Landstudio

RESIDENTIAL SITE IN Y FFOR

Flood Consequence Assessment

August 2025

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CONTENTS

Residential Site In Y Ffor: **INTRODUCTION**

01

RESIDENTIAL SITE IN Y FFOR: INTRODUCTION

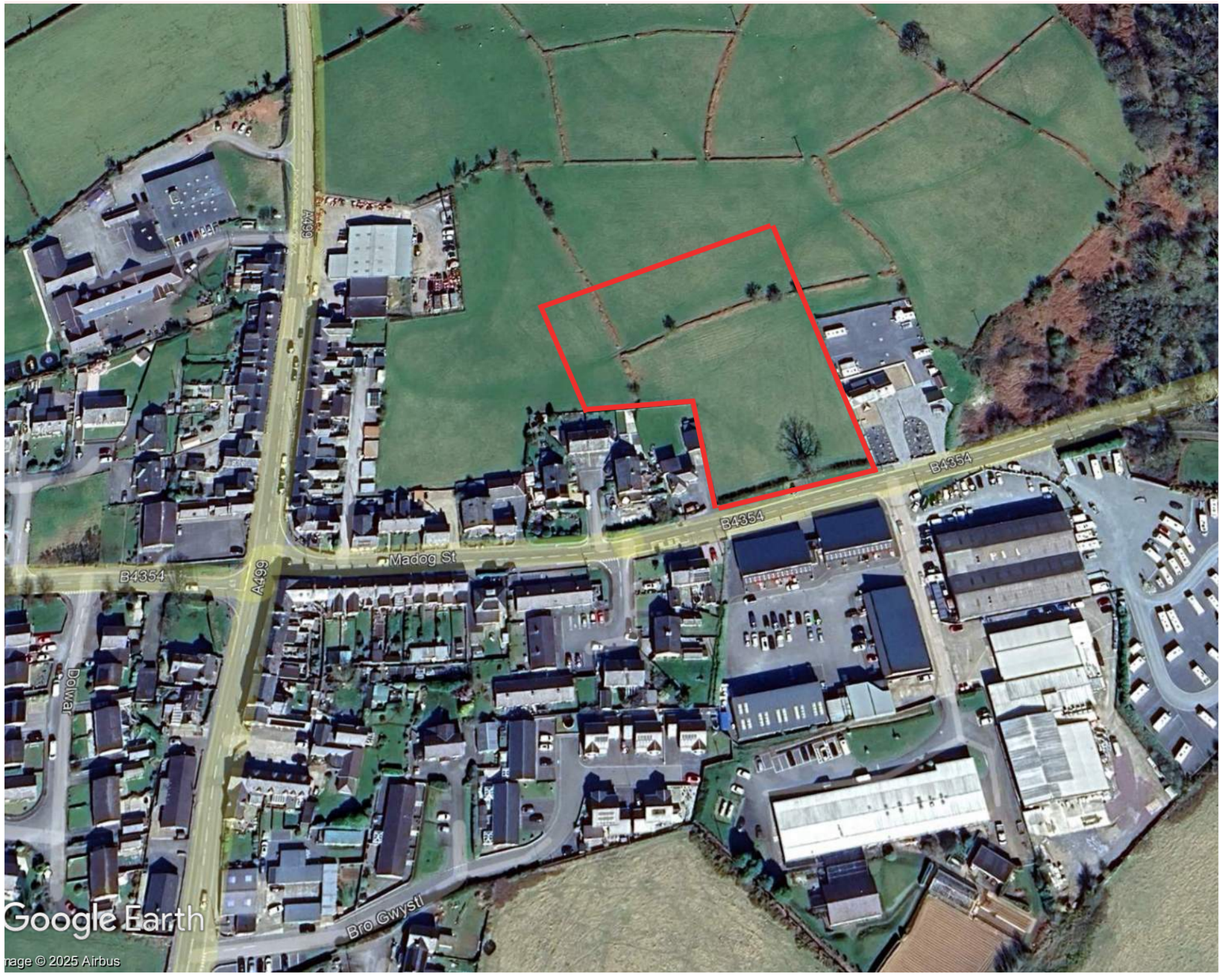


Figure 1 Site Location

Land Studio have been appointed by Williams Homes (Bala) Limited to produce a Flood Consequence Assessment in support of a planning application for the construction of 27 residential dwellings on land off the B4354 in Y Ffor, Gwynedd.

