

10. ECOLOGY AND BIODIVERSITY

The following Technical Appendices referred to in this chapter can be found at Appendix 4 to this document.

Appendices

Appendix 4.1 - Ecological appraisal and desk study report

Appendix 4.2 - Habitats Regulations Assessment report

Appendix 4.3 - Bat surveys report

Appendix 4.4 - Breeding and wintering bird surveys report

Appendix 4.5 - Hazel dormouse surveys report

Appendix 4.6 - Invertebrate surveys report

Appendix 4.7 - Reptile surveys and mitigation strategy report

Appendix 4.8 - Biodiversity metric calculation

10.1 Introduction

- 10.1.1 This chapter of the Environmental Statement (ES) has been prepared by senior ecologist Andrew Heideman and considers the impacts of the proposals on biodiversity, which includes the flora and fauna identified on the site, and to be associated with the site, and occurring within the relevant Zones of Influence, as well as their interlinking connections.
- 10.1.2 This chapter summarises the ecological baseline of the site, which was determined using pre-existing sources of information through a desk-based study and from field survey work undertaken between 2015 and 2022 and identifies the Important Ecological Features (IEFs) requiring an assessment of impacts and effects. This chapter also summarises the methodologies and any published guidelines that were followed in conducting this assessment, as well as the relevant wildlife legislation and policies.
- 10.1.3 Where relevant, mitigation measures are proposed to minimise the impacts of the proposed development during both preparation, operational and restoration phases of the scheme. Any anticipated residual effects of the proposals are then stated along with any further mitigation or monitoring proposals.

10.2 Study Area

10.2.1 The site is the former Hamble Airfield which is located to the east of Hamble Lane, Hamble-le-Rice, Eastleigh, Hampshire, SO31 4NL (approximate central Grid Ref: SU 47765 07807).

10.2.2 The study area, or 'Zone of Influence', for this ecological impact assessment comprises the site (as depicted in the red line boundary plan for the proposals) plus the additional surrounding radii detailed below:

- 5 kilometres for any international statutory designated sites for nature conservation.
- 2 kilometres for any national statutory designated sites for nature conservation.
- 2 kilometres for any non-statutory designated sites for nature conservation.
- 2 kilometres for all records of protected, notable and invasive species.
- 500 metres for off-site habitats, ancient woodland, habitats of principal importance, and ecological networks.

10.3 Methodology

Previous Assessment Stages

- 10.3.1 Hampshire County Council were contacted in May 2016 for pre-application advice on the outline site proposals to “extract approximately 1.7 million tonnes of sand and gravel with restoration of site back to existing levels” and on the scope of any further studies required to support a planning application, including any ecological surveys and assessments (HCC, 2016).
- 10.3.2 The site has been subject to a comprehensive suite of ecological studies and assessments between 2015 and 2022, as summarised in table 10.1 below.

Legislation and Planning Policy

Legislation

- 10.3.3 Domestic and international legislation of relevance to this assessment includes:
- The Conservation of Habitats and Species (Amendments) Regulations 2017
 - The Wildlife and Countryside Act 1981 (and amendments)
 - The Countryside and Rights of Way Act 2000
 - Natural Environment and Rural Communities Act (NERC) 2006
 - The Protection of Badgers Act 1992
 - Wild Mammals (Protection) Act 1996
 - Hedgerow Regulations 1997

National Planning Policy and Practice Guidance

- 10.3.4 Chapter 15 of the National Planning Policy Framework (NPPF, 2021) ‘Conserving and enhancing the natural environment’ sets out the Government’s policies on biodiversity, landscape and geological conservation. Relevant paragraphs within this chapter include 172 and 174 to 182.

Local Planning Policy

- 10.3.5 Local planning policies of relevance to this assessment include:
- Policies 3 (Protection of habitats and species) and 5 (Protection of the countryside) of the Hampshire Minerals and Waste Plan - October 2013 (Adopted) (HCC, 2013)
 - Appendix A of the Hampshire Minerals and Waste Plan, where it refers to development considerations for this site
 - Policies 21.NC – 26.NC of the Eastleigh Borough Local Plan 2001-2011
 - Eastleigh Biodiversity SPD 2009
 - Biodiversity Action Plan for Eastleigh Borough 2012-2022 (EBC, 2012)

Methodologies for Establishing the Ecological Baseline

- 10.3.6 In line with CIEEM guidance (CIEEM, 2019), the extent of the desk study and field surveys used to establish the ecological baseline were informed by an initial review of online mapping and aerial photography, as well as through consultation with the relevant local planning authority. The pre-application advice for the proposed project, provided by Hampshire County Council in May 2016 (HCC, 2016), was used to help define the scope of the baseline ecological studies and impact assessment. However, some elements of the advised baseline studies were either not possible or were scoped out based on

a review of online mapping, desk study information and professional judgement (refer to section 10.4, and appendix 4.1).

10.3.7 The following information sources and fieldwork summarised in table 10.1 below was used to establish the ecological baseline and inform the impact assessment. It is considered that a comprehensive level of desk study and fieldwork information has been gathered to provide a robust ecological baseline to inform the design of the project and assess impacts appropriately. All field survey work undertaken was in accordance with the relevant standard practice guidelines applicable to each separate topic (full details of the methodologies employed are included within each separate appendix).

Table 10.1 Summary of information sources and field survey work

SURVEY TYPE	YEAR	COMMENTS
Desk study – International and National statutory sites for nature conservation	2017 and 2021	Information obtained from Natural England’s web-based Multi-Agency Geographic Information for the Countryside (MAGIC)
Desk study – Non-statutory local designated sites for nature conservation	2017 and 2021	Relevant details provided by the Hampshire Biodiversity Information Centre (HBIC)
Desk study - records of protected, notable and invasive species	2017 and 2021	Relevant details provided by the Hampshire Biodiversity Information Centre (HBIC)

SURVEY TYPE	YEAR	COMMENTS
Preliminary ecological appraisal, including extended Phase 1 habitat survey	2017, 2019 and 2021	Undertaken by LC Ecological Services (appendix 4.1)
Hedgerow Regulations assessment	2018	Undertaken by LC Ecological Services (appendix 4.1)
Phase 1 badger (<i>Meles meles</i>) surveys	2017, 2019 and 2021	Undertaken by LC Ecological Services (appendix 4.1)
Habitats Regulations Assessment	2021	Undertaken by specialist sub-contractors (appendix 4.2)
Phase 1 and Phase 2 bat surveys	2015, 2017/2018, 2019 and 2020	Undertaken by LC Ecological Services (appendix 4.3)
Breeding bird surveys	2015, 2017 and 2020	Undertaken by LC Ecological Services and (appendix 4.4)
Wintering bird surveys	2015/2016, 2017/2018 and 2021/2022	Undertaken by LC Ecological Services (appendix 4.4)

SURVEY TYPE	YEAR	COMMENTS
Hazel dormouse (<i>Muscardinus avellanarius</i>) surveys	2015, 2019 and 2021	Undertaken by LC Ecological Services (appendix 4.5)
Invertebrate surveys	2021	Undertaken by specialist sub-contractors (appendix 4.6)
Reptile surveys	2015 and 2020	Undertaken by LC Ecological Services (appendix 4.7)

Ecological Impact Assessment Methodology

10.3.8 This biodiversity chapter follows the best practice guidelines for Ecological Impact Assessment (EclA) in the UK and Ireland, established by the Chartered Institute of Ecology and Environmental Management (CIEEM, 2019).

10.3.9 The starting point was to determine which features should be subject to detailed assessment, that is, those IEFs:

- a) Of sufficient value that impacts upon them may be significant (in terms of legislation or policy); and
- b) Potentially vulnerable to significant impacts arising from the development.

10.3.10 This approach is consistent with the EIA Regulations, which only require investigation of likely significant effects.

Receptor Sensitivity

10.3.11 The CIEEM guidelines recommend that the value of ecological receptors or IEFs is determined based on a geographic frame of reference that includes the following levels presented in table 10.2 below:

Table 10.2 Level of Value Assigned to each Ecological Feature (adapted from CIEEM, 2019)

Level of Value	Example of Definitions
International	<p>An internationally important site e.g. SPA, SAC, Ramsar (or a site considered worthy of such a designation).</p> <p>A viable area of a habitat type listed in Annex 1 of the Habitats Directive, or smaller areas of such habitats which are essential to maintain the viability of a larger whole.</p> <p>A regularly occurring population of an internationally important species (listed on Annex IV of the Habitats Directive).</p>
UK / National	<p>A nationally designated site e.g. SSSI or a site considered worthy of such designation.</p> <p>A viable area of a priority habitat identified within the UK BAP, or of smaller areas of such habitat which are essential to maintain the larger whole.</p> <p>Any recurring population of a nationally important species e.g. listed on Schedules 5 and 8 of the Wildlife and Countryside Act 1981 (as amended). A feature identified as of critical importance in the UK BAP.</p>
Regional (Hampshire)	<p>A site designated as either a Site of Importance for Nature Conservation (SINC) or a Site of Nature Conservation Interest (SNCI), or habitats that meet the designation criteria for SINC in Hampshire.</p>

Level of Value	Example of Definitions
	<p>Areas of internationally or nationally important habitats which are degraded but are considered readily restored.</p> <p>A regularly occurring, locally significant population of a species listed as being nationally scarce.</p> <p>A regularly occurring, locally significant number of a regionally important species.</p>
<p>Local (the zone of influence including the site and its immediate vicinity, including habitats within or linked to those on site)</p>	<p>Areas of internationally or nationally important habitats which are degraded and have little or no potential for restoration.</p> <p>A good example of a common or widespread habitat in the region.</p> <p>A notable population or assemblage of common or widespread species in the region.</p>

Determining Impact Magnitude

10.3.12 The assessment of the magnitude of effect assesses whether an impact will be positive or negative; its extent; duration; reversibility and timing and frequency as well as the cumulative effect. A combination of quantitative information and qualitative assessment based on professional judgment was used whilst considering all of these factors to assign effects on the receptors to one of four categories as detailed in table 10.3 below.

Table 10.3 Assessment of the Magnitude of Effects

Impact Magnitude	Typical Criteria
High	A permanent or long-term effect on the extent/size or integrity of a site, habitat, species assemblage or community, population or group. If adverse this is likely to threaten its sustainability. If beneficial this is likely to enhance its conservation status.
Medium	A permanent or long-term effect on extent/size or integrity of a site, habitat, species assemblage or community, population or group. If adverse this is unlikely to threaten its sustainability. If beneficial this is likely to be sustainable but is unlikely to enhance its conservation status.
Low	A short-term but reversible effect on the extent/size or integrity of a site, habitat or species assemblage or community, population or group that is within the range of variation normally experienced between years.
Negligible	A short-term but reversible effect on the extent/size or integrity of a site, habitat or species assemblage or community, population or group that is within the normal range or annual variation.

Determining Significance and Nature of Effects

10.3.13 For each IEF, the significance of the effects of the proposed project at all stages (including site preparation, operation, restoration and post-restoration phases) are characterised and assessed according to the value of the IEF and magnitude of the impacts and effects. Where there is uncertainty over the appropriate level of significance to assign, this will be stated, but as a precautionary measure the higher level of significance will be applied. Where

significant negative effects on IEFs are predicted to arise from the proposals, mitigation, compensation and/or enhancement measures are provided.

- 10.3.14 Both direct and indirect impacts are considered within this assessment. A direct impact is a defined action, such as the physical degradation or loss of a habitat, or the immediate mortality of individuals of a particular species. Indirect impacts are attributable to an action, but which affect ecological features through effects on an intermediary.

Habitats Regulations Assessment

- 10.3.15 The project site lies within relatively close proximity to four designated sites that form part of the National Sites Network (NSN), namely the Solent and Southampton Water Special Protection Area (SPA) and Ramsar, the Solent Maritime Special Area of Conservation (SAC), and the Dorset and Solent Coast SPA. Therefore, in line with the advice from Hampshire County Council (HCC, 2016) and Regulation 63 of the Habitats Regulations, a separate Habitats Regulations Assessment (HRA) was undertaken (refer to appendix 4.2) to ascertain whether the development proposals could potentially have any significant adverse effects on the integrity of the NSN sites, either alone or in combination with other plans or projects. This HRA document will provide information for the HRA that Hampshire County Council will need to undertake in determining the planning application for the site.

Biodiversity Net Gain

- 10.3.16 The proposed development presents an opportunity to enhance the biodiversity value of the site (and potentially the local area), in line with the objectives of the relevant local planning policies (refer to those listed under paragraph 10.3.4). Biodiversity net gain (BNG) is an approach to development, and/or land management, that aims to leave the natural environment in a measurably better state than it was beforehand. It delivers measurable improvements for biodiversity by creating or enhancing habitats in association

with development, and this can be achieved both on-site and off-site. Relevant national planning policy within the NPPF (NPPF, 2021) sets out that planning should provide BNG where possible and the Environment Act (recently passed into law in November 2021) includes mandatory BNG in England to ensure that all Town & Country Planning Act developments deliver at least a 10% increase in biodiversity value with habitats secured for at least 30 years via obligations/conservation covenants (this is expected to be fully implemented in law by Autumn 2023).

