

The Old School.

The Pottery, Culmington, Ludlow, Shropshire. SY82DF.

September 2021

Flood Risk Assessment / Drainage.

Background.

The western boundary of the Pottery site is bounded by the Seifton Brook which is a fast flowing watercourse springing from a catchment area to the north and west of Culmington Parish. Along the Brook water levels are generally shallow at normal times but during significant weather events water is not always contained within the watercourse hence some properties can be at risk of flooding but this is very dependent on the local levels, property floor levels and the detailed topography of the land adjacent to the banks of the Brook.

During the last 5 years Culmington Parish has been part of the 'Slow the Flow' project using Natural Flood Management (NFM) interventions up stream to limit the flow of storm water entering the watercourses and to stall the peak flow during significant flood events. The effects of this work are now being monitored and recorded by Cardiff University but the positive effects were clearly apparent to local property owners during storm Ciara and Dennis early in 2020. Future NFM projects continue to be developed involving multiple agencies to ensure that the risk of flooding to properties within Culmington is reduced.

Having lived in the Pottery for over 38 years the family of the applicants are very aware of the risks that Seifton Brook presents. During recent years with the impacts of climate change there have been a number of significant weather events, July-2007, July-2013 and Feb-2020. A number areas in Culmington village centre have experienced flooding but the isolated location of the Pottery and the higher levels within the boundary creates an island effect, hence the property and the site of the proposed dwelling have not flooded.

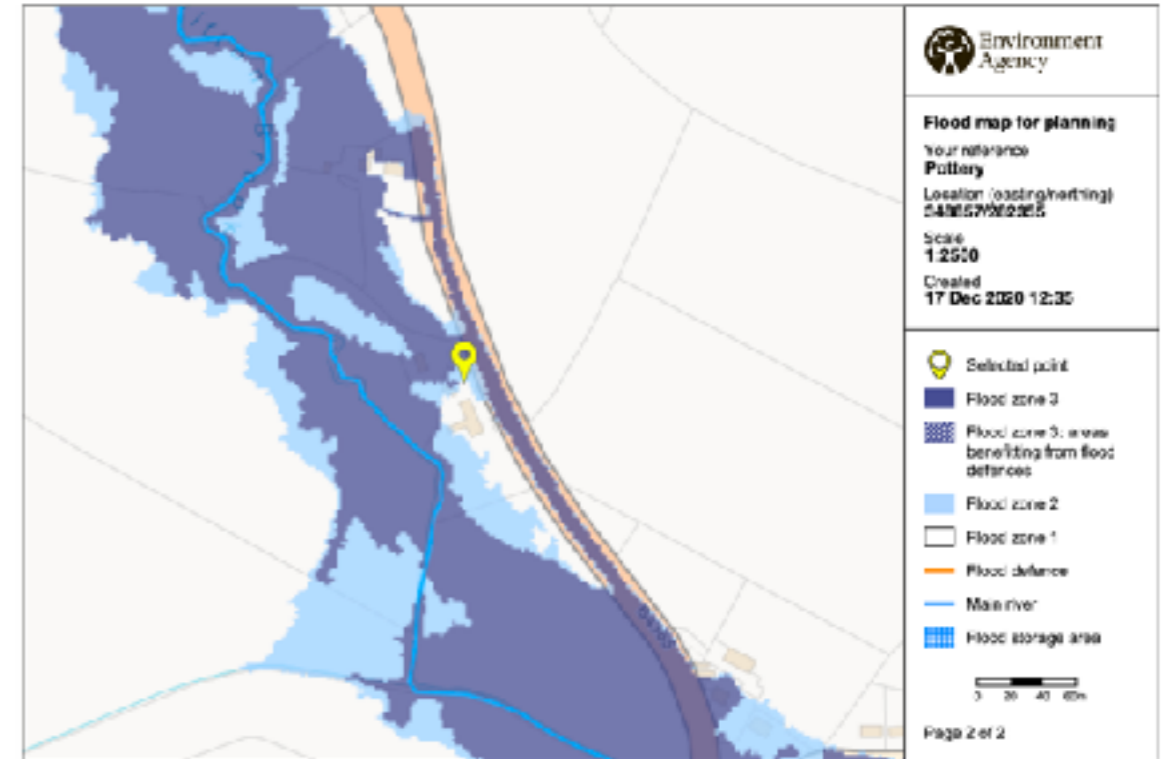
Flood Risk Assessment

Simple Flood Risk Assessment. (Ref: EA guidance notes for simple FRA).

