**Report ID: INCA 2021-29**

# South Bank Site Remediation

## Ecological Impact Assessment
## Revision A
## Final

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INCA
Industry Nature Conservation Association

**Contents**

## 1. Introduction

1.1 This document has been prepared by INCA on behalf of Teesworks (formerly South Tees Development Corporation) in connection with a detailed planning application for South Bank Site Remediation Works. The application description is:

*"Engineering operations associated with ground remediation and preparation and alterations to access arrangements".*

1.2 This report assesses the ecological impact of the proposed development considering embedded mitigation and other mitigation measures to determine residual effects. It further proposes compensatory measures to ensure no net loss of biodiversity.

1.3 This report has been written with reference to the Chartered Institute of Ecology and Environmental Management ('CIEEM') guidelines for Ecological Impact Assessment (EcIA) [i].

The assessment process involves:

i Identifying an ecological baseline and characterising likely impacts;

ii Incorporating measures to avoid and mitigate (reduce) all adverse likely impacts;

iii Assessing the significance of any residual effects after mitigation;

iv Identifying appropriate compensation measures to offset significant residual effects; and

v Identifying opportunities for ecological enhancement.

1.4 Likely impacts are actions that result in changes either positive or negative to ecological features. Effects are the outcomes for those features. Both positive and negative impacts of the proposed development are identified and defined in terms of their effects on ecological features.

## 2. Project description

2.1 The site is in the borough of Redcar and Cleveland and is on industrial land north of the area known as South Bank. It is at Ordnance Survey grid reference NZ 538-226 (Figure 1). It is part of the much larger Teesworks site, for which there is a master plan. The site covers 42.3 Ha.

2.2 The project involves the remediation of previously developed [industrial] land to provide a stable area of land with appropriate access roads for future development.

2.3 The development site is approximately rectangular in shape. Its frontage is the River Tees. A site access road borders much of the site, with internal tracks leading into the site. Until very recently, a large portion of the site was used for a sand and gravel screening operation and a smaller compound is currently in operation as a cement making plant. The latter is excluded from the red line boundary and the planning application (Figure 2). There are lengths of perimeter bund and several buildings and storage compounds on the site.

Figure 1. Location of the site (red oval).

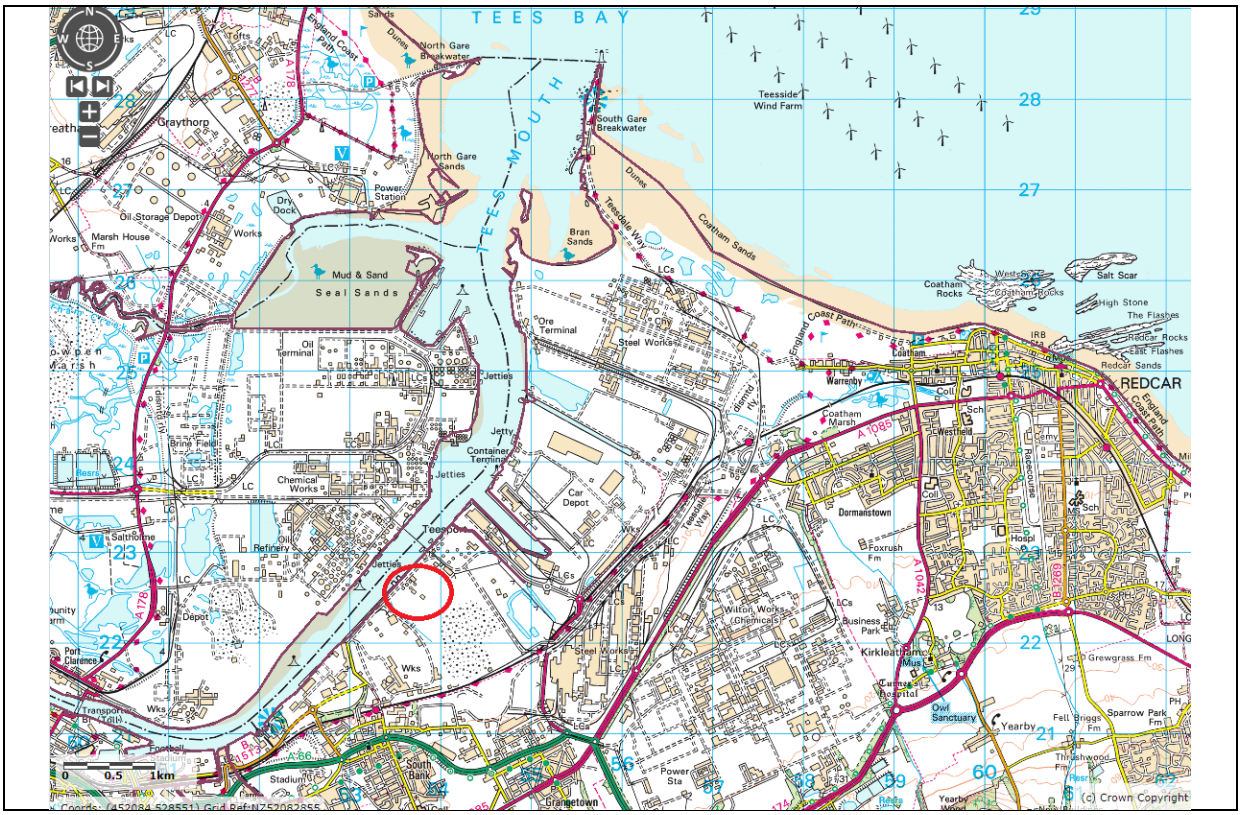
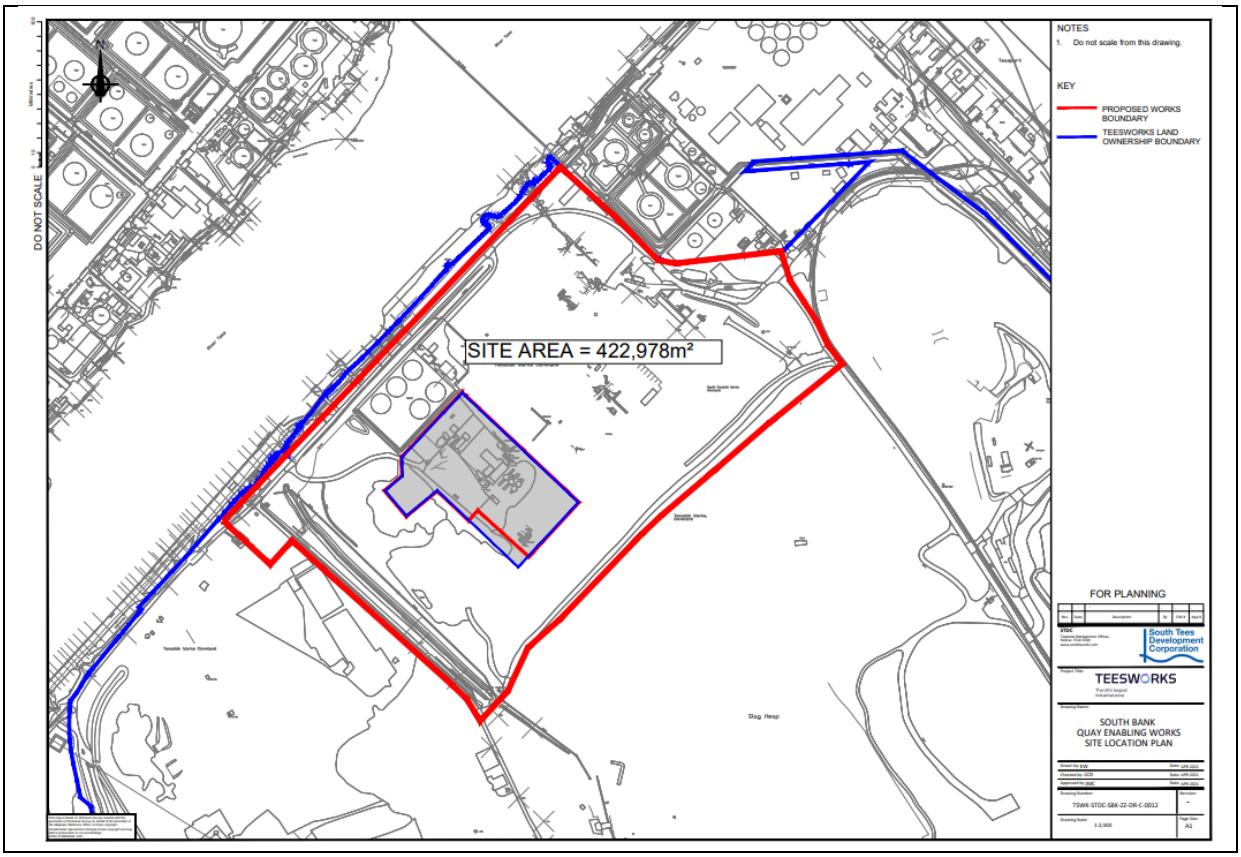