- 10.3.17 The Biodiversity Metric 3.1 calculation tool (Natural England, 2022) was used to calculate the biodiversity net gain values for the development project and site restoration plans (refer to appendix 4.8).

EclA Limitations and Assumptions

- 10.3.18 It was not possible to undertake a detailed botanical survey of the adjacent non-statutory designated site Badnam Copse (Site of Importance for Nature Conservation (SINC)) due to site access requests sent to the landowners being denied (refer to appendix 4.1). Therefore, an assessment of impacts on this particular site is based on the basic details and SINC criteria provided in the Hampshire Biodiversity Information Centre (HBIC) data search.

10.4 Ecological Baseline

Location overview

- 10.4.1 The site lies on the northern fringe of the village of Hamble-le-Rice, which is located within the small Hamble peninsula that forms part of the Coastline of Southern England. The peninsula's southern and western limits are bounded by the Southampton Water estuary and its eastern flank is bounded by the River Hamble where it flows out into the Southampton Water.
- 10.4.2 The site's immediate location is considered to be semi-rural, with it being largely enclosed by the urban environs (mostly residential) of Hamble-le-Rice to the south-west, south and south-east, and, at the same time, adjoining a more open landscape, comprising landscaped parkland, small pasture fields with hedgerows, and some substantial stands of broadleaved woodland, to the east, north and north-west. However, it is also acknowledged that the site's immediate north-east, north and north-west boundaries abut significant local infrastructure, including Hamble Lane, a national rail line, Hamble School and Satchell Lane respectively.
- 10.4.3 Within the wider surrounding landscape, the limits of the Hamble peninsula to the west, south and east are largely dominated by a coastal and estuarine landscape comprising saltmarshes, mudflats, saline lagoons, shingle beach, reedbeds, wet woodland and grazing marshes, as well as some urban, industrial and recreational land uses. Further to the north-east and north there is mixed agricultural land with hedgerow networks and stands of broadleaved woodland, as well as densely urbanised areas, including Netley, Butlocks Heath and Bursledon.
- 10.4.4 The site is situated within the far western end of the South Coast Plain National Character Area (NCA) (Natural England, 2014). This NCA comprises a strip of land extending along the Hampshire and Sussex coast from the edge of

Southampton in the west to Brighton and Hove in the east. It is a largely flat, coastal landscape with an intricately indented shoreline which occurs between the dip slope of the South Downs and South Hampshire Lowlands and the waters of the English Channel, Solent and Southampton Water estuary. Some of the key characteristics of this NCA include the following:

- Streams and rivers flowing south from the higher land of the Downs to the sea.
- Coastal inlets and 'harbours' containing a diverse landscape of tidal creeks, mudflats, shingle beaches, dunes, grazing marshes and paddocks. These include the internationally important Chichester, Langstone, Portsmouth and Pagham harbours, the Hamble Estuary and the recent coastal realignment site at Medmerry.
- Stretches of farmed land between developed areas to the north of the coastline, often with large arable fields defined by low hedges or ditches.
- Isolated remnants of coastal heath in the west.
- Sand dunes and intertidal marsh communities are characteristic of the coastline, while small areas of species-rich meadow remain inland.
- A coastline which provides feeding grounds for internationally protected populations of overwintering waders and wildfowl, whilst also used extensively for public recreation.
- A mostly exposed, open coastal plain and shoreline, where tree cover is limited to isolated wind-sculpted woodlands and shelterbelts.

10.4.5 The site itself is considered to form a part of the characteristic inland rural landscape of the west of this NCA occurring between developed areas,

including paddocks, arable, remnants of unimproved grassland and heath, boundary hedgerows and stands of semi-natural broadleaved woodland.

The site overview

- 10.4.6 The site itself comprises an area of open land, approximately 60 hectares in size, that was formerly used as an airfield but is now largely an expanse of regenerated grassland and scrub, together with remnant boundary hedgerows and minor stands of regenerating broadleaved woodland. The site is private land and is not allocated for any form of public recreational use, it does not include any designated public footpaths or rights of way. However, it is currently used informally by the public for recreation and dog walking purposes. The landowners have made repeated efforts to try and keep trespassers off the site by installing fencing along the boundaries, although this fencing has been continually vandalised by the public. The landowners have undertaken some management of scrub on site in the past, however more recently it is only wild grazing by deer and rabbits maintaining some of the vegetation present.
- 10.4.7 The site's potential value in terms of its setting and connectivity within the surrounding landscape is identified in the relevant local policy documentation and other supporting information. The site is highlighted as an ecological 'Network Opportunity' area within the HBIC desk study information (appendix 4.1) and as a 'Priority Biodiversity Link' within the Biodiversity Action Plan for Eastleigh Borough (EBC, 2012). The majority of the northern half of the site is highlighted as a 'Countryside Gap' and most of the site margins are highlighted as 'Landscape improvement' areas on the Eastleigh Borough Local Plan Review 2001 - 2011 Southern Proposals map (EBC, 2006b).

Designated sites

- 10.4.8 No designated land of International or National importance for nature conservation is located within or directly adjacent to the Site.
- 10.4.9 The closest International designated sites include the Solent and Southampton Water Special Protection Area (SPA) and Ramsar and the Solent Maritime Special Area of Conservation (SAC), all of which are located approximately 340 metres to the east of the site at their nearest point. The River Hamble, which lies approximately 410 metres to the east of the site at its nearest point, also forms part of the Solent and Dorset Coast SPA. The closest national, statutory designated sites include the Lee-On-The Solent to Itchen Estuary Site of Special Scientific Interest (SSSI) and Mercury Marshes Local Nature Reserve (LNR), which both lie 340 metres to the east, and Lincegrove and Hackett's Marshes SSSI which lies 350 metres to the north-east. All of these national, statutory designated sites also form constituent parts of the above international designated sites. Refer to appendix 4.1.
- 10.4.10 All of these statutory designated sites have been included within the baseline for this assessment due to their relatively close proximity, their high level of sensitivity, and the large-scale mineral extraction nature of the proposals. The project site is also lies within the SSSI Impact Risk Zones and the nature of the proposals is a type identified by Natural England as having the potential to result in adverse effects on nearby SSSIs, SPAs or SACs, (namely: Minerals, Oil and Gas). All other identified statutory designated sites occurring within the Zone of Influence (refer to appendix 4.1) have been scoped out of this assessment, primarily due to the substantial intervening distances involved and the high level of embedded mitigation to be implemented during the proposed project, with no impacts therefore predicted.
- 10.4.11 The closest non-statutory designated site is Badnam Copse SINC which is located approximately 65 metres to the north-east of the project site at its

nearest point. Other nearby non-statutory designated sites considered to be of relevance and forming part of the ecological baseline include Mercury Marsh South SINC located 226 metres to the south-east, Mercury Marina Saltmarsh SINC located 340 metres to the east, West Wood (Royal Victoria Country Park) SINC located 255 metres to the west and Mallards Moor SINC located 375 metres to the north-east.

10.4.12 No detailed botanical information was available on these sites and Badnam Copse could not be accessed for further survey, however based on the HBIC criteria codes listed for each of these non-statutory sites (refer to appendix 4.1) they are collectively considered to be of **Regional value** due to their likely comprising regionally important habitat types, including relict stands of ancient semi-natural woodland, important woodland community types of restricted distribution in Hampshire, and sensitive coastal and estuarine habitats. All other identified non-statutory designated sites occurring within the Zone of Influence (refer to appendix 4.1) have been scoped out of this assessment, primarily due to the substantial intervening distances involved and the high level of embedded mitigation to be implemented during the proposed project, with no impacts therefore predicted.

10.4.13 The project site itself and adjacent land to the south and north-east is designated as a non-statutory site for waders and brent goose (*Branta bernicla*), although this land is currently listed as only having negative records for waders and brent geese.

Habitats (on-site)

10.4.14 The habitat types present on site were recorded, in accordance with the categories specified for a Phase 1 vegetation and habitat survey (JNCC, 2016), during the walkover surveys undertaken in 2017, 2019 and 2021. The habitats were classified and evaluated according to their vegetative composition, species abundances and general condition, as well as environmental

parameters such as soil type and soil moisture content (dampness). The following habitats were recorded on the site, and these are described in full detail within the accompanying ecological appraisal report (appendix 4.1).

Semi-improved grassland

- 10.4.15 The vast majority of the semi-improved grassland recorded on site comprised rank and overgrown swards that were dominated by tussocks of coarse grasses. However, there was also an element of unimproved and more botanically-interesting acid grassland present amongst some sections of the sward, particularly in the north-east region of the site where it appears that there may have been a higher level of wild grazing by deer and rabbits taking place.
- 10.4.16 The semi-improved grassland on site is considered to be of **Local value**, this is based on its substantial extent on site, its low to moderate botanical value, its moderate value as a habitat resource for wild fauna, and the common and widespread distribution of this habitat throughout the UK.

Scrub

- 10.4.17 The scrub on site is considered to be of **Local value**, this is based on its substantial extent on site, its variety of UK native woody species, its moderate value as a habitat resource for wild fauna, and the common and widespread distribution of this habitat throughout the UK.

Native hedgerows

- 10.4.18 Species-rich native hedgerows comprising a good variety of native woody species, including numerous mature standard pedunculate oak (*Quercus robur*) and ash (*Fraxinus excelsior*) trees, and reasonably diverse field layer vegetation including a number of woodland axiophytes. The hedgerows

ranged from 1.5 to 4 metres in height and 1.5 to 3.5 metres in width and had a significant number of gaps.

- 10.4.19 The native hedgerows on site are considered to be of **Regional value**, this is based on their being identified to qualify as UKBAP hedgerow habitat as well as 'Important' hedgerows under the Hedgerow Regulations Act 1997, their current sub-optimal condition, and the common and widespread distribution of this habitat throughout the UK (although much reduced in extent nationally as a result of agricultural intensification during the 20th Century preceding the Hedgerow Regulations Act).

Broadleaved woodland

- 10.4.20 Stands of regenerating broadleaved woodland with canopies generally of a young stage of growth and mostly dominated by semi-mature specimens of pedunculate oak and silver birch (*Betula pendula*), together with occasional to rare sycamore (*Acer pseudoplatanus*), ash and goat willow (*Salix caprea*). The understorey layers largely consisted of a mixture of field maple (*Acer campestre*), hazel (*Corylus avellana*), hawthorn (*Crataegus monogyna*) and blackthorn (*Prunus spinosa*), together with pedunculate oak, sycamore and silver birch saplings. The field layers were generally species-poor and dominated by ivy (*Hedera helix*), bramble and bracken (*Pteridium aquilinum*). However, a low number of common woodland axiophytes were also present in scattered abundance, including bluebell (*Hyacinthoides non-scripta*), dog's mercury (*Mercurialis perennis*), soft shield-fern (*Polystichum setiferum*) and broad buckler-fern (*Dryopteris dilatata*).
- 10.4.21 The stands of broadleaved woodland on site are considered to be of **Local value**, this is based on their limited extent on site, their young, regenerating growth stage, sub-optimal condition and lack of botanical diversity, their moderate value as a habitat resource for wild fauna, and the common and widespread distribution of species-poor broadleaved woodland habitat of

similar character throughout the UK. The stands of broadleaved woodland on site are not considered to qualify as UKBAP habitat as they do not comprise relict stands of species-rich lowland broadleaved woodland of high conservation value.

Scattered trees

10.4.22 Scattered trees recorded on site mostly comprised semi-mature specimens of pedunculate oak, English elm (*Ulmus procera*), cherry (*Prunus sp*), bird cherry (*Prunus padus*), silver birch, ash, whitebeam, sycamore and rowan (*Sorbus aucuparia*). These trees were largely recorded in the southern half of the site. An additional row of mature trees, comprising mostly pedunculate oak and a single ash, were also recorded just off-site, adjacent to the north-west boundary along the east side of Hamble Lane.

10.4.23 The scattered trees recorded both within and off-site are collectively considered to be of **Local value**, this is based on their moderate value as a habitat resource for wild fauna and their contribution to the overall habitat heterogeneity both on site and in the wider locality, as well as providing ecosystem services. The trees recorded just off-site are considered to be of most ecological value as these all comprise good mature specimens, whilst the trees recorded within the site are all generally of low ecological value as they are low in numbers and comprise unexceptional, semi-mature specimens.

Habitats (off-site)

Amenity grassland

10.4.24 A small area of amenity grassland comprising a sports playing area lies adjacent to the southern boundary of the site. This area of grassland consisted of a regularly mown short sward dominated by common grass species.

