10 IMPLICATIONS FOR DESIGNATED STATUS[1]

10.1 INTRODUCTION

1. This section assesses the implications of the construction and operational phases of the tidal works and channel dredging for the designated status of the Stour and Orwell Estuaries SPA. The assessment involves considering the potential impacts of the proposed scheme, during both the construction and operational phases of the works, in relation to the 'integrity' of the SPA. As noted earlier, PPG9 defines a site's integrity as the *"coherence of the site's ecological structure and function, across its whole area, or the habitats, complex of habitats and/or populations of the species for which the site is classified"*. An adverse effect is likely to be one that prevents the site from maintaining the same contribution to 'favourable conservation status' for the relevant feature(s) as it did when the site was designated. The favourable conservation status of the Stour and Orwell Estuaries SPA is defined through its 'conservation objectives'. The potential impacts of the proposed tidal works and channel dredging, therefore, have to be considered in light of these objectives and the European interest features of the site (set out below in Section 10.2.1 and 10.2.2).

2. In order to provide guidance on assessing the potential impacts of a scheme on the site's conservation objectives, English Nature have produced favourable condition tables which contain a number of targets relating to the nature conservation interests of the Stour and Orwell Estuaries SPA (English Nature, 2001). For each of the favourable condition targets, an assessment has been made as to whether the potential impacts of the scheme contribute towards the target (and, therefore, contribute to maintaining the site in a favourable condition) or have a negative effect (set out in Section 10.3).

10.2 STOUR AND ORWELL ESTUARIES SPA

1. The Stour and Orwell estuaries qualify as a SPA under Articles 4.1 and 4.2 of the EC Wild Birds Directive because they support internationally and nationally important populations of the species set out below and summarised in Table 4.3. This qualification is based on high water bird counts from 1986/87 to 1990/91.

10.2.1 Stour Estuary SSSI and Orwell Estuary SSSI European interest features

1. This section summarises the European interest features of the Stour Estuary SSSI and Orwell Estuary SSSI. These interest features form the basis of the designation of the Stour and Orwell estuaries as a SPA.

[1] This section is unchanged from that published in the tidal works ES

Annex I species

2. The Stour Estuary SSSI and the Orwell Estuary SSSI contribute to the internationally important populations of the Stour and Orwell Estuaries SPA by supporting notable numbers of the following Annex I species:

- Golden plover.

Migratory species

3. The Stour Estuary SSSI and the Orwell Estuary SSSI contribute to the regularly occurring internationally important populations of the Stour and Orwell Estuaries SPA by supporting the following migratory species:

- Black-tailed godwit;
- Dark-bellied Brent goose;
- Dunlin;
- Grey plover;
- Redshank;
- Ringed plover;
- Shelduck; and,
- Turnstone.

Waterfowl assemblage

4. The Stour Estuary SSSI and the Orwell Estuary SSSI contribute to the internationally important waterfowl assemblage of the Stour and Orwell Estuaries SPA by supporting the following species:

- Wigeon;
- Pintail;
- Mute swan;
- Knot;
- Goldeneye;
- Curlew; and,
- Scaup.

10.2.2 Conservation objectives for the Stour and Orwell Estuaries SPA European interest features

1. Conservation objectives are defined in order to assist in the maintenance of the European interest features and to reflect the quality of the site in its designated state. In determining the potential effects of a project on a site's habitats and species, it is therefore necessary to determine how the sites conservation objectives (as defined by its features and attributes) are going to be affected.

2. The conservation objectives set out below have been defined by English Nature (2001) based on the European interest features of the Stour Estuary SSSI and Orwell Estuary SSSI. At a generic level, the conservation objectives for the Stour and Orwell Estuaries SPA are to maintain in 'favourable condition' the habitats, in particular intertidal mudflat and saltmarsh, of:

- The internationally important populations of the regularly occurring Annex I bird species; and,
- The internationally important populations of regularly occurring migratory bird species.

3. For the purposes of the Approach Channel Deepening (1998/2000) Mitigation and Monitoring Package (PDE and HR Wallingford, October 1998), the 'favourable conservation status' of the Stour and Orwell Estuaries SPA was defined as:

a) Intertidal habitats (i.e. saltmarsh, soft muddy and granular habitats) that, in combination, maintain the geomorphological form and function of the estuaries, in order that they are capable of sustaining the bird populations for which the site qualifies.

b) Populations of internationally/nationally important overwintering birds, based on the site's qualification, that is:

- Notable numbers of golden plover (under Article 4.1);
- Important populations of dunlin, shelduck, dark-bellied brent geese, redshank, grey plover, black-tailed godwit, turnstone, ringed plover, wigeon, knot, curlew, pintail, mute swans, goldeneye, and scaup (under Article 4.2).