Figure 2. Plan of South Bank Quay Enabling Works, showing red line boundary.



## 3. Scope of the assessment

3.1 This assessment covers all Valued Ecological Receptors (VERs) that are found in the wider Teesside area and which have the potential to be present on the site or else be affected by the development.

3.2 In assessing the impacts of a proposal the geographical extent over which those impacts on VERs might potentially be significant needs to be considered; this is referred to as the Zone of Influence (ZOI). The ZOI for the proposed development will vary depending on specific factors such as the ecology of the receptor, the sensitivity of the receptor to the potential impacts of the proposed development and potential pathways to the receptor. The conservation importance of the receptor also influences the extent of the ZOI, for example, the ZOI over which potential impacts on internationally designated sites would be much greater than that of widespread habitats and species. For the purposes of this assessment, the following ZOIs have been used.

vi internationally - 10km from the closest site perimeter;

vii nationally designated sites – 5km from the closest site perimeter;

viii locally designated sites and Priority Habitats – 2km from the closest site perimeter;

ix protected species and Priority Species – The ZOI is dependent in part on the dispersal ability of the species, i.e., its potential to reach the site from its closest breeding population, therefore the ZOI is considered individually for each species in terms of its proximity to the site; and

x widespread species and habitats – site only.

## 4. Legislative and Planning context

### Legislation

4.1 The following legislation is relevant to this chapter:

The Conservation of Habitats and Species Regulations 2017 [ii] (hereafter referred to as 'Habitats Regulations');

Wildlife and Countryside Act (WCA) 1981 (as amended) [iii]; and

Natural Environment and Rural Communities (NERC) Act 2006 [iv].

4.2 The Environment Bill 2019-2021 [v] is currently going through Parliament. The Bill as it stands includes a provision that Biodiversity Net Gain (BNG) should be made a condition of the grant of planning permission. This will require developers to provide evidence of BNG, likely to be of a minimum 10%. It is understood that this will be demonstrated using a Biodiversity Metric (BM) developed by Defra. Once the Bill has received Royal Assent, there will be a two-year transition before BNG is required to be implemented.

4.3 BNG is not yet, therefore, mandated through adoption of the Environment Bill and is expected to become mandatory in 2023. It is the intention that the Environment & Biodiversity Strategy being developed by Teesworks will identify habitat enhancement schemes within and beyond the Teesworks area that can contribute towards BNG in future and provide a means of compensating habitat loss occurring from development schemes that proceed ahead of its finalisation.

4.4 Until the Environment Bill is enacted and reflected in national policy, full weight should be given to the policies of the Redcar and Cleveland Local Plan, 2018 [vi].

### Planning Policy

4.5 The following planning policies are relevant to this assessment:

i. Redcar and Cleveland Borough Council (RCBC) Local Plan (statutory policy) [vi];

ii. National Planning Policy Framework (NPPF) [vii]; and

iii. South Tees Area Supplementary Planning Document (SPD) 2018 (non-statutory policy/ material planning consideration) [viii];

**Tees Valley Local Biodiversity Action Plan (LBAP)**

4.6 The Tees Valley Nature Partnership has prepared a priority list of habitats and species which make up its LBAP (Table 1). LBAP habitats and species are classed as a material consideration in the planning system.

Table 1. Tees Valley LBAP

| Tees Valley Biodiversity Action Plan | | | | | |
|---|---|---|---|---|---|
| Species | | | | Habitats | |
| Barn Owl | Ringed Plover | Grey Partridge | Tree Sparrow | Traditional Orchards | Semi-natural Broadleaved Lowland Woodland |
| Little Tern | Corn Bunting | Shelduck | Wagtail Yellow | Reedbeds | Rivers & Streams |
| Bittern | Swift | Purple Milk-vetch | Water Violet | Arable field Margins | Roadside Verges |
| Globeflower | Pepper saxifrage | Tufted Sedge | Knotted hedge-parsley | Lowland Meadows | Sand Dunes |
| Yellow Star of Bethlehem | Burnt Orchid | Green Winged Orchid | Strawberry Clover | School Grounds | Maritime Cliffs and Slopes |
| Flat Sedge | Small Leaved Lime | Black Poplar | Lyme Grass | Grazing Marsh | Hedgerows |
| Scarlet Wax Cap | White-letter Hairstreak | Grayling | Dingy Skipper | Gardens and Allotments | Saline Lagoons |
| Blomer's Rivulet | Crescent Striped | Forester | Large Red-Belted Clearwing | Marsh and Saltmarsh | Ponds, Lakes & Reservoirs |
| Fen Wainscot | Shore Wainscot | Eccentric Grass Snail | Moss Chrysalis Snail | Parks and Recreation Grounds | Lowland Heath |
| Moss Chrysalis Snail | Bats (except common pipistrelle) | Brown Hare | Harvest Mouse | Brownfields | Churchyards and Cemeteries |
| Harbour Seal | Water Vole | Common Lizard | Slow Worm | | |
| Great Crested Newt | Bullhead | Salmon | Brown Trout | | |
| European Eel | Brook Lamprey | Sea Lamprey | River Lamprey | | |

## 5. Desk study

5.1 The desk study is based principally on data collected by INCA, which has carried out ecological surveys across almost all the industrial land in the wider South Tees area over more than a 20-year period, including the majority of the Teesworks area. INCA has been the main organisation collecting ecological data across the Teesworks area, accumulating a significant number of species records relevant to the site and the surrounding area. Therefore, it was considered more appropriate to use INCA data for this report than to consult the Environmental Records Information Centre North East.

5.2 Additional information on wildlife that is relevant to this assessment and is in the public domain has also been utilised.

5.3 Priority habitats and Priority species are listed under the NERC Act and are consequently a material consideration in the planning system.

**Internationally designated sites**

5.3 There are two internationally designated sites within a 10km radius of the site; the Teesmouth and Cleveland Coast Special Protection Area (SPA) and the Teesmouth and Cleveland Coast Ramsar site. SPAs are designated under the EU Wild Birds Directive. Ramsar sites are wetlands of international importance designated under the Ramsar Convention on Wetlands but which are afforded the same level of protection in policy terms in respect of new development as European sites. The Teesmouth

and Cleveland Coast Ramsar site shares the same boundary as the Teesmouth and Cleveland Coast SPA except where the SPA includes a marine component. The intertidal element of the Teesmouth and Cleveland Coast SPA is also classed as a European Marine Site and shares its interest features with the SPA. The location, distance from the site, main interest features and size for each internationally designated site is given in Table 2.

