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Ecology report

**Storage of Soils and its final use in the
regeneration of land**

South Tees Development Corporation

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1. Introduction

INCA was commissioned by the South Tees Development Corporation (STDC) to undertake an ecological assessment of various areas of land which are being considered for the temporary storage and permanent use of soils from the Sirius Minerals mining operation. The purpose of the assessment was to determine the current ecological value of each of the areas in broad terms and to identify the potential for any valued ecological receptors to be present or impacted by the proposed works. This includes any species to which legislation applies, such as protected species or invasive non-native plants. It also includes priority habitats and species, which are those habitats and species listed under Section 41 of the Natural Environment and Rural Communities Act (2006) as being of principal importance for the conservation of biodiversity in England. Priority habitats and species can be a material planning consideration.

This report does not provide a detailed Ecological Impact Assessment as the works will be phased and specific details may be subject to change, so are not known at this time. In addition, given the likely timescales over which storage and permanent use will occur, further ecological surveys will be required ahead of future phases. Instead this report provides a “worst-case” scenario based on current knowledge for the potential impacts on habitats and valued ecological receptors. The report enables the local planning authority to reach an informed decision on the accompanying application proposals, and in respect of the potential extent of the habitat impact.

2. Site location

The application is for ground preparation works, which includes the temporary storage and permanent use of soils at various locations across the South Tees Development Corporation (STDC) area.

Six potential locations have been identified for the temporary deposition and storage of the soils. These are shown in Figure 1, outlined in black. Permanent use of the soils would be over a much larger area of the STDC site and would typically involve an increase of no more than 0.5m above existing ground levels, subject to local variations and low spots. The exact locations where the soils would be deposited for final use have not been determined as this will be subject to operational need but the areas where they could potentially be used is shown in the red-line boundary in Figure 1.

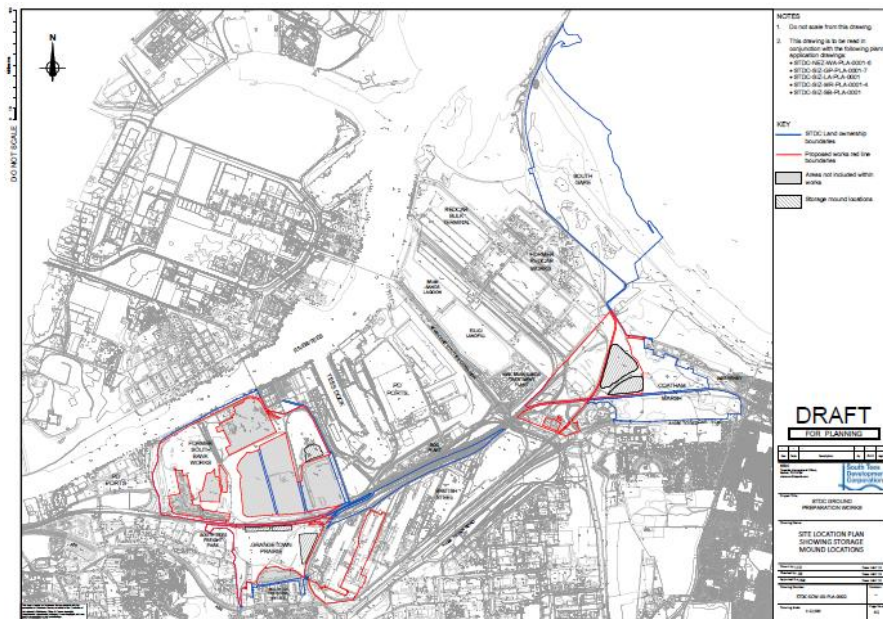


Figure 1. Proposed locations for temporary storage and final use of soils

3. Review of available data

INCA has obtained a considerable amount of data on wildlife in the South Tees and adjacent Wilton industrial estates over more than a decade and holds the most comprehensive data set of ecological records in this area. The following review of ecological receptors that are found in the wider South Tees area and therefore may be relevant to the site is based primarily on INCA's data and other data that are in the public domain. In addition, a data search was obtained from the Environmental Records Centre North East for records of reptiles and Great Crested Newts within a 5km radius of the STDC site.

3.1 Designated Sites

3.1.1 Internationally Designated Sites

Four European sites are within 10km of at least part of the application site: North York Moors SPA; North York Moors SAC; Teesmouth and Cleveland Coast SPA; Teesmouth and Cleveland Coast Ramsar. The westernmost units of the North York Moors SPA and North York Moors SAC are approximately 9km away from their closest point to the closest part of the application site, which is Grangetown Prairie. Given the distances involved and the nature of the proposals, these have been screened out as having a Likely Significant Effect.

The Teesmouth and Cleveland Coast SPA and the Teesmouth and Cleveland Coast Ramsar are within 1km of parts of the application site therefore these European Sites are considered in this report. Both sites are designated because they support important populations of wintering and passage waterbirds and certain species of breeding bird that are associated with marine or wetland habitats. As the SPA and Ramsar site have effectively shared the same interest features and boundaries and are subject to the same legislation, they are therefore usually referred to together as the "SPA".

Natural England has proposed an extension to the SPA and to the Ramsar site which will incorporate both additional areas and additional interest features. This proposed extension is currently with the Secretary of State for approval. However, since the launch of the formal consultation on 31 July 2018, both the new areas and the additional species are given the same legal protection as the

existing SPA. The proposed extension would mean that the proposal site would be approximately 90m away from the closest part of the SPA which is at Coatham Marsh. Details of the SPA and an assessment of potential impacts on it from this application are given in Appendix 2.

3.1.2 Nationally Designated Sites

There is only one nationally designated site which is in close enough proximity to the proposal site to require consideration. This is the Teesmouth and Cleveland Coast SSSI, which 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 Teesmouth National Nature Reserve is located on the north side of the River Tees at Seal Sands and Seaton Common but its boundaries and interest features are a sub-set of the Teesmouth and Cleveland Coast SSSI, so it is not considered separately.

The closest other nationally designated site is the North York Moors SSSI, which is some 9 km to the south at its closest point.

Details of the Teesmouth and Cleveland Coast SSSI and an assessment of potential impacts from this proposal on it are given in Appendix 2.

3.1.3 Locally Designated Sites

There are no locally designated nature conservation sites within a 2km radius of the site.

3.2 Protected species

3.2.1 Great Crested Newt *Triturus cristatus* (GCN)

INCA carried out GCN surveys of all of the waterbodies on the former Corus site in 2007 and of four ponds at Teesport in 2005. All proved to be negative for GCN. INCA also undertook an environmental DNA survey for GCN of ponds on Grangetown Prairie site in 2018. This also proved negative.

There is an unconfirmed record of GCN from a pond on the golf course approximately 200m to the north of the northernmost point of the STDC 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 approximately 5km 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).

3.2.2 Bats

INCA has recorded Common Pipistrelle *Pipistrellus pipistrellus* foraging in small numbers across various parts of the Wilton industrial complex and one occasion a single Noctule bat *Nyctalus noctula* commuting over that area. Cleveland Bat Group has recorded both of those species feeding across South Gare. 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). It is likely to forage in small numbers in any areas of the STDC site that have suitable habitat to support its prey of flying insects.

3.2.3 Reptiles

Common Lizard *Zootoca vivipara* has been recorded from the coastal dune areas from South Gare to Coatham Common, though records are few and far between which suggests that there is not a large population. A survey in 2018, which covered the majority of the Warrenby area (Quants Ecology, 2014) found a single Common Lizard. There is also a single record of a Common Lizard from Eston Pumping Station in 2009. A survey of seven sites on the wider STDC area but including the southern end of Warrenby proved negative for reptiles. (INCA, 2014). Several surveys for reptiles have taken place at the nearby Wilton industrial estate, all of which have proved negative. Other than the above, the closest reptile record is approximately 5km away from the application site at Eston Moor.

