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## **4 Management Unit plans and option selection**

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### **4.1 Introduction**

Each of the harbours has been defined as a Management Unit and a plan for each has been set out as a brief individual document within Appendix 1. Each plan sets out relevant information as text, tables and supporting maps, then recommends management options based on the standardised approaches discussed in detail below, except where specific local circumstances suggest that a different approach may be appropriate. Finally the plans outline possible approaches to achieve the preferred option, including both traditional and more novel approaches that should be considered during scheme design. Although the plans are intended to contain sufficient information to stand alone, they are only able to present a summary of the information contained in Volumes I and III (Stage I).

Timescales for the SMP are classified as follows:

- short term - up to 20 years
- medium term - 20 to 50 years
- long term - more than 50 years

As most coastal structures are designed and justified economically to have an approximate 50 year life expectancy, there management options are only relevant to this term. However, as long term economic, technical and environmental sustainability is important, then the implications of the options after the 50 year period must also be considered.

### **4.2 Management information**

The information within each harbour plan includes:

- Approximate shoreline length and limits
- Processes
  - summary of historic and existing shoreline situation
  - solid and drift geology
  - wave climate, including dominant directions and predicted significant wave heights under a 1:50 year return period storm
  - tidal regime, including maximum velocities, and predicted maximum water levels with a range of occurrence probabilities
  - influence of saltmarshes
  - sediment transport, including fines
  - possible future changes based on existing wave climate trends and accepted rates of sea level rise
- Summary of existing defences
- Natural environment, including designated areas and implications for management.
- Land use
- Human environment, including recreation, landscape interests and cultural heritage
- Planning policies for future developments and the relevant policy documents.

### **4.3 Strategic coastal defence options**

#### **4.3.1 Background**

The preferred strategic coastal defence options for the shoreline within the harbours depend on the management type and are based on the decision process set out below. Possible options for each management type are proposed and discussed, then a standard preferred option is defined for each management type. Where this standardized approach is inappropriate due to site specific conditions then additional discussions are set out in the Harbour Plans and the affected areas are referenced on the accompanying maps.

Within the discussions for defence options in each harbour Unit suggestions are made for setting boundaries relevant to the scheme strategy studies that will follow the adoption of the SMP. These boundaries consider areas linked by flood risk areas as other coastal processes within the harbours generally do not have impacts beyond a very localized area. Environmental management must be considered on a regional basis for all of the harbours and the Solent as a whole in order to comply with the Habitats Directive. Where strategic boundaries are not proposed then shoreline operations need only consider local factors plus environmental management.

Section 4.5 presents discussions of further constraints and issues that have been considered in selecting the preferred defence options for the SMP.

#### 4.3.2 SMP defence options

The strategic defence options set out by the MAFF guidance for SMP purposes are:

- Do nothing - allow natural processes to act with no intervention
- Hold the line - maintain or improve the existing shoreline or line of built defences
- Retreat the line - managed landward realignment of the shoreline or line of built defences to a pre-determined and more sustainable position
- Advance the line - reclamation of land by shifting the shoreline or line of built defences seaward

Although the open coast SMP for the East Solent (Volume II) conforms to this simplified set of options, it has been necessary to modify the approach for the harbours. The standard set of options are considered to be inadequate as they:

- do not consider defence standards
- do not define the meaning of the term “line”
- imply that “do-nothing” is a management option rather than a theoretical scenario for use in economic analysis
- imply that “advance the line” is a normal coast defence option
- do not consider the options of risk management or tiered defence
- use the emotive tem “retreat” that is widely misunderstood by Consultees.

