29 HABITATS REGULATIONS ASSESSMENT

29.1 Introduction

This section of the EIA Report draws together information regarding the potential for the proposed scheme to affect European sites and presents an assessment of the potential effects with respect to the interest features, and the supporting habitats, of sites screened into the assessment.

The assessment process is explained below, but in summary the following is presented in this section:

- An overview of the HRA process (**Section 29.2**).
- Screening the predicted effects of the proposed scheme to determine likely significant effect (LSE) in respect of the designated interest features of the European sites, both alone and in-combination with other plans and projects (**Section 29.3**);
- Consideration of other plans and projects to include in the in-combination assessment (**Section 29.4**);
- Provision of information to inform the AA alone (**Section 29.5**);
- Provision of information to inform the AA in-combination with other plans and projects (**Section 29.6**);
- A summary and conclusion (**Section 29.7**).

29.2 Overview of the HRA process

In accordance with Regulation 63 of the Habitats Regulations, HRA is required for any plan or project, not connected with the management of a European site, which is likely to have an LSE on the site either alone or in-combination with other plans or projects.

Typically, a staged process to assessment under the Habitats Regulations is undertaken, as follows:

- **Screening/LSE assessment (Stage 1):** The process to identify the likely impacts of a project upon a European site, either alone or in combination with other plans and projects and consider whether the impacts are likely to be significant.
- **Appropriate Assessment (Stage 2):** A decision (by the competent authority) with regard to the effect on the integrity of the European site, either alone or in combination with other plans and projects. Where there are adverse impacts, an assessment of mitigation options is carried out to determine adverse effect on the integrity of the site. If these mitigation options cannot avoid adverse effects on site integrity, then development consent can only be given if subsequent tests (see Stages 3 and 4 below) can be satisfied.
- **Consideration of Alternative Solutions (Stage 3):** Examining alternative ways of achieving the objectives of the project to establish whether there are solutions that would avoid an effect - or have a lesser effect - on European sites.
- **Imperative Reasons of Overriding Public Interest (IROPI) (Stage 4):** If the above tests cannot be satisfied, it is necessary to demonstrate that the project is required for IROPI. If this test is met, then the project can only proceed if sufficient compensatory measures can be identified and implemented to maintain the overall coherence of the Natura 2000 network.

All four stages of the process are referred to collectively as the HRA, to clearly distinguish the whole process from the stage within it referred to as the ‘Appropriate Assessment’.

With regard to Stage 1, a recent ruling (April 2018) by the Court of Justice of the European Union (CJEU) referred to as *People Over Wind and Sweetman v Coillte Teoranta* (C-323/17) has provided a judgement that *"…it is not appropriate, at the screening stage, to take account of the measures intended to avoid or reduce the harmful effects of the plan or project on that site"*. As such, no such mitigation measures have been taken into account when undertaking the LSE screening exercise.

With regard to Stage 2, the integrity of a European site is defined as: "*the coherence of the site's ecological structure and function, across its whole area, which enables it to sustain the habitat, complex of habitats and/or populations of species for which the site has been designated*" (EC, 2001). An adverse effect on integrity, therefore, is likely to be one which prevents the site from making the same contribution to favourable conservation status for the relevant feature(s) as it did at the time of designation.

Natural England's Habitats Regulations Guidance Note 1 'The Appropriate Assessment (Regulation 48)' (English Nature, 1997) described how an Appropriate Assessment should be undertaken. This guidance bases the assessment on a series of nine steps that the competent authority should follow in undertaking an Appropriate Assessment. These steps, including consultation, data collection, impact identification and assessment, recommendation of project modification and/or restriction and reporting, are outlined in **Table 29.1** below.

Table 29.1 Recommended key steps in the preparation of information for Appropriate Assessment

Step	Description of requirements
1	Must consult with Natural England
2	May consult with other organisations and the general public
3	Clearly define the site's conservation objectives
4	Require the applicant to provide such information as may reasonably be required to undertake the assessment
5	Identify the effects of the proposal on habitats and species of international importance and how those effects are likely to affect the site's conservation objectives
6	Decide whether the plan or project, as proposed, would adversely affect the integrity of the site in light of the site's conservation objectives
7	Consider the manner in which the plan or project is proposed to be carried out, whether it could be modified, or whether conditions or restrictions could be imposed, so as to avoid adverse effects on the integrity of the site
8	Conclude whether the proposal, as modified by conditions or restrictions, would adversely affect the integrity of the site
9	Record the assessment and notify Natural England of the conclusions

It is Natural England's role to advise the competent authority on the potential significance of effects on European sites. This section of the EIA Report is intended to present all of the information necessary to assist Natural England (and the competent authority) in reaching a conclusion.

29.2.1 Consultation and responses received

A scoping note was submitted to both the MMO and RCBC in July 2020. This confirmed that an HRA will be undertaken to consider the potential effects to European sites. Within its response, the MMO made no specific comments regarding HRA. RCBC confirmed that there are a number of major developments which have been consented and others which are currently being considered in proximity to the proposed scheme footprint, which should be taken into account. Such other plans and projects have been considered in the assessment presented below.

29.2.2 Implications of the scheme in-combination with other plans and projects

When assessing the implications of a plan or project in light of the conservation objectives of the European site in question (i.e. assessing the potential for LSE and ascertaining the potential for effect on site integrity), it is necessary to consider the potential for in-combination effects, as well as effects due to the project in isolation. Natural England's Habitats Regulations Guidance Note 4 (English Nature, 2001) provides guidance on in-combination effects and, at paragraph 2.3, states that other plans or projects should include:

- approved but as yet uncompleted plans or projects;
- permitted on-going activities such as discharge consents or abstraction licenses; and,
- plans and projects for which an application has been made and which are currently under consideration but not yet approved by competent authorities.

It is also noted that in some circumstances it may be appropriate to include plans and projects not yet submitted to a competent authority for consideration but for which sufficient detail exists on which to make judgements on their effect on the European site.

In undertaking an in-combination assessment, it is important to consider the potential for each plan or project to influence the site. In order for an in-combination effect to arise, the nature of two effects does not necessarily have to be the same. The in-combination effects assessment, therefore, focusses on the overall implications for the site's conservation objectives, regardless of the type of effect.

29.3 Screening for LSE

29.3.1 Introduction

The screening process comprises an assessment of the capacity for the likely effects of the proposed scheme to influence the qualifying interest features of the relevant European, such that an LSE could arise. There is no specific definition of what constitutes LSE; however, guidance produced by Natural England (English Nature, 1999) provides information on the determination process and the criteria that can be applied in reaching a decision.

The guidance states that:

> "*likely significant effect is, in this context, any effect that may reasonably be predicted as a consequence of a plan or project that may affect the conservation objectives of the features for which the site was designated, but excluding trivial or inconsequential effects. Proposals having no, or de minimis, effects can be progressed without further consideration under the Habitats Regulations (i.e. there is no requirement to undertake appropriate assessment), although reasons for reaching this decision must be justified and recorded*".

The following criteria are cited as potential types of effects that are likely to be significant:

- causing change to the coherence of the site or the Natura 2000 series (e.g. presenting a barrier between isolated fragments, or reducing the ability of the site to act as a source of new colonisers):
- causing reduction in the area of habitat or of the site;
- causing direct or indirect change to the physical quality of the environment (including the hydrology) or habitat within the site;
- causing on-going disturbance to species or habitats for which the site is notified;
- altering community structure (species composition);

- causing direct or indirect damage to the size, characteristics or reproductive ability of populations on the site;
- altering the vulnerability of populations to other impacts;
- causing a reduction in the resilience of the feature against external change (for example its ability to respond to extremes of environmental conditions); and,
- affecting restoration of a feature where this is a conservation objective.

The types of effects associated with a proposed scheme, particularly their spatial extent and duration, are of particular importance in identifying the European sites and associated designated interest features that may be influenced.

29.3.2 Screening for likely significant effect (alone)

Table 29.2 sets out the results of the screening for LSE associated with the proposed scheme in isolation. The potential environmental impacts have been assessed for each interest feature of the designated sites with the potential to be impacted by the proposed scheme.

Royal HaskoningDHV

Table 29.2 Screening of European and Ramsar sites for LSE

Site (distance and direction from proposed scheme)	Interest features	Supporting features	Potential pathway for likely significant effect during construction	Potential pathway for likely significant effect during operation	Screened in/out of Appropriate Assessment
Teesmouth and Cleveland Coast SPA / Ramsar site (0km)	The site qualifies under Article 4 of the Birds Directive for the following Annex I species: • During the breeding season: Little tern, avocet, ruff, common tern and Sandwich tern (non-breeding) The site regularly supports two regularly occurring migratory species not listed in Annex I: • Red knot and common redshank The site also qualifies under Article 4.2 of the Birds Directive as it is used regularly by over 20,000 waterbirds, including all Annex 1 species outlined above	• Sand and shingle • Intertidal sand and mudflats • Shallow coastal waters • Rocky shores • Terrestrial wet grassland • Saltmarsh • Deep and shallow pools	• Loss of supporting habitat for SPA features due to dredging, excavation and demolition works. • Noise and visual disturbance to waterbirds due to construction works, including impact pile driving. • Water quality reductions from demolition and dredging impacting on prey resources. • There are no potential pathways for likely significant effect on breeding little tern and avocet, nor on passage Sandwich terns, given the distribution of these species in the SPA and their use of the zone of influence of the proposed scheme. Further details are provided in **Section 29.3.3** below. • As the Tees Bay C disposal site is located beyond the seaward boundary of the Teesmouth and Cleveland Coast SPA / Ramsar site, and the potential effects of the disposal activity are predicted to remain largely within the boundary of the disposal site, impacts associated with offshore disposal of dredged material have been screened out of the assessment.	• Noise and visual disturbance to waterbirds due to operation of the quay. • Effects on waterbird feeding habitat due to changes in coastal processes.	• Screened in (with the exception of breeding little tern, Sandwich tern and avocet, which are screened out)
Durham Coast SAC (9.5km north)	The SAC is designated under Article 4(4) of the Directive (92/43/EEC) for the following habitats listed in Annex I: • Vegetated sea cliffs of the Atlantic and Baltic coasts	• Not applicable	• This feature is not present within the proposed scheme footprint and no effects on coastal processes within the SAC boundary are predicted.		• Screened out
Northumbria Coast SPA (9.5km north)	The site qualifies under Article 4.1 of the Birds Directive for the following Annex I species: • During the breeding season: Little tern (breeding) The site also qualifies under Article 4.2 of the Birds Directive for:	• Shallow inshore waters • Sandy beaches • Rocky shores with associated boulder and cobble beaches • Hide tide artificial roost sites	• No pathway for disturbance exists due to the separation distance between the source of disturbance and the SPA boundary. • Foraging grounds of common and little tern are unlikely to interact with the proposed scheme as the colony is located over 90km north.	• No pathway for effects during operation given the separation distance in relation to the predicted zone of influence from operational phase effects.	• Screened out

Site (distance and direction from proposed scheme)	Interest features	Supporting features	Potential pathway for likely significant effect during construction	Potential pathway for likely significant effect during operation	Screened in/out of Appropriate Assessment
	• Over-wintering: ruddy turnstone and purple sandpiper				
Northumbria Coast Ramsar site (9.5m north)	Ramsar criteria 6 Species / populations occurring at levels of international importance. Species regularly supported during the breeding season: • Little tern Species with peak counts in winter: • Purple sandpiper • Ruddy turnstone	• As for the Northumbria Coast SPA	• As for the Northumbria Coast SPA	• As for the Northumbria Coast SPA	• Screened out
Berwickshire and North Northumberland Coast SAC (90km north)	Annex I habitats that are a primary reason for selection of the site: • Mudflats and sandflats not covered by seawater at low tide. • Large shallow inlets and bays. • Reefs • Submerged or partially submerged sea caves. Annex II species present as a qualifying feature but not a primary reason for site selection: • Grey seal	• Not applicable	• Given the separation distance, there is no pathway for any direct effect on the SAC. • There would be no potential for any PTS to grey seal as a result of underwater noise during dredging and offshore disposal. As outlined in **Section 10.5.1**, underwater noise levels are below the thresholds which could result in any permanent auditory injury, ensuring grey seal remains a viable component of the SAC.	• No pathways for effect predicted.	• Screened out.
Southern North Sea SAC	Harbour porpoise	• Not applicable	• Given the separation distance, there is no pathway for any direct effect on the SAC.	• No pathways for effect predicted.	• Screened out.

