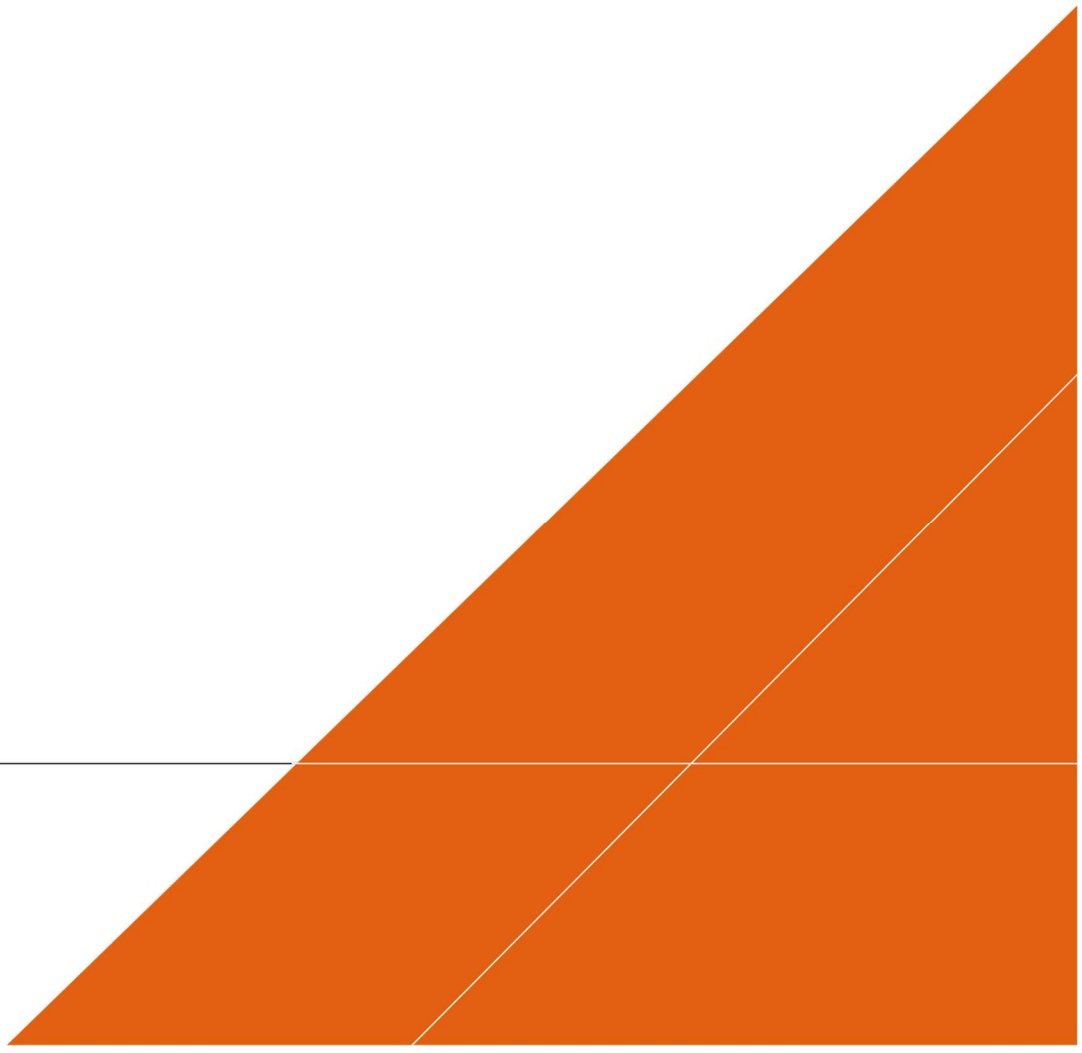
ARCADIS Design & Consultancy for natural and built assets

COG MOORS WWTW – PROPOSED ADVANCED ANAEROBIC DIGESTION (AAD) PLANT

Bat Tree Roost Assessment Report

NOVEMBER 2017



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EC HARRIS BUILT ASSET CONSULTANCY

Hyder

CONTACTS

LUCY FAY
Principal Ecologist

dd +44 (0) 2920 926850
m +44 (0) 7894 481 039
e lucy.fay@arcadis.com

Arcadis.
Arcadis Cymru House
St Mellons Business Park
Fortran Road
Cardiff
CF3 0EY
United Kingdom

COG MOORS WwTW – Proposed Advanced Anaerobic Digestion (AAD) Plant

Bat Tree Roost Assessment Report

Author	Julie Player
Checker	Lucy Fay
Approver	Sarah Simons
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VERSION CONTROL

Version	Date	Author	Changes
1	August 2017	Julie Player	Issue of final document
2	November 2017	Lucy Fay	Non-technical summary and tree climbing survey/results added

CONTENTS

Non-technical Summary

Surveys were undertaken to assess the suitability of trees and determine the presence/likely absence of roosting bats within the footprint of the proposed Development at Cog Moors Wastewater Treatment Works.

Of the trees that will be directly impacted by the proposed Development, five trees have features suitable for use by roosting bats. The potential for roosting bats is considered to be low and, in accordance with best practice guidelines, no further/specific surveys are required.

However, as a precautionary approach, it is recommended that all tree felling takes place during the winter when roosting bats and nesting birds are least likely to be present.

Executive Summary

This report presents the findings of a preliminary ground-level tree roost assessment and subsequent tree climbing surveys associated with the proposed Development at Cog Moors Wastewater Treatment Works (WwTW), Dinas Powys, undertaken by Arcadis Consulting (UK) Ltd ("Arcadis") on behalf of Dŵr Cymru Welsh Water (DCWW).

The proposed Development comprises an upgrade and extension to the sludge treatment process at Cog Moors WwTW. This report has been prepared to allow an assessment of the potential impacts on roosting bats to inform the planning application for the proposed Development, and to outline appropriate mitigation and enhancement measures.

