ECOLOGICAL AND ENVIRONMENTAL RISKS ON CONSTRUCTION SITES
Some of the more common ecological risks that can affect construction sites in the UK are associated with the following, which are described in detail in later sections of this booklet:

- badgers
- bats
- birds
- reptiles
- amphibians
- water voles
- dormice
- otters
- invertebrates
- white-clawed crayfish
- trees
- hedgerows
- plants
- designated wildlife sites
- invasive species

At Phlorum we are committed to providing cost effective solutions that surpass our clients’ expectations and benefit the natural environment. Our mission is to understand your needs, providing a transparent and personalised service in an approachable and honest manner.

We have expertise in a wide range of environmental monitoring and assessment disciplines, and are UKAS certified to OHSAS18001 (Safety), ISO14001 (Environment) and ISO9001 (Quality), leaving you safe in the knowledge that your requirements will be dealt with in a professional manner from start to finish.

QUICK GUIDE TO POTENTIAL ECOCLOGICAL RISKS DIFFERENT HABITAT/SITE TYPES:

<table>
<thead>
<tr>
<th>BADGERS</th>
<th>BATS</th>
<th>DESIGNED WILDLIFE SITES</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GRASSLAND</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SCRUB</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MARSH</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ROADSIDES</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SAND DUNES</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SHINGLE</td>
<td></td>
<td></td>
</tr>
<tr>
<td>WASTE GROUND</td>
<td></td>
<td></td>
</tr>
<tr>
<td>WOODLAND</td>
<td></td>
<td></td>
</tr>
<tr>
<td>WATERCOURSES</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BUILDINGS</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- grassland
- scrub
- marsh
- roadsides
- sand dunes
- shingle
- waste ground
- woodland
- watercourses
- buildings

CONENTS

- Quick guide to potential ecological risks for different habitat/site types
- Badgers / Bats
- Birds / Reptiles / Amphibians
- Great Crested Newts / Water Voles
- Dormice / Otters
- Invertebrates / White-Clawed Crayfish / Trees
- Hedgerows / Plant Species / Designated Wildlife Sites
- Invasive Plant Species
- Air Pollution
- Noise
- Transport / Water
- Waste
- Contamination
BADGERS (Meles meles)

REASONS WHY BADGERS PRESENT AN ECOLOGICAL RISK

It is illegal, under UK law, to intentionally or recklessly interfere with a badger sett. A rough guide to what might, potentially, constitute interference is if the following equipment is used within the stated distances from an active badger sett:

- Heavy machinery within 30m;
- light machinery within 20m; or
- hand tools within 10m.

Guidance should be sought if you think there are badgers, or a badger sett, or on or near a site you are working on.

SIGNS TO LOOK OUT FOR

Badger setts are made up of one or more holes approximately 20cm in diameter. The holes are often wider than they are tall. Rabbits holes generally:

- have a diameter of 7-10 cm, are vertically aligned, and are more round. Large setts are sometimes located in a mound, with spoil heaps littered around, but they can also be found in dense vegetation or around tree roots.

Badger setts, on or near a site you are working on.

It is illegal, under UK law, to intentionally kill, injure or take badgers or intentionally (or recklessly in England and Wales) damage or destroy their roots (even if badgers are not occupying the root at the time). Pennines have been interpreted to mean any structure or place that is used by a bat for shelter or protection.

Bats will frequently feed along the edges of a woodland or near water and tend to use linear features such as hedgerows to navigate along.

Bats will emerge from roosts around dusk between April and October.

BATS (Vespertilionidae)

REASONS WHY BATS PRESENT AN ECOLOGICAL RISK

All UK bats are European Protected Species. It is illegal to intentionally kill, injure or take bats or intentionally (or recklessly in England and Wales) damage or destroy their roosts. Badger setts are made of one or more holes approximately 20cm in diameter. The holes are often wider than they are tall. Rabbits holes generally are more round. Large setts are sometimes located in a mound, with spoil heaps littered around, but they can also be found in dense vegetation or around tree roots.

A survey for bats should be undertaken before any works that might disturb potential roosts are undertaken. Bats are very mobile so even if there has been a bat survey in the last year, tree felling and demolition of buildings could require supervision by a bat expert as they are removed.

A licence from an appropriate regulatory body is required if someone is present to conduct a search of vegetation.

