

# Kidwelly Flood Investigation Report

A report into the flooding events of the 4<sup>th</sup> and 20<sup>th</sup> October 2021 at Clos Y Helyg, Parc Pendre, Llys Gwenllian, Ferry Road, Cae Ffynnon, Ger Y Castell, Ger Y Gwendraeth and Kidwelly Industrial Estate – as required under section 19 of the Flood and Water Management Act 2010.

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## 5. Introduction

### 5.1 The Report

- 5.1.1 An investigation has been undertaken by Carmarthenshire County Council (CCC) as Lead Local Flood Authority (LLFA) in response to the flooding that occurred at Kidwelly on the 4<sup>th</sup> and 20<sup>th</sup> October 2021.
- 5.1.2 This report is a summary of the investigation and includes relevant information required to meet the statutory requirements placed on the Authority by [Section 19 of The Flood and Water Management Act 2010](#).
- 5.1.3 [The Flood Risk Regulations 2009](#) and the [Flood and Water Management Act 2010](#) identify CCC as the LLFA in Carmarthenshire. This has placed several flood risk management duties and responsibilities on the Council. In particular, [Section 19 of the Flood and Water Management Act 2010](#) places a duty upon CCC to undertake investigations into flood events to the extent that it considers necessary.
- 5.1.4 Guidance from Welsh Government has clarified that significant flooding events, namely those that require formal Section 19 reports, are those where 20 or more residential dwellings are flooded internally.

CCC considers that the incidents that occurred during October 2021 in Kidwelly were sufficiently severe and can confirm that more than 20 residential dwellings were flooded internally during these events.



## 5.2 The Focus of the Report

5.2.1 In keeping with Section 19 of The Flood and Water Management Act 2010, Carmarthenshire County Council will, as a LLFA, to the extent that it considers it necessary or appropriate, investigate —

- Which Risk Management Authorities (RMAs) have relevant flood risk management functions, and
- Whether each of those risk management authorities has exercised, or is proposing to exercise, those functions in response to the flood.

5.2.2 The report does not provide firm recommendations and conclusions in relation to the implementation of capital works that may be appropriate in terms of flood alleviation, but the report will set out a series of actions that will inform the debate about the feasibility and viability of future flood alleviation capital works where appropriate.

5.2.3 Furthermore, the report does set out the need to map and better manage maintenance responsibilities and arrangements for drainage infrastructure assets in future.

5.2.4 The report also clarifies ownership and responsibility of the assets, and land and drainage assets that service the area.

5.2.5 For the purpose of this report, we have identified that the relevant RMAs are:

- Carmarthenshire County Council (CCC) as the Lead Local Flood Authority
- Carmarthenshire County Council as the Highways team
- Dŵr Cymru Welsh Water (DCWW)
- We also note that Pobl and Carmarthenshire County Council, as social housing landlords and commercial landlords, have a significant role to play in the management of flood risk.

## 6. The Flooding Events Monday 4<sup>th</sup> October and Wednesday 20<sup>th</sup> October 2021

### 6.1 Record of Flood Forecasts, Weather Warnings and Rainfall Data

6.1.1 Below is a record of the flood forecasts and the weather warnings that were published on and around the flooding incidents on both the 4<sup>th</sup> and 20<sup>th</sup> October 2021.

### 6.2 Monday 4<sup>th</sup> October 2021 Weather Chronology

6.2.1 Monday 4<sup>th</sup> October 10:25

6.2.1.1 The UK Meteorological Office (Met Office) Advisor issued advice on wet weather. He stated that “Following some wet weather over the weekend there are a few heavy showers in the forecast today before an area of more persistent rain reaches Pembrokeshire by late afternoon and then quickly spreads across Wales this evening with the rain likely to be very heavy at times. For many places there is likely to be around 2 to 3 hours of persistent rain before much of the rain clears away to the east during the very early hours of Tuesday. Some showery rain will soon follow however, especially in parts of Mid and North Wales where further rain is likely at times tomorrow morning.”

6.2.2 Monday 4<sup>th</sup> October 10:28

6.2.2.1 The Flood Forecasting Centre issued a yellow impact rain warning at 10:28am on the 4<sup>th</sup> October, valid from 17:00pm on Monday 4<sup>th</sup> October until 04:00am on Tuesday 5<sup>th</sup> October, with some minor flooding impacts from rivers and surface water possible. The overall flood risk was judged to be “LOW”.

### 6.2.3 Monday 4<sup>th</sup> October 21:12 (During the Storm/Flood Event)

- 6.2.3.1 A Flood Alert was issued by NRW for the Rivers Gwendraeth (rivers in the Gwendraeth Fach and Gwendraeth Fawr catchments). This stated that “The current period of heavy rainfall is forecast to ease by 10:00 PM on Monday 4<sup>th</sup> October, only isolated showers are expected to occur thereafter. The combination of ground conditions, existing river levels and rainfall quantities gives a high risk of flooding of low-lying land into the early hours of Tuesday morning.”

## 6.3 Tuesday 19<sup>th</sup> October 2021

### 6.3.1 Tuesday 19<sup>th</sup> October 10:32

- 6.3.1.1 At 10:32 on Tuesday 19<sup>th</sup> October 2021 the Flood Forecasting Centre issued a yellow impact weather warning for “probable minor surface water flooding impacts in England and Wales on Wednesday morning. Overall flood risk is LOW”.

### 6.3.2 Tuesday 19<sup>th</sup> October 10:46

- 6.3.2.1 This was quickly followed up at 10:46am by a yellow thunderstorm warning for areas including Wales from the Met Office which stated that “a brief period of heavy rain, thunderstorms and very gusty winds may cause disruption on Wednesday morning”. This was valid from 04:00am on Wednesday 20<sup>th</sup> October to 12:00 (midday) on Wednesday 20<sup>th</sup> October.

### 6.3.3 Tuesday 19<sup>th</sup> October 11:24

- 6.3.3.1 The Met Office advised that “first thing on Wednesday morning some very active thunderstorms are likely to push in across Wales from the west bringing some localised spells of intense rain, accompanied by some thunder and lightning and perhaps some very strong squally/gusty winds as well. These thunderstorms have potential to give some short spells of quite unpleasant weather to a few localities although they will clear away rapidly by Wednesday afternoon”.

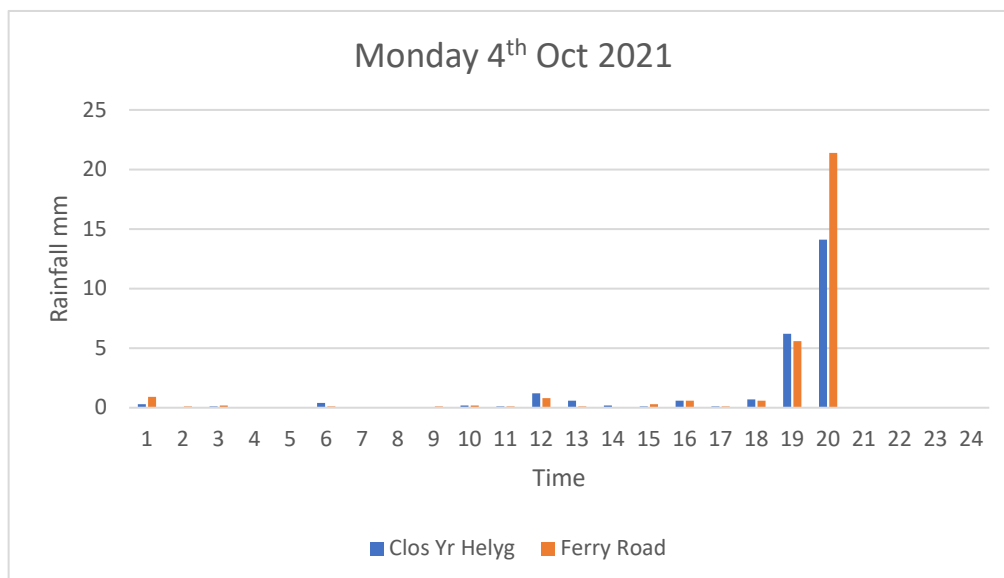
### 6.3.4 Wednesday 20<sup>th</sup> October 06:12

6.3.4.1 A Flood Alert was issued by NRW for the Rivers Gwendraeth stating that “Heavy and thundery showers remain possible this morning, Wednesday 20<sup>th</sup> October 2021. The combination of ground conditions, existing river levels and forecast rainfall quantities gives a high risk of flooding of low-lying land during the next 12 hours”.

## 6.4 Rainfall Data Monday 4<sup>th</sup> October 2021

6.4.1 Carmarthenshire County Council’s weather service provider, MetDesk, can provide rainfall amounts in millimeters (mm) for any hour throughout the day. The recorded radar rainfall amounts per hour (mm) for Clos Yr Helyg and Ferry Road are shown below in Figure 1. Between 18:00pm and 20:00pm, 20.3mm and 27mm of rain fell at Clos Yr Helyg and Ferry Road, respectively. To place the rainfall intensity in context, 30mm of rainfall in a 24-hour period is a standard trigger for action by Carmarthenshire County Council.

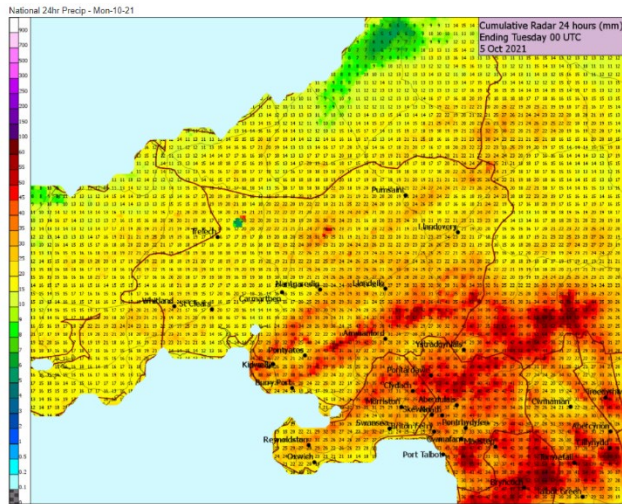
Figure 1 - Published MetDesk rainfall amounts in Kidwelly for each hour on the 4<sup>th</sup> October 2021 (mm).



6.4.2 The MetDesk 24-hour rainfall totals for Monday 4<sup>th</sup> October 2021 were 25.1mm at Clos Yr Helyg and 31.4mm at Ferry Road. As can be seen from Figure 1 above, the vast majority of

the 24-hour rainfall total (more than 80%) fell over 2 hours from 18:00pm to 20:00pm. The cumulative radar 24-hour rainfall totals are shown below in Figure 2.

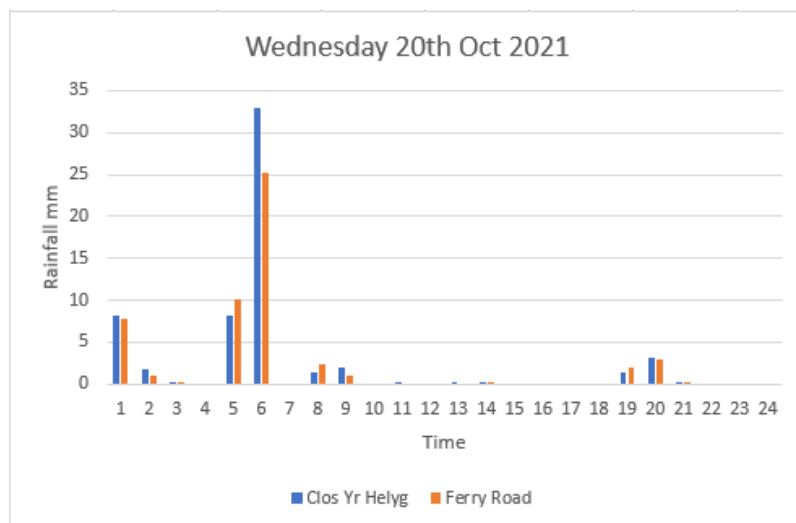
Figure 2 - Cumulative 24-hour rainfall totals (mm) in Carmarthenshire on the 4<sup>th</sup> October 2021.



## 6.5 Rainfall Data 20<sup>th</sup> October 2021

6.5.1 The recorded radar rainfall amounts for Clos Yr Helyg and Ferry Road are shown below in Figure 3 - Recorded rainfall amounts in Kidwelly for each hour on the 20<sup>th</sup> October 2021 (mm).. During the hour from 04:00am to 05:00am there was 8.1mm rain recorded at Clos Yr Helyg and 10.1mm at Ferry Road. Between 05:00am and 06:00am, 32.9mm and 25.2mm of rain fell at Clos Yr Helyg and Ferry Road, respectively.

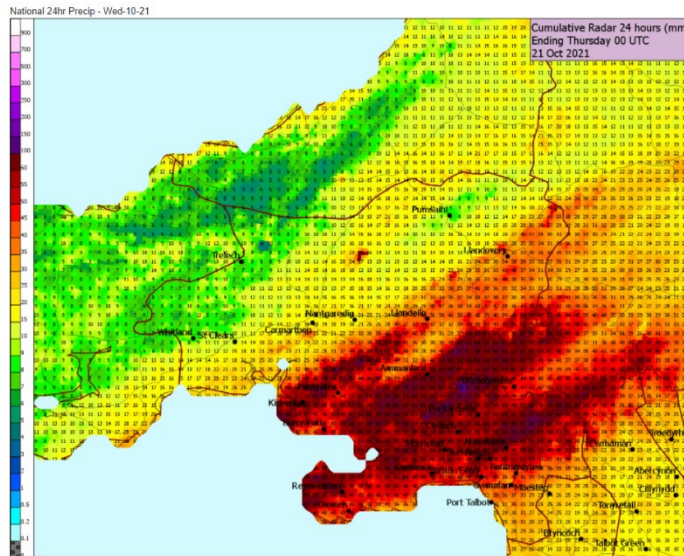
Figure 3 - Recorded rainfall amounts in Kidwelly for each hour on the 20<sup>th</sup> October 2021 (mm).



6.5.2 The MetDesk 24-hour rainfall totals for Wednesday 20<sup>th</sup> October 2021 were 60.1mm at Clos Yr Helyg and 53.1mm at Ferry Road. As can be seen from

6.5.3 Figure 3 above, approximately 50% of the 24-hour rainfall total fell during one hour from 05:00am to 06:00am. The cumulative radar 24-hour rainfall totals are shown below in Figure 4.

Figure 4 - Cumulative 24-hour rainfall totals (mm) in Carmarthenshire on the 20<sup>th</sup> October 2021.



## 7. The Flood Investigation – Clos Yr Helyg and Parc Pendre

### 7.1 Introduction

- 7.1.1 This section of the report will focus specifically on the flooding that occurred on the 4<sup>th</sup> October and 20<sup>th</sup> October 2021 at Clos Yr Helyg and Parc Pendre. This is a large residential area comprising of approximately 90 homes, located in the south-east corner of Kidwelly (Figure 5).

Figure 5 - The Clos Yr Helyg and Parc Pendre flood investigation area.