Preliminary Ecological Appraisals were previously undertaken by Mott MacDonald Bentley in October 2016 and Arcadis in November 2016. No records of roosting bats were identified within the site by desk studies that were undertaken as part of these appraisals. However, field surveys identified suitable roosting, commuting and foraging habitat within woodland and wastewater features within the site boundary. A preliminary ground-level tree roost assessment was therefore recommended to determine the suitability of trees for roosting bats.

The bat tree assessment was undertaken in February 2017 by a suitably licensed bat ecologist from Arcadis. Surveys were carried out in accordance with best practice guidelines published by the Bat Conservation Trust.

A total of 11 trees within the site boundary were identified as having "low" potential and 21 trees had "moderate" potential to support roosting bats. Of these, five "low" potential trees are due to be impacted as part of the proposed Development. These trees are of a suitable size and age to support roosting bats and/or had dense Ivy cover.

Tree climbing surveys were undertaken to further assess the suitability of two trees with moderate potential that would be impacted by the proposed Development. These trees supported one or more potential roosting features for bats and/or dense Ivy cover. Of these, one tree was subsequently downgraded to "negligible" potential and one tree was subsequently downgraded to "low" potential and the design revised to retain the low potential tree.

All other trees on site were considered to have negligible potential to support roosting bats. They do however provide suitable commuting and foraging habitat for bats.

Approximately 1.1 hectares of woodland/trees within the survey boundary is due to be cleared as part of the proposed Development. Bats and their roosts are legally protected and without appropriate mitigation/compensation measures in place, there is potential for an offence to be caused during the proposed works.

A summary of proposed mitigation and enhancement measures is outlined below (see section 7 for an extensive list of recommendations): -

- All low potential trees due to be affected by the proposed Development (T9, T10, T14, T15 and T17) would be felled during the winter when roosting bats are unlikely to be present. If this is not possible they would be felled under the guidance and supervision of an experienced and suitably licensed bat ecologist;
- The removal of vegetation on site would be minimised where possible. Compensatory planting would be provided to replace lost habitats and ensure foraging and commuting resources for the local bat population are maintained;
- Night time working would be avoided where possible to avoid disturbing bats;
- Any temporary or permanent lighting would be designed to avoid illuminating features used by bats and designed in consultation with an experienced bat ecologist; and
- Bat roost boxes could be installed on retained trees to replace any potentially suitable roosting features that would be lost as a result of the proposed Development and to further enhance the remaining habitat for bats.

1 Introduction

This report presents the results of the preliminary ground-level tree roost assessment and subsequent tree climbing surveys undertaken at Cog Moors Wastewater Treatment Works (WwTW). These surveys were undertaken by Arcadis Consulting (UK) Ltd ("Arcadis") working as part of Dŵr Cymru Welsh Water (DCWW) Capital Delivery Alliance (CDA).

The aim of the survey was to assess the trees within the site boundary, determine their suitability to support roosting bats, and assess the likely impacts of the proposed works on bats (see Proposed Site Layout Plan). The surveys also sought to determine what mitigation will be required.

2 Background Information

2.1 Site Location

The site is located in the Vale of Glamorgan south of Dinas Powys at grid reference ST 16327 69571 (see Proposed Site Layout Plan for the location and survey boundary).

Cog Moors WwTW is situated to the east of the A4055 Cardiff Road, approximately 2km east of Barry and 1km south of Dinas Powys.

The site contains both concrete and steel process tanks, together with a series of process and control buildings and associated items of plant and equipment.

Vehicular and pedestrian access to the site is gained via a private road (Green Lane), which runs in a south easterly direction from its junction with the A4055.

The WwTW site is located within a low-lying landscape, characterised by flat fields separated by ditches. The land rises steeply to the north of the WwTW site (Pop Hill) and is intermittently wooded.

The nearest residential properties to the WwTW site are located at Downs Farm and Brook Cottage, approximately 230m and 290m to the east, respectively. Other residential properties are located at distances of more than 500 m, on Ashby Road to the south, along Cross Common Road to the north east and along Sully Road and Cog Road to the east and south, respectively.

The WwTW is well screened in the surrounding landscape, and from most of the surrounding roads and properties, by the localised topography and by existing hedgerows and trees. The only significant views of the WwTW are from nearby public footpaths.

2.2 Proposed Development

The proposed AAD plant comprises a number of new process and storage tanks and buildings, together with the demolition of and modifications to some existing items of plant and equipment.

The proposed Development is shown on the Proposed Site Layout Plan.

The proposed Development would provide for:

- Additional digestion capacity;
- Conditioning of the sludge generated on the site (dewatering and removal of contaminating rags and plastic);
- Reception facilities for sludge imported to the site from satellite WwTWs;
- Blending of the indigenous sludge and imported sludge;
- A thermal hydrolysis plant (THP), which uses steam to increase the temperature and pressure in a reaction vessel to pre-treat the sludge;
- Boilers to generate the steam for thermal hydrolysis;
- A siloxane plant to remove contaminants from the biogas generated;

- A combined heat and power (CHP) plant to generate useable heat and electricity, which can be used on site, exported to the grid, or both;
- A UV plant to treat some of the final effluent water from the WwTW, to provide better quality process water, for the sludge downstream of thermal hydrolysis;
- Tanks to hold sludge and liquor, resulting from the thickening and dewatering processes;
- A cake storage silo;
- Odour control equipment;
- New internal site access roads and drainage;
- Site clearance and earthworks and new fencing;
- New MCC equipment and control kiosks; and
- Appropriate mitigation planting and ecological mitigation measures.

The proposed Development would not involve the use of any hazardous substances in notifiable quantities.

The proposed AAD plant would operate in conjunction with the existing sewage sludge treatment facilities and is located, therefore, on the eastern side of the existing Cog Moors WwTW, adjacent to the existing sewage sludge treatment infrastructure.

Part of the proposed AAD plant would be located within the existing operational area of the WwTW. The balance of the proposed Development would be sited immediately to the east of the existing operational area, on an area of woodland, scrub and ruderal vegetation. This area immediately adjacent to the existing WwTW (Cog Moors Site of Importance for Nature Conservation (SINC)) is designated for its series of species-rich rush pastures.