Table 2. Internationally designated sites in relation to the site.

| Site | Approx. Distance (km) | Map Ref | Site | Area (ha) |
|---|---|---|---|---|
| Teesmouth and Cleveland Coast SPA | adjacent | various | Wintering and passage waterbirds, breeding populations of Avocet, Common Tern, Little Tern | 12,226.28 |
| Teesmouth and Cleveland Coast Ramsar | 0.4 W | various | Waterbirds, breeding populations of Avocet, Common Tern, Little Tern | 1,247.31 |

Teesmouth and Cleveland Coast SPA

5.4 The Teesmouth and Cleveland Coast SPA was first classified in 1995 for its numbers of European importance of breeding little tern *Sternula albifrons,* passage sandwich tern *Thalasseus sandvicensis*, wintering red knot *Calidris canutus* and passage common redshank *Tringa totanus,* as well as an assemblage of over 20,000 waterbirds. The SPA was updated in 2000 to include additional areas of coastal and wetland habitats important for waterbirds.

As of the commencement of a formal consultation in 2019, the SPA was further extended to include at sea foraging areas for breeding little tern and breeding and foraging areas for common tern *Sterna hirundo*, the latter being proposed as a new qualifying feature in the light of recent increases in the size of the breeding population within the site. The extension includes additional areas of terrestrial habitats such as wet grassland, saltmarsh, deep and shallow pools and intertidal areas important for other foraging and roosting waterbirds which were existing features of the SPA. Non-breeding ruff *Calidris pugnax* and breeding pied avocet *Recurvirostra avosetta* have also been added as new qualifying features of the SPA.

The boundary of the SPA extension covers an area from Castle Eden Denemouth in the north to Marske-by-the Sea in the south and includes the River Tees up to the Tees Barrage resulting in a revised SPA area of 12,226.28 ha. This increases the area of the existing SPA (1,251.50 ha) by 10,974.78 ha. The seaward boundary has been drawn to include waters out to around 3.5km from Crimdon Dene, to include the areas of greatest importance to the little terns at that colony, and out to around 6km offshore further south to include the areas of greatest importance to the common terns at the Saltholme colony.

Teesmouth and Cleveland Coast Ramsar

5.5 The existing Teesmouth and Cleveland Coast Ramsar boundary has also been extended, as with the SPA, to include the additional terrestrial wet grassland, saltmarsh, deep and shallow pools and intertidal areas for breeding and non-breeding waterbirds. Historically the Teesmouth SPA and Ramsar have effectively shared the same boundary and interest features however the Ramsar extension will only cover those terrestrial extension areas of the SPA down to Mean Low Water and will not extend outside of the SPA extension. Although not a qualifying feature the Ramsar site citation recognises that the site supports a rich assemblage of invertebrates, including the following seven Red Data Book species: *Pherbellia grisescens, Thereva valida, Longitarsus nigerrimus, Dryops nitidulus, Macroplea mutica, Philonthus dimidiatipennis* and *Trichohydnobius suturalis*.

The qualifying features for the Teesmouth and Cleveland Coast SPA/Ramsar are given in Table D4.1. The number of birds in the Ramsar assemblage is greater than for the SPA as it includes mute swan *Cygnus olor* and greylag goose *Anser anser,* both of which are resident all year; the SPA only including migratory and wintering waterbirds.

**Nationally Designated Sites**

5.6 There are two nationally designated sites within a 5km radius of the proposed development site; Teesmouth & Cleveland Coast Site of Special Scientific Interest (SSSI) and Teesmouth National Nature Reserve ('NNR'). The NNR is a sub-set of the SSSI and comprises two parts; the intertidal mudflats at Seal Sands and the dunes and grazing marshes around North Gare. As it is a part of the SSSI with the same interest features then it is not described or assessed separately.

The Teesmouth and Cleveland Coast SSSI is an amalgamation and rationalisation of the seven SSSIs which were formerly present in the Teesmouth area. It extends the original SSSIs geographically to underpin the non-marine elements of the extension to the Teesmouth and Cleveland Coast SPA and Ramsar (the SPA) and includes some additional, areas that are outside of the SPA as well as adding new interest features. The Teesmouth and Cleveland Coast SSSI was confirmed by Natural England (NE) in January 2019. The interest features of the SSSI and their relation to the site are shown in Table 3.

Table 3. Interest features of the Teesmouth and Cleveland Coast SSSI in relation to the site.

| Qualifying feature | Principal locations with respect to the site | Distance to the site (km) |
|---|---|---|
| Jurassic Geology | Redcar Rocks | 6.9 NE |
| Quaternary Geology | Seaton Carew | 9.0 N |
| Saltmarsh | Confined almost entirely to the Greatham Creek area north of the Tees. There is a very small amount at Bran Sands | 3.9 NW Greatham Creek<br>3.8 N Bran Sands |
| Sand Dunes | Coatham – South Gare to Coatham Common; Seaton Dunes in Hartlepool. | 4.9 NE Coatham Dunes<br>4.7 N Seaton Dunes |
| Harbour Seal | Present in the estuary and river. Hauls out on Seal Sands and Greatham Creek. There are no haul out locations south of the Tees | 3.2 N Haul-out |
| Breeding Birds | Present on all areas of suitable wetland habitat. South of the Tees, Coatham Marsh and South Gare are the key areas. | 5.1 NE Coatham Marsh<br>4.6 NE South Gare |
| Non -breeding Birds | Present on intertidal, freshwater and marine areas. North Tees Mudflats is the closest site holding significant numbers. | 0.4 W |
| Invertebrate Assemblage | Coatham Dunes is of particular importance | 4.9 NE |

5.7 The Teesmouth and Cleveland Coast SSSI is an extensive mosaic of coastal and freshwater habitats centred on the Tees Estuary, including sand dunes, saltmarsh, mudflats, rocky and sandy shore, saline lagoons, grazing marshes, reedbeds and freshwater wetlands. These habitats support rich assemblages of invertebrates, breeding seals and large numbers of breeding and non-breeding seabirds and waterbirds. The site is of special interest for the following nationally important features that occur within and are supported by the wider habitat mosaic:

Jurassic geology

5.8 The foreshore between Redcar Rocks and Coatham Rocks provides exposures of parts of the Lower Jurassic succession that are otherwise unexposed in the Cleveland Basin. These complement the younger Lower Jurassic successions exposed further south in Robin Hood's Bay and are sedimentologically distinct from rocks of the same age to the south of the Market Weighton Axis. The sequence of ammonite assemblages that occur here indicates that the succession is very complete and may provide a key for the comparison of other Hettangian and Sinemurian successions in the Northwest European Province.

Quaternary geology

5.9 Tees Bay includes a feature known as the 'submerged forest' which has been well studied on the foreshore at Hartlepool between Carr House Sands and just north of Newburn Bridge, but which is also exposed south of Teesmouth on the foreshore at Redcar. On the Hartlepool foreshore there is complex of peats, estuarine and marine sediments deposited during the Holocene, which overlie glacial deposits from the last Ice Age. Within the peats there are tree stumps and branches. This sequence is also rich in fossils and contains archaeological evidence from the Mesolithic to the Romano-British periods. The palaeo-environmental records at Hartlepool indicate changes in sedimentation due to fluctuations in relative sea level during the mid-Holocene, from approximately 7,000 to 3,000 years BP. The location of Hartlepool on the fulcrum between areas of crustal uplift to the north and subsidence to the south makes these sediments crucial in interpreting Holocene sea level change.

Saltmarsh

5.10 The Tees Estuary supports the largest area of saltmarsh between Lindisfarne and the Humber Estuary. Its saltmarshes show a succession of vegetation types, from pioneer marshes of glasswort *Salicornia* species and annual sea-blite *Suaeda maritima*, through common saltmarsh-grass *Puccinellia maritima* communities, to stands dominated by common couch *Elytrigia repens* and its hybrid with sea couch *Elytrigia atherica, Elytrigia x drucei*, at the limit of tidal influence. The common saltmarsh-grass communities are diverse and sea aster *Aster tripolium*, common sea-lavender *Limonium vulgare* and thrift *Armeria maritima* provide a colourful late summer display.