### 7.2 Flood Incident Data and Site Observations - Monday 4<sup>th</sup> October 2021

- 7.2.1 At 11pm on the 4<sup>th</sup> October the CCC out of hours duty officer received a call regarding serious flooding in Kidwelly. The cyclic gang on duty was advised to attend as soon as possible.
- 7.2.2 At 2:30am the local councilor requested more sandbags due to flooding concerns. It was noted by the CCC duty officer that the Mid and West Wales Fire Service (MWWFS) had been in attendance but had since left. The cyclic gang was requested to attend and to inspect the local trash screens.
- 7.2.3 At 5am the CCC duty officer noted on the incident log that sandbags had been left in Kidwelly and that the gangs had reported that all grids were clear.

- 7.2.4 At 9:28am the Highways Services Manager informed the CCC FDCP Manager that there had been a serious incident overnight.
- 7.2.5 An officer from the FDCP team attended site immediately and began an investigation into the event. The officer discovered that 9 homes had been flooded internally at Clos Y Helyg. A local contractor was called to immediately clean and survey the primary drainage located at Parc Pendre.
- 7.2.6 Photos of the flooding (Figure 6), (taken from Facebook posts) show the degree of flooding experienced in Clos Yr Helyg.

Figure 6 - Photos of the flooding at Clos Yr Helyg on the 4<sup>th</sup> October 2021 (Gemma Wilby).

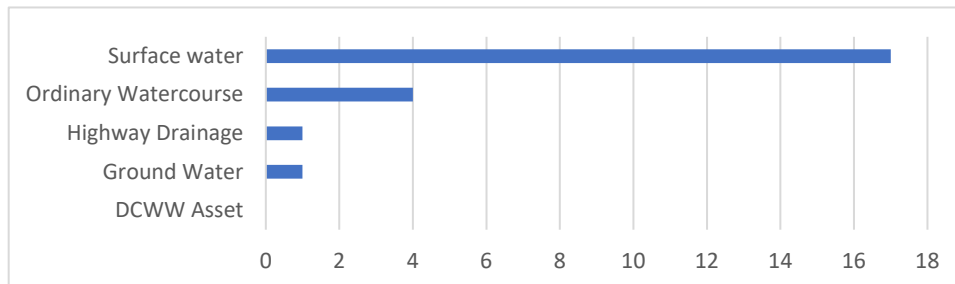


- 7.2.7 Emergency actions on the local drainage network included jetting and a camera survey of the line. No issues were found along the Parc Pendre culvert.
- 7.2.8 At the Parc Pendre outfall, at the bottom to Parc Pendre, the contractor highlighted that the screen was covered with sewage litter. This was cleared and the screen removed to prevent further blockages.
- 7.2.9 The Highways team deployed a gully sweeper to ensure that all highway gullies at Clos Yr Helyg and Parc Pendre were clear.
- 7.2.10 DCWW were contacted and asked to check their system, and the pumping station at the bottom of Parc Pendre. No issues were reported.



7.2.11 Of all the reports of internal property flooding received by CCC, the vast majority of residents reported the source as 'surface water' as shown in Figure 7 below.

Figure 7 – The source of property flooding on the 4<sup>th</sup> October 2021, as recorded by CCC residents.



## 7.3 Flood Incident Data and Site Observations – Wednesday 20<sup>th</sup> October 2021

- 7.3.1 CCC received no reports of flooding from Clos Yr Helyg on the 20<sup>th</sup> October 2021.
- 7.3.2 However, when CCC's FDCP officers attended site, they discovered that 8 homes had flooded in a similar manner to that of the 4<sup>th</sup> October.
- 7.3.3 The FDCP team, in collaboration with the Highways team, de-silted the ordinary watercourse to the rear of Clos Yr Helyg.
- 7.3.4 Road sweeping and gully cleansing was also undertaken by the Highways team and their contractors.
- 7.3.5 The Council met with the Landlord of Clos Yr Helyg, [Pobl Housing Group](#), and discussed the surveys and interventions necessary to understand the flooding events.

## 7.4 Flooding History - Clos Yr Helyg and Parc Pendre

### 7.4.1 Flood Defence and Coastal Protection (FDCP) Flood Records

- 7.4.1.1 The FDCP team at CCC is the team that manages flood risk from surface water, ordinary watercourses, and groundwater. There is not a statutory duty to undertake flood alleviation works, but the Council has statutory powers to manage the risk.

7.4.1.2 The FDCP team have one record of previous flooding in Clos Yr Helyg, as detailed in figure 8.

Figure 8 – Property flood history at Clos Yr Helyg, Kidwelly.

<b>Date</b>	<b>Location</b>	<b>Cause</b>	<b>Number of Properties affected</b>
5 <sup>th</sup> September 2008	Clos Yr Helyg	Unknown	5

#### 7.4.2 The Carmarthenshire County Council Highway Team’s Flood Records

7.4.2.1 The Highways team at CCC have no historical records of flooding at Clos Yr Helyg or Parc Pendre.

#### 7.4.3 Dŵr Cymru Welsh Water (DCWW) Flood Records

7.4.3.1 DCWW have no historical records of flooding at Clos Yr Helyg or Parc Pendre.

#### 7.4.4 Pobl Flood Records

7.4.4.1 In relation to reported incidents, Pobl have stated that ‘we have checked our systems, and there have been no reported flooding or drainage back up incidents on site for over 6 years’.

#### **Action 1**

##### **CCC and Pobl**

Empower and ensure that residents of Clos Y Helyg understand the need to report and document drainage issues. Residents should be clear who is responsible for flooding and who to contact.

## 7.5 Drainage Networks and Assets – Clos Yr Helyg and Parc Pendre

### 7.5.1 Ordinary Watercourses

7.5.1.1 There are two unnamed, ordinary watercourses in the Clos Yr Helyg and Parc Pendre area.

7.5.1.2 The first is culverted and flows southwest from Monksford Street down the northwest side of the Co-Op, and then down Parc Pendre (Figure 9). This is named the Parc Pendre culvert/watercourse on the CCC FDCP asset management system.

Figure 9 - Map of the Parc Pendre surface water culvert.



7.5.1.3 The second ordinary watercourse is a ditch that begins at the southern edge of the Co-Op supermarket and flows south around Clos Yr Helyg (Figure 10). This is named the Clos Yr Helyg ditch on the CCC FDCP asset management system.

Figure 10 - Map of the Clos Yr Helyg ordinary watercourse.



7.5.1.4 The Parc Pendre watercourse drains surface water from an area of approximately 35 hectares. It typically contains a mixture of urban and rural surface water runoff.

7.5.1.5 The Clos Yr Helyg watercourse has a significantly smaller catchment of approximately 2.6 hectares and, with the exception of a section of the Co-Op car park, is fed from surface water runoff and drainage water from surrounding fields.

7.5.1.6 These ordinary watercourses merge at the rear of the DCWW pumping station on Parc Pendre and then flow south to the River Gwendraeth.

## 7.5.2 CCC Flood Risk Management Assets

### 7.5.2.1 Parc Pendre Culvert

7.5.2.1.1 There is a 900mm diameter, concrete culvert, 448 metres in length that is owned and managed by the CCC. This culvert manages highways and surface water drainage plus contains a watercourse from the north as mentioned in paragraph 3.5.1.2.

7.5.2.1.2 The standard inspection and maintenance procedure for this asset is dependent on its condition. Currently, assets that are known to be in a very poor state of

repair have planned, annual inspections. Assets in poor condition are surveyed every 2 years and assets classified as being in a good state of repair or better are surveyed every 3-5 years, based on risk.

7.5.2.1.3 A CCTV survey undertaken in April 2019 classified the Parc Pendre culvert as being in poor condition as there were service and structural defects, as highlighted in Figure 11. These defects were actioned in November and December 2019 and the asset was due to be resurveyed in Spring 2021. This did not happen due to COVID restrictions.

**Action 2**  
**CCC FDCP team**  
 Undertake a CCTV drainage survey of the culvert at Parc Pendre.

Figure 11 – A list of defects found in the 2019 CCTV survey of the Parc Pendre Culvert.

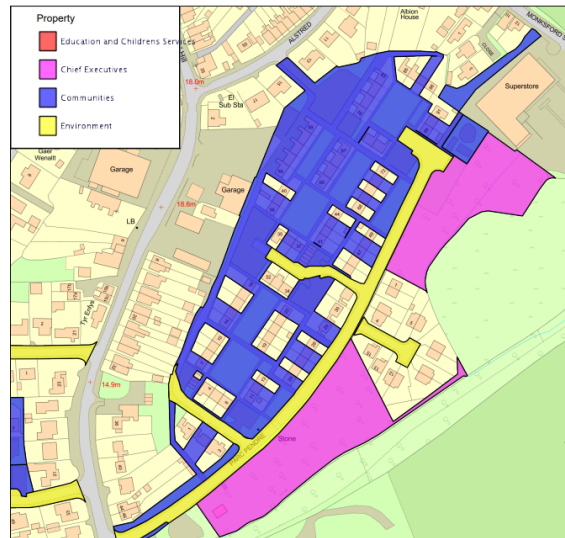
Reference	Recommended Action	Date Added	Added By	Work Description	Work Completed
SI1900209	Desilting	19 <sup>th</sup> Sept 2019	Malcolm Edwards	Desilt	6 Dec 2019
BR1900005		19 <sup>th</sup> Sept 2019	Malcolm Edwards	Repair	13 Nov 2019
SI1900210	Desilting	19 <sup>th</sup> Sept 2019	Malcolm Edwards	Desilt	6 Dec 2019
BR1900004		19 <sup>th</sup> Sept 2019	Malcolm Edwards	Repair	13 Nov 2019
BR1900006		19 <sup>th</sup> Sept 2019	Malcolm Edwards	Repair	13 Nov 2019
SI1900211	Desilting	19 <sup>th</sup> Sept 2019	Malcolm Edwards	Desilt	6 Dec 2019

#### 7.5.2.2 Clos Yr Helyg Watercourse

7.5.2.2.1 Post the October 2021 flooding events, the Clos Yr Helyg watercourse has been added to the FDCP asset database. The land through which the watercourse flows is partially CCC land, as depicted in Figure 12.

7.5.2.2.2 This investigation has found no evidence of maintenance of this watercourse over the years. As such, its ability to receive and convey surface water has been compromised.

Figure 12 – Map of CCC land ownership at Clos Yr Helyg, Kidwelly.



### Action 3

#### CCC FDCP team

Ensure the management of the Clos Yr Helyg watercourse in perpetuity.

#### 7.5.2.3 CCC Highways team Assets

7.5.2.4 With the exception of the surface water gullies, the Highways team has no surveys or maps of the highway's drainage assets in this area. The 2019 CCTV survey, commissioned by the FDCP team, focused on the surface water system, not the highways drainage system.

### Action 4

#### CCC Highways team

Undertake a CCTV survey of the highway drainage system down Clos Yr Helyg in order to have a better record of CCC assets and action any defects accordingly.

### Action 5

#### CCC Environment Department

Ensure a thematic approach to CCTV drainage and asset surveys where possible, capturing all infrastructure, not just departmental assets.

7.5.2.5 In Clos Yr Helyg the highway has its own independent drainage system. This is served by two surface gullies that drain the carriageway and walkway. The gullies discharge to a 150mm plastic culvert which conveys surface water southeast to the ordinary watercourse as shown in Figure 13 below.

Figure 13 - Map of the highway drainage system at Clos Yr Helyg, Kidwelly.



7.5.2.6 The 2019 CCTV survey did attempt to survey the Clos Yr Helyg highway drainage system. However, this investigation has discovered that the survey was not completed because of silts and water in the line. Water in the line would suggest defects in the system. This investigation has been unable to find any records that these defects were reported, recorded, or resolved.

### Action 6

#### CCC Environment Department

Develop a more robust method of reviewing CCTV drainage surveys and recording and actioning defects between divisions and teams.

7.5.2.7 The maintenance of highways assets is delivered on a reactive basis. Assets are inspected and repaired as and when issues are highlighted.

7.5.2.8 There are no records of any defects or issues on the Parc Pendre or the Clos Yr Helyg highway systems and as such there is no record of any maintenance.

7.5.2.9 The exceptions to this are those highway gullies which are subject to an informal annual maintenance programme. This investigation has found 3 maintenance records since 2015, as shown below in Figure 14 and in Appendix H.

Figure 14 – Highway gully maintenance records since 2015.

Year	Location	Date	Defects
2017	Parc Pendre	1 September	None
2021	Clos Yr Helyg	28 October	25% Silt
2021	Parc Pendre	28 October	25-100% silt

### 7.5.3 Dŵr Cymru Welsh Water (DCWW) Assets

7.5.3.1 The primary DCWW assets in the area are the foul drainage and the pumping station at the bottom of Parc Pendre.

7.5.3.2 A map of the DCWW assets can be viewed in Appendix A. This map highlights that there is a private surface water system (green) and a DCWW foul system (brown) in the area.

7.5.3.3 DCWW have advised that the maintenance pertaining to their assets is on a reactive basis, as and when issues are reported. A five-year history check of reported incidents has highlighted 4 blockages in Parc Pendre but no incidents in Clos Yr Helyg.

### 7.5.4 Private Surface Water Systems

7.5.4.1 This investigation has discovered that Clos Yr Helyg is served by a private surface water drainage system (Appendix A). This system collects rainwater from the roofs and yards of the dwellings and facilitates its draining away.

7.5.4.2 Pobl, as the landlords, are responsible for the management of this drainage system. However, they have been unable to provide this investigation with any drainage plans for the area.



- 7.5.4.3 In relation to the maintenance of the private surface water system, Pobl have stated that ‘all of our estates are regularly inspected visually by our estates teams and ground maintenance contractors, who will note any visible issues and report back to the business for action’. No further details have been provided.

## Action 7

### Pobl

Ensure that robust records of the drainage system are available and that an annual inspection and maintenance programme is delivered.

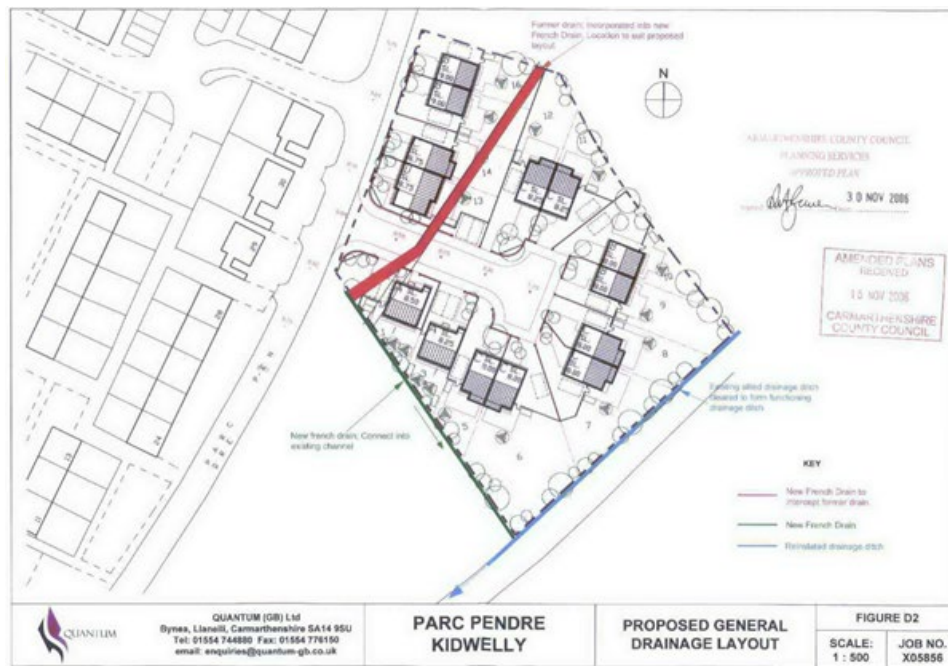
## 7.6 The Clos Yr Helyg Flood Consequence Assessment (FCA) that supported the planning application for the Clos Yr Helyg housing development.

