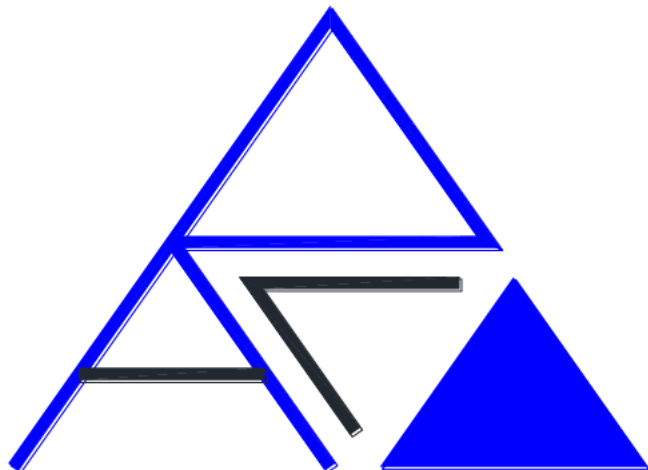


**DRAINAGE STRATEGY REPORT**  
**RESIDENTIAL DEVELOPMENT ON**  
**LAND SOUTH OF CWMGARW ROAD**  
**BRYNAMMAN**  
**CARMARTHENSHIRE**  
**SA18 1DA**  
**JOB No.: 17689**

**VERSION 02**

**Roger Casey Associates**  
Consulting Civil & Structural Engineers

[Redacted]  
Tel: [Redacted]  
[Redacted]  
Tel: [Redacted]  
Email: [Redacted]  
Website: <http://www.rca-eng.co.uk>



**DRAINAGE STRATEGY REPORT**

**FOR**

**RESIDENTIAL DEVELOPMENT ON**

**LAND SOUTH OF CWMGARW  
ROAD**

**BRYNAMMAN**

**CARMARTHENSHIRE**

**SA18 1DA**

Job No.: 17689

Prepared By:	Date:
[REDACTED]	September 2020
C	Date:
[REDACTED]	September 2020
Approved By:	Date:
[REDACTED]	September 2020



**Roger Casey Associates**

Consulting Civil & Structural Engineers

Tel: [REDACTED]  
Fax: [REDACTED]  
Email: [REDACTED]

**DOCUMENT REVISION RECORD**

Version	Description	Date	Originator	Approver
01	Draft	24/08/2012	PWJL	RC
02	Update	02/09/2020	PWJL	RC

**CONTENTS**

1.0	Introduction
2.0	Site Description and Topography
3.0	Flood Risk
4.0	Existing Drainage and Site Investigations
5.0	Proposed Drainage Strategy and Summary
Appendix A	- Local Development Plan Extract
Appendix B	- Dwr Cymru Welsh Water Pre-Planning Enquiry Response
Appendix C	- Site Survey Plan
Appendix D	- Natural Resources Wales Flood Risk Map and Welsh Government TAN 15 Development Advice Map
Appendix E	- Drainage Strategy Site Plan

## **1.0 INTRODUCTION**

Roger Casey Associates have been commissioned to undertake a Drainage Study on 19 June 2012 by Asbri Planning acting upon the instructions of the Mrs Helen Wright and Mrs Catherine Dydlyke.

The purpose of the Drainage Study is to determine a suitable drainage strategy for the disposal of foul and surface water flows arising from a proposed residential development at the presently greenfield land. The study will in turn demonstrate whether the site is deliverable from the drainage perspective in order to secure Outline Planning Permission. It is understood that a possible 30 to 35 dwellings could be constructed at the site location.

This study has been produced solely for the use of the Ms Helen Wright, Ms Gloria Searles, Asbri Planning and Carmarthenshire County Council and shall not be assigned to or relied upon by others without the expressed written permission of Roger Casey Associates.

This report may not be used for any purpose other than that which it was commissioned.

This report may not be reproduced and/or made public by print, photocopy, microfilm, or any other means without the prior written permission of Roger Casey Associates.

The conclusions resulting from this study and contained within this report are not necessarily indicative of future conditions or operating practices at or adjacent to the site.

When final scheme proposals are prepared further consultation with all the Statutory Utility Companies will be required together with detailed design. It should be noted that with time other developments may come online and this may alter the available service capacity referred to in this study.

The National Grid Reference of the approximate centre point of the proposed development site is SN 71588 14184, Easting 271588, Northing 214184.

## **2.0 SITE CONDITIONS AND TOPOGRAPHY**

The site is broadly rectangular in shape on plan, located on the southern side of Cwmgarw Road. The land is accessed between existing dwellings constructed alongside Cwmgarw Road. Remaining allocated LDP land is located to the west, with greenfield areas to south and east.

A copy of the site location plan is included in Appendix A.

The land rises in a fairly uniform gradient away from a low spot in the south to a higher elevation along the northern boundary.

A copy of the topographical site survey is included in Appendix C.

### **3.0 FLOOD RISK**

The proposed use of the site, residential, will classify the risk as being a 'Highly Vulnerable Development' (TAN 15, Figure 2). However, in accordance with Natural Resources Wales Flood and Welsh Government TAN 15 Development Advice Maps the site is located within an area designated being Flood Zone A.

A copy of the proposed architectural site plan is included in Appendix C.

In accordance with guidance contained within TAN 15, Figure 1, further flood risks and justification tests are not required to sites located within Zone A and sound drainage design incorporating aspects of Sustainable Urban Drainage Systems (SuDS) is applicable to the development.

National Resources Wales Flood Risk Map and Welsh Government TAN 15 Development Advice Map are included in Appendix D.

Planning Policy and Technical Advice Note (TAN) 15 lists six sources of flooding which need to be considered in the assessment of flood risk and the probability of flooding at the Site Location.

#### Flooding from Rivers or Fluvial

Not applicable due to Site Location and demonstrated on Flood Map in Appendix D.

#### Flooding from the Sea or Tidal Flooding

Not applicable due to Site Location and demonstrated on Flood Map in Appendix D.

#### Flooding from Land

Not applicable due to surface water management within the proposed drainage strategy leading to detail design. Proposed external ground formation/levels must form appropriate informal overland flow routes within the landscaping and external area design to safely transfer any flood water away from the proposed buildings and any other existing premises.

#### Flooding from Groundwater

Based on site investigation work by Quantum Geotechnical on 19 and 20 July 2007, groundwater was encountered at 2 to 2.2 metres below existing ground level. If groundwater is struck during further site investigations and/or excavations, suitable measures shall be undertaken to protect proposed and existing premises from this potential flood risk from this source.

### **3.0 FLOOD RISK (Continued)**

#### Flooding from Sewers

Not applicable due to foul and surface water management within drainage design. Notwithstanding blockage or catastrophic failure of drainage systems upstream of development site resulting in overland flows not being contained within kerb upstand heights, surface gradients, etc.

Floor levels will be kept above the level of the relevant adjacent existing access road.

#### Flooding from Reservoirs, Canals and Other Artificial Sources

Not applicable due to Site Location and demonstrated on Flood Map in Appendix D.