3.2.4 Otter *Lutra lutra*

Otter has been recorded on Dabholm Gut and Coatham Marsh on the south side of the Tees and at several locations on the north side of the river. As an otter's territory typically extends for several kilometres it is possible that the species will occur at any location on Teesside where there are suitable water bodies with connectivity to other suitable habitat.

3.2.5 Water Vole *Arvicola amphibius*

The most recent record of Water Vole on the STDC site 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 current location for Water Voles is on Spencer Beck approximately 2km to the southwest of the site.

3.2.6 Badger *Meles meles*

The closest record of badger is from Wilton Woods, though there are no known recent records from there. In 1995, three rescued badgers were released at an artificial sett on the eastern boundary of the Wilton Industrial Complex but surveys by INCA in 2014 established that they were no longer present. There is no suitable habitat for badger nearer to the proposal site than Wilton Woods.

3.2.7 Nesting birds

There is no information on nesting birds specifically for the proposal site but the various species of birds present on Teesside between them nest in a variety of habitats and are likely to be present anywhere where there is suitable habitat.

3.3 Priority Species

3.3.1 European Hedgehog *Erinaceus europaeus*

Hedgehogs are frequently encountered as road casualties on the A174 approximately 3-4km south of the site but very rarely on the A66 east of the A19, though they could still be present in areas around the site where there is suitable habitat.

3.3.2 Brown Hare *Lepus europaeus*

Brown Hare is resident and widespread across the STDC estate.

3.3.3 Common Toad *Bufo bufo*

Toads have been recorded in several ponds across the South Tees Development Corporation area though never in large numbers.

3.3.4 Butterflies and moths

Of the several priority butterfly species, Dingy Skipper *Erynnis tages* and Grayling *Hipparchia semele* are closely associated with relatively open areas on brownfield sites, such as are present across much of the STDC site. Grayling have been found in high numbers at the eastern end of the former Corus site and both it and Dingy Skipper have been recorded in good numbers on the Wilton site.

There have been no specific surveys for moths on the STDC site but a number of priority species that utilise similar habitats to Dingy Skipper and Grayling are likely to be present.

3.4 Invasive non-native plants

Giant Hogweed, *Heracleum mantegazzianum* is known to be present at Teesport where INCA monitors it annually in order to facilitate control measures. It has not to date been recorded elsewhere on the STDC site. Floating Pennywort *Hydrocotyle ranunculoides* covers much of The Stell. No other invasive non-native plants are known from the STDC site.

4. Surveys

4.1 Survey details

All site surveys were carried out between April and June 2019, except for Grangetown Prairie. An ecological survey of Grangetown Prairie was undertaken in May 2018 to inform potential development on that site. Grangetown Prairie was revisited in April 2019 to check for any changes that might have rendered any aspects of the 2018 survey obsolete. Conditions had not changed to any appreciable extent, except for the felling of trees and shrubs over a discrete area in the south. These changes have been addressed in this report but otherwise the 2018 survey of this area is considered still valid.

All surveys were carried out by Ian Bond CEnv MCIEEM, Ecologist with INCA. All areas were surveyed on foot in their entirety, except for the Metals Recycling Area, which was viewed from binoculars from an elevated central point and for a small area of Lackenby, which was viewed through the security fence using binoculars.

The weather conditions at the time of the surveys were suitable for undertaking habitat surveys though on occasion the wind was strong enough to deter butterfly flight.

In some cases it was not possible to identify a small number of plant species accurately due to the time of year. Similarly, the timing of the surveys did not necessarily coincide with the times when certain protected or priority species would be evident. However, as the principal aim was to identify the potential for those species to be present this was not considered to be a constraint on the accuracy of the surveys. There are not considered to be any other constraints on the accuracy of the survey.

4.2 Habitat surveys

Surveys were undertaken by first identifying different habitats and delineating their approximate boundaries. These boundaries were approximate due in many cases to habitats grading into each other. Each habitat was then traversed on foot so that all features could be observed, and the main components of its vegetation were recorded. Surveys did not attempt to list all plant species or to assess each habitat against specific criteria, such as “The Guidelines for selection of Local Wildlife Sites in the Tees Valley” (Tees Valley Wildlife Trust, 2010). Instead each separate habitat was assessed in broad terms for its biodiversity value.

4.3 Great Crested Newt (GCN) survey.

During a habitat surveys on 23 May 2019 newts were observed in the concrete tank which supports a pipe bridge (See T1, in Figure X). The water in the tank was viewed through binoculars for 10 minutes and a total of two newts were seen. One was clearly in the larval stage, the second was

glimpsed briefly and thought to be an adult Smooth Newt *Lissotriton vulgaris* but it could not be ruled out that it might have been a larval GCN. Given that there is a historical GCN record (albeit unconfirmed) approximately 200m away, an environmental DNA (eDNA test) was carried out for the presence of GCN.

Samples of water were taken from the tank on 30 May 2019, using the approved methodology as set out in Biggs et al, (2014). The results were sent off for analysis by SureScreen Scientifics, which is an accredited company for carrying out analysis of GCN eDNA. Prior to commencing the eDNA survey the tank was again viewed with binoculars for 10 minutes to look for newts. In addition, during the taking of water samples for the eDNA test, which took over 30 minutes, observation for newts continued without binoculars.

4.4 Other notable species

Other than for Great Crested Newt, no specific surveys for species were carried out; instead the site was assessed for its potential to support protected or priority species. However, any casual records of protected or priority species that were obtained during the habitat surveys were noted.

5. Results

5.1 Habitats

The majority of the area within the red line boundary is Open Mosaic Habitat (OMH), which is a priority habitat. This takes the form of what might be termed “brownfield habitats”, which form on previously developed land. The OMH varies in quality and composition across the area depending on various factors such as; substrate; topography; former land use; proximity to other habitats etc. A significant proportion of the OMH is of high quality. Some areas may support the diversity of plant species required to meet the criterion for designation as a Local Site as set out by the Local Sites Partnership (Tees Valley Wildlife Trust, 2010) though this was not specifically addressed as part of this survey. Nevertheless, it is estimated that approximately 12ha could be classed in broad terms as high quality OMH at a sub-regional level.

Grassland is confined to areas where the soil is deeper and more nutrient-rich, in particular along the borders of the watercourses. These areas are relatively small and are at best moderately herb-rich with small amounts of scrub. They would not be classed as Lowland Meadow priority habitat.

The most significant wetland feature of within the proposal site is The Fleet, which flows from Coatham Marsh to join Dabholm Gut. This is joined by a very short section of the Mill Race, which flows from Kirkleatham, but is culverted across the STDC site except for a stretch of approximately 100m before it joins The Fleet. There are three other wetlands in the proposal site; a series of small, shallow pools, which have formed on slight depressions on Grangetown Prairie; a small, former pond constructed with a liner and now full of emergent vegetation and a large, artificial pond. The last two lie near to the Tees Dock Road.

There are no substantial areas of other types of habitats

Descriptions of each of the habitats on the site and plans showing their locations are given in Appendix 1.

5.2 Fauna

5.2.1 Great Crested Newt (GCN)

The eDNA survey of the tank on the pipe bridge proved negative. Therefore it can be concluded that GCN are not present in that body of water.

5.2.2 Other protected species

Other than nesting birds, no protected species were observed during site surveys.