The harbours SMP has been based on a more extensive set of options that emphasize defence standards rather than the defence line. These options are derived from an earlier MAFF document (MAFF, 1993c), modified to the following:

- ***Do-nothing*** - this is a hypothetical option to be evaluated as a baseline against which the benefits of other options can be assessed.
- ***Non-intervention*** - monitor shoreline and maintain public safety. This is the basic minimum shoreline management option, involving no attempt to maintain or improve standards of flood or erosion defence, but possibly involving works such as removing unstable and redundant coastal structures. Where appropriate, public rights of way may need to be realigned to prevent loss by flooding or erosion. This option equates to *retreat the line* under MAFF guidance, except in the situation (not found in the East Solent) of a hard rock shoreline with no erosion or flooding.
- ***Risk management*** - develop warning systems, plan evacuation procedures to safeguard lives and plan for emergency service communication and transportation, in conjunction with the non-intervention option or with other options. Risk management may also involve publication of flood risk information to allow owners of property or other assets the opportunity to make provisions for protection (e.g. sand bagging, construction of minor flood embankments, etc.). This option equates to *retreat the line* under MAFF guidance.
- ***Maintain standard along existing defence alignment*** - carry out works to maintain defences at their design standard along the existing defence alignment, including works to maintain standards in response to future changes in sea conditions. This option may include works to maintain existing natural defences, such as saltmarshes, and equates to *hold the line* under MAFF guidance.
- ***Upgrade standard along existing defence alignment*** - carry out works to improve standards of defence, maintaining the approximate alignment of the existing defence (e.g. beach recharge that moves high water line to seaward). This option may include works to maintain or enhance natural defences, such as saltmarshes, and equates to *hold the line* under MAFF guidance.

- **Maintain or upgrade standard by constructing new defences to seaward** - provision of protected water (e.g. harbour) or reclaimed land by moving defences seaward. This option is not normally considered as coast defence, since the motivation is normally property development, provision of infrastructure or provision of land fill sites. An exception would be construction of a barrage across the mouth of an inlet or estuary to reduce potential flood risks or wave attack along the shoreline. This option equates to *advance the line* under MAFF guidance.
- **Maintain or upgrade standard by constructing new defences to landward** - planned loss of existing land to recreate new intertidal habitat or reduce long term defence costs by shifting to a less exposed alignment or shortening the defended shoreline. This option equates to *retreat the line* under MAFF guidance.
- **Upgrade standard by creating a tiered defence** - creation of backshore zones with different risk levels by construction of a secondary defence line while maintaining the existing defence alignment, possibly at a reduced standard (e.g. recreation or environmentally sensitive areas protected by existing defences with a 1:5 year risk of flooding, while a secondary flood wall provides a 1:200 year defence standard to residential property further inland). This option may include works to maintain or enhance natural defences, such as saltmarshes, and equates to *retreat the line* under MAFF guidance.
- **Combinations of options within a Management Unit** (applicable to the open coast only) - provision of several strategies within a single Unit in response to spatially varying shoreline situations (e.g. differences in geology, land use, topography, wave exposure, etc. along the frontage that are not sufficient to justify division into further Management Units).
- **Changing of options over time** - planning for a change of strategy in response to temporally varying shoreline situations (e.g. planned change of land use allowing retreat or reduced standard, anticipated increase in wave climate due to expected nearshore erosion making existing defence inadequate, etc.).

This more extensive and detailed set of strategic options allows for greater management flexibility. All of these options, except *do-nothing*, assume ongoing monitoring of coastal processes, the environment and the effectiveness of the management operations to allow future review.

#### 4.3.3 Selection of options

Within each of the harbours there is a planning presumption against any further land reclamation in areas designated for nature conservation as reclamation will destroy existing protected habitats. This presumption applies to all of Langstone, Chichester and Pagham Harbours, and all of Portsmouth Harbour apart from the eastern shore south of Whale Island and a short section of the Gosport shore. Therefore, for the purposes of the East Solent SMP, the option of creating a new line of defence to seawards by reclaiming land is not considered appropriate. Within the non-designated areas of Portsmouth Harbour minor advances for the purpose of improving dock facilities may be acceptable provided that they can be shown to have no significant impact on coastal processes or the natural environment within the harbour.

The benefits and impacts of the remaining strategic coastal defence options are considered below for management types 1 through 7:

##### Type 1

This classification indicates that the frontage has no existing defences and that if erosion or flooding occurs either now or in the future there will not be sufficient damage or loss to justify the expense of management operations apart from maintenance of public-safety. **Non-intervention** is assumed to be the preferred option for all Type 1 shorelines. As all frontages within the harbours that are classified as Type 1 are also within the designated SPA/SAC, then this approach is compatible with the English Nature policy of allowing natural coastal development where ever possible. As with all other classifications, Type 1 frontages will need to be monitored to ensure that if future evolution alters the shoreline situation then the non-intervention option can be reviewed and amended if necessary. It is assumed that the backshore zone of Type 1 frontages will remain undeveloped in accordance with current planning policies.

