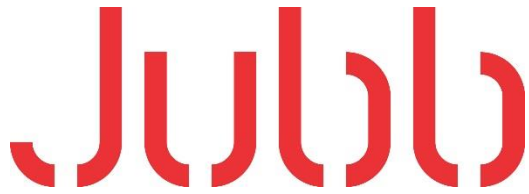


23157



Title: Non-Mains Drainage Assessment – Gnoll Park

Date: 02/08/2023

Version: P1

I. Introduction

Jubb have been appointed by Andrew Scott Ltd. to provide engineering input relating to a non mains drainage assessment for the re-development of an existing facility and its associated works, located at Gnoll Country Park, Neath on National Grid Reference SS766975, 2766975 E; 197559 N, postcode SA11 3EF.

The site is divided into six work area zones approximately 3 ha in size and is currently occupied by a visitor centre, pond cottage, ruins, service yard, potting sheds and associated car parking.

The proposed re-development will include the six work area zones, which are identified in the table below:

Area	Description	Proposed Works	Foul	Note
01	Gnoll House Ruins	Restoration and repair	NO	No foul drainage required for this area.
02	Visitor Centre	Proposed new visitor centre	YES	Visitor Centre includes toilets and a restaurant kitchen.
03	Pond Cottage	Restoration and minor extension	YES	Pond Cottage includes toilets and a café kitchen.
04	Kitchen Garden & Service yard	Cabin accommodation lodges, service yard and Carpark	YES	Kitchen Garden includes toilets, showers, baths and kitchens for the accommodation units. No foul drainage required for the Service yard.
05	Main Carpark	Proposed additional carpark	NO	No foul drainage required for this area.
06	Woodland Bridge	Proposed bridge	NO	No foul drainage required for this area.

This assessment seeks to assess the proposed package treatment plants arrangement to confirm its viability and feasibility according to the guidance requirements and suitability to the local planning authority. It will aim to confirm that the proposals provided will not cause environmental, public health or amenity hazards.

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Refer to Appendix A – Jubb Drainage Layouts – 00500 & 00502

The assessment follows guidance taken from Circular 008/2018 and Natural Resources Wales (NRW) guidelines ‘Private sewage treatment in an area with a public sewer’, which provides advice on non-mains drainage and the feasibility of disposal options.

II. Consultation

As part of the Planning pre-application consultation, Dwr Cymru Welsh Water (DCWW) have provided comments in relation to the outline drainage proposals provided. It is noted that no objection towards the proposed development was provided.

DCWW comments are as follows:

- Public Sewerage Network
“There is no public sewerage system in this immediate locality and therefore any new development will require provision of satisfactory alternative facilities for sewage disposal.”
- Foul Water Drainage – Sewage Network
“It appears the application does not propose to connect to the public sewer, and therefore Dwr Cymru Welsh Water has no further comments.”
- Sewage Treatment
“No problems are envisaged with the Wastewater Treatment Works for the treatment of domestic discharges from this site.”

Refer to Appendix B – DCWW Map (which identifies the approximate distance from the development areas to the closest DCWW sewer chamber)

III. Assessment of Non-Mains Drainage

It has been confirmed above by DCWW that there is no public sewer within practicable distance from the development.

The closest public foul sewer available for connection for:

- Area 02 - Visitor Centre is located approximately 250m north. This route is not feasible as it would cross through third party land, over a length of 250m with a level change of approximately 20m.
- Areas 03 & 04 - Pond Cottage and Kitchen Gardens is located approximately 350m south. This route is not feasible as it would have to be routed around the existing pond (to avoid the woodland) within the existing carriageway and would cross a watercourse, over a length of 350m with a level change of approximately 30m.

NRW guidance also indicates that a sewer more than (maximum discharge volume in L/750) x 30m would not be viable for a sewer connection.

Applying this to:

- Visitor Centre: 150 people (assumed) x 30l = 4500l
 = 4500 / 750 = 6 x 30m
 = 180m (less than the required 250m to connect to the closest sewer).

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- Pond Cottage and Kitchen Gardens: 42 people x 150l = 6300l
= 6300 / 750 = 8.4 x 30m
= 252m (less than the required 350m to connect to the closest sewer).

Refer to Appendix C – which details the Discounted Route and associated Topographical challenges

As such, a public sewer connection is not feasible and has been discounted. The drainage strategy proposes two separate Package Treatment Plants to treat the foul water flows from the Area 01 - Visitor Centre and Areas 02 & 04 - Pond Cottage & Kitchen Gardens.