Some of the habitat on the application site, mainly on the peripheries of the various areas, has some suitability for reptiles. However it is considered that the distances involved, the presence of operational or former operational areas and other unsuitable habitat, not least watercourses such as The Fleet and Dabholm Gut, would have precluded the spread of reptiles to any sites west of Warrenby. There are some relatively small areas of Warrenby and Area CLE31, which haven't been surveyed for reptiles, but which have habitat that is potentially suitable for Common Lizards. Specifically these are: Areas CLE31 3AH2 Area CLE31 3B H3; the boundary of CLE31 3B H4 and The Fleet; parts of Areas W1 and W2.

The Fleet had some suitability for Water Vole however the long-term absence of this species from the surrounding area makes its presence very unlikely. The Fleet is likely to be used by Otters for commuting between the river and Coatham Marsh.

5.2.3 Nesting birds

Barn Owl *Tyto alba*, was found to be nesting in one of the buildings on site. Barn Owl receives special protection under Schedule 1 of the Wildlife and Countryside Act 1981 (as amended). No other Schedule 1 species were seen during the surveys but it was noted that there is suitable habitat present in several areas for Little Ringed Plover *Charadrius dubius*.

Several other bird species were noted whilst undertaking the habitat surveys, most of which could potentially nest on the site. While most species seen would be confined to nesting in the shrubs on the site, some such as Lapwing *Vanellus vanellus* are ground-nesting and could potentially breed across much of the site.

5.2.4 Priority Butterflies and Moths

Some of the surveys coincided with the peak flight period of Dingy Skipper butterfly. When weather conditions were suitable for butterflies to fly this species was observed across much of the proposal site. It was particularly prevalent across the former South Banks Works, where in excess of 20 were noted as a casual observation whilst undertaking a habitat survey. It is expected that this species will be widespread across the proposal site wherever there is suitable habitat.

The surveys were undertaken earlier in the year than the flight period for Grayling butterfly, nevertheless much of the habitat across the site was also suitable for this species and it is expected that it will be present. Similarly the habitat was suitable for some other priority butterfly and moth species and these are also likely to be present.

5.2.5 Other Priority species

Brown Hare was seen on most surveys and is widespread across the site. No other Priority species were noted during the surveys.

5.2.6 Invasive non-native species

A small, isolated clump of Japanese Knotweed *Fallopia japonica*, was present at South Bank, to the north of “High Tip” at grid reference NZ538222.

A single bush of Small-leaved Cotoneaster, *Cotoneaster microphylla*, was present at the northern end of Warrenby at NZ575252.

6. Assessment

This assessment is based on the “worst-case” scenario that all the areas within the red-line boundary are covered by soils at the outset of the development though this is not the intention and in practice is not possible. The assessment also does not take account of any opportunities for mitigation that may occur as the works progress, as details of the phasing of the work are not currently known. The report enables the local planning authority to reach an informed decision on the accompanying application proposals, and in respect of the potential extent of the habitat impact.

6.1 Designated sites

An assessment of potential impacts on European sites and on Sites of Special Scientific Interest is given in Appendix 2. No impact on designated sites is predicted due to the distances involved to those sites and the nature of the proposal.

6.2 Habitats

The application site covers an area of 286ha. Of this approximately 54ha would be classed as the OMH priority habitat. This OMH varies significantly in quality with approximately 25ha being of high quality, of which an estimated 12ha is likely to be of sub-regional significance for this habitat resource. Other areas which are of less floristic diversity nevertheless have the right plant species and habitat structure to support priority butterfly and moth species (see section 6.3). The development could therefore in theory potentially result in the loss of 25ha of high-quality habitat. However, in assessing potential losses it is essential to compare this to the “do-nothing” scenario. Open Mosaic Habitat is an early successional habitat that is essentially transient but which is also by its nature readily re-creatable. It is more properly known as “Open Mosaic Habitat on previously developed land” and therefore requires areas of bare, nutrient-poor substrate in order to establish. Once established it undergoes normal vegetation successional processes whereby over time the habitat becomes more nutrient-rich and consequently the vegetation becomes rank and less diverse. It therefore requires the periodic creation of bare, nutrient-poor substrates, or else management to remove the ranker vegetation and revert the vegetation succession to an earlier point. Within the timescale of this proposal, i.e. 10 years, the “do-nothing” scenario would result in the deterioration of much of the OMH present. This has happened at the western end of Grangetown Prairie, which was first surveyed by INCA in 2007, at which point it was for the most part high quality OMH but by the time of the 2018 survey only relatively small pockets of good quality habitat remained. The creation of areas of bare nutrient-poor substrate by the spreading of soils in the form of mudstone should of itself create suitable conditions for the establishment of OMH. These areas would then be predicted to develop naturally into something that could be classed as OMH within a period of possibly less than five years. Whether the mudstone soil arisings would be as suitable for OMH as the calcareous iron-slag substrate that covers much of the current site is harder to predict, but in any case the net loss of habitat is predicted to be somewhat less than would be the case simply by calculating the current area of good quality habitat within the red line boundary. Notwithstanding

that it is not possible to accurately predict the actual biodiversity loss due to uncertainties with the timing of the works and the natural loss of biodiversity over time, nevertheless there will be some net loss of Open Mosaic Habitat, which in the absence of mitigation is likely to be of the order of several hectares of high quality habitat. Therefore compensatory measures in the form of habitat creation and management will be required to address this. This could be in the form of sowing suitable wild flower seeds onto the mudstone in appropriate locations.

6.3 Protected Species

The proposal will result in the loss of some nesting bird territories, primarily of species that nest in isolated pockets of scrub. The actual number of bird territories that was present in 2019 wasn't determined but this will vary from year to year in any case. The proposal will need to incorporate measures to compensate for loss of nesting bird territories. Vegetation clearance will need to take place outside of the bird nesting season unless the area is first checked by a suitably qualified ecologist who confirms in writing that no nesting birds are present.

It is known that there is a very low population of Common Lizard on a discrete area of Warrenby. This would appear to be an isolated population as surveys elsewhere on Warrenby have proved negative for the species.

The areas listed in section 5.2.2 at the northern end of Warrenby and CLE 31 are the only areas with the potential to support Common Lizards that have not been surveyed for this species. It is likely that these would similarly be small populations as the extent of the potentially suitable habitat in those areas is quite small. The worst-case scenario from the proposal, without mitigation, is therefore potential harm to a small number of a widespread reptile species. As such it is recommended that a condition of the permission is that a mitigation strategy to prevent harm to reptiles is drawn up and implemented prior to works commencing in any area known to support or potentially support reptiles.

6.4 Priority Species

The proposal would result in the loss of large areas of habitat for both Dingy Skipper and Grayling butterfly both of which have regionally important populations across the site. As with Open Mosaic Habitats it is not possible to predict how these would change in the "do-nothing" scenario but similarly it is likely that there would be some deterioration over time. Both species have habitat requirements that are easily re-creatable and compensatory habitat for these species should be provided.

Brown Hare is unlikely to be significantly affected by the proposals given that it is highly mobile with individuals utilising a mosaic of habitats over a large area.

7. Conclusion

Without mitigation it is predicted that several hectares of good quality Open Mosaic Habitat would be lost and that regionally important populations of Priority butterfly species would be significantly affected. It is not possible to predict the extent to which losses will occur, without mitigation, due to the likely phased approach of the proposal and the natural changes that would occur over time.

Both the Open Mosaic Habitat and the habitat supporting the Priority butterfly species are by their

nature easily re-creatable. Opportunities exist to recreate those habitats on the soils that would be used under this proposal but if this is not sufficient then compensation in the form of ex-situ biodiversity offsetting could be used.

There would be a loss of some nesting bird territories which will also require compensatory measures either on-site or ex-situ.

Without mitigation there is the potential for harm to a small number of a widespread reptile species. Harm to reptiles will be prevented by the implementation of a suitable mitigation strategy.

No effects on designated sites are predicted.

There are two isolated examples of invasive non-native plant species. These will need to be treated so as not to cause their spread.

