

Gwent Europark, Magor

Preliminary Ecological Appraisal

Final

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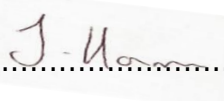
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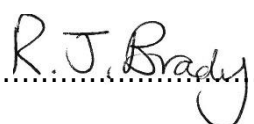
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This report describes work commissioned by Matthew Smith, on behalf of CMF UK, by an email dated 5th April 2019. Jonathan Harrison and Tabitha Barker of JBA Consulting carried out this work.

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Purpose

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Abbreviations

BAP	Biodiversity Action Plan
CIEEM	Chartered Institute of Ecology and Environmental Management
CRoW	Countryside and Rights of Way Act
EPS	European Protected Species
HPI	Habitat of Principal Importance
HRA	Habitat Regulations Assessment
JNCC	Joint Nature Conservation Committee
LNR	Local Nature Reserve
NERC	Natural Environment and Rural Communities Act
NNR	National Nature Reserve
NPPF	National Planning Policy Framework
PEA	Preliminary Ecological Appraisal
SAP	Species of Principle Importance
SEWBRc	South East Wales Biodiversity Records Centre
SPA	Special Protection Area
SPI	Species of Principal Importance
SSSI	Site of Special Scientific Interest
UKBAP	United Kingdom Biodiversity Action Plan

during Phase 3. Final layout and usage of these units will be determined during Phase 2 and 3, however all will be industrial in nature.

2 Methods

A PEA of the site was undertaken in line with current best practice guidance (CIEEM, 2017) and included:

- A desk-based assessment to identify any records of protected and/or notable habitats and species, and designated nature conservation sites in the vicinity of the proposed works;
- A site survey comprising a Phase 1 Habitat Survey including an assessment of the possible presence of protected or priority species, and (where relevant) an assessment of the likely importance of habitat features present for such species; and
- An assessment of the potential impacts of the works on the habitats and species present at the site and the surrounding areas.

2.1 Desk-based assessment

Prior to undertaking the site survey, searches of databases containing ecological records, priority habitats, and information on statutory and non-statutory designated sites were made. The following sources were included in these searches:

- MAGIC mapping service (www.magic.gov.uk)
- Welsh Government GIS data (<http://lle.gov.wales/home>)
- South east Wales Biodiversity Records Centre (SeWBREC)

Due to the size of the site, it is considered that the zone of influence would be 2km from the central grid reference ST 17883 96091 and therefore the desk-based assessment was conducted within this search area. Historic records (those preceding 2000) and records of species whose habitat are considered not to be relevant to the site have been excluded.

2.2 Site Survey

A site survey was undertaken on 18th April 2019 by Jonathan Harrison BSc MSc and Tabitha Barker BSc. The survey included the proposed development site and immediate surroundings.

The PEA was based upon a Phase 1 Habitat Survey, conducted following the Joint Nature Conservation Committee (JNCC) survey methodology (JNCC, 2010). The method was extended to include consideration of notable / protected habitats and species (CIEEM, 2017).

2.2.1 Habitats

Habitats within the site boundaries were surveyed to the Phase 1 Habitat Survey methodology (JNCC, 2010). The Phase 1 habitat survey is a standard technique for classifying and mapping British habitats where the dominant plant species are recorded and habitats are classified according to their vegetation types. All habitats within the site and its surroundings were recorded during the site survey and a description of each habitat type collected. Botanical names follow Stace (2010).

2.2.2 Reen Survey

A further walkover survey of the reens within the site was undertaken on 21st June 2019 by the same ecologists. Macrophytes within the reens were surveyed and assessed using the UKTAG River Assessment methodology for Macrophytes and Phytobenthos (LEAFPACS2), with reference to the Flora Monitoring on the Gwent Levels Sites of Special Scientific Interest (CCW, 1996) methodology.

2.2.3 Protected and notable species

Habitats were also assessed for their potential to support any legally protected species or species of conservation concern and any incidental faunal sightings, or field signs discovered

during the survey, were recorded. The following sections provide further details on the assessments undertaken in relation to specific species. Legislative guidance relating to protected species is outlined in Appendix A, along with details of other relevant policy and legislation.

Badger

The survey area was searched for signs of Badgers *Meles meles*, and where evidence was found details were recorded following Harris et al. (1989). In addition to recording the presence of setts and the level of activity at them, the following signs of activity were also searched for: latrines, footprints, evidence of feeding activity and well-worn paths through vegetation. Badgers will use a number of setts throughout their territory at different times of year; any large holes with the potential to be used by Badgers, but not showing obvious signs of recent activity, were therefore also recorded.

Bats

Structures and trees likely to be impacted by the proposed works were inspected to determine the potential for bat roosts to be present, using the methods specified in Collins (2016).

Potential Roosting Features (PRF) on trees include cracks/splits, crevices, rot cavities, fluting, loose bark, woodpecker holes and areas of Ivy *Hedera helix*. Evidence indicating the existence of a bat roost may include dark stains running below holes or cracks, bat droppings, odours, or scratch marks. However, roosting bats may still be present without any external evidence being recorded.

Furthermore, the suitability of habitats across the site to support commuting and foraging bats was assessed in terms of habitat type, abundance, connectivity and distribution. These were categorised as having either 'negligible', 'low', 'moderate' or 'high' suitability for bats which was determined by applying the categories given within the BCT Guidelines.

