H Fraser Consulting
Contaminated Land and Hydrogeology

Dolau House Farm HIA

Hydrogeological Impact Appraisal

Prepared for: B Watkins and Son

Dolau House

Dolau

Llandrindod Wells

LD1 6UP

Date: 22/02/2024

Status: Final

Reference: 30724R1

Prepared by: H Fraser Consulting Ltd

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Version History

Version	Author	Approved by	Issue date	Comment
30724R1D1	Xenia Boyes Greg Walton	Joe Gomme	30/08/23	Draft report issued to client
30724R1	Xenia Boyes	Emilie Roberts	22/02/24	Final report issued to client

CONTENTS

FIGURES

TABLES

APPENDICES

1 INTRODUCTION

Richard Watkins of B Watkins and Son has appointed H Fraser Consulting Ltd to conduct a Hydrogeological Impact Assessment (HIA), which is required for a water abstraction licence application relating to three boreholes at Dolau House Farm, Dolau, Llandrindod Wells, LD1 6UP.

Natural Resources Wales's (NRW) key concern is to identify to what degree the current poultry farm groundwater abstraction regimen is derogating groundwater baseflow to the River Ithon, notably during periods of low river flows. NRW does not require a pumping test and has confirmed that a 1 km search radius for the water features survey is required.

1.1 Objectives

Preparation of a basic (Tier 1) Hydrogeological Impact Appraisal (HIA) to support a groundwater abstraction licence application.

1.2 Scope of work

The following scope of work has been undertaken:

- Desk study, including purchase of a Groundsure report
- Desk-based water features survey to 1 km radius of the abstraction boreholes
- Sitework: Determination of pumped and rest groundwater levels
- Assessment, including simple numeric groundwater modelling to investigate the lateral extent of groundwater drawdown
- Development of conceptual model
- Impact appraisal
- Reporting

2 REGIONAL WATER RESOURCE STATUS

In 2007 the Environment Agency (EA) released the report "HIA for groundwater abstractions". The report states that:

> *"England and Wales has been divided up into CAMS areas, and each area will eventually be assigned a resource availability status, from four possible categories:*
>
> *i. Water available: Water likely to be available at all flows including low flows. Restrictions may apply.*
>
> *ii. No water available: No water available for further licensing at low flows, although water may be available at higher flows with appropriate restrictions.*
>
> *iii. Over-licensed: Current actual abstraction is resulting in no water available at low flows. If existing licences were used to their full allocation they would have the potential to cause unacceptable environmental impact at low flows. Water may be available at high flows with appropriate restrictions.*
>
> *iv. Over-abstracted: Existing abstraction is causing unacceptable environmental impact at low flows. Water may still be available at high flows with appropriate restrictions."*

The site is in the River Wye CAMS area where the surface water resource availability status is "*No water available: No water available for further licensing at low flows, although water may be available at higher flows with appropriate restrictions*", therefore "*the onus is on abstractors to demonstrate that their abstraction is not part of the regional water resources problem. Abstractors may have to accept seasonal restrictions*." (EA, 2007: Table 4.1)[1]

Further detail on the River Wye CAMS is provided in The Wye Abstraction Licensing Strategy (NRW & EA 2015), which has been used to inform Sections 2.1, 2.2, and 2.3 below.

2.1 Resource availability

Surface Water

The surface water resource availability status for the site is that water is available for licensing at high, median and low flows but that at very low flows restricted water is available for licensing.

At high, median and low flows (Q30, Q50 and Q70 respectively) there is more water than required to meet the needs of the environment. Water is therefore generally available for abstraction. New licences will be considered depending on local and downstream impacts. Any consumptive licence issued will have abstraction restrictions to protect medium and low flows, and non-consumptive licences can be issued but local flow restrictions will be applied.

At very low flows (Q95), the volume of water abstraction already licensed compromises the needs of the environment. If all licensed water is abstracted, there will not be enough water left for the environment. This means:

- No further consumptive licences will be granted for abstraction at very low flows.
- Non-consumptive licences can be issued but local flow restrictions will be applied.

[1] CAMS means Catchment Abstraction Management Strategy.

In this situation, water may be available if you can 'buy' (known as licence trading) the entitlement to abstract water from an existing licence holder.

Groundwater

The degree of connection between the watercourses in the CAMS area and the regional groundwater needs to be assessed on a case-by-case basis. Groundwater flow direction within the bedrock and superficial deposits is assumed to mirror topography with groundwater discharging into the streams and rivers within the catchment area. However, the differing nature of the aquifers present across the area, from fractured limestones to mudstones, to mixed sedimentary superficial deposits, means that the volume of water that can actually/physically be abstracted from the strata will be naturally highly variable.

Abstraction from aquifers such as the river gravels would likely have a direct impact on surface water and therefore be subject to the same licensing controls as surface water.

The majority of the strata present are classed as Secondary aquifers. These strata contain permeable layers that are generally capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of baseflow to rivers. In some areas these strata are able to support larger scale commercial and public water supply abstraction.

2.2 Abstraction conditions

Abstraction conditions such as Hands-off Flow and Hands-off Level do not apply to non-consumptive abstraction (surface water and groundwater) or a consumptive groundwater abstraction assessed not to have an adverse impact on the Wye catchment Special Area of conservation (SAC) species and/or habitats. In these instances, application of abstraction restrictions will be assessed on a case-by-case basis and resource reliability discussed with you on application.

2.3 Groundwater licensing policy

The Wye Abstraction Licensing Strategy (NRW & EA 2015) states:

> *There is no separate groundwater licensing policy as such and surface water availability may override local groundwater availability. Licences will only be granted if it can be demonstrated that the abstractions (with appropriate restrictions) will have "no adverse effect" on the integrity of the River Wye SAC. The following principles will apply:*
>
> - *Any application for a new groundwater abstraction licence or upwards variation to an existing licence will be treated on a case by case basis.*
> - *Applications will be assessed as to their impact on designated sites and local features of importance such as watercourses, and other groundwater users.*
> - *We will not issue a licence that would cause deterioration in the ecological quality of a water body.*
> - *Abstraction restrictions will be dependent upon aspects such as aquifer type, the depth of the borehole/well, the proximity to a surface water course, the proximity to a designated site and local features of importance, the quantity of water applied for and purpose (how consumptive the abstraction will be).*
> - *Where a groundwater application is found to adversely impact flows in the River Wye SAC or designated tributaries then the surface water Hands-off Flow (HOF) equivalent of 1,900 Ml/d (418 mgd) restriction at Redbrook gauging station will be applied. The*

appropriate HOF location will be based on the point of impact of the groundwater abstraction and determined during the licence application process.

- *In most cases a time limit of 31 March 2027 will be applied. A shorter time period may be applied if we feel there is a need to review an abstraction earlier so we can monitor the effect of the abstraction on the SAC and change the licence conditions if necessary. In exceptional circumstances we may grant longer term licences.*
- *There is the presumption of renewal for time limited licences, subject to the three renewal criteria (environmental sustainability, continued justification of need, and efficient use of water) and local considerations such as connectivity to watercourses and wetland sites, however:*
    - *conditions may be replaced with more restrictive terms and conditions to protect the environment e.g. as a result of a WFD assessment,*
    - *renewals may be subject to minor changes including the addition of water efficiency conditions,*
    - *we will also take into account any objections received to the renewal of the licence,*
    - *where connectivity to a watercourse is a factor and the RA flows have fallen below the EFI, we may seek to reduce licensed quantities as part of the renewal process, and*
    - *where connectivity to a watercourse is a factor and the FL flows have fallen below the EFI, we may seek to reduce unused portions of licensed quantities as part of the renewal process.*
- *We will endeavour to give six years notice if a time limited licence will not be renewed or is to be renewed but on more restrictive terms that significantly impact on the use of the licence.*
- *As CAMS resource assessments and WFD assessments are reviewed and updated, we may identify water resources pressures that will need to be investigated through our Restoring Sustainable Abstraction programme (or future equivalent, if applicable).*

3 DESK STUDY

3.1 Location

Dolau House Farm is located c.5 km northeast of Llandrindod Wells, immediately adjacent to Dolau Station. The farm location is shown in Figure 3.1.

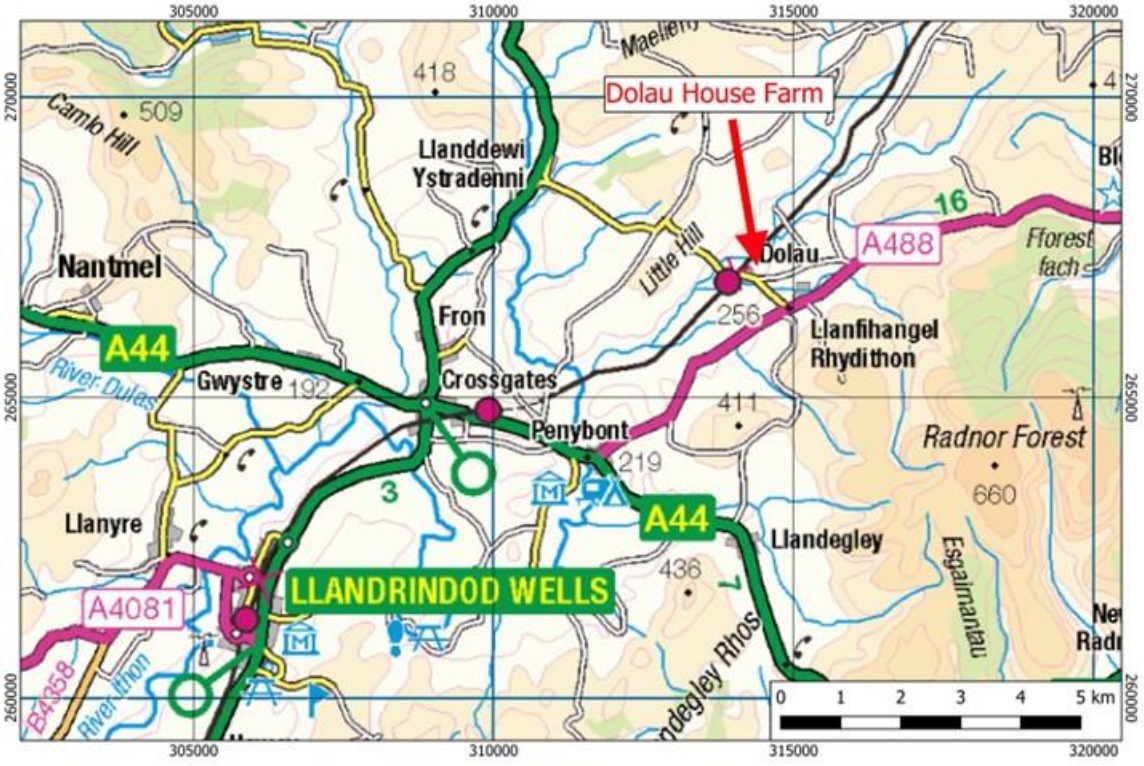

Figure 3.1 Site location

Three groundwater abstraction boreholes located on the farm provide water for the chicken sheds. For the purposes of this report, the site is defined as the three boreholes and the study area is defined as the area within 1 km of these boreholes, as shown in Figure 3.2.

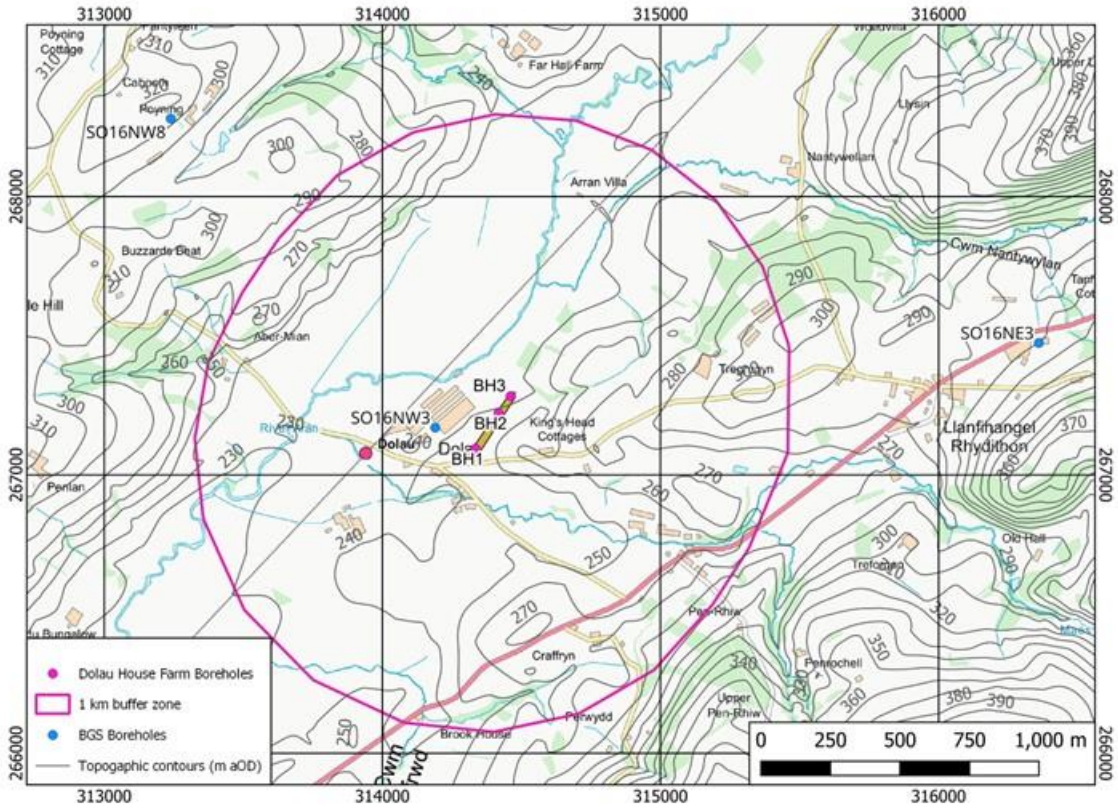

Figure 3.2 Study area

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The three boreholes associated with the farm's chicken house are located at the following: BH1 – c.109m east of the farmhouse (NGR 314342, 267090); BH2 – c.80m east (NGR 314418, 267220); BH3 – c.143m east (NGR 314456, 267276).

3.2 Current Abstraction

Dolau House Farm currently has nine chicken sheds which house c.250,000 chickens. Water is supplied to seven of the sheds by the three boreholes (BH1 – supplies shed 3; BH 2 - supplies shed 1 and 2; BH 3 – supplies shed 6, 7, 8, and 9), with the remaining two sheds on mains water. The groundwater abstraction is currently not licensed. Available borehole information is summarised in Table 3.1, with borehole logs included in Appendix A.

Table 3.1 Summary characteristics of Dolau House boreholes

Parameter	BH1	BH2	BH3
Date drilled	Jan-00	Jan-09	Oct-13
Geology	Majority mudstone	Shale to 50m; Limestone 50m to 76.2m	Banded limestone to 90m
Drilled depth	73m	76.2m	90m
Borehole diameter	200 mm	225 mm to 11.5 m 200 mm to base	200 mm to 3 m 154 mm to base
Water struck	11m, 15m, 29m, 55m	18m, 37m, 58m	28m, 45m, 76m
Screen depth	31 – 73 m	47 – 76 m	All screened
Screen diameter	unknown	150 mm	114 mm
Pump make / model	ZDS 2-24	Grundfos 5-23	Lowara 2-24
Yield details on drillers log	12 gallons per minute (i.e. 0.9 l/s)[2]	15 l/min (i.e. 0.25 l/s)[2]	2.2kW 3phase pump – duty of 2m^3/hr (i.e. 0.56 l/s)

The pipe diameter from the pumps is c.32 mm,[3] as estimated from Figure 3.1.

Figure 3.3 Photo of headworks at borehole BH2

[2] Not clear if blow yield or pump test

[3] The diptube diameter is 32 mm and this appears to be the same diameter as the outflow pipe

The water use is consumptive: the water is used as poultry drinking water, and at the end of each flock cycle, the sheds are washed. The water use is not seasonal, with maximum demand occurring on a 48-day cycle, with 38 days of growth followed by 10 days rest period. During the growing period abstraction can occur 24 hrs/day, with pumping automatically triggered by low tank volume. This results in the pump switching on and off fairly frequently (a matter of minutes). The required volume increases with the maturity of the flock and there are periods when no water is used (e.g the 7-day downtime between flocks, once the sheds have been washed).

Abstraction is recorded by means of a daily water meter reading. The abstraction history is summarised in Table 3.2.

Table 3.2 Summary of abstraction history

Maximum quantities abstracted				
yearly	**daily**	**hourly**	**peak**	**max. duration**
m^3/annum	**m^3/d**	**m^3/hr**	**l/s**	**hr/d**
12,200	75	Not measured	Unknown[4]	24

3.3 Catchment overview

Dolau House Farm is located within the Wye Catchment Abstraction Management Strategy (CAMS) area. The catchment overview is taken from NRW & EA publication "Wye Abstraction Licensing Strategy, September 2015".

3.3.1 Hydrology

The River Wye is the sixth largest river in the UK. The River Wye has a total catchment area of 4,171 km^2 spanning both England and Wales. From its source in the Cambrian Mountains of mid-Wales, the main River Wye flows for approximately 250 km (150 miles) and is varied in its character as it transforms from an upland stream to a lowland river. The river is tidal for approximately 23 km (14 miles) from the tidal limit at Bigsweir Bridge to Chepstow where it flows into the Severn Estuary.

The annual average rainfall across the area varies between 2,200 mm in the mountainous headwaters, to 700 mm in the lower catchment. The river can be flashy in nature and respond quickly following rainfall in the upper parts of the catchment, due to the low permeability of the underlying geology. Prolonged rainfall can lead to large flood events, conversely, river levels can drop quickly particularly during very dry periods.

The River Wye is a 'regulated river'. Water is released from the Elan Valley Reservoirs to support public water supply and other abstractions in the lower reaches of the Wye, when flows, as measured at Redbrook gauging station, fall below a certain threshold.

3.3.2 Geology and Hydrogeology

The solid (bedrock) geology underlying the Wye catchment ranges in age from the Precambrian to the early Jurassic. These are overlain with a patchy veneer of superficial deposits laid down during the last Ice Age and by more recent alluvial processes. The main aquifer is the Lower Old Red

[4] See Section **Error! Reference source not found.**

Sandstone covering 67% of the CAMS area. This is a Secondary (Minor) aquifer in which groundwater storage and flow is principally within joints and fault-related fracture systems. The other significant aquifers are the Carboniferous Limestone (a Principal aquifer) in the south of the catchment and the superficial deposits located along the valley floors. The remaining geological strata yield small volumes of groundwater but are still important for small-scale abstractions in the more remote areas.

3.3.3 Topography

The River Wye catchment comprises some of the most diverse rural landscapes in England and Wales, ranging from the mountainous uplands through highly developed agricultural land of the lower catchment. The River Wye rises on the slopes of Plynlimon in the Cambrian Mountains of mid-Wales at an altitude of 680 m. In its upper reaches, it is a typical fast flowing upland river with steep gradients. In its middle and lower reaches, it flows through the flatter agricultural plains of Herefordshire, and becomes siltier and slower flowing as it nears the Severn Estuary at Chepstow.

Its distinctive landscape has afforded the Wye Valley with the designation of an Area of Outstanding Natural Beauty (AONB), since 1971. The AONB is a 58 mile/92 km reach straddling the border between England and Wales from Hereford to Chepstow and is considered to be one of the finest lowland river landscapes in Britain. A small part of the catchment, around the area of Talgarth, falls within the Brecon Beacons National Park.

3.3.4 Land Use

Agriculture is the major land use in the catchment area. There are large variations in the type of farming across the catchment linked to the quality of the soil. The main urban areas within the catchment are Hereford, Monmouth, Leominster, Ross-on-Wye and Hay-on-Wye. Tourism is a major contributor to the rural economy.

3.3.5 Main Water Resources Pressures

Surface water is the main source of supply for abstraction. In the upper catchment the headwaters of the Elan River are impounded, creating the Elan Valley system of reservoirs. These are vital in providing potable water for Birmingham, Gloucestershire and South Wales. Aside from public water supply, the main pressure on water resources in the catchment is from agricultural businesses where water is required for trickle and spray irrigation and other agricultural uses. Other sectors requiring water for abstraction include the food and drink manufacturers, quarry operators and golf clubs.

3.3.6 Ecological importance

The River Wye system acts as an important wildlife corridor, an essential migration route and a key breeding area for many nationally and internationally important species. The ecological value of the river and its tributaries is recognised through their national designation as Sites of Special Scientific Interest (SSSIs) and as a riverine SAC under the European Union Habitats Directive (1992). The SAC designation applies to the River Wye itself and some of its tributaries including the Rivers Llynfi, Bachhowy, Edw, Duhonw, Irfon, Dulas, Ithon, Aran, Elan and Lugg (up to Hampton Court Weir). The River Wye SAC has been designated for its range of migratory fish, particularly salmon, shad and lamprey species, which spawn mainly in the gravel shoals in the middle and upper catchment. Other SAC species include the white-clawed crayfish, which occur in coarser sediments along its length; otters which live and breed in the river and along the banks throughout the catchment; and bullheads which are widespread. Also of importance are the communities of water crowfoot (Ranunculus) and a small area of watershed mire. All these features are considered potentially sensitive to abstraction pressures.

The River Wye and its tributaries also support UK Biodiversity Action Plan (BAP) species, many of which are at risk from abstraction. These include otter, watervole, twaite and allis shad, depressed river and freshwater pearl mussels, white-clawed crayfish (a seriously threatened species), river lamprey, fine lined pea mussel and river jelly lichen, common frog, toad, palmate and smooth newt. Other species within the system depend on still waters and damp habitats and are equally vulnerable to changes in hydrology and groundwater levels.

The River Wye is the only UK river that supports all six unionid mussels found in the UK. The rare pearl mussel and depressed river mussel (both UK BAP priority species) have been recorded. These species lives on silty river margins and are vulnerable to abstraction. Rare invertebrates are present throughout the catchment.

The River Monnow supports nationally rare shoal invertebrates, while a rare diving beetle is present in the Wye at Glasbury and Rhayader. The Wye catchment makes an ideal environment for migratory fish and also supports many species of coarse fish.

The River Wye flows into the Wye Estuary (SAC designation), and subsequently the Severn Estuary, which is designated as a SSSI, a Habitats Directive Special Protection Area (SPA) and SAC. The Severn Estuary is included on the list of wetlands of international importance under the Ramsar Convention (Ramsar Site).

Over time, development pressure and changing agricultural practices have adversely affected water bodies and watercourses within the catchment and caused significant loss or deterioration of wetland habitats. This has led to many of the remaining water related habitats being formally recognised through statutory protection and / or by the UK and local BAPs.

3.4 Hydrology

3.4.1 Rainfall

The nearest Met Office weather station is Sennybridge (NGR 289451 241743, 307 m aOD)[5], c.21 miles from Dolau House Farm. Climate averages at Sennybridge are shown in Table 3.3.