This report records the results of a Flood Consequence Assessment which has been carried out in accordance with Planning Policy Wales (PPW) and Technical Advice Note (TAN 15).

This report considers the risk of various sources of flooding to the site and the consequent risk of flooding to the downstream receptors (such as people, property, habitats, infrastructure and statutory sites) and recommends any necessary measures to reduce or mitigate flood risk to both the site and downstream catchment.

The proposed drainage strategy has been produced by others and therefore whilst drainage design criteria is included in this report the detailed drainage design is covered by a separate report.

In preparation of the report and performance of any other services, Land Studio has relied upon publicly available information, information provided by the client and information provided by third parties. Accordingly, the conclusions reached in this report are valid only to the extent that the information provided was accurate and complete. Land Studio cannot accept liability for the accuracy or otherwise of any information derived from third party sources.

RESIDENTIAL SITE IN Y FFOR: THE SITE

Figure 2 Proposed Development

The development site is existing agricultural land located at land off the B4354 in Y Ffor, Gwynedd.

The grid reference for the centre of the development is SH 39981 39159. The site location can be found in Figure 1.

The site is bounded by residential developments to the south west and south east of the site and agricultural land to the north.

There are no known water or drainage features within the existing site boundary.

The proposed development is the construction of 27 new residential properties with the proposed development plan indicated in Figure 2.

RESIDENTIAL SITE IN Y FFOR: RELEVANT PLANNNG POLICY & GUIDANCE

The following legislation and planning guidance have been reviewed and considered in preparation of this report and the subsequent design.

Planning Policy and Guidance

The following legislation and planning guidance has been reviewed in regards to Flood Risk. Additional policy and guidance in relation to drainage design is available and will be covered by the separate drainage strategy report.

Planning Policy Wales (PPW)

Planning Policy Wales (PPW) sets out governments planning policies for Wales and how these are expected to be applied. TAN 15 provides technical guidance which supplements the policy within PPW and seeks to ensure that flood risk is taken into account at all stages in the planning process and is appropriately addressed.

National policy requires that planning applications for new developments should incorporate sustainable drainage systems (SuDS) to appropriate operational standards and with maintenance arrangements in place unless there is clear evidence that this would be inappropriate.

PPW states that the planning system protects water features and fosters sustainable water management as key attributes of attractive and resilient places to live and is closely aligned with securing the multiple benefits of green infrastructure. The outcome of which should make a contribution towards achieving the requirements imposed by EU Water Framework Directive along with Welsh Government Policy for the integrated planning and management of water both in the urban and rural areas.

New developments of more than one dwelling or where the area covered by construction work equals or exceeds 100m^2 also requires approval from the SuDS Approval Body (SAB) before construction can commence.

The provision of SuDS must be considered as an integral pat of the design of new developments and proposals should incorporate design of surface water management based on the principles which work with nature to facilitate the natural functioning of the water cycle.

Any developments discharging domestic sewage should connect to the foul sewer where it is reasonable to do so. Developments proposing the use of non-mains drainage schemes will only be considered acceptable where connection to the main sewer is not feasible. Non mains drainage schemes should be subject to as assessment of their effects on the environment, amenity and public health in the locality.

All developments should reduce, and must not increase, flood risk arising from river and/or coastal flooding on and off the development itself.

All developments should not cause additional run-off and therefore requires control as close to source as possible by the use of SuDS.

Technical Advice Note 15: Development and Flood Risk

TAN 15 sets out a precautionary framework to guide planning decisions in areas at high risk of flooding. The aim of the framework is to direct new developments away from those areas which are at high risk of flooding and where developments are considered in high risk flood areas only those developments which can be justified should be located in such areas. The aim of TAN15 is also to ensure that flood risk is considered at all stages in the planning process and to direct development run-off away from the areas at highest risk. Where new development is proposed in such areas, policy aims to make it safe without increasing flood risk elsewhere and where possible to reduce flood risk overall.

For "highly vulnerable development (houses) TAN 15 requires the developer must ensure that future occupiers of the development are aware of the flooding risks and any consequences, effective flood warnings if necessary are provided, escape routes are known, development is designed to minimise structural damage during any flooding, there is no flooding elsewhere due to the development and that any flood mitigation is designed, maintained and paid for by the developer.