10.4.25 This off-site area of amenity grassland is considered to be of **Negligible value**, this is based on its being a very common and widespread grassland type, its limited extent, and its negligible botanical and ecological value. It is therefore **scoped out of this assessment**.

Semi-improved grassland

10.4.26 Small pasture fields comprising semi-improved grassland of varying botanical value and condition are present to the north-east, north and north-west of the site. However, these fields were not surveyed in detail due to this being separate, private land.

10.4.27 The off-site areas of semi-improved grassland are considered to be of **Local value**, this is based on an estimated low to moderate botanical value, its moderate value as a habitat resource for wild fauna, and the common and widespread distribution of this habitat throughout the UK.

Scrub

10.4.28 Stands of dense and scattered scrub are present to the east, north and west of the site, most notably this includes the dense mature stands along the rail line cuttings adjacent to the northern site boundary.

10.4.29 The off-site scrub is considered to be of **Local value**, this is based on its moderate extent, its likely variety of UK native woody species, its moderate value as a habitat resource for wild fauna, and the common and widespread distribution of this habitat throughout the UK.

Native hedgerows

10.4.30 Native hedgerows are present within the surrounding land to the north-west, north and north-east of the site, most notably this includes a mature hedgerow

along the opposite side of Satchell Lane adjacent to the north-east boundary of the site.

- 10.4.31 The off-site native hedgerows are considered to be of **Local value**, this is based on the likelihood that some may qualify as UKBAP hedgerow habitat as well as ‘Important’ hedgerows under the Hedgerow Regulations Act 1997, their value as a habitat resource for wild fauna, and the common and widespread distribution of this habitat throughout the UK (although much reduced in extent nationally as a result of agricultural intensification during the 20th Century, preceding the Hedgerow Regulations Act).

Broadleaved woodland

- 10.4.32 Stands of broadleaved woodland are present to the west and north-east of the site and these all either form constituent parts of non-statutory designated sites (SINCs) and/or are highlighted as being ‘lowland mixed deciduous woodland’ priority habitat in the desk study information provided by HBIC.
- 10.4.33 These stands of off-site broadleaved woodland are considered to be of **Regional value**. Although not surveyed as part of this assessment, it is considered likely that these stands will comprise relict ancient lowland woodland (possibly including stands of uncommon wet woodland habitat) of substantial botanical and conservation value. It is also acknowledged that ancient woodland habitat is now regarded as ‘irreplaceable habitat’ within the NPPF.

Plantation woodland

- 10.4.34 A narrow band of semi-mature plantation woodland runs alongside the south-west boundary of the site. This area of woodland was surveyed and identified to comprise mixtures of both native and non-native tree and shrub species, as well as some mature non-native coniferous trees. The field layer vegetation

was species-poor and comprised mixtures of ruderals and shade tolerant plants.

- 10.4.35 This stand of off-site plantation woodland is considered to be of **Local value**, this is primarily based on its moderate value as a habitat resource for wild fauna, as well as providing ecosystem services. However, this habitat is considered to be low botanical value.

Coastal habitats

- 10.4.36 Coastal habitats, including saltmarsh, inter-tidal mudflats, vegetated shingle, reedbeds and marshy grassland and broadleaved woodland, are present approximately 320 metres to the east of the site (at their nearest point) along the River Hamble and eastern flank of the Hamble peninsula. These areas are largely covered by national and international statutory nature conservation designations (see above).
- 10.4.37 The off-site coastal habitats are considered to be largely of **International value**, this is based on the presence of highly sensitive and threatened habitats, including Annex I habitats, as well as their importance for migratory waterbirds and various other fauna.

Urban, residential, and developed land

- 10.4.38 The site is largely surrounded by the developed environs of the Hamble-le-Rice village to the south-east, south and south-west. This land is predominantly residential, but also includes some industrial retail and recreational development, as well as essential public services such as schools. Natural spaces amongst this developed land include residential gardens, landscaped parks and urban green spaces, churchyards, and sports pitches.
- 10.4.39 The off-site developed land is considered to be of **Local value**, this is based on the habitats present being mostly common and widespread examples of low

botanical and ecological value, although residential gardens, parks, green spaces and churchyards are all likely to be of value as habitat resources for wild fauna.

Species or Species Groups

Badger

- 10.4.40 The site holds potential to support badgers, however no firm evidence of badger activity was identified on site during any of the walkover surveys. Despite this, badgers have previously been recorded in locality and there is potential that badgers could occasionally use the site at night-time for foraging purposes, and/or the large stands of dense scrub may conceal old, disused, or partially-used setts (refer to appendix 4.1). Badger is a common and widespread mammal species in the UK and is considered to be of **Local value**.

Bats (Roosting)

- 10.4.41 The updated ground-level tree roost assessment undertaken in 2021 identified four of the mature off-site trees along the east side of Hamble Lane as holding potential to support roosting bats. No trees within the site were identified to hold any potential to support roosting bats (refer to appendix 4.3). The potential bat roosting features identified on the adjacent off-site trees are considered to be of **Local value**.

Bats (Foraging and commuting)

- 10.4.42 Phase 2 bat activity surveys undertaken on site in 2017/2018 and in 2020 identified that the site supports a bat population of **Regional value** with low numbers of five species, and three genera of bat recorded during the activity surveys (refer to appendix 4.3).

Breeding birds

10.4.43 Phase 2 breeding bird surveys undertaken on site in 2015, 2017 and in 2020 identified that the site supports a breeding bird assemblage of **Local value** (refer to appendix 4.4). A total of seventeen species were confirmed as breeding on site during the update survey in 2020, which included the bird species of national conservation concern skylark (*Alauda arvensis*), linnet (*Carduelis cannabina*), song thrush (*Turdus philomelos*), dunnock (*Prunella modularis*) and common whitethroat (*Sylvia communis*). The site was also identified to be of ornithological interest and value in terms of the overall assemblages of bird species recorded (all species recorded during the breeding season surveys, including all breeding, possible breeding and non-breeding records). One individual of the protected species Dartford warbler (*Sylvia undata*) was recorded on site on one occasion during the breeding bird surveys in 2017, however this species has not been recorded on site since then. No wading birds or waterfowl were recorded on site during the breeding bird surveys.

Wintering birds

10.4.44 Phase 2 wintering bird surveys undertaken on site in 2015/2016, 2017/2018 and 2021/2022 identified that the site supports a wintering bird assemblage of **Local value** (refer to appendix 4.4). The site was identified to be of value for overwintering flocks of the nationally declining farmland bird species skylark, linnet and meadow pipit (*Anthus pratensis*), as well as for its overall assemblages of birds recorded during the winter surveys. Low numbers of Dartford warbler were recorded on site during the winter surveys of 2015/2016 and 2017/2018, however this species has not been recorded on site since then. The findings of the wintering bird surveys to date are in line with the

current Solent Waders and Brent Goose Strategy 2020 which does not identify the site as being used by citation SPA/Ramsar species.

Great crested newt

10.4.45 The site provides suitable terrestrial habitat for great crested newt (*Triturus cristatus*) and the desk study returned 38 individual records of the species from a location over 1 kilometre to the north-east of the site. However, it is considered highly unlikely that great crested newt are utilising the site or any immediately adjacent land due to the considerable intervening distances between the site and any suitable waterbodies (well above the typical 500 metres dispersal distance of this species), as well as the presence of a number of significant barriers to great crested newt movements within the intervening landscape (refer to appendix 4.1). Great crested newt has therefore been **scoped out of this assessment**.

Hazel dormouse

10.4.46 The site provides suitable habitat for hazel dormouse (*Muscardinus avellanarius*) and the species is known to be present in the wider surround area, although no dormouse records within two kilometres of the site were returned in the desk study. Standard presence / absence surveys for hazel dormouse were undertaken on site in 2015, 2019 and 2021 and the species was not recorded (or any evidence to indicate its presence) (refer to appendix 4.5). It is therefore concluded that hazel dormouse is currently likely absent from the site and immediate surrounding land and is **scoped out of this assessment**.

Hedgehog

10.4.47 The site provides a substantial amount of suitable habitat for European hedgehog (*Erinaceus europaeus*) and the desk study returned 19 records of hedgehog within two kilometres of the site. It is considered that hedgehog

could potentially be utilising the site and the site would therefore be of **Local value** to this species.

Invertebrates

10.4.48 Terrestrial invertebrate surveys were conducted across the site during spring and summer 2021. These surveys recorded a total of 472 invertebrate taxa, of which, 22 have a conservation designation. This includes three S41 Priority Species / UK BAP species, one Nationally Rare species, nine Nationally Scarce, or provisionally Nationally Scarce species, one 'Vulnerable' species (likely to be reassigned Nationally Scarce in an upcoming review), one 'Rare' species (likely to be reassigned Nationally Scarce in an upcoming review), and seven Nationally Scarce - Notable species. No protected species or species of significant conservation importance were recorded. The survey work also identified the site to support three specific invertebrate assemblage types (SATs) that were in favourable condition, namely, F001 Scrub edge, F003 Scrub-heath & moorland and F112 Open short sward (refer to appendix 4.6). The survey findings indicate that the site is of **Local value** for terrestrial invertebrates.

Reptiles

10.4.49 The site provides a substantial amount of suitable habitat for common UK reptile species. A targeted Phase 2 reptile survey undertaken on the site in 2015 recorded an exceptional population of slow-worm (*Anguis fragilis*) and a good population of common lizard (*Zootoca vivipara*). An update reptile survey undertaken on site in 2020 recorded a good population of slow-worm and a low population of common lizard (refer to appendix 4.7). Although the survey results appear to have shown a decline in the populations of both slow-worm and common lizard between 2015 and 2020, the site does still provide a very substantial area of grassland and scrub mosaic that is highly suitable for these species, and, due to LCES previous experience of working on similar

development sites in the same local area where high numbers of these species have been encountered, it is therefore assumed that the populations of both slow-worm and common lizard on site could potentially be exceptional. On this basis the site is considered to be of **Regional value** for slow-worm and common lizard.

Water vole and otter

10.4.50 The desk study returned three records of European water vole (*Arvicola amphibius*) and one record of European otter (*Lutra lutra*) within two kilometres of the site (all dated between 1992 and 2009). However, a review of online mapping did not identify any watercourses in close proximity to the site that could potentially support either of these species (refer to appendix 4.1). It is therefore concluded that it is highly unlikely the development proposals will have any effect on either of these species and they have therefore been **scoped out of this assessment**.

Confirmation of Important Ecological Features

10.4.51 The identified IEFs forming the baseline for this assessment, including existing ecological features on the site and within the surrounding ZOI, together with their ecological importance, are summarised in Table 10.4 below. This includes all those ecological features valued at Local level or above which are considered IEFs requiring assessment in this Chapter, following good practice guidance as described in the Methodology section. Ecological features already discussed in this section but not considered to require further assessment and therefore scoped out, are not included.

Table 10.4 Assessment of the Magnitude of Effects

ECOLOGICAL FEATURE	ECOLOGICAL IMPORTANCE
Designated sites	

ECOLOGICAL FEATURE	ECOLOGICAL IMPORTANCE
Solent and Southampton Water Special Protection Area (SPA) and Ramsar	International
Solent Maritime Special Area of Conservation (SAC)	International
Solent and Dorset Coast SPA	International
Lee-On-The Solent to Itchen Estuary Site of Special Scientific Interest (SSSI)	National
Lincegrove and Hackett's Marshes SSSI	National
Mercury Marshes Local Nature Reserve (LNR)	Regional
Badnam Copse Site of Importance for Nature Conservation (SINC)	Regional
Mercury Marsh South SINC	Regional
Mercury Marina Saltmarsh SINC	Regional
West Wood (Royal Victoria Country Park) SINC	Regional
Mallards Moor SINC	Regional
Habitats (on-site)	
Semi-improved grassland	Local
Scrub	Local
Native hedgerows	Local
Broadleaved woodland	Local
Scattered trees	Local

ECOLOGICAL FEATURE	ECOLOGICAL IMPORTANCE
Habitats (off-site)	
Semi-improved grassland	Local
Scrub	Local
Native hedgerows	Local
Broadleaved woodland	Regional
Plantation woodland	Local
Coastal habitats	International
Urban, residential, and developed land	Local
Species or Species Groups	
Badger	Local
Bats (Roosting)	Local
Bats (Foraging and Commuting)	Regional
Breeding birds	Local
Wintering birds	Local
European hedgehog	Local
Invertebrates	Local
Reptiles	Regional

10.5 Embedded Mitigation

- 10.5.1 A suite of ecological mitigation measures and strategies have been built into the method of working (MOW) phasing plans for the proposed quarry project. The general approach taken will be to retain and enhance habitats wherever possible alongside the operational quarrying works and to gradually implement the ecological restoration plan for the site as phases of the project are completed and extraction voids back-filled to previous ground levels. In addition to this, there will also be various measures implemented during the works to prevent and limit any environmental impacts that could have indirect negative effects on IEFs within the wider ZOI.
- 10.5.2 This overall approach is considered to be the optimal mitigation strategy for this project and will function dynamically in tandem with the phases of the quarrying works. The site restoration and enhancement plan is also considered to be ambitious and aims to maximise biodiversity outcomes, including new habitat creation and re-establishment of habitats already present on site to a better condition and ecological value, as well as strengthening local habitat connectivity.

