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Ecological Risk Assessment

Foundry Central East, Teesworks

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Industry Nature Conservation Association

1. Introduction

The purpose of this report is to identify any valued ecological receptors (VERS) or other ecological constraints within a 1 km radius of the area known as Foundry Central East, Teesworks (henceforth termed the Site) in respect to the associated construction of a development platform. Where any VERS are likely to be present within that radius it considers any potential impacts on them from works and where potential impacts have been identified, recommends mitigation to prevent harm to VERS.

The location of the Foundry Central East remediation site is shown in Figure 1 and a plan showing a 1km radius from the centre of the Site is shown in Figure 2. This report considers VERS within 1km of the closest point of the Foundry Central East area so covers a slightly wider area than the radius shown in Figure 2.

Figure 1. Site location (plan provided by AtkinsRéalis)

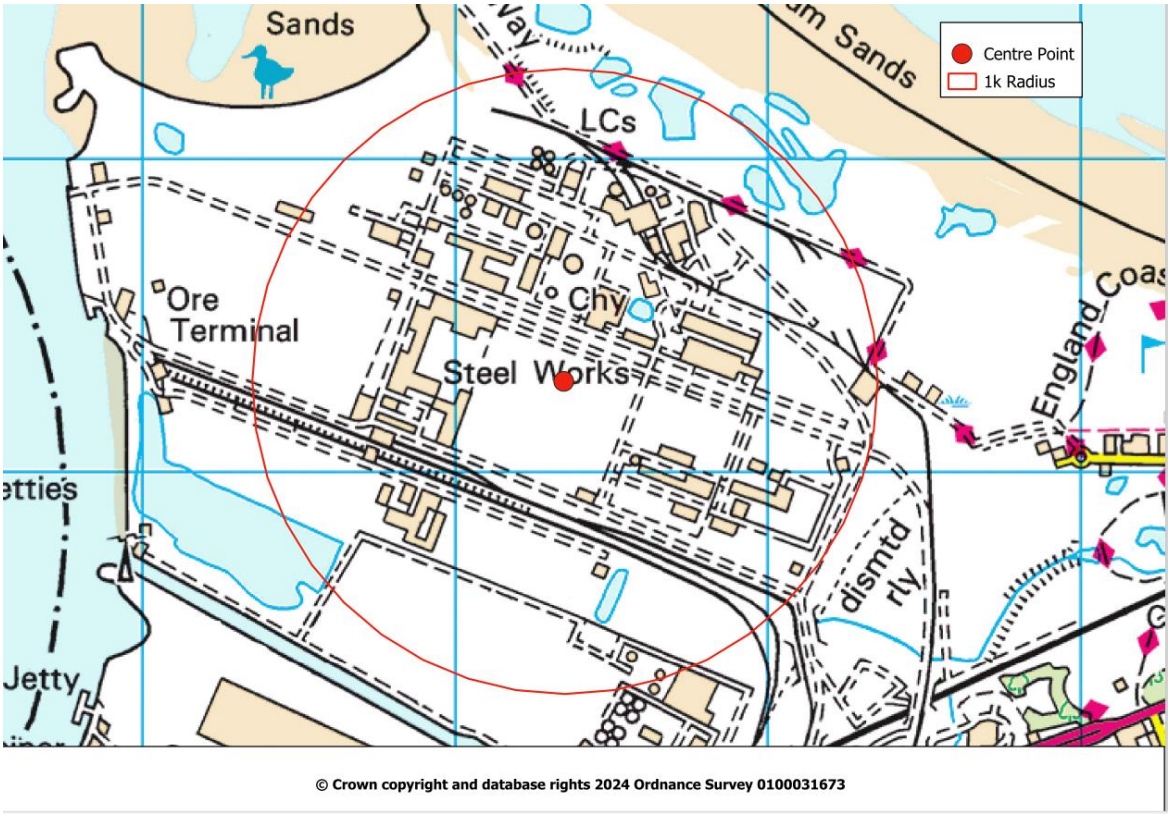

Figure 2. The 1km radius from the centre of the site

2. Identification of Valued Ecological Receptors

2.1 Internationally Designated Sites

There are two internationally designated sites within 1km 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 and SACs under the EU Habitats Directive, whereas Ramsar sites are wetlands of international importance. On Teesmouth the Ramsar site shares the same boundary as the SPA except where the SPA includes a marine component, and they effectively share the same interest features. Therefore, the usual convention, which is followed in this report, is to treat them as one site, described as the SPA, except where it is only the Ramsar that is referred to. The intertidal element of the Teesmouth and Cleveland Coast SPA is also classed as a European Marine Site and its interest features are a subset of the SPA. Further details of The Special Protection Area and Ramsar site are given in Appendix 1.