- 7.6.1 CCC’s FDCP officers reviewed the Clos Yr Helyg planning file from 2006. In May 2006 there was a planning application for the Clos Yr Helyg Estate comprising of a proposal for 4 no. flats and 12 no. houses on land (4800 square metres) at Parc Pendre, Kidwelly.
- 7.6.2 On 25<sup>th</sup> July 2006 Environment Agency Wales noted that the proposed development site was located in a Flood Zone B. They pointed out that properties were proposed to be built over an existing watercourse and that any applications to culvert this watercourse would be unlikely to be approved. They required the existing watercourse to be left open. They had no objection in principle to the development, however any flood risk issues appeared to relate to a drainage channel and therefore they stated that the Council’s engineers should be consulted. They asked for amended site layout and provision for surface water drainage.
- 7.6.3 A Flood Consequences Assessment was undertaken by Quantum in March 2006 to support the development. In the initial site visit they noted that the land was saturated with a substantial amount of standing water.
- 7.6.4 The FCA concludes that the potential for flooding comes from the increase of surface water runoff associated with the development of impermeable areas of hardstanding and buildings onsite. The report estimates an increase in surface water runoff in the region of 225.4 cubic metres for a one-hour (23mm) storm. It was concluded that this increase in runoff created

potential flooding issues for the development itself and for any receiving watercourses and properties downstream.

7.6.5 The approved surface water drainage design involved the remodelling of the former drain/watercourse into a new French drain running across the development and discharging into the reinstated drainage ditch running along the south-eastern boundary, as shown below in Figure 15.

Figure 15 – Map of the approved surface water drainage design for Clos Yr Helyg (Quantum, 2006).



## 7.7 Investigation Findings and Conclusions - Clos Yr Helyg

- 7.7.1 On both the 4<sup>th</sup> and 20<sup>th</sup> October 2021, residents in Clos Yr Helyg experienced significant flooding. On the evening of the 4<sup>th</sup> October 2021, 20.3mm of rain fell in just 2 hours and 9 homes were flooded internally. On the morning of the 20<sup>th</sup> October 2021, 32.9mm of rain fell in just one hour (41mm in a 2-hour period) and the same 8 properties were flooded. Both events could be described as ‘flash flooding’ events where a day’s worth of rain falls over a significantly shorter period.
- 7.7.2 The 2006 FCA for the development of Clos Yr Helyg concluded that the potential for flooding comes from the increase of surface water runoff associated with the development of impermeable areas of hardstanding and buildings onsite. The report estimated an increase in surface water runoff in the region of 225.4 cubic metres from a 23mm one-hour storm. This is what was experienced on both the 4<sup>th</sup> and 20<sup>th</sup> of October 2021.
- 7.7.3 The rainfall landing at Clos Yr Helyg is ordinarily managed by two drainage systems. The primary system is the private surface water system (paragraph 3.5.4 and Appendix A) which is owned and maintained by Pobl. The secondary system is the Highways drainage system (paragraph 3.5.2.3) which is owned and maintained by the Carmarthenshire County Council as the Highways team. However, this investigation has concluded that neither the Highways team nor Pobl have routine inspection or maintenance programmes for these drainage systems. The highway gullies are cleared annually, but the connecting drainage is not cleansed unless an issue is reported. Pobl have been unable to provide this investigation with any information on their drainage assets or any details of maintenance that has been undertaken by them.
- 7.7.4 In addition to the above, this investigation notes that there were aggravating circumstances that further increased flood risk at Clos Yr Helyg. Firstly, the receiving watercourse – the Clos Yr Helyg ordinary watercourse – was in a poor state of repair with no inspection or maintenance regime in place. Secondly, this investigation notes that leaf fall in October had blinded some of the gullies and, as such, further reduced functionality of the drainage.
- 7.7.5 In response, this investigation has proposed 7 actions to be implemented in the short and medium term by Pobl and CCC (as the Highways team and Lead Local Flood Authority) to manage the flood risk at Clos Yr Helyg. These actions are detailed below in Figure 16.

Figure 16 - Table of the 8 Clos Yr Helyg actions to be undertaken by CCC and Pobl.

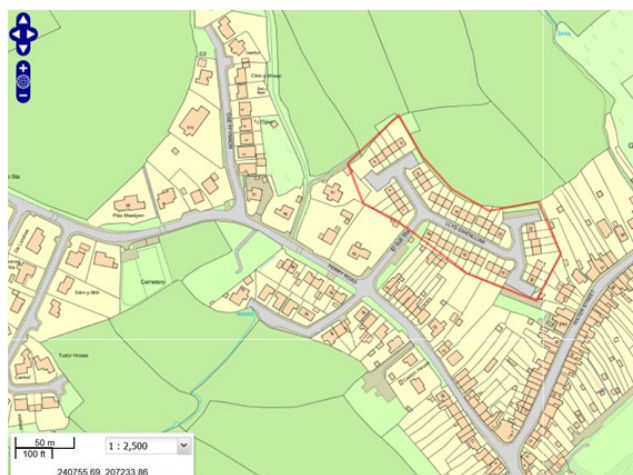
<b>Action No.</b>	<b>Owner</b>	<b>Details</b>	<b>Priority</b>
1	CCC & Pobl	CCC and Pobl must empower and ensure that residents of Clos Y Helyg understand the need to report and document drainage issues. Residents should be clear who is responsible for flooding and who to contact.	High
2	CCC	CCC FDCP team must undertake a CCTV drainage survey of the culvert at Parc Pendre.	Med
3	CCC	CCC FDCP team must ensure management of the Clos Yr Helyg watercourse in perpetuity.	Med
4	CCC	CCC Highways team must undertake a CCTV survey of the highway drainage system down Clos Yr Helyg in order to have a better record of CCC assets and action any defects accordingly.	High
5	CCC	CCC Environment Department must ensure a thematic approach to CCTV drainage and asset surveys where possible, capturing all infrastructure, not just departmental assets.	Med
6	CCC	CCC Environment Department must develop a more robust method of reviewing CCTV drainage surveys and recording and actioning defects between divisions and teams.	Med
7	Pobl	Pobl must ensure that robust records of drainage systems are available and that an annual inspection and maintenance programme is delivered.	High

## 8. The Flood Investigation – Llys Gwenllian

### 8.1 Introduction

- 8.1.1 This section of the report will focus specifically on the flooding that occurred on the 4<sup>th</sup> October and 20<sup>th</sup> October 2021 at Llys Gwenllian. This is a small private residential area owned by Pobl Housing Association, comprising of approximately 40 homes, located in the northwest corner of Kidwelly (Figure 17).

Figure 17 – Map of Llys Gwenllian, Kidwelly.



### 8.2 Flood Incident Data and Site Observations - Monday 4<sup>th</sup> October 2021

- 8.2.1 On the 4<sup>th</sup> October, no reports of flooding were received at Llys Gwenllian. As such, the incident investigation does not extend to this area for this period.

### 8.3 Flood Incident Data and Site Observations – Wednesday 20<sup>th</sup> October 2021

- 8.3.1 On the 20<sup>th</sup> October, the FDCP team at CCC received 1 report of flooding in Llys Gwenllian.

**Action 8****CCC and Pobl**

Empower and ensure that residents of Llys Gwenllian understand the need to report and document drainage issues. Residents should be clear who is responsible for flooding and who to contact.

## 8.4 Subsequent Site Investigations, Observations and Visits – Llys Gwenllian

- 8.4.1 A programme of highway gully cleansing was delivered.
- 8.4.2 On 3<sup>rd</sup> November 2021, officers from CCC's FDCP team attended site and went door-to-door to enquire about the recent flooding. This highlighted 7 internal flooding incidents, in addition to 9 homes and families that were struggling to manage the surface water in their gardens. These incidents had not been reported. There was no answer at 11 properties. The discussions with residents also highlighted that a number of flooding incidents occurred on the 4<sup>th</sup> October 2021 but were not reported at the time.
- 8.4.3 On the 12<sup>th</sup> January 2022, officers from Pobl and CCC's FDCP team visited Llys Gwenllian to discuss the drainage issues. After an inspection of the area, CCC officers inspected the fields to the north of Llys Gwenllian. There they observed multiple springs discharging water which subsequently flow down to the rear of Llys Gwenllian (Figure 18).

**Action 9****CCC and Pobl**

Empower and ensure that residents of Llys Gwenllian understand the need to report and document drainage issues. Residents should be clear who is responsible for flooding and who to contact.



Figure 18 – Photographs of the springs discharging water towards Llys Gwenllian.



## 8.5 Flooding History (Llys Gwenllian)

### 8.5.1 Flood Defence and Coastal Protection (FDCP) Flood Records

8.5.1.1 The FDCP team have no historical records of flooding at Llys Gwenllian.

### 8.5.2 Highways team Flood Records

8.5.2.1 The Highways team have no historical records of flooding at Llys Gwenllian.

### 8.5.4 Dŵr Cymru Welsh Water (DCWW) Flood Records

8.5.4.1 DCWW have no historical records of flooding at Llys Gwenllian.

## 8.5.5 Pobl Flood Records

8.5.5.1 Pobl have no historical records of flooding at Llys Gwenllian.

# 8.6 Drainage Networks and Assets – Llys Gwenllian

## 8.6.2 Ordinary Watercourses

8.6.2.1 There are no ordinary watercourses in this area

## 8.6.3 CCC Flood Risk Management Assets

8.6.3.1 CCC's FDCP team have no flood risk management assets in this area.

## 8.6.4 CCC Highways team Assets

8.6.4.1 With the exception of the surface water gullies, the Highways team have no surveys or maps of the highway drainage assets in this area.

8.6.4.2 The maintenance of highway assets is delivered on a reactive basis. Assets are inspected and repaired as and when issues are highlighted.

8.6.4.3 There are no records of any defects or issues on the Llys Gwenllian highway systems and as such there is no record of any maintenance.

8.6.4.4 The exceptions to this are those highway gullies which are subject to an informal annual maintenance programme. This investigation has checked the records and the gullies at Llys Gwenllian have been cleaned 3 times in the last 7 years as highlighted in Figure 19 below and Appendix H.



Figure 19 – Llys Gwenllian highway gully maintenance records.

Year	Location	Date	Defects
2015	Llys Gwenllian	8 October	None
2017	Llys Gwenllian	8 September	None
2021	Llys Gwenllian	11 October	25-100% silt

### Action 10

#### CCC Highways team

Undertake a CCTV survey of the highway drainage system down Llys Gwenllian to understand its path, its interactions with other drainage systems and ensure that any defects are resolved accordingly.

## 8.6.5 Dŵr Cymru Welsh Water (DCWW) Assets

- 8.6.5.1 A map of the DCWW assets can be viewed in Appendix C. This map highlights that there is a private surface water system (green) and a DCWW foul system (brown) in the area.
- 8.6.5.2 DCWW have advised that the maintenance pertaining to their foul system is on a reactive basis, as and when issues are reported. A five-year history check of reported incidents returned no flooding incidents, two operational blockages and 1 odour issue.

## 8.6.6 Private Surface Water Systems

- 8.6.6.1 This investigation has discovered that Llys Gwenllian is served by a private surface water drainage system. This collects rainwater from the roofs and yards of the dwellings and facilitates its draining away.
- 8.6.6.2 Pobl, as the landlords, are responsible for the management of this drainage system. However, they have been unable to locate any files on the drainage layouts at Llys Gwenllian or provide this investigation with any drainage plans for the area.
- 8.6.6.3 In relation to the maintenance of the private surface water system, Pobl have stated that 'all of our estates are regularly inspected visually by our estates teams and ground maintenance contractors, who will note any visible issues and report

back to the business for action'. Pobl also added that 'the culvert at No.15 Llys Gwenllian is inspected and cleared on an annual basis and if there have been any significant periods of rain, the chamber is inspected for blockages etc'.

### **Action 11**

#### **Pobl**

As Action 7, ensure that robust records of drainage systems are available and that an annual inspection and maintenance programme is delivered.

## **8.7 Investigation Findings and Conclusions – Llys Gwenllian**

- 8.7.1 On both the 4<sup>th</sup> and 20<sup>th</sup> October 2021, residents in Llys Gwenllian experienced significant flooding. On the evening of the 4<sup>th</sup> October 2021, 27mm of rain fell in just 2 hours (MetDesk data for nearby Ferry Road) but this investigation has not uncovered any evidence of internal property flooding at the time of writing. On the morning of the 20<sup>th</sup> October 2021, 35.3mm of rain fell in a 2-hour period (MetDesk data, Ferry Road) and this time CCC were notified of issues. A subsequent door to door investigation highlighted the scale of the incident and drainage issues, and it is now understood that 7 homes were flooded internally, and at least 9 properties suffered external flooding issues. Both events could be described as 'flash flooding' events where a day's worth of rain falls over a significantly shorter period.
- 8.7.2 The rainfall landing at Llys Gwenllian is ordinarily managed by two drainage systems. The primary system is a private surface water drainage system and is owned and maintained by Pobl, as denoted on the DCWW maps in Appendix C. The secondary system is the CCC highways drainage system and is owned and maintained by the Highways team. However, this investigation has concluded that neither Pobl nor the Highways team have routine inspection or maintenance programmes for these drainage systems. The highway gullies have been cleared three times in seven years (Figure 19), but the connecting drainage is not cleansed unless an issue is reported. Pobl have been unable to provide this investigation with any information on their drainage asset or any records of maintenance that has been undertaken on them.
- 8.7.3 In addition to the above, this investigation notes that groundwater and surface water from the land above Llys Gwenllian also adversely affects the flood risk in this area.

8.7.4 In response to the above, this investigation has proposed 4 actions to be implemented in the short to medium term by Pobl and CCC (as the Highways team and LLFA) to manage the flood risk at Llys Gwenllian. These actions are detailed below in Figure 20.

Figure 20 - Table of the Llys Gwenllian actions to be undertaken by CCC and Pobl.

<b>Action No.</b>	<b>Owner</b>	<b>Details</b>	<b>Priority</b>
8	CCC & Pobl	CCC and Pobl must empower and ensure that residents of Llys Gwenllian understand the need to report and document drainage issues. Residents should be clear who is responsible for flooding and who to contact.	High
9	CCC	CCC FDCP team must work with landowner to try to manage the flow in a manner that poses least risk to the residents of Llys Gwenllian.	High
10	CCC	CCC Highways team must undertake a CCTV survey of the highway drainage system down Llys Gwenllian to understand its path, its interactions with other drainage systems and ensure that any defects are resolved accordingly.	High
11	CCC	Pobl must ensure that robust records of the drainage system are available and that an annual inspection and maintenance programme is delivered.	High

## 10. The Flood Investigation – Cae Ffynnon and Ferry Road

### 10.1 Introduction

10.1.1 This section of the report will focus specifically on the flooding that occurred on the 4<sup>th</sup> October 2021 at Cae Ffynnon and Ferry Road. These are both residential areas, comprising of approximately 80 homes in total, located in the northwest corner of Kidwelly (Figure 21).

Figure 21 - The Cae Ffynnon and Ferry Road flood investigation area.