4. In addition, the strategic aim of the Stour and Orwell Estuaries Management Plan (which is of relevance here) is to:

- Promote the sustainable use of the Stour and Orwell Estuaries through the management of human activity in a way that is compatible with the conservation of the estuarine ecosystem.

5. At a more detailed level, Tables 4.4 and 4.5 provide the measures of and targets for achieving and maintaining 'favourable condition' for the various relevant habitat features of the SPA based on its:

- Internationally important populations of regularly occurring Annex I bird species (Table 4.4); and,
- Internationally important populations of regularly occurring migratory species (Table 4.5).

10.3 IDENTIFICATION OF IMPACTS OF RELEVANCE TO THE DESIGNATED STATUS OF THE STOUR AND ORWELL ESTUARIES

1. A number of impacts have been identified within this report that are of direct relevance to the designated status of the Stour and Orwell Estuaries SPA, Ramsar site and SSSIs. These impacts derive from the effects of the proposed tidal works and dredging on the habitats that contribute towards supporting the interest features of the site or which, in themselves, constitute interest features. These habitats comprise intertidal mudflats and saltmarsh.

2. The impacts identified can be classified as either direct (i.e. those impacts that arise due to the footprint of the tidal works and dredging) or indirect (i.e. arising further afield due to changes to the flow regime and consequently sedimentary movements and estuarine morphology). Key direct impacts that relate to the designated status of the site comprise:

- The reclamation of approximately 65ha of intertidal habitat above CD in Bathside Bay (approximately 2.8ha of which is saltmarsh); and,
- The dredging of approximately 4ha of intertidal area above CD in the Gas House Creek area to the east of the bay to create an area for the relocation of moorings.

3. The conclusion of the EIA is that it is not possible to mitigate these impacts.

4. The indirect impacts of the proposed works that have the potential to affect the designated status of the site comprise:

- The one-off effect of decreased exposure of approximately 3ha of intertidal on spring tides at the intertidal:subtidal margin of the Stour and Orwell estuarine system (due to the effects of the proposed development on tidal propagation);
- The predicted increase in the rate of intertidal erosion system-wide, equating to 2.8ha/year; and,
- The increase in wave activity, particularly in the lower Stour estuary at the eastern end of Erwarton Bay.

5. The decreased exposure of the intertidal will occur on completion of the construction phase and cannot be mitigated. The predicted increase in the rate of intertidal erosion is an ongoing impact arising due to the trapping of sediment in the deepened channel, and subsequent dredging and offshore disposal, that would have propagated further up the estuarine system to be deposited (to a lesser or greater extent) in the intertidal area. By maintaining the offshore disposal of material arising from maintenance at present levels (which are the same as those of 1993) this impact will be mitigated.

6. The predicted increase in wave activity in the lower Stour estuary arises under certain conditions and is due to the reflection of waves from the

continuous hard face of the proposed quay at Harwich International Port and along Bathside Bay. This increased wave activity is expected to increase erosion of the intertidal area and saltmarsh, particularly in the east of Erwarton Bay. This impact will be mitigated within the SPA by the additional benefits of the sediment replacement programme.

7. A more detailed assessment of the potential for the proposed works to affect the designated status of the Stour and Orwell Estuaries SPA is provided below.

10.4 IMPLICATIONS FOR INTEGRITY

1. Table 10.1 is a simple matrix intended to link the information presented in Tables 10.2 and 10.3, which summarise the potential effects of the scheme during the construction and operational phases, with the favourable condition targets for the Stour and Orwell Estuaries SPA. It focuses on those environmental parameters that are important for maintaining the favourable condition of the site (e.g. benthic invertebrates); summarising the potential IMPACT of the scheme with reference to these parameters. The relevant favourable condition targets (Tables 4.4 and 4.5) that potentially will be affected (both adversely and beneficially) are then identified (numbers in Table 10.1 refer to various favourable condition targets in Tables 4.4 and 4.5). In Table 10.1 the potential impacts of the scheme have been described simply as either 'adverse' or 'beneficial', as the intention is to assess whether or not the impact contributes towards, or is in conflict with, the favourable condition target.

2. Having identified the favourable condition targets that could be affected by the scheme in Table 10.1, the favourable condition tables are repeated and, by way of an addition, the right-hand column in Tables 10.2 and 10.3 (which does not form part of English Nature's favourable condition tables) broadly indicates whether the target will be compromised by the impacts defined, or whether the scheme will contribute to maintaining the favourable condition of the site.