Table 2-1 - Guidelines for assessing the potential suitability of proposed development sites for bats

Suitability	Description of Roosting Habitats	Commuting and Foraging Habitats
Negligible	Negligible habitat features on site likely to be used by roosting bats.	Negligible habitat features on site likely to be used by commuting or foraging bats.
Low	A structure with one or more potential roost sites that could be used by individual bats opportunistically. However, these potential roost sites do not provide enough space, shelter, protection, conditions, and/or suitable surrounding habitat to be used on a regular basis or by large numbers of bats (unlikely to be suitable for maternity or hibernation). A tree of sufficient size and age to contain potential	Habitat that could be used by a small number of commuting bats such as gappy hedgerow or unvegetated stream, but not very well connected to the surrounding landscape by other habitat. Suitable, but isolated habitat that could be used by small numbers of foraging bats such as a lone tree or a patch of scrub.

Suitability	Description of Roosting Habitats	Commuting and Foraging Habitats
	roosting features but with none seen from the ground or features observed have only very limited roosting potential.	
Moderate	A structure or tree with one or more potential roost sites that could be used by bats due to their size, shelter, protection, conditions and surrounding habitat but unlikely to support a roost of high conservation status.	Continuous habitat connected to the wider landscape that could be used by bats for commuting such as lines of trees and scrub or linked back gardens. Habitat that is connected to the wider landscape that could be used by bats for foraging such as trees, scrub, grassland or water.
High	A structure or tree with one or more potential roost 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.	Continuous high-quality habitat that is well connected to the wider landscape that is likely be used regularly by commuting bats such as river valleys, streams, hedgerows, lines of trees and woodland edge. High quality habitat that is well connected to the wider landscape that is likely to be used regularly by foraging bats such as broadleaved woodland, tree-lined watercourses and grazed parkland. Site is close to, and connected to, known roosts.

Birds

Vegetation and habitats within the site were assessed for their suitability to support nesting birds. Special consideration was given to bird species listed on Schedule 1 of the Wildlife and Countryside Act 1981 (as amended). Furthermore, any birds seen or heard on site during the survey were recorded as incidental observations.

Dormouse

The suitability of the habitat for Hazel Dormice *Muscardinus avellanarius* was assessed. Dormice in the UK are primarily arboreal typically require extensive or well-connected woodland, scrub and hedgerows (Juskaitis & Büchner, 2013).

Great Crested Newt

Habitat features with the potential to support Great Crested Newt *Triturus cristatus*, and other amphibians, were recorded. Such features can include:

- ponds with habitat suitable for breeding newts within 500m of the proposed works;
- piles of logs, stones or other debris;
- cracks in the ground;
- stone or rubble covered ground, and;
- any other features that could support newts.

Where access was possible, any substantial waterbodies within 500m of the site, and which had ecological connectivity to the site, were assessed for their potential to support newts. This assessment was based on the Habitat Suitability Index (HSI) (Oldham et al., 2000; ARG UK, 2010). This system involves assessment of ten suitability indices per waterbody and is an accepted method of assessing the likelihood for a particular pond to hold breeding Great Crested Newts.

Reptiles

As part of the site survey, an assessment of the habitat suitability for common reptiles was made. This involved inspection of the site for key habitat features/microhabitats which may be favoured by reptiles, such as embankments, log, brash or rock piles, dry stone walls, hedgerows, open sandy areas, woodland edges and rides and interfaces between different habitat types (Froglife 1999).

Otter

Watercourses and surrounding areas within the site were assessed for their potential to support Otter *Lutra lutra*, based on RSPB (1994) and Chanin (2003). This involved walking the reed and ditch network and recording any spraints (droppings), slides, feeding remains and footprints. A search was also made for possible holt and couch (resting) sites. Otters are extremely difficult to observe, and this method provides the most effective and efficient means of investigating presence or absence.

Water Vole

The field survey assessed the suitability of the reed network for Water Vole *Arvicola amphibius*, based on initial habitat assessment criteria outlined in Dean et al. (2016). The assessment of habitat suitability for Water Vole is based on the availability and nature of dry areas above water level for burrowing/nesting (e.g. bank profile, bank substrate), vegetation (i.e. the quantity and cover of herbaceous species) and the presence of water.

Any field signs observed within the survey area, informed by Strachan et al. (2011), were also noted. The most important, diagnostic field sign for Water Vole is the presence of latrine sites. These are locations repeatedly used by Water Vole to deposit their droppings, often in prominent locations along the bank. Other field signs include the presence of burrows, feeding sites and footprints. Although these other signs provide indications of presence and are useful supporting evidence to latrines, they are of limited value on their own.

Other notable species

During the site survey, any signs or sightings of other notable species were also recorded.

Invasive non-native species

Any Invasive Non-native Species (INNS) observed during the survey were recorded. For stand-forming plant species, the extents of such stands were noted.

2.3 Limitations

2.3.1 Third-party data

Data from biological records centres or on-line databases is historical information, and datasets might be incomplete, inaccurate or missing. It is important to note that even where data is held, a lack of records for a defined geographical area does not necessarily mean that the species is absent; the area may simply be under-recorded. The data represents the information available at the date of the request. An absence of records for any particular species does not demonstrate the absence of a species from the local area; instead it may be that a species is under-recorded.

2.3.2 Accessibility

All areas of the site were walked by the surveyors with the exception of one area of dense scrub towards the western extent of the site, which was so dense it was inaccessible at the time of survey.