#### **4.0 EXISTING DRAINAGE AND SITE INVESTIGATIONS**

##### Foul Water Drainage

A Pre-Planning Application (PPA) was submitted to Dwr Cymru Welsh Water Developer Services on 7 January 2020 to confirm whether sufficient capacity existed within the Public Sewerage Network and Sewage Treatment Systems to accommodate the proposed residential development.

Dwr Cymru Welsh Water Developer Services confirmed by their letter dated 23 January 2020 that the foul water sewerage network and treatment works infrastructure has sufficient capacity to cater for the proposed development to connect foul water only flows to the existing public combined water sewer located in Cwmgarw Road. This proposed connection route could also accommodate the diversion of the existing combined sewer which crosses the development site.

A copy of the Dwr Cymru Welsh Water Developer Services response is included in Appendix B.

The existing combined public sewer in Cwmgarw Road is to the north of the proposed development site; this is also the highest part of the site. Therefore, foul water flows from proposed dwellings constructed will require pumping of flows to communicate with the Cwmgarw Road public sewer.

To avoid the need for pumping of the foul water flows there is an option to connect to the existing public sewer located to the south of the development site. To communicate with this public sewer would require entry into third party land by agreement or alternatively requisition of a sewer connection from Dwr Cymru Welsh Water. Confirmation of this option is also contained in Appendix B.

Dwr Cymru Welsh Water Developer Services advised that surface water flows from the proposed development would have to be disposed of separately. The options for surface water disposal would be infiltration, watercourse or sewer (when the two former options are not practicable). These are discussed in below.

##### Surface Water Drainage

On 7 January 2019, the Welsh Government implemented Schedule 3 of the Flood and Water Management Act (2010). The new mandatory regulations make the incorporation of sustainable drainage systems (SuDS) compulsory in new developments in order to help reduce flood risk and improve water quality. SuDS on new developments must be designed and built in accordance with the Statutory SuDS Standards published by the Welsh Ministers. Schemes must be approved by the Local Authority acting in the role of SuDS Approving Body (SAB) before construction begins.

For the purposes of this Drainage Strategy Report to support an outline planning application, only the surface water runoff destination will be discussed to provide evidence to the LPA that a surface water drainage scheme on this site is achievable.



#### 4.0 **EXISTING DRAINAGE AND SITE INVESTIGATIONS (Continued)**

With reference to Standard S1 of the Statutory Sustainable Drainage Systems Standards, surface water runoff destination is considered in five priority levels:

Priority Level	Flow Destination
1	Surface water run-off is collected for use;
2	Surface water runoff is infiltrated to ground;
3	Surface water runoff is discharged to a surface water body;
4	Surface water runoff is discharged to a surface water sewer, highway drainage, or another drainage system;
5	Surface water runoff is discharged to a combined sewer.

Following investigations and in response to each of the Priority Levels:

1. Rainwater butt(s) will be provided to each dwelling to assist in recycling of rainwater for irrigation, car washing and other uses external of the dwelling. At this stage it is not envisaged to install underground pumped rainwater harvesting tank(s).
2. Quantum Geotechnical undertook intrusive site investigations on 19 and 20 July 2007. Trial holes revealed variable thickness of soft, wet topsoil and marsh grass predominantly underlain by a semi-cohesive silt/ clay band. This in turn rests upon comparatively uniform strata of mainly granular material. Groundwater seepages were present at 2 to 2.2 m depth below existing ground levels – although these could be perched. There are a number of land drainage channels on site which convey surface water run-off from the land into the River Amman to the south.

Based on the ground conditions revealed by the site investigations, possible past mining activities and also the possibility of washing fines out of the underlying granular materials by concentrating surface water infiltration at soakaway locations we recommend that infiltration is not utilised at this site on a plot by plot basis. Quantum are supportive of infiltration to the southern area of the site as quoted below:

*'The use of a soakaway system or SUDS (Sustainable Urban Drainage Systems) may be employed to deal with surface waters generated from the new development. Consideration should be given to this 'sterile' area being used as a focal drainage point for a soakaway system, which could ultimately drain into the lower lying River Amman. However, this would require consultation with both the Environment Agency and Welsh Water in addition to the Local Planning Authority.'*

#### **4.0 EXISTING DRAINAGE AND SITE INVESTIGATIONS (Continued)**

Therefore, we recommend that the surface water run-off is piped from all impermeable surfaces to an open basin located in the southern site area with an attenuated discharge into the onsite Land Drainage Channel which ultimately discharges into the River Amman. The open basin will not be lined and as a result there will be the opportunity given for surface water run-off flow to infiltrate in this area when climatic/ground conditions allow located safely away from proposed dwellings.

3. As mentioned above, there are existing land drainage trenches located across the site to deal with run-off from the currently undeveloped site.

The land drainage trenches form a network which exits the southern boundary into adjoining land before reaching the River Amman.

It is proposed that surface water flows arising from the proposed development would be discharged, by gravity, into a new open basin with an attenuated discharge into the existing land drainage network. The discharge flow rate would be regulated to a greenfield run-off rate equivalent.

The topography of the field also lends itself to a gravity discharge of surface water into the land drainage trenches along the southern site boundary.

4. Not considered further due to available surface water drainage destination at Priority Level 3.
5. Not considered further due to available surface water drainage destination at Priority Level 3.

## 5.0 PROPOSED DRAINAGE STRATEGY AND SUMMARY

Following consideration of the available surface water destination, it is envisaged the following SuDS features could be incorporated into the final development site to meet Welsh Government SuDS Standards:

- Shallow dry swale adjacent to the proposed carriageway and footpath corridors.
- Rainwater butts on plot.
- Drives and parking areas laid in permeable surfaces.
- On plot rain gardens which could be above ground in some instances.
- Control of final surface water discharge from site to existing watercourse.

The site will be served by separate foul and surface water drainage systems discharging as follows based on existing drainage and site investigations outlined above (refer to Appendix E for the proposed Drainage Strategy Site Plan).

### Foul Water Drainage

All foul water drainage flows will be collected from the proposed development via a new gravity sealed pipe system and connected into the existing public sewer system at one of the locations mentioned above.

Where the new foul water drainage system lies outside of the legal curtilage of the proposed dwellings it will need to be adopted by Dwr Cymru Welsh Water under a Water Industry Act Section 104 Adoption Agreement between DCWW and the Developer.

Connection to the public sewer will be subject to a Water Industry Act 1991 Section 106 application and will take the form of either a new chamber or the use of an existing chamber which will be determined at detailed design stage.

### Surface Water Drainage

The proposed development's surface water drainage will have to comply with Welsh Government Statutory standards for sustainable drainage systems. These Standards are enforced by Carmarthenshire County Council acting as the Sustainable urban Drainage System Approving Body (SAB).

As part of the detail design the surface water runoff destination, surface water runoff hydraulic control, water quality, amenity, biodiversity and design of drainage for construction, operation and maintenance must be considered. These are referred to as Standards S1 to S6. At this outline planning stage only standards S1 and S2 are being considered (surface water runoff destination and surface water runoff hydraulic control).