The Environment Agency (EA) flood mapping indicates that the Pottery site is in Flood zone 2 with a medium probability of flooding and requires a Simple Flood Risk Assessment (FRA) which is incorporated below. Whilst the EA map is an indication that the site area could be subject to flooding it is acknowledged that these maps are a best estimation of potential flooding in the location but the actual impact may vary so local knowledge is very important.

The realities on the ground are very different for this site and are more accurately illustrated by the alternative maps produced by Shropshire County Council. The detail extract shows that the Pottery is protected by the existing levels of the land holding the flood water at the site boundaries hence the site of the pottery and the new dwelling have not experienced flooding. The land to the west of the Brook is lower than the site and therefore acts as a flood plain when the Seifton Brook is in flood. See topographical survey, Appendix B. These alternative maps support the experience and knowledge of the applicants.

- The EA flood mapping confirms the site for the proposed dwelling (Location 348848/28234) is in Zone 2. (see Appendix : EA Flood Map)
- The 100 year AOD for the flood level in this location is not available from the EA records. Please note; the EA completed a survey of the whole river in November 2012 and the AOD for the river level in this location at this time was **104.51m**. See topographical survey, Appendix B.
- The AOD for the Finished Floor Level of the proposed dwelling is **105.86m** which is the same as the existing adjoining Pottery, the attached Topographical Survey shows all the existing levels. The proposed site plan includes the Finished Floor Level and the ground levels across the site for the proposed dwelling.
- There are no flood defences protecting this site, the existing site levels do provide a natural protection by creating an island around the boundary line. There are TVA Alarms installed up stream located at high water level 'hot-spots' which transmit electronic messages to residents as an early warning of rising water levels in the watercourse.
- The B4365 at the site location does channel flood water during extreme weather events but remains passable to the north of the village hence evacuation and access for emergency services is possible. Culmington Flood Action Group have an emergency plan for occupants of properties under threat within the village.
- The development is not within 20m of the Seifton Brook and will therefore not be of special interest to the EA.