The Flood Map for Planning (which will replace the Development Advice Maps) are provided by Natural Resources Wales (NRW) based on Environment Agency's extreme flood outlines and British Geological Survey drift data. These indicate the level of risk associated fluvial, coastal and surface water on the location of the site and how to assess the consequences of flooding on the site.

To reduce surface water run-off from the site sustainable drainage solutions both hard and soft can be employed to manage and treat surface water run-off prior to discharge.

Statutory Authority Guidance

The approach outlined in the Welsh Government Sustainable Drainage Systems Standards for Wales (SuDS Standards) and the CIRIA SuDS manual seek to manage the quality and quantity of rainwater runoff close to where it falls and to bring not just drainage design solutions but also amenity benefits to site users and encourage biodiversity. The SuDS Standards require compliance with the following objectives and are covered further in Section 4.0 of this report and the drainage design strategy. S1: Surface water runoff destination, S2: Surface water runoff hydraulic control, S3: Water Quality, S4: Amenity and S5: Biodiversity.

Local Policy

The Anglesey and Gwynedd Joint Local Development Plan was adopted by Gwynedd Council in July 2017 and reviewed in March 2022. Policy PS6: Alleviating and adapting to the effects of climate change relates to flooding.

In order to alleviate the effects of climate change, proposals will only be permitted where it is demonstrated that they have fully taken account of and responded to the following;

1. Implementing sustainable water management measures in line with the objectives in the Western Wales Basin Management Plan;

2. Locating away from flood risk areas, and aim to reduce the overall risk of flooding within the Plan area and areas outside it, taking account of a 100 years and 75 years of flood risk in terms of the lifetime of residential and non residential developments, respectively, unless it can be clearly demonstrated that there is no risk or that the risk can be managed;

3. Be able to withstand the effects of climate change as much as possible because of its high standards of sustainable design, location, layout and sustainable building methods (in line with Policy PCYFF 3).

4. Aim for the highest possible standard in terms of water efficiency and implement other measures to withstand drought, maintain the flow of water and maintain or improve the quality of water, including using sustainable drainage systems (in line with Policy PCYFF 6).

Policy PCYFF 6: Water Conservation indicates that proposals should incorporate water conservation measures where practicable, including SuDS. All proposals should implement flood minimisation or mitigation measures where possible, to reduce surface water runoff and minimise its contribution to flood risk elsewhere.

Residential Site In Y Ffor: **BASELINE REVIEW**

02

RESIDENTIAL SITE IN Y FFOR: BASELINE DATA REVIEW

Flood Risk

Flood risk is a combination of the probability and the potential consequence of flooding. Areas at risk of flooding are those at risk of flooding from any source now or in the future.

The key aims of this flood consequence assessment are to:

- Assess the flood risk to the development and to demonstrate the feasibility of designing the development so that the risk of flooding is acceptable.

- Assess the potential impact of the development on flood risk elsewhere and demonstrate that this can be mitigated by using sustainable drainage systems.

- Satisfy the requirements of the Technical Advice Note (TAN 15).

Flood Risk from Rivers (Fluvial)

The NRW Flood Maps for Planning indicates that the area within the redline boundary is in a Flood Zone 1 for fluvial flooding which is land that has been assessed as having a less than 1 in 1000 annual probability of river flooding (<0.1%). The site is therefore at a very low risk of river flooding.

Flood Risk from Seas (Tidal)

The NRW Flood Maps for Planning indicates that the area within the redline boundary is in a Flood Zone 1 for tidal flooding which is land that has been assessed as having a less than 1 in 1000 annual probability of tidal flooding (<0.1%). The sea is approximately 3.25km to the north of the site. The site is therefore at a very low risk of tidal flooding.

Flood Risk for Surface Water (Pluival)

Overland flow occurs when the infiltration capacity of the ground or capacity of the drainage systems is exceeded in a storm event. This can result in water travelling over land or ponding.

The NRW Flood Maps for Planning indicates a small section of surface water flooding within the site boundary close to the proposed public open space on the site. The topography indicates this flows in an easterly away from the site and can be seen in Figure 3.

Flooding from Reservoirs

The site is not located in proximity of any reservoirs and the Flood Maps for Planning indicate that flooding from reservoirs is at very low risk at this site.