Table 3.3 Meteorological data

Month	Max. temp (°C)	Min. temp (°C)	Days of air frost (days)	Rainfall (mm)	Days of rainfall ≥1 mm (days)
Jan	5.98	0.63	13.22	171.82	18.75
Feb	6.43	0.45	11.72	136	15.46
Mar	8.69	1.5	9.7	117.79	14.83
Apr	11.63	2.9	5.66	94.79	13.57
May	14.69	5.48	1.86	93.71	13.33
Jun	17.19	8.32	0.13	90.13	12.43
Jul	18.83	10.17	0	102.33	13.87
Aug	18.45	9.98	0	112.56	15.06

[5] https://www.metoffice.gov.uk/research/climate/maps-and-data/uk-climate-averages/gcm2jvb2g

Month	Max. temp (°C)	Min. temp (°C)	Days of air frost (days)	Rainfall (mm)	Days of rainfall ≥1 mm (days)
Sep	16.19	8	0.27	116.91	13.37
Oct	12.52	5.88	2.57	168.71	17.2
Nov	8.86	2.95	6.72	168.77	18.63
Dec	6.42	0.96	11.79	192.1	18.77
Annual	**12.19**	**4.79**	**63.64**	**1565.62**	**185.27**

3.4.2 Rivers

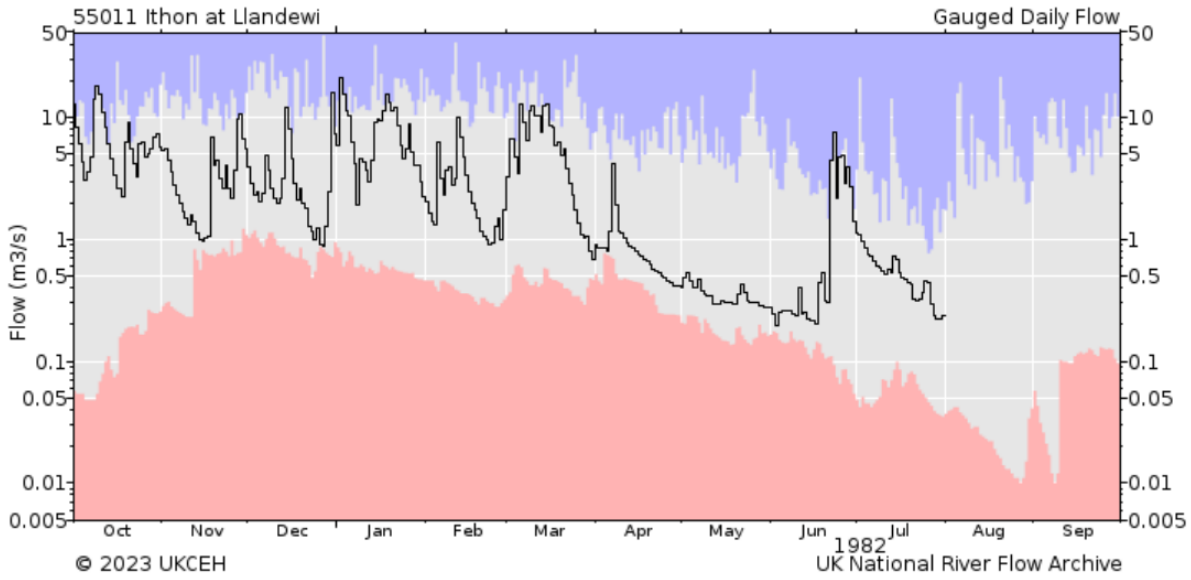
Dolau House Farm is located within the Wye catchment. Locally, the main watercourse is the River Aran, located c.200 m northwest of the Dolau House boreholes. The farm sits between the Aran to the north and Maes Brook to the south; their confluence is southwest of the site. The River Aran discharges into the River Ithon approximately 3 km southwest of Dolau House Farm. The River Ithon discharges to the River Wye approximately 16 km southwest of Dolau House Farm, just south of the town of Newbridge.

Historic flow data exists for the River Ithon at Llandewi[6] (NGR SO 104 682), c.4 km west (i.e. upstream) of the Dolau House boreholes, as summarised in Table 3.4 and Figure 3.4.

Table 3.4 Daily flow data for the River Ithon at Llandewi

Period of Record:	1959 - 1982
Percent Complete:	98 %
Base Flow Index:	0.38
Mean Flow:	2.626 m^3/s
95% Exceedance (Q95):	0.137 m^3/s
70% Exceedance (Q70):	0.62 m^3/s
50% Exceedance (Q50):	1.413 m^3/s
10% Exceedance (Q10):	6.598 m^3/s
5% Exceedance (Q5):	9.678 m^3/s

[6] https://nrfa.ceh.ac.uk/data/station/info/55011



Key: Red and blue envelopes represent lowest and highest flows on each day over the period of record.

Figure 3.4 Hydrograph for the River Ithon at Llandewi

The River Ithon at Llandewi has a catchment area of 111 km^2 and a baseflow index (BFI)[7] is 0.38. Between 1959 and 1982 the mean flow was 2.63 m^3/s and the Q95 flow was 0.14 m^3/s.

3.5 Geology

The solid geology underlying the site is the Nantglyn mudstone formation, defined as 'alternating beds of fine shales and turbidite mudstone'[8] to the northwest and the Crûg mudstone to the southeast, the latter formerly known as 'Lower Ludlow shale' – a medium grey graptolitic mudstone that weathers to 'slatey shale'[8]. These are shown in Figure 3.5.

This geology has been subject to significant tectonic activity, creating a collection of faults (three of which occur within the 1 km buffer zone) known as the Llangullo Pontesford Fault Group.

Bedrock is exposed c.700 m northwest and c.210 m southeast of the boreholes, but in the central region of the 1 km buffer zone superficial deposits are at the surface; Alluvium has been deposited by the River Aran, and Till has been deposited by previous glacial activity. BGS maps superficial deposits as Alluvium in a narrow band along the course of the River Aran, with Till elsewhere. Only Till is mapped around the existing boreholes.

[7] BFI is the proportion of the river runoff that derives from stored sources; the more permeable the rock, superficial deposits and soils in a catchment, the higher the baseflow and the more sustained the river's flow during periods of dry weather. The BFI of 0.38 means that 38% of the flow is from groundwater, 62 % from rainfall runoff

[8] Teme Valley Geological Society, assisted by the Earth Heritage Trust. Knighton Map – England and Wales Geological Sheet 180

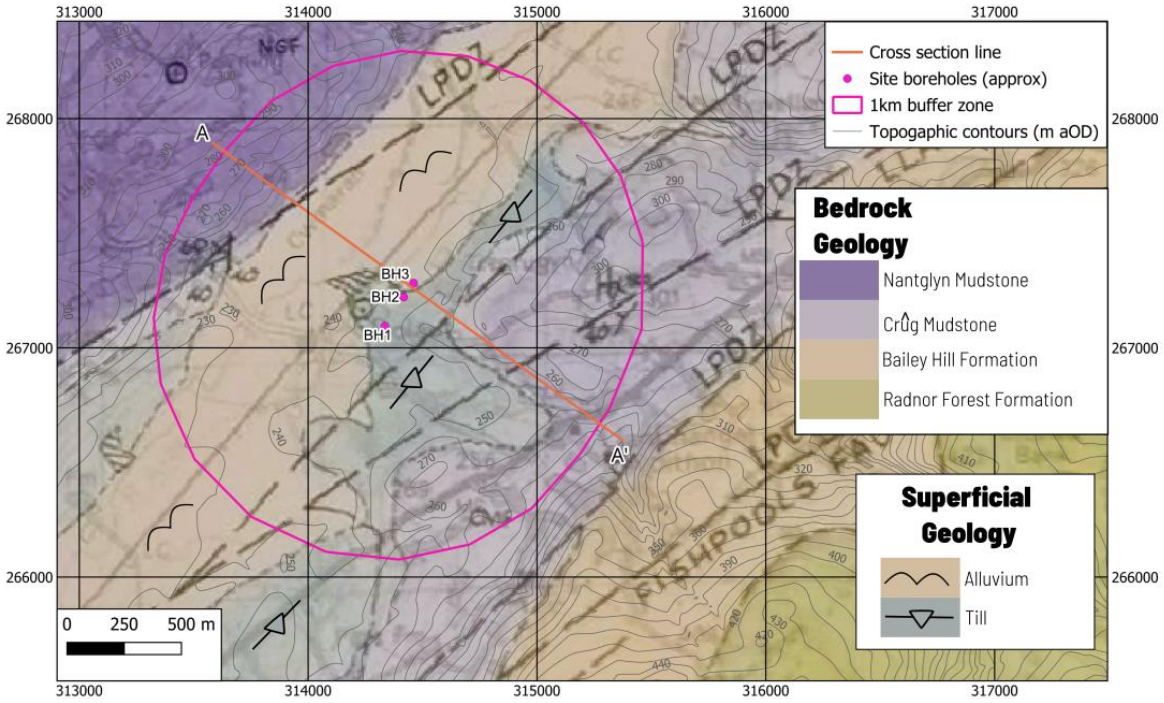


Figure 3.5 Superficial and bedrock geology

Local BGS borehole logs are summarised in Table 3.5, with borehole locations shown in Figure 3.2. The borehole records confirm the mapped geology, with the bedrock comprising mostly of shale with some areas of limestone.

Table 3.5 Local BGS borehole data

Borehole Reference	Easting	Northing	Geology	Water Encountered
SO16NW3	314190	267170	From the surface to 7.3 m bgl the ground is unconsolidated gravel underlain by shale to 40 m bgl.	Not recorded
SO16NE3	316360	267474	Topsoil to 1 m bgl, underlain by 54 m of limestone.[10]	Not recorded
SO16NW8	313239	268280	Unconsolidated gravel to 7.6 m bgl, underlain by shale bedrock to 105 m bgl.	4.0 m bgl and at 84 m bgl

3.6 Hydrogeology

The bedrock aquifer within a 500 m radius of the boreholes is classed as a Secondary B aquifer (previously minor and/or non-aquifer), as shown in Figure 3.6.[11]

[10] No limestone is mapped on site and this is inconsistent with the logs of BH1 and BH3; this may be a driller's logging error.

[11] Groundsure report GS-7NU-DJP-PLI-6B2.

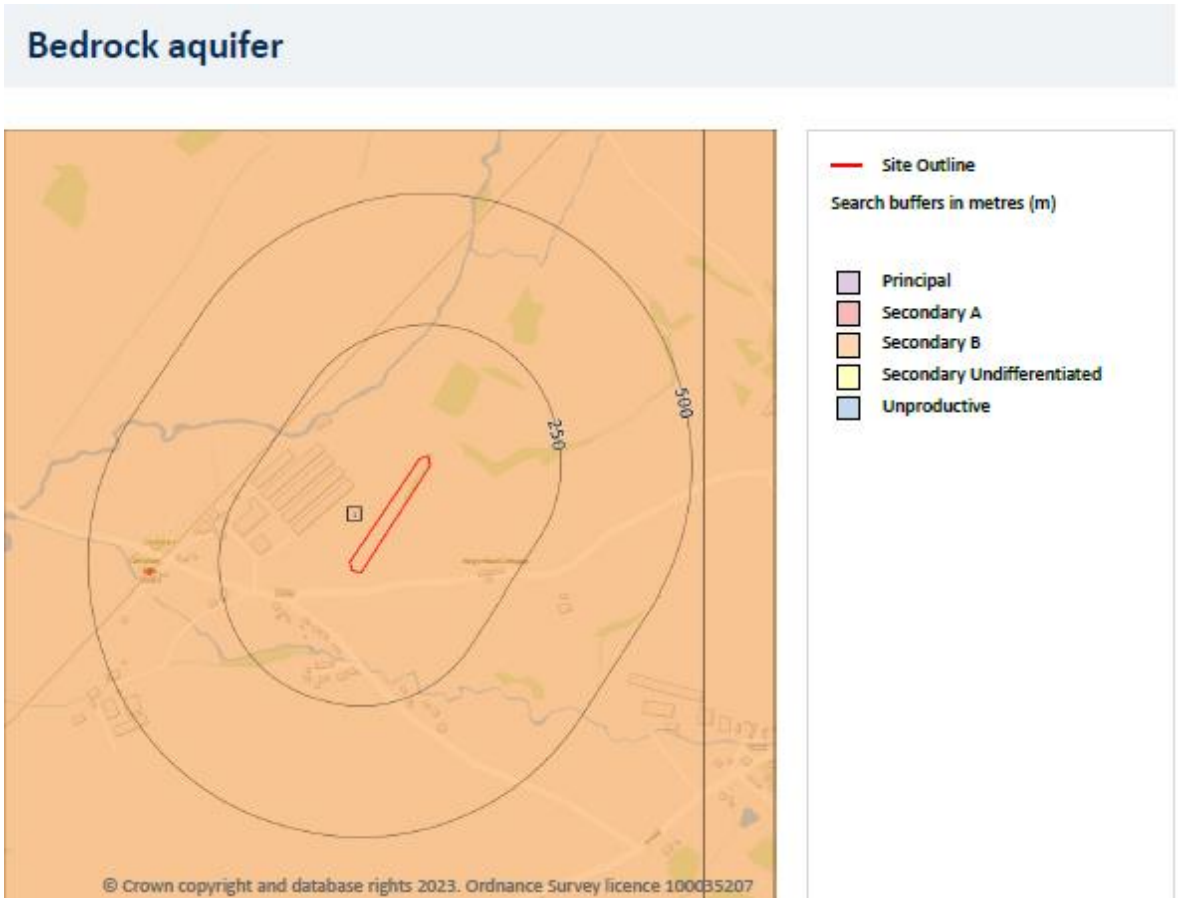


Figure 3.6 Aquifer classification of study area

The permeability of this aquifer is likely to be secondary, meaning the permeability is due to fissures/weathering in the rock, rather than the permeability of the rock matrix, which in this case being shale/mudstone, is negligible.

Alluvium and Till, the superficial deposits that underlie the site, are generally designated minor aquifer and non/minor aquifer respectively. However, these are unlikely to contribute to the groundwater as the depth to the water table is considerably lower than the depth of superficial deposits[12].

The boreholes do not lie within 500 m of a source protection zone (SPZ).

3.7 Environmental designations

Environmental designations recorded within 1 km of the Dolau House boreholes are shown in Figure 3.7 and summarised in Table 3.6. This information is obtained from Groundsure report GS-7NU-DJP-PLI-6B2 (Appendix B).

[12] Groundsure report GS-7NU-DJP-PLI-6B2

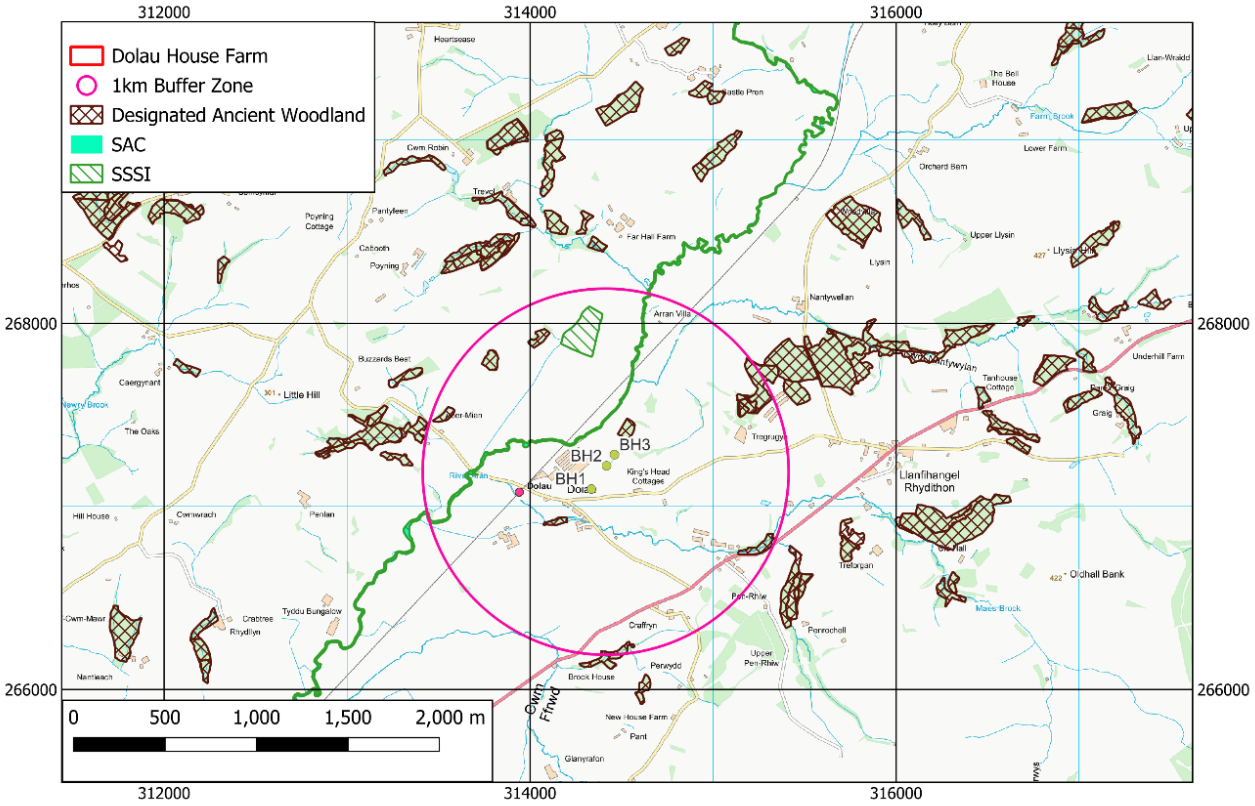


Figure 3.7 Environmental designations

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Table 3.6 Environmental designations within 1 km of Dolau House boreholes

Designation	Name	Location	Description
SSSI	River Aran	c.205 m NW	The River Aran, located c.205m northwest of the Dolau House boreholes, is a Site of Special Scientific Interest (SSSI) and is also part of the River Wye SAC. It is recognized for the wet hollows created by the river's flooding which have allowed rare flora to thrive.
SAC	River Wye	c.205 m NW	The River Wye is a nationally important area for conservation due to its importance for breeding otter, spring salmon and the growth of rare aquatic plants such as water crowfoot.
SSSI	Far Hall Meadow	c.729 m NW	This floodplain habitat is protected for the flora and fauna it supports.
Designated Ancient Woodland		9 within 1 km	The forests adjacent to the site vary between ancient semi-natural woodland; plantations on ancient woodland sites and restored ancient woodland sites. The nearest designated ancient woodland is c.205m NE of the borehole 2.

4 WATER FEATURES SURVEY

A desk-based water features survey of 1 km radius has been undertaken using data from Ordnance Survey maps, a Groundsure EnviroInsight report and a query to Powys Council regarding private water supplies. Water features are shown in Figure 4.1.

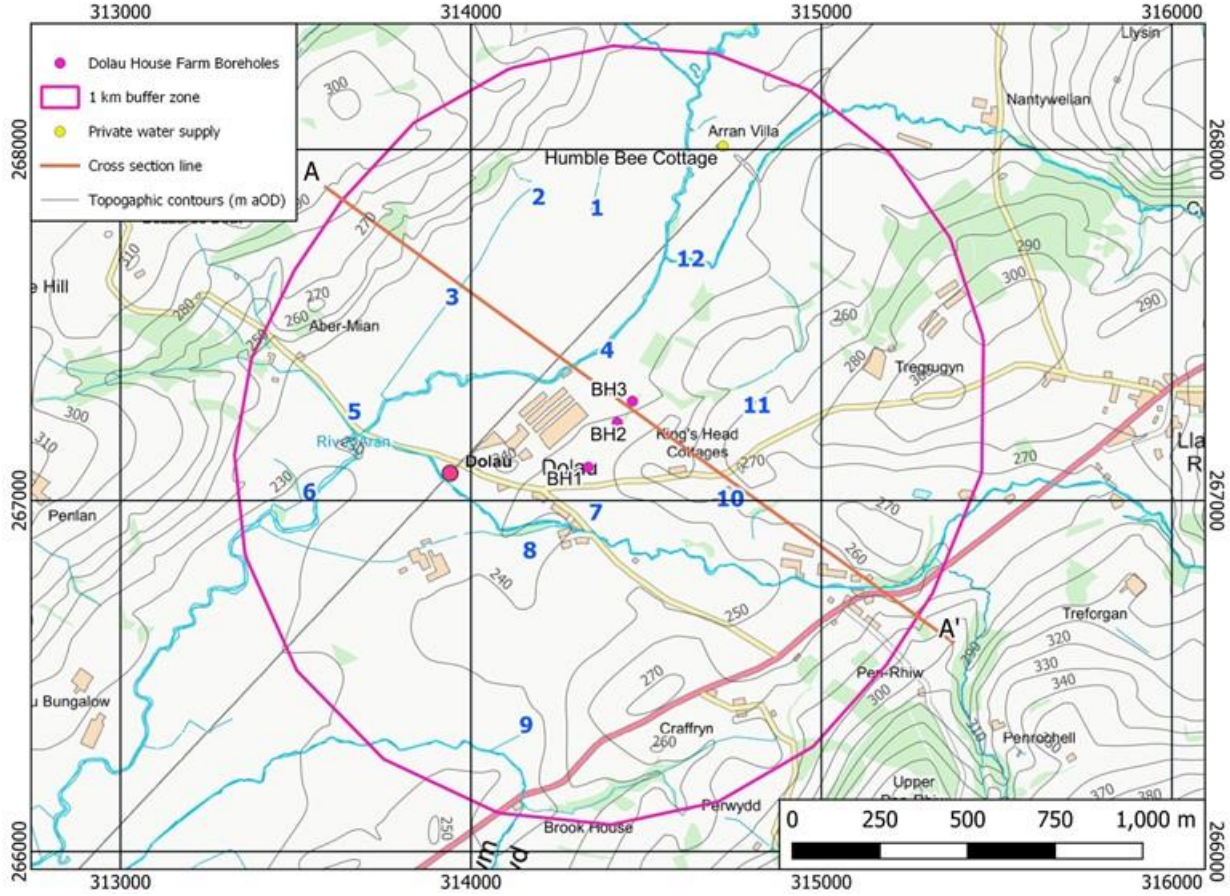


Figure 4.1 Water features within the study area

Contains Ordnance Survey data © Crown copyright and database right 2024

Watercourses are numbered 1 to 12 as per Table 4.1

4.1.1 Watercourses

There are 12 waterbodies within a 1 km radius of the abstraction boreholes, of which three are small (less than 200 m in length). The watercourses are summarised in Table 4.1 and numbered in Figure 4.1. Locally, the nearest river is the River Aran; at the nearest point BH3 is located c.150 m from it. The river flows c.3.3 km southwest to a confluence with the River Ithon, itself connecting to the major River Wye c.12 km southwest. The watercourses are summarised in Table 4.1 below (note: the distance and direction are taken from the position of the label of each watercourse as shown in Figure 4.1, which is the closest point to the abstraction boreholes).

Table 4.1 Watercourses within the study area

Reference number in Figure 4.1	Distance / direction from site	Description
1	550 m NW	Minor tributary of River Aran
2	680 m NW	Minor stream draining into 3
3	580 m NW	Tributary of River Aran
4	150 m NW	River Aran
5	730 m W	Tributary of River Aran
6	820 m W	Minor tributary of River Aran
7	170 m S	Maes Brook
8	170 m SW	Bypass channel from Maes Brook to River Aran
9	760 m S	Tributary of River Aran
10	460 m SE	Minor watercourse with no apparent outlet
11	300 m NE	Minor watercourse with no apparent outlet
12	420 m N	Tributary of River Aran

4.1.2 Other waterbodies

There is one other waterbody within 1 km of the Dolau House boreholes; a pond located c.940 m E of the abstraction boreholes.

4.1.3 Springs

There are no springs mapped within 1 km of the site.

4.1.4 Aquifer – superficial

Superficial aquifer designations do not appear to be recorded in Wales. However, the Till is likely to be a minor / non-aquifer and the Alluvium is likely to be a minor aquifer.

4.1.5 Aquifer – bedrock

The bedrock unit that underlays the entire study area is classified as a Secondary B aquifer.

4.1.6 Abstractions – licensed

There are no licensed groundwater or surface water abstraction licences within 1 km of the boreholes.[13]

4.1.7 Abstractions – unlicensed

Powys Council hold records regarding unlicensed private water supplies for one property within 1 km of the site, shown in Figure 4.1. This property, Humble Bee Cottage, is a single domestic supply, using approximately 0.4 m^3/day.

[13] Groundsure report GS-7NU-DJP-PLI-6B2.

5 SITE INVESTIGATION

Water level loggers were installed into BH1, BH2, and BH3 for 18 days, between 07 July and 24 July 2023. The loggers were installed to cover the peak demand during the end of the growing cycle[14], as well as the rest period following the growing cycle. Site operations and water consumption (measured daily) during this time are summarised in Table 5.1 and Figure 5.1.