2.3.3 Lifespan of data

The results and recommendations contained within this report are considered to be valid for up to two years from the date of survey. After that period, an update may be required in order to inform ecological constraints to development proposals and/or support a planning application.

3 Baseline Ecological Conditions

3.1 Desk-based assessment

3.1.1 Statutory designated sites

A search of the MAGIC database found two statutory designated sites within 2km of the site. Their location can be seen in Figure 3-1.

The Gwent Levels Site of Special Scientific Interest (SSSI) are an area of reclaimed wet pasture and constitute the lowlands between Chepstow and Cardiff. They are drained by an ordered network of drainage ditches and reens, some of which cross the site. The large variety of reen types and their management regimes results in a rich plant assemblage and provides conditions for submerged species such as Hairlike Pondweed *Potamogeton trichoides* and Arrowhead *Sagittaria sagittifolia* to flourish. Aquatic invertebrate fauna is also very diverse across the Gwent Levels with nationally rare or notable species present such as *Haliphus mucronatus* and *Hydrophilus piceus*. The Redwick and Llandeenny SSSI is a part of the wider Gwent Levels SSSI designation.

Magor Marsh is the last natural area of fenland on the Gwent Levels. It contains a variety of habitats including haymeadows, sedge fen, reedbeds, wet woodland, scrub, open water, and a network of reens and ditches. Species known to be present include Kingfisher *Alcedo atthis*, Cetti's Warbler *Cettia cetti* and Water Vole *Arvicola amphibius*.

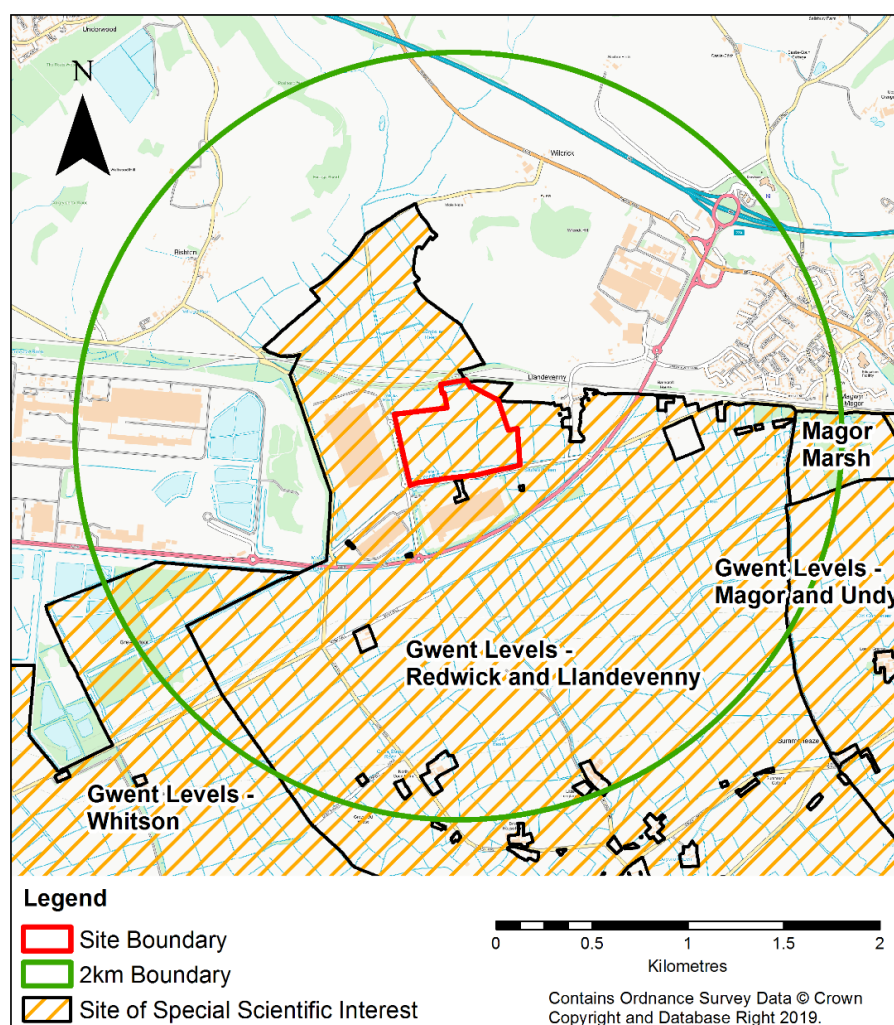


Figure 3-1 – Designated sites within 2km of the site

3.1.2 Non-statutory designated sites

There are two Sites of Importance for Nature Conservation (SINCs) within 1km of the site. Greenmoor Pool is located approximately 600m west of the site and is an area of former open standing water which now contains reed swamp, supporting bird populations including Cetti's warbler.

Wilcrick Fort West is located approximately 850m north of the site and is an area of unimproved neutral grassland on slopes.

3.1.3 Baseline Information on Gwent Levels - Redwick and Llandeenny SSSI

The reasons for designation of the Gwent Levels - Redwick and Llandeenny SSSI are outlined in Section 3.1.1 above. The reens (some of which are present within the red line boundary) are the key habitat feature of the SSSI and these support a variety of aquatic plants and a diverse aquatic invertebrate community.

The available baseline information on the SSSI site consists of quarterly ecological monitoring surveys of the reens dating between May 2005 and January 2007 (AMEC, 2007), this includes a freshwater invertebrate and macrophyte survey in September 2005 (AMEC, 2005), and aquatic invertebrate sampling surveys conducted in 2011 (Boyce, 2012).

