

8

Flora and Fauna

8.1

Introduction and methodology

Information on the ecology of the study area is based on:

- citations and objectives provided by English Nature (2001) for the Solent European Marine Site;
- meeting with English Nature in March 2005;
- wetland bird surveys undertaken by Cresswell Associates between December 2004 and March 2005;
- intertidal invertebrate surveys by Emu Limited in January 2005;
- benthic surveys in May 2005;
- ecological documents including Biodiversity Action Plans (BAP);
- Extended Phase 1 Ecological Survey (IEA, 1995) and Protected Species Surveys by Halcrow scientists in April and June 2005.

Impacts on the ecological interest of the site were evaluated using the guidelines for ecological evaluation and impact assessment (Regini 2000). These define the significance of an ecological impact as a function of the value of the feature being affected and the magnitude of the impact. Guidance on 'resource value', 'impact magnitude' and 'impact significance' is provided in Tables 6.1 to 6.3.

It is possible to relate the impact significance to legislation and planning policy.

- a residual impact that is of major significance would only be permitted if there are circumstances of over-riding national social or economic importance. Under these circumstances it is necessary to demonstrate that all alternatives have been examined and the proposed option has the least adverse impact. Compensation of equivalent value would normally be required.
- a residual impact that is of moderate significance would only be permitted if there are circumstances of over-riding county or metropolitan social or economic importance and there is no viable alternative which has less significant adverse impacts. Compensation of equivalent value would normally be required.

- a residual impact that is of minor significance, the development should not normally be constrained by ecological issues. Compensation of equivalent value would normally be required.
- a residual impact that is of negligible significance, the development should not normally be constrained by ecological issues. Compensation of equivalent value would not normally be required.

Mitigation measures or activities should be implemented to reduce or ameliorate potential adverse impacts of the scheme on wildlife interest or provide some compensation, while maximising protection/enhancement of the study area for wildlife. Mitigation measures can be based on:

- **avoidance** through re-location, re-design or changes in the development programme;
- **reduction** involving lessening the severity of an impact which cannot be avoided; and
- **compensation** through habitat creation or enhancement.

8.2

8.2.1

Baseline conditions

Nature Conservation Designations

Figures 8.1 and 8.2 show the existing nature conservation designations within the area of the proposed scheme. The various nature conservation designations present are defined as follows:

- (a) Statutory International Importance
 - Special Area of Conservation (SAC) – Designated under the European Union Habitats Directive (92/43/EEC), implemented in Britain by the Conservation (Natural Habitats & c.) Regulations 1994.
 - Special Protection Area (SPA) – Designated under the European Union Birds Directive (79/409/EEC), implemented in Britain by the Wildlife and Countryside Act 1981.
 - Ramsar Site – Designated in accordance with the 1971 Convention on Wetlands of International Importance especially as Waterfowl Habitat (Ramsar Convention).
- (b) Statutory National Importance

- National Nature Reserve (NNR) – Designated under Section 19 of the National Parks and Access to the Countryside Act 1949, or Section 35 of the Wildlife and Countryside Act 1981. The areas declared as NNRs represent some of the most important natural and semi-natural ecosystems in Great Britain and are managed primarily for nature conservation.
- Sites of Special Scientific Interest (SSSI) - Designated under Section 28 of the Wildlife and Countryside Act 1981 (as amended by the Countryside and Rights of Way Act 2000), SSSIs represent some of the best examples of Britain's natural features by reason of their flora, fauna, geological or physiographical features. SSSIs are of national or regional nature conservation or geological importance and their boundaries include terrestrial areas and marine intertidal areas to a seaward limit of Mean Low Water (MLW). All terrestrial SAC and SPAs are also designated as SSSIs.

(c) Statutory Regional or Local Importance

- Sites of Importance for Nature Conservation (SINC)

Of particular significance to coastal management in relation to SPAs and SACs are the Habitats Regulations 1994, which implement the Habitats Directive into UK law.

The number of nature conservation designations (Figures 8.1 and 8.2) reflects the ecological value of the study area.

Solent Maritime Special Area of Conservation (SAC)

The Solent Maritime SAC is located on both sides of the Solent and is designated principally for its marine, littoral and sub-littoral features, including the following: -

Estuaries: The Solent encompasses a major estuarine system on the south coast of England and its inlets are unique in Britain and Europe for their hydrographic regime and habitat complexity. The attributes of this designation are shingle communities, reedbed communities, saltmarsh communities, intertidal mudflat and sandflat communities, intertidal mixed sediment communities and subtidal sediment communities.

Annual vegetation of drift lines: This habitat occurs along the strandline of shingle beaches and is considered to support a significant presence within the Solent Maritime SAC and is rare as its total extent in the United Kingdom is estimated to be less than 100ha.

Atlantic salt meadows: The Solent contains the second-largest aggregation of Atlantic salt meadows in south and south-west England. As a whole the site is less truncated by man-made features than other parts of the south coast and shows rare and unusual transitions to freshwater reedswamp and alluvial woodland as well as coastal grassland. The main attributes of this interest feature are low marsh communities, mid-marsh communities, upper marsh communities and transitional high marsh communities.

Salicornia and other annual colonising mud and sand: The Solent supports a significant presence of annual *Salicornia* saltmarsh communities and *Suaeda maritime* saltmarsh communities.

Cordgrass swards (Spartinion): Solent Maritime is the only site for smooth cord-grass *Spartina alterniflora* in the UK and is one of only two sites where significant amounts of small cord-grass *Spartina maritima* communities are found. It is also one of the few remaining sites for Townsend's cord-grass *Spartina × townsendii* communities. The Solent is one of only two known outstanding localities in the UK and is considered to be rare as its total extent in the UK is estimated to be less than 100ha.

Mudflats and sandflats not covered by seawater at low tide: The Solent is considered to support a significant presence of intertidal mud communities, intertidal muddy sand communities, intertidal sand communities and intertidal mixed sediment communities.

Sandbanks slightly covered by seawater at all times: The Solent supports a significant presence of subtidal sands and gravels, subtidal muddy sand and subtidal eelgrass *Zostera marina* beds.

Coastal Lagoons: The Solent is considered to support a significant presence of this interest feature.

Perennial vegetation of stony banks: The Solent is considered to support a significant presence of this interest feature.

*Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes):* The Solent is considered to support a significant presence of shifting dunes with marram.

Vertigo moulinsiana (Desmoulin's Whorl Snail): This Annex II species is present as a qualifying feature of the SAC (but not a primary reason for selection of the site) and is not known to be present within the study area.

Solent and Southampton Water Special Protection Area (SPA)

Solent and Southampton Water SPA, shown on Figure 8.1 (classified in 1998 and covering an area of 5506ha), qualifies under Article 4.1 of the Birds Directive in that it supports:

- Internationally important breeding populations of regularly occurring Birds Directive Annex 1 species: sandwich tern *Sterna sandvicensis*, common tern *Sterna hirundo*, little tern *Sterna albifrons*, roseate tern *Sterna dougallii* and Mediterranean gull *Larus melanocephalus*; and
- Internationally important wintering populations of the Birds Directive Annex 1 species Black-tailed Godwit *Limosa limosa islandica*, Dark-bellied Brent Goose *Branta bernicla bernicla*, Ringed Plover *Charadrius hiaticula* and Teal *Anas crecca*.

The SPA is also designated under Article 4.2 of the EU Birds Directive in that it regularly supports:

- 20,000 waterfowl;
- Over winter, 53,948 individual waterfowl (5 year peak mean 1991/2 - 1995/6) including: Gadwall *Anas strepera*, Teal *Anas crecca*, Ringed Plover *Charadrius hiaticula*, Black-tailed Godwit *Limosa limosa islandica*, Little Grebe *Tachybaptus ruficollis*, Great Crested Grebe *Podiceps cristatus*, Cormorant *Phalacrocorax carbo*, Dark-bellied Brent Goose *Branta bernicla bernicla*, Wigeon *Anas penelope*, Redshank *Tringa totanus*, Pintail *Anas acuta*, Shoveler *Anas chryseata*, Red-breasted Merganser *Mergus serrator*, Grey Plover *Pluvialis squatarola*, Lapwing *Vanellus vanellus*, Dunlin *Calidris alpina alpina*, Curlew *Numenius arquata* and Shelduck *Tadorna tadorna*.
- The site comprises a series of estuaries and harbours with extensive mud-flats and saltmarshes together with adjacent coastal habitats including saline lagoons, shingle beaches, reedbeds, damp woodland and grazing marsh. The mud-flats support beds of *Enteromorpha* spp. and *Zostera* spp. and have a rich invertebrate fauna that forms the food resource for the

estuarine birds. In summer, the site is of importance for breeding seabirds, including gulls and four species of terns. In winter, the SPA holds a large and diverse assemblage of waterbirds, including geese, ducks and waders. Dark-bellied Brent Goose *Branta b. bernicla* also feed in surrounding areas of agricultural land outside the SPA.

Table 8.1 shows the qualifying interest of the SPA.

Table 8.1 *Qualifying Interest of Special Protection Area*

Article of Directive	Season	Species	Population	Supporting Habitat
Solent and Southampton Water SPA				
Article 4.1 (Annex 1)	Breeding	Mediterranean Gull	2 pairs (8.2-13.9% of British)	Sand and shingle, saltmarsh, intertidal mudflats and sandflats and shallow coastal waters
		Sandwich tern	231 pairs (1.7% of British)	
		Common tern	267 pairs (2.2% of British)	
		Little tern	49 pairs (2% of British)	
		Roseate tern	2 pairs (3.1% of British)	
Article 4.1 (Annex 1)	Wintering	Dark-bellied brent goose	7,506 birds (2.5% of Western Siberian.European)	Saltmarsh, intertidal mudflats and sandflats, boulder and cobble shores and mixed sediment shores.
		Teal	4,400 birds (1.1% of North-west European)	
		Ringed plover	552 birds (1.1% of European/North-west African)	
		Black-tailed godwit	1,125 birds (1.6% of Icelandic)	
Article 4.2 Waterfowl assemblage	Wintering		51,361 individual birds (21,401 wildfowl, 29,960 waders)	Saltmarsh, intertidal mudflats and sandflats, boulder and cobble shores and mixed sediment shores.

The key habitats on the site for which English Nature has defined conservation objectives are:

- sand and shingle
- shallow coastal waters
- saltmarsh

- intertidal mudflats and sandflats
- boulder and cobble shores
- mixed sediment shores

Solent and Southampton Water Ramsar Site

The Solent and Southampton Water Ramsar site (see Figure 8.1), listed in 1998 is of international importance because it:

- Regularly supports 20,000 waterfowl;
- Regularly supports 1% of the individuals in a population of waterfowl (Ramsar site selection criterion 3c): Teal *Anas crecca*, Ringed Plover *Charadrius hiaticula*, Black-tailed Godwit *Limosa limosa islandica*, Dark-bellied Brent Goose *Branta bernicla bernicla*, sandwich tern *Sterna sandvicensis*, common tern *Sterna hirundo*, little tern *Sterna albifrons* and roseate tern *Sterna dougallii*.
- qualifies under Criterion 1a of the Ramsar Convention being one of very few major sheltered channels between a substantial island and mainland in European waters, exhibiting an unusual strong tidal flow and has long periods of slack water at high and low tide. The site contains many good and representative examples of wetland habitats characteristic of the biogeographical region including saline lagoons, saltmarshes, estuaries and reefs.
- supports an appreciable assemblage of rare, vulnerable or endangered species or subspecies of plant or animal, or an appreciable number of individuals of any one or more of these species (Ramsar site selection criterion 2a). These are:
 - (i) 39 British Red Data Book (RDB) invertebrates have been recorded including the following Endangered species: the micro-moth *Elachista littoricola*, the ground beetle *Drypta dentata*, the rove beetle *Staphylinus caesareus*, and the water beetles *Gyrinus natator* and *Paracymus aeneus*.
 - (ii) The following eight British RDB plants have also been recorded within the site: dwarf spike-rush *Eleocharis parvula*, little robin Geranium *purpureum forsteri*, slender birdsfoot trefoil *Lotus angustissimus*, Hampshire purslane *Ludwigia palustris*, yarrow broomrape *Orobanchepurpurea*, smooth cord-grass *Spartina alterniflora* and foxtail stonewort *Lamprothamnium papulosum*.