Habitats Mitigation Strategy (on-site)

Site preparation / pre-works stage

- 10.5.3 The proposed quarry working zone will include a substantial 'stand-off' area around its perimeter (refer to the boundary treatment plan, MOW and site restoration plans) and this will be utilised to maximum effect as mitigation habitat (ecological buffer) throughout the duration of the works. The width of the project 'stand-off' will be 14 metres at its narrowest point in the north-west and 103 metres at its widest point in the south, the majority of the eastern, southern and western stand-off zones will be > 40 metres in width, whilst the northern and north-western stand-off zones will be the narrowest at c. 20

metres width (refer to the boundary treatment plan). A permissive public footpath will run through the eastern, northern and north-western sections of the project stand-off, whilst the southern and western sections will be excluded from public access with the use of appropriate fencing (refer to the boundary treatment plan and MOW plan). The strategy in regards to the 'stand-off' areas will include the following elements:

- Maximum retention of existing grassland, scrub, hedgerow, broadleaved woodland and scattered trees lying within the 'stand-off' areas. This will amount to approximately 6.303 hectares of existing semi-improved grassland, 4.536 hectares of existing scrub, 0.73 kilometres of existing native hedgerows, 0.598 hectares of existing broadleaved woodland, and 31 existing scattered trees.
- Maintenance and enhancement of retained grassland via late summer mowing and removal of arisings, this management regime will be applied to 50% of the grassland within the project stand-offs on an annual rotation in order to provide a mix of both rough and more open sward structures, thereby offering more opportunities and resources for the identified fauna of interest.
- Minimal management of retained scrub stands via flailing in order to control growth and maintain access (some minor clearance of retained scrub will be required to enable access through the 'stand-off' zones and to undertake hedgerow planting).
- Enhancement of the two existing native hedgerows along the northern and north-eastern site boundaries via gap planting using a selection of native tree and shrub species, as well as implementing a low intensity management regime e.g. light biannual flailing to improve and maintain shape and structure.

- Planting of a new species-rich native hedgerow along the south-east boundary, incorporating existing mature and semi-mature pedunculate oak trees (refer to paragraph 10.5.9).
- Enhancement of the retained stands of broadleaved woodland in the north and north-west of the site, together with new woodland planting in these areas of the site connecting with and extending the existing stands of retained woodland (refer to paragraph 10.5.9).
- All retained hedgerows and areas of woodland will be suitably protected during site preparation and operation by installing suitable fencing along the root protection zones from the project outset, in accordance with British Standards Institute guidelines (BSI, 2012).
- Installation of features to benefit wild fauna, including log and brushwood piles, deadwood habitat ('loggeries'), the perimeter earth bunds will incorporate areas of open bare ground (especially those having a south-facing aspect) which will benefit invertebrates, artificial hibernacula (primarily for reptiles), bat roosting boxes, and bird nesting boxes.

Operational stages

- 10.5.4 The proposed habitats strategy within the quarry working area will primarily involve retaining, managing and enhancing existing habitats within phases of the project that are yet to be worked and to implement the site restoration plan within phases once mineral extraction is complete and they have been backfilled and restored to original ground levels.
- 10.5.5 Specific grassland and scrub management prescriptions, as well as installation of enhancement features (mainly log and brushwood piles and artificial hibernacula), will be undertaken within the yet to be worked phases so that these areas can function to maximum effect as mitigation habitat for the

important fauna whilst works progress in the preceding phases. These measures are set out in detail within the accompanying reptile surveys and mitigation report (appendix 4.7) with the principal aim being to provide an appropriate level of receptor habitat for reptiles during works, whilst at the same time offering suitable, good quality mitigation habitat for all other fauna of concern. This is considered to be the optimal overall approach within the quarry working area as existing habitat will be retained within phases for as long as possible and utilised for ecological mitigation purposes, before being cleared and worked. Habitat restoration will then commence at the earliest opportunity in each phase when complete.

10.5.6 The preservation and replacement of the indigenous topsoil is also considered to be an optimal strategy as this will help to limit the use of imported restoration soils to the underlying basal formation layer and soils in restoring ground levels and the uppermost soil profiles and will form a suitable base substrate layer upon which acid grassland habitat (similar in character and composition to that currently present on site and within local fields) can be restored.

10.5.7 When each phase is prepared for extraction works, the existing vegetation will be cleared following standard methodologies to ensure that the important fauna of concern are safeguarded from harm at all times. The approach will primarily focus on protecting reptiles, including trapping and translocation of reptiles and supervised habitat degradation and clearance works (as set out in appendix 4.7), but will also incorporate other safeguarding measures, as required, to protect the other important fauna (refer to paragraphs 10.5.8 to 10.5.17). Once all vegetation has been cleared, the existing indigenous topsoil layer of each phase will be carefully removed and then stored appropriately on site, to then be replaced when that phase of works is complete and ground levels restored. Soils stripped from the bund footprint area and phase 1 zones of the project will be used temporarily to create the perimeter bunding and will

then be re-used in restoring ground levels and indigenous topsoil within the final phases of the works at the end of the project. This is depicted in the MOW plans for the project.

- 10.5.8 An additional measure to be incorporated during the operational phase will be to seed the perimeter earth bunding with a wild game bird seed mixture after it's been constructed, and then to subsequently manage the earth bunding as an area of rough ruderal vegetation with bi-annual cutting of this vegetation and removal of arisings undertaken to control scrub establishment. It is considered that this measure will greatly enhance the operational site for birds all year-round, as well as providing opportunities and resources for other fauna including invertebrates and foraging and commuting bats.

Site restoration

- 10.5.9 The habitat restoration strategy for the project (refer to site restoration plan) has been designed to ensure that the site is restored back to natural land of substantially greater biodiversity value than it was prior to development. It is considered that the proposed restoration plan will offset the temporary losses of habitat on site and any disruption caused to important fauna during the operational phases, and will, in the long-term, result in significant positive biodiversity outcomes for the identified fauna, habitats and designated sites in the surrounding locality which share landscape connectivity with the site. The site restoration plan will include the following measures:

- Retention and enhancement of approximately 6.303 hectares of existing semi-improved grassland within the project stand-offs.
- Retention and maintenance of approximately 4.536 hectares of existing scrub within the project stand-offs.
- Retention (within the project stand-offs) and enhancement of the two existing native hedgerows along the northern and north-eastern site

boundaries, totalling 0.73 kilometres in length. Enhancement will comprise hedgerow gap planting using a selection of native tree and shrub species, as well as low intensity management e.g. light biannual flailing to improve and maintain shape and structure.

- Retention (within the project stand-offs) and enhancement of the majority of the existing stands of broadleaved woodland alongside the north-west boundaries of the site, totalling 0.598 hectares. Enhancement will consist of implementing a low intensity management regime comprising coppice management techniques and control of undesirable ground flora species, as well as undertaking planting to fill gaps and replace non-native trees and shrubs (using an appropriate mixture of native tree and shrub species).
- Retention (within the project stand-offs) of 31 existing scattered trees.
- Re-creation of approximately 39.019 hectares of rough acid grassland on site to provide a valuable habitat resource for the important fauna, including badger, foraging and commuting bats, ground-nesting birds, wintering birds, hedgehog, invertebrates and reptiles. This habitat will largely be created by allowing the sward to naturally regenerate following replacement of the indigenous topsoil layer, together with strewing of hay from a suitable local source (ideally a local source of unimproved acid and/or neutral grassland) to assist in this process. This re-created grassland will be managed and maintained via infrequent or winter livestock grazing, and/or biannual hay cutting and removal of arisings.
- Creation of approximately 2.87 hectares of open, acid grassland of botanical value within the proposed community access meadow in the far north of the site. This will provide a valuable habitat resource for the important fauna and will increase the local inland stock of botanically diverse grassland. This habitat will largely be created by allowing the

sward to naturally regenerate following replacement of the indigenous topsoil layer, together with strewing of hay from a suitable local source (ideally a local source of unimproved acid grassland) to assist in this process. It will be managed and maintained via regular livestock grazing, and/or annual late summer hay cutting and removal of arisings.

- Creation of approximately 1.831 hectares of new, mixed native scrub habitat (this is addition to the areas of retained scrub). This new scrub habitat will comprise a number of scattered stands of varying sizes and will be created by planting a range of native shrub and tree species (refer to planting scheme on Restoration and Boundary plans). The new scrub habitat on site will be maintained via coppicing and flailing, and some natural establishment of bramble (*Rubus fruticosus* agg.) will also be encouraged amongst this scrub planting to provide greater opportunities and resources for the identified fauna of interest.
- Creation of approximately 1.019 kilometres of native hedgerow on site, comprising a new hedgerow along the entire south-east boundary of the site, and another across the north-east corner of the site. New hedgerow planting will incorporate a diverse range of native shrubs, as well as native standard trees (refer to planting scheme on Restoration and Boundary plans). This hedgerow creation will be a substantial long-term enhancement to the site, improving habitat connectivity both on and off-site and providing a valuable resource for wild fauna.
- Creation (planting) of approximately 1.518 hectares of mixed broadleaved woodland mostly in the north of the site to expand and bolster the retained stands and enhance woodland connectivity both on site and with adjacent off-site areas, including non-statutory designated sites. Planting will include a selection of native tree and shrub species (refer to planting scheme on Restoration and Boundary plans) which will

aim to eventually form an acid pedunculate oak / silver birch woodland community which is regarded as being appropriate for the local soil type, with woodland ground flora species colonising the planted areas from adjacent retained stands.

- A total of 35 scattered trees will be planted on site to increase habitat heterogeneity and provide future veteran trees, as well as providing additional resources for wild fauna. Tree planting on site will use native species, mostly pedunculate oak.
- Creation of wetland habitat, including approximately 0.547 hectares of ponds and approximately 1.176 hectares of surrounding fen or marsh vegetation. A variety of native macrophytic plants will be introduced into the ponds, and the surrounding areas of damp ground will be sown with an appropriate native pond edge or marshy grassland seed mixture. A suitable long-term management regime will also be implemented to maintain the condition of the wetland habitats when established, this will likely involve management of macrophytes/pond vegetation by hand and management of fen/marsh vegetation via a combination of livestock grazing and mowing.

Biodiversity Net Gain

10.5.10 The headline results of the biodiversity metric calculation are shown in table 10.5 below, whilst the full metric spreadsheet for the project is included as appendix 4.8. To summarise, with all of the measures incorporated in the site restoration plan being implemented on site (refer to paragraph 10.5.5 above and the site restoration plan), this will result in a 10.56% BNG resulting after development which is in line with the governments mandatory BNG requirements that are currently being introduced into UK planning legislation.

Table 10.5 Results of the Biodiversity Metric 3.1 calculation for the development

	HABITAT UNITS	HEDGEROW UNITS
On-site Baseline (existing ecological baseline prior to development)	283.77	10.07
On-site post-development (including habitat retention, creation, enhancement & succession)	313.74	24.00
Total net unit change (including all habitat retention/creation)	29.97	13.93
Total net % change (including all habitat retention/creation)	10.56%	138.25%

Mitigation Strategies for Designated Sites and Off-Site Habitats

10.5.11 The proposed working methodologies, phased approach and site layout for the quarrying project have all been designed to minimise potential environmental impacts on the surrounding landscape (including off-site habitats and designated sites). Some of the key embedded mitigation features to be implemented during the works include:

- Perimeter earth bunding, ranging between 3 and 5 metres in height, which will enclose and screen the working area and mitigate for visual, noise and dust impacts.
- A substantial stand-off of retained and enhanced natural habitat surrounding the project area, between the outer edge of the earth bunding and the site boundary (refer to paragraph 10.5.2, and the MOW and site restoration plans). This will provide mitigation for noise and visual impacts, and will also maintain a reasonable level of habitat connectivity

between the site and the surrounding land during the project, mitigating for the temporary reduction in the site's ecological connectivity resulting from the land-take of the operational project.