Quarterly ecological monitoring surveys were undertaken by AMEC over a period of 20 months between 2005 and 2007, these surveys included assessments of aquatic flora and fauna across the site. The surveys found the diversity of aquatic flora within the reens on site to be variable over the surveying period, this was attributed to management activities including bank cutting. The effect of dumping arisings from bank cutting into the reens was considered to have had a particularly detrimental effect on the communities of submerged macrophytes in the reens, by reducing dissolved oxygen levels in the water and increasing shading. Over the 20-month survey period, the site supported 32 different species of aquatic plants, including five species that were considered to be locally rare- Pink Water Speedwell *Veronica catenata*, Greater Duckweed *Spirodela polyrrhiza*, Hornwort *Ceratophyllum demersum*, Small Pondweed *Potamogeton berchtoldii* and Hair-like Pondweed *Potamogeton trichoides* (AMEC, 2005).

Aquatic invertebrate monitoring surveys undertaken between 2005 and 2007 identified a total of 69 taxa in the reens within the site, including 14 taxa of water beetles, 13 of bugs and 18 of molluscs (AMEC, 2005). Generally, the results show a variable diversity of beetles and bugs and an increase in molluscs over the survey period (AMEC, 2007). No rare species of beetles were found in the reens, with the only species of particular note being Large Soldierfly *Odontomyia ornata* (a species of conservation concern but widespread on the Gwent Levels) and the bug *Corixa panzeri* (scarce in Wales). More recently, aquatic invertebrate sampling has been undertaken on the site in June 2011 (Boyce, 2012). These surveys found the main reen in the centre of the site had a Species Richness Score (SRS) of 33, a Species Quality Score (SQS) of 47, a Species Quality Index (SQI) of 1.42 and a Habitat Quality Score (HQS) of 4.55. These results indicate that 33 taxa of native aquatic invertebrates were represented on the site and the figures are comparatively low for grazing marsh ditches in southern Britain (Boyce, 2012). The relatively low aquatic invertebrate diversity within the reen was attributed in part to the growth of species of Duckweed *Lemna* sp. and the regular maintenance of the site.

A macrophyte survey was undertaken in 2011 and 2017 by NRW. This found that large areas of the reens were free from vegetation. Plants recorded consisted predominantly of duckweeds *Lemna* sp. With small amounts of Hair-like Pondweed *Potamogeton trichoides* present at a couple of sample points. These surveys also noted the poor management of the fields and the presence of poaching along much of the length.

3.2 Habitats

The results of the Extended Phase 1 Habitat survey are described in the following sections and shown in Figure 3-2.

3.2.1 Semi-natural broad-leaved woodland

The southern boundary of the site is bordered by semi-natural broad-leaved woodland. Species present include Alder *Alnus glutinosa*, Oak *Quercus robur* and Hazel *Corylus avellana*.

3.2.2 Semi-improved neutral grassland

The majority of the site consists of semi-improved neutral grassland and contained grazing horses at the time of survey. The dominant grass species found was *Deschampsia sp.* with Common Dandelion *Taraxacum officinale* and Marsh Thistle *Cirsium palustre*.

3.2.3 Hedgerow

There are hedgerows running along the east and west boundaries of the sites, on the far side of the respective reens. The hedgerow to the east is species poor and dominated by Hawthorn *Crataegus monogyna* with occasional broadleaved trees. The hedgerow to the west is gappy and in the gaps consists predominately of tall ruderal species such as Yarrow *Achillea millefolium*, Field Horsetail *Equisetum arvense*, and Ribwort Plantain *Plantago lanceolata*.

There is one hedgerow running north/south in the centre of the site, dominated by hawthorn with occasional broadleaved trees such as Willow.

3.2.4 Running water

The Gwent Levels are a renowned area for lowland drainage habitat. The area is below high tide and the reens serve as a storage facility when outfalls are tide locked.

The reens typically have 1 in 1 side slopes, and vary in depth and width, but are typically 3 m in width at the top and 1 m in width at the base. As the water levels are controlled by sluices there is typically very little flow. The field ditches are significantly smaller than these reens and are frequently dry. The ditches commonly run along existing hedgerows on the edge of fields and connect to the reens.

There is a network of reens running throughout the site as seen in figure 3-2. These are a part of a larger network of reens and ditches which flow through, and are a feature of, the Gwent Levels SSSI - Redwick and Llandeenny. The reens within the site are homogenous and approximately 4m wide with steep grassy banks and limited marginal and submerged vegetation.

Similar to historic site surveys, the current surveys found that broadleaved macrophytes were generally uncommon, and during this survey, were only found in the realigned Waun deilad Reen on the site's eastern boundary. These plants consisted of locally common False Water Cress *Apium nodiflorum* and a small amount of Hairlike Pondweed.

As with the previous surveys, these surveys found that arisings from maintenance of the reen/ditch banks had been left in or next to the channels, potentially having a detrimental impact.

Two small reed beds were present in the south west corner and the north east corner of the development site.

3.2.5 Seasonally wet ditch

The internal reen was moved in 2006/2007. This remains in the centre of the site running north south. Waterflow has been cut off from this ditch but it is considered that it is seasonally wet. At the time of the survey there was no flow along the ditch, however the soil was saturated and boggy.