North Solent National Nature Reserve

The 820ha site comprises coastal habitats (open shore, mudflats, saltmarsh and coastal grazing marsh) woodland, lowland grassland and lowland heathland. There are also low, sandy cliffs of geological interest.

North Solent Site of Special Scientific Interest (SSSI)

The 1,188ha site extends approximately 13km north of the shoreline of the West Solent and includes the parallel valleys of the Beaulieu River, Dark Water and the Stanswood Valley. The site comprises a diversity of habitats ranging from coastal mudflats/saltmarshes, shingle beaches and spits, fresh and brackish marshland and pools, maritime grassland, species rich neutral and acidic grassland, valley mire, heathland and a range of ancient semi-natural woodlands. These habitats support rich flora and insect fauna with rare or diminishing species, and substantial populations of over-wintering or migratory birds.

Between the shingle ridges at Gravelly Marsh and to the east at Lepe Beach, brackish pools and lagoons occur, which support a highly specialised invertebrate community.

This SSSI is also important for its geological exposures at Stone Point and Calshot Cliffs (section 12 'Soils, Geomorphology and Geology').

Approximately 98.13% of the North Solent SSSI meets the Public Service Agreement (PSA) target and approximately 86.26% of the SSSI is considered by English Nature to be in favourable condition (English Nature 2005).

Within the study area, the littoral rock at Lepe foreshore (SSSI unit 5) is considered to be in unfavourable condition (no change). At this location, there is considerable visitor pressure and the area is heavily dug for bait. Both activities may be denying waterfowl the opportunity to feed and roost.

Sites of Importance for Nature Conservation (SINC)

- Lepe Point Meadow – NGR SZ 4550 9880 (Figure 8.1)
This is a small, semi-improved acid grassland situated on a gently sloping hilltop and hillside, on the immediate northern side of the site of Lepe Point. The site is currently unmanaged. Details of floral communities present within this site are provided in Appendix B.
- Gurnard Cliff West (C14) – NGR 465 950; 9.09ha (Figure 8.2)

This SINC comprises a series of parallel slumped cliffs which are largely un-vegetated but support pioneering plants such as Coltsfoot, Giant Horsetail, and Tall Melilot. The more mature cliff slumps are dominated locally by Wood Small-reed and Common Reed, in association with species more commonly found on calcareous grassland, such as Yellow-wort, Restharrow, and Common Centaury. The oldest slumps are dominated by mixed scrub with Birch and Alder in wetter areas, and Gorse, Hawthorn and Privet in the drier.

- Gurnard Cliff East Site (C235) – NGR 477 956 (Figure 8.2)

This is an area of secondary woodland with older woodland at the foot of the cliff with Field Maple, Hazel, Early Purple Orchid and Wood Sedge. Dormouse is recorded in the area. The site includes a narrow belt of coastal grassland with Coltsfoot, Glaucous Sedge, Common Reed and Wood Small-reed. The coastline is eroding with Bembridge limestone blocks on the shore.

- Hornhill Copse (C154) - NGR 469 950 (Figure 8.2)

This is a 1.4ha area of ancient semi-natural broad-leaved woodland supporting a population of red squirrels.

- Gurnard Marsh (C236) – NGR 474 953; 7.86ha site (Figure 8.2)

Gurnard Marsh consists of two sub-sites as follows: -

- an area of upper grazed marsh adjoining Gurnard Luck including an area of semi-improved brackish pasture dominated by Sea Club-rush and Sea Couch, and a stand of the nationally scarce Divided Sedge
- Gurnard Meadow consists of herb-rich grassland on a complex soil including Alluvium, Osborne and Headon Beds, and Bembridge Limestone.

Sensitive Marine Areas

Sensitive Marine Areas (SMA) are nationally important sites around the coast that receive a cautious and detailed management approach. The status aims to highlight areas important for marine nature conservation.

The Solent and Isle of Wight SMA was established in 1994, and is a non-statutory designated area, which extends from Pagham Harbour in the east to Hurst Spit in the west and serves to highlight areas of particular maritime nature conservation interest. The SMA demonstrates unusual physical conditions in its strong tidal currents in the Solent channel, harbour entrances and at headlands, and a wide

range of wave exposures salinities, water temperatures and sediment and rock types, combined with a diverse range of habitats and communities, some of them particularly rich. Several biotopes that occur within this SMA are considered to be nationally important including communities with piddocks in soft chalk, clay or peat; *Zostera* beds on muddy sands; and communities including the bivalve *Mya arenaria* and polychaetes in muds and muddy gravels under conditions of reduced salinity. It is also significant for the internationally important numbers of wildfowl and waders found primarily in the shallow harbours.

8.2.2

Species

(a) Birds

Legislation

Birds are protected by the Wildlife and Countryside Act, 1981 (and subsequent amendments). This legislation makes it an offence to intentionally or recklessly:

- (i) kill, injure or take any wild bird;
- (ii) take, damage or destroy the nest of any wild bird while it is in use or being built;
- (iii) take or destroy the egg of any wild bird; and
- (iv) disturb any wild bird listed on Schedule 1 of the Act while it is nest building or is at (or near) a nest with eggs or young; or disturb the dependant young of such a bird.

Wintering Bird Surveys

The use of the foreshore and adjacent wetland habitat by wintering waterbirds at West Gurnard (Isle of Wight) and Lepe (Hampshire) was undertaken by Cresswell Associates (2005) between December 2004 and March 2005. The aim of the study, which comprised a desk study and field surveys, was to assess the conservation value of the two survey areas for waterbirds.

In total 27 species were recorded during the surveys at Lepe, with birds mainly using the foreshore and the adjacent inland wetland areas to the east and west of Lepe Country Park. Overall, the areas of the foreshore that were most heavily used by wetland birds included the spit and the entire foreshore to the west of the spit.

The foreshore at Gurnard supported far fewer birds than Lepe, which is likely to be a result of the smaller area of exposed mud available at low

tide. A total of 15 species were recorded using the foreshore at both high and low tide. Overall, the majority of the birds using the foreshore tended to show preference for the area of foreshore between the south-western edge of Gurnard Cliff and Gurnard Bridge.

The study also noted that the results of a Greater Solway bird count in 1999 showed that Lepe and possibly Gurnard were not the most important areas for any of the species recorded.