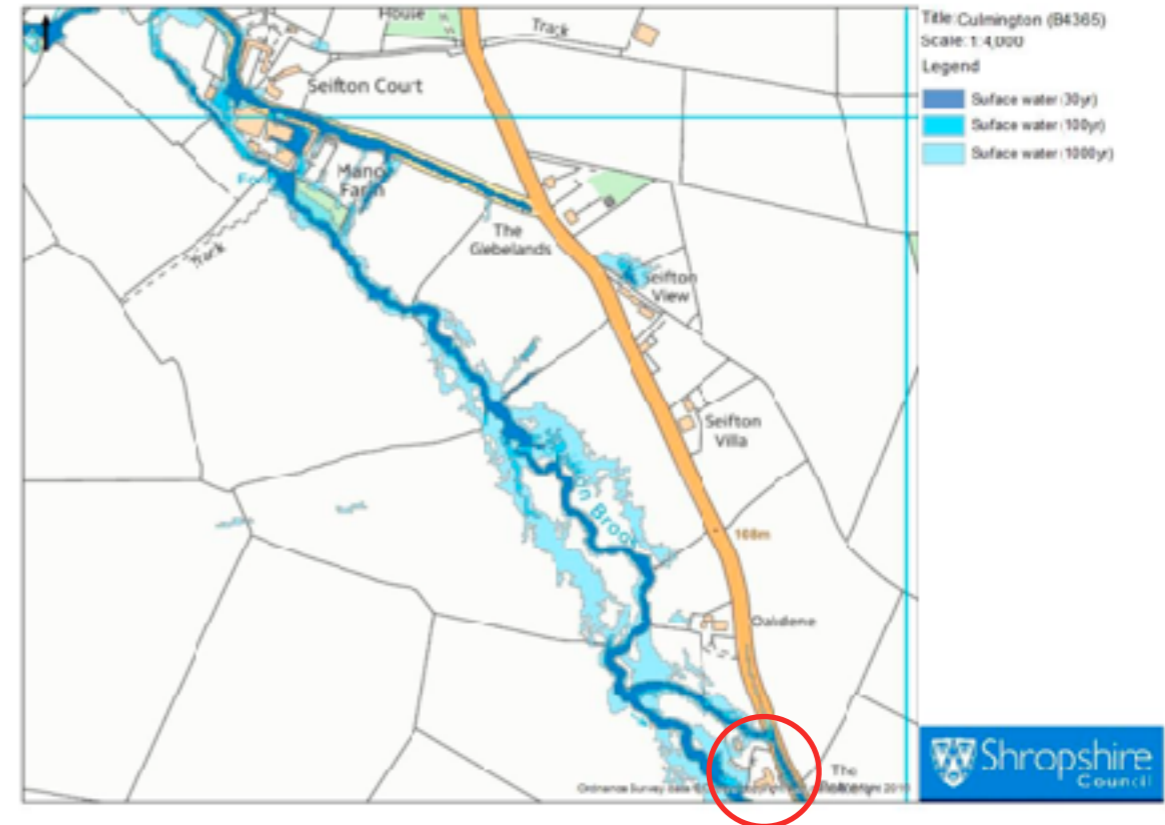
Environment Agency flood map



Shropshire Council flood map 1.

Flood Risk Assessment

- The existing properties and proposed site has not flooded despite a number of nationally recognised significant weather events within the last 38 years but as climate change is predicted to increase flood levels in the future the Landscaping design will be an integral component to increase the resilience of the site. Designs will allow flood water to flow across the area and to return to the watercourse, the whole site will remain permeable to allow the maximum infiltration of any surface water. Ground levels and possible landscaping interventions, ie. low earth bunds, within 2m of the building will be designed to divert flood water and protect the fabric of the property.
- The proposal is a residential property therefore it is considered to be a life time development. The detailed design of the property and the use of materials will reflect the potential impacts of Climate Change on flooding events and will increase the flood resilience of the property mitigating the impacts of severe weather events.
- Generally recorded flooding of properties within Culmington Village is for a short duration at depths of less than 0.3m, so the strategy for the new dwelling is to adopt a resistant approach with the aim of keeping water out of the building.
- Flood resilient design and resistant construction will be included at the construction stage. The emphasis will be placed on minimising water entry whilst maintaining structural integrity therefore using materials and construction, building walls and floors with low permeability to facilitate drying and cleaning.
- The reference document, 'Improving the Flood Performance of new Buildings, Flood Resilient Construction' provides detailed research to designing construction details resistant to flood water with particular attention to the first 0.3m.
- Resilience measures to be adopted are:
- a/ Foundation - Use 'class A' blue engineering brickwork to form the foundation construction below ground and up to 300mm above Finished floor Level (FFL). b/ Ground floor slab - Design traditional concrete ground bearing slab, min 150mm thick on dpm, sand binding and compacted hardcore with insulation above slab. c/ External walls built off engineering brick plinth - Cement/lime render on blockwork cavity walls with partial-fill. Minor amount of sacrificial timber cladding attached to blockwork cavity walls with partial-fill. Full height glazed areas - include recessed fixing channels for proprietary flood barriers to be installed. d/ Flooring and skirting - Ceramic tiling with waterproof grout. e/ Kitchen fittings- raise plinth levels to min 300mm above FFL. f/ Cabling/services install min. 450mm above FFL.



Shropshire Council flood map 2.



Detail from flood map 1 showing the Pottery site as an island.