Two ditches located in the south west corner of the site were recorded as dry during the initial surveys in April and June 2019, however, a subsequent visit in December 2019 found these to be wet. These ditches are no longer connected to the reën network to the north but did discharge into the southernmost reën.

3.2.6 Dense scrub

A large area within the western half of the site is dominated by dense scrub. This extends eastwards along either side of the reën. This scrub is dominated by Bramble *Rubus fruticosus* agg. and Willow *Salix* sp. with occasional Alder.

3.2.7 Scattered scrub

Semi-improved grassland across the north of the site is overlain by scattered scrub. This consists mainly of Bramble with occasional Hawthorn.



Figure 3-2 – Phase 1 habitat map of the site

3.3 Protected and Notable Species and Species Groups

3.3.1 Invertebrates

The sediment and flora within the reens provide suitable habitat for a number of aquatic invertebrate species. These are discussed within the baseline information for the SSSI designation in Section 3.1.3.

The semi-natural broad-leaved woodland, scrub and semi-improved grassland habitats within the site are likely to support a range of common and widespread terrestrial invertebrate species.

The wet meadows of the Gwent Levels support local populations of the Shrill Carder Bee *Bombus sylvarum*. Whilst the fields present in the study area are heavily grazed and not in good condition there is the potential for this species to be present.

3.3.2 Fish

There are known populations of European eel and salmonids in the River Usk which is approximately 7.5 km to the west of site. However, Newcut reen lies immediately to the west of the site and this connects to the Severn estuary at its downstream extent. This potentially allows a passage route for eels and salmonids species to enter the site.

3.3.3 Amphibians

There is low potential for Great Crested Newt (GCN) on site within the reens, with a small amount of suitable riparian habitat present. In addition to the reens there is one pond on adjacent land within 500m of the site. The reens on site and the adjacent ponds were previously surveyed in 2006 (AMEC, 2006) using bottle trapping and torch surveys after dark.

Positive eDNA results have been obtained for waterbodies located to the south of the scheme in 2015/16. Tests carried out within the development site provided negative results.

There are no records for other amphibians within 2km of the site, however there is potential for common and widespread amphibian species such as Common Frog *Rana temporaria* and Common Toad *Bufo bufo* to be present within the reens, broad-leaved woodland and scrub around the site.

There is one pond located to the south of the site, a subsequent site visit carried out in December 2019 found that it was stained blue from an unknown source.

3.3.4 Reptiles

The semi-improved grassland within the site has a low sward and appears to be well managed with frequent grazing. However, dense and scattered scrub habitats provide good opportunities for foraging and sheltering reptiles. No potential hibernacula were identified, however the areas of dense scrub to the western extent of the site were not accessible and may contain suitable features for hibernation. Overall, the mosaic of habitats present on the site are considered suitable to support a population of reptiles such as Slow Worm *Anguis fragilis*.

3.3.5 Birds

During the Extended Phase 1 Habitat Survey nesting Mute Swans *Cygnus olor* were observed on the banks of the reen running along the eastern boundary of the site. No other breeding birds were observed at the time of the survey.

The habitats present within the site are considered to be unsuitable for species of ground nesting birds, due to the short length of the semi-improved grassland, the frequency of grazing and the lack of winter stubble fields within and in the vicinity of the site. However, the areas of dense scrub and broad-leaved woodland within the site are likely to support several species of widespread and common breeding birds.

3.3.6 Bats

There are no trees within the site that have potential roost features, and therefore there is no potential for the site to support roosting bats. The broad-leaved woodland, scrub, flowing water in the reens and semi-improved grassland habitats on site provide good foraging opportunities for bats. In addition, the reens and narrow strip of broad-leaved woodland to the south of the site provide corridors for commuting bats to move around the wider landscape.

3.3.7 Dormice

Generally, the site is considered to have low potential to support Hazel Dormouse, the dense scrub within the site is separated from other areas of suitable habitat by reens and semi-improved grassland.

However, the strip of broad-leaved woodland adjacent to Bareland Street at the south of the site is well connected to treelines and scrub in the wider area and may be used by Dormice.

3.3.8 Water Vole

Water Vole burrows were observed along within the reen at the northwest corner of the site. The reens represent suitable habitat for water vole and there is the potential for further sections of reen to be populated.

3.3.9 Otter

No signs of Otter *Lutra lutra* e.g. spraint, footprints etc. were observed during the survey. The reens within the site offer no potential to support resting places or holts due to their lack of bankside vegetation and trees. It is considered possible that the reens within the site are used by commuting Otter as part of a wider territory. Otter are known to be present within the River Usk, approximately 7.5km to the west of site.

3.4 Invasive non-native species

No Invasive Non-native Species (INNS) were observed during the survey. However, due to the dense scrub being inaccessible to surveyors there is the potential for INNS to be present within this area.

4 Evaluation and Recommendations

4.1 Statutory Designated Sites

Disturbance to the Gwent Levels SSSI Redwick and Llandeenny and other habitats downstream through disturbance or changed in water quality is considered below.

Natural Resources Wales are likely to request that the remaining reen network is not adversely impacted upon by the development of the site. Measures to ensure this are likely to include a buffer strip between the development and the reen network. Discussions with NRW should take place to agree the size of this buffer.

A further report will detail the existing baseline of the reens and a monitoring plan to ensure that they are not detrimentally impacted upon by the works.

4.2 Non-statutory Designated Sites

Due to the close proximity of the SINCs and their connectivity through the network of reens in the area, the Local Planning Authority should be consulted prior to the commencement of the works in order to fully understand any impacts to local SINCs.

