Table 19.8: Likely significant effects resulting from construction, considered for each Important Ecological Feature

IEF: Deciduous woodland (includes Priority Habitat)
Potential effect:
1. Habitat loss/damage 2. Habitat degradation
Proposed development activity:
The construction phase will focus on site preparation works, including the felling of plantation and deciduous woodland habitat (P1, P3 and part of DW1) to facilitate the first phase of works and removal of associated vegetation cover (including within extraction cells 1 to 10), formation of access infrastructure, establishment of the weighbridge, site office and staff welfare facilities, and construction of the CMRF and water storage and silt settlement lagoon. During site preparation c.3.03ha of plantation and deciduous woodland, and their component scrub and grassland will be removed. Access works during the construction stage are expected to focus on the layby on Loxwood Road, formation of access and turning head within the extraction site, and formation of two passing places within plantation woodland along the access route, each measuring approximately 7.5m in width and 20m in length.
Characterisation of impact, taking account of embedded mitigation:
Partial removal of high-quality deciduous woodland (Priority Habitat) during the construction phase represents a minor magnitude (relative to the operation phase) negative impact. The impact will occur during the short term (1—2yrs) but the effect is a permanent reduction in the available extent of deciduous woodland in this location. The impact is irreversible and is of significance at the Local level. Formation of a parking area in Pephurst Wood (Ancient Woodland) close to the Loxwood Road layby will be contained within an existing concrete foundation and is not expected to result in physical damage to the woodland. The following boundary features will, however, be retained and protected for the duration of development as part of the embedded mitigation which will provide some continuity of habitat resource availability: deciduous woodland at the north, west, and east boundaries. Potential damage to and degradation of these retained features as a result of mechanical damage to tree and shrub root systems, pollution, dust, soil compaction and local alterations to hydrology, will be avoided through implementation of a 10m buffer zone and by best practice techniques within the CEMP, including: - Tree protection fencing - Restrictions on the operation of heavy plant required for construction to within the footprint of the proposed new access track into the development site
Scale of effect:

Minor negative effect at the Local level

Cumulative effects:

None – no other approved or potential developments are expected to affect the Site's deciduous woodland

Additional mitigation required, including means of securing implementation:

A habitat mitigation and enhancement strategy will be prepared with the objective of translocating or re-creating deciduous woodland habitat features of greatest potential value to locations outside of the Proposed Development Site boundary but on land within the applicant's control. The main elements of the mitigation strategy during the construction phase will include:

- Approximately 1.0ha of conifer plantation within compartment 37a, and c.1.8ha of conifer plantation within compartment 29b, which are outside the Proposed Development Site boundary but within the applicant's control, will be converted to semi-natural deciduous woodland.
- Conifers will be removed and deciduous woodland will be allowed to develop through natural regeneration, supplemented where appropriate with materials (smaller trees (<c.150mm dbh), shrubs and soils, including field layer flora) translocated from the extraction site which cannot be accommodated on site in the construction phase.
- Deadwood habitats, where present in the construction phase footprint, will be removed and repositioned within compartment 31, which is outside the Proposed Development Site but within the applicant's control.
- A management prescription of selective thinning and subsequent rotational coppicing will be implemented within existing deciduous woodland to benefit the field layer flora within compartments 31 and parts of 36 and 42, which are outside the Proposed Development Site but within the applicant's control.

The mitigation strategy will form part of the LEMP and can be secured via an appropriately worded planning condition.

Significance of residual effect:

Long term to permanent Negligible negative effect within the Site on habitat structure and species composition of importance at the Local level

IEF: Deciduous plantation (includes Ancient Replanted Woodland)

Potential effect:

1. Habitat loss/damage
2. Habitat degradation

Proposed development activity:

The construction phase will focus on site preparation works, including the felling of plantation and deciduous plantation habitat (P1, P3 and part of DW1) to facilitate the first phase of works and removal of associated vegetation cover (including within extraction cells 1 to 10), formation of access infrastructure, establishment of the weighbridge, site office and staff welfare facilities, and construction of the CMRF and water storage and silt settlement lagoon. During site preparation c.3.03ha of plantation and deciduous plantation, and their component scrub and grassland will be removed. The CMRF will be constructed in the north-west corner of the extraction site within the 50m buffer around the Ancient Replanted Woodland (but outside the 15m buffer) and will comprise a prefabricated shell on shallow foundations. Access works during the construction stage are expected to focus on the layby on Loxwood Road, formation of access and turning head within the extraction site, and formation of two passing places within plantation woodland along the access route, each measuring approximately 7.5m in width and 20m in length.

Characterisation of impact, taking account of embedded mitigation:

Partial removal of moderate-quality deciduous plantation during the construction phase represents a moderate magnitude (relative to the operation phase) negative impact resulting in a permanent reduction in the available extent of deciduous plantation habitat during the short term (1—2yrs). The impact is of significance at the Local level. This loss of structure and function is reversible during Site restoration, however, the effect on ground flora richness will be more difficult to reverse within the Site. None of the Ancient Replanted Woodland adjacent to the extraction site will be directly affected. The formation of two passing places, each measuring approximately 7.5m in width and 20m in length, within plantation woodland along the access route is unlikely to result in any significant habitat damage. The easternmost of these falls within Ancient Replanted Woodland but is within coniferous plantation (not an IEF) and both passing places have been sited to avoid impacts on mature trees.