3. As demonstrated in Tables 10.2 and 10.3, favourable condition targets tend to be highly specific and, in many cases, are quantified. However, for many of the impacts expected to be associated with the scheme, it is difficult, if not impossible, to define the scale of the impact in a quantitative manner (at this stage) in order to be able to assess these impacts in relation to the targets. This will need to be determined through monitoring. However, it is possible to determine whether the scheme will have a positive or negative effect on the targets (and hence the measures and attributes) defined in the favourable condition tables. This information is intended to assist the competent authority in determining whether or not the scheme will compromise the conservation objectives for the Stour and Orwell Estuaries SPA.

Table 10.1 Summary of potential impacts (after mitigation) of the Bathside Bay development on favourable condition targets for the Stour and Orwell Estuaries SPA (listed in Tables 4.4 and 4.5)

PARAMETER	CONSTRUCTION PHASE		OPERATIONAL PHASE	
	IMPACT	Affected objective	IMPACT	Affected objective
Benthic invertebrates (intertidal)	MAJOR ADVERSE	4, 9	NO IMPACT	-
Benthic invertebrates (subtidal)	MODERATE ADVERSE	4,9	MINOR ADVERSE	-
Feeding waterfowl	MAJOR ADVERSE	2, 6, 7, 8, 9, 10, 11, 12	NEGLIGIBLE	-
Roosting waterfowl	MODERATE ADVERSE	2, 5, 6, 7, 8, 11	NEGLIGIBLE	-
Saltmarsh	MODERATE ADVERSE	3, 4, 5, 6, 8, 9, 11, 12	NEGLIGIBLE	-
Grazing marsh	NO IMPACT	-	NO IMPACT	-
Grassland	NO IMPACT	-	NO IMPACT	-

4. It is important to note that the effects of the construction and operational phases on the favourable condition targets identified in Tables 10.2 and 10.3 are not necessarily indicators of failure or success to meet the various targets. In order to determine an impact to this level of detail, a very detailed dataset would be required, based on a number of years of survey, in order to define a baseline which adequately describes, for example, benthic invertebrate community dynamics (i.e. the natural variability of the population over time). This would then allow potential impacts on such populations, in relation to the targets stated in Tables 10.2 and 10.3, to be defined and assessed more precisely. However, even with such a baseline, post-project monitoring would be required to determine with further confidence how the project has actually affected each favourable condition target (see Section 12).

10.5 CONCLUSION

1. Tables 10.2 and 10.3 indicate that the construction phase of the proposed development will give rise to a number of impacts that will be in conflict with a number of favourable condition targets for the Stour and Orwell Estuaries SPA. Although Bathside Bay is currently outside of the boundaries of the SPA, the approach adopted throughout this ES is to consider the bay as though it were part of the SPA. The bay is obviously an important part of the

estuarine system and it is considered that it is a contributory habitat to the nature conservation interest of the European site.

2. The conflicts identified in Tables 10.2 and 10.3 relate, in particular, to the decrease in intertidal area within the system and the decrease in biomass (and diversity and abundance) of intertidal invertebrate populations that support the waterfowl interest of the intertidal areas. Other conflicts arise through the loss of saltmarsh and the decrease in coverage of surface algae, such as *Enteromorpha* spp.. It should be remembered that the favourable condition tables have been developed to inform the monitoring of the favourable status of the European site. The tables have been used in this section as a basis for relating the potential impacts of the proposed development during the construction and operational phases of the works to the condition of the SPA. Therefore, caution should be adopted in linking the impacts of the proposed development to Tables 10.2 and 10.3, as the tables were not developed by English Nature for this purpose.

3. It is concluded, based on the information provided in Tables 10.2 and 10.3, and given the nature and scale of the tidal works, that the proposed development will have an adverse effect on the integrity of the Stour and Orwell Estuaries SPA due to:

- The loss of intertidal area (and hence feeding habitat for waterfowl) that contributes to the designated status of the SPA;
- The loss of roosting area (saltmarsh and raised sand and gravel areas) that support waterfowl during the high water period; and,
- Through the above two points, the potential for the proposed development to increase pressure for resources (food, space, etc.) within the remainder of the system.