4.3 Habitats

The proposed development will result in the loss in the majority of the terrestrial habitats described in the above sections. The majority of the terrestrial habitats on site have been assessed as being in poor condition, however, the mosaic of woodland, scrub, grassland in combination with the reens have the potential to support a number of species. Potential impacts to protected species are outlined below. In order to compensate for the loss of terrestrial habitats it is recommended that areas not being developed are enhanced for biodiversity.

It is recommended that a biodiversity management plan (BMP) is developed for this purpose and incorporated into the scheme design. This should include plans for a buffer zone 7m away from all reens, plans for the enhancement of the parcel of land located between the southern reen and the treeline and recommendations for the SuDS scheme that will be developed within the site boundary.

The reens will not be directly impacted upon by the scheme. Historic surveys, including the ones carried out by NRW in 2017 did not find the reens to be in good condition and have been impacted upon by bad management practices at the site. The surveys carried out for this report confirmed this and it is considered that the development of the scheme provides an opportunity to enhance the reen habitat and provide management recommendations for the future. The biodiversity management plan should outline details for enhancements and future management.

Impacts from construction pollution are considered below and a separate drainage strategy has been developed to avoid impacts from the development. A monitoring plan has been developed to ensure that there are no impacts to the reen network.

4.4 Protected and Notable Species and Species Groups

4.4.1 Invertebrates

The works will result in the loss of habitats suitable for a number of terrestrial invertebrates. It is recommended that provision for terrestrial invertebrates associated with surrounded area are included in the enhancements that are recommended in the biodiversity management plan.

The reens are not considered to provide good habitat for freshwater invertebrates associated with the SSSI in their current condition. There is the potential for the reens habitat to be enhanced for freshwater invertebrates associated with the SSSI, this should be reflected in

the BMP. The monitoring plan includes provision for the monitoring of invertebrate populations in the reens.

4.4.2 Fish

There is the potential for activities to adversely affect water quality and therefore fish species within the watercourses within and surrounding the site, as well as habitats further downstream. Appropriate mitigation measures should be implemented prior to the construction phase to ensure that water quality is not adversely affected through pollution incidents and the release of contaminants from the site. Please refer to the pollution prevention measures detailed in Section 4.7.

No development will take place in the reens and a 7m buffer from all reens will be enforced.

4.4.3 Amphibians

The site is considered to have moderate terrestrial habitat for Great Crested Newt.

Whilst these results should be considered out of date, the lack of records and connectivity to suitable habitat indicates that colonisation of the waterbodies surrounding the site is unlikely. It is recommended that discussion with the county ecologist is carried out to gain agreement on this.

It is possible that other amphibians, such as Common Frog and Common Toad are found within the development boundary. The general avoidance measures found in Section 4.6 should be applied to amphibians.

4.4.4 Birds

There is potential for the scrub, broadleaved trees, and hedgerow at the site to be utilised by nesting and foraging birds. It is not considered that the small-scale loss of foraging habitat will have a significant impact upon bird species. Therefore, impacts are limited to the disturbance of nesting birds. Any clearance of vegetation required to permit works and access should be carried out outside of the bird breeding season (i.e. avoiding March to September inclusive). If works are proposed during the bird breeding season, or if following initial clearance it becomes apparent that some further de-vegetation is necessary during the bird breeding season, an experienced ecologist should first check all areas for the presence of nesting birds. Should any nests be found they should have an exclusion zone put in place to safeguard the nests until the chicks have fledged.

These details should be included in a Construction Environmental Management Plan (CEMP).

4.4.5 Dormice

Records for dormice in the local area have been obtained and the semi-natural woodland along the southern boundary of the site was considered to be suitable for Dormouse, however, this area will not be impacted upon by the scheme.

The habitats on site were considered to have a very low potential for dormouse and it is therefore considered suitable for a precautionary approach to be taken to the works.

Clearance should be carried out by hand and a suitably qualified ecologist must be present to ensure no Dormouse nests or nesting birds are harmed during the clearance. This should be detailed in a CEMP and in the unlikely event a Dormouse is discovered, works must stop immediately until a licence has been granted and suitable mitigation instated.

4.4.6 Reptiles

The habitats throughout the site are broadly suitable for reptiles. Reptiles hibernate during winter (November to March inclusive) under log-piles, rocks, and boulders or in burrows. They are active during the daytime in warmer temperatures.

During summer months, reptiles may occasionally be observed basking. They will almost always move away from any disturbance. Staff should be briefed on reptile identification, and if large numbers of reptiles are found, an ecologist should be consulted.

The site will be cleared in stages, therefore in the first instance it is recommended that an ecologist is present for at least the first couple of days to ensure that reptiles are not adversely impacted upon. Should a large population of reptiles be discovered it will be possible to move them to the part of the site not being developed in the first instance. This should be detailed in the CEMP.

4.4.7 Water Vole

Water Vole are known to be present within the Gwent Levels SSSI and burrows were observed on the banks of the reens within the site during the survey. The reens will not be impacted upon by the proposed works and a buffer zone of a minimum of 7m from any of the reens is recommended. As no burrows were found outside of the reens and ditches, the potential impacts to Water Vole are low. However, it is recommended that areas to be cleared are first checked by an ecologist and pollution prevention guidelines detailed below followed. Details to avoid impacts on Water Vole should be detailed in the CEMP.