Hampshire Ornithological Society Bird Data

Information on bird species at Lepe was obtained from Hampshire Biodiversity Information Centre (provided by Hampshire Ornithological Society). A list of the species present at Lepe Country Park and Lepe Foreshore is shown in Appendix C.

Species recorded within the study area include Schedule 1 species (birds protected under the Wildlife and Countryside Act by special penalties at all times) such as red-throated, black-throated and great northern diver, slavonian grebe, black-necked grebe, bittern, common and velvet scoter, red kite, marsh harrier, plover, green sandpiper, curlew, marsh harrier, buzzard, osprey, hobby and peregrine falcon.

(b) Reptiles

The four common species of reptiles (slow worms, common lizards, grass snakes and adders) are afforded protection through their inclusion in Schedule 5 of the Wildlife and Countryside Act 1981 (and amendments). The relevant parts of the legislation, with regard to this project, make it an offence to intentionally kill or injure reptiles.

Targeted survey work was not undertaken, however an area of grassland and scrub adjacent to the electric sub-station and south of the drill rig site at Lepe holds some potential as a reptile habitat. As this area will not be affected by the proposals or the temporary works, a survey has not been undertaken.

It was considered that there may be a low potential for reptiles in the area of scrub and ruderal herbs to the north of the field adjacent to Cliff Farm, due to a mosaic of habitats offering favourable conditions. As this area will not be affected by the proposals, a survey has not been undertaken.

(c) Mammals

Badgers

Badgers receive protection under the Badgers Act 1973, the Wildlife and Countryside Act 1981 (and subsequent amendments), and the Protection of Badgers Act 1992. Under this legislation it is an offence to knowingly interfere with a badger sett unless a license has been obtained. Those offences, which are applicable to this project include:

- To wilfully kill, injure, take, possess or cruelly ill-treat a badger, or to attempt to do so;
- To damage or destroy setts;
- To obstruct access to, or any entrance of, a sett; or
- To disturb a badger whilst occupying a sett.

A badger survey was undertaken by Halcrow in April 2005

No signs of badger were identified within the drill rig sites although a small badger latrine was observed along the Isle of Wight coastal footpath to the north of Cliff Farm. Best practice dictates that in the event of the unanticipated discovery of a potential sett the following actions should be undertaken:

- the Contractor should immediately stop all work within 30m;
- specialist advice should be sought; and
- English Nature should be consulted in order to identify a suitable way forward.

Red Squirrels

The red squirrel is protected under Schedules 5 and 6 of the Wildlife and Countryside Act 1981. Under the Act, the species must not be intentionally killed or injured and active drays should not be disturbed. It is one of the priority species listed by the Government on the UK Biodiversity Action Plan. There is also a specific Red Squirrel Species Action Plan for the Isle of Wight, which has the aim of conserving and enhancing the squirrel population by preserving and increasing woodland and the links between woodlands.

Red squirrels have been sighted within many parts of the study area on the Isle of Wight side including Hornhill Copse, a broad-leaved woodland area

lying adjacent to the drill rig site at Gurnard (Figure 8.2). Hedgerows connected to the woodland will act as a good linear connection to other sites used by red squirrel.

Bats

During the Phase 1 surveys, no evidence of bats roosting was recorded at the drill rig sites.

At Gurnard, a mature oak was recorded in a hedgerow adjacent to Cliff Farm which supported cracks and crevices that may have a low potential in supporting roosting or hibernating bats. The southern drill rig site supported mature oak trees either side of the main access into the site. No cracks or crevices were observed, however a precautionary approach should be adopted. The hedgerows and fields provided suitable foraging habitat, and adjacent woodland good roosting sites.

No potential roosting or hibernating sites were observed on the mature pedunculate oak trees within the hedgerow to the north of the drill rig site at Lepe and this area will not be affected by the proposed scheme.

(d) Amphibians

Common frogs and toads are afforded limited protection under the Wildlife and Countryside Act 1981 (and amendments) and this is unlikely to be relevant to activities being undertaken as part of this project.

The proximity of the proposed working areas to small bodies of water indicates that the study area has limited potential to fall within the terrestrial habitat of amphibian species.

(e) Marine species

Benthic Communities

A significant shallow sub-tidal and UK biodiversity species present in the Solent are a wide range of eelgrass beds (*Zostera spp*). These species, which stabilise the substratum and provide an attachment for other species, are considered to be scarce, and are protected under the EC Habitats Directive.

Marine Mammals

Twenty-five cetacean species have been recorded in British Waters, of which eleven are encountered regularly (Doody et al 1996). Regular visitors to the Solent include the harbour porpoise, dolphin and seals.

Intertidal Invertebrates

Surveys of the intertidal areas were undertaken by Emu Ltd in 2005 to gather information such that biotope descriptions can be made. The status and sensitivity of the biotopes could then be assessed as suitable habitats for feeding, nesting and roosting birds.

The methods employed consisted of biotope mapping based on Marine Nature Conservation Review techniques. Full species lists together with ecological and physical observations and photographic records were also compiled (Emu Ltd 2005).

The most important biotopes recorded in this study included the mixed sediment shore at Lepe (*Hediste diversicolor* in littoral gravely muddy sand and gravely sandy mud' code: LS.LMx.GvMu.HedMx and 'Cirratulids and *Cerastoderma edule* in littoral mixed sediments' code: LS.LMx.Mx.CirCer) which occupied the largest intertidal mid-and low shore area. These biotopes are important for providing food source to several species of birds including redshank, avocet, grey plover, bar-tailed godwit, curlew and curlew sandpiper.

At Gurnard Bay, littoral rock biotopes (*Fucus spiralis* on sheltered variable salinity upper eulittoral, code LR.LLR.FVS.FspiVS; '*F. serratus* and large *Mytilus edulis* on variable salinity lower eulittoral rock' code: LR.LLR.FVS.FserVS; '*F. serratus* and under boulder fauna on lower eulittoral boulders', code: LR.MLR.BF.FserBO) accounted for the largest area surveyed. The importance of these biotopes lies in providing feeding habitat to ringed plovers and turnstone. They also provide food sources for a large number of migrating and over wintering birds.