### 10.2 Flood Incident Data and Site Observations - Monday 4<sup>th</sup> October 2021

10.2.1 At 11pm on the 4<sup>th</sup> October the CCC out of hours duty officer received a call regarding serious flooding in Kidwelly. The cyclic gang on duty was advised to attend as soon as possible.

10.2.2 At 2:30am the local councilor requested more sandbags due to flooding concerns. It was noted by the CCC duty officer that the Mid and West Wales Fire Service (MWWFS) had been in attendance but had since left. The cyclic gang was requested to attend and to inspect the local trash screens.

10.2.3 At 5am the CCC duty officer noted on the incident log that sandbags had been left in Kidwelly and that the gangs had reported that all grids were clear.

- 10.2.4 At 8am a highways operative reported to the Highways Inspector that the trash screen at Cae Ffynnon was blocked and needed immediate attention.
- 10.2.5 The highway department received a [video of the flooding](#).
- 10.2.6 At 09:28am the Highways Services Manager informed the CCC FDCP Manager that there had been a serious incident overnight.
- 10.2.7 Multiple operational gangs were mobilised to attend site and manage a clean-up operation that included the removal of mud, silts and stones from the [Cae Ffynnon trash Screen](#) (Figure 22) in addition to the highway and private gardens (Figure 23). The Highways team cleared approximately 50-tonnes of stone from the trash screen and the watercourse immediately upstream.

Figure 22 - Photos of the debris removed after the flooding event on the 4<sup>th</sup> October 2021 at Cae Ffynnon.



- 10.2.8 An officer from the FDCP Team attended site immediately and began an investigation into the event. He discovered that 1 home had been flooded internally, but as many as 15 had significant external flooding.
- 10.2.9 A local contractor was brought in to clear the upstream channel above Cae Ffynnon of any blockages and undertake bank repairs where damage had occurred.



Figure 23 - Photo of the debris removed after the flooding event on the 4<sup>th</sup> October 2021 at Ferry Road.



### 10.3 Flood Incident Data, Investigation and Observations - Wednesday 20<sup>th</sup> October 2021

- 10.3.1 From 8am onwards, incidents and complaints were received regarding further flooding at Ferry Road.
- 10.3.2 Highway operatives attended immediately.
- 10.3.3 CCC had a contractor already on site clearing the watercourse. They cleared another 30 tonnes of material from the trash screen and upstream.
- 10.3.4 An officer from the FDCP team attended site immediately and began an investigation into the event.

### 10.4 Subsequent Site Investigations, Observations and Visits

- 10.4.1 After the flooding events on the 4<sup>th</sup> October, local residents attempted to unblock the watercourse upstream of Cae Ffynnon with shovels and picks, as shown in Figure 24, and attempted to prevent water flowing down the footpaths to Ferry Road.

- 10.4.2 On October 27<sup>th</sup> CCC's FDCP Engineers visited the site and the watercourse breach scenario was evaluated.
- 10.4.3 On October 25<sup>th</sup> a brief was developed to procure consultancy support to assist in the technical evaluation of the flood event.
- 10.4.4 On November 1<sup>st</sup> the FDCP Manager and Head of Service attended site to speak to residents and observe the issues personally.
- 10.4.5 On November 19<sup>th</sup>, the FDCP Manager and the local Councillor met on site.
- 10.4.6 Also on November 19<sup>th</sup>, CCC staff met with the contractor to discuss further works and interventions.
- 10.4.7 On December 15<sup>th</sup> a virtual community/public meeting was held online.
- 10.4.8 In January 2022 a second contractor, with a larger machine, repeated the emergency works, undertook channel reprofiling and re-enforced the banks where they had previously breached.

Figure 24 – Photo of Kidwelly residents unblocking the Cae Ffynnon watercourse north of Cae Ffynnon. In the picture, the water is flowing down the footpath, the watercourse is where the men are standing.



- 10.4.9 This investigation notes that CCC officers and managers from both the FDCP team and the Highways team have spent and recorded many tens of hours dealing with complaints, information requests and attending site visits pertaining to the incidents on the 4<sup>th</sup> and 20<sup>th</sup> October 2021 at Ferry Road. Recording every interaction affords no benefit to this investigation and as such only the headlines have been recorded above.

10.4.10 It is also noted that during these events there were a significant number of customer requests, complaints, and member requests, many of which were duplications. These requests were often passed to multiple departments which reduced and slowed service times.

**Action 12**

**CCC Environment Department and Communications Team**

Undertake a review of communications channels during incidents to ensure more efficient use of officer time and resources.



## 10.5 Flooding History (Cae Ffynnon and Ferry Road)

### 10.5.1 Flood Defence and Coastal Protection (FDCP) Flood Records

- 10.5.1.1 The FDCP Team have some knowledge of previous flooding in this area of Kidwelly. Recorded historical flooding history is detailed below in Figure 25.

Figure 25 – Property Flooding History at Ferry Road and New Street Kidwelly.

<b>Date</b>	<b>Location</b>	<b>Cause</b>	<b>Number of Properties affected</b>
27 <sup>th</sup> November 2002	Ferry Road	Trash Screen Blockage	Unrecorded
21 <sup>st</sup> January 2013	Ferry Road and New Street	Trash Screen Blockage	4
13 <sup>th</sup> September 2015	Ferry Road	Field Runoff	Unknown
3 January 2016	Ferry Road	Not recorded	2

### 10.5.2 CCC Highways team Flood Records

- 10.5.2.1 The Highways team have no historical records of flooding in this area.

### 10.5.3 Dŵr Cymru Welsh Water (DCWW) Flood Records

- 10.5.3.1 A check of incidents within the last 5 years has returned details of five operational blockages but no flooding incidents.

## 10.6 Drainage Networks and Assets – Cae Ffynnon and Ferry Road

### 10.6.1 Ordinary Watercourses

10.6.1.1 There is a single unnamed, ordinary watercourse in this area that runs from Penlan-isaf Farm south to Cae Ffynnon and Ferry Road, over a length of 1.3km. The watercourse starts as an open channel, is culverted through its mid-section, and then runs in an open channel before it eventually discharges onto the saltmarsh in the Gwendraeth Fach estuary. The gradient of watercourse is on average 1 in 10, which is very steep. As such, the watercourse experiences flow velocities far greater than you would normally see in a watercourse of this size. This in turn, combined with the geology in the area, results in high levels of erosion, transportation and subsequent deposition of materials which results in watercourse blockage. The catchment of this watercourse is depicted in Figure 26.

Figure 26 – Map of the unnamed ordinary watercourse catchment at Cae Ffynnon and Ferry Road. Labelled A.



10.6.1.2 The watercourse drains an area of approximately 63.7 hectares (Catchment A), of which is 95% agricultural land and fields. Catchment B drains to a lane at the rear of Cae Ffynnon. The hydrology of these catchments is detailed below in Figure 27.

Figure 27 - The hydrology of the Cae Ffynnon Catchments (Amey Consulting, March 2022).

Return Period (Years)	Catchment A (63.7ha)		Catchment B (10.9 ha)	
	Peak Flow (l/s)	Total Volume (m <sup>3</sup> )	Peak Flow (l/s)	Total Volume (m <sup>3</sup> )
5	698	7241	120	1026
10	846	8697	146	1272
30	1195	12102	207	1872
50	1384	13996	240	2187
100	1634	16403	283	2616

10.6.1.3 Downstream of the [Cae Ffynnon Trash Screen](#), (see section 5.6.2.1) there is an approximately 265 meter long section of privately owned, culverted watercourse, as denoted in Figure 28. This section of culvert is a concrete pipe, 750mm in diameter, which was last surveyed on the 24<sup>th</sup> September 2018. No defects or concerns were noted during that survey and the culvert is regarded as being in good condition.

Figure 28 - The private section of culverted watercourse at Cae Ffynnon Kidwelly.



10.6.1.4 In addition to the above, the lower reaches of the ordinary watercourse are also in private ownership, as denoted in Figure 29 below. There are two sections where the watercourse is culverted in a 900mm diameter culvert. The condition of this culvert is unknown at the time of writing but the catchment analysis suggests that a

900mm diameter pipe is of sufficient size to contain and convey flood flows to the necessary standard namely 1 in 100 (1% AEP).

- 10.6.1.5 Between the two privately owned culverted sections of watercourse, there is an open section of privately owned watercourse as depicted in Figure 29 below. The evaluation undertaken as a part of this investigation has concluded that flood flows will not be contained in this open channel.

Figure 29 - Photos of the private sections of watercourse at 68 Ferry Road, Kidwelly.



#### 10.6.1.6 Ordinary Watercourse Riparian Rights and Responsibilities

- 10.6.1.6.1 The persons that own the land adjacent to the watercourse or land through which the watercourse flows, either in open channel or in a culvert, are classed as riparian landowners. There are multiple riparian landowners along this ordinary watercourse. All riparian landowners have [rights and responsibilities](#) for the management of the watercourse.
- 10.6.1.6.2 The owners of the upper reaches of the watercourse are those that own the land up to the center of the watercourse, including the banks. The majority of the land in the wooded section north of Cae Ffynnon is unregistered with HM Land Registry.

- 10.6.1.6.3 It is worth noting that if land is unregistered this does not mean that it is unowned. Unregistered land is still private land, and CCC is not the default custodian if that land is not managed accordingly.

**Action 13**

**CCC FDCP Team**

Continue to investigate land ownership for the land north of Cae Ffynnon and develop a range of short-, medium- and long-term options to better manage the flood risk in the area.

**Action 14**

**CCC FDCP Team**

Undertake a CCTV survey of the private sections of watercourse at Ferry Road.

**Action 15**

**CCC FDCP Team**

Ensure riparian landowners are aware of their rights and responsibilities.

## 10.6.2 CCC Flood Risk Management Assets

### 10.6.2.1 The Cae Ffynnon Trash Screen

- 10.6.2.1.1 At the upstream end of Cae Ffynnon - at the point where the ordinary watercourse transitions from open watercourse to a culverted watercourse - is a trash screen (Figure 30). The purpose of this structure is to prevent large debris from entering and blocking the culvert.

Figure 30 – On the left, the new trash screen as seen today, on the right, the screen that was replaced in 2014.

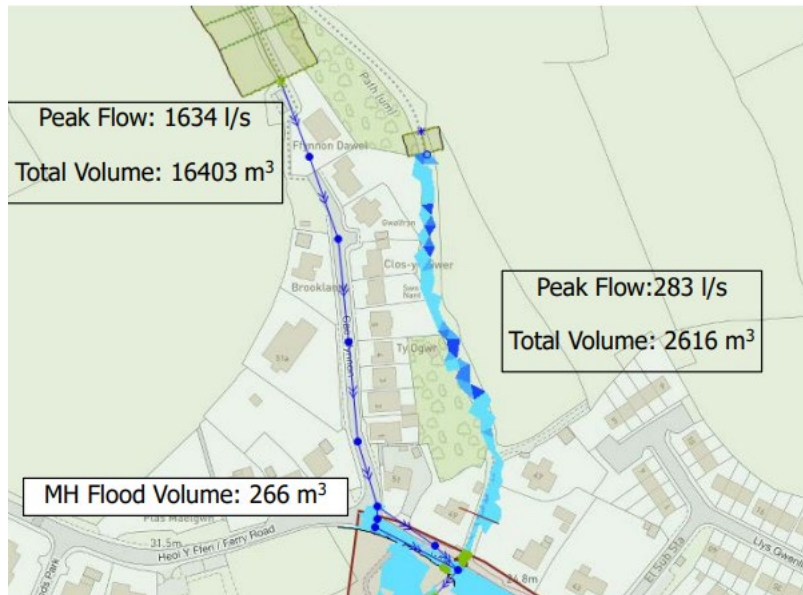


10.6.2.1.2 The Cae Ffynnon trash screen was upgraded in 2014/2015, as a part of a £70,000 CCC FDCP capital works scheme in the area.

10.6.2.1.3 An evaluation undertaken as a part of this investigation has concluded that this asset is fit for purpose, with the ability to manage flood flows up to the 1 in 100-year annual probability flood event (1% AEP). **Error! Reference source not found.** below depicts the flood modelling outputs and shows no predicted flooding during the modelling of this storm event.



Figure 31 - Hydraulic modelling output of a 1 in 100-year (0.1% AEP) flood event - showing no surcharge at the Cae Ffynnon trash screen (Amey Consulting, March 2022).



10.6.2.1.4 This asset has a routine maintenance schedule that is detailed below in Figure 32.

Figure 32 - The routine maintenance duties undertaken at the Cae Ffynnon Trash Screen.

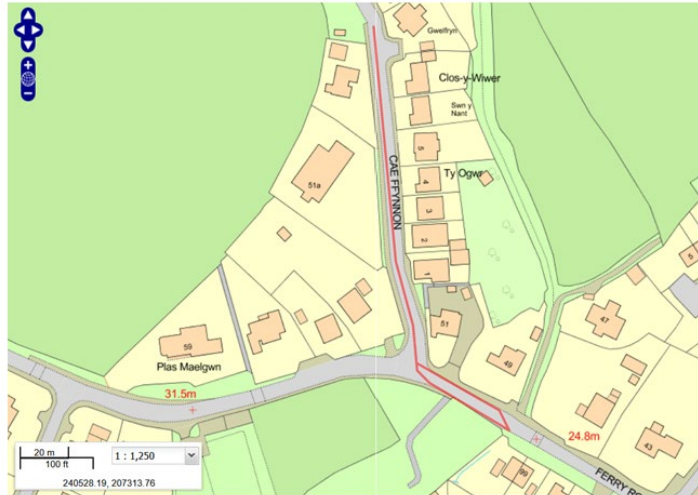
Type of Maintenance	Frequency	Last Inspection	Next inspection
Clear debris from screen	Weekly in winter; monthly in the summer	8 August 2022	September 2022
Mechanical clearance or deep clean	Ad-hoc when needed	27 October 2021	N/A
Full structural inspection	Annually	14 July 2022	Summer 2023
Public Safety Risk Assessment (PRSA)	5-years or when significant changes are made to the structure	17 September 2021	2026

10.6.2.2 Culverted Ordinary Watercourse

10.6.2.2.1 Where the watercourse is culverted beneath the adopted highway, CCC as the Highways team is the riparian landowner.

10.6.2.2.2 As such, approximately 145 metres of the culverted watercourse, beneath Cae Ffynnon, as denoted in Figure 33, is the responsibility of CCC as the Highways team.

Figure 33 - CCC owned section of the Cae Ffynnon watercourse.



10.6.2.2.3 This section of culvert is concrete and 750mm in diameter. It was last surveyed on the 24<sup>th</sup> September 2018. No issues or defects were noted.

10.6.2.2.4 At the bottom of Cae Ffynnon, the culverted watercourse bifurcates and there is a mixture of pipe sizes ranging from 450mm to 900mm. The 2018 culvert survey did highlight that a section of this culvert was damaged and that broken pieces of the culvert were trapped in the structure.

### Action 16

#### CCC Environment Department

Improve communication and recording of defects between teams and divisions in CCC.

10.6.2.2.5 The evaluation undertaken as a part of this investigation has concluded that this bifurcated section has the ability to manage flood flows up to the 1 in 50-year annual probability flood event (2% AEP). To bring this up to the 1 in 100-year (1% AEP) standard the culverts need to be upsized and invert levels amended.



### **Action 17**

#### **CCC FDCP Team**

Seek funding for the detailed design and upgrade of the bifurcated section of culverted watercourse beneath Ferry Road.