- The project stand-offs will also include a permissible public footpath running alongside the northern and eastern boundaries which will be available for recreation and dog walking throughout the duration of the operational phases and site restoration (refer to MOW plans). It is considered that this will largely mitigate any potential negative effects on nearby statutory and non-statutory designated sites, resulting from possible indirect increases in recreational pressure, by maintaining a reasonable level of public access and recreation on the site at all times.
- The project will have only a single main site access off the B3397 Hamble Lane which will help to minimise the risks of spreading dust, silt and/or other pollutants into the surrounding land by restricting access only to the well-serviced main local thoroughfare, and to minimise trees/vegetation lost.
- The operational site will also maintain strict pollution controls, including safe storage of all chemicals, equipment and other materials in designated locations within the Plant Site.
- There is to be no discharge of water off-site and no significant dewatering that could affect groundwater levels
- Use of a wheel-wash, water bowsers and other dust suppression methods as necessary to minimise off-site dust

Mitigation Strategies for Species and Species Groups

Badger

10.5.12 No setts or signs of badger activity were recorded on the site during the 2021 survey, however this is a highly mobile species and badgers have previously been recorded in the locality. Continual checks of the site for signs of any badger activity will therefore be undertaken by suitably experienced ecologists throughout the site preparation, operational and restoration phases of the project. Where any evidence is encountered to suggest that badgers are present within operational areas of the site, the ecologist will provide advice on any further actions as necessary to ensure the species is safeguarded from harm. If any active setts are encountered up to 30 metres from operational zones of the site, then a suitable mitigation strategy will need to be implemented, either involving retention and protection of the active sett, or a sett closure and destruction exercise under licence from Natural England together with appropriate compensation measures.

Bats (Roosting)

10.5.13 One pedunculate oak tree located off-site, approximately 2 to 3 metres west of the north-west boundary (identified as tree T6 on the arboriculture survey plans), was assessed as holding low potential to support roosting bats (refer to appendix 4.3) and this will require felling to create the main site access point. Consequently, an appropriate tree-climbing inspection survey will be conducted on this tree immediately prior to felling to check there are no roosting bats present. If roosting bats are present, then a Natural England mitigation licence will need to be obtained to facilitate the works.

10.5.14 Numerous bat roosting boxes will be installed on suitably mature retained woodland and hedgerow trees within the 'stand-off' areas from the outset of the project. It is considered that this will substantially benefit local bat populations by providing a good level of roosting opportunities on site throughout the duration of the project and long-term post restoration.

Bats (Foraging and commuting)

10.5.15 The habitat strategies for the project during operation, restoration and post restoration (refer to paragraphs 10.5.1 to 10.5.9 and the reptile mitigation strategy in appendix 4.7) will all ensure that a suitable level of good quality mitigation habitat with good connectivity to the surrounding landscape is available on site for foraging and commuting bats throughout the operational and restoration phases of the project. The habitats strategies will also ensure that the site is significantly enhanced for foraging and commuting bats in the long-term post restoration. The operational quarry working hours will be no later than 17:00 and there will be no night-time working or use of flood lights involved, therefore no significant mitigation measures to limit lighting disturbance impacts on foraging and commuting bats are required.

Breeding birds

10.5.16 Numerous bird nesting boxes will be installed on suitably mature retained woodland and hedgerow trees within the 'stand-off' areas from the outset of the project. It is considered that this will substantially benefit arboreal nesting bird species on site each year by providing a good level and variety of nesting opportunities on site throughout the duration of the project and long-term post restoration.

10.5.17 The habitat strategies for the project during operation, restoration and post restoration (refer to paragraphs 10.5.1 to 10.5.9 and the reptile mitigation strategy in appendix 4.7) will all ensure that a suitable level of good quality mitigation habitat with good connectivity to the surrounding landscape is available on site for breeding birds (including both arboreal and ground nesting species) throughout the operational and restoration phases of the project. The habitats strategies will also ensure that the site is significantly enhanced for breeding birds in the long-term post restoration.

10.5.18 To avoid the risk of disturbing, injuring or killing nesting birds, all vegetation clearance required as part of any site preparation works should ideally be

undertaken outside of the bird nesting season which is considered to run from March to August (inclusive). Where any vegetation must be cleared within the nesting bird season, it must first be checked by an ecologist for the presence of nesting birds (including both arboreal and ground nesting species) immediately prior to clearance. Should any active nests be encountered, the clearance in those particular areas must be postponed and a suitable protection zone established until either the nestlings have fledged or the nest is abandoned.

Wintering birds

10.5.19 The habitats strategies for the project during operation, restoration and post restoration (refer to paragraphs 10.5.1 to 10.5.9 and the reptile mitigation strategy in appendix 4.7) will all ensure that a suitable level of good quality mitigation habitat with good connectivity to the surrounding landscape is available on site for wintering birds (including both resident and migrant species) throughout the operational and restoration phases of the project. The habitats strategies will also ensure that the site is significantly enhanced for wintering birds in the long-term post restoration.

European hedgehog

10.5.20 The habitats strategies for the project during operation, restoration and post restoration (refer to paragraphs 10.5.1 to 10.5.9 and the reptile mitigation strategy in appendix 4.7) will all ensure that a suitable level of good quality mitigation habitat, with suitable refuge and hibernacula features and good connectivity to the surrounding landscape, is available on site for hedgehog throughout the operational and restoration phases of the project. The habitats

strategies will also ensure that the site is significantly enhanced for hedgehog in the long-term post restoration.

- 10.5.21 Ecological exclusion fencing will ensure that hedgehogs cannot enter operational areas of the quarrying works and are thereby safeguarded from harm. However, they will be able to utilise internal receptor habitat within the works zone of the project via a single access tunnel within the eastern perimeter bund line fitted with a mesh with gaps large enough to allow hedgehog movements. Any hedgehogs encountered during supervised clearance and preparation of phases will be suitably relocated to receptor habitat within the site stand-off areas (refer to the reptile mitigation strategy in appendix 4.7). Hedgehogs will also be able to access the early restored phases of the project, when these are sufficiently ready to begin accepting reptiles and other fauna, via an access tunnel in the west bunding line.

Invertebrates

- 10.5.22 The habitats strategies for the project during operation, restoration, and post restoration (refer to paragraphs 10.5.1 to 10.5.9 and the reptile mitigation strategy in appendix 4.7) will all ensure that a suitable level of good quality mitigation habitat, which will include a high level of structural diversity, creating a good range of microhabitats that will be utilised by both invertebrates and reptiles (see Edgar *et al.* 2010 for example). It is essential that important invertebrate habitats and foodplants be retained during the operational and restoration phases which will enable rare, scarce, and conservation priority species recorded on site to persist. Substantial areas of important habitat, such as the botanically diverse acid grassland element (recorded along the north-eastern boundary), and areas of semi-improved grassland dominated by bird's-foot trefoil (*Lotus corniculatus*) (recorded in the south-east) will be retained within the project 'stand-offs'. These areas supported the vast majority of notable grassland invertebrate species, including the S41 small

heath butterfly (*Coenonympha pamphilus*). The following habitats and plant species that should be retained will include, but will not be limited to, herb rich open grassland areas with yarrow (*Achillea millefolium*), ribwort plantain (*Plantago lanceolata*), mugwort (*Artemisia vulgaris*) and other asteraceae, and various umbellifers, such as hogweed (*Heracleum sphondylium*), as well as retaining taller tussocky grassland areas, and areas of bramble (*Rubus fruticosus* agg.) scrub. Retaining a full range of broom (*Cytisus scoparius*) age groups is very important for the Nationally Rare Wormwood Beetle (*Dryophilus anobioides*), and the provisionally Nationally Scarce Acalyptatae fly (*Micropeza lateralis*) both of which are restricted to this plant species. The habitats strategies will ensure that the site is significantly enhanced for invertebrates in the long-term post restoration.

Reptiles

- 10.5.23 A detailed phased reptile mitigation strategy for the project is provided in appendix 4.7.
- 10.5.24 The habitat restoration strategy for the project will ensure that the site is significantly enhanced for reptiles in the long-term post restoration.

10.6 Likely Significant Environmental Effects

Operational Phase (Extraction and Restoration)

Statutory designated sites

- 10.6.1 The statutory designated sites referred to are Solent and Southampton Water SPA and Ramsar, Solent Maritime SAC, Lee-On-The Solent to Itchen Estuary SSSI, Lincegrove and Hackett's Marshes SSSI, and Mercury Marshes LNR.
- 10.6.2 The identified statutory designated sites forming the baseline ecological features for this assessment all comprise part of the UK's National Site Network, being either designated as SACs and SPAs, or being a constituent site within an SAC or SPA designated area. Due to the close proximity of these NSN sites to the proposed project location, a Habitats Regulations Assessment (HRA) was therefore undertaken to suitably assess possible impacts and effects that may result from the proposed works (refer to appendix 4.2). The HRA concluded that **the proposals will not have an adverse effect on the integrity of the NSN sites identified above, either alone or in combination with other plans and projects.**

Non-statutory designated sites

- 10.6.3 The non-statutory designated sites referred to are Badnam Copse SINC, Mercury Marsh South SINC, Mercury Marina Saltmarsh SINC, West Wood (Royal Victoria Country Park) SINC, and Mallards Moor SINC.
- 10.6.4 Taking into account the low impact nature of the working methodologies and phased approach, with only a single main site access off the B3397 Hamble Lane, as well as the embedded mitigation including pollution controls, earth bunding around the perimeter of the working zone and a substantial 'stand-off' of natural habitat, and other factors such as the absence of any major surface water linkages with the surrounding land, it is considered highly unlikely that

there will be any significant negative effects on these nearby non-statutory sites. This view is supported by the Habitats Regulations Assessment undertaken for the project (refer to appendix 4.2).

10.6.5 The pre-application advice for the proposed project, provided by Hampshire County Council (Pre-app Ref: PRE/2016/0280) raised concerns about potential impacts to and the site's existing connectivity with three nearby non-statutory sites which are likely to support priority broadleaved woodland habitat, namely Badnam Copse SINC, Mallards Moor SINC and West Wood SINC. Mallards Moor and West Wood were scoped out of any further baseline botanical surveys due to the substantial intervening distances and negligible risk of any direct operational impacts from the project to these sites (regardless of woodland habitat quality). However, Badnam Copse, was considered to be at some risk of direct operational impacts due to its close proximity to the north-east boundary of the site, although access to undertake a detailed botanical survey of this site was refused. Despite the close proximity of Badnam Copse, it is considered highly unlikely that there will be any significant negative impacts to this site during the operational and restoration phases due to the following:

- The presence of the perimeter earth bunding which will enclose the works.
- The substantial stand-off of natural habitat provided on site.
- The presence of a substantial area of intervening land, covering a distance of between approximately 65 and 185 metres, which comprises Satchell Lane, areas of grassland and scrub, native hedgerows and at least two large residential properties.
- The fact that there will be no heavy goods vehicles associated with the project (which can potentially spread pollutants, dust and silt) using

Satchell Lane at any time, other than potentially in the exceptional case of a very local delivery being required south of the site, as they will be routed north out of the site along Hamble Lane.

- The site is private land and there are no designated public footpaths into the SINC (although it is acknowledged that there are designated public footpaths which briefly pass alongside its western and north-eastern edges).

10.6.6 It is considered that the project stand-offs around the northern boundaries of the site, which will incorporate retained native hedgerows and stands of broadleaved woodland, new broadleaved woodland and scrub planting, and some retained dry acid grassland, will mitigate for any temporary reductions in the site's ecological connectivity with these three non-statutory sites (Badnam Copse SINC, Mallards Moor SINC and West Wood SINC) during the operational phases and site restoration.

10.6.7 The project stand-offs will also include a permissible public footpath running alongside the northern and eastern boundaries which will be available for public commuting, recreation and dog walking throughout the duration of the operational phases and site restoration (refer to MOW plans). It is considered that this will largely mitigate any potential negative effects on nearby non-statutory sites, resulting from possible indirect increases in recreational pressure (caused by displacement of the current level of informal public usage of the site), by maintaining a reasonable level of public access and recreation on the site at all times.

10.6.8 On the basis of these points discussed above and the embedded mitigation to be implemented for the project, it is concluded that the magnitude of any

negative effects on non-statutory designated sites within the ZOI will be **negligible and not significant**.

Habitats (on-site)

- 10.6.9 The existing habitats on site are semi-improved grassland, scrub, native hedgerows, broadleaved woodland and scattered trees.

Semi-improved grassland

- 10.6.10 The proposed works will result in a short-term temporary loss of approximately 31.63 hectares of semi-improved grassland habitat on site, however this loss will not occur in a single instance but will take place gradually, in stages, as the operation phases of the project progress, and grassland habitat will also begin to be restored as soon as project phases are complete, following the restoration plan to create approximately 39.019 hectares of rough acid grassland and 2.87 hectares of botanically-rich acid grassland on site. There will also be retention and enhancement of approximately 6.303 hectares of semi-improved grassland encompassed within the project 'stand-off' (buffer) zones. So therefore, it is predicted that throughout the duration of the works there will be substantial areas of semi-improved grassland present, both retained and newly created, and any losses will be temporary and short term. Taking these factors into account and the mostly low botanical value and poor condition of the existing semi-improved grassland habitat on site, it is therefore concluded that the magnitude of the effect is **low and not significant**.