Benthic Species

Subtidal studies comprising a biotope mapping survey of the intertidal area between the northern and southern 'break-out' points of the proposed pipelines were undertaken by Emu Ltd in May 2005. The study was

designed to establish the current status of the biological communities along the corridor of the pipeline.

The full results of the surveys will be forwarded as soon as they become available, however an interim report (Appendix D) has been prepared based on the collection of data from diving activities and observational records from grab samples.

The most widely spread sediment type encountered during the survey was small cobbles, with pebbles, gravel and coarse sand.

A total of 84 faunal species were identified during the survey. The most frequently occurring species were *Pomatoceros* sp (generally *P. triqueter*), *Sabellaria spinulosa*, *Balanus* sp. and Bryozoa indet, which were particularly evident in the central section of the marine area. The occurrence of *Sabellaria spinulosa* probably corresponds with areas peripheral to mobile, current-swept sand, which the *Sabellaria* are able to consolidate. These consolidated areas are also able to support more diverse communities of epifauna, including more cryptic crustacean species.

Large numbers of prosobranchs were also recorded and their presence is likely to be due to seasonal mobility. It is apparent that for some species the area is favourable for egg laying and as a consequence is valuable as a scavenging area for other prosobranchs (Emu Ltd 2005).

PomB was the most widespread of the biotopes; several of these crossed over with SspiMx where more sand was found.

Sea grass (*Zostera*) is known to have occurred off Calshot, Thorness Bay, the entrance to the Medina and off Lee-on-Solent. None was found during the survey of the pipeline route.

Shellfish

The distribution of shellfisheries in the Solent and protection of shellfish is described in section 9 'Fisheries'.

A native oyster typically cements itself to the substratum on metamorphosis so loss of the substratum would cause death of the population. The native oyster does have a pelagic larval phase which can

disperse over large distances to re-establish populations. It is also highly fecund and spawns regularly. However, dominance of other species such as *Crepidula fornicata* following loss of the oyster population can prevent re-establishment, through changes to the environment and competition. Because the adults are cemented to the substratum, adult immigration is not possible. Native and introduced predators can also restrict re-establishment. Habitat management may be required in order to allow oysters to re-colonize an area.

8.2.3

Biodiversity Action Plan (BAP)

Priority species included in the Hampshire, Isle of Wight and UK Biodiversity Action Plans (BAP) that may be represented in the area are shown in Table 8.2.

Table 8.2 *Hampshire, Isle of Wight and UK BAP Priority Species*

Hampshire and UK BAP Species	Latin Name	Locations	Hampshire/Isle of Wight/UK BAP Target
Seed-Eating Farmland Birds			
Linnet	<i>Carduelis cannabina</i>	Hampshire	Protect and increase the distribution and population and maintaining existing populations.
Skylark	<i>Alauda arvensis</i>		
Stone Curlew			
Grey Partridge	<i>Perdix perdix</i>		
Tree Sparrow	<i>Passer montanus</i>		
Yellowhammer	<i>Emberiza citrinella</i>		
Birds of Wet Grassland			
Lapwing	<i>Vanellus vanellus</i>	Hampshire	Protect and increase the breeding population and maintaining existing populations and ranges of birds breeding on wet grassland.
Common snipe	<i>Gallinago gallinago</i>		
Redshank	<i>Tringa tetanus</i>		
Yellow wagtail	<i>Motacilla flava</i>		
Shorebirds: scarce breeding birds			
Mediterranean gull	<i>Larus melanocephalus</i>	Solent	Protect and increase populations utilising Hampshire's coastal habitat, and improve understanding/awareness.
Roseate tern	<i>Sterna dougallii</i>		
Little tern	<i>Sterna albifrons</i>		
Dark-bellied brent goose	<i>Brenta bernicla</i>		Not yet published

Shorebirds: wintering and migrant wading birds			
Ringed plover	<i>Charadrius hiaticula</i>	Hampshire	Protect and increase populations utilising Hampshire's coastal habitat, and improve understanding/awareness.
Grey plover	<i>Pluvialis squatarola</i>		
Knot	<i>Calidris canutus</i>		
Sanderling	<i>Calidris Alba</i>		
Dunlin	<i>Calidris alpina</i>		
Black-tailed godwit	<i>Limosa limosa</i>		
Bar-tailed godwit	<i>Limosa lapponica</i>		
Redshank	<i>Tringa totanus</i>		
Turnstone	<i>Arenaria interpres</i>		
Mammals			
Red squirrel	<i>Sciurus vulgaris</i>	Isle of Wight	Maintain and enhance current populations and re-establish populations where appropriate
European otter	<i>Lutra lutra</i>	Hampshire/ Isle of Wight	Maintain/expand existing otter populations. By 2010, restore breeding otters to all catchments and coastal areas where they have been recorded since 1960
Pipistrelle Bat	<i>Pipistrellus pipistrellus</i>	Hampshire/ Isle of Wight	Maintain the existing population size, geographical range of Pipistrellus pipistrellus and Pipistrellus pygmaeus.
Barbastelle bat	<i>Barbastella barbastellus</i>	Hampshire	Maintain the known range and size of the known populations. Increase the total population size of this species in the UK.
Dormouse	<i>Muscardinus avellanarius</i>	New Forest/ Isle of Wight	Maintain/enhance dormouse populations. Re-establish self-sustaining populations in at least 5 counties where they have been lost.
Water vole	<i>Arvicola terrestris</i>	New Forest	Maintain distribution and abundance, restore and ensure management of watercourses and wetlands.