### 10.6.3 CCC Highways team Assets

- 10.6.3.1 With the exception of the surface gullies, the Highways team have no surveys or maps of the highway's drainage assets in this area. The 2018 CCTV survey, commissioned by the FDCP team, focused on the culverted watercourse, not the gullied highway drainage system.

### **Action 18**

#### **CCC Environment Department**

As Action 5, ensure a thematic approach to CCTV drainage and asset surveys where possible, capturing all infrastructure, not just departmental assets.

### **Action 19**

#### **CCC Highways team**

Undertake a CCTV survey of the highway drainage systems down Ferry Road in order to have a better record of CCC assets and action any defects accordingly.

- 10.6.3.2 In 2015, as a part of the flood defence mitigation works, beany kerbs were installed along a 50-metre section from houses no.40 to no.44 on Ferry Road. Beany kerbs provide additional storage space for water within the kerb.
- 10.6.3.3 The maintenance of all highways assets is delivered on a reactive basis. Assets are inspected and repaired as and when issues are highlighted.
- 10.6.3.4 There are no historical records of any defects or issues in Cae Ffynnon or the Ferry Road highway systems and as such there is no record of any maintenance.
- 10.6.3.5 The exceptions to this are those highway gullies which are subject to an informal annual maintenance programme. This investigation has checked the maintenance

records and the gullies at Ferry Road and Cae Ffynnon have been periodically cleansed as detailed below in Figure 34 and Appendix H.

Figure 34 – Cae Ffynnon and Ferry Road highway gully maintenance records.

Year	Location	Date	Defects
2016	Ferry Road	June	None
2018	Ferry Road	Sept	None
2019	Ferry Road	November	None
2020	Ferry Road	September	None

#### 10.6.4 Dŵr Cymru Welsh Water (DCWW) Drainage System and Assets

10.6.4.1 Ferry Road is serviced by a DCWW combined system as shown in Appendix E.

10.6.4.2 DCWW have advised that the maintenance pertaining to this system is on a reactive basis, as and when issues are reported.

#### 10.6.5 Other Assets

10.6.5.1 Public Right of Way

10.6.5.1.1 The Public Right of Way known as Byway 11/3 runs along Cae Ffynnon and continues north, eventually running alongside the watercourse. This path extends to Pen-lan-isaf farm and beyond. The path is managed by CCC, as the Highways team, under the Highways Act. The land is not owned by CCC but, similar to flood risk, the Authority has powers to maintain the byway, but not a statutory duty to do so. This byway can be viewed on the CCC website [here](#).

10.6.5.1.2 To the rear of Cae Ffynnon there is a lane, or unofficial footpath, which is not a designated public right of way.

10.6.5.1.3 This investigation has undertaken HM Land Registry searches pertaining to this path and results show that most of the land is unregistered. Further information on unregistered land is available [here](#).

**Action 20**

**Local residents and landowners**

Check title deeds and be clear of their boundaries, responsibilities, and liabilities.

## 10.7 Investigation Findings and Conclusions – Cae Ffynnon and Ferry Road

- 10.7.1 On the evening of the 4<sup>th</sup> October 2021, 27mm of rain fell in just 2 hours (MetDesk data for Ferry Road). Although there was significant flooding, only a single home was flooded internally. On the morning of the 20<sup>th</sup> October 2021, 35.3mm of rain fell in a 2-hour period, and this time no properties were flooded internally.
- 10.7.2 This investigation notes that the flooding caused significant damage to properties. Outbuildings, walls, and garden fences were damaged and destroyed by the force of the water.
- 10.7.3 Initially, there were many hypotheses pertaining to the source and cause of the flooding. It is now clear that the flooding that occurred on both the 4<sup>th</sup> and 20<sup>th</sup> October 2021 was caused by the ordinary watercourse above Cae Ffynnon breaking its banks. Water escaping the watercourse was unable to re-join the channel and was funneled down the footpath to the rear of Cae Ffynnon and then on to Ferry Road.
- 10.7.4 It is noted that remedial action has been undertaken to manage the risk of this watercourse breach in the short term.
- 10.7.5 It is also noted that detailed hydrological investigations have been undertaken to further understand flood risk in the area.
- 10.7.6 In response to the above, this investigation has proposed 9 actions to be implemented in the short to medium term, 8 of these are for CCC. These are detailed below in Figure 35.

Figure 35 - Table of the 9 Ferry Road and Cae Ffynnon actions to be undertaken.

<b>Action No.</b>	<b>Owner</b>	<b>Details</b>	<b>Priority</b>
12	CCC Communications	CCC Environment Department and Communications team must undertake a review of communications channels during incidents to ensure more efficient use of officer time and resources.	Medium
13	CCC FDCP	CCC FDCP team to continue to investigate land ownership for the land north of Cae Ffynnon and develop a range of short-, medium- and long-term options to better manage the flood risk in the area.	Medium
14	CCC FDCP	CCC FDCP team must undertake a CCTV survey of the private sections of watercourse at Ferry Road.	High
15	CCC	CCC FDCP team must ensure riparian landowners are aware of their rights and responsibilities	High
16	CCC	CCC Environment Department must improve communication and recording of defects between teams and divisions in CCC.	High
17	CCC	CCC FDCP team must seek funding for the detailed design and upgrade the bifurcated section of culverted watercourse beneath Ferry Road.	High
18	CCC	CCC Environment Department must ensure a thematic approach to CCTV drainage and asset surveys where possible, capturing all infrastructure, not just departmental assets.	High
19	CCC	CCC Highways team must undertake a CCTV survey of the highway drainage systems down Ferry Road and action any defects accordingly.	High
20	Public	Local residents and landowners must check their title deeds and be clear of their boundaries, responsibilities, and liabilities.	High

# 11. The Flood Investigation - Ger Y Castell and Ger Y Gwendraeth

## 11.1 Introduction

11.1.1 This section of the report will focus specifically on the flooding that occurred on the 4<sup>th</sup> October and 20<sup>th</sup> October 2021 at Ger Y Gwendraeth and Ger Y Castell. This is a medium sized residential area comprising of approximately 130 homes, located in the north of Kidwelly (Figure 36).

Figure 36 - The Ger Y Castell and Ger Y Gwendraeth flood investigation area.



## 11.2 Flood Incident Data - Monday 4<sup>th</sup> October 2021

11.2.1 On the 4<sup>th</sup> October, the FDCP team at CCC received no reports of flooding from this area.

11.2.2 The CCC Property Maintenance team however were made aware of 8 instances of internal property flooding, namely Nos.1-7 Ger Y Gwendraeth and No.32 Ger Y Castell.

## 11.3 Flood Incident Data - 20<sup>th</sup> October 2021

- 11.3.1 On the 20<sup>th</sup> October, the FDCP Team at CCC received 4 reports of flooding.
- 11.3.2 At 21:15pm on the 20<sup>th</sup> October house no.20 on Ger Y Castell requested sandbags.
- 11.3.3 At 06:22am a report was received of flooding between houses No.1 and 7 on Ger Y Gwendraeth.
- 11.3.4 The MWWFS informed the CCC duty officer that they had a unit on site at Ger Y Gwendraeth and that their pumping was keeping the water from entering properties.

## 11.4 Subsequent Site Investigations, Observations and Visits

- 11.4.1 The Highways team checked all highway gullies to ensure that they were clear.
- 11.4.2 The CCC Property Maintenance team had a sub-contractor attend houses No.1-7 Ger Y Gwendraeth and clear the drainage system.
- 11.4.3 Properties at 1-7 Ger Y Gwendraeth also received de-humidifiers and repairs were undertaken to damaged doors and flooring. Aco-drainage has been installed to manage the surface water.

Figure 37 – Photo of the properties at Ger Y Gwendraeth that were flooded.



- 11.4.4 The Property Maintenance Supervisor noted that houses No.1-7 on Ger Y Gwendraeth lie beneath the level of the road. As such water flooding from the highway flows down to the dwellings and causes flooding.

11.4.5 At No.32 Ger Y Castell the Property Maintenance team had a contractor come and clear the private drainage which was full of leaves and debris. They then installed aco-drainage at the rear of the property and provided de-humidifiers. Walls were replastered and damaged doors and skirting replaced.

Figure 38 – Photo of 32 Ger Y Castell that had internal flooding from the rear.



11.4.6 It was noted that No.32 Ger Y Castell lies towards the bottom corner of the estate and is lower than surrounding properties. Detailed plans of the drainage servicing this area are not currently available.

## 11.5 Flooding History

### 11.5.1 Flood Defence and Coastal Protection (FDCP) Flood Records

11.5.1.1 The CCC FDCP team have no historical records of flooding at this location.

### 11.5.2 CCC Highways team Flood Records

11.5.2.1 The Highways team have no historical records of flooding at this location.

### 11.5.3 CCC Property Team Flood Records



11.5.3.1 The Housing and Property Maintenance Teams have no records of previous flooding.

#### 11.5.4 Dŵr Cymru Welsh Water (DCWW) Flood Records

11.5.4.1 A check of incidents reported within the last 5 years has returned details of 18 blockages and 1 flooding incident in Ger Y Castell, and 4 blockages and no flooding in Ger Y Gwendraeth.

### **Action 21**

#### **CCC Communities Department**

Empower residents to report flooding and drainage issues to the relevant departments and organisations so that those organisations are aware of issues.

## **11.6 Drainage Networks and Assets – Ger Y Gwendraeth and Ger Y Castell**

### 11.6.1 Ordinary Watercourses

11.6.1.1 There are no ordinary watercourse in or around Ger Y Castell or Ger Y Gwendraeth.

### 11.6.2 Flood Defence and Coastal Protection (FDCP) Assets

11.6.2.1 CCC's FDCP team have flood defence assets in this area.

### 11.6.3 CCC Highways team Assets

11.6.3.1 With the exception of the surface water gullies, the Highways team have no surveys or maps of the highway drainage assets in this area.

## Action 22

### CCC Highways team

Undertake a CCTV survey of the highway drainage systems down Ger Y Gwendraeth and Ger Y Castell and action any defects accordingly.

- 11.6.3.2 The maintenance of all highways assets is delivered on a reactive basis. Assets are inspected and repaired as and when issues are highlighted.
- 11.6.3.3 There are no records of any defects or issues on the Ger Y Castell or Ger Y Gwendraeth highway systems and as such there is no record of any maintenance.
- 11.6.3.4 The exceptions to this are those highways gullies which are subject to an informal annual maintenance programme. This investigation has checked the records and the gullies at Ger Y Castell and Ger Y Gwendraeth have been periodically cleansed, as detailed in Figure 39 and Appendix H.

Figure 39 – Ger Y Gwendraeth and Ger Y Castell highway gully maintenance records.

Year	Location	Date	Defects
2015	Ger Y Castell	October	None
2015	Ger Y Gwendraeth	October	None
2017	Ger y Gwendraeth	September	None
2017	Ger Y Castell	September	None
2021	Ger Y Gwendraeth	November	25-50% silts
2021	Ger Y Castell	November	25-100% silts

### 11.6.4 Dŵr Cymru Welsh Water (DCWW) Assets

- 11.6.4.1 A map of the DCWW assets at Ger Y Castell and Ger Y Gwendraeth can be viewed in Appendices F and G. These maps highlight that the area is served by a DCWW combined system.
- 11.6.4.2 DCWW have advised that the maintenance pertaining of this system is on a reactive basis, as and when issues are reported.

## 11.6.5 CCC Communities Department Responsibilities

- 11.6.5.1 CCC Communities Department are the owners and landlords of many properties at Ger Y Gwendraeth and Ger Y Castell, as denoted in blue in Figure 40. As the landowners, they have shared responsibility of the drainage system.
- 11.6.5.2 CCC have no surveys or maps of the drainage system in this area.
- 11.6.5.3 The maintenance of all CCC Communities assets is delivered on a reactive basis. Assets are inspected and repaired as and when issues are highlighted.

### **Action 23**

#### **CCC Communities Department**

Collaborate with CCC Highways team on undertaking a CCTV the drainage systems down Ger Y Gwendraeth and Ger Y Castell and action any defects accordingly.

### **Action 24**

#### **CCC Director**

Agree a lead department/organisation to manage and oversee flood risk in this area and ensure that policies and procedures are in place to capture and share all relevant flood risk information.

Figure 40 - Map highlighting property owned by CCC (coloured blue) in Ger Y Gwendraeth and Ger Y Castell.



## 11.7 Investigation Findings and Conclusions – Ger Y Gwendraeth and Ger Y Castell

- 11.7.1 On the evening of the 4<sup>th</sup> October 2021, 20.3mm of rain fell in 2 hours (MetDesk data for nearby Clos Yr Helyg). There was significant flooding and 8 homes were flooded internally.
- 11.7.2 On the morning of the 20<sup>th</sup> October 2021, 41mm of rain fell in a 2-hour period (MetDesk data for nearby Clos Yr Helyg), and the same 8 homes were flooded.
- 11.7.3 This investigation would highlight that although multiple agencies attended the flooding of 16 homes over the two events, no single agency or department coordinated the response.
- 11.7.4 This investigation concludes that the surface water drainage systems in this area were not able to cope with the volume of rain that fell. This is in part evidenced by the highway gully information in Figure 39, which highlights a lack of recent maintenance and silt levels that could have been an aggravating factor. We again note that many drains and gullies were blinded by leaf litter.

11.7.5 At Nos.1-7 Ger Y Gwendraeth, the investigation concludes that water flooding from the highway and neighbouring properties adversely affects the flood risk of these properties.

11.7.6 However, this investigation does note that there is no information on the subterranean drainage available and, as such, further investigation is necessary to fully understand the root cause of the flooding.

11.7.7 The cause of the flooding at No.32 Ger Y Castell also requires further investigation of the highways and surface water drainage systems.

11.7.8 Considering the above, this investigation has proposed 4 actions to be implemented in the short to medium term by CCC. These are detailed in Figure 41 below.

Figure 41 - Table of the Ger Y Gwendraeth and Ger Y Castell actions to be undertaken by the relevant RMAs.

Action No.	Owner	Details	Priority
21	CCC Communities	CCC Communities Department must empower residents to report flooding and drainage issues to the relevant departments and organisations so that those organisations are aware of issues.	High
22	Highways team	CCC Highways team must undertake a CCTV survey of the highway drainage systems down Ger Y Gwendraeth and Ger Y Castell and action any defects accordingly.	High
23	CCC Communities	CCC Communities Department must collaborate with CCC Highways team to undertake a CCTV survey of the drainage systems down Ger Y Gwendraeth and Ger Y Castell and action any defects accordingly.	High
24	CCC Director of Environment	CCC Director must agree a lead department/organisation to manage and oversee flood risk in this area and ensure that policies and procedures are in place to capture and share all relevant flood risk information.	High

## 12. The Flood Investigation - Kidwelly Industrial Estate

### 12.1 Introduction

12.1.1 This section of the report will focus specifically on the flooding that occurred on the 4<sup>th</sup> October and 20<sup>th</sup> October 2021 at Kidwelly Industrial Estate.

### 12.2 Flood incident data – 4<sup>th</sup> October 2021

12.2.1 On the 4<sup>th</sup> October no reports of flooding were received for Kidwelly Industrial estate.

12.2.2 On the 7<sup>th</sup> October Travis Perkins logged an incident with CCC's Property Services Team. They reported significant flooding of their yard, but no internal flooding.