Sand dunes

5.11 The SSSI supports an extensive complex of dunes flanking both side of the Tees Estuary. It is the largest dune complex between Druridge Bay (Northumberland) and Spurn Point (East Yorkshire). There are two main dune systems: Seaton Dunes to the north of the Tees, and Coatham Dunes to the south. The dunes support a large area of semi-natural vegetation including the typical succession from strandline vegetation, occasionally including sea sandwort *Honckenya peploides* and sea rocket *Cakile maritima*, through foredunes of sand couch *Elytrigia juncea* and mobile dunes dominated by both marram *Ammophila arenaria* and lyme-grass *Leymus arenarius*, to fixed dune grassland with diverse swards, where herbs such as common bird's-foot trefoil *Lotus corniculatus*, lady's bedstraw *Galium verum*, fairy flax *Linum catharticum* and common restharrow *Ononis repens* form a prominent component. The fixed dunes also support a number of scarce and threatened species, including purple milkvetch *Astragalus danicus*. There are a number of damp depressions in both dunes ('slacks'), which support a range of wetter vegetation types. A particularly prominent feature of some of the slacks are large and colourful stands of marsh orchids *Dactylorhiza* species and their hybrids. Some of the slacks show affinities with saltmarsh vegetation, with salt-tolerant species such as saltmarsh rush *Juncus gerardii*, sea plantain *Plantago maritima* and sea milkwort *Glaux maritima*. More consistently wet slacks support swamp communities. The dunes also show transitions to wetter habitats and saltmarsh.

Harbour seal

5.12 Harbour seals *Phoca vitulina* (also known as common seal) have lived at the mouth of the River Tees for hundreds of years but were lost from the estuary for much of the 20th Century, principally due to pollution. They recolonised the estuary in the 1980s and have subsequently established a regular breeding colony which is the only pupping site in north-east England. Harbour seals are present in the estuary and the tidal Tees throughout the year, with regular haul outs at Greatham Creek and Seal Sands. Pupping tends to occur in June and July on the intertidal mud of Seal Sands.

Breeding birds

5.13 The SSSI supports nationally important numbers of three breeding species: pied avocet, little tern and common tern. Pied avocets and common terns both nest within the SSSI. Little terns nest in a large colony at Crimdon (in the adjacent Durham Coast SSSI) and/or on Seaton Carew beach, and use the SSSI for foraging and pre- and post-breeding gatherings. One or twp pairs have attempted to breed at South gare over the last few years. The extensive sand dunes, saltmarshes and wetlands across the site support a diverse assemblage of breeding birds. This includes several scarce and declining species, such as shoveler *Spatula clypeata,* pochard *Aythya ferina*, ringed plover *Charadrius hiaticula* and little ringed plover *Charadrius dubius*.

Non-breeding birds

5.14 The extensive areas of open water, grazing marsh and intertidal habitats within the site provide safe feeding and roosting opportunities for large numbers of waterbirds throughout the year. The SSSI is of special interest for its non-breeding populations of ten species (shelduck *Tadorna tadorna*, shoveler, gadwall *Mareca strepera,* ringed plover, knot *Calidris canutus*, ruff *Calidris pugnax*, sanderling *Calidris alba*, purple sandpiper *Calidris maritima*, redshank *Tringa totanus*, Sandwich tern *Thalasseus sandvicensis*) and an assemblage of over 20,000 non-breeding waterbirds. The assemblage comprises a wide variety of waterbirds, including (in addition to the aforementioned species that are reasons for notification in their own right), large numbers of wigeon *Mareca penelope,* lapwing *Vanellus vanellus*, black-headed gull *Chroicocephalus ridibundus* and herring gull *Larus argentatus*. Shoveler, gadwall and ruff are predominantly associated with the extensive freshwater wetlands of the site, while ringed plover, knot, sanderling, purple sandpiper and Sandwich tern mostly use the open coast. Redshanks are widespread across the site, but the greatest foraging concentrations occur, along with the largest numbers of shelduck, on the intertidal mud of Seal Sands and Greatham Creek. Seal Sands and Bran Sands are also extensively used by ringed plover and knot.

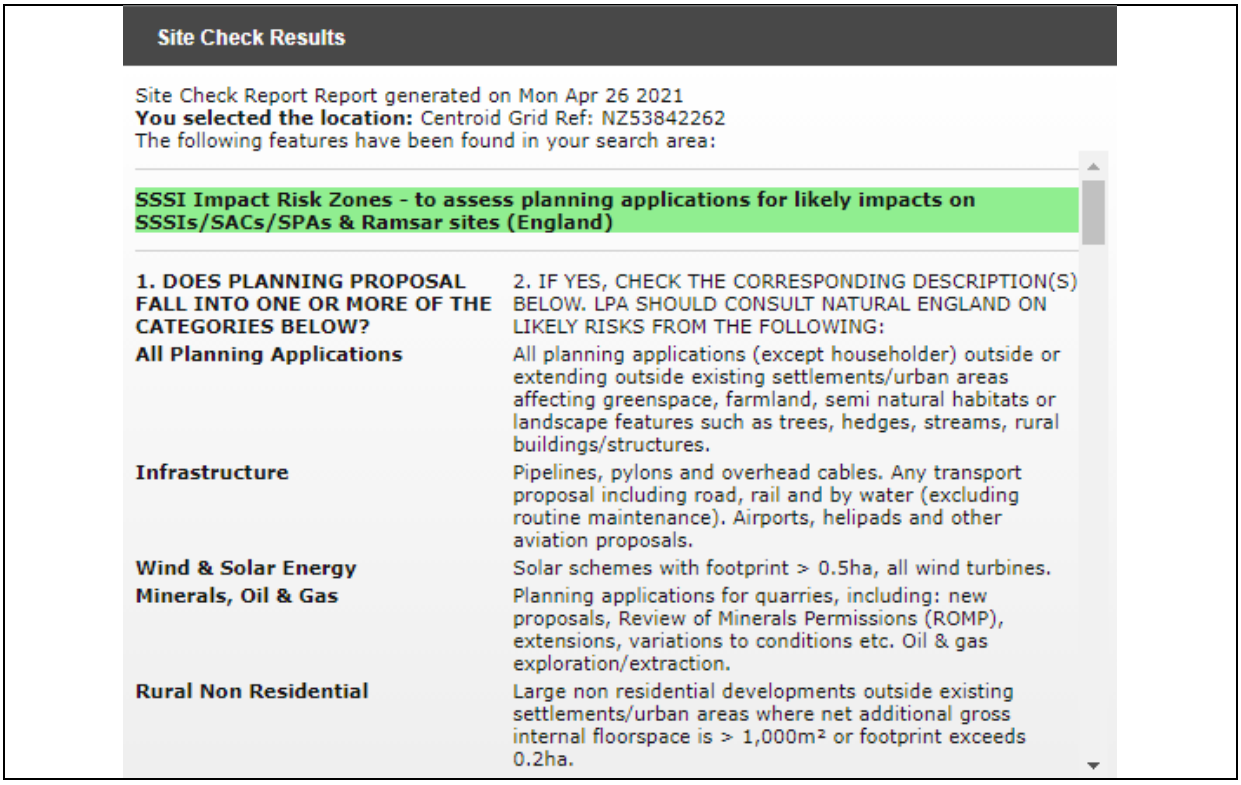
Invertebrate assemblage

5.15 The extensive complex of sand dunes within the SSSI supports a nationally important invertebrate assemblage, including at least 14 threatened species. The assemblage is diverse and makes use of a wide range of niches, with a strong dependency on open but consolidated sand exposures within which to nest and hunt, as well as on flower-rich swards for nectar and pollen gathering. The assemblage does not include a high number of rarities but is a good example of its type in the north of its range. As such, species such as the tephritid fly *Acanthiophilus helianthi*, whose larvae feed within the capitula of carline thistle *Carlina vulgaris*, occur towards the northern edge of their British range. The grayling butterfly *Hipparchia semele* is found here and remains a scarce species on this north-eastern coastal strip.