##### Type 2

This classification indicates that the frontage is developed or sensitive for other reasons (i.e. contaminated fill, high value recreation), but there are no existing defences and there is no present or predicted future risk of significant erosion or flooding. This situation only applies to two lengths in Langstone Harbour along Ports Creek

and along the A27/A3(M) junction. **Non-intervention** is assumed to be the preferred option for Type 2 shorelines as there is no existing risk.

### Type 3

This classification indicates that the frontage has existing defences against *erosion*, but that the backshore *is not* developed nor sensitive for other reasons (i.e. contaminated fill, high value recreation). It is assumed that the backshore is not at risk from flooding due to ground levels being above the predicted 1:200 years return period water level, allowing for future rises and that land use within the erosion risk area will not change.

Depending on the specific local situation it may be appropriate to either not intervene, or to maintain the defence standard along the existing line or a new line to landward. Decisions are based on some or all of the following criteria:

#### *Maintain along the existing line*

- Existing defences require minimal maintenance and provide adequate erosion protection.
- Existing defences are not considered to be significantly damaging to the environment or a detriment to the landscape.
- Backshore areas are valued in their present state (e.g. designated habitats, recreation, farming, MoD, etc).
- Erosion of backshore area may pose a safety, health or environmental risk (i.e. may cause Type 3 to become Type 4).

#### *Maintain along a new line to landward*

- Existing defences require major improvements to provide adequate erosion protection at a cost that is not justified by the benefits gained.
- Immediate backshore does not justify defences at present, but erosion will need to be controlled in the future due to risks to developed or otherwise sensitive areas (i.e. Type 3 will become Type 4 in the future).
- Replacement defences built to landward would be exposed to less severe conditions and would be less costly to build and maintain.
- Existing defences define an unnecessarily long shoreline, that could be made significantly shorter by realignment, and therefore less costly to maintain.
- Existing defences are considered to be damaging to the environment or a detriment to the landscape.
- Erosion of backshore poses no health or safety problems.

#### *Non-intervention*

- Existing defences are not needed, either because natural defences (e.g. beaches, saltmarshes) to seaward provide protection under normal conditions, because potential erosion without the defences would be slow, because the backshore area that may be lost to erosion is not considered to be of sufficient value to justify continued protection, or because the existing backshore area may have greater value as additional intertidal area following erosion (e.g. new habitat, additional mooring space).

As the harbour shorelines are not subject to high energy conditions, the cost of maintaining or improving existing defences are low relative to the open coast. This indicates that **maintaining standards along the existing defence alignment** will normally be the preferred option for Type 3 shorelines. Where costs are high relative to the backshore value, or where enhancements to the natural or human environment may be achieved, then the alternative management options are proposed and justified for specific frontages in the Harbour Plans.

### Type 4

This classification indicates that the frontage has existing defences against *erosion* and that the backshore is developed or is sensitive for other reasons (i.e. contaminated fill, high value recreation, etc). It is assumed that the backshore is not subject to flooding due to ground levels being above the predicted 1:200 years return period water level, allowing for future rises, and that land use within the erosion risk area will not change.

As Type 4 frontages protect areas valued in their present state, the preferred options are to **maintain or upgrade standards along the existing defence alignment**, with the decision based on the effectiveness and condition of the existing protection in relation to the risks to backshore assets.

## Type 5

This classification indicates that the frontage has existing defences intended to prevent *flooding* of a backshore that *is not* developed nor sensitive for other reasons (i.e. contaminated fill, high value recreation). Unlike areas of higher ground subject to erosion where the area at risk is usually only the immediate backshore, areas of low ground subject to flooding may be extensive. Much of the land around the harbours is former upper saltmarsh that has been reclaimed for farming over the centuries by bunding and draining. As sea levels rise in the future, ever larger areas of low ground will become at risk from flooding during extreme events. It is assumed that land use within the flood risk area will not change.