Porosity tests have been undertaken within the superficial strata across the site, the tests suggest that the sites' average infiltration rate is 1.14×10^{-4} m/s which produces a subsequent average Vp of 2.92. The fast infiltration rate has deemed the tested strata to not be suitable as an infiltration medium for treated foul per The Building Regulations Part H as its too fast to provide tertiary treatment. It is possible to import filter sand or similar, to artificially reduce the speed of infiltration however this method has been deemed not economically feasible. Additionally, the required drainage fields are too large to be located appropriately on site due to the steep topography and the woodland tree root protection areas.

As ground has been deemed not suitable as a method of discharge, a watercourse would be the next preferred option when following the hierarchy of discharge for treated foul water. The site contains two ponds which are deemed to be a suitable location for discharge on initial review. The visitor centre treatment plant would discharge directly into the pond whilst the treatment plant serving pond cottage and the kitchen gardens would discharge into a nearby existing watercourse (stream) which subsequently discharges into the lower pond. It is anticipated that the site will utilise a BioCell 'Apex 100' or similar approved treatment plant, which would be designed to meet Natural Resources Wales discharge requirements. The treatment plant will provide treatment over three principal stages, meeting the UK Royal Commission Standard for effluent and EN 12566-3 testing. An average effluent quality of 9.9mg/L for BOD, 14.7mg/L for suspended solids and 6.8mg/L for ammonia will be achieved, together with a robust sludge management system. Refer to Appendix D for the technical specification sheet. This is considered to be the only practical means of non-mains drainage discharge at the development.

An NRW license will be required for the treatment plant and discharge of the treated foul water into the adjacent waterbodies, including a separate operation and maintenance strategy as part of the permit.

Foul water flows were calculated from the British Standard BS EN 12056-2:2000, at 6.43 l/s for the visitor centre and 6.69 l/s for pond cottage and kitchen gardens.

IV. Circular 008/2018 Assessment

This assessment will further provide a full assessment of the proposed use of treatment plants at the site. In line with Circular 008/2018, the assessment of the proposed private drainage proposals includes full and detailed consideration of the following factors:

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- a. **Contravention of recognised practices:** Any evidence which shows the proposed arrangements are likely to prejudice, contravene or breach any statute, Regulation, Directive, Code of Practice, Byelaw, water quality objective or any other authoritative standard (such as British Standards, Groundwater protection position statements research papers/reports with proven conclusions).

The package treatment plants are to be installed, operated and maintained in full accordance with the manufacturer's specification and in accordance with the permitting conditions imposed by NRW. Therefore, there is no evidence to indicate that the proposed method would prejudice or breach any statute, Regulation, Directive, Code of Practice, Byelaw, water quality objective or any other authoritative standard.

- b. **Adverse effect on water sources/resources:** Any information produced by the British Geological Survey, Natural Resources Wales (including its predecessor bodies) or any other authoritative sources, which shows the area has geological formations which could allow the transmission by percolation or by surface run-off of sewage effluent from the proposed foul drainage system, directly or indirectly, so as to adversely affect any existing or potential surface or groundwater sources.

The geology map published by the British Geological Surveys (BGS), indicate that the bedrock located on site is Brithdir Member – Sandstone. Sedimentary bedrock. The Groundwater Vulnerability Map published BGS identifies the local strata as a secondary aquifer with low to medium vulnerability. BGS maps suggest that the site contains shallow bedrock with no record of overlaying strata. The Bedrock Aquifer designation for the Site is Secondary A. Additionally, the geotechnical soakaway testing results indicate varying infiltration rates across the site, with little to no infiltration in some areas.

As such given the above and the fact that the system will be installed and maintained in full accordance with the manufacturer recommendations and be subject to the approval of an Environmental Permit from NRW, there would be no adverse effect any existing or potential surface or groundwater sources by percolation (infiltration is not proposed) or by surface run-off of sewage effluent from the proposed foul drainage system.

- c. **Health hazard or nuisance:** Any evidence which indicates the proposed arrangements and the associated effluent disposal system is likely to lead to a risk to public health or cause a nuisance.

There are no public sewers in the immediate area and as such the existing site is serviced by existing septic tanks in terms of foul water disposal. An additional CCTV survey will be undertaken to confirm the septic tanks. The existing septic tanks are constantly under strain, particularly during the summer periods when the park experiences a high number of visitors. This current system is required to be emptied frequently and any additional capacity (such as that of the proposed development) will result in system failure and spillage, creating major issues with regards to pollution and public health. Therefore, the proposed development will utilise a treatment plant system which will be sited at a sufficient depth below ground level, odour free, with lockable access covers and will provide sufficient capacity, provide primary and secondary treatment and reduce the frequency of emptying. As such, based upon this fact there is no evidence to suggest that the proposed disposal system is likely to lead to a risk to public health or cause a nuisance.