Site (distance and direction from proposed scheme)	Interest features	Supporting features	Potential pathway for likely significant effect during construction	Potential pathway for likely significant effect during operation	Screened in/out of Appropriate Assessment
(100km south east)			• There would be no potential for any PTS to harbour porpoise as a result of underwater noise during dredging and offshore disposal. As outlined in **Section 10.5.1**, underwater noise levels are below the thresholds which could result in any permanent auditory injury, ensuring harbour porpoise remains a viable component of the SAC.		
Tweed Estuary SAC (approximately 140km north)	Annex I habitats that are a primary reason for selection of the site: • Estuaries. • Mudflats and sandflats not covered by seawater at low tide. Annex II species present as a qualifying feature but not a primary reason for site selection: • Sea lamprey. • River lamprey.	• Not applicable	• Given the separation distance, there is no pathway for any direct on the SAC; • There would be no potential for disturbance to migrating fish from the SAC arising from offshore disposal, as outlined in **Section 26.3.1**.	• No pathways for effect predicted.	• Screened out.
The Wash and North Norfolk Coast SAC (approximately 200km south)	Qualifying habitats: • Atlantic salt meadows • Coastal lagoons • Large shallow inlets and bays • Mediterranean and thermo-Atlantic halophilous scrubs • Mudflats and sandflats not covered by sea water at low tide • Reefs • Salicornia and other annuals colonising mud and sand	• Not applicable	• Given the separation distance, there is no pathway for any direct effect on the SAC. • There is no potential for PTS to common seal or otter due to underwater noise from dredging and offshore disposal.	• No pathways for effect predicted.	• Screened out.

Site (distance and direction from proposed scheme)	Interest features	Supporting features	Potential pathway for likely significant effect during construction	Potential pathway for likely significant effect during operation	Screened in/out of Appropriate Assessment
	• Sandbanks which are slightly covered by sea water all the time Qualifying species: • Common seal • Otter				

Based on the information presented within **Table 29.2**, it is considered that the Teesmouth and Cleveland Coast SPA and Ramsar site should be screened into the AA stage for construction and operational activities (i.e. there is potential for LSE alone). The location of the SPA / Ramsar site in relation to the proposed scheme is presented in **Figure 11.2**.

Background information for the Teesmouth and Cleveland Coast SPA and Ramsar site is presented in **Section 12** of this EIA Report. Although the qualifying interest features of the Teesmouth and Cleveland Coast SPA differ slightly from the qualifying criteria for the Ramsar site, the proposed scheme will affect the features / criteria in the same way, given that the habitats of importance to the features of / criteria for both the SPA and Ramsar site are the same. For this reason, the potential effects of the proposed scheme are presented for both the SPA and Ramsar sites together.

There is no potential for LSE on the Northumbria Coast SPA and Ramsar site, the Durham Coast SAC, Berwickshire and North Northumberland Coast SAC, Southern North Sea SAC, Tweed Estuary SAC or the Wash and North Norfolk SAC on the basis of their location and qualifying interest features (i.e. there is no conceivable pathway for effect on these sites). No further consideration of potential impacts to the interest features of these sites has been undertaken within this HRA.

29.3.3 Screened out features of the Teesmouth and Cleveland Coast SPA / Ramsar site

As outlined in **Table 29.2**, breeding little tern and avocet and passage Sandwich terns have been screened out of appropriate assessment, since there are no LSE predicted as a result of the scheme either alone or in-combination with other projects and plans. This section provides justification for this conclusion.

Breeding little tern

The little tern colony is located at Crimdon Dene, approximately 13km north of the proposed scheme footprint (Natural England, 2018a). The feeding grounds of the little terns that nest at Crimdon Dene lie predominantly in marine areas within 5km alongshore of the colony and within 3.5km offshore. This area does not overlap with the proposed scheme footprint, or the zone of influence from any impacts arising from it. While discussions with Natural England indicate that the little tern colony has relocated to Seaton Carew, approximately 2km north of the Tees estuary, survey work undertaken by INCA in June to August 2020 indicated that no little tern were present in the Tees. Even at Seaton Carew, the predicted maximum foraging range for little tern in the SPA (Parsons *et al.*, 2015) would not encompass the footprint of the proposed scheme nor the modelled extent of the maximum-expected sediment plume from the capital dredging.

When considering intra-project effects (i.e. the combined effect of the various impact pathways arising from the proposed scheme), the maximum area affected will be driven by the most far-reaching of impacts. Following modelling of noise levels and sediment dispersion, it has been concluded that the overall zone of influence of the proposed scheme will be determined by the sediment plume during dredging activities. Given that the little tern nesting and foraging extent is outside the overall zone of influence, there is no risk of intra-project effects. Furthermore, since there will be no effects as a result of the proposed scheme, there can be no interaction effects on the little tern SPA population when considering the proposed scheme in combination with other plans and projects.

Breeding avocet

The majority of breeding avocet breed on No.4 Brinefield, mainly on the saline lagoon south of Greatham Creek, with smaller numbers on Greenabella Marsh (Natural England, 2018a). This is located 2 – 3km from the proposed scheme and is again outwith the overall zone of influence from the proposed scheme. There have been no avocets recorded during WeBS counts from 2014/15 to 2018/19 at the two sectors affected

by the proposed scheme (see **Section 12.4.2**), therefore there is no functional linkage to foraging birds that may commute from the breeding site. Again, this indicates that there would be no effect on the SPA breeding avocet population and distribution as a result of the scheme, even when considering all impact pathways of the proposed scheme together, and hence there would be no pathway for interaction effects when considering the proposed scheme in combination with other plans and projects.

Passage Sandwich tern

The proportion of the passage Sandwich tern population that uses the affected area is considered to be insignificant, given that a mean peak count of four individuals was recorded at WeBS sectors affected by the scheme over the period (2014/15 to 2018/19) (see **Section 12.4.2**), which represents 0.2% of the SPA reference passage population. Roosting birds use Coatham Sands, Seal Sands, North Gare Sands/Seaton Snook and Bran Sands (Natural England, 2018a), all of which lie outside the overall zone of influence from the proposed scheme. Again, this indicates that there would be no effect on the SPA passage Sandwich tern population and distribution as a result of the scheme, even when considering all impact pathways of the proposed scheme together, and hence there would be no pathway for interaction effects when considering the proposed scheme in combination with other plans and projects.

29.3.4 Conservation objectives for European sites screened into the assessment

Natural England has developed conservation objectives for the Teesmouth and Cleveland Coast SPA which aim to maintain, in favourable condition, the quality, distribution and extent of the designated habitats which support the cited bird species.

The conservation objectives which apply to the Teesmouth and Cleveland Coast SPA are provided below (Natural England, 2018b):

> *"With regard to the SPA and the individual species and/or assemblage of species for which the site has been classified, and 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."*

29.4 Consideration of other plans and projects to include in the in-combination assessment

Relevant plans and projects to be considered in the in-combination assessment have been identified through a search of MMO and RCBC public registers, as well as via consultation with RCBC. A high-level screening exercise has been undertaken to remove certain types of development that are judged to be insignificant in nature and scale (e.g. minor change of use application or conversions to existing buildings, minor residential developments etc.) and, as such, there is no pathway for in-combination effects due to the minor nature of those schemes. Relevant plans and projects identified within the vicinity of the proposed scheme are screened in **Table 29.3**. Where data is available, details of project type, construction dates, duration of works and other relevant data are provided, along with the distance from the proposed works.

Table 29.3 Plans and projects identified in the vicinity of the proposed scheme

Plan or project	Description and timing	Distance from proposed scheme	Status	Screening assessment rationale, including potential effects and impacts
AV Dawson	Proposed quayside works and dredging at its North Sea supply base and Dawson's Wharf.	Approximately 4.5km upstream	No marine licence application submitted to date.	There is no environmental assessment information available for this proposed scheme. It is therefore not possible to include the AA. **Screened out of the AA.**
South Industrial Zone	Outline planning application for demolition of existing structures on site and the development of up to 418,000sqm (gross) of general industry (Use Class B2) and storage or distribution facilities (Use Class B8) with office accommodation (Use Class B1), HGV and car parking and associated infrastructure works. All matters reserved other than access.	Immediately adjacent (inland)	Outline planning application submitted but awaiting approval.	The South Industrial scheme is located in very close proximity to the proposed scheme footprint. A review of the application documents confirms that Natural England have no objection to the scheme subject to appropriate mitigation being secured to ensure no impact to the SPA / Ramsar. Specifically, Natural England confirmed that additional HRA should be undertaken for any reserved matters applications once detail on construction method and likely development is known as well as adoption of all mitigation identified in the shadow HRA. LSE could not be ruled out due to loss of habitat suitable to support SPA / Ramsar species, disturbance due to construction related pollution, noise and visual disturbance during construction and risk of pollution during operation. Intertidal mud sampling confirmed within the South Industrial Zone site confirmed that the Slems does not support foraging waterbirds due to a lack of invertebrates. However, the Slems is likely to be used by wintering birds for loafing and sheltering and such habitat would be lost as a result of the scheme. In addition, areas of woodland, scrub, grassland, open mosaic habitat and wetland habitats all provide suitable foraging habitat for wintering birds; such habitat would be lost due to the proposed scheme. In-combination effects on