Flood Risk Assessment

- g/ Internal walls - Use damp resistant materials throughout with a dado set at suitable height to allow ease of replacement. h/ Internal doors - Fit simple rising butt hinges to aid quick removal. i/ Discharge points - Fit non-return valves on all ground floor discharge points from toilets, sinks and white goods.

The proposal is to convert the existing Pottery buildings including a minor extension forming a new family dwelling, the ground levels and floor levels are restricted to those of the existing buildings. Whilst the site is not known to have flooded during recent times which includes a number of significant weather events the new dwelling will be designed to be resilient to possible flood waters allowing for the continuing impacts of climate change. The aim of the proposal is to minimise the impact on the site and not create any increase to or restrict the flow of the Seifton Brook or impact on the flood risk to any other properties within the catchment area of the Brook.

Drainage.

Foul drainage.

Culmington village is not provided with a foul mains sewer, The Pottery has an existing foul drainage system which leads to a multi-chamber settlement tank and pumping station connected to an existing outfall to the Seifton Brook.

The proposal is to decommission the existing pumping station and replace it with a new proprietary Package Treatment Plant designed and installed in accordance with Building Regulation, Approved Doc H to serve Both the new dwelling and the existing Pottery accommodation. The new treatment plant will be located on the Pottery site, 11m from the nearest building and within 30m of the access for an emptying tanker. The new plant will be connected into the existing foul drainage pipework leading to the existing outfall to the Seifton Brook as shown on the proposed site plan.

A completed FDA1 form is included with the application documents which confirms that Culmington does not have a main drainage sewer system hence the properties rely on individual package treatment plant to discharge foul water.

The preferred package treatment plant for the development is a Klargestar Biodisc Domestic Treatment Plant supplied via Kingspan.

Appendix C includes the quotation for a 12 person, Biodisc Plant sized for the two properties, Pottery (3 bedrooms) and the new dwelling (3 bedrooms) in accordance with Code of Practice, 'Flows and Loads - 4 (British Water) and Building Regulations, Approved Doc H2.

The 12 person Biodisc package Treatment Plant provides a max total Daily flow of 2.4 cubic metres. It has been calculated that the two properties (max. 6 bedrooms) will produce a predicted total of 1.56 cubic metres of treated sewage per day.

The predicted Daily flow falls within the Exempt Water Discharge Activities relating to small discharges of sewage effluent of 5 cubic metres per day. (Ref: Environmental Permitting Guidance : Water Discharge Activities)

The location of the new package treatment plant is shown on the proposed site plan.

A legal agreement for the management, maintenance and repair of the new Package Treatment Plant will be drawn up and signed by the occupiers of the two properties.

Drainage.

Storm water drainage.

The storm water from the property will be connected to a new drainage network, independent of the Pottery and all within the boundary of the new dwelling. Parking areas and driveways will continue to be permeable surfacing to promote infiltration as existing.

The proposed site plan indicates the preferred drainage layout. Storm water from a number of roofs passes through a silt trap and connects to a new soakaway to be located under the driveway designed to BRE Digest 365 and Approved Document H3.

A percolation test in the preferred location was completed between 17th and 19th September 2021 to determine whether soil conditions are suitable for the installation of the new soakaway.

Appendix D includes a photographic record of the percolation test in accordance with standard procedures. The weather conditions throughout the test were normal for the time period.

The base of the test hole was set at a min of 1m below the ground surface level which is 750mm below invert level of the proposed storm drain inlet. The test hole was excavated through the base providing a test hole measuring 300 x 300 x 300mm.

As can be seen from the results table the average time taken in seconds for the groundwater to drop 1mm is 96.48 and less than 100 indicating that the soil conditions are suitable for installing a soakaway.

Design of a rectangular soakaway to BRE Digest 365.

The total roof area of the proposed dwelling to be drained is 119 sq.m.

Using a web based design tool based on BRE Digest 365 for soakaway design the following is an indication of the possible volume of the new soakaway.