SSSI Impact Risk Zones

5.16 The Defra Magic Maps website gives Impact Risk Zone information and indicates which type of planning application the Local Planning Authority should consult NE on. For this application, the best fit category is 'Infrastructure', which does require NE to be consulted (Figure 3).

Figure 3. Designated sites Impact Risk Zone.



**Site Check Results**

Site Check Report Report generated on Mon Apr 26 2021
**You selected the location:** Centroid Grid Ref: NZ53842262
The following features have been found in your search area:

**SSSI Impact Risk Zones - to assess planning applications for likely impacts on SSSIs/SACs/SPAs & Ramsar sites (England)**

| 1. DOES PLANNING PROPOSAL FALL INTO ONE OR MORE OF THE CATEGORIES BELOW? | 2. IF YES, CHECK THE CORRESPONDING DESCRIPTION(S) BELOW. LPA SHOULD CONSULT NATURAL ENGLAND ON LIKELY RISKS FROM THE FOLLOWING: |
|---|---|
| **All Planning Applications** | All planning applications (except householder) outside or extending outside existing settlements/urban areas affecting greenspace, farmland, semi natural habitats or landscape features such as trees, hedges, streams, rural buildings/structures. |
| **Infrastructure** | Pipelines, pylons and overhead cables. Any transport proposal including road, rail and by water (excluding routine maintenance). Airports, helipads and other aviation proposals. |
| **Wind & Solar Energy** | Solar schemes with footprint > 0.5ha, all wind turbines. |
| **Minerals, Oil & Gas** | Planning applications for quarries, including: new proposals, Review of Minerals Permissions (ROMP), extensions, variations to conditions etc. Oil & gas exploration/extraction. |
| **Rural Non Residential** | Large non residential developments outside existing settlements/urban areas where net additional gross internal floorspace is > 1,000m² or footprint exceeds 0.2ha. |

**Locally designated sites**

5.17 There are no locally designated sites on or within 2km of the site. The closest, Eston Pumping Station Local Wildlife Site is 2.5km north east of the site and is designated for its mosaic of habitats, including 'Urban Grassland', a form of brownfield habitat.

**Priority species**

Great Crested Newt (GCN) *Triturus cristatus*

5.18 GCN is a European Protected Species, a Priority species and a LBAP species. INCA carried out GCN surveys of all the waterbodies on the Teesworks area in 2007 and of four ponds at Teesport in 2005. All proved to be negative for GCN. More recently INCA has undertaken environmental DNA surveys for GCN at Dorman Point and Long Acres on the Teesworks area in 2018 and 2019 respectively and at various waterbodies at the nearby Wilton Industrial Complex and Lazenby village over the period 2018-2020 All of these eDNA surveys have proved negative for GCN. There is an unconfirmed record of GCN from a pond on the golf course at Coatham, almost 5km to the north east of the site. This record was from 1988 and the pond where it was recorded no longer exists.

The closest current records of GCN to the site are at Lovell Hill Ponds which is almost 7km away to the south east. There are records from the 1980s from Wilton Lake however this was surveyed in 2013 along with a further nine water bodies between Marske and the Wilton Industrial Complex for the Forewind Dogger Bank wind turbine proposal, all of which proved negative for GCN (Peak Ecology, 2013 [ix]).

Bats

5.19 Common pipistrelle is a Priority species but not a LBAP species. There are no records of bats over the site though anecdotally bats were regularly seen over the adjacent South Bank area in the period when parts of that site were operational. INCA has recorded common pipistrelle *Pipistrellus pipistrellus* foraging in small numbers across various parts of the nearby industrial areas. Common pipistrelle is more of a generalist in terms of its use of habitats than any other British bat species. and in the North East is the only species that has been found to roost in urban areas (Jackson, 2012 [x]). No other species of bat have been reliably recorded as resident in the surrounding industrial areas although noctule bat *Nyctalus noctula*, has been recorded by INCA as commuting over the Wilton area.

Breeding Birds

5.20 The Teesworks area supports a wide diversity of breeding birds, including several species of ground-nesting birds associated with the flat, open areas, the scrub and the wetland features. These include some Priority species such as grey partridge *Perdix perdix*.

Water Vole *Arvicola amphibius*

5.21 Water vole is a Priority species and a LBAP species. The most recent record of water vole on the Teesworks area is from an unspecified location on the former Corus site in 2007. Water vole has been recorded from Coatham Marsh in the past though not within the past decade. INCA has carried out water vole surveys on Dabholm Beck, Kettle Beck and Kinkerdale Beck in the intervening period with negative results. The closest known recent location for water voles is on Spencer Beck approximately 3km to the south of the site, though water voles are not regularly present on Spencer Beck.

European Hedgehog *Erinaceous europaeus*

5.22 Hedgehog is Priority species. Hedgehog distribution and relative abundance is most easily deduced by their occurrence as road casualties. They are rarely encountered as road casualties on the A1085 trunk road, which is probably a reflection of the small and isolated nature of areas of suitable habitat for them in this general area.

Brown Hare *Lepus europaeus*

5.23 Brown hare is a Priority species and a LBAP species. The industrial sites on Teesside are thought to support some of the largest populations of brown hare in north east England due to the

combination of extensive grassland areas and lack of disturbance. Brown hare is common across the Teesworks area.

Common lizard *Zootoca vivipara*

5.24 Common lizard is a LBAP species. It is the only native reptile species which is found in the surrounding areas is common lizard. It is confined to the coastal dune areas from South Gare to Coatham Common from where small numbers have spread into the northern end of the Teesworks area. Surveys by INCA have found small numbers of common lizards at various points on the Long Acres site, including a small population just north of The Fleet watercourse. The closest record of common lizard to the site is over 2.5km to the north east and was of a single individual from Eston Pumping Station in 2009. All the common lizard records are north of Dabholm Gut and separated from the site by watercourses and large areas of unsuitable habitat, making further spread unlikely.

Common Toad *Bufo bufo*

5.25 is a Priority species. Common toad has been recorded as breeding in most ponds in the Teesworks area.

Dingy Skipper butterfly *Erynnis tages*

5.26 Dingy skipper is a Priority species and a LBAP species. There have not been any targeted surveys for butterflies on the site however dingy skipper is known to be present in regionally significant numbers when assessed across the entire Teesworks area, with the adjacent South Bank area being particularly notable for this species, prior to clearance.

Grayling butterfly *Hipparchia semele*

5.27 Grayling is a Priority species and a LBAP species. There have not been any targeted surveys for butterflies on the site however grayling is known to be present in regionally significant numbers when assessed across the entire Teesworks area and was present on the adjacent South Bank area, prior to clearance.

Wall butterfly *Lasiommata megera*

5.28 Wall is a Priority species. There have not been any targeted surveys for butterflies on the site however wall is known to be present in the area.

Small heath butterfly *Coenonympha pamphilus*

5.29 Small heath is a Priority species. There have not been any targeted surveys for butterflies on the site however wall is known to be present in the area.

Other invertebrates

5.30 There have been no targeted surveys for moths or other invertebrates on the site. Certain parts of the Teesworks area are important for some groups of invertebrates but those are associated with specialist habitats such as Open Mosaic Habitats or waterbodies.

Invasive Non-Native Species (INNS)

5.31 There has been no survey for INNS on this site, however Japanese knotweed *Fallopia japonica*, Japanese Rose *Rosa rugosa*, were present on the adjacent South Bank area. Buddleia bushes *Buddleia davidii* are widespread and cotoneaster bushes are occasional.

## 6. Field survey methodology

6.1 The site was visited on 27 April 2021. Weather conditions at the time of the survey were overcast, with a gentle easterly breeze, occasional light rain and a temperature of 9$^{o}$ C.

6.2 The purpose of the survey was to define the nature of the habitats present and only the vegetated parts of the site were visited (Figure 4).

