

# DRAINAGE STRATEGY REPORT

Proposed Residential Dwelling  
On Land at 70 Main Road,  
Crynant

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## 1.0 Introduction

### 1.1 Site Location

The site is located adjacent to number 70 on the Main Road in Crynant, in the county borough of Neath Port Talbot. The post code for the site is SA10 8NT (grid reference SN 79349 05187).

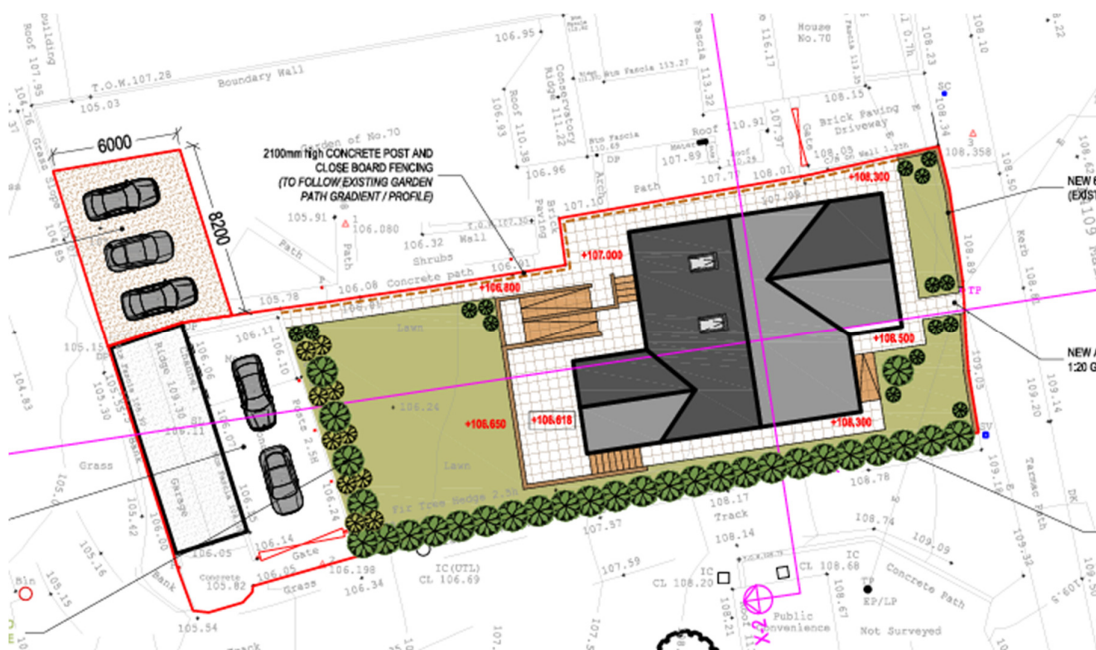
The site is currently used as a residential garden with paths and a large grassed area. The site slopes downhill from the public highway in the east to its boundary to the west. There is currently a parking area located to the west of the site that is used by the occupants of number 70 Main Road. A well-established hedgerow surrounds the East and South boundar.

The site is approximately 0.05 hectares in total, the map below shows the red line boundary of the site as well as a blue line boundary of the current land owners. See Appendix A for the topographical survey.



## 1.2 Proposal

The proposed development is to construct a detached residential property with open space and associated works including car parking, access, hard and soft landscaping and associated engineering building works. An extract of the development proposal is included below, and the full plan is included in Appendix B.



### 1.3 Geology

Land Soilscales websites define the ground conditions as “Slowly permeable wet very acid upland soils with a peaty surface”. Drainage is characterised as “Impeded drainage”. Based on the geology website, infiltration is not likely. As such on-site permeability testing was carried out to determine the actual infiltration rates. The results from the testing carried out in accordance BRE digest 365 has shown that infiltration is not possible. Please see the soakaway test report in Appendix E.

## 1.4 Existing Drainage

There is no existing surface water drainage on site, the site is currently used as a residential garden for the adjacent property. The site is predominantly greenfield but has some paths and minor hard standings.

Surface water mapping shows the site is predominantly at Very Low risk of flooding, please refer to the NRW surface water flood map in Appendix D.