To ensure a necessary habitat protection, mitigation and/or compensation during the final use of the soils, a draft condition is provided within the accompanying Planning Statement which would ensure that the habitat value of the site, and potential impacts on that value, are understood and satisfactorily addressed.

References

Biggs J, Ewald N, Valentini A, Gaboriaud C, Griffiths RA, Foster J, Wilkinson J, Arnett A, Williams P and Dunn F (2014). Analytical and methodological development for improved surveillance of the Great Crested Newt. Appendix 5. Technical advice note for field and laboratory sampling of great crested newt (*Triturus cristatus*) environmental DNA. Freshwater Habitats Trust, Oxford.

INCA (2014) A survey of reptiles on various sites at Wilton International and PD Ports Estate

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

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

Quants Environmental (2018) Reptile Survey

Tees Valley Wildlife Trust (2010) Guidelines for the Selection of Local Wildlife Sites in the Tees Valley

Appendix 1. Habitats survey results

South Bank (See Figure A)

Notwithstanding the areas of hard standing and derelict infrastructure and the ditch which forms the eastern perimeter, there are four distinct habitats on this site.

Area SB H1. A dense area of young trees, which are almost exclusively Silver Birch *Betula pendula*. The trees are mainly in the range of 3-5m in height. The ground flora is significantly reduced compared to surrounding areas due to shading from the trees.

Area SB H2. (Photograph 1, Appendix 3). Open grassland on a substrate primarily consisting of coal residue. In this habitat the grass is quite sparse and predominantly consists of Red Fescue *Festuca rubra*. There is a high level of rabbit grazing throughout. Herb species are frequent in the sward but their diversity is relatively low. Birds-foot Trefoil *Lotus corniculatus*, Mouse-eared Hawkweed *Pilosella officinarum*, Thyme-leaved Sandwort *Arenaria serpyllifolia* and Ribwort Plantain *Plantago lanceolata* are all frequent with Ragwort species, *Senecio spp.*, and Biting Stonecrop *Sedum acre*, both occasional.

Area SB H3. Species-poor rank grassland which is presumably occurring where there is a layer of soil on top of the coal substrate. The most evident grass species are Red Fescue *Festuca rubra* and Cocksfoot *Dactylis glomerata*. Herb species are infrequent and mainly represented by Wild Parsnip *Pastinaca sativa* and Ribwort Plantain. Some scattered scrub and young trees.

Area SB H4. This area consists of low mounds of presumably tipped earth, which is covered in rank grass and Bramble *Rubus fruticosus*. The grass has little in the way of herbs, other than Ribwort Plantain.

Area SB H5. (Photograph2, Appendix 3.) A narrow strip of land around the northern and western flanks of "High Tip". This is floristically diverse area of short perennial Open Mosaic Habitat. Kidney Vetch *Anthyllis vulneraria*, Zig-zag Clover *Trifolium medium* and Wild Parsnip are all frequent and Birds-foot Trefoil is occasional but several other species that are typical of this habitat are also present in smaller quantities. There is a single, isolated clump of Japanese Knotweed.

Area SB H6. (Photograph 3. Appendix 3). A continuation of the strip of land down the western flank of "High Tip" but here grass becomes more prevalent, mainly Cocksfoot and Soft Brome *Bromus hordeaceus*. Herb species diversity is much reduced compared to Area SB5 though Kidney Vetch is abundant and Melilot *Melilotus sp.* and Hawksbeard *Crepis sp.* are frequent.

Area SB H7. The lower flanks of "High Tip" are predominantly rank, species-poor grassland with some scrub.

Area SB H8. These are areas of hardstanding of various types but all effectively devoid of vegetation and with negligible ecological value.

Area SB H9. Rank grassland with young trees and scrub.

TN1. The ditch which borders the eastern perimeter is possibly an earlier channel of the Holme Beck prior to it being culverted. However, there is no sign of any vegetation associated with wetlands. Instead it develops from species-poor, rank grassland at the southern end throughout an increasing density of scrub as it continues north. The scrub consists of Bramble, Dog Rose *Rosa canina* and Elder *Sambucus nigra*, throughout, with Hawthorn *Crataegus monogyna* becoming increasingly prevalent towards the northern end. At the northern end there is a small area of more open grassland, which is, in part, maintained in this condition by rabbit grazing however it is species-poor with Mouse-eared Hawkweed being the only frequent herb.



Figure A South Bank

Lackenby (See Figure B)

Area L H1. This appears to have been an area of former amenity grassland that formed part of a landscaping scheme, incorporating a small artificial pond. The grass is principally Red Fescue and there are effectively no herb species in the sward. There is a row of amenity shrub planting around one perimeter

Area L H2. This area was viewed through the fence but like L1 appears to be another area of former landscaping with amenity grassland surrounding a large pond. There is a strip of semi-mature broad-leaved tree planting bordering Tees Dock Road.

Area L H3. A mixture of Open Mosaic Habitat and hard standing. The Open Mosaic Habitat is of good quality with Birds-foot Trefoil and Hawksbeard frequent.

Area L H4. This area comprises derelict buildings and hardstanding. There is no semi-natural vegetation and negligible ecological interest.

TN1. A small, wetland of approximately 20m * 15m. This was formerly a pond constructed using a liner that has now become a swamp dominated by Reedmace *Typha latifolia*. There is now no open

water though there is some shallow water, of a few centimetres depth, between the Reedmace stems. A Heron *Ardea cinerea* was disturbed from the pond so presumably there are some amphibians using the pond in which it was hunting.

TN2. A large, artificial pond. The pond was viewed from a distance of 20m through the fence. Its sides were bare clay and the water itself was heavily silted. A pair of Canada Geese *Branta canadensis* were present and it is possible that the presence of waterfowl is responsible for the water being silted. As far as could be seen there was no submerged or floating vegetation in the pond but there were small stands of Reedmace at either end.



Figure B. Lackenby

Grangetown Prairie (See Figure C)

Area GP H1. This is former industrial land which appears to have been cleared relatively recently with the ground comprising crushed rubble with areas of concrete hardstanding. It is in the early stages of becoming vegetated with less than 50% vegetation cover. The vegetation principally comprises individual clumps of Creeping Bent *Agrostis stolonifera* with some Narrow-leaved Ragwort *Senecio inaequidens* and Biting Stonecrop. In the south-east corner there is a small amount of young Hawthorn, which is approximately five years old.

Area GP H2. (Photograph 4, Appendix 3). This is similar to Area GP1 and would have formed part of the same industrial area. Where it was vegetated the vegetation is noticeably taller than in Area GP1 though the vegetation is still quite sparse. Rosebay Willowherb *Chamerion angustifolia* is starting to invade.

Area GP H3. The substrate in this area is a light soil which was dressed with crushed iron slag. It is quite sparsely vegetated with the most abundant herb species being Hop Trefoil *Trifolium campestre*, Melilot, and Catsear *Hypochaeris radicata*. There are small amounts of Kidney Vetch and Hawkweed. The vegetation is typical of that which forms on many brownfield sites on Teesside due to the calcareous influence of the iron slag base. It would be classed as the priority habitat, Open Mosaic Habitat, although it was not very species-rich and only a moderate quality example of that type of habitat.

Area GP H4. (Photograph 5, Appendix 3). For the most part the ground conditions and ground flora are similar to Area GP3, the main difference being quite extensive colonisation by scrub which mainly comprises Sea Buckthorn *Hippophae rhamnoides*. There is also a small area of good quality Open Mosaic Habitat.

Area GP H5. This area is very similar to Area GP1 in terms of substrate and vegetation.