## 5.0 **PROPOSED DRAINAGE STRATEGY AND SUMMARY (Continued)**

SuDS measures will be provided on plot and as part of the estate road construction to address SuDS Standards S1 to S6. Due to the soil infiltration rates in the ground strata underlying the site, some final hydraulic control will be necessary prior to a discharge of surface water being made to the existing watercourse on the site's northern boundary.

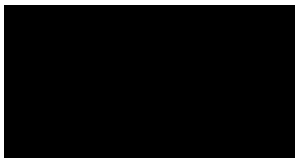
At this stage it is proposed that the final hydraulic control used would be the greenfield equivalent run-off rate for the area of surface drained by the SuDS network with storage accommodating the 6 hour 1:100 year return storm with +30% allowance for climate change.

Upstream of the hydraulic control, above ground storage will be provided. This may include an element of below ground storage. This would be determined as part of the detail surface water drainage design prepared for SAB Approval and approval of reserved matters planning.

We envisage that the carriageways and footpaths, surface water drainage, along with the street lighting will be Adopted by Carmarthenshire County Council (CCC) under a Highway Act Section 38 Agreement and SuDS Agreement between CCC and the Developer.

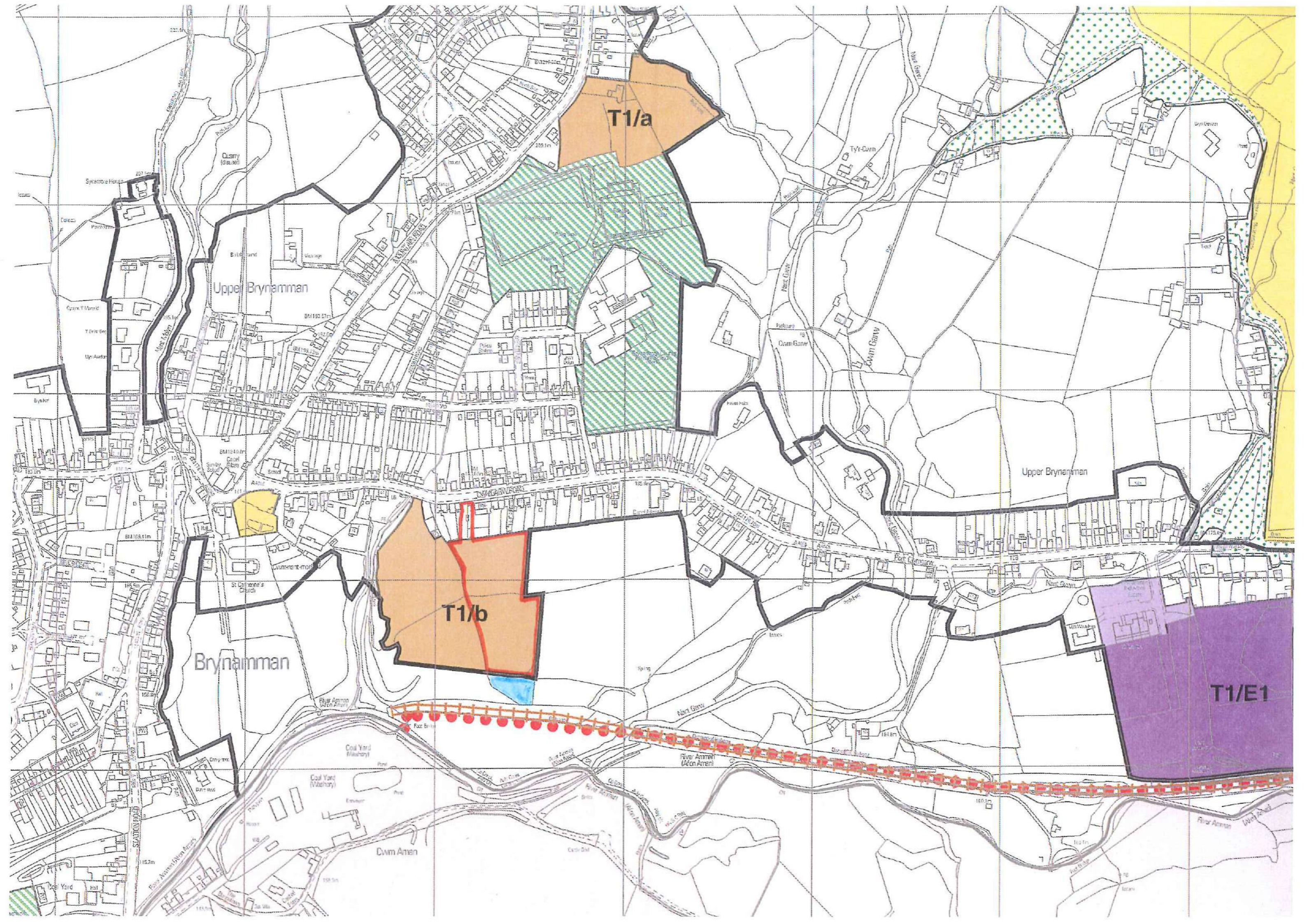
### Flooding

As noted in Section 3.0 the site is located in a low flood risk location considered by TAN 15.



**Philip Lawrence MCIHT GMICE**  
**Technical Director – Civil Engineering**  
**for Roger Casey Associates**

**APPENDIX A – LOCAL DEVELOPMENT PLAN EXTRACT**



T1/a

T1/b

T1/E1

Upper Brynamman

Brynamman

Upper Brynamman

Dwm Amman

Clarry (disused)

Ty'r-Dwn

St Catherine's Church

River Amman (Afon Amman)

Upper Brynamman

Coal Yard (Washery)

River Amman (Afon Amman)

STATION (19-20)

Coal Yard (Washery)

Spring

Nant Gwyn

Upper Brynamman

Coal Yard (Washery)

River Amman (Afon Amman)

River Amman (Afon Amman)

Coal Yard (Washery)

River Amman (Afon Amman)

River Amman (Afon Amman)

Coal Yard (Washery)

River Amman (Afon Amman)

River Amman (Afon Amman)

**APPENDIX B – DWR CYMRU WELSH WATER DEVELOPER SERVICES PRE-  
PLANNING ENQUIRY RESPONSE**

Mrs H Wight

[REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED]

**Date: 23/01/2020**  
**Our Ref: PPA0004578**

Dear Mrs Wight

**Grid Ref: 271670 214170**  
**Site Address: Land South of Cwmgarw Road, Brynamman**  
**Development: Residential**

I refer to your pre-planning enquiry received relating to the above site, seeking our views on the capacity of our network of assets and infrastructure to accommodate your proposed development. Having reviewed the details submitted I can provide the following comments which should be taken into account within any future planning application for the development.

### **APPRAISAL**

Firstly, we note that the proposal relates to a residential development of 65 dwellings at Land South of Cwmgarw Road, Brynamman, Carmarthenshire. Please note, notwithstanding the following assessment, we would advise there is also a mandatory requirement to undertake pre-application consultation with all 'Specialist Consultees', including Dwr Cymru Welsh Water as the statutory water and sewerage undertaker, in accordance with Schedule 4 of Town & Country Planning (Development Management Procedure) (Wales) (Amendment) Order 2016. As a major development, amounting to more than 10 units, you will be statutorily required to consult Welsh Water and a substantive response will be issued within 28 days from the date of the notice as per the requirements of Article 2E.