Amphibians and Reptiles			
Great Crested Newt	<i>Triturus cristatus</i>	Hampshire	Establish populations in 100 appropriate unoccupied sites each year from 1995 to 2005, ensuring that the species is found in sites that are representative of the range of habitats used and the geographic distribution. Maintain the geographical range of the great crested newt. Maintain the viability of existing great crested newt populations.
Natterjack toad	<i>Bufo calamita</i>	Hampshire	Maintain the size of all existing populations at known or presumed 1995 levels. Where appropriate, restore each population to its size in the 1970s. (The 1970s level was chosen as a date when baseline information was available, and represents a recent historic date for which the targets should be both achievable and measurable). Re-establish five further populations between 1995 and 2005 within the species' former range. (A target of five sites was selected since this represents an approximate increase of 10%, and it is an achievable target. There may be difficulties selecting more than five sites over the next five years; more may divert conservation attention away from the need to enhance existing populations).
Insects, Other Invertebrates and Molluscs			
European flat oyster	<i>Ostrea edulis</i>	Solent	Maintain the current range of the oyster around the UK coastline and, where possible, increase the population and the number of viable oyster beds.
Hornet robberfly	<i>Asilus crabroniformis</i>	Hampshire	Ensure the continued survival of the species
Southern Damselfly	<i>Coenagrion mercuriale</i>	New Forest, Hampshire	Ensure all UK populations are in favourable condition, maintain the (1995) UK range preventing further loss of sites in England and Wales and increase the (1995) UK range by encouraging re-establishment of 5 former sites by 2005
Noble chafer	<i>Gnorimus nobilis</i>	New Forest, Hampshire	Maintain/enhance populations at all known sites.
Pearl-bordered Fritillary	<i>Boloria ephrosyne</i>	Isle of Wight	Halt the current decline by the year 2005, through maintaining viable networks of populations in core areas of distribution. In the long-term, re-introduce the species to at least 3 sites per previously occupied county, through habitat restoration throughout the butterfly's former range.
Glanville fritillary	<i>Melitaea cinxia</i>	Isle of Wight	Maintain viable networks of populations throughout its current range, to conduct research on the distribution and ecology of the species and to

			continue the monitoring programme to enable its effective conservation.
Ross Worm	<i>Sabellaria spinulosa</i>	Solent	Maintain the extent, distribution and quality of <i>S. spinulosa</i> reefs in the UK. Establish and ensure necessary habitat conditions required for the re-establishment of <i>S. spinulosa</i> reef where formerly found, for example in the Essex Estuaries and Morecambe Bay.
Medicinal Leech	<i>Hirudo medicinalis</i>	Hampshire	Maintain populations at not less than 87 sites Maintain the current geographical range
Plants and Mosses			
Small-flowered Catchfly	<i>Silene gallica</i>	Gurnard Bay	Maintain the geographical range of small-flowered catchfly in the UK. Increase the total population size of small-flowered catchfly in the UK. Achieve the natural colonisation of new sites. Establish populations at eight sites within the historic range by 2003. Establish an ex-situ programme to protect genetic diversity, create a reserve population and provide experimental material.
Spreading-leaved beardless moss	<i>Weissia squarrosa</i>	Gurnard Bay (west)	Maintain viable populations throughout the current British range of the species

Priority habitats included in the Hampshire, Isle of Wight and/or UK BAP that may be represented in the study area include: -

- Ancient and/or species rich hedgerow
- Cereal field margins
- Coastal and floodplain grazing marsh
- Lowland dry acid grassland
- Lowland beech and yew woodland
- Lowland wood pasture and parkland
- Maritime cliff and slopes
- Mudflats
- Seagrass beds
- Wet woodland

8.2.4

Habitats

(a) Phase 1 Habitat Survey

An Extended Phase 1 Ecological Survey of the proposed drill rig sites was undertaken by Halcrow in April and June 2005 (Halcrow Group Ltd June 2005). The survey (see Appendix E) comprised a Phase 1 survey, hedgerow survey and an assessment of the nature conservation value of the sites. The results are summarised below.

Phase 1 Survey

At Gurnard, the northern field to be used for the pipeline connection comprises improved grassland with low species diversity, hedgerows and areas of ruderal herbs and scrub.

The proposed drill rig site at Gurnard, which lies adjacent to an area of broad-leaved woodland comprises hedgerows and improved grassland (wet in places). The improved grassland consists of abundant perennial rye (*Lolium perenne*), with occasional common mouse-ear (*Cerastium fontanum*), common vetch (*Vicia sativa* subsp. *segetalis*), creeping thistle (*Cirsium arvense*) and meadow buttercup (*Ranunculus acris*). The broad-leaved woodland to the north of this field supports abundant mature pedunculate oak (*Quercus robur*) trees, with frequent ash (*Fraxinus excelsior*) trees and bramble.

At Lepe, the drill rig site comprises a recently ploughed arable field, semi-improved species-poor and species-rich grassland, broad-leaved plantation, scattered trees, scrub and hedgerow.

Hedgerow

The small section of hedgerow to be removed at Gurnard acts as a boundary between Rew Street and the drill rig site. Woody species recognised by the Hedgerow Regulations that were recorded within a 30m stretch were frequent hawthorn with occasional blackthorn, field rose and a pedunculate oak tree. Ground flora species recognized as valuable with regard to the Hedgerow Regulations are dog's mercury (*Mercurialis perennis*), with wild carrot (*Daucus carota* subsp. *carota*), cleavers (*Galium aparine*) and ivy (*Hedera helix*). This hedgerow would not qualify as 'important' under the Hedgerow Regulations (DoE 1997) as it lacks the criteria stated under archaeology and history; and under species diversity and associated features. However, it is considered 'important' under the Hedgerow Regulations as it may be used by red squirrel (Schedule 5 species).

The section of hedgerow to be removed at Lepe acts as a boundary between Lepe Road and the drill rig site. This species-poor hedge supported abundant hawthorn with occasional blackthorn (*Prunus spinosa*) and holly (*Ilex aquifolium*). Ground flora included garlic mustard (*Alliaria petiolata*), greater stitchwort (*Stellaria holostea*), wood sage (*Teucrium scorodonia*) and herb-robert, of which the latter two are listed under the

Hedgerow Regulations as valuable ground flora species. It is dominated by hawthorn and blackthorn, as well as occasional elder (*Sambucus nigra*), holly, honeysuckle and dog-rose (*Rosa canina*) further north, with one pedunculate oak tree. This hedgerow would not qualify as 'important' under the Hedgerow Regulations (DoE 1997) as it lacks the criteria stated under archaeology and history; and under wildlife and landscape, species diversity and associated features.

Other important habitats within the study area include: -

- (b) **Vegetated Shingle**
Several areas around the Solent support small areas of both annual vegetation of drift lines and perennial vegetation of stony banks.
- (c) **Woodland**
Small areas of woodland lie within the study area at Gurnard (Hornhill Copse) and at Lepe.
- (d) **Intertidal habitats**
The predominant habitats observed within the study area, include sand, shingle and groynes at Lepe Country Park and at West Gurnard. These habitats support rich flora including rare and uncommon species.