The following boundary features will be retained and protected for the duration of development as part of the embedded mitigation which will provide some continuity of habitat resource availability: Ancient Replanted Woodland at the north-west corner. Potential damage to and degradation of this retained feature as a result of mechanical damage to tree and shrub root systems, pollution, dust, soil compaction and local alterations to hydrology, will be avoided through implementation of the 15m buffer zone and by best practice techniques within the CEMP, including:

- Tree protection fencing
- Restrictions on the operation of heavy plant required for construction to within the footprint of construction works

Scale of effect:

Moderate negative effect at the Local level

Cumulative effects:

None – no other approved or potential developments are expected to affect the Site's plantation woodland

Additional mitigation required, including means of securing implementation:

A habitat mitigation and enhancement strategy will be prepared with the objective of translocating or re-creating deciduous woodland habitat features of greatest potential value to locations outside of the Proposed Development Site boundary but on land within the applicant's control. The main elements of the mitigation strategy during the construction phase will include:

- Approximately 1.0ha of conifer plantation within compartment 37a, and c.1.8ha of conifer plantation within compartment 29b, which are outside the Proposed Development Site boundary but within the applicant's control, will be converted to semi-natural deciduous woodland.
- Conifers will be removed and deciduous woodland will be allowed to develop through natural regeneration, supplemented where appropriate with materials (smaller trees (<c.150mm dbh), shrubs and soils, including field layer flora) translocated from the extraction site which cannot be accommodated on site in the construction phase.
- A management prescription of selective thinning and subsequent rotational coppicing will be implemented within existing deciduous plantation within compartment 25 and/or 34, which are outside the Proposed Development Site but within the applicant's control, to maintain and extend the area of open mosaic habitats of coarse grassland, scrub and trees.

The mitigation strategy will form part of the LEMP and can be secured via an appropriately worded planning condition.

Significance of residual effect:

Medium to long term minor negative effect on habitat extent, structure and function at the Local level, permanent negative effect on species composition

IEF: Stream

Potential effect:

Habitat degradation: pollution

Proposed development activity:

Access works during the construction stage are expected to focus on the layby on Loxwood Road and formation of access and turning head within the extraction site. The formation of two passing places, each measuring approximately 7.5m in width and 20m in length, within plantation woodland along the access route is unlikely to result in any significant risk of pollution to the stream. The weighbridge, site office and staff welfare facilities are to be accommodated in portacabins at the north-western corner of the extraction site. The CMRF will also be constructed in the north-west corner and will comprise a prefabricated shell on shallow foundations. None of these works are in the immediate vicinity of the woodland stream. However, in order to facilitate the movement of HGVs to and from the extraction site, a replacement bridge over the woodland stream will be installed over a new box culvert. The bridge will be constructed with a maximum internal width of 6m and maximum internal height of 3m. The access road over the bridge will be 6m wide and approach ramps will constructed on either side at a 1 in 10 gradient.

Characterisation of impact, taking account of embedded mitigation:

The surrounding area of the Site is characterised by surface water drains and channels through the woodland with the exception of a deep valley containing an unnamed drain to the west of the Site. The drainage channels were considered by Caulmert[9] (2020) to be ephemeral with no flow during the dry summer months. Two discharge points from the extraction site were noted. The first is a culvert beneath the track to the south of the site which was dry at the time of survey and discharges into a channel through the woodland to the south before eventually connecting with the stream upstream (east) of its crossing of the access route. The second is a culvert on the western boundary which discharges into a channel, also mainly dry during the survey and flowing south-west. It eventually joins the stream at a confluence located approximately 535m downstream to the south-west of the Site. Although this is a direct hydrological connection between the extraction site and the stream, the distance from the site and influence of overland flows and other drains also discharging into the stream dilutes the connection.

During the construction phase there is a short-duration minor risk of sedimentation or pollutants reaching the Site's southern or western discharge, potentially resulting in toxic effects to plants and aquatic organisms within the stream. However, the likelihood of this significantly affecting biophysical conditions within the stream is considered to be low to moderate and limited to during site clearance and construction phase activities given the relatively long distance hydrological connection, especially via the western discharge. Furthermore, the short-duration minor risk will be prevented through the implementation of embedded mitigation including the CEMP and surface water storage and silt settling lagoon.

Works to construct the new bridge and approach ramps, including land re-profiling, installation of a new box culvert and formation of the bridge deck, will result in a short-term, temporary risk of pollution impacts to the stream, including via sedimentation and pollution from chemicals and concrete pouring. The effects of such an impact may include smothering of downstream in-channel vegetation or biochemical changes in water quality. This would constitute a minor magnitude, short-term impact of significance at the Local level, but would be largely be prevented by embedded mitigation in the form of a CEMP.

Scale of effect:

Minor negative effect at the Local level, short-term

Cumulative effects:

None – no other approved or potential developments are expected to affect the stream

Additional mitigation required, including means of securing implementation:

In order to further reduce the likelihood of significant impacts, bridge components will if possible be prefabricated off-site, including the box culvert and bridge deck. This will reduce the need for concrete pouring in-situ.

Significance of residual effect:

[9] Caulmert Ltd (2020): *Loxwood Clay Pit Development: Chapter 10: Water*.