### **Public Sewerage Network**

The proposed development site is located in the immediate vicinity of a combined public sewerage system which drains to Garnswllt Wastewater Treatment Works (WwTW).

This site is crossed by a public sewer with the approximate position being marked on the attached Statutory Public Sewer Record. In accordance with the Water Industry Act 1991, Dwr Cymru Welsh Water requires access to its apparatus at all times in order to carry out maintenance and repairs.



No part of any building will be permitted within the protection zone of the public sewers measured 3 metres either side of the centreline. Our strong recommendation is that your site layout takes into account the location of the assets crossing the site and should be referred to in any master-planning exercises or site layout plans submitted as part of any subsequent planning application. Further information regarding Asset Protection is provided in the attached Advice & Guidance note.

You are also advised that some public sewers and lateral drains may not be recorded on our maps of public sewers because they were originally privately owned and were transferred into public ownership by nature of the Water Industry (Schemes for Adoption of Private Sewers) Regulations 2011. The presence of such assets may affect the proposal. In order to assist you may contact Dwr Cymru Welsh Water on 0800 085 3968 to establish the location and status of the apparatus in and around your site. Please be mindful that under the Water Industry Act 1991 Dwr Cymru Welsh Water has rights of access to its apparatus at all times.

### **Surface Water Drainage**

As of 7th January 2019, this proposed development is subject to Schedule 3 of the Flood and Water Management Act 2010. The development therefore requires approval of Sustainable Drainage Systems (SuDS) features, in accordance with the 'Statutory standards for sustainable drainage systems – designing, constructing, operating and maintaining surface water drainage systems'. As highlighted in these standards, the developer is required to explore and fully exhaust all surface water drainage options in accordance with a hierarchy which states that discharge to a combined sewer shall only be made as a last resort. Disposal should be made through the hierarchical approach, preferring infiltration and, where infiltration is not possible, disposal to a surface water drainage body in liaison with the Land Drainage Authority and/or Natural Resources Wales.

It is therefore recommended that the developer consult with Carmarthenshire County Council as the determining SuDS Approval Body (SAB), in relation to their proposals for SuDS features. Please note, DCWW is a statutory consultee to the SAB application process and will provide comments to any SuDS proposals by response to SAB consultation. Please refer to further detailed advice relating to surface water management included in our attached Advice & Guidance note.

In addition, please note that no highway or land drainage run-off will be permitted to discharge directly or indirectly into the public sewerage system.

### **Foul Water Drainage – Sewerage Network**

We have considered the impact of foul flows generated by the proposed development and concluded that flows can be accommodated within the public sewerage system. We advise that the flows should be connected to the combined sewer that is located in Heol Garw at or downstream of manhole SN711462020.



Should a planning application be submitted for this development we will seek to control these points of communication via appropriate planning conditions and therefore recommend that any drainage layout or strategy submitted as part of your application takes this into account. However, should you wish for an alternative connection point to be considered please provide further information to us in the form of a drainage strategy, preferably in advance of a planning application being submitted.

You may need to apply to Dwr Cymru Welsh Water for any connection to the public sewer under Section 106 of the Water Industry Act 1991. However, if the connection to the public sewer network is either via a lateral drain (i.e. a drain which extends beyond the connecting property boundary) or via a new sewer (i.e. serves more than one property), it is now a mandatory requirement to first enter into a Section 104 Adoption Agreement (Water Industry Act 1991). The design of the sewers and lateral drains must also conform to the Welsh Ministers Standards for Foul Sewers and Lateral Drains, and conform with the publication "Sewers for Adoption"- 7th Edition. Further information can be obtained via the Developer Services pages of [www.dwrcymru.com](http://www.dwrcymru.com).

### **Foul Water Drainage – Sewerage Treatment**

No problems are envisaged with the Waste Water Treatment Works for the treatment of domestic discharges from this site.

### **Potable Water Supply**

The proposed development is in an area where there are water supply problems for which there are no improvements planned within our current Capital Investment Programme AMP6 (years 2015 to 2020). In order to establish what would be required to serve the site with an adequate water supply, it will be necessary for the developer to fund the undertaking of a hydraulic modelling assessment on the water supply network. For the developer to obtain a quotation for the hydraulic modelling assessment, we will require a fee of £250 + VAT.

I trust the above information is helpful and will assist you in forming water and drainage strategies that should accompany any future planning application.

I also attach copies of our water and sewer extract plans for the area, and a copy of our Planning Guidance Note which provides further information on our approach to the planning process, making connections to our systems and ensuring any existing public assets or infrastructure located within new development sites are protected.

Please note that our response is based on the information provided in your enquiry and should the information change we reserve the right to make a new representation. Should you have any queries or wish to discuss any aspect of our response please do not hesitate to contact our dedicated team of planning officers, either on 0800 917 2652 or via email at [developer.services@dwrcymru.com](mailto:developer.services@dwrcymru.com)



Please quote our reference number in all communications and correspondence.

Yours faithfully,



**Owain George**  
**Planning Liaison Manager**  
**Developer Services**

***Please Note that demands upon the water and sewerage systems change continually; consequently the information given above should be regarded as reliable for a maximum period of 12 months from the date of this letter.***



Welsh Water is owned by Glas Cymru – a 'not-for-profit' company.  
Mae Dŵr Cymru yn eiddo i Glas Cymru – cwmni 'nid-er-elw'.

We welcome correspondence in  
Welsh and English

Dŵr Cymru Cyf, a limited company registered in  
Wales no 2366777. Registered office: Pentwyn Road,  
Nelson, Treharris, Mid Glamorgan CF46 6LY

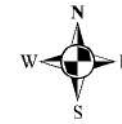
Rydym yn croesawu gohebiaeth yn y  
Gymraeg neu yn Saesneg

Dŵr Cymru Cyf, cwmni cyfyngedig wedi'i gofrestru yng  
Nghymru rhif 2366777. Swyddfa gofrestredig: Heol Pentwyn  
Nelson, Treharris, Morgannwg Ganol CF46 6LY.