Table 10.2 Favourable condition table for internationally important populations of regularly occurring Annex I bird species

IMPACT KEY

Indicates that impact of the scheme is in conflict with the favourable condition target
Indicates that impact of the scheme contributes towards the favourable condition target
Construction or operational phase of the scheme will not affect the favourable condition target

No.	Sub-feature	Attribute	Measure	Target	Comments	IMPACT [1]
1	Intertidal mudflat and saltmarsh	Extent and distribution of habitat	Area (ha)	No decrease in extent from an established baseline	Roosting and feeding areas for golden plovers	Construction
						Operation
2	Intertidal mudflat and saltmarsh	Disturbance	Reduction or displacement of birds	No significant reduction in numbers or displacement of wintering birds from an established baseline, subject to natural change	All qualifying species	Construction
						Operation
3	Intertidal mudflat and saltmarsh	Absence of obstructions to view lines	Openness of terrain unrestricted by obstructions, measured periodically (frequency to be determined)	No increase in obstructions to existing bird view lines, subject to natural change	Golden plovers require unrestricted views over >200m to allow early detection of predators when feeding and roosting	Construction
						Operation

[1] Addition to the favourable condition tables provided by English Nature (2001) for the purposes of this assessment

Table 10.2 (continued)

4	Intertidal mudflat and saltmarsh	Food availability	Presence and abundance of marine worms, molluscs and crustaceans measured periodically (frequency to e determined)	Presence and abundance of prey species should not deviate significantly from an established baseline, subject to natural change	*Nereis, Arenicola* and *Notomatus* are important for golden plover	Construction
						Operation
5	Saltmarsh	Vegetation characteristics	Open, short vegetation or bare ground predominating in areas used for roosting, measured periodically (frequency to be determined)	Vegetation height throughout areas used for roosting should not deviate significantly from an established baseline, subject to natural change	Vegetation height of <10cm is required throughout areas used for roosting by golden plovers	Construction
						Operation

Table 10.3 Favourable condition table for internationally important populations of regularly occurring migratory species

No.	Sub-feature	Attribute	Measure	Target	Comments	IMPACT
6	Saltmarsh and intertidal mudflat	Extent and distribution of habitat	Area (ha) measured once during reporting cycle	No decrease in extent of habitats, from an established baseline subject to natural change	Saltmarsh, intertidal mudflats and shallow coastal waters are all important feeding and roosting habitats	Construction
						Operation
7	Saltmarsh and intertidal mudflat	Disturbance	Reduction or displacement of birds	No significant reduction in numbers or displacement of wintering birds from an established baseline, subject to natural change	All qualifying species	Construction
						Operation

Table 10.3 (continued)

No.	Sub-feature	Attribute	Measure	Target	Comments	IMPACT
8	Saltmarsh and intertidal mudflat	Absence of obstructions to view lines	Open areas relatively free of obstruction, measured periodically (frequency to be determined)	No increase in obstructions to existing view lines	Generally waterfowl require unrestricted views of >200m to allow early detection of predators when feeding or roosting. Dark-bellied Brent geese require unrestricted views over >500m	Construction Operation
9	Saltmarsh and intertidal mudflat	Food availability	Presence and abundance of intertidal invertebrates, measured periodically (frequency to be determined)	Presence and abundance of prey species should not deviate significantly from an established baseline, subject to natural change	Important prey species include *Macoma* for bar tailed godwit, dunlin, redshank; *Cardium [Cerastoderma]* for bar-tailed godwit; *Nereis* for bar-tailed godwit, dunlin, grey plover, redshank, shelduck; *Hydrobia* for dunlin, redshank, shelduck; *Arenicola* for grey plover; *Gammarus* for grey plover and turnstone; tubifex worms and *Pisidium* for ringed plover; *Corophium* for shelduck; *Balanus, Carcinus* and *Littorina* for turnstone	Construction Operation

Table 10.3 (continued)

No.	Sub-feature	Attribute	Measure	Target	Comments	IMPACT
10	Saltmarsh and intertidal mudflat	Food availability	Presence and abundance of mud-surface plants and green algae, measured periodically (frequency to be determined)	Presence and abundance of food species should not deviate significantly from an established baseline, subject to natural change	*Zostera* and *Enteromorpha* are important for dark-bellied Brent geese	Construction
						Operation
11	Saltmarsh	Vegetation characteristics	Open, short vegetation or bare ground predominating in areas used for roosting and short vegetation predominating in areas used for feeding, measured periodically (frequency to be determined)	Vegetation height throughout areas used for roosting and feeding should not deviate significantly from an established baseline, subject to natural change	Vegetation height of <10cm is required throughout roosting areas for waders. Vegetation height of <10cm is required throughout feeding areas for dark-bellied Brent geese	Construction
						Operation
12	Saltmarsh	Food availability	Presence and abundance of soft-leaved plants, measured periodically (frequency to be determined)	Presence and abundance of food species should not deviate significantly from an established baseline, subject to natural change	*Spergularia, Puccinellia, Triglochin, Aster tripolium, Plantago* and *Salicornia* spp are important for dark-bellied Brent geese	Construction
						Operation

Source: Adapted from English Nature's favourable condition tables for the Stour Estuary SSSI and the Orwell Estuary SSSI