Scrub

- 10.6.11 The project proposals will result in a permanent loss of approximately 15.3 hectares of existing scrub habitat on site, although this loss will not occur in a single instance but will take place gradually, in stages, as the operational phases of the project progress. A substantial amount of existing scrub, totalling approximately 4.536 hectares in size, will be retained within the project 'stand-

off' (buffer) zones. There will also be approximately 1.831 hectares of new mixed, native scrub creation as part of the site restoration plan and this will be implemented as soon as project phases are complete. It is considered that the loss of scrub habitat will be suitably offset by the combination of habitat creation measures to be implemented as part of the site restoration plan, including grassland, scrub, woodland and wetland creation, which will provide a more heterogeneous and valuable habitat mosaic on site. Taking these factors into account and the mostly low botanical value and poor condition of the existing scrub on site which largely comprises thickets of bramble, it is therefore concluded that the magnitude of the effect is **moderate and not significant**.

Native hedgerows

10.6.12 The project proposals will retain and preserve the two existing native hedgerows within the project 'stand-off' (buffer) zones throughout the duration of the operational phases, with appropriate tree protection installed. The hedgerows will also be enhanced with gap planting and management from the outset of the project. There will also be a substantial amount of new native hedgerow planting as part of the site restoration, including a length along the entire south-east boundary of the site which will be created within the stand-off at the outset of the project. Taking these factors into account it is therefore concluded that the project will have **a positive effect** in relation to native hedgerows on site that is of **moderate magnitude and minor significance**.

Broadleaved woodland

10.6.13 The project proposals will result in a minor loss of approximately 0.026 hectares of broadleaved woodland in order to create the main site access for the project, however the remaining areas of existing broadleaved woodland (approximately 0.598 hectares) will be retained and preserved within the project 'stand-off' (buffer) zones throughout the duration of the operational

phases, with appropriate tree protection installed. These stands of woodland will also be enhanced with a suitable management regime being implemented from the outset of the project, and there will also be some new woodland planting undertaken within the 'stand-off' zones from the outset. As part of the restoration plan for the site, a total of 1.518 hectares of broadleaved woodland will be created on site, using a mix of suitable native tree and shrub species. Taking these factors into account it is therefore concluded that the project will have **an overall positive effect** on broadleaved woodland habitat that is of **moderate magnitude** and **not significant**.

Scattered trees

- 10.6.14 The project proposals will result in a loss of 14 existing trees (equating to approximately 0.51 hectares of scattered tree habitat in the BNG metric). There will also be a loss of three trees located off-site approximately 2 to 3 metres west of the north-west boundary, which is required to create the main site access point. This loss of trees will not occur in a single instance but will take place gradually, in stages, as the operational phases of the project progress. A substantial number of existing scattered trees (31 trees in total) will be retained within the project 'stand-off', with up to 7 of these to be incorporated within new native hedgerow planting along the south-east boundary as part of the site restoration. There will also be a substantial amount of new native scattered trees (35 new trees in total, equating to approximately 1.2819 hectares in the BNG metric) being planted as part of the site restoration. The proposed woodland planting will also result in a significant increase in native broadleaved tree cover on the site. Taking these factors into account it is therefore concluded that the project will have an overall, **long-**

term positive effect in terms of scattered trees that is of **negligible magnitude and not significant**.

Habitats (off-site)

- 10.6.15 The habitats off-site are semi-improved grassland, scrub, native hedgerows, broadleaved woodland, plantation woodland, coastal habitats, and urban, residential, and developed land.
- 10.6.16 Taking into account the low impact nature of the working methodologies and phased approach, with only a single main site access off the B3397 Hamble Lane, as well as the embedded mitigation including pollution controls, earth bunding around the perimeter of the working zone and a substantial ‘stand-off’ of natural habitat, and other factors such as the absence of any major surface water linkages with the surrounding land, it is therefore considered highly unlikely that there will be any significant negative effects on off-site habitats during the operational and restoration phases of the proposed project. This view is supported by the Habitats Regulations Assessment undertaken for the project (refer to appendix 4.2).
- 10.6.17 It is also considered that the suite of habitat retention, enhancement and creation measures to be implemented throughout the project’s ‘stand-off’ (buffer) zones will have **a positive effect** on off-site habitats primarily in terms of strengthening ecological connectivity between the site and adjacent off-site habitats, particularly adjacent stands of scrub, native hedgerows, broadleaved woodland and semi-improved grasslands surrounding the site to the north-east, north and north-west. It is expected that this positive effect will become more pronounced over successive years following commencement of the project as habitats within the ‘stand-off’ areas become more established and as further areas within the site begin habitat restoration when quarrying phases have been completed. The magnitude of these anticipated positive

effects during operation and restoration is expected to be **low and of minor significance**.

Species or Species Groups

Badgers

10.6.18 The proposed works will result in a temporary loss of suitable habitat for badger on site, including semi-improved grassland and scrub. However suitable habitat of high suitability for badger will be provided within the project 'stand-off' throughout the operational and restoration phases. Based on the survey findings to date, it is assumed that badgers are currently likely absent from the site (possibly dissuaded by the current levels of public recreation and dog walking), although they are known to be present in the wider locality and therefore appropriate precautionary measures will be in place during site preparation and habitat clearance works, with continuous checks undertaken for any evidence of badger activity. Taking this into account, the magnitude of any negative effects on badger are expected to be **negligible and not significant**.

Bats (roosting)

10.6.19 No trees with potential to support roosting bats were identified within the site during the update survey work undertaken in 2021, however one tree located off-site, approximately 2 to 3 metres west of the north-west boundary, which will require felling to create the main site access point, was assessed as holding low potential to support roosting bats. Consequently, an appropriate tree-climbing inspection survey will be conducted on this tree immediately prior to felling to check there are no roosting bats present. If roosting bats are

present, then a Natural England mitigation licence will be obtained to facilitate the works.

- 10.6.20 Numerous bat roosting boxes will be installed on suitably mature retained woodland and hedgerow trees within the ‘stand-off’ areas from the outset of the project, and it is considered that this will substantially benefit local bat populations in the long-term. Taking these factors into account, it is concluded that there will be **an overall positive effect** on roosting bats during the operational and restoration phase of the project as substantially more roosting opportunities are provided from the outset, the magnitude of the positive effect is expected to be **low and not significant**.

Bats (foraging and commuting)

- 10.6.21 The proposed works will result in a temporary loss of suitable habitat for foraging and commuting bats on site, including semi-improved grassland and scrub, however there will be a substantial level of existing habitat retained and enhanced within the project ‘stand-off’ throughout the operational and restoration phases (as well as some new broadleaved woodland planting within the ‘stand-off’), and this will be maintained as dark, unlit habitat zones at all times. There will also be minimal to no disturbance impacts on foraging and commuting bats caused by lightning systems because the operational quarry working hours will be no later than 17:00 and there will be no night-time working or use of flood lights involved.
- 10.6.22 In addition to this, existing habitat within later phases of the project will be retained and enhanced as part of the reptile mitigation strategy (refer to appendix 4.7) and there will be a wild game bird seed mixture initially sown across the perimeter earth bunds followed by subsequent management to maintain the bunding as an area of rough ruderal vegetation. These measures will also benefit foraging and commuting bats during the operational phases and provide substantial areas of good quality habitat on site that they can

utilise. In addition, when phases of the project are completed and the habitat restoration plan is implemented in these areas, this will provide new areas of mitigation habitat for foraging and commuting bats during later stages of the operational phase. However, it is acknowledged that there will be a substantial loss of suitable bat foraging and commuting habitat occurring over the course of the operational phase, particularly the loss of grassland and scrub, and there will be a time delay in terms of the habitats within the restored phases becoming suitable.

- 10.6.23 Taking all of these factors into account, it is concluded that substantial areas of good quality foraging and commuting habitat for bats will be present on site at all stages of the project. Although, it is expected that there will inevitably be a level of disruption caused to foraging and commuting bats during the time between phases being worked and habitats within the restored land becoming suitable. It is expected that any negative effects could be **moderate and of minor significance**, although these would only be short-term and then soon offset in the post-restoration period.

Breeding birds

- 10.6.24 The proposed works will result in a temporary loss of suitable habitat for breeding birds on site, including semi-improved grassland and scrub, however there will be a substantial level of existing habitat retained and enhanced within the project 'stand-off' throughout the operational and restoration phases (together with new hedgerow and broadleaved woodland planting), as well as a wild game bird seed mixture initially sown across the perimeter earth bunds followed by subsequent management to maintain the bunding as an area of rough ruderal vegetation. This will all provide a substantial variety of nesting and foraging opportunities for both arboreal and ground-nesting species. There will also be a provision of numerous bird nesting boxes on suitable retained mature trees. In addition to this, existing habitat within later phases of

the project will be retained and enhanced as part of the reptile mitigation strategy (refer to appendix 4.7) and this will also benefit breeding birds during the early operational phases and provide areas of good quality habitat on site that they can utilise during works. In addition, when phases of the project are completed and the habitat restoration plan is implemented in these areas, this will provide new areas of mitigation habitat for breeding birds during later stages of the operational phase.

10.6.25 It is acknowledged that there will be a substantial short-term loss of suitable breeding habitat occurring over the course of the operational phase, particularly the loss of scrub and grassland, and there will be a time delay in terms of the restored phases becoming suitable for breeding birds. This will inevitably cause a level of disruption to breeding birds during the operation phase. However, it is concluded that substantial areas of good quality breeding habitat, suitable for all bird species recorded during the field survey work to date (including the nationally declining farmland bird species starling, skylark, linnet and meadow pipit, and other notable species such as Dartford warbler), will be present on site during all stages of the project. It is also considered that there will be a beneficial effect on breeding birds in terms of a significant reduction in disturbance from public recreation and dog walking due to public access being restricted to only the permissive footpath, and the operational works themselves (which will not involve any use of explosives) are expected to cause very minor levels of disturbance to breeding birds as these will be focussed only on live working phases of the project with all unworked phases and perimeter bunds not subject to any anthropogenic activities or movements of vehicles or plant during the bird nesting season. Taking all of these factors into account, it is expected that any adverse effects could be at worst **moderate and not significant**.

Wintering birds

10.6.26 The proposed works will result in a temporary loss of suitable habitat and foraging resources for wintering birds on site, mostly comprising areas of semi-improved grassland and scrub. However good quality habitat with improved connectivity will be provided within the project 'stand-off' throughout the operational phases, and these will incorporate a substantial amount and variety of overwinter foraging resources including retained and enhanced grassland, scrub, hedgerows and broadleaved woodland habitats, as well as new hedgerow and broadleaved woodland planting, and a wild game bird seed mixture initially sown across the perimeter earth bunds followed by subsequent management to maintain the bunding as an area of rough ruderal vegetation. This will all provide a substantial variety of foraging opportunities, including seeds, berries, other fruits, and invertebrates, which would cater to all species recorded during the fieldwork. Existing habitat within later phases of the project will be retained and enhanced as part of the reptile mitigation strategy (refer to appendix 4.7) and this will also benefit wintering birds during the early operational phases and provide additional areas of good quality winter foraging habitat on site that they can utilise during works. In addition, when phases of the project are completed and the habitat restoration plan starts to be implemented in these areas, this will provide new areas of mitigation habitat for wintering birds during latter stages of the operational phase.

10.6.27 It is acknowledged that there will be a substantial short-term loss of suitable wintering habitat occurring over the course of the operational phase, particularly the loss of grassland and scrub, and there will be a time delay in terms of the restored phases becoming suitable for wintering birds. This will inevitably cause a level of disruption to wintering birds during the operation phase. However, it is concluded that substantial areas of good quality wintering habitat resources, suitable for all bird species recorded during the field survey work (including the nationally declining farmland bird species starling, skylark,

linnet and meadow pipit, and other notable species such as Dartford warbler), will be present on site during all stages of the project. It is also considered that there will be a beneficial effect on wintering birds in terms of a significant reduction in disturbance from public recreation and dog walking due to public access being restricted to only the permissive footpath, and the operational works themselves (which will not involve any use of explosives) are expected to cause very minor levels of disturbance to wintering birds as these will be focussed only on live working phases of the project with all unworked phases only subject to brief habitat maintenance works by sub-contractors between September and February (inclusive). Taking all of these factors into account, it is expected that any adverse effects could be at worst **moderate and not significant**.

Hedgehog

10.6.28 The proposed works will result in a temporary loss of suitable habitat for European hedgehog on site, including semi-improved grassland and scrub, which could potentially result in local population declines in the species. However, good quality habitat with improved connectivity will be provided within the project 'stand-off' throughout the operational and restoration phases, and this will provide substantial foraging and commuting opportunities for hedgehog, as well as potential hibernation features such as log and brushwood piles. In addition to this, when phases of the project are completed and the habitat restoration plan is implemented in these areas, this will provide new areas of mitigation habitat for hedgehog to colonise, with access provided via a passageway within the perimeter bunding. Taking all of these factors into account, it is therefore concluded that any negative effects will be **low and not significant**.