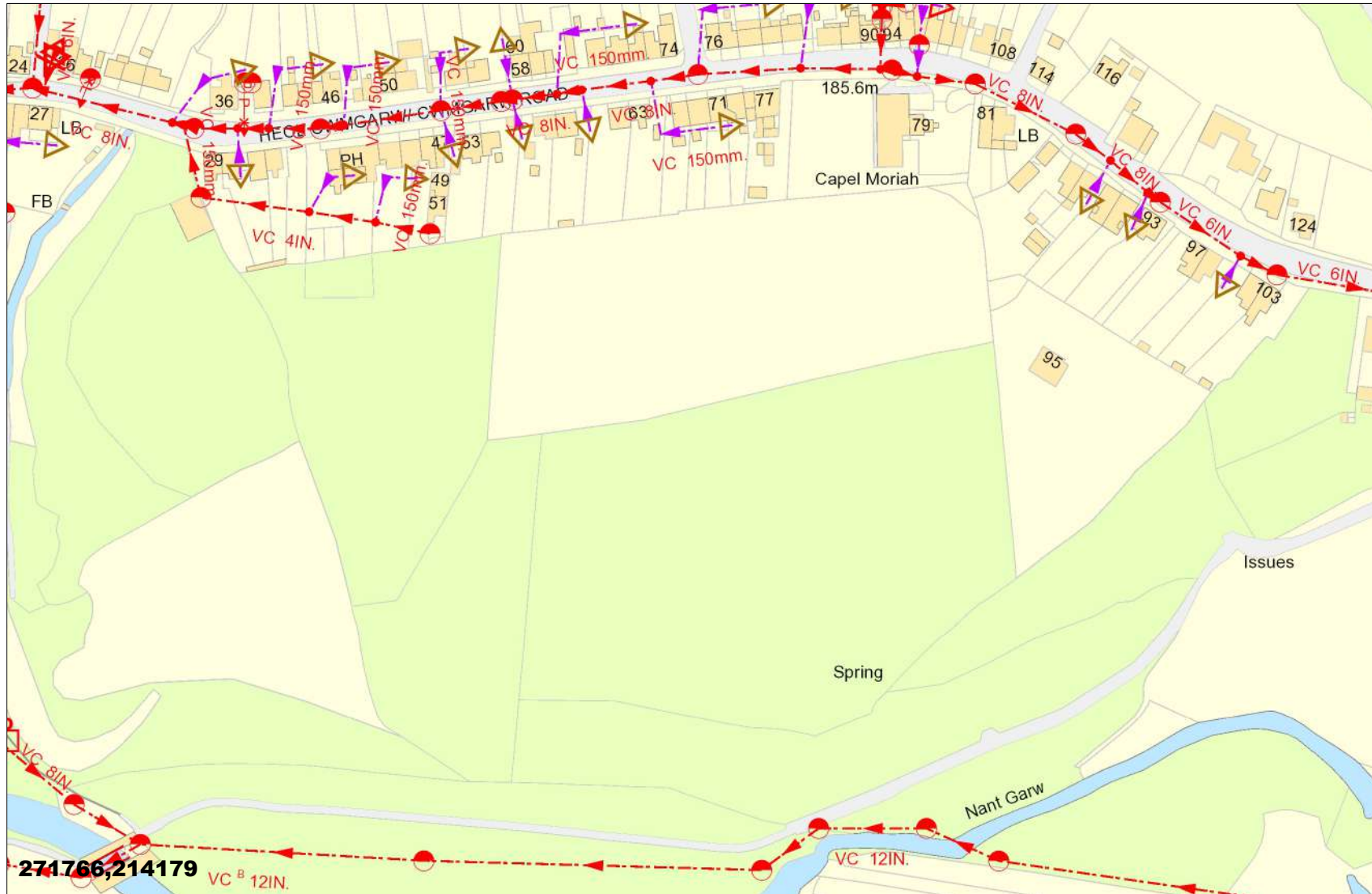


Dwr Cymru  
Welsh Water

20/02/2020



Scale: 1: 2071



**LEGEND**

**Clean Water**

- Sluice Val
- Air Val, SINGLE
- Tap
- Pressure Reducing Value
- Meter
- BULK Meter
- FH
- Cap
- Existing Main
- NON COMPANY

**Sewerage External**

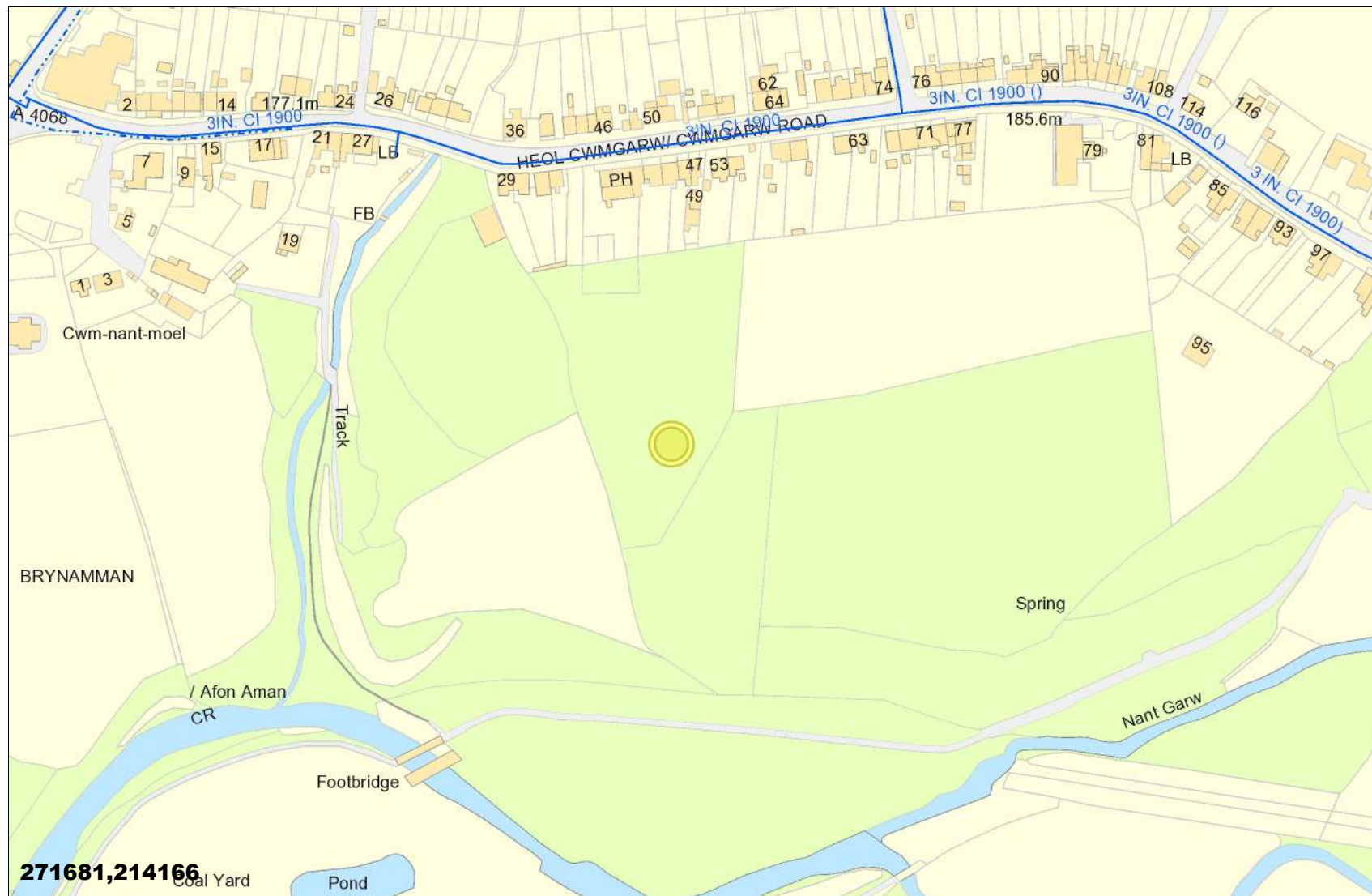
- Foul
- Surface Water
- Combined
- Rising Main
- Private
- Treatment Works
- Pumping Station
- Special Purpose
- Unknown End
- Change, Combined Overflow
- Outfall, FOUL
- Lamp Hole, Foul
- Private Sewer Transfer
- Lateral Drain
- Inspection Chamber

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 correctness is relied upon in the event of excavations or other works made in the vicinity of the company's apparatus. The onus of locating apparatus before carrying out any excavations rests entirely on you. The information which is supplied by the Company, is done so in accordance with statutory requirements of sections 198 and 199 of the Water Industry Act 1991 which is 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 water main, service pipe, sewer, lateral drain or disposal main and any associated apparatus 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**

Reproduced from the Ordnance Survey's maps with the permission of the Controller of Her Majesty's Stationary Office. Crown Copyright. Licence No: WU298565.