### 12.3 Flood Incident data – 20<sup>th</sup> October 2021

12.3.1 At 10:29 an email was received from Travis Perkins containing photos of the flooding. These are shown in Figure 42.

12.3.2 CCC's Property Team received a call from Unit-3 regarding the drainage backing up and causing flooding.

12.3.3 On the 26<sup>th</sup> October CCC's Property Services contractors pumped way excess water.

Figure 42 – Photos of the flooding at Kidwelly Industrial Estate on the 20th October 2021.



## 12.4 Subsequent Site Visits and Observations

- 12.4.1 On 18th October Officers from CCC's FDCP team visited the site to assess the drainage in the area.
- 12.4.2 CCC FDCP officers met with the manager of Travis Perkins Kidwelly who showed them the pond area to the north of the flooded yard, which does not drain water away effectively. In addition to this, the officers observed that the road gullies were full of silt and stone.
- 12.4.3 In addition to site visits, a desk-top review of the drainage plans and recent planning history was undertaken. This suggests that the construction of a new development adjacent to Travis Perkins could have resulted in a loss of surface water drainage that had previously benefitted the estate.

## 12.5 Flooding History

### 12.5.1 Flood Defence and Coastal Protection (FDCP) Team Flood Records

12.5.1.1 The FDCP team have no historical records of flooding at this location.

### 12.5.2 CCC Highways team Flood Records

12.5.2.1 The Highways team have no historical records of flooding at this location.

### 12.5.3 Dŵr Cymru Welsh Water (DCWW) Flood Records

12.5.3.1 DCWW have no historical records of flooding at this location.

### 12.5.4 CCC Regeneration Team Flood Records

12.5.4.1 CCC's Property Services - who manage units 2 and 3, and the highway in the Industrial Park (Figure 44), have records of flooding that occurred in March 2021. After this event, a drainage contractor provided advice on resolution of the issues but to date that advice has not been followed up.

12.5.4.2 It has been suggested that in the construction of a private unit, drainage that served the estate has changed.

#### **Action 25**

#### **CCC Estates Management**

Investigate the claims that drainage has been damaged or lost and take any necessary action to re-instate accordingly.



## 12.6 Drainage Networks and Assets – Kidwelly Industrial Estate

### 12.6.1 CCC Flood Risk Management Assets

12.6.1.1 The FDCP Team have no flood risk management assets in this area.

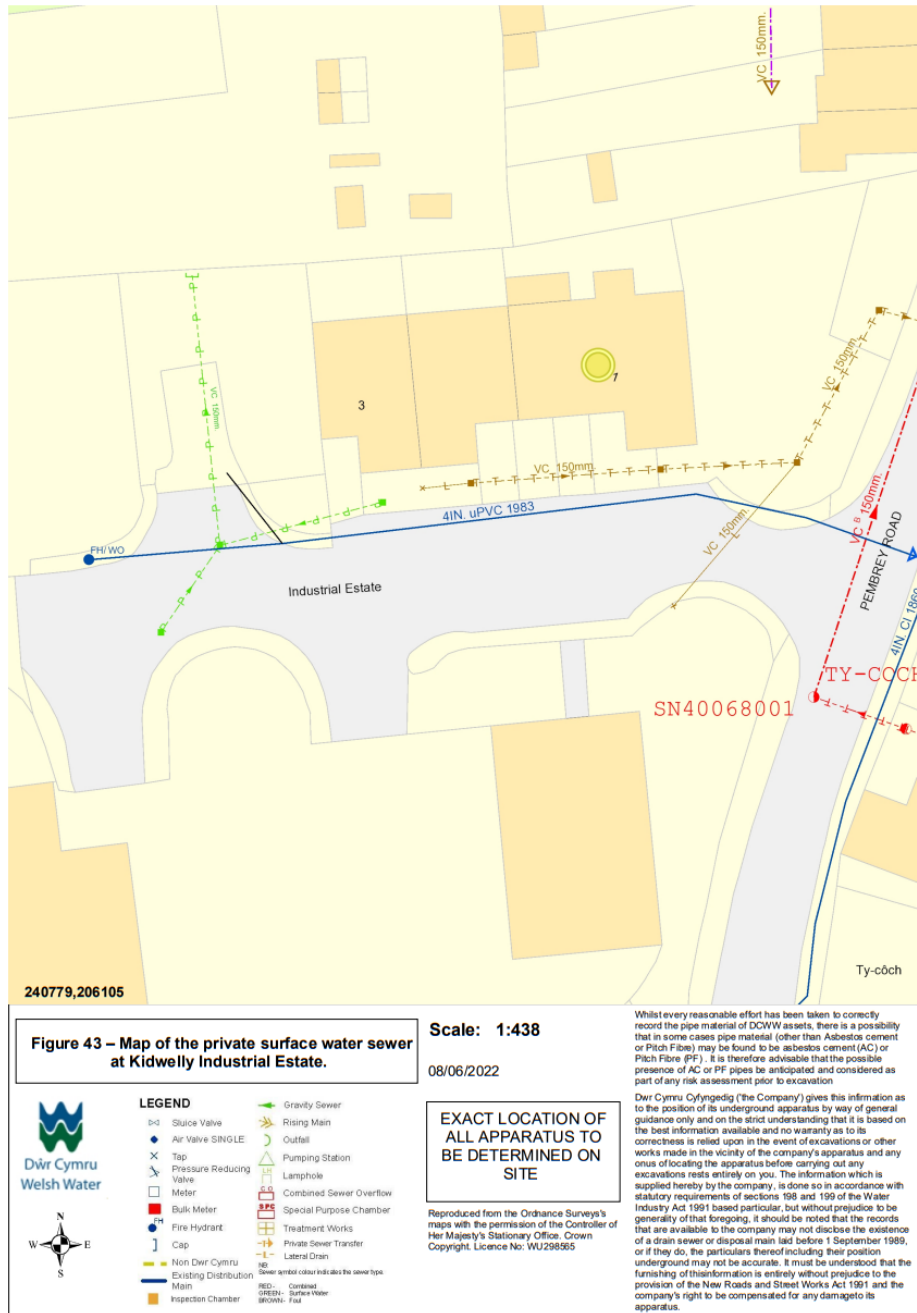
### 12.6.2 CCC Highways team Assets

12.6.2.1 The Highways team have no assets in the industrial estate.

### 12.6.3 Dŵr Cymru Welsh Water (DCWW) Assets

12.6.3.1 The industrial estate is served by a DCWW foul sewer and a private surface water sewer as shown in Figure 43.

Figure 43 – Maps of the private surface water sewer at Kidwelly Industrial Estate.



## 12.6.4 CCC Estates Assets

- 12.6.4.1 The CCC Estates Team manage units 2 and 3 and the industrial estate road, as shown in Figure 44.

- 12.6.4.2 With the exception of the DCWW data, there are no surveys or maps of the drainage systems in this area.
- 12.6.4.3 Private drainage systems are the responsibility of those that derive benefit from them or the landowners, as such, CCC's Estates team hold a majority stake in the site's drainage. If any other private units derive benefit from the system, they may also be liable for a percentage of its maintenance.

### Action 26

#### CCC Estates Management

Undertake a CCTV survey of the industrial estate's drainage systems and action any defects accordingly.

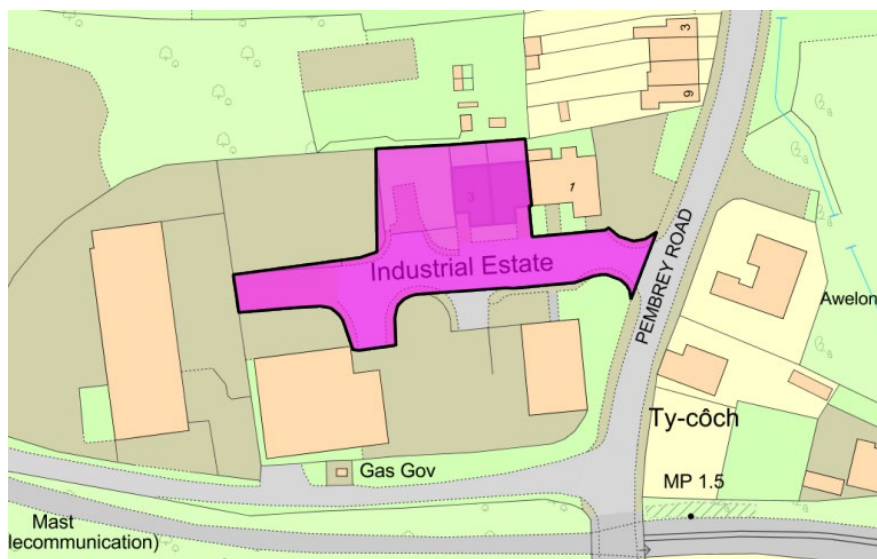
### Action 27

#### CCC Estates Management

Use the CCTV survey to develop a drainage management plan for the estate, ensuring that all tenants and private businesses are aware of their drainage and their responsibilities.

- 12.6.4.4 The maintenance of all CCC's industrial or business estates is delivered on a reactive basis. Assets are inspected and repaired as and when issues are highlighted.

Figure 44 - Kidwelly Industrial Estate and the area managed by CCC's Property Services (highlighted in pink).



## 12.7 Investigation Findings and Conclusions – Kidwelly Industrial Estate

- 12.7.1 On the evening of the 4<sup>th</sup> October 2021, 20.3mm of rain fell in just 2 hours (MetDesk data for nearby Clos Yr Helyg). On the 7<sup>th</sup> October, businesses reported ongoing flooding issues. On the morning of the 20<sup>th</sup> October 2021, 32.9mm rain fell in one hour and 41mm over a 2-hour period (MetDesk data, Clos Yr Helyg). This time 3 businesses reported that their premises had flooded internally.
- 12.7.2 This investigation concludes that the industrial park lacks strategic management with regards to its drainage. There is no knowledge of the drainage systems other than what exists on DCWW records, and there is a lack of drainage expertise and joined up thinking with regards to its management.
- 12.7.3 We note that there is awareness that part of the drainage has been changed, but to date, that has not been investigated or resolved.
- 12.7.4 This investigation has proposed 3 actions to be implemented in the short term by CCC's Estates Department to manage the flood risk at Kidwelly Industrial Estate. These are detailed below in Figure 45.

Figure 45 - Kidwelly Industrial Estate actions to be undertaken by CCC's CCC Estates Department.

Action No.	Owner	Details	Priority
25	CCC Estates	CCC Estates must investigate the claims that drainage that has been changed or damaged and take any necessary action to re-instate accordingly.	High
26	CCC Estates	CCC Estates must undertake a CCTV survey of the industrial estate's drainage systems and action any defects accordingly.	High
27	CCC Estates	CCC Estates must use the CCTV survey to develop a drainage management plan for the estate, ensuring that all tenants and private businesses are aware of their drainage and responsibilities.	High

## 13. Strategic Investigation Findings

### 13.1 Findings

- 13.1.1 From the reports received and the information collected, we have concluded that during the 2 flooding events in Kidwelly in October 2021, 41 residential dwellings and 7 businesses suffered internal flooding. The areas focused on in this report had the highest number of flood incidents, with a few incidents outside of these areas.
- 13.1.2 From the information gathered as a part of this report we have concluded that the primary flooding sources were:
- a) Ordinary watercourse
  - b) Surface water
  - c) Highway Authority drainage systems
  - d) Private surface water drainage systems
  - e) DCWW drainage systems
  - f) Ground water
- 13.1.3 There is currently no evidence to suggest that Kidwelly experienced flooding from main rivers during these flooding events.
- 13.1.4 The lead RMAs pertaining to flood risk management at Kidwelly are CCC as the LLFA, CCC as the Highways Authority, and DCWW.
- 13.1.5 We also note that Pobl and CCC as social housing landlords, and CCC as a commercial landlord, have a significant role to play in the management of flood risk.
- 13.1.6 Kidwelly has seen several flooding events historically and, with climate change, there is the potential for increased flooding. However, residents and community leaders should acknowledge that this is not an issue specific to Kidwelly. Many communities across Carmarthenshire, and indeed Wales, have seen multiple, significant flooding events in recent months and years, with an increasing number of properties affected.
- 13.1.7 There is an assumption that the Local Authority is responsible for all flood risk management eventualities, and residents are not aware of the role they and other RMAs play in the management of their flood risk.

13.1.8 Local community resilience and communication post the October flooding has been excellent. However, despite the history of flooding, residents have limited knowledge of their personal flood risk, their responsibility in managing that risk and the responsibilities of the relevant RMAs.

13.1.9 Considering the above, this investigation recommends that CCC, in partnership with the local member and other RMAs, hold a community awareness session. This should seek to inform local residents of their flood risk, what they can do to manage that risk, and what roles the relevant RMAs play.

**Action 28**

**CCC FDCP Team**

Develop and hold a community flood risk awareness session. This should seek to inform residents of their flood risk, what they can do to manage that risk, and what roles the relevant RMAs play.

Action No.	Owner	Details	Priority
28	CCC	CCC FDCP team must Develop and hold a community flood risk awareness session. This should seek to inform residents of their flood risk, what they can do to manage that risk, and what roles the relevant RMAs play.	Medium