Temporary construction compounds would be sited on an area of mown grassland, immediately adjacent to the existing final settlement tanks, and on an area of grassland within Cog Moors SINC to the east of the proposed AAD plant.

Vehicular access to the proposed Development would continue to be gained from the A4055 via Green Lane.

In addition, an upgrade to the electricity connection would be required.

2.3 Review of Existing Information

An Ecological Impact Assessment of Cog Moors WwTW was undertaken by Cresswell Associates in 2006 (Ref 1). This identified a number of trees within a small area of woodland located north-east of the existing WwTW site (within the current survey area) as having potential to support roosting bats. The site also offered suitable foraging and commuting habitats for bats via hedgerows and ditches.

A Preliminary Ecological Appraisal of the current WwTW site was undertaken by Mott McDonald Bentley (Ref 2) in October 2016. Arcadis subsequently surveyed adjacent land outside of the existing WwTW boundary in November 2016 (Ref 3 and 4).

Desk studies undertaken as part of the previous ecological appraisals returned records for six species of bats within 2km of the site. Species included lesser horseshoe (*Rhinolophus hipposideros*), noctule (*Nyctalus noctula*), Leisler's bat (*Nyctalus leisleri*), soprano pipistrelle (*Pipistrellus pygmaeus*), common pipistrelle (*Pipistrellus pipistrellus*), and serotine (*Eptesicus serotinus*). The closest bat roost identified was that of a pipistrelle bat located 1.2 km north-west of the site. No records of bat roosts were identified within the survey boundary. No statutory designated sites that are noted for their bat interests were identified within 10 km of the proposed Development.

The results of field surveys that were undertaken as part of the previous ecological appraisals recorded suitable habitat to support roosting, foraging and commuting bats within the woodland/trees and wastewater features on site.

Information on trees protected by Tree Preservation Orders (TPO's) within and adjacent to the site was requested from the Vale of Glamorgan Council in January 2017. Trees with TPO's were identified along the north-eastern boundary of the survey area.

3 Legislation and Policy

Bats (and their roosts) are protected under the Conservation of Habitats and Species Regulations 2010 (as amended). Under this legislation it is an offence to:

- Deliberately capture, kill or injure a bat;
- Deliberately disturb wild bats (disturbance is defined as any activity likely to impair the ability to breed, reproduce, rear or nurture young, hibernate, migrate and/or significantly affect the local distribution or abundance of the species);
- Damage or destroy a breeding site or resting place (i.e. roost); and
- Possess, control, transport, sell, exchange, offer for sale or exchange, any live or dead animal or part of an animal.

Bats are also partially protected under the Wildlife and Countryside Act 1981 (as amended) which makes it an offence to intentionally or recklessly:

- Damage or destroy any structure or place which bats use for shelter or protection;
- Disturb bats while occupying a structure or place which is used for shelter or protection; and
- Obstruct access to any structure or place which any such animal uses for shelter or protection.

Bats (barbastelle bat (*Barbastella barbastellus*), Bechstein's (*Myotis bechsteinii*) noctule (*Nyctalus noctula*) common pipistrelle (*Pipistrellus pipistrellus*), soprano pipistrelle (*Pipistrellus pygmaeus*), brown long-eared (*Plecotus auritus*), greater horseshoe (*Rhinolophus ferrumequinum*) and lesser horseshoe bats (*Rhinolophus hipposideros*)) are listed under Section 7 of the Environment (Wales) Act 2016 (Ref 5) as species of principle importance for the purpose of maintaining and enhancing biodiversity in Wales.

Policy MG21 of the Local Development Plan (Ref 6) states that:

"Development proposals likely to have an adverse impact on Priority species will only be permitted where it can be demonstrated that:

1. The need for the development clearly outweighs the nature conservation value of the site;

2. Adverse impacts on nature conservation and geological features can be avoided:

3. Appropriate and proportionate mitigation and compensation measures can be provided: and

4. The development conserves and where possible enhances biodiversity interests."

Planning Policy Wales (Ref 7) states that "Local planning authorities should seek to protect trees, groups of trees and areas of woodland where they have natural heritage value or contribute to the character or amenity of a particular locality" and should "make full use of their powers to protect and plant trees to maintain and improve the appearance of the countryside".

4 Methodology

4.1 Preliminary ground-level tree roost assessment

A preliminary ground-level tree roost assessment was undertaken on all trees located within the survey boundary. The survey was carried out on the 9th February 2017 in accordance with best practice guidelines published by the Bat Conservation Trust (BCT) (Ref 8).

The survey was undertaken by licenced bat surveyor Julie Player (licence number 68243:OTH:CSAB:2015) during daylight hours.

A detailed inspection of the trees was undertaken from ground level to compile information about the tree, identify features that bats could potentially use for roosting and record any evidence of bat roosting. The survey was carried out using a Ridgid Micro CA-100 fiberscope, binoculars and a Clulite ML7.

Potential features that may be used by roosting bats in trees include:

- Woodpecker holes;
- Rot holes;
- Hazard beams;
- Vertical or horizontal cracks and splits (such as frost cracks) in stems and branches;
- Partially detached flaky bark;
- Knot holes arising from naturally shed branches, or branches previously pruned back to the branch collar;
- Man-made holes (e.g. cavities that have developed from flush cuts) or cavities created by branches tearing out from parent stems;
- Cankers (caused by localised bark death) in which cavities have developed;
- Other hollows or cavities, including butt rot;
- Double leaders forming compression forks with included bark and potential cavities;
- Gaps between overlapping stems or branches;
- Partially detached ivy with stem diameters in excess of 50 mm and/or dense ivy that could potentially be hiding roosting features; and
- Artificial bat, bird or dormouse nest boxes.

Details that were recorded of any potentially suitable roosting features include the height of the feature above ground level and orientation of the feature on the tree.

Evidence of bats roosting in features include:

- The confirmed presence of bats;
- Bat droppings in, around or below the potential feature;
- Odour emanating from a potential feature; and
- Staining below the potential feature.