8.2.5

Natural Area Profiles

Natural Areas are tracts of countryside or coastline that are readily recognised by their characteristic land forms, wildlife and land use. They are intended to provide a framework to identify the priorities and objectives for nature conservation at a local level and have a key role in translation of national targets for habitats and species into action at the local level.

The site falls within the Isle of Wight, New Forest and the Solent and Poole Bay natural areas, based on English Nature's natural area profile description (<http://www.english-nature.org.uk/science/natural>, accessed 28 January 2005). These natural areas have the following key characteristics: -

- Isle of Wight Natural Area (76) – chalk downland ridge, arable farmland, wooded dairy pasture, small areas of heathland and hay meadows, sea cliffs and estuarine creeks. A number of rich and varied habitat types including chalk grassland, neutral meadows, ancient semi-natural broad-

leaved woodland and relict heathland and acid grassland. Important for classic geological sections from the Lower Cretaceous to the Lower Tertiary and for modern day coastal processes and geomorphological features; the cliffs and landslips support a number of rare plants.

- New Forest Natural Area (77) – a diverse and complex mosaic of landscape and habitat types. Open landscapes are provided by the broad River Avon floodplain, open marshes and extensive tracts of heathland. Villages, hedged lanes, small fields, and coppice woodlands, grazed wood pastures and forestry plantations. Within the New Forest, a complex of heathland, mire and pasture woodland. Geologically the area is underlain by internationally important sequence of Tertiary deposits, which include sands and clays deposited in rivers, around coastlines and at sea. These deposits are often rich in fossils, including plants and molluscs.
- Solent and Poole Bay Natural Area (109) - International important for marine, coastal and maritime habitats, communities and species present. An area of transition between the Lusitanian (warm temperate) and Boreal (cold temperate) provinces with fauna and flora of both being present. Important natural and undisturbed coastal lengths of coast, with unusual examples of natural transitions from marine to coastal and terrestrial habitats. Major features include large, shallow harbours. Extensive areas of intertidal mudflats, saltmarshes and shingle habitats support national and internationally important numbers of migratory wildfowl and waders and resident seabird colonies. The area supports the highest density of brackish water lagoons in the country which support a number of rare, specialist plants and animals. Extensive limestone ledges at Bembridge. The coastline exposes a sequence of Cretaceous/Tertiary rocks of international importance.

8.3

8.3.1

Impact Assessment and Mitigation

Construction Impacts: New Forest

- I.1 The proposed pipeline corridor will be routed beneath the internationally and nationally designated conservation sites (Solent Maritime SAC, Solent and Southampton Water SPA/Ramsar site, North Solent SSSI and NNR) and their notified features, and will lie at an approximate depth of 10m below the intertidal areas of these sites. No SINC's within the New Forest will be impacted by the proposed scheme. Consequently, the

terrestrial components of the proposal will have **no significant impact** on these designated sites.

- I.2. There is the potential for the proposed scheme to impact on birds in the Lepe area. In particular, the removal of an 8m stretch of hedgerow at Lepe (see Figure 1.1) may have a **minor adverse impact** upon breeding birds and secondary noise and vibration impacts from the proposal have the potential to disturb protected Schedule 1 birds and breeding birds that may be present within the drill rig site at Lepe, Lepe Meadow SINC and in Lepe Country Park.
- M.2. The removal of the hedgerow at Lepe for access into the drill rig site will be undertaken to avoid the bird breeding/nesting season and if woody vegetation needs to be cleared outside of this time, an ecologist will be required to check the site first to ensure that no nesting birds will be affected. Following mitigation, there will be **no significant residual impact** on breeding birds.

8.3.2

Construction Impacts: Isle of Wight

- I.3. The proposed pipeline corridor will be routed beneath the internationally designated Solent Maritime SAC and the locally designated SINC (Gurnard Cliff West) and their notified features, lying at an approximate depth of 10m below the intertidal areas of these sites. Consequently, the terrestrial components of the proposal will have **no significant impact** on these sites.
- I.4. The proposed twin pipelines will be drilled beneath the eastern section of Hornhill Copse (to the east of the designated Hornhill Copse SINC), an area of mature oak *Quercus robur* woodland. The pipelines will be routed at a sufficient depth of between 4m and 6m to avoid damage to tree roots (which generally lie at a depth of between 1m and 3m, depending on soil depth, moisture retention and air content) and the entry point will be drilled at a distance of approximately 20m from the trees (thus avoiding the tree canopy) and therefore it is unlikely that there will be any significant impacts upon trees in this area.
- I.5. The proposed scheme will result in the loss of 4m of hedgerow at Gurnard during the widening of the access into the drill rig site, which is considered to qualify as ‘important’ under the Hedgerow Regulations as it

may be used by red squirrels (a Schedule 5 species), and also the potential loss of one or two trees/field margin habitat at the site entrance. These impacts are considered to be **moderate to minor adverse**.

- M.5. There will be replanting of removed hedgerow as a result of the proposed works with a diverse species mix, preferably of local provenance.

Any spoil will not be pushed up or stored against any trees that are to remain, in order to prevent the compaction of tree roots.

Where possible, the working area will avoid the root zones of trees (i.e. area directly under the canopy). Where this is not possible, the root zone will be protected from compaction with a protective layer (e.g. imported material and specially designed road plates). The exact areas where roots may need to be protected should be mapped at the detailed design stage. Any felling will avoid the bird breeding season. Where trees are felled, they should be replaced with the same, or more appropriate, native species.

Although no bat roosts have been identified during the baseline ecological survey (Halcrow 2005), care will be taken when felling mature trees due to the possibility of finding bat roosts. Bats are protected under Schedule 5 of the Wildlife and Countryside Act 1981, and as such all trees scheduled to have work undertaken on them will be checked by a suitably qualified ecologist in advance of the construction. If bat roosts are found then English Nature will be notified and Defra contacted to arrange appropriate licences for movement and relocation.

For purposes of best practice working areas will be kept to a minimum and fenced to prevent machinery from damaging adjacent vegetation

The Isle of Wight Council will be consulted with regard to the hedgerow removal and felling of trees if deemed necessary at Gurnard (this will be detailed in the planning application). Following mitigation, the impacts could be reduced to **minor adverse**.