Plan or project	Description and timing	Distance from proposed scheme	Status	Screening assessment rationale, including potential effects and impacts
				the SPA / Ramsar site cannot therefore be ruled out. **Screened into the AA.**
NGCT	The NGCT scheme comprises capital dredging up to 4.8 million m^3 of sediment from the riverbed, realignment of the approach channel, disposal of dredged material offshore, construction of a new container terminal facility and construction of various landside elements (buildings, rail terminal, road access, lighting, drainage and a pumping station). PDT is proposing to fully construct the proposed NGCT in advance of the existing Harbour Revision Order expiring on 7th May 2028.	Approximately 1.5km downstream. Dredge footprint overlaps at Tees Dock turning circle.	Planning permission granted and implemented. Marine licence application submitted but awaiting approval.	Should the NGCT scheme coincide with the proposed scheme, in-combination effects to the interest features of the SPA / Ramsar site could occur in the form of underwater and airborne noise, visual disturbance and water quality reductions, which have the potential to reduce the available foraging area for qualifying species. **Screened into the AA.**
Anglo American Harbour Facilities	The Anglo American Harbour Facilities scheme was granted a DCO in 2016. The DCO permits the following activities which are yet to commence: Phase 1 • site compounds; • construction of a 28m wide and 280m long quay including ship loads and ship loader rails; • dredging up to 750,000m^3 of material from the approach channel and berth pocket; • lagoon habitat enhancement works; • installation of a surge bin; • installation of a conveyor system and transport towers; • construction of buildings and parking area; • erection of security fencing; • provision of ancillary infrastructure. Phase 2 • extension of the quay to provide a total quay length of 486m including ship loader and ship loader rails; • dredging up to 372,000m3 of material from the approach channel and berth pocket;	Immediately downstream	Marine licence granted.	Should the proposed Anglo American Harbour facilities scheme coincide with the proposed scheme, in-combination effects to the interest features of the SPA / Ramsar site could occur in the form of underwater and airborne noise and water quality reductions, which have the potential to reduce the available foraging area for qualifying species. **Screened into the AA.**

Plan or project	Description and timing	Distance from proposed scheme	Status	Screening assessment rationale, including potential effects and impacts
	• installation of a second surge bin; • installation of a second conveyor within the conveyor housing installed during Phase 1; • provision of ancillary infrastructure.			
Hartlepool approach channel	PDT is proposing to undertake a programme of works within and adjacent to the existing approach channel into Victoria Harbour, located to the immediate south of Hartlepool Headland on the north-east coast of England. The current approach channel dimensions are limiting the size of vessels which can gain entry into the harbour. PDT is therefore proposing to deepen, realign, widen and extend the length of the approach channel, to allow Victoria Harbour to accept deeper drafted and larger beam vessels through a wider tidal window. In addition to the proposed dredge (and associated disposal of dredged material), PDT is proposing to construct an underwater retaining wall, immediately adjacent to the Middleton Breakwater, which is located at the mouth of Victoria Harbour. The underwater retaining wall is required to avoid the risk of Middleton Breakwater being undermined following the proposed dredge.	Approximately 6km north	Marine licence granted	Should the Hartlepool channel scheme coincide with the proposed scheme, in-combination effects to the interest features of the SPA / Ramsar site could occur in the form of underwater and airborne noise and water quality reductions, which have the potential to reduce the available foraging area for qualifying species. **Screened into the AA**
Ongoing maintenance dredging at Hartlepool and in the Tees estuary	This activity has been ongoing for many years.	0km	Marine licence granted for offshore disposal.	Given the frequency, duration and long-term nature of this activity, maintenance dredging and disposal is represented in the baseline conditions for the area. Although maintenance dredging would not be undertaken in the footprint of the proposed scheme at the same time as the capital dredging for the scheme, there is potential for maintenance dredging elsewhere within the Tees to coincide with the capital dredging, which could result in in-combination effects on water quality. The effects of maintenance dredging at Hartlepool (which is also within the source area on PDT's maintenance dredge disposal licence) would not extend into the Tees estuary and therefore this is screened out of the assessment.

Plan or project	Description and timing	Distance from proposed scheme	Status	Screening assessment rationale, including potential effects and impacts
				Screened into the AA (for the Tees only).
Inter Terminals Jetty 1 refurbishment	Inter Terminals has submitted a planning application and a marine licence application to undertake refurbishment works to its existing Jetty 1 on the northern bank of the Tees estuary. The scheme involves minor 'top-side' works to the existing infrastructure at Jetty 1 and Dolphin D, and a dredge of the river bed (with associated disposal of dredged material) to extend the existing berth pocket downstream. The works would result in Dolphin D being used as an operational structure rather than simply a berthing dolphin.	Immediately adjacent to the dredge footprint	Consent in place	The proposed works to Jetty 1 are highly localised and the construction works would be short term. The works are considered to be of a sufficiently small scale that there would be no significant in-combination effects. **Screened out of the AA.**
Tees Channel Dredge	The Tees Channel Dredge project involves a proposed deepening of the Tees navigation channel, the turning circle and Tees Dock to a maximum maintained depth of 14m below CD. An Environmental Scoping Report (Royal HaskoningDHV, 2016) was submitted to the MMO alongside a request for a scoping opinion for the project in 2016; however, the environmental assessment proposed within that report has not yet been undertaken.	0km	No application submitted to date	The dredge footprint for the proposed scheme overlaps with the proposed Tees channel dredge. There is very limited environmental assessment information on the latter project, as the scheme has not progressed beyond the Environmental Scoping process. However, it is understood that the Tees Channel dredge would not be undertaken should the proposed scheme commence first. **Screened out of AA**
Tees GasPort	Trafigura is proposing a scheme to import Liquefied Natural Gas (LNG) at Teesport (within the Tees estuary), on the north-east coast of England. The proposed LNG import scheme comprises floating storage regasification unit (FSRU) at an existing, currently unused jetty. Once the FSRU is in place, LNG carriers will berth next to the FRSU in a side-to-side mooring configuration and discharge the LNG into the FSRU before leaving again. In order to enable the LNG import facility to function the following works are required, referred to herein as the 'proposed works': • Concrete and steel work repairs to the existing jetty. • Modifications to the existing mooring dolphins. • Replacement / repair of ancillary items on the existing jetty.	Approximately 1.5km downstream	Application submitted but no licence granted	The marine licence application has been submitted. The non-statutory environment assessment undertaken in support of the marine licence application concluded that there would be no significant impact on any environmental parameters as a result of the Tees GasPort scheme. It is therefore concluded that this project should be screened out of the AA. **Screened out of the AA.**

Plan or project	Description and timing	Distance from proposed scheme	Status	Screening assessment rationale, including potential effects and impacts
	• Modifications to onshore mooring blocks. • Dredging of the existing berth and disposal of dredged material.			
Anglo American Materials Handling Facility at Wilton and Storage Facility at Bran Sands	Anglo American secured planning permission from RCBC for a Materials Handing Facility (MHF) on land at Wilton, Teesside, in 2015 (reference R/2014/0626/FFM). The associated Anglo American Harbour Facilities DCO was also granted under s114 (1)(a) of the Planning Act 2008 (reference SI 2016 No. 772). Together the permission and consent provide for the construction and operation of facilities to process, transfer and handle for export the material emerging from a portal at the Wilton site, which will serve the consented mine and underground materials transfer system. The permissions led to progression of detailed design engineering, from which emerged requirements for an amended conveyor routing, and an additional storage facility (Use Class B8) at Bran Sands, Redcar. The Storage Facility has indicative dimensions of 1300m long x 170m wide x 40m high.	4km and 3.5km respectively	Both schemes are consented by RCBC	Should the Anglo American Materials Handling Facility scheme coincide with the proposed scheme, in-combination effects to the interest features of the SPA / Ramsar site could occur in the form of airborne noise and visual disturbance, which have the potential to reduce the available foraging area for qualifying species. **Screened into the AA.**
Dogger Bank Teesside A and Dogger Bank Teesside B (now Sofia Offshore Wind Farm, referred to throughout as Sofia)	Dogger Bank Teesside was Forewind's second stage of development of the Dogger Bank Zone. Originally planned to be four separate wind farms known collectively as Dogger Bank Teesside, this stage was divided into two separate applications - Dogger Bank Teesside A & Sofia and Dogger Bank Teesside C&D. Only Dogger Bank Teesside A & Sofia was progressed through to application. The A & Sofia application comprised two wind farms, each with a maximum installed capacity of 1.2GW. They will connect to the national grid at the existing Lackenby Substation in Teesside via an export cable to be located within an export cable corridor. The Dogger Bank Teesside A & Sofia schemes both have consent, currently sharing the same DCO. The DCO states that construction should commence by August 2022. It is understood that both Teesside A and Sofia will potentially bid into the next Contracts for Difference (CfD) round in Spring 2019, which would commit the developers to construction timelines.	5km	DCO granted for the scheme which contains a deemed marine licence from the MMO	The consented Dogger Bank Teesside A & Sofia scheme is located within the coastal waters of Tees Bay. A trench of approximately 2.2km long required for export cable burial overlaps with the SPA / Ramsar site. Although this scheme has received consent, it is yet to be constructed, and therefore the potential exists during cable laying for in-combination impacts from underwater noise and reductions in water quality to affect prey species of qualifying features. **Screened into the AA.**

Plan or project	Description and timing	Distance from proposed scheme	Status	Screening assessment rationale, including potential effects and impacts
	As the programme for construction works has not yet been determined, there is potential for construction works to coincide with the proposed scheme.			
Tees navigation channel deepening	PDT is proposing to undertake a dredge of the approach channel to locally deepen from 5.1m bCD to 5.7m bCD. Consultation with the MMO has confirmed that PDT should submit a variation request to its existing maintenance dredge licence in order to dispose of the dredged material (i.e. the MMO sees the proposed dredge as a maintenance dredge activity). PDT's intention is to undertake the dredge during 2020/2021.	Approximately 2km upstream	Application submitted August 2020.	The MMO sees the Tees navigation channel dredge as a maintenance dredge activity. Given the frequency, duration and long-term nature of maintenance dredging within the Tees, this activity is represented in the baseline conditions. However, the deepening could coincide with the capital dredging activity required for the proposed scheme (albeit within a different part of the estuary). **Screened into the AA (but considered to fall under the 'maintenance dredge' umbrella rather than a separate plan or project).**
Grangetown Prairie	An Energy Recovery Facility is proposed capable of processing up to 450,000 tonnes of waste per annum. The need for the scheme has arisen from the Tees Valley Joint Waste Strategy, which has been extended from 2020 to 2035. The proposed site is located on the former South Tees Eco Park, Grangetown Prairie, located approximately 4 miles north-east of Middlesbrough town centre.	Approximately 1.4km south-east	Outline planning permission granted in July 2020.	No works are required within the estuary itself, with all works being located on land. A review of the HRA screening report undertaken in support of the marine licence application concluded no LSE in isolation (due to the separation distance between the scheme and the SPA / Ramsar site). On this basis, it is concluded that there is no pathway for in-combination effects with the proposed scheme. **Screened out of the AA.**
Land at Former South Bank Works; Grangetown Prairie; British Steel and Warrenby Area	Demolition of structures and engineering operations associated with ground preparation and the temporary storage of soils in mounds, for their final use in the remediation and preparation of land for regeneration and development.	Approximately 1.4km south-east	Full planning permission granted May 2017	No environmental assessment was submitted in support of the application, as no significant environmental impacts were envisaged. Given the nature of the ground preparation and storage works in relation to the footprint of the proposed scheme, it is concluded that there is no pathway for in-combination effects.