Trees were categorised based on the features' potential to support roosting bats, according to the descriptions provided in Table 1 below, which is taken from the BCT guidelines (Ref 8).

Table 1 - Guidelines for assessing the potential suitability of trees to support roosting bats based on the presence of features

Suitability	Description of Roosting Habitat
Negligible	Negligible habitat features on site likely to be used by roosting bats.
Low	A tree of sufficient size and age to contain potential roosting features but with none seen from the ground or features seen with only very limited roosting potential.
Moderate	A tree with one or more potential roosting sites that could be used by bats due to their size, shelter, protection, conditions and surrounding habitat but are unlikely to support a roost of high conservation status.
High	A tree with one or more potential roosting sites that are obviously suitable for use by larger numbers of bats on a more regular basis and potentially for longer periods of time due to their size, shelter, protection conditions and surrounding habitat.

4.2 Tree climbing survey

Following the preliminary ground-level tree roost assessment, tree climbing surveys were carried out in accordance with Bat Conservation Trust guidelines (Ref 8). Only those trees identified as having moderate potential to support roosting bats and which would be directly impacted by the proposed Development were climbed (T16 and T18).

Suitably qualified and experienced tree climbers worked in pairs during only daylight hours on 21st July 2017 and used ropes and harnesses to climb the two trees. A Rigid SeeSnake CA300 endoscope and Lenser P7 torch were used by surveyors to inspect potential roost features (PRFs) within each tree and search for evidence of bats including the presence of bats/ bat corpses, droppings, feeding remains, staining and smoothing/ polishing of internal surfaces. The survey was led by licensed bat ecologist Stephen Hancock (licence number 71738:OTH:CSAB:2016), assisted by Lee Gwyther.

5 Limitations

Trees T2-T4 and T19-T33 were not fully assessed during the preliminary ground-level tree roost assessment due to access restrictions – the trees were situated on the boundary of the site and could only be surveyed from within the WwTW. Unrelated construction works that were being undertaken adjacent to Trees T12 and T13 also prevented these trees from being fully assessed at the time of the survey. This is not considered to be a significant constraint to the survey as the design of the proposed Development has been developed to avoid impacts to these trees, which are due to be retained. Trees that could not be fully assessed have been highlighted as having moderate potential to support roosting bats as a precaution, to ensure further surveys/assessment are undertaken should any future design changes warrant these trees to be impacted by the proposed Development.

The road leading to the site (Green Lane) was not included within the survey area as this is a private road. Although this road will continue to be used for access to the WwTW, no works are proposed along the road and no trees along it are anticipated to be impacted.

6 Discussion

Results of the surveys are outlined below, with locations of suitable bat roosting trees shown on Drawing 4798-S-202-HYD-XX-XX-DR-XX-08008. Further details of the survey results are provided in Appendices A and B.

The preliminary ground-level tree roost assessment identified a total of 32 trees as having potential to support roosting bats - 21 trees with moderate potential and 11 trees with low potential. Low potential trees were of a size and age that they could support roosting bats and/or had dense Ivy cover. Moderate potential trees were of an age that could support roosting bats, had one or more features PRFs for bats and/or dense Ivy cover, or were unable to be fully assessed at the time of the survey due to access limitations. Ivy cover could support a small number of roosting bats and/or be concealing PRFs. The tree species identified as having roosting

potential were predominantly Oak (*Quercus robur*), with small numbers of Ash (*Fraxinus excelsior*) and Hazel (*Corylus avellana*).

Of the 32 trees that would be affected as part of the proposed Development, two had moderate potential to support roosting bats (T16 and T18) and five had low potential to support roosting bats (T9, T10, T14, T15 and T17). The other 25 trees were considered to have negligible potential for supporting roosting bats.

The tree climbing survey determined that T18 did not exhibit any PRFs suitable for use by bats and the tree was downgraded from having moderate bat roost potential to negligible bat roost potential.

The tree climbing survey determined that T16 had a single PRF that was considered sub-optimal for roosting bats, but could be used on occasion by a single bat. No evidence of bat activity was found within the single PRF present in T16. T16 was downgraded from having moderate bat roost potential to low bat roost potential. The design was subsequently revised to avoid impacts to T16 and this tree is to be retained.

The proposed Development has been designed with ecological input throughout to minimise the ecological impacts of the proposed works, and maximise tree retention where possible, in order to comply with guidance issued by Welsh Government (Ref 7). This includes retention of all trees covered by a TPO on the north-eastern boundary of the site.

Approximately 0.45 hectares of broadleaved plantation woodland located to the east of the existing WwTW and 0.65 hectares of broadleaved woodland located within Cog Moors WwTW are due to be affected by the proposed Development. This includes the loss of five low potential trees that provide suitable features for supporting roosting bats. The trees/woodland that would be impacted by the proposed Development currently provide a sizeable block of foraging/commuting habitat for bats, as well as potential roost features. In the absence of appropriate mitigation/compensation, there is a potential for negative impacts on the local bat population to occur as a result of the loss of this resource.

Bats and their roosts are afforded legal protection under the Conservation of Habitats and Species Regulations 2010 (as amended) and the Wildlife and Countryside Act 1981 (as amended). In the absence of appropriate mitigation, the proposed Development may therefore result in an offence being committed under these provisions.

Mitigation/compensation are proposed to avoid impacts on the local bat population and ensure legislative compliance during the proposed works**.**

7 Mitigation and Enhancement

The following recommendations are based on the scope of works as detailed in Section 2.2 and site layout as shown on the Proposed Site Development drawing.

Trees with low roosting potential

The proposed Development would impact Trees T9, T10, T14, T15 and T17 (see Drawing 4798-S-202-HYD-XX-XX-DR-XX-08008) that are of low roosting potential.

Precautionary measures when felling low potential trees will be required. Ideally, these trees will be felled during the winter months (November – February inclusive) when bats are less likely to roosting within them. If this is not possible, the trees would be felled under the guidance and supervision of an experienced licenced bat ecologist.

Trees with negligible roosting potential

Trees classified as having negligible potential for roosting bats can be felled without further mitigation measures.