Negligible negative effect at the Local level, short-term

IEF: Species-poor hedgerows H1/H2 (Priority Habitat, Hedgerow Regulations Important)

Potential effect:

Habitat degradation: pollution

Proposed development activity:

No construction phase works are specifically planned to take place adjacent to hedgerows H1/H2. Traffic movements associated with the development are not expected to exceed 42 daily movements (21 in and 21 out) but this maximum level is not expected to occur until the operation phase.

Characterisation of impact, taking account of embedded mitigation:

The double hedgerow H1/H2 is located alongside the proposed access route at 505560, 131965 where the track passes through grazing pasture between the east and west woodland blocks (Pephurst and Hurst Woods). The total length of both hedgerows is approx. 125m and the distance between the hedgerows is approx. 10m. The width of the track is approx. 4m with the remainder formed of semi-improved grassland verge inside the hedge lines. The hedgerows themselves are species-poor being dominated by blackthorn *Prunus spinosa* with occasional willow *Salix sp*. and rose *Rosa sp*. and rarely holly *Ilex aquifolium*. The northern hedgerow includes some goat willow *Salix caprea* trees. Both hedgerows appeared to be regularly cut and were considered to be of Site level importance, notwithstanding their status as Priority Habitat and Hedgerow Regulations Important. The ground flora associated with hedgerows and grass verge is also species-poor, containing common and widespread species such as rough meadow grass *Poa trivialis*, Yorkshire fog *Holcus lanatus*, common bent *Agrostis capillaris*, perennial rye grass *Lolium perenne*, creeping buttercup *Ranunculus repens*, cinquefoil *Potentilla sp*. and cuckoo flower *Cardamine pratensis* with a prominent ruderal element, including broadleaved dock *Rumex obtusifolius*, creeping thistle *Cirsium arvense*, nettle *Urtica dioica* and cleavers *Galium aparine.*

There is a theoretical risk of traffic caused dust pollution smothering the vegetation adjacent to the track but during the construction phase the effect is expected to be negligible and of short duration.

Scale of effect:

No significant effect

Cumulative effects:

n/a

Additional mitigation required, including means of securing implementation:

n/a

Significance of residual effect:

No significant effect

IEF: Ponds P13, P14, P14a, P15

Potential effect:

Habitat degradation: pollution

Proposed development activity:

No construction phase works are specifically planned to take place adjacent to ponds P13/P14/P14a/P15. Traffic movements associated with the development are not expected to exceed 42 daily movements (21 in and 21 out) but this maximum level is not expected to occur until the operation phase.

Characterisation of impact, taking account of embedded mitigation:

Ponds P13, P14, P14a, P15 lie close to the existing forestry track which will form the access route for development; P13 and P14 are c.5m from the track edge, P14a and P15 are slightly further back at c.15m. P14/P14a/P15 form a group within Pephurst Wood and are similar in character, being small, mostly shallow, often sinuous woodland ponds under heavy shade and with little or no submerged or emergent vegetation. P13 at the south-east corner of Hurst Wood is also small and shaded from the north and west but more open to the south and east where the more open conditions have allowed some aquatic and marginal vegetation, including water starwort *Callitriche sp*. and flote grass *Glyceria fluitans.* None of the four ponds were found to support great crested newt or other species of principal importance, but all four supported populations of smooth and palmate newt (which are protected against trade under the WCA).

During the construction phase there is a theoretical risk of traffic caused dust or pollutants reaching ponds P13/P14/P14a/P15, potentially resulting in toxic effects to plants and aquatic organisms, but the impact is expected to be negligible and of short duration.

Scale of effect:

No significant effect

Cumulative effects:

n/a

Additional mitigation required, including means of securing implementation:

n/a

Significance of residual effect:

No significant effect

IEF: Breeding birds (including six Red/Amber list species and four species of principal importance)

Potential effect:

1. Habitat loss/damage
2. Habitat degradation
3. Killing/injury of animals, including destruction/damage to active nests
4. Displacement of animals, including disturbance to active nests

Proposed development activity:

The construction phase will focus on site preparation works, including the felling of plantation and deciduous woodland habitat (P1, P3 and part of DW1) to facilitate the first phase of works and removal of associated vegetation cover (including within extraction cells 1 to 10), formation of access infrastructure, establishment of the weighbridge, site office and staff welfare facilities, and construction of the CMRF and water storage and silt settlement lagoon. During site preparation c.3.03ha of plantation and deciduous woodland, and their component scrub and grassland will be removed. Access works during the construction stage are expected to focus on the layby on Loxwood Road, formation of access and turning head within the extraction site, and formation of two passing places within plantation woodland along the access route, each measuring approximately 7.5m in width and 20m in length.

Characterisation of impact, taking account of embedded mitigation:

Partial removal of c.3.03ha of deciduous woodland and broadleaved plantation habitats will reduce the availability of both habitats for breeding birds within the extraction site. The impact will take place over the short term (1 to 2 years). The effect on breeding birds of the loss of deciduous woodland – which will be a reduction in the number of breeding territories – is irreversible and is of significance at the Local level. The effect on breeding birds of the loss of broadleaved plantation will continue over the medium term and is also of significance at the Local level, but is reversible during restoration.

Potential damage to and degradation of adjacent retained features as a result of mechanical damage to tree and shrub root systems, pollution, dust, soil compaction and local alterations to hydrology, will be avoided through implementation of best practice techniques within the CEMP.

Risk of killing and injuring birds and of damaging or disturbing active nests (which is unlawful under the WCA) will be avoided by removing vegetation outside the bird breeding season of March to August inclusive, which will be specified in the CEMP.