Plan or project	Description and timing	Distance from proposed scheme	Status	Screening assessment rationale, including potential effects and impacts
				Screened out of the AA.
Land at Low Grange Farm, South Bank	Outline application for residential development (up to 1250 dwellings) (all matters reserved).	Approximately 1.6km south	Outline planning permission granted March 2016.	Natural England confirmed that although an HRA was not submitted in support of this application, the proposed residential development would not result in an LSE and was screened out from further assessment. This decision was made on the basis of its location in relation to the SPA / Ramsar site and its setting (surrounded by existing residential and industrial development). On this basis, there is no pathway for in-combination effects with the proposed scheme. **Screened out of the AA.**
Residential development	Outline planning application for up to 550 residential units with associated access, landscaping and open space.	Approximately 5.5km east	Planning permission granted July 2020	A review of the supporting documentation submitted with the outline planning application confirmed that there would be no impacts upon the qualifying features of the SPA / Ramsar site. None of the qualifying features were found during breeding bird surveys. The habitat within the site does, however, offer limited potential for roosting and foraging lapwing, oystercatcher and redshank. A review of the planning officer's report confirmed that Natural England originally objected to the proposed residential development due to adverse effects on the SPA / Ramsar site. Natural England subsequently removed its objection through the adoption of mitigation, including the provision of open space within the development at the reserved matters stage. Natural England raised no objection to the reserved matters application. Although there is potential for the proposed scheme to affect the same features as the consented residential development, the mitigation measures to be adopted and built into the reserved matters application for the residential development
	Reserved matters application (appearance, landscaping, layout and scale) following approval of outline planning permission R/2016/0663/OOM for up to 550 residential units with associated access, landscaping and open space.		Planning permission granted October 2019	

Plan or project	Description and timing	Distance from proposed scheme	Status	Screening assessment rationale, including potential effects and impacts
				will remove the potential for significant in-combination effects. **Screened out of the AA.**
Teesside Combined Cycle Power Plant	Construction of a 1,700mwe combined-cycle gas turbine power station at Wilton International.		Order made April 2019	The HRA for the combined cycle power plant confirmed that only the effect of air emissions was taken forward for further assessment. The assessment presented in **Section 18** of this report concludes that there would be not significant impacts as a result of the proposed scheme. It is therefore concluded that there is no pathway for significant in-combination effects. **Screened out of the AA.**
Lianhetech, Seal Sands (Stockton Council)	Proposed new buildings, plant upgrade, swale and associated access and car parking provision	Approximately 1.5km north	Planning permission granted February 2020	The supporting environmental assessment to the Lianhetech works concluded that any direct or indirect impacts to the interest features of the SPA / Ramsar site would be negligible. On this basis, there is no potential for an in-combination effect to occur. **Screened out of the AA.**
New cinema development	Demolition of existing cinema and replacement with a new cinema including external terraces, landscaping and temporary sea wall	Approximately 7km east	Planning permission granted August 2020	The HRA submitted in support of the new cinema development confirmed that LSE could not be ruled out during the construction and operational phase. LSE could not be ruled out for redshank, knot, ringed plover, ruff and the waterbird assemblage during construction and operation. Although the proposed schemes are geographically separate, there is potential for effects arising from both schemes to result in in-combination effects on the same receptors. **Screened into the AA.**

Plan or project	Description and timing	Distance from proposed scheme	Status	Screening assessment rationale, including potential effects and impacts
Engineering operations at Metals Recovery Area	Demolition of existing buildings/structures and engineering operations associated with ground remediation and preparation of land for development.	Approximately 500m east	Application submitted and awaiting decision	No works are required within the estuary itself, with all works being located on land. Although the works are in close proximity to the proposed scheme, the works are very minor in nature and no significant in-combination effects are predicted. **Screened out of AA.**

Where there is potential for these projects and plans to have an in-combination effect on the SPA / Ramsar site, these have been screened in for AA and are considered further in **Section 29.5**. Unless otherwise stated, it is assumed that if LSE for the project alone is determined with respect to a particular site / feature, this conclusion also stands with regard to potential in-combination effects.

As detailed in **Section 29.3.3**, features of the Teesmouth and Cleveland Coast SPA / Ramsar site that are screened out of the 'alone' assessment have been considered in terms of LSE arising from interactions between the effects of the proposed scheme and those of other projects. It was concluded that, for all of the screened-out features (i.e. breeding little tern and avocet, passage Sandwich tern), no LSE is predicted from in-combination effects.

29.4.1 Summary of HRA screening

The HRA screening stage has determined that the proposed scheme has potential to result in LSE on the following European (when considered in isolation):

- Teesmouth and Cleveland Coast SPA / Ramsar site (excluding little tern, Sandwich tern and avocet).

The following potential construction phase effects will be assessed:

- Loss of intertidal feeding resource due to dredging and excavation to create the berth pocket.
- Airborne noise disturbance to waterbirds due to demolition and construction works.
- Indirect impacts on foraging behaviour as a result of impacts to prey resource from capital dredging and excavation works (water quality reductions).

The following operational phase effects will be assessed:

- Disturbance due to operation of the quay.
- Effects on existing habitats due to changes in coastal processes.

It is concluded that LSE in-combination cannot be ruled out when considering the proposed scheme alongside the following plans and projects:

- Anglo American Harbour Facility
- Anglo American MHF.
- Dogger Bank Teesside A and Sofia.
- Hartlepool approach channel.
- Maintenance dredging.
- NGCT.
- New cinema development.
- South Industrial Zone development.

All other plans and projects have been screened out of the in-combination assessment, either due to a lack of pathway for in-combination effects or due to the lack of environmental information to allow a sufficient in-combination assessment to be undertaken.

29.5 Information to inform the Appropriate Assessment

29.5.1 Introduction

This section of the HRA provides the information required for AA of the proposed scheme on the Teesmouth and Cleveland Coast SPA and Ramsar site. With reference to the relevant sections of the EIA Report where appropriate, this section describes the potential impacts of the proposed scheme insofar as they are relevant to the qualifying features. The potential impacts are then considered in the context of the defined conservation objectives for the relevant features and a view is given on whether the proposed scheme (when considered in isolation) is predicted to have a significant adverse effect on the integrity of the SPA and Ramsar site.

Information to inform an in-combination assessment with the plans and projects outlined above is provided in **Section 29.6**.

29.5.2 Approach to assessment of potential adverse effects

Determining whether, in view of the SPA and Ramsar site's conservation objectives, the plan or project either alone or in combination with other plans or projects would have an adverse effect (or risk of this) on the integrity of the site has been assessed in light of:

- site-specific information obtained from surveys and studies undertaken as part of the EIA for the proposed scheme;
- the advice of statutory bodies;
- the potential effects on the SPA and Ramsar site;
- evidence provided within the EIA Report; and,
- professional judgement and lessons learned from other development projects.

The following definitions and approach were used to determine whether the proposed scheme would result in an adverse effect on the SPA / Ramsar site:

Site integrity

The assessment of adverse effects on the integrity of the site is addressed in light of the conservation objectives. The integrity of a site is defined as the "*the coherence of the site's ecological structure and function, across its whole area, which enables it to sustain the habitat, complex of habitats and/or populations of species for which the site has been designated*" (ODPM Circular 06/2005).

EC guidance (European Commission, 2000) emphasises that site integrity involves its ecological functions and that the assessment of adverse effect should focus on, and be limited to, the site's conservation objectives.

Adverse effect

The potential impacts of the proposed scheme during the construction and operation phases have been considered in the context of their effects on the qualifying features (i.e. the species and their supporting habitats) of the SPA and Ramsar site.

An adverse effect on integrity is likely to be one which prevents the site from making the same contribution to favourable conservation status for the relevant feature as it did at the time of designation. In addition, an adverse effect would be one which caused a detectable reduction in the species for which the sites are designated, *at the scale of the site rather than at the scale of the location of the impact*.

Article 1 of the Habitats Directive defines the conservation status of a natural habitat as 'favourable' when "*the specific structure and functions which are necessary for its long-term maintenance exist and are likely to continue to exist for the foreseeable future*". An adverse effect on site integrity will not occur if it can be shown that, in the long term, the habitat or population of the species in question as a viable component of the site will be maintained despite potential impacts. Long-term is considered to be a period of at least five years. This is considered to be an appropriate timescale for the assessment of adverse effect on integrity because, for example, SPAs are usually designated in the UK on the basis of five-year population estimates. A five-year rolling mean is used because it is considered to take account of sufficient data to demonstrate that birds use sites regularly, smoothing out any short-term peaks and troughs in numbers.

Using the same argument, it is therefore logical to continue to review populations over the same timescale in order to demonstrate that observed use or 'non-use' of habitat is typical, and not a chance event. In addition, bird breeding performance and productivity varies between species and between years, and many species have long life spans. Population dynamics data therefore need to take into account the possible short-term fluctuations in the numbers of any species.

European Commission (2000) also recommends that, when considering the 'integrity of the site', it is important to take into account a range of factors, including the possibility of effects manifesting themselves in the short, medium and long-term.

29.5.3 Estuarine processes

An assessment of the potential effects of the proposed scheme on estuarine processes (comprising effects on tidal propagation, wave climate, current speeds and sediment budget of the estuarine system) has been undertaken and is presented in **Section 6** of this report (with further detail provided in **Appendix 5**). A summary of the predicted effects is provided below to inform the assessment of potential adverse effects on the features of the SPA and Ramsar site.

Effects on estuarine processes due to demolition activities

During construction, the demolition of the existing wharf and jetties will have only minor, localised and temporary effects that are not of significant concern. Construction of the new quay (to be set back from the riverbank) will be from land using predominantly land-based plant, with no construction activity in the river and so will cause no effects on the hydrodynamic and sedimentary regime.

Effects on water quality due to dredging and disposal

The capital dredging of the river will cause plumes of sediment to form. The plume effects arising from the river dredging are characterised by a short-lived localised increase in suspended sediment concentrations by the order of a few hundred mg/l at the point of dredging activity, followed by a general dispersion in spatial extent and reduction in concentration over the following hours. Since the dredging is a near-continuous operation, the plume effects will be observed throughout much of the approximately five-month period, but at varying extents depending on the dredging activities undertaken at any one time. Deposition thicknesses of sediment from the plumes on the river or seabed will be very small.

Effects of completed scheme on hydrodynamic conditions

Since the new quay is to be set back from the existing riverbank, there are expected to be local changes to the baseline hydrodynamics due to the new alignment. Changes in hydrodynamics could also arise from the absence of the existing wharf and jetties and the deepened areas in the Tees Dock turning circle, approach channel and berth pocket.

Numerical modelling during both neap and spring tides show that general baseline tendencies (i.e. maximum current speeds being greater on the spring tides than the neap tides, an ebb dominance during neap tides and a flood dominance during spring tides) remain unaffected by the scheme.

The tidal current velocities along the length of the quay's new set-back alignment will mostly be 0.05 – 0.10 m/s during flood spring tides, and less than 0.05m/s during ebb neap tides. Under both spring and neap tide conditions there are predicted to be general small reductions in baseline flow rate, which will vary during different phases of the tidal cycle but are generally between 0.05 and 0.15 m/s, with small areas of reduction of around 0.20 m/s. Such reductions may extend across the width of the river but are not predicted to extend along the axis of the river beyond that adjacent to the new quay. There is predicted to be no measurable change in the Tees Dock turning circle.