- a. Traditional granular fill design - 6.6 cubic metres.
- b. Proprietary crate design - 1.98 cubic metres.

The traditional design, 6.6 cubic metres with granular fill with 30% free volume is the preferred construction and generates dimensions of 2.9m x 1.5m x 1.54m.

Drainage.

This initial assessment confirms that the traditional rubble design can be accommodated at the preferred location on site.

Assuming the initial design dimensions of 2.9m long x 1.5m wide x 1.54m deep the required width of the soakaway can be calculated following the BRE Digest 365 methodology and using Shropshire rainfall data together with the infiltration rate of the soil.

Following the site test the soil infiltration rate of $f = 3.30 \times 10^{-5}$ m/s can be used to design a soakaway filled with granular material having 30% free volume.

Appendix E shows the full calculations to BRE Digest 365 for the rectangular soakaway which were repeated for each storm duration. The table of results confirm that the Maximum width for soakaway is **1.6m**.

The calculations also show the check to determine the time taken for the design volume to half empty, the required target time is within 24hours.

Conclusion :

The calculations confirm that the dimensions of the Rectangular Soakaway to BRE Digest 365 should be **2.9m long x 1.5m effective depth x 1.6m wide** to be suitable for the critical storm duration of around 1 hour for a 10 year event. The check calculations confirm that the emptying time for half the volume is **1.4hrs** and is therefore within 24 hours.

The location of the new soakaway is shown on the proposed site site plan.

Flood map for planning

Your reference Location (easting/northing) Created

Pottery 348857/282355

17 Dec 2020 12:35

Your selected location is in flood zone 2, an area with a medium probability of flooding.

This means:

- you must complete a flood risk assessment for development in this area
- you should follow the Environment Agency's standing advice for carrying out a flood risk assessment (see www.gov.uk/guidance/flood-risk-assessment-standing-advice)