Disturbance to breeding birds from construction activities, including people and vehicle movements, noise and vibration, within the extraction site and along the proposed access route has the potential to cause reductions in breeding bird territory occupancy and density in adjacent areas and loss of some breeding species.

The combined effects of habitat loss and disturbance will result in a reduction in breeding territories, and potential loss of some breeding species, including Red/Amber Listed species such as nightingale, particularly from within the extraction site.

Scale of effect:

Minor negative effect at the Local level. The effect on breeding birds of loss of deciduous woodland habitat would be permanent. The effect on breeding birds of loss of broadleaved plantation is reversible in the medium to long term. Disturbance effects would be temporary and limited to the construction period.

Cumulative effects:

None – no other approved or potential developments are expected to affect the Site's breeding bird assemblage.

Additional mitigation required, including means of securing implementation:

Measures proposed through the habitat mitigation and enhancement strategy will also contribute towards mitigating the negative effect of development on breeding birds. In addition the following measures will be implemented specifically to mitigate the impacts on breeding birds:

- Approximately 2.8ha of conifer plantation within compartments 37a and 29b, which are outside the Proposed Development Site boundary but within the applicant's control, will be converted to semi-natural deciduous woodland to provide additional breeding habitat for affected bird species.
- For the duration of the development, selective thinning and subsequent rotational coppicing will be implemented within existing deciduous woodland in compartments 25 and parts of 31/35/36/42, which are outside the Proposed Development Site but within the applicant's control, to provide additional breeding habitat for impacted species, including nightingale.

The mitigation strategy will form part of the LEMP and can be secured via an appropriately worded planning condition.

Significance of residual effect:

Negligible negative effect at the Local level.

IEF: Wintering birds (including eight Red/Amber list species, four species of principal importance and two WCA schedule 1 birds)

Potential effect:

1. Habitat loss/damage
2. Habitat degradation

3. Displacement of animals

Proposed development activity:

The construction phase will focus on site preparation works, including the felling of plantation and deciduous woodland habitat (P1, P3 and part of DW1) to facilitate the first phase of works and removal of associated vegetation cover (including within extraction cells 1 to 10), formation of access infrastructure, establishment of the weighbridge, site office and staff welfare facilities, and construction of the CMRF and water storage and silt settlement lagoon. During site preparation c.3.03ha of plantation and deciduous woodland, and their component scrub and grassland will be removed. Access works during the construction stage are expected to focus on the layby on Loxwood Road, formation of access and turning head within the extraction site, and formation of two passing places within plantation woodland along the access route, each measuring approximately 7.5m in width and 20m in length.

Characterisation of impact, taking account of embedded mitigation:

Partial removal of c.3.03ha of deciduous woodland and broadleaved plantation habitats will reduce the availability of both habitats for wintering birds within the extraction site. The impact will take place over the short term (1 to 2 years). The effect on wintering birds of the loss of deciduous woodland is irreversible and is of significance at the Local level. The effect on wintering birds of the loss of broadleaved plantation will continue over the medium term and is also of significance at the Local level, but is reversible during restoration.

Potential damage to and degradation of adjacent retained features as a result of mechanical damage to tree and shrub root systems, pollution, dust, soil compaction and local alterations to hydrology, will be avoided through implementation of best practice techniques within the CEMP.

Disturbance to wintering birds from construction activities, including people and vehicle movements, noise and vibration, within the extraction site and along the proposed access route has the potential to reduce use of available habitats and resources in adjacent areas and consequently reduce the abundance and diversity of wintering birds.

The combined effects of habitat loss and disturbance will result in a reduction abundance and diversity of wintering birds, including Red/Amber Listed species, particularly from within the extraction site.

Scale of effect:

Minor negative effect at the Local level. The effect on wintering birds of loss of deciduous woodland habitat would be permanent. The effect on wintering birds of loss of broadleaved plantation is reversible in the medium to long term. Disturbance effects would be temporary and limited to the construction period.

Cumulative effects:

None – no other approved or potential developments are expected to affect the Site's wintering bird assemblage.

Additional mitigation required, including means of securing implementation:

Measures proposed through the habitat mitigation and enhancement strategy will also contribute towards mitigating the negative effect of development on wintering birds. In addition the following measures will be implemented specifically to mitigate the impacts on wintering birds:

- Approximately 2.8ha of conifer plantation within compartments 37a and 29b, which are outside the Proposed Development Site boundary but within the applicant's control, will be converted to semi-natural deciduous woodland to provide additional winter habitats and resources for affected species.

The mitigation strategy will form part of the LEMP and can be secured via an appropriately worded planning condition.

Significance of residual effect:

Negligible negative effect at the Local level.

IEF: Invertebrates (including three species of principal importance and one WCA schedule 5 species)

Potential effect:

1. Habitat loss/damage
2. Habitat degradation
3. Habitat fragmentation
4. Killing/injury of animals
5. Displacement of animals

Proposed development activity:

The construction phase will focus on site preparation works, including the felling of plantation and deciduous woodland habitat (P1, P3 and part of DW1) to facilitate the first phase of works and removal of associated vegetation cover (including within extraction cells 1 to 10), formation of access infrastructure, establishment of the weighbridge, site office and staff welfare facilities, and construction of the CMRF and water storage and silt settlement lagoon. During site preparation c.3.03ha of plantation and deciduous woodland, and their component scrub and grassland will be removed. Access works during the construction stage are expected to focus on the layby on Loxwood Road, formation of access and turning head within the extraction site, and formation of two passing places within plantation woodland along the access route, each measuring approximately 7.5m in width and 20m in length.