The reductions in baseline current speeds may lead to a slight increase in deposition of sediment. In areas adjacent to the north bank, opposite the quay, this is positive as it will help the existing North Tees Mudflat be sustained in light of sea level rise. In the main channel, the deposition will require periodic dredging to maintain design depths. An increase in annual maintenance dredging requirement considered in **Section 6** is predicted to yield a very low overall contribution to the net annual maintenance dredging requirements from the estuary as a whole and the potential increase in maintenance dredging requirement could easily be managed within existing maintenance dredging regimes (i.e. no change to the existing maintenance dredge strategy is required).

There are no predicted effects on local wind-generated waves at the site since the changes in hydrodynamics are so small and localised, and there will be no estuary-scale effects on baseline hydrodynamic conditions.

Effects of completed scheme on tidal range

Design calculations for the proposed scheme show that the increase in mean tidal prism as a result of the new quay's set-back alignment and dredging of part of the existing estuary bed is 150,901m^3. This represents an increase in the existing tidal prism of the estuary by less than one percent (0.8% to one decimal place) and is not deemed to be a cause of significant estuary-wide change in hydrodynamics.

29.5.4 Effects on the extent, distribution and function of supporting habitat for wintering waterbird species

The proposed scheme will result in the conversion of approximately 2.5ha of intertidal habitat within the SPA, behind the existing wharf, to subtidal habitat, due to the capital dredging and excavation required to create the berth pocket. The dredging footprint in the channel and the Tees Dock turning circle does not overlap with intertidal habitat at North Tees Mudflat, Vopak Foreshore nor any other areas of extensive mudflat / other intertidal types in the estuary (i.e. the dredge will be within subtidal areas only). Dredging in existing subtidal habitat (an area of 32.5ha) will result in a temporary change to the seabed benthic community, although the excavation of the landside materials to create the berth pocket will result in the creation of additional subtidal habitat in the long term.

Walkover survey observations of the site in 2020 indicate that the intertidal habitat is similar to that recorded during 2019 intertidal surveys undertaken for the NGCT scheme (full details are presented in **Section 9.4**). As such, it is concluded that the intertidal habitat present in the footprint of the proposed scheme is impoverished and predominantly artificial due to historic industrial development, which restricts the ability for a more natural rocky shore community to develop. As outlined in the WFD compliance assessment (see **Section 28**), there is approximately 400ha of "intertidal sediment" habitat within the estuary. The area of intertidal habitat that would be lost during excavation / demolition would represent approximately 0.6% of this. While the priority habitat data presented in **Figure 11.2** indicates that there may be small, isolated

patches of intertidal mudflat within the footprint, amounting to a total area of approximately 0.79ha, there was no evidence of such habitat being present during the walkover survey.

The site-specific bird counts undertaken to date (July to September 2020) support the conclusion drawn in **Section 9** that the affected intertidal area is of poor quality. The bird counts indicate that the intertidal habitat and the existing wharf and jetty structures are of relatively low value for SPA and Ramsar qualifying features. While it should be noted that the counts do not take into account wintering numbers, it suggests that the alternative habitat present at North Tees Mudflat is preferable for redshank (the only SPA / Ramsar feature recorded at South Bank during the counts), during both high and low tide. Full details are provided in **Section 12.4.3**, but, in summary, low tide peak counts of redshank at South Bank (inclusive of birds observed on the intertidal habitat and on the existing wharf structures) were up to two individuals (0.1% of the SPA reference population), compared to peak counts of up to 82 individuals (5.0% of the SPA population) at North Tees Mudflat. Though numbers at South Bank may be higher during winter months, there is still likely to be a strong preference for the North Tees Mudflat, and localised redistribution of birds from South Bank to North Tees Mudflat would not represent a significant effect on the SPA-wide distribution of waterbirds. Furthermore, assessments undertaken for other projects in the Tees (such as the NGCT scheme and the Anglo American Harbour facilities scheme (Royal HaskoningDHV, 2015 and 2020)) indicate that there are other high-value habitats, such as *inter alia* Bran Sands, Bran Sands lagoon, Dabholm Gut, Seal Sands and North Gare Sands within the SPA / Ramsar site that would provide ample alternative intertidal foraging and roosting opportunities for the very low numbers of birds recorded at South Bank.

The subtidal areas to be affected by the proposed scheme are infrequently used by breeding common terns as foraging grounds, indicated by WeBS core counts for the two sectors in which capital dredging will be undertaken (see **Section 12.4.2**) and the site-specific tern surveys undertaken in 2020 (see **Section 12.4.4**). For example, the most recent common tern 5-year mean peak count was 19 (2.4% of the SPA population), and the peak count recorded over the summer of 2020 was 12. Regardless, the subtidal habitat affected is subject to regular (almost daily) maintenance dredging by PDT therefore the impact of the capital dredge is not expected to result in any significant long-term changes to benthic composition. The findings of ecological surveys in the Tees (detailed further in **Section 9.4.3**) show that the benthic community in the river channel is characteristic of disturbed seabed, and it is expected to return to a similar state following completion of the proposed capital dredge. Furthermore, the subtidal area within the proposed dredge footprint represents approximately 0.3% of the overall subtidal area available in the SPA.

As outlined, the assessments set out in **Sections 9** and **12** indicate that the subtidal, intertidal and artificial habitats within the direct footprint of the scheme do not constitute high value supporting habitats for SPA / Ramsar site features. Given the very minor extent of the potentially-affected habitat in terms of the SPA-wide supporting habitat available, and the fact that other habitats within the SPA are likely to be of significantly higher value to SPA / Ramsar site features, it can be reasonably assumed that the loss / alteration of the affected habitat would not have an adverse effect on the integrity of the site.

Furthermore, in light of the changes in coastal processes outlined above in **Section 29.5.3**, there are predicted to be no significant estuary-wide changes in the tidal prism. The slight reductions in tidal flow at the north bank of the Tees would be beneficial in that the resulting minor increases in deposition may help to sustain North Tees Mudflat in light of future sea levels rise (with no significant effect on the benthic communities anticipated as a result, as detailed in **Section 9**). As such, an adverse effect on the integrity of the SPA and Ramsar site would not occur.

29.5.5 Displacement of food resources

Common tern feed on a wide variety of small fish, including clupeids (i.e. largely herring and sprat) and sandeels. The potential effects on resident and migratory fish within the Tees are presented in the fish and

fisheries assessment in **Section 13**, and the findings of that assessment are applied here to assess the resulting indirect effects on SPA / Ramsar site features. **Section 13** indicates that notable impacts on fish are not anticipated to arise from disturbances associated with underwater noise and increases in SSC during dredging.

While 32.5ha of subtidal will be affected by the proposed capital dredging, the area already experiences regular (almost daily) maintenance dredging by PDT so there are not expected to be any long-term changes to the suitability of the site in supporting fish resources. The marine water quality assessment undertaken in **Section 7** indicates that there are not expected to be any significant risks to fish as a result of contaminant release or reduced DO (details are provided in **Section 13.5.1**). Further assessment is presented below.

Effects of changes in water quality

With the application of mitigation in the form of ensuring that the capital dredging transects run along the axis of the river, rather than across it (further details are provided in **Sections 12.5.2** and **13.5.1**), the dredging activities associated with the highest modelled increase in SSC (i.e. Stage 2 of the dredging, which requires use of TSHD and BHD on soft sediment in the channel and berth pocket) will result in plumes of elevated SSC that collectively occupy around half the width of the river channel as they move up and downstream. The zone of influence affected by increases in SSC during Stage 2 has been described in **Figure 6.39**; in summary, measurable increases in SSC will not be experienced (at any time) at a distance of more than *c.*750m downstream and *c.*2,500m upstream, and it is important to note that, in reality, only a fraction of this would be affected at any one time.

The sediment dispersion modelling of Stage 2 dredging indicates that, at any given time, significant SSC excesses from the capital dredging are confined to the dredging transects and are predicted to decrease significantly with increased distance from the dredging vessel, both laterally and along the line of the vessel, with plumes diminishing typically to levels of <30 mg/l but often <10mg/l at a distance of no more than a few hundred metres. Baseline levels are expected to be restored within a few minutes to a few hours of release. Full details of the sediment dispersion modelling are presented in **Section 6.5.2**.

With mitigation in place, the predicted impacts on fish as a result of SSC increases are predicted to manifest as a very localised redistribution to less-affected areas, and the movement of fish along the river is expected to be largely uninterrupted (see **Section 13.5.1** for full details). There would be no estuary-wide effects, therefore the provision of fish in the estuary is expected to remain unchanged. However, it should be noted that the localised displacement of fish, plus decreased visibility through the water, may represent a temporary disruption to the foraging behaviour of terns. This may continue across the approximately five-month dredging programme.

Common terns breeding at Saltholme will forage along the length of the Tees and within adjacent offshore areas, and it should be noted that the January 2020 subtidal extension to the SPA was partly based on the identification of an area of approximately 9,400ha within the expected foraging range of this species (Natural England, 2018a). The area affected by the sediment plume generated from proposed dredging, though spatially and temporally variable, will represent a minute proportion of the foraging area within the SPA. Maintenance dredging in the channel, undertaken by PDT on an almost-daily basis, infers that terns using the channel are habituated to foraging in spite of localised increases in SSC and other sources of disruption to their fish prey; in fact, the revised boundary of the SPA covers the area that has been, and is, regularly dredged.

With the above in mind, the localised redistribution of fish and consequent temporary reduction in tern foraging opportunities during the capital dredging are not considered to represent a significant change to foraging ability in the context of the wider SPA, and would not be expected to affect the distribution or

population of terns using the site. Furthermore, impacts would not be expected to extend beyond the approximately five-month duration of the capital dredging campaign. As such, there are expected to be no adverse effects on the integrity of the SPA / Ramsar site.

Effects of underwater noise

An assessment of the impacts of underwater noise on fish is detailed in **Section 13.5.3** and **13.5.4**, which concludes that the periodic nature of underwater noise, plus the likely habituation to background dredging noise due to regular maintenance dredging, means that impacts on fish are considered to be of minor significance only. There would be no reduction in the number of fish within the estuary as a result of injurious noise levels. Land-based impact pile driving noises that propagate through the water are expected to occur over an estimated 40 minutes per day (assuming ten minutes of impact piling per rig for four piling rigs) and are predicted to fall below thresholds likely to result in significant behavioural responses at a distance of greater than approximately 200m from source (see **Appendix 8**). There would be negligible effects on fish during the operation phase, since the increase in vessels movements is minimal in the context of baseline traffic within the Tees (see **Section 13.5.4**).

With mitigation in place, the predicted impacts on fish as a result of underwater noise is again predicted to manifest as a very localised redistribution to less-affected areas, and the movement of fish along the river is expected to be largely uninterrupted (see **Section 13.5.3** for full details). There would be no estuary-wide effects, therefore the provision of fish as a feeding resource in the estuary is expected to remain unchanged. Again, it should be noted that localised displacement of fish may represent a temporary disruption to the foraging behaviour of terns and may continue throughout the construction phase.

As previously stated, localised redistribution of fish and consequent temporary reduction in tern foraging opportunities during the capital dredging are not considered to represent a significant change to foraging ability in the context of the wider SPA and Ramsar site, and would not be expected to affect the distribution or population of terns using the site. Furthermore, impacts would not be expected to extend beyond the duration of the construction phase. As such, it is concluded that there would be no adverse effect on the integrity of the SPA and Ramsar site.