Table 5.1 Site operations and water consumption

Date range	Site operations	Boreholes used	Average consumption (m^3/day)
07 - 17 July 2023	Peak demand	BH1	8.8
		BH2	17.1
		BH3	18.3
			Total: 44.1
18 – 19 July 2023	Poultry depleted	BH1	8.1
		BH2	17.4
		BH3	11.4
			Total: 36.9
20 – 21 July 2023	Start of rest period: Washdown of poultry sheds	Mostly BH2	Unknown (no meter)
22 – 24 July 2023	Rest period	BH1 and BH3	Minimal

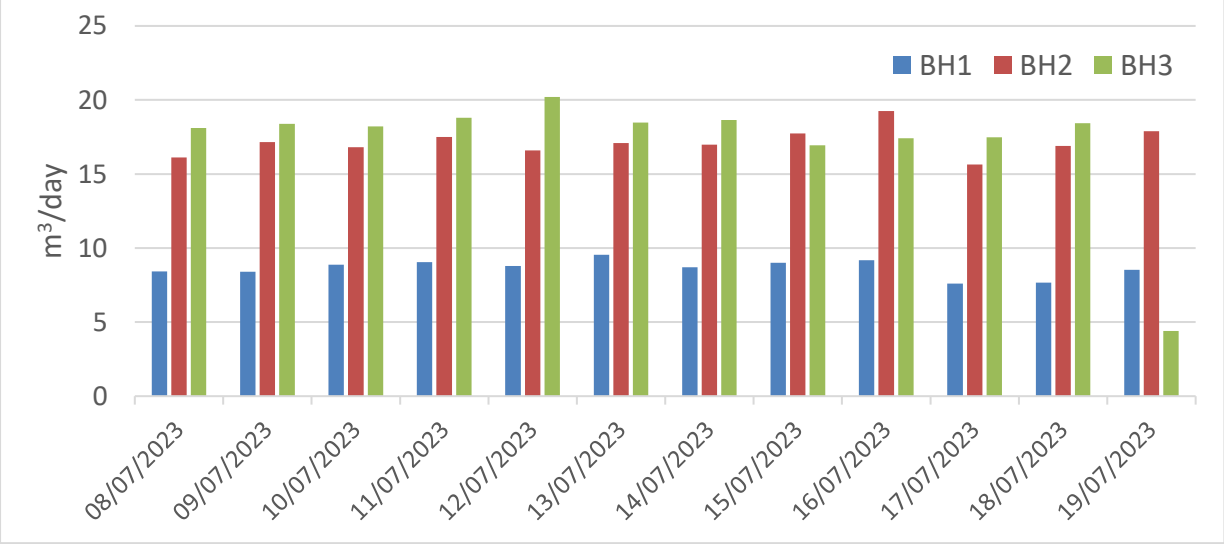


Figure 5.1 Daily water consumption

[14] Growing cycle ran from 12 June to 18 July

During the site visit on 7 July, instantaneous flow rate from each borehole was estimated. The pipeline from each borehole to the sheds has a tap. Flow rate was measured at each tap by recording the time to fill a bucket. It is noted that flow rate tests on boreholes BH2 and BH3 during did not capture all the flow as some was going to the chickens. Results are shown in Table 5.2.

Table 5.2 Instantaneous flow rates (approximate)

Borehole	Flow rate (l/s)
BH1	0.7
BH2	0.7
BH3	1.4
Total	**2.84**
Total assuming half of flow at BH2 and BH3 to chickens	**5.0**

Borehole parameters obtained during the test are shown in Table 5.3. Groundwater levels at BH1, BH2, and BH3 during the test period are shown in Figure 5.2.

Table 5.3 Borehole parameters

Parameter	BH1	BH2	BH3	Total
Ground level (m aOD)[1]	245	244	242	
Pump depth (m bgl)	64	68	61	
Rest water level (m bgl)[2]	6	8	6	
Maximum pumped water level (m bgl)	49	68	23	
Average pumped water level (m bgl)	10.2	24.6	14.7	
Average drawdown (m)	4.2	16.6	8.7	
Average daily flow during growing cycle (m^3/day)	9	17	17	43
Average annual flow (m^3/year)[3]	2,500	4,800	4,800	12,100

[1]Approximate: obtained using Google Earth
[2]Inferred
[3]Assuming 37 days growing and 11 days rest (with no abstraction during rest days)

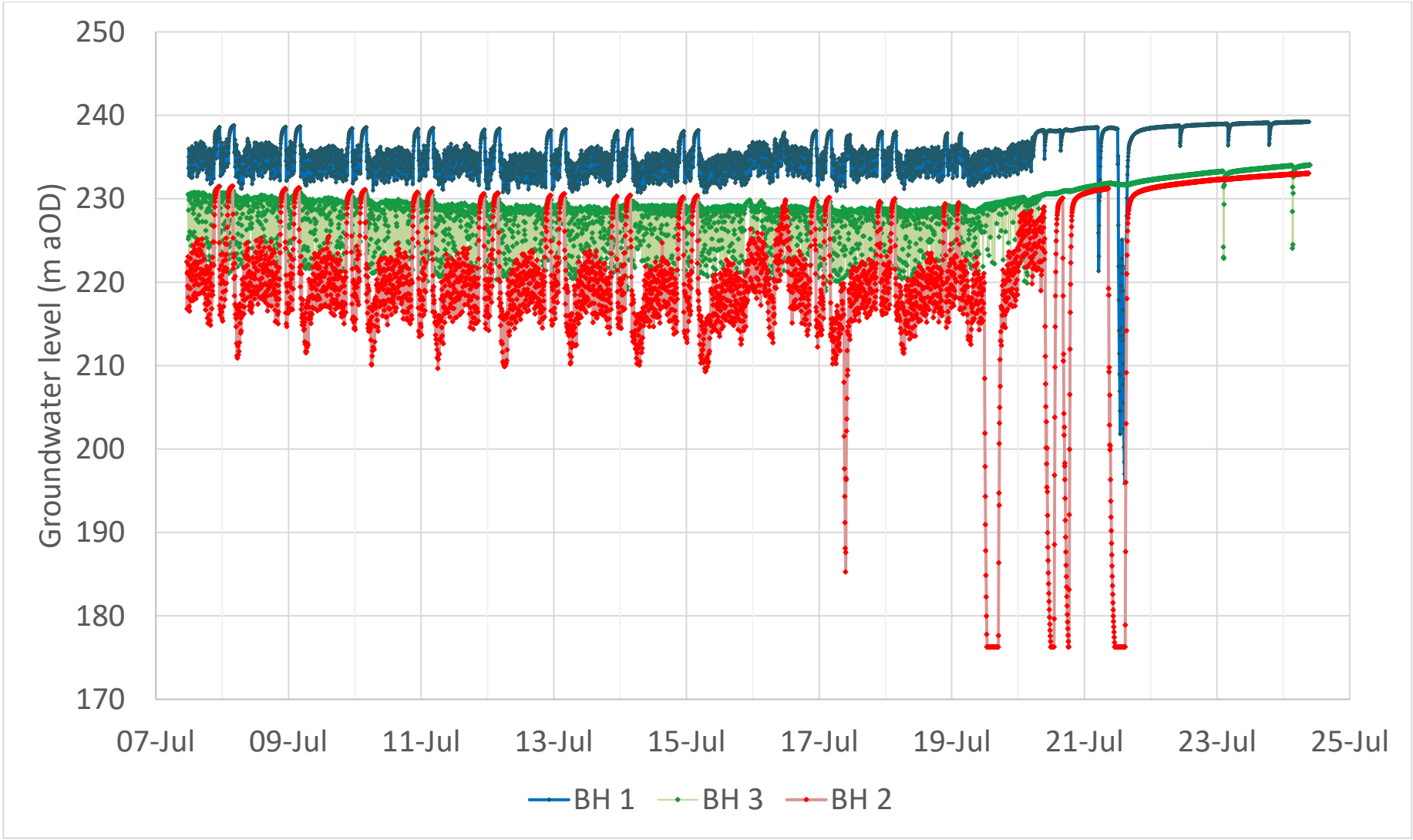


Figure 5.2 Groundwater level during test period

The following points are noted:

- Rest water level was not observed during the test therefore was inferred by extrapolating the recovery curves.
- During the growing cycle the boreholes did not run dry. However, the borehole pumps stay on for a short duration (a matter of minutes), therefore the logging frequency of 5 minutes could be insufficient to capture the full extent of the drawdown for each occasion the pump is on.
- During the washdown period (19 – 21 July) BH2 briefly ran dry on four occasions. Maximum drawdown was also seen in BH1 during this period. Water used during the washdown is not on a meter therefore the volumes and abstraction rates are were not recorded. However, these are estimated in Table 5.4, by comparing the groundwater level drawdown in the growing cycle and in the washdown (see Appendix C).

Table 5.4 Estimated washdown rates and volumes

Parameter	Unit	BH1	BH2	Total
Washdown rate	l/s	1.00	1.98	5.0
	m3/hr	3.58	7.13	17.8
Volume used during washdown	m3	10.75	110.44	121
	m3/d	3.58	36.81	40

- Groundwater levels within the boreholes did not appear to be significantly influenced by pumping in the neighbouring boreholes. This is most clearly seen during the wash down and recovery period (20 July onwards)

6 CONCEPTUAL MODEL

Dolau House Farm currently has nine chicken sheds which house c.250,000 chickens. Water is supplied to seven of the sheds by the three boreholes (BH1 – supplies shed 3; BH 2 - supplies shed 1 and 2; BH 3 – supplies shed 6, 7, 8, and 9), with the remaining two sheds on mains water. The abstraction is currently not licensed.

The local geology comprises Ordovician and Silurian aged sedimentary rocks (mudstones interbedded with shale), cut through by faulting activity. These are overlain by alluvium and till. Mudstone is highly impermeable, therefore the designation of the site as a secondary B aquifer is likely to be entirely due to fissures and fracturing within the bedrock.

The nearest watercourse is Maes Brook, located 170 m south. The largest watercourse is the River Aran; at the nearest point BH3 is located c.150 m from it. The river flows c.3.3 km southwest to a confluence with the River Ithon, itself connecting to the major River Wye c.12 km southwest. The River Ithon is a SSSI as well as part of the River Wye Special Area of Conservation.

The desk study also elucidated that the only usage of groundwater within 1 km of the site is an unlicensed private supply, pumping approximately 0.4 m^3/day.

Water level loggers were installed into BH1, BH2, and BH3 for 18 days, between 07 July and 24 July 2023, which were used to measure groundwater level during peak demand and the rest level. The rest water level was found to be between 6 – 8 m bgl across the three boreholes. The average pumped water level was found to be between 10 – 25 m bgl for the three boreholes. Pumping from each borehole did not have a major effect on the water levels in the nearby boreholes. The average daily abstraction, during the growing period, from all the boreholes combined is c.43 m^3/day.

A conceptual hydrogeological cross-section is presented below in Figure 6.1.

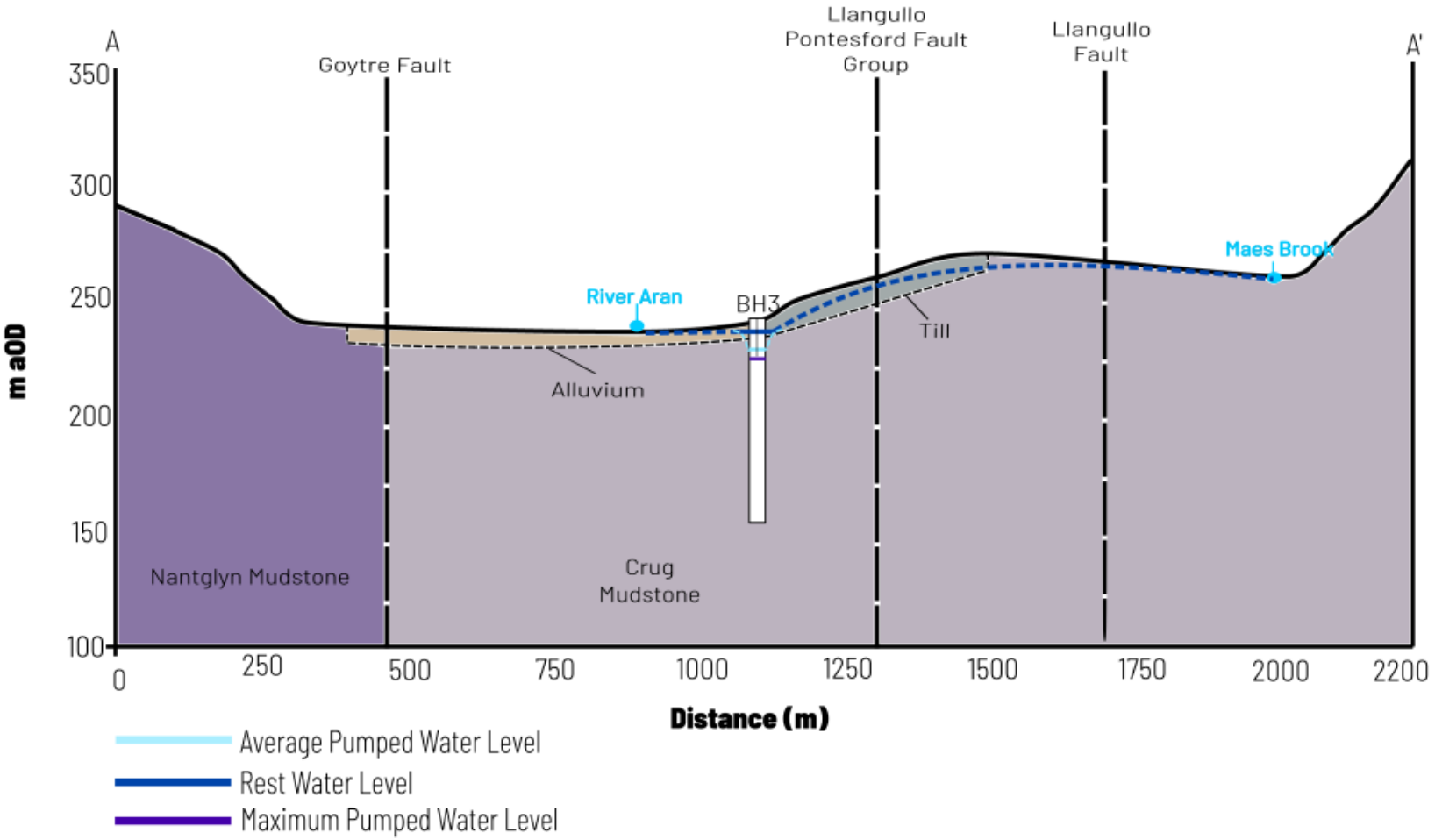


Figure 6.1 Hydrogeological cross section

7 HYDROGEOLOGICAL IMPACT ASSESSMENT

The groundwater abstraction at Dolau House Farm has the potential to impact any nearby watercourses, waterbodies, and other groundwater abstractions. A water features survey has been conducted which has identified a number of water features within a 1 km radius of the groundwater abstraction at Dolau House Farm (Section 4). Of greatest concern in the region is a reduction in groundwater baseflow to the River Wye and its tributaries, one of which is the River Aran, located c.150 m from the Dolau House abstraction.

To assess whether the Dolau House Farm abstraction will have an impact on the local water features a dual approach has been taken.

- Firstly, the radius of influence around each borehole will be calculated based on the measured drawdown and average pumping rates.
- Secondly, a water balance calculation will compare the annual average pumped volume at the farm to annual rainfall across the local catchment.

7.1 Abstraction volumes

The maximum required abstraction volumes, in terms of the licence application, are presented in Table 7.1. Where appropriate, these volumes are used in later calculations.

Table 7.1 Maximum volumes for abstraction licence (both boreholes combined)

Timescale	Value	How derived
Annual	14,342 m^3/a	Growing cycle: 13420 m^3/a is maximum historic record plus 10% increase for climate change. Washdown: 922 m^3/a (see Appendix C)
Daily	83 m^3/d	Maximum historic record plus 10% increase for climate change
Hourly	18 m^3/hr	Estimated maximum washdown useage if all three boreholes pumping at once (see Appendix C)
Instantaneous	5 l/s	Pro-rata'd from hourly value. Also estimated during site visit
Max. duration	24 hr/d	

7.2 Radius of influence

The radius of influence around a pumped borehole gives the expected distance from the borehole that a measurable effect on the groundwater level is expected. Beyond this radius of influence the groundwater level, and subsequently any surface water bodies that are fed by groundwater, will not be affected by the groundwater abstraction.

The radius of influence (R_0) can be estimated, following the method of Sichardt (Equation 1), given the permeability of the aquifer (k), the borehole radius (r_e) and the drawdown in the pumped borehole ($H - h_w$):

$$R_0 = R_0 = r_e + C(H - h_w)\sqrt{k} \qquad \textbf{Equation 1}$$

where C is an empirical calibration factor. If (H – h_w) and k are in m and m/s respectively to obtain R_0 in m, C is taken to be 3000 for a circular zone of influence.

The permeability of the aquifer underlying Dolau House Farm is unknown and is likely to be highly variable. However, as we know the average pumping rate associated with each borehole we can use the Dupuit-Thiem equation (Equation 2), which relates flow rate (Q) to permeability (k), drawdown (H-h_w), and radius of influence (R_0) to perform an inverse calculation for the permeability and the radius of influence.

$$Q = \frac{\pi k(H^2 - {h_w}^2)}{\ln\left({}^{R_0}/_{r_e}\right)} \qquad \textbf{Equation 2}$$

The results of this calculation, as well as the parameters used for each borehole, are summarised in Table 7.2.

Table 7.2 Calculated radius of influence

Parameter	Symbol	Units	BH1	BH2	BH3
Borehole radius	r_e	m	0.05	0.05	0.05
Initial water level (above base of aquifer)	H	m	44	42	44
Final water level (above base of aquifer)	h_w	m	39.8	25.4	35.3
Flow rate	Q	m^3/day	9	17	17
Permeability	**k**	**m/day**	**0.042**	**0.031**	**0.047**
Radius of influence	**R_0**	**m**	**9**	**30**	**19**

The following assumptions are made:

- The aquifer is unconfined.
- Flow in the aquifer is homogeneous, this is unlikely to be the case as the aquifer permeability is thought to be secondary, i.e. through fractures. The aquifer thickness is not known, but as the anticipated groundwater flow is via fractures which tend to be more closed with depth, an estimated aquifer thickness of 50 m has been used.
- The flow rates used (total of 43 m^3/d) are those measured during the end of the growing cycle, when consumption is highest (Table 5.3). The total is similar to the daily equivalent of the annual quantity (39 m^3/d). It is noted that the requested daily maximum is higher (83

m^3/d), but it is considered appropriate to use long term rates for the radius of influence calculations

The calculated radius of influence around each borehole is shown in Figure 7.1.

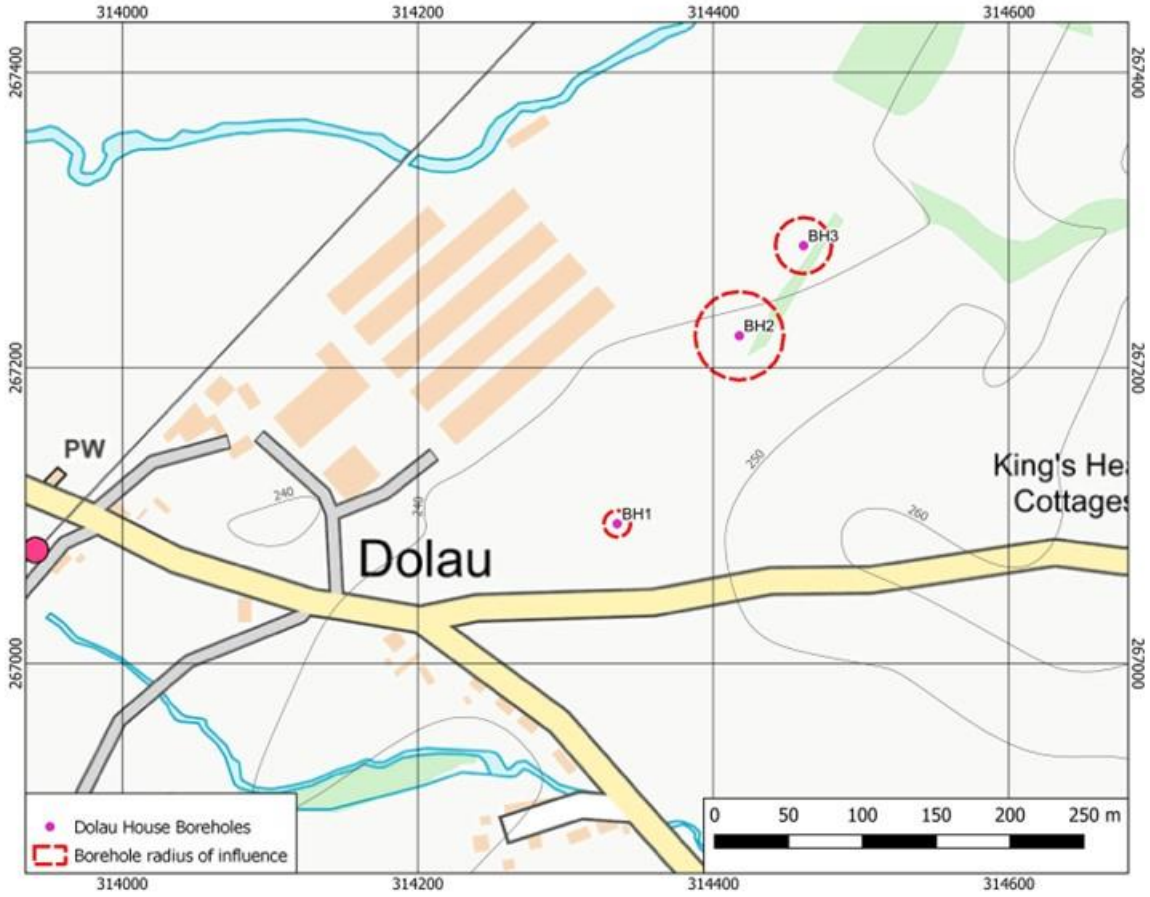


Figure 7.1 Radius of influence around abstraction boreholes

It is clear that the expected radius of influence around each abstraction borehole does not intercept any of the nearby water features identified in Section 4.

7.3 Water balance

In addition to calculating the radius of influence around each abstraction borehole a water balance calculation has been carried out to compare the total annual volume of water pumped, to the annual rainfall and recharge across the area.

The maximum annual volume of groundwater abstracted at Dolau House Farm is 14,342 m^3.

Effective rainfall is the portion of rainfall that contributes directly to soil moisture and isn't lost through runoff or evaporation. It represents the amount of precipitation that effectively replenishes groundwater. The effective rainfall is calculated by subtracting evaporation (calculated from average monthly temperatures) and rapid runoff (assumed to be 30% of rainfall) from the overall rainfall. The total and effective rainfall calculated from the Sennybridge meteorological data are summarised in Table 7.3.

Table 7.3 Effective and total annual rainfall

Month	Average daily rainfall (mm)	Average daily runoff (mm)	Average daily Evaporation (mm)	Average daily effective rainfall (mm)
Jan	5.54	1.66	0.38	3.50
Feb	4.81	1.44	0.67	2.70
Mar	3.80	1.14	1.29	1.37
Apr	3.16	0.95	2.20	0.02
May	3.02	0.91	2.12	0.00
Jun	3.00	0.90	2.10	0.00
Jul	3.30	0.99	2.31	0.00
Aug	3.63	1.09	2.54	0.00
Sep	3.90	1.17	1.98	0.75
Oct	5.44	1.63	1.02	2.78
Nov	5.63	1.69	0.50	3.44
Dec	6.20	1.86	0.32	4.02
Annual total	**1566**	**470**	**532**	**564**

The average annual total rainfall in the area is 1,566 mm, with c.564 mm of effective rainfall.

Given these rainfall rates the equivalent surface area of rainfall that is needed to supply the Dolau House abstraction boreholes can be calculated. Using the total annual rainfall of 1,566 mm, and the Dolau House annual abstraction of 14,342 m^3, rainfall across an area of only 0.9 ha (9164 m^2) would be required. Taking the effective rainfall instead of the total rainfall, an area of 2.5 ha (25,429 m^2) would be required.

The water features survey (Section 4) identified Maes Brook and the River Aran, as well as several of their tributaries, as surface water receptors near the site. The catchment area of Maes Brook where it passes Dolau House Farm is c.8.6 km^2, while the catchment area of the River Aran at the closest point to the abstraction boreholes c.39 km^2.[15] When compared to the catchment areas of these water features, the Dolau House groundwater abstraction is negligible, accounting for 0.3% of the Maes Brook catchment, and 0.07% of the River Aran catchment.

Finally, the peak daily abstraction rate at Dolau House (83 m^3/day) can be compared to the River Ithon Q95 flow at Llandewi. The Q95 flow rate represents low flow conditions, giving the river flow rate that is exceeded 95% of the time. At Llandewi the River Ithon Q95 flow rate is 0.14 m^3/s (12,100 m^3/day). The Dolau House average abstraction rate is 0.32 % and the peak recorded abstraction rate is only 0.69 % of the River Ithon flow rate during low flow conditions.