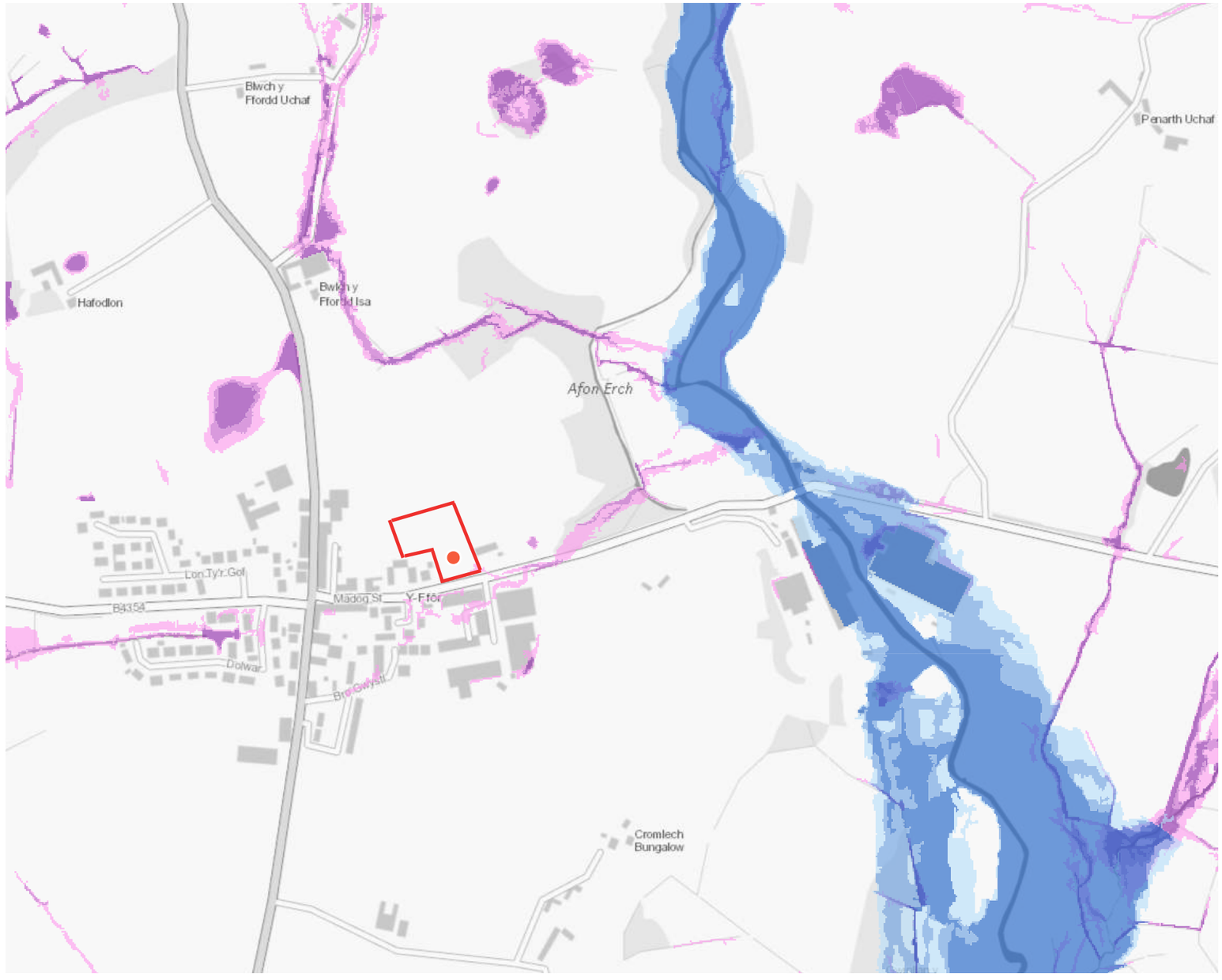


Figure 3 Natural Resources Wales Flood Risk for Planning Map

RESIDENTIAL SITE IN Y FFOR: BASELINE DATA REVIEW

Flooding from Sewers and Drains

If the capacity of the sewer or private drains are exceeded in an extreme event, or a blockage occurs, surcharging of the drainage network can result in flooding. The site is greenfield. There are no known public or private drainage systems within site boundary therefore the risk of flooding from sewers and drains is very low risk.

Watercourse

Data Map Wales indicates the closest main rivers are the Afon Erch approximately 430m to the east of the site and the Afon Ddwyrd which starts approximately 300m to the west of the site. These are indicated in Figure 4.