Area GP H6. The substrate in this area is similar to Areas GP3 & GP4 and the vegetation is similarly sparse and its composition influenced by the calcareous influence of the substrate. There is a slightly greater diversity of herb species compared to Areas GP3 & GP4 though overall the quality is moderate but there are two small pockets of high-quality Open Mosaic Habitat vegetation, the largest of which is approximately 50x80m in extent.

Area GP H7. This mainly comprises fairly rank grassland consisting of Cocksfoot, Red Fescue and False Oat Grass *Arrhenatherum elatius* though some herb species are present, particularly Kidney Vetch and Birds Foot Trefoil, which are respectively frequent and occasional in the sward.

Area GP H8. An area of recently felled young woodland and shrubs. The ground flora is sparse due to the dense nature of the trees and shrubs prior to felling and consists of widespread species.

Area GP H9. This is a large embankment comprising mainly railway ballast, the wide lower plateau is very sparsely vegetated with the main species present being Red Valerian *Centrathus rubra*. There was until recently a mixture of young trees and *Buddleia* bushes on the sides of the embankment but as with Area GP8, these have recently been cleared.

Target Note 1. (Photograph 6, Appendix 3) Several shallow pools of standing water spread over an area of approximately 250m x 150m. The pools are, with one exception, shallow depressions with a layer of silt on the base that hold water to varying degrees. Some of these pools would appear to merge depending on the amount of water present, hence the total number of pools with water is likely to vary depending on the time of year at which they are surveyed. At the time of the survey at least eight pools had an area of standing water of approximately 25m² or more. Most of the pools have a narrow fringe of Common Reed *Phragmites australis*. Water in these shallow pools is at most 20-30cm deep and very clear. Submerged vegetation is only present in one of the pools and this comprises Stonewort, *Chara sp.*, which is an indicator of low nutrient water bodies.

The largest water body has formed through the flooding of some form of shallow concrete-lined structure. It was approximately 150m² in area and at least 45cm deep in places. No submerged or floating aquatic vegetation was observed though due to the depth of the water and the surface being slightly choppy, it was not possible to clearly see the bottom of this pool. There are some further pools that had formed on a white, chalk-like precipitate. In most cases they were dry at the time of the survey but those that did hold water were completely devoid of life.

Target Note 2. An open length of Holme Beck runs north-south through the south-west extremity of the site before being culverted beneath the remainder of the site. The open watercourse is approximately 100m long, 1m wide and 30cm deep and had a fast flow rate at the time of the survey. At its northern end the banks were made of vertical concrete panels with no bankside vegetation but the banks at the southern end were well vegetated. There was some submerged vegetation



Figure C. Grangetown Prairie

Metals Recycling Area (Photograph 7, Appendix 3)

This is a recently active operational area with activities including stockpiling and moving of substrates. It is effectively bare of vegetation. In the centre a small area of water had collected into an ephemeral pool, but this did not contain any vegetation.

CLE 31 3A (See Figure D)

Area CLE 31 consists of two distinct areas separated by The Fleet. Area 3A is a steep-sided mound with a flat plateau. This is a former landfill site with the waste material being predominantly iron slag. Area 3B is a flat area which was prepared as a landfill site but which was never used as such. The two areas are separated by The Fleet watercourse. The vegetation bordering both sides of the Fleet is rank species-poor grassland with some shrubs.

3A H1. (Photograph 8, Appendix 3) This is the plateau itself and the access track, which are very sparsely vegetated with the main species present being Red Valerian. There is also some English Stonecrop *Sedum anglica*, Creeping Bent and Oxford Ragwort *Senecio squalidus*, but in total the vegetation cover would be substantially less than 10%. A bund of unvegetated slag separates this area from the remainder of the plateau and the slopes.

3A H2. (Photograph 9, Appendix 3) The remainder of the plateau and part of the eastern flank consists of tall, dense grass with the main herb species being Coltsfoot *Tussilago farfara*. There are also scattered young shrubs, mainly Bramble with some Dog Rose and Hawthorn and a patch of Sea Buckthorn.

3A H3. On the western flank of the mound there is a short, grass sward which appears to be kept short by rabbit grazing. The sward is partially open and is moderately herb-rich though not species-rich. The main herb species is Birds-foot Trefoil, which is frequent with Carlina Thistle *Carlina vulgaris* and Ribwort Plantain both being occasional. There are few other species although there are some examples of Meadow Clary *Salvia pratensis*.

3A H4. The lower north-west slope is covered in a mixed plantation of semi-mature trees which are generally at least 5m in height. These comprise mainly Silver Birch, Rowan *Sorbus aucuparia*, Pine *Pinus sp.*, and Sallow, *Salix sp.*

3A H5. The eastern flank of the mound is for the most part covered in Sea Buckthorn with a few other young trees and shrubs.

Target Note 1. (Photograph 10, Appendix 3). A shallow, <10cm pond, approximately 8mx2m in area. Most of the pond is taken up by emergent Reedmace and Hard Rush *Juncus effusus* but there is a small amount of open water. The pond is shown as Target Note 1 (T1) in Figure X.

Area CLE 31 3B (See Figure D)

3B H1. (Photograph 11, Appendix 3). At the eastern end and comprising at least half of the total area is a short, sparse sward. Dandelion *Taraxacum officinale*, Ribwort Plantain and Catsear are the only herbs which are frequent but each of Storksbill *Erodium cicutarium*, English Stonecrop *Sedum anglica* and Common Whitlow Grass *Erophila verna* are occasionally present. There is a clump of Sea Buckthorn in the centre of this area which appears to be spreading quite rapidly from the number of young shoots that are present.

3B H2. In the centre of Area 3B and occupying approximately a further 20% of the total area is an area of bare material of a loose, sandy constituency. It is effectively unvegetated.

3B H3. At the southern end of Area 32 there is a slightly raised mound, which presumably contains some soil as part of the substrate as it is covered with grass and small shrubs and trees. Sea Buckthorn and Snowberry *Symphoricarpos albus* are the main shrubby species but examples of Sycamore *Acer pseudoplatanus*, Field Maple *Acer campestre* and Ash *Fraxinus excelsior* are also present. The trees are all stunted in height to around 3m, but the thickness of the stems suggests that some are somewhat in excess of 10 years old.

3B H4. (Photograph 12, Appendix 3). This is an example of Open Mosaic Habitat based on an iron slag substrate. It is herb-rich but of moderate species diversity. Birds-foot Trefoil is abundant and English Stonecrop, Red Clover *Trifolium pratense* and Ribwort Plantain are frequent. Bloody Cranesbill *Geranium sanguineum* is an occasional though notable addition to the sward. This area of good quality habitat extends to a maximum of 0.5ha.