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- d. **Damage to controlled waters:** Any evidence, including reference to information on site hydrology and geology and to the Environmental Permitting Regulations, which indicates the proposed arrangements may result in the entry of any poisonous, noxious or polluting matter or any solid waste matter into any controlled waters, including ground waters.

Based on the above in Sections A and C, the fact that the treatment plants will be designed in accordance to NRW requirements for discharge and installation of the treatment plants will be subject to permitting requirements by NRW, there is no evidence to indicate the proposed arrangements would result in the entry of any poisonous, noxious or polluting matter or any solid waste matter into the receiving waterbodies within or outside the site.

- e. **Damage to the environment and amenity:** Any evidence the proposed arrangements are likely to lead to raw or partially treated sewage entering into receiving waters or onto land, to such an extent as to damage or undermine the environment and amenity value of the locality or any other area, particularly if it is of special significance such as a Site of Special Scientific Interest (SSSI), Special Area of Conservation (SAC) or public open space.

The site lies in a location away from any Site of Special Scientific Interest (SSSI), Special Area of Conservation (SAC) but is deemed to be a public open space under the council's ownership. The proposed method of discharge will provide a betterment to the public open space by the replacement of the existing historical septic tank with a treatment plant. The former raw sewage which was collected and removed from site on a frequent basis will now be treated (primary and secondary) by the treatment plant with the tertiary treatment being provided by the receiving waterbody. The treated effluent discharge will not lead to any environmental damage and a sampling chamber or similar would be provided near the point of discharge to facilitate regular testing.

- f. **Overloading the existing capacity of the area:** Any authoritative assessment or available records, which indicate i) the addition of new discharges from a proposed development to those which already exist in the area, or ii) the quality or quantity of new discharges by themselves are likely to overload the local subsoil soakage capacity or receiving water to the extent it may lead to the problems of ponding, sewage flooding, pollution or nuisance.

There are no public sewers in the immediate area and as such the existing site is serviced by existing septic tanks in terms of foul water disposal. The proposed treatment plants will be adequately sized to provide sufficient capacity to deal with the flows generated from the proposed development. Given the fact there are no recorded treated foul discharges into the receiving ponds and that the water level is controlled via existing spillway overflows, the proposed discharge would not overload the existing capacity of the pond.

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- g. **Absence of suitable outlets:** Any evidence to show there is no suitable facility such as satisfactory water courses (for a package treatment plant) or adequate land for soakage in the locality to accommodate the disposal of effluent from the proposed treatment plant(s) or septic tank(s) serving the new development.

The site lies adjacent to an existing waterbody and stream which would allow suitable outlets from the proposed package treatment plants. Discharge from the treatment plant to ground by infiltration has been ruled out due to the high infiltration rates present which are deemed to be too fast for tertiary treatment and will require suitable infiltration material of approximately 1m deep (240m³) to artificially reduce the speed of infiltration, which is not a viable option. Additionally, the required drainage fields are too large to be located appropriately on site with the required easements and conflicting with the woodland tree root protection areas.

- h. **Unsuitable soakage characteristics:** Any results derived from percolation tests which have been carried out in accordance with BS 6297 or a subsequent superseding standard, (preferably carried out in winter conditions when the soils are saturated), which show the local soil conditions would preclude effective disposal of any sewage effluent from the proposed sewage treatment plant(s) or septic tank(s) serving the new development.

Whilst no percolation tests which have been carried out in accordance with BS 6297 to date, the ground investigation soakaway tests (undertaken in accordance with BRE 365) indicate that the site is unsuitable for the installation of drainage field soakaways as mentioned above due to the high infiltration rates present which are deemed to be too fast for tertiary treatment and will require suitable infiltration material of approximately 1m deep (240m³) to artificially reduce the speed of infiltration, which is not practicable or feasible. Therefore, infiltration to ground is deemed to not be the proposed method of discharge and a connection into the adjacent waterbodies will be sought.

- i. **High water table:** Any evidence drawn from records of 'rest water levels' observed in trial holes which show the water table in the locality is so high, at any time of the year it could inhibit or impede or adversely affect the proposed foul drainage/effluent disposal arrangements.