A survey for bats should be undertaken before any works that might disturb potential roosts are undertaken. Bats are very mobile so even if there has been a bat survey in the last year, tree felling and demolition of buildings could require supervision by a bat expert as they are removed.

A licence from an appropriate regulatory body is required if someone is present to conduct a search of vegetation.

SIGNS TO LOOK OUT FOR

Bats will emerge from roosts around dusk between April and October.

BIRDS (Aves)

REASONS WHY BIRDS PRESENT AN ECOLOGICAL RISK

It is illegal, under UK law, to kill, injure, take, damage or destroy birds’ eggs or nests. Certain bird species and their habitats have greater European protection.

SIGNS TO LOOK OUT FOR

Information that might help identify whether a site could contain reptiles:

- reptiles are normally active between March and October (they hibernate from November to February);
- they may be found under logs, discarded sheet metal, bits of carpet, wooden boards or roofing felt, or found basking on rubble piles/stones or on areas of hard standing;
- their preferred habitat is long grass or scrubby vegetation, often with denser areas for them to seek refuge in; and
- on hotter days (18°C and above) they are likely to be more active and therefore harder to see.

AMPHIBIANS

The native amphibian species in the UK include the common frog, the common toad, natterjack toad, pool frog, smooth newt, palmate newt and great crested newt. All amphibians have limited protection under UK law, from sale only. However, the natterjack toad, pool frog and great crested newt are European Protected Species.

Natterjack toads are rare, mainly confined to sand dunes and lowland, sandy heaths. The native pool frog is all but extinct in the UK. The great crested newt is much more prevalent and can range over a wide area.

VEGETATION:

A survey for bats should be undertaken before any works that might disturb potential roosts are undertaken. Bats are very mobile so even if there has been a bat survey in the last year, tree felling and demolition of buildings could require supervision by a bat expert as they are removed.

A licence from an appropriate regulatory body is required if someone is present to conduct a search of vegetation.

Information that might help identify whether a site could contain reptiles:

- reptiles are normally active between March and October (they hibernate from November to February);
- they may be found under logs, discarded sheet metal, bits of carpet, wooden boards or roofing felt, or found basking on rubble piles/stones or on areas of hard standing;
- their preferred habitat is long grass or scrubby vegetation, often with denser areas for them to seek refuge in; and
- on hotter days (18°C and above) they are likely to be more active and therefore harder to see.

AMPHIBIANS

The native amphibian species in the UK include the common frog, the common toad, natterjack toad, pool frog, smooth newt, palmate newt and great crested newt. All amphibians have limited protection under UK law, from sale only. However, the natterjack toad, pool frog and great crested newt are European Protected Species.

Natterjack toads are rare, mainly confined to sand dunes and lowland, sandy heaths. The native pool frog is all but extinct in the UK. The great crested newt is much more prevalent and can range over a wide area.
Suitable ponds and other water bodies are essential for great crested newts to breed. However, the majority of their lifecycle is spent on land, usually within 100m of a water body. Great crested newts and their habitats are protected by UK and European legislation, making it an offence to intentionally or recklessly disturb them or damage, destroy or obstruct habitats where they live and breed. Natural England guidance recommends that all water bodies within 500m of a development site should be surveyed for the presence or absence of great crested newts.

Signs that might indicate the presence of water voles include:
- significant numbers of invertebrates in the water
- non-polluted water — i.e. no oily sheen on the surface
- the presence of aquatic plants increases the likelihood of finding water voles
- no fish (fish eat newt eggs and larvae);
- several ponds in the same area;
- an absence, or small numbers, of wildfowl using the water body;
- long grass or vegetation all the way to the edge of a pond;
- large ponds (e.g. >5m in diameter) that are only partially shaded;
- water voles tend to get waterlogged fur and they swim much higher up in the water than rats do.

Information that may indicate the presence of dormice includes:
- they can be distinguished from other mice by their furry tail
- dropped hazelnuts with a neat, round hole with smooth edges nibbled in them (squirrels make jagged, uneven holes);
- they are more likely to be found in areas with fruiting trees, particularly hazel;
- dormice are now mainly restricted to southern England and they spend most of their time off the ground.

Suitable ponds and other water bodies are essential for great crested newts. However, the majority of their lifecycle is spent on land, usually within 100m of a water body. Great crested newts and their habitats are protected by UK and European legislation, making it an offence to intentionally or recklessly disturb them or damage, destroy or obstruct habitats where they live and breed.

Natural England guidance recommends that all water bodies within 500m of a development site should be surveyed for the presence or absence of great crested newts.