29.5.6 Disturbance effects on the population and distribution of SPA / Ramsar site features

Since the footprint of the proposed scheme overlaps with the SPA and is adjacent to the Ramsar site, there is potential disturbance to SPA and Ramsar site features that forage and roost in nearby areas, such as the North Tees Mudflat. Disturbance could arise due to the following:

- Airborne noise disturbance to birds during demolition, construction and operation.
- Visual disturbance during construction and operation.

Given that common terns forage and commute through the site and have a large foraging range within which to feed, they would not be significantly affected by local disturbances at the site of the proposed scheme. As such, this assessment focuses on foraging / roosting waterbirds at North Tees Mudflat and other areas that may fall within the impact range.

Airborne noise disturbance to birds during construction (including demolition) and operation

The demolition, construction and operation phases of the proposed scheme will inevitably result in the creation of noise which could disturb SPA / Ramsar site species.

Sections 12.5.4 and **12.6.1** fully assess the impacts of both construction and operation phase noise, and use the output of airborne noise modelling at ecologically-important receptors (i.e. those within the SPA /

Ramsar site that are known to support significant numbers of waterbirds) to demonstrate that disturbance thresholds set out by studies such as Cutts *et al.* (2009 and 2013) and Wright *et al.* (2010) are not exceeded at any locations downstream of the North Tees Mudflat. As such, any effects of noise-related disturbance on the conservation objectives of the SPA and Ramsar site would be driven by impacts on wintering / passage waterbirds using North Tees Mudflat.

As set out in **Section 12.5.4**, the construction phase noise levels at modelled receptors on the North Tees Mudflat range from 46.8 to 59.5 dB L_{Aeq} (continuous noise) and 68.8 to 80.0 dB L_{Amax} (impulsive noise from e.g. pile driving). With the incorporation of the mitigation measures detailed in **Section 12.5.4** (i.e. employment of shrouding around the piling rigs during construction works), the predicted noise levels at the North Tees Mudflat are reduced to 44.8 to 58.5 dB L_{Aeq} and 54.8 to 66.0 dB L_{Amax}.

The Waterbird Disturbance Mitigation Toolkit, developed by Cutts *et al.* (2013), provides noise level thresholds acceptable for 16 different waterbird species based on their respective sensitivities. While this does not cover all of the SPA / Ramsar site features, it does include redshank, the only SPA / Ramsar site feature recorded to date in the site-specific surveys (see **Section 12.4.3**) and the only qualifying feature for which WeBS counts in the two affected count sectors exceed 5%[12] of the SPA reference population (see **Section 12.4.2**). The Toolkit also provides thresholds for knot (a qualifying feature of the SPA / Ramsar site), plus lapwing and sanderling (major component species of the SPA assemblage). According to the Toolkit, redshank and knot are *"particularly sensitive to noise stimuli"*, and the acceptable noise level threshold of 70dB(A) for redshank and knot is the highest of all the species included (Cutts *et al.*, 2013). As such, these are considered to be appropriate representative species for the purpose of the noise disturbance assessment in **Section 12.5.4**.

With the piling shrouding employed, the noise levels produced during construction (including during pile driving) are therefore within the "acceptable" limits for redshank and knot at the nearest modelled receptor (i.e. the downstream section of the North Tees Mudflat). There may be some behavioural responses to impulsive piling noises, including non-flight responses such as head turning, scanning and movement away and/or flight with return, but these would be limited to an estimated forty minutes per day (assuming four rigs, with ten minutes of impact pile driving per day per rig), and there are suitable alternative, unaffected foraging locations within a short distance. This includes upstream sections of the North Tees Mudflat (which extend approximately 1km upstream of the proposed scheme footprint), since noise levels are lower at the central and upstream section, plus other intertidal areas (e.g. Bran Sands, Dabholm Gut, Seal Sands). At worst, therefore, the proposed scheme would lead to some localised, temporary redistribution of sensitive species in the immediate area, likely on the same mudflat.

Modelled predictions of operational noise levels are presented in **Section 12.6.1**. Modelled L_{Aeq} is less than 50 dB at all receptor locations (including North Tees Mudflat), indicating that there would be no noticeable impact on foraging or roosting birds (Cutts *et al.*, 2009; Wright *et al.*, 2010). Threshold exceedances would be sufficiently occasional that there would be no-long-term impacts; regardless, the modelled L_{Amax} is predicted to be no more than 61.9dB at North Tees Mudflat, which falls within the low to moderate range (Cutts *et al.*, 2009 and 2013) and is likely to have no significant behavioural effect according to Wright *et al.* (2010), but as a worst case may lead to non-flight responses.

With the above in mind, the outcome of the assessments set out in **Section 12.5.4** and **12.6.1** is that any impacts on waterbirds within the local area from construction or operation phase noises would be minor

[12] *A 5% threshold was used to determine significant populations within the Teesmouth and Cleveland Coast pSPA/Ramsar Departmental Brief, which is consistent with assessments of the importance of prospective extensions to other sites in England (Natural England, 2018a)*

adverse, at worst. When considering the impacts in the terms of the functioning, distribution and population on a SPA and Ramsar site wide scale, there is no risk of adverse effect on the integrity of the site.

Visual disturbance during construction and operation

In addition to noise disturbances, there may be accompanying visual disturbances due to the presence of construction personnel, plant / machinery, dredgers / other vessels and construction lighting. **Sections 12.5.4, 12.6.1**, **12.6.2** and **12.6.3** fully assess the impacts of both construction and operation phase visual disturbances. As with the noise disturbances outlined above, the assessments demonstrate that visual disturbance thresholds set out by studies such as Cutts *et al.* (2009 and 2013) are not exceeded at any locations downstream of the North Tees Mudflat and Vopak Foreshore. As such, any effects on the conservation objectives of the SPA and Ramsar site would be driven by impacts on the birds using these areas.

Construction phase works (including demolition) are predicted to be undertaken 24 hours a day and, therefore, lighting will be required at night during such works. Additionally, the operational phase will see the use of an estimated 18 lighting columns along the quayside. Under existing conditions there is little light spill from the proposed scheme footprint given its largely derelict nature, however, there is light spill into the water column from operations throughout the majority the estuary. An assessment of the disturbance impacts of artificial lighting on fish, set out in **Section 13.6.2**, concludes that effects associated with lighting would be negligible, therefore any effects on SPA / Ramsar site features would manifest as a direct behavioural response to lighting, rather than as a displacement of food resources.

Given the industrial use of the Tees, it is likely that there will be some level of habituation to riverside lighting. Waterbirds may feed nocturnally and some may actually take advantage of artificial light sources to extend feeding opportunities in darkness (e.g. Dwyer *et al.*, 2013). The area directly affected (i.e. adjacent to the proposed quay) has, as described in **Section 29.5.4**, little value to SPA / Ramsar site features. Regardless, birds that may otherwise be affected will have been displaced from the site during demolition of existing features and excavation of the intertidal area at South Bank. Areas considered to be of higher value, such as North Tees Mudflat, are sufficiently distant to avoid impacts on roosting or foraging behaviour, particularly with the implication of mitigation measures set out in **Sections 12.5.4** and **12.6.3** (i.e. sympathetic placement and orientation of lighting to minimise light spill across the water). As such, the use of artificial lighting is not expected to have any adverse effect on the distribution or extent of qualifying SPA / Ramsar site features either at North Tees Mudflat or on a wider SPA and Ramsar site level.

In addition to the above, the construction phase of the proposed scheme will require various personnel and demolition / construction plant and machinery to be present at South Bank, depending on the nature of the works being undertaken. There is no requirement for personnel or plant to enter the North Tees Mudflat or any other intertidal areas outside the project footprint.

The assessment in **Section 12.5.4** considered the range of potential impacts in terms of a conservative proximity threshold of 300m, as set by Cutts *et al*. (2009 and 2013). This threshold was based on the most sensitive of species considered and is therefore an appropriate threshold to use for SPA / Ramsar site features. Most areas of supporting habitat for waterbirds in the SPA / Ramsar site, including *inter alia* Vopak Foreshore, Bran Sands, Seal Sands and North Gare Sands, lie beyond the 300m threshold and would not be affected by visual disturbance at South Bank. However, at the nearest point North Tees Mudflat is located approximately 250m from the existing South Bank Wharf. According to Cutts *et al.* (2009), at a 250m distance feeding activity may be disrupted by some species taking flight and showing other behavioural changes, such as a potential reduction in feeding.

The 300m threshold is, however, based on the sensitivity of unhabituated birds, whereas at North Tees Mudflat it is likely that most birds would be habituated to activity along the riverbank, given that the Tees along this stretch (including the area immediately downstream of North Tees Mudflat on the northern bank) is characterised by industrial activity. Furthermore, the proximity threshold would only be exceeded at the downstream extent of the mudflat, and only during works at the extreme upstream end of the proposed scheme footprint (not including dredging activities, which are considered separately below), therefore for the majority of the time foraging and roosting SPA / Ramsar site features will be outside of the impact range. At worst, disturbance from the site may lead to some localised, temporary redistribution of sensitive species in the immediate area, likely on the same mudflat. In the context of the wider SPA and Ramsar site, this is not considered to represent a significant change in the distribution of features within the site.

During dredging of the main channel and the turning circle, dredging vessels will operate in close proximity to the North Tees Mudflat and Vopak Foreshore. Most notably, sections of the channel dredge footprint run adjacent to the North Tees Mudflat, therefore the presence of dredging vessels may result in disturbance to waterbirds foraging or roosting on the mudflat. Such disturbance, especially if it is repeated, could reduce the time that birds can feed within the tidal cycle and could therefore potentially reduce the overall feeding efficiency. This can be critical during the winter months and during periods of particularly severe weather when maximising available feeding time is of paramount importance.

The sensitivity of such species is offset by the fact that there is regular vessel traffic in the estuary (there are between 800 and 900 vessel movements in the Tees per month from commercial vessels alone (for more information on shipping movements, refer to **Section 14**). This also includes regular maintenance dredging vessels which operate on an almost daily basis within the channel, including within 30m of the Vopak Foreshore and adjacent to North Tees Mudflat, therefore it is likely that birds foraging on the mudflat would have some level of habituation to such activities. Furthermore, it is likely that there will be further habituation over the proposed capital dredging period and any effects would lessen through the course of the campaign.

Disturbances at Vopak Foreshore would be limited to the approximately one week of dredging required to deepen the Tees Dock turning circle. Disturbance to birds at North Tees Mudflat would be limited to the approximately 4.5 months of dredging required further upstream, but only during times when the dredging transect runs close to the mudflat (for example, when dredging the southern half of the river it is unlikely to have any significant effect on foraging at North Tees Mudflat). It should also be noted that only birds foraging at the downstream end of the North Tees Mudflat would be affected, even when considering a 300m threshold, and the mudflat itself extends over a kilometre upstream of the proposed dredge footprint. As such, any displacement of birds would likely amount to local redistribution on the same area of intertidal.

With the above in mind, the outcome of the assessments set out in **Section 12.5.4, 12.6.2** and **12.6.3** is that any impacts on waterbirds within the local area from construction or operation phase disturbances would be minor adverse, at worst. When considering the impacts in the terms of the functioning, distribution and population at the SPA and Ramsar site scale, there would be no adverse effect on the integrity of the site nor on the achievement of conservation objectives.