Based on the ground investigation results, no water strikes were recorded in the trial pit logs (average depth of 2m). It is assumed that the water level remains below 2m during the winter season, this can be validated by undertaking additional testing over the winter period. Hence, there is no evidence of any changes to the water table beyond seasonal variation due to precipitation which would lead to any damaging effects as a result of any discharges which would be negligible in the context of wider surface water flows.

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- j. **Rising ground water levels:** Any evidence, such as water table records of the locality, which show the levels have been rising consistently and are likely to interfere with the proposed foul drainage/effluent disposal system, or may cause damage to other land or property in the area e.g. by its contribution to landsliding or subsidence.

Due to the topography of the site surface/ground water flows in a southerly direction toward the existing waterbodies. There is no evidence of any changes to the water table beyond seasonal variation due to precipitation which would lead to any damaging effects as a result of any discharges which would be negligible in the context of wider surface water flows.

- k. **Flooding:** Any evidence, such as records of frequencies and levels of previous flood incidents, which show the locality is subject to flooding to the extent the proposed private sewerage would lead or contribute to environmental or amenity problems.

According to the publicly accessible flood risk maps, the ponds are located within a recognised flood zone 3 area for surface water and small watercourses. The identified flood risk zone is localised to the ponds only and the NRW flood maps does not show flood levels rising above the pond banks. It should be noted that all other areas of the existing site, proposed development and treatment plants are located outside any areas of flooding (flood zone 1). The entire site is outside the areas of TAN 15, as set out in the Development Advice Maps and the Flood Maps For Planning which are available on the NRW website. As such given the absence of any flood mechanisms there is no evidence to suggest the installation of the treatment plants and disposal into the adjacent waterbodies would lead or contribute to environmental or amenity problems.

Refer to Appendix E – NRW Flood Maps

- l. **Maintenance plan:** Environmental Permitting Regulations permits and exemptions require records of maintenance and de-sludging of the treatment system to be kept for 5 years. Keeping a service log, contractor invoices or entering into a service agreement with a servicing contractor should meet this requirement.

The treatment plants would be maintained in full accordance with the manufacturer recommendations and be subject to the approval of an Environmental Permit from NRW.

V. Conclusion

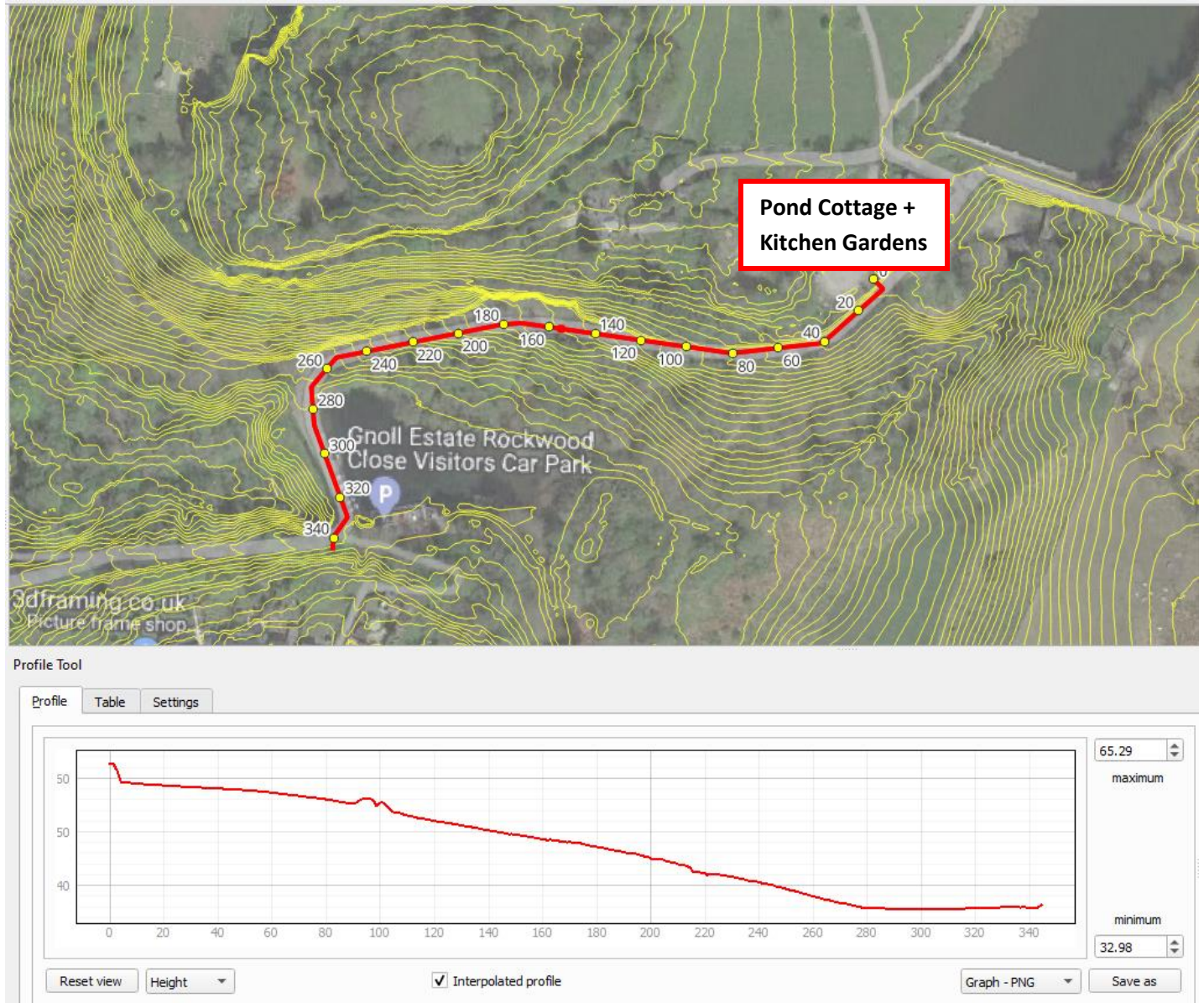
This assessment concludes that the installation of a package treatment plant is the most suitable and feasible method of non-mains drainage for the development. Installation of the treatment plant will be conducted in accordance with the manufacturers recommendations and maintained thereafter as such and will be strictly controlled by permitting from NRW.