Site Wide

Night working during the construction phase would be avoided where possible and any proposed lighting (temporary or permanent) would be directed away from retained habitat, particularly tree lines/woodland. Any lighting proposals would be designed in consultation with an experienced bat ecologist.

Any tree removal would be scheduled to take place during the winter (November – February) when bats are less likely to be present, and to avoid conflicts with nesting birds.

Mitigation/enhancement

Mitigation/enhancement measures are recommended as part of the works and could include:

- The provision of bat boxes on remaining trees/buildings and/or incorporated into the proposed buildings;
- Installation of hoods/shields on existing lighting columns to reduce light spill; and
- Landscaping/planting to increase foraging habitat and connectivity between the buildings.

These measures would contribute towards the client's duties under Section 6 of the Environment (Wales) Act 2016 to "maintain and enhance biodiversity" and "promote ecosystem resilience".

8 References

Ref 1: Cresswell Associates (2006). Proposed Extension of Cog Moors WwTW, Vale of Glamorgan: Supplementary Report to the Ecological Impact Assessment.

Ref 2: Mott MacDonald Bentley (2016). Cog Moors WwTW South Sludge Strategy - Preliminary Ecological Appraisal (Rev P02).

Ref 3: Arcadis Consulting (UK) Ltd (2017). Cog Moors WwTW – Proposed Advanced Anaerobic Digestion (AAD) Plant – Bat Activity Survey Report (Rev 2) (Report number 4798-S-202-HYD-XX-XX-RP-NX-10401).

Ref 4: Arcadis Consulting (UK) Ltd (2017). Cog Moors WwTW - Proposed Advanced Anaerobic Digestion (AAD) Plant. Addendum Preliminary Ecological Appraisal (Rev 4) (Report number 4798-S-202-HYD-XX-XX-RP-NX-10406).

Ref 5: Environment (Wales) Act 2016. http://www.biodiversitywales.org.uk/Environment-Wales-Bill [Accessed 07 July 2017].

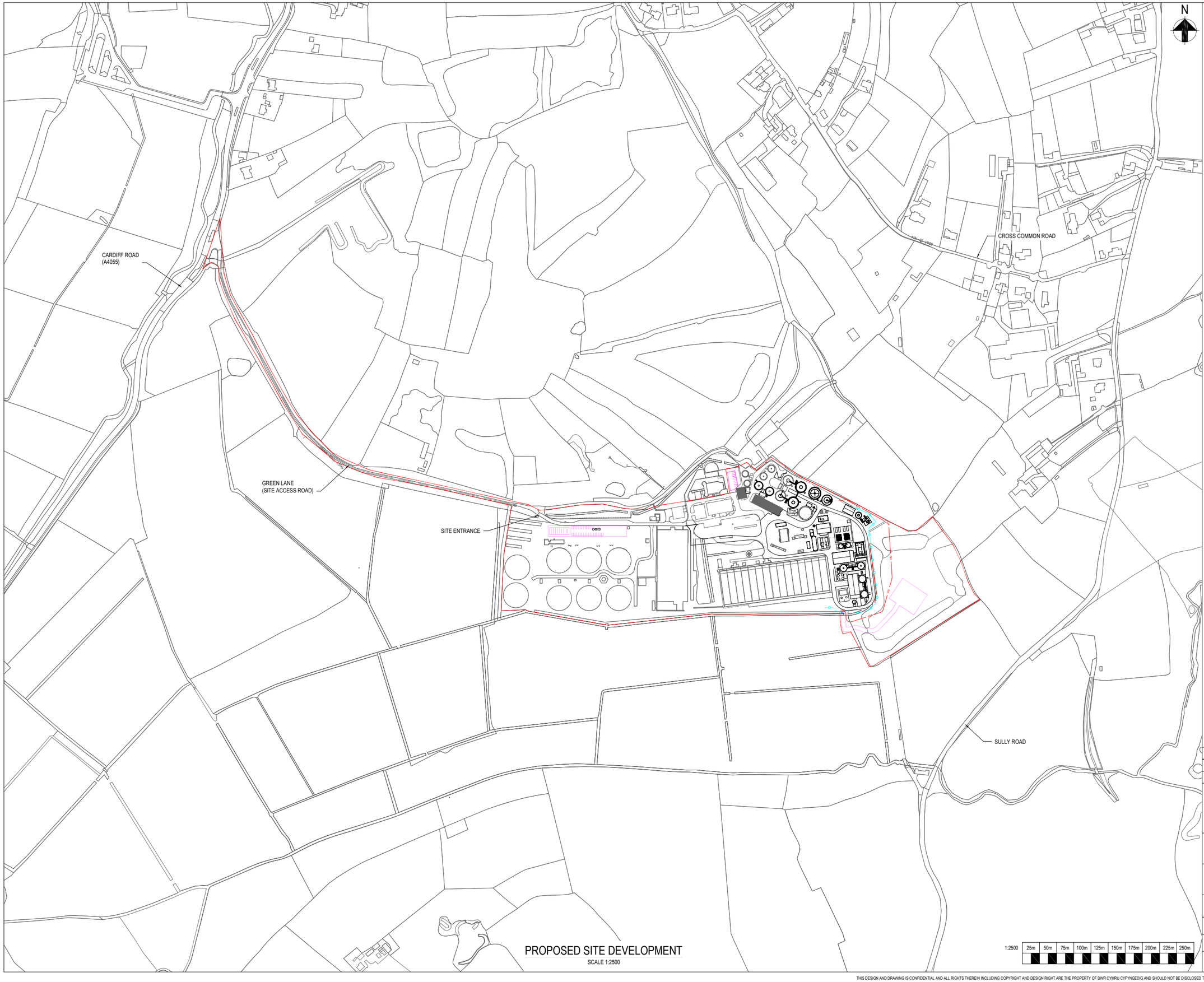
Ref 6: Vale of Glamorgan Council (2017). Vale of Glamorgan Local Development Plan 2011-2026. Written Statement.