29.5.7 Intra-project effects

As well as considering potential effects on SPA features from the individual impact pathways associated with the proposed scheme, it is necessary to understand the interaction between the impact pathways to determine whether, cumulatively, they may result in an adverse effect on the integrity of the site.

Hypothetically, an intra-project cumulative effect could mean that effects (on SPA / Ramsar site features) of, for example, a loss of supporting habitat could be compounded when considered alongside the likely effects of visual or noise disturbance, or effects on prey resources.

It is anticipated that the very low number of SPA features that may be displaced by the demolition and excavation works at South Bank would be likely to relocate at North Tees Mudflat, Vopak Foreshore and/or other appropriate intertidal habitats in the lower Tees. Impacts on North Tees Mudflat and the Vopak Foreshore due to noise and visual disturbance could, in theory, result in further redistribution of the same features. However, as outlined in **Section 29.5.6**, the minor disturbance impacts on North Tees Mudflat and Vopak Foreshore are not anticipated to have a significant effect on the distribution of wintering waterbirds using the site, and any redistribution would likely occur at a highly localised scale (i.e. on the same area of intertidal or on other nearby areas). In other words, while features may relocate from South Bank to North Tees Mudflat and the Vopak Foreshore as a result of lost habitat in the proposed scheme, this local redistribution will not be exacerbated by other disturbances and there is little risk of the combination of impacts resulting in significant adverse effects on the distribution of features at an SPA level.

Conversely, the effects caused by visual and / or noise disturbance at North Tees Mudflat and Vopak Foreshore would not be compounded by the loss of habitat associated with the proposed scheme, since it is likely that any localised displacement would see birds relocate elsewhere on the North Tees Mudflat or the Vopak Foreshore, or to other areas of high-value habitat nearby (e.g. Bran Sands and Lagoon, Dabholm Gut). None of these areas would be affected by the loss of low-value habitat at South Bank.

In terms of intra-project effects on foraging common terns, the zone of influence from the sediment plume associated with the capital dredging has been assumed to represent a temporary loss of foraging habitat in the assessment set out in **Section 29.5.5**. When set into the context of foraging ground availability across the SPA, it has been concluded that there would be no significant effect on the population or distribution of common terns in the SPA. Considering other potential impacts in conjunction with this, the maximum extent of the area would not be increased since the plume is considered to be the most far-reaching effect on tern foraging ability. Regardless, it is likely that common terns foraging in the Tees would be habituated to the various impacts commonly associated with dredging and industrial work in the Tees. As such, the number of birds that may be affected would not change, nor the magnitude of impacts on those that are affected.

With the above in mind, it has been concluded that there would be no adverse effect on the integrity of the SPA / Ramsar site.

29.5.8 Conclusion in light of conservations objectives

The conservation objectives for the Teesmouth and Cleveland Coast SPA are:

"With regard to the SPA and the individual species and/or assemblage of species for which the site has been classified, and 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.*
- *The distribution of the qualifying features within the site."*

The assessment presented above has illustrated that impacts arising from the construction phase and operation of the proposed scheme, when considered independently of other projects and plans, will not lead to an adverse effect on the integrity of the SPA or Ramsar site.

29.6 Assessment of in-combination effects

This section considers the in-combination effects of the proposed scheme with other plans and projects screened into the assessment on the Teesmouth and Cleveland Coast SPA and Ramsar site. The potential in-combination effects screened into the assessment comprise:

- effects on the extent, distribution and functioning of supporting habitat;
- disturbance effects on the population and distribution of interest features;
- effects on the distribution of prey resources; and,
- effects on the hydrodynamic and sedimentary regime.

These potential in-combination effects are considered further below.

29.6.1 In-combination effects on the extent, distribution and functioning of supporting habitat

As detailed in **Section 29.5.4**, the potential supporting habitats likely to be affected by the proposed scheme are the intertidal habitats and artificial structures present at South Bank and the subtidal area within and adjacent to the dredging footprint. The proposed scheme will result in the conversion of approximately 2.5ha of intertidal to subtidal habitat, demolition of artificial structures and dredging of an area of approximately 32.5ha of subtidal habitat. While this is not anticipated to have an adverse effect on the integrity of the SPA / Ramsar site when considering the proposed scheme alone, the effects on SPA / Ramsar site features may be compounded should other projects and plans have an effect on similar habitats.

As stated in **Section 29.5.4**, the effects of capital dredging on subtidal habitat are considered to be temporary, with a return to baseline conditions expected upon completion (i.e. a seabed community characteristic of a disturbed environment regularly affected by ongoing maintenance dredging). Impacts on the subtidal from the scheme, therefore, do not represent a long-term change to the extent, distribution or functioning of this as a supporting habitat; consequently, there is no risk of in-combination effects with other projects. As such, projects that may have an in-combination effect are those that may result in loss or change in subtidal within the SPA and Ramsar site, i.e. the adjoining South Industrial Zone scheme, the NGCT scheme, the Anglo American Harbour Facilities scheme, the Dogger Bank Teesside A and Sofia project and the proposed new cinema development project at Redcar. The Hartlepool approach channel would not result in the loss of intertidal as all works are located within the subtidal. There is therefore no pathway for in-combination effect on potential feeding grounds with the proposed scheme.

HRAs produced for each of the above projects have indicated that, when considered alone, none of the projects will have a significant effect on the distribution and extent of supporting habitats within the SPA / Ramsar site, though cumulatively there will be a greater overall loss in supporting habitat than when considering each of the projects in isolation. The NGCT scheme will result in a loss of 1.19ha of intertidal habitat, though it was concluded in the HRA for the scheme that this represents poor quality habitat that is not important for foraging waterbirds. Likewise, 3.6ha of poor quality, semi-artificial intertidal habitat is predicted to be lost during the Anglo American Harbour Facilities scheme, which will be offset by habitat enhancement in Bran Sands Lagoon as part of the same scheme and will result in a net gain in supporting habitat. In the South Industrial Zone scheme (adjacent to the proposed scheme), 11ha of saltmarsh, open water and intertidal mud will be lost, including 'The Slems' (an area of wetland), though the HRA for that scheme concludes that the site is not used by a significant number of SPA / Ramsar features (based on the

findings of invertebrate sampling undertaken on sediment samples from The Slems). The HRA undertaken for the new cinema development at Redcar concluded no LSE associated with habitat loss for any of the SPA and Ramsar site species and therefore no further assessment of this project is required.

None of the above projects will result in any loss to key areas of intertidal supporting habitat referred to in the site citation or the supporting scientific evidence (Natural England, 2018a), such as *inter alia* North Tees Mudflat, Bran Sands, Seal Sands, North Gare Sands. In all instances, the respective HRAs for the above schemes conclude no adverse effects from the schemes in isolation, due to the low value of the affected habitat and the low number of SPA / Ramsar site features affected. As such, the further loss of 2.5ha of similarly low-value intertidal habitat at South Bank would not be expected to significantly affect the distribution of features within the site. To put into context, the intertidal habitat loss within the SPA from the proposed scheme in combination with the NGCT scheme represents less than 1% of "intertidal sediment" habitat within the estuary alone (let alone when including intertidal areas in coastal waters). The South Industrial Zone is outwith the boundary of the SPA and habitat loss in the Anglo American Harbour Facilities scheme will be offset by the habitat enhancement measures and therefore these projects have been excluded from the calculation above.

In light of the above, the in-combination effects on the extent and functioning of supporting habitat at the SPA and Ramsar site level are not considered to be significant, hence there would be no adverse effect on the integrity of the site.

A further HRA is to be undertaken for the South Industrial Zone scheme at the reserved matters stage, so any updates in the use of the site by SPA features (i.e. following the completion of wintering bird surveys) will be encompassed in the in-combination assessment undertaken at that stage for that project.

29.6.2 In-combination disturbance effects on the population and distribution of SPA / Ramsar site features

While disturbances arising from the proposed scheme are not anticipated to result in any adverse effects on SPA / Ramsar site features when considered in isolation, this section assesses the potential for combined disturbances from other projects to compound the potential disturbance impacts. This would only be a possibility in the unlikely event that at least one of the other schemes coincides temporally with the proposed scheme.

Without mitigation in place, the construction phase of the proposed scheme may result in redistribution of wintering waterbirds at North Tees Mudflat as a result of disturbance from noise-related impacts (notably the impulsive noises from impact pile driving). In the unlikely event that other projects coincide with the proposed scheme, which also result in disturbances to SPA / Ramsar site features, such effects could be compounded on an estuary wide scale. However, with the use of shrouding on piling rigs during the proposed scheme, the significantly reduced noise levels at the nearest sensitive intertidal receptor (North Tees Mudflat) are not expected to result in any significant effects on SPA / Ramsar site features (see **Section 29.5.6**). At worst this would lead to some localised, temporary redistribution of sensitive species in the immediate area, likely on the same mudflat.

As such, in-combination effects on waterbirds can only occur if there is likely to be noise-related disturbance that prevents local redistribution on the North Tees Mudflat or other nearby areas of mudflat, which consequently could see more widespread movement away from the site. The nearest projects are the adjacent South Industrial Zone scheme, the Anglo American Harbour Facilities scheme and the NGCT scheme. The proposed new cinema development at Redcar and the proposed Hartlepool approach channel scheme would result in disturbance to SPA features, but the effect would be spatially separated from that

arising from the proposed scheme and any impacts would not interact. Hence, an in-combination effect is not predicted in conjunction with the construction of operational phases of the proposed scheme.

The Anglo American Harbour Facilities ES (Royal HaskoningDHV, 2015) presented the findings of a cumulative noise impact assessment of the NGCT, Dogger Bank Teesside A & Sofia project and the Harbour Facilities project. The assessment concluded that the cumulative impact of noise and vibration on sensitive receptors was not predicted to be significant at any of the noise-sensitive receptor sites considered, and the noise sources are sufficiently distant that wintering waterbirds using the North Tees Mudflat would not be affected. The South Industrial Zone is immediately landward of the proposed scheme, but best practice mitigation measures will be in place and noise levels within the SPA would be less than 50dB(A) (i.e. below the disturbance thresholds set out in Cutts *et al.* (2009 and 2013)) and would not have a disturbance effect on waterbirds using the North Tees Mudflat. In any case, noise impacts from the proposed scheme and other projects are mostly associated with the construction works and would be temporary in nature, therefore there would be no long-term impacts on waterbirds. As such, significant in-combination effects on the distribution and population of waterbirds at the SPA and Ramsar site scale would not occur.

Construction and operation activity at the site of the demolition, intertidal excavation and quay construction are not anticipated to cause significant visual disturbance to waterbirds roosting or foraging on North Tees Mudflat. Such activities, therefore, are not likely to have any effect on the functioning or distribution of SPA / Ramsar site features and would not contribute to in-combination effects from other nearby plans and projects. However, dredging activity may, at worst, lead to some localised redistribution on North Tees Mudflat and the Vopak Foreshore due to visual disturbance. This is anticipated to be highly localised, and would have no bearing on distribution of SPA / Ramsar site features in the wider estuary, therefore the only other projects that may have in-combination effects on the integrity of the site are those that would similarly affect North Tees Mudflat and the Vopak Foreshore.