We consider that the proposals noted within this assessment are acceptable and will not result in environmental, public health or amenity hazards. The proposal fully complies with all local and national guideline regulations and there should be no adverse considerations preventing the permission and approval.

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Appendix C: Discounted Route and Topographical challenges*Visitor Center to nearest DCWW sewer*

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Pond Cottage & Kitchen Gardens to nearest DCWW sewer

Appendix D: BioCell Technical Data Sheet – Apex 100



+44 (0) 1759 369 915 sales@wte-ltd.co.uk
Unit 2, Bolton Lane, York, YO41 5QX, UK
www.wte-ltd.co.uk

Installation

The compact design and robust construction make installation as simple, quick and low cost as possible.

APEX is capable of being installed above ground if required.

Shallow and deep inlet inverts are available for most tanks in the range to cater for a range of foul drain depths.

Please contact our office if you would like the details of your nearest approved installer.

Technical Details

Model	PE	Length (mm)	Width (mm)	In Ground Depth (mm)	Inlet Invert (mm)*	Outlet Invert (mm)**	Power (Kw)
APEX 60	60	5,600	2,124	1,912	600	700	0.70
APEX 70	70	6,000	2,124	1,912	600	700	0.70
APEX 80	80	6,600	2,124	1,912	600	700	0.70
APEX 90	90	7,500	2,124	1,912	600	700	0.70
APEX 100	100	7,500	2,524	1,912	600	700	0.70
APEX 125	125	9,000	2,524	1,912	600	700	0.75
APEX 150	150	10,500	2,524	1,912	600	700	1.10