4.4.8 Otter

To reduce potential disturbance to commuting Otters, works should not take place after sunset or before dawn. As a precautionary measure, any excavations should be covered when works are not active, to avoid the accidental trapping of Otters and other animals at night (see Section 4.6). The pollution prevention measures outlined in Section 4.7 should be followed in order to prevent the works from detrimentally affecting water quality. Details should again be included in the CEMP.

4.4.9 Badger

It is considered unlikely that Badgers will be encountered on site. As no setts were identified in the vicinity, the general avoidance measures listed in Section 4.6 below will be sufficient to protect from accidental harm. If a Badger is discovered on site, works should cease, and an ecologist should be notified immediately.

4.5 Invasive Non-native Species

Although no INNS were observed during the survey, there remains the possibility that they are present in the inaccessible area of dense scrub on site.

The Check, Clean, Dry approach should be employed throughout the works to reduce the risk of spreading invasive species.

4.6 General Avoidance Measures

General avoidance measures that should be incorporated within the scheme include:

- Limiting the hours of working to daylight hours if possible, to limit disturbance to nocturnal and crepuscular animals;
- Contractors must ensure that no harm comes to wildlife by maintaining the site efficiently and clearing away materials which are not in use, such as wire or bags in which animals can become entangled; and
- Any pipes should be capped when not in use (especially at night) to prevent animals becoming trapped. Any trenches or excavations should be covered overnight to prevent animals from falling and getting trapped. If that is not possible, a strategically placed plank should be used to allow animals to escape.

4.7 Pollution Prevention

Appropriate mitigation measures should be implemented to ensure that habitats within proximity of the works, particularly the reens, are not degraded as a result of pollution events during the works. Mitigation should include:

- Abiding by relevant pollution prevention measures e.g. CIRIA Guidance (Masters-Williams, 2001). Information useful for toolbox talks on working near water and pollution prevention can be found on the CIRIA website (CIRIA, 2017);
- Any chemical, fuel and oil stores should be located on impervious bases within a secured bund with a storage capacity 110% of the stored volume. These should be located away from the reens wherever possible;
- Biodegradable oils and fuels should be used where possible;
- Drip trays should be placed underneath any standing machinery to prevent pollution by oil/fuel leak. Where practicable, refuelling of vehicles and machinery should be carried out on an impermeable surface in one designated area well away from any reens (at least 10m);
- Emergency spill kits should be available on site and staff trained in their use;
- Operators should check their vehicles on a daily basis before starting work to confirm the absence of leakages. Any leakages should be reported immediately;
- Daily checks should be carried out and records kept on a weekly basis and any items that have been repaired/replaced/rejected noted and recorded. Any items of plant machinery found to be defective should be removed from site immediately or positioned in a place of safety until such time that they can be removed;
- Exposed bare earth should be covered as soon as possible to prevent soil erosion and silt run-off. This can be achieved by selecting a fast growing and soil binding seed mix for any areas to be reseeded, or by using geotextile coverings;
- Operatives on site should be aware of visible signs of changes in water quality within the reens that could indicate a pollution incident. Changes in water colour or a visible plume could indicate sediment input or a fuel spillage. Should anyone on site notice a potential pollution incident, works should be stopped, and a solution found to prevent the pollution source entering the watercourse; and
- Environmentally sensitive products should be used where possible. For example, this could include the use of less harmful innovative products such as Cemfree™ in place of concrete.

Appendices

A Legislation

A.1 Relevant Policy and Legislation

The legislation discussed below is intended as a guide only and does not replace formal legal advice.

A.2 National Planning Policy Framework (NPPF)

The National Planning Policy Framework (NPPF) sets out the Government's planning policies for England and how these are expected to be applied with a presumption in favour of sustainable development a core element of the framework.

Of relevance to the proposed works in this report, the document states in relation to conserving and enhancing biodiversity, that: "If significant harm resulting from a development cannot be avoided (through locating on an alternative site with less harmful impacts), adequately mitigated, or, as a last resort, compensated for, then planning permission should be refused" Ministry of Housing, Communities and Local Government (2018).

It also states that: "development on land within or outside a Site of Special Scientific Interest, and which is likely to have an adverse effect on it (either individually or in combination with other developments), should not normally be permitted. The only exception is where the benefits of the development in the location proposed clearly outweigh both its likely impact on the features of the site that make it of special scientific interest, and any broader impacts on the national network of Sites of Special Scientific Interest" Ministry of Housing, Communities and Local Government (2018).

A.3 Natural Environment and Rural Communities (NERC) Act 2006

Section 40 of the Natural Environment and Rural Communities Act (2006) states that 'Every public authority must, in exercising its functions, have regard, so far as is consistent with the proper exercise of those functions, to the purpose of conserving biodiversity'. Section 40(3) also states that 'conserving biodiversity includes, in relation to a living organism or type of habitat, restoring or enhancing a population or habitat'.

Section 41 of the NERC Act requires the Secretary of State to publish a list of species of flora and fauna and habitats considered to be of principal importance for the purpose of conserving biodiversity. To meet this requirement, the England Biodiversity List (the S41 list) has been developed. Species and habitats listed under Section 41 of the NERC Act 2006, whilst not necessarily being legally protected, can be a material planning consideration.

The S41 list, which replaces the list published under Section 74 of the Countryside and Rights of Way (CROW) Act 2000, should be used to guide decision-makers such as public bodies, including local and regional authorities, in implementing their duty under section 40 of the NERC Act 2006 'to have regard' to the conservation of biodiversity in England, when carrying out their normal functions.