**WATER VOLES** *(Arvicola terrestris)*

**REASONS WHY WATER VOLES PRESENT AN ECOCLOGICAL RISK**

Under UK legislation it is illegal to damage, destroy or obstruct access to any structure or place that water voles use for shelter or protection, or to disturb water voles while they are using such a place. The actual water vole itself is not protected. It is the water vole's habitat that receives the protection.

Water voles live along suitable stretches of river and dig burrows into the bank. They generally do not range further than a few metres from the water's edge into the bank side vegetation.

**DORMICE** *(Muscardinus avellanarius)*

**REASONS WHY DORMICE PRESENT AN ECOCLOGICAL RISK**

The dormouse is a European Protected Species and is also protected by UK law. It is illegal to intentionally kill, injure, take, or trade a dormouse. It is also illegal to intentionally or recklessly disturb a dormouse whilst it is in a nest or hibernating, or to damage, destroy or obstruct habitats where they live and breed.

A licence from an appropriate regulatory body is required where disturbance of dormice or damage to their habitat is likely to occur.

**OTTERS** *(Lutra lutra)*

**REASONS WHY OTTERS PRESENT AN ECOCLOGICAL RISK**

In addition to protection under UK law, the otter is also a European Protected Species. It is therefore illegal to capture, disturb, injure or kill an otter. It is also illegal to damage or destroy an otter's breeding site or resting place.

Otters are found in rivers, streams, ditches, lakes, canals and coastal areas. They can inhabit stretches of water over 10 miles long. They make hovels, where they rest, in secluded areas close to riverbanks and other watercourses, often amongst tree roots or old building structures. Holls can be difficult to identify as the entrances are often underwater.

**GREAT CRESTED NEWTS** *(Triturus cristatus)*

**REASONS WHY GREAT CRESTED NEWTS PRESENT AN ECOCLOGICAL RISK**

Suitable ponds and other water bodies are essential for great crested newts to breed. However, the majority of their lifecycle is spent on land, usually within 100m of a water body. Great crested newts and their habitats are protected by UK and European legislation, making it an offence to intentionally or recklessly disturb them or damage, destroy or obstruct habitats where they live and breed.

Natural England guidance recommends that all water bodies within 500m of a development site should be surveyed for the presence or absence of great crested newts.

Signs that might indicate the presence of water voles include:
- water voles require quite steep banks by canals, ditches or slow flowing rivers;
- water vole droppings are 8 to 12 mm long, cylindrical with blunt ends and are usually green, but colour can vary between green and black; and
- water voles tend to get waterlogged fur and they swim much higher up in the water than rats do.

**SIGNS TO LOOK OUT FOR**

- water voles require quite steep banks by canals, ditches or slow flowing rivers;
- water vole droppings are 8 to 12 mm long, cylindrical with blunt ends and are usually green, but colour can vary between green and black; and
- water voles tend to get waterlogged fur and they swim much higher up in the water than rats do.

**SIGNS TO LOOK OUT FOR**

- water voles require quite steep banks by canals, ditches or slow flowing rivers;
- water vole droppings are 8 to 12 mm long, cylindrical with blunt ends and are usually green, but colour can vary between green and black; and
- water voles tend to get waterlogged fur and they swim much higher up in the water than rats do.

**SIGNS TO LOOK OUT FOR**

- water voles require quite steep banks by canals, ditches or slow flowing rivers;
- water vole droppings are 8 to 12 mm long, cylindrical with blunt ends and are usually green, but colour can vary between green and black; and
- water voles tend to get waterlogged fur and they swim much higher up in the water than rats do.

**SIGNS TO LOOK OUT FOR**

- water voles require quite steep banks by canals, ditches or slow flowing rivers;
- water vole droppings are 8 to 12 mm long, cylindrical with blunt ends and are usually green, but colour can vary between green and black; and
- water voles tend to get waterlogged fur and they swim much higher up in the water than rats do.

**SIGNS TO LOOK OUT FOR**

- water voles require quite steep banks by canals, ditches or slow flowing rivers;
- water vole droppings are 8 to 12 mm long, cylindrical with blunt ends and are usually green, but colour can vary between green and black; and
- water voles tend to get waterlogged fur and they swim much higher up in the water than rats do.
Invertebrates

**Reasons why invertebrates present an ecological risk**

Invertebrates include insects, worms, molluscs and marine and aquatic arthropods like crayfish and lobsters. Insects in particular are hugely important in most ecosystems as they are vital for plant pollination, decomposition of organic matter and are a food source for many birds, mammals and other animals.