## 14. Actions from the Investigation (x28)

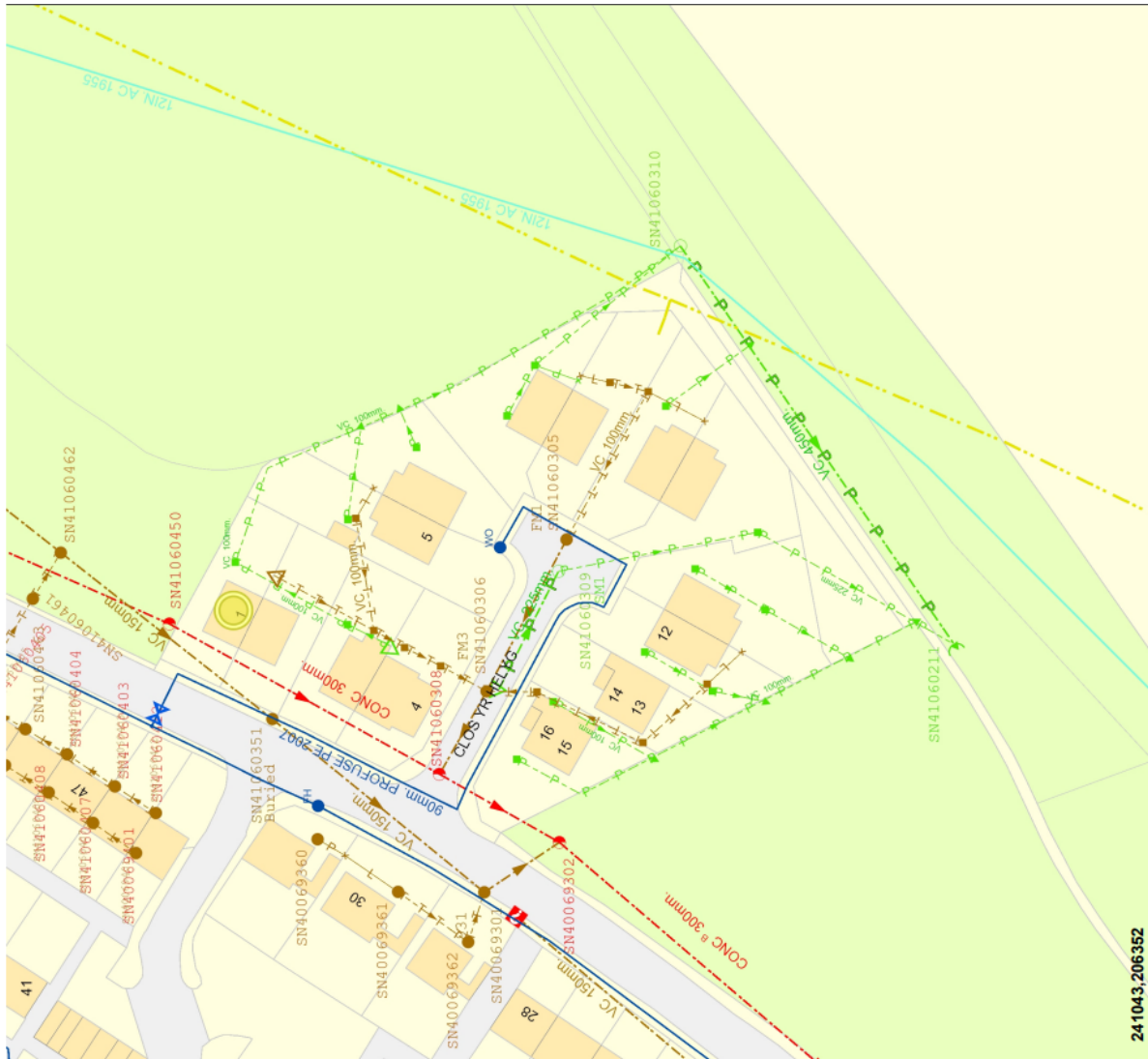
Action No.	Location	Owner Dept	Owner (Name)	Details	Priority	Deadlines (To be agreed with relevant managers)
1	Clos Yr Helyg	CCC & Pobl	Ben Kathrens	Empower and ensure that residents of Clos Y Helyg understand the need to report and document drainage issues. Residents should be clear who is responsible for flooding and who to contact.	High	Jan 23
2	Clos Yr Helyg	CCC (FDCP)	Ben Kathrens	Undertake a CCTV drainage survey of the culvert at Parc Pendre.	High	Oct 22
3	Clos Yr Helyg	CCC (FDCP)	Ben Kathrens	Ensure the management of the Clos Yr Helyg watercourse in perpetuity.	High	Complete
4	Clos Yr Helyg	CCC (Highways)	Stephen Pilliner	Undertake a CCTV survey of the highway drainage system down Clos Yr Helyg in order to have a better record of CCC assets and action any defects accordingly.	High	Complete
5	Clos Yr Helyg	CCC (Environment)	Ben Kathrens	Ensure a thematic approach to CCTV drainage and asset surveys where possible, capturing all infrastructure, not just departmental assets.	Medium	April 23
6	Clos Yr Helyg	CCC (Environment)	Ben Kathrens	Develop a more robust method of reviewing CCTV drainage surveys and recording and actioning defects between divisions and teams.	Medium	April 23
7	Clos Yr Helyg	Pobl	Pobl	Ensure that robust records of drainage systems are available and that an annual inspection and maintenance programme is delivered.	High	Jan 23
8	Llys Gwenllian	CCC & Pobl	Ben Kathrens	Empower and ensure that residents of Llys Gwenllian understand the need to report and document drainage issues. Residents should be clear who is responsible for flooding and who to contact.	High	Jan 23
9	Llys Gwenllian	CCC (FDCP)	Ben Kathrens	Work with landowner to manage the flow of spring water in a manner that poses least risk to the residents of Llys Gwenllian.	Medium	April 23
10	Llys Gwenllian	CCC (Highways)	Stephen Pilliner	Undertake a CCTV survey of the highway drainage system down Llys Gwenllian to understand its path, its interactions with other drainage systems and ensure	High	Oct 22

				that any defects are resolved accordingly.		
11	Llys Gwennllian	Pobl	Pobl	Ensure that robust records of drainage systems are available and that an annual inspection and maintenance programme is delivered.	High	Oct 22
12	Ferry Road & Cae Ffynnon	CCC (Environment & Communications)	Ben Kathrens & Deina Hockenhall	Undertake a review of communications channels during incidents to ensure more efficient use of officer time and resources.	Medium	April 23
13	Ferry Road & Cae Ffynnon	CCC (FDCP)	Ben Kathrens	Continue to investigate land ownership for the land north of Cae Ffynnon and develop a range of short-, medium- and long-term options to better manage the flood risk in the area.	Medium	Jan 23
14	Ferry Road & Cae Ffynnon	CCC (FDCP)	Ben Kathrens	Undertake a CCTV survey of the private sections of watercourse at Ferry Road.	High	Complete
15	Ferry Road & Cae Ffynnon	CCC (FDCP)	Ben Kathrens	Ensure riparian landowners are aware of their rights and responsibilities.	High	Complete
16	Ferry Road & Cae Ffynnon	CCC (Environment)	Ben Kathrens and Stephen Pilliner	Improve communication and recording of defects between teams and divisions in CCC.	High	Jan 23
17	Ferry Road & Cae Ffynnon	CCC (FDCP)	Ben Kathrens	Seek funding for the detailed design and upgrade of the bifurcated section of culverted watercourse beneath Ferry Road.	High	Complete
18	Ferry Road & Cae Ffynnon	CCC (Environment)	Ben Kathrens	As Action 5, ensure a thematic approach to CCTV drainage and asset surveys where possible, capturing all infrastructure, not just departmental assets.	High	Jan 23
19	Ferry Road & Cae Ffynnon	CCC (Highways)	Stephen Pilliner	Undertake a CCTV survey of the highway drainage systems down Ferry Road in order to have a better record of CCC assets and action any defects accordingly.	High	Oct 22
20	Ferry Road & Cae Ffynnon	Public	Public	Check title deeds and be clear of their boundaries, responsibilities, and liabilities.	High	Jan 23
21	Ger Y Castell and Ger Y Gwendraeth	CCC (Communities)	Housing Officers	Empower residents to report flooding and drainage issues to the relevant departments and organisations so that those organisations are aware of issues.	High	Jan 23
22	Ger Y Castell and Ger Y Gwendraeth	CCC (Highways)	Stephen Pilliner	Undertake a CCTV survey of the highway drainage systems down Ger Y Gwendraeth and Ger Y Castell and action any defects accordingly.	High	Oct 22
23	Ger Y Castell and Ger Y Gwendraeth	CCC (Communities)	TBC	Collaborate with CCC Highways team to undertake a CCTV survey of the drainage systems down Ger	High	Oct 22



				Y Gwendraeth and Ger Y Castell and action any defects accordingly.		
24	Ger Y Castell and Ger Y Gwendraeth	CCC (Director)	Ainsley Williams	Agree a lead department/organisation to manage and oversee flood risk in this area and ensure that policies and procedures are in place to capture and share all relevant flood risk information.	High	Dec 23
25	Kidwelly Industrial Estate	CCC (Estates)	Steve Morgan	Investigate the claims that drainage has been damaged or lost and take any necessary action to re-instate accordingly.	High	Jan 23
26	Kidwelly Industrial Estate	CCC (Estates)	Steve Morgan	Undertake a CCTV survey of the industrial estate's drainage systems and action any defects accordingly.	High	Oct 22
27	Kidwelly Industrial Estate	CCC (Estates)	Steve Morgan	Use the CCTV survey to develop a drainage management plan for the estate, ensuring that all tenants and private businesses are aware of their drainage and their responsibilities.	High	Jan 23
28	Strategic	CCC (FDCP)	Ben Kathrens	Develop and hold a community flood risk awareness session. This should seek to inform residents of their flood risk, what they can do to manage that risk, and what roles the relevant RMA's play.	Medium	June 2023

Appendix A - DCWW Drainage Map for Clos Yr Helyg.



Whilst every reasonable effort has been taken to correctly record the pipe materials of DCWW assets, there is a possibility that in some cases pipe material (other than Asbestos cement pipes, ductile iron pipes or polypropylene pipes or Pitch Fibre (PF)). It is therefore anticipated and considered as part of any risk assessment prior to excavation.

Dwr Cymru Cylngedig (the Company) gives this information as to the position of its underground apparatus by way of general guidance only and on the strict understanding that it is based on the best information available and no warranty as to its accuracy is given. The Company is not responsible for any other works made in the vicinity of the company's apparatus and any onus of locating the apparatus before carrying out any excavations rests entirely on you. The information which is

Scale: 1:738  
08/06/2022

EXACT LOCATION OF ALL APPARATUS TO BE DETERMINED ON SITE

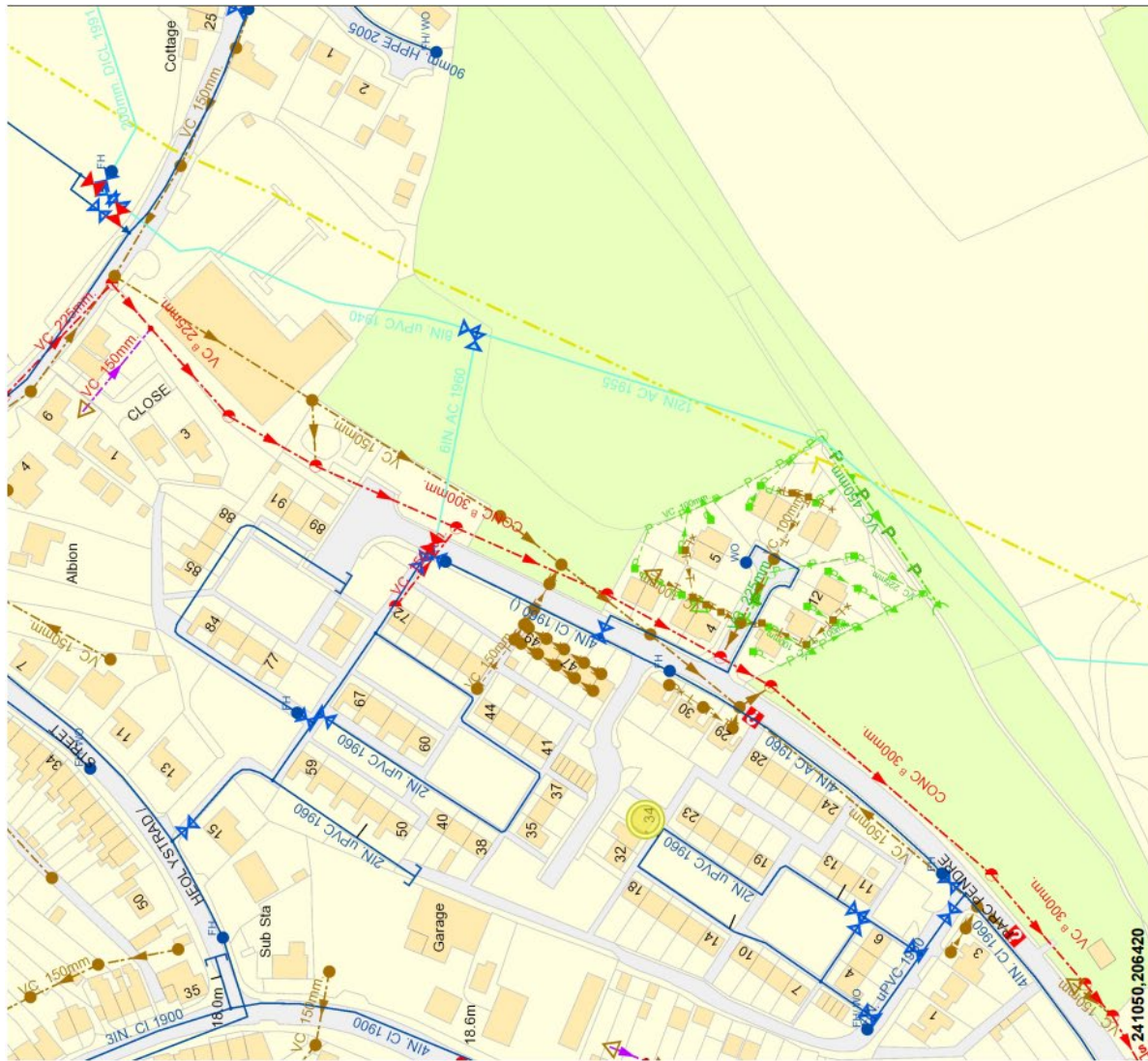
Appendix A - DCWW Drainage Map for Clos Yr Helyg

- LEGEND
- Gravelly Sewer
  - Silica Valve
  - Air Valve SINGLE
  - Tap
  - Pressure Reducing Valve
  - Gravelly Sewer
  - Rising Main
  - Outlet
  - Pumping Station
  - Lamp Hole



241043,206352

Appendix B – DCWW drainage map for Parc Pendre.



Whilst every reasonable effort has been taken to correctly record the pipe material of DCWW assets, there is a possibility that in some cases pipe material (other than Asbestos cement pipes, Cast Iron pipes or Plastic Pipes (PP)) is therefore anticipated and considered as part of any risk assessment prior to excavation.

Dwr Cymru Cyfyngedig (the Company) gives this information as to the position of its underground apparatus by way of general guidance only and on the strict understanding that it is based on the best information available and no warranty as to its accuracy is given. The Company is not responsible for any other works made in the vicinity of the company's apparatus and any excavation of the apparatus before carrying out any excavations rests entirely on you. The information which is

**Scale: 1:1753**  
08/06/2022

**Appendix B – DCWW drainage map for Parc Pendre**

**EXACT LOCATION OF ALL APPARATUS TO BE DETERMINED ON SITE**

**LEGEND**

- Gravelly Sewer
- Soil Valve
- Air Valve SINGLE
- Tap
- Pressure Reducing Valve
- Manhole
- Rising Main
- Outlet
- Pumping Station
- Lamphead

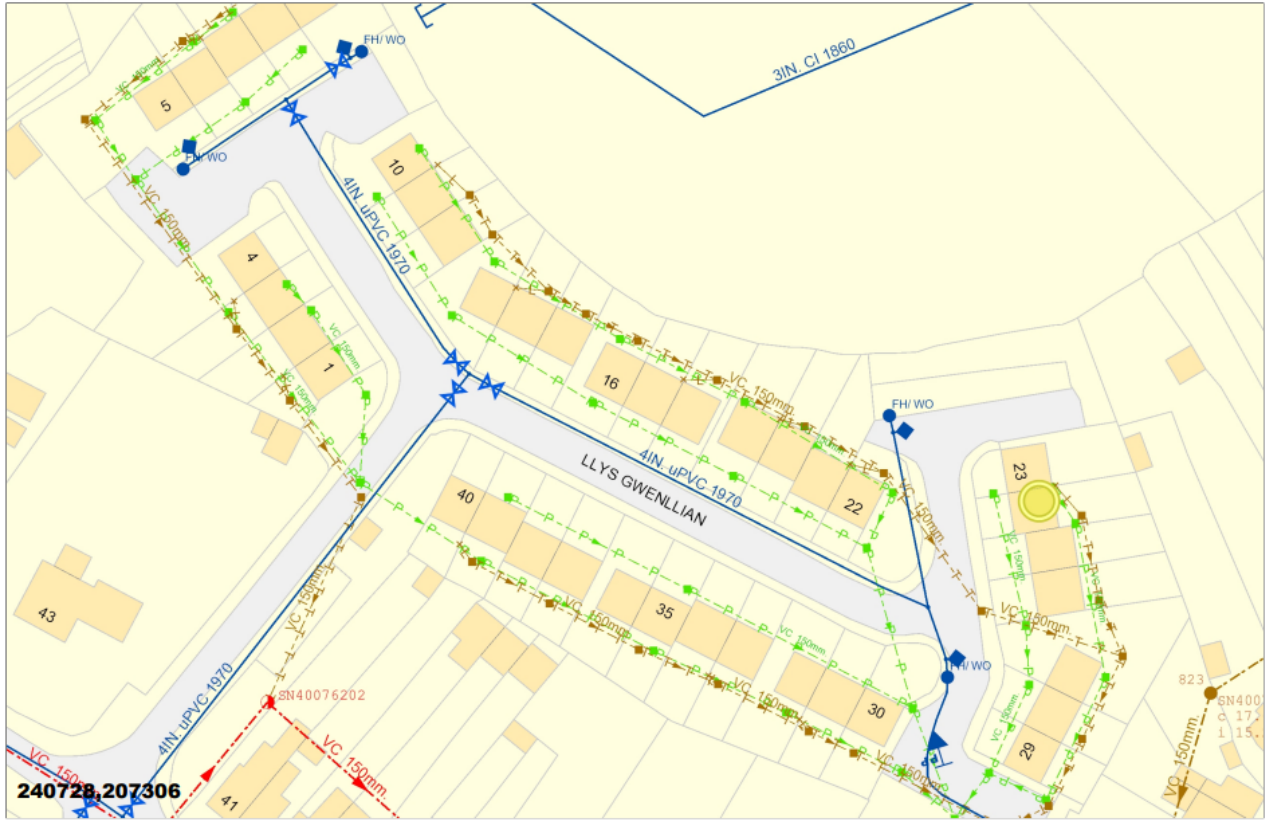
Dwr Cymru

Appendix C – DCWW drainage map for Llys Gwenllian.