Ref 7: Welsh Government (2016). Planning Policy Wales. Edition 9. Chapter 5 – Conserving and Improving Natural Heritage and the Coast.

Ref 8: Collins, J., (ed.) (2016). Bat Surveys for Professional Ecologists. Good Practice Guidelines (3rd edition). The Bat Conservation Trust. London.

DRAWINGS

Drawing 4798-S-202-HYD-XX-XX-DR-XX-06120 – Proposed Site Development



PROPOSED SITE DEVELOPMENT
SCALE 1:2500

A1

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE STATED.
2. ALL LEVELS ARE IN METERS ABOVE GROUND LEVEL.
3. DO NOT SCALE FROM THIS DRAWING.

LEGEND:

- PLANNING APPLICATION BOUNDARY
- EXISTING
- PROPOSED
- TEMPORARY CONTRACTORS COMPOUND
- PROPOSED SECURITY FENCE TO TIE INTO EXISTING FENCE LINE

1:2500 25m 50m 75m 100m 125m 150m 175m 200m 225m 250m

Rev.	Date.	Drawn.	Description.	Chkd.	Appd.	Date.
P02	17/10/17	DP	FOR INFORMATION	YF	MN	17/10/17
P01	21/08/17	DP	FOR INFORMATION	YF	MN	21/08/17

Capital Delivery Alliance
Cynghrair Cyflawni Cyfalaf
Ty Awen, Spooner Close, Coed Kernew, Newport, NP108FZ

Project Name.
COG MOORS WwTW AAD

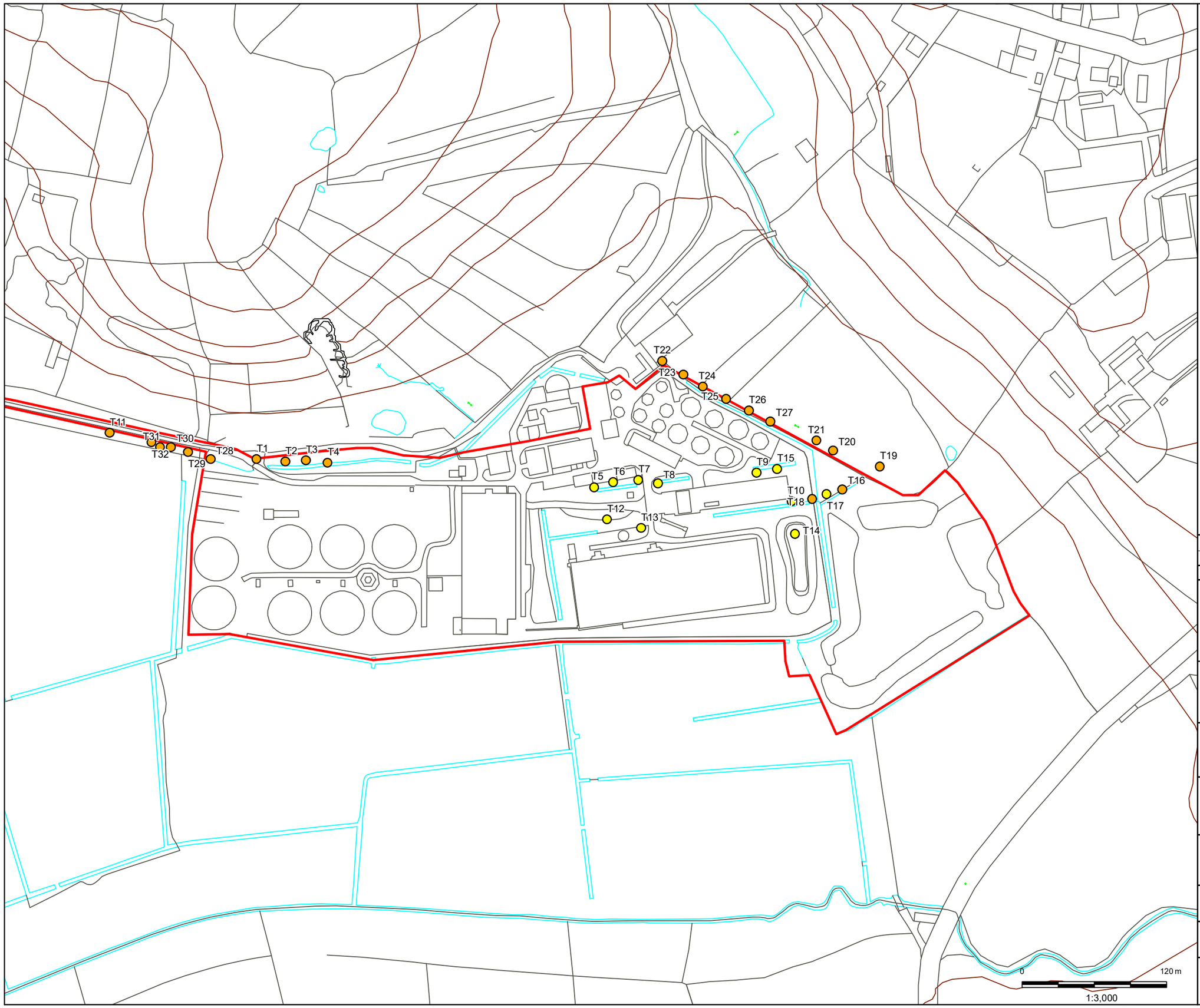
Drawing Title.
PROPOSED SITE DEVELOPMENT

Suitability.	Suitability Code.
ISSUED FOR INFORMATION	S2

Originator.	Designer.	Date.
DP	RN	17/10/17
Internal Project Number.	Scale.	Rev.
UA007902	1:2500	P02

Drawing Number.
4798-S-202-HYD-XX-XX-DR-XX-06120

Drawing 4798-S-202-HYD-XX-XX-DR-XX-08008 – Bat Tree Assessment



DRAWING DETAIL IS INDICATIVE AND ISSUED FOR INFORMATION PURPOSES ONLY.