Topography

The topography indicates that the centre of Y Ffor at the junction of the A499 and B4354 is the highest point with land falling towards watercourses to the west and east. The levels within the site fall from the north west corner at 64 AOD to 56 AOD in the south east corner with exceedance flows entering the highway and then heading east towards the Afon Erch.

There is agricultural land to the north of the development with overland flow routes towards the development due to the topography. The drainage strategy would need to consider these pathways within the design to ensure overland flow routes do not impact the new development and can continue to occur if needed.

Geological Setting

Heavy rain falling on waterlogged ground or impermeable surfaces can cause localised flooding almost anywhere. The LandIS soilscapes mapping indicates the site is underlain by freely draining slightly acid sandy soils. This area is indicated in dark pink in Figure 5. It is recommended that infiltration testing be undertaken to support the drainage strategy. Due to the likely permeability of the ground and its topography flooding from waterlogged ground is unlikely.

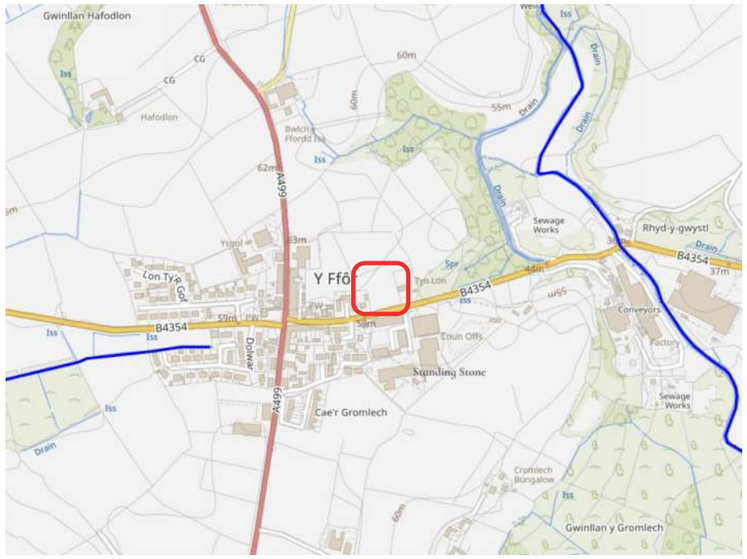


Figure 4 : Main River Locations

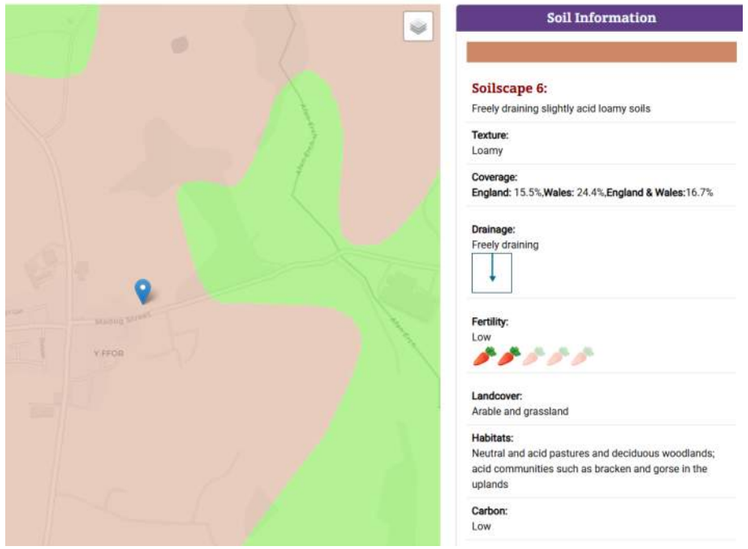


Figure 5: Soilscape Mapping

Residential Site In Y Ffor: **ASSESSMENT OF FLOOD RISK**

03

RESIDENTIAL SITE IN Y FFOR: ASSESSMENT OF FLOOD RISK

Assessment of Flood Risk

As a residential development, the development type is classed as “more vulnerable”.

In accordance with TAN15 guidance, the development is located within Zone 1 for from all sources of flooding and therefore is an acceptable location for development.

Surface water will be managed through implementation of SuDS for collection of surface water from the new development and that exceedance flow routes are retained or diverted within the proposed landscape design to ensure they are directed away from new properties and do not increase any flooding of existing properties.