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 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 anticipated and considered as part of any risk assessment prior to excavation



**LEGEND**

**Clean Water**

-  Sluice Val
-  Air Val, SINGLE
-  Tap
-  Pressure Reducing Valve
-  Meter
-  BULK Meter
-  FH
-  Cap
-  Existing Main
-  NON COMPANY

**Sewerage External**

-  Foul
-  Surface Water
-  Combined
-  Rising Main
-  Private
-  Treatment Works
-  Pumping Station
-  Special Purpose
-  Unknown End
-  Change, Combined Overflow
-  Outfall, FOUL
-  Lamp Hole, Foul
-  Private Sewer Transfer
-  Lateral Drain
-  Inspection Chamber

271681,214166

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 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 by 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.

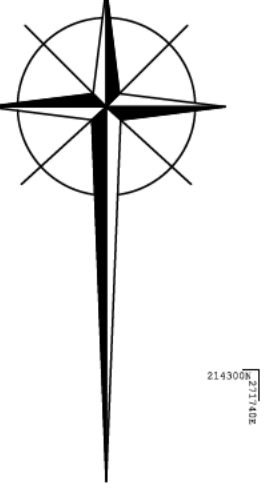
**EXACT LOCATION OF ALL APPARATUS TO BE DETERMINED ON SITE**

Reproduced from the Ordnance Survey's maps with the permission of the Controller of Her Majesty's Stationary Office. Crown Copyright. Licence No: WU298565.

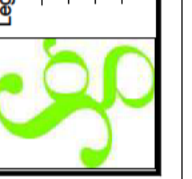
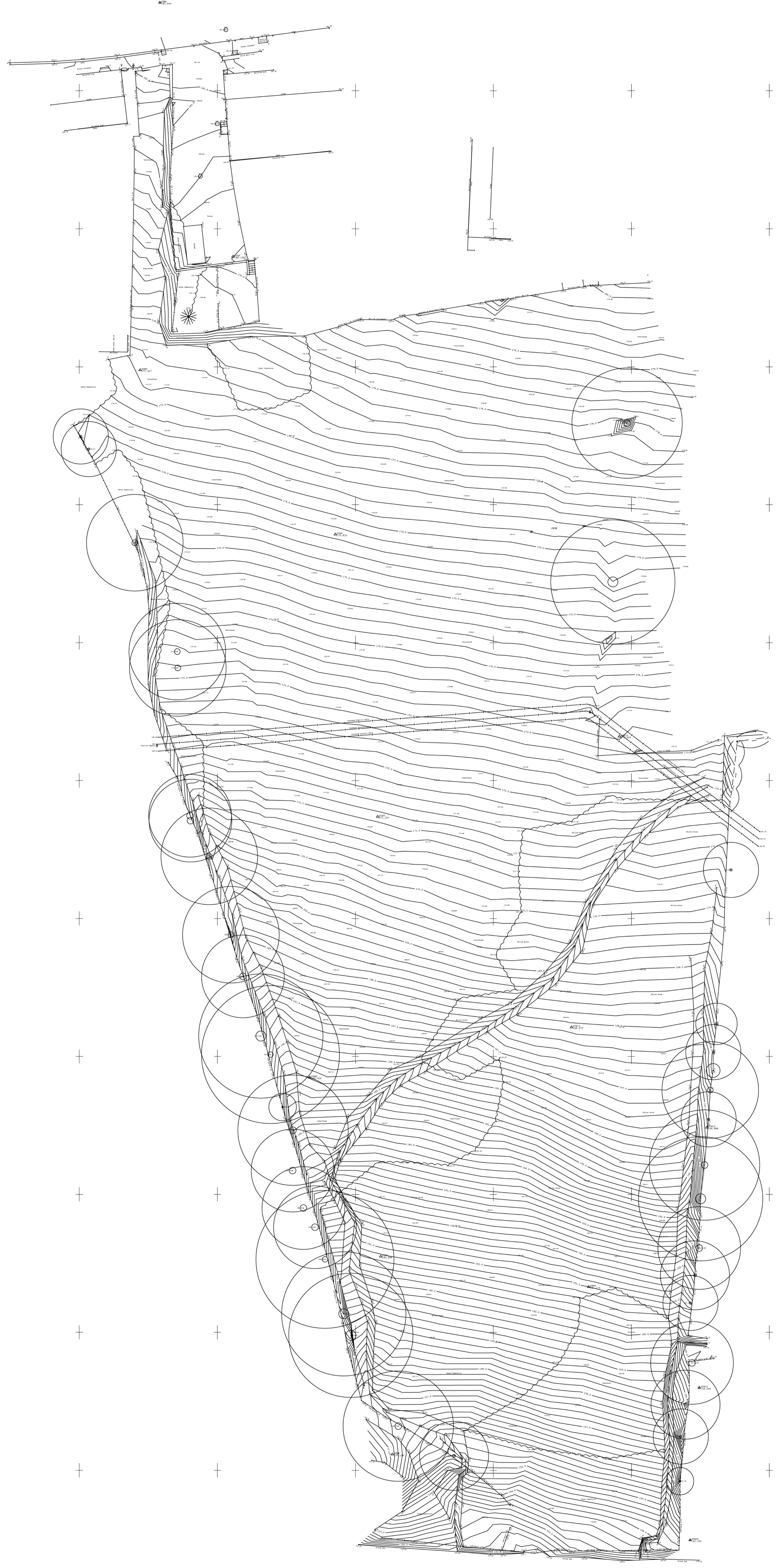
Whilst every reasonable effort has been taken to correctly record the pipe material of DCWW assets, there is a possibility that in some cases pipe material (other than Asbestos Cement or Pitch Fibre) may be found to be Asbestos Cement (AC) or Pitch Fibre (PF). It is therefore advisable that the possible presence of AC or PF pipes be anticipated and considered as part of any risk assessment prior to excavation

**APPENDIX C – SITE SURVEY PLAN**

NORTH Approx.