Management of Type 5 shoreline depends on local conditions. Appropriate options include non-intervention, risk management, upgrading with a tiered defence or maintaining/upgrading the defence standard along the existing line or a new line to landward. Decisions are based on some or all of the following criteria:

### *Maintain along the existing line*

- Existing defences require minimal maintenance, provide adequate protection, can be modified as necessary to maintain future standards and can provide sustainable future protection at a cost that is appropriate to the benefits gained.
- Existing defences are not considered to be damaging to the environment or a detriment to the landscape.
- Backshore areas are valued (e.g. conservation area, farming, recreation, MoD, etc.) in their present state and that value will be lost or damaged by flooding.
- Flooding of the backshore area may have a significant adverse affect on land drainage over a wider area, causing fresh water flooding above the tidal flood level or altering the water table such that existing land use beyond the flood footprint is no longer viable.
- Flooding of the backshore area may pose health and safety problems.

### *Upgrade along the existing line*

- Existing design defence standard is not appropriate for the backshore assets.
- Upgrading of defences along the existing alignment can be achieved without significant damage to the environment or a detriment to the landscape.

### *Maintain or upgrade along a new line to landward*

- Existing defences require improvements to provide sustainable future flood protection, at a cost that is not justified by the benefits gained.
- Replacement defences built to landward would be exposed to less severe conditions and would be less costly to build and maintain.
- Existing defences define an unnecessarily long shoreline that could be made significantly shorter by realignment.
- Existing defences are considered to be damaging to the environment or a detriment to the landscape.
- The value of the backshore areas may be enhanced by realignment (e.g. creation of habitat, creation of mooring space).
- Flooding of a limited area of the backshore will not have a significant adverse affect on land drainage
- Flooding of a limited area of the backshore poses no health or safety problems.

### *Upgrade with a tiered defence*

- Backshore flood risk zone has assets requiring different defence standards, with some areas tolerant of occasional flooding while others are more sensitive.
- Costs of maintaining defence standards along existing line are higher than the cost of providing new defences for the more sensitive areas along a new line to landward (can be implemented with *risk management*).
- Works along the existing line may be environmentally damaging or a detriment to the landscape.
- Occasional flooding of part of the backshore may have environmental advantages.

### *Risk management*

- Backshore flood risk zone can tolerate occasional flooding, but there are problems of public health and safety.
- Risk management can provide adequate standards of public health and safety.

- Costs of maintaining or upgrading defence standards along existing line are higher than the costs of implementing a risk management programme (can be implemented with a *tiered defence*).
- Maintenance or upgrading of defences is considered to be significantly damaging to the environment or detrimental to the landscape.

#### *Non-intervention*

- Existing defences are not needed, either because the ground levels are high enough that flooding will only occur under *future* conditions with an occurrence probability less than is considered an appropriate risk for the existing land use, or because the backshore area subject to flooding is not considered to be of sufficient value to justify the cost of protection.

As the harbour shorelines are not subject to high energy conditions the costs of maintaining or improving existing defences are low relative to the open coast. These relatively low defence costs, coupled with the potential consequences of flooding (e.g. loss of farmland, recreation areas, isolated properties, etc), indicate that **maintaining or upgrading standards along the existing defence alignment** will normally be the preferred options for Type 5 shorelines, with decisions based on the effectiveness and condition of the existing structures in relation to the backshore assets. However, where costs of defence are high relative to the backshore value or where enhancements to the natural or human environment may be achieved, then alternative management options are proposed and justified for specific frontages within the Harbour Plans.

As the benefits, impacts and economic implications of realignment, tiered defences, risk management or non-intervention must be assessed in detail for each proposed frontage then these options can not be considered to be definitive on those frontages for which they are suggested. However, in view of the future costs of maintaining or upgrading standards along all of the very extensive existing shorelines of the East Solent harbours, and the potential for enhancing the natural environment by allowing an expansion of the intertidal area, these options require serious consideration ( it should be noted that limited compensation may be available to land owners if realignment leads to creation of new saltmarsh).