Characterisation of impact, taking account of embedded mitigation:

The survey area supports a moderately diverse woodland invertebrate fauna that includes a high proportion of scarce species indicative of niche woodland features such as heartwood rot and woodland edge. Habitat resources considered to provide particularly favourable conditions during the invertebrate assessment included scrub fringe (28 species), flower rich woodland and openings (26 species including small heath *Coenonympha pamphilus*, species of principal importance), bark and sapwood decay (includes the nationally rare beetle *Dasytes niger)*, and heartwood decay which, although limited in extent

owing largely to the lack of very old and degenerate trees, includes the Red Data Book 3 *Microrhagus pygmaeus* beetle. The sapwood and heartwood decay resource is found throughout the site but is most abundant along the northern and eastern side of the site, where mature trees are more abundant and possess deadwood features; these features will be partly retained by the embedded mitigation (see below). The presence of a suite of woodland butterflies is of particular note, the most noteworthy being wood white *Lepidea sinapsis* (WCA schedule 5 and species of principal importance) and white admiral *Limenitis camilla* (species of principal importance).

During the construction phase (1—2yrs) approximately 3.03ha of semi-natural and plantation deciduous woodland will be removed, including its component scrub fringe, rides and openings and deadwood habitats and the invertebrate fauna they support. The following boundary features will, however, be retained and protected for the duration of development as part of the embedded mitigation which will provide some continuity of habitat resource availability for invertebrates: deciduous woodland at the north, west, and east boundaries (including a 10m buffer), and Ancient Replanted Woodland at the north-west corner (including a 15m buffer). The extent of deciduous woodland and plantation proposed to be removed represents a minor negative impact of relatively short duration. The effect will be a permanent reduction in the diversity and abundance of invertebrate fauna within the extraction site, and likely displacement of invertebrates from adjacent habitats.

Following infill each excavation cell will be restored, initially seeded with a wildflower grass mix to prevent erosion by wind or surface water, and subsequently with native species trees and shrubs to reinstate the site's woodland cover (see operation phase impact assessment). Within a period of approximately 10-15yrs restored cells are likely to be structurally similar to the existing broadleaved plantation within the extraction site, and will hence provide a habitat resource to invertebrates of scrub fringe habitats in particular. Nevertheless, flower rich woodland rides and openings and deadwood habitats (bark and sapwood decay) will take much longer to re-establish meaning that invertebrates associated with these resources may be permanently lost from the site.

There is also a risk of construction traffic movements along the access route leading to direct (as a result of driving over) and indirect (as a result of smothering by dust pollution) damage to vegetation adjacent to the track. This is likely to have a greater effect on the ground flora and associated invertebrate fauna than on trees and woodland which are more resilient. However, wood white (WCA schedule 5 (protected against trade) and species of principal importance) and white admiral (species of principal importance) in particular were noted using access tracks and adjacent habitats and are particularly vulnerable to the effects of dust as well as killing/injury or displacement and habitat damage/fragmentation as a result of the increase in traffic movements. The wood white population appears to be centred along the existing access track and into adjacent open clear-felled areas (particularly around Great Birchfield where the track bends north towards the extraction site, and between Caddick copse and Hurst wood). The white admiral similarly can be found, sometimes in abundance, along the tracks and also small glade areas along the eastern edge of the extraction site.

Passing places have been sited specifically to avoid habitat used by important invertebrate species. Impacts on wood white associated with vehicle movements during the construction phase are predicted to be of low to moderate magnitude over a short duration. Additional mitigation is required to adequately reduce the displacement and fragmentation effects, as well as impacts on individuals and population abundance. However, to account for a potentially lengthy process of establishment of mitigation measures for wood white, implementation of mitigation required for operation phase impact will be front-loaded to the construction stage as well to maximise its effectiveness.

Overall the effect of Proposed Development on the invertebrate assemblage recorded in the survey area is likely to be a permanent reduction in the diversity and abundance of invertebrate fauna within the extraction site and using the access track, likely displacement of invertebrates from adjacent habitats, and possible fragmentation of habitats used by butterflies, in particular wood white and white admiral.

Scale of effect:

Minor negative effect at the County level.

Cumulative effects:

None – no other approved or potential developments are expected to affect the Site's invertebrate fauna.

Additional mitigation required, including means of securing implementation:

An invertebrate mitigation strategy will be prepared with the objective of translocating or re-creating habitat resources of greatest potential value to the Site's invertebrate fauna to locations outside of the Proposed Development Site boundary but on land within the applicant's control. It will not, however, be possible to translocate the individual species populations, meaning that the mitigation strategy will be reliant on species populations dispersing into translocated or newly created habitats and features. Many of the measures will therefore be targeted towards compartments 31 in the first instance (adjacent west to the extraction site) but will also be applied in other compartments contributing to the wider mitigation strategy. The main elements of the invertebrate mitigation strategy will include:

- Creation and maintenance of short turf and bare ground habitats, both within rides and elsewhere
- Planting and maintenance of flowering swards
- Creation and maintenance of scrub fringe habitat
- Retention, translocation or replication of deadwood and rot
- Placement of deadwood and sectioning timber
- Retention, creation and maintenance of woodland rides and glades, to increase the extent and connectivity of habitats for wood white and white admiral
- Ensuring sufficient juxtaposition between scrub, woodland edge and open habitats

The above measures will be implemented alongside the habitat enhancement/conversion and management measures proposed to mitigate impacts on other ecological features, including for example conversion of compartments 37a and 29b from conifer plantation to deciduous woodland, and thinning/coppicing within compartments 31 and parts of 35, 36 and 42.