The South Industrial Zone scheme, located immediately landward of the proposed scheme, will include the erection of hoardings around the site to minimise the visual disturbance risk from personnel and low-level equipment / machinery. Regardless, it is further from the North Tees Mudflat / Vopak Foreshore than the proposed scheme and lies outwith the 300m threshold stated within the Waterbird Disturbance & Mitigation Toolkit (Cutts *et al.,* 2013). Other projects, such as the NGCT scheme, the Anglo American scheme and the ongoing PDT maintenance dredging, have the potential to cause similar disturbance to the Vopak Foreshore and / or North Tees Mudflat due to dredging activity in the channel. However, the dredge footprint for the proposed scheme overlaps in part with the NGCT dredge footprint at the Tees Dock turning circle. The dredge at Tees Dock turning circle would therefore only be undertaken by one of these schemes, which reduces the potential for in-combination disturbance to birds at Vopak foreshore. Maintenance dredging within the estuary occurs on an almost daily basis; such dredging was ongoing at the time the SPA and Ramsar site was extended and has been occurring for many years. It is therefore concluded that dredging does not cause significant visual disturbance to birds within the SPA and Ramsar site. Consequently, should dredging for all schemes screened into the assessment be required at the same time (which is highly unlikely), a significant in-combination visual impact is not expected.

With this is mind, it is concluded that there would be no adverse effects on the integrity of the SPA / Ramsar site due to disturbance.

29.6.3 In-combination effects on the distribution of prey resources

Effects on fish may be compounded by the combined sediment plumes of other projects or plans that may lead to increases in SSC, which would infer a consequent effect on foraging common terns. As such, projects that may have an in-combination effect with the proposed scheme are the NGCT scheme, the Anglo

American Harbour Facilities scheme, Dogger Bank Teesside A & Sofia offshore cable works, the Hartlepool approach channel scheme and the ongoing maintenance dredging by PDT.

An interaction between the sediment plumes would only occur in the unlikely event that the capital dredging for the proposed scheme should overlap (temporally) with elements of at least one other project which may lead to increased SSC. Furthermore, to affect the foraging of common terns in the SPA / Ramsar site, the programmes would both have to overlap with the breeding season for this species (i.e. May to August). If the programmes do overlap, the effect is predicted to be a greater increase in SSC than that predicted as a result of the proposed scheme in isolation, and across a wider area, although it should be noted from the assessment in **Section 29.5.5** that the area of foraging habitat likely to be affected by the proposed scheme is minute.

The ES for the NGCT scheme (Royal HaskoningDHV, 2020) concluded that the scheme would have a negligible effect on feeding resources for terns. When this is considered alongside the localised increase in SSC from the proposed scheme described in **Section 29.5.5**, the combined effect on potential common tern foraging areas is predicted to remain very low in the context of the available foraging habitat in the SPA. Plumes from each project would be temporary and short-lived. The same applies for the Anglo American Harbour Facilities scheme and the Dogger Bank Teesside A & Sofia cable works; assessments for each (Royal HaskoningDHV, 2015, Forewind, 2014) indicate that the area affected by the individual projects is small and all effects are temporary. Again, in the context of the foraging habitat available, the effect of the combined plumes is expected to be minor.

The magnitude of the potential effect on water quality due to the consented Hartlepool approach channel is low, with any effect confined to the footprint of the proposed dredge. The predicted increase in suspended sediment from Hartlepool channel is not considered sufficient to result in a lethal effect on fish, with any impact dissipating within 10 minutes following completion of the dredge (Royal HaskoningDHV, 2018).

The HRA for the NGCT scheme (Royal HaskoningDHV, 2020) indicated that there would be no adverse effect on the integrity of the SPA / Ramsar site as a result of in-combination effects with the Anglo American Harbour Facilities scheme, the ongoing maintenance dredging and the Dogger Bank Teesside A & Sofia cable works. In the context of the overall foraging area available to common terns within the SPA (an area of approximately 9,400ha (Natural England, 2018a)), the inclusion of localised, temporary and short-lived effects from the proposed scheme are not considered to significantly change this conclusion.

It should be noted that the mitigation measures described for the proposed scheme in **Section 12.5.2** (i.e. dredging transects oriented along the axis of the river rather than across to ensure that, at any one time, sediment plumes occupy only half of the river cross section) has also been proposed for the NGCT project. For the Anglo American Harbours facilities scheme specialist dredging equipment (i.e. an enclosed grab loading into a sealed barge) will be used for dredging of unconsolidated material to minimise resuspension in the water column. With mitigation measures in place for all schemes, the combined impact will be reduced as far as possible, and the risk of creating barriers to prey fish movement and stretches of turbid water spanning the width of the river is minimised. Common terns are mobile foragers and, given that there is extensive (and on-going) maintenance dredging within the channel on an almost-daily basis, common terns from Saltholme are likely to be habituated to foraging in spite of regular disturbances to water quality in the Tees.

With the above taken into consideration, there are expected to be no significant adverse effects on common tern distribution or foraging ability even when considering the in-combination effects of increased SSC from the aforementioned projects.

Sections 9.5.3 and **12.5.3** assess the impacts of the proposed scheme on the benthic food resources in the intertidal zone at North Tees Mudflat and any other locations outside the project footprint; in summary, there are anticipated to be no significant effects on the availability of such resources for foraging waterbirds. As such, there is no pathway by which effects on the distribution of prey resources from other projects and plans may be compounded by the proposed scheme.

As such, it can be concluded that in-combination effects are not likely to have significant adverse effect on the foraging ability of any SPA / Ramsar site features as a result of indirect impacts on food resources.

In summary, there would be no adverse effect on the integrity of the SPA and Ramsar site.

29.6.4 In-combination effects on the hydrodynamic and sedimentary regime

Given the marine nature of this potential effect, all other plans and projects screened into the assessment on land are excluded. The ongoing maintenance dredging is also not considered here as this forms part of the baseline environment.

As reported in **Section 6**, there are no predicted changes in water level or wave conditions near the site or in the wider estuary, other than locally in the area of newly set-back quay. The change in the overall tidal prism of the estuary will be minor (0.8% increase) and is not deemed to be a cause of significant estuary-wide change in hydrodynamics. There is no predicted effect on the baseline sediment transport regime and seabed or shore morphology across the wider study area of the Tees Estuary or Tees Bay. The potential increase in maintenance dredging requirement is not expected to be significant and could easily be managed within existing maintenance dredging and offshore disposal regimes.

With regard to NGCT, it is predicted that there would be an increased supply of material to the Tees estuary from offshore (by 10%). This effect arises due to the deepening of the approach channel through the mouth of the Tees and the resultant effect on tidal flows and sediment transport.

The studies for the Anglo American Harbour Facilities concluded that the Harbour Facilities would not change the supply of fine sediment to the Tees, and the sediment predicted to deposit in its berth pocket would be material that would have deposited in the approach channel anyway. Such material would have been subject to maintenance dredging and offshore disposal as part of ongoing maintenance dredging. Predicted modelling for the Anglo American Harbour Facilities scheme concluded that there would be no potential for an effect on the sediment budget of the estuary to arise and, therefore, there would be no impact on morphology of intertidal areas.

Sedimentary and hydrodynamic modelling undertaken for the consented Hartlepool approach channel project confirmed that the magnitude of effect on tidal hydrodynamics and wave regime arising from the proposed scheme is predicted to be low. The magnitude of effect on the baseline sediment transport regime and seabed morphology arising from the Hartlepool approach channel scheme during its operational phase is medium, directly in the vicinity of the approach channel. There is no predicted effect on the baseline sediment transport regime and seabed or shore morphology across the wider study area as a result of Hartlepool approach channel. Given the localised nature of potential effects during the operational phase of the Hartlepool approach channel scheme, it is concluded that there is no pathway for in-combination effects with the proposed scheme.

29.6.5 Overall in-combination effects

As well as considering potential in-combination effects on SPA features from the individual impact pathways, it is necessary to understand the interaction between impact pathways to determine whether, cumulatively, they may result in an adverse effect on the integrity of the site.

When considering the in-combination effects of intertidal habitat loss, visual and noise disturbance, displacement of foraging resources for piscivorous species and effects on the hydrodynamic scheme together, this has the potential to have an increased effect on SPA / Ramsar site features than when one impact pathway is considered in isolation. Hypothetically, in-combination effects (on SPA / Ramsar site features) of, for example, a loss of supporting habitat could be compounded when considered alongside the likely in-combination effects of visual or noise disturbance, or effects on prey resources.

The same rationale for assessing intra-project effects of the proposed scheme alone (see **Section 29.5.6**) equally applies when assessing the combined inter-project effects. Again, it is anticipated that the value of the intertidal habitat lost across all projects is low, and any SPA / Ramsar site features that may be displaced due to a loss of habitat in the various projects would likely relocate to higher value sites (e.g. exposed mudflats) known to be important for supporting such features. With regard to the proposed scheme, this will most likely include North Tees Mudflat and the Vopak Foreshore. Impacts on North Tees Mudflat and the Vopak Foreshore due to the disturbances arising from the proposed scheme and other projects could, in theory, result in further redistribution of features. However, as outlined in **Section 29.6.2**, there are no significant in-combination disturbance effects on the North Tees Mudflat and Vopak Foreshore and any redistribution would likely occur at a highly localised scale, without the need for wider displacement. In other words, while features may relocate from South Bank to North Tees Mudflat and the Vopak Foreshore as a result of lost habitat in the proposed scheme (and others), this local redistribution will not be exacerbated by other disturbances and there is little risk of the combination of impacts resulting in significant adverse effects on the distribution of features at an SPA level.

Conversely, the effects caused by combined disturbances at North Tees Mudflat and Vopak Foreshore would not be compounded by direct loss of intertidal habitat due to the proposed scheme and other projects, since it is likely that any localised displacement would see birds relocate elsewhere on the North Tees Mudflat or the Vopak Foreshore, or to other areas of high-value habitat nearby (e.g. Bran Sands and Lagoon, Dabholm Gut). None of these areas would be lost due to the proposed scheme or any others.

The zone of influence from predicted sediment plumes (including the combined plumes from the proposed scheme, the NGCT scheme, the Anglo American Harbour Facilities scheme and the Hartlepool approach channel scheme) would encompass the marine area affected by other impacts, such as visual and/or noise disturbance. Given that the conclusion of no adverse effect described in **Section 29.6.3** was based on assumed temporary loss of such habitat for foraging common terns, there is no additional area that may be affected by a combination of impact pathways nor would there be an increase in the average number of birds affected. Again, it is likely that common terns foraging in the Tees would be habituated to the various impacts commonly associated with dredging and industrial work in the Tees, regardless. As such, the conclusion from **Section 29.6.3** remains valid when considered alongside the other impacts described in this assessment.

With the above in mind, it has been concluded that there would be no adverse effects on the integrity of the SPA / Ramsar site.

29.7 Conclusion

In light of the conservation objectives for the Teesmouth and Cleveland Coast SPA, it is predicted that the proposed scheme, when assessed alone and in-combination with other plans and projects, will not have an adverse effect on the integrity of the Teesmouth and Cleveland Coast SPA and Ramsar site.