#### Type 6

This classification indicates that the frontage has existing defences intended to prevent flooding of a backshore that is developed or is sensitive for other reasons (e.g. contaminated fill, high value recreation). The flood risk area may be extensive and may include residential, commercial, industrial or recreational development on land originally reclaimed from the sea for farming. As sea levels rise in the future, even larger areas of low ground will become at risk from flooding during extreme events.

As backshore areas are valued in there present state the appropriate options are to either maintain or upgrade standards along the existing defence alignment or to implement a tiered defence. Decisions are based on some or all of the following criteria:

#### *Maintain along the existing line*

- Existing design defence standard is appropriate for the backshore assets at risk.
- Existing defences are not considered to be significantly damaging to the environment or detrimental to the landscape.

#### *Upgrade along the existing line*

- Existing design defence standard is not adequate for the present or future backshore assets at risk.
- Upgraded defences along the existing alignment are not considered to be significantly damaging to the environment or detrimental to the landscape.

#### *Upgrade with a tiered defence*

- Backshore flood risk zone has assets requiring different defence standards, with some areas tolerant of occasional flooding while others are more sensitive.
- Existing design defence standard is not adequate for the present or future backshore assets at risk.
- Costs of upgrading defence standards along existing lines are higher than the costs of providing new defences for more sensitive areas along a new line to landward (can be implemented with *risk management*).

- Upgrading works along the existing line may be environmentally damaging or detrimental to the landscape.
- Occasional flooding of part of the backshore may have environmental advantages.

The preferred options for Type 6 shorelines are to **maintain or upgrade standards along the existing defence alignment**, with decisions based on the effectiveness and condition of the existing structures in relation to the backshore assets. Where costs of upgrading along the existing line are unacceptable or if significant environmental damage may occur then tiered defences are proposed as an alternative within the Harbour Plans

#### Type 7

This classification indicates that the frontage has a shoreline defined for a purpose other than erosion protection or flood defence. Jetties, bridge piers, military fortifications, major slipways, land fill bunds, road foundations and marina walls are all included.

The options for these frontages assume that the shoreline structures still serve the function for which they were designed and will be retained to the end of their functional life. A review of management options will be required after that time to ensure future sustainable management of the shoreline.

The existing shoreline structures may serve a coast defence function for areas beyond their immediate backshore and may require management intervention to ensure that adequate standards are achieved. Depending on the specific local situation it may be appropriate to maintain or upgrade standards along the existing shoreline, or create a tiered defence. Decisions are based on some or all of the following criteria:

##### *Maintain along the existing line*

- Existing structures provide an adequate standard of flood or erosion defence for backshore areas.
- Maintenance of defence standard is not considered to be significantly damaging to the environment or detrimental to the landscape.

##### *Upgrade along the existing line*

- Existing structures do not provide an adequate standard of flood or erosion defence to backshore areas.
- Upgrading of defence standard along the existing line will be compatible with the function of the structure and can be undertaken cost effectively.
- Upgrading of defence standard can be achieved without significantly damaging the environment.

##### *Upgrade with a tiered defence*

- Existing structures do not provide an adequate standard of flood or erosion defence to backshore areas.
- Upgrading the defence standard with a tiered defence is more cost effective than upgrading along the existing line.
- Tiered defences are compatible with the function of the shoreline structure.
- Upgrading along the existing line will cause significant environmental damage.

Type 7 shorelines will be maintained throughout their functional life. The preferred options are to **maintain or upgrade standards along the existing defence alignment**, with decisions based on the effectiveness and condition of the existing structures in relation to the backshore assets. Where adequate standards of defence can not be provided along the existing line then tiered defences are proposed as an alternative within the Harbour Plans.

## 4.4 Management operations

Management operations to achieve the preferred strategic options must take account of:

- local extreme wave and water level conditions
- the standard of service required (acceptable erosion, overtopping or flooding under conditions with a range of occurrence probabilities)
- potential changes to sea conditions and natural defences (saltmarshes, mudflats) over the design life
- impact on the environment (statutory requirement within an SSSI, SPA or SAC)
- impact on recreation, landscape and navigation.