Table 1 gives information for each of the qualifying features in terms of their proximity to the Site. Only Redshank and the wintering waterbird assemblage are within 1km of the Site. These are scoped in for further assessment, all other interest features are scoped out.

Table 1. Qualifying features for Teesmouth and Cleveland Coast SPA/ Ramsar

Qualifying feature	Principal locations with respect to The Foundry East	Distance (km)
Sandwich Tern	Principal feeding area is the mouth of the Tees or at sea. Most birds roost at North Gare.	2.5 W - North Gare roost
Little Tern	Usually breeds at Crimdon though the colony bred at Seaton Carew in 2019. Historically bred at South Gare but there is no longer any suitable habitat there.	5.0 NW - Seaton Carew
Common Tern	Breeds at Saltholme. Feeds along the entire intertidal section of River Tees and certain of its tributaries, across Seaton Channel and out to sea.	6.5 SW - Saltholme
Pied Avocet	Breeds on the North Tees brinefields and at Saltholme	5.0 SW - Brinefields 6.5 SW - Saltholme
Ruff	Present on intertidal areas and margins of large freshwater bodies, mainly on North Tees	5.0 SW – North Tees
Red Knot	Present on intertidal areas. The closest site regularly used is Seal Sands, although most birds now favour North Sands in Hartlepool.	3.0 W - Seal Sands 10.5 NW - North Sands
Redshank	Present on intertidal and freshwater areas. The closest sites regularly used by significant numbers are Bran Sands Lagoon and Dabholm Gut	**0.5 SW - Bran Sands Lagoon** **0.8 - Dabholm Gut**
Wintering waterbird assemblage	Distributed across most intertidal and freshwater areas within the SPA and some terrestrial areas.	**0.5 SW - Bran Sands Lagoon** **0.8 S - Dabholm Gut** **0.9 W - Bran Sands** 1.6 NW - South Gare

2.2 Nationally Designated Sites

There is one nationally designated site with a 1km radius of the Site, which is the Teesmouth & Cleveland Coast Site of Special Scientific Interest (the SSSI).

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 in January 2019.

The citation and description of each of the interest features of the SSSI is given in Appendix 2.

The location of the closest examples of each interest feature to the closest perimeter of the Site is given in Table 2. The only interest features within a 1km radius are; non-breeding birds, breeding birds, sand dunes and invertebrate associated with sand dunes. These are scoped in for further assessment, all other interest features are scoped out.

Table 2. Qualifying features in relation to the Site

Qualifying feature	**Principal locations with respect to The Foundry East**	**Distance (km)**
Jurassic Geology	Redcar Rocks	3.4 E
Quaternary Geology	Seaton Carew	7.8 NW
Saltmarsh	Confined almost entirely to the Greatham Creek area north of the Tees. There is a very small amount at Bran Sands	5.4 W Greatham Creek 1.7 W Bran Sands
Sand Dunes	Coatham – South Gare to Coatham Common, Seaton Dunes in Hartlepool.	**0.6 N Coatham Dunes** 3.2 NW 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	2.7 W 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.	1.5 E Coatham Marsh **0.5 NW South Gare**
Non -breeding Birds	Present on intertidal, freshwater and marine areas. Dabholm Gut and Bran Sands Lagoon are the closest sites holding large numbers.	**0.5 SW Bran Sands Lagoon**
Invertebrate Assemblage	Coatham Dunes is of particular importance	**0.6 N**

2.3 Locally Designated Sites

Locally designated sites comprise Local Nature Reserves (LNR) and Local Sites, with Local Sites including Local Wildlife Sites (LWS) and Local Geological Sites (LGS).

There are no Locally Designated Sites within a 1km radius. The closest is Eston Pumping Station LWS which is 1.2km SW of the closest part of the Site. Eston Pumping Station is designated as a habitat mosaic including reedbed and urban grassland.

Locally designated sites are scoped out.

2.4. Protected Species

This section provides a scoping exercise to identify any protected for which mitigation measures might be needed as part of construction of the development platform at the Site. It is confined to those species that are found in the South Tees area.