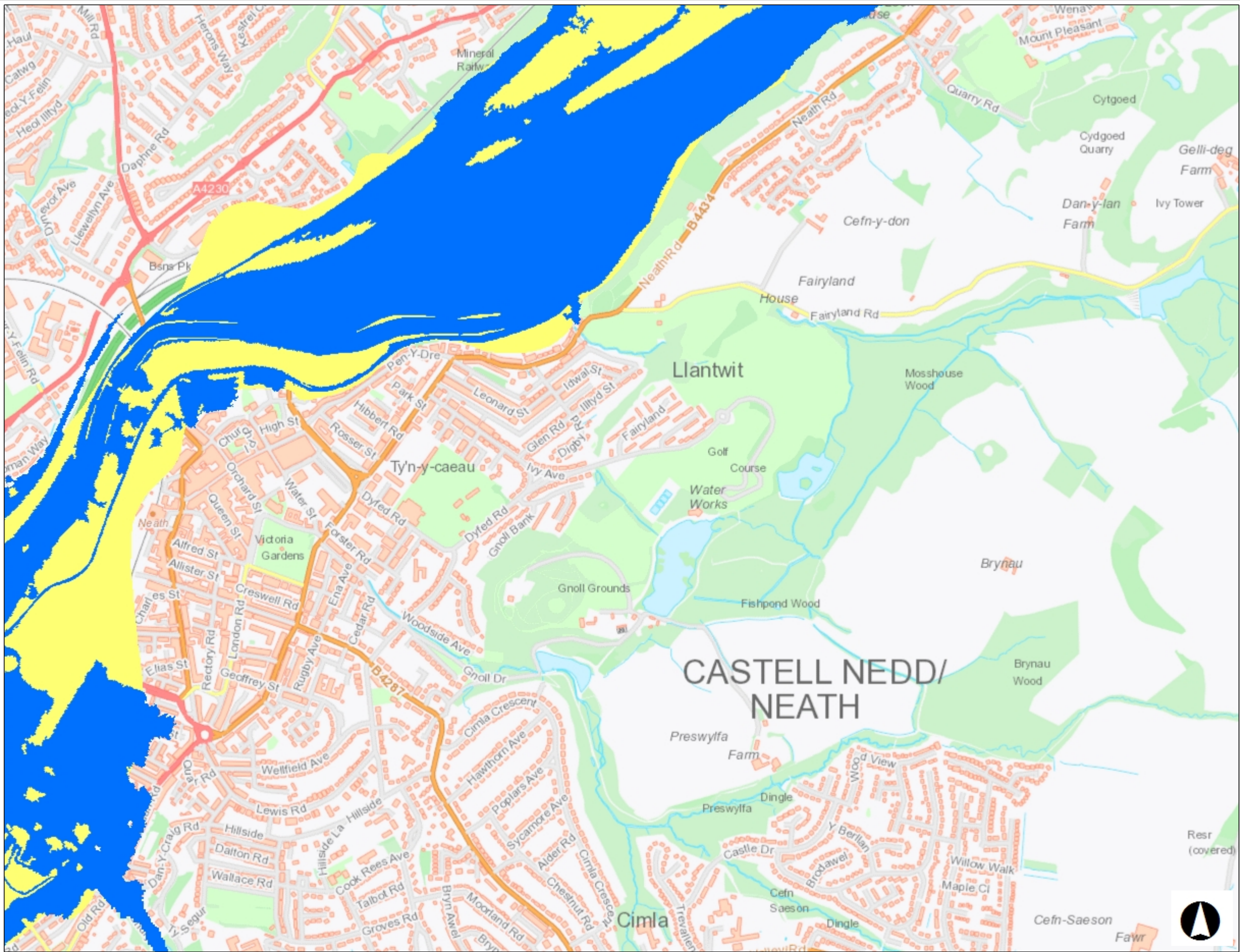
Performance

APEX has been designed to meet the UK Royal Commission Standard for effluent. Due to its unique design, it far exceeded this standard during EN testing.

Pollutant	Design Effluent Quality (95%ile Basis)	Average Effluent Quality - During EN 12566-3 Testing - 100% Loading
COD	N/A	53.8 mg/L
BOD ₅	20 mg/L	9.9 mg/L
Suspended Solids	30 mg/L	14.7 mg/L
Ammonia (NH ₄ -N)	20 mg/L	6.8 mg/L

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Appendix E: NRW Flood Maps



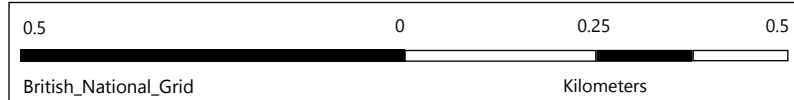
Map Perygl Llifogydd / Flood Risk Map -

Allwedd / Map Key

- Zone C1
- Zone C2
- Zone B
- Zone A

Graddfa / Scale at A3 1: 9,999

Dyddiad / Date
11/08/2023



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Flood Risk Maps
Enter title (max 35 characters)

Legend

Flood Risk from Rivers

- High
- Medium
- Low

Flood Risk from the Sea

- High
- Medium
- Low

Flood Risk from Surface Water & Small Watercourses

- High
- Medium
- Low
- Risk Level Under Review



N

0.2 0.1 0 0.2

km

British National Grid

Disclaimer
<https://naturalresources.wales/flooding/disclaimer-for-our-flood-and-coastal-erosion-risk-maps/?lang=en>

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Scale at A3: 1:5,000

Date: 11/08/2023

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