In most cases operations will comprise only maintenance or simple upgrading of walls, revetments or embankments. Defences must be sustainable over the required design life in relation to engineering, economic and environmental requirements. They should extend over as long a frontage as appropriate to give coherence to achieving the defence objectives along related areas (i.e. flooding or erosion along one frontage may cause problems for adjacent areas) and coherence to the appearance of the structures. This work will be straight forward in engineering terms, but may result in environmental damage requiring the provision of compensatory measures under the European Union Habitats Directive. The implications of the Directive are discussed further in Section 4.5.

Tiered defences, combining limited maintenance of the existing line with construction of secondary flood embankments or walls to protect sensitive areas, may be less costly and more acceptable environmentally. This approach will require site specific investigations to determine cost effective and environmentally acceptable designs.

Realignment will only be applicable to a limited number of frontages defined as Type 3 or Type 5. Loss of land due to realignment will always be controversial, with conflicting views of benefits, losses and costs. The operations required for landward realignment across a low lying backshore and the potential impacts of this approach on habitats and land drainage are the subject of research at present and will require site specific investigations to determine the most appropriate methods of achieving a sustainable defence. Economic and environmental appraisals require a level of investigation beyond the scope of the SMP, and further guidance is required at a national level to establish the mechanisms for implementing realignment schemes. The constraints and issues involved are outlined in Section 4.5.

More imaginative schemes that may reduce the costs of maintaining or upgrading shoreline defence standards include:

- active management of the existing saltmarshes to encourage growth and therefore efficiency at dissipating wave energy seaward of the shoreline
- construction of intertidal islands to dissipate wave energy. Shallow face slopes would limit visual intrusion and the need for armouring. Islands would also serve as high water roosts for water fowl.
- construction of tidal barrages, either across individual inlets or at the main entrance to the harbours to control water levels during extreme events that might otherwise cause flooding

Consideration should be given to these approaches at the scheme strategy stage following completion of the SMP.

## **4.5 Strategic issues and constraints on options**

### **4.5.1 Background**

Selection of the preferred strategic coastal defence option is by no means a simple process. The guiding principles of economic, engineering and environmental sustainability encompassed within the impact matrices for each Unit are interlinked with legal obligations, social and political pressures, identification of management responsibility, the availability and sources of funds, definitions of the existing line of defence and assumptions regarding standards of defence. Uncertainty over the present and future situation regarding these management issues, combined with the engineering uncertainties of incomplete understanding of coastal processes, poor definition of defence failure risk, varying estimates of future water levels and inability to predict storm frequencies, directions or intensities, means that selection of preferred options must rely heavily on the Consultation process and the judgement of the shoreline managers. Stage 1 of the SMP brought together background information to facilitate the selection process. The remainder of this section outlines some additional factors that have been considered in arriving at the preferred coastal defence strategies for the East Solent.

### **4.5.2 Sustainability**

The aim of a SMP, as set out by the MAFF guidelines, is *to provide the basis for sustainable coastal defence policies within a sediment cell and to set objectives for the future management of the shoreline*. The guidelines go on to define sustainable schemes as those *which take account of the inter-relationships with other defences, developments and processes within a catchment or coastal cell or sub-cell, and which avoid as far as possible, tying future generations into inflexible and expensive options for defence*. This definition of sustainability is open to differing interpretation depending on the perceptions of different interest groups. These different perceptions are at the root of many of the conflicts over the preferred strategic defence options.

Within the East Solent SMP a number of general principles have been applied to assist in the interpretation of sustainability:

- the SMP is assumed to apply over a period of 50 years, although uncertainty over future coastal processes and the natural and human environment will result in the need for revisions within a shorter period
- the SMP is based on present day economic, social and political values, but recognizes that these values will continue to evolve as they have in recent decades with respect to issues such as the natural environment, farmland, military facilities, public access to open areas, golf courses, transport routes and the value of shorefront residential property
- existing residential areas will be retained and protected to an appropriate standard of defence, except along some immediate backshore areas where long term planning initiatives to reduce existing development are supported as they decrease the future risks of overtopping or erosion damage
- existing commercial or private holiday property within areas at risk will not necessarily be retained
- agricultural or recreational land will not necessarily be retained
- if a preferred strategic defence option cannot be agreed at present, then any temporary works required to retain the existing situation should be designed and implemented in a manner that is not prejudicial to future options
- it is assumed that existing planning policies restricting new development in Coastal Zones will be retained and that there will be no further development in areas identified as at risk.