2.4.1 Great Crested Newt (GCN)

There are no records of GCN within a 1km radius of the Site. The closest known current record is from Lovell Pools, over 6km to the south. INCA carried out GCN surveys of all the waterbodies on the former Steelworks area in 2007 and all proved to be negative for GCN. More recently, INCA has undertaken environmental DNA surveys for GCN at two ponds on Teesworks in 2019 and 2021 which were respectively 0.2km and 0.9km from the Site. These were also negative for GCN. There is a record of GCN from a pond on the golf course at Coatham, a little over 1.0km to the east of the Site. This record was from 1988 and the pond where it was recorded no longer exists. It is possible that the species survives in the one remaining pond on the golf course. However, the negative eDNA result from 2019 was from a pond within 200m of the unconfirmed 1988 record so it is unlikely on that basis that a population exists in this area. Great Crested Newt is therefore scoped out.

2.4.2 Reptiles

The only native reptile species which is found in the surrounding areas is Common Lizard *Zootoca vivipara.* 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, 1.0km to the east of the Site. There has also been the occasional record of Common Lizard from the Teesworks northern boundary fence line just within the 1km radius but a reptile survey carried out by INCA in 2020 on the area known as "Iron Ponds" between the fence and the Site proved negative for reptiles. Also, a reptile survey carried out by INCA in 2021 of land that appeared to be very suitable for reptiles, approximately 0.5km south-east of the Site proved to be negative. There is no suitable habitat for reptiles on the Site itself, therefore reptiles are scoped out.

2.4.3 Bats

It is known that bats have in the past used the northern perimeter of the Teesworks site for foraging and that bats forage along the coastal fringe up to South Gare. However, there is no suitable bat foraging habitat on the Site, nor are there any roosting opportunities. Therefore, bats are scoped out.

2.4.4 Water Vole *Arvicola terrestris*

There is no suitable habitat for Water Voles within a 1km radius of the Site therefore Water Voles are scoped out.

2.4.5 Otter *Lutra lutra*

Otters are found on water courses and waterbodies across Teesside including on Dabholm Beck and Coatham Marsh, so are likely to occur within a 1km radius as there are water bodies with fish in them in that area. It is possible then that otters may occasionally commute within a 1km radius of the Site. Otters are therefore scoped in for further assessment.

2.4.6 Nesting birds

The Teesworks area supports a wide diversity of nesting birds, including a variety of ground-nesting birds associated with the flat, open areas. These include Little Ringed Plover *Charadrius dubius*, a Schedule 1 protected species, which is known to have bred within the 1km radius, annually since 2021. As this species nests in bare areas, as does Lapwing *Vanellus vanellus*, then it is possible that nesting birds will be present on the Site so are scoped in for assessment.

2.4.7 Migratory fish

Each of Atlantic Salmon *Salmo salar*, River Lamprey *Lampetra fluviatilis*, Sea Lamprey *Petromyzon marinus*, and European Eel *Anguilla anguilla*, are known to migrate along the River Tees. It is unclear whether any of the first three species could access The Fleet due to impediments between Dabholm Gut and Dabholm Beck, but in any case, the bed of The Fleet is unsuitable for their respective life cycles, so they are presumed to be absent. By contrast, European Eel is known to travel to Coatham Marsh via Dabholm Gut and The Fleet watercourses. However, the closest point of The Fleet to the Site is approximately 800m therefore migratory fish are scoped in for further assessment.

2.5 Invasive species

A variety of Invasive Non-native plant species, as listed on Schedule 9 of The Wildlife and Countryside Act 1981 (as amended) or The Invasive Alien Species (Enforcement and Permitting) Order 2019, are present in the wider area. These include but are not necessarily limited to: Japanese Rose *Rosa rugosa*, various *Cotoneaster* species; Alexanders *Smyrnium perfoliatum*,

Japanese Knotweed *Reynoutria japonica*, Giant Hogweed *Heracleum mantegazzianum,* Floating Pennywort *Hydrocotyle ranunculoides*, Nuttall's Waterweed *Elodea nuttallii*. Of these only Floating Pennywort is known from within a 1km radius of the Site, through its presence in The Fleet, but all of the above species are present within a 2km radius and have the potential to spread. Invasive species are therefore scoped in.

3. Assessment of potential impacts

3.1 Internationally designated sites

The following effects with the potential to impact on the Redshank or wintering waterbird assemblage interest features of the Teesmouth and Cleveland Coast SPA/ Ramsar (SPA) have been identified.

1. Loss of habitat outside of the SPA which supports SPA birds
2. Visual disturbance to SPA birds
3. Noise disturbance to SPA birds
4. Discharge of water borne pollutants to the SPA
5. Discharge of dust and particulates to the SPA.

Each of the above potential effects is assessed as follows:

1. Loss of habitat outside of the SPA which supports SPA birds.

The Site consists of extensive areas of bare substrate much of which was formerly buildings or roads, so is compacted. There is therefore no suitable habitat for SPA birds and this effect is screened out.