An early priority will be to target mitigation for the wood white population. The mitigation strategy will aim to deliver an increase in the amount and connectivity of suitable habitat through ride widening. It will provide enhanced management of plantations adjoining the access track (especially compartments 34 and

40 where many observations were recorded) to increase the availability of larval foodplants and draw the species further away from the track edge, to reduce killing/injury risk from vehicle movements. The ride network will be extended to provide additional suitable habitat away from the access route. Suitable habitat is characterised as being warm, sheltered and damp, where both larval foodplants and nectar sources are in abundance. Foodplants include bird's-foot trefoil *Lotus spp*., bitter vetch *Lathyrus linifolius*, and tufted vetch *Vicia cracca*. Nectar sources include a variety of wildflowers including bramble *Rubus fruticosus*, bugle *Ajuga reptans*, ragged robin *Lychnis flos-cuculi* and birds-foot trefoil. This part of the mitigation strategy will be implemented before the operational phase commences to ensure habitat availability in locations not at risk of direct or traffic-related impacts is secured prior to impacts taking place. This will require removal of trees, shrubs and bramble scrub and thinning of conifer cover on land adjoining the track, and in locations where the ride network is extended or widened, supplemented with plug planting of larval foodplants to accelerate the establishment of suitable habitat. An appropriate maintenance and management regime will then be implemented for the duration of the development.

Mitigation measures for deadwood habitats will similarly be an early priority, including translocation of and works to replicate deadwood and rot habitats, to ensure continuous availability of habitats for this group. Compartment 31 will be the focus of measures to translocate and replicate deadwood habitats as it is in close proximity to the extraction site (and therefore potentially accessible by target species with short dispersal ranges) and provides comparable habitat conditions.

The mitigation strategy will form part of the LEMP and can be secured via an appropriately worded planning condition.

Significance of residual effect:

Negligible negative effect at the County level.

IEF: Roosting bats

Potential effect:

1. Habitat loss/damage
2. Killing/injury of animals
3. Displacement of animals

Proposed development activity:

The construction phase will focus on site preparation works, including the felling of plantation and deciduous woodland habitat (P1, P3 and part of DW1) to facilitate the first phase of works and removal of associated vegetation cover (including within extraction cells 1 to 10), formation of access infrastructure, establishment of the weighbridge, site office and staff welfare facilities, and construction of the CMRF and water storage and silt settlement lagoon. During site preparation c.3.03ha of plantation and deciduous woodland, and their component scrub and grassland will be removed. Access works during the

construction stage are expected to focus on the layby on Loxwood Road, formation of access and turning head within the extraction site, and formation of two passing places within plantation woodland along the access route, each measuring approximately 7.5m in width and 20m in length.

Characterisation of impact, taking account of embedded mitigation:

The majority of trees within the extraction site are young or early mature, either self-seeded or part of recently replanted plantation. However, 21 mature trees mainly within the south-western quarter of the extraction site exhibited potential roost features for bats. Felling or arboricultural works to these trees could result in destruction of a bat roost or present a risk of killing, injury or disturbance if bats are present during the works, which would constitute an offence under the WCA and Habitats Regulations.

Trees with roosting bat potential on the northern and eastern boundaries of the extraction site will be retained and protected via embedded mitigation, but within the extraction site the following will be directly or indirectly affected over the short term (1—2yrs):

- Moderate suitability trees T6, T7, T12 and T18, and low suitability trees T5, T11, T14, T16, T21, T22 and T23, which will either be felled or exposed as a result of felling as part of vegetation removal to enable construction and extraction of cells 1 to 10; and
- Moderate suitability trees T13, T15 and T19, and low suitability tree T17, which will either be felled or exposed as a result of felling as part of vegetation removal to enable the water storage and settlement lagoon.

None of the four moderate suitability trees or three low suitability trees alongside the access route is currently expected to be directly affected.

Presence/absence surveys for bats roosting in high and moderate suitability trees were not carried out in 2020 because no trees with roosting bat potential were identified in the north-west quadrant of the extraction site which is intended to be the focus of construction activity over the short term (1—2yrs). Furthermore, the low to moderate levels of bat activity recorded within the extraction site during the transect surveys would indicate that bat roosts of high conservation significance are unlikely to be present. In addition, bats' usage of tree roost habitats is dynamic and changeable throughout the year and between years, which could render the survey data out of date by the time subsequent phases are addressed. However, the final proposals for site access and the drainage lagoon are likely to affect moderate suitability trees T6, T7, T12, T13, T15, T18 and T19 at the outset, and tree climbing and aerial inspection surveys are being undertaken in 2021.

Low suitability trees are not required to undergo further surveys. Arboricultural works to low suitability trees will be undertaken in accordance with a Non-Licenced Method Statement to reduce the risk of killing/injury to bats, which will be specified in the CEMP.

Scale of effect:

Uncertain but potentially up to a Moderate negative effect at the Site level. The impact (loss of mature trees with potential roost features) is irreversible over the medium to long term, however, the effect (loss of available roosting habitat) is capable of mitigation.