- I.6. There is the potential for the proposed scheme to impact on birds within the study area on the Isle of Wight. In particular, the removal of approximately 4m of hedgerow to extend the access into the field at

Gurnard may have a **minor adverse impact** upon breeding birds, and secondary noise and vibration impacts from the proposal have the potential to disturb protected Schedule 1 birds and/or breeding birds that may be present within the drill rig site at Gurnard.

- M.6. The removal of the hedgerow at Gurnard will avoid the bird breeding/nesting season and if woody vegetation needs to be cleared outside of this time, an ecologist will be required to check the site first to ensure that no nesting birds would be affected. Following mitigation, there would be **no significant residual impact** on breeding birds.
- I.7. There may be some **minor** noise disturbance to red squirrels at Hornhill Copse, resulting from the drilling operations and presence of personnel and machinery.
- M.7. As drilling is due to start in May 2006 when young litters could be present and the start of the works may affect the adult care, it is recommended that works start in late May when the majority of young squirrels will be weaned and mobile. Squirrels may have another litter mid summer, although works will have been ongoing for a number of months so the impact of the works on the adults and new kittens will be reduced. Following mitigation, it is envisaged that the works will have **no significant/minor adverse impact** on red squirrels.

8.3.3

Construction Impacts: Mopley Booster Station

- I.8. The proposed works at Mopley Booster Station will have **no significant ecological impacts**, as the modifications will be undertaken within the existing site compound.

8.3.4

Construction Impacts: Intertidal Areas

- I.9. The selected construction method of directional drilling below the intertidal zone means that there will be no direct impacts on the intertidal SSSIs, SPA, SAC and Ramsar Site. The possibility of drilling lubricant leakage from the drilling onto the surface has been considered and is extremely unlikely because of the depth of the drilling (a minimum of 10m below surface) and the nature of the solid geology through which it will be carried out.

- I.10. Noise and vibration will arise from the directional drilling operations, which could potentially disturb birds using the international and national conservation sites. However, the drill rig will be about 500m from the intertidal zone at both Lepe and Gurnard, which will attenuate noise so no disturbance will occur. Because the proposed drilling will be undertaken at a minimum depth of 10m below the intertidal surface level, it is unlikely to transmit any vibration to the surface. In addition, the geology through which the drilling will take place (mudstone/clay/marl) and the thixotropic nature of the overlying sediments mean that any vibrations will tend to be absorbed. Consequently, it is considered that there will be **no significant noise or vibration impacts**, a conclusion agreed by English Nature and RSPB.
- I.11 Although the proposed drilling will avoid any direct impact on the intertidal areas, it does entail the release of drilling lubricant at the drill break out points, which will be a minimum of 400m seaward of the low water mark. This will be dispersed in the water column and will settle out over a period of days following its release. A drilling lubricant such as bentonite is an inert clay so there are no toxic or other chemical ecological effects to be considered. However, it could lead to physical smothering of mudflats. Sediment transport modelling was undertaken to assess this (section 7 – water). The results showed the maximum deposition after one week would be less than 0.1mm. This is considered negligible in terms of mudflat ecology so the release of drilling lubricant will have **no significant impact** on the intertidal sites.

English Nature's formal advice is currently being sought on the requirement for an Appropriate Assessment relating to the intertidal European sites. Informal advice from English Nature suggests that the scheme is not likely to have a significant effect on the designated conservation sites, in which case Appropriate Assessment would not be required.

8.3.5

Construction Impacts: Marine Areas

- I.12. Concerns have been raised by English Nature and other organisations regarding the impacts of the release of drilling lubricants such as bentonite mud into the water column. The HDD pipeline section will emerge on the seabed in the central section of the study area at a minimum distance of 50m beyond the Solent Maritime SAC. Sediment transport modelling

of the dispersion of drilling lubricants (section 7 'Water') shows that although there will be some release, this will be minimal in the context of the large volume of water within the Solent. The maximum predicted depth averaged concentrations of drilling lubricant will be less than 2mg/l in the vicinity of the discharges. This is an order of magnitude smaller than monitored maximum suspended sediment concentrations and is well within the range of natural variability recorded (Table 7.2). The impact of the release of drilling lubricant on marine ecology is therefore considered to be **minor adverse** in nature.

- M.12. The proposed main will be correctly positioned with at least 10m of impervious geology above it and the exit angle will be defined based on the known ground conditions in order to reduce the risk of breakthrough of drilling lubricant. The risk of release of drilling lubricant will also be mitigated by selecting a contractor who has shown competence in this type of work.

It is likely that a **minor adverse impact** will remain following mitigation.

- I.13. Sediment jetting for laying the central part of the pipeline will also cause suspension of sediment in to the water column. Modelling shows that the maximum concentration will not exceed 2mg/l, which as in the case of drilling lubricant is an order of magnitude smaller than monitored maximum suspended sediment concentrations and is well within the range of natural variability recorded (Table 7.2). The impact of sediment jetting on marine ecology is therefore considered to be **minor adverse** in nature.
- I.14 Two organisms particularly sensitive to sedimentation were identified during the baseline studies: *Sabellaria spinulosa* reefs and *Zostera* seagrass beds.

Sabellaria reefs rely on the movement of clear waters to disperse fines, which could otherwise accumulate and smother them. Any alteration of water flow or water quality not only influences the distribution of beds but also the associated flora and fauna that rely on this habitat. However, as noted above the increase in turbidity from both drilling lubricant and sediment jetting is small compared to existing sediment concentrations, even in the vicinity of the discharge. Moreover, the marine environment

is subjected to seasonal increases in turbidity from storms and may therefore be expected to be robust to such temporary minor increases.

Zostera is particularly sensitive to smothering by fine particles which inhibit photosynthesis and respiration. *Zostera* is known from the Solent but none was recorded in the benthic surveys, so the nearest location to the project site is not known. In view of the small impact on water quality and sediment deposition predicted in the vicinity of the discharges themselves, the potential impact on any *Zostera* that may be present further afield is considered to be low.

8.3.6

Operational Impacts

I.15 No long-term impacts on flora or fauna are envisaged as a result of the proposed scheme.