There are a few species of invertebrates that are partially protected under UK legislation. However, these are rare and are usually only found within designated wildlife sites. It is important, therefore, to carry out invertebrate surveys on proposed development sites that border, or are close to designated wildlife sites where protected invertebrates might be found.

**White-clawed crayfish**

*White-clawed crayfish* (Austropotamobius pallipes)

**Reasons why white-clawed crayfish present an ecological risk**

The white-clawed crayfish is the only crayfish in the UK protected by both UK and European legislation. A licence is required to trap them, the aim of which is to prevent commercial harvesting. White-clawed crayfish habitat is often protected indirectly through other legislation and local authorities may consider white-clawed crayfish when determining planning applications.

White-clawed crayfish are found in slow flowing fresh water streams/rivers, often with boulders and other suitable features that can provide them with shelter.

**Trees**

**Reasons why some trees present an ecological risk**

Trees may have Tree Preservation Orders (TPOs) on them that protect them from being felled or damaged. Damage can be caused by placing heavy objects or construction plant close to trees. Placing even a few inches of soil or rubble on top of tree roots in the area under the canopy can suffocate roots and kill a tree.

It is important to check with the tree officer at the local council if any trees or groups of trees are within a conservation area and/or protected by Tree Preservation Orders. If a site contains a number of mature trees it should be surveyed by an arboriculturalist.

Trees can provide habitat for wildlife, including protected species such as bats and nesting birds. They are also a valuable amenity resource. Efforts should be made to retain mature trees within development proposals.

**Hedgerows**

**Reasons why hedgerows present an ecological risk**

Planning authorities may consider species rich or ancient hedgerows when granting planning permission. The UK legislation aims to prevent the damage or destruction of such hedgerows. However, by their very nature, they can be trimmed or maintained without approval.

Some hedgerows can be removed. However, the following must be considered before such works take place:

- the relevant local authority should receive notice from the owner of the hedgerow of plans to damage it;
- the local authority should supply written notice to the relevant person stating that the hedgerow can be removed through a hedgerow removal notice; and
- removal should be carried out in accordance with the hedgerow removal notice and should be done within two years of its service.

**Signs to look out for**

The bulleted points below summarise some of the features that can indicate that a hedgerow might be valuable and/or protected:

- hedgerows that are longer than 20m, or are less than 20m but meet another hedgerow at each end; and
- hedgerows that are more than 30 years old.

**Plants**

**Reasons why some plant species present an ecological risk**

In the UK, nine plant species are protected under European legislation, and a further 185 plant species are protected under UK legislation. However, all of these species are very rare, and are unlikely to be found on development sites unless they are near designated wildlife sites where populations are known to exist. It is therefore important to liaise with local ecological stakeholders if a proposed development site is close to such habitat.

**Designated wildlife sites**

**Reasons why designated wildlife sites present an ecological risk**

The habitats on the following list of sites designations are classified as statutory wildlife sites:

- Ramsar Sites (international designation);
- Special Protection Areas (SPAs) (European designation);
- Special Areas of Conservation (SACs) (European designation);
- SSSIs (national designation);
- National Nature Reserves (NNRs) (national designation);
- Areas of Outstanding Natural Beauty (AONBs) (national designation); and
- Local Nature Reserves (LNR) (local authority designation).

Natural England has to be consulted for proposed developments within SSSIs (or International sites) or within a consultation area that can be within a 500m to 2km radius from a SSSI (or International sites).

As part of the planning process for a proposed development, a search should be carried out to determine if there are any wildlife sites nearby that could be affected by the construction and/or operation of the development.
INVASIVE PLANT SPECIES

REASONS WHY INVASIVE PLANT SPECIES PRESENT AN ECOLOGICAL RISK

There are a number of non-native plant species that have been introduced to the UK that can invade sites to the detriment of biodiversity. A number of plants are specified in legislation that makes it illegal to allow them to grow in the wild. Case law shows that this can mean that a land owner who allows an invasive plant to spread from their site onto that of their neighbour could be guilty of an offence.

The main invasive, introduced plant species that are likely to be encountered on or close to a development site include the following:

• Japanese knotweed (Fallopia japonica);
• giant hogweed;
• Himalayan balsam; and
• rhododendron.