Issues not covered by these general principles are considered on a site specific basis with consideration being given to matters raised during the consultation period and to the discussions below.

#### 4.5.3 Responsibility for shoreline management

Obligation and responsibility for management of the shoreline requires explanation. MAFF has overall responsibility for coastal defence policy in England and Wales. Local Authorities with a maritime frontage, as defined under Schedule 4 of the Coast Protection Act (1949), are responsible for supervising the application of the Act along the entire shoreline within their administrative boundary. The Environment Agency has a statutory obligation to exercise supervision over all matters related to flood defence under the Water Resources Act (1991), and has permissive powers in respect of the shoreline where the hinterland is liable to tidal flooding. These responsibilities and powers to act do **not** imply a duty to prevent erosion or flooding.

Owners of property along the shoreline, including government bodies (e.g. Ministry of Defence, Department of Transport), local authorities and private landowners are responsible for their own frontage, but must act within the applicable statutory planning and other legislation. In some circumstances a Local Authority or the Environment Agency will undertake shoreline management operations along privately owned frontages, particularly where the risk from flooding or erosion extend beyond the frontager's property. In general Local Authorities and the Environment Agency will only act where:

- there is clear economic justification
- an appropriate engineering solution is achievable
- environmental legislation is not contravened.

Construction of defences by a Local Authority or the Environment Agency does not imply a continuing responsibility for prevention of erosion or flooding, only for ensuring public safety in relation to the structures themselves (e.g. supporting or removing unstable structures, marking navigational hazards).

#### 4.5.4 Statutory obligations

The primary aim of the Government's Flood and Coastal Defence Policy is "*the protection of life and hence of urban areas*" but this aim does not infer any legal obligation on the part of the Government, Local Authorities or the Environment Agency and does not entitle frontagers to any compensation for loss of property, income or other assets. There is, however, an obligation to comply with the European Union Habitats Directive with respect to the maintenance of those aspects of the natural environment set out by Natura 2000 (see Volumes I and III).

Compliance with the Directive is a significant issue within Langstone, Chichester and Pagham Harbours, but is also important along the open coast around the harbour entrances, along the south coast of Hayling Island, at Gilkicker Point and to the east of the River Hamble mouth. These areas are within existing or proposed SPA or SAC under EC Directives. In brief the Directive requires that shoreline management operations within a

European designated site that are considered to cause significant environmental damage may not be undertaken unless there is an overriding public interest. If there is considered to be an overriding public interest and works are undertaken, then compensatory measures must be applied through habitat creation schemes to maintain the total extent and quality of the designated habitat at a regional level.

Unfortunately the practical interpretation and implications of the Habitats Directive are by no means clear at present. Responsibility for supervision of the application of the Directive is with English Nature. It is likely that definitions of “significant damage” and “overriding public interest”, the practicalities of providing satisfactory compensatory measures and establishing the source of funding to cover the costs of compliance will take several years and may involve the establishment of legal precedents.

In addition to the obligations to comply with environmental legislation, there are also obligations to the maintenance of navigation rights and the protection of Scheduled Ancient Monuments. Within the East Solent navigation issues are most notable within the entrance channels to the harbours. Structures impeding navigation may well be considered unacceptable and would, at the least, require appropriate notification and marking. A number of Scheduled Ancient Monuments are located within the shoreline risk areas, but in most cases their protection is linked to the protection of other property assets and is therefore not noted as a separate issue. The most notable exceptions are the situations at Old Portsmouth and Haslar where management operations must give specific consideration to a number of historic structures along the shoreline.

#### 4.5.5 Funding of shoreline management operations

In recent years the majority of major coastal defence schemes have been funded to a large extent by MAFF. Increasing requirements for accountability of public expenditure has led to the publication of guidelines for economic assessment of proposed schemes. As MAFF funding is provided centrally then the economic benefits given primary consideration are those applicable to the nation rather than those that may have a local relevance.