A3

KEY

Bat Tree Assessment

- High
- Moderate
- Low
- Planning Application Boundary

Rev.	Date.	Drawn.	Description.	Chkd.	Appd.	Date.
01	06/03/17	R.M.	Revision 1	J.P.	XX	XX/03/17

Client

Capital Delivery Alliance
Cynghrair Cyflawni Cyfalaf

ARCADIS Design & Consultancy for natural and built assets

Project Name.

Cog Moors

Drawing Title.

Cog Moors Bat Tree Assessment

Drawing Status.

Issued for Information

Checked.	Approved.	Date.
C.D.	XX	22-08-2017
Scale.	**Designer.**	**Rev.**
1:3,000	R.M.	01

Drawing Number.

4798-S-202-HYD-XX-XX-DR-XX-08008

COORDINATE SYSTEMS: OSGB36 NATIONAL GRID

Date: 22/08/2017 15:02:24 File: 003-UA007902-UE31D-01-Bat Tree Assessment.mxd

APPENDICES

Appendix A – Tree assessment survey results

Tree Number	Grid Reference	Tree Species	Description of feature	Suitability	Additional Comments and Photo	Impact of proposed Development
T1	ST 15835 69628	Dead Ash	Dead hollow trunk/limbs.	Moderate	No photograph taken	None – tree to be retained
T2	ST 15859 69626	Oak	Dense Ivy cover; no visible features from ground-level but dense Ivy may support a small number of bats or be hiding potential roosting features (PRFs). However, surveyor was unable to assess the entire tree due to access issues. Have therefore classified the tree as Moderate potential and recommend a full assessment if the tree is to be removed.	Moderate	 Unable to fully assess tree due to access restrictions	None – tree to be retained

Tree Number	Grid Reference	Tree Species	Description of feature	Suitability	Additional Comments and Photo	Impact of proposed Development
T3	ST 15876 69627	Oak	No visible features from ground-level but of a size and age suitable to support a small number of roosting bats. However, surveyor was unable to assess the entire tree due to access issues. Have therefore classified the tree as Moderate potential and recommend a full assessment if the tree is to be removed.	Moderate		None – tree to be retained
T4	ST 15894 69625	Oak	Dense Ivy cover; no visible features from ground-level but dense ivy may support a small number of bats or be hiding PRFs. However, surveyor was unable to assess the entire tree due to access issues. Have therefore classified the tree as Moderate potential and recommend a full assessment if the tree is to be removed.	Moderate		None – tree to be retained

Tree Number	Grid Reference	Tree Species	Description of feature	Suitability	Additional Comments and Photo	Impact of proposed Development
T5	ST 16096 69608	Oak	Dense Ivy cover; no visible features from ground-level but dense Ivy may support a small number of bats or be hiding PRFs.	Low		None – tree to be retained

Tree Number	Grid Reference	Tree Species	Description of feature	Suitability	Additional Comments and Photo	Impact of proposed Development
T6	ST 16102 69609	Oak	Dense Ivy cover; no visible features from ground-level but dense Ivy may support a small number of bats or be hiding PRFs.	Low		None – tree to be retained

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Tree Number	Grid Reference	Tree Species	Description of feature	Suitability	Additional Comments and Photo	Impact of proposed Development
T7	ST 16116 69608	Oak	Hazard beam on a branch approx. 2m high on northern aspect of the tree and some Ivy cover.	Low		None – tree to be retained

Tree Number	Grid Reference	Tree Species	Description of feature	Suitability	Additional Comments and Photo	Impact of proposed Development
T8	ST 16168 69608	Oak	Dense Ivy cover; no visible features from ground-level. Located within a well-lit area of the site. Semi-mature tree in good condition.	Low		None – tree to be retained
T9	ST 16250 69617	Oak	Dense Ivy cover; no visible features from ground-level but dense Ivy may support a small number of bats or be hiding PRFs.	Low	No photograph taken	Tree to be removed

Cog Moors WwTW – Proposed Advanced Anaerobic Digestion (AAD) Plant

Tree Number	Grid Reference	Tree Species	Description of feature	Suitability	Additional Comments and Photo	Impact of proposed Development
T10	ST 16279 69593	Oak	Dense Ivy cover; no visible features from ground-level but dense Ivy may support a small number of bats or be hiding PRFs.	Low		Tree to be removed

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Tree Number	Grid Reference	Tree Species	Description of feature	Suitability	Additional Comments and Photo	Impact of proposed Development
T11	ST 15713 69650	Ash	Dense Ivy cover suitable to support a small number of bats or potentially be concealing PRFs. However, surveyor was unable to assess the entire tree due to access issues. Have therefore classified the tree as Moderate potential and recommend a full assessment if the tree is to be removed.	Moderate		None – tree to be retained

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Tree Number	Grid Reference	Tree Species	Description of feature	Suitability	Additional Comments and Photo	Impact of proposed Development
T12	ST 16126 69578	Oak	Dense Ivy cover; no visible features from ground-level but dense Ivy may support a small number of bats or be hiding PRFs.	Low		None – tree to be retained

Tree Number	Grid Reference	Tree Species	Description of feature	Suitability	Additional Comments and Photo	Impact of proposed Development
T13	ST 16154 69571	Ash	Dense Ivy cover suitable to support a small number of bats or be hiding PRFs.	Low		None – tree to be retained
T14	ST 16282 69566	Oak	One knot hole, which had healed over and some dense Ivy cover.	Low		Tree to be removed

Tree Number	Grid Reference	Tree Species	Description of feature	Suitability	Additional Comments and Photo	Impact of proposed Development
T15	ST 16267 69620	Oak.	Dense Ivy cover suitable to support a small number of bats or be concealing PRFs.	Low		Tree to be removed

Tree Number	Grid Reference	Tree Species	Description of feature	Suitability	Additional Comments and Photo	Impact of proposed Development
T16	ST 16321 69603	Oak	Suitable size and age to support roosting bats. Split/crack in limb approx. 8-10m high on the northern aspect of the tree.	Moderate		Tree originally proposed to be removed. Design subsequently revised to allow the tree to be retained