If significant standing water is within, or close to, a development site, the following invasive, aquatic plants might also present a risk:

• New Zealand pygmyweed; and
• floating pennywort.

SIGNS TO LOOK OUT FOR

Japanese knotweed (Fallopia japonica)

• Can grow 3m tall in one season and has large, shield-shaped leaves. Produces spikes of small white flowers around September/October. Above ground growth dies back over winter leaving dead, bamboo-like stems, before sending up new shoots from large, red buds the following spring.

Giant hogweed (Heracleum sphondylium)

• Is a very large Apiales, which looks like carrot or cow parsley. It can grow 3-5.5m tall, often along the banks of the river. It flowers from late spring to early summer. It has dark reddish-purple pigments on its stem and spotted leaf stalks that are hollow and produce sturdy bristles. The stem varies from 3-8cm in diameter, sometimes 10cm. The leaves are spiky and can be 1.5m across.

Himalayan balsam (Impatiens glandulifera)

• Is a summer annual that can grow 3m tall, mainly along river banks and ditches. It has smooth, hollow stems with no hairs. The flowers are very pretty, bell-shaped and lipped and loosely resemble those of foxgloves in shape and colour. They vary from pale pink to purple and appear from June to October.

New Zealand pygmyweed (Crassula helmsii)

• Is an aquatic or semi aquatic plant. The plant is very small but forms dense mats on standing water. The leaves are 2cm long and about 0.5cm wide.

Rhododendron (Ponticum)

• Can grow 5m tall and has a woody stem. The leaves are dark green and very shiny with a thick waxy cover. The leaves are 6-18cm long and 2-5cm wide. The flowers are red-purple and are formed in clusters.

Floating pennywort (Hydrocotyle ranunculoides)

• Grows along riverbanks and out across open freshwater. It has deep green kidney shaped leaves 2-8cm in diameter. It forms dense mats on water bodies growing in from the banks.

NATIVE SPECIES LISTED IN UK LEGISLATION TO PREVENT THEIR SPREAD.

Common ragwort (Senecio Jacobaea)

• Is poisonous to livestock. The flowering stalk is often 0.3-1m tall and produces yellow, daisy like-flowers between June to November.

AIR POLLUTION

Air pollutants affecting air quality, such as dust, odour, smoke and fumes, are regulated by several pieces of UK legislation. These include, but are not limited to:

• nuisance effects (dust and odour);
• ambient concentration limits; and
• limits on emission rates from industrial and transport sources.

WHAT ARE THE MAIN AIR POLLUTION SOURCES?

Dust is airborne solid matter up to about 2mm in size, sources include:

• wind blowing over dry bare ground, including hail load;
• wind blowing over stores of fine material (eg sand, soil); and
• loading or unloading of fine dry material/earth moving operations.

Odours or fumes are caused by the release of volatile chemicals from:

• fuel tanks;
• vehicle exhausts; and
• remediation of sites.

REASONS WHY AIR QUALITY CAN CAUSE NUISIBLES:

Neighbours: simple things like residents having to rewash clothes, cars and windows will annoy them and cause complaints. Dust and odours may also cause eye irritation and asthma. Toxic volatile chemicals can cause breathing problems and serious adverse health effects.

Farmers: claims may arise due to dust affecting plant and fruit crops.

Ecology: dust blown into water courses can affect aquatic life, and trees may drop their leaves up to two months early if they are covered in dust.

Plant and equipment: dust can clog filters and cause mechanical/electrical faults to equipment.
CONTROL MEASURES:
• ensure plant keeps to designated haul routes;
• ensure fumes from exhaust are directed upwards and not into the ground;
• maintain speed limits on site;
• in dry conditions damper bare ground, fine stores, haul routes, as appropriate;
• reduce drop height of hoppers and loads from lorries;
• cover stores of fine materials;
• use enclosed chutes during demolition;
• if materials are moved ensure that they are covered;
• ensure all vehicles and equipment are regularly maintained;
• ensure silencers are fitted to exhausts;
• ensure engine compartments are closed while plant is running;
• use noise protection measures when necessary/legally required;
• reduce noise impacts at certain times of the day;
• review operations and use the appropriate equipment or methods that create minimum noise/vibration, where practical;
• reduce noise emissions at source or reduced to a minimum.

NOISE
Noise and vibration is covered by UK legislation, including nuisance issues. Noise levels can be agreed with the council for proposed works through agreements, prior to works commencing.