A.4 Statutory Designated Nature Conservation Sites

Sites with statutory designations receive varying degrees of legal protection under UK statute and European Directives. There are several statutory designations used for sites of high nature conservation value in the UK, which are applied depending upon the importance of the site in a local, regional, national or international context.

- • Ramsar Sites (International designation)
- • SAC and SPA (European designations)

- National Nature Reserves (NNR) and SSSI (National designations)
- Local Nature Reserves (LNR) (Local designation)

A.5 Non-Statutory Designations

Non-statutory sites are afforded no statutory legal protection but are normally recognised by local planning authorities and statutory agencies as being of local nature conservation value. The protection afforded to such sites is usually discretionary, through Local Plan policies. Non-statutory sites are designated by the local authority, usually in partnership with the County Wildlife Trust (or equivalent).

A.6 Protected Species

A number of species are protected under UK and international legislation. In the UK, primary protection is provided under the Wildlife and Countryside Act 1981 (as amended). Species of European importance receive additional protection in England under the Conservation of Habitats and Species Regulations 2017; others may receive protection through specific legislation. Further details on specific species and their levels of protection are provided below.

A.6.1 Otter

The European Otter *Lutra lutra* is an EPS protected under the Conservation of Habitats and Species Regulations 2017 (as amended), making it an offence to:

- deliberately capture, injure or kill an Otter
- deliberately disturb an Otter such as to affect local populations or breeding success
- damage or destroy an Otter holt, possess or transport an Otter or any part of an Otter
- sell or exchange an Otter.

Otters also receive protection under the Wildlife and Countryside Act 1981 (as amended), this makes it an offence to:

- intentionally or recklessly disturb any Otter whilst within a holt
- intentionally or recklessly obstruct access to a holt.

A.6.2 Water Vole

The Water Vole *Arvicola amphibius* is protected under the Wildlife and Countryside Act 1981 (as amended). This makes it an offence to:

- intentionally kill, injure or capture a Water Vole
- possess or control a Water Vole, living or dead, or any part of a Water Vole
- intentionally or recklessly damage, destroy or obstruct access to any place of shelter, or disturb a Water Vole within such a place
- sell or offer for sale a Water Vole living or dead, or part of a Water Vole.

A.6.3 Great Crested Newt

The Great Crested Newt *Triturus cristatus* is a EPS under the Conservation of Habitats and Species Regulations 2017 (as amended). This makes it an offence to:

- kill, capture or disturb a Great Crested Newt
- take or destroy the eggs of a Great Crested Newt
- damage or destroy the breeding or resting places of Great Crested Newt.

It also receives additional protection under the Wildlife and Countryside Act 1981 (as amended) making it illegal to possess or control any Great Crested Newt, living or dead.

A.6.4 Reptiles and Other Amphibians

Legal protection varies considerably for different species. Smooth Snake *Coronella austriaca*, Sand Lizard *Lacerta agilis* and Natterjack Toad *Epidalea calamita* are EPS, and it is an offence to:

- deliberately kill, capture or disturb these species
- deliberately take or destroy the eggs of these species
- damage or destroy the breeding or resting places of these species.

Under the Wildlife and Countryside Act 1981 (as amended) Adder *Viperus berus*, Grass Snake *Natrix natrix*, Common Lizard *Zootoca vivipara* and Slow Worm *Anguis fragilis* are protected from intentional killing or injuring, additionally Common Frog *Rana temporaria*, Common Toad *Bufo bufo* and other newt species are prohibited from sale.

A.6.5 White-clawed Crayfish

White-clawed Crayfish are listed on Schedule 5 of the Wildlife & Countryside Act 1981 (as amended), but only receive protection under Sections 9(1) and 9(5). Section 9(1) of the Act makes it an offence to take White-clawed Crayfish. Under Section 9(5) it is an offence to offer for sale, transport for sale, advertise for the purpose of trading any live, dead, part, or derivative of, White-clawed Crayfish. Section 9 applies to all stages in their life cycle.

Their inclusion on the Habitats Directive allows areas to be designated as Special Areas of Conservation (SAC) for the presence of White-clawed Crayfish. Such a designation brings legal restrictions to the management and operations and development that can occur in such sites, to help conserve the White-clawed Crayfish and the specific habitat it requires.

A.7 Invasive Non-native Species

Schedule 9 of the Wildlife and Countryside Act 1981 (as amended) lists plant species, groups of plants and animal species for which it is illegal to plant, release, allow to escape or cause to spread into the wild. Examples of species listed on Schedule 9, which are most likely to be encountered include:

Japanese Knotweed *Fallopia japonica*, Himalayan Balsam *Impatiens glandulifera*, Giant Hogweed *Heracleum mantegazzianum* and Signal Crayfish *Pacifastacus leniusculus*.

Some species are also classed as 'controlled waste' under the Environmental Protection Act 1990 and must be disposed of properly (i.e. Japanese Knotweed and Giant Hogweed). These provisions mean that, if these species occur on a site proposed for development or other work which may disturb the ground, control of these species is likely to be required.

B Photographs

Number	Photograph	Description
1		Reen along the southern boundary of the site
2		Sluice structure within reen along southern boundary of the site
5		Reen running along western edge of site

7		Reen within northeast corner of site – Water Vole burrow holes visible at base of bank
8		Seasonally wet ditch

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