[15] https://fehweb.ceh.ac.uk/Map

Even assuming, therefore, that all of the water abstracted at Dolau House would otherwise contribute to baseflow in the River Ithon and its tributaries, the proportion of their flow that might be derogated is negligible, even during low flow conditions.

8 CONCLUSIONS

A hydrogeological impact appraisal has been undertaken on the groundwater abstraction at Dolau House Farm.

Dolau House Farm currently has nine chicken sheds which house c.250,000 chickens. Water is supplied to seven of the sheds by the three boreholes (BH1 – supplies shed 3; BH 2 - supplies shed 1 and 2; BH 3 – supplies shed 6, 7, 8, and 9), with the remaining two sheds on mains water. The abstraction is currently not licensed. The water use is not seasonal, with maximum demand occurring on a 48-day cycle, with 38 days of growth followed by 10 days rest period. During the growing period abstraction can occur 24 hrs/day, with pumping automatically triggered by low tank volume. The maximum recorded water use is 75 m^3/d and 12,200 m^3/year.

The local geology comprises Ordovician and Silurian aged sedimentary rocks (mudstones interbedded with shale), cut through by faulting activity. These are overlain by alluvium and till. Mudstone is highly impermeable, therefore the designation of the site as a secondary B aquifer is likely to be entirely due to secondary flow through fissures and fracturing within the bedrock.

A desk-based water features survey has been carried out identifying a number of water features within 1 km of the abstraction boreholes. The nearest water feature identified is the River Aran; at the nearest point BH3 is located c.150 m from it.

A site investigation has been conducted including the monitoring of BH1, BH2, and BH3 using level loggers for 18 days. The rest water level was found to be between 6 – 8 m bgl across the three boreholes. The average pumped water level was found to be between 10 – 25 m bgl for the three boreholes. Pumping from each borehole did not have a major effect on the water levels in the nearby boreholes, which are much closer to each other than to any potentially impacted receptor.

The maximum required abstraction volumes, in terms of the licence application, are 14,342 m^3/annum, 83 m^3/d, 18 m^3/hr and 5 l/s, for 24 hours per day.

The groundwater levels from the monitoring have been used alongside the daily pumping rates from each borehole to calculate a radius of influence for each abstraction borehole. The radius of influence for the abstraction boreholes is calculated as c.9 m for BH1, c.30 m for BH2, and c.19 m for BH3. The predicted radius of influence for each borehole is significantly smaller than the distance to the nearest identified water feature, suggesting that the abstraction will not have an impact on any of the nearby water features.

A water balance has been carried out to assess the impact on the nearby watercourses of the loss of the abstracted water from their catchments. The expected annual groundwater abstraction volume at Dolau House Farm is 14,342 m^3. When compared to the catchment areas of Maes Brook and the River Aran the Dolau House Farm groundwater abstraction is negligible, accounting for 0.3% of the Maes Brook catchment, and 0.07% of the River Aran catchment. In addition, the peak daily abstraction rate at Dolau House is 0.69% of the Q95 flow of the River Ithon at Llandewi.

It is concluded, based on the calculated radius of influence and the water balance calculations, that the groundwater abstraction at Dolau House will have a negligible effect on the nearby water features.

9 REFERENCES

Environment Agency, 2007. **Hydrogeological impact appraisal for groundwater abstractions** Science Report – SC040020/SR2. ISBN 978-1-84432-674-7

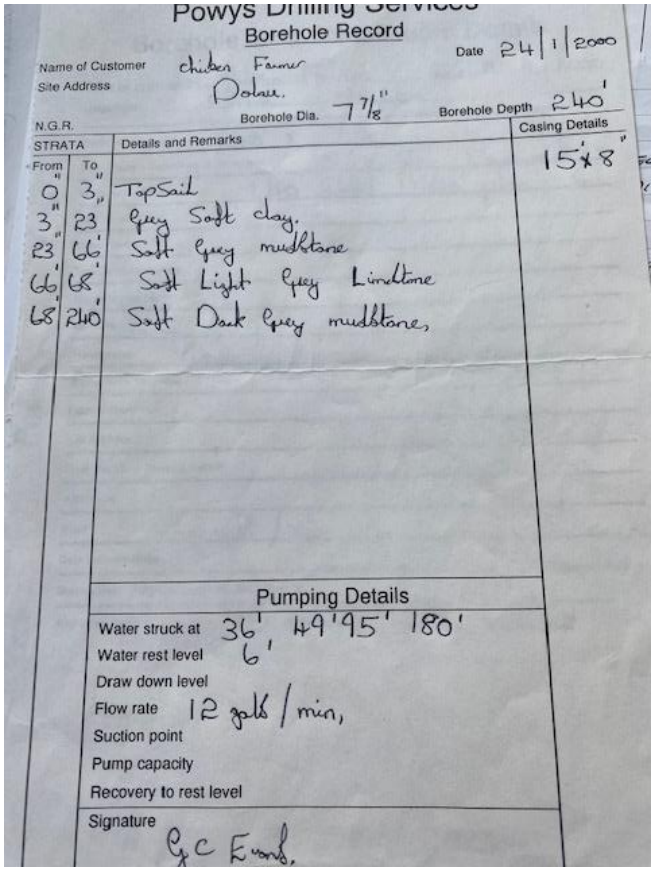
Teme Valley Geological Society, assisted by the Earth Heritage Trust. **Knighton Map – England and Wales Geological Sheet 180**

Natural Resources Wales, September 2015; **Wye abstraction licensing strategy**

APPENDIX A

Abstraction borehole logs

BH1



Powys Drilling Services

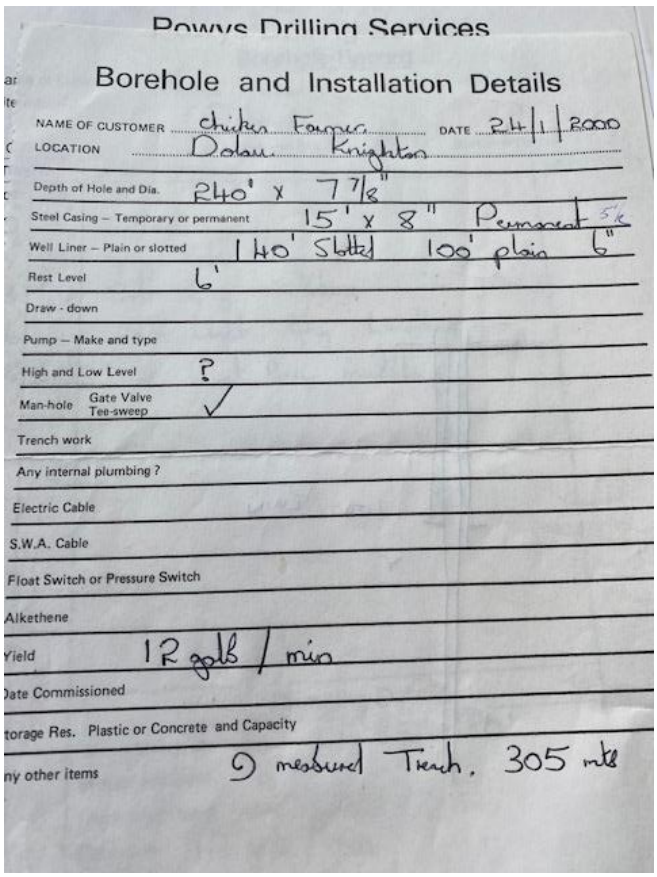
Borehole Record

Name of Customer: chicken Farmer
Site Address: Dolau.
Date: 24/1/2000
Borehole Dia.: 7 7/8"
Borehole Depth: 240'
N.G.R.

STRATA From	To	Details and Remarks	Casing Details
0"	3"	TopSoil	15'x 8"
3"	23'	Grey Soft clay.	
23'	66'	Soft Grey mudstone	
66'	68'	Soft Light Grey Limestone	
68'	240'	Soft Dark Grey mudstone,	

Pumping Details

Water struck at: 36', 49'95' 180'
Water rest level: 6'
Draw down level:
Flow rate: 12 galls / min,
Suction point:
Pump capacity:
Recovery to rest level:
Signature: G C Evans.

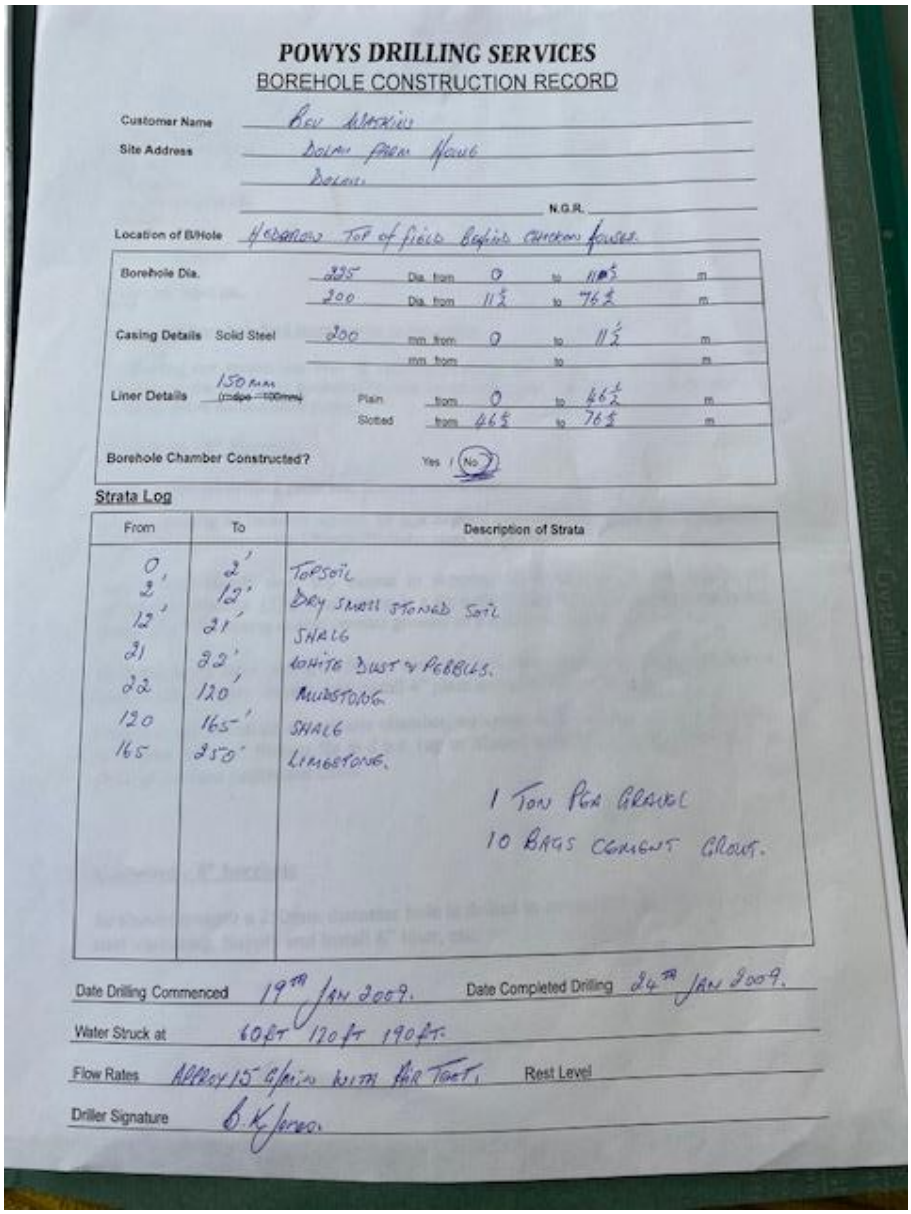


Powys Drilling Services

Borehole and Installation Details

NAME OF CUSTOMER: chicken Farmer. DATE: 24/1/2000
LOCATION: Dolau. Knighton
Depth of Hole and Dia.: 240' x 7 7/8"
Steel Casing – Temporary or permanent: 15' x 8" Permanent
Well Liner – Plain or slotted: 140' Slotted 100' plain 6"
Rest Level: 6'
Draw - down:
Pump – Make and type:
High and Low Level: ?
Man-hole Gate Valve Tee-sweep: ✓
Trench work:
Any internal plumbing ?:
Electric Cable:
S.W.A. Cable:
Float Switch or Pressure Switch:
Alkethene:
Yield: 12 galls / min
Date Commissioned:
Storage Res. Plastic or Concrete and Capacity:
Any other items: 9 measured Trench. 305 mts

BH2



POWYS DRILLING SERVICES

BOREHOLE CONSTRUCTION RECORD

Customer Name: Ben Watkins

Site Address: Dolau Farm House, Dolau.

N.G.R.

Location of B/Hole: Horsebox Top of field Behind chicken houses.

Borehole Dia. 225 Dia. from 0 to 11½ m

200 Dia. from 11½ to 76½ m

Casing Details Solid Steel 200 mm from 0 to 11½ m

mm from to m

Liner Details 150 mm (~~dpe~~ ~~100mm~~) Plain from 0 to 46½ m

Slotted from 46½ to 76½ m

Borehole Chamber Constructed? Yes / (No)

Strata Log

From	To	Description of Strata
0,	2'	TOPSOIL
2'	12'	DRY SMALL STONED SOIL
12'	21'	SHALE
21	22'	WHITE DUST & PEBBLES.
22	120'	MUDSTONE
120	165'	SHALE
165	250'	LIMESTONE.

1 TON PEA GRAVEL

10 BAGS CEMENT GROUT.

Date Drilling Commenced 19TH JAN 2009. Date Completed Drilling 24TH JAN 2009.

Water Struck at 60FT 120FT 190FT.

Flow Rates APPROX 15 G/min WITH AIR TEST. Rest Level

Driller Signature B. K Jones.

Powys Drilling Services

Borehole Record

Date 24/1/2000

Name of Customer chiken Farmer

Site Address Dolau.

Borehole Dia. 7 7/8"

Borehole Depth 240'

N.G.R.

Casing Details 15' x 8"

STRATA From	To	Details and Remarks
0"	3"	TopSoil
3"	23'	Grey Soft clay.
23'	66'	Soft Grey mudstone
66'	68'	Soft Light Grey Limestone
68'	240'	Soft Dark Grey mudstone,

Pumping Details

Water struck at 36', 49' 95' 180'

Water rest level 6'

Draw down level

Flow rate 12 galls / min,

Suction point

Pump capacity

Recovery to rest level

Signature G C Evans.

APPENDIX B

Groundsure enviro-insight report

Groundsure
LOCATION INTELLIGENCE

Enviro
Insight

314400.00809986447,267182.95785619685,

Order Details

Date: 24/07/2023

Your ref: 30724_Dolau_House_Farm

Our Ref: GS-7NU-DJP-PLI-6B2

Site Details

Location: 314400 267182

Area: 0.66 ha

Authority: Powys County Council ↗

Contact us with any questions at:
info@groundsure.com ↗
01273 257 755

Summary of findings

Page	Section	Past land use >	On site	0-50m	50-250m	250-500m	500-2000m
12 >	1.1 >	Historical industrial land uses >	0	0	1	17	-
13 >	1.2 >	Historical tanks >	0	0	1	0	-
14	1.3	Historical energy features	0	0	0	0	-
14	1.4	Historical petrol stations	0	0	0	0	-
14	1.5	Historical garages	0	0	0	0	-
14	1.6	Historical military land	0	0	0	0	-
Page	Section	Past land use - un-grouped >	On site	0-50m	50-250m	250-500m	500-2000m
15 >	2.1 >	Historical industrial land uses >	0	0	2	19	-
16 >	2.2 >	Historical tanks >	0	0	1	0	-
17	2.3	Historical energy features	0	0	0	0	-
17	2.4	Historical petrol stations	0	0	0	0	-
17	2.5	Historical garages	0	0	0	0	-
Page	Section	Waste and landfill >	On site	0-50m	50-250m	250-500m	500-2000m
18	3.1	Active or recent landfill	0	0	0	0	-
18	3.2	Historical landfill (BGS records)	0	0	0	0	-
19	3.3	Historical landfill (LA/mapping records)	0	0	0	0	-
19	3.4	Historical landfill (EA/NRW records)	0	0	0	0	-
19	3.5	Historical waste sites	0	0	0	0	-
19	3.6	Licensed waste sites	0	0	0	0	-
19 >	3.7 >	Waste exemptions >	0	0	1	6	-
Page	Section	Current industrial land use >	On site	0-50m	50-250m	250-500m	500-2000m
21	4.1	Recent industrial land uses	0	0	0	-	-
21	4.2	Current or recent petrol stations	0	0	0	0	-
22	4.3	Electricity cables	0	0	0	0	-
22	4.4	Gas pipelines	0	0	0	0	-
22	4.5	Sites determined as Contaminated Land	0	0	0	0	-

22	4.6	Control of Major Accident Hazards (COMAH)	0	0	0	0	-
22	4.7	Regulated explosive sites	0	0	0	0	-
23	4.8	Hazardous substance storage/usage	0	0	0	0	-
23	4.9	Historical licensed industrial activities (IPC)	0	0	0	0	-
23 >	**4.10 >**	**Licensed industrial activities (Part A(1)) >**	0	0	12	0	-
25	4.11	Licensed pollutant release (Part A(2)/B)	0	0	0	0	-
25	4.12	Radioactive Substance Authorisations	0	0	0	0	-
25	4.13	Licensed Discharges to controlled waters	0	0	0	0	-
25	4.14	Pollutant release to surface waters (Red List)	0	0	0	0	-
26	4.15	Pollutant release to public sewer	0	0	0	0	-
26	4.16	List 1 Dangerous Substances	0	0	0	0	-
26	4.17	List 2 Dangerous Substances	0	0	0	0	-
26	4.18	Pollution Incidents (EA/NRW)	0	0	0	0	-
26	4.19	Pollution inventory substances	0	0	0	0	-
27	4.20	Pollution inventory waste transfers	0	0	0	0	-
27	4.21	Pollution inventory radioactive waste	0	0	0	0	-

Page	Section	**Geology (basic) >**					
28	5.1	Superficial geology (625k)	None (within 500m)				
28 >	**5.2 >**	**Bedrock geology (625k) >**	Identified (within 500m)				

Page	Section	Hydrogeology	On site	0-50m	50-250m	250-500m	500-2000m
29	6.1	Superficial aquifer	None (within 500m)				
30 >	**6.2 >**	**Bedrock aquifer >**	Identified (within 500m)				
31 >	**6.3 >**	**Groundwater vulnerability >**	Identified (within 50m)				
32	6.4	Groundwater vulnerability- soluble rock risk	None (within 0m)				
32	6.5	Groundwater vulnerability- local information	None (within 0m)				
33 >	**6.6 >**	**Groundwater abstractions >**	0	0	1	0	0
34	6.7	Surface water abstractions	0	0	0	0	0
34	6.8	Potable abstractions	0	0	0	0	0
34	6.9	Source Protection Zones	0	0	0	0	-

35	6.10	Source Protection Zones (confined aquifer)	0	0	0	0	-
Page	Section	**Hydrology >**	On site	0-50m	50-250m	250-500m	500-2000m
36 >	**7.1 >**	**Water Network (OS MasterMap) >**	0	0	12	-	-
38 >	**7.2 >**	**Surface water features >**	0	0	5	-	-
38 >	**7.3 >**	**WFD Surface water body catchments >**	1	-	-	-	-
38 >	**7.4 >**	**WFD Surface water bodies >**	0	0	1	-	-
39 >	**7.5 >**	**WFD Groundwater bodies >**	1	-	-	-	-
Page	Section	River and coastal flooding	On site	0-50m	50-250m	250-500m	500-2000m
40	8.1	Risk of flooding from rivers and the sea	None (within 50m)				
40	8.2	Historical Flood Events	0	0	0	-	-
40	8.3	Flood Defences	0	0	0	-	-
41	8.4	Areas Benefiting from Flood Defences	0	0	0	-	-
41	8.5	Flood Storage Areas	0	0	0	-	-
42 >	**8.6 >**	**Flood Zone 2 >**	Identified (within 50m)				
43	8.7	Flood Zone 3	None (within 50m)				
Page	Section	**Surface water flooding >**					
44 >	**9.1 >**	**Surface water flooding >**	1 in 30 year, 0.1m - 0.3m (within 50m)				
Page	Section	**Groundwater flooding >**					
46 >	**10.1 >**	**Groundwater flooding >**	Low (within 50m)				
Page	Section	**Environmental designations >**	On site	0-50m	50-250m	250-500m	500-2000m
47 >	**11.1 >**	**Sites of Special Scientific Interest (SSSI) >**	0	0	1	0	1
48	11.2	Conserved wetland sites (Ramsar sites)	0	0	0	0	0
48 >	**11.3 >**	**Special Areas of Conservation (SAC) >**	0	0	1	0	0
49	11.4	Special Protection Areas (SPA)	0	0	0	0	0
49	11.5	National Nature Reserves (NNR)	0	0	0	0	0
49	11.6	Local Nature Reserves (LNR)	0	0	0	0	0
49 >	**11.7 >**	**Designated Ancient Woodland >**	0	0	2	0	79
52	11.8	Biosphere Reserves	0	0	0	0	0
53	11.9	Forest Parks	0	0	0	0	0

53	11.10	Marine Conservation Zones	0	0	0	0	0
53	11.11	Green Belt	0	0	0	0	0
53	11.12	Proposed Ramsar sites	0	0	0	0	0
53	11.13	Possible Special Areas of Conservation (pSAC)	0	0	0	0	0
54	11.14	Potential Special Protection Areas (pSPA)	0	0	0	0	0
54	11.15	Nitrate Sensitive Areas	0	0	0	0	0
54	11.16	Nitrate Vulnerable Zones	0	0	0	0	0
55	11.17	SSSI Impact Risk Zones	0	-	-	-	-
55	11.18	SSSI Units	0	0	0	0	0
Page	Section	Visual and cultural designations	On site	0-50m	50-250m	250-500m	500-2000m
56	12.1	World Heritage Sites	0	0	0	-	-
56	12.2	Area of Outstanding Natural Beauty	0	0	0	-	-
56	12.3	National Parks	0	0	0	-	-
56	12.4	Listed Buildings	0	0	0	-	-
57	12.5	Conservation Areas	0	0	0	-	-
57	12.6	Scheduled Ancient Monuments	0	0	0	-	-
57	12.7	Registered Parks and Gardens	0	0	0	-	-
Page	Section	**Agricultural designations** >	On site	0-50m	50-250m	250-500m	500-2000m
58 >	**13.1** >	**Agricultural Land Classification** >	Grade 3b (within 250m)				
59	13.2	Open Access Land	0	0	0	-	-
59	13.3	Tree Felling Licences	0	0	0	-	-
59	13.4	Environmental Stewardship Schemes	0	0	0	-	-
59	13.5	Countryside Stewardship Schemes	0	0	0	-	-
Page	Section	Habitat designations	On site	0-50m	50-250m	250-500m	500-2000m
60	14.1	Priority Habitat Inventory	0	0	0	-	-
60	14.2	Habitat Networks	0	0	0	-	-
60	14.3	Open Mosaic Habitat	0	0	0	-	-
60	14.4	Limestone Pavement Orders	0	0	0	-	-