Access and Egress

In accordance with TAN15 guidance, the development will need to demonstrate that during a flood event the site will:

- Remain operational and safe for users in times of flood;
- Result in no net loss of floodplain storage; and
- Not impede water flows and not increase flood risk elsewhere.

The levels on the site fall towards the site access point with levels outside of the site continuing to fall away.

The proposed buildings are to have finished floor levels a minimum of 150mm above the proposed external works levels with threshold drainage if required and falls away from the building to direct water away from the buildings in accordance with Building Regulations Part H.

Maintaining Exceedance Events

Exceedance events are storm or flood events that go beyond what can be practicably quantified and flows from such events will need to be directed through the proposed development, away from any high risk areas, such as building thresholds and towards low risk areas and then off site.

To ensure localised flooding does not occur from the private drainage systems regular maintenance of both the foul and surface water networks will need to be undertaken.

Sustainable Drainage Systems (SuDS)

Sustainable drainage developed in line with the ideals of sustainable development is collectively referred to as Sustainable Drainage Systems (SuDS). At a particular site, these systems are designed to manage both the environmental risks resulting from the urban runoff and to contribute, wherever possible, to environmental enhancement. Therefore, SuDS objectives are to minimise the impacts from the development on the quantity and quality of the runoff and maximise amenity and biodiversity opportunities (CIRIA C753, 2015).

Planning policy promotes sustainable management of surface water runoff from a new development or redevelopment, and the use of SuDS is recommended.

The ‘Management Train Approach’ should be central to the surface water drainage strategy of a proposed site. The main objective is the treatment and control of runoff as near to source as possible, thus protecting downstream habitats and further enhancing the amenity value of the site. This concept uses a hierarchy of drainage techniques to incrementally reduce pollution, flow rates and volumes of storm water discharge from the site, and is as follows:

- Prevention: The use of good site design and housekeeping measures to prevent runoff and pollution (e.g. rainwater re-use).

- Source Control: Control of runoff at source or as close to source as possible (e.g. soakaways, green roofs, pervious pavements).

- Site Control – Management of water in a local area (e.g. ground storage/ attenuation, detention ponds/basins).

- Regional Control – Management of water from a site or various sites (e.g. wetlands, balancing ponds).

Further details on SuDS implementation is given in Section 4.0 and the separate drainage strategy documentation provided by others.

Flood Risk Conclusion

With flooding from all existing sources being classed as very low and the implementation of localised flood mitigation measures within the proposed levels and drainage design it is therefore deemed that the proposed development will not have a material impact on the hydrology of the existing land and that all foreseeable sources and receptors of flood risk as a result of the development have been considered.

Residential Site In Y Ffor: **DRAINAGE DESIGN CRITERIA**

04

RESIDENTIAL SITE IN Y FFOR: DRAINAGE CRITERIA

Surface Water Drainage Discharge

The proposed surface water drainage shall be designed so that there is no surcharging of pipework during storms up to a 1:2-year annual probability and no flooding on the surface, apart from within green SuDS features during storms up to a 1:30-year annual probability.

The design will also be checked to ensure no flooding of third-party land or buildings during storms up to a 1:100-year annual probability plus allowance for 30% climate change.

S1: Surface Water Runoff Destination

The SuDS Standard has five priority levels for surface water runoff. These are:

- Priority 1: Surface water runoff collected for use
- Priority 2: Surface water runoff is infiltrated to ground
- Priority 3: Surface water runoff is discharged to a surface water body
- Priority 4: Surface water runoff is discharged to a surface water sewer, highway drain or another drainage system
- Priority 5: Surface water runoff is discharged to a combined sewer

Solutions that reuse rainwater prior to discharge include rainwater harvesting for on-site non-potable use, flushing toilets for example or for landscape maintenance in the form of water butts or larger scale attenuation with a pumped outlet. Passive irrigation is also an effective way of utilising rainwater, particularly in low-intensity events, and reduces maintenance requirements for planted areas. Section G1.6 of the Statutory Standards for SuDS states that “in most cases, rainwater harvesting alone will not be adequate to deal with the site drainage and provision will be required for an overflow to a Priority Level 2 or lower priority runoff destination”.

Ground information obtained through review of the soilscape website indicates that infiltration methods are likely to be possible as the main source of discharge on this site. It is recommended that infiltration testing is undertaken on the site. Drainage design is covered in a separate drainage strategy report.