Scale	1:200 @ A3	Scale	O.S.
Date	20/07/12	Date	O.S.
Project	Topographical Survey	Project	Topographical Survey
Client	Mr. B. K. K. K.	Client	Mr. B. K. K. K.
Sheet	1 of 1	Sheet	1 of 1
Drawn	B. K. K. K.	Drawn	B. K. K. K.
Checked	B. K. K. K.	Checked	B. K. K. K.
Project No.	123456789	Project No.	123456789
Client No.	987654321	Client No.	987654321

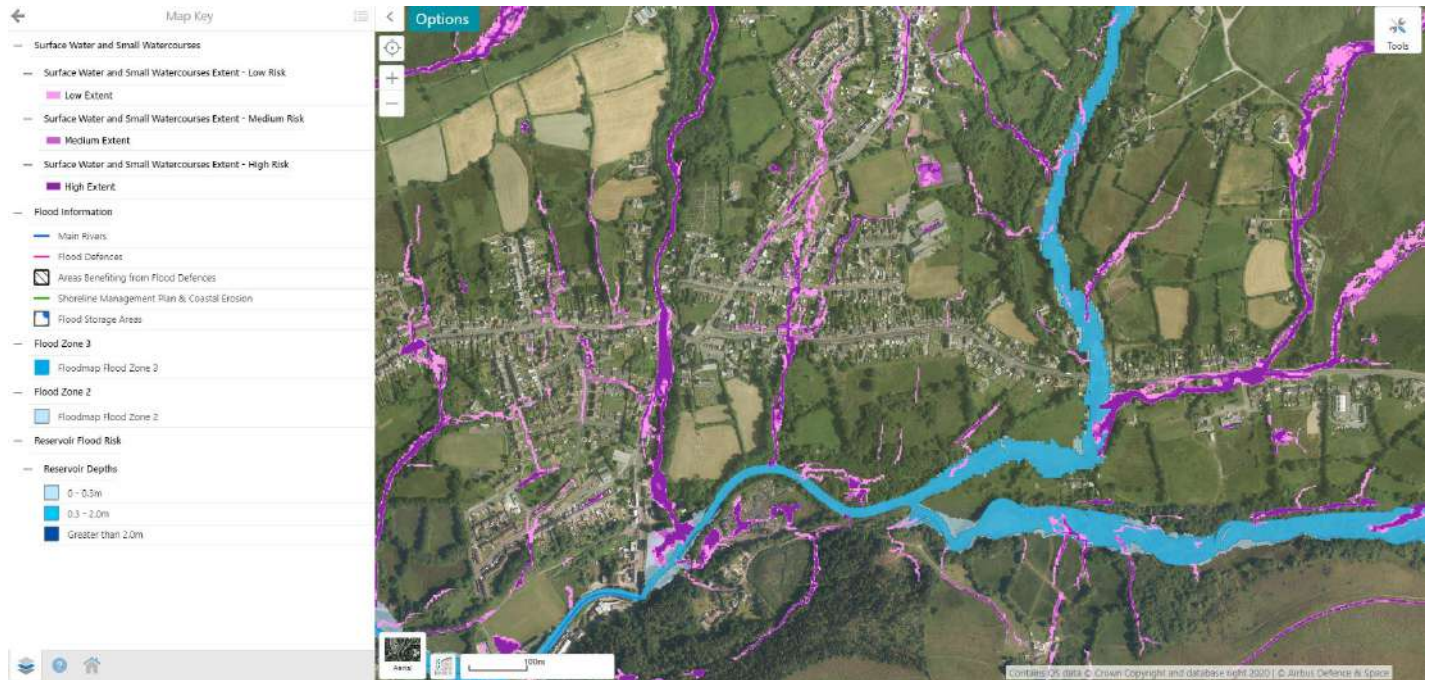


**APPENDIX D – NATURAL RESOURCES WALES FLOOD RISK MAP AND  
WELSH GOVERNMENT TAN 15 DEVELOPMENT ADVICE MAP**

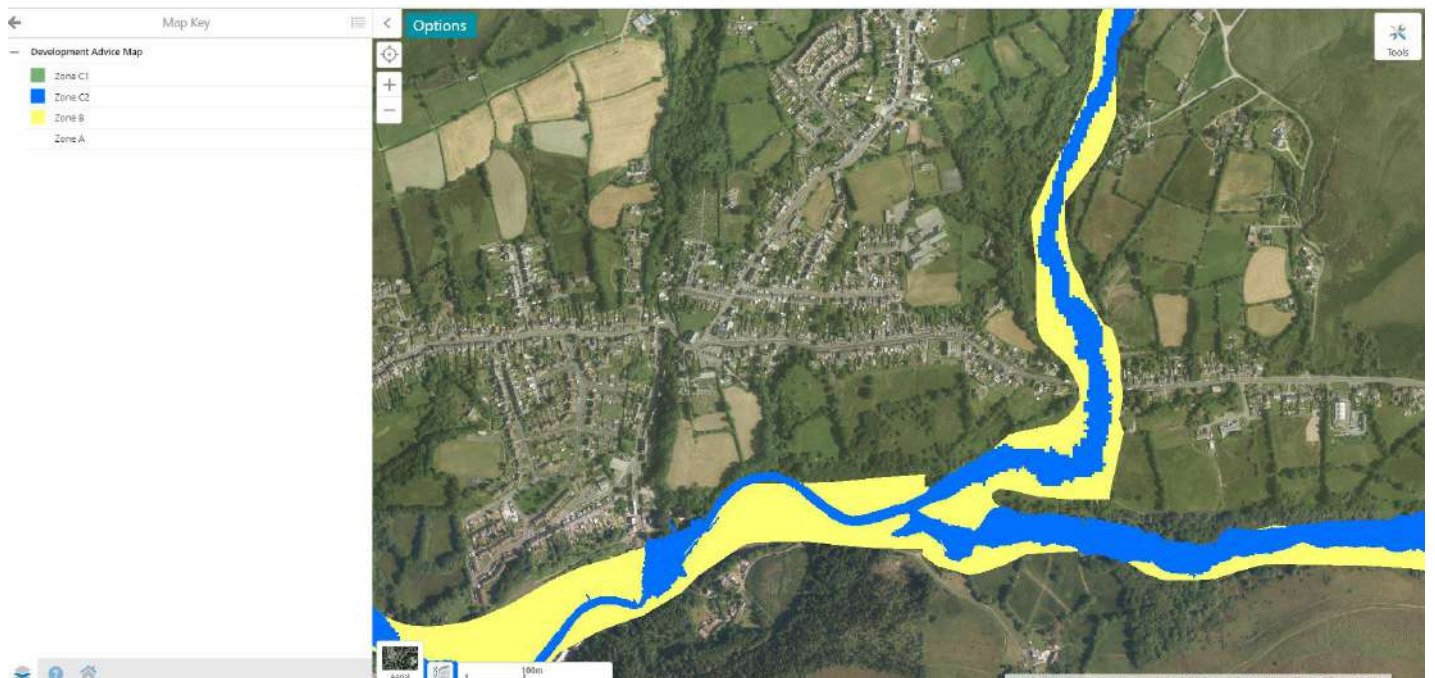


# 17689 – Residential Development off Cwmgarw Road, Brynamman, Carmarthenshire SA18 1DA

## NRW Flood Map:

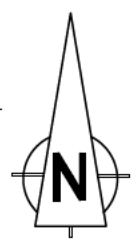


## WG Development Advice Map:

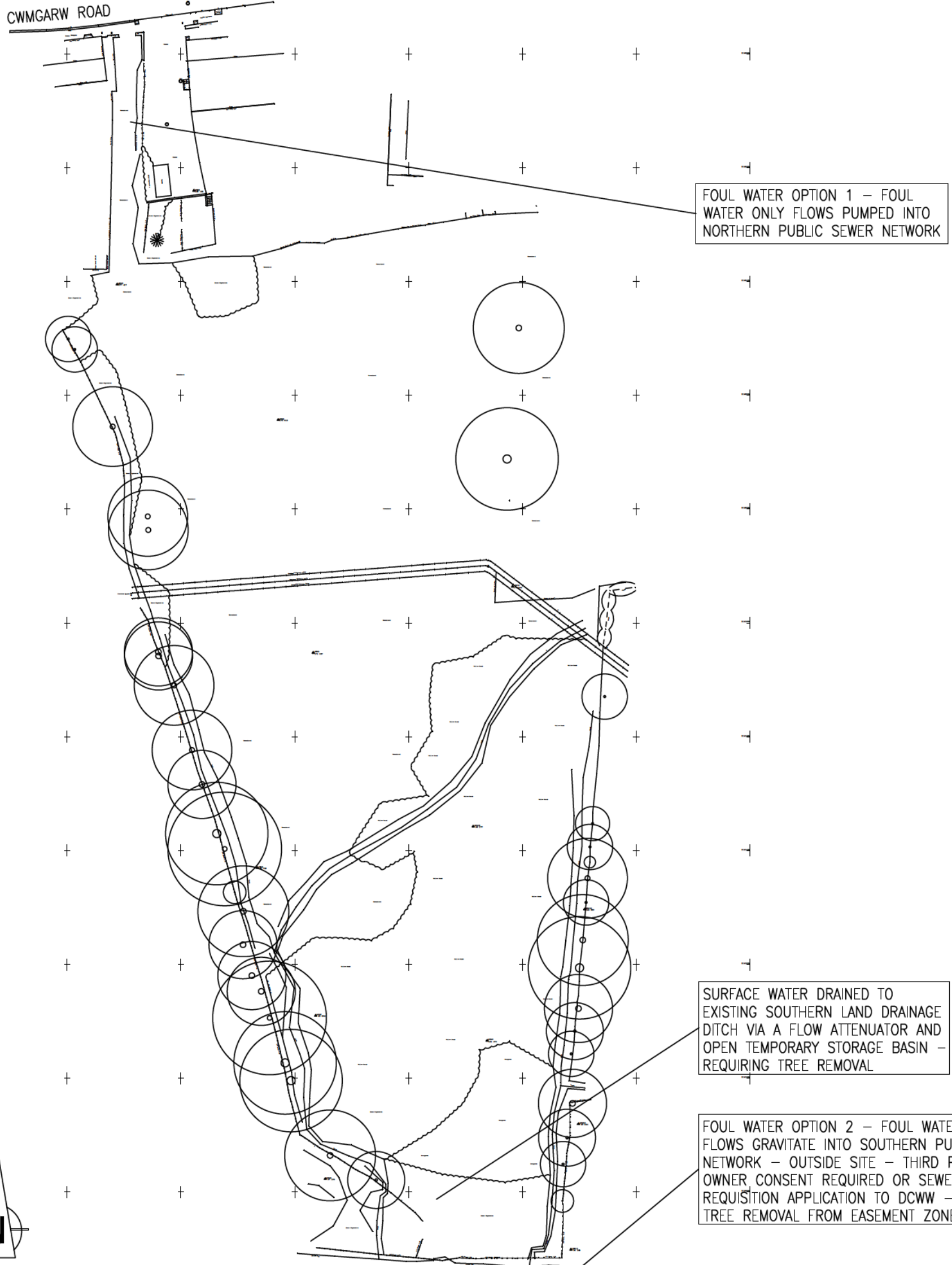


**APPENDIX E – DRAINAGE STRATEGY SITE PLAN**

**DO NOT SCALE**



CWMGARW ROAD



FOUL WATER OPTION 1 – FOUL WATER ONLY FLOWS PUMPED INTO NORTHERN PUBLIC SEWER NETWORK

SURFACE WATER DRAINED TO EXISTING SOUTHERN LAND DRAINAGE DITCH VIA A FLOW ATTENUATOR AND OPEN TEMPORARY STORAGE BASIN – REQUIRING TREE REMOVAL

FOUL WATER OPTION 2 – FOUL WATER ONLY FLOWS GRAVITATE INTO SOUTHERN PUBLIC SEWER NETWORK – OUTSIDE SITE – THIRD PARTY LAND OWNER CONSENT REQUIRED OR SEWER REQUISITION APPLICATION TO DCWW – REQUIRING TREE REMOVAL FROM EASEMENT ZONE