Cumulative effects:

None – no other approved or potential developments are expected to affect roosting bats at the Site.

Additional mitigation required, including means of securing implementation:

Additional mitigation will need to be designed and specified according to the species of roosting bats recorded (if any), roost type and status, and abundance of individual roosting bats. Mitigation may include careful removal and translocation of roost features to retained trees in suitable habitat outside of the site on land within the applicant's control, provision of artificial roost boxes, and/or exclusion of bats from their roosts prior to works.

Additional mitigation, if required, will be specified and secured in a mitigation licence to be obtained from Natural England prior to commencement. This is anticipated to include measures for the prevention of killing/injury/disturbance to individual bats and creation of replacement roost sites proportionate to the conservation significance of bat roosts affected during the construction phase (if any).

Significance of residual effect:

Uncertain but likely capable of being reduced to a Minor or Negligible negative effect at the Site level.

IEF: Foraging and commuting bats (including at least four species of principal importance and nine Habitats Regulations schedule 2 species)

Potential effect:

1. Habitat loss/damage
2. Habitat degradation
3. Habitat fragmentation
4. Displacement of animals

Proposed development activity:

The construction phase will focus on site preparation works, including the felling of plantation and deciduous woodland habitat (P1, P3 and part of DW1) to facilitate the first phase of works and removal of associated vegetation cover (including within extraction cells 1 to 10), formation of access infrastructure, establishment of the weighbridge, site office and staff welfare facilities, and construction of the CMRF and water storage and silt settlement lagoon. During site preparation c.3.03ha of plantation and deciduous woodland, and their component scrub and grassland will be removed. Access works during the construction stage are expected to focus on the layby on Loxwood Road, formation of access and turning head within the extraction site, and formation of two passing places within plantation woodland along the access route, each measuring approximately 7.5m in width and 20m in length.

Characterisation of impact, taking account of embedded mitigation:

The majority (96.9%) of all bat calls recorded during passive monitoring within the extraction site and along the access route were from pipistrelle bats, with common pipistrelles registering an average of 376.79 bat passes per hour (BPPH), soprano pipistrelles registering an average of 64.21 BPPH, and

Nathusius' pipistrelles registering an average of 0.04 BPPH. Of the remaining bat passes, those of Myotis spp. (1.4% or 5.77 BPPH) were the next most frequently recorded, followed by barbastelle (0.9% or 3.77 BPPH), Nyctalus spp. (0.5% or 2.19 BPPH), serotine (0.2% or 0.83 BPPH) and finally brown long-eared bats (0.02% or 0.08 BPPH). Features which appeared to be particularly favoured by foraging and commuting bats during observations made during transect surveys within the extraction site included the recent plantation clearings in the north-west and south-east, the narrow band of broadleaved woodland at the northern boundary, and the access tracks and rides within and around the extraction site. Features which appeared to be particularly favoured during transect surveys along the access route included the track passing through the cow field between Pephurst wood and Hurst wood which is bounded by hedgerows H1/H2 and recent plantation clearings, particularly those close to Hurst wood and around Great Birchfield.

During the construction phase (1—2yrs) approximately 3.03ha of semi-natural and plantation deciduous woodland will be removed, including its component scrub fringe and openings. The reduced availability of both habitats for foraging and commuting bats within the extraction site, with a consequent reduction in cover and the abundance of invertebrate prey, is likely to displace foraging and commuting bats from the site and adjoining land. The effect on foraging and commuting bats of the loss of deciduous woodland is irreversible and is of significance at the Local to County level. The effect on foraging and commuting bats of the loss of broadleaved plantation will continue over the medium term and is also of significance at the Local to County level, but is reversible during restoration.

The following boundary features will, however, be retained and protected for the duration of development as part of the embedded mitigation which will provide some continuity of habitat resource availability and connectivity for foraging and commuting bats: deciduous woodland at the north, west and east boundaries, and Ancient Replanted Woodland at the north-west corner. Potential damage to and degradation of adjacent retained features as a result of mechanical damage to tree and shrub root systems, pollution, dust, soil compaction and local alterations to hydrology, will be avoided through implementation of best practice techniques within the CEMP.

No direct or indirect effects are predicted for foraging and commuting bats using the access route. Traffic movements associated with the development are not expected to exceed 42 daily movements (21 in and 21 out) but this maximum level is not expected to occur until the operation phase. Artificial lighting will not be used within the extraction site outside of the hours 08.00 to 18.00. There are no plans to artificially light the access route.

The combined effects of habitat loss and displacement will result in a reduced abundance and diversity of foraging and commuting bats from within the extraction site.

Scale of effect:

Minor negative effect at the Local to County level. The effect on foraging and commuting bats of loss of deciduous woodland habitat would be permanent. The effect on foraging and commuting bats of loss of broadleaved plantation is reversible in the medium to long term.

Cumulative effects:

None – no other approved or potential developments are expected to affect the Site's assemblage of foraging and commuting bats.

Additional mitigation required, including means of securing implementation:

Measures proposed through the habitat mitigation and enhancement strategy will also contribute towards mitigating the negative effect of development on foraging and commuting bats. In addition the following measures will be implemented specifically to mitigate the impacts on foraging and commuting bats:

- Approximately 2.8ha of conifer plantation within compartments 37a and 29b, which are outside the Proposed Development Site boundary but within the applicant's control, will be converted to semi-natural deciduous woodland to provide additional foraging habitat for affected species.
- For the duration of the development, selective thinning and subsequent rotational coppicing will be implemented within existing deciduous woodland in compartments 25 and parts of 31/35/36/42, which are outside the Proposed Development Site but within the applicant's control, to provide additional foraging habitat for impacted species.
- Extensions to the amount and connectivity of ride habitat which will targeted towards mitigating effects on wood white will also increase the extent of available foraging and commuting habitat for bats.