Recent aerial photograph

Capture Date: 04/04/2021

Site Area: 0.66ha

Recent site history - 2018 aerial photograph

Capture Date: 24/06/2018

Site Area: 0.66ha

Recent site history - 2014 aerial photograph

Capture Date: 16/04/2014

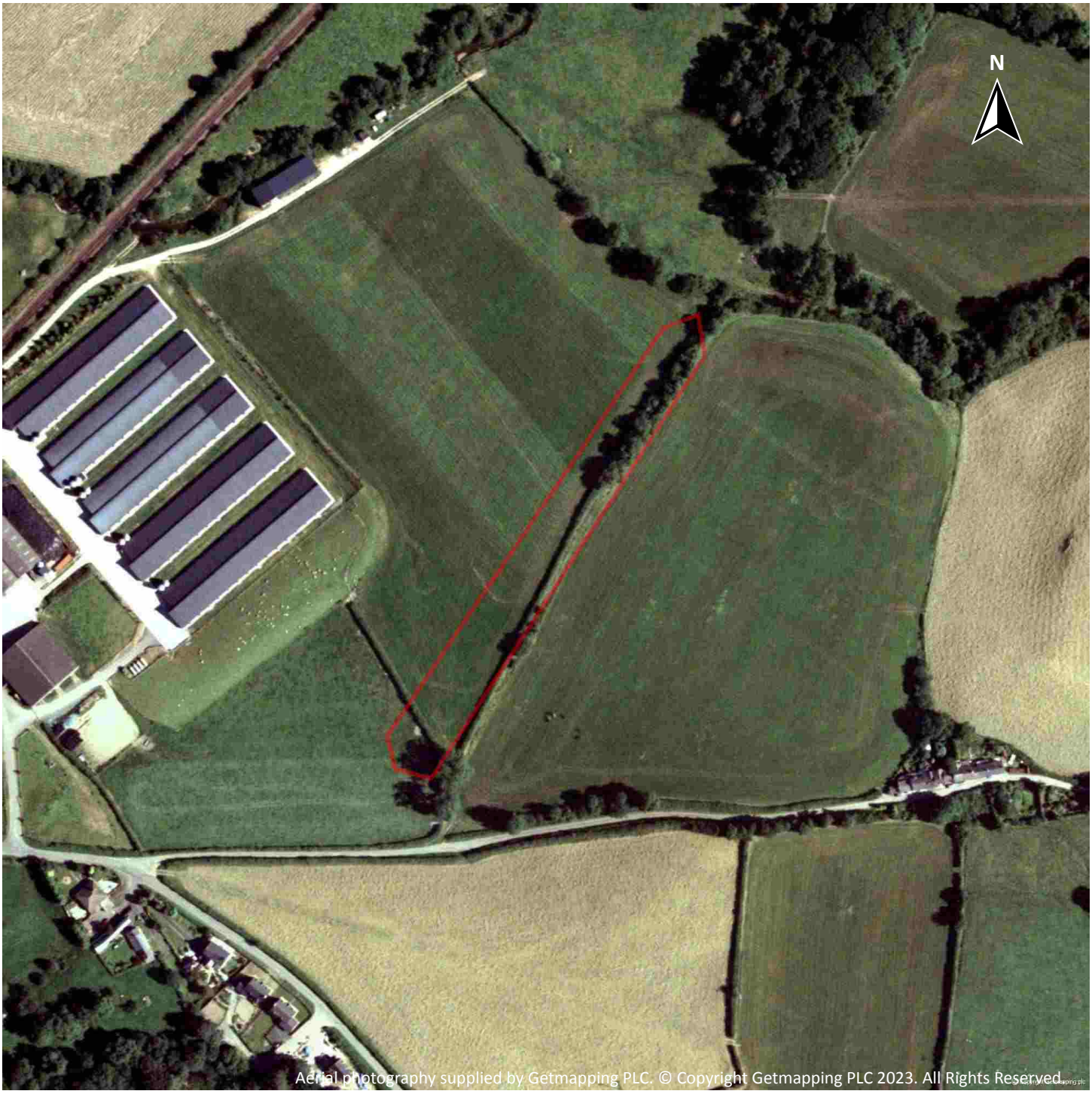
Site Area: 0.66ha

Recent site history - 2009 aerial photograph

Capture Date: 12/09/2009

Site Area: 0.66ha

Recent site history - 2000 aerial photograph



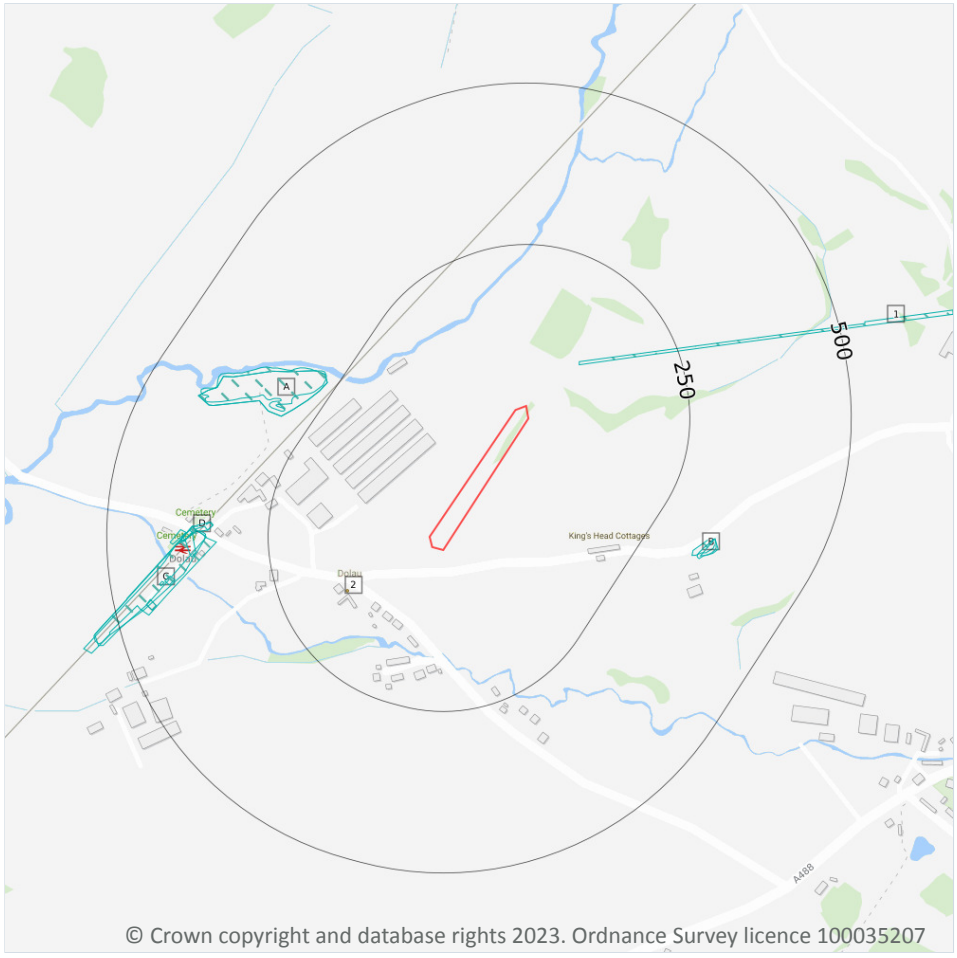
Capture Date: 18/07/2000

Site Area: 0.66ha

OS MasterMap site plan

Site Area: 0.66ha

1 Past land use



Site Outline

Search buffers in metres (m)

Historical industrial land uses

Historical tanks

1.1 Historical industrial land uses

Records within 500m	18

Potentially contaminative land use features digitised from historical Ordnance Survey mapping at 1:10,000 and 1:10,560 scale, intelligently grouped into contiguous features. To prevent misrepresentation of the size of historical features at any given time, features are only grouped if they have similar geometries within immediately preceding or succeeding map editions. See section 2 for a breakdown of grouping if required. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use map on **page 12 >**

ID	Location	Land use	Dates present	Group ID
1	104m NE	Tunnel	1902 - 1952	1068989

ID	Location	Land use	Dates present	Group ID
A	265m NW	Unspecified Disused Tip	1982	1005228
A	265m NW	Unspecified Heap	1948	1120412
A	268m NW	Unspecified Heap	1902 - 1948	1043397
B	325m E	Unspecified Quarry	1887	1155852
C	330m W	Railway Sidings	1902	1076276
B	334m E	Unspecified Quarry	1902 - 1948	1126464
D	336m W	Railway Station	1948	1057226
D	337m W	Railway Station	1948	1044347
B	339m E	Unspecified Quarry	1948	1133973
C	346m W	Railway Sidings	1948	1037682
C	347m W	Railway Sidings	1887	1155103
D	361m W	Unspecified Station	1902	1033495
D	363m W	Railway Station	1887	1124777
D	377m W	Railway Station	1982	1016084
C	400m W	Railway Building	1902	1013597
C	417m W	Railway Building	1887	1013598
C	437m W	Railway Building	1902	1013596

This data is sourced from Ordnance Survey / Groundsure.

1.2 Historical tanks

Records within 500m	**1**

Tank features digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale, intelligently grouped into contiguous features. To prevent misrepresentation of the size of historical features at any given time, features are only grouped if they have similar geometries within immediately preceding or succeeding map editions. See section 2 for a breakdown of grouping if required. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use map on **page 12 >**

ID	Location	Land use	Dates present	Group ID
2	146m SW	Unspecified Tank	1988	151886

This data is sourced from Ordnance Survey / Groundsure.

1.3 Historical energy features

Records within 500m	0

Energy features digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale, intelligently grouped into contiguous features. To prevent misrepresentation of the size of historical features at any given time, features are only grouped if they have similar geometries within immediately preceding or succeeding map editions. See section 2 for a breakdown of grouping if required. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

This data is sourced from Ordnance Survey / Groundsure.

1.4 Historical petrol stations

Records within 500m	0

Petrol stations digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale, intelligently grouped into contiguous features. To prevent misrepresentation of the size of historical features at any given time, features are only grouped if they have similar geometries within immediately preceding or succeeding map editions. See section 2 for a breakdown of grouping if required. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

This data is sourced from Ordnance Survey / Groundsure.

1.5 Historical garages

Records within 500m	0

Garages digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale, intelligently grouped into contiguous features. To prevent misrepresentation of the size of historical features at any given time, features are only grouped if they have similar geometries within immediately preceding or succeeding map editions. See section 2 for a breakdown of grouping if required. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

This data is sourced from Ordnance Survey / Groundsure.

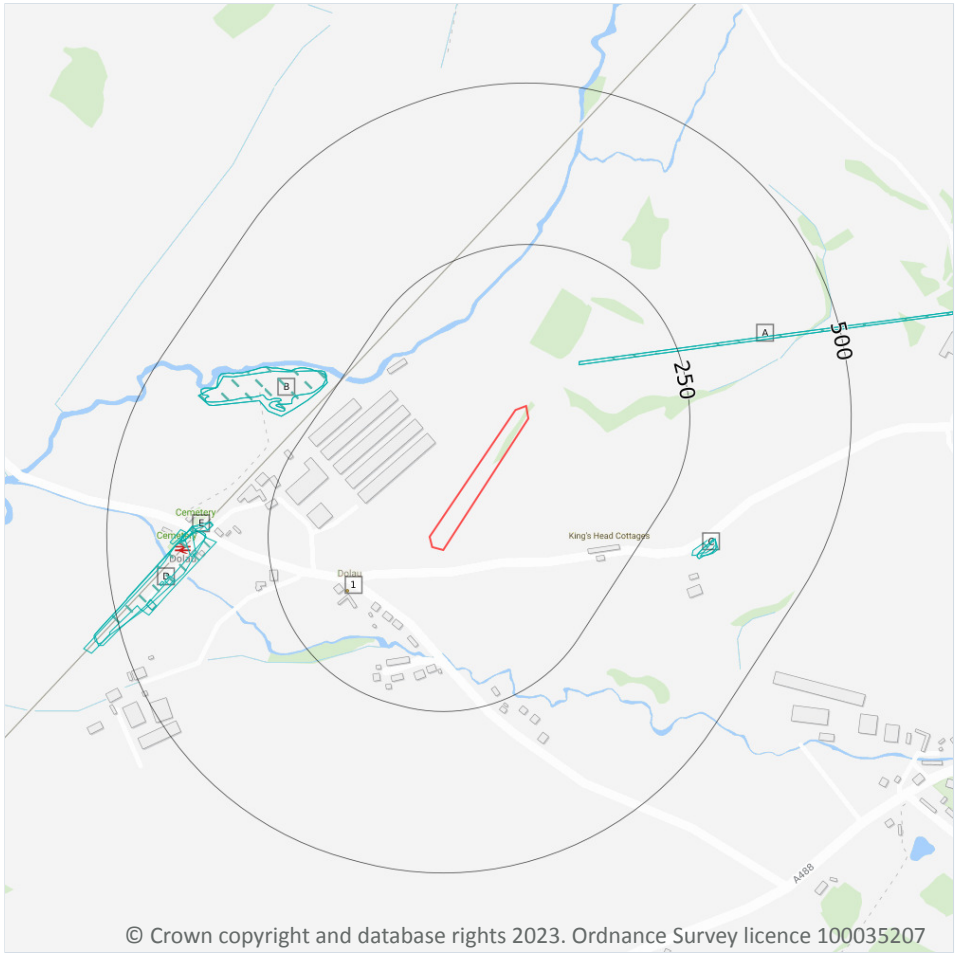
1.6 Historical military land

Records within 500m	0

Areas of military land digitised from multiple sources including the National Archives, local records, MOD records and verified other sources, intelligently grouped into contiguous features.

This data is sourced from Ordnance Survey / Groundsure / other sources.

2 Past land use - un-grouped



Site Outline

Search buffers in metres (m)

Historical industrial land uses

Historical tanks

2.1 Historical industrial land uses

Records within 500m	21

Potentially contaminative land use features digitised from historical Ordnance Survey mapping at 1:10,000 and 10,560 scale. Any records shown are available intelligently grouped in section 1. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use - un-grouped map on **page 15 >**

ID	Location	Land Use	Date	Group ID
A	104m NE	Tunnel	1902	1068989
A	104m NE	Tunnel	1948	1068989
B	265m NW	Unspecified Disused Tip	1982	1005228

ID	Location	Land Use	Date	Group ID
B	265m NW	Unspecified Heap	1948	1120412
B	268m NW	Unspecified Heap	1948	1043397
B	268m NW	Unspecified Heap	1902	1043397
C	325m E	Unspecified Quarry	1887	1155852
D	330m W	Railway Sidings	1902	1076276
C	334m E	Unspecified Quarry	1902	1126464
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C	339m E	Unspecified Quarry	1948	1133973
D	346m W	Railway Sidings	1948	1037682
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E	363m W	Railway Station	1887	1124777
E	377m W	Railway Station	1982	1016084
D	400m W	Railway Building	1902	1013597
D	417m W	Railway Building	1887	1013598
D	437m W	Railway Building	1902	1013596

This data is sourced from Ordnance Survey / Groundsure.

2.2 Historical tanks

Records within 500m	**1**

Tank features digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale. Any records shown are available intelligently grouped in section 1. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use - un-grouped map on **page 15 >**

ID	Location	Land Use	Date	Group ID
1	146m SW	Unspecified Tank	1988	151886

This data is sourced from Ordnance Survey / Groundsure.

2.3 Historical energy features

Records within 500m	0

Energy features digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale. Any records shown are available intelligently grouped in section 1. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

This data is sourced from Ordnance Survey / Groundsure.

2.4 Historical petrol stations

Records within 500m	0

Petrol stations digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale. Any records shown are available intelligently grouped in section 1. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

This data is sourced from Ordnance Survey / Groundsure.

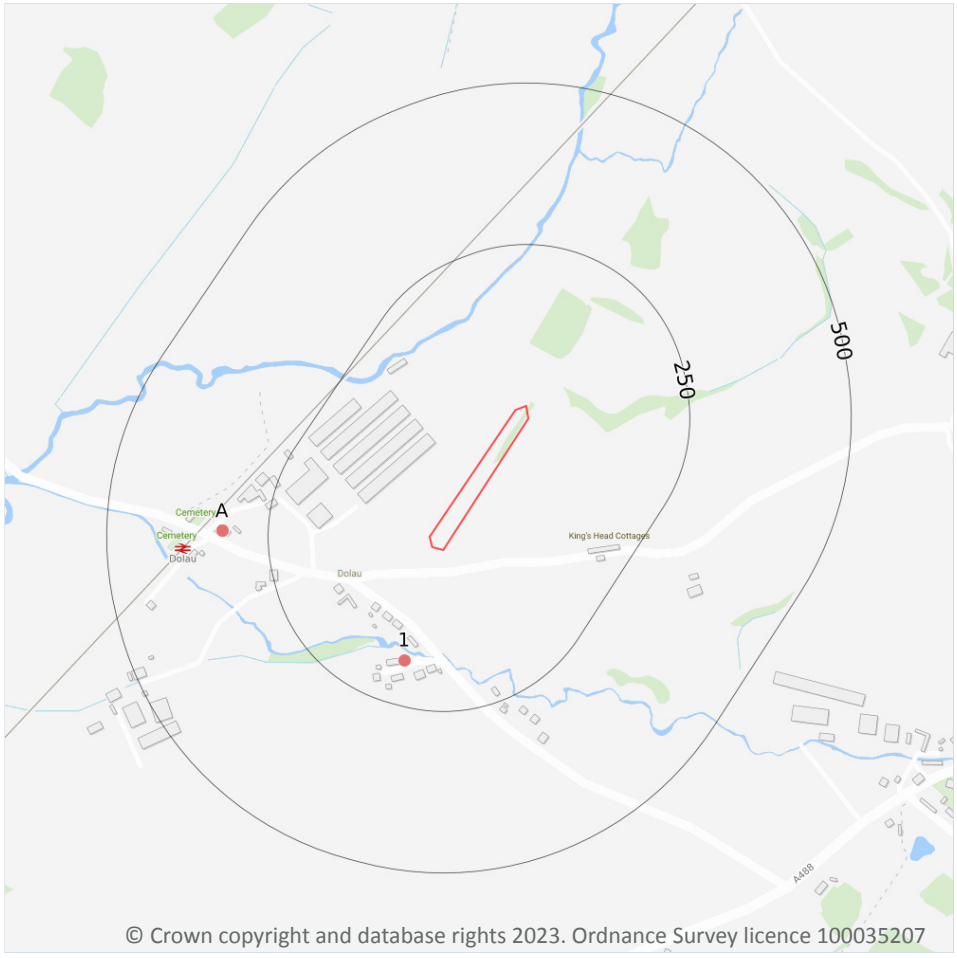
2.5 Historical garages

Records within 500m	0

Garages digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale. Any records shown are available intelligently grouped in section 1. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

This data is sourced from Ordnance Survey / Groundsure.

3 Waste and landfill



Site Outline

Search buffers in metres (m)

Waste exemptions

3.1 Active or recent landfill

Records within 500m	0

Active or recently closed landfill sites under Environment Agency/Natural Resources Wales regulation.

This data is sourced from the Environment Agency and Natural Resources Wales.

3.2 Historical landfill (BGS records)

Records within 500m	0

Landfill sites identified on a survey carried out on behalf of the DoE in 1973. These sites may have been closed or operational at this time.

This data is sourced from the British Geological Survey.

3.3 Historical landfill (LA/mapping records)

Records within 500m	0

Landfill sites identified from Local Authority records and high detail historical mapping.

This data is sourced from the Ordnance Survey/Groundsure and Local Authority records.

3.4 Historical landfill (EA/NRW records)

Records within 500m	0

Known historical (closed) landfill sites (e.g. sites where there is no PPC permit or waste management licence currently in force). This includes sites that existed before the waste licensing regime and sites that have been licensed in the past but where a licence has been revoked, ceased to exist or surrendered and a certificate of completion has been issued.

This data is sourced from the Environment Agency and Natural Resources Wales.

3.5 Historical waste sites

Records within 500m	0

Waste site records derived from Local Authority planning records and high detail historical mapping.

This data is sourced from Ordnance Survey/Groundsure and Local Authority records.

3.6 Licensed waste sites

Records within 500m	0

Active or recently closed waste sites under Environment Agency/Natural Resources Wales regulation.

This data is sourced from the Environment Agency and Natural Resources Wales.

3.7 Waste exemptions

Records within 500m	7

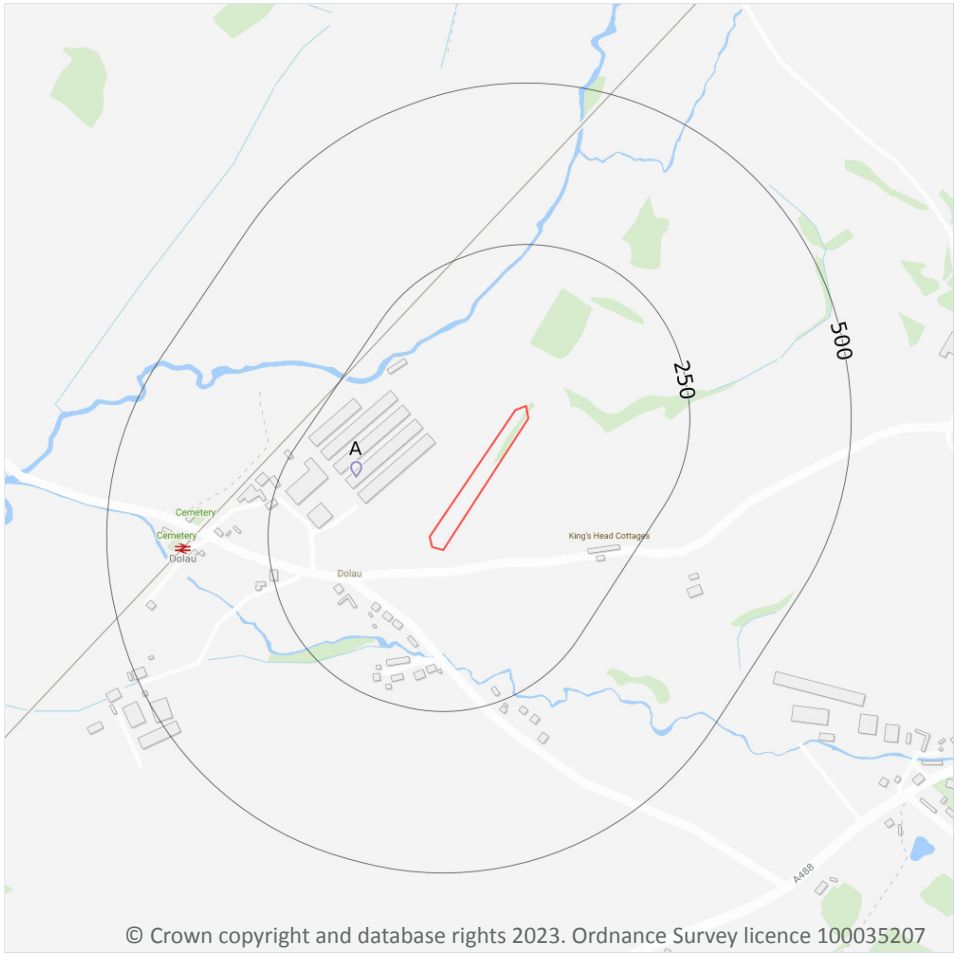
Activities involving the storage, treatment, use or disposal of waste that are exempt from needing a permit. Exemptions have specific limits and conditions that must be adhered to.

Features are displayed on the Waste and landfill map on **page 18 >**

ID	Location	Site	Reference	Category	Sub-Category	Description
1	181m S	Dolau Farm Dolau Llandrindod Powys LD15TE	NRW-WME023473	Disposing of waste exemption	On a farm	Deposit of agricultural waste consisting of plant tissue under a Plant Health notice
A	322m W	Beverley Watkins Richard Watkins Patricia Watkins, Dolau House, Dolau, Llandrindod Wells, Powys, LD1 6UP	NRW-WME042331	Using waste exemption	On a farm	Burning of waste as a fuel in a small appliance
A	322m W	Beverley Watkins Richard Watkins Patricia Watkins, Dolau House, Dolau, Llandrindod Wells, Powys, LD1 6UP	NRW-WME042331	Using waste exemption	On a farm	Use of waste in construction
A	322m W	Beverley Watkins Richard Watkins Patricia Watkins, Dolau House, Dolau, Llandrindod Wells, Powys, LD1 6UP	NRW-WME042331	Disposing of waste exemption	On a farm	Burning waste in the open
A	322m W	Beverley Watkins Richard Watkins Patricia Watkins, Dolau House, Dolau, Llandrindod Wells, Powys, LD1 6UP	NRW-WME042331	Using waste exemption	On a farm	Use of waste for a specified purpose
A	322m W	Beverley Watkins Richard Watkins Patricia Watkins, Dolau House, Dolau, Llandrindod Wells, Powys, LD1 6UP	NRW-WME042331	Treating waste exemption	On a farm	Aerobic composting and associated prior treatment
A	322m W	Beverley Watkins Richard Watkins Patricia Watkins, Dolau House, Dolau, Llandrindod Wells, Powys, LD1 6UP	NRW-WME042331	Disposing of waste exemption	On a farm	Deposit of waste from dredging of inland waters

This data is sourced from the Environment Agency and Natural Resources Wales.