As the SMP procedures were also set up by MAFF then the economic assessment procedures, as discussed in Section 4.6, also give primary consideration to nationally important assets. It should be noted that MAFF may not consider the full costs of complying with the Habitats Directive to be supportable by grant aid. Further guidance will be available as precedents are set (Section 4.5.4).

The practical implications of this approach to funding are important to shoreline managers. Fixed property assets such as houses or other buildings are valued in a widely accepted way, but businesses, jobs, quality of life, the natural environment, cultural heritage, mobile assets (e.g. caravans), etc. are not necessarily given a value that would be considered satisfactory to a resident, business owner or local interest group. Demands for improved defence standards based on local perceptions of benefits may attract local support, but unless a sound economic argument based on MAFF procedures can be presented then sufficient funding is unlikely to be made available from MAFF.

This restriction does not prevent private frontagers, commercial interests, local authorities or other land owners (Ministry of Defence, Department of Transport) from undertaking shoreline management operations in the absence of MAFF funding. In these situations the economic basis for the preferred coastal defence strategy in the SMP may be inappropriate and could be reviewed. However, the engineering and environmental basis for the preferred SMP strategy would still be valid and would need careful consideration.

Locally funded schemes would still be subject to Planning restrictions, review by MAFF and compliance with statutory procedures with respect to the environment.

Further guidelines on the prioritization of schemes are in preparation by MAFF. Publication of these guidelines will assist operating authorities in determining the potential for grant aid of schemes and may encourage investigation of alternative funding arrangements.

#### 4.5.6 Standards of defence

MAFF have published guidelines for indicative standards of defence for a range of land use types (MAFF, 1993a, Annexe K). Table 3 presents these standards, which are the basis of recommendations set out for each Unit in Appendix 1. The intention of the MAFF guidelines is not to indicate an entitlement to protection at a certain level, but only to indicate design targets for shoreline managers. The return period indicates the annual probability that a coast defence will encounter conditions more severe than those for which it was designed.

This concept of standard of defence is most easily applied to predicted wave overtopping rates under extreme conditions. Other forms of risk, such as flooding due to breaching, backshore erosion due to sea wall collapse or property loss due to cliff instability, are all too complex and site specific to assess within an SMP.

The problems of risk assessment are the subject of extensive research from which guidance and predictive methods will emerge over the next few years.

It should be noted that the table of standards does not consider environmental, cultural or recreational assets. Allowance has been made for these assets for Management Units where they are considered to be important. Further consideration will be needed at the scheme strategy and project appraisal stages.

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**Table 3 Indicative standards of protection (based on MAFF 1993a)**

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Current land use	Return period in years
High density urban	200
Medium density urban, may include some agricultural land	150
Low density or rural communities including high grade farmland	50
Medium grade farmland with isolated properties	20
Predominantly unimproved grazing, few properties at risk	5

#### **4.6 Economic assessment**

Unlike the open coast Management Units of Volume II, no do-nothing loss values or management costs are set out in support of the proposed coastal defence options. As the costs of maintaining or improving defences to an appropriate standard within the harbours will be low relative to the open coast (approximately £0.4M/km), then it is assumed that management operations along all frontages designated as developed or sensitive can be fully justified in terms of benefit-cost. Where coastal defence options are proposed for undeveloped or insensitive frontages they are also considered to be fully justifiable, except those that are identified and discussed individually due to uncertainty over sensitivities, do-nothing implications or costs of works.

Table 4 sets out the guide values used for backshore assets within the SMP area that are potentially lost or damaged under a theoretical do-nothing situation.

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**Table 4 Present day asset values of damages**

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Asset type	Value
High density urban	£2,000,000/ha
Low density urban	£600,000/ha
High value private or public recreational land (gardens, public parks, golf courses, etc.)	£100,000/ha
Low value recreational land and higher grade farmland	£6000/ha
Lower grade farmland	£3000/ha
Main roads	£700,000/km
Minor roads	£300,000/km