Utility searches on site have indicated that there is a 150mm diameter (VC) Welsh Water sewer located to the west of the plot, this pipeline runs North to South outside the footprint of the proposed property (Appendix C). It is proposed that all foul effluent shall discharge to the sewer once a section 106 application is submitted and approved.

## 2.0 Surface Water Drainage Proposal

Using methods that mimic natural processes, by making use of the landscape and vegetation to control the flow, volume and quality of the surface water runoff. A SUDS design for the site shall be carried out to provide amenity benefits by providing aesthetically pleasing and natural landscapes, and biodiversity benefits by creating habitats for wildlife and vegetated areas. The drainage strategy for the site follows the standard structure given by Schedule 3 of the Flood and Water Management Act 2010, which in Wales is managed by the SuDS Approving Body (SAB) by local authorities. Since the 7th of January 2019, developments greater than 100m<sup>2</sup> or developments containing more than one building will be required to submit a SAB application. This application requires developers to utilise Sustainable Drainage Systems (SuDS) in their surface water management for the development.

The Welsh Government's Statutory Standards for Sustainable Drainage Systems contains six standards, which details the requirements for the surface water drainage. The standards are as follows:

S1. Runoff destination

S2. Hydraulic control

S3. Water quality

S4. Amenity

S5. Biodiversity

S6. Construction, operation and maintenance

It is proposed that the development will apply these standards in the following way.

### 2.1 Runoff destination

The Welsh Government's SuDS Standard S1 provides a discharge hierarchy for surface water from developments, as well as exemption criteria for each level that must be met before the next level can be considered. The discharge hierarchy is shown below:

Level 1: Surface water runoff is collected for use;

Level 2: Surface water runoff is infiltrated to ground;

Level 3: Surface water runoff is discharged to a surface water body;

Level 4: Surface water runoff is discharged to a surface water sewer, highway drain, or another drainage system;

Level 5: Surface water runoff is discharged to a combined sewer.

The aim of this is to encourage developments to use runoff as a resource and ensure that runoff is sustainably managed to avoid any negative impacts from the development, such as increased flood risk.

#### 2.1.1 Runoff destination

##### **Level 1 - Collected for Use**

Where possible every effort has been made to collect and reuse water, however the site is restricted in terms of the area available to construct/locate an underground rainwater harvesting system. Any proposed underground rainwater harvesting system would be extremely difficult to install within the footprint of the site, due to the close proximity of the neighbouring properties. The existing topography of the land slopes to the west and would prove difficult to achieve.

Considering the above physical constraints “The use of rainwater harvesting is not a viable/ cost-effective part of the solution for managing surface water runoff on the site, taking account of the potential water supply benefits of such a system.” Extract from paragraph G1.4 of the Suds national standards.

As part of the development it is proposed to use at least 1 rainwater butt to collect rainwater from either the roof gutter or the raised footpaths that are proposed around the property. This collected water will be used to water gardens and flowers when required.

As such a lower priority level will be sought to comply with standard S1.

##### **Level 2: Surface water runoff is infiltrated to ground.**

Permeability tests in accordance with BRE 365 were carried out on site by Cwm Planning & design. These tests determined the ground conditions of the site are not favourable for infiltration and infiltration cannot be used to effectively manage surface water on site.

As no infiltration can be achieved for the proposed development and surrounding footpaths a lower priority level will be sought to comply with standard S1.

Making use of the garden a series of shallow swales shall be constructed to capture and store water in the garden that generates from the pathways. The existing and proposed parking areas are proposed to be constructed from clean aggregate with no fines.

**Level 3:** Surface water runoff is discharged to a surface water body.

Not applicable, there are no watercourses near the development.