4 Current industrial land use



Site Outline

Search buffers in metres (m)

Part A(1) industrial activities

4.1 Recent industrial land uses

Records within 250m	0

Current potentially contaminative industrial sites.

This data is sourced from Ordnance Survey.

4.2 Current or recent petrol stations

Records within 500m	0

Open, closed, under development and obsolete petrol stations.

This data is sourced from Experian.

4.3 Electricity cables

Records within 500m	0

High voltage underground electricity transmission cables.

This data is sourced from National Grid.

4.4 Gas pipelines

Records within 500m	0

High pressure underground gas transmission pipelines.

This data is sourced from National Grid.

4.5 Sites determined as Contaminated Land

Records within 500m	0

Contaminated Land Register of sites designated under Part 2a of the Environmental Protection Act 1990.

This data is sourced from Local Authority records.

4.6 Control of Major Accident Hazards (COMAH)

Records within 500m	0

Control of Major Accident Hazards (COMAH) sites. This data includes upper and lower tier sites, and includes a historical archive of COMAH sites and Notification of Installations Handling Hazardous Substances (NIHHS) records.

This data is sourced from the Health and Safety Executive.

4.7 Regulated explosive sites

Records within 500m	0

Sites registered and licensed by the Health and Safety Executive under the Manufacture and Storage of Explosives Regulations 2005 (MSER). The last update to this data was in April 2011.

This data is sourced from the Health and Safety Executive.

4.8 Hazardous substance storage/usage

Records within 500m	0

Consents granted for a site to hold certain quantities of hazardous substances at or above defined limits in accordance with the Planning (Hazardous Substances) Regulations 2015.

This data is sourced from Local Authority records.

4.9 Historical licensed industrial activities (IPC)

Records within 500m	0

Integrated Pollution Control (IPC) records of substance releases to air, land and water. This data represents a historical archive as the IPC regime has been superseded.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.10 Licensed industrial activities (Part A(1))

Records within 500m	12

Records of Part A(1) installations regulated under the Environmental Permitting (England and Wales) Regulations 2016 for the release of substances to the environment.

Features are displayed on the Current industrial land use map on **page 21 >**

ID	Location	Details	
A	153m W	Operator: Mr Beversley Watkins, Mrs Patricia Watkins and Mr Richard Watkins Installation Name: Dolau Growers EPR/HP3036ME Process: - Permit Number: HP3036ME Original Permit Number: -	EPR Reference: - Issue Date: 12/03/2018 Effective Date: 12/03/2018 Last date noted as effective: 25/05/2023 Status: Effective
A	153m W	Operator: Mr Beversley Watkins, Mrs Patricia Watkins and Mr Richard Watkins Installation Name: Dolau Growers EPR/HP3036ME Process: REARING POULTRY OR PIGS INTENSIVELY IN AN INSTALLATION WITH MORE THAN 40,000 PLACES FOR POULTRY Permit Number: HP3036ME Original Permit Number: -	EPR Reference: - Issue Date: 12/03/2018 Effective Date: 12/03/2018 Last date noted as effective: 25/05/2023 Status: Effective
A	153m W	Operator: B WATKINS & SON Installation Name: DOLAU GROWERS EPR/HP3036ME Process: - Permit Number: HP3036ME Original Permit Number: WP3836VG	EPR Reference: - Issue Date: 21/07/2014 Effective Date: 21/07/2014 Last date noted as effective: 01/12/2016 Status: EFFECTIVE

ID	Location	Details	
A	153m W	Operator: MR BEVERSLEY WATKINS, MRS PATRICIA WATKINS AND MR RICHARD WATKINS Installation Name: DOLAU GROWERS EPR/HP3036ME Process: REARING POULTRY OR PIGS INTENSIVELY IN AN INSTALLATION NOT REGULATED BY 'ENVIRO... Permit Number: HP3036ME Original Permit Number: WP3836VG	EPR Reference: - Issue Date: 12/03/2018 Effective Date: 12/03/2018 Last date noted as effective: 01/04/2018 Status: EFFECTIVE
A	153m W	Operator: MR BEVERSLEY WATKINS, MRS PATRICIA WATKINS AND MR RICHARD WATKINS Installation Name: DOLAU GROWERS EPR/HP3036ME Process: REARING POULTRY OR PIGS INTENSIVELY IN AN INSTALLATION NOT REGULATED BY 'ENVIRO... Permit Number: HP3036ME Original Permit Number: WP3836VG	EPR Reference: - Issue Date: 12/03/2018 Effective Date: 12/03/2018 Last date noted as effective: 01/04/2018 Status: EFFECTIVE
A	153m W	Operator: B WATKINS & SON Installation Name: DOLAU GROWERS Process: INTENSIVE FARMING; > 40,000 POULTRY Permit Number: HP3036ME Original Permit Number: HP3036ME	EPR Reference: - Issue Date: 31/01/2008 Effective Date: 31/01/2008 Last date noted as effective: 17/11/2015 Status: SUPERCEDED
A	153m W	Operator: B WATKINS & SON Installation Name: DOLAU GROWERS Process: ASSOCIATED PROCESS Permit Number: HP3636CW Original Permit Number: HP3036ME	EPR Reference: - Issue Date: 15/01/2013 Effective Date: 15/01/2013 Last date noted as effective: 17/11/2015 Status: SUPERCEDED
A	153m W	Operator: B WATKINS & SON Installation Name: DOLAU GROWERS Process: INTENSIVE FARMING; > 40,000 POULTRY Permit Number: HP3636CW Original Permit Number: HP3036ME	EPR Reference: - Issue Date: 15/01/2013 Effective Date: 15/01/2013 Last date noted as effective: 17/11/2015 Status: SUPERCEDED
A	153m W	Operator: B WATKINS & SON Installation Name: DOLAU GROWERS EPR/HP3036ME Process: ASSOCIATED PROCESS Permit Number: WP3836VG Original Permit Number: HP3036ME	EPR Reference: - Issue Date: 21/07/2014 Effective Date: 21/07/2014 Last date noted as effective: 17/11/2015 Status: EFFECTIVE
A	153m W	Operator: B WATKINS & SON Installation Name: DOLAU GROWERS EPR/HP3036ME Process: INTENSIVE FARMING; > 40,000 POULTRY Permit Number: WP3836VG Original Permit Number: HP3036ME	EPR Reference: - Issue Date: 21/07/2014 Effective Date: 21/07/2014 Last date noted as effective: 17/11/2015 Status: EFFECTIVE
A	153m W	Operator: B WATKINS & SON Installation Name: DOLAU GROWERS Process: ASSOCIATED PROCESS Permit Number: XP3832TJ Original Permit Number: HP3036ME	EPR Reference: - Issue Date: 28/07/2010 Effective Date: 28/07/2010 Last date noted as effective: 17/11/2015 Status: SUPERCEDED

ID	Location	Details	
A	153m W	Operator: B WATKINS & SON Installation Name: DOLAU GROWERS Process: INTENSIVE FARMING; > 40,000 POULTRY Permit Number: XP3832TJ Original Permit Number: HP3036ME	EPR Reference: - Issue Date: 28/07/2010 Effective Date: 28/07/2010 Last date noted as effective: 17/11/2015 Status: SUPERCEDED

This data is sourced from the Environment Agency and Natural Resources Wales.

4.11 Licensed pollutant release (Part A(2)/B)

Records within 500m	0

Records of Part A(2) and Part B installations regulated under the Environmental Permitting (England and Wales) Regulations 2016 for the release of substances to the environment.

This data is sourced from Local Authority records.

4.12 Radioactive Substance Authorisations

Records within 500m	0

Records of the storage, use, accumulation and disposal of radioactive substances regulated under the Radioactive Substances Act 1993.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.13 Licensed Discharges to controlled waters

Records within 500m	0

Discharges of treated or untreated effluent to controlled waters under the Water Resources Act 1991.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.14 Pollutant release to surface waters (Red List)

Records within 500m	0

Discharges of specified substances under the Environmental Protection (Prescribed Processes and Substances) Regulations 1991.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.15 Pollutant release to public sewer

Records within 500m	0

Discharges of Special Category Effluents to the public sewer.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.16 List 1 Dangerous Substances

Records within 500m	0

Discharges of substances identified on List I of European Directive E 2006/11/EC, and regulated under the Environmental Damage (Prevention and Remediation) Regulations 2015.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.17 List 2 Dangerous Substances

Records within 500m	0

Discharges of substances identified on List II of European Directive E 2006/11/EC, and regulated under the Environmental Damage (Prevention and Remediation) Regulations 2015.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.18 Pollution Incidents (EA/NRW)

Records within 500m	0

Records of substantiated pollution incidents. Since 2006 this data has only included category 1 (major) and 2 (significant) pollution incidents.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.19 Pollution inventory substances

Records within 500m	0

The pollution inventory (substances) includes reporting on annual emissions of certain regulated substances to air, controlled waters and land. A reporting threshold for each substance is also included. Where emissions fall below the reporting threshold, no value will be given. The data is given for the most recent complete year available.

This data is sourced from the Environment Agency and the Scottish Environment Protection Agency.

4.20 Pollution inventory waste transfers

Records within 500m	0

The pollution inventory (waste transfers) includes reporting on annual transfers and recovery/disposal of controlled wastes from a site. A reporting threshold for each waste type is also included. Where releases fall below the reporting threshold, no value will be given. The data is given for the most recent complete year available.

This data is sourced from the Environment Agency and the Scottish Environment Protection Agency.

4.21 Pollution inventory radioactive waste

Records within 500m	0

The pollution inventory (radioactive wastes) includes reporting on annual releases of radioactive substances from a site, including the means of release. Where releases fall below the reporting threshold, no value will be given. The data is given for the most recent complete year available.

This data is sourced from the Environment Agency and the Scottish Environment Protection Agency.

5 Geology (basic)

5.1 Superficial geology (625k)

Records within 500m	0

Generalised geology data based on BGS's published poster maps of the UK (North and South). Superficial related themes digitised from 1977 first edition Quaternary map (North and South).

This data is sourced from the British Geological Survey.

5.2 Bedrock geology (625k)

Records within 500m	1

Generalised geology data based on BGS's published poster maps of the UK (North and South). Bedrock related themes created through generalisation of 1:50,000 data.

Location	Lex code	Description	Rock type
On site	**WEN-MDSS**	**WENLOCK ROCKS (UNDIFFERENTIATED)**	**MUDSTONE, SILTSTONE AND SANDSTONE**

This data is sourced from the British Geological Survey.

6 Hydrogeology - Superficial aquifer

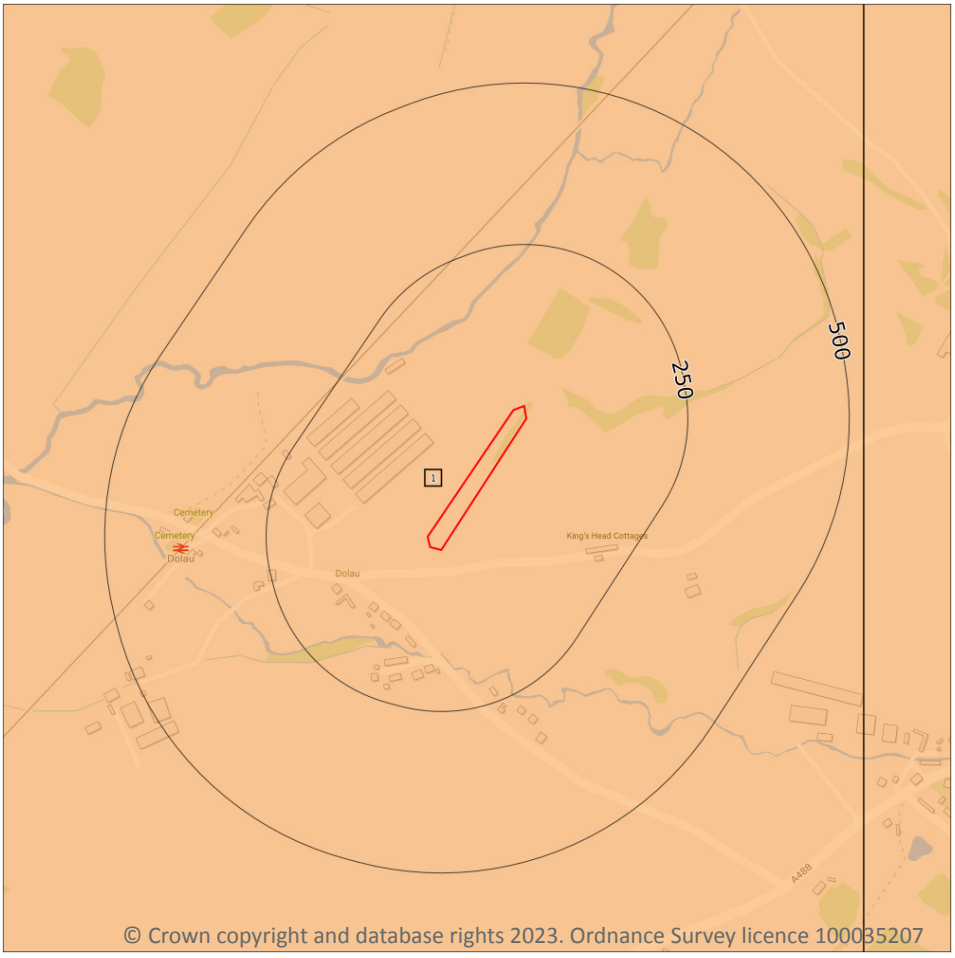
6.1 Superficial aquifer

Records within 500m	0

Aquifer status of groundwater held within superficial geology.

This data is sourced from the British Geological Survey, the Environment Agency and Natural Resources Wales.

Bedrock aquifer



Site Outline

Search buffers in metres (m)

- Principal
- Secondary A
- Secondary B
- Secondary Undifferentiated
- Unproductive

6.2 Bedrock aquifer

Records within 500m	1

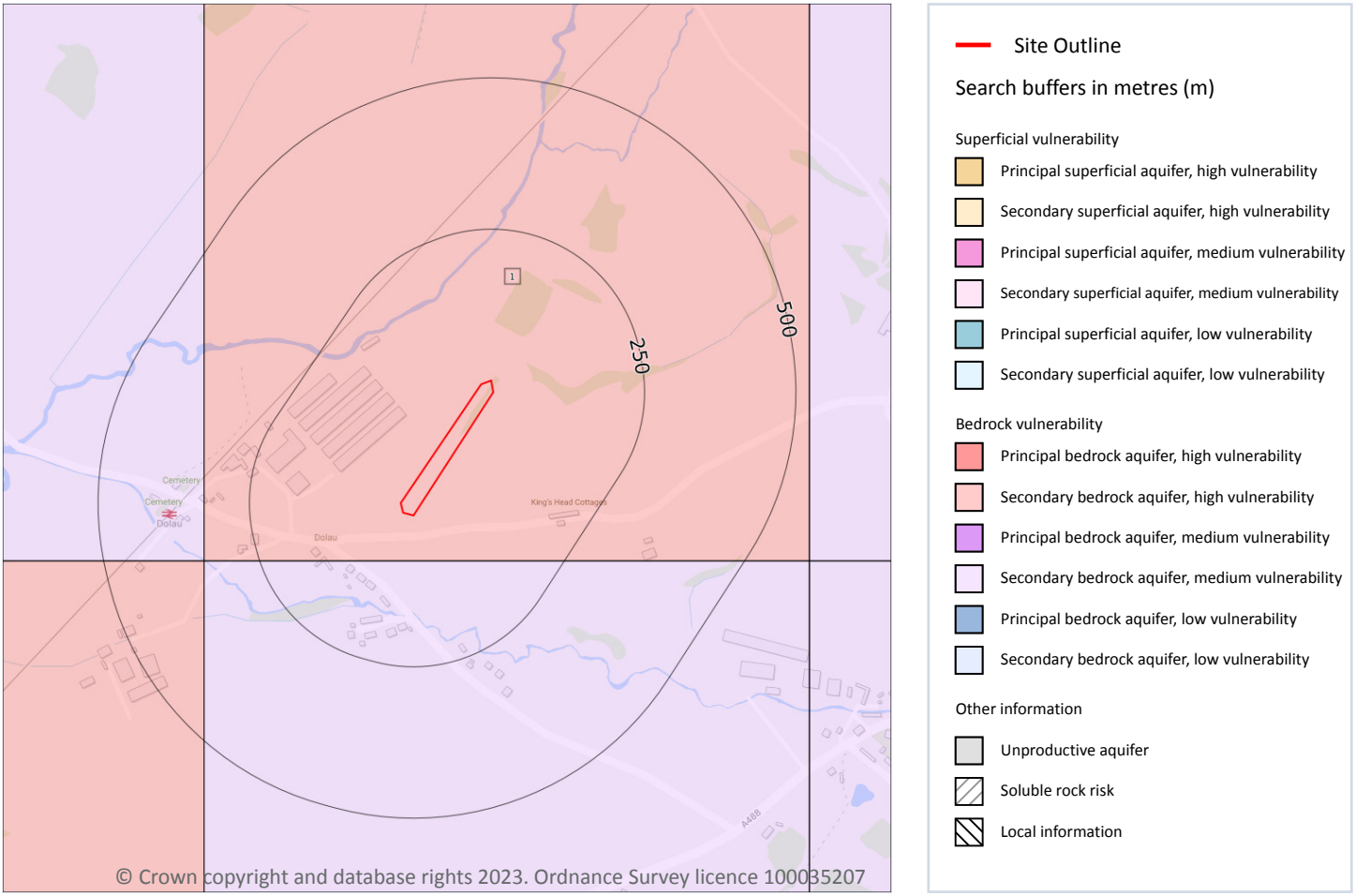
Aquifer status of groundwater held within bedrock geology.

Features are displayed on the Bedrock aquifer map on **page 30 >**

ID	Location	Designation	Description
1	On site	Secondary B	Predominantly lower permeability layers which may store/yield limited amounts of groundwater due to localised features such as fissures, thin permeablehorizons and weathering. These are generally the water-bearing parts of the former non-aquifers

This data is sourced from the British Geological Survey, the Environment Agency and Natural Resources Wales.

Groundwater vulnerability



6.3 Groundwater vulnerability

Records within 50m	1

An assessment of the vulnerability of groundwater to a pollutant discharged at ground level based on the hydrological, geological, hydrogeological and soil properties within a one kilometre square grid. Groundwater vulnerability is described as High, Medium or Low as follows:

- High - Areas able to easily transmit pollution to groundwater. They are likely to be characterised by high leaching soils and the absence of low permeability superficial deposits.
- Medium - Intermediate between high and low vulnerability.
- Low - Areas that provide the greatest protection from pollution. They are likely to be characterised by low leaching soils and/or the presence of superficial deposits characterised by a low permeability.

Features are displayed on the Groundwater vulnerability map on **page 31 >**

ID	Location	Summary	Soil / surface	Superficial geology	Bedrock geology
1	On site	**Summary Classification: Secondary bedrock aquifer - High Vulnerability Combined classification: Productive Bedrock Aquifer, No Superficial Aquifer**	**Leaching class: Low Infiltration value: >70% Dilution value: >550mm/year**	**Vulnerability: - Aquifer type: - Thickness: <3m Patchiness value: <90% Recharge potential: No Data**	**Vulnerability: High Aquifer type: Secondary Flow mechanism: Well connected fractures**

This data is sourced from the British Geological Survey, the Environment Agency and Natural Resources Wales.

6.4 Groundwater vulnerability- soluble rock risk

Records on site	0

This dataset identifies areas where solution features that enable rapid movement of a pollutant may be present within a 1km grid square.

This data is sourced from the British Geological Survey and the Environment Agency.

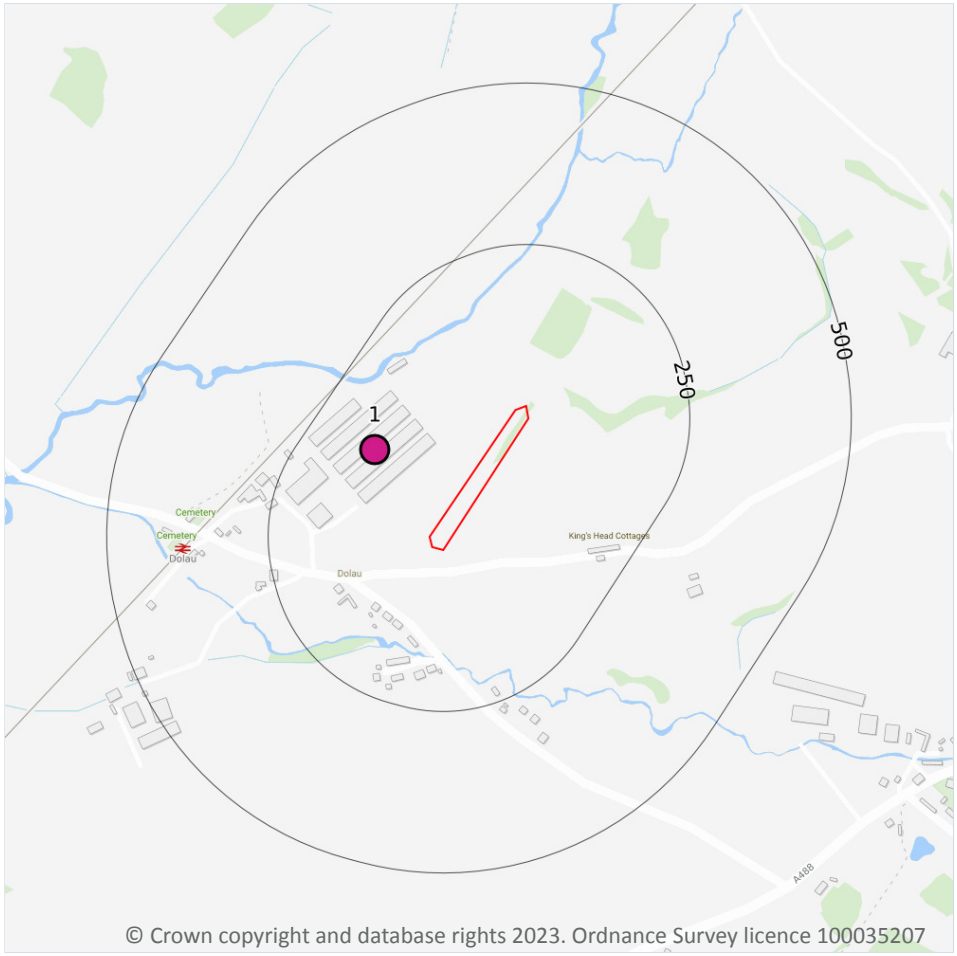
6.5 Groundwater vulnerability- local information

Records on site	0

This dataset identifies areas where additional local information affecting vulnerability is held by the Environment Agency. Further information can be obtained by contacting the Environment Agency local Area groundwater team through the Environment Agency National Customer Call Centre on 03798 506 506 or by email on enquiries@environment-agency.gov.uk ↗.

This data is sourced from the British Geological Survey and the Environment Agency.

Abstractions and Source Protection Zones



Site Outline

Search buffers in metres (m)

- Source Protection Zone 1 — Inner catchment
- Source Protection Zone 2 — Outer catchment
- Source Protection Zone 3 — Total catchment
- Source Protection Zone 4 — Zone of Special Interest
- Source Protection Zone 1c — Inner catchment - confined aquifer
- Source Protection Zone 2c — Outer catchment - confined aquifer
- Source Protection Zone 3c — Total catchment - confined aquifer
- Drinking water abstraction licences
- Drinking water abstraction licences — Polygon features
- Drinking water abstraction licences — Linear features
- Groundwater abstraction licence (point)
- Groundwater abstraction licence (area)
- Groundwater abstraction licence (linear)
- Surface Water Abstractions (point)
- Surface Water Abstractions (area)
- Surface Water Abstractions (linear)

6.6 Groundwater abstractions

Records within 2000m	1

Licensed groundwater abstractions for sites extracting more than 20 cubic metres of water a day and includes active and historical records. The data may be for a single abstraction point, between two points (line data) or a larger area.

Features are displayed on the Abstractions and Source Protection Zones map on **page 33 >**

ID	Location	Details	
1	145m W	Status: Historical Licence No: 19/55/4/0083 Details: General Farming & Domestic Direct Source: EAW Groundwater Point: BOREHOLE IN THE PARISH OF LLANFIHANGEL Data Type: Point Name: Watkins Easting: 314240 Northing: 267230	Annual Volume (m^3): 5856 Max Daily Volume (m^3): 16 Original Application No: - Original Start Date: - Expiry Date: - Issue No: 100 Version Start Date: 01/04/2006 Version End Date: -

This data is sourced from the Environment Agency and Natural Resources Wales.