**NOTES:**

THE PROPERTY OF THIS DRAWING AND DESIGN IS VESTED IN ROGER CASEY ASSOCIATES AND MUST NOT BE COPIED OR REPRODUCED IN ANY WAY WITHOUT THE WRITTEN CONSENT OF ROGER CASEY ASSOCIATES.  
 THE CONTRACTOR IS TO CHECK ALL LEVELS AND DIMENSIONS BEFORE WORK COMMENCES, AND ANY DISCREPANCIES TO BE REPORTED IMMEDIATELY TO THE CONSULTANTS.  
 WORK TO FIGURED DIMENSIONS IN PREFERENCE TO SCALING.  
 THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER ROGER CASEY ASSOCIATES DRAWINGS AND SPECIFICATIONS AND ALL OTHER CONSULTANTS DRAWINGS AND SPECIFICATIONS RELATING TO THIS PROJECT.

REV.	DESCRIPTION	DRAWN	CHECK	DATE



**Roger Casey Associates**  
 Consulting Civil & Structural Engineers  
 Ty Mansel 6 Mansel Street Carmarthen Carmarthenshire SA31 1PX  
 Tel: +44 (0) 1267 22 26 46  
 Fax: +44 (0) 1267 22 13 77  
 Email: office@rca-eng.co.uk

**CLIENT:**  
 Mrs HELEN WRIGHT  
 &  
 Mrs CATHERINE DYDLYKE

**PROJECT:**  
 RESIDENTIAL DEVELOPMENT TO  
 SOUTH OF CWMGARW ROAD,  
 BRYNAMMAN, CARMS.

**DRAWING TITLE:**  
 DRAINAGE STRATEGY PLAN

<b>DRAWN BY:</b> PWJL	<b>DESIGN BY:</b> PWJL	<b>CHECKED BY:</b> RSC	<b>DATE:</b> 24/08/12
<b>SCALES:</b> 1:750	<b>DRAWING No.:</b> 17689/SK1	<b>REVISION:</b>	

<b>DRAWING STATUS:</b> DRAINAGE STRATEGY
<b>ORIGINAL DRAWING A3</b>
© Roger Casey Associates Limited 2012