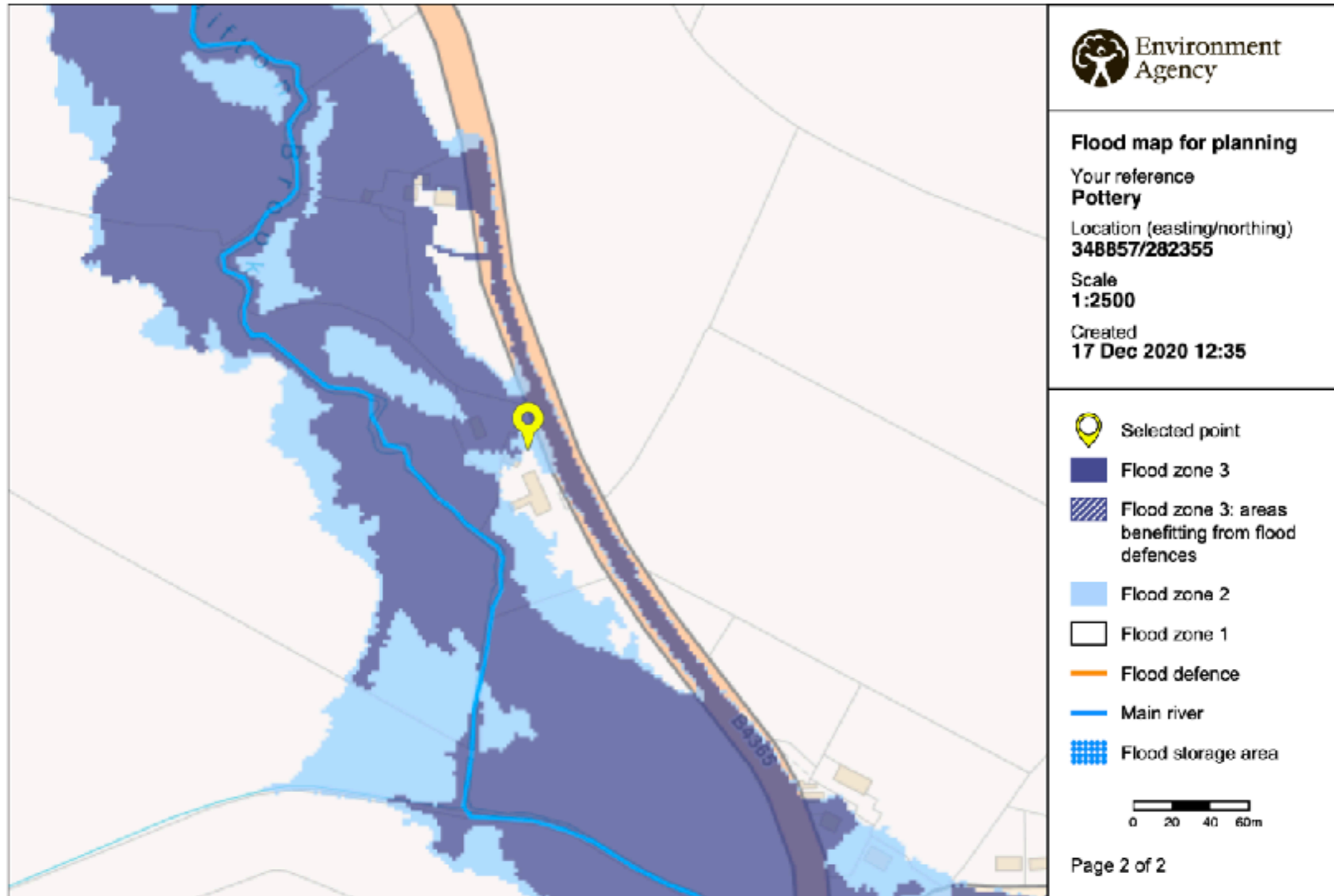
Notes

The flood map for planning shows river and sea flooding data only. It doesn't include other sources of flooding. It is for use in development planning and flood risk assessments.

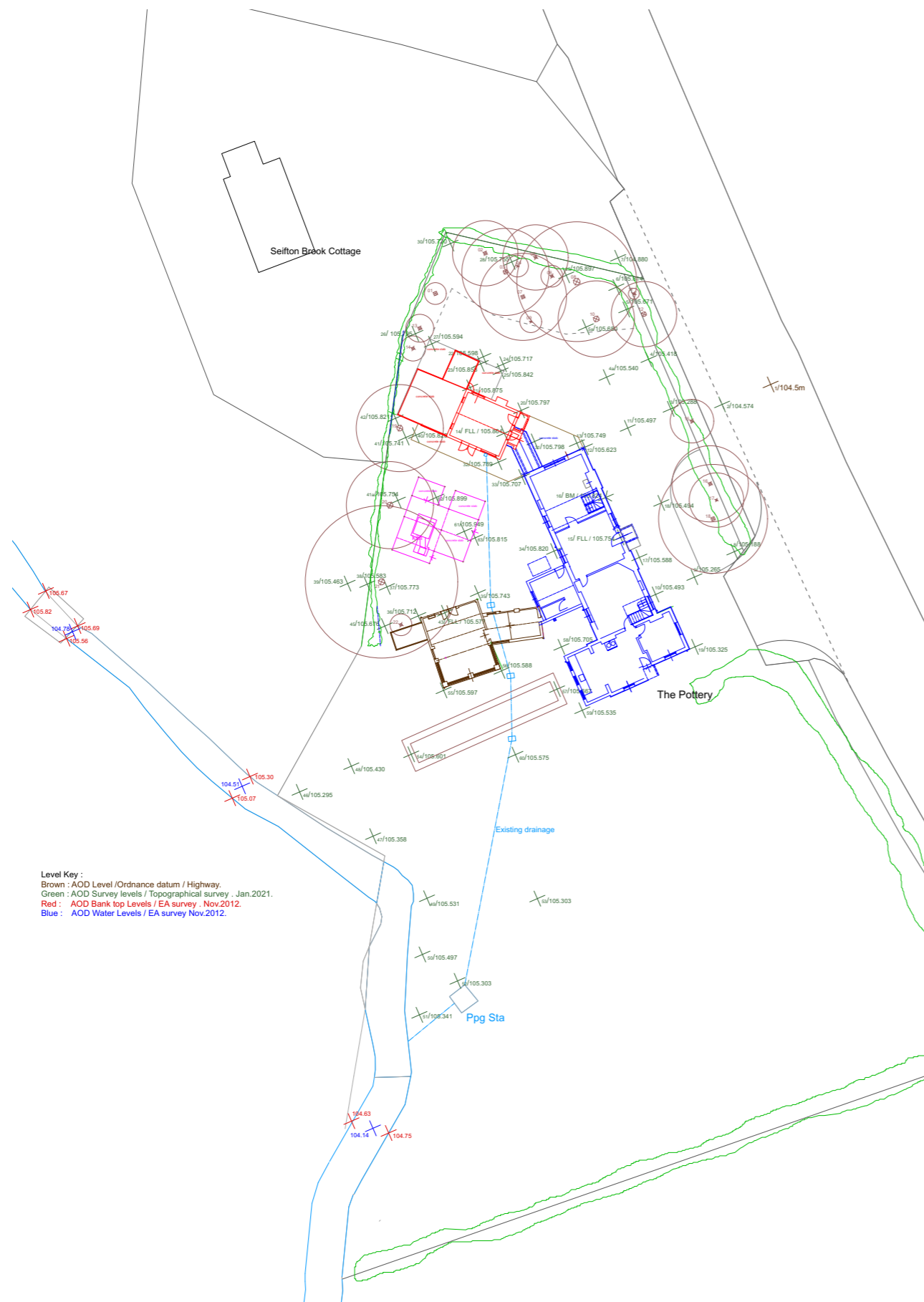
This information relates to the selected location and is not specific to any property within it. The map is updated regularly and is correct at the time of printing.