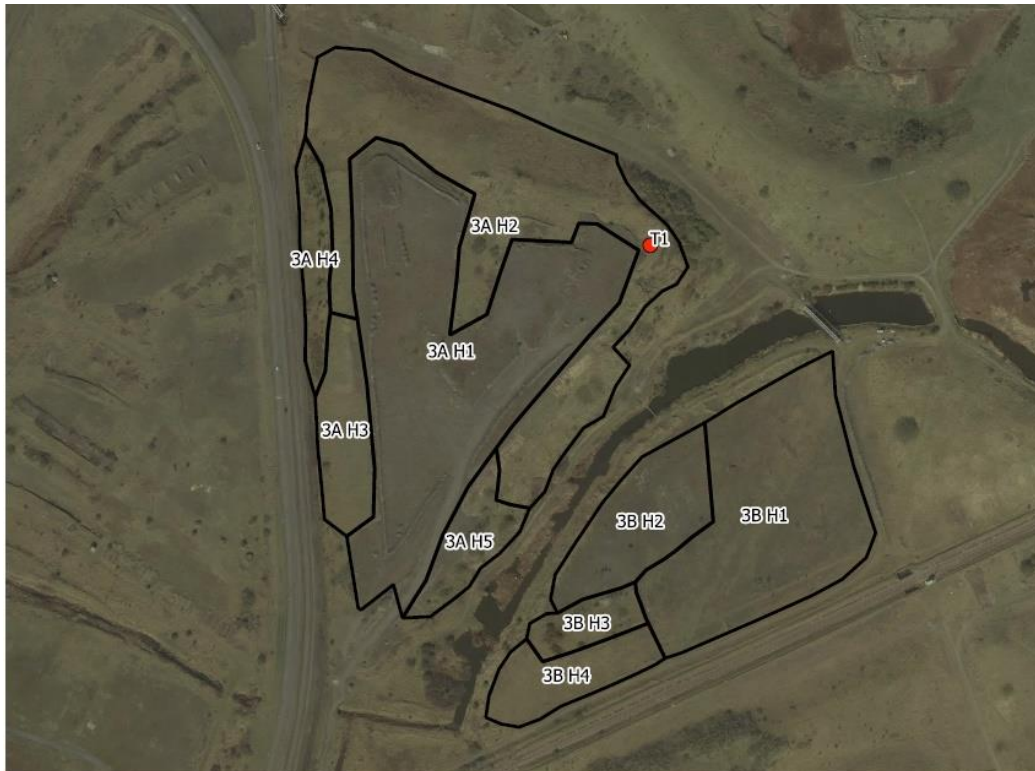


Figure D. Areas CLE 31 3A and 3B

Warrenby (See Figures E, F & G)

Area W H1. Short perennial herbs with a very open structure, with up to 50% of the ground between the vegetation is bare. The grass that is present is almost exclusively Soft Brome. Ribwort Plantain is the only herb which is frequent with Birds-foot Trefoil and Wild Carrot *Daucus carota* being occasional and a few examples of Storksbill.

Area W H2. (Photograph 13, Appendix 3). Rank grassland where Red Fescue is the prominent grass species. Ribwort Plantain is frequent but there were few other herbs other than localised patches of Rosebay Willowherb. There was a single specimen of Small-leaved Cotoneaster *Cotoneaster microphylla* which is listed under Schedule 9 of the Wildlife and Countryside Act (1981) (as amended), as a plant species for which it would be an offence to cause to grow in the wild.

Area W H3. An area in which the substrate is clinker and which is largely bare, with the few plant species present being almost exclusively confined to Red Valerian and English Stonecrop.

Area W H4. Open Mosaic habitat on iron-slag. Birds-foot Trefoil, Wild Parsnip and English Stonecrop are all frequent and Mouse-eared Hawkweed and Storksbill occasional and there is a high proportion of bare ground.

Area W H5. A very bare area with little vegetation other than moss, though there are small amounts of Storksbill and Birdsfoot Trefoil around the perimeter.

Area W H6. Part of this area is a former road with bare tarmac exposed in places though much of the area is covered by a very sandy and presumably thin soil. It is heavily rabbit grazed and grass is

very sparse. The sward is herb-rich but not particularly diverse. Birds-foot Trefoil is abundant and Stonecrop, Storksbill and Ribwort Plantain are all frequent but other plant species are rare.

Area W H7. Tall, rank grassland. There are some herbs in the sward with Ribwort Plantain being frequent and Wild Carrot, Black Knapweed *Centaurea nigra* and Melilot occasional.

Area W H8. (Photograph 14, Appendix 3). Rank grassland with small amounts of scrub. There are some more robust herb species in the sward with Wild Parsnip and Black Knapweed frequent and Yarrow *Achillea millefolium* occasional.

Area W H9. Open Mosaic Habitat which is perhaps the most botanically diverse area on the Warrenby site. Ox-eye Daisy *Leucanthemum vulgare* and Birds-foot Trefoil are frequent and Melilot, Wild Carrot and Mouse-eared Hawkweed are occasional. Other herb species are relatively rare in occurrence nevertheless there is a high number of herb species.

Area W H10. A west-facing embankment overlooking The Fleet. There is an open structure to the sward with the grass being predominantly Barren Brome. There are a high proportion of herbs in the sward though their diversity is moderate. Hawksbeard and Ribwort Plantain are frequent and Teasel *Dipsacus fullonum*, Birds-foot Trefoil and Wild Carrot are occasional.

Area W H11. Fleet Corridor. (Photograph 15, Appendix 3). This is a low-lying corridor along The Fleet which is mainly rank species-poor grassland. The east-facing embankment is covered in Bramble, which is occasionally spreading elsewhere. There are small stands of Reedmace and Common Reed which would indicate a higher level of ground moisture than the surrounding areas but there was no surface water other than The Fleet. This section of The Fleet is more natural in its profile than the sections upstream and it only has a small amount of Floating Pennywort.

Area W H12. (Photograph 16, Appendix 3). Open Mosaic Habitat dominated by short perennials along the route of a former road corridor, where bare tarmac is still exposed in places. Snow-in-snow *Cerastium tomentosum*, Dovesfoot Cranesbill *Geranium molle* and Stonecrop are all frequent and Birds-foot Trefoil and Hawksbeard are occasional.

Area W H13. An area of grassland which grades in terms of its structure from open to rank. Nevertheless it is relatively species-poor throughout with Hawksbeard being occasional but all other herb species relatively rare.

Area W H14. (Photograph 17, Appendix 3). Open Mosaic Habitat dominated by short perennials. Birds-foot Trefoil, Stonecrop and Kidney Vetch are all frequent and Mouse-eared Hawkweed and Storksbill are occasional.

Area W H15. Open Mosaic Habitat dominated by short perennials with very little grass. Birds-foot Trefoil is abundant and Storksbill and Stonecrop are frequent. Several other herb species that are characteristic of this habitat are also present.

Area W H16. This area is a continuation of Area W H15 but is somewhat elevated. This is likely to be due to an increased amount of soil in the substrate as the proportion of grass was much higher and this was somewhat rank and species-poor.

Area W H17. Tall, rank grass which is accounted for by its growing on excavated material from the Fleet, which is presumably nutrient-rich.

Area W H18. An area of short perennial, Open Mosaic Habitat which is very similar to Areas W H14 and 15. Likewise it is a good species-diverse example of this type of habitat.

Area W H19. Short perennial with Zig-zag Clover being particularly abundant. It is less open in structure than Area W H18 with more grass, though other herbs such as Birdsfoot Trefoil, Hawksbeard, Stonecrop and Dovesfoot Cranesbill are all occasional in the sward. There are a few young trees and Bramble is starting to gain a hold around the perimeter.

Area W H 20. This area is dominated by Zig-zag Clover with relatively few other herbs. Rank, species-poor grass is present in parts.

Area W H21. Rank, species-poor grassland with the main herb species being Hogweed *Heracleum sphodylium*. There are several young trees and patches of bramble scrub.

Target Note 1. A concrete tank surrounding the base of a pipe bridge. Water has collected in the tank and contains a dense stand of Stonewort.

Target Note 2. A brick-built pumphouse in which a nesting box for Barn Owl *Tyto alba* has been placed. There were intact Barn Owl pellets on the floor indicating that it had been used relatively recently.

Target Note 3. (Photograph 18, Appendix 3). Two further small brick-buildings, one with a Barn Owl nest box installed internally. There were fresh droppings and Barn Owl pellets on the floor indicating that the building is in current use by Barn Owls.

Target Note 4. The Fleet. Along this section and through Area CLE31 it has high, artificial banks and its surface is almost completely covered with Floating Pennywort.