6.3 In addition to classifying the habitats according to JNCC Phase 1 categories [xi], notes were taken on the topography, substrate and key plant indicator species for each habitat. No targeted surveys

were undertaken for any taxa however notes were made of any notable species seen and of the potential for notable species to be present. The time of year and the weather conditions were suitable for many species to be evident if present.

6.4 The site visit was undertaken by Graham Megson (MSc Ecology), who is an ecology associate with INCA. He has over 38 years' experience of working in a land management and ecological role, which includes over 30 years as a local authority ecologist. He is an experienced surveyor of habitats, vascular plants, birds, terrestrial vertebrates, Lepidoptera and Odonata.

Figure 4. Phase 1 habitats map

## 7. Field survey results

### Phase 1 habitats

7.1 The semi-natural vegetation on the site is confined to the western portion of the site, with several verges and bunds elsewhere.

J1.3 Ephemeral/ short perennial grassland (approx. 2.5 Ha)
7.2 Most of the vegetation is Phase 1 category (J1.3) Ephemeral/ short perennial. The substrate in this habitat is a mixture of blast-furnace slag, crushed brick, sand and other materials, often scraped into mounds but mainly level and used as hard standing. There is a patchwork of recently scraped bare ground. The vegetation is short, and rabbit (*Oryctolagus cuniculus*) grazed (with few, small bare patches) or taller and more rank with self-sown scrub species including dog rose and bramble. Typical species in the shorter areas match J1.3 which is a habitat typical of derelict industrial sites. The taller vegetation includes ruderal species such as docks, thistles and false oat-grass *Arrhenatherum elatius*. Stands of stinging nettles *Urtica dioica* indicate areas more akin to C3.1 tall ruderal.

A2.2 Scattered scrub (approx. 0.5 Ha)
7.3 The grassland is developing into scrub and there are sizeable patches of bramble *Rubus fructicosus* with several apple trees *Malus sylvatica*, hawthorn *Cretaegus monogyna*, sallow *Salix caprea* and elder *Sambucus nigra*.

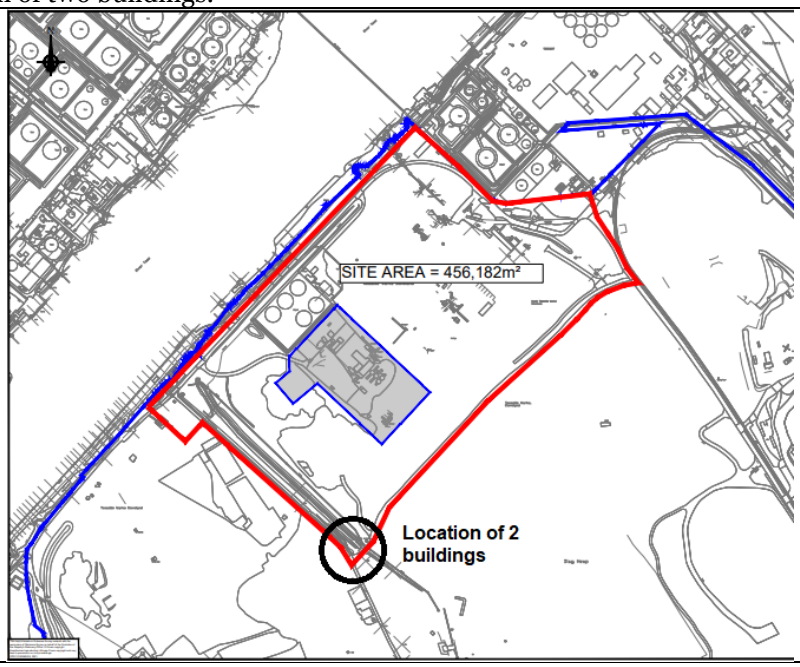
G1.3 Oligotrophic standing water (approx. 420 sqm)
7.4 A pond at OS grid reference NZ 5365-2230 was not chemically tested but is clear and almost entirely free of aquatic vegetation, suggestive of it being oligotrophic (low in nutrients). The pond sits in a depression with steep slopes of loose ballast material.

B6 Poor semi-improved grassland (approx. 1.7 Ha)
7.5 The verges and other roadside areas of grassland showed some species diversity, including areas of taller vegetation with fennel *Foeniculum vulgare* and shorter turf with frequent kidney vetch *Anthyllis vulnereria* and occasional bird's-foot trefoil. Some roadside landscaped embankments are planted

with trees. These appear to be 10-15 years old and included field maple *Acer campestre*, silver birch *Betula pendula*, rowan *Sorbus aquafaria*, hawthorn and gorse *Ulex europaeus*.

Target note 1.
7.6 There are two derelict brick and concrete buildings at NZ 5378-2213 (Figure 5).

Figure 5. Location of two buildings.



Building 1
7.7 The western most building in Figure 5 is a former pumping station. It is a single room with one door opening. Three windows have been bricked up. See photograph below. The building contained no signs of current or past bird nesting.

Building 2
7.8 The eastern most building in figure 5 is a former electricity sub-station. It consists of three rooms with a wide doorway on the south-east facing wall and a narrow doorway on the north-east facing wall. There are windows (broken glass) on the north-west wall (one) and south-west wall (two). One of the latter has a board over it. See photograph below. The building contained no signs of current or past bird nesting.

Building 1

Building 2

**Species**

7.9 Few Priority species were seen on the site visit. Willow warbler *Phylloscopus trochilus*, dunnock *Prunella modularis* and linnet *Linaria cannabina* singing and both are likely to be breeding. All three of these are Birds of Conservation Concern (BoCC) and therefore Priority species. A list of species seen is given in Table 4.

Table 4. Birds noted during the site visit:

| **Species** | **Scientific name** | **Number** | **Note** |
|---|---|---|---|
| Wood pigeon | *Columba palumbus* | 8 | Foraging |
| Willow warbler | *Phylloscopus trochilus* | 1 | Singing |
| Whitethroat | *Sylvia communis* | 3 | Singing (3 pairs likely to nest) |
| Dunnock | *Prunella modularis* | 1 | Singing (1 pair likely to nest) |
| Robin | *Erithacus rubecula* | 2 | Singing (2 pairs likely to nest) |
| Wren | *Troglodytes troglodytes* | 1 | Singing (1 pair likely to nest) |
| Blue tit | *Cyanistes caeruleus* | 1 | Foraging |
| Blackbird | *Turdus merula* | 1 | Male foraging |
| Carrion crow | *Corvus corone* | 2 | 1 nest seen |
| Magpie | *Pica pica* | 2 | Foraging |
| Goldfinch | *Carduelis carduelis* | 2 | Foraging |
| Linnet | *Linaria cannabina* | 2 | Singing (1 pair likely to nest) |

7.10 Rabbits were plentiful on the site. Several black and red ant nests were noted, and the pond supported a species of whirligig beetle. The semi-natural habitats on the western portion of the site support some species of breeding bird. It is likely that they will support some Priority species as well as common butterflies.

7.11 The verges and bunds around the north-western and north-eastern perimeter included bird's-foot trefoil, the food plant of common blue butterfly *Polyommatus icarus* and narrow-bordered five-spot burnet moth *Zygaena lonicerae*. Bird's-foot trefoil is assessed as abundant enough to support a small population of the Priority species dingy skipper butterfly.

7.12 Four INNS were recorded - Buddleia, a Cotoneaster sp., Spanish bluebell *Hyacinthoides hispanica* and daffodil *Narcissus* sp.

## 8. Assessment of baseline ecology

8.1 This section assesses each Valued Ecological Receptor and concludes whether it is a constraint within the planning system, or not.

### Internationally designated sites

8.2 A shadow Habitats Regulations Assessment (HRA) has been completed for the proposed development, to inform the HRA which the Local Planning Authority must undertake as set out under Regulation 63 of the Conservation of Habitats and Species Regulations 2017.