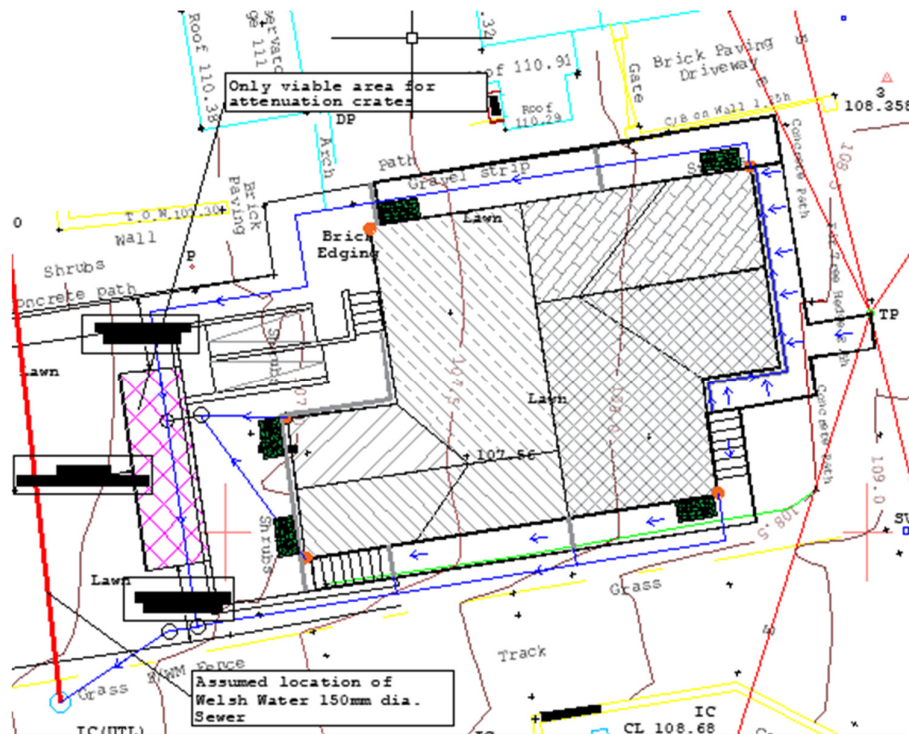
As such a lower priority level will be sought to comply with standard S1.

**Level 4:** Surface water runoff is discharged to a surface water sewer, highway drain, or another drainage system.

Given the site conditions mentioned above the next logical step is to discharge any surface water to the existing drainage system. The only significant drainage system available is the existing Welsh Water 150mm dia. foul sewer located to the west of the site.

It is proposed to collect and attenuate all surface water from the proposed development on site, utilising underground attenuation crates and then release this stored water at a controlled rate into the existing foul sewer pipe. The proposed dwelling will store the surface water in an attenuation storage crates located within the garden. It is assumed 8 crates shall be installed each 0.42m deep, 0.6m wide, 1.2m long with a combined storage area of 2.5m<sup>3</sup>. These attenuation crates shall be 4m away from the house foundations and 2.4m away from the boundary line of the site. The attenuation crates shall be wrapped with an impermeable membrane.

There is limited space available within the site due these physical constraints and only a small are is viable for attenuation storage.



The stored water in the attenuation crates will then discharge into the Welsh Water foul sewer at a controlled maximum rate of 2l/s via a network of underground pipes. Pending approval from Welsh Water. The attenuation crates shall be located 3m offset from the existing Welsh Water sewer.

**Level 5:** Surface water runoff is discharged to a combined sewer

The existing Welsh Water pipe within the property is not a combined sewer.

### 2.1.2 Hydraulic control

Hydraulic control for the site will primarily be provided by temporarily storing rainwater on site and allowing the water to discharge from the site at a controlled rate of 2l/s into the existing Welsh Water sewer. The proposal is to design systems to attenuate the surface water and then release it at a controlled rate. The volume of water to be stored has been calculated to attenuate flows for a 1 in 100-year event plus 40% climate change. The outlet from the attenuation crates shall be a small dia hole, size to be confirmed at detail design.

With regard to the water generated from the roof it is proposed that this water shall be collected using roof guttering and directed to down pipes. At the bottom of the downpipes there will be a raised rain gardens. It is assumed that these rain garden will be 1.2m long x 0.6m x 0.4m deep and are designed to store a 1:1 rainfall event. The use of rain gardens will allow significant amounts of runoff to be lost via natural processes such as infiltration, transpiration, or evapotranspiration. Once the rain garden has

reached capacity an overflow pipe will direct water to a sub-surface pipe network that will lead to an attenuation storage area (Geocellular crates). The underground pipe network shall be laid to a maximum gradient of 1:9 and no less than 1:150. Each geocellular crate shall have a void ratio of 95%.