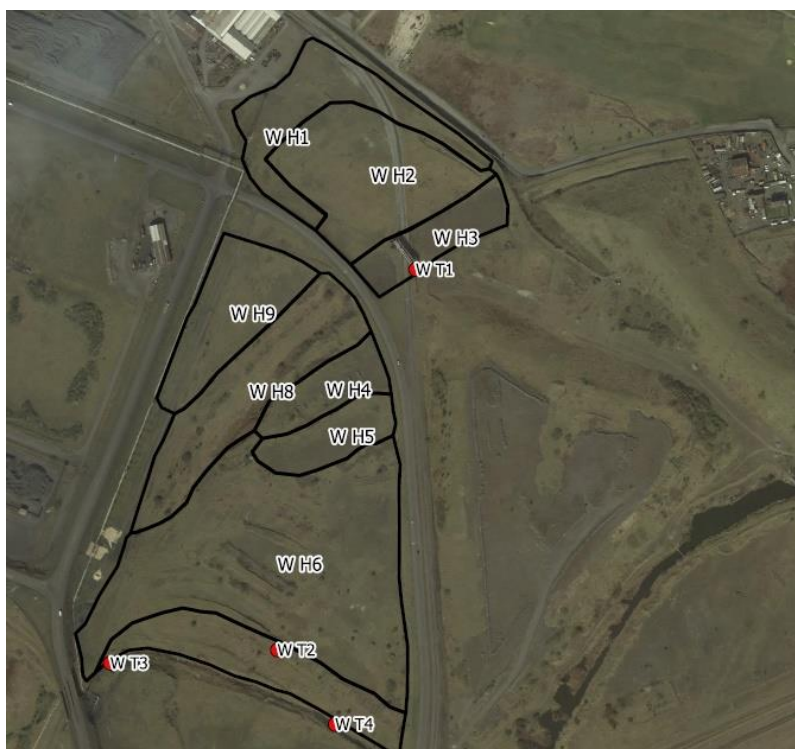


Figure E. Warrenby Areas 1-9



Figure F. Warrenby Areas 10-17



Figure G. Warrenby Areas 18-21

Appendix 2. Sssessment for potential impacts on statutory sites

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.

Natural England has proposed to extend the SPA 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 SPA. The extension, currently a potential SPA (pSPA) would also include 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 proposed as new qualifying features of the pSPA.

The boundary of the pSPA extension would cover an area from Castle Eden Denemouth in the north to Marske-by-the Sea in the south and include the River Tees up to the Tees Barrage resulting in a revised SPA area of 12,226.28 ha. This would increase 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

Natural England also proposes to extend the Teesmouth and Cleveland Coast Ramsar boundary to include the additional terrestrial wet grassland, saltmarsh, deep and shallow pools and intertidal areas for breeding and non-breeding waterbirds, as for the SPA. 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 pSPA down to Mean Low Water and will not extend outside of the pSPA 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*, *Macrolea mutica*, *Philonthus dimidiatipennis* and *Trichohydriobius suturalis*.

Both the pSPA and the corresponding extension to the Ramsar site are currently with the Secretary of State for determination however since the launch of the formal consultation on 31st July 2018, both the new areas and the additional species are given the same legal protection as if the existing SPA and Ramsar.

The qualifying features for the Teesmouth and Cleveland Coast pSPA/Ramsar are given in Table 5. 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. As the Ramsar is to a very large extent a sub-set of

the SPA the term SPA as it relates to the Teesmouth and Cleveland Coast is taken to refer to both unless otherwise stated.

Table 5. Qualifying features for Teesmouth and Cleveland Coast SPA/ Ramsar

Feature	Count (period)	% of Population	Interest type	Selection Criteria	New feature (Y/N)
Sandwich Tern <i>Thalasseus sandvicensis</i>	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 <i>Sternula albifrons</i>	81 pairs (2010-2014)	4.3% GB	Annex 1 (breeding)	Stage 1.1	N
Common Tern <i>Sterna hirundo</i>	399 pairs (2010-2014)	4.0% GB	Annex 1 (breeding)	Stage 1.1	Y
Pied Avocet <i>Recurvirostra avosetta</i>	18 pairs (2010-2014)	1.2% GB	Annex 1 (breeding)	Stage 1.1	Y
Ruff <i>Calidris pugnax</i>	19 individuals (2011/12-2015/16)	2.4% GB	Annex 1 (non- breeding)	Stage 1.1	Y
Red Knot <i>Calidris canutus</i>	5,509 individuals (1991/92-1995/96)	1.6% NE Canada/Greenland/Ic eland/UK population	Migratory (winter)	Stage 1.2 (SPA), Criterion 6 (Ramsar)	N
Common Redshank <i>Tringa totanus</i>	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)		Stage 1.3 (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.”

Nationally designated sites.

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 a 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 sides 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.

Relationship to the application site

The SPA and Ramsar are under-pinned by the SSSI which is in turn divided into management units. The closest management unit to the application site is Unit 33, Coatham Marsh, which is 36.12ha in extent and which is approximately 90m from the temporary storage site at Area CLE 3B at its closest

point. Management Unit 33 is shown in pale sky-blue in Figure 1. Figure 2 shows the SSSI as proposed in the July 2018 consultation in order to show the extent of the SSSI Unit in relation to the proposal sites. Following consultation the extent of the SSSI in the north east corner of Unit 33, at Warrenby Reedbeds, was reduced. The extent of the SSSI at Warrenby Reedbeds as confirmed by Natural England's board in March 2019, is shown in Figure 3 (NB. Maps showing the full extent of the SSSI as amended at confirmation are not currently available). This amendment at Warrenby Reedbeds means that the SSSI is now approximately 150m from area CLE 3A.

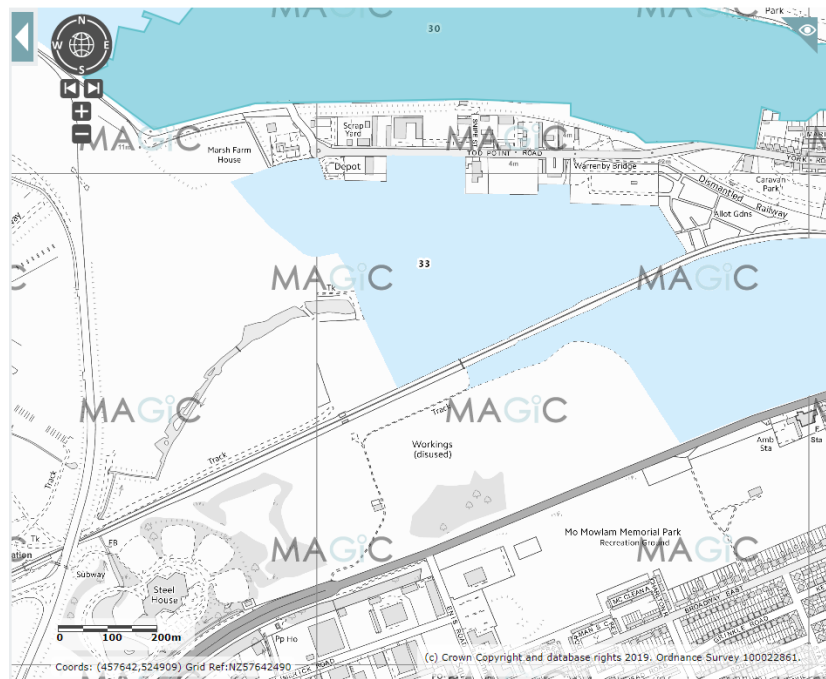


Figure 1. Unit 33 of Teesmouth and Cleveland Coast SSSI



Figure 2. The confirmed boundary of the SSSI (shown in dark green)

The SSSI boundary is more extensive than the SPA boundary and following consultation the proposed SPA boundary has been reduced in the north east corner of Unit 33 to the area shown in purple on Figure 3 . This is also 90m from CLE 31B at its closest point.