8.3 Stage 1 of the shadow HRA involved screening to identify the potential for impacts to have likely significant effects. No likely significant impacts were identified.

8.4 The shadow HRA Stage 2 assessment (Appropriate Assessment) considers those potential impacts identified at Stage 1 and assesses whether there would be a likely significant effect from each. This assessment takes into consideration the embedded mitigation measures. The Stage 2 Appropriate Assessment concluded that, 'the proposed development will not cause adverse effects to the integrity of the Teesmouth and Cleveland Coast SPA and Ramsar site, either alone or in combination with other plans or projects'. No additional mitigation measures are required.
*Constraint: No.*

### Teesmouth & Cleveland Coast SSSI

8.5 The Teesmouth & Cleveland Coast SSSI underpins the SPA/Ramsar. Therefore, it can be concluded (based on the shadow HRA) that there would be no adverse effect on those interest features of the SSSI that it shares with the SPA/Ramsar.

8.6 However, the SSSI includes several interest features and areas that are in addition to those of the SPA/ Ramsar. Those additional features that are within the 5km ZOI are; saltmarsh, sand dunes, harbour seal, the assemblage of breeding birds associated with wetlands and the invertebrate assemblage associated with sand dunes. Of these the closest is the breeding bird assemblage at Coatham Marsh, 5.1km ENE of the site. Given the distances involved and the lack of pathways given the embedded mitigation in the application, it is concluded that there would be no effects on Teesmouth and Cleveland Coast SSSI.
*Constraint: No.*

### Locally Designated Sites

8.7 No pathways have been identified between the site and the interest features of the Eston Pumping Station LWS therefore it is concluded that there would be no adverse effects on Locally Designated Sites.
*Constraint: No.*

### Habitats

8.8 The ephemeral/ short perennial grassland is not a Priority habitat but is a LBAP habitat (termed 'brownfields'). It is an important element of the habitat suite across the whole of the Teesworks area and is of local (borough) value. Its loss (of approx. 2.5 Ha) requires compensation.
*Constraint: Yes.*

8.9 The scattered scrub is not a Priority or LBAP habitat. This relatively small area is assessed as of negligible value.
*Constraint: No.*

8.10 Oligotrophic standing water (the pond) is a Priority and a LBAP habitat. Its loss requires compensation (size approx. 420 sqm).
*Constraint: Yes.*

8.11 The poor semi-improved grassland is mainly associated with road verges, which are a LBAP habitat. It is not a Priority habitat. Its loss requires compensation (approx. 1.7 Ha).
*Constraint: Yes.*

**Species**

Great Crested Newt (GCN)

8.12 GCN is a European Protected Species and a Priority Species. As GCN appears to be absent from the surrounding South Tees area, despite extensive survey effort, it is therefore considered to be absent from the site with no realistic potential for it to colonise.

*Constraint: No.*

Bats

8.13 There is negligible amount of suitable habitat for bats on the proposed development site though small numbers would be expected to forage over the site. Two derelict electrical switchgear/ pumping station buildings were checked and are of negligible roosting potential for bats. Both buildings are single skin brickwork with a concrete roof, neither of which provide any suitable crevices for bats to roost in. An inspection of ledges within the buildings found no evidence of bat droppings.
*Constraint: No.*

Reptiles

8.14 The habitat on the site is of low suitability for reptiles. Given that reptiles (common lizards) have only been recorded in the north of the Teesworks area and the limited opportunity for dispersal from there then reptiles are assessed as absent.
*Constraint: No.*

Breeding Birds

8.15 Several pairs of breeding birds occur on the site, utilising the scrub and trees. The WCA 1981 makes it an offence to knowingly destroy the nests of birds when in use. The following Priority species are present:

- Willow warbler
- Dunnock
- Linnet
- + General nesting birds

*Constraint: Yes.*

Water Vole

8.16 There are no nearby records and no suitable watercourses on the site. This species is assessed as absent.
*Constraint: No.*

Hedgehog

8.17 While the on-site habitat is suitable for this species, it is disconnected from wildlife corridors and is assessed as not being present.
*Constraint: No.*

Brown Hare

8.18 While the on-site habitat is suitable for this species, it is disconnected from wildlife corridors and is assessed as not being present.
*Constraint: No.*

Common Toad

8.19 It was not safe to closely survey the pond for common toad tadpoles, although, none were seen through x10 binoculars when viewed from the top of the slope. No adult common toads were found under six felts and boards that were lifted and checked. This species is assessed as unlikely to be present.
*Constraint: No.*

Dingy Skipper

8.20 The 'poor semi-improved grassland' contained some bird's-foot trefoil (the larval foodplant of this butterfly). The likely presence of dingy skipper is assessed as moderate.
*Constraint: Yes.*

Grayling butterfly

8.21 The 'ephemeral/ short perennial' habitat contains some of this butterfly's larval food plant (bents and fescue grasses). The likely presence of grayling is assessed as moderate.
*Constraint: Yes.*

Wall butterfly
8.22 The grassland habitats on-site support various grasses which make up the larval food plant of this species and bare spots are attractive to this species. The likely presence of wall butterfly is assessed as moderate.
*Constraint: Yes.*

Small heath butterfly
8.23 The grassland habitats on-site support various grasses which make up the larval food plant of this species. The likely presence of small heath is assessed as moderate.
*Constraint: Yes.*

Other Invertebrates

8.24 Several ant nests were noted but the ants were not identified to species. Available grassland, scrub and bare substrate may support other invertebrates of conservation importance (such as moths, solitary wasps, beetles, flies). However, due to the relatively small and secluded nature of the habitats, the likely presence of Priority species is assessed as negligible.
*Constraint: No.*

Invasive Non-Native Species (INNS)

8.25 The buddleias, Spanish bluebells and daffodils on site are not considered to warrant special attention such as licensed removal and disposal. The single cotoneaster plant noted may be listed in Schedule 9 of the WCA 1981 as a species which requires responsible disposal at a licensed waste disposal site. Five species of cotoneaster are listed, however, the species seen on site was not identified to species.
*Constraint: Yes.*

## 9. Assessment of the impacts of the proposal

9.1 No designated sites will be adversely impacted – no action is required.

9.2 It is assessed that all habitats on the site will be lost if the application is approved.
Priority habitats - ephemeral/ short perennial grassland, the pond and poor semi-improved grassland – see compensation below.

9.3 It is assessed that all species on the site will be lost as a result of the loss of habitats.
Priority species willow warbler, dunnock and linnet - see compensation below.
Priority species butterflies – small populations of dingy skipper, grayling, wall and small heath - see compensation below.

9.4 It is assessed that general nesting birds could be harmed – see mitigation below.

9.5 It is assessed that invasive non-native plant species, (Schedule 9 of the WCA 1981 &/or the Invasive Alien Species (Enforcement and Permitting) Order 2019) – see mitigation below.

## 10. Recommendations

### Mitigation measures (including Informatives)

10.1 Informative –Removal of vegetation that may support nesting birds should be undertaken outside of nesting season (March to August inclusive), unless the habitats are first checked by a suitably qualified ecologist, who confirms in writing to the LPA that no nesting birds are present, and the work is undertaken within 48 hours. This is a legal requirement of the WCA 1981.

10.2 Informative – Measures will be implemented to prevent the spread of invasive non-native plant species, as listed under either Schedule 9 of the WCA 1981 or the Invasive Alien Species (Enforcement and Permitting) Order 2019 (this is a legal requirement).

10.3 It is assumed that all habitats and species will be lost during the construction works, so no other on-site mitigation is possible.

### Compensation measures

10.4 Compensation refers to the process by which any residual losses after mitigation will be addressed. Compensation measures should be such that there will be no overall significant harm to biodiversity.