6.7 Surface water abstractions

Records within 2000m	**0**

Licensed surface water abstractions for sites extracting more than 20 cubic metres of water a day and includes active and historical records. The data may be for a single abstraction point, a stretch of watercourse or a larger area.

This data is sourced from the Environment Agency and Natural Resources Wales.

6.8 Potable abstractions

Records within 2000m	**0**

Licensed potable water abstractions for sites extracting more than 20 cubic metres of water a day and includes active and historical records. The data may be for a single abstraction point, a stretch of watercourse or a larger area.

This data is sourced from the Environment Agency and Natural Resources Wales.

6.9 Source Protection Zones

Records within 500m	**0**

Source Protection Zones define the sensitivity of an area around a potable abstraction site to contamination.

This data is sourced from the Environment Agency and Natural Resources Wales.

6.10 Source Protection Zones (confined aquifer)

Records within 500m	0

Source Protection Zones in the confined aquifer define the sensitivity around a deep groundwater abstraction to contamination. A confined aquifer would normally be protected from contamination by overlying geology and is only considered a sensitive resource if deep excavation/drilling is taking place.

This data is sourced from the Environment Agency and Natural Resources Wales.

7 Hydrology

Site Outline

Search buffers in metres (m)

Water Network (OS MasterMap)

Surface water features (wider than 5m)

Surface water features (narrower than 5m)

WFD River, canal and surface water transfer water bodies

WFD Lake water bodies

WFD Transitional and coastal water bodies

WFD Surface water body catchments boundaries

WFD Groundwater body boundaries

7.1 Water Network (OS MasterMap)

Records within 250m	12

Detailed water network of Great Britain showing the flow and precise central course of every river, stream, lake and canal.

Features are displayed on the Hydrology map on **page 36 >**

ID	Location	Type of water feature	Ground level	Permanence	Name
B	159m SW	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	Maes Brook

ID	Location	Type of water feature	Ground level	Permanence	Name
5	159m N	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	River Aran
C	164m SW	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	Maes Brook
6	165m S	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	Maes Brook
B	165m S	Inland river not influenced by normal tidal action.	Underground	Watercourse contains water year round (in normal circumstances)	Maes Brook
B	167m SW	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	Maes Brook
B	167m SW	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	Maes Brook
B	169m SW	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
7	174m SW	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
9	237m NW	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	River Aran
D	237m NW	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
D	240m NW	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-

This data is sourced from the Ordnance Survey.

7.2 Surface water features

Records within 250m	5

Covering rivers, streams and lakes (some overlap with OS MasterMap Water Network data in previous section) but additionally covers smaller features such as ponds. Rivers and streams narrower than 5m are represented as a single line. Lakes, ponds and rivers or streams wider than 5m are represented as polygons.

Features are displayed on the Hydrology map on **page 36 >**

This data is sourced from the Ordnance Survey.

7.3 WFD Surface water body catchments

Records on site	1

The Water Framework Directive is an EU-led framework for the protection of inland surface waters, estuaries, coastal waters and groundwater through river basin-level management planning. In terms of surface water, these basins are broken down into smaller units known as management, operational and water body catchments.

Features are displayed on the Hydrology map on **page 36 >**

ID	Location	Type	Water body catchment	Water body ID	Operational catchment	Management catchment
A	**On site**	**River WB catchment**	**Aran - source to conf R Ithon**	**GB109055042110**	**Ithon**	**Wye MC**

This data is sourced from the Environment Agency and Natural Resources Wales.

7.4 WFD Surface water bodies

Records identified	1

Surface water bodies under the Directive may be rivers, lakes, estuary or coastal. To achieve the purpose of the Directive, environmental objectives have been set and are reported on for each water body. The progress towards delivery of the objectives is then reported on by the relevant competent authorities at the end of each six-year cycle. The river water body directly associated with the catchment listed in the previous section is detailed below, along with any lake, canal, coastal or artificial water body within 250m of the site.

Features are displayed on the Hydrology map on **page 36 >**

ID	Location	Type	Name	Water body ID	Overall rating	Chemical rating	Ecological rating	Year
4	159m N	River	Aran - source to conf R Ithon	GB109055042110	Good	Good	Good	2016

This data is sourced from the Environment Agency and Natural Resources Wales.

7.5 WFD Groundwater bodies

Records on site	1

Groundwater bodies are also covered by the Directive and the same regime of objectives and reporting detailed in the previous section is in place.

Features are displayed on the Hydrology map on **page 36 >**

ID	Location	Name	Water body ID	Overall rating	Chemical rating	Quantitative	Year
A	**On site**	**Wye Uplands Lower Palaeozoic**	**GB40902G205100**	**Poor**	**Poor**	**Good**	**2017**

This data is sourced from the Environment Agency and Natural Resources Wales.

8 River and coastal flooding

8.1 Risk of flooding from rivers and the sea

Records within 50m	0

The chance of flooding from rivers and/or the sea in any given year, based on cells of 50m within the Risk of Flooding from Rivers and Sea (RoFRaS)/Flood Risk Assessment Wales (FRAW) models. Each cell is allocated one of four flood risk categories, taking into account flood defences and their condition. The risk categories for RoFRaS for rivers and the sea and FRAW for rivers are; Very low (less than 1 in 1000 chance in any given year), Low (less than 1 in 100 but greater than or equal to 1 in 1000 chance), Medium (less than 1 in 30 but greater than or equal to 1 in 100 chance) or High (greater than or equal to 1 in 30 chance). The risk categories for FRAW for the sea are; Very low (less than 1 in 1000 chance in any given year), Low (less than 1 in 200 but greater than or equal to 1 in 1000 chance), Medium (less than 1 in 30 but greater than or equal to 1 in 200 chance) or High (greater than or equal to 1 in 30 chance).

This data is sourced from the Environment Agency and Natural Resources Wales.

8.2 Historical Flood Events

Records within 250m	0

Records of historic flooding from rivers, the sea, groundwater and surface water. Records began in 1946 when predecessor bodies started collecting detailed information about flooding incidents, although limited details may be included on flooding incidents prior to this date. Takes into account the presence of defences, structures, and other infrastructure where they existed at the time of flooding, and includes flood extents that may have been affected by overtopping, breaches or blockages.

This data is sourced from the Environment Agency and Natural Resources Wales.

8.3 Flood Defences

Records within 250m	0

Records of flood defences owned, managed or inspected by the Environment Agency and Natural Resources Wales. Flood defences can be structures, buildings or parts of buildings. Typically these are earth banks, stone and concrete walls, or sheet-piling that is used to prevent or control the extent of flooding.

This data is sourced from the Environment Agency and Natural Resources Wales.

8.4 Areas Benefiting from Flood Defences

Records within 250m	0

Areas that would benefit from the presence of flood defences in a 1 in 100 (1%) chance of flooding each year from rivers or 1 in 200 (0.5%) chance of flooding each year from the sea.

This data is sourced from the Environment Agency and Natural Resources Wales.

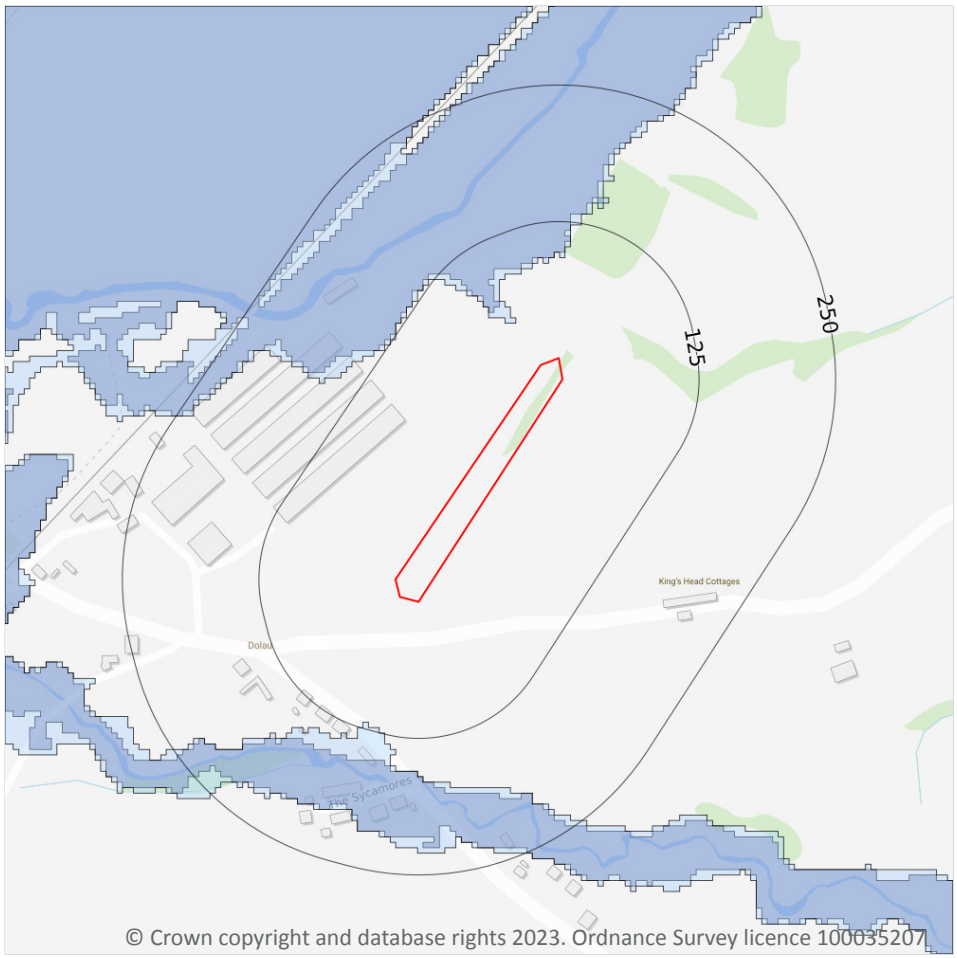
8.5 Flood Storage Areas

Records within 250m	0

Areas that act as a balancing reservoir, storage basin or balancing pond to attenuate an incoming flood peak to a flow level that can be accepted by the downstream channel or to delay the timing of a flood peak so that its volume is discharged over a longer period.

This data is sourced from the Environment Agency and Natural Resources Wales.

River and coastal flooding - Flood Zones



Site Outline

Search buffers in metres (m)

Flood zone 2

Flood zone 3

8.6 Flood Zone 2

Records within 50m	1

Areas of land at risk of flooding, when the presence of flood defences are ignored. Covering land between Flood Zone 3 (see next section) and the extent of the flooding from rivers or the sea with a 1 in 1000 (0.1%) chance of flooding each year.

Features are displayed on the River and coastal flooding map on **page 40 >**

Location	Type
44m N	Zone 2 - (Fluvial /Tidal Models)

This data is sourced from the Environment Agency and Natural Resources Wales.

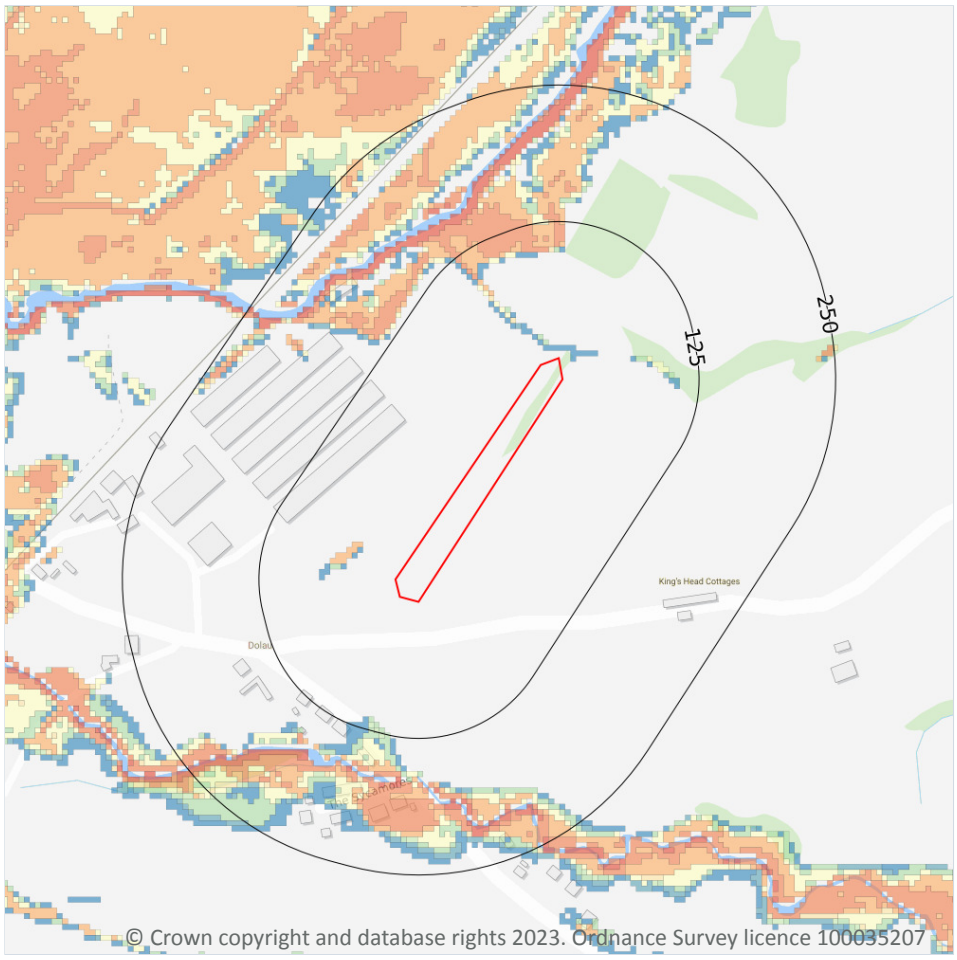
8.7 Flood Zone 3

Records within 50m	0

Areas of land at risk of flooding, when the presence of flood defences are ignored. Covering land with a 1 in 100 (1%) or greater chance of flooding each year from rivers or a 1 in 200 (0.5%) or greater chance of flooding each year from the sea.

This data is sourced from the Environment Agency and Natural Resources Wales.

9 Surface water flooding



Site Outline
Search buffers in metres (m)

1 in 1000 return period
- Depth between 0.1m - 0.3m
- Depth between 0.3m - 1.0m
- Depth greater than 1.0m

1 in 250 return period
- Depth between 0.1m - 0.3m
- Depth between 0.3m - 1.0m
- Depth greater than 1.0m

1 in 100 return period
- Depth between 0.1m - 0.3m
- Depth between 0.3m - 1.0m
- Depth greater than 1.0m

1 in 30 return period
- Depth between 0.1m - 0.3m
- Depth between 0.3m - 1.0m
- Depth greater than 1.0m

9.1 Surface water flooding

Highest risk on site	**Negligible**
Highest risk within 50m	**1 in 30 year, 0.1m - 0.3m**

Ambiental Risk Analytics surface water (pluvial) FloodMap identifies areas likely to flood as a result of extreme rainfall events, i.e. land naturally vulnerable to surface water ponding or flooding. This data set was produced by simulating 1 in 30 year, 1 in 100 year, 1 in 250 year and 1 in 1,000 year rainfall events. Modern urban drainage systems are typically built to cope with rainfall events between 1 in 20 and 1 in 30 years, though some older ones may flood in a 1 in 5 year rainfall event.

Features are displayed on the Surface water flooding map on **page 44 >**

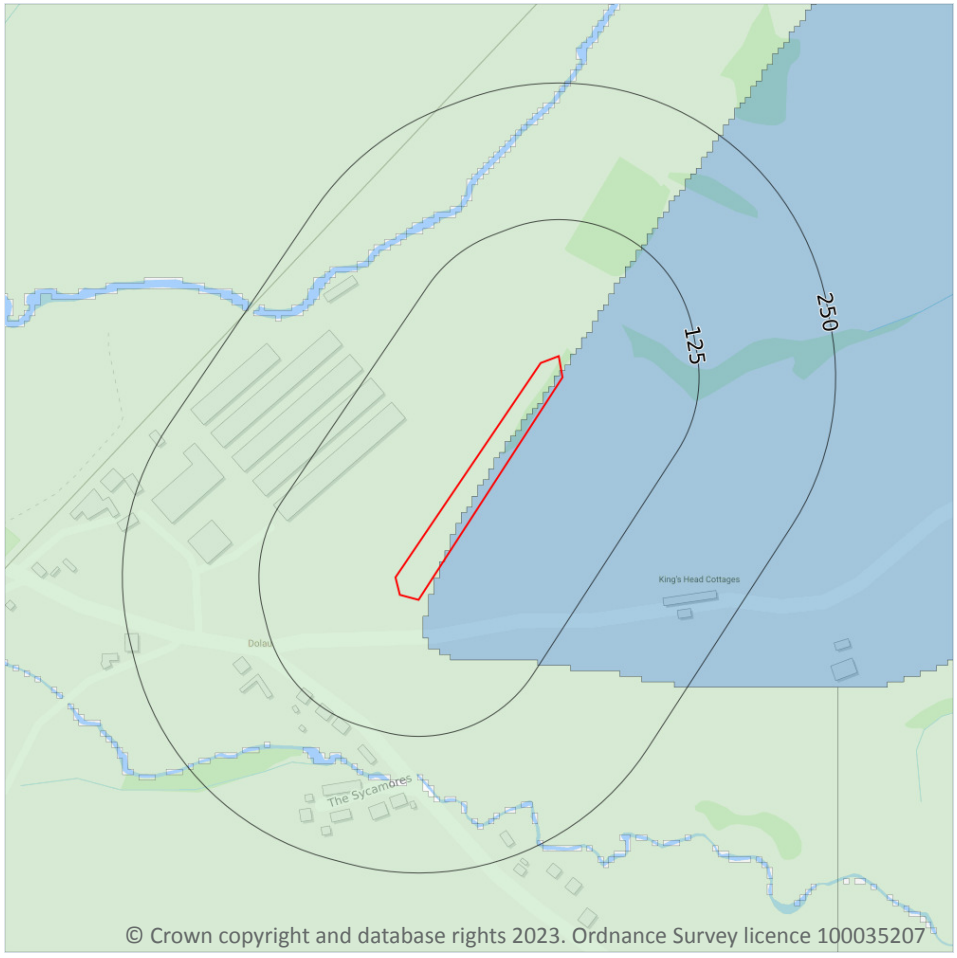
The data shown on the map and in the table above shows the highest likelihood of flood events happening at the site. Lower likelihood events may have greater flood depths and hence a greater potential impact on a site.

The table below shows the maximum flood depths for a range of return periods for the site.

Return period	Maximum modelled depth
1 in 1000 year	Negligible
1 in 250 year	Negligible
1 in 100 year	Negligible
1 in 30 year	Negligible

This data is sourced from Ambiental Risk Analytics.

10 Groundwater flooding



Site Outline

Search buffers in metres (m)

High

Moderate - High

Moderate

Low

Negligible

10.1 Groundwater flooding

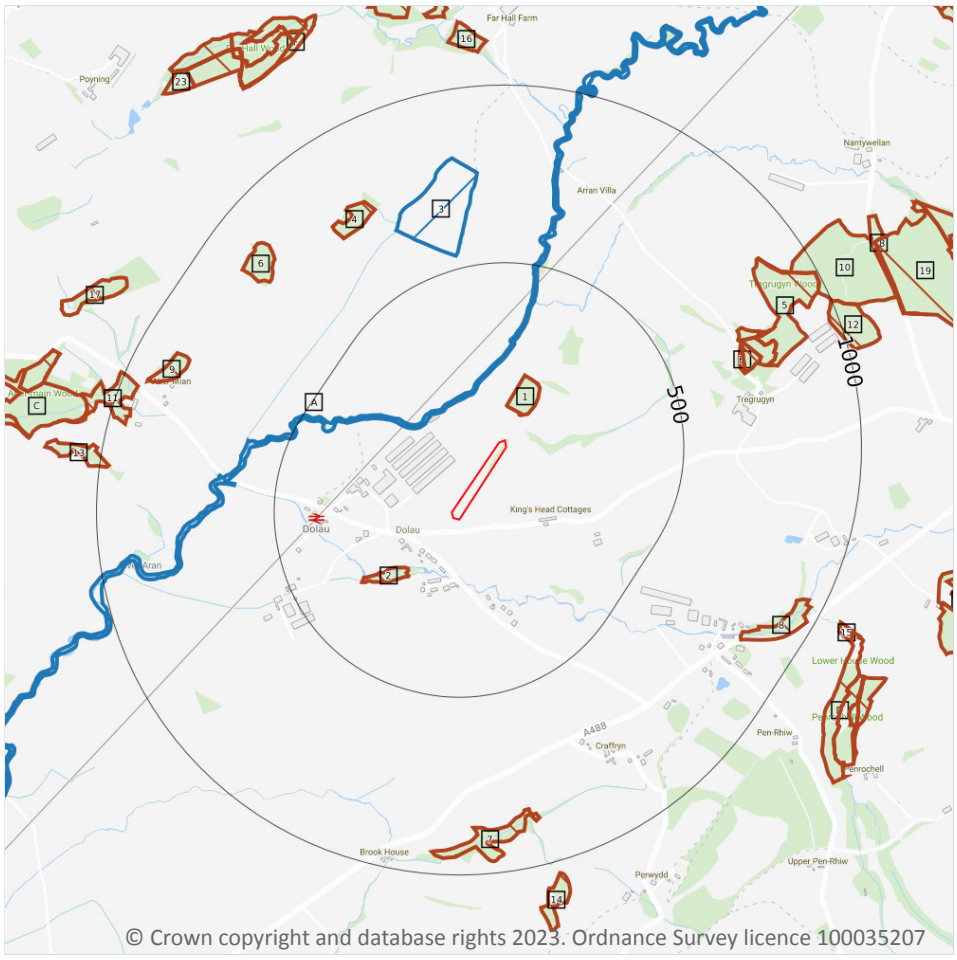
Highest risk on site	**Low**
Highest risk within 50m	**Low**

Groundwater flooding is caused by unusually high groundwater levels. It occurs when the water table rises above the ground surface or within underground structures such as basements or cellars. Groundwater flooding tends to exhibit a longer duration than surface water flooding, possibly lasting for weeks or months, and as a result it can cause significant damage to property. This risk assessment is based on a 1 in 100 year return period and a 5m Digital Terrain Model (DTM).

Features are displayed on the Groundwater flooding map on **page 46 >**

This data is sourced from Ambiental Risk Analytics.

11 Environmental designations



Site Outline

Search buffers in metres (m)

Sites of Special Scientific Interest (SSSI)

Special Areas of Conservation (SAC)

Designated Ancient Woodland

11.1 Sites of Special Scientific Interest (SSSI)

Records within 2000m	2

Sites providing statutory protection for the best examples of UK flora, fauna, or geological or physiographical features. Originally notified under the National Parks and Access to the Countryside Act 1949, SSSIs were re-notified under the Wildlife and Countryside Act 1981. Improved provisions for the protection and management of SSSIs were introduced by the Countryside and Rights of Way Act 2000 (in England and Wales) and (in Scotland) by the Nature Conservation (Scotland) Act 2004 and the Wildlife and Natural Environment (Scotland) Act 2010.

Features are displayed on the Environmental designations map on **page 47 >**

ID	Location	Name	Data source
A	155m N	River Ithon	Natural Resources Wales

ID	Location	Name	Data source
3	537m N	Far Hall Meadow	Natural Resources Wales

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

11.2 Conserved wetland sites (Ramsar sites)

Records within 2000m	**0**

Ramsar sites are designated under the Convention on Wetlands of International Importance, agreed in Ramsar, Iran, in 1971. They cover all aspects of wetland conservation and wise use, recognizing wetlands as ecosystems that are extremely important for biodiversity conservation in general and for the well-being of human communities. These sites cover a broad definition of wetland; marsh, fen, peatland or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, and even some marine areas.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

11.3 Special Areas of Conservation (SAC)

Records within 2000m	**1**

Areas which have been identified as best representing the range and variety within the European Union of habitats and (non-bird) species listed on Annexes I and II to the Directive. SACs are designated under the EC Habitats Directive.