S2: Surface Water Runoff Hydraulic Control

Flood Risk will not be significantly increased as a result of the development proposals if mitigation measures are implemented and the drainage is designed with these in mind.

The runoff rates proposed should be limited to greenfield runoff rates or 2l/s/ha.

The restriction of runoff rates and increase in impermeable area will generate storm-water storage volumes that will need to be attenuated on-site prior to release.

The details of the drainage strategy should be discussed further in the drainage strategy provided by others.

S3: Water Quality

The quality of runoff from the site to support and protect the natural environment effectively needs to be taken into account in the design of the drainage systems.

The SuDS design for the development will need to provide pollution prevention and site control techniques prior to discharge from the site. Surface water treatment using the ‘Management Train’ approach to remove and isolate contamination at all SuDS facilities prior to conveyance should be utilised along with reduction of the overall potential impermeable area of the site where possible.

Where practical treatment systems should be designed to be close to the source of runoff and reviewed in accordance with Water Quality design criteria set in Chapter 4 and Water Quality Management: Design Methods in Chapter 26 of The SuDS Manual CIRIA C753 2015.

The forms of treatment proposed should be discussed further in the drainage strategy provided by others.

S4: Amenity

The provision of above ground SuDS features which can provide amenity space allows for the SuDS feature to be integrated into the landscape design and be utilised during exceedance events to prevent flooding in areas of the site used for accommodation.

S5: Biodiversity

The provision of above ground SuDS features can include planting which allows for increased biodiversity but also help channel water in times of flood and allow wet areas to be incorporated which also helps enhance biodiversity.

Foul Drainage

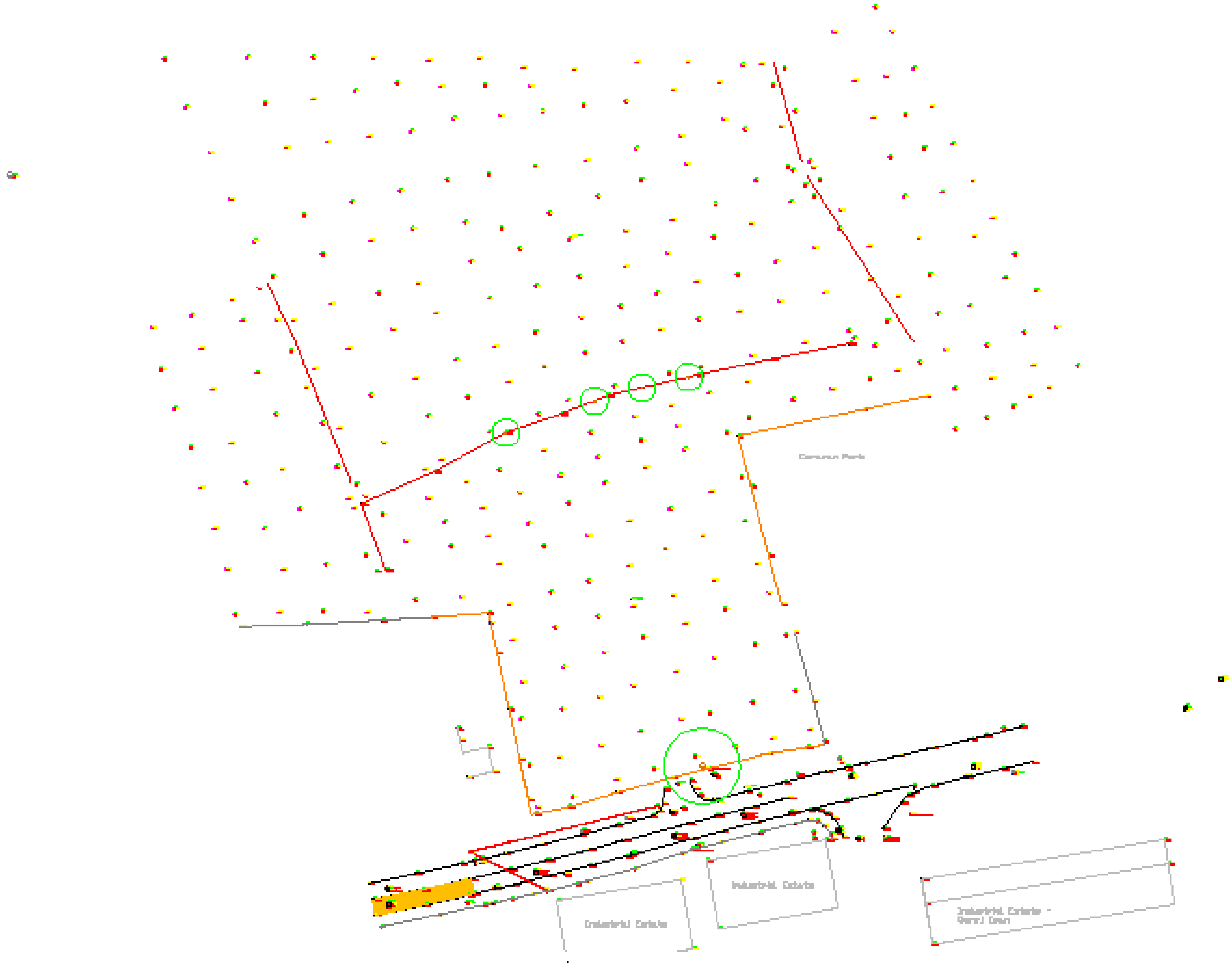
The proposed foul drainage discharge shall be designed in accordance with the following discharge hierarchy and agreed with Welsh Water or Natural Resources Wales to confirm adequate discharge from the site.