### Appendix C– DCWW drainage map for Llys Gwenllian



Scale:



- LEGEND**
- Clean Water**
- Sluice Val
  - Air Val, SINGL
  - Tap
  - Pressure Re Valve
  - Meter
  - BULK Meter
  - FH
  - Cap
  - Existing Main
  - NON COMPAN
- Sewerage Extern**
- Foul
  - Surface Water
  - Combined
  - Rising Main
  - Private
  - Treatment W
  - Pumping St
  - Special Purp
  - Unknown E
  - Change, Comb
  - Outfall, FOUL
  - Lamp Hole, F
  - Private Sewe
  - Lateral Drain
  - Inspection C

Dŵr Cymru Cyfyngedig ('the Company') gives this information as to the position of its underground apparatus by way of general guidance only and on the strict understanding that it is based on the best information available and no warranty as to its correctness is relied upon. In the event of excavations or other works made in the vicinity of the company's apparatus and any onus of locating the apparatus before carrying out any excavations rests entirely on you. The information which is supplied hereby the company, is done so in accordance with statutory requirements of sections 198 and 199 of the water industry Act 1991 based upon the best information available and in particular, but without prejudice to the generality of the foregoing, it should be noted that the records that are available to the Company may not disclose the existence of a drain sewer or disposal main laid before 1 September 1989, or if they do, the particulars thereof including their position underground may not be accurate. It must be understood that the furnishing of this information is entirely without prejudice to the provision of the New Roads and Street Works Act 1991 and the company's right to be compensated for any damage to its apparatus.

**EXACT LOCATION OF ALL APPARATUS TO BE DETERMINED ON SITE**

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Whilst every reasonable effort has been made to correctly record the position of the apparatus there is a possibility that other than Asbestos Containing Materials (ACM) or PF pipes be identified in any risk assessment.

Appendix D – DCWW drainage Map for Cae Ffynnon.





**Appendix D- DCWW drainage Map for Cae Ffynnon**

Scale: 1:1753  
09/06/2022

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**LEGEND**

- Gravelly Sewer
- Source Valve
- Rising Man
- Air Valve SING LE
- Tap
- Pressure Reducing Valve
- Outlet
- Pumping Station
- Lampole

Whilst every reasonable effort has been taken to correctly identify the location of all apparatus, it is acknowledged that in some cases pipe material (other than Asbestos cement or Pitch Fibre) may be found to be asbestos cement (AC) or Pitch Fibre (PF). It is therefore advisable that the possible presence of AC or PF pipes be investigated and considered as part of any risk assessment prior to excavation.

Dwr Cymru Cyllyngedig (The Company) gives this information as to the position of its underground apparatus by way of general information only. It is not intended to be relied upon as the best information available and no warranty as to its correctness is relied upon in the event of excavations or other works made in the vicinity of the company's apparatus and any omission of apparatus from the map is not intended to be construed as a warranty or guarantee. The Company is not liable for any damage to property or persons arising from the use of this information.

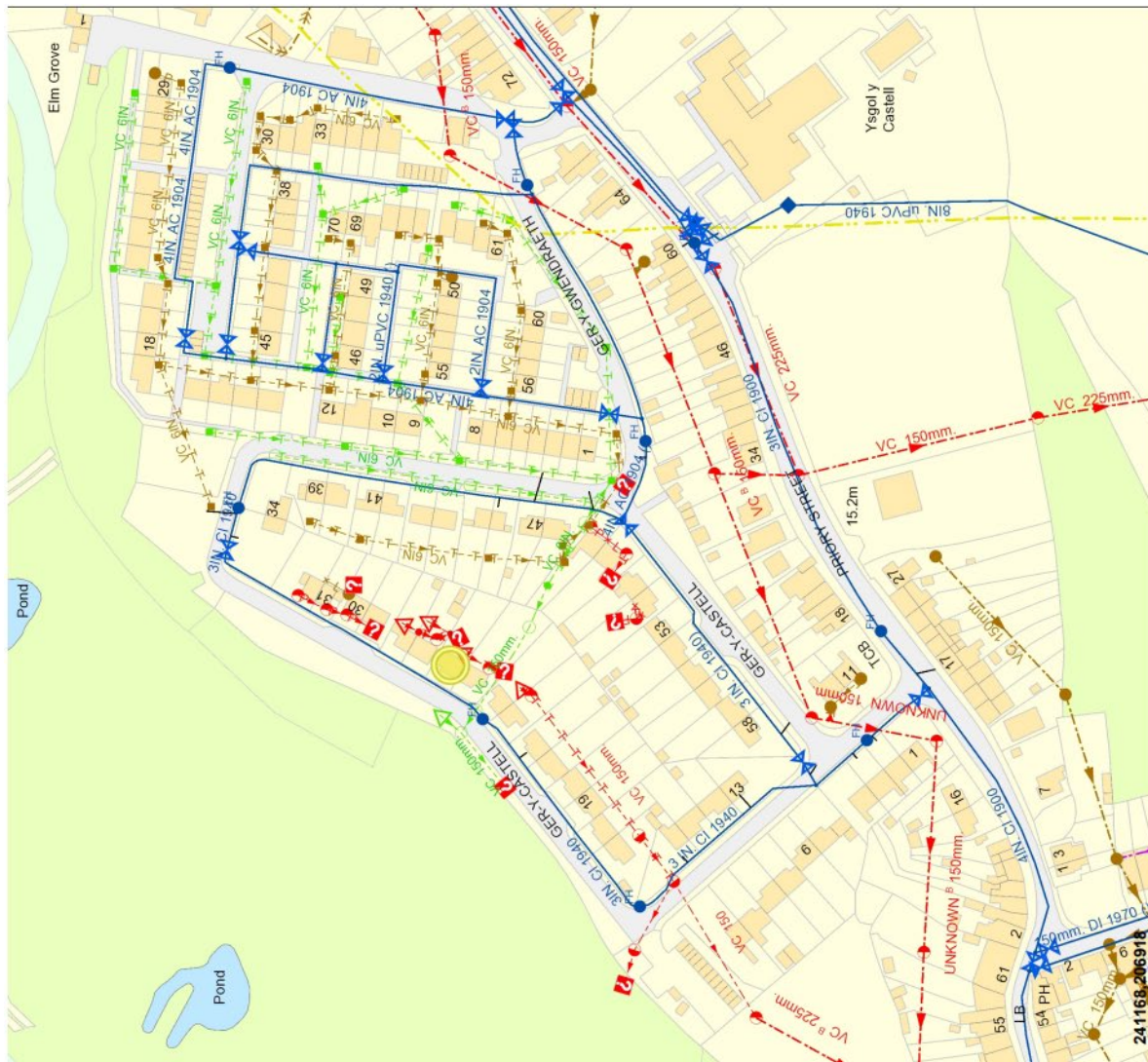
**EXACT LOCATION OF ALL APPARATUS TO BE DETERMINED ON SITE**

**Dwr Cymru**  
Welsh Water





Appendix F – DCWW drainage Map for Ger Y Castell.



Whilst every reasonable effort has been taken to correctly identify the location of the underground apparatus, it is not possible to guarantee that in some cases pipe material (other than Asbestos cement or Pitch Fibre (PF)) may be found to be asbestos cement (AC) or Pitch Fibre (PF). It is therefore advisable that the possible presence of AC or PF pipes be anticipated and considered as part of any risk assessment prior to excavation.

Dwr Cymru Cyfyngedig (the Company) gives this information as to the position of its underground apparatus by way of general information only. It is not intended to be used as a basis for the best information available and no warranty as to its correctness is relied upon in the event of excavations or other works made in the vicinity of the company's apparatus and other apparatus located in the vicinity of the company's apparatus and other apparatus located in the vicinity of the company's apparatus and other apparatus located in the vicinity of the company's apparatus. The Company is not liable for any damage or loss arising from the use of this information.

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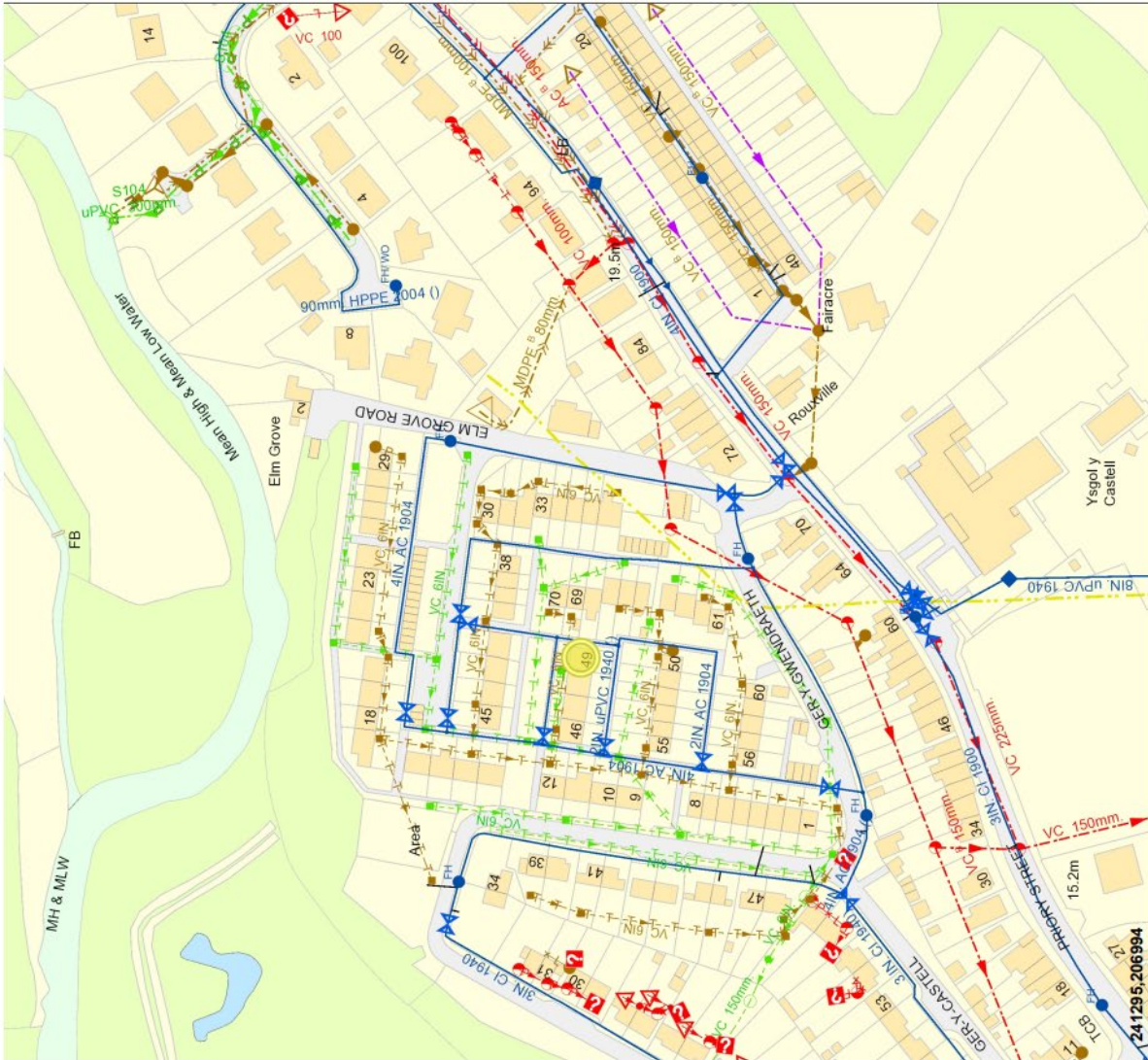
EXACT LOCATION OF ALL APPARATUS TO BE DETERMINED ON SITE

- LEGEND**
- Greenly Sewer
  - Blue Sluice Valve
  - Blue Air Valve SINGLE
  - Blue X T80
  - Blue Pressure Reducing Valve
  - Green Ringing Main
  - Green Outfall
  - Green Pumping Station
  - Green Lamppole

Appendix F – DCWW drainage Map for Ger Y Castell



Appendix G – DCWW drainage map for Ger Y Gwendraeth.



Whilst every reasonable effort has been taken to correctly record the pipe material of DCWW assets, there is a possibility that in some cases pipe materials (other than Adequately Corroded Cast Iron (ACI), Polypropylene (PP), Polyethylene (PE), Polyethylene Glycol (PEGL), Pitch Fibre (PF), It is therefore advisable that the possible presence of AC or PF pipes be anticipated and considered as part of any risk assessment prior to excavation.

Dwr Cymru Cynhyddig (the Company) gives this information as to the position of its underground apparatus by way of general guidance only and on the strict understanding that it is based on the best information available and not warranted as to its accuracy. The Company is not responsible for any other works made in the vicinity of the company's apparatus and any onus of locating the apparatus before carrying out any excavations rests entirely on you. The information which is

Scale: 1:1753  
08/06/2022

**Appendix G – DCWW drainage map for Ger Y Gwendraeth**

- LEGEND**
- Gravelly Sewer
  - 8" Sulock Valve
  - 4" Air Valve SINGLE
  - Top Pressure Reducing Valve
  - Gravelly Sewer
  - Rising Main
  - Outfall
  - Pumping Station
  - Lamphole

**EXACT LOCATION OF ALL APPARATUS TO BE DETERMINED ON SITE**



Appendix H – Highway Gully Maintenance records for Kidwelly (2015-2021).



Gully Cleansing -  
Kidwelly area.PDF

*Figure 46* [Link to Highway Gully Maintenance records for Kidwelly PDF](#)