2. Visual disturbance to SPA birds – screened out.

The closest areas used by SPA birds are Bran Sands Lagoon, 500m to the south west and Dabholm Gut, 800m to the south of the closest parts of the Site. No visual disturbance is anticipated at this distance in any case but there are existing, permitted, operational activities on the intervening areas on both sides which would potentially cause more visual disturbance but which are not considered to be having an adverse effect on the SPA.

3. Disturbance to SPA from increased noise – screened out.

SPA birds do not occur closer than 500m from the Site. At that distance noise attenuation would be such that there would be no significant increase above the baseline levels to which the birds are habituated.

4. Discharge of water borne pollutants to the SPA

Without mitigation there is the potential for soil leachate to migrate to groundwater and via groundwater to the SPA. The risk of contaminants leaching from soils and migration of groundwater is assessed in the remediation strategy for the works (Arcadis Report No. 10047374-AUK-XX-XX-RP-ZZ-893-01-FCE_ROA&S) and the Hydrogeological Risk Assessment (Arcadis Report No.10047374-AUK-XX-XX-RP-ZZ-815-01-FCW_HRA).

Subject to the required mitigation measures associated with the Hydrogeological Risk Assessment being implemented it is considered that there would be no adverse impact on the SPA from water borne pollutants.

5. Discharge of dust and airborne particulates to the SPA

There is the potential for dust and other particulates to disperse from the Site to the SPA. The only areas of the SPA within a 1km radius of the Site that support significant numbers of SPA birds are

Bran Sands Lagoon, Dabholm Gut and Bran Sands, all of which are either open water or intertidal habitats and therefore not significantly susceptible to dust accumulation. A small number of Redshank use a pool approximately 600m to the north of the Site but there is no indication these are affected by dust levels from surrounding industry or from dust levels from historic industry. In any case, measures to limit the amount of dust generated will be controlled by standard dust suppression measures as part of a Construction Environment Monitoring Plan (CEMP) which will be implemented as part of the planning process.

3.2 Nationally designated sites

Three of the interest features of the SSSI are present within 1km of the Site; non-breeding birds, breeding birds, sand dunes and invertebrates associated with sand dunes. The non-breeding bird interest feature is the same as for the those features of the SPA that are not breeding birds, hence is covered by the assessment in section 3.1.

In addition to the breeding bird interest features which the SSSI shares with the SPA, and which have been scoped out, the breeding bird interest feature of the SSSI also includes the assemblage of breeding birds associated with 'Lowland water and their margins'. In relation to the Site these are found in connection with reedbeds which at their closest point are 500m to the north west of the Site. No potential impacts on the breeding bird interest feature have been identified other than those considered for the SPA interest features in section 3.2 and those potential impacts on the SSSI have been ruled out for the same reasons as for the SPA.

The only potential effect on the sand dunes and their associated invertebrate assemblage from the remediation works would be through deposition of dust and particulates. This would only be likely to cause an impact if these were deposited in sufficient quantities to either directly smother vegetation, or to cause a change in ground and /or nutrient conditions that affects the plant species composition, or to directly smother invertebrates at certain stages of their life cycles, or to indirectly affect invertebrates through changing the plant species composition. The control measures for dust and particulates which will be implemented as part of a CEMP are considered sufficient to prevent such impacts on the SSSI.

3.3 Protected species

3.3.1 Otter

As otters could potentially traverse the Site then there is the possibility of them falling into and being trapped in excavations. This would apply to other large and mobile mammal species which are found in the surrounding area, such as hares, deer and hedgehogs. While these other species are not protected by law, nevertheless mitigation to prevent harm to them would be good practice.

Any steep-sided excavations should therefore either be covered up outside of working hours or else be provided with some form of ramp so that any mammals that might fall into them can climb out.

3.3.2 Nesting birds

There is the potential for bird's nests to be damaged or destroyed during remediation works. In addition, Schedule 1 bird species are protected from disturbance whilst they are nesting.

Prior to the start of the construction of the development platform, the Site should be checked by an ecologist for the presence of nesting birds. This should occur within 48 hours of works commencing. Should nesting birds be found to be present then a suitable buffer zone will be established around

the nest(s) so that no harm or, if relevant disturbance, takes place. This will need to be repeated should new areas of the Site be worked after the initial check.