REASONS NOISE CAN CAUSE NUISIBLES:
Noise emissions must be eliminated at source or reduced to a minimum. When risks cannot be prevented, individual hearing protection must be made available. Noise exposure should be assessed at the point where workers are, or for neighbours on site boundaries.

Noise and vibration can be transmitted large distances and though materials and therefore operatives need to be aware of the potential impacts their work could be having off-site.

TRANSPORT
Transport impacts are generated by most sites and are generally caused by: the movement of plant on site; the transport of staff to and from site; delivery of supplies; and the removal of waste/products.

The legislation covering transport issues is varied depending on the issues. Environmental issues covered by legislation include, but are not limited to: waste carrier licences; emission rates; and nuisance issues, such as dust and noise/vibration impacts.

CONTROL MEASURES
Deliveries and removers:
• ensure all staff are aware of the site parking rules/areas;
• programme delivery and removal routes, and times, as necessary, taking into account the local issues;
• ensure all waste and muck-away lorries are sheeted when leaving site;
• position toilets away from residential areas;
• cover containers for odorous wastes – vegetation etc and plan odorous activities – digging out contamination etc –
• provide, or promote, alternative staff transport such as minibus, car share, bicycles;
• arrange deliveries at certain times of the day as appropriate for the site and area;
• ensure that drivers adhere to the site speed limit.

WATER
Watercourses, water abstractions and discharges to watercourses/sewers are covered by UK legislation, and sections are also covered by European legislation. Prior to any works on-site it is important to identify any water courses on or near the site and establish any specific water controls in the area.

WATER ISSUES
Silt entering watercourses can prevent light penetration and cover aquatic plants preventing them from photosynthesising. Silt can also clog up the gills of aquatic animals. Certain chemicals including hydrocarbons such as oil, can travel vast distances in water affecting aquatic organisms and potentially affecting drinking water abstractions.

On-site:
• provide designated and clearly marked haul routes on-site;
• provide designated walkways on and around site;
• ensure that exhausts, of site plant, do not discharge directly at the ground, as this could generate dust which could cause nuisance issues on or off-site;
• ensure all plant and vehicles are in good working order, to reduce dust, vibration and/or noise issues;
• wash out concrete lorries in a designated area;
• all engines to be switched off whilst waiting on-site and ensure that drivers adhere to the site speed limit.

Noise and vibration can be transmitted large distances and through materials and therefore operatives need to be aware of the potential impacts their work could be having off-site.
WASTE

WASTE ISSUES
Waste needs to be appropriately stored and segregated. Waste skips should be covered, in order to prevent the potential of waste material being blown off site. Food waste should be sealed in order to prevent the potential for rodents on site. The storage, treatment and removal of waste on-site is covered by several pieces of UK and European legislation.

CONTROL MEASURES:
• create a waste management plan for the site and ensure that it is implemented and monitored.

Waste storage:
• segregate and appropriately store all waste;
• label waste containers with the types of waste they can receive;
• do not mix hazardous and non-hazardous waste;
• avoid mixing hazardous waste types;
• seal food waste;
• cover waste skips to prevent waste being blown across site; and
• ensure there is no wind-blown litter or debris.

Waste removal:
• ensure all waste is removed in accordance with the Duty of Care;
• ensure transfer notes/consignment notes are appropriately filled in with description of the waste and appropriate waste codes;
• ensure waste facility is appropriately licensed;
• ensure waste haulier is appropriately licensed;
• ensure transfer notes/consignment notes are kept for the appropriate period.

CONTOAMINATION
CONTOAMINATION ISSUES
An appropriate ground investigation should be undertaken at all development sites. Assessment needs to comply with current UK guidance, including identification of the Sources, Pathways and Receptors present. If necessary, a remediation plan should be agreed with the local authority or appropriate body. Ensure appropriate permits are in place for any remedial works. Monitoring of the ground, water and gases may be required as part of the remediation plan for the site.

Prior to any excavation, services plans of the site need to be reviewed. Even if services are not marked on the site, the excavation area should be regularly scanned, e.g. with a Cable Avoidance Tool (CAT) as necessary. A geophysical survey of the site may be required prior to any excavation works to identify buried structures, such as services or tanks. In certain areas an unexploded ordnance (UXO) report and/or watching brief by a UXO engineer may be required.

During any excavation work it is important to continually assess the ground for signs of contamination.