#### 2.1.3 Water quality

The surface water generated from the roof and footways will all be filtered prior to being directed to the attenuation storage area. Where possible it is proposed to filter the surface more than once to remove any potential pollutants.

The roof water will enter a raised rain garden which will be located at the base of each down pipe, the rain garden will have bio retention soil that will remove suspended solids and fine silts before entering the underground pipe network. The underground pipe network will lead to a silt filtration manhole before entering the attenuation storage area. Once in the attenuation storage area the water will be temporarily stored in a cell before released into the proposed drainage network, thus offering additional opportunities for sediment to drop out.

The footpaths will capture surface water and direct it to swale located in the rear garden or will be captured via gullies and aco drains and directed to a silt filtration manhole before entering the attenuation storage area.

The proposed parking areas will be surfaced with type 3 aggregate that will have no fines. A permeable membrane shall be laid below this surface to act as a filter.

A simple index approach method will be undertaken as per the SUDS manual C753 (2015) for the roof water, footpaths and parking areas. This table for evaluating water quality has shown that these measures will meet water quality and create a betterment in water quality.

#### 2.1.4 Amenity

There is little potential to increase the amenity value of the development considering its size and the number of SUDS features available. However, the underground attenuation storage area has been designed in a such a way that it will not be visible on the surface, thus increase the available living space in the small garden area. As this feature is below the surface it allows the property owner the opportunity to use the rear garden for recreation and other social events. The proposed swales shall be constructed sympathetically to blend into the garden.

It is proposed to use raised rain gardens at all downpipe locations. These raised rain garden will be planted with a variety of plants that will improve the landscape and visual appearance of the garden. These rain gardens will promote and support flora and fauna and assist in improving the biodiversity of the site. The SUDS features proposed are

minimal, however these features can play an important role in maintaining mental and physical health and providing places for recreation and relaxation.

#### 2.1.5 Biodiversity

The use of a raised rain garden at all the down pipes is proposed as part of the biodiversity benefit of the site.

- The plants that are proposed to use are the following:
- Proposed Plats to be used in the rain garden
- Herbaceous perennial
- Yellow flag (*Iris pseudocorus*)
- Pendulous Sedge (*Carex pendula*)
- Water Mint (*Mentha aquatica*)
- Hemp agrimony (*Eupatorium cannabinum*)
- Ragged Robin (*Lychnis flos-cuculi*)

These plants are referenced from the RHS Plants for Pollinators or Rain Garden Fact Sheet.

#### 2.1.6 Construction, operation and maintenance

All construction plans will follow Ciria SuDS manual and CIRIA report C768 – Guidance on construction of SuDS. The design proposed is simple but effective for the scale and size of the development.

With the consideration of the works being in close proximity to boundary fences, neighbouring properties, the design takes into consideration the minimal space available and allowing the SUDS features to be as easy to maintain as possible.

The Drainage infrastructure will be constructed by the developer and maintained by the property owner, for the duration of its life. There is no proposal for the SAB to adopt any of these features.

A 'SUDS Management and Maintenance Plan' will be submitted detailing the types and frequency of maintenance required for the attenuation storage cells, rain garden and the open graded aggregate in accordance with Ciria C753.

### 3.0 Proposed Drainage Strategy

In accordance with SuDS Philosophy, surface water runoff should mimic the pre-development greenfield scenario as much as possible. This typically includes both the rate and destination of surface water run-off. Where possible every effort will be made to do this.