3.3.3 Migratory fish

Migratory fish could be affected by discharges to the Fleet from the works. The Fleet is separated from the Site by a road network, which is on higher ground than the Site therefore there would be no direct discharges to the Fleet from the Site. No other direct pathways for water borne pollutants from the Site to The Fleet have been identified. The potential for leachate to reach The Fleet will be addressed through the required mitigation measures associated with the implementation of the Hydrogeological Risk Assessment. Subject to this it is concluded that there would be no impact on migratory fish.

3.4 Invasive species

Although no invasive species have been recorded on the Site, there is the potential for them to be present given that they could disperse from the surrounding area.

Prior to works commencing, an invasive species survey should be undertaken by a suitably experienced ecologist. Should any invasive species be found then an invasive species management plan will be drawn up and implemented to prevent the spread of such species.

4. Conclusion

The following measures, as set out above, will be required to ensure compliance with legal requirements relating to ecology:

Measures to prevent waterborne contaminants affecting designated sites in accordance with the Hydrogeological Risk Assessment.

A CEMP to prevent dust and particulates affecting designated sites.

Measures to prevent otters or other mammals being trapped in excavations.

Prior to works commencing, a survey for invasive plant species should be undertaken by a suitably experienced ecologist. Should invasive species be found then a management plan, appropriate to the species identified, will be put in place prior to work commencing.

A nesting bird check to take place within 48 hours of works commencing, or of works commencing on any new areas of the Site, if these are to take place within the nesting bird season ie March-August inclusive.

Appendix 1 Internationally designated sites

Teesmouth and Cleveland Coast SPA

The Teesmouth and Cleveland Coast Special Protection Area (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 2019, the SPA has been 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

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 3. 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.

Table 3. Qualifying features for Teesmouth and Cleveland Coast SPA/ Ramsar

Feature	Count (period)	% of Population	Interest type	Selection Criteria	New feature (Y/N)
Sandwich Tern *Thalasseus sandvicensis*	1,900 individuals (1988-1992	4.3% GB, 1.3% Western Europe/Western Africa	Annex 1 (non-breeding)	Stage 1.1 (SPA), Criterion 6 (Ramsar)	N
Little Tern *Sternula albifrons*	81 pairs (2010-2014)	4.3% GB	Annex 1 (breeding)	Stage 1.1	N
Common Tern *Sterna hirundo*	399 pairs ((2010-2014)	4.0% GB	Annex 1 (breeding)	Stage 1.1	Y
Pied Avocet *Recurvirostra avosetta*	18 pairs (2010-2014)	1.2% GB	Annex 1 (breeding)	Stage 1.1	Y
Ruff *Calidris pugnax*	19 individuals (2011/12-2015/16)	2.4% GB	Annex 1 (non-breeding)	Stage 1.1	Y
Red Knot *Calidris canutus*	5,509 individuals (1991/92-1995/96)	1.6% NE Canada/Greenland/Iceland/UK population	Migratory (winter)	Stage 1.2 (SPA), Criterion 6 (Ramsar)	N
Common Redshank *Tringa totanus*	1,648 individuals (1987-1991)	1.1% East Atlantic population	Migratory (passage)	Stage 1.2 (SPA), Criterion 6 (Ramsar)	N

Feature	Count (period)	Average number of individuals	Selection Criteria
Waterbird assemblage	2011/12-2015/16	26,014 individuals (SPA assemblage), 26,786 individuals (Ramsar assemblage)	Stage1.3 (SPA), Criterion 5 (Ramsar)

The conservation objectives for the SPA and the individual species and/or assemblage of species for which the site has been classified are:

"Subject to natural change, ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the aims of the Wild Birds Directive, by maintaining or restoring;

- The extent and distribution of the habitats of the qualifying features;
- The structure and function of the habitats of the qualifying features;
- The supporting processes on which the habitats of the qualifying features rely;
- The population of each of the qualifying features, and,
- The distribution of the qualifying features within the site."

Appendix 2. Teesmouth & Cleveland Coast SSSI

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

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

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 palaeoenvironmental 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

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

The site 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

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

The site supports nationally important numbers of three breeding species: pied avocet *Recurvirostra avosetta*, little tern *Sternula albifrons* and common tern *Sterna hirundo*. Avocets and common terns both nest within the SSSI. Little terns from a large nearby colony at Crimdon (in the adjacent Durham Coast SSSI) use the SSSI for foraging and pre- and post-breeding gatherings, with only occasional recent nesting attempts. The extensive sand dunes, saltmarshes and wetlands across the site support a diverse assemblage of breeding birds. This includes a number of 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

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 site 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. Redshank 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 regularly used by ringed plover and knot.

Invertebrate assemblage

The extensive complex of sand dunes within the site 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, 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.