Visual Signs:
• buried material (e.g. waste items, asbestos fibrous material);
• made ground (in-filled material and mounds);
• burned areas;
• discarded soil (e.g. chemical residues, hydrocarbons stains, cyanide oxides “blue billy”);
• odours (e.g. hydrocarbons, hydrogen sulphide “rotten eggs”);
• buried structures, tanks and drains; and
• unplanned ordinance.

ARCHAEOLOGY
KEY ISSUES
Certain archaeological and built heritage structures and areas have varying degrees of protection internationally and in the UK. Some sites are internationally protected as World Heritage Sites, such as Stonehenge. Most of these sites will also have national protection as Scheduled Ancient Monuments.

UK protection includes, but is not limited to: Scheduled Ancient Monuments; listed buildings; registered parks and gardens; registered historic battle fields; protected wrecks sites, and conservation areas.

VISUAL SIGNS:
During site survey:
• changes in ground level (e.g. mounds, dips); and
• presence of buildings/walls.

During excavation work:
• in-filled areas/ditches; post holes;
• burned material;
• buried foundations such as brick or stone;
• manmade items such as brick, tile, pottery or glass fragments;
• coins and other metal items; and
• human or animal remains such as bone fragments or skatations.

If archaeological finds are discovered on site, then stop work immediately, protect the find, and contact an archaeologist.

If known archaeological or built heritage sites are present on site, ensure they are protected. This will often also include protecting a buffer area around them. An archaeological watching brief may be required when working inside these buffer areas.
<table>
<thead>
<tr>
<th>SURVEY TIMES FOR ECOLOGICAL SPECIES</th>
<th>JAN</th>
<th>FEB</th>
<th>MAR</th>
<th>APR</th>
<th>MAY</th>
<th>JUN</th>
<th>JUL</th>
<th>AUG</th>
<th>SEP</th>
<th>OCT</th>
<th>NOV</th>
<th>DEC</th>
</tr>
</thead>
<tbody>
<tr>
<td>HABITATS/ VEGETATION</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Phase 1 and NVC</td>
<td>Phase 1 and National Vegetation Classification (NVC)</td>
<td>Phase 1 and NVC</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BIRDS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wintering bird surveys</td>
<td>Breeding bird and migrant species</td>
<td>Breeding Bird Surveys</td>
<td>Low activity - breeding bird species</td>
<td>Surveys of migrant bird species</td>
<td>Wintering bird surveys</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BADGER</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Limited sett/bait surveys</td>
<td>Bait marking and sett surveys</td>
<td>Limited bait marking and sett surveys</td>
<td>Sett surveys</td>
<td>Limited sett/bait surveys</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BAT</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inspection of hibernation roosts</td>
<td>Limited activity</td>
<td>Summer roosts, emergence (dawn &amp; dusk) activity surveys</td>
<td>Limited activity</td>
<td>Inspection of hibernation roosts</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Surveys of potential roosts, and internal surveys of buildings/structures are possible all year round</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DORMOUSE (NEST BOX &amp; TUBES)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nest box and nest tube surveys</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DORMOUSE (HAZELNUT SEARCH)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gnawed hazel nut search</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OTTERS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Surveys can be conducted all year round. Survey limited by vegetation cover and weather conditions</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>WATER VOLES</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Initial habitat survey</td>
<td>Survey for habitat and field signs. Surveys for water vole activity may be limited by vegetation cover and weather</td>
<td>Initial habitat survey</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>REPTILES</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reptiles hibernating</td>
<td>Limited activity - lower effectiveness of refugia</td>
<td>Peak survey months - natural and artificial refugia searches</td>
<td>Warmer weather resulting in reduced basking time and lower effectiveness of refugia</td>
<td>Peak survey month - refugia searches</td>
<td>Limited activity - lower effectiveness of refugia</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GREAT CRESTED NEWTS (AQUATIC)</td>
<td>Newts hibernating on land</td>
<td>Limited activity</td>
<td>Netting, bottle trap, torching, surveys for adults - egg searches from mid-May survey for larvae</td>
<td>Netting, bottle trap, torching, egg &amp; larvae surveys</td>
<td>Newts hibernating on land</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GREAT CRESTED NEWTS (TERRESTRIAL)</td>
<td>Newts hibernating</td>
<td>Limited activity</td>
<td>Search of natural refugia</td>
<td>Search of natural refugia</td>
<td>Newts hibernating</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NATTERJACK TOADS</td>
<td>Toads hibernating</td>
<td>Pond survey for adults, terrestrial survey &amp; egg surveys April to mid-June. Larvae surveys from mid-May</td>
<td>Survey for adults on land</td>
<td>Toads hibernating</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>WHITE-CLAWED CRAYFISH</td>
<td>Reduced activity</td>
<td>Hand, search, torchlight trapping</td>
<td>Breeding period - torchlight survey only</td>
<td>Substrate search by hand. Torchlight and trapping surveys</td>
<td>Reduced activity</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>STAG BEETLES</td>
<td>Underground</td>
<td>Above ground</td>
<td>Underground</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**KEY:**
- [ ] Survey optimal
- [ ] Survey sub-optimal
- [ ] Survey not possible