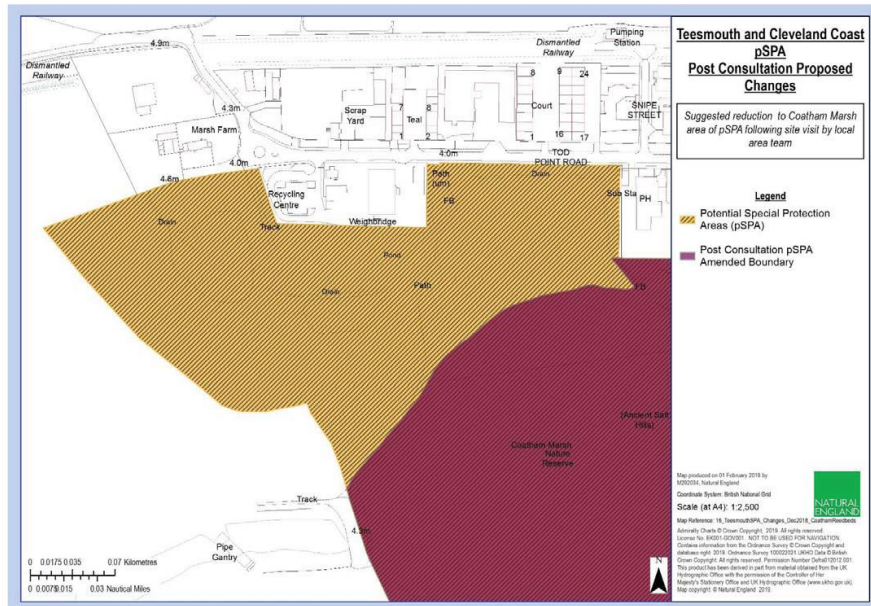


Figure 3. The western extent of the proposed SPA at Coatham Marsh (shown in red)

Coatham Marsh consists of a mosaic of habitats, mainly wetlands including extensive reedbeds and marsh with some large areas of open water. The Fleet watercourse extends from Coatham Marsh flowing downstream between sites 3A and 3B. The SPA interest features at Coatham Marsh would be confined to waterfowl which form part of the wintering waterbirds assemblage. The use of Coatham Marsh by waterfowl would be confined to the areas of open water and their fringes.

The interest features of the SSSI are more diverse than those of the SPA however, other than the non-breeding birds interest feature, which are the waterfowl which form part of the wintering waterbirds assemblage, the only other SSSI interest feature which would be present in Unit 33 would be the assemblage of breeding birds associated with wetlands. These latter would be waterfowl associated with the margins of open water but also a suite of passerine bird species such as Reed Bunting *Emberiza schoeniclus*, Sedge Warbler *Acrocephalus schoenobaenus* and Reed Warbler *Acrocephalus scirpaceus* all of which would nest in tall, wetland vegetation.

The closest area of open water and associated wetland vegetation to the proposed temporary storage areas is a section of The Fleet at National Grid Reference NZ58102471, which is approximately 100m away from Area 3B at its closest point. This section of The Fleet is a relatively small area of water, approximately 0.15ha in extent although much of it is choked with Floating Pennywort *Hydrocotyle ranunculoides*, which is an invasive non-native plant. As such it would only have the capacity to support very small numbers of waterfowl at best though it could support one or two breeding passerine territories. The nearest significant area of open water on Coatham Marsh is a pond of 0.3ha in size, which is fringed by reed beds. It is further north east than The Fleet, at National Grid Reference NZ58192478, and is 230m away from Area 3B at its closest point. All other bodies of open water on Coatham Marsh are between approximately 500m and 1km away from Area 3B.

Assessment of potential impacts

Effects on designated sites can be direct through such as land take or damage, or indirect such as through disturbance. The significance of an effect depends on the sensitivity of the interest feature that might be affected. For example an increase in NO_x could cause an increase in vegetation growth on dune systems, potentially making them unsuitable for breeding Little Tern however the same increase in NO_x may have no effect on a eutrophic water body for which it is its productivity which makes it important for wintering waterfowl.

The proposed works would involve the movement by vehicle of earth to form large mounds. These mounds would then be in place, potentially for several years before being excavated and the earth spread elsewhere on the STDC site. In relation to the works, four issues are considered as to their potential impact:

- i) Changes to flight lines or sight lines for birds due to the presence of the mounds.
- ii) Disturbance to SPA birds due to the movement of earth.
- iii) Impacts from dust related to the movement of earth.
- iv) Run-off from the mounds.

i) Coatham Marsh is currently surrounded by large mounds on its southern and north-western perimeters, of which Area 3A is one. These can be considered not to be having any effect on the bird interest features of the SPA or SSSI, as Coatham Marsh has achieved this designated status with these in place. The addition of a further mound (ie Area 3B), at a distance of at least 100m from any areas that would have any functional use for such birds, is similarly considered not likely to have any impact.

ii) The extent to which birds are disturbed by a given activity depends on various factors, including the species of bird, the nature of the activity and on the degree of habituation of the birds to the activity. It is readily observed that birds are much less susceptible to disturbance by vehicles or other machinery than by people on foot. It is very unlikely that any birds that might be on the designated section of The Fleet would be disturbed by vehicle movements at a distance of around 100m, much less so those more distant waterbodies that have the potential to support significant numbers of SPA birds. The vehicle movements would be associated with tipping of earth which would cause additional noise and movement but similarly to the vehicle movements themselves, the distances involved mean that disturbance is unlikely. In the context of disturbance, it should be noted that the STDC site was an operational industrial site until recently and no issues have been identified relating to effects on the existing SPA and SSSI, from the then operation of the site. It should also be noted that the largest bodies of open water on Coatham Marsh and which support the largest proportion of the wildfowl are on the eastern side, as close as 60m from the A1042 road, which is also elevated with respect to the waterbodies at that point and lit at night. Disturbance to the SPA from use of the road by vehicles or pedestrians or from lighting has not been noted.

iii) Coatham Marsh, as a series of productive, eutrophic habitats, would have relatively low sensitivity to dust deposition. In any case given the distances involved and standard dust suppression measures that would be employed it is unlikely that there would be any impacts from dust.

iv) As the earth material is relatively inert mudstone, run-off from the mounds would only be likely to result in increased sedimentation rather than an increase in pollutants. This would be dealt with by way of settlement ponds, but should some run-off find its way into The Fleet the movement of the water in The Fleet is away from the Coatham Marsh. The Fleet discharges into Dabholm Gut, which is also part of the SPA and SSSI. The importance of Dabholm Gut to the interest features of the designated sites is based on it being an area of intertidal mud, therefore should any sedimentation from the mudstone reach Dabholm Gut any potential impact is likely to be beneficial rather than detrimental. It is therefore concluded that there would be no impact on the designated sites from run-off.

Conclusion

Various issues that could potentially arise as part of this proposal have been considered for their potential to have an impact on internationally or nationally designated sites. It is considered that none would be likely to have a significant effect on such sites.

Appendix 3. Photographs



Photograph 1. Area SB H2



Photograph 2. Area SB H5



Photograph 3. Area SB H6



Photograph 4. Area GP H2



Photograph 5. Area GP H4



Photograph 6. One of the shallow pools on Grangetown Prairie



Photograph 7. Metals recycling area



Photograph 8. Area 3B H1. Plateau showing a typical area of bare substrate



Photograph 9. Area 3A H2



Photograph 10. Area 3A T1. Pond



Photograph 11. Area 3B H1. The western end of Area 3B.



Photograph 12. Area 3B H4



Photograph 13. Area W2 H2



Photograph 14. Area W H8



Photograph 15. Area W H11, The Fleet Corridor with Area W H10 in the left of the photo



Photograph 16. Area W H



Photograph 17. Area W H14



Photograph 18. Warrenby Target Note 3, building with an active Barn Owl nest