Features are displayed on the Environmental designations map on **page 47 >**

ID	Location	Name	Features of interest	Habitat description	Data source
A	155m N	River Wye / Afon Gwy (Wales)	Estuaries; Intertidal mudflats and sandflats; Atlantic salt meadows; Rivers with floating vegetation often dominated by water-crowfoot; Dry heaths; Very wet mires often identified by an unstable `quaking` surface; Caves not open to the public; Mixed woodland on base-rich soils associated with rocky slopes; Western acidic oak woodland; Bog woodland; Alder woodland on floodplains; Sea lamprey; Brook lamprey; River lamprey; Allis shad; Twaite shad; Atlantic salmon; Bullhead; Freshwater pearl mussel; White-clawed (or Atlantic stream) crayfish; Lesser horseshoe bat; Greater horseshoe bat; Otter.	Improved grassland; Salt marshes, Salt pastures, Salt steppes; Heath, Scrub, Maquis and Garrigue, Phygrana; Tidal rivers, Estuaries, Mud flats, Sand flats, Lagoons (including saltwork basins); Dry grassland, Steppes; Inland rocks, Screes, Sands, Permanent Snow and ice; Humid grassland, Mesophile grassland; Inland water bodies (Standing water, Running water); Broad-leaved deciduous woodland; Other land (including Towns, Villages, Roads, Waste places, Mines, Industrial sites); Bogs, Marshes, Water fringed vegetation, Fens	Natural Resources Wales

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

11.4 Special Protection Areas (SPA)

Records within 2000m	0

Sites classified by the UK Government under the EC Birds Directive, SPAs are areas of the most important habitat for rare (listed on Annex I to the Directive) and migratory birds within the European Union.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

11.5 National Nature Reserves (NNR)

Records within 2000m	0

Sites containing examples of some of the most important natural and semi-natural terrestrial and coastal ecosystems in Great Britain. They are managed to conserve their habitats, provide special opportunities for scientific study or to provide public recreation compatible with natural heritage interests.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

11.6 Local Nature Reserves (LNR)

Records within 2000m	0

Sites managed for nature conservation, and to provide opportunities for research and education, or simply enjoying and having contact with nature. They are declared by local authorities under the National Parks and Access to the Countryside Act 1949 after consultation with the relevant statutory nature conservation agency.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

11.7 Designated Ancient Woodland

Records within 2000m	81

Ancient woodlands are classified as areas which have been wooded continuously since at least 1600 AD. This includes semi-natural woodland and plantations on ancient woodland sites. 'Wooded continuously' does not mean there is or has previously been continuous tree cover across the whole site, and not all trees within the woodland have to be old.

Features are displayed on the Environmental designations map on **page 47 >**

ID	Location	Name	Woodland Type
1	83m NE	Unknown	Ancient Semi Natural Woodland
2	191m SW	Unknown	Ancient Semi Natural Woodland
B	693m NE	Unknown	Ancient Semi Natural Woodland

ID	Location	Name	Woodland Type
B	703m E	Unknown	Ancient Semi Natural Woodland
B	714m NE	Unknown	Plantation on Ancient Woodland Site
4	721m NW	Unknown	Ancient Semi Natural Woodland
B	722m NE	Unknown	Plantation on Ancient Woodland Site
5	764m NE	Unknown	Ancient Semi Natural Woodland
B	768m NE	Unknown	Ancient Semi Natural Woodland
6	788m NW	Unknown	Restored Ancient Woodland Site
7	837m S	Unknown	Ancient Semi Natural Woodland
8	841m SE	Unknown	Ancient Semi Natural Woodland
9	850m W	Unknown	Plantation on Ancient Woodland Site
10	870m NE	Unknown	Ancient Semi Natural Woodland
11	945m W	Unknown	Ancient Semi Natural Woodland
12	974m NE	Unknown	Ancient Semi Natural Woodland
13	974m W	Unknown	Ancient Semi Natural Woodland
14	1034m S	Unknown	Ancient Semi Natural Woodland
15	1063m E	Unknown	Ancient Semi Natural Woodland
C	1066m W	Unknown	Ancient Semi Natural Woodland
16	1096m N	Unknown	Ancient Semi Natural Woodland
D	1105m E	Unknown	Ancient Semi Natural Woodland
17	1113m NW	Unknown	Plantation on Ancient Woodland Site
18	1174m NE	Unknown	Ancient Semi Natural Woodland
D	1176m SE	Unknown	Restored Ancient Woodland Site
19	1178m NE	Unknown	Ancient Semi Natural Woodland
C	1189m W	Unknown	Ancient Semi Natural Woodland
D	1197m SE	Unknown	Plantation on Ancient Woodland Site
D	1198m SE	Unknown	Plantation on Ancient Woodland Site
20	1204m N	Unknown	Ancient Semi Natural Woodland
D	1204m SE	Unknown	Restored Ancient Woodland Site

ID	Location	Name	Woodland Type
E	1207m W	Unknown	Ancient Semi Natural Woodland
D	1214m SE	Unknown	Plantation on Ancient Woodland Site
21	1222m N	Unknown	Ancient Semi Natural Woodland
F	1224m NW	Unknown	Plantation on Ancient Woodland Site
F	1226m NW	Unknown	Plantation on Ancient Woodland Site
D	1252m SE	Unknown	Restored Ancient Woodland Site
F	1256m NW	Unknown	Plantation on Ancient Woodland Site
F	1267m NW	Unknown	Restored Ancient Woodland Site
F	1268m NW	Unknown	Plantation on Ancient Woodland Site
G	1276m E	Unknown	Restored Ancient Woodland Site
F	1285m N	Unknown	Ancient Semi Natural Woodland
F	1298m NW	Unknown	Ancient Semi Natural Woodland
F	1300m NW	Unknown	Plantation on Ancient Woodland Site
F	1301m NW	Unknown	Plantation on Ancient Woodland Site
F	1302m NW	Unknown	Ancient Semi Natural Woodland
G	1305m E	Unknown	Restored Ancient Woodland Site
-	1308m N	Unknown	Ancient Semi Natural Woodland
23	1318m NW	Unknown	Ancient Semi Natural Woodland
F	1336m NW	Unknown	Ancient Semi Natural Woodland
24	1342m NE	Unknown	Ancient Semi Natural Woodland
-	1361m N	Unknown	Restored Ancient Woodland Site
-	1367m W	Unknown	Ancient Semi Natural Woodland
-	1451m N	Unknown	Ancient Semi Natural Woodland
-	1487m NE	Unknown	Ancient Semi Natural Woodland
-	1545m N	Unknown	Restored Ancient Woodland Site
-	1559m E	Unknown	Restored Ancient Woodland Site
-	1584m E	Unknown	Restored Ancient Woodland Site
-	1619m N	Unknown	Ancient Semi Natural Woodland

ID	Location	Name	Woodland Type
-	1650m S	Unknown	Ancient Semi Natural Woodland
-	1660m E	Unknown	Ancient Woodland Site of Unknown Category
-	1710m S	Unknown	Ancient Semi Natural Woodland
33	1716m NE	Unknown	Ancient Semi Natural Woodland
34	1717m NE	Unknown	Restored Ancient Woodland Site
-	1722m S	Unknown	Ancient Semi Natural Woodland
-	1736m N	Unknown	Restored Ancient Woodland Site
-	1749m N	Unknown	Ancient Semi Natural Woodland
36	1752m NE	Unknown	Ancient Semi Natural Woodland
-	1777m N	Unknown	Ancient Semi Natural Woodland
-	1784m N	Unknown	Restored Ancient Woodland Site
-	1800m S	Unknown	Ancient Semi Natural Woodland
-	1803m NW	Unknown	Ancient Semi Natural Woodland
-	1849m E	Unknown	Ancient Woodland Site of Unknown Category
-	1882m E	Unknown	Restored Ancient Woodland Site
-	1886m E	Unknown	Restored Ancient Woodland Site
-	1933m S	Unknown	Ancient Semi Natural Woodland
-	1936m E	Unknown	Restored Ancient Woodland Site
-	1966m N	Unknown	Plantation on Ancient Woodland Site
-	1984m NE	Unknown	Ancient Semi Natural Woodland
-	1988m N	Unknown	Ancient Semi Natural Woodland
-	1989m E	Unknown	Restored Ancient Woodland Site

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

11.8 Biosphere Reserves

Records within 2000m	0

Biosphere Reserves are internationally recognised by UNESCO as sites of excellence to balance conservation and socioeconomic development between nature and people. They are recognised under the Man and the Biosphere (MAB) Programme with the aim of promoting sustainable development founded on the work of the

local community.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

11.9 Forest Parks

Records within 2000m	0

These are areas managed by the Forestry Commission designated on the basis of recreational, conservation or scenic interest.

This data is sourced from the Forestry Commission.

11.10 Marine Conservation Zones

Records within 2000m	0

A type of marine nature reserve in UK waters established under the Marine and Coastal Access Act (2009). They are designated with the aim to protect nationally important, rare or threatened habitats and species.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

11.11 Green Belt

Records within 2000m	0

Areas designated to prevent urban sprawl by keeping land permanently open.

This data is sourced from the Ministry of Housing, Communities and Local Government.

11.12 Proposed Ramsar sites

Records within 2000m	0

Ramsar sites are areas listed as a Wetland of International Importance under the Convention on Wetlands of International Importance especially as Waterfowl Habitat (the Ramsar Convention) 1971. The sites here supplied have a status of 'Proposed' having been identified for potential adoption under the framework.

This data is sourced from Natural England.

11.13 Possible Special Areas of Conservation (pSAC)

Records within 2000m	0

Special Areas of Conservation are areas which have been identified as best representing the range and variety within the European Union of habitats and (non-bird) species listed on Annexes I and II to the Directive. SACs are designated under the EC Habitats Directive. Those sites supplied here are those with a status of 'Possible' having been identified for potential adoption under the framework.

This data is sourced from Natural England and Natural Resources Wales.

11.14 Potential Special Protection Areas (pSPA)

Records within 2000m	0

Special Protection Areas (SPAs) are areas designated (or 'classified') under the European Union Wild Birds Directive for the protection of nationally and internationally important populations of wild birds. Those sites supplied here are those with a status of 'Potential' having been identified for potential adoption under the framework.

This data is sourced from Natural England.

11.15 Nitrate Sensitive Areas

Records within 2000m	0

Areas where nitrate concentrations in drinking water sources exceeded or was at risk of exceeding the limit of 50 mg/l set by the 1980 EC Drinking Water Directive. Voluntary agricultural measures as a means of reducing the levels of nitrate were introduced by DEFRA as MAFF, with payments being made to farmers who complied. The scheme was started as a pilot in 1990 in ten areas, later implemented within 32 areas. The scheme was closed to further new entrants in 1998, although existing agreements continued for their full term. All Nitrate Sensitive Areas fell within the areas designated as Nitrate Vulnerable Zones (NVZs) in 1996 under the EC Nitrate Directive (91/676/EEC).

This data is sourced from Natural England.

11.16 Nitrate Vulnerable Zones

Records within 2000m	0

Areas at risk from agricultural nitrate pollution designated under the EC Nitrate Directive (91/676/EEC). These are areas of land that drain into waters polluted by nitrates. Farmers operating within these areas have to follow mandatory rules to tackle nitrate loss from agriculture.

This data is sourced from Natural England and Natural Resources Wales.

SSSI Impact Zones and Units

11.17 SSSI Impact Risk Zones

Records on site	0

Developed to allow rapid initial assessment of the potential risks to SSSIs posed by development proposals. They define zones around each SSSI which reflect the particular sensitivities of the features for which it is notified and indicate the types of development proposal which could potentially have adverse impacts.

This data is sourced from Natural England.

11.18 SSSI Units

Records within 2000m	0

Divisions of SSSIs used to record management and condition details. Units are the smallest areas for which Natural England gives a condition assessment, however, the size of units varies greatly depending on the types of management and the conservation interest.

This data is sourced from Natural England and Natural Resources Wales.

12 Visual and cultural designations

12.1 World Heritage Sites

Records within 250m	0

Sites designated for their globally important cultural or natural interest requiring appropriate management and protection measures. World Heritage Sites are designated to meet the UK's commitments under the World Heritage Convention.

This data is sourced from Historic England, Cadw and Historic Environment Scotland.

12.2 Area of Outstanding Natural Beauty

Records within 250m	0

Areas of Outstanding Natural Beauty (AONB) are conservation areas, chosen because they represent 18% of the finest countryside. Each AONB has been designated for special attention because of the quality of their flora, fauna, historical and cultural associations, and/or scenic views. The National Parks and Access to the Countryside Act of 1949 created AONBs and the Countryside and Rights of Way Act, 2000 added further regulation and protection. There are likely to be restrictions to some developments within these areas.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

12.3 National Parks

Records within 250m	0

In England and Wales, the purpose of National Parks is to conserve and enhance landscapes within the countryside whilst promoting public enjoyment of them and having regard for the social and economic well-being of those living within them. In Scotland National Parks have the additional purpose of promoting the sustainable use of the natural resources of the area and the sustainable social and economic development of its communities. The National Parks and Access to the Countryside Act 1949 established the National Park designation in England and Wales, and The National Parks (Scotland) Act 2000 in Scotland.

This data is sourced from Natural England, Natural Resources Wales and the Scottish Government.

12.4 Listed Buildings

Records within 250m	0

Buildings listed for their special architectural or historical interest. Building control in the form of 'listed building consent' is required in order to make any changes to that building which might affect its special interest. Listed buildings are graded to indicate their relative importance, however building controls apply to all buildings equally, irrespective of their grade, and apply to the interior and exterior of the building in its entirety, together with any curtilage structures.

This data is sourced from Historic England, Cadw and Historic Environment Scotland.

12.5 Conservation Areas

Records within 250m	0

Local planning authorities are obliged to designate as conservation areas any parts of their own area that are of special architectural or historic interest, the character and appearance of which it is desirable to preserve or enhance. Designation of a conservation area gives broader protection than the listing of individual buildings. All the features within the area, listed or otherwise, are recognised as part of its character. Conservation area designation is the means of recognising the importance of all factors and of ensuring that planning decisions address the quality of the landscape in its broadest sense.

This data is sourced from Historic England, Cadw and Historic Environment Scotland.

12.6 Scheduled Ancient Monuments

Records within 250m	0

A scheduled monument is an historic building or site that is included in the Schedule of Monuments kept by the Secretary of State for Digital, Culture, Media and Sport. The regime is set out in the Ancient Monuments and Archaeological Areas Act 1979. The Schedule of Monuments has c.20,000 entries and includes sites such as Roman remains, burial mounds, castles, bridges, earthworks, the remains of deserted villages and industrial sites. Monuments are not graded, but all are, by definition, considered to be of national importance.

This data is sourced from Historic England, Cadw and Historic Environment Scotland.

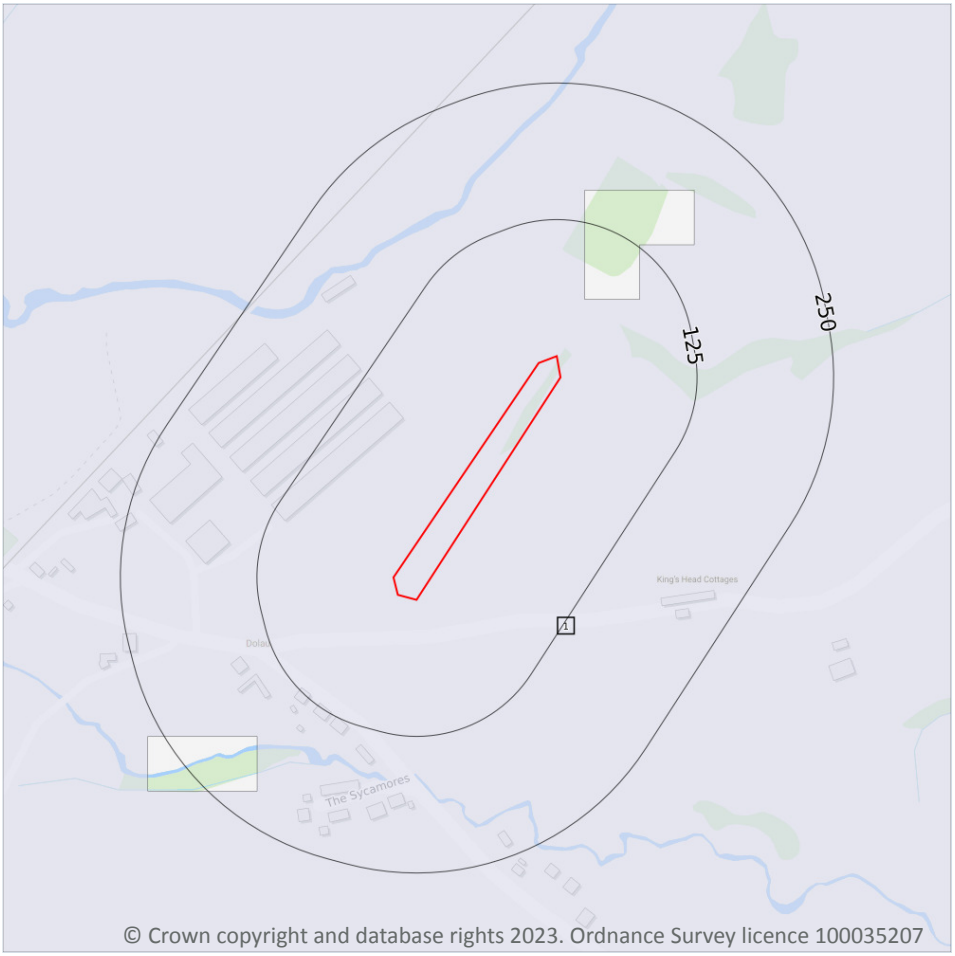
12.7 Registered Parks and Gardens

Records within 250m	0

Parks and gardens assessed to be of particular interest and of special historic interest. The emphasis being on 'designed' landscapes, rather than on planting or botanical importance. Registration is a 'material consideration' in the planning process, meaning that planning authorities must consider the impact of any proposed development on the special character of the landscape.

This data is sourced from Historic England, Cadw and Historic Environment Scotland.

13 Agricultural designations



Site Outline

Search buffers in metres (m)

- Grade 1 - excellent quality
- Grade 2 - very good quality
- Grade 3a - good quality
- Grade 3b - moderate quality
- Grade 4 - poor quality
- Grade 5 - very poor quality
- Timber felling licences
- Open Access land

13.1 Agricultural Land Classification

Records within 250m	1

Classification of the quality of agricultural land taking into consideration multiple factors including climate, physical geography and soil properties. It should be noted that the categories for the grading of agricultural land are not consistent across England, Wales and Scotland.

Features are displayed on the Agricultural designations map on **page 58 >**

ID	Location	Classification	Description
1	**On site**	**Grade 3b**	**Moderate quality agricultural land**

This data is sourced from Natural Resources Wales.

13.2 Open Access Land

Records within 250m	0

The Countryside and Rights of Way Act 2000 (CROW Act) gives a public right of access to land without having to use paths. Access land includes mountains, moors, heaths and downs that are privately owned. It also includes common land registered with the local council and some land around the England Coast Path. Generally permitted activities on access land are walking, running, watching wildlife and climbing.

This data is sourced from Natural England and Natural Resources Wales.

13.3 Tree Felling Licences

Records within 250m	0

Felling Licence Application (FLA) areas approved by Forestry Commission England. Anyone wishing to fell trees must ensure that a licence or permission under a grant scheme has been issued by the Forestry Commission before any felling is carried out or that one of the exceptions apply.

This data is sourced from the Forestry Commission.

13.4 Environmental Stewardship Schemes

Records within 250m	0

Environmental Stewardship covers a range of schemes that provide financial incentives to farmers, foresters and land managers to look after and improve the environment. The schemes identified may be historical schemes that have now expired, or may still be active.

This data is sourced from Natural England.

13.5 Countryside Stewardship Schemes

Records within 250m	0

Countryside Stewardship covers a range of schemes that provide financial incentives to farmers, foresters and land managers to look after and improve the environment. Main objectives are to improve the farmed environment for wildlife and to reduce diffuse water pollution.

This data is sourced from Natural England.

14 Habitat designations

14.1 Priority Habitat Inventory

Records within 250m	0

Habitats of principal importance as named under Natural Environment and Rural Communities Act (2006) Section 41.

This data is sourced from Natural England.

14.2 Habitat Networks

Records within 250m	0

Habitat networks for 18 priority habitat networks (based primarily, but not exclusively, on the priority habitat inventory) and areas suitable for the expansion of networks through restoration and habitat creation.

This data is sourced from Natural England.

14.3 Open Mosaic Habitat

Records within 250m	0

Sites verified as Open Mosaic Habitat. Mosaic habitats are brownfield sites that are identified under the UK Biodiversity Action Plan as a priority habitat due to the habitat variation within a single site, supporting an array of invertebrates.

This data is sourced from Natural England.

14.4 Limestone Pavement Orders

Records within 250m	0

Limestone pavements are outcrops of limestone where the surface has been worn away by natural means over millennia. These rocks have the appearance of paving blocks, hence their name. Not only do they have geological interest, they also provide valuable habitats for wildlife. These habitats are threatened due to their removal for use in gardens and water features. Many limestone pavements have been designated as SSSIs which affords them some protection. In addition, Section 34 of the Wildlife and Countryside Act 1981 gave them additional protection via the creation of Limestone Pavement Orders, which made it a criminal offence to remove any part of the outcrop. The associated Limestone Pavement Priority Habitat is part of the UK Biodiversity Action Plan priority habitat in England.

This data is sourced from Natural England.

Data providers

Groundsure works with respected data providers to bring you the most relevant and accurate information. To find out who they are and their areas of expertise see https://www.groundsure.com/sources-reference ↗.

Terms and conditions

Groundsure's Terms and Conditions can be accessed at this link: https://www.groundsure.com/terms-and-conditions-april-2023/ ↗.

APPENDIX C

Calculations

Table 1: Average daily flow measured during site investigations

Unit	BH1	BH2	BH3	Total	Comment
m3/d	8.6	17.1	17.1	42.8	Recorded
m3/hr	0.4	0.7	0.7	1.8	Pro-rata'd from daily
l/s	0.1	0.2	0.2	0.5	Pro-rata'd from daily
m3/a	2420	4811	4811	12042	Total during growing period (37 days growing and 11 days rest. Doesn't include washdown

From graph in Figure 5.2, perhaps 5 x more drawdown is observed at BH2 whilst washdown pumping is on. To be conservative, assume linear correlation drawdown vs flow rate, and 10 x more drawdown.

Table 2: Hours pumping at full rate during washdown

Date	Unit	BH1	BH2	BH3
19/07/2023	hrs	0	5	0
20/07/2023	hrs	0	5.5	0
21/07/2023	hrs	3	5	0
Total hrs pumping at max rate	hrs	3	15.5	0

Table 3: Estimated washdown rates and volumes

	Unit	BH1	BH2	BH3	Total
Washdown rate If 10 x hourly rate during growing cycle	l/s	1.00	1.98	1.98	5.0
	m3/hr	3.58	7.13	7.13	17.8
Volume used during washdown	m3	10.75	110.44	0	121
	m3/d	3.58	36.81	0	40

No. growing cycles per year: 7.6

Table 4: Annual volume used during washdown

	BH1	BH2	BH3	Total
m3	812	840	0	922

Table 5: Required abstraction quantities (detailed)

Timescale		Value	Unit	How derived
Annual	Growing	13420	m3/a	Max historic plus 10% increase for climate change
	Washdown	922	m3/a	Not recorded. Conservative estimate from groundwater graph
	Total	14342	m3/a	
		39	m3/d	equivalent
Daily	Growing	83	m3/d	Max historic plus 10% increase for climate change
	Washdown	40	m3/d	Not recorded. Conservative estimate from groundwater graph
Hourly	Growing	3		Not recorded. Pro-rata'd from daily value
	Washdown	18	m3/hr	Not recorded. Conservative estimate from groundwater graph, if all 3 BHs pumping at once (they are only on for a few hours per day)
Instantaneous	Growing	5.0	l/s	Not known. Estimated during site visit (from taps)
	Washdown	5.0	l/s	Pro-rata'd from hourly value

Items highlighted in cream to be carried through to summary table

Table 6: Required abstraction quantities (summary)

Timescale	Value	Unit
Annual	14342	m3/a
Daily	83	m3/d
Hourly	18	m3/hr
Instantaneous	5.0	l/s