10.5 Teesworks is currently preparing an Environment and Biodiversity Strategy that will guide future decisions by Teesworks as to the delivery of habitat enhancement schemes to off-set biodiversity loss resulting from its development and regeneration activities. This uses the Defra Biodiversity Metric 2.0 [xiii] to calculate the total number of BDUs which will be lost as a result of development across the entire Teesworks area.

The Strategy will also calculate the number of BDUs that can be created in the Teesworks area including on land outside of any areas proposed for development, as well as identifying any local, off-site habitat creation and enhancement measures that could be implemented, focusing primarily on the Tees estuary but potentially within the wider Tees catchment area if necessary.

Measures in the Strategy will include offsite habitat creation and enhancement, and species-specific compensation for faunal ecological features impacted.

10.6 It is the intention that the Environment and Biodiversity Strategy will provide options and opportunities for Teesworks, and those developing within the Teesworks area, to meet any biodiversity value deficit arising from development. The Strategy will be delivered by a Management Plan, including a monitoring programme.

10.7 The application site is part of the South Industrial Zone (Figure 6) for which BDUs have been calculated in an earlier study (Appendix 1).

Figure 6. The South Industrial Zone.


10.8 The residual loss of biodiversity for the application site is:

- 25.07 BDUs.

The LPA should satisfy itself that the applicant will use the Teesworks Environment and Biodiversity Strategy Management Plan to deliver compensation measures for 25.07 BDUs.

**BNG and biodiversity enhancement**

10.9 Enhancement refers to measures that are taken which increase biodiversity value above the baseline conditions, either of the overall biodiversity value or for specific Valued Ecological Receptors. In ecological terms it is known as BNG. The Environment Bill is currently passing through Parliament and lists a BNG of 10% to be secured by development. In planning terms, BNG is currently aspirational rather than mandatory.

10.10 However, NPPF (2018) paragraph 170 d) requires a level of biodiversity enhancement:

*Planning policies and decisions should contribute to and enhance the natural and local environment by d) minimising impacts on and providing net gains for biodiversity, including by establishing coherent ecological networks that are more resilient to current and future pressures.*

Net gain should be appropriate to the scale of the development and should be secured by the LPA. For this application, biodiversity enhancement will have to be delivered off-site.

The LPA should satisfy itself that the applicant will deliver the biodiversity enhancement required of this major application, either by using the Teesworks Environment and Biodiversity Strategy, or through another mechanism.

**Monitoring**

10.11 The actions implemented to deliver the Teesworks Environment and Biodiversity Strategy will require oversight and monitoring.

10.12 Monitoring is required to ensure that identified compensatory and, where relevant, enhancement measures, have been achieved across an agreed timescale. This will include but not necessarily be limited to all compensatory measures set out in this section.

10.13 Monitoring will need to be in place for the duration of time that it is necessary to ensure that compensatory measures have achieved their objectives.

10.14 Monitoring will identify any measures that have not achieved, or are failing to achieve, their objectives and in such cases will provide remedial measures to address any shortfall.

10.15 The Environment and Biodiversity Strategy will include a Management Plan to provide the required actions, and these will be the focus of a scheduled monitoring programme.

10.16 The LPA should satisfy itself that the applicant will contribute, as appropriate, to the Teesworks Environment and Biodiversity Strategy Management Plan monitoring programme.

## 11. Conclusion

11.1 The number of BDUs on the site has been calculated as 25.07.

11.2 Seven Valued Ecological Receptors require specific compensatory measures (three Priority species of bird and four species of Priority species butterfly).

11.3 The development, implementation, delivery and monitoring of an Environment and Biodiversity Strategy and its Management Plan will ensure that appropriate compensatory measures are provided such that there is no net loss of biodiversity arising from the proposed development.

**Appendix 1**

**Defra Biodiversity Metric - calculated biodiversity units for South Bank compartments (INCA 2020)**

Compartments STD11 (H6 & H7) are within the application site (lettered green).

| Compartment | Phase 1 habitat code | UK Habitat type | Sqm | Hectares | Distinctiveness | Condition | Connectivity | Strategic Significance | BDU/ha | BDUs | Notes 1 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| STDC11 H4 | B3.2 | Open Mosaic Habitat | 6325.874 | 0.63 | 6 | 2.5 | 1.15 | 1.1 | 18.98 | 12.00 | Meets Bio Metric criteria 1, 4 & 6 |
| STDC11 H3 | B3.2 | Ruderal | 2972.795 | 0.30 | 2 | 2.5 | 1.1 | 1.1 | 6.05 | 1.80 | Herbs sp. abundant and fairly diverse |
| STDC11 H1 | A1.1.1 | Other woodland, broadleaved | 17454.01 | 1.75 | 4 | 1 | 1 | 1 | 4.00 | 6.98 | |
| STDC11 H2 | B3.2 | Ephemeral/ short perennial | 3842.466 | 0.38 | 2 | 2.5 | 1.15 | 1.1 | 6.33 | 2.43 | |
| STDC11 H5 | B6 | Modified Grassland | 7075.846 | 0.71 | 2 | 1 | 1.1 | 1 | 2.20 | 1.56 | |
| STDC11 H2 | B3.2 | Ephemeral/ short perennial | 6391.027 | 0.64 | 2 | 2.5 | 1.15 | 1.1 | 6.33 | 4.04 | |
| STDC11 H2 | B3.2 | Ephemeral/ short perennial | 57007.76 | 5.70 | 2 | 2.5 | 1.15 | 1.1 | 6.33 | 36.06 | |
| STDC11 H5 | B6 | Modified Grassland | 176730.1 | 17.67 | 2 | 1 | 1.1 | 1 | 2.20 | 38.88 | |
| STDC11 H6 | B6 | Modified Grassland | 59263.96 | 5.93 | 2 | 1 | 1.1 | 1 | 2.20 | 13.04 | |
| STDC11 H7 | B3.2 | Open Mosaic Habitat | 7921.736 | 0.79 | 6 | 2 | 1.15 | 1.1 | 15.18 | 12.03 | |
| **Total** | | | | | | | | | | 128.81 | |

## 12. References


i. CIEEM (2016) Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater and Coastal (2nd edition). CIEEM, Winchester.

ii. The National Archives: The Conservation of Habitats and Species Regulations 2017 http://www.legislation.gov.uk/uksi/2017/1012/contents/made.

iii. The National Archives: Wildlife & Countryside Act 1981 http://www.legislation.gov.uk/ukpga/1981/69.

iv. National Archives: Natural Environment and Rural Communities Act 2006. http://www.legislation.gov.uk/ukpga/2006/16/contents.

v. Environment Bill, available: https://publications.parliament.uk/pa/bills/cbill/2019-2019/0003/cbill_2019-20200003_en_1.htm.

vi. Redcar & Cleveland Borough Council [RCBC] (May 2018) Local Plan Adopted May 2018. https://www.redcar-cleveland.gov.uk/resident/planning-and-building/strategic%20planning/Documents/Local%20Plan%20Adopted%20May%202018.pdf .

vii. Department for Communities and Local Government (2019) National Planning Policy Framework. https://www.gov.uk/government/publications/national-planning-policy-framework--2 .

viii. RCBC (2018) South Tees Area SPD. https://www.redcar-cleveland.gov.uk/resident/planning-and-building/local-plan/Pages/South-Tees-Area-SPD.aspx .

ix. Peak Ecology (2013) Ecological Impact Assessment: Technical Report Dogger Bank Teesside A & B

x. Jackson N., in Bond I., (2012). *Mammals, Amphibians and Reptiles of the North East*. Natural History Society of Northumbria. Newcastle.

xi. Joint Nature Conservation Committee [JNCC] (2010) 'Handbook for Phase 1 Habitat Survey. A technique for environmental audit'. Revised re-print. JNCC, Peterborough.

xii. Tees Valley Local Nature Partnership (2010) Guidelines for the selection of Local Wildlife Sites in the Tees Valley – version 7

xiii. Natural England (2019) The Biodiversity Metric 2.0: Auditing and accounting for biodiversity value. Technical Guide