The Open Government Licence sets out the terms and conditions for using government data.

<https://www.nationalarchives.gov.uk/doc/open-government-licence/version/3/>



Appendix B : Topographical survey.



Water Management Solutions

Kingspan
7 YEAR WARRANTY

Customer Quotation

Richard - The Pottery, Ludlow SY8 2DF

Klargester
DOMESTIC SEWAGE TREATMENT PLANT RANGE



kingspan.co.uk/klargester



Klargester Sewage Treatment Plant Quotation

Customer Details	Name:	Richard	Date:	16/09/2021
	Company:			
	Email Address:	richardguygriffiths@hotmail.co.uk		
	Contact No:	07817 168708		

Thank you for your enquiry.
We are pleased to provide details of our Klargester Domestic Sewage Treatment Plant.

Basis of Design

The site usage figures are as detailed on the enclosed enquiry sizing sheet. Please check these figures for accuracy and provide details of any changes you envisage.

All the loading figures stated have been taken from the British Water Flows and Loads for small communities in sizing small waste treatment systems.

Site Notes

2 x 3 Bedroom houses.
Gravity Discharge.
Discharge to watercourse.
Advised need to be 10 mts away from electricity pylon.
450/750mm Invert TBC by Richard.

NB: Formal discharge consent is the responsibility of the site owner and should be requested from the authorities prior to order.
This consent may require that the above sizing data changes.



Klargester Sewage Treatment Plant Quotation

The Biodisc utilizes Rotating Biological Contactor technology for small domestic application. This process offers inherent cost and performance benefits with a low carbon footprint.



Effluent Quality Design

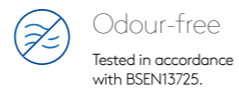
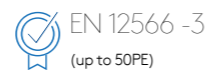
BOD	10 mg/l
Suspended Solids	15 mg/l
Ammoniacal Nitrogen	3.8 mg/l

This should be acceptable for discharge to a watercourse or sub surface irrigation system, but would however, be subject to formal consent from the Environment Agency (this applies to Northern Ireland only). This consent may require that the above effluent figures be varied.

