinidog Newid Hinsawdd
Minister for Climate Change