The mitigation strategy will form part of the LEMP and can be secured via an appropriately worded planning condition.

Significance of residual effect:

Negligible negative effect at the Local to County level.

IEF: Reptiles (including three species of principal importance and three WCA schedule 5 species)

Potential effect:

1. Habitat loss/damage
2. Killing/injury of animals
3. Displacement of animals

Proposed development activity:

The construction phase will focus on site preparation works, including the felling of plantation and deciduous woodland habitat (P1, P3 and part of DW1) to facilitate the first phase of works and removal of associated vegetation cover (including within extraction cells 1 to 10), formation of access infrastructure, establishment of the weighbridge, site office and staff welfare facilities, and construction of the CMRF and water storage and silt settlement lagoon. During site preparation c.3.03ha of plantation and deciduous woodland, and their component scrub and grassland will be removed. Access works during the construction stage are expected to focus on the layby on Loxwood Road, formation of access and turning head within the extraction site, and formation of two passing places within plantation woodland along the access route, each measuring approximately 7.5m in width and 20m in length.

Characterisation of impact, taking account of embedded mitigation:

Low populations of common lizard (peak count of 3 adults) and grass snake (peak count of 2 adults), and an exceptional population of slow worm (peak count of 29 adults) were present within the survey area during the 2020 survey season. Reptiles were most abundant within the recent plantation clearings in the extraction site, but slow worm and common lizard were also recorded in similar habitats along the access route.

During the construction phase (1—2yrs) approximately 3.03ha of semi-natural and plantation deciduous woodland will be removed. The loss of component scrub fringe and openings will result in reduced availability of shelter and foraging habitats for reptiles within the extraction site, while loss of deciduous woodland will reduce the extent of suitable hibernation habitat. Although the impact will occur in the short term, its effect will be experienced over the medium term, but is reversible during restoration. The impact is of significance at the Local level.

Potential damage to and degradation of retained features adjacent to the extraction site as a result of mechanical damage to tree and shrub root systems, pollution, dust, soil compaction and local alterations to hydrology, will be avoided through implementation of best practice techniques within the CEMP.

Reptiles present within the extraction site will also be at risk of killing and injury during site clearance and construction works, which would constitute an offence under the WCA. No reptiles were recorded within the proposed passing places along the access route but it is possible that vehicle movements could result in a risk of incidental killing and injury to reptiles using trackside habitats.

The combined effects of killing/injury and habitat loss will result in a reduction in the abundance and distribution of reptiles, particularly within the extraction site.

Scale of effect:

Minor negative effect at the Local level. The effect on reptiles of loss habitats is reversible in the medium to long term. The risk of killing and injury would be temporary and limited to the construction period.

Cumulative effects:

None – no other approved or potential developments are expected to affect the Site's reptile assemblage.

Additional mitigation required, including means of securing implementation:

A Method Statement will be produced for a phased translocation of the site's population of reptiles to a suitable receptor site prior to vegetation clearance or development works commencing. The Method Statement and translocation can be secured via an appropriately worded planning condition.

The translocation phasing will be as follows:

- Prior to commencement of the construction phase, land required for access infrastructure within the extraction site, construction of the weighbridge, site office, staff welfare facilities and CMRF, and for extraction cells 1 to 10 will be enclosed with permanent reptile fencing to prevent reptiles from ranging onto the site during the translocation or subsequent development works. The translocation will then be undertaken in accordance with the agreed Method Statement which will remove the majority of reptiles from this phase. Prior to the removal of habitat within this phase, the site will

be destructively searched for any reptiles remaining after the translocation, the methods for which will be specified in the Method Statement. The permanent reptile fencing will be left in situ and regularly checked/repaired until this phase is fully restored.

The Method Statement will include reasonable avoidance measures to prevent killing/injury without translocation in the following locations:

- During small scale clearance of habitat within the footprint of passing places; and
- During clearance of woodland habitat with low suitability for reptiles during the active season (but still suitable for hibernation) within the footprint of the water storage and silt settlement lagoon.

The site's population of reptiles will be translocated to c.5.1ha of land in woodland compartments 25a, 25b and 26, which are outside the Proposed Development Site boundary but within the applicant's control. These areas are currently dominated by recent broadleaved plantation with patchy and locally dense scrub and self-seeded trees, with scattered mature or semi-mature trees. They are therefore similar in character to habitats within the extraction site which currently support reptiles. Given the similarities, it is likely that compartments 25a, 25b and 26 already support a population of reptiles, and so the translocation will need to be informed by population estimate surveys within compartments 25a, 25b and 26 to establish their carrying capacity, and to devise appropriate habitat enhancements to increase their carrying capacity. Alternatively or as a supplementary measure, conifer plantation within woodland compartment 40 (outside of the Proposed Development Site but within the applicant's control) will be converted to suitable reptile habitat comprising a mosaic of coarse grassland and dense scrub alongside measures to enhance this area for wood white butterfly.

Significance of residual effect:

Negligible negative effect at the Local level.