Tree Number	Grid Reference	Tree Species	Description of feature	Suitability	Additional Comments and Photo	Impact of proposed Development
T17	ST 16308 69599	Oak	No features identified from ground, but difficult to see fully. The tree is of suitable size and age to support roosting bats.	Low		Tree to be removed

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Tree Number	Grid Reference	Tree Species	Description of feature	Suitability	Additional Comments and Photo	Impact of proposed Development
T18	ST 16296 69595	Pedunculate Oak	Split limb located approx. 3m high on western aspect. Dense Ivy cover suitable to support a small number of bats or be hiding PRFs.	Moderate		Tree to be removed

Tree Number	Grid Reference	Tree Species	Description of feature	Suitability	Additional Comments and Photo	Impact of proposed Development
T19	ST 16320 69620	Pedunculate Oak	Suitable size and age to support roosting bats. No features identified from ground-level. However, surveyor was unable to assess the entire tree due to access issues. Recommend a full assessment if the tree is to be removed.	Moderate		None – tree to be retained

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Tree Number	Grid Reference	Tree Species	Description of feature	Suitability	Additional Comments and Photo	Impact of proposed Development
T20	ST 16305 69627	Pedunculate Oak	Suitable size and age to support roosting bats. No features identified from ground-level. However, surveyor was unable to assess the entire tree due to access issues. Recommend a full assessment if the tree is to be removed.	Moderate		None – tree to be retained

Tree Number	Grid Reference	Tree Species	Description of feature	Suitability	Additional Comments and Photo	Impact of proposed Development
T21	ST 16284 69625	Pedunculate Oak	Suitable size and age to support roosting bats. No features identified from ground-level. However, surveyor was unable to fully assess the tree from WwTW - will require access to adjacent land. Have therefore classified the tree as Moderate potential and recommend a full assessment if the tree is to be removed.	Moderate		None – tree to be retained

Tree Number	Grid Reference	Tree Species	Description of feature	Suitability	Additional Comments and Photo	Impact of proposed Development
T22	ST 16198 69683	Pedunculate Oak	Suitable age to support roosting bats but unable to fully assess from the WwTW. Have therefore classified the tree as Moderate potential and recommend a full assessment if the tree is to be removed.	Moderate		None – tree to be retained

Tree Number	Grid Reference	Tree Species	Description of feature	Suitability	Additional Comments and Photo	Impact of proposed Development
T23	ST 16218 69673	Pedunculate Oak	Suitable age to support roosting bats. One knot hole on tree branch approx. 2m high on the southern aspect of the tree. Unable to fully assess from WwTW. Have therefore classified the tree as Moderate potential and recommend a full assessment if the tree is to be removed.	Moderate		None - tree to be retained

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Tree Number	Grid Reference	Tree Species	Description of feature	Suitability	Additional Comments and Photo	Impact of proposed Development
T24-T27	ST 16240 69662	Pedunculate Oak	Suitable size to support roosting bats. Unable to fully assess from WwTW. Have therefore classified the tree as Moderate potential and recommend a full assessment if the tree is to be removed.	Moderate		None - trees to be retained.

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Tree Number	Grid Reference	Tree Species	Description of feature	Suitability	Additional Comments and Photo	Impact of proposed Development
T28	ST 15797 69628	Oak	Dense Ivy cover suitable to support a small number of bats or potentially be concealing PRFs. However, surveyor was unable to assess the entire tree due to access issues. Have therefore classified the tree as Moderate potential and recommend a full assessment if the tree is to be removed.	Moderate		None – tree to be retained

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Tree Number	Grid Reference	Tree Species	Description of feature	Suitability	Additional Comments and Photo	Impact of proposed Development
T29	ST 15778 69634	Oak	Dense Ivy cover suitable to support a small number of bats or potentially be concealing PRFs. However, surveyor was unable to assess the entire tree due to access issues. Have therefore classified the tree as Moderate potential and recommend a full assessment if the tree is to be removed.	Moderate		None – tree to be retained

Tree Number	Grid Reference	Tree Species	Description of feature	Suitability	Additional Comments and Photo	Impact of proposed Development
T30	ST 15764 69638	Ash	Dense Ivy cover suitable to support a small number of bats or potentially be concealing PRFs. However, surveyor was unable to assess the entire tree due to access issues. Have therefore classified the tree as Moderate potential and recommend a full assessment if the tree is to be removed.	Moderate		None – tree to be retained

Tree Number	Grid Reference	Tree Species	Description of feature	Suitability	Additional Comments and Photo	Impact of proposed Development
T31	ST 15755 69638	Oak	Dense Ivy cover suitable to support a small number of bats or potentially be concealing PRFs. However, surveyor was unable to assess the entire tree due to access issues. Have therefore classified the tree as Moderate potential and recommend a full assessment if the tree is to be removed.	Moderate		None – tree to be retained

Tree Number	Grid Reference	Tree Species	Description of feature	Suitability	Additional Comments and Photo	Impact of proposed Development
T32	ST 15748 69642	Ash	Dense Ivy cover suitable to support a small number of bats or potentially be concealing PRFs. However, surveyor was unable to assess the entire tree due to access issues. Have therefore classified the tree as Moderate potential and recommend a full assessment if the tree is to be removed.	Moderate		None – tree to be retained

Appendix B – Tree climbing survey results

Tree Number	Grid Reference	Additional features found	Photograph	Suitability	Further work required
T16	ST 16321 69603	Knot hole type cavity present at 4.5 m above ground, south-east side, on main stem above lowest two limbs (not visible from the ground)		Initially assessed as moderate potential during ground assessment (see Appendix A). Confirmed as low potential during climbing survey	None – tree to be retained.
T18	ST 16296 69595	No suitable PRFs observed.	n/a	Initially assessed as moderate potential during ground assessment (Appendix A). Confirmed as negligible potential during climbing survey	None required

Arcadis Consulting (UK) Limited

Arcadis Cymru House
St Mellons Business Park
Fortran Road
Cardiff
CF3 0EY
United Kingdom

T: +44 (0)29 2079 9275

arcadis.com