Invertebrates

- 10.6.29 The proposed works will result in a temporary loss of suitable habitat for terrestrial invertebrates on site, including semi-improved grassland and scrub, which could potentially result in local population declines in various species of interest and conservation concern. However, good quality habitat with improved connectivity will be provided within the project 'stand-off' throughout the operational and restoration phases. A wild game bird seed mixture will be initially sown across the perimeter earth bunds followed by subsequent management to maintain the bunding as an area of rough ruderal vegetation, with areas of open bare ground, which is especially important on south-facing aspects. This will all provide a substantial variety of habitat resources and opportunities for invertebrates, including potential nesting and hibernation features. In addition to this, existing habitat within later phases of the project will be retained and enhanced as part of the reptile mitigation strategy (refer to appendix 4.7) and this will also benefit terrestrial invertebrates during the early operational phases and provide areas of good quality habitat on site that they can utilise.
- 10.6.30 In addition, when phases of the project are completed and the habitat restoration plan is implemented in these areas, this will provide new areas of mitigation habitat for invertebrates during later stages of the operational phase. Taking all these factors into account, it is concluded that substantial areas of good quality habitat, suitable for the vast majority of the invertebrate species recorded during the field survey work, will be present on site at all stages of the project. Although, it is expected that there will inevitably be a level of disruption caused to invertebrates during the time between phases being worked and the restored land becoming suitable as supporting habitat. It is expected that any negative effects could be at worst **moderate and not significant**.

Reptiles

10.6.31 The proposed works will result in temporary losses of suitable habitat for slow-worm and common lizard on site, including semi-improved grassland and scrub, which could potentially result in local population declines in these species. There is also potential for injury and/or deaths of individual reptiles during site preparation and the operational works without suitable mitigation. A detailed and carefully considered mitigation strategy for reptiles (as set out in appendix 4.7) will be implemented on the site, which will largely entail temporary relocation of reptiles to suitable receptor areas within the site and exclusion from active operational zones. It is considered to be the optimal reptile mitigation strategy for this project and should ensure that the conservation statuses of both slow-worm and common lizard on site will be largely preserved. However, it is acknowledged that there will be a substantial loss of suitable habitat for reptiles occurring over the course of the operational phase, particularly the loss of grassland and scrub, and there will be a time delay in terms of the habitats within the restored phases becoming suitable. This will inevitably result in some level of disruption being caused to the reptile populations on site during the works. The potential for any significant adverse effects on reptiles as a result of shading from the earth bunding line is considered to be minor and only likely to be an issue along the northern section of the stand-off zone where it is narrowest. The other sections of the perimeter stand-off zone are of a generous width (refer to the boundary treatment plan) and therefore unlikely to be significantly shaded by the bunding line. Reptiles will also have the freedom to move anywhere within the stand-off zone or into off-site land if shading becomes an issue in a particular location at a particular time of day. Shading from the bunding line is not considered to be an issue for reptiles inside the working area as there will be ample open spaces within both the temporary receptor areas and restored phases for them to move around in and avoid shading. In summary, it is expected that any negative effects on reptiles could be at worst **moderate and**

of minor significance, although these would only be short-term and then soon offset in the post-restoration period.

Post Restoration

Statutory designated sites

10.6.32 In the long-term after restoration, it is considered that the site will potentially have a positive effect on the identified statutory sites in terms of providing a much-enhanced biodiversity link (improved habitat connectivity) within the wider local landscape which will better facilitate the movements and dispersal of species between local sites, as well as adding to the local supply of good quality (higher value) habitat resources. It is also considered that the restored site will function better as a natural buffer against the adjacent urbanised areas and infrastructure, offering more natural screening and improved ecosystem services, for example increased interception of rainwater, soil stability and absorption of air pollution due to the 2.8 hectares net gain in broadleaved woodland, creation of 3.4 hectares of mixed native woody scrub, and 1.019 kilometres net gain in native hedgerows, on site (Quine *et al.*, 2011). This is only likely to have beneficial effects on the identified statutory sites and their qualifying features (both flora and fauna).

10.6.33 There is also potential that the wetland habitats created on site, including ponds with surrounding damp fen vegetation, may provide suitable habitat for citation waterbird species which typically use the identified NSN sites for breeding and/or overwintering. So therefore, the restored site could increase the local availability of suitable habitat resources to support citation bird species.

10.6.34 Following restoration, a substantial area of the site will be freely accessible to the public for commuting (on foot), recreation and dog walking purposes. The footpath to be established on site during the operational phase will also be retained and extended further southwards alongside the north-eastern

boundary, thereby offering more scope for public use of the site and increased connectivity with off-site pedestrian routes. There will also be an accessible community meadow established in the north-east corner of the site for public use. Taking these factors into account, it is predicted that previous levels of public recreation (informal) on the site will largely be maintained and therefore it is considered highly unlikely that there will be any abnormal increases in recreational pressure on the identified statutory sites as an indirect consequence of the site proposals (post restoration).

10.6.35 On the basis of these points discussed above, it is expected that there will be **an overall long-term positive effect** on statutory designated sites post restoration, this would be of **low magnitude and minor significance**.

Non-statutory designated sites

10.6.36 In the long-term after restoration, it is considered that the site will likely have a positive effect on the identified non-statutory sites in terms of fulfilling its potential as a valuable biodiversity link within the wider local landscape (appendix I; EBC, 2012) which will better facilitate the movements and dispersal of species between local sites, as well as adding to the local supply of good quality (higher value) habitat resources. In particular, it is expected that the site will have much improved connectivity with the Badnam Copse, West Wood (Royal Victoria Country Park) and Mallards Moor SINC's due to the substantial level of broadleaved woodland and mixed scrub habitat to be created alongside the northern site boundaries, as well as retention and enhancement of existing stands of broadleaved woodland and native hedgerows in this part of the site (refer to the site restoration plan).

10.6.37 It is also considered that the restored site will function better as a natural buffer against the adjacent urbanised areas and infrastructure, offering more natural screening and enhanced ecosystem services, for example increased interception of rainwater, soil stability and absorption of air pollution due to the

increase in broadleaved tree and shrub cover on site (Quine *et al.*, 2011). This is only likely to have beneficial effects on the identified non-statutory sites and their flora and fauna.

10.6.38 Based on the points discussed above, it is considered highly unlikely that there will be any abnormal increases in recreational pressure on identified non-statutory sites as an indirect consequence of the site proposals (post restoration).

10.6.39 On the basis of these points discussed above, it is expected that there will be **an overall long-term positive effect** on non-statutory designated sites post restoration, this would be of **low magnitude and minor significance**.

Habitats (on-site)

Semi-improved grassland

10.6.40 The restoration plan for the site will re-establish approximately 39.019 hectares of rough acid grassland and create approximately 2.87 hectares of botanically-diverse dry acid grassland. It is considered that this will result in a substantially improved (and considerably larger) grassland habitat resource being available on site, compared with what currently exists. It will offer both rough and open sward structures and thereby maximise its benefit for a wide range of fauna, and there will also be greater botanical diversity across the more regularly managed area of grassland. Taking these factors into account it is considered that there will be a substantially improved grassland resource of greater ecological value post restoration, it is concluded that the magnitude of the effect is **moderate and not significant**.

Scrub

10.6.41 After restoration the project proposals will result in a permanent loss of approximately 15.3 hectares of existing scrub habitat on site. While this is a

substantial habitat loss, it is considered that this will be off-set by the combination of habitat creation measures to be implemented as part of the site restoration plan, including grassland, hedgerow, woodland, wetland and fen habitat creation, as well as 1.831 hectares of new mixed native woody scrub, and these habitats will collectively be of greater ecological value. The existing scrub on site is mostly of low ecological value and in poor condition, largely comprising thickets of bramble, and there are also substantial resources of scrub habitat present within the surrounding landscape, for example along the adjacent rail line to the north of the site. Taking all of these factors into account, it is concluded that the magnitude of the effect is **moderate and not significant**.

Native hedgerows

10.6.42 After restoration, it is expected that the two retained and enhanced native hedgerows on site will be in substantially better condition and of greater ecological value with improved connectivity. This is because at that stage all gap planting should have matured and the management regime applied will have improved the hedgerow shape and structure. There will also be a substantial amount of new, species-rich native hedgerow planting established on site, including a length along the entire south-east boundary of the site linking with the existing hedgerow along the north-east boundary, and a new length of native hedgerow with standard trees across the north-east corner of the site. Taking these factors into account it is therefore concluded that the project will have a substantial **overall positive effect** in terms of native hedgerows on site that is of **moderate magnitude and minor significance**.

Broadleaved woodland

10.6.43 After restoration, there will be a substantially greater resource of broadleaved woodland habitat on site in the long-term. However, the majority of this will be at a very early growth stage immediately after project completion and will take

a number of decades to mature into more established woodland habitat with distinct canopy and understorey layers. The existing retained stands of broadleaved woodland will be expected to be in better condition after project completion following implementation of woodland management prescriptions and it is also expected that the canopy and understorey layers will have matured to some degree over the lifespan of the project. Aside from this, the significant long-term gain in broadleaved woodland habitat on site, with substantial stands being formed alongside the northern boundaries of the site incorporating existing woodland and new planting, will be a **positive effect of moderate magnitude and not significant**.

Scattered trees

- 10.6.44 After restoration, there will be a modest net increase of 21 scattered trees on site (equating to 0.7692 hectares in the BNG metric) as a result of the proposed planting and these will increase in ecological value in the long term as they mature. It is considered that the tree planting on site will eventually offset the initial loss of trees (mostly unexceptional semi-mature specimens) required during clearance of the project site, as well as the clearance of three off-site trees for the site access. It is concluded that the project will have **an overall, long-term positive effect** in terms of scattered trees that is of **low magnitude and not significant**.

Habitats (off-site)

- 10.6.45 After completion of the project and when the proposed habitat restoration plan has been implemented, it is considered that there will be **a positive overall effect** on off-site habitats. This will primarily be in terms of strengthening ecological connectivity between the site and adjacent off-site habitats, particularly adjacent stands of scrub, native hedgerows, broadleaved woodland and semi-improved grasslands all surrounding the site to the north-

east, north and north-west, as well as with habitats in the wider surrounding landscape.

- 10.6.46 It is considered that the proposed habitat restoration plan will maximise the site's long-term value as a link within the wider local habitat network (EBC, 2012 & 2014a). It is expected that these positive effects will become more pronounced over successive years following completion of the project as habitats become more established together with continual management regimes being implemented to enhance habitat condition. The magnitude of these anticipated positive effects post-restoration is expected to be **moderate and of minor significance**.

Species or Species Groups

Badgers

- 10.6.47 In the long-term after restoration, it is considered that the site will be of substantially greater suitability for badger with a greater extent of broadleaved woodland cover and native hedgerows as well as better quality grassland habitat, all of which will provide improved foraging opportunities, more suitable locations to construct setts, and improved habitat connectivity to facilitate commuting and dispersal within the local landscape. Although badgers are currently assumed likely absent from the site, it is considered that after restoration, with a better-quality mosaic of habitats created, there will be a greater likelihood that they might start to use the site. This **overall, long-term positive effect** is expected to be of **low magnitude and not significant**.

Bats (roosting)

- 10.6.48 In the long-term after restoration, it is considered that the site will be of substantially higher suitability for roosting bats with a good number of roosting boxes remaining in situ on retained mature hedgerow and woodland trees (installed during the outset of the operational phase), as well as a substantial

amount of native tree planting as part of the habitat creation measures, which in the long-term are expected to provide more potential roosting opportunities (natural roosting features) as they mature. This **overall, long-term positive effect** is expected to be of **low magnitude and not significant**.

Bats (foraging and commuting)

10.6.49 In the long-term after restoration, it is considered that the site will be of substantially greater value to foraging and commuting bats with a greater extent of broadleaved woodland cover and native hedgerows as well as enhanced grassland habitat and some wetland habitat, all of which will provide a greater diversity of foraging opportunities, as well as substantially improved habitat connectivity to facilitate commuting within the local landscape. This positive effect is expected to become more pronounced in the long term as the habitats on site become more established and it could potentially result in small local increases in numbers of bats and/or draw in a greater diversity of bat species, especially given the large size of the site and extent of the habitat restoration strategy. There will also be no lighting included on site as part of the restoration strategy, so therefore no lighting disturbance should restrict the use of the site by foraging and commuting bats. These **overall, long-term positive effects** are expected to be of **moderate magnitude and minor significance**.