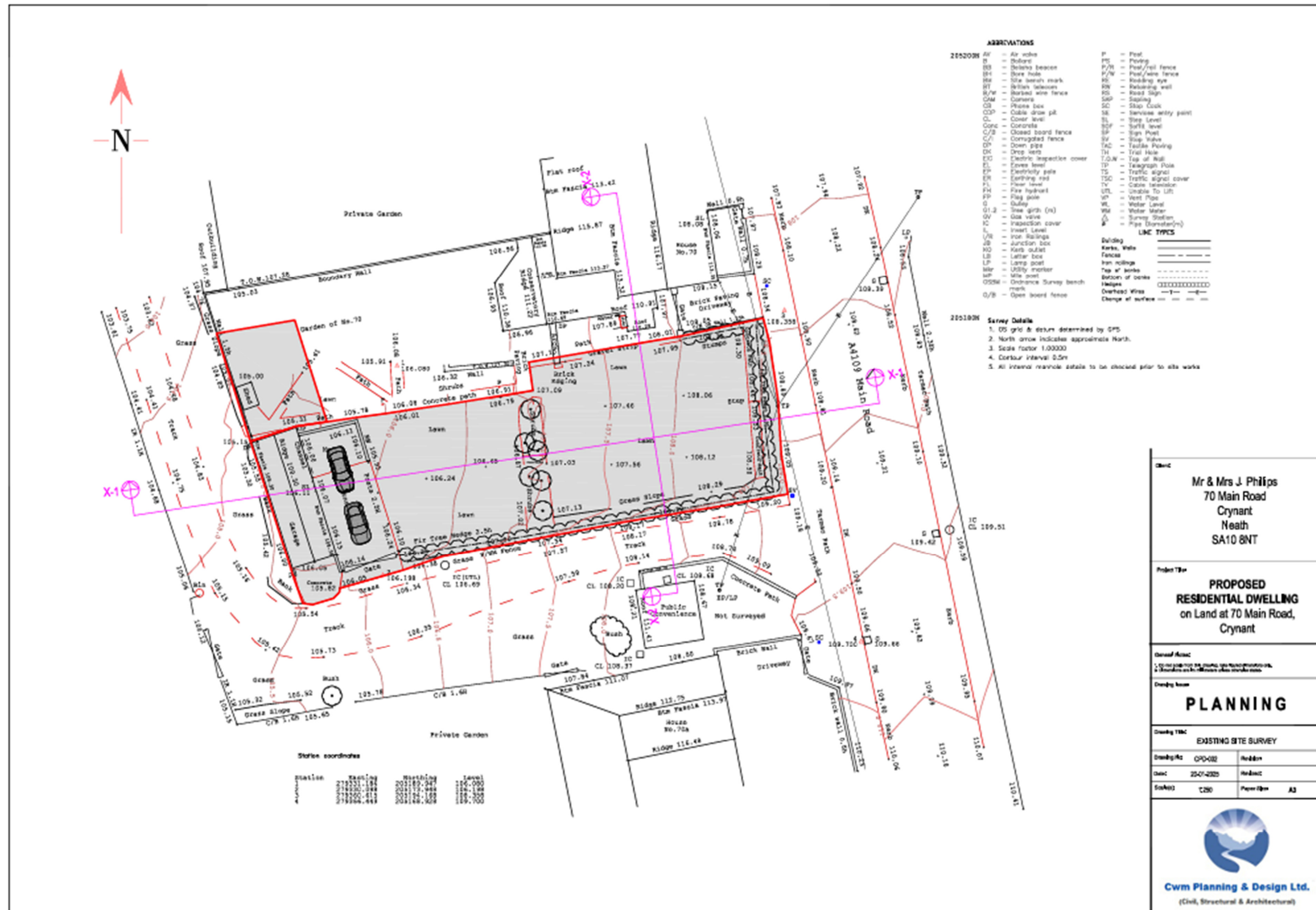
Stormwater storage will be required for all events up to and including the 1 in 100 year storm plus 40% to accommodate for climate change and the attenuation storage area will be appropriately sized.

This proposal shall be modelled using infodrainge to confirm the proposed drainage network functions correctly without causing any localised flooding.