- Discharge to public foul sewer
- Discharge to combined sewer
- Discharge to sewage treatment plant to ground then watercourse
- Discharge to septic tank to ground then watercourse
- Discharge to cesspool

Residential Site In Y Ffor: **APPENDICES**

05

Residential Site In Y Ffor: **APPENDIX 1 - TOPOGRAPHICAL SURVEY**


Caravan Park
Industrial Estate
Industrial Estate
Industrial Estate -

Residential Site In Y Ffor: **APPENDIX 2 - PROPOSED SITE PLAN**

6x	**FFLAT 2 PERSON 1 GWELY /** 2P1B FLAT	53m²
12x	**TŶ 4 PERSON 2 WELY /** 4P2B HOUSE	83m²
5x	**TŶ 5 PERSON 3 GWELY/** 5P3B HOUSE	93m²
3x	**TŶ CORNEL 5 PERSON 3 GWELY/** 5P3B CORNER HOUSE	93m²
1x	**TŶ 7 PERSON 4 GWELY/** 7P4B HOUSE	114m²

TOTAL - 27 PLOTS

ARDAL MAN AGORED CYHOEDDUS -
AR Y SAFLE: 741m²
ARDAL YCHWANEGOL: 172m²
CYFANSWM ARDAL MAC: 913m²

POS AREAS
ON SITE: 741m²
ADDITIONAL AREA: 172m²
TOTAL POS AREA: 913m²

VISUAL SCALE 1:500 @ A2

REV	DISGRIFIAD/DESCRIPTION	DYDDIAD /DATE	GAN /BY
K	REVISED SITE BOUNDARY & LAYOUT - APTS NOW REPOSITONED TO THE WEST	28/08/25	OR
J	FFLS AND ROAD LEVELS REVISED	15/08/25	IO
H	PATH MOVED AWAY FROM PLOT 27	08/08/25	IO
G	DATRYS COMMENTS	08/08/25	IO
F	WELSH TRANSLATION	01/08/25	IO
E	CLAWDD SHOWN ALONG NORTHERN BOUNDARY. CHANGE IN MIX	30/07/25	IO
D	FFL SHOWN	24/07/25	IO
C	STONE WALL + RAILING ADDED PLOT 1-2	21/07/25	IO
B	NEW SITE LAYOUT WITH FRONT POS	17/07/25	IO
A	PATHS AMENDED TO COMPLY WITH 1:60	09/06/25	IO

PROSIECT/PROJECT
SITE AT Y FFOR
for WILLIAMS HOMES

TEITL Y CYNLLUN/ DRAWING TITLE
CYNLLUN SAFLE ARFAETHEDIG - PROPOSED SITE LAYOUT

GRADDFA / SCALE	DYDDIAD/ DATE	DRAWN	CHECKED
1 : 500 @A2	29/04/25	IO	SV

DRAWING STATUS: PLANNING

Rhif JOB No	Rhif CYNLLUN /DRAWING No	ADOLYGIAD /REVISION
C1136	008	K

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