Breeding birds

10.6.50 In the long-term after restoration, it is considered that the site will be of substantially greater value to breeding birds with a greater extent of broadleaved woodland cover and native hedgerows as well as better quality grassland habitat and some wetland habitat, all of which will provide a greater abundance and diversity of both nesting and foraging opportunities, as well as substantially improved habitat connectivity to facilitate commuting within the local landscape. There will be a good number of bird nesting boxes remaining

in situ on retained mature hedgerow and woodland trees (installed during the outset of the operational phase) and the habitat creation strategy will provide a diversity of good quality nesting habitat for a wide range of bird species in the long term, including woodland, scrub and native hedgerows for arboreal nesting species, and large expanses of rough grassland (to be continually managed as such) across the whole site that will provide opportunities for ground nesting bird species of conservation concern which have been regularly recorded on site, such as skylark and linnet.

- 10.6.51 There is also potential that the wetland habitats created on site, including ponds with surrounding damp fen vegetation, could attract new bird species to the site during the breeding season and provide a resource for breeding waders and waterfowl from the surrounding coastal areas and NSN sites. The positive effects on breeding birds are expected to become more pronounced in the long term as the habitats on site become more established and the tree and shrub planting matures, this could potentially result in small local increases in numbers of birds and/or draw in a greater diversity bird species each year, including a range of migrant species and perhaps some new species which have not been previously recorded on the site. These **overall, long-term positive effects** are expected to be of **moderate magnitude and not significant**.

Wintering birds

- 10.6.52 In the long-term after restoration, it is considered that the site will be of substantially greater value to wintering birds with a greater extent of broadleaved woodland cover and native hedgerows as well as better quality grassland habitat and some wetland habitat, all of which will provide a greater supply and variety of winter foraging opportunities, as well as substantially improved habitat connectivity within the local landscape. The planted and retained scrub, hedgerows and woodland will all provide good resources of

fruit and seeds (mostly berries and hips) as well as overnight roosting opportunities. The grassland habitat on site, with both rough and open sward types, will also provide a good foraging resource to birds seeking invertebrates and seeds from grassland plants. There is also potential that the wetland habitats created on site, including ponds with surrounding damp fen vegetation, could attract waders and waterfowl from the surrounding coastal areas and NSN sites. The positive effects on wintering birds are expected to become more pronounced in the long term as the habitats on site become more established and the tree and shrub planting matures, this could potentially result in small local increases in wintering bird numbers and/or draw in a greater diversity of bird species to the site each winter period. These **overall, long-term positive effects** are expected to be of **moderate magnitude and not significant**.

Hedgehog

10.6.53 In the long-term after restoration, it is considered that the site will be of substantially greater value to European hedgehog with a greater extent of broadleaved woodland cover and native hedgerows, as well as better quality grassland habitat, all of which will provide enhanced foraging opportunities, as well as substantially improved habitat connectivity within the local landscape. There will also be a considerable number of suitable refuge and hibernation resources made available in the form of multiple log and brushwood piles created in strategic locations across the site. It is anticipated that any positive effects on European hedgehog are likely to become more pronounced in the long term as the habitats on site become more established and the tree and shrub planting matures, this could potentially result in increased survival rates, small local increases in hedgehog numbers, increased dispersal within the wider landscape, and generally contribute to sustaining the local population of

what is a nationally declining mammal species. These **overall, long-term positive effects** are expected to be of **low magnitude and not significant**.

Invertebrates

10.6.54 In the long-term after restoration, it is considered that the site will be of substantially greater value to terrestrial invertebrates with a greater extent of broadleaved woodland cover and native hedgerows as well as better quality grassland habitat and some wetland habitat, all of which will provide a greater supply and variety of breeding and foraging opportunities suitable for a wide range of species, as well as substantially improved habitat connectivity within the local landscape. There is expected to be a significantly greater variety of nectar sources and hostplants available on site and substantial overwinter hibernation resources including provision of multiple log and brushwood piles and deadwood habitat features ('loggeries') in strategic locations across the site. Open areas of bare ground will be created during the operational phases, which should be retained and managed within the restoration phases. Blossom bearing plants such as hawthorn, blackthorn, and rowan should be retained and enhanced where necessary. There is also potential that the wetland habitats created on site, including ponds with surrounding damp fen vegetation, could attract new invertebrate species which require aquatic and/or marsh habitats, such as dragonflies and damselflies. The positive effects on invertebrates are expected to become more pronounced in the long-term as the habitats on site become more established and the tree and shrub planting matures, this could potentially result in small local increases in the abundance and diversity of invertebrate species. These **overall, long-term positive effects** are expected to be of **moderate magnitude and not significance**.

Reptiles

10.6.55 In the long-term after restoration, it is considered that the site will be of substantially greater value to common reptiles, namely the populations of slow-worm and common lizard which are known to currently be present. The greater extent of broadleaved woodland cover and native hedgerows, mixed scrub planting, and enhanced grassland habitat including both rough and open sward types, will all provide a better variety of foraging opportunities for slow-worm and common lizard, as well as substantially improved habitat connectivity within the local landscape. There will also be a considerable amount of suitable refuge and hibernation resources available in the form of tree and shrub root systems and the provision of multiple log and brushwood piles and artificial hibernacula created in strategic locations across the site. There is also potential that the wetland habitats created on site, including ponds with surrounding damp fen vegetation, could attract grass snake (*Natrix helvetica*) to the site. The positive effects on reptiles are expected to become more pronounced in the long term as the habitats on site become more established and the tree and shrub planting matures, this could potentially result in increased survival rates, local increases in slow-worm and common lizard numbers, increased reptile dispersal within the wider landscape, and generally contribute to sustaining the local populations of these protected and UKBAP species. The **overall, long-term positive effects** are expected to be of **low magnitude and minor significance**.

10.7 Additional Mitigation, Compensation, Enhancement Measures

- 10.7.1 Following completion of the project and implementation of the site restoration plan there will be a five-year aftercare period where all habitats on site will be appropriately managed to ensure their successful establishment.
- 10.7.2 Any requirements for post restoration ecological monitoring of the site will be discussed and negotiated with Hampshire County Council.

10.8 Assessment Summary and Likely Significant Residual Ecological Effects

10.8.1 This ecological impact assessment has identified two negative and two positive effects of minor significance on baseline ecological features during the operational phase (extraction and restoration). Six positive effects of minor significance were identified on baseline ecological features during the post-restoration. No significant negative residual effects on baseline ecological features were identified during the post restoration. All identified significant effects are summarised below.

Operational Phase (Extraction and Restoration)

10.8.2 **Native hedgerows** - positive effects expected to be of moderate magnitude and minor significance.

10.8.3 **Habitats (off-site)** - overall positive effects expected to be of low magnitude and minor significance.

10.8.4 **Bats (foraging and commuting)** - negative effects which could be moderate and of minor significance, although these would only be short-term and then soon offset in the post-restoration period.

10.8.5 **Reptiles** - negative effects which could be moderate and of minor significance, although these would only be short-term and then soon offset in the post-restoration period.

Post-Restoration

10.8.6 **Statutory designated sites** - overall, long-term positive effects expected to be of low magnitude and minor significance.

- 10.8.7 **Non-statutory designated sites** - overall, long-term positive effects expected to be of low magnitude and minor significance.
- 10.8.8 **Native hedgerows** - overall, long-term positive effects expected to be of moderate magnitude and minor significance.
- 10.8.9 **Habitats (off-site)** - overall, long-term positive effects expected to be of moderate magnitude and minor significance.
- 10.8.10 **Bats (foraging and commuting)** - overall, long-term positive effects expected to be of moderate magnitude and minor significance.
- 10.8.11 **Reptiles** - overall, long-term positive effects expected to be of low magnitude and minor significance.

10.9 Cumulative Impacts

- 10.9.1 It is considered that there will be no cumulative ecological impacts on the identified IEFs associated with any other similar mineral extraction projects in the area because these are all located at a substantial distance away from the application site, outside of the project's ZOI (HCC, 2019). The nearest similar project is Forest Lodge Home Farm quarry located in Hythe, Hampshire on the opposite side of the Southampton Water estuary.
- 10.9.2 It is noted that Policy HA2 of the emerging Eastleigh Borough Local Plan 2016-2036) identifies 4.7ha of land at the Mercury Marina and the Riverside Camping and Caravan Park, Satchell Lane, Bursledon/ Hound (as defined on the policies map) is allocated for a marina, hotel, a range of other holiday accommodation and car parking/boat storage. The policy notes that a site level HRA is required to demonstrate how the site will be delivered without adverse effect on any European sites.
- 10.9.3 A search of current planning applications on the Eastleigh Borough Council website using the terms "Mercury Marina, Mercury Holiday Park, Riverside Camping and Caravan Park and Satchell Lane", showed the last planning applications relating to the HA2 site were in 2018 and 2019 and related only to minor infrastructure adjustments and usage of portable cabins associated with the Mercury Marina. It is considered unlikely that any future granted planning applications on the HA2 site (if concurrent with the project lifespan) will have any significant cumulative effects on IEFs in-combination with the project proposals due to the HA2 area already being mostly developed and well-used for tourism and leisure purposes, as well as requirements in the policy for a site level HRA, and management and enhancement of the adjacent shoreline and non-statutory site to improve nature conservation value.
- 10.9.4 An application by Foreman Homes to construct 61 dwellings on land immediately adjacent to the east of the application site (planning Ref No:

F/20/89488) was refused in August 2021, although this is still within the six-month appeals period at the time of writing. Based on the extent of objections raised in the decision notice, it is considered unlikely that a successful appeal will be made. However, should the development gain planning approval, it is considered unlikely to result in any significant cumulative effects on IEFs in-combination with the project proposals due to the limited lifespan of the quarry project and the land then being restored to enhanced natural habitat, as well as the relatively small-scale of the residential proposals which will tightly abut existing residential housing and will incorporate natural buffers along its western and northern boundaries.

- 10.9.5 There are a number of approved residential developments underway, some of which are nearing completion, within the environs of Bursledon to the north of the site. However, these developments are all considered to be substantially outside of the project's ecological ZOI and therefore highly unlikely to contribute to any significant cumulative effects on IEFs in-combination with the project proposals.
- 10.9.6 No further planning applications of significance were identified within the project's ZOI.

10.10 Impacts of Climate Change

- 10.10.1 It is also considered that the restoration plan for the site will provide a nature-based solution for climate change mitigation on a local level by restoring the site to natural land with habitats that will provide an enhanced level of ecosystem services (compared with the habitats which presently exist) that can contribute towards ameliorating the effects of climate change. This will largely come from a substantial increase in broadleaved woodland, hedgerow and woody scrub cover as set out in the site restoration plan.
- 10.10.2 A recent research report by Natural England (Gregg *et al.*, 2021) identifies that woodlands have the largest carbon sequestration rates amongst semi-natural habitats and native broadleaved woodlands are reliable carbon sinks that can continue to take up carbon over centuries, whilst also providing benefits for biodiversity and other ecosystem services. Creating new native broadleaved woodlands is identified as a key principle in the assessment when considering biodiversity alongside climate change mitigation. It also states that hedgerows, orchards and other trees outside of woodlands can also be valuable in sequestering and storing carbon as well as providing other benefits.
- 10.10.3 It is considered that the net increases in broadleaved woodland cover on site, as well as net increases in native hedgerows and scattered trees, proposed in the site restoration plan will offer an enhanced level of regulatory and supporting ecosystem services on a local scale which can all contribute as mitigation for the effects of climate change and abnormal weather events. Woodlands are recognised as one of the main habitats providing vital regulatory and supporting ecosystem services, including oxygen production, nutrient cycling, maintenance of soil stability, interception of rainfall and moderation of rainfall events, air and water purification, and habitats for

pollinators and organisms which can help to control pests and pathogens (Quine *et al.*, 2011).

- 10.10.4 A reasonable level of key ecosystem services will also be maintained on site throughout the operational lifespan of the project as the generous stand-offs surrounding the working area and the phased approach to the mineral extraction will ensure that substantial areas of natural habitat are available on site throughout the operational lifespan of the project.
- 10.10.5 The project will also re-use and recycle existing top soils on the site to restore ground levels, which is considered to be the most efficient and sustainable method and also helps limit the use of fossil fuels in transporting restoration materials.

10.11 Conclusion

- 10.11.1 It is concluded that the proposed project is only likely to have short-term adverse effects during the operational and restoration phases, mainly resulting from the temporary losses of habitat and associated disruption caused to species of fauna which use the site. It is considered that an optimal level of embedded ecological mitigation is being proposed for the operational phases of the project and any unavoidable, short-term adverse ecological effects will be controlled at an acceptable level and then soon offset in the post-restoration period. Any adverse effects during the operational phases should also be counterbalanced to some degree by the predicted positive effects in relation to native hedgerows and off-site habitats.
- 10.11.2 The proposed restoration plan for the site is expected to have an overall positive long-term effect in terms of the biodiversity value of the site itself, the effects on identified ecological features within the ZOI, and the site's ecological connectivity and functionality within the surrounding landscape.

10.12 References

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