# Appendix A

## Topographical Survey



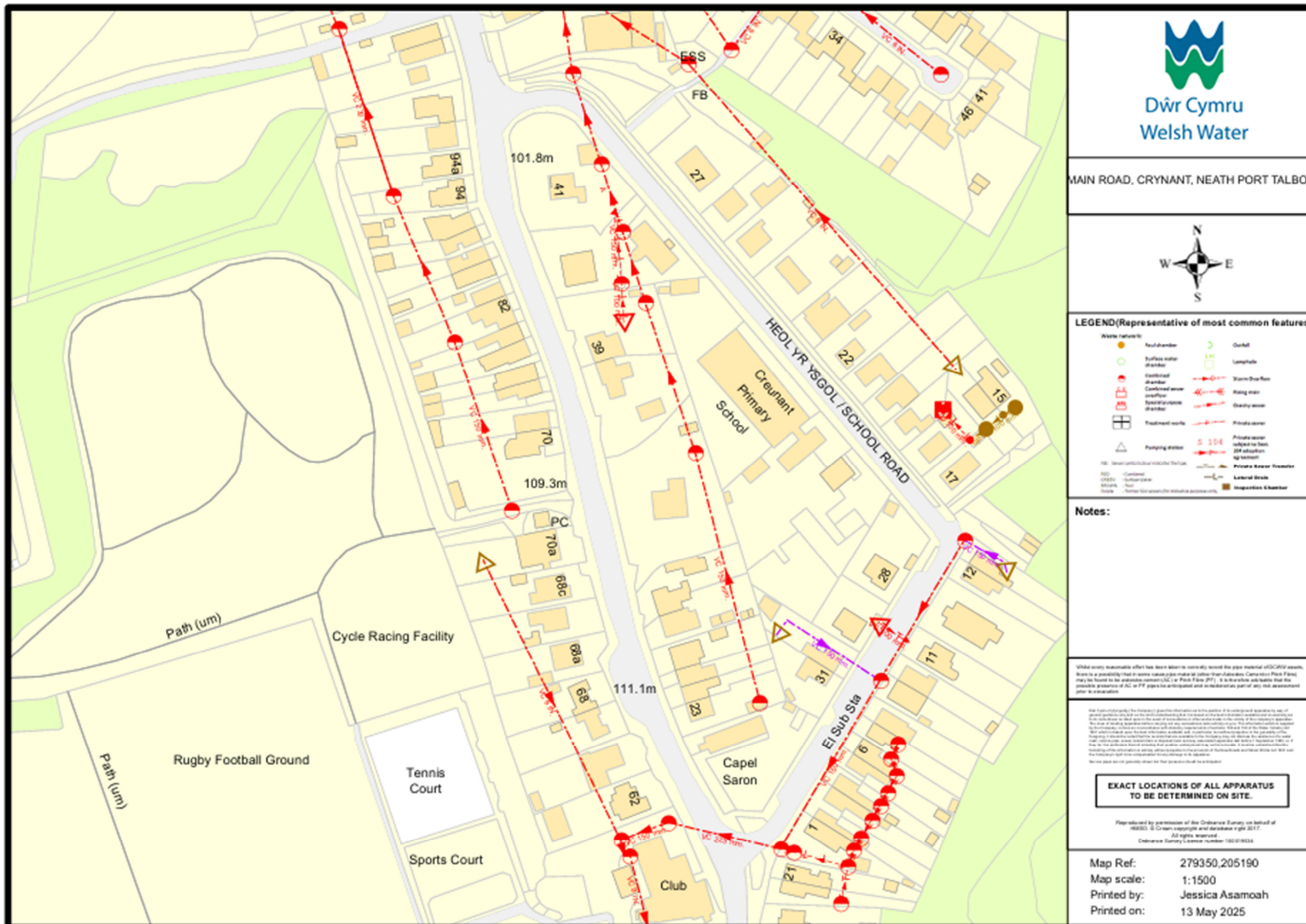
## Appendix B

### Proposed Layout (General Arrangement)



**PROPOSED SITE PLAN**  
Scale 1:250

## Welsh Water Foul Utility Returns





Dŵr Cymru  
Welsh Water

MAIN ROAD, CRYNANT, NEATH PORT TALBOT



#### LEGEND

|  |                         |  |                       |
|--|-------------------------|--|-----------------------|
|  | Clean network           |  | Stop tap              |
|  | Shut-off valve          |  | Water Treatment Works |
|  | Pressure reducing valve |  | Water Pumping Station |
|  | Motor                   |  | Existing main         |
|  | Bulk meter              |  | Non-operational main  |
|  | Hydrant                 |  | Raw Water             |
|  | Cap and                 |  |                       |
|  | Air valve               |  |                       |