**SURVEY PERIOD:**
- HABITAT SURVEYS: Provided the habitat has not been significantly altered then habitat surveys need to be reviewed every one to three years.
- PROTECTED SPECIES: Most protected species surveys need to be repeated each year.
- BAT SURVEYS: As bats are very mobile, demolition of building/structures, or felling of trees, should be carried out within a week of a bat survey stating that there are no signs of bats there.
The survey and mitigation timings provided are given as a guide only and may vary depending on the specific circumstances. We recommend that if you wish to discuss survey and mitigation times and options for your particular site you contact Phlorum Ltd.

<table>
<thead>
<tr>
<th>MITIGATION OF SPECIES</th>
<th>JAN</th>
<th>FEB</th>
<th>MAR</th>
<th>APR</th>
<th>MAY</th>
<th>JUN</th>
<th>JUL</th>
<th>AUG</th>
<th>SEP</th>
<th>OCT</th>
<th>NOV</th>
<th>DEC</th>
</tr>
</thead>
<tbody>
<tr>
<td>BADGERS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>No disturbance to existing setts/building of artificial setts only</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Stopping up/destruction of existing setts</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Same as Jan-June</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BATS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Works on maternity roosts only</td>
<td>Works on hibernation roosts only</td>
<td>Works on maternity roosts only</td>
</tr>
<tr>
<td>GREAT CRESTED NEWTS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Pond management only (hibernation)</td>
<td>Trapping/exclusion</td>
<td>Trapping/exclusion</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Capture and translocation programmes</td>
<td>Capture and translocation programmes</td>
<td>Capture and translocation programmes</td>
</tr>
<tr>
<td>REPTILES</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Aboveground shrub clearance only (hibernation)</td>
<td>Aboveground shrub clearance only (hibernation)</td>
<td>Aboveground shrub clearance only (hibernation)</td>
</tr>
<tr>
<td>WATER VOLE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Avoid works in habitat</td>
<td>Avoid works in habitat</td>
<td>Avoid all works in habitat</td>
</tr>
<tr>
<td>CLEARANCE TO AVOID BREEDING BIRDS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Clearance</td>
<td>Avoid clearance/construction works as birds nesting</td>
<td>Clearance</td>
</tr>
<tr>
<td>HABITATS/VEGETATION</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Planting &amp; translocation</td>
<td>Sub-optimal</td>
<td>Sub-optimal</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Planting and translocation not recommended for the majority of larger species</td>
<td>Planting and translocation</td>
<td></td>
</tr>
<tr>
<td>DORMICE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Avoid ground vegetation clearance</td>
<td>Capture &amp; release &amp; stump and root clearance</td>
<td>Capture only</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Capture &amp; release &amp; stump and root clearance</td>
<td>Aboveground vegetation clearance</td>
<td></td>
</tr>
<tr>
<td>WHITE-CLAWED CRAYFISH</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Avoid capture programme</td>
<td>As Jul-Oct</td>
<td>Avoid capture programmes</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Capture and exclusion from construction areas</td>
<td>Avoid capture programmes</td>
<td></td>
</tr>
<tr>
<td>OTTERS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>No seasonal constraints but likely to be restricted where otters are breeding</td>
<td></td>
</tr>
</tbody>
</table>

KEY: Mitigation possible | Mitigation restricted | Mitigation not possible
While Phlorum has prepared this document with care and diligence, this document does not constitute advice and Phlorum cannot accept responsibility for any loss which might arise from reliance on the information in this document or any damage which may be caused. The information has not been written to meet your individual requirements. However, we recommend that if you wish to discuss further how construction activities and environmental legislation could impact on your particular site you contact Phlorum Ltd.