Price and Product Choice

	Quantity	Price per unit	Totals
BB BioDisc - 12 POP - Gravity Outlet - 450/750mm Invert TBC	1	£ 4,492.00	£ 4,492.00
Control Panel & Alarm		Included FOC	
Optional HIAB Offload	1	£ 75.00	£ 75.00
Optional Sample Chamber	1	£ 150.00	£ 150.00
TOTAL	3		£ 4,717.00

Accreditations



Klargester Sewage Treatment Plant Quotation

TERMS AND CONDITIONS	
VAT	20%
Delivery	direct to site but excludes offloading
Payment	Jewson Shrewsbury
Quote Validity	30 days
Delivery Period	9 - 11 working day's currently

IMPORTANT:

- This proposal assumes that waste disposal units will not be used.
- Please refer to our full installation, Operation and Maintenance guidelines prior to finalising the site design and layout.

For the full range of our products and services including all technical data please contact us or visit our website at:

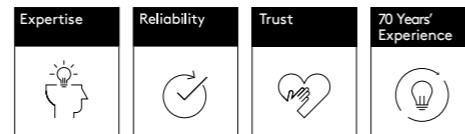
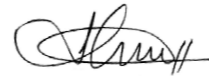
kingspan.co.uk/klargester

If required we can arrange a free site visit to assist you in finalising your site design. Please do not hesitate to contact us if you would like a meeting.

Please note all Kingspan products are made under a BS EN ISO 9001:2000 Quality Management Accreditation.

We trust our comments and enclosures are sufficient for your immediate needs. Please do not hesitate to contact us if we can be of any further assistance.

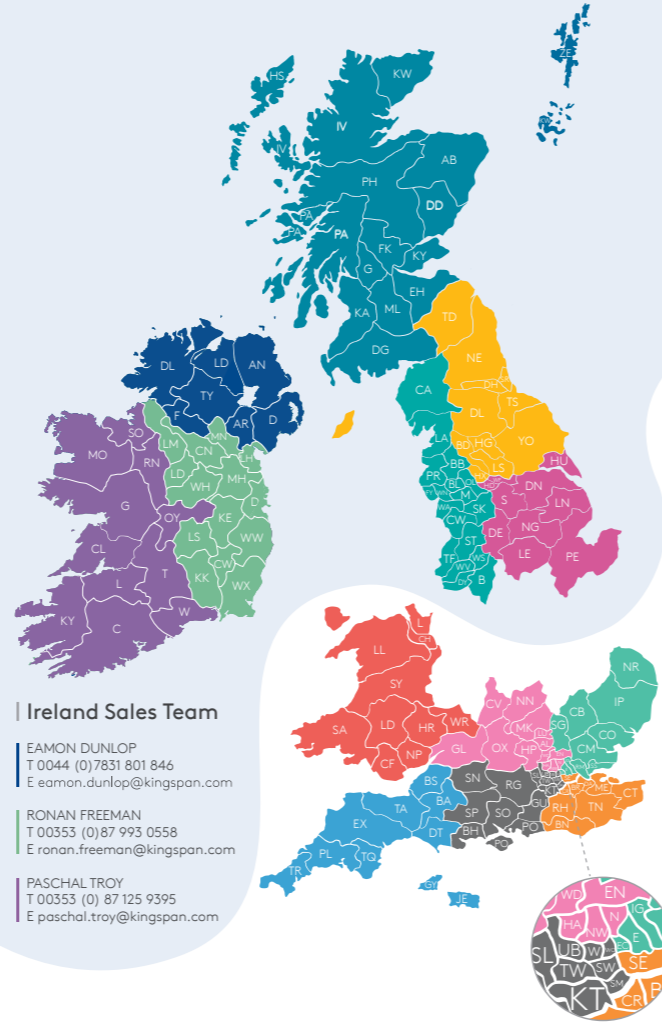
Yours faithfully,



To arrange your no-obligation technical consultation with one of our Klargester product advisors, e-mail: **klargesterin@kingspan.com** or call us on **+44 (0)28 3026 6799**



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