#### Notes:

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

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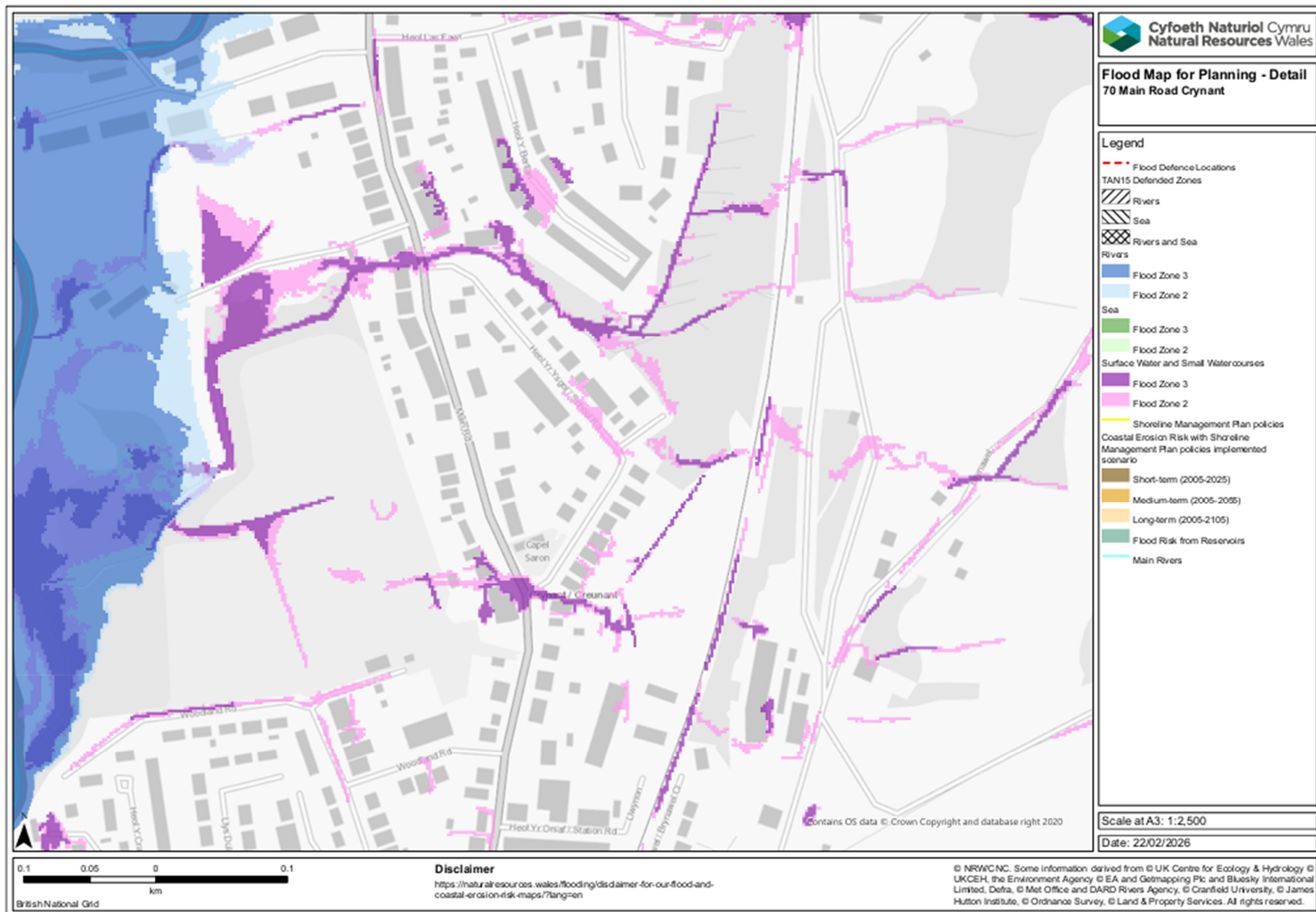
**EXACT LOCATIONS OF ALL APPARATUS TO BE DETERMINED ON SITE.**

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Map Ref: 279350,205190  
Map scale: 1:1500  
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# Appendix D

## NRW Surface Water Flood Map



Appendix E

Appendix E – Infiltration Test